

# 80 micro

the #1 magazine for Tandy users

MARCH 1988  
USA \$4.00  
CANADA \$4.50  
UK £2.50  
AN IDG COMMUNICATIONS  
PUBLICATION

NOW  
Exclusively for  
Your Tandy MS-DOS Computer!

## TANDY 1000 TX

Faster, But Is It Better?

The Best Way  
To Back Up  
A Hard Drive

See Pages Before  
You Print Them

Access Files  
With One  
Keystroke

Do-It-Yourself  
Program Menus

### REVIEWED:

Keynotes, Bookmark, Xywrite III Plus,  
Show Me!, EZ-Forms, Millionaire II,  
and American Investor.

TANDY 1000 PERSONAL COMPUTER TX







# Maximum Tandy Performance from Zuckerboard!

We're the #1 add-in board manufacturer because we have:

- the broadest product line.
- the only add-in board brand name carried in Canadian Radio Shack stores.
- toll free technical support.
- the highest quality and reliability.
- standard five-year warranty.

We support you with quality service and a steady flow of new products to maximize your computer system potential.

Whether you have yesterday's, today's or tomorrow's system, we have the boards you need. We'll

expand your memory, add disk drives and modems, or give you input/output and multifunctions. Maximize your Tandy's performance with a Zuckerboard.

## Memory Expansion to Grow With

Expand your Tandy 1000 computer memory to 640K with inexpensive boards with either 64K or 256K DRAMs. The half-card sizes allow you to efficiently fill any remaining slots. Options include a clock/calendar with a 20-year lithium battery.

Our NEW 2 Mbyte EMS expanded memory board supports the 4.0 LIM standard and allows you to maximize the upgrade potential of most Tandy computers. It includes RAM disk and print spooler software and is compatible with memory hungry

programs such as Javelin, Microsoft Windows, and Framework II. The new EMS board is available in configurations of .5, 1 and 2 Mbytes.

## Multifunction Board Flexibility

Our multifunction boards give your 1000 computers input/output and memory expansion to 640K. Features include an RS-232 serial port selectable for COM 1, 2, 3 or 4, a DMA controller chip, and clock/calendar. Plus RAM disk and print spooler software programs designed to give you more free time for your computing needs.

## Hard Drive Plug-ins

Our 20 Mbyte internal hard disk drive for Tandy's 1000 and 3000 computers is preformatted with a controller card for easy installation. It eliminates the accumulation of floppy diskettes and dramatically

640K



02/29/88

decreases loading time on larger files. The drive is completely assembled, requires no preventative maintenance, and has low power consumption.

Two **NEW** members of our hard disk family are a 20 Mbyte drive for Tandy's new 1400 portable computer and an RLL 30 Mbyte hard card for the 1000 and 3000 computers.

#### Input/Output Power

Our four-option I/O board enables you to add up to two RS-232 serial ports and a clock/calendar to your Tandy 1000, 1200, or 3000 personal computer. The parallel port and optional clock/calendar comes with a 20-year lithium battery.

Our **NEW** game I/O clock board allows you to add a serial, parallel, game port and clock/calendar to your 1000, 1200, or 3000 computer.

It has a selectable serial port of COM 1, 2, 3 or 4; a selectable parallel port of LPT 1, 2 or 3; and a game port that supports dual joysticks on one connector.

#### Modem Compatibility

Our 1200 baud internal modem is Hayes compatible and works with all Tandy series computers except the EX and HX models. It has auto/switch capabilities allowing back and forth adjustment between 300 and 1200 frequencies. Also included are pulse/tone dialing, auto dialing and auto answer. It comes complete with PC Talk III software and is compatible with standard communications software packages.

#### Get the Facts

Find out how Zuckerboard can maximize the performance of your Tandy computer. Call toll-free today at 1-800-222-4920 (US) or 1-800-654-2212 (CA). Or, use the order form to bring out the full potential of your Tandy computer.

#### TANDY 1000

2002 256K Memory Board	\$109
2003 512K Memory Board	149
2004 Clock Chip Option	49
2007 384K Memory Board	125
2009 512K Memory Serial Clock/Calendar	279
2046 RLL 30 Mbyte Hard Disk Card	659

#### TANDY 1000SX

2027 256K Multi I/O	\$199
2046 RLL 30 Mbyte Hard Disk Card	659

#### TANDY 1000, SX, TX, 1200, 3000

2004 Clock Chip Option	\$49
2031 Clock Board	59
2029 I/O Serial Port	80
2030 2nd Serial Option	49
2045 1200 Baud Modem	129

#### TANDY 1000 EX

2026 384K Memory Board	\$149
------------------------	-------

#### NEW

#### FOR 1000, SX, TX, 3000 HL

2046 RLL 30 Mbyte Hard Disk Card	\$659
2047 2 Mbyte EMS Board	Call
1102 Game I/O Clock/Calendar	99

Subtotal \$ \_\_\_\_\_

CA Residents add  
applicable sales tax \$ \_\_\_\_\_

Shipping \$6.00 per  
product in the U.S. \$ \_\_\_\_\_

Total \$ \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_ Zip \_\_\_\_\_

Phone \_\_\_\_\_

☐ Visa ☐ MasterCard ☐ Amex

Number \_\_\_\_\_

Expiration Date \_\_\_\_\_

Signature \_\_\_\_\_

Check or Money Order. Please allow 2-4 weeks for delivery.

\*Prices subject to change without notice.

**It's another  
ZUCKERBOARD**

**ATD/Zuckerboard**  
235 Santa Ana Court  
Sunnyvale, CA 94086  
(408) 720-1942

Circle 378 on Reader Service card.

©1987 Advanced Transducer Devices, Inc.  
ATD and Zuckerboard are registered trademarks of  
Advanced Transducer Devices, Inc.  
Tandy, Tandy 1000, Tandy 1000EX, Tandy 1000SX,  
Tandy 1000TX, Tandy 1200, Tandy 1400, and Tandy 3000  
are registered trademarks of Radio Shack, a Division of  
Tandy Corporation.



# SOFTWARE SALE!



Cart Off the Savings You'll Bag  
from Montezuma's  
Bare Bottom Prices!

**FREE  
SHIPPING\***

\*On orders over \$100.

## HARD DRIVES

(All kits come complete with drive, controller and cables)

21 4MB Seagate ST225 65ms fast stepper...\$ 289  
32 7MB Seagate ST238 65ms fast stepper... 315  
42 8MB Seagate ST251 40ms fast stepper... 479  
65 5MB Seagate ST277 40ms fast stepper... 649

## PRINTERS & CABLES

NX-1000 144cps NI Q tractor...\$ 199  
NX-15 120cps NLQ, 5K buffer, 132 column... 329

ND-10 180cps, 12.6K buffer, NLQ, tractor...\$ 299  
ND-15 Same as above but 132 column... 399  
NR-15 240cps, 12.6K buffer, 132 col, NLQ... 499  
NB-15 300cps, 16K buffer, 132 col, NLQ... 729  
NB-2410 216cps, 5K buffer, 24-wire LQ... 479  
NB-2415 Same as above but 132 column... 589  
Molded 10' parallel cable with thumbscrews... 12

## ADD-ONS & ACCESSORIES

Video extender cable, DB-9 each end...\$ 9

RS-232 molded cable w/thumbscrews 10'...\$ 20  
Centronics/Centronics molded cable 10'... 20  
DB-25 Gender changer, specify M/M or M/F... 9  
Printer Switch Box, 2-position, Centronics... 39  
Printer Switch Box, 4-position, Centronics... 49  
Printer Switch Box, 2-position, DB-25... 39  
Printer Switch Box, 4-position, DB-25... 49  
Flip-top disk storage box with lock... 9  
Vertical CPU stand (add \$9 for wheels)... 25  
All 8087 and 80287's in stock. Call for price!

## TRS-80 SOFTWARE & BOOKS

Any Super Utility Program...\$ 44  
BASIC Faster & Better with disks... 24  
Convert 3-to-4... 35  
Convert 4-to-PC... 99  
Inside Level II... 9  
Machine Language Disk I/O... 18  
Microsoft BASIC Decoded... 18  
Modem 80 Model 1/3 Comm Program... 24  
SuperCross/XT specify Mod 1/3/4... 59  
TRS-80 Disk & Other Mysteries... 18  
TRSDOS 2.3 Decoded... 18  
Using Super Utility Plus Book... 15

## SAVE A BUNDLE With one of our Bundles

**"A" Bundle  
\$299**  
WordStar SpellStar  
MailMerge Star Index  
Montezuma Micro CP/M

**"B" Bundle  
\$399**  
WordStar ReportStar  
SpellStar CalcStar  
Montezuma Micro CP/M  
Star Index MailMerge  
DataStar

**"C" Bundle  
\$499**  
Turbo PASCAL ReportStar  
DataStar dBase II CalcStar  
SpellStar MailMerge  
Star Index WordStar  
Montezuma Micro  
CP/M

## CP/M® SOFTWARE

Borland Database Toolbox...\$ 39  
Borland Turbo PASCAL... 39  
Borland Turbo Tutor... 22  
CP/M Programmers Guide - book... 15  
DataStar... 175  
dBase II... 349  
Mex Plus... 45  
Mex Plus with REO & TEM... 68  
Microsoft Multiplan... 125  
Montezuma Micro CP/M... 169  
Out-Think... 34  
Rembrandt... 29  
ReportStar... 150  
SuperCalc... 174  
Twist & Shout... 26  
WordStar Professional 3.31... 250  
Call for other formats & 8"



# MONTEZUMA MICRO

"WE KEEP YOU RUNNING"



2544 W. Commerce St. • P.O. Box 224767 • Dallas, Texas 75222-4767

©by 1987 Montezuma Micro. All rights reserved.

Prices and specifications subject to change without notice.

• Telephone: (214) 631-7900

Facsimile: (214) 634-8303



## MS-DOS® BUSINESS SOFTWARE

(We stock the latest versions)

Ability .....	\$ 63
Borland Quattro (1-2-3 Clone) .....	124
Borland Reflex Workshop .....	45
Borland Reflex: The Analyst .....	85
Borland Turbo Lighting .....	62
BPI Entry 1 Accounting System .....	59
Cornerstone .....	63
DAC Easy Accounting (all version 2) .....	59
DAC Easy Accounting Tutor .....	19
DAC Easy Mate .....	26
DAC Easy Payroll .....	46
DAC Easy Payroll Tutor .....	19
DAC Easy Report .....	26
DAC Easy Word .....	32
dBase II .....	328
dBase III Plus .....	399
Desqview .....	84
Diagram Master .....	199
EGA Paint .....	56
Eight in One .....	34
Formtool .....	63
Framework II .....	372
Generic Cadd 3.0 .....	59
Harvard Graphics .....	249
Inside Track II .....	72
IPrint .....	120
Lotus 1-2-3 2.01 .....	319
Managing the Market .....	89
Microsoft Excel .....	338
Microsoft Project .....	249
Microsoft Word/Spell .....	239
MultiMate Advantage II .....	279
Multipian .....	119
Newsroom .....	38
Newsroom Professional .....	78
Paradox 2.0 .....	445
pfs: First Choice .....	89
pfs: First Publisher .....	59
pfs: Professional File .....	140
pfs: Professional Write .....	119
Printshop .....	38
Printshop Companion .....	32
Printshop Graphics Library #1 .....	23
Printshop Graphics Library #2 .....	23
ProDesign II .....	159
Q & A .....	219
R-Base 5000 .....	330
R-Base Extended Report Writer .....	197
R-Base System V .....	419
Smart System .....	529
SuperCalc 4 .....	320
Timeline .....	299
Twin Classic (Lotus 1-2-3 Clone) .....	57
Twin 2 (Lotus 1-2-3 2.01 Clone) .....	86
Ventura Publisher 4.1 .....	479
VP Expert .....	57
VP Info (dBase III Clone) .....	57
VP Planner (Lotus 1-2-3 Clone) .....	57
VP Planner Plus .....	99
Websters New World Writer .....	59
WordPerfect 4.2 .....	209
WordPerfect Executive .....	119
WordPerfect Library .....	63
WordPerfect Network 4.2 .....	354
WordStar 2000 Plus Release 3 .....	249
WordStar Pro Release 4 .....	239

## MS-DOS LANGUAGES/UTILITIES

Borland Eureka: The Solver .....	\$ 99
Borland Sidekick .....	49
Borland Superkey .....	49
Borland Traveling Sidekick .....	56
Borland Turbo BASIC .....	59
Borland Turbo C .....	59

Borland Turbo PASCAL with 8087/BCD .....	\$ 59
Borland Turbo PASCAL Graphics Toolbox .....	39
Borland Turbo Prolog .....	59
Borland Turbo Prolog Toolbox .....	59
Borland Turbo Tutor .....	22
Borland Turbo BASIC Database Toolbox .....	59
Borland Turbo BASIC Editor Toolbox .....	59
Borland Turbo BASIC Telecom .....	59
Borland Turbo PASCAL Database Toolbox .....	39
Borland Turbo PASCAL Editor Toolbox .....	39
Borland Turbo PASCAL Gameworks .....	39
Borland Turbo PASCAL NumMeth Toolbox .....	59
Borland Word Wizard .....	39
Carbon Copy + .....	125
Clipper .....	419
Copy II PC .....	23
Copy II PC Option Board .....	84
Crosstalk XVI .....	99
Cruise Control .....	24
Disk Optimizer .....	34
Fastback 5.14 .....	95
Fontasy 2.0 .....	39
Home Base .....	52
Mace Utilities .....	59
Media Master .....	29
Microsoft C Compiler 5.0 .....	289
Microsoft Macro Assembler 5.0 .....	97
Microsoft Quick BASIC Compiler .....	59
Microsoft Windows 2.02 .....	64
Mirror - Crosstalk Clone .....	39
Norton Commander .....	39
Norton Utilities 4.0 .....	55
Norton Utilities 4.0 Advanced .....	79
Printmaster Plus .....	35
Sideways .....	42
SmartComm II 3.0 .....	89
SQZ .....	51
Wonder Plus by Bourbaki .....	59
X Tree .....	29

## OTHER MS-DOS SOFTWARE

3-D Helicopter Simulation .....	\$ 29
Alge Blaster .....	29
Bank Street Writer Plus .....	59
Certificate Maker .....	24
Certificate Maker Library #1 .....	24
Championship Golf .....	26
Dollars and Sense .....	99
F-15 Strike Eagle .....	23
Gato .....	10
Gunship .....	32
Hitchhikers Guide to the Galaxy .....	19
Jet .....	35
Karateka .....	22
Kings Quest I .....	32
Kings Quest II .....	32
Kings Quest III .....	32
Leather Goddess of Phoebe .....	25
Leisure Suit Larry .....	26
Managing Your Money .....	115
Mastertype .....	26
Math Blaster Plus .....	29
Mean 18, Ultimate Golf .....	29
Micro Cookbook .....	28
Microsoft Flight Simulator .....	33
NFL Challenge .....	69
Reader Rabbit .....	26
Sargon III .....	25
Silent Service .....	23
Speed Reader II .....	39
Spell It! .....	28
Toy Shop .....	32
Typing Tutor IV .....	32
Wizardry .....	38
Word Attack .....	29
Zork I .....	25

## MS-DOS BOOKS

1-2-3 Business Formula Hbook .....	\$ 15
1-2-3 Command Language .....	15

1-2-3 for Business, 2nd Edition .....	\$ 15
1-2-3 Macro Library Handbook .....	15
1-2-3 Tips, Tricks & Traps, 2nd Edition .....	15
Using 1-2-3, Special Edition .....	17
C Programmer's Library .....	19
C Self-Study Guide .....	14
dBASE III Plus Handbook .....	15
IBM BASIC Handbook .....	12
Inside the IBM-PC .....	16
Inside the IBM-PC with software .....	26
MS-DOS Advanced .....	17
MS-DOS Quick Reference Guide .....	4
MS-DOS Users Guide 2nd Edition .....	16
Nortons Programmers Guide .....	15
Running MS-DOS .....	17
Turbo PASCAL for BASIC Programmers .....	15
Using 1-2-3 with software .....	22
Using Dollars and Sense .....	15
Using Managing Your Money .....	16
Using Paradox .....	17
Using Q & A .....	15
Using Reflex .....	15
Using Symphony .....	19
Using WordPerfect .....	15
WordPerfect Tips, Tricks & Traps .....	17

## BUY FROM US RIGHT NOW

(Please read the fine print first)

Our inventory is so large it can not be listed completely. Please call us if you do not see what you want. Chances are, we have it or can get it right away. Because of the time lag in magazine advertising, prices are subject to change without notice. Our prices are for mail order only. We are only human, so we decline responsibility for typographical errors. We welcome your company and/or personal checks. We use TeleCheck. Please follow these TeleCheck regulations. The check must be drawn on a U.S. or Canadian bank and be payable in U.S. Dollars. Your check must be bank printed and contain your street address (not P.O. Box or APO/FPO) and telephone number. The signature must exactly match the name printed on the check. If your check does not meet these requirements, allow three weeks check clearance time. We also accept American Express, MasterCard, Visa, Cashier's Checks, electronic funds transfer, and we ship COD. COD's and motor freight shipments may require a deposit. Some special items may require a deposit. All COD's require cash on delivery. Company and/or personal checks can **NOT** be accepted in payment of COD shipment. Your credit card is not charged until we ship your order. Ground shipping charges are included on all orders over \$100. Add shipping to all orders under \$100. We do not collect state sales tax on orders shipped outside of Texas. Orders placed by 5 PM will be shipped the next day if stock is on hand. Your order will leave before we go home. The responsibility of suitability of software rests with the purchaser. Due to the nature of the business and product, there are **NO REFUNDS ON SOFTWARE**. Please do not buy software from us if you are not sure it will work for you. **SOFTWARE IS NOT RETURNABLE**. Software support is provided by the manufacturer. We will **PROVIDE REPLACEMENT ONLY** if your disk is defective, if you notify us within 30 days after delivery of your merchandise. Please call us for help and instructions should you have a problem.

## GOOD AS GOLD WARRANTY

We want you to be happy with your purchase. All items we offer carry the manufacturer's warranty, and any problem you might have in service will be handled by his service organization. Please call us should you have any difficulty in obtaining service. Your satisfaction is our goal and we back it up with a 30 day money-back guarantee (except software). We will be happy to mail you a copy of the complete warranty details on request.

**ORDER TOLL FREE!**  
**1-800-527-0347**

AD 06



**Attention TRS-80™ Owners! End of year SUPER-SALE**  
**TRS-80 SOFTWARE • All new packages • Support not included.**

**"The King of Utilities" for TRS-80 and all popular operating systems**

Super Utility + Mod III & I - Disk repair plus 65 functions with manual.	\$49.95
Super Utility + 4 (same as above for TRS-80 Model 4, 4P, 4D)	\$49.95
Using Super Utility+ extra 175 pg. book. Free with purchase of SU+!	\$FREE
PowerMail+ (specify 4, III or I) Five Star mailing list-data system!	\$59.95
FREE Text-Merge Form Letter Option with purchase of PowerMAIL!	\$FREE
PowerSCRIPT - major enhancement for SCRIPSIT 4, III and I	\$24.95
PowerDraw (animated screen graphics! Easy to use.)	\$19.95
PowerDOT 2.0 (for printers. Mix text with graphics - no problem)	\$19.95
ST-80 III Communications w/ FREE mini BBS! Specify Mod III or I	\$39.95
PowerDriver Plus for SuperSCRIPSIT™ & SCRIPSIT PRO™	
allows PC and EPSON type printers to be used.	\$19.95

**Neat Utilities for Hard disk and/or floppies:**

LDOS™ ToolBox (hard disk check, repair, modify, much more!)	\$29.95
Model 4 ToolBelt (same for Model 4 TRSDOS 6 use)	\$29.95
Back/Rest Super Fast Hard Disk Backup & Restore	\$39.95
Superior Drivers for Tandy hard disk systems (Auto-boot on 4P!)	\$49.95
Game Disk - Android Nim, Snake Eggs, Dancing Demons, 3 more!	\$ 7.95

Do you have a new MS-DOS™ computer or PC compatible?  
 And do you have a LOT of data from your TRS-80™ that you'd like to bring over and have access to? Like your word processing files, spreadsheet, database, etc.? Without retyping them, of course. How about BASIC programs you've written or had written that you'd like to keep using with MS-DOS? Or DeskMate™ or PFS™ files?

**We can help you. It's easy.**  
**TRSCROSS™ 2.0 is the answer.**

TRSCROSS™ runs in your PC or compatible, yet directly reads your double-density TRS-80™ diskettes, so that you may simply copy them over to MS-DOS. Converts while copying. Everything is done in ONE STEP! Easy and fast. Allows you to transfer files both directions too!

**SCRIPSIT™ and SuperSCRIPSIT™ files are NO problem!**

Exclusive feature! Only TRSCROSS 2.0 converts SuperSCRIPSIT or SCRIPSIT files to ASCII, while copying! This is a tremendous time-saver to you, as other transfer programs will require you to go back to the TRS-80 and convert your files to ASCII first before transfer is even possible. What a waste of time! We do it all right there in one pass on your PC.

**You may now obtain TRSCROSS from your local Tandy computer dealer by requesting Cat. No. 90-3212.**

**FOUR STAR review in the 2/87 80-MICRO!**  
**Glowing review in the 1/87 COMPUTER SHOPPER!**  
**Highly recommended in The Lawyer's PC™!**

TRSCROSS now supports copying from high-capacity drives (1.2MB), even more improved BASIC conversion and LS-DOS 6.3 and LDOS 5.3 are fully supported. If you have any questions, please write or call.

We have thousands of letters/comments on-file complimenting us on the ease of use in transferring files with TRSCROSS. Save yourself time and trouble.

**Only \$89.95**

**In Stock - Same day Shipping!**

*TRSCROSS cannot convert machine language programs (/CMD) - nor can any other conversion product.*

Please add \$3 shipping/handling. For COD add \$2. Texas residents must add sales tax. Orders must be prepaid. Visa/MC OK • Orders shipped within 24 working hours. All products work as advertised.

**POWERSOFT**

**17060 Dallas Parkway, Suite 114**  
**Dallas, TX 75248 • (214) 733-4475**

<b>Publisher</b>	Jim McBrian
<b>Associate Publisher</b>	William J. Smith
<b>Editor-In-Chief</b>	Michael E. Nadeau
<b>Managing Editor</b>	Paula Noonan
<b>Senior Editor</b>	Dorothy Rosa
<b>Review Editor</b>	Mark Reynolds
<b>Copy Editor</b>	David L. Andrews
<b>Technical Writer</b>	David S. Veale
<b>Technical Editors</b>	Mare-Anne Jarvela
	Beverly Woodbury
<b>Disk Series Technical Editor</b>	Keith Johnson
<b>Associate Editors</b>	Hardin Brothers
	Harry Bee
	David Goben
	Thomas L. Quindry
<b>Director of Sales</b>	
<b>Eastern Sales Manager</b>	Brenner K. Fuller
	1-800-441-4403
<b>Western Sales Manager</b>	
<b>West Coast Office</b>	Diane Fuller
	Suite #201
	3350 W. Bayshore Road
	Palo Alto, CA 94303
	415-328-3470
<b>Advertising Coordinator</b>	Whitney Karr
<b>Marketing Director</b>	Melinda J. Baker
<b>Staff Administrator</b>	Janet Calhoun
<b>Art Director</b>	Lou Ann Morin
<b>Ad/Graphics Production</b>	Holly Vance
<b>Director of Corporate Production</b>	Dennis Christensen
<b>Manufacturing Manager</b>	Susan Gross
<b>Typesetting Manager</b>	Linda P. Canale
<b>Typographer</b>	Lisa Jalliet
<b>President</b>	Michael S. Perlis
<b>Vice President/General Manager</b>	Roger Murphy
<b>Business Manager</b>	Renee Dynan
<b>Director of Credit</b>	
<b>Sales And Collection</b>	William M. Boyer
<b>Circulation Director</b>	Frank S. Smith
<b>Circulation Manager</b>	Bonnie Welsh
<b>Direct Marketing Manager</b>	Paul Ruess
<b>Direct Sales Manager</b>	Elizabeth R. Kehn
<b>Newsstand Sales</b>	Linda Ruth
	1-800-343-0728
<b>Audits and Statistics Manager</b>	Cecile Giguere
<b>Special Products Director</b>	Paul Finch
<b>Founder</b>	Wayne Green



Article submissions from our readers are welcomed and encouraged. Inquiries should be addressed to: Submissions Editor, 80 Elm Street, Peterborough, NH 03458. Include an SASE for a copy of "How to Write for 80 Micro." Payment for accepted articles is made at a rate of approximately \$50 per printed page; all rights are purchased.



# Contents

**MARCH 1988**

## Features

### **30 The 1000 TX: Vive la Difference**

How does Tandy's top 1000 model compare with the rest of the PC-compatible world?

by David A. Williams

### **36 Menus à la Carte**

Design your menus for reuse.

by William McMullan

### **41 Files by Number**

Call up data files with just one keystroke.

by David Leithauser

### **46 Page Previewer**

See how your document will appear on paper before you print it.

by Dale Rogerson

### **51 The Big Backup**

An orderly approach is best when backing up a hard drive's files.

by David A. Williams



### **On Our Cover**

The new Tandy 1000 TX offers 80286 speed at an 8088 price. See David Williams' evaluation of this computer on page 30.

Photography by Larry Dunn

*The program listings included with 80 Micro run on all Tandy MS-DOS computers unless otherwise noted. The Model 2000 and Tandy 600 are not true MS-DOS compatibles, and we do not cover either computer.*

## Departments

### **6 The 80 Micro Disk Series Index**

### **8 Side Tracks**

by Michael E. Nadeau

### **13 Feedback Loop**

### **16 Pulse Train**

by Ron White

### **20 Info Line**

compiled by Mark E. Reynolds

### **26 Reviews**

Keynotes

Xywrite III Plus

Show Me!

American Investor and

Millionaire II

EZ-Forms Executive 1.2

Bookmark 1.2

### **65 Advertiser Index**

### **66 Reader Forum**

### **68 Fine Lines**

by Harry Bee

### **70 How to Use 80 Micro Program Listings**

### **71 The Next Step**

by Hardin Brothers

### **80 Input**

80 Micro (ISSN-0744-7868) is published monthly by IDG Communications/Peterborough Inc., 80 Elm St., Peterborough, NH 03458. Phone: 603-924-9471. Second class postage paid at Peterborough, NH and additional mailing offices. (Canadian second class mail registration number 9563.) Subscription rates in U.S. are \$24.97 for one year, \$38 for two years, and \$53 for three years. In Canada, \$45.97—one year only, Canadian funds. In Mexico, \$29.97—one year only, U.S. funds drawn on a U.S. bank. Nationally distributed by International Circulation Distributors. Foreign subscriptions (surface mail), \$44.97—one year only, U.S. funds drawn on a U.S. bank. Foreign subscriptions (air mail), please inquire. In South Africa contact 80 Micro, P.O. Box 782815, Sandton, South Africa 2146. All subscription correspondence should be addressed to 80 Micro, Subscription Department, P.O. Box 981, Farmingdale, NY 11737. Please include your address label with any correspondence. Postmaster: Send address changes to 80 Micro, Subscription Services, P.O. Box 981, Farmingdale, NY 11737. Send Canadian changes of address to 80 Micro, P.O. Box 1051, Fort Erie, Ontario L2A 5N8, Canada. Return postage guaranteed. Entire contents ©copyright 1988 by IDG Communications/Peterborough Inc. No part of this publication may be reprinted, or reproduced by any means, without prior written permission from the publisher. All programs are published for personal use only. All rights reserved.



**TANDY MS-DOS & TRS 80™ SOFTWARE****SMALL BUSINESS ACCOUNTING  
with PAYROLL \$99.95**

Based on the **Dome Bookkeeping Record #612**, this program handles **bookkeeping** and **payroll** for a small business. Bookkeeper provides single entry ledgers with categories for income and expenses, computes monthly and yearly summaries. Fiscal year can start with any month. Payroll handles up to 99 employees with automatic computation of F.I.C.A. and federal income tax. State tax and three optional deductions also included. Prints payroll and expense checks. Computes monthly, quarterly, and yearly summaries as well as Form 941 reports and W-2 forms. Simple and easy to learn—ideal for first-time computer users.

**MAILING LIST \$99.95**

Build and maintain mailing lists of up to **32,767** names. Up to five-line labels including title, first and last names, optional second line, address, city, state, zip code, optional fifth line, and telephone number. Sort or search for names by **any** field. Print labels in 1, 2, 3, or 4 adjustable columns or on envelopes. Print **form letters** with any substitutions. Includes 14 user-defined **key groups** for combining different lists into one file.

**HOME BUDGET and  
CHECKBOOK ANALYST \$59.95**

A complete checkbook program together with budgeting, income and expense analysis, comparisons, and projections. Computes current checking balance. Also handles non-check expenses, bank debits, and income. Monthly and year-to-date summaries, yearly projections based on data through a known month. Monthly expenses compared to pre-established budget.

**TRS-80™ SOFTWARE****TYPITALL Word Processor \$69.95  
TYPITALL with Spelling Checker \$99.95**

Word Processor upwardly compatible with SCRIPSIT—it reads your old SCRIPSIT files and uses the same formatting and cursor movement commands—but it is a completely different word processor with many advanced features.

**SYSTEM DIAGNOSTIC \$69.95**

Complete tests for every component of your TRS-80 Model 1, 3, or 4 (separate versions necessary for each model).

**SMART TERMINAL \$39.95**

The **intelligent** communications program for TRS-80 1, 3, or 4.

**HOWE SOFTWARE**

64 Windmill Road  
Armonk, New York 10504  
(914) 273-3998

24-Hour TOLL-FREE Order Number:

Outside California call:

**(800) 428-7825, ext. 169**

Inside California call:

**(800) 428-7824, ext. 169**

Terms: checks, Visa, Master Card, or C.O.D.

Shipping and handling: \$3.00. Canada, Mexico, Hawaii: \$6.00  
Air mail overseas: \$17.00. New York residents add sales tax.

**30-day Money Back Guarantee!**

\*TRS-80 is a trademark of Tandy Corp.

**The 80 Micro Disk Series:  
1000/1200/3000**

80 Micro comes to the rescue of Tandy 1000, 1200, and 3000 owners. Now you don't have to type in the MS-DOS programs that appear in 80 Micro. They are available on a quarterly basis. You will need the appropriate issues as documentation to use the programs. Listed below are the directories for the quarterly disks by issue, article title, and page number.

To order, call toll-free 1-800-258-5473, 24 hours a day, seven days a week, or mail your request to us with payment enclosed. The price for each disk is \$17.95, including postage and handling. The disk for the January-March 1988 programs will be available in mid-January 1988.

**QUARTERLY DIRECTORY****July-September 1987****July**

Tally and Track, p. 44; Taking Stock of Your Stock, p. 50; The No-Nonsense Disk Editor, p. 63; Easy Labels, p. 76; John's MS-DOS Column, p. 84; Fixes and Updates, p. 87

**August**

Data to Order, p. 69; Communal Data Entry, p. 75; Test Tester, p. 78

**September**

Calendars to Go, p. 73

**October-December 1987****October**

Life Above 640K (Turbo Pascal), p. 44; Land of the Bulging Files, p. 56

**November**

Make It Snappy, p. 44; No More Pencils, No More Rulers, p. 57

**December**

Add Pizzazz to Your Characters, p. 46; Label Your Disks . . . Automatically, p. 69

**January-March 1988****January**

Special Delivery, p. 28; Testing All Keys, p. 42; Same Old Routines, p. 49; The Next Step, p. 82

**February**

Help Yourself, p. 41; The Amazing Shrinking Program, p. 47; Ready, Aim, Fire!, p. 61; The Next Step, p. 91

**March**

Menus à la Carte, p. 36; Files by Number, p. 41; Page Previewer, p. 46; The Next Step, p. 71

80 Micro is a publication of IDG Communications, the world's largest publisher of computer-related information. IDG Communications publishes over 90 computer publications in 33 countries. Fourteen million people read one or more IDG Communications publications each month. IDG Communications contribute to the IDG News Service offering the latest domestic and international computer news. IDG Communications publications include: ARGENTINA'S Computerworld/Argentina; ASIA'S Communications World, PC Review, Computerworld Singapore, Computerworld Malaysia, Computerworld Hong Kong, Computerworld SE Asia; AUSTRALIA'S Computerworld Australia, Communications World, Australian PC World, Australian Macworld; AUSTRIA'S Computerwelt Österreich; BRAZIL'S DataNews, PC Mundo, Micro Mundo; CANADA'S Computer Data; CHILE'S Informatica, Computacion Personal; DENMARK'S Computerworld Danmark, PC World Danmark; FINLAND'S Tie-toivikko, Mikro; FRANCE'S Telecom's International, Distributique, InfoPC, Le Monde Des Telecoms; GREECE'S Micro and Computer Age; HUNGARY'S Computerworld/SZT, PC Mikrovilag; INDIA'S Dataquest; ISRAEL'S People & Computers Weekly, People & Computers Biweekly; ITALY'S Computerworld Italia; JAPAN'S Computerworld Japan; MEXICO'S Computerworld Mexico; THE NETHERLANDS' Computerworld Netherlands, PC World Benelux; NEW ZEALAND'S Computerworld New Zealand; NORWAY'S Computerworld Norge, PC World Norge; PEOPLE'S REPUBLIC OF CHINA'S China Computerworld, China Computerworld Monthly; SAUDI ARABIA'S Arabian Computer News; SOUTH KOREA'S Computerworld Korea, PC World Korea; SPAIN'S CIMWORLD, Computerworld Espana, Commodore World, PC World Espana, Comunicaciones World, Informatica Industrial; SWEDEN'S ComputerSweden, Mikrodatorn, Svenska PC World; SWITZERLAND'S Computerworld Schweiz; UNITED KINGDOM'S Computer News, DEC Today, ICL Today, PC Business World, LOTUS; UNITED STATES' AmigaWorld, CD-ROM Review, CIO, Computer Currents, Computerworld, Computers In Science, Digital News, Federal Computer Week, 80 Micro, FOCUS Publications, InCider, InfoWorld, Macintosh Today, MacWorld, Computer & Software, Micro Marketworld/Lebhar-Friedman, Network World, PC World, Portable Computer Review, Publish!, PC Resource, RUN; Windows; VENEZUELA'S Computerworld Venezuela; WEST GERMANY'S Computerwoche, PC Welt, Run, Information Management, PC Woche.

Problems with Subscriptions: Send a description of the problem and your current and/or most recent address to: 80 Micro, Subscription Department, P.O. Box 981, Farmingdale, NY 11737.

Problems with Disk Series Circulation: Address correspondence to Disk Series, 80 Elm St., Peterborough, NH 03458.

Problems with Advertisers: Send a description of the problem and your current address to: 80 Micro, Rt. 101 & Elm Street, Peterborough, NH 03458. If urgent, call 1-800-441-4403.

Change of Address: Send old label or copy of old address and new address to: 80 Micro, P.O. Box 981, Farmingdale, NY 11737. Please give eight weeks advance notice.

Microfilm: This publication is available in microform from University Microfilms International, United States address: 300 North Zeeb Road, Dept. P.R., Ann Arbor, MI 48106. Foreign address: 18 Bedford Row, Dept. P.R., London, WC1R4EJ, England.

Dealers: Contact Elizabeth R. Kehn, Retail Sales Manager, 80 Micro, Elm St., Peterborough, NH 03458. (800) 343-0728.



*Complete and Easy . . .  
and only \$16!*



*Parsons Technology*

# MONEY COUNTS®

VERSION 4.0

## Complete Money Management/ Accounting System . . .

- CPA-designed for home & business
- Manages cash, checking, savings & credit cards
- Smart checkbook balancer — makes short work of the toughest bank statement
- Handles up to 999 accounts & 24000 transactions per year

## Prepares & Prints a Wealth of Reports . . .

- Financial statements (4 types including net worth)
- Inquiry reports (3 types)
- General ledger & accountant's trial balance

## Now Including . . .

- Automatic transactions
- Financial calculator — computes interest rates, loan payments, prints amortization schedules
- Journal entries
- And more

## Plus These Important Additional Features . . .

- Budgeting
- Fast financial data base with 3-way look-up
- Pop-up calculator
- Graphics
- Works great with monochrome & color monitors
- Not copy-protected

VISA, MasterCard & COD orders call:

**1-800-223-6925**

(In Iowa 319/373-0224)

**Here it is.** You won't find software that's easier to use:

- Requires no accounting knowledge
- Completely menu-driven with on-line help
- 93-page fully indexed tutorial manual (on disk)

**A Proven Track Record.** Hard to believe the \$16 price? Don't worry. MoneyCounts® has been marketed for three years and is continually receiving rave reviews. There's **no** catch. This is a fully functional system that compares with products selling for \$99 and more.

**Same-Day Shipping.** Order today and own MoneyCounts® for only \$16! Add \$3 shipping and handling (outside North America add \$7). Iowa residents please add 4% sales tax. Send check or money order payable to Parsons Technology. VISA and MasterCard orders welcome.



*Parsons Technology*

Dept. 80  
6925 Surrey Drive NE  
Cedar Rapids, IA 52402

**MONEY  
COUNTS®**

\$16 + \$3 Shipping

MoneyCounts® requires IBM or compatible computer with two disk drives (or a hard disk drive), 192k or more memory, DOS 2.0 or later and printer.

Name: \_\_\_\_\_

Address: \_\_\_\_\_

City/State/Zip: \_\_\_\_\_

Phone: \_\_\_\_\_

Check ☐ Money Order ☐ VISA ☐ MasterCard ☐

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





## Know Thy Reader

■ by Michael Nadeau ■

**K**now thy reader" is one of an editor's Ten Commandments. "Don't trust surveys" is another. Having stated this, I'd like to tell you about the results of a recent 80 Micro reader survey.

Last fall, we mailed 1,000 questionnaires to a random sampling of our subscribers. Nearly 500 responded. The survey was designed to reveal three things about our readership: what computers you use, your interests, and your level of computer expertise. Much of what we learned was expected, but you did surprise us in a few instances.

Before I get into specifics, keep in mind that this survey was mailed when 80 Micro covered both TRSDOS and MS-DOS computers. Unless otherwise noted, the totals and percentages I cite here represent only the MS-DOS respondents. Of the 492 questionnaires returned, 278 came from Tandy MS-DOS users.

### Tandys of Choice

As anticipated, Tandy 1000 users (255) greatly outnumbered users of other Tandy MS-DOS models (49). Tandy 3000 ownership was next highest with 25. The 1200, 2000, and 4000 accounted for 24 responses. (Multiple model ownership explains these figures adding up to more than 278.)

The most popular 1000 was the original model, with 118 responses. The SX was next with 98, then the EX with 36. The HX and TX claimed a total of three responses each. I expect the EX and the newer HX to remain less popular than both the SX and TX. While the lower-end 1000s appeal to entry-level buyers, they offer less expandability for small-business owners and computer-using professionals, who represent larger markets for Tandy.

I also expect to see more 3000 owners reading 80 Micro in the near future. The price is dropping to within reach of many traditional 1000 buyers; some mail-order franchises have discounted the price of the 3000 HL to about the retail price of a 1000 TX. The 1400 LT should come on strong, too. It's a solid unit priced (\$1,200 discount) to seize a good chunk of the MS-DOS portable market.

### Your Likes and Dislikes

We asked three questions to determine your computing interests: One concerned feature articles, and the others concerned software and hardware reviews, respectively.

Of the 16 topics listed on the questionnaire, 10 drew a 20 percent or higher response. (Readers were asked to choose three items.) Those topics,

in order, were software reviews (45 percent), MS-DOS tutorials (44 percent), type-in utilities (36 percent), business-related programs (33 percent), batch file tutorials (30 percent), hardware reviews and telecommunications (24 percent each), graphics and Basic tutorials (23 percent each), and games (22 percent).

This is the first 80 Micro survey I can recall where utilities did not rank first in interest. Also, the urge to program seems not to be as strong as it once was. My interpretation is that computer users, or more specifically, MS-DOS computer users, are more application-oriented now.

Productivity—which I take to mean getting the job done in the most efficient manner possible—is the primary pursuit of our readers. Technical knowledge and recreation are still important, but only secondarily.

The top software review items were utilities (27 percent), word processors and personal finance software (26 percent each), desktop publishing products (24 percent), data base managers (23 percent), communications and educational software (21 percent each), and games and programming languages (20 percent each).

Notable here are the items with the lowest response: networking products (9 percent), business graphics (10 percent), general ledger/accounting software (13 percent), and spreadsheets (18 percent). I can understand interest in networking being so low; few home users or small businesses need it. I did expect a more enthusiastic response to the business-related topics.

I suspect that readers tended to choose items that piqued their interest rather than those of immediate use to them. For instance, I doubt that 24 percent of our readers are actually using desktop publishing. The topic is "hot," however, and that promotes interest that otherwise might not exist among computer users.

You were clear on your choices of hardware items to review: Hard drives (42 percent), multifunction boards (35 percent), printers (31 percent), memory (24 percent), and modems (23 percent) outpaced the rest of the field. Surprisingly low were keyboards (4 percent), monitors (8 percent), and EGA/VGA adapters (15 percent).

Apparently, a lot of you are looking to buy hardware, especially hard drives, multifunction boards, and printers. Look for advice on these items in upcoming issues. I attribute the low ratings for keyboards, monitors, and video adapt-

ers to a lack of awareness of alternatives.

Tandy would have its customers believe that they must stick with its hardware, but several companies are developing better keyboards and video adapters specifically for the Tandy 1000. Many inexpensive, high-quality, third-party monitors are available for your Tandy. We plan to review these items despite their low ratings on the survey.

### Level of Coverage

The survey wasn't successful in telling us if we were hitting our readers at the right level. I can only make guesses by reading between the lines.

First, the facts: You've owned your computer for an average of 3.66 years—a relatively long time. You use your computer mostly at home for personal tasks (89 percent) and at home for business (64 percent). Only 30 percent of you use them at work.

You rate yourselves as beginning to intermediate Basic programmers with little interest in other programming languages. You generally agree that the magazine is easy to read and disagree with the statements that the magazine is too technical and that the magazine isn't technical enough. The other computer magazines you read tend not to be very technical.

I have no solid conclusion on your average level of expertise. My guess is that the level of 80 Micro's content is close to what you need. In the next survey, I hope to reword the questions so they'll provide more definitive answers.

### The Trouble with Surveys

While surveys are an important tool for gauging reader interests, they have their faults. First, you never know if the person filling out a questionnaire interprets the questions the way you intended them to be understood. Second, there's no guarantee that the respondents represent the readership at large.

For example, I suspect that the number of TRSDOS users responding to the survey was out of proportion to the actual number of TRSDOS-using readers. Surveys based on reader service card responses contradict the numbers in this survey.

Finally, it's too easy to rationalize when the results aren't what was expected, dismissing them because you don't want to accept what they say. Consequently, we don't use surveys alone to determine the editorial direction of the magazine. They offer valuable information about your needs, but we also need interaction with individual readers, knowledge of the market, and good instincts to serve you well. ■



# LeScript

## Named No.1 Choice in Word Processors!

Now Includes  
70,000 word  
**Spell  
Checker**

80 MICRO Review, November 1985

### Your Need

Your writing is important to you, and it should be. It is an expression of who you are. And how your documents look when they are read is as important as what you have to say.

When you need a word processor that can help you achieve the professional and sophisticated look that you want in your writing, two things are most important: 1.) The ability to present your ideas on paper in a sharp, crisp, and attractive manner, and 2.) The ability to accomplish this quickly.

### The #1 Solution

LeScript has the power to handle all your most complex writing assignments with the ease and simplicity you never dreamed possible in an advanced word processing product.

### Advanced Features

LeScript's features include Automatic Page Makeup, Automatic Multiple Columns, Automatic Form-Letter Mail-Merge, Automatic Footnotes, Automatic Outline Indenting, Automatic Key-Word Search Disk File Directories, Programmable Macro Keys, Proportional Printing, ability to change Font Styles and Sizes, Foreign Language Character support, over 250 Printers supported, Tandy 1000/2000 Keyboard support, and ability to handle files as large as 1 megabyte (with optional memory expansion).

### The Professional Look Is Easy

Unlike other advanced software packages, LeScript is one of the easiest you'll ever use. One reason is, LeScript displays your text on the screen the way it is going to look printed - with headers, footers, indents, columns, footnotes, page numbers, line spacing, the works. LeScript even has the incredible ability to show you right on the screen the words that are italic, boldface, underlined, subscripted. A feature that is so necessary, yet unheard of among the competition.

Also, LeScript's commands are intuitive. They work the way you think, not the way a programmer thinks. There is no faster, more efficient way to generate text files.

### Learning Is Easy

The LeScript users manual is written in plain English to help you acquire advanced word processing skills quickly. With LeScript's on-line help screens, self-paced tutorial, quick reference cards, and the many sample files you will have no trouble learning and using LeScript the very first day you have it.

### Ordering Is Easy

Call (305) 259-9397, if you are ready to make the move to the #1 rated word processor. We will be happy to answer your technical questions and assist you in placing your order. We take VISA, MasterCard, and C.O.D. orders right over the phone, and ship most orders the same day. Personal and company check orders are shipped after check clears.

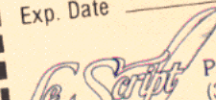
Name \_\_\_\_\_  
Address \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_  
City \_\_\_\_\_  
Telephone \_\_\_\_\_  
Type of computer \_\_\_\_\_

**PLEASE RUSH ME:**

☐ LeScript Demo Disk and Training Guide ..... **FREE**  
☐ LeScript IBM-PC/XT/AT compatible ..... (\$199.95)  
     includes Tandy 1000 and 2000  
☐ LeScript TRS-80 Model 1/3/4/4P/4D ..... (\$129.95)  
☐ 768K RAM Expansion Board Models 1,3 ..... (\$139.00)  
     requires 256K chips, not included  
☐ 1 Meg RAM Expansion Board Models 4, 4P ..... (\$159.00)  
     requires 256K chips, not included

5% sales tax if Florida resident  
 \$2 S/H for each Expansion Board.  
 LeScript or Demo; or \$4 for Air Mail  
 Total Enclosed \_\_\_\_\_

Visa/MasterCard # \_\_\_\_\_ Signature \_\_\_\_\_  
 Exp. Date \_\_\_\_\_

 P.O. Box 361136 • Melbourne, FL 32936  
 (305) 259-9397

"LeScript is exceptional, maybe the best there'll ever be!"

80 MICRO  
September, 1987

Find out why *LeScript* was named no.1, mail this coupon today.







Tandy Computers:  
Because there is  
no better value.<sup>TM</sup>

# The Tandy<sup>®</sup> 1400 LT

**A price breakthrough in MS-DOS<sup>®</sup> portable computers.** Introducing a portable computer that is a true IBM<sup>®</sup> PC compatible. With a removable rechargeable battery pack built in, the Tandy 1400 LT is perfect for people on the go—like busy executives, sales personnel and journalists. And you can even use it in your office as a full-fledged desktop computer.

**Easy on the eyes!**

While many laptops have a standard liquid crystal display, the 1400 LT's 80-character by 25-line display utilizes the latest "supertwist" LCD technology. "Supertwist" alone is a big improvement in readability. But since the 1400 LT is also *backlit*, it's one of the best LCD displays available.

**The power of a**

**desktop computer.** The Tandy 1400 LT's 8088-equivalent microprocessor has a clock speed of 7.16 MHz (vs. 4.77 MHz for most other PC-compatible portable computers). The 768K RAM puts a tremendous amount of computing power into your hands. With 640K addressed by MS-DOS, and 128K for a RAM-based disk drive, you'll have plenty of memory for large spreadsheet and database applications. And you

can even connect the 1400 LT to a color monitor and an enhanced keyboard for the perfect office desktop system. The 1400 LT could be the solution to all your computing needs.

**The convenience of 3 1/2" disks.** Standard equipment includes two 720K 3 1/2" built-in disk drives. The new standard in storage, pocket-sized 3 1/2" disks hold more programs and data and are more durable than 5 1/4" diskettes. What's more, the smaller size makes transporting disks easier—perfect for portables.

**The "extras" are included.** The Tandy 1400 LT comes with many standard features the competition considers extra-cost: a parallel printer adapter, RGBI and composite monitor outputs, an RS-232C serial adapter, external keyboard adapter and a real-time clock. We even include the MS-DOS 3.2 operating system, as well as GW-BASIC software.

**Come in today!** Want the best in both worlds of computing for a terrific low price? The Tandy 1400 LT combines the best features of a desktop computer with the ultimate in portability. Don't leave the office without it—only \$1599. (25-3500)



**Radio Shack<sup>®</sup>**  
**The Technology Store<sup>TM</sup>**

A DIVISION OF TANDY CORPORATION

Circle 75 on Reader Service card.

Price applies at Radio Shack Computer Centers and participating stores and dealers. Monitor, applications software and enhanced keyboard sold separately. MS-DOS/Reg. TM Microsoft Corp. IBM/Reg. TM IBM Corp.



# From Computer Plus to YOU ... PLUS after PLUS after PLUS



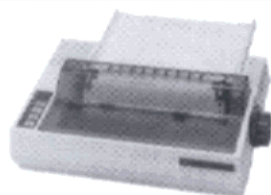
Tandy 1400 LT \$1239  
Tandy 102 32K \$379  
Tandy 200 24K \$429\*



Tandy 3000 \$1199\*  
Tandy 3000 HL \$899\*  
Tandy 4000 \$1959



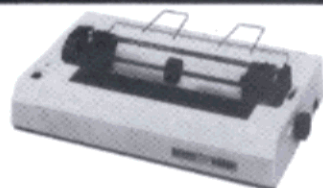
Tandy 1000 HX \$539  
Tandy 1000 TX \$779\*



DMP-130A \$279



Color Computer 3  
w/128K Ext. Basic \$159



DMP-106 \$169

## BIG SAVINGS ON A FULL COMPLEMENT OF RADIO SHACK COMPUTER PRODUCTS

Tandy 1000 EX 1 Drive 256K	429.00*
Tandy 1000 SX 1 Drive 384K	649.00
Tandy 3000 HL 1 Drive 512K	899.00*
Tandy 3000 1 Drive 512K	1199.00*
Tandy 4000 1 Drive 1 Meg. Ram	1959.00
Tandy 1400 LT 2 Drive 768K	1239.00
Model 1VD 64K with Deskmate	510.00*

### PRINTERS

Radio Shack DMP-106 80 CPS	169.00
Radio Shack DMP-130A 120 CPS	279.00
Radio Shack DMP-430 180 CPS	559.00
Radio Shack DWP-230 Daisy Wheel	339.00
Tandy LP-1000 Laser Printer	1699.00
Star Micronics NP-10 100 CPS	169.00
Star Micronics NX-10 120 CPS	199.00
Star Micronics NX-15 120 CPS	359.00
Panasonic P-1080L 120 CPS	189.00
Panasonic P-1091L 160 CPS	210.00
Panasonic P-1092L 240 CPS	349.00
Okidata 292 240 CPS	479.00
Okidata 192 + 200 CPS	329.00
Okidata 182 120 CPS	229.00

### TANDY 1000 ACCESSORIES

Tandy 1000 Disk Drive Kit	159.00
Tandy 1000 EX 5 1/4" Ext. Drive	199.00
Tandy 1000 20 Meg. Hard Card	619.00
Osicard 20 Meg. Hard Card	459.00
128K Memory Plus Expansion Adp.	110.00
PBJ Multi-Function Board (512K)	199.00
PBJ X-Ram EMS Board (256K)	199.00
PBJ Mini I/O (RS-232, Clock, Par.)	99.00
128K Ram Upgrade Kit	78.00
256K Ram Upgrade (for 1000SX)	69.00
Logitech RS-232 Serial Mouse	99.00
Plus 1200 Baud Modem Board	165.00
Plus 300 Baud Modem Board	85.00
CPI 1200 Baud Modem Board	119.00

### TANDY MONITORS

Tandy VM-4 Green Monitor	99.00
Tandy CM-11 RGB Color Monitor	345.00
Tandy CM-5 RGB Color Monitor	249.00
Tandy VM-5 TTL Green Monitor	119.00
Tandy EGM-1 Enhanced Monitor	559.00
Tandy Enhanced Graphics Adapt.	259.00
Tandy Dual Display Adapt.	169.00

\*Sale prices thru 2-29-88

### \*\*COMPUTER PLUS SPECIALS\*\*

The PBJ MFB-1000 Multi-Function Board with 512K Ram, DMA, RS-232 Serial Port, Clock Calendar with Battery Backup, and Ram Disk Software ..... 199.00

The PBJ XRAM Expanded Memory Board with 256K Ram, Upgradable to 2 Megabytes of Additional Memory, EMS Compatible, with Ram Disk Software ..... 199.00

Tandy 1000 20 Megabyte Internal Hard Drive Kit with Controller, Cables and Mounting Hardware ..... 399.00

### \*\*SOFTWARE BONUS\*\*

Order the PBJ MFB-1000 with 512K or the PBJ XRAM Board and receive the Leading Edge Word Processor with the Spell Checker a \$199.00 Value for only \$30.00!!

Prices are subject to change without notice. Please call for shipping charges. Prices in our retail store may be higher. Send for complete catalog.

**CALL TOLL FREE  
1-800-343-8124**

- LOWEST POSSIBLE PRICES
- BEST POSSIBLE WARRANTY
- KNOWLEDGEABLE SALES STAFF
- TIMELY DELIVERY
- SHOPPING CONVENIENCE



**computer  
plus**

P.O. Box 1094  
480 King Street  
Littleton, MA 01460

SINCE 1973

IN MASSACHUSETTS CALL (617) 486-3193



# Accessing DOS from Basic

## CAN A NEW 1000 TOP THE OLD MODEL 4?

**Q.** I've owned four Tandy computers—a Color Computer, a Model III, a Model 4, and a 1000 SX. Though each has offered clear advantages over the previous one, each has also had its disadvantages.

One of the advantages of the Model 4 is being able to access DOS commands from Basic. For example, I can copy a file from one drive to another without losing the Basic program. How can I do this with the 1000?

Model 4 Basic has a search-and-replace function. It also allows the use of words to designate specific program lines so that in programming it isn't necessary to remember the line numbers you want to refer back to. Furthermore, it enables you to scroll up and down in the listing. I haven't been able to find such a program for the 1000.—*Arnold H. Eichert, Fort Lauderdale, FL*

**A.** The Shell command in Basic allows access to DOS commands. To copy from one drive to another in Basic, use the command:

SHELL "COPY A:filename B:filename"

Take a look at a compiled Basic such as Microsoft's Quick Basic or Borland's Turbo Basic. Both have a search-and-replace function, use labels instead of line numbers, and scroll up and down in the listing. They also add several other features, particularly a significant increase in speed. They are more than worth their \$99 price.

## WHAT'S IT FOR?

**Q.** I have a 1000 SX, and I want to be able to boot an application program disk without having to install my start-up disk. In the quick reference guide that came with the computer, it says that at the A> prompt, I should type COPYDOS P, but I keep getting "Bad command" or "Bad file name" messages. I've tried it in lower- and uppercase. I've tried it with my MS-DOS/GW-Basic 3.2 and the MS-DOS Supplemental Programs disk, but no luck. And that's another thing—what is the Supplemental Disk for? The manual doesn't mention it, and I've never used it.—*Harry Spoerl, New Castle, DE*

**A.** Copydos is an MS-DOS 2.11 command. It is not available in 3.2 (note the 2.11 on



the disk picture next to the Copydos command in Tandy's 1000 SX Quick Reference Guide). Use the SYS command to transfer the system files to your application program disk. You must then use the Copy command to copy the Command.COM file to your application disk. Assuming your DOS disk is in drive A and your application disk is in drive B, at the A> prompt, type in the following, pressing enter after each line:

```
SYS B:
COPY COMMAND.COM B:
```

Be aware that the system files plus the Command.COM file require 70,656 bytes of disk space. You must have at least that much space available on your application disk.

The Supplemental Disk contains several utilities, most of which are briefly explained in the quick reference guide. Backup.COM, FDisk.COM, HSECT.COM, MLFormat.COM, MLPart.COM, MLPart.SYS, Restore.COM, and Shiptrak.COM are all used for hard drives. EXE2BIN.EXE, LIB.EXE, and Link.EXE are used with assembly language files. Share.EXE is used in networking.

Append.COM sets a data file path. De-

*Send your problems and solutions to Feedback Loop, 80 Micro, 80 Elm St., Peterborough, NH 03458. Where applicable, include the proper program name and version, the computer you're using (including any non-standard system configuration), the DOS version you're using, your phone number (not for publication unless you request it), and a self-addressed, stamped envelope.*

bug.COM is used to create and assemble small assembly language files, follow the processing of a program to "debug" (find error and correct it), and look at areas of memory or disk. Edlin.COM is a limited word processor. KEYCNVRT.SYS changes some keyboard generated codes to make them compatible with some application programs. The keys affected are the backslash (\), vertical line (|), tilde (~), single left quote ('), minus (-) (delete number lock), and plus (+) (insert number lock). KEYCNVRT.SYS must be in the Config.SYS file as DEVICE = KEYCNVRT.SYS. LPSetup.COM is a printer filter that allows pagination. Patch.COM allows you to modify a disk file (using hexadecimal values). Recover.COM recovers files with bad sectors. And finally, Spooler.COM sends commands to and gets the status of the print spooler. Spooler.SYS must be installed in the Config.SYS file as DEVICE = SPOOLER.SYS. (A spooler is a buffer that contains data on its way to the printer. It feeds the printer while allowing the computer to continue its processing.)

## BOOTING FROM HARD DISK

**Q.** I have a Tandy 1000 SX. I recently reorganized the files on my hard disk according to John Harrell's recommendations (see "Beating the Hard-Disk Hodgepodge," September 1987, p. 92). Now I have only one problem: I don't know how to get it to boot up from the hard disk again. What do I do?—*Debra Heiss Hall, Green Lane, PA*

**A.** I suspect that when you reformatted your hard drive, you didn't use the /s option to transfer the hidden system files (IO.SYS and MSDOS.SYS) from your master DOS disk to your hard drive. You can now transfer the files to your disk with the SYS command. Place your master DOS disk in drive A and type SYS C:. Then press the enter key. Also be sure to put the Command.COM file in your root directory.

## UPDATING DOS

**Q.** I have an early Tandy 1000: BIOS (basic input/output system) 01.01.00, MS-DOS 2.11.24, with a 10-megabyte (MB) external hard disk. Can I change the DOS to 3.2? I have the 3.2 on a floppy, but copying it to my hard disk still leaves me in 2.11. If I try to run a command peculiar to 3.2, I get an "Incorrect DOS version" message.



Is there anything I can do?—Robert Hogg, Anacortes, WA

**A.** You also need to use the SYS command to transfer the 3.2 hidden system files to update your DOS. The Copy command does not transfer the hidden system files.

## THIRD-PARTY PERIPHERALS

**Q.** Most of the early MS-DOS Tandy would not accept third-party peripheral cards—controller or EGA cards—in their slots. If I buy a 3000 HL or a 4000, will I be able to buy stock AT cards now readily available at reasonable prices and install them as I would in any other clone or compatible?—Al Perkins, Palm Coast, FL

**A.** Yes, you should be able to use any stock AT cards now available. I don't believe that there's any such thing as 100 percent compatibility among computers, even those manufactured by the same company.

It's always wise to establish before purchase either that the board has been proven compatible with your system or that you have the option of a refund if the board proves to be incompatible.

## MOVE QUBIE TO A TX?

**Q.** I have an original Tandy 1000 and a

20MB hard disk supplied by Qubie. The controller card for this disk is specially designed for the Tandy 1000's unique interrupt structure. However, I now need a faster system. Will this disk drive work with a Tandy 1000 TX?

At what speed does the coprocessor run? Will I need an 80287-8 for the 1000 TX?

Can I use one of my two 5¼-inch floppy drives from my old 1000 in the 1000 TX?—Anthony Q. Martin, Clemson, SC

**A.** Yes, you should be able to transfer your hard drive and controller card and 5¼-inch floppy drive over to your new 1000 TX. And yes, you should get a 80287-8 coprocessor for the TX. The number after the hyphen indicates the speed to which the coprocessor is quality tested. This should be equal to or higher than the speed of the computer.

## ADDING A SECOND HARD DRIVE

**Q.** Is there a 20- or 30MB hard drive I could use to replace the 10MB drive in my 1200? What would be involved in adding a second external hard drive?—W.L. Garrett, Gainesville, FL

**A.** Hard Drive Specialist, 16208 Hickory Knoll, Houston, TX 77059, 800-231-6671,

and Bi-Tech (BT Enterprises), 10 Carlough Road, Bohemia, NY 11716-2996, 800-645-1165, both supply hard drives for the 1200. The drives come with controller boards, most of which allow you to attach a second hard drive such as an external drive. The external drive would have to have a casing, a power supply, and cables to connect to the controller board.

The installation is not difficult. After you remove the outer case, unscrew the floppy drive and slide it forward so you can access the screws of the hard drive. Remove the old hard drive and controller board and insert the new hard drive and controller board according to the instructions included with the unit. Replace the floppy drive and cover, and you are ready to go.

## PRINT QUEUE

**Q.** I am using a 1000 SX with 640K, operating under MS-DOS 3.2. I have a question concerning the print queue program (Print.COM) that comes with MS-DOS. The quick reference guide says that the program accepts commands to change the number of files in the print queue, but every time I've tried to use the /Q: option, the program gives me an "Invalid param-

PRICE  
UPDATE

Save And Donate

Two percent of our pre-tax profit will be given to charity.

Your patronage has helped increase the size of our donation.

Tandy Computers:

Because there is no better value.™



**TANDY MS DOS LAPTOP**



**1000 TX**  
**\$815**  
(freight paid)  
reg. \$1199

**TANDY 1000 TX**



**TANDY 4000**

CUSTOMER SERVICE/QUESTIONS ABOUT YOUR ORDER and in TEXAS 1-817-573-4111 (9 am-5 pm TEXAS TIME MONDAY-FRIDAY)

Fort Worth Computers

377 Plaza  
Granbury, Texas 76048





Circle 214 on Reader Service card.



FORT WORTH COMPUTERS

(WE ARE SERIOUS ABOUT SAVING YOU MONEY)

for **LATEST PRICES** and CREDIT CARD ORDERS

CALL FREE 1-800-433-SAVE

9 a.m. - 5 p.m. Texas Time



## FEEDBACK LOOP

eter" error message.

I called the local Radio Shack store and they gave me a number for Radio Shack's MS-DOS support group, but every time I try to call the number I get a busy signal. Any ideas on what I can try or what I am doing wrong?—Scott A. Michels, Sanford, FL

**A.** The /D: option to specify the print device, the /B: option to specify the buffer size, and the /Q: option to specify the number of files allowed in the print queue must be in the first Print statement used after you boot. If they are introduced after a Print statement has been used, they will result in an "Invalid" parameter error message.

The Tandy support number is 817-338-239n, where n is zero for spreadsheets and word processing; 1 for accounting; 2 for languages and operating systems; 4 for hardware; 5 for Color Computers, laptops, and games; and 6 for education. Please note that the call is on your nickel, and you may have a long wait on line.

### KEY QUERY

**Q.** I purchased a 1000 EX several months ago. Because it was sold as "IBM compatible," I assumed this meant I could use any IBM-compatible software.

The 1000 EX keyboard, however, has 90 keys, and the IBM keyboard has 101. This was immediately apparent when I bought some IBM-compatible software that required a number of keystrokes for which there were no keys on my 1000 EX—for example, the scroll lock key.

The software manufacturer told me to ask Tandy. Tandy told me to ask the manufacturer. Can you help me? It seems that if the 1000 EX is compatible, there must be combinations of keys that will produce the required scan codes. Otherwise the computers wouldn't be "compatible." —F.C. Le Rocker, San Jose, CA

**A.** Use the alternate-break key combination to emulate the scroll lock key. Add KEYCONVRT.SYS (included with DOS) to the Config.SYS file by adding the line: DEVICE = KEYCONVRT.SYS

Be sure to place KEYCONVRT.SYS in your root directory. This will eliminate most compatibility problems.

Some programs look for a key's position on the keyboard so you can use the "2," "4," "6," and "8" keys on the numeric pad as the arrows and the left arrow key as the backslash.

I strongly suggest the same for software

as I did for hardware (see "Third-Party Peripherals," above). Be sure to establish that a program has been proven to run on your system; if you can't do that, make sure you have the option of returning the program if you can't use it.

### GONE FISHING

**Q.** James McLean's letter (see "Fishing For Chips," November 1987, p. 10) gave me the idea that I too could upgrade my 1000A. I have the same upgrade board mentioned in the article, with 128K and room for another 128K. I ordered and installed two sets of 64K chips but cannot access the memory addresses. Does this upgrade require more than just putting in the memory chips? Do I need another chip or a special jumper?—Alan M. Pess, Bellmore, NY

**A.** A jumper should have been enclosed with your board, if not already installed on it. The absence of the jumper on pins E1 and E2 tells the computer that the board has 128K installed. When the second 128K is installed, the jumper must be installed on pins E1 and E2 to inform the computer there is 256K. If you've lost the jumper, you can buy one at an electronic parts or Radio Shack store. ■

PRICE  
**UPDATE**

### Save And Donate

Two percent of our pre-tax profit will be given to charity.

Your patronage has helped increase the size of our donation.

**Tandy® Radio Shack™**  
Computers & Printers Products

**1000 SX**  
**\$605**  
(freight paid)  
**reg \$849**

**MOD 4D**

CUSTOMER SERVICE/QUESTIONS ABOUT YOUR ORDER and in TEXAS 1-817-573-4111 (9 a.m. to 5 p.m. TEXAS TIME MONDAY-FRIDAY)

**Fort Worth Computers**  
377 Plaza  
Granbury, Texas 76048



**TANDY 3000**



**FORT WORTH COMPUTERS**

(WE ARE SERIOUS ABOUT SAVING YOU MONEY)



for **LATEST PRICES** and **CREDIT CARD ORDERS**

**CALL FREE 1-800-433-SAVE**

9 a.m. - 5 p.m. Texas Time



# Spawning a Computer "Virus"

The hunter moves quickly and silently through the battlefield, searching for an enemy that lurks unseen. The hunter must be wary because it, too, is hunted. The enemy could attack at any moment, hacking the hunter in two and wiping it out of existence. Almost too small to be noticed but deadly just the same, the enemy springs. The hunter never knows what's happening. One moment it is on the attack, but the next moment it is obliterated. The only witnesses to its death are a group of people gathered around a computer screen.

The computer is the only window to this particular war, which is being fought entirely within the memory of a personal computer at the Computer Museum in Boston. The people are members of the International Core Wars Society. They may be strange poets in their own fashion because they write programs that are violent imitations of life and death.

Their creations are not video games—at least not the familiar kind in which images of soldiers, space ships, and monsters are manipulated with joysticks and buttons. "Core wars" are battles between rival programs for control of a theoretical computer's operating system. The only video images created by the battles are seemingly random clumps of differently colored pixels on the computer screen.

Each pixel represents a location in the computer's core memory that is occupied by part of one of the opposing programs. The display changes as the programs move through the memory, sometimes spawning clones of themselves that take up the hunt. When one program spots a portion of the enemy's code, it wipes it out. The winner is declared when not enough of the enemy code is sufficiently intact to function.

"It's kind of an aesthetic thing. It really is," said William R. Buckley, editor of *Core Wars Newsletter* and the new director of the society. Twenty-four of these hackers submitted 30 programs for the society's second annual tournament last fall at the museum. The winner was Robert Reed, a 39-year-old programmer from Windsor Locks, CT. His program, *Ferret*, had only 12 instructions. As its name implies, *Ferret's* strategy was to make itself as incon-



Robert Reed (left), the 1987 *Core Wars* champion, is congratulated by Chip Wendell (right), the 1986 winner.

spicuous as possible. While opposing programs roamed the 8K area of the computer's memory that served as the battlefield looking for *Ferret*, Reed's program stayed in one spot as it sent small probes that made delicate but deadly incisions in the enemy code.

In contrast to *Ferret's* guerilla tactics, the second-place program, *Plague*, written by Rod Paludan of Tucson, AZ, used the equivalent of mass bombing raids. *Plague* actually consisted of two programs. One tried to cause uncontrolled growth in the opponent, and the second one moved in to wipe out the opponent while the bloated code was immobilized under its own weight.

Versions of *Core Wars* work on MS-DOS, Apple, Amiga, and Atari personal computers, and some have even been designed for mainframes. The game actually consists of two parts. One is *MARS* (Memory Array Red Code Simulator), which creates a hypothetical computer within the real computer that *MARS* is running on. This *MARS* "computer" is the arena for the programs written with the second part of *Core Wars*, *Red Code*, an assembly language with its own compiler that the programmers use to create their code warriors. The language has only 10 instructions, and a program that uses more than 24 instructions is considered large among the society's buffs. But according to Buckley, with the various parameters that the instructions can use, it's possible to create different

programs equal to 1 billion raised to the 8,000th power.

While the opposing programs fight it out, their creators can't do much except watch pixels change colors on the screen until *MARS* declares the winner. With practice, Buckley said, you can learn to recognize signature patterns created by different programs—but *Galaxian*, it's not.

Without the shoot'em-up appeal of many computer games, *Core Wars* is obviously entertainment for an elite group of sophisticated aficionados whose numbers are growing quickly. The society had only about 30 members when it began a couple of years ago, but that quickly shot up to 200, with branches in West Germany, Japan, and Australia.

The game "is designed for programmers to test their abilities against one another," Buckley said. "It's like chess, but the pieces do all their own moving."

"It's the ultimate hacker game because it satisfies the primal urge of the programmer to get around other systems," added Buckley, who in his youth cracked a defense contractor's mainframe half a continent away. "You can be a hacker and be it legally. No one is going to put you in jail. You're just writing something to use against someone who's also a hacker and who's writing something to breach your security."

Buckley sees in the hacker aspect of *Core Wars* some possible practical applications—if your idea of applications software is industrial and international sabotage. The principles behind *Core Wars* programs are similar to those in computer "viruses," which are insidious programs used by unethical hackers to destroy data stored on others' disks.

"A virus program could enter another piece of code and act like an AIDS virus, attaching itself to and riding the code to other disks," Buckley said. "The program could figure out how to turn on a computer's modem and download itself. It could spread from computer to computer without anyone knowing until it was too late."

"The most obvious application would be to infiltrate the IBM plant where their hard disks come from. Or you could infect the computers that control Soviet missiles, and



# FINISH FINANCIAL WORK FIVE TIMES FASTER.

ALL NEW!  
For Business and Home

Quicken finishes  
all this in  
under 5 minutes!



**I**ntroducing Quicken® Version 2—absolutely the fastest, easiest way to write checks, keep financial records, track income and expenses, budget, and manage your cash flow. It's ideal for business and personal use.

## Now, Finish Financial Chores in Seconds.

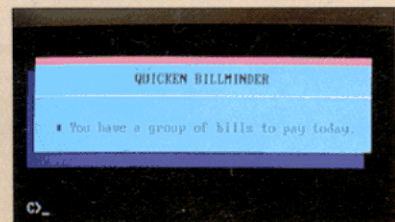
Quicken completes your financial work 5 to 8 times faster than ever before:

- Analyze budget vs. actual expenses by month for 12 months: 4 seconds
- Look up a check you wrote 1000 checks ago: 1 second
- Write and print 20 checks and update all records: 3 minutes
- Compile an itemized list of tax deductions for the year: 3 seconds

How can it be so fast? Quicken uses indexed files and speed-optimized C and assembler code—the very latest in high-speed technology.

## So Automatic, It Eliminates Work.

Quicken's fully automatic "macros" eliminate repetitious clerical work. Macros



Quicken remembers the bills you forget.

remember your bills, print your checks, and update all records automatically. All you do is sign the checks.

In fact, Quicken is so automatic it reminds you to pay your bills even if you forget to use it! Simply turn on your hard disk PC, and Quicken's pop-up Billminder™ appears when you need to pay bills.

## No Need to Alter Your Bookkeeping Procedures.

Quicken is easy to use because it works just like your checkbook. There's no need to change your bookkeeping format or learn anything new—no accounting jargon, no "debits," no "credits."

Quicken also comes with comprehensive on-line help, a complete manual, and free technical support.

Here's what the critics say:

**"I've never seen such an easy-to-use manual or software that's so simple to use."** Martin Blumenthal, in *Cider Magazine*

**"Extremely simple and fast"**

Esther Dyson, *Industry Analyst*

**"Absolutely the best small accounting program made."**

Bob Schwabach,  
*Universal Press Syndicate*

## New Features for Business.

Quicken provides special sections for businesses covering payables, receivables, cash flow forecasting, payroll, petty cash control and job, client, and property bookkeeping.

If you're a doctor, property manager, accountant, consultant, or manage any type of small business, and you write checks, Quicken will save you time and money starting today.

## Free 30-Day Trial.

Try Quicken. If you're not 100% satisfied, return it within 30 days and pay nothing.

### Specifications

**Software Compatibility:** Exports data and reports in ASCII. Also exports in Lotus® format with optional Transfer Utility.  
**Hardware Compatibility:** All IBM® PC, AT, PS/2® and compatibles with 256K RAM and DOS 2.0 or higher. All printers. All monitors. Also available for Apple® IIe, IIc and GS with most of the same features.

**Capacity:** Number of bank accounts: unlimited. Number of transactions: unlimited. Maximum amounts: \$9,999,999.99. Number of income/expense categories: 250 with 256K, thousands with 512K RAM.

**Other:** Not copy-protected. Checks are approved for all financial institutions in the U.S. and Canada.

**Quicken** **\$49.95**

NOT COPY PROTECTED

**Try Quicken for 30 Days Free!** If not completely satisfied, return Quicken within 30 days for a full refund (including \$3.00 shipping and handling charge).

**Call 800 624-8742**

(in California call 800 468-8481)

Or send coupon with payment to: Intuit, 540 University Ave., Palo Alto, CA 94301

☐ Check enclosed (No purchase orders)  
☐ Visa ☐ MasterCard ☐ Amex

Card No. \_\_\_\_\_ Exp. \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

Zip \_\_\_\_\_ Phone \_\_\_\_\_

☐ Quicken, \$49.95 plus \$3.00 shipping & handling. CA residents add sales tax.

☐ IBM version ☐ Apple II version

☐ 5¼" disk ☐ 3½" disk

☐ Transfer to Lotus Utility (optional), \$19.95

**Current Quicken owners—Call our 800 number for upgrade information.**

**Intuit** Code  
EM0388



when they're fired off, they would malfunction."

Is this science fiction, or does Buckley think that some super-secret government agency might be working on just that kind of computer espionage? "I don't know," he said. "But if anyone's interested, they can contact me. I'll be glad to do it for a million bucks."

The Core Wars concepts may also have application in the less antagonistic area of artificial life, he added. Last year, as a guest at Los Alamos National Laboratories in New Mexico, he discussed with scientists the similarities between living creatures and a Core Wars program's ability to carry out functions—including reproducing itself—without any outside control.

"Core wars may be a pre-cut of what life was all about before there was life," Buckley said.

If you feel the call to battle, there are several ways you can get started creating your own lean, mean Core Wars fighting machine. One is with a pair of programs written and sold by Buckley. The Core War Colosseum includes a MARS simulator and a Red Code assembler for MS-DOS computers. It costs \$24.95 and is available through AMRAN Software, 5712 Kern Drive, Huntington Beach, CA 92659-4535. Membership in the International Core Wars Society costs \$25 a year and includes the quarterly newsletter, which, by itself, is \$20 annually. For membership or subscription information, write Michael de la Maza, ICWS Secretary, 10 Tumbleweed Drive, Irvine, CA 92715.

## TANDYLAND

The salesman was desperate. "Do you have a Color Computer?" he asked. The answer was no. "Here. It doesn't matter. Take this. It's free. If you run into anyone with a Color Computer, give it to them." He thrust an educational game for a Tandy Color Computer III into our hands and turned back to brave the ocean of customers packed into a little retail outlet that had once been a Tandy training center in San Antonio, TX.

For the next hour, nobody left the store empty-handed. If they didn't buy anything, someone gave them a copy of the educational game from a pile near the door.

For three days, Tandy owners packed the store to grab bargain hardware and software that was gathering dust on shelves in Radio Shack stores throughout south Texas. Like a computer nerd's dream of a garage sale, the event occurs in cities throughout the country whenever unsold stock has accumulated too long.

At the San Antonio sale, copies of Dbase III, Lotus's 1-2-3, and Symphony were selling for under \$50. A copy of PFS:Write cost a

mere \$19. Games sold for pocket change. Odd assortments of hardware—old 8-inch floppy drives, joysticks, and several Tandy 1000 and 2000 computers—could be bought at bargain prices. It was hard to determine exactly what some of the hardware was (or had been at one time), but it was snatched up by people who either knew or thought that at those prices, it was worth a chance to figure out how to use it.

In addition to the sales that pop up on an irregular basis, a Tandy warehouse on Terminal Road in Fort Worth, TX, hosts a permanent bargain basement. The store is ostensibly a regular Radio Shack store, and most of the items for sale are priced the same as at any other Tandy store. But off to one side on rows of metal shelves is a hodgepodge of surplus stock. What's on the shelves changes continually. Sometimes it's computers that were used by reviewers or Tandy's staff. Other times it's equipment that got separated from its boxes, test samples, or merchandise that didn't sell. The store has found there's even a market for mock-ups of real equipment, such as cardboard and photo imitations of stereo equipment.

Basically, the bargain shelves are potluck, which makes it all the more exciting when you discover an odd-looking piece of equipment at the back of a shelf without an identifying label, and others have passed it up because they didn't know what it was.

A trip to the Fort Worth store is only convenient for those who live in the area, but considering the time one normally spends between planes at the Dallas-Fort Worth airport, it might be a good way to kill a few hours the next time you pass through Texas.

The 1400 LT has been so successful, you'd think Tandy would be falling all over itself to get at least an 80286, hard-disk version of the 1400 on the market—better yet an 80386, which no one has done as of this writing.

Tandy's marketers didn't anticipate the heavy demand for the 1400, and if they run true to form, they probably don't think there's that much desire for a small computer that runs so fast it wants to leap out of your lap. They might be surprised here, too.

## MICRO TRENDS

Yo, ho, ho, and a bottle of RAM. Pirates, beware. American software manufacturers are on the attack, raiding the most notorious overseas black markets specializing in counterfeit programs.

Areas like the Golden Computer Arcade in Hong Kong are infamous for harboring shops that sell bootleg software complete with manuals. A new organization, the

Business Software Association (BSA), conducted its first sting at the Golden Arcade and rounded up \$260,000 worth of illegal software. The raid cost about \$25,000 and six months of investigation for BSA, and the sting operation only scratched the surface, PC Week quoted Thomas Chan, an attorney for Ashton-Tate, which organized the association.

But BSA intends to conduct more raids, which have a dramatic appeal lacking in anti-piracy campaigns supported by the Association of Data Processing Service Organizations (ADAPSO) or by the Software Publisher Association (SPA). Their efforts have consisted mostly of magazines ads reminding computer users that unauthorized copying is a crime. Ads are OK, but BSA's Hong Kong raid has the satisfying ring of a Miami Vice episode.

ADAPSO is mainly an organization of companies associated with mainframes, and SPA is largely oriented toward games. BSA's members—still being organized at this writing—are likely to include microcomputer business software vendors such as Word Perfect Corp., Lotus Development, Microsoft, and Apple.

BSA has its work cut out for it. In the Golden Arcade alone there are more than 30 software bootleggers, Chan said. The most BSA can do is try to shake them up occasionally. Other sting operations will probably be conducted in Taiwan, Italy, Spain, Mexico, and Singapore.

The emphasis on foreign countries is because software companies feel that the readily available bootleg software overseas prevents them from expanding into those markets. After all, sooner or later, everybody and his dog will have a personal computer and all the software he can shove onto a hard disk. The market is greener on the other side of the sea.

There's a new bully on the block. ADAPSO attacks on IBM are reminiscent of a decade ago when IBM was the industry's heavy and constantly under attack on antitrust charges. But the way Microsoft Corp. has been acting lately, it may replace IBM as the industry's Mr. Mean.

Relations have never been smooth between Microsoft and Borland International, the manufacturer of several high-quality, low-cost software programs. But when Borland recently hired one of Microsoft's top executives, Microsoft threatened to sue on the basis that the exec had an exclusive contract with Microsoft and might give away trade secrets to Borland. Then Microsoft threatened to sue a small, virtually unknown company because its name includes the words "Micro Software Development." (Micro Software . . . Microsoft Ware, get it?) The company's owner agreed to change his name because he couldn't afford to fight Big M. ■



# **HARDCARD** For TANDY 1000

20 Meg, 65 ms

**\$489<sup>00</sup>**

30 Meg, 65 ms

**\$689<sup>00</sup>**

## HARDCARD FOR TANDY 3000 & OTHER XT/AT COMPATIBLES

20 Meg, 65 ms

**\$449<sup>00</sup>**

30 Meg, 65 ms

**\$649<sup>00</sup>**

### INTERNAL HARD DISK w/Controller & Cables For XT/AT Compatibles

20 Meg, 65 ms	\$350 <sup>00</sup>
30 Meg, 65 ms	\$395 <sup>00</sup> (except Tandy 1000)
40 Meg, 61 ms	\$595 <sup>00</sup>

### INTERNAL HARD DISK

For AT, AT Compatibles, & Tandy 3000 & 4000

20 Meg, 65 ms	\$295 <sup>00</sup>
40 Meg, 61 ms	\$495 <sup>00</sup>
40 Meg, 40 ms	\$545 <sup>00</sup>

Hard Disk/Floppy Controller for AT, Tandy 3000 & Tandy 4000  
(Includes Cables, Will Handle 1.2 Meg, 5 1/4 " Floppy Drive)

**\$170<sup>00</sup>**

## **ALL DISKS ARE FORMATTED**

# **FREE!**

### DISK ORGANIZER PROGRAM

w/your Hard Disk, Hard Card Order.  
Direc-Tree by Micro-Z Co. (\$49<sup>00</sup> Value)  
Run Your Favorite Programs w/2 Key Strokes.

### Internal 1200/300 BAUD Modem

Fully Hayes Compatible  
w/Software

**\$89<sup>00</sup>**

FREE SHIPPING IN THE CONTINENTAL U.S.

To Order Call: 1-800-541-0900

or Send Check or Money Order to:

### ZEUS COMPUTER

181 W. Gonzales Road  
Oxnard, CA 93030  
(805) 485-4451



COMPUTER



C.O.D. (cash or money orders)

CA Residents Add 6% Sales Tax. Personal checks please allow 2 weeks to clear. All merchandise is warranted for 1 year.

Circle 6 on Reader Service card.



## UTILITIES

### A Better Squeeze

SQZ! Plus's data-compression technology automatically compresses Lotus's 1-2-3 and Symphony files up to 95 percent. The program also includes backup and restore features, a file-history function, and a key-stroke recorder.

Symanec Corp., 10201 Torre Ave., Cupertino, CA 95014, 408-253-9600, \$99.95.  
Circle 575 on Reader Service card.

### Lap-Link Plus and Desk-Link

The software and six-foot serial cable that come with Lap-Link Plus (\$139.95) let you connect an MS-DOS laptop to any other MS-DOS machine so they can share disk drives and printers. Desk-Link (\$169.95) lets you transfer data between any two MS-DOS machines, including laptops, PS/2s, and networked computers. Both setups can transfer over 115,000 bits per second.

Traveling Software Inc., North Creek Corporate Center, 19310 North Creek Parkway, Bothell, WA 98011, 206-483-8088, \$139.95.  
Circle 576 on Reader Service card.

### Better PC Tools

PC Tools Deluxe, an update to PC Tools, is a DOS utility package that includes a DOS shell; fast hard-disk backup and restore; undelete and unformat; and disk optimization, caching, verification, and safe formatting.

Central Point Software, 9700 S.W. Capitol Highway, Portland, OR 97219, 503-244-5782, \$79.

Circle 577 on Reader Service card.

### Text Collector

The Text Collector can search any file (word processing, source code, e-mail, data base) on hard or floppy disks for anything (words, parts of words, phrases, punctuation, non-ASCII characters).

O'Neill Software, P.O. Box 26111, San Francisco, CA 94126, 415-398-2255, \$69.  
Circle 578 on Reader Service card.

### Disk Full

The memory-resident Disk Watcher automatically tells you when the disk you're working on is full so you won't lose your current work. The software also prevents you or a runaway program from formatting your hard disk.

RG Software Systems Inc., 2300 Computer Ave., Suite 1-51, Willow Grove, PA 19090, 215-659-5300, \$79.95.

Circle 579 on Reader Service card.

### Graph-in-the-Box

The instant graph generator, Graph-in-the-Box 2.0, includes VGA and MCGA compatibility, faster performance, Ventura Publisher and Pagemaker compatibility, and batch printing.

New England Software, Greenwich Office Park 3, Greenwich, CT 06831, 203-625-0062 or 800-633-2252, \$99.95.

Circle 580 on Reader Service card.

### For the 386

386-to-the-Max is a memory manager for 80386-based systems. It clears implicit processing delays, freeing applications to run faster, lets your DOS applications access more and faster base RAM, remaps slow ROM to fast RAM, lets some memory-resident programs live outside the usual 640K base area, and supports the advanced page-mapping features of new LIM/EMS 4.0.

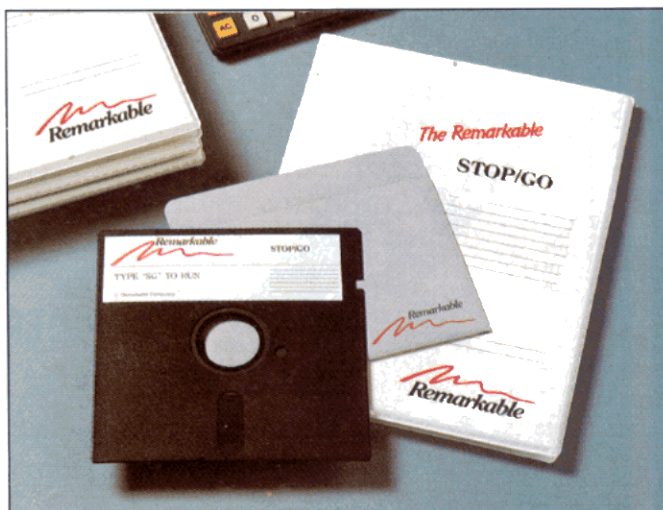
Qualitas Inc., 8314 Thoreau Drive, Bethesda, MD 20817, 301-469-8848, \$74.95.  
Circle 581 on Reader Service card.

## FOR THE PROFESSIONAL

### Business Decision-Maker

Stop/Go helps you weigh 70 factors under 13 categories to make an objective forecast on the chances for success or failure of a product, project, or other undertaking. The program can identify strong and weak areas within a project.

Suntex National Corp., P.O. Box 772868, Houston, TX 77215, 713-783-9059, \$195.  
Circle 588 on Reader Service card.



Stop/Go helps you make business decisions.



## Conversion Tables

Memory-resident Quickinfo contains hundreds of conversion equivalencies that let you translate measurements such as kilowatts to horsepower or gallons to cubic feet.

*Plies Development Corp., 2110 Crystal Hills, Houston, TX 77077, 713-493-3679, \$49.*

**Circle 569 on Reader Service card.**

## Landlord's Helper

Rental Record Keeper manages information such as rental revenues and deposits, operating expenses and depreciation, mortgage interest and payments, year-end reports, and profit reports for any number of apartments in up to 24 rental properties.

*Microease, 7110 44th Ave. S.W., Seattle, WA 98136, 206-447-2925 or 800-426-3401, \$295.*

**Circle 561 on Reader Service card.**

## Asksam with Hypertext

Asksam 4.0, a free-form data base, is one of the first MS-DOS products to include hypertext capability. You can move a light bar to select a key word or phrase from a screen and retrieve all information (even across file boundaries) associated with it.

*Seaside Software, P.O. Box 1428, Perry, FL 32347, 904-584-6590 or 800-372-5726, \$295.*

**Circle 562 on Reader Service card.**

## Radio Shack Carries Excel

Microsoft's Excel is now available from Radio Shack. The powerful spreadsheet runs under Microsoft Windows on the Tandy 1000 TX/3000/4000 and offers two-way compatibility with Lotus's 1-2-3 files, so you can load and save Lotus spreadsheets directly. Excel's Macro Translation Assistant translates 1-2-3 macros into Excel macros.

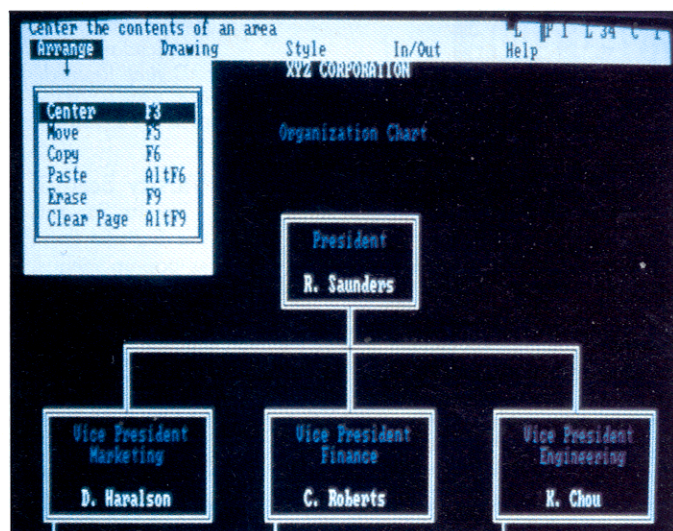
*Microsoft Corp., 16011 N.E. 36th Way, Box 97017, Redmond, WA 98073-9717, 800-426-9400 (in WA or AK, 206-882-8088), \$495 (or from your Radio Shack dealer—catalog no. 25-1185).*

**Circle 563 on Reader Service card.**

## Cheaper Word Processing, Better Data Management

Data Access Corp. has reduced the price of their Dataflex Word Processing Option from \$195 to \$69.95 and announced revision 2.3 of their relational data-base development system, Dataflex (\$695), which is faster, has graphics capabilities, and supports floating-point arithmetic as well as

**Instant Pages lets you combine text and graphics but doesn't require a graphics card.**



binary coded decimal (BCD).

*Data Access Corp., 14000 S.W. 119th Ave., Miami, FL 33186, 305-238-0012.*

**Circle 566 on Reader Service card.**

## Point of Sale

Salespoint is a point-of-sale system that prints invoices and purchase orders, manages inventory, and generates quotes, lay-aways, back orders, and work orders.

*SSR Corp., 1600 Lyell Ave., Rochester, NY 14606, 800-521-0142 or 716-254-3200, \$19.95.*

**Circle 565 on Reader Service card.**

## Gimme a Light

Dac-Easy Light provides multi-level, double-entry accounting for the non-accountant at home or at the office. The package can write checks, prepare invoices and statements, print financial statements, provide budgets, and track expenses.

*Dac Software Inc., 4801 Spring Valley Road, Building 110B, Dallas, TX 75244, 214-458-0038 or 800-992-7779, \$69.95.*

**Circle 564 on Reader Service card.**

## Project Manager

The Actiontracker project management system handles deadlines, priorities, budget, and time considerations for people who handle many projects simultaneously. It can produce over 1,000 combinations of reports on projects, actions, budgets, and resources.

*Information Research Corp., 2421 Ivy Road, P.O. Box 6668, Charlottesville, VA 22906, 800-952-8660 (in VA, 804-977-2680), \$198; with project query language, \$298; network with PQL, \$1,495.*

**Circle 567 on Reader Service card.**

## WORD PROCESSING

### Desktop Publisher

Instant Pages lets you combine text and graphics to create forms, newsletters, charts, and correspondence. The menu-based program works with a color or monochrome monitor and doesn't require a graphics card.



**Webster's New World Combo combines the New World Spelling Checker and New World Thesaurus.**

*Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404, 415-571-7171, \$49.95.*

**Circle 573 on Reader Service card.**

## New World Help

Webster's New World Outliner + (\$69.95) can help you outline your ideas, transfer ideas from word processor to spreadsheet, and organize personal tasks.

Webster's New World Combo (\$89.95) combines the 114,000-word New World Spelling Checker and the 20,000-entry New World Thesaurus.

Compatible with over 40 popular word processors, the Speller proofreads documents as you work. The Thesaurus contains 330,000 synonym references and offers access to over one million replacement words.

*Simon and Schuster Software, 1 Gulf + Western Plaza, New York, NY 10023, 800-624-0023 (in NJ, 800-624-0024).*

**Circle 574 on Reader Service card.**



## First Word

The GEM First Word Plus includes GEM Paint 2.0 and the latest release of the GEM system software, GEM/3. The word processor includes such features as pull-down menus with keyboard shortcuts, the ability to open four windows simultaneously and integrate text and graphics, a 40,000-word

spelling checker, footnote management, and leading control.

Digital Research Inc., Box DRI, Monterey, CA 93942, 800-443-4200, \$295.

Circle 572 on Reader Service card.

## Varsity Scripsit

Varsity Scripsit, Tandy's new addition to the Scripsit family, includes such features as pop-up menus, an append-file function, on-line help, split screens, spell checking, foot- and endnoting, and keywords file generation.

Tandy/Radio Shack, One Tandy Center, Fort Worth, TX 76102, \$99.95 (catalog no. 25-1174).

Circle 571 on Reader Service card.

Circle 133 on Reader Service card.

## HARDWARE

### Compatible Keyboard

The Tandy 1000 Turbo-101 keyboard plugs directly into the 1000. Its Selectric-style key layout includes 12 function keys; extra wide shift, return, and control keys; a separate cursor pad; a numeric keypad; and a page-control cluster. Turbo-101 is bundled with a variety of software packages, including Borland's Turbo Lightning and Superkey, Living Videotext's Think Tank, or some of Turner Hall's Lotus add-ons.

Datadesk International, 7650 Haskell Ave., Van Nuys, CA 91406, 818-780-1673 or 800-826-5398 (in CA, 800-595-9602), \$169.95.

Circle 550 on Reader Service card.

### Data Translator

The Data Receiver half card and software lets you send data via a parallel-printer cable from a TRS-80, Apple, Kaypro, most CP/M systems, and others into your MS-DOS machine.

Image Technology Inc., 8150 S. Akron St., Suite 405, Englewood, CO 80112, 303-799-6433, \$119.

Circle 551 on Reader Service Card.

### Super Graphics

The Vega VGA switches between compatibility modes automatically. With a variable frequency digital monitor, it produces resolution of 640 by 480 or 800 by 600 pixels, each with 16 on-screen colors selected from a palette of 64.

With an analog monitor, the board can put 256 colors on screen from a palette of 262,144 at 320 by 200 pixels or 16 simultaneous colors at 640 by 480 pixels.

Video Seven, 46335 Landing Parkway, Fremont, CA 94538, 415-656-7800, \$499.

Circle 552 on Reader Service card.

### More Super Graphics

The VIP VGA graphics adapter offers a resolution of 800 by 560 pixels on multisync monitors and can display 256 colors from a palette of 256,000 in analog mode. The VIP includes 9- and 15-pin cables to use with digital or analog monitors. The card automatically senses and switches to the appropriate mode.

ATI Technologies Inc., 3761 Victoria Park Ave., Scarborough, Ontario, M1W 3S2, 416-756-0711, \$449.

Circle 553 on Reader Service card.

### Printer Interface Expansion

The Printer Performance Card makes it possible for up to three computers to share as many as seven printer devices. The card has an internal 256K (expandable) print buffer and a microprocessor, is configured with six print devices, and is equipped with six parallel and two serial ports and a high-speed synchronous port.

Dresselhaus Computer Products, 8560 Vineyard Ave., Suite 405, Rancho Cucamonga, CA 91730, 800-368-7737, \$399.

Circle 557 on Reader Service card.

UPGRADE YOUR TANDY!

**CDA**

Major Credit Cards Accepted!

computer sales

### Hard Cards for 1000

Hard Drive cards come preformatted for Tandy 1000, 1000SX or 1000TX. Easy to install, requires only one slot. 1 Year Warranty! (1000, 1000SX, 1000TX)

Mega Card 20 (65ms access time) \$399

Mega Card 30 (65ms access time) 549

### Hard Drive Kits

Tandy 1000 Hard Drive Kits feature a Seagate Hard Drive with a Western Digital Controller. Easy to install, comes preformatted. 1 Year Warranty! (Requires the removal of drive B-1000, 1000SX, 1000TX)

Hard Drive Kit 20 \$369

Hard Drive Kit 40 649

Tandy 3000, 3000HL and 4000 Kits feature a Western Digital Floppy/Hard Controller and Segate High Speed Drives.

30-Megabyte Full Height Kit (40ms) \$ 799

40-Megabyte Half Height Kit (40ms) 749

40-Megabyte Full Height Kit (28ms) 899

80-Megabyte Full Height Kit (40ms) 1299

### Expansion Boards

for 1000/1000SX/1000TX

Serial Board \$ 59

Serial with Clock 79

Dual Serial Board 99

Dual Serial with Clock 109

for 1000EX/1000HX/or Plus Boards

Serial Board \$ 55

Serial with Clock \$ 75

Dual Serial Board \$ 95

Dual Serial with Clock \$ 105

### Modems

Internal Modems by Everex—complete with a 1-year warranty and Bitcom communications software.

1200 Baud Evercom \$129

2400 Baud Evercom 239

### Memory Upgrades

for 1000

Zucker Memory Expansion—512K of memory with DMA. An optional clock calendar can be added. \$119

Zucker Multifunction Card—512K of memory with DMA, clock/calendar with battery backup, serial RS-232 port and Ramdisk software. \$199

for 1000 SX

SX Chip Set—upgrade your 1000SX from 384 to 640K. Easy to install with instructions. \$39

for 1000TX/3000HL

128K RAM Kit—Upgrade your 1000TX from 640 to 768K or your 3000HL from 512K to 640K. \$35

for 1000EX/1000HX

384K Upgrade by Micromainframe—Complete with two memory plus expansion connectors for adding Tandy Plus expansions, upgrades your EX/TX to 640K. \$139

for 4000

1-Megabyte SIMM Kit—Upgrade your 4000 from 1 Megabyte to 2! Includes four 256 SIMMS. \$239

4-Megabyte SIMM Kit—Upgrade your 4000 with a 4-Megabyte upgrade! Includes four 1-Megabyte SIMMS. \$1049

for 1000/1000SX/1000TX

EMS Memory Board—includes EMS software, RAM disk, Print Spooler. Meets EMS standards set by Lotus and Intel.

1 Megabyte (upgradable to 2) \$249

2 Megabytes \$369

Radio Shack/Tandy is an authorized trademark of Tandy Inc.

ORDER TOLL FREE 800-526-5313

**NO-RISK 30-DAY SATISFACTION GUARANTEE** If you're not 100% satisfied with any Hardware or Accessories purchased from CDA Computer Sales, we will refund your purchase price 100% no questions asked!

**FREE TECHNICAL SUPPORT HOTLINE** We support our customers with knowledgeable technicians on all products we sell. A Technical Support Hotline is provided for all our customers.

**ORDER VIA MAIL** - Write: CDA Computer Sales, 31 Marshall Hill Road, West Milford, New Jersey 07480. Please include full name, address, and phone number.

**ORDER VIA TELEPHONE** - 1-800-526-5313

**ORDER VIA COMPUSERVE'S ELECTRONIC MALL** - 24 hours a day! GO WOC

**FREIGHT** - UPS GROUND SHIPPING - Add 2% (\$3.50 minimum). UPS BLUE LABEL SHIPPING - Add 5% (two-day delivery - \$5.50 minimum). APO/FPO SHIPPING - Add 4% (\$4.50 minimum). ALASKA, HAWAII, PUERTO RICO - Add 6% (\$6.50 minimum). FOREIGN ORDERS - Please call.

**MAJOR CREDIT CARDS ACCEPTED** - No additional charge! Cashiers Checks, Money Orders, Personal and Company checks accepted. NO COD's please!

In N.J. 201-728-8080

Mon-Fri. 9-9 EAST Sat. 10-4 EST 31 Marshall Hill Rd., West Milford, NJ 07480



## Low-Priced Laser Printer

The F-1000A Compact Laser Printer can produce 10 pages per minute, sharp text, graphics, and 39 bar code styles at 300 dpi (dots per inch) resolution. It has 79 resident fonts (including eight foreign-language character sets), three Dynamic fonts that you can modify, two IC-card slots, seven built-in emulation modes, 512K RAM, and both parallel and serial ports.

Kyocera Unison Inc., 3165 Adeline St., P.O. Box 3056, Berkeley, CA 94703, 415-848-6680, \$2,895.

Circle 554 on Reader Service card.

## Voice Kit

Heathkit's half-size HV-2000 computer voice card includes a circuit board-based speech synthesizer and audio amplifier as well as the software-based punctuation rules necessary for translating ASCII data or high- or low-level languages into intelligible speech.

Heath Co., Department 350-020, Benton Harbor, MI 49022, 616-982-3200, \$89.95

Circle 556 on Reader Service card.

## Small and Wide

The 2.87 by 9.17 by 19-inch Diconix 300W ink-jet printer prints up to 310 cps and accommodates paper up to 14.8 inches wide.

Diconix Inc., 3100 Research Blvd., Dayton, OH 45420, 1-800-342-6649, \$749.

Circle 555 on Reader Service card.

## FOR THE PROGRAMMER

### C-Like Assembler

RisC is a portable, object-oriented, high-level assembly language with C-like syntax.

IMSI, 1299 Fourth St., San Rafael, CA 94901, 415-454-7101, \$79.95.

Circle 560 on Reader Service card.

### Quick Basic Graphics

Xgraf is an assembly-language extended-graphics kernel for Quick Basic that adds full-featured calls that perform Basic's graphics functions in all graphics modes. Xgraf also offers screen packing, zooming (fatbits), file saving and loading, and importing of graphics screens.

Komputerwerk, 851 Parkview Blvd., Pittsburgh, PA 15215, 412-782-0384, \$99.

Circle 558 on Reader Service card.

### C Compiler and Debugger

Release 4.0 of the Eco-C88 C compiler supports four different memory models, incorporates proposed ANSI language enhancements, and has an expanded library that includes the new ANSI functions.

Release 4.0 of C-more, the C source-code debugger, can trace program execution, single-step it, monitor variable values with full attributes and indexing, set simple and conditional breakpoints, evaluate complex expressions, and examine CPU registers.

Ecosoft Inc., 6413 N. College Ave., Indianapolis, IN 46220, 317-255-6476, \$99.95 for Eco-C88. C-more (usually \$49.95) is offered free through the first quarter of 1988 when you buy Eco-C88.

Circle 559 on Reader Service card.

## ADD-ONS

### ...To Dbase

Applications Plus includes three of Fox and Geller's Dbase enhancements: Quick-code Plus, Quickreport, and Dgraph, for bug-free applications and presentation-quality reports and graphs.

Fox and Geller Inc., 604 Market St., Elmwood Park, NJ 07407, 201-794-8883, \$499.

Circle 582 on Reader Service card.

### ...To Word Processors

Lettermaster works with most word processors to create customized mailing lists, labels, and Rolodex cards from existing data bases or Lettermaster data bases.

Research Development Systems, P.O. Box 110216, Arlington, TX 76007, 817-860-0155 or 800-338-9181, \$99.

Circle 585 on Reader Service Card.

### ...To 1-2-3

When you provide low and high accuracies for the independent variables (e.g. sales, expenses, investments) in your spreadsheet, Monte Carlo Plus estimates

## INFO LINE

# THE I.R.S. HAS 102,206 EMPLOYEES. EVEN THE ODDS.

This year, make your tax preparation fast and simple. Just type in your figures and Tax Advantage™ will do the rest. Adding here, deducting there. Planning, calculating and printing out your tax forms so perfectly that the I.R.S. will accept them right out of your printer. And Tax Advantage sells for under \$50.

No wonder it's been the number one tax program four straight years. Now, it's brought to you by Monogram, publishers of Dollars and Sense®, the world's best-selling personal financial management program.

You can buy Tax Advantage wherever software is sold.

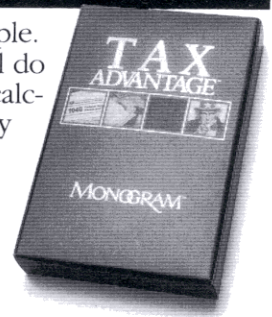
This year, file tax forms so meticulous that not one of those 102,206 people can find anything to pick at.

## MONOGRAM

531 Van Ness Avenue, Torrance, California 90501

(213) 533-5120

CompuServe: 76701,113 ©1987 Monogram Software, Inc.



Circle 46 on Reader Service card.





## ELECTRONICS

100%  
**TANDY**  
RADIO SHACK  
DEALER



WHY TANDY COMPUTERS. . . . . THERES NO BETTER VALUE  
WHY NOCONA ELECTRONICS. . . . . THERES NO BETTER VALUE

1MG. MOD 4000 . . . . .	*1799.00	DMP 106 PRINTER . . . . .	149.00
512K MOD 3000 HL . . . . .	*1039.00	DMP 130 PRINTER . . . . .	249.00
640K MOD 3000 1 DR . . . . .	*1419.00	DMP 440 PRINTER . . . . .	*479.00
640K MOD 3000 20 MG . . . . .	*2139.00	DMP 2120 PRINTER . . . . .	*1129.00
640K MOD 3000 40 MG . . . . .	*2729.00	DWP 230 PRINTER . . . . .	315.00
640K MOD 1000 TX1 DR . . . . .	*729.00	DWP 520 PRINTER . . . . .	709.00
384K MOD 1000 SX1 DR . . . . .	*589.00	20 MG. HARD DISK CARD . . . . .	549.00
256K MOD 1000 HX1 DR . . . . .	*509.00	3.5" DRIVE MOD 102 . . . . .	159.00
512K MOD 6000 15MG 1 DR . . . . .	1959.00	360K DRIVE MOD 3000 . . . . .	135.00
768K MOD 1400 LT PORTABLE . . . . .	*1129.00	1.2 MG DRIVE MOD 3000 . . . . .	209.00
24K MOD 102 PORTABLE . . . . .	369.00	128K COCO 3 . . . . .	129.00
24K MOD 200 PORTABLE . . . . .	619.00	PRINTER SWITCH . . . . .	80.00
32K MOD 600 PORTABLE . . . . .	499.00	PRINTER CONTROLLER . . . . .	179.00
VM-4 MONO MONITOR . . . . .	94.00	250 WT. S/B POWER UNIT . . . . .	*299.00
VM-5 MONO MONITOR . . . . .	109.00	1200 BPS PC MODEM . . . . .	159.00
CM-5 COLOR MONITOR . . . . .	189.00	64K MOD 4-D . . . . .	509.00
CM-11 COLOR MONITOR . . . . .	309.00	DT-100 TERMINAL . . . . .	499.00
EGM-1 COLOR MONITOR . . . . .	499.00	CELLULAR PHONE . . . . .	*639.00
EGA ADPT. CARD . . . . .	219.00	300 BPS DCM 7 MODEM . . . . .	*75.00
LP1000 LASER PRINTER . . . . .	*1529.00		

20% TO 60% OFF CATALOG PRICES..FULL WARRANTY  
100% RADIO SHACK COMPONENTS..UPS DELIVERY  
VISA..MASTERCARD..AMERICAN EXPRESS..FRIENDLY SERVICE

\*NEW ITEMS

**(817) 825-4027**

**NOCONA ELECTRONICS • BOX 593 • NOCONA, TX 76255**

PRICES SUBJECT TO CHANGE WITHOUT NOTICE



the statistical probability of falling short or exceeding the results of your model predictions. The program produces tables and graphs of its risk and sensitivity analyses.

Suntex National Corp., P.O. Box 772868, Houston, TX 77215, 713-783-9059, \$89.  
Circle 583 on Reader Service card.

### ...To Zyindex

Zyindex works with the text-search program, Zyindex, to let you define records and fields in a free-form search. You can define a field as existing from one word or character to another as it already exists in your data.

Zylab Corp., 3105-T N. Frontage Road, Arlington Heights, IL 60004, 312-632-1100, \$95.  
Circle 584 on Reader Service card.

## LITERATURE

### C Library

Eric Bloom's *The C Trilogy: A Complete Library for C Programmers* provides information on such topics as C language rules, syntax, and standard functions; C and MS-DOS; screen and printer control; and structured programming, data manipulation, financial calculating, and array-manipulation techniques.

Tab Books Inc., P.O. Box 40, Blue Ridge Summit, PA 17214, 717-794-2191, \$32.95 (hardbound), \$22.60 (paperback).

Circle 588 on Reader Service card.

## ON LINE

### Bank On It

Weatherbank sifts through mounds of weather data from various agencies and displays it in graphic form. They'll send you their software for free, and for 20¢ per minute, you can access color displays of radar scans, cloud maps, interstate weather reports, temperatures, forecasts and world-wide data.

Weatherbank, 2185 S. 3600 West, Salt Lake City, UT 84119, 801-973-3132.

Circle 589 on Reader Service card.

### E-Mail Order

Hudson Data is now offering hardware, computer supplies, household goods, and other merchandise via their on-line system. No subscription fee or on-line charge is required.

Hudson Data Inc., 18831 W. 12 Mile Road, Lathrup Village, MI 48076, 313-557-1613 (300/1,200/2,400 baud, 8-bit words, 1 stop bit, no parity) or 313-557-4504 (voice).

Circle 590 on Reader Service card.

## USER GROUPS

### Toledo Area Tandy

#### Special Interest Group

TATSIG is dedicated to improving the serious user's abilities and to assisting the newcomer in discovering the machine's potential. Though the group is Tandy-specific, membership is not limited to Tandy own-

ers. It supports all Tandy machines except Pocket and Color Computers. Dues are \$20 per year. Now 4 years old, the group has 179 members, publishes a newsletter, and operates a BBS (313-856-8183 or 313-856-8184, 300/1,200/2,400 baud, 8-bit words, 1 stop bit, no parity).

1632 S. Wheeling St., Oregon, OH 43616.  
Contact A. F. Morel, 419-693-0951.

### Milwaukee Area Tandy Users Group

MATUG disseminates information about software and hardware applications and helps new users get acquainted with Tandy

computers. Tandy-specific, it supports the 1000, 2000, 3000, and TRS-80 machines. The club is 9 years old, has 50 members, and publishes a newsletter. Dues are \$12 per year.

3822 N. 75th St., Milwaukee, WI 53216.  
Contact Ray Ratke, 414-463-5953.

## INFO LINE

# Menu Express™



**FAST,  
ONE-KEYSTROKE  
ACCESS TO ALL YOUR  
HARD DISK SOFTWARE**

Menu Express builds simple, single-keystroke menus easily. Eliminates repetitive DOS commands. Lets you move quickly from one favorite program to another without entering a single command. Plus you get password security — also usage tracking — on whatever items you choose. Be more productive. Control your hard disk like a DOS pro.

- Eliminates repetitive DOS commands
- Multiple levels of password security; screen blanking
- Easy menu setup for advanced point-and-shoot menus
- Usage tracking with detail and summary reporting
- Not copy protected, site licensing available
- 30-day, money-back guarantee

Call toll free  
US 1-800-258-8787 ext 230  
OH 1-800-821-9400 ext 230

**ONLY  
\$49.95**



**FirsTrack Systems, Inc.**

23611 Chagrin Blvd., Suite 101E, Beachwood, OH 44122

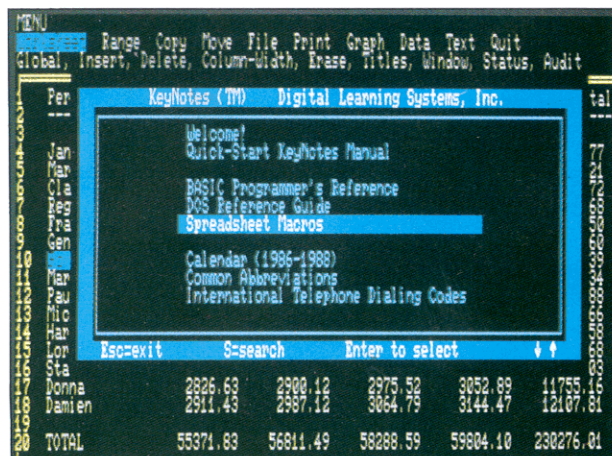
Dealer Inquiries Welcome

+ \$5 shipping/handling

Circle 27 on Reader Service card.



# Keynotes: A Better Help Screen



Keynotes popped up over a Words & Figures worksheet.

by Eric Grevstad

If you've ever thought you could write a better help screen than the programmers who wrote the software you use, or wished for a customized on-line list of commands or addresses, Keynotes offers a simple, ingenious alternative. This memory-resident (35K) reference program works like a cross between a help system and a data base, popping up to show a series of notes or text windows over your application.

Press alternate-F1 (or alternate and another key of your choice), and Keynotes shows a scrolling menu of up to 100 items. Move the cursor to one and press enter, and the window shows either some explanatory text (up to 2,048 characters) or another menu, moving through up to five levels.

You'll never reach the theoretical limit of 10 billion items—Keynotes files, even though stored in a compressed format, can't be that big, and scrolling through more than 20 or 30 menu lines grows tiresome, despite the flexibility of using the up and down arrows or page up/page down, home, and end keys. But there's plenty of room to build as big a pyramid as you like.

A limited search function can find a word on the current level; whether it finds "Toronto" will depend on whether the displayed item, "Cities in Canada," is text (part of the currently loaded file) or a command to load another file.

The sample files, which range from a pop-up Keynotes manual to lists of Basic and DOS commands and international telephone codes, are just the beginning. Keynotes' easy-to-use editor lets you create and rearrange your own menus and specify a pop-up key, a path for menu files, and the name of the top file in your stack. If you need more editing power than backspacing or deleting characters, the editor can import and export ASCII files suitable for most word processors.

Except for its frequent disk access (I'd recommend a hard disk), Keynotes worked smoothly on my Tandy 1000, whether popping up over Xywrite III Plus or interrupting a 1-2-3 recalculation. It had no trouble blanking and then redrawing screens of graphics programs, though my Pac-Man game turned Keynotes' mildly annoying end-of-text beep (when you move to the end of an item with the page down key) into a continuous screech that lasted until I quit Keynotes and resumed play.

The program also coexisted with Sidekick, though I managed to fulfill the manual's warning and crash my system by using both at once (calling Keynotes while Sidekick was still on screen).

## Memory-Resident Writing 101

For a sample of what Keynotes can do, or for those too lazy to make their own files, there's Writer's Handbook. This is a slightly different, bigger version of Keynotes (37K or 49K, depending on graphics support); it omits the editor that lets you change or create files, but adds the ability to set colors or remove Keynotes from memory without rebooting, features that a company spokesperson told me would appear in later versions of the parent program.

More important, Writer's Handbook uses Keynotes' layered topics to give a good pop-up rundown of writing rules and hints. A Letters section covers business, memo, and envelope styles and proper forms of address for every job title imaginable. An Info Bank holds copious lists of abbreviations, holidays, symbols, and foreign phrases, along with slightly thin definitions of computer terms.

The Rules selections range from capitalization and punctuation guides to help with Nyms (acronyms, homonyms, synonyms) and a first-class section on diction, redundant phrases, avoidable clichés, and non-sexist writing.



I could quibble with the Handbook's organization—abbreviations and spelling are each split across different sections—and wish for more examples, along with definitions of commonly misused words (great on *beside* and *besides*, okay on *affect* and *effect*, but disappointing with a wimpy cop-out on *that and which*).

But while Writer's Handbook can't compete with books like *The Elements of Style*, it can certainly help you avoid writing mistakes, without having to leave your word processor. For more serious writers, Digital Learning Systems has announced a Keynotes version of the Associated Press Style-

book (\$49.95), which I'm tempted to endorse sight unseen.

That shows the kind of potential Keynotes has—the potential Borland used to claim for Turbo Lightning, a sort of smaller, home-made version of CD-ROM. The base program is somewhat expensive next to the bargain-priced Writer's Handbook, but it's fun to play with on your own and terrific if you teach or supervise computer users. ■

**Keynotes (\$99.95) and Keynotes Writer's Handbook (\$29.95) are not copy-protected. Digital Learning Systems Inc., 4 Century Drive, Parsippany, NJ 07054, 201-538-6640.**

## Word Processing for the Power-Hungry



The Xywrite III Plus screen.

by Eric Grevstad

There are several good programs for serious word processing, but Xywrite III Plus is designed for fanatical word processing. Compared to Wordperfect (the corporate champion) or Microsoft Word (the desktop publisher's darling), Xywrite is for the user who writes a lot and demands a lot when writing—the kind of person who used to have a souped-up, hand-patched copy of Wordstar, though Xywrite III Plus is a much more elegant and powerful package.

It's very fast, packed with advanced features, and more customizable than anything short of writing your own program. (Indeed, the manual practically tells you how to rewrite Xywrite.)

But such power has its price. While not quite the monster it's made out to be, Xywrite is no cinch for beginners to learn. Its sophisticated spelling, thesaurus, and help functions are happier on a hard disk than on floppies. Some everyday functions are incompatible with the Tandy 1000 keyboard. The supplied Tandy keyboard driver offers only a partial solution.

Nevertheless, as you spend time with the

program you progress from being daunted to impressed to amazed. Imagine a time-saving or formatting feature; Xywrite probably goes beyond what you've imagined. For example, a good word processor can indent the first line of each paragraph to spare you the effort of using the tab key; Xywrite can capitalize the first letter in each sentence so you don't need to press the shift key.

### At Your Command

If you're used to many of today's programs, where F1 is the help key and the escape key pulls down a menu, you'll have to roll up your sleeves to learn Xywrite. There are no menus; some default function-key assignments seem almost random; and you give commands by literally giving commands, moving the cursor between the text area and a command line where you type abbreviated instructions such as LM 10 (set left margin) or TYPE (print).

What you see on screen isn't wholly what you'll get in terms of justification, spacing, and so on, but control-F9 helpfully toggles between displaying embedded formatting commands as little triangles (putting the cursor on one shows its meaning) and spell-

ing them out between brackets.

You won't master Xywrite in an hour, but you'll soon learn the basics: F10 moves between the text and command areas, F5 or F6 clears the command line for a new entry, and F9 executes the most recently entered command, useful for a repeated search or periodic save.

Then, studying the two good tutorial manuals and the excellent detailed reference guide, you can spend a lifetime learning more expert commands—advancing from Type to Types, 3-10,E (print a screen preview of even-numbered pages from 3 to 10), or from Change to the six different search-and-replace commands for on- or off-screen, global or individual, and case-sensitive or case-insensitive changes. The help menu gives you half a dozen ways to look something up, whether from a command index or by typing a key word like DOS or FOOTNOTE.

Xywrite is renowned as the world's fastest full-featured word processor. But a low-priced cult favorite, Ann Arbor Software's Textra, proved fractionally quicker at deleting lines or words. In my search-and-replace test, Textra performed over 2,300 replacements in 2.5 seconds, compared with Xywrite's 4.5; Wordstar Professional Release 4, on the other hand, took 40 seconds.

But make no mistake: Xywrite on an 8088 system beats other programs on an 80286, with amazingly fast file handling, scrolling, and on-the-fly formatting, not only wrapping words but optionally hyphenating them as fast as you can type. Even printing one file while editing another in one of Xywrite's nine document windows won't slow you down.

Speaking of printing, since Xywrite produces pure ASCII files, it's ideal for applications requiring importing files from or exporting files to other word processors. Xywrite can also produce a printer-ready file with proper control codes for printing from DOS. If your spreadsheet or graphics program can do the same, you can include the file in a Xywrite document.

### Formats and Features

There's more to Xywrite's formatting than word wrap and hyphenation. The program offers default or dynamic control of everything from headers and footers to automatically numbered and positioned footnotes. You can not only specify flush left, right, or centered lines, but also flush tabs to mix such alignments on a single line.

You have a choice of two ways to print columns: a spreadsheet-like table on screen (the shift and arrow keys move the cursor among up to 10 independently formatted column areas) or one skinny column that "snakes" into two to six columns when printed.

As for vertical formatting, III Plus goes beyond manual or conditional page breaks to give you control of widow or orphan

(continued on page 56)



# Clone ™

## IBM® QUALITY AT AN AFFORDABLE PRICE!



### CLONE 286

## \$1599

The Finest AT Clone Yet!

Add \$45 shipping for ground, \$90 for air.

With  
MS-DOS® 3.3  
& GWBASIC  
\$69 Extra

#### STANDARD FEATURES

- Intel 80286 @ 10mHz - 0 Wait States  
6mHz - 0 Wait States
- 1024K 120ns RAM on Mainboard.
- 80287 Socket.
- 1.2MB Floppy Drive.
- 1.44MB 3.5" Floppy Capability.
- 42.8 megabyte Seagate ST251.
- Combined Hard/Floppy Controller.
- 200 Watt Power Supply.
- Hercules® Compatible Monochrome Card.
- HiResolution TTL Monitor (Green or Amber).
- LED's for Power, Turbo and Hard Disk Access.
- Keyboard Lock.

- Clock/Calendar with AA Battery Backup.
- Enhanced 5339 Keyboard.
- 2-Parallel Printer Ports.
- 2-Serial Ports (1 - Optional \$29).
- Game-Joystick Port.
- System Hardware Reset Switch on Front Panel.
- 8 Slots.
- FCC Class B Certified.
- Fully Expandable.
- Setup in ROM.
- Novell Compatible.
- PC-Write - QModem - Express Calc - HomeBase - MoneyMaster - Findex - Clone Utilities.
- One Year Parts and Labor Warranty.

CGA. With CGA card and RGB monitor ..... \$1783  
EGA. With EGA card and EGA monitor ..... \$1978

VGA. With VGA card and MultiFrequency monitor ..... \$2221

## TURBO CLONE

AT Style Keyboard

## \$649

Add \$35 shipping for ground, \$70 for air.

With  
MS-DOS® 3.3  
& GWBASIC  
\$69 Extra

#### STANDARD FEATURES

- 4.77 - 8mHz Turbo-speed Mainboard.
- 640K RAM.
- 8087 Socket.
- 150 Watt Power Supply.
- 360K Floppy Drive with Disk Controller.
- Hercules® Compatible Video Card.
- HiResolution TTL Monitor (Green or Amber - your choice).
- 2-Parallel Printer Ports.
- 2-Serial Ports (1 - Optional \$29).

- Game - Joystick Port.
- Clock/Calendar with Battery Backup.
- AT Style Keyboard.
- 8 Slots.
- Fully Expandable.
- Mom's ROM BIOS.
- PC-Write - QModem - ExpressCalc - HomeBase - MoneyMaster - Findex - Clone Utilities.
- FCC Class B Certified.
- One Year Parts and Labor Warranty.

COLOR CLONE. Turbo Clone with CGA card and RGB monitor .... \$833

HARD CLONE. Turbo Clone with 21.4MB Seagate ST-225 installed ..... \$928

EGA CLONE. Turbo Clone with EGA card and EGA monitor ... \$1028

VGA CLONE. Turbo Clone with VGA card and MultiFrequency monitor ..... \$1271



#### OUR GUARANTEE

Simply, if anything is wrong with your Clone, we'll fix it free for up to one year after you receive it. Our Warranty is so simple and straightforward you may be skeptical, so here is the fine print.

You can void your warranty by failing to exercise normal care when hooking up or operating your Clone. Or trashing its guts with a hammer. Or running it over with something. Or burning it up.

You have 30 days after receipt of your Clone to see if you and it are going to be compatible. If you are not satisfied with your Clone for any reason within that time, you may return it to us for a full refund, less shipping charges. Just don't write in the manuals and damage or lose anything that was in the original container, which also must be returned. Complete warranty details are available on request.

#### NO ORPHANED CUSTOMERS!

We have been supplying our customers with high quality hardware, software since 1980. Sound engineering, high performance, quality construction, outstanding warranties and a reputation for doing the right thing have been our way of doing business since Day One. As the manufacturer of Clone computers, we stand behind each computer sold with a 100% commitment to our customer's satisfaction. Price, Performance, Value...Clone is the clear choice for serious computer users. To order, call us today toll-free. REMEMBER...YOUR BEST FRIEND MAY BE A CLONE.



#### BUY A COMPUTER WITHOUT LEAVING YOUR CHAIR!

Just pick up the phone and call us toll-free. Your American Express, MasterCard and Visa are welcome at no extra charge, as well as your check, money order or COD order. UPS will deliver right to your door.

We sell Clones exclusively by mail. And there is a good reason why. Your are buying the Clone computer at wholesale prices, direct from the manufacturer. We know more about your Clone than anyone, and it comes with an iron-clad guarantee that exceeds most other manufacturers' and we have been around long enough to enforce it. Our guarantee is backed by a reputation earned during years of experience in the mail order and manufacturing business. Think about it. Repeat orders come from satisfied customers. This makes us work very hard to get it right the first time.

IBM is a registered trademark of International Business Machines.

# ORDER TOLL FREE 1-800-527-0347

from anywhere in the lower 48 states and Hawaii.

Circle 404 on Reader Service card.

AD 12



# OPTIONAL EQUIPMENT FOR CLONE COMPUTERS

## TTL DISPLAY



12" HiResolution monochrome display, 1000 x 350 dots, 24 mHz. Please specify either a green or amber screen ..... \$65\*

\*With purchase of our computer.

## RGB DISPLAY



14" CGA/RGB 640 x 200 resolution, 16 colors. Green text switch. A tilt/swivel base is also included. 15mHz ..... \$184\*

14" CGA/RGB 640 x 200 resolution. Green text switch. Built-in tilt/swivel base. VCR and audio inputs. 16mHz ..... \$217\*

\*Exchange price including CGA card.

## EGA DISPLAY



14" EGA/CGA/RGB dark glass non-glare tube, 0.31mm dot diameter, 640 x 350 resolution, 64 colors, amber text switch, and a built-in tilt/swivel stand, 20mHz ..... \$379\*

14" EGA/CGA/RGB non-glare tube, 0.31mm dot diameter, 720 x 350 resolution, 64 colors, amber or green text switch ..... 399

\*Exchange price including EGA card.

## MULTI-FREQUENCY DISPLAY

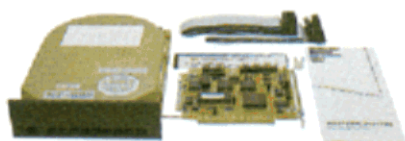


14" VGA/EGA/CGA/RGB/HERC/MONO. 15kHz to 34kHz horizontal scan. TTL and analog inputs plus audio, green text switch, and a tilt/swivel base. 25mHz ..... \$622\*

NEC MultiSync II ..... 702\*

\*Exchange price including VGA card.

## HARD DRIVES



21.4MB Seagate ST225 kit as shown ..... \$279  
32.7 MB Seagate ST238 kit as shown ..... 309  
42.8MB Seagate ST251 kit as shown ..... 479  
65.5MB Seagate ST277 kit as shown ..... 549

All sizes are after formatting.

## FLOPPY DRIVES



360K 5.25" 40tk TEAC bare drive ..... \$99  
720K 5.25" 80tk TEAC bare drive ..... 109†  
1.2M 5.25" 80tk 2-speed TEAC bare ..... 119\*  
360K 3.5" 40tk TEAC bare drive ..... 99  
720K 3.5" 80tk TEAC bare drive ..... 109†  
720K 3.5" TEAC but in 5.25" bracket ..... 129†  
1.44M 3.5" 80tk 2-speed TEAC bare ..... 139†  
Dual 5.25" drive case/power supply ..... 59  
Dual 3.5" drive case/power supply ..... 89  
External drive cable for use with 37-pin external floppy controller port ..... 39  
External drive cable for use with 2-drive controller. Plugs into drive "B" connector inside computer case ..... 39

\*Requires an AT type controller.

† Requires DOS 3.2 or later.

‡ Requires a compatible BIOS.

All floppy are half-height.

## TAPE BACKUP



Uses existing floppy controller. Multiple tape capability allows use of any size hard drive. Automatic backup included with software.

Irwin 20MB internal, specify XT/AT ..... \$299†  
Irwin 20MB external, specify XT/AT ..... 449†  
Mountain 40MB internal, specify XT/AT ..... 399  
Data cartridge, specify 20 or 40MB ..... 22  
Adapter cable to use external tape in place of internal floppy drive "B" ..... 39

† Takes the place of floppy drive "B".

‡ For XT/AT with external 37 pin floppy controller port.

## ADD-IN BOARDS

Hercules type graphic card w/printer ..... \$49  
Color graphics card w/printer port ..... 49  
EGA, CGA, HERC, including software ..... 129  
VGA, EGA, CGA, HERC, 132 col. with software ..... 299  
2-drive floppy disk controller with internal cable ..... 21  
4-drive floppy disk controller with internal cable ..... 29  
Multi I/O Par/Ser/Clk/Cal/Game/2-dr FDC ..... 69  
XT I/O as above except no FDC ..... 59  
AT I/O Par/2-Ser/Game ports ..... 49  
2MB EMS XT Mem. card L-I-M w/OK RAM ..... 79  
2MB EMS AT Mem. card L-I-M w/OK RAM ..... 99

## MODEMS

300/1200 Baud internal with software ..... \$69  
2400 Baud internal with software ..... 179

## KEYBOARDS



IBM AT type layout. 84 keys ..... \$34\*

\*With purchase of our computer, otherwise \$49.



IBM AT enhanced style. 102 keys ..... \$30

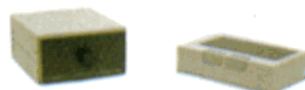
\*Exchange, otherwise \$69.

## STAR PRINTERS

NX-1000 144/36cps, NLQ, 4K buffer ..... \$179\*  
NX-15 120/30cps, NLQ, 5K buffer, wide ..... 299\*  
ND-10 180/45cps, NLQ, 12.6K buffer ..... 279\*  
ND-15 wide carriage version ND-10 ..... 379\*  
NR-15 240/60cps NLQ, 12.6K buffer ..... 479\*  
NB-15 300/100cps NLQ, 16K buffer ..... 699\*  
NB24-10 216/72 LQ, 24 wire, 5K buff ..... 459\*  
NB24-15 wide carriage version ..... 569\*

\*With purchase of our computer.

## PRINTER SWITCHES



2-pos DB-25 input/output connectors ..... \$39  
2-pos Centronics input/output connectors ..... 39  
4-pos DB-25 input/output connectors ..... 49  
4-pos Centronics input/output connectors ..... 49

All connections switched. May be used with multiple computers or printers.

## CABLES

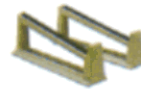


10' Centronics, specify M/M or M/F ..... \$20  
10' Standard IBM printer cable ..... 12  
10' DB-25, specify M/M or M/F ..... 20  
10' Tandy 1000 printer cable (26-1401) ..... 9  
6' coiled keyboard extender cable ..... 9  
6' DB9 M/F video extender cable ..... 9  
6' special IBM hooded power/IEC cable ..... 9  
Centronics M/M gender changer ..... 9  
DB25 gender changer specify M/M or F/F ..... 9

Cables are fully shielded with molded connectors and thumb screws (except Tandy).

## ACCESSORIES

Printer Stand fits all ..... \$9



5.25" Head Cleaning Kit ..... \$6

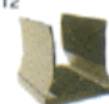
Disk Storage Box w/Key Lock & Dividers holds 100 disks ..... \$9  
With 100 DSDD disks ..... \$49



Tilt/Swivel Stand for 12" monitors .. \$9  
for 14" monitors ..... 12



CPU Floor Stand Heavy Duty Metal Adjustable ..... \$24



CLONE COMPUTERS • 2544 W. Commerce St. • Box 223957  
Dallas, Texas 75222-3957 • Telex: 882761 • Fax: 214-634-8303

© 1987 by Clone Computers. All rights reserved. Prices and specifications subject to change without notice. All prices are in U.S. Dollars. Payments must be in U.S. funds drawn on a U.S. bank.

Clone **smolC**™

Circle 421 on Reader Service card







# The 1000 TX: Vive la Difference!

*Newest 1000-series is faster—but how much?*

by David A. Williams

**T**he Tandy 1000 TX, the latest and most powerful computer in the 1000 series, differs only slightly from the earlier 1000 SX. But vive la difference!

Replacing the aging 8088 microprocessor with an 80286 running at 8MHz boosts processing speed by a factor of seven, according to a popular speed index, when compared with a standard PC. Other differences include a 3½-inch disk drive instead of the older 5¼-inch size, 640K of memory (up from 384K), the addition of a volume control, and a nine-pin serial port instead of a light-pen port.

Options include a battery-powered clock, a 128K memory expansion, and an 80287 math coprocessor. Five 10-inch, 8-bit expansion slots will accept most of the shorter PC-compatible accessory cards. Unlike most other 80286 computers, the 1000 TX has no 16-bit expansion slots. The second drive slot takes either size floppy drive.

Adding a hard disk presents some difficult choices. Tandy offers only a 20MB hard-disk card (\$799) and a 20MB external drive (\$699). The external drive requires a controller card (\$299.95). While a third-party, half-height drive might fit in the second drive slot, the puny 67-watt power supply limits your choices.

The 3½-inch floppy drive exacerbates this problem. Although the 3½-inch drive may soon become the industry standard, a 5¼-inch drive will be an essential accessory for TX owners with an inventory of software. This leaves you with nowhere to put an internal hard drive unless you remove the 3½-inch drive. On the other hand, if you don't have a hard drive, the higher capacity of the 3½-inch disks greatly reduces the disk swapping you have to do.

Physical appearance is nearly identical to that of the SX. A red reset button, keyboard socket, joystick ports, volume control, and a phone jack are arrayed across the bottom of the front panel. The rear panel contains Tandy's usual non-standard, card-edge printer connector, the serial port, monitor connector, and jacks for video and audio outputs.

## Software and Documentation

The 1000 TX comes with MS-DOS 3.2, GW-Basic, and Personal Deskmate 2. Documentation consists of an owner's guide, a command reference, and the Deskmate manual. The first half of the owner's guide tells you how to set up the computer and install options, and describes the keyboard. The second half introduces MS-DOS. Both are clearly written and amply illustrated.

The DOS documentation is the bare minimum you'll need to get started. For example, there's no mention of batch files, Config.SYS, or ANSI.SYS—a serious omission. A spreadsheet program refused to run until I installed a Config.SYS file to increase the files' and buffers' parameters.

The Quick Reference includes brief descriptions of DOS and Basic commands—too brief to impart adequate understanding of what they do. Plan on buying the separate *DOS/Basic Reference Manual* (\$29.95).

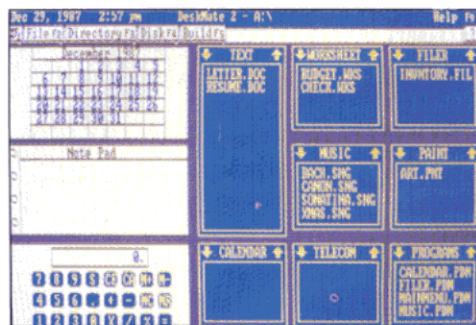
You'll find several commands and utilities that don't appear in other versions of DOS 3.2. The Mode command has several options unique to the TX. The Spooler com-

---

*The Tandy 1000 TX comes with 640K, one 720K 3½-inch disk drive, five 10-inch expansion slots, MS-DOS 3.2, GW-Basic, and Personal Deskmate 2. Tandy Corp., Fort Worth, TX 76102. Catalog no. 25-1600, \$1199.*

---





**Photo 1. The Tandy Personal Deskmate 2 main menu shows all the available applications plus the files available under each. Applications are accessible from the keyboard or by using a mouse.**



**Photo 2. Filer is a computerized index-card filing system that simulates real file cards.**

mand controls and gets the status of the print spooler, a device driver also included. The utilities include a disk cache, a file-compression program, backup and restore utilities said to be faster than the DOS commands, and a file-encryption utility.

Personal Deskmate 2 is an integrated program that includes seven main programs

and several accessories (see Photo 1). In the former category are an appointment calendar, a filing system (Photo 2), a music program (Photo 3), a paint program (Photo 4), a communications program, a word processor, and a spreadsheet.

The five accessories you can call up from within the Deskmate applications (but not

other applications) include a notepad, a monthly calendar, a calculator, a phone directory, a clipboard, and utilities to change certain program parameters. The program almost fills a 720K disk.

A 450-page reference manual tells you everything you need to know about Desk-mate. Pages containing operating instruc-

## Upgrade Kit Expands TX Memory

by David S. Veale

**O**ne of the features of the Tandy 1000 series is its enhanced CGA (color-graphic adapter) display modes. While the 1000 maintains the IBM standard CGA resolution (640 by 200 or 320 by 200 pixels), it provides twice as many colors as IBM (four instead of two in high-resolution mode and 16 instead of eight in medium-resolution mode). But these enhancements come at a price: Boot up a 1000, run CHKDSK, and you'll find that you've lost 16K of your total memory. Because of its enhanced CGA capabilities, the computer will grab between 16K and 128K of user RAM for video use.

This means that if you have a program that requires 512K to run on an IBM PC and you have 512K in your Tandy 1000, the program may not work because your machine really has only 496K—or less—available for programs.

But in the new 1000 TX, Tandy has provided a way to deliver the promised 640K. Four sockets on the system board accommodate additional memory; by installing the 128K RAM Upgrade Kit (catalog no. 25-4082, \$49.95) it's possible to dedicate the extra 128K to the video circuitry and leave the main 640K memory intact.

The real beauty of this additional memory, however, is the effect it has on the speed of graphics operations. With the extra memory installed, the video circuitry has more room to run, without having to swap in and out of the user's RAM.

To test the effect of the additional memory, we ran several graphics demonstration programs included in Microsoft's Quick Basic 4.0. After compiling the programs to stand-alone EXE files, we ran them on a 1000 TX without the graphics memory installed and then ran them again with the memory installed. We measured an overall

speed increase of between 311 and 430 percent on the programs we ran—a dramatic difference that makes the 128K upgrade a worthwhile option.

To install the additional RAM, remove the cover of the system unit and the metal RFI shield so you can get to the system board. Plug the RAM chips into the four empty sockets and remove the jumper connecting pins E9 and E10 on the system board. That's all there is to it.

Because performing this upgrade changes the entry address of the video memory, you may come across a few ill-behaved programs that fail to function properly. If this happens, replace the jumper on E9 and E10 to disable the additional video RAM. But then you'll just have to hope the program doesn't require a full 640K to run! ■

David S. Veale is a technical writer for 80 Micro. Write to him at 80 Micro, 80 Elm St., Peterborough, NH 03458.

**Table. Execution times of various graphics-intensive programs. Times are in minutes and seconds.**

	BALLPSET.EXE	BALLXOR.EXE	SINEWAVE.EXE	MANDEL.EXE	TORUS.EXE
Tandy 1000A (640K)	01:46	02:36	00:16	14:02	01:40
Tandy 1000 TX (640K)	01:27	02:09	00:13	08:24	01:23
Tandy 1000 TX (768K)	00:28	00:39	00:03	02:48	00:21
Speed Increase 1000 TX with 768K vs. 640K	311%	331%	430%	300%	395%



Make Any Computer Do Exactly What You Want With McGraw-Hill's

# Contemporary Programming & Software Design Series



## 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.

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.

## 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 attached 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



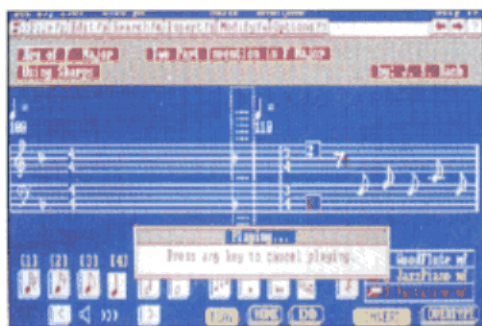


Photo 3. Personal Deskmate 2's music program produces melodies in three voices.



Photo 4. A sample picture produced using Personal Deskmate 2's 16-color paint program.

tions are divided into two columns, one for keyboard use and one for the mouse. The reference section's encyclopedia format makes it easy to find what you're looking for.

Many first-time users will find Deskmate adequate for their needs, but most will soon want more powerful, stand-alone programs, and pop-up accessories they can use within any application. Experienced computer users can skip it entirely.

### The Inside Story

The 1000 TX is sturdy and well built. The innards are neatly laid out and readily accessible once the covers are off. The overall effect is one of quality and attention to detail. The RFI shielding appears sufficient; my Walkman picked up no interference when I placed it beside the computer. I did have to turn the volume up, though, to drown out the louder-than-average fan noise.

The built-in video controller supports the color-graphics adapter (CGA) standard and can drive either a composite monochrome monitor or a color graphics monitor. You can install a separate video adapter, but some enhanced graphics adapters (EGAs) might not work.

It is unfortunate that Tandy elected to ignore the newer video standards. The CGA was mediocre from the beginning; the EGA, multi-color graphics array (MCGA), and video graphics array (VGA) standards have rendered it obsolete. Unlike the standard CGA, Tandy's requires no special snow-prevention programming.

As in other 1000-family computers, video memory is taken from the 640K system RAM. The 128K memory expansion gives this memory back to your programs and provides additional paging capability for programs written to take advantage of it (see "Upgrade Kit Expands TX Memory" on page 34).

I ran several benchmarks and application programs to check the TX's performance. It is slightly slower than an 8MHz AT clone, probably because of the TX's 8-bit memory bus. Compared with a standard PC, its true performance improvement is

probably more like a factor of three rather than six, as stated in Tandy's ads. Since some software might not load or run at 8MHz, you can use the Mode command or hold down the F4 key during startup to change the clock speed to 4MHz.

I noticed an anomaly when running some compiled Basic programs. When running stand-alone programs, the TX performed normally, but its performance fell by a factor of four when it ran the same programs compiled to use the run-time module. The 1000 SX shares this fault to a lesser degree, but four other computers executed both program types at the same speed. I doubt this phenomenon would occur in an application, but it's possible.

The keyboard is the standard 1000-style, still an oddball even though IBM has adopted the 12-function-keys-across-the-top layout. Tandy has recognized that some

**T**he overall effect is one of quality and attention to detail.

users may not be happy with this keyboard and has provided an optional adapter (\$99) that will let you connect an IBM-compatible keyboard.

### The Bottom Line

Keep in mind that the 1000 TX is a compatible, not a clone. If you're upgrading from an earlier 1000, you've already learned to live with its idiosyncrasies. If you're moving up from a Tandy 1200 HD or another clone, the strange keyboard, the short expansion slots, and the possibility of compatibility surprises might bother you—though you probably don't need to worry

about the latter.

Tandy has solved many of the compatibility problems present in the earlier 1000s. Every program I tried, including several memory-resident programs, worked perfectly.

It should be stressed that the TX is not an AT or Tandy 3000 compatible. With its 8-bit bus, it is not intended to run Xenix, OS/2, or other 80286-type operating systems. The only 80286 advantage you get with the machine is speed. Tandy could have economized by using an 8MHz 8086 instead of the 80286, without significantly compromising performance.

To compare value, though, you have to add the cost of the accessories you'll need to the TX's \$1,199 price tag. Start with a 5¼-inch floppy drive from Tandy at \$169.95. Since an 80286 computer without a hard drive just doesn't make sense, add \$799 for the Tandy hard card. (You can save several hundred dollars—and improve performance—if you opt for a third-party hard drive instead of the Tandy hard card.)

Now add \$399.95 for Tandy's better quality color monitor, \$39.95 for the battery-powered clock, and \$49.95 for the video expansion memory. The total, if you don't have your calculator handy, is \$2657.80.

Although slightly more pricey than the clones, the TX is still \$500 less than a comparably equipped IBM PS/2 Model 30, which would be considered the TX's closest competition. Compare that, however, with the price of a typical AT clone with 1MB of RAM, a 20MB hard drive, an EGA monitor, 16-bit, full-size expansion slots, a battery-powered clock, two serial and two parallel ports, and a 190-watt power supply for \$2299.

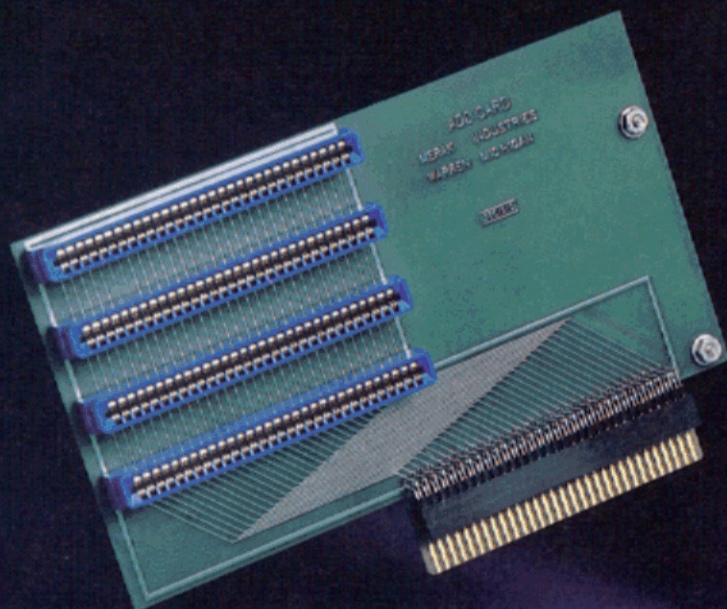
Of course, you might have to order the clone by mail, and you won't have your friendly Tandy computer store to go to if you have trouble. You make the choice. ■

David A Williams is a staff engineer with a major aerospace firm and has 25 years of experience with computers. Write to him at 2452 Chase Circle, Clearwater, FL 33546.



# Two for your Tandy

This year, give your  
Tandy *Power* and  
*Performance*



**\$99.00**

## Slot Addition Card

With this completely internal card you can add three expansion slots to your 1000 or 1000A. Includes five-year warranty.



**\$395.00**

## 30 Megabyte Hard Card

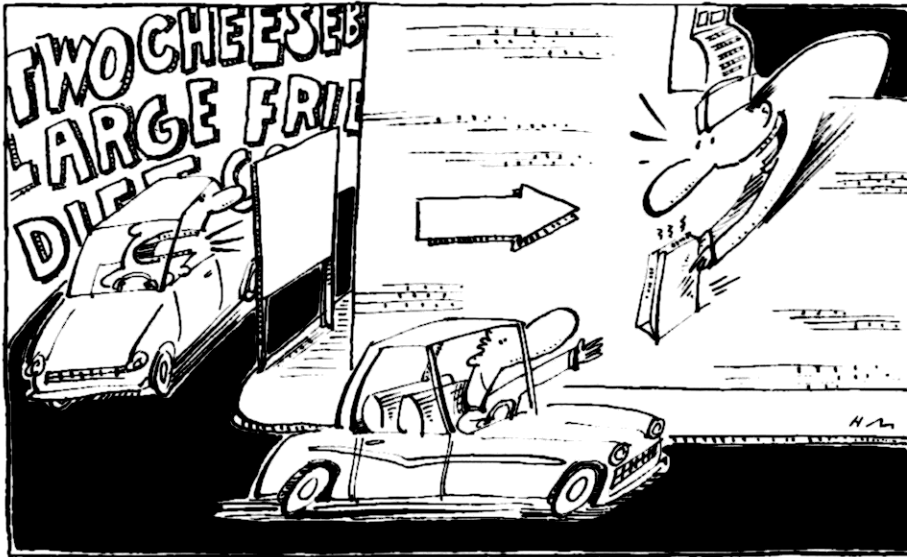
Standard features include: auto-parking, low power consumption, Tandy - IBM switchable, preformatted with two-year warranty.

**Discount Computer Supplies** specializing in Tandy upgrades & enhancements.  
89 Columbus Rd., Athens, OH 45701 **National:** 1-800-537-3539 **Ohio** 1-614-594-4180  
We accept Visa, Mastercard, and C.O.D.'s. Dealer and foreign orders welcome.



# Menus à la Carte

Order up this menu-module program and get complete menus to go.



by William McMullan

**W**riting menus can be a tedious—though vital—part of the programming process. Whether your program is long or short, its menu will be surprisingly similar to the last one you wrote. Producing the same code over and over, therefore, is a tiring waste of time. To solve this problem, I've written Menu.MOD, a flexible, bug-free, menu-module program.

## Just a Taste

Menudemo.BAS is a short, powerful program that will give you a taste of this menu module. To see how it works, type and run the program (see Program Listing 1).

You can use both upper- and lowercase, and don't worry about typing a wrong response; nothing will happen if you do. Lines 1010, 1020, 1030, and End in line 1040 represent routines in a normal Basic program. I used DOS commands for demonstration purposes. Save the program as Menudemo.BAS.

To use the menu module, delete lines 10-60 and lines 1000-11010. Then save a copy in ASCII by typing:

SAVE "MENU.MOD",A

This lets you merge it with the next program you write. You will need to add a Data statement containing the menu elements to the end of your program (see line

11010 in the demonstration program).

The first data is the menu title. Load the menu title into MT\$ and use it in lines 110, 120, and 130. The second data is a number, in this case, the number 4, which tells the program that the menu will have four elements. It is used in lines 110, 120, and 140 as the variable MN. The rest of the data are the prompts that will appear in the menu.

Next, change the letters "ADSQ" in line 150 of the MID\$ statement to the new menu's letters of choice that you will use in your program. Change the letters in line 210 of the INSTR() statement using the same sequence. Be sure to include the upper- and lowercase of each choice. You will notice a blank space before the letters. This permits you to type in a wrong response without anything appearing to happen; the Goto 200 in this same line actually takes you back for another try. Note that in line 210 you must change the numbers after the second 200 to match the locations to which you will branch in your program.

The calculations in line 120 let you center the menu vertically on the screen. The portions containing the variable MT center the menu header horizontally. The variable MR is used in the Locate statements. The "25" represents the 25 screen lines, and "5" is the overhead, which includes the top bar and bottom bar plus the spaces. The variable MN is the number of menu choices. If you need to add more rows, you can remove the spaces.

All the variables in Menu.MOD start with the letter M. This eliminates most conflicts with the program with which you will merge the menu. This also makes using the DEFINT statement easier. If possible, avoid using variables starting with "M" in the rest of your program. Be sure to include a DEFINT M in the beginning of your program; it is good programming practice to define integers whenever possible.

You can use the menu in a program as many times as you like. In fact, you can include different elements each time by adding Data statements that will be read

---

System Requirements: Basic. Available on the January-March 1988 Disk Series.

---



People Who Shop—Around Buy—Here

**“ALL” TANDY<sup>®</sup> COMPUTERS & PRINTERS from \$1.25 EACH**  
1K RAM

All  
Radio Shack  
products

**NATIONAL**  
**COMPUTER WAREHOUSE CLUB**  
**FREE MEMBERSHIP**  
With Your First Order

All  
Radio Shack  
products

The Tandy 1000 HX



The Tandy 1000 TX



**\$799.**  
Reg. \$1199.

The Tandy 1400 LT



The Tandy 4000



The Tandy 3000 HL



The Tandy 3000



Tandy Daisy-Wheel Printers



**No risk--30 days hardware satisfaction or return guarantee**  
**If it's not here please call - we've got it!**

Cat. #	Description	Reg. ea.	5 or more	2-4	Single	Cat. #	Description	Reg. ea.	5 or more	2-4	Single
25-1052	1000SX 384K 1DD	\$849	\$565	\$575	\$585	25-3500	1400 Portable 768K 2DD	\$1599	\$1159	\$1169	\$1179
25-4001	3000 512 1DD	2199	1200	1210	1220	26-3803	102 Portable 24K	499	374	379	384
25-4070	3000HL 512K 1DD	1699	838	848	858	26-3860	200 Portable 24K	799	613	623	633
26-1070	Mod 4D 64K 2DD	1199	494	499	504	26-1280	DMP 130 100 cps	359	252	257	262
25-1020	VM-4 Monitor	129	91	96	101	26-2808	DMP 440 300 cps	699	480	490	500
25-1023	CM-5 Color Monitor	299	209	214	219	26-2812	DWP 230 200 wpm	459	319	324	329
25-1053	1000HX 256K 1DD	699	504	514	524	26-2800	DWP 520 500 wpm	995	706	716	726
25-1600	1000TX 640K 1DD	1199	797	799	799	26-2811	DMP 2120 240 cps	1599	1090	1100	1110

PRICES: SUBJECT TO CHANGE - INCLUDES 3% PRE-PAYMENT DISCOUNT - PLUS SHIPPING & HANDLING

**HOW TO ORDER and JOIN**

1. Mail your check, including appropriate shipping charge, or
2. Telephone and use your credit card

**TOLL  
FREE**



**1-800-433-SALE**



**MON  
to FRI**

**NEW  
TELEPHONE**

**National Computer Supply**

1200 HWY 377, Granbury, TX 76048

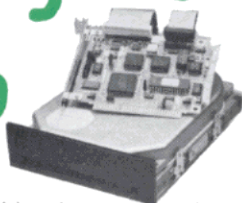
(9AM-5PM Central Time) Customer Service & Texas: 817-573-0220

**EVERY MONTH “A SPECIAL SALE” - CALL FOR THIS MONTH'S SPECIAL**



# Seagate

## kits T1000



Kits include:

- New Seagate drive, 1 year warranty
- Genuine Western Digital Short Slot Controller with 1 year warranty
- Cables, face plate, & mounting hardware included
- Compatible with T1000, A, SX, & TX. (Specify model when ordering)
- 30 Page Installation guide
- The award-winning **TakeTwo Backup Utility**



<b>20MB kit</b>	ST225 65msec.	<b>\$319</b>
<b>30MB kit</b>	ST238 65msec.	<b>\$359</b>
<b>40 MB kit</b>	ST251 40msec.	<b>\$487</b>
<b>65 MB kit</b>	ST277 65msec.	<b>\$599</b>

# Miniscribe

## 32 MB card

### \$419



- Specially designed for Tandy 1000, A, SX, and TX. (Specify Model)
- 32.7 MB capacity, 68 ms. average access
- Low power consumption, 14 watts
- **TakeTwo Backup Utility**
- 1 year warranty



2524B Townsgate Rd.  
Dept. M, Westlake  
Village, CA 91361

- No extra for Shipping, Visa/MasterCard
- 30-Day Money-Back Guarantee
- Corporate & Institutional PO's accepted

To Order, Call:  
**TOLL FREE 800-722-AT-XT**  
**California 805-373-7847**



## MENUS

**Program Listing 1. Menudemo.BAS demonstrates how the menu module works.**

```

10 *** FILE NAME MENUDemo.BAS --MS-DOS-- VER 1.0 05/15/87 ***
20 *** MENU'S THE EASY WAY
30 *** WRITTEN BY WILLIAM McMULLAN
40 *** RT 6 BOX 1, BASTROP, LA. 71220
1385 50 CLS: CLEAR: DEFINT M
60 *** IF YOU USE MORE THAN TEN CHOICES IN THE MENU, YOU MUST DIM MAS().
619 70 KEY OFF
100 ***** START MENU *****
3243 110 READ MTS, MN: FOR MY=1 TO MN: READ MAS(MY): NEXT MY
2530 120 MR= (25-5*MN)/2: MT=LEN(MTS): MT=(38-MT)/2
4489 130 LOCATE MR, 19: PRINT STRINGS(MT, CHR$(205)) " MTS" "STRINGS(MT, CHR$(205))"
1631 140 FOR MY=1 TO MN: MR=MR+1
1524 150 LTR$=MIDS("ADSQ", MY, 1)
1130 155 ML=LEN(MAS(MY))
3915 160 LOCATE MR+1, 23: PRINT MAS(MY); " "; STRINGS(27-ML, "-"); " <LTR$>";
781 170 NEXT MY
2827 180 LOCATE MR+3, 19: PRINT STRINGS(40, CHR$(205));
3515 190 LOCATE MR+4, 26: PRINT "PRESS LETTER OF YOUR CHOICE"
2342 200 MCS="": WHILE MCS="" : MCS=INKEY$: WEND
4416 210 ON 1+INSTR(" AaDdSsQq", MCS) GOTO 200, 200, 1010, 1010, 1020, 1020, 1030, 1030
3799 1000 ***** START MAIN PROGRAM *****
2507 1010 CLS: LOCATE 12, 37: PRINT "<BEEP>": BEEP: GOSUB 10000: GOTO 120
2642 1020 CLS: SHELL "DIR": GOSUB 10000: GOTO 120
4268 1030 CLS: SHELL "DIR/V": GOSUB 10000: GOTO 120
10000 1040 END: ***** REM RETURN TO BASIC OR PUT SYSTEM AND RETURN TO DOS
3376 10000 ***** INKEY ROUTINE *****
3264 10010 LOCATE 23, 27: PRINT "PRESS ANY KEY TO CONTINUE";
10020 MDS="": WHILE MDS="" : MDS=INKEY$: WEND: CLS: RETURN
11000 11000 ***** DATA STATEMENTS *****
5032 11010 DATA "DEMO" MENU, 4, "SOUND THE ALARM", "LONG DIR", "SHORT DIR", "QUIT TO BASIC"

```

**Program Listing 2. Menu.BAS provides a complete, ready-to-use menu module.**

```

1 ***** << Listing No. 2 >> *****
10
1385 50 CLS: CLEAR: DEFINT M
2752 100 M1=0: REM ***** START MENU *****
1390 105 IF M1 THEN RESTORE
2269 150 IF M1 THEN LTR$=MIDS("ADSQ", MY, 1)
2127 152 IF M2 THEN LTR$=MIDS("TDM", MY, 1)
5950 210 IF M1 THEN ON 1+INSTR(" AaDdSsQq", MCS) GOTO 200, 200, 1010, 1010, 1020, 1020, 1030, 1030, 1040, 1040, 4000, 4000
4642 215 IF M2 THEN ON 1+INSTR(" TtDdMm", MCS) GOTO 200, 200, 2000, 2000, 3000, 3000, 0, 5000, 5000
3349 2000 CLS: PRINT "THE TIME IS "TIMES: GOSUB 7000: GOTO 120
3559 3000 CLS: PRINT "TODAYS DATE IS "DATES: GOSUB 7000: GOTO 120
1595 4000 CLS: M1=0: M2=1: GOTO 105
1596 5000 CLS: M1=1: M2=0: GOTO 105
5464 9010 DATA "MENU A", 5, "SOUND THE ALARM", "LONG DIR", "SHORT DIR", "QUIT TO BASIC"
2664 9020 DATA "MENU B", 3, "TIME", "DATE", "GOTO MENU 'A'"

```

into the array MA\$( ) and by using Boolean operators to direct program flow.

### The Full Course

Now merge the Menu.MOD program with Menu.BAS (see Program Listing 2) and run the new version. By studying the new program, you will see how simply it works.

The Restore statement in line 105 ensures that the data is available when you want the first menu. To make sure that the first menu that comes up is the right one, make the Boolean operator not equal to zero in line 50 by setting the variable M1 = 1. To get to the second menu, make the variable M1 = 0 and M2 = 1 in line 4000. (In this case, you arrived at line 4000 through the first menu.) To return to the first menu, reverse the process in line 5000.

Only six more lines are required for the additional menu. The number of menu combinations you can devise using this technique is up to you. If you are using a number of menus and the reading and restoring of the Data statements give you a problem, you could delete line 105 and change line 110 so that MA\$(n) = "element" for the number of elements you want. Include MT\$ = "menu title" and MN = n ("n" being the number of menu choices), and add additional lines as needed. For example:

```
110 IF M1 THEN MT$ = "MENU A": MN =
```

```
4: MA$(1) = "FREE": MA$(2) = "LONG DIR". . . etc.
```

```
112 IF M2 THEN MT$ = "MENU B": MN = 3: MA$(1) = "TIME": MA$(2) = "DATE". . . etc.
```

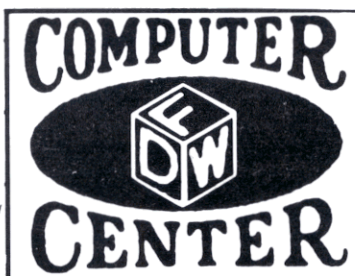
For those who don't understand how the If. . . (variable). . . Then statement works, here is a simple explanation: If the variable—in this case, M1 or M2—is less than or greater than zero, then the rest of the line is used. If the variable is zero, then the program skips to the next line. Some programmers consider Gotos outside a sub-routine bad practice, and in some cases, I agree. You can get around this problem in line 210 if you use Goto statements to go to line numbers inside the menu routine, which, if necessary, can branch with Gosub statements to other parts of the program. Of course, you could change the Goto to a Gosub, but this would create a problem getting back to line 200 when you make a wrong entry.

Finally, renumber the Menu.MOD file so that it fits nicely into your program. This menu module should make your programming a little faster, more enjoyable, and give you more time to be creative. ■

*William McMullan is a self-employed electronics technician and software consultant who enjoys ham radio and computing. Write to him at Route 6, Box 1, Bastrop, LA 71220.*



ALL TANDY®  
Radio Shack products



ALL TANDY®  
Radio Shack products



Tandy®

and  
Radio Shack  
Full Line



Triple Mode Printer  
IBM PC Compatible

FOR YOUR  
SALE PRICE



TOLL FREE 9am To 5pm Central Time.

**1-800-433-S.A.L.E.**

Customer Service and in Texas: (817)-573-7283

Model	Catalog #	Cash
T1000TX.....	(1600)	799.00
T1000HX.....	(1053)	524.00
T1000EX.....	(1050)	480.00
T3000HL.....	(4070)	844.00
T3000HL.....	(4071)	1059.00
T3000.....	(4001)	1220.00
T3000.....	(4002)	1456.00
T4000.....	(5000)	1798.00
T6000HD.....	(6022)	2638.00
Model 4D.....	(1070)	504.00
T102.....	(3803)	384.00
T200.....	(3860)	633.00
T1400LT.....	(3500)	1153.00
COCO 3.....	(3334)	150.00
VM-4 Monitor.....	(1020)	101.00
CM-5 Monitor.....	(1023)	219.00
CM-11 Monitor.....	(1024)	318.00
EGM-1 Monitor.....	(4035)	525.00

Model	Catalog #	Cash
20 Meg HD Card.....	(1029)	614.00
40 Meg HD Kit.....	(4061)	1032.00
20 Meg HD Kit.....	(4062)	481.00
HD Control Board.....	(4060)	265.00
DMP 106.....	(2802)	163.00
DMP 130A.....	(1280)	262.00
DMP 440.....	(2808)	499.00
DMP 2110.....	(2810)	951.00
DMP 2120.....	(2811)	1110.00
DWP 230.....	(2812)	329.00
DWP 520.....	(2800)	725.00
LP 1000 Laser.....	(2804)	1536.00
DT-100.....	(6052)	517.00
Port Disk Drive.....	(3814)	165.00

\* ALL  
UPGRADES &  
INSTALLATION AVAILABLE\*

PRICES SUBJECT TO CHANGE WITHOUT NOTICE TEXAS RESIDENTS ADD 6% SALES TAX

"World's CLOSEST\* independent authorized computer dealer."  
\* Closest to the Tandy warehouse—means faster, cheaper, safer delivery.

☒ CHECK OUR

**NEW PRICES**

**DFW COMPUTER CENTER, 1200 HWY 377, Granbury, TX 76048**



**FREE!**  
 TRS-80 CHARACTER  
 SET & LOADER FOR YOUR PC.  
**NEW!**  
 FILE TRANSFER SERVICE.  
 WE'LL DO IT FOR YOU. DETAILS BELOW.

# TRANSFER ANY MOD I/III/4 FILE CONVERT BASIC PROGRAMS for use on the IBM PC, XT, AT and TANDY PC's

**Conv3toPC V2.0** "Convert Mod I/III to PC package." \$139.95 Includes Hypercross Mod I/III to TRANSFER any Mod I/III file or BASIC program to a PC/MS-DOS Diskette, and Cnv3toPC.BAS to CONVERT 95%\* or more of each transferred BASIC program to PC BASIC syntax. Mod I's need a "disk doubler" to run Hypercross.

**Conv4toPC V1.0** "Convert Mod 4 to PC package." \$139.95 Includes Hypercross Mod 4 to TRANSFER any Mod 4 file or BASIC program to a PC/MS-DOS Diskette, and Cnv4toPC.BAS to CONVERT 95%\* or more of each transferred BASIC program to PC BASIC syntax.

\*Basic programs containing machine language routines & ROM calls are very difficult to convert.

*"...Conv3toPC has saved me months of work!"*  
*"...Conv4toPC is the best conversion package I ever used."*

**AVAILABLE WORLDWIDE through Radio Shack's Express Order Software**

Conv3toPC V2.0 Catalog #90-0345

Conv4toPC V1.0 Catalog #90-3100

## INDIVIDUAL PROGRAMS

<b>Hypercross</b>	Read/Write/Format 5 1/4 PC diskettes in your TRS-80. Mod I's need disk doubler. Specify Mod TRS-80, type & number of drives. ....	<b>\$49.95</b>
<b>PCXZap</b>	Read/Write/Format TRS-80 diskettes in your PC. All DD TRS-80 formats. ....	<b>\$79.95</b>
<b>Cnv3toPC.BAS</b>	4 1/2 Stars, 80 MICRO. Automatically perform 95% or more of the required syntax changes*, flag conditions that need manual attention and explain what needs to be done.	
<b>Cnv4toPC.BAS</b>	They run on a PC and translate ASCII versions of BASIC programs transferred to the PC via HYPERCROSS, PCXZap or our transfer service. Specify 5 1/4 or 3 1/2 PC disk format. ....	<b>\$99.95</b>
<b>PC BASIC RTNS</b>	Includes: HRGF_TIS.COM a machine language terminate and stay resident program that loads a custom TRS-80 graphics set (ASCII codes 128-255), the standard PC graphics set and reserves a 1000 byte scratch pad for use with BASIC/A and QuickBASIC programs. Plus: BASIC and machine language routines to replace TRS-80's CHR\$(30) & CHR\$(31) commands - instantly clear to end line/screen; add video scroll protect and simulate TRS-80 Mod I/III SET, RESET and POINT graphics, etc. FREE with packages below, or.....	<b>\$24.95</b>
<b>FASTSORT</b>	Machine language SORT for the PC, callable from BASIC/A and QB. Excellent replacement for TRS-80's CMD "O" command in converted programs or with new PC programs. Sorts any single dimension array and includes a tag along feature. ....	<b>\$24.95</b>

## PACKAGE DISCOUNTS

Package 1 - Cnv3toPC.BAS + Hypercross.....	<b>\$139.95</b>
Package 2 - Cnv3toPC.BAS + PCXZap.....	<b>\$159.95</b>
Package 3 - Cnv4toPC.BAS + Hypercross.....	<b>\$139.95</b>
Package 4 - Cnv4toPC.BAS + PCXZap.....	<b>\$159.95</b>

## **NEW!** FILE TRANSFER SERVICE!

If you'd rather "leave the driving to us," EMSI will transfer ANY TRS-80 Mod III/4 data file to the PC for use with ANY PC data base. For example, we can transfer a PROFILE file to the PC; unblock the KEY segment and consolidate the DAT, DA2 and DA3 segments as necessary; eliminate records flagged for deletion; expand, delete or rearrange fields; provide a printed record/field analysis to facilitate defining your new PC record layout; and create a custom tailored sequential fixed length or quote/comma delimited file for importing into dBase III, dBase III, etc., etc.

**Call today for further details and a free estimate.**



# EMSI

## 201-879-5982

PO Box 471, Chester, New Jersey 07930



EMSI direct order terms: VISA, Mastercard, MO check or COD. Add \$3.00 shipping/handling, Add \$1.90 for COD.  
 Foreign or first class, add first class postage (package wt. 2 1/4 lbs.) NJ residents add 6% sales tax.



# Files by Number

Select your data files without typing their names.

by David Leithauser

**M**any programs—most obviously, word processing and data-base programs—allow you to save files. Though others do not, it's possible to modify these programs to allow you to save data. For example, you can use a "Save Game" feature in games that run a long time (such as adventure games or complex simulations) to stop the game before it's finished. Any program that runs a long time can benefit from a save function; if you're writing a program, this is a feature you may want to include.

The usual procedure for saving a file is to enter a file name. Later, when you want to retrieve it, you type in the same file name. This requires that you remember the name you used to save the data.

You can use the Files command to call up a list of files to help you remember which files are on the disk, but this can create a few problems. First, the Files command will display all the files on disk, such as Command.COM, the program itself, and the data files. The Files command will also show any extension the program has added to the file name. For example, you may have the program add the extension DAT to the eight-letter name you give a data file. But seeing these extensions on the names can be confusing. Finally, you have to find the name of the file and type it in exactly to load the file. This introduces the possibility of error.

To give your programs a more professional look, you can have them list only the data files on that disk. You can have the program remove the extensions before it displays the names and even sort the names of the files alphabetically. Best of all, you can have the file names numbered in the list (see the Photo) so you can select a file by typing the number of the file instead of typing the whole name.

Program Listing 1 is a subroutine to let you

do this. Type Listing 1 and save it in ASCII with the command SAVE "file name", A. The subroutine stores each file name in one element of the F\$ array. Only files with specific extensions (such as DAT or BAS) are stored in the array; the extension is not stored. For example, if you were searching for all files with the DAT extension, and the files on the disk with this extension were Tom.DAT and Sue.DAT, then F\$(1) would contain Tom and F\$(2) would contain Sue when the computer returned from this subroutine. The variable F would contain the number of files found, which would be two in this case.

## How It Works

The subroutine works by using the Files command to display the files on the screen, then actually reading the file names off the screen. To avoid messing up your screen, the subroutine performs this operation on screen 1 while allowing you to continue seeing screen zero. This makes the entire operation invisible. Unfortunately, this works only on computers with the CGA card, and only in the text mode. If you want the program to operate on computers without CGA, or if your program is operating in a graphics mode, you must omit the part of line 60000 before the CLS command and the part of line 60130 before the On Error command.

Line 10, which is not actually part of the subroutine, dimensions the F\$ array to hold the file names. This subroutine can obtain a maximum of 79 names if the computer has a screen width of 80 and 39 names if the screen width is 40. Fortunately, this is usually enough.

Line 60000 stores the x and y positions of the cursor in CX and CY, respectively, so that the subroutine can return the cur-

---

System Requirements: GW-Basic. Available on the January-March 1988 Disk Series.

---





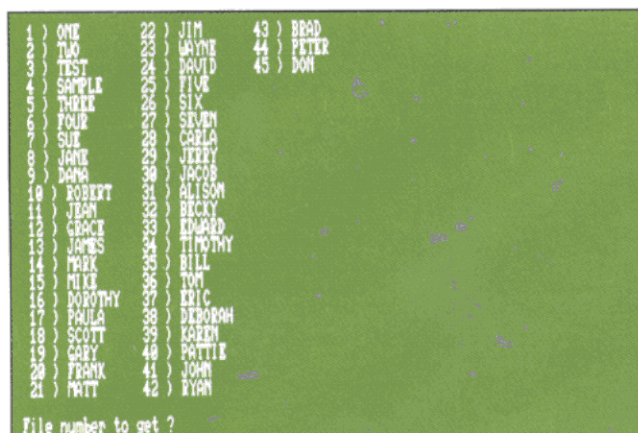


Photo. A sample menu.

sor to its original position when the computer goes back to screen zero. Then the Screen command diverts all input and output to screen 1, while displaying screen zero. It then clears screen 1 and prints 45 spaces. After it has done this, the X position of the cursor tells the computer whether you have a screen width of 40 or 80. Depending on the screen width, the variable LW will have a value of 19 or 55. This variable tells the computer where to look for the file names on the screen.

Line 60010 clears screen 1 again. It then activates error trapping, which is designed to return the computer from the subroutine immediately if an error occurs while the computer is executing the subroutine. The only likely one would be a "File not found" error caused by the absence of files with the desired extension on the disk.

After setting the error trapping, line 60010 sets F=0 and executes a Files command. If there are no files with the desired extension on the disk, the error trapping sends the computer to line 60140, which sends the computer to line 60130. This line returns the computer from the subroutine.

The command FILE "\*" + EX\$ causes the computer to display any files with the extension stored in EX\$. I wrote the command this way for the sake of generality. You could store any extension you like in EX\$. If you always use the same extension in your program, you could modify the Files command to contain a string constant instead of a variable. For example, if your program always looks for files with the extension DAT, you could change FILES "\*" + EX\$ to FILES "\*.DAT".

Once the Files command has displayed the names of the files on the hidden screen (the one you cannot see), lines 60020-60120 read the names from the screen, picking letters off the screen one at a time. Lines 60060-60100 put these letters together into a name for each file. After these lines finish collecting the letters in one file name, line 60050 increases F by one and starts on the

next name. As soon as line 60040 finds a space where a file name should start (which indicates the end of the list of files), it sends the computer to line 60130 to return from the subroutine.

The Locate statement in line 60130 returns the cursor to the position it had before the computer went to screen 1. The Screen statement returns to screen zero as the active screen (the one to which Print statements write).

The ON ERROR GOTO 0 statement turns off the error trapping that was activated in line 60010. If your program originally had error trapping before going to this subroutine, this error trapping should reactivate the original error trapping rather than turning off all error trapping. For example, if your program has an ON ERROR GOTO 50000 statement at the beginning, then the On Error statement in line 60130 should read ON ERROR GOTO 50000, not ON ERROR GOTO 0.

You can easily add this subroutine to your programs. I've already mentioned a few small changes you may want to make, such as deleting the parts of lines 60000 and 60130 that switch screens, changing the Files command, and changing the On Error Goto 0 command. You may also need to change some of the variable names (CX, CY, LW, F, EX\$, F\$( ), SC\$, X, Y, and Z) if these variables are actively in use by your program when it goes to this subroutine. This is unlikely, because most programs are generally not performing other functions when they're loading or storing files, but you should be aware of the possibility. You'll also need to renumber the subroutine if your program already includes lines with the numbers 60000-60140.

### Using the Subroutine

As I explained earlier, when the computer returns from this subroutine, the number of files has been stored in F and each file name has been stored in one element of the F\$ array, from F\$(1) to

F\$(F). You can do anything with this list of names that you can do with any other string array. For example, you can sort the array alphabetically or output the list of names to the screen.

You can also use the F\$ array variables as file names in file commands, such as Open or Run. For example, you could use the command OPEN "I",F\$(N) + "." + EX\$ in your program. This would allow the program to input data from the file with the name stored in F\$(N) and the extension stored in EX\$. If the file names are Basic programs with the BAS extension, you could give the command RUN F\$(N) in your program. You wouldn't need to add the BAS extension in the Run command, because the computer will add this automatically.

Program Listing 2 demonstrates a typical use of the subroutine. Type in Listing 2, then merge Listing 1 with Listing 2 with the command MERGE "LISTING 1". This listing is a simple data-base program that lets you create and store data files that are just lists of strings. It also allows you to load these files later and display them on the screen.

Line 10 dimensions the array that will hold the file names. Line 90 turns off the key list at the bottom of the screen and dimensions the array that will hold the data in the data files. It also stores DAT in EX\$, because this program will add that extension to all the data files it saves. Lines 100-130 are a menu routine that lists your three choices: create and save a file, load a file and display its contents, and end the program.

Lines 200-220 input the data for a file from the keyboard. When you've finished entering data into the file (which you indicate by pressing Return with no data), the computer goes on to line 230. This line clears the screen and prints "Files already on disk are:" at the top of the screen. It then executes a Gosub to line 60000 to get the list of files on the disk.

The program then executes a Gosub to a subroutine that starts at line 30000. If the subroutine doesn't find a file at line 60000, this subroutine prints the message "No files found." If files are found, the subroutine prints all the elements of the F\$ array on the screen between screen lines 2 and 22. If there are more names to be printed when the computer reaches screen line 22, the subroutine goes back to screen line 2, moves over 15 spaces on the screen, and resumes printing.

This process repeats until all the file names have been printed. As each file name is printed, the number of that file is printed beside the file name. For example, if F\$(2) equals "SAMPLE", it would be





# MARYMAC

## INDUSTRIES INC.

Radio Shack  
**Tandy®**

Radio Shack  
**Tandy®**



OVER  
100,000  
SATISFIED  
CUSTOMERS

OVER  
27 MILLION  
DOLLARS  
IN SALES

### We Always Offer:

- ☒ Our 10 years of experience as an authorized sales center.
- ☒ McManus family owned and operated
- ☒ References in your area
- ☒ 100% pure Tandy products
- ☒ Best possible warranty
- ☒ Lowest discounted prices—call: **We will MEET OR BEAT**
- ☒ Mastercard, Visa, American Express
- ☒ We always pay freight and insurance
- ☒ Most items shipped Same Day UPS

***“World’s largest independent authorized computer dealer.”***

NOW ON COMPUERVE-ELECTRONIC MALL—24 HOURS A DAY—GO MM

**22511 Katy Fwy., Katy (Houston), Texas 77450**

**(713) 392-0747    Telex 774132**

OPEN MON.—FRI 8–6 CST    6 phone lines to serve you better!

**CALL TOLL FREE    800-231-3680**



## LOWEST PRICES EVER!

### MODELS I, III, IV:

Electric Webster Speller 55% off \$ 39.99  
w/Correcting Feature \$ 99.99

"The Cadillac" of Spelling Checkers—80 Micro, 3/82

EI. Web. Hyphenation 35% off \$ 32.49

E.W. Grammer & Style 35% off \$ 32.49

"A fantastic . . . Grammer Checker"—80 Micro, 4/85

The Works! (All E.W. features) \$149.99

LeScript 1.7

50% off (reg 129.99) \$ 64.99

Allwrite (w/o support) 67% off \$ 64.99

W/P Combo (EW & Word Proc.)

55% off \$149.99

WHOLE WORKS!

(All EW & W/P) \$199.99

Order Now, Toll-Free:  
1-800-343-2432  
in Calif. 415-528-7000

### MS/DOS:

The Works! (All E.W. features) \$129.99

Whoops Instant Speller/

Thesaurus \$ 49.99

"delivers its full potential superbly."—80 Micro, 6/87

LeScript 1.7 50% off (reg 199.99) \$ 99.99

W/P Combo

(Whoops & Lscript 1.7) \$139.99

Visa, MasterCard, checks O.K. Add \$3 for C.O.D. Add \$5 for shipping & handling. Add sales tax in Calif. Specify W/P when ordering. Prices good until 4/10/88 while supplies last!

**Cornucopia Software, Inc.**  
1625 Beverly Place, Berkeley, CA 94707

Circle 29 on Reader Service card.

## FILES

displayed as "2) SAMPLE".

The purpose of displaying all the existing file names at this point is to help you avoid giving the newly created file the same name as an existing file, which would result in overwriting the old file. After the subroutine at line 30000 lists all the files on disk with the extension DAT, line 240 positions the cursor at line 24 and inputs the name under which you want to save the data. Line 250 then opens a file with that name, plus the extension DAT. Lines 260-270 then save the data to disk, close the file, and send the program back to the menu.

Lines 300-380 load a file from disk and display it on the screen. Line 300 clears the screen and prints "Files on disk are:". It then executes a Gosub to line 60000 to get the list of files and to line 30000 to display this list. If F=0, the If . . . Then statement at the end of line 300 bypasses the entire operation of loading a file, since there are none to load.

With the list of files now displayed in front of you, line 310 asks you to select a

file. Notice that it's asking for a number, not a file name. You type in the number; if it's less than 1 or larger than the number of files, line 310 displays an error message for a few seconds and then asks you to enter the number of your chosen file again.

Line 320 then opens a file with the name you select. For example, if you enter the number 5 in line 310 and F\$(5)="RECORDS", the file opened would be RECORDS.DAT. In this program, I replaced FILES F\$(N) + "." + EX\$ with FILES F\$(N) + ".DAT", since the only extension used in this program is DAT.

Lines 330-360 read the data from the file and display it on the screen, then close the file. Lines 370-380 send the program back to the main menu after you press Return. Line 400 ends the program. ■

David Leithauser is a free-lance writer with a bachelor's degree in electrical engineering. You can write him at 4649 Van Kleeck Drive, New Smyrna Beach, FL 32069.

**Program Listing 1. A subroutine that lists only data files, without extensions, and lets you select them by number. See page 70 for information on using checksums.**

```

670 10 DIM F$(80)
5771 60000 CX=POS(0):CY=CSRLIN:SCREEN,,1,0:CLS:PRINT SPC(45);:IF POS(0)=46 T
      HEN LW=55 ELSE LW=19
2864 60010 CLS:ON ERROR GOTO 60140:F=0:FILES "*. "+EX$
1072 60020 FOR Y=2 TO 24
1617 60030 FOR X=1 TO LW STEP 18
1986 60040 IF SCREEN(Y,X)=32 THEN 60130
1020 60050 F=F+1:F$(F)=
1020 60060 FOR Z=0 TO 7
1753 60070 SC$=CHR$(SCREEN(Y,X+Z))
1423 60080 IF SC$=" " THEN 60110
1091 60090 F$(F)=F$(F)+SC$
720 60100 NEXT Z
719 60110 NEXT X
721 60120 NEXT Y
3479 60130 LOCATE CY,CX:SCREEN,,0,0:ON ERROR GOTO 0:RETURN
1030 60140 RESUME 60130

```

End

**Program Listing 2. A simple data-base program that lets you create and store data files.**

```

1856 90 KEY OFF:DIM D$(100):EX$="DAT"
5514 100 CLS:PRINT "MENU:":PRINT "1) Create file":PRINT "2) Load file":PRINT
      "3) End"
2341 110 PRINT:INPUT "Your choice";C
1341 120 ON C GOTO 200,300,400
671 130 GOTO 110
640 200 CLS:D=1
4599 210 PRINT "Data item # ";D;" (press RETURN to stop)":INPUT D$(D)
2004 220 IF D$(D)<>" " THEN D=D+1:GOTO 210
4782 230 CLS:PRINT "Files already on disk are":GOSUB 60000:GOSUB 30000
3320 240 LOCATE 24,1:INPUT;"Name to save under ";N$
1293 250 OPEN "O",1,N$+".DAT"
2262 260 FOR C=1 TO D:PRINT #1,D$(C):NEXT C
1107 270 CLOSE:GOTO 100
4943 300 CLS:PRINT "Files on disk are":GOSUB 60000:GOSUB 30000:IF F=0 THEN 3
      70
11570 310 LOCATE 24,1:INPUT;"File number to get ";N:IF N<1 OR N>F THEN LOCATE
      24,1:PRINT "Invalid file number!";:BEEP:FOR C=0 TO 500:NEXT C:LOCATE
      24,1:PRINT TAB(39);:GOTO 310
1436 320 OPEN "R",1,F$(N) + ".DAT"
644 330 D=1:CLS
1736 340 INPUT #1,D$(D):PRINT D$(D)
2190 350 IF NOT EOF(1) THEN D=D+1:GOTO 340
559 360 CLOSE
3222 370 INPUT;"Press RETURN for main menu.";AS
677 380 GOTO 100
395 400 END
3401 30000 IF F=0 THEN PRINT "No files found.":RETURN
704 30010 R=2:C=1
1035 30020 FOR X=1 TO F
943 30030 LOCATE R,C
1271 30040 PRINT X;" "F$(X);
2711 30050 IF CSRLIN=22 THEN R=2:C=C+15 ELSE R=R+1
720 30060 NEXT X
762 30070 RETURN

```

End



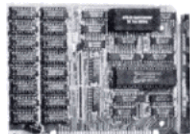


**Rose**®

# You've Got TOTAL ACCESS

(specializing in TRS80®)

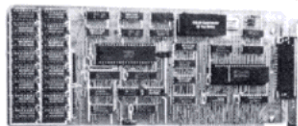
**TO YOUR COMPUTER HARDWARE & SOFTWARE  
NEEDS. CALL ROSE TODAY!**



**Tandy 1000/A  
Memory  
Expansion  
Board**

Expand the memory of your Tandy 1000/1000A from the standard 128K to its total capacity of 640K. Uses 256K DRAMS. Includes the DMA controller chip. Order the optional clock/calendar and plug it right onto the board without taking an additional slot. This board has low power consumption and a five year warranty direct from the manufacturer. Half-size card and easy installation.

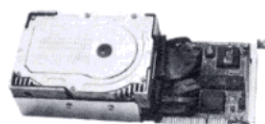
OK...\$52 256K...\$76 512K...\$104 Clock/Cal...\$28



**1000/A Multifunction Board**

Expand the capabilities of your Tandy 1000/1000A with maximum RAM, a DMA controller chip, a serial port and a clock/calendar. Comes with ZSPOOL and ZDISK, high level programs indeed. The manufacturer's five year warranty is included at no extra cost. Don't suffer any longer...get yours today! Order toll-free.

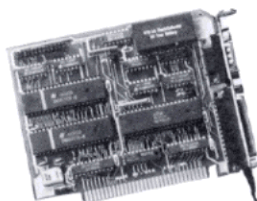
OK...\$99 256K...\$123 512K...\$154



**20 Megabyte Hard Disk Drive**

This unit comes completely assembled and formatted. Easy installation, and it is ready to gobble up all those pesky floppy diskettes you have laying around the place. No preventive maintenance required. Low power use, so expansion capabilities are not limited. One year manufacturer's warranty comes with this little beauty. One model fits the Tandy 1000/1000A and 1000SX and another for the Tandy 3000.

Model 1000...\$395 Model 3000...\$395

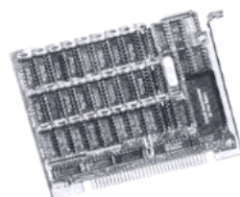


**Serial Port  
Board**

Add 1 or 2 RS-232 serial ports to your Tandy 1000, SX or 3000. One serial port is standard. Add optional port and clock/cal as you need them.

Model 1000/A/SX...\$52 2nd serial port...\$26  
Model 3000...\$74 2nd serial port...\$43  
Clock/Calendar...\$29

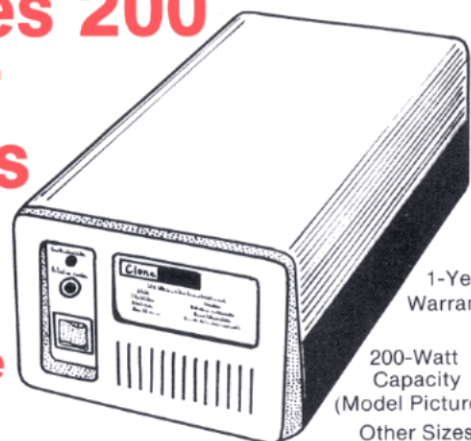
Add \$4 shipping and handling for boards.  
Add \$10 shipping and handling for drives.



**Zucker  
300/1200  
Modem**

Now everyone can have their own modem. Rose has cut profit to the bare minimum on this American-made internal modem for your IBM, Clone or Tandy MS-DOS computer. Software is included. You can start communicating as soon as you install it. Everything included except the phone line. Zucker guarantees this little jewel for five years. Simple to install with complete instructions included. Call me today and let's get started.

Zucker's 300/1200 modem with software...\$77



1-Year  
Warranty

200-Watt  
Capacity  
(Model Pictured)  
Other Sizes  
Available.

## Rose Gives 200 Watts for 200 Bucks

Save Your Data  
— and Your Money —  
with Our  
**Uninterruptable  
Power Supply**

Forget about power failures when you use our standby power supply. Simply plug your computer into the outlets provided. When power interruptions occur, the unit switches to its own internal power source, allowing uninterrupted use of your computer during the power outage. The length of time depends on the actual load. Plenty of time to choose between continuing to work or going through an orderly shutdown, thereby preserving the work performed prior to the loss of line power. Operation is completely automatic with both audible

and visual power failure alarms.

This unit is compact, maintenance free and ruggedly constructed to give you years of unattended service. A one year warranty includes both parts and labor. Finally enjoy freedom from worry while inputting your data. Our low price lets you give your data (and wallet) the protection they deserve. Call us toll-free and we will send yours today. Please add \$23 for shipping and handling in the lower 48 states.

### CONTACT ROSE TODAY!

Call your order in toll-free or write to me. I just love to get mail. If you need technical information or service just call in my support troops at (214) 634-3336 between 9am and 6pm, except during their lunch which is from 11:30 to 1:30. The prices listed are subject to change and are for mail orders only. I take **AMERICAN EXPRESS, MASTERCARD and VISA** and I will not charge your card until I ship your goodies. I have to pay a fee when you use a credit card, so add 1.5% cause that is what I have to pay the bank. You can send a check or money order but it must be in US\$ drawn on a US bank and include your address and telephone number. If the check is good it will not delay your order at all. COD orders are welcome and require cash or a Cashier's Check on delivery. Shipping charges quoted are for the lower 48 states only. No tax collected on shipments outside of Texas. Texans add that good old state sales tax of 7.25%. Everything I sell has the manufacturer's guarantee and he is the guy that makes it good if anything goes wrong. I have spoken with each of my suppliers and they assure

me that they will not let you down if you need service. My own guys are pretty sharp so call me first at (214) 634-3336 if you have a problem of any kind. I bet we can get it resolved. However, there is one thing we can't help you with. Be sure you know what software you are buying. **SOFTWARE IS SOLD ON A REPLACEMENT BASIS ONLY — NO REFUNDS.** Unless otherwise noted. If the software media is defective or you accidentally format the disk and destroy all the data I can help. Just call me for instructions. Please order from me now...I need the money and I promise not to jack you around. I do reserve the right to charge up to a 10% fee if you jack me around.

Your satisfaction is guaranteed. I have been doing this for almost eight years and if I can't make you happy within 30 days, I will cheerfully refund your purchase price in full, less the shipping charges. You can order from me without a worry. Trust me.

**NEXT DAY SHIPMENT** of goods in stock.  
**STAY ON TOP WITH ROSE.**

**ORDER TOLL FREE!  
1-800-527-0347**

AD 10

**TOTAL ACCESS**  
P.O. Box 224767  
Dallas, Texas 75222-4767  
(214) 634-3336

M-F 9-6, Sat. 10-3

Prices and specifications subject to change without notice. Not responsible for typographical errors.

©1987 by Total Access. All rights reserved.



# Page Previewer

*See how your document will print—before you print it.*

**by Dale Rogerson**

**H**ow many times have you tried to print the documentation from public domain disks, only to have it print incorrectly? Too many times?

That's why I wrote Page Previewer, which allows you to see—before you print—how your document will look after it's printed.

Page Previewer is a Turbo Pascal program that uses the standard Input facilities of MS-DOS. This means that input comes from redirection or piping, which I'll explain later.

Page Previewer (see the Program Listing) uses the color graphics adapter (CGA) high resolution mode of 640 by 200 pixels and displays reduced-size graphics representations of two pages (see Figures 1, 2, and 3) of your text or other output. Two pixels represent each letter that would be printed on the printer.

Page Previewer assumes the following:

- The page is 80 columns wide and 66 lines long.
- Automatic perforation skip is off.
- The program will respond only to carriage returns, line feeds, form feeds, and horizontal tabs; all other control characters will be ignored.

The program is designed to preview only those text files that are claimed to print correctly on your printer. It will not recognize special printer commands for boldface or italics, for example, since most public domain software documentation doesn't use these special faces. It will preview documentation of programs, such as Fansi Console, that use the four control characters named above to produce underlined and boldface type. Page Previewer is not a text formatter; the only formatting it does simulates a carriage return and line feed after every 80 characters.

## What Page Previewer Will Do

Page Previewer can tell you much about the file you're about to print. For example, you can see if the program provides for a left margin. Have you ever printed out freeware documentation that had no left margin in which to punch holes? (This happens to me all the time.) By previewing the document before you print, you can adjust the paper to give you the margin you want.

Sometimes there's an extra message, one you don't want to print, at the beginning of shareware documentation. With Page Previewer, you can spot trouble before you print; just delete the unwanted text and run the file through Page Previewer again.

Page breaks are frequently the most troublesome problem with printing these files. If you need automatic perforation skip or want to start printing a few lines further down the page than usual, Page Previewer can help you do both jobs.

Page Previewer prints an asterisk next to the word "page" if the document tries to print on the 66th line. If your document doesn't skip the 66th line, the program assumes that it would print on the perforation. If the asterisk appears, two things can happen: Large spaces in the simulated pages indicate that your document is formatted for the page breaks, but the first page may include extra text or may not be set for the correct top margin. If you don't see large spaces, it means your document isn't formatted for page breaks and needs to be printed either with the perforation skip turned on or printed from your word processor.

---

*System Requirements: Turbo Pascal 3.01 or later. Available on the January-March 1988 Disk Series.*

---



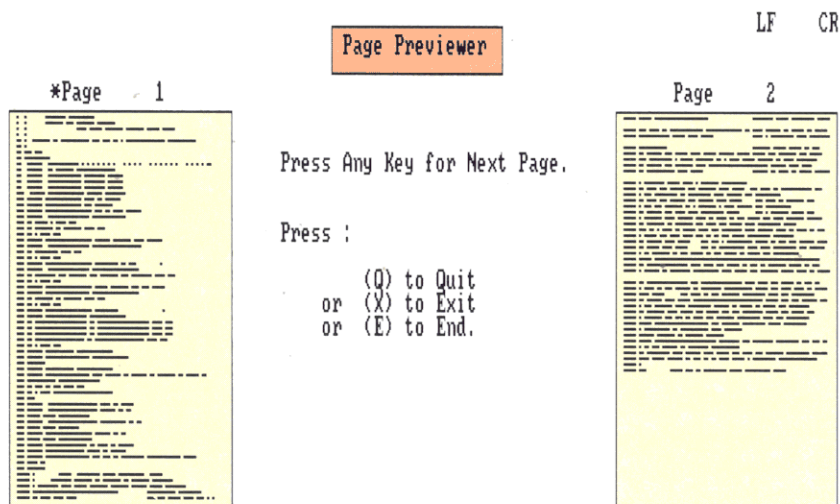


Figure 1. Preview of a Basic listing.

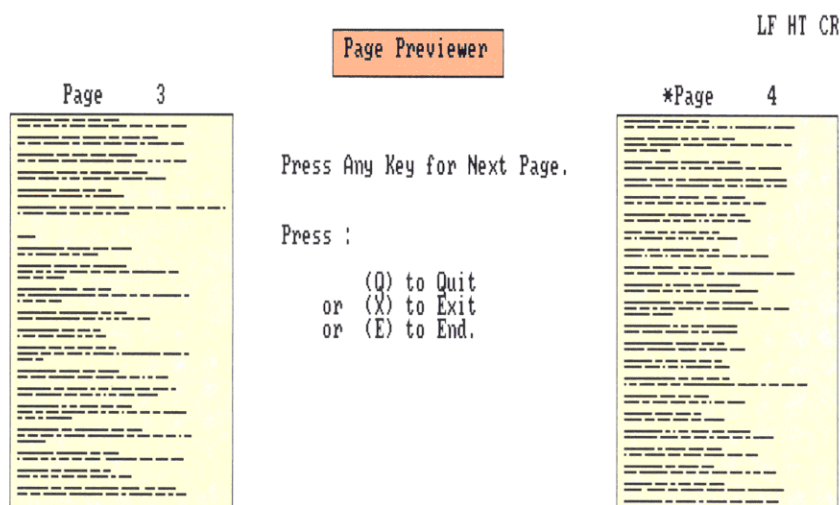


Figure 2. Preview of an index.

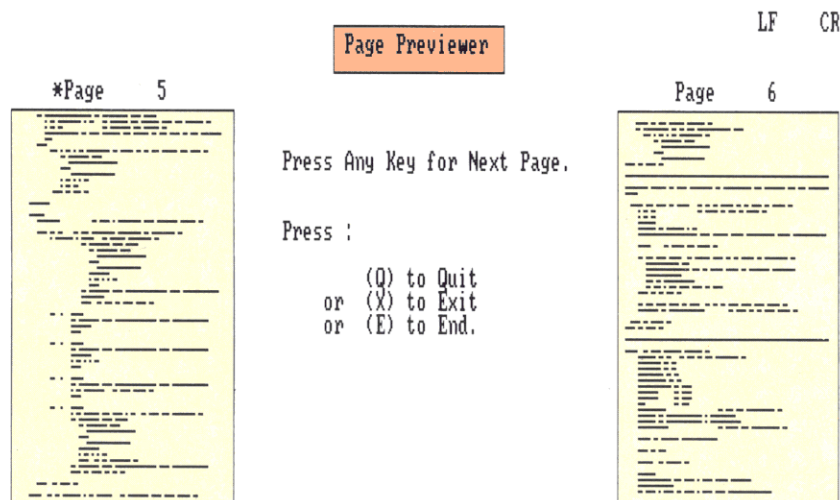


Figure 3. Preview of a Pascal listing.

The program can also tell you much more about the file you're trying to print. In the upper right corner of the display is the controls section, which displays each control character found: FF for form feed, and LF, CR, and HT for line feed, carriage return, and horizontal tab, respectively. If the document includes form feeds, make sure your printer's top of form is set correctly. If it has none of the control characters, print your document from a word processor.

### How to Use Page Previewer

To use the program, you'll first have to compile it to a COM file. You do this by pressing "O" for option in the Turbo Pascal Menu. Then press "C" and "Q." I suggest naming it something like "PP." Also make sure that the Turbo Pascal Graph.P program is on your disk. My program includes it when compiling.

Page Previewer uses redirection to get its input. To process a file, enter the command: PP<Filename.EXT

Because the program uses redirection for its input, you can pipe information to it. For example:

```
TYPE Filename.EXT| PP.
```

This sends Filename.EXT to the Page Previewer. Though this method is essentially equivalent to the first method, it is slower.

After Page Previewer displays the two simulated pages, you can press a key and examine the next two pages or press the Q, X, or E keys to end the program.

### Anyone for Updates?

Though I originally wanted Page Previewer to remain a relatively simple program, I did have visions of a program that would allow some formatting—page margins, for example—or a shift feature that would permit adding space along the left margin for notebook holes or one that would permit text to be moved about the page with a mouse.

I decided I needed user feedback before continuing, however. How would you like to see this program improved? Which would be better—to have the program page directly from the disk or work only with files that fit into memory?

Page Previewer is a useful, powerful program. Send in your ideas and let's see how we can improve it! ■

*Dale Rogerson is an electrical engineering student at Georgia Institute of Technology. You can reach him at 473 Mill Stream Road, Lexington, SC 29072.*



**Program Listing. A Turbo Pascal program to display reduced-sized representations of your text.**

```
(*
      ==> Page Previewer <==
      By
      Dale Rogerson
Uses CGA 640 x 200 graphic mode to simulate the printed page.
*)

($G2048,D-) (* Standard Input to allow piping and redirection *)

PROGRAM PagePrt(input,output);
CONST
  HT      = #09; (* Control Characters simulated. *)
  LF      = #10;
  FF      = #12;
  CR      = #13;
  CharPerLineMax = 80;
  LinePerPageMax = 66;
TYPE
  Ctrl1   = SET OF CHAR;
  GenStr  = String[80];
VAR
  Cmds,
  CtrlFound : Ctrl1;
  Quit,
  PageFlag  : Boolean;
  Key,
  Ch        : Char;
  PageNum,
  X,Y,Xmax,Ymax,Xstart,Ystart
  : Integer;
($I graph.p)

(*-----*)
PROCEDURE NumberPage; (* Number the Pages. *)
BEGIN
  GotoXY(12,4);
  Write(PageNum:4);
  GotoXY(71,4);
  PageNum := PageNum + 1;
  Write(PageNum:4);
  PageNum := PageNum + 1;
end;

(*-----*)
PROCEDURE SetScreen; (* Set the screen up. *)
begin
  HiRes; (* This program uses HiRes Graphics *)
  HiResColor(Blue); (* I like it blue. *)

  draw(0,34,171,34,1); (* Draw Left Page *)
  draw(0,169,171,169,1);
  draw(0,34,0,169,1);
  draw(171,34,171,169,1);

  draw(468,34,639,34,1); (* Draw Right Page *)
  draw(468,169,639,169,1);
  draw(468,34,468,169,1);
  draw(639,34,639,169,1);

  GotoXY(6,4); Write('Page ');
  GotoXY(65,4); Write('Page ');
  GotoXY(33,2); Write('Page Previewer'); (* Put Title on Screen *)
  draw(248,5,380,5,1); draw(380,5,380,21,1); (* Box in Title *)
  draw(380,21,248,21,1); draw(248,21,248,5,1);

  GotoXY(1,25); Write('Dale Rogerson'); (* Put on credits *)
  GotoXY(70,25); Write('Aug 1987');

  (*--- Write the instructions for use on the screen. ---*)
  GotoXY(27,7); Write('Press Any Key for Next Page. ');
  GotoXY(27,10); Write('Press ');
  GotoXY(27,12); Write(' (Q) to Quit ');
  GotoXY(27,13); Write(' (X) to Exit ');
  GotoXY(27,14); Write(' (E) to End. ');

  (*--- Write Page numbers on screen and set up window. ---*)
  PageNum := 1;
  NumberPage;
  GraphWindow(6,36,166,166);

end;
(*-----*)
PROCEDURE DispStatus; (* Display control characters received. *)
VAR col : integer;
St : String[2];
BEGIN
  CASE Ch OF
    CR : begin (* Carriage Return Received *)
      Col := 79;
      St := 'CR';
      end;
    HT : begin (* Horizontal Tab Found *)
      Col := 76;
      St := 'HT';
      end;
    LF : begin (* Line Feed Found *)
      Col := 73;
      St := 'LF';
      end;
    FF : begin (* Form Feed Found *)
      Col := 70;
      St := 'FF';
      end;
  end; (* Case *)
  GotoXY(Col,1); (* Print the character found. *)
  Write(St);
  CtrlFound := CtrlFound - [Ch]; (* Remove character found from set so
                                we don't print it again. *)
end;

(*-----*)
PROCEDURE NextSpace; (* Print a space for move to next print position. *)
BEGIN
  IF x = Xmax - 2 then begin (* Reached end of Line? *)
    x := 0;
    Y := Y+2;
    end
  ELSE (* Otherwise just move to next char location *)
    x := x+2;
  end;

(*-----*)
BEGIN
  CtrlFound := [CR,LF,FF,HT]; (* Control Chars we look for. *)
  Cmds := ['X','x','Q','q','E','e']; (* Exit/Quit/End Commands. *)
  Xmax := CharPerLineMax*2;
  Ymax := LinePerPageMax*2;
  SetScreen; (* Set up screen. *)

  PageFlag := False; (* False := Page 1 *)
  Quit := False;

  WHILE NOT Quit DO begin (* Do it until it is time to QUIT. *)
    y := 0;
    x := 0;

    REPEAT
      Read(Ch); (* Read a character from standard input. *)
      IF CH IN CtrlFound Then DispStatus; (* Find Control character? *)
      CASE Ch OF (* Act correctly depending on Character *)
        '!'.#255 : begin (* Normal Character *)
          IF (y = Ymax - 2) (* On Line 66? *)
            THEN begin (* If so then print "" *)
              IF PageFlag Then
                GotoXY(64,4)
              else
                GotoXY(5,4);
              Write(' ');
            END; (* If Then *)
            Draw(x,y,x+1,y,1); (* Each character is two dots *)
            NextSpace;
            end; (* End of Char case *)
        ' ' : NextSpace;
        CR : x := 0; (* Back to beginning of line. *)
        LF : begin
          y := y + 2; (* Next Line. *)
          x := 0;
          end;
        FF : Y := Ymax; (* Next Page. *)
        HT : X := ((X+2) DIV 16)*16 + 14; (* Next tab position. *)
      end; (* Case *)
    UNTIL (y >= Ymax) OR (EOF); (* Finished with this page. *)

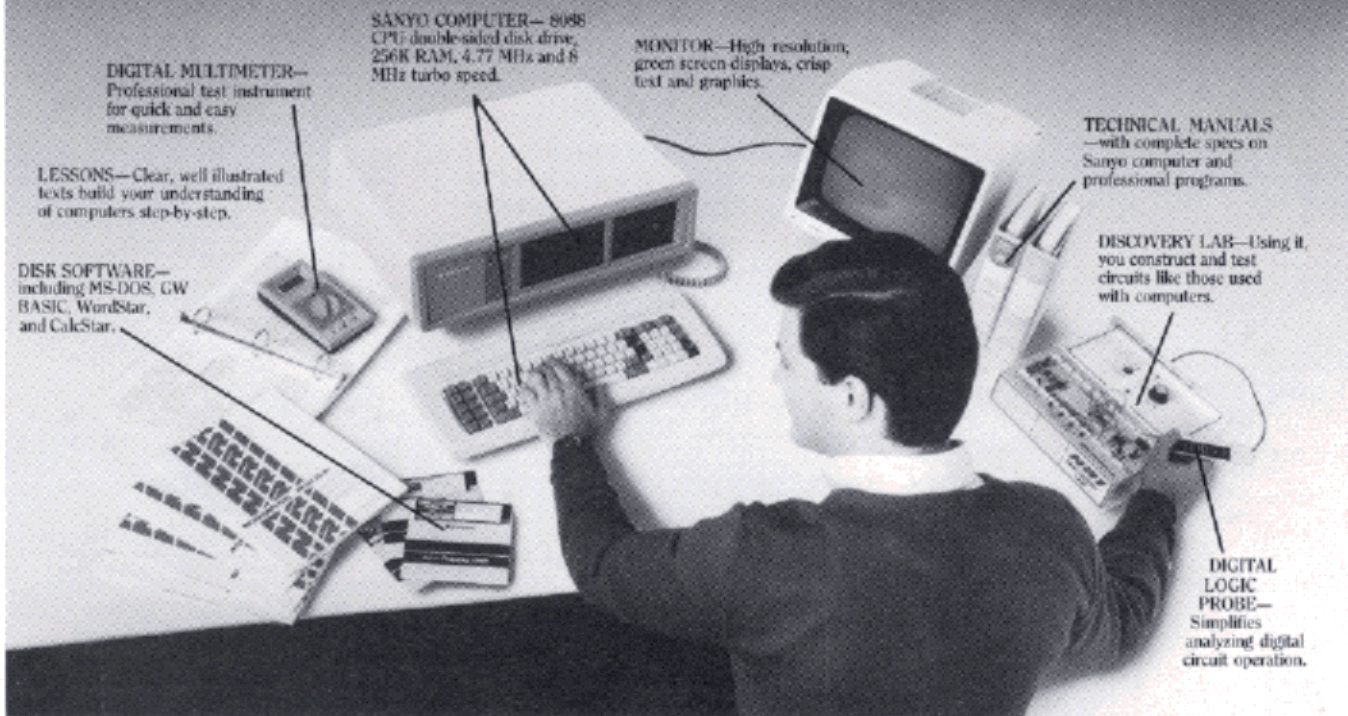
    IF (y >= Ymax) AND NOT(PageFlag) Then begin (* Setup for First Page *)
      GraphWindow(474,36,633,167); (* Change window for right page. *)
      PageFlag := True; (* Now do right page. *)
    end
    ELSE begin
      Read(kbd,Key); (* Done right page now wait for key. *)
      IF Key IN Cmds Then (* Time to exit? *)
        Quit := True; (* Yes let's quit. *)
      IF EOF Then Quit := True; (* If No more file then quit. *)
      ClearScreen; (* Clear out right page. *)
      GraphWindow(6,36,165,167); (* Set window to left page. *)
      ClearScreen; (* Clear left page. *)
      PageFlag := False; (* Time to do left page. *)
      NumberPage; (* Number the pages. *)
      GotoXY(64,4); Write(' '); (* Clear any ""s *)
      GotoXY(5,4); Write(' ');
      end; (* ELSE *)
    end; (* While *)
  TextMode; (* Let's go back to text mode. *)
  GotoXY(1,1);

```

End



# Train with NRI for a high paying career servicing computers.



## Get started now by building this fully PC compatible computer

Now you get it all... training for America's fastest growing career opportunity... training to service all computers... training on the newest total computer system, the Sanyo 880. Only NRI can give you the well-rounded training you need, because only NRI gives you a complete computer system... computer, monitor, disk drive, software, even test instruments like a digital multimeter and logic probe to work with and keep. It all adds up to training that builds the knowledge, competence, and ability you need to succeed as a computer service specialist.

### Get inside the newest Sanyo Computer—fully compatible with the IBM PC\*

As an NRI student, you'll get total hands-on training as you actually build your own latest model Sanyo 880 Series computer from the keyboard up. It's fully compatible with the IBM PC and, best of all, it runs programs almost twice as fast as the PC. As you assemble the Sanyo 880, you'll perform demonstrations and experiments that will give

you a total mastery of computer operation and servicing techniques. You'll do programming in BASIC language—even run and interpret essential diagnostic software.

### Understanding you get only through experience

You need no previous knowledge to succeed with NRI. You start with the basics, rapidly building on the fundamentals of electronics with bite-size lessons. You perform hands-on experiments with your NRI Discovery Lab and then move on to master advanced concepts like digital logic, microprocessors, and computer memories.

### Learn at home in your spare time

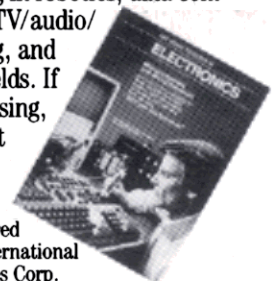
You train in your own home at your own convenience, backed at all times by your own NRI instructor and the entire NRI staff of educators and student service support people. They're always ready to give you guidance, follow your progress, and help you over

the rough spots to keep you moving toward your goal.

### 100 page free catalog tells more... send today

Send the postage-paid reply card today for NRI's 100 page catalog that gives all the facts about computer training plus career training in robotics, data communications, TV/audio/video servicing, and many other fields. If the card is missing, write to NRI at the address below.

\*IBM is a registered trademark of International Business Machines Corp.



# NRI

 SCHOOLS

McGraw-Hill Continuing Education Center  
3939 Wisconsin Avenue  
Washington, DC 20016

We'll give you tomorrow







# SAVE BIG BUCKS NOW ON PERIPHERALS!

## MODEL 3/4 HARD DISK DRIVES

As Low As  
**\$379**



NEW LOW PRICES!

Start enjoying the added speed and power of your Model 3/4/4D/4P with an Aerocomp hard drive. Your external hard drive arrives complete and ready to work with a cable, and a LDOS, TRSDOS or CP/M driver (your choice) supplied at no additional cost. These units are not something out of some defunct manufacturer's boneyard but brand new, quality devices designed and built by us right here in Dallas. We provide the little things that are so important for a long, trouble-free life. Things like continuous duty switching power supplies; buffered seek drives; plated media; filtered forced-air ventilation; EMI filtration; solid steel construction; front panel LED indicators; built-in diagnostics; automatic error correction; gold plated connectors; plus your satisfaction is assured by our 30 day money back guarantee. If, for any reason, you don't like the drive, we'll refund the entire purchase price, less shipping. Order yours today!

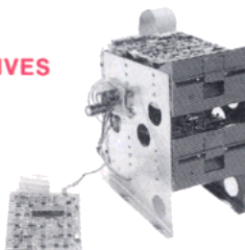
5 Meg \$379      20 Meg \$589  
40 Meg \$799

Add \$20 shipping. White case standard. Add \$30 for stainless. One year parts and labor warranty.

## ADD DISK DRIVES TO YOUR MODEL 3/4

Complete System  
Less Drives

**\$159**



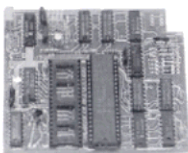
Convert your cassette Model 3 or 4 to fast disk operation with one of our easy-to-install kits. Complete instructions are provided. All you need is a screwdriver and a pair of pliers. Our own advanced controller, 100% compatible with the original, plated steel mounting towers with RFI shield and all cables and hardware are included. Select your drives from the other column and call us, toll-free, to place your order. If, for any reason, you don't like the kit, we'll refund the entire purchase price, less shipping. Order yours today!

Complete system less drives, DOS \$159

Disk Controller only \$110

RS-232 Board complete \$69

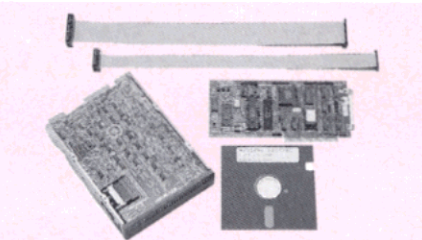
Add \$5 shipping. One year parts and labor warranty.



**DOUBLE DENSITY CONTROLLER**  
**\$99**

Add \$4 shipping.

80% more disk capacity is what you get when you add our DDC to your TRS-80 Model I. This controller has withstood the test of time. All the others are gone, yet the Aerocomp DDC endures. Why? Because it has proven itself as the only way to achieve reliable floppy disk operation on the Model I. Requires the Radio Shack Expansion Interface and software driver. All DOS (except TRSDOS) have the necessary double density driver. If, for any reason, you don't like the DDC, we'll refund the entire purchase price, less shipping. Order yours today! One year parts and labor warranty.

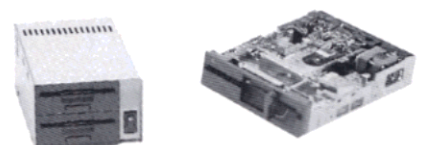


## LOW COST HARD DRIVES

21.4 Meg kit \$299      42.8 Meg kit \$469  
32.7 Meg kit \$329      65.5 Meg kit \$579

Don't spend more than necessary to add an internal hard drive to your Tandy 1000/A/SX/3000. Aerocomp provides the best low-cost, high quality, fast access hard drives for your Tandy 1000 or other IBM compatible. These kits come complete with the drive, controller, cables and installation instructions. Our systems allow you to boot directly from the hard drive. We use brand new genuine Seagate drives, not some obscure reject off-brand, so you can be assured of long, trouble-free, drive life. Our 20 and 30 megabyte drives have an average access time of 65ms and the 40 megabyte drive is a mere 28ms. Not a slow-stepping dog in the bunch. We provide software to park the heads for maximum protection (automatic on 40MB model). All connectors and card edges are gold plated to insure flawless service. SX owners can save hundreds by simply removing one floppy and installing our low-power 20, 30 or 40MB hard drive in its place. The sizes listed are after formatting. DOS 2.1 or later is required (40MB requires 3.2 or later). Tandy 1000 requires DMA and RCM 1.01.00 or later. Not for Tandy 1000EX/HX. 30 day satisfaction guarantee. If, for any reason, you don't like your hard drive, we'll refund the entire purchase price, less shipping. Order yours today!

One year parts & labor warranty. Add \$10 shipping.



## LOW COST FLOPPYS TOO!

Aerocomp has been supplying quality disk drives at low prices since 1980. All drives are half-height and are new—not factory blemes, seconds, close-outs or a defunct manufacturer's surplus (MPI, Gume, Tandon, etc.) We offer just about every combination of internal and external floppy configuration, plus the proper cables to connect everything together. We appreciate your business and will do our very best to support you. If, for any reason, you aren't happy with your hardware selection, we'll cheerfully refund the entire purchase price, less shipping. Order yours today! All items (except software) have a one year parts and labor warranty.

### BARE DRIVES

360K 5 1/4" TEAC 55B bare drive 401K	\$ 99
720K 5 1/4" TEAC 55F bare drive 801K	105
1.2M 5 1/4" TEAC 55G bare drive 801K	119
360K 3 1/2" TEAC 35B bare drive 401K	89
720K 3 1/2" TEAC 35F bare drive 801K	129
1.4M 3 1/2" TEAC 35H bare drive 801K	139

For 5 1/4" bracket for 3 1/2" drive, add \$10.

### DRIVE - POWER SUPPLY COMBINATIONS

(Includes gold plated extender)	
1-TEAC 35B 360K in a dual enclosure	\$ 139
1-TEAC 35F 720K in a dual enclosure	179
1-TEAC 35H 1.44M in a dual enclosure	189
2-TEAC 35B's in a dual enclosure	228
2-TEAC 35F's in a dual enclosure	299
2-TEAC 35H's in a dual enclosure	328
1-TEAC 55B 360K in a dual enclosure	139
1-TEAC 55F 720K in a dual enclosure	146
2-TEAC 55B's in a dual enclosure	239
2-TEAC 55F's in a dual enclosure	251

Add \$10 for brushed stainless steel cover.

### CABLES - CASES - DOS

IBM external floppy cable (drives C/D)	\$ 40
TRS-80 2-drive floppy cable	24
TRS-80 4-drive floppy cable	34
6" floppy extender cable, gold contacts	12
3 1/2" case and power supply w/o extender	49
5 1/4" case and power supply w/o extender	59
TRS-80 Model 1 TRSDOS 2.3 with manual	25
TRS-80 Model 3 TRSDOS 1.3 disk only	15
TRS-80 Model 4 TRSDOS 6.x with manual	25
TRS-80 Model 4 CP/M (Montezuma version)	129

Add \$10 for brushed stainless steel cover.

Add \$4 shipping for singles, \$6 for duals.

Add \$4 shipping for singles, \$6 for duals.

## UNINTERRUPTABLE POWER SUPPLY

Save Your Data  
and Money Too!

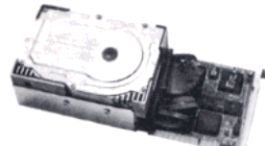
**\$249**

Add \$23 shipping in  
the lower 48 states.



Forget about power failures when you use our 300-watt standby power supply. The unit automatically switches to its own internal batteries during the power outage allowing uninterrupted use of your computer. The actual length of time is approximately 20 minutes at a 300W load. Longer at lesser loads. The unit is compact, maintenance free and ruggedly constructed to give you years of unattended service. Our one year warranty covers both parts and labor. Our low price gives your data (and wallet) the protection they deserve. There's no risk with our 30 day money back guarantee. If, for any reason, you aren't happy, we'll cheerfully refund the entire purchase price, less shipping. Order yours today!

## 20 MEG HARD CARD



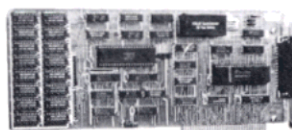
As Low As  
**\$365**

Add \$10 shipping.

These hard cards come completely assembled and formatted. Installation is easy and instructions are included. Low power use. One year warranty with our 30 day money back guarantee. Specify computer when ordering.

20 Meg \$365      30 Meg \$395

## ZUCKERBOARDS



Tandy 1000/A Memory Expansion Board. Includes the DMA chip. Clock/calendar optional. Five year warranty plus our 30 day satisfaction guarantee.

ØK \$42      512K \$104  
256K \$76      Clk/Cal \$28

Tandy 1000/A Multi-Function board. Includes DMA chip, serial port and clock/calendar. Five year warranty plus our 30 day satisfaction guarantee.

ØK \$99      255K \$123      512K \$154

Tandy 1000/A/SX/3000 Serial Port Board. Add one or two serial ports and a clock/calendar to your machine. Five year warranty plus our 30 day satisfaction guarantee.

Model 1000/A/SX \$44      2nd Serial Port \$26

Model 3000 \$74      2nd Serial Port \$43

Optional Clock/Calendar for either, \$29

300/1200 Internal Modem for all Tandy and IBM Compatibles. Start communicating with this board as it has everything you need except the phone line itself. Five year warranty plus our 30 day satisfaction guarantee.

Zucker 300/1200 baud modem  
w/software \$69

Add \$4 for shipping.

# AEROCOMP

2544 West Commerce St. Dallas, Texas 75212  
P.O. Box 223957

TELEX: 882761      FAX: 214-634-8303  
SERVICE: 214-638-8886      INFORMATION: 214-637-5400

©1988 by Aerocomp. All rights reserved.



Have your American Express, MasterCard or Visa ready. We will not charge your card until the day we ship your order. Mail orders are welcome. Money orders are accepted as well as your company and personal checks as long as they are bank printed and have your address and telephone number. We will ship surface COD with no deposit on most items, but all COD's require cash or a Cashier's Check on delivery. Texas residents add State Sales Tax. No tax collected on out of state shipments. There is a one year warranty (unless otherwise stated) on all hardware items against defects in materials or

workmanship. Your satisfaction is guaranteed on hardware products. If you are not satisfied, for any reason, call us within 30 days of receipt and we will cheerfully refund your money (less shipping). All original materials must be intact and undamaged, as well as the original shipping container. This offer does not apply to software. Defective software will be replaced. No other software warranty applies. Prices and specifications are subject to change without notice. Any returns must have our RMA number on the label to be accepted.

# ORDER TOLL FREE!

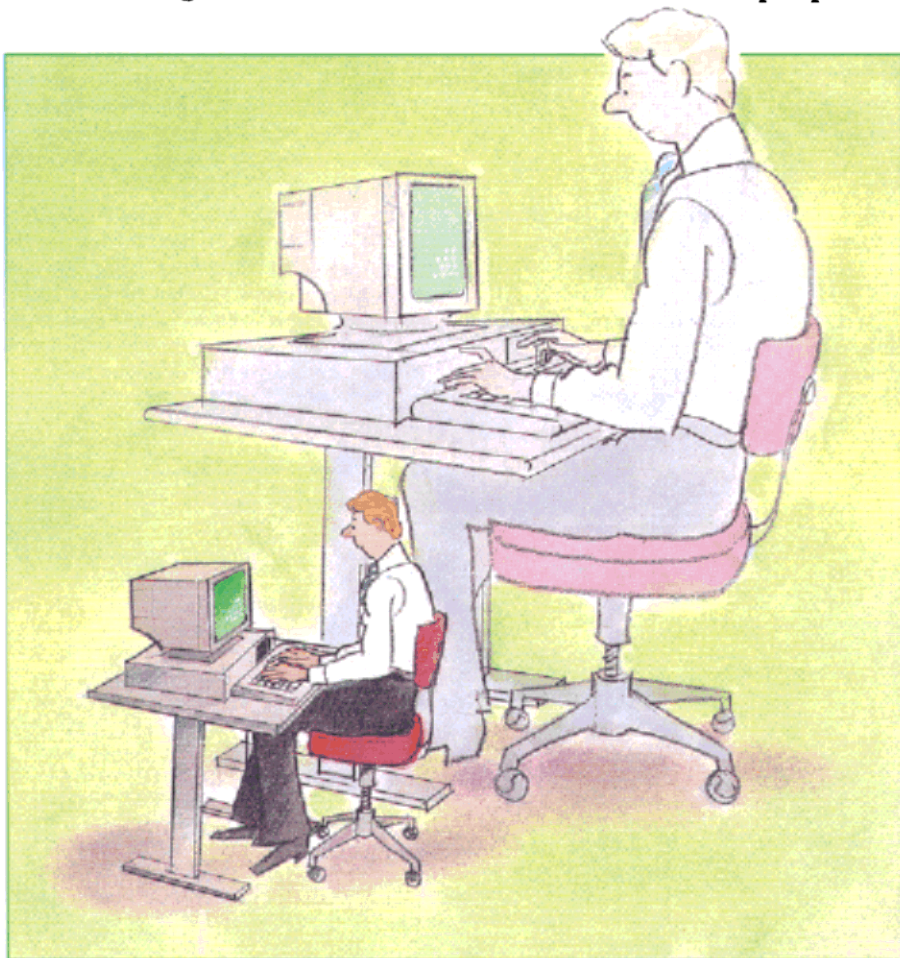
# 1-800-527-0347

AD 14



# The Big Backup

*A little organization makes hard-drive backups painless.*



by **David A. Williams**

**M**ost hard-disk users eventually bemoan the lack of a backup system that is fast, reasonably priced, and, most important, easy to use. Both hardware and software commercial systems have their drawbacks in at least one of these categories. The DOS Backup command, while inexpensive, is time-consuming and cumbersome.

The ideal backup system should also be automatic, since backups are usually ne-

glected until it is too late. Individual files should be readily available without having to restore the entire disk. Cockpit errors account for more lost files than do hardware failures.

## Major Concerns

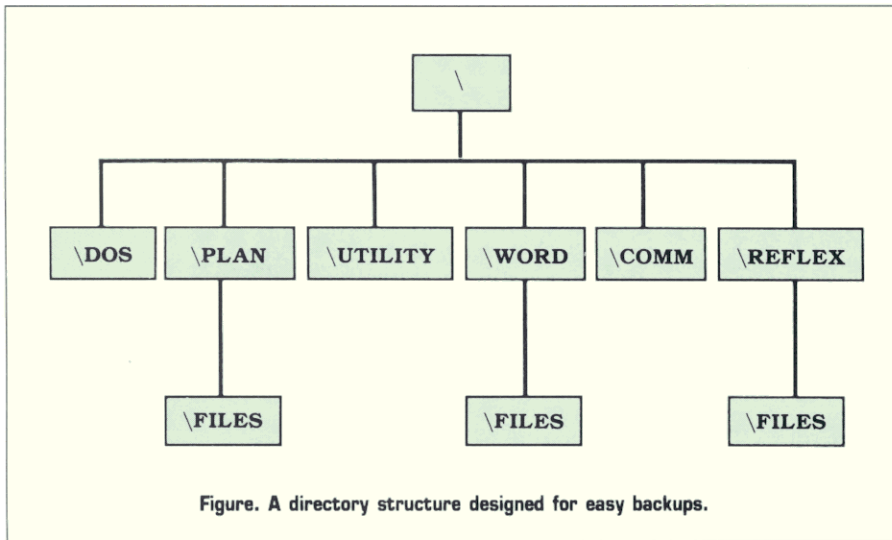
You probably have considered the problem without realizing the extent of your exposure. Your work is at greater risk on a hard-disk system than it is on floppy disks. The hardware is fairly reliable, but if anything goes wrong with your hard disk, your files, while perhaps safe in the long run, are inaccessible until the machine is fixed. If your files are on floppy disks and your work is urgent, you can get a replacement machine.

Until someone invents an automatic backup system, you can do the following to ease the problem. First, decide what files you need to back up and when. Then organize your drive's directory structure to make the backup process as easy as possible.

Selective backup is the key to the solution. You don't need to back up your programs repeatedly when they reside safely on their original disks. Your data files are your first concern, but you should back them up only when they change. For example, you do not need to back up your spreadsheets every day if you haven't worked on them in a week. If you access some data-base files often, but rarely update them, then they, too, need backup only when changed.

You are also concerned about backing up your configuration files, batch files, and similar items that are unique to your system and change on occasion. Most programs generate a configuration file at the time of installation. You can repeat the installation process, but you save time if you have a backup copy of the files. When you add words to your dictionary, you create a file that you won't want to lose, especially if





you have been adding to it for a long time. Still, you don't have to save this file every day.

The following system is not a panacea. It requires discipline and an understanding of the directory structure you use on your computer. It makes the job as easy as pos-

sible considering the tools you have at your disposal.

## Disk Inventory

First, you need to know what is on your disk. This is not a trivial matter. A hard disk is like a storage closet—things tend to

accumulate. Usually, you only use a few of many printer drivers and configuration files for a program. If you have a list of the contents of each directory on your hard disk, reconstruction is much easier.

You can inventory your hard disk with three DOS commands. Build your batch file, named List.BAT, with the following lines:

```

DIR > LIST
TREE /F >> LIST
CHKDSK >> LIST
  
```

This program, which you must execute from the root directory, creates a file named List that lists the subdirectories and the names of the files in them. DIR copies the contents of the root directory into the file. TREE /F lists the subdirectories and the files in them. CHKDSK primarily records the space taken by system and other invisible files.

The double arrow (>>) tells DOS to append the output of a command to the file rather than to overwrite it. You can make a hard copy of this file and get a backup when you back up the root directory. Run List only when you add a new program or change the configuration.

# Interleave for a Faster Hard Disk

by Alan L. Zeichick

**A**ccording to Sysinfo, a utility packaged with the Norton Utilities 4.0, the factory-installed 10-megabyte (MB) hard drive in my 1000 HD rates a 1.2—which means it's 20 percent faster than the drives sold with the original IBM PC/XT. Not bad. But could it do better?

Yes—and by a factor of 8–25 percent, depending on the test you used.

When my computer wants information from the hard drive, it reads one full sector at a time. If DOS is trying to load a program file that occupies three sectors, for example, it reads one sector, digests it, reads the next, digests it, and finally reads and digests the third.

Bear in mind that the hard-disk surfaces are spinning at about 3,600 rpm. So while the hard drive controller is busy digesting sector 1, sector 2 has spun right past the head. To read sector 2, the machine has to wait for the disk to spin all the way around again. That's a lot of wasted time.

The above assumes that the sectors are contiguous on the disk. In actuality, they're not; they're interleaved, or separated by other sectors, to compensate for disk movement during data digestion.

Like many computers, the 1000 HD is set for an interleave level of three. This means that each sector is three sectors away from its predecessor, giving the computer slack time to digest the information. How much time? At 3,600 rpm, it takes about 1 millisecond (ms) per sector. At an interleave of three, that's about 2 ms to handle 512 bytes of information.

What if a hypothetical computer needs only 1.5 ms to decipher the sector? The one-half millisecond wasted isn't much to worry about. But if the computer requires 2.5 ms, the read head will miss its mark, causing a delay of about 19 ms between the reading of each sector.

*System Requirements: Tandy 1000 HD. Caution: these procedures will not work and should not be tried on non-8088 machines such as the 1000 TX, 2000, 3000, or 4000.*

However, with an interleave of four, our hypothetical 2.5-ms computer wouldn't have this problem.

## Low-Level Formatting

There's no easy way to determine a computer's best interleave setting save trial and error. Realizing this, I decided to experiment with several different interleave values on my 1000 HD. The first step was to back up all information on the hard drive, since formatting would destroy all the data on it. For safety's sake, I created two backups and verified each backup floppy's integrity with Norton's Disk Test utility. I don't take chances with my data!

A hard drive's interleave level is set during a process known as low-level formatting, which is different from the DOS-level formatting performed by the Format and HFormat commands. Many hard drives are low-level formatted, and therefore interleaved, at the factory before it's known what type of computer they'll go into. Even though the usual default interleave level of three is reasonably efficient, the interleaving level isn't optimized for the computer's CPU speed or for hard-drive controller efficiency.

The Western Digital hard-drive controller included with the 1000 HD has its low-level format program in ROM, which is easily accessible from DOS. To redo the low-level format, insert your MS-DOS boot disk in drive A and reboot the computer. When the system's ready, type DEBUG. You'll see a minus sign. Type the letters R AX and press enter; that tells Debug that we want to store a value in one of the 8088's registers. It responds with the following:

```
AX 0000
```

This tells you that the AX register currently contains the value zero and then prompts you for a new value. After the colon, type the desired interleave level, preceded by three zeros; for example, if you want an interleave of four, type 0004 and press enter.

You'll see the minus sign again. This time, type:

```
G=C800:5
```

Press enter. This tells Debug to branch to a certain memory address—the



## Organizing Your Directories

You might need to reorganize your directory structure before developing a satisfactory backup technique. If you mix everything in one huge directory you might as well forget streamlining your backup procedure. The Figure shows the directory structure I use. Tailor yours to fit your own requirements, but this should serve as a guide. The idea is to separate files that change often from those that do not.

The root directory contains Command.COM, Config.SYS, ANSI.SYS, and the BAT files I use to change directories and call programs. The DOS subdirectory contains all the other DOS programs that I use. I don't waste space on a copy of Edlin, and I don't keep a copy of the command that reformat the hard disk.

The Utility subdirectory is a collection of short utility programs that I find useful on occasion. The rest of the subdirectories are associated with particular programs. Plan, where I keep Multiplan, is typical. Under it is a subdirectory called \Plan\Files that contains the data files.

My Autoexec.BAT file contains the following path command:

```
PATH\;\DOS;\UTILITY;\PLAN;\WORD;\REFLEX
```

The first backslash (\) designates the root directory, which allows me to execute my BAT files from any subdirectory. With \DOS and \Utility you can execute any of the DOS commands and the utility programs from any subdirectory. The other three are the directories that have \Files subdirectories. They are included in the Path statement so that DOS can find the main program. For example, my BAT file to execute Multiplan, M.BAT, looks like this:

```
ECHO OFF
CLS
CD\PLAN\FILES
MP %1
CLS
```

If you want to run Multiplan, type M and press the return key regardless of the subdirectory you are in. DOS finds the BAT file in the root directory and executes it while changing to the \Plan\Files subdirectory. DOS finds MP in the \Plan subdirectory. Because it maintains \Plan\Files as the current directory, Multiplan looks there for the data files.

## Using the System

After you organize your directory structure, you can back up the disk with minimal effort. Starting at the top, keep a backup of the root directory. Update this backup when you change an existing file or add a new one. I don't worry about the DOS subdirectory because I have several copies of DOS and the List file reminds me which programs I keep there. I have copies of the programs in \Utility on several disks, but I back up this directory for convenience. My communications program uses several configuration files, one for each system that I access. I back up the \COMM directory to record these files.

Other miscellaneous configuration files are not covered elsewhere. You can copy all of these on one disk, so you won't have to re-create them if there is a problem. It's best to do this when you add a new program and the purpose of the various files is fresh in your mind. You need to make a backup only when you change the basic configuration of your system.

Data files change more often, but you won't need to back up files that haven't changed. If you are working on a docu-

address of the low-level formatting program—and begin execution. When it begins running, you'll see the following:

```
WX2 Format Revision 3.0
(C) Copyright Western Digital Corp. 1984
(AH) = Relative drive number (0 - 7)
(AL) = Interleave factor (3 is standard)
Press "y" to begin formatting drive C with
interleave 04
```

The last number should be your chosen interleave level. If it isn't, or if you're having second thoughts about the integrity of your data backup, press control-break or the reset button to cancel the low-level formatting. When you're ready to proceed, type "Y." The low-level formatting process should take about 10 minutes.

If you have a Tandy 20MB hard card, you can use the LLFormat.COM program that came with the card to adjust the interleave. Use an interleave level of 5. The syntax is LLFormat C:X, where X is the desired interleave factor. If you have another brand of hard disk, see if the software that came with it allows you to set the interleave.

When you're done, insert your hard disk utilities program and execute the hard-drive partitioning program (it's called Part on my system). Tell the partitioner to create an MS-DOS partition, use the entire drive, and make that partition the active one. When you're done, reinsert your DOS floppy and reboot.

When the computer's ready, reinsert the hard disk utilities disk and format the hard drive at the DOS level. In my system, the command HFormat /S formats and installs the operating system on the hard drive. When HFormat is complete, you should be able to boot from your hard drive, restore your backup (if you're finished experimenting), and resume business as usual.

I ran through the above procedure three times, comparing interleave levels 2, 4, and 5 against the system's default 3, using Norton Utility 4.0's Sysinfo and Core International's Disk Performance Test 2.7. If you want to perform similar tests on your system, you can create and time any disk-intensive operation. A good test would be to first copy your entire DOS floppy to a directory named DOS, and then time the execution of a Timer.BAT batch file such as the following:

```
MKDIR\DOS1
MKDIR\DOS2
MKDIR\DOS3
```

**Table. Speed results on Tandy 1000 HD.**

Interleave Level Index	Norton's Disk Index	Coretest's Data Transfer Rate	Coretest's Performance
2	0.5	27.0 KB/sec	0.724
3	1.2	100.2 KB/sec	1.159
4	1.3	124.9 KB/sec	1.305
5	1.2	100.2 KB/sec	1.159

```
COPY\DOS\**\DOS1
COPY\DOS\**\DOS2
COPY\DOS\**\DOS3
```

Keep testing higher interleave levels until the execution time increases, which will mean that you've passed the optimal interleave level.

My test results demonstrated that an interleave of four is a substantial improvement over the computer's original interleave of three (see Table). My results should be consistent with those of other Tandy 1000 HDs, for which an interleave of four should also be optimal.

If you have a different 8088-based computer, such as a Tandy 1200, you should perform your own series of tests at different interleave levels to determine your drive's best performance level. Do not try these procedures on non-8088 machines such as the 1000 TX, 2000, 3000, or 4000. And if your computer's response to G = C800:5 is substantially different from what I've described, follow the directions in your hard-drive controller's manual instead.

If you find a better interleave value for your hard drive, you will have improved your computer's speed without buying additional hardware and software, without consuming precious RAM, and without introducing any potential compatibility problems. ■

Alan L. Zeichick is a technical editor for CD-ROM Review. You can write to him at IDG Communications/Peterborough, 80 Elm St., Peterborough, NH 03458.



## BACKUP

ment, back it up whenever you accumulate more than you are willing to do over again.

If you're working on several projects, it may not be easy to remember to back them up. You can copy the entire \Files subdirectory to your backup disk, but this takes time if you have long files. I have a secret weapon that makes this job a snap. A simple utility program, Kopynew (or Knew), copies only those files in the current directory that have a more recent time and date than the corresponding files on the backup disk.

### Public Domain

This program, copyrighted by Glen C. Siegel, is in the public domain. I downloaded it from a bulletin board in my area. You can find it on some of the national bulletin boards. It is also available on the 80 Micro BBS (603-924-6985, 300/1,200 baud, 8-bit words, 1 stop bit, no parity).

Use Knew with a file name and wildcard characters to selectively back up a certain class of files. My word-processing directory contains documents with the extension DOC and style sheets with the extension STY. I can back up only the

documents by using Knew \*.DOC. You can automate the backup by changing the BAT file to the following:

```
ECHO OFF
CLS
CD\PLAN\FILES
MP %1
CLS
KNEW
```

When you exit Multiplan, Knew executes automatically. Knew prompts you to insert

**W**ith . . . a little  
luck you should  
not have to restore  
your hard disk.

the backup disk in drive A and then copies anything from the present session to the backup disk.

One more problem to consider is when

you have a data-base file larger than the capacity of a single floppy disk. Here I must rescind what I said earlier: You should use the Backup command to back up single files of any size. The following command:

BACKUP C:\PATH\File name.EXT A:

only backs up the named file. If it extends to more than one disk, Backup prompts you to insert another one. Both disks must be formatted and empty. A file backed up this way can only be read by the Restore command. Restore the file with this command:

RESTORE A:\.\* C:\PATH

### Shareware

Shareware programs that copy long files to multiple disks are also available. With care on your part and a little luck you should not have to restore your hard disk. But if the worst should happen, these procedures will reduce a catastrophe to a mere inconvenience.

David A. Williams is a staff engineer with a major aerospace firm and has 25 years of experience with computers. Write to him at 2452 Chase Circle, Clearwater, FL 33546.

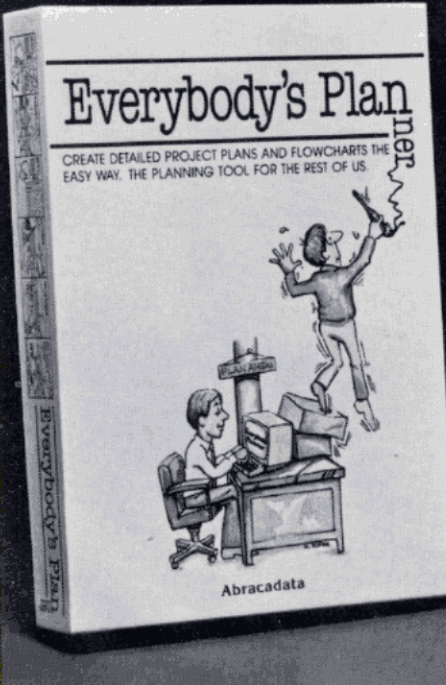
Circle 3 on Reader Service card.

Planning all types of projects just got easy!

*Finally!*  
Project Management and Flowcharts software for the rest of us. **\$99.95**

IBM compatibles with 256K (flowcharts requires CGA)

- pull-down menus
- mouse optional
- 7 reports included
- 13 more reports for \$39.95.



**Everybody's Planner**  
CREATE DETAILED PROJECT PLANS AND FLOWCHARTS THE EASY WAY. THE PLANNING TOOL FOR THE REST OF US.

**Abracadata**  
the source of plan-making software

Dept. PCR      P.O. BOX 2440  
EUGENE, OR 97402  
(503) 342-3030

Circle 95 on Reader Service card.

**We Sell For Less**  
**CALL FOR CURRENT DISCOUNTS**

1000 SX

Tandy 1000 SX  
384K **\$618<sup>00</sup>**

• CALL FOR FREE QUOTATIONS.  
• FREE CATALOG WITH ORDER.

**TOLL FREE**  
**800-443-9129**

**TANDY**  
**COMPUTERS**  
**AND PRINTERS**

Freight Included on orders over \$100

VISA   MasterCard   Discover

In Texas 409-598-3883  
or 409-598-7432

20% OFF Radio Shack  
Catalog Software & Telephones

Cashiers Check or Money Order.  
Prices subject to change without notice.  
Freight Included on orders over \$100

**3H**  
Computers  
209 Hurst Street  
Center, Texas 75935



# Hypersoft bridges the TRS-80 - PC Gap.

## Programs for PCs and Compatibles.

### PC-Four - A TRS-80 Emulator.

Now you can run your favorite TRS-80 Model 4 programs on your PC with **PC-Four**. Not just BASIC but machine language programs as well! This is another Hypersoft **FIRST!** **PC-Four** is a program that makes your PC or Compatible behave like a TRS-80 Model 4 complete with operating system, Z80 microprocessor and 128K of memory so you can run many of your favorite Model 4 programs such as **ALCOR C**, **MULTI-BASIC & PASCAL**, **ALLWRITE**, **BASCOM**, **ELECTRIC WEBSTER**, **PFS FILE**, **PROFILE**, **SUPERSCRIPIT**, **VISICALC**, **Model 4 BASIC**, and many more. Recommended by Prosoft for running Allwrite on your PC.

**PC-Four** even works with assemblers such as **ALDS**, **EDAS** and **MZAL** and debugger/monitors such as **TASMON** so you can write, assemble, debug and run Z80 machine code programs on your PC. To use it you must transfer your old files to MSDOS disks first. For this we recommend **PCXZ** or **Hypercross** - see below for details.

**Runs on PCs or compatibles with at least 384K of memory.** Put it on your lap-top, now you can carry your TRS-80 in your briefcase, wherever you go! Also runs on IBM PS/2s.

**Prices:** Order #PC4 \$79.95 alone, #PC4H \$104.95 with **Hypercross** **SX3PCM4**, #PC4Z \$119.95 with **PCXZ**. Send \$3 for PC4/PCXZ demo disk - refundable on order. **PC-Four** is also available on 3.5" disk format for lap-top machines, Tandy 1000TX, IBM PS/2s etc.

### PCXZ reads TRS80 disks on your PC

**PC Cross-Zap (PCXZ)** is a utility that runs on your PC or PC-compatible. With it you can copy files to or from TRS-80 disks at will. Suitable for all types of files, BASIC, ASCII and Binary. Converts **BASIC** and text files automatically as you copy. You can also format a disk, copy disks, explore, read and write sector data, repair bad directories and much more. Long after your TRS-80 is gone you will still be able to read your old disks. **Formats Supported:** Model I mixed density: DOS+ 3.4, DoubleDOS, LDOS (SOLE), MultiDOS, NEWDOS 80 V2, TRSDOS 2.7/8; Model I/III Double Density: DOS+ 3.5, LDOS 5.x, Model III: DOS+ 3.4, MultiDOS, NewDOS 80, TRSDOS 1.3; Model 4/4P: MultiDOS, DOS+ 4, TRSDOS 6., LSDOS 6.3; Max-80: LDOS 5.1. **PCXZ** supports single or double sided, 35, 40 and 80 track formats.

**Requires:** PC, XT, AT or compatible, Tandy 1000 (1000EX needs DMA), 1200, 3000. You must have at least one 5-1/4" 360K, 720K or 1.2M drive and 256K memory. An original program by Hypersoft. Not for PS/2s: Order # PCXZ ..... \$79.95

### Also may we recommend for your PC:

**XenoCopy II** runs on your PC and lets you read, write and format approx. 300 different CP/M, CoCo, P-System and other formats. Order # Xeno ..... \$81.95

**Uniform-PC** runs on your PC and lets you read, write and format approx. 200 different CP/M and MS-DOS formats. Supports Matchpoint, and Compaticard (see below). Order # UFPC ..... \$69.95

**Matchpoint-PC** reads Apple-II Disks on your PC. Includes a half-size card that plugs in your PC plus software. Reads **Apple DOS**, **PRODOS**, **SOS**, **CP/M**, and over 200 CP/M formats including hard sector types like NorthStar. Includes Uniform-PC. Order # MPPC ..... \$195.00

**Matchmaker** - reads **MACINTOSH** disks! a half size card plugs in your PC and, together with the supplied software, reads, writes and initializes MAC disks. Requires an external MAC drive.

Order # PCMAC ..... \$149.00

**COMPATICARD** disk controller card lets you attach 3.5" (720K or 1.44 Meg), 5.25" (360K, 720K or 1.2 Meg), and 8" disk drives to your PC, XT or AT. Control up to 16 drives with 4 Compaticards. May require Uniform-PC. Order # CCRD ..... \$175.00

**UniDOS Z-80 CP/M card** installs in your PC and lets you run CP/M programs on its built in 8 MHz Z80. Includes a free copy of Uniform-PC to transfer your old CP/M programs. Order # UZ80 ..... \$175.00

## TRS-80 Corner.

### HyperCross reads CP/M and PC-DOS on TRS-80s

Using **HYPERCROSS** 3.0 you can **COPY** files between TRS-80 disks and those from many CP/M and IBM-PC type computers on your own TRS-80 Model I, III, 4/4P or Max-80. If you have access to more than one kind of computer, or you are changing to a new machine then you need **HYPERCROSS** to transfer your files. You can **FORMAT** alien disks, read their directories, copy files to and from them, even copy directly from one alien disk to another.

**Formats supported:** IBM-PC and MS-DOS including DOS 1.1, 2.0-3.2 Tandy 2000, single and double sided, 3.5 and 5 inch. CP/M from Aardvark to Zorba, including all popular TRS80 CP/M formats such as Holmes, Montezuma, and Omikron. Also supports CoCo format.

**HyperCross converts Basic files!** HyperCross will automatically convert tokenized Basic file to MSDOS or CP/M as it copies them.

**Tried and Tested** in 1000s of installations world wide, by Industry, Universities, Government Institutions and nice TRS-80 owners everywhere. Prices include disk and 40 page manual.

**HyperCross 2.0 CoCo** reads CoCo format (No Basic convert) Order

**SX2CCM1, SX2CCM3 or SX2CCM4** ..... \$49.95

**HyperCross 3.0 PC** reads popular MSDOS 1.1-3.2 formats Order

**SX3PCM1, SX3PCM3 or SX3PCM4** ..... \$49.95

**HyperCross XT/3.0** reads 90 different CP/M and PC formats Order

**SX3XTM1, SX3XTM3 or SX3XTM4** ..... \$89.95

**HyperCross XT/3.0-Plus.** Reads over 220 formats inc CoCo Order

**SX3XTM1+, SX3XTM3+ or SX3XTM4+** ..... \$129.95

Specify TRS-80 Model I (needs doubler), III, 4/4P or MAX-80. Dual model versions e.g. Mod 3/4 on one disk add \$10 extra.

### Amazing HYPERZAP 3.2G Disk Magic!

Do you want to back up your precious copy of Copycat 3, or SU. Do you want to fix or modify a disk - if so then you need **HYPERZAP!** More than just another disk copying program - it is the program for analyzing, copying, repairing, creating floppy disks of all kinds. It works with TRS-80 formats as well as many others such as CP/M, PC, CoCo etc. Designed to handle mixed density sectors on any track in any sequence. Many features for reading, writing, editing track and sector data. **Hyperzap** is the tool that lets you be in charge. **Make your own self booting disks.** Take your own CMD file and turn it into a dual booting Mod 1/III/IV disk. **Autopilot mode** learns, saves and repeats procedures. Disk comes with fascinating examples. Use Hyperzap as a learning tool, find out how things are done!

**HYPERZAP 3.2G** - nothing else even comes close! Order # HZ32 - one version runs on all Model I/III/4/4Ps ..... \$49.95



## HYPERSOFT

PO Box 51155, Raleigh, NC 27609



**Orders:** 919 847-4779 8am-6pm, Orders/Tech Support: 919-846-1637 6-11pm EST.

**We Accept:** MasterCard, Visa, COD, Checks, POs. Shipping: S2, \$5 2nd day.

Many of the product names mentioned above are Registered or Copyrighted by Alcor, IBM, Misoys, Prosoft, Tandy and others too numerous to mention.



(continued from page 27)

lines. You also get unbreakable blocks, detailed commands for page length (nominal, minimum, and maximum), top and bottom margins, headers, footers, page numbers, single- or multi-page footnotes, and footnote and text separators.

Indeed, page layout was almost overwhelming: It took careful reading and plenty of trial-and-error experiments to sort out all the choices available. So was Xywrite's generation of up to nine custom-formatted indexes or tables of contents. In this area, Xywrite III Plus makes Wordstar 4 seem simple. Setting up a mail-merge data file and document, however, is easier in Xywrite than in Wordstar, though I missed the latter's ability to sum or calculate numeric merge fields.

Earlier versions of Xywrite were known for seizing control of the keyboard and causing trouble with memory-resident programs. Xywrite III Plus proved well-behaved when I tried it with Sidekick and Pop-Up Deskset, but its built-in utilities make most accessory programs unnecessary.

Need a calculator? Xywrite lets you type an equation on the command line or sum the numbers in a defined block. Want a macro program? You can record any string of text or layout commands as one of 36 Save/Gets—macros summoned with a keystroke such as alternate-Z—and save and load different sets of these macros.

Intrigued by memory-resident shorthand programs? The same Auto Replace feature that corrects mistakes from your personal spelling dictionary—changing "alright" to "all right" as soon as you type the former and press the space bar—can instantly change "vlt" to "Very truly yours" or "atpt" to "at this point in time".

The spelling checker requires that you create and load your own personal dictionary file; it doesn't make one for you. But this lets you have more than one dictionary (such as lists of legal and medical words) in addition to the main one.

The checker is also fast and easy to use, and has the ability to work unattended—to check one file or a disk full of files, present you with a list of unrecognized words, then go back and implement your corrections. The thesaurus is Microlytics' popular Word Finder, as efficient and flexible in Xywrite as in Wordstar or Word.

Corporate users or fussy authors will like III Plus's redlining feature, which vividly shows changes to a file (with additions in bold and deletions in reverse video). You can print a marked-up version of the file showing the changes, or remove or install them one at a time or globally.

A similar embedded command lets you

insert a non-printing note or label. You can use this not only as a reminder of changes or questions but also for references such as "See Madison's opinion on page 6"; the proper page number will be inserted when you print out, no matter where you move Madison's opinion.

## Problems and Possibilities

I've always liked the feel of the Tandy 1000 keyboard, but its layout is the Tandy 2000's revenge from beyond the grave—and Xywrite is one of those programs that see the 1000 keyboard as if it were an IBM keyboard.

Instead of using the arrow keys, you must move the cursor with the even numbers on the numeric keypad (the Tandy's right and down arrows serve, respectively, as the keypad plus and minus). Keypad zero becomes the insert key, and while the page up, page down, and end keys work normally, home is keypad 7 instead of the home key.

Tandy's KEYCNVRT.SYS driver doesn't help, but, if you can afford it, Xywrite works fine on a 1000 with Tandy's Universal Keyboard Adapter and an IBM-style keyboard.

Since my other computer has such a keyboard, I found it almost easier to adapt to this than to use the supplied remedy. You can modify the word processor's Startup.INT file (similar to Autoexec.BAT, it sets various defaults and loads your spelling dictionaries and printer driver) to load a special Tandy.KBD file.

This isn't difficult—the startup file, like the printer and keyboard drivers, is a Xywrite document you can edit like any other—but it does only a partial job. The conversion enables the home key, but disables end and makes you use the shift key

to get page up and page down. The arrow keys work within text, but you still need the keypad numbers to steer through Xywrite's help screens. Oddly, with or without Tandy.KBD, you must press numbers lock twice to unlock the numbers mode.

On the positive side, Xywrite's reliance on typed commands instead of keyboard shortcuts means that the incompatibility affects only a few functions. Better yet, some study of Xywrite's extensively documented codes and function calls will let you customize Tandy.KBD yourself, reassigning function keys or implementing your favorite features. (Under the section headed Table =, for example, the changes 73 = PU, 81 = PD, and 79 = BS will give you a shiftless page up and page down and activate the end key.)

You alter Xywrite by editing Xywrite files; consequently, it's the easiest program to modify that I've ever seen. And since it's not copy-protected, you'll always have a backup if you hopelessly scramble something.

## End of File

You'll hit a few moguls skiing the expert slope, and you'll never mistake Xywrite III Plus for Personal Deskmate. But for a famously Spartan, command-driven program, Xywrite's documentation, spelling checker, and certain other features are almost luxurious. If you have some money, some patience, a lust for power, and a passion for word processing, Xywrite is a spectacular piece of software. ■

**Xywrite III Plus 3.52 requires one 720K or two 360K disk drives and 256K RAM (384K for spelling checker). Xyquest Inc., P.O. Box 372, Bedford, MA 01730, 617-275-4439. \$445.**

# The Show-Me State

by David Williams

**D**OS has only limited capability for displaying ASCII files and throws up its hands if you want to display a binary file. But Show Me!—one of several utilities available for improving its pathetic performance in this area—can help.

How many times have you wanted to read a documentation file while running a new program? Show Me!, in its memory-resident mode, can do just that. You can also cut material from a file and paste it into the current program. There's no limit to the file size that Show Me! can handle, and you can open up to four files at one time.

Show Me! is anything but small; the program requires 36K plus a nominal 16K for the file buffers. If you have limited

memory space and Show Me! is the last memory-resident program you've loaded, you can use the Unload command to free up the space it occupies without rebooting. You can also operate Show Me! in a non-resident mode, but much of its usefulness stems from memory-resident operation.

Options you can specify on the command line let you customize many of the program's characteristics. Screen colors, the buffer size, the maximum number of open files, and the default display mode—hexadecimal (hex) or ASCII—are all under your control. You can also change the activation key and the paste key combinations.

The selected buffer size is divided by the maximum number of open files (from one to four) to create separate buffers for each file. You can reduce disk activity when viewing large files if you specify larger buffers. If you expect to view only one or two



F1-OPEN	F2-HELP	F3-DIR	F4-SEARCH	F5-GOTO	F6-SWITCH	Esc-EXIT	U2.01
00308	12 81 06 80	1E 06 02 26	09 07 2D 20	00 03 08 38	.....	.....	.....
00308	00 72 03 09	57 FF 52 0C	0A 0E C2 03	2E EA 2A 40	.....	.....	.....
00308	F7 06 75 10	00 00 75 1D	F7 06 97 00	00 00 75 23	.....	.....	.....
00308	1E 00 59 0A	0E 00 80 16	DC 01 B4 09	CD 21 1F E0	.....	.....	.....
00400	D1 06 08 51	06 00 36 4C	3C 0D 3E DC	11 00 0E 4F	.....	.....	.....
00410	10 F3 A4 03	3E 62 13 01	77 00 0D 3E	61 32 09 09	.....	.....	.....
00420	00 00 20 F3	AA 00 36 3E	34 09 36 3E	13 00 00 F0	.....	.....	.....
00430	0E 00 26 00	3E FF FF 51	75 10 C6 06	FC 2A 01 26	.....	.....	.....
00440	01 3E 2F 00	30 33 75 0A	01 0E 75 10	00 10 FE 06	.....	.....	.....
00450	FC 2A C7 06	EE 2A 00 00	C6 06 FA 2A	00 CD 11 25	.....	.....	.....
00460	30 00 3D 30	00 74 4F 3D	00 00 74 4A	C6 06 FA 2A	.....	.....	.....
00470	01 C7 06 EE	2A 00 00 C6	06 FB 2A 00	B4 12 B3 10	.....	.....	.....
00480	CD 10 00 FB	10 74 05 C6	06 FB 2A 01	F7 06 75 10	.....	.....	.....
00490	00 10 75 10	00 3E 43 10	01 74 10 C6	06 47 10 02	.....	.....	.....
004A0	C6 06 44 10	0F 00 0E 44	10 10 EB 0A	C6 06 47 10	.....	.....	.....
004B0	07 C6 06 44	10 0F 07 06	75 10 00 00	74 05 EB 0F	.....	.....	.....
004C0	00 5A C0 FA	B4 34 CD 21	2E 0C 06 20	00 2E 09 1E	.....	.....	.....
004D0	22 00 B4 35	00 00 CD 21	2E 09 1E 00	00 2E 0C 06	.....	.....	.....
004E0	02 00 00 09	CD 21 2E 09	1E 04 00 2E	0C 06 06 00	.....	.....	.....
004F0	00 13 CD 21	2E 09 1E 00	00 2E 0C 06	0A 00 00 16	.....	.....	.....
00500	CD 21 2E 09	1E 0C 00 2E	0C 06 06 00	00 25 CD 21	.....	.....	.....
00510	2E 09 1E 14	00 2E 0C 06	16 00 00 26	CD 21 2E 09	.....	.....	.....

**Show Me! works best as a memory-resident utility.**

files simultaneously, you can make more efficient use of memory if you specify this on the command line.

You can select a file for display in either of two ways: You can press F1 to display a file-selection menu, type the file name (including a path, if necessary), and select the hex or ASCII display mode, or you can press F3 to display the current directory. Use the arrow keys to move the highlight bar to the desired file and press return to select a file. You can also view and select files from other directories.

A help menu across the top of the screen

displays the function key assignments. A status line across the bottom of the screen displays the file name and the line number of the first line displayed. Once you have a file displayed, you can page through it with the cursor keys. Normally you'll use the full screen for file display, but you can change to a smaller window if you prefer.

You can jump to a specific line number in the case of an ASCII file or to a hex offset if the file is displayed in the hex mode. A special mode translates Wordstar files to a readable format. Press the escape key (ESC) to exit back to the interrupted

program. The next time you invoke Show Me!, the same file will be displayed without having to be reselected.

A search function lets you find specific entries in a file. If the display is in ASCII, press F4 and enter a search string. If the display is in hex, enter hexadecimal values. The search speed isn't the fastest I've seen, but it is adequate for the job.

Once you load Show Me! in the memory-resident mode, another program can call it. The distribution disk includes demo programs in C, Basic, and Pascal to illustrate the calling procedure. Once called, the program performs in the usual manner.

Show Me! is reasonably priced considering the performance it delivers. The 50-page manual is clearly written, but you won't have to refer to it often; the program is easy to use. If you can afford the memory, you'll want to load it every time you boot up. ■

**Show Me! requires 52K. Serengeti Software, P.O. Box 27254, Austin, TX 78755, 512-345-2211, \$39.**

Circle 37 on Reader Service card.

## BUSINESS SOFTWARE FROM MICROTECH For the IBM PC and Compatibles

### SMALL BUSINESS ACCOUNTING-PC

This sales-based accounting package is designed for the non-accountant oriented businessman. It also contains the flexibility for the accounting oriented user to set up a double entry journal with an almost unlimited chart of accounts. Includes Sales Entry, transaction driven Accounts Receivable and Accounts Payable, Journal Entry, Payroll Disbursement, and Record Maintenance programs. System outputs include Balance Sheet, Income Statement, Customer and Vendor status Reports, Accounts Receivable and Payable Aging Reports, Check Register, Sales Reports, Account Status Lists, and a Journal Posting List.

**\$79.95**

### INVENTORY CONTROL/SALES ANALYSIS-PC

This module is designed to handle inventory control, with user defined product codes, and produce a detailed analysis of the business' sales and the sales force. One may enter/update inventory data, enter sales, run five sales analysis reports, run five inventory reports, set up product codes, enter/update salesman records, and update the SBAP inventory.

**\$59.95**

Call for package price

### PAYROLL-PC

Designed for maintaining personnel and payroll data for up to 200 hourly and salaried employees with 8 deductions each. Calculates payroll and tax amounts, prints checks and maintains year-to-date totals which can be automatically transferred to the SBA package. Computes each pay period's totals for straight time, overtime and bonus pay and determines taxes to be withheld. Additional outputs include mailing list, listing of employees, year-to-date federal and/or state tax listing, and a listing of current misc. deductions. Suited for use in all states except Oklahoma and Delaware.

**\$59.95**

These programs are user friendly and menu driven. Sample transactions are included. MS-Dos 2.0 or above required. One or two disk drives. Can be installed on Hard Disk. Supports all printers.

### ACCOUNTS RECEIVABLE-PC

Includes detailed audit trails and history reports for each customer, prepares invoices and monthly statements, mailing labels, aging lists, and an alphabetized customer listing. The user can define net terms for commercial accounts or finance charges for revolving accounts. This package functions as a standalone A/R system or integrates with the Small Business Accounting package.

**\$59.95**

### ACCOUNTS PAYABLE-PC

Designed for the maintenance of vendor and A/P invoice files. The system prints checks, voids checks, cancels checks, deletes cancelled checks, and deletes paid A/P invoices. The user can run a Vendor List, Vendor Status report, Vendor Aged report, and an A/P Check Register. This package can be used either as a standalone A/P system or can be integrated with the Small Business Accounting Package.

**\$59.95**

**MICROTECH CONSULTANTS INC.**  
1906 Jerrold Avenue  
St. Paul, MN 55112  
Dealer Inquiries Invited



**Ordering Information**  
Add \$3.00 shipping & handling, MN residents add 6% sales tax.  
Visa, Mastercard, COD (add \$3.50), personal checks.

**(612) 633-6161**



## Color Printer Ribbons

		Price Each	
Colors	Ribbons	Price Each	Black Color
Red	Radio Shack—DMP 100	5.50	—
	DMP 110	4.15	4.75
	DMP 120	6.75	8.50
	DMP 130	5.25	6.50
	DMP 200	6.75	8.50
Blue	(m/s) DMP 230	3.75	5.75
	DMP 430	Call For Price	—
	DMP 2100	5.75	—
Green	Apple Imagewriter I/II	3.75	4.75
	Brother HR 15/25/35 m/s	6.00	8.00
Brown	Citizen 120D	5.00	—
	Epson LX 80/90	3.60	4.25
	Epson MX/FX/RX 80/85	3.75	4.25
Purple	Epson MX/FX/RX 100/185	5.50	7.60
	IBM Proprinter 4201	5.25	7.20
	Okidata 80/82/92/93	1.75	2.25
Yellow	Okidata 182/192/193	6.00	8.00
	Panasonic KXP 1090/1091	6.50	8.75
	Seikosha SP 800/1000	5.25	6.50

### T-Shirt Ribbons (Heat Transfer Ribbons)— Call For Price & Availability.

For ribbons not listed above, call for price and availability. Price and specification are subject to change without notice.

Minimum order is \$25.00. Shipping & handling is \$3.50. UPS Ground. Add \$2.00. C.O.D. additional. Illinois residents add 6.25% tax. Master Card and Visa accepted.

**RENCO COMPUTER PRINTER SUPPLIES**  
P.O. Box 475, Manteno, IL 60950 U.S.A.  
1-800-522-6922 • 815-468-8081

## REVIEWS

# Vapor Wealth

AMERICAN STOCK EXCHANGE		AMEX MAJOR MARKET INDEX (XMI)	
The AMEX closed at:	231.75	The XMI closed at:	261.12
Avg share gained/lost:	....	Net change:	-8.62
Advanced:	253	High:	263.62
Declined:	268	Low:	268.62
Unchanged:	252	Call volume:	9,243
New highs:	26	Put volume:	7,716
New lows:	11	Call open interest:	71,651
Total volume (888's):	5,957	Put open interest:	64,957
Session high:	232.75	Session high:	263.62
Session low:	288.37	Session low:	227.58

DOW JONES INDUSTRIAL AVERAGE		S&P 500 INDEX	
The DJIA closed at:	1334.88	The S&P 500 closed at:	192.88
Net change:	-3.12	Net change:	-8.37
Total volume (888's):	88,632	Session high:	193.25
Session high:	1353.58	Session low:	168.88
Session low:	1154.62		

(Enter) to continue

The American Investor reveals market information at the close of the trading day.

## by Harry Green

These two programs give new meaning to the term "paper profits." With the American Investor, you don't invest cash; the program simulates stock transactions on the American Stock Exchange to help you learn how to make investment decisions. You get feedback almost instantaneously, and you can compress months of investments and observations into a few hours at the keyboard. Millionaire II is a game in which one or two players try to parlay a modest investment into one million dollars, all on paper.

### The American Investor

Each American Investor session represents a 190-day period. You begin by establishing an initial investment, which the program keeps in a money-market fund until you decide how to invest it. From the main menu, you can advance to a new day or get information about the market.

As each trading day ends, the program displays four market indexes, news headlines, dividend notices, and trends in key interest indicators (see the Photo). You can also choose a complete table of price quotations for the 47 stocks used in the simulation. The stocks are real companies and the investment information is from actual market history.

Another main menu selection is fundamental research, which provides data on companies, industry groups, or one of the four indexes. You can also do a technical analysis, which many investors rely on to predict major shifts in the market.

You can start a simulation with any amount of money up to \$999,999. The program charges brokerage commissions and purchases stock at some value between

the high and low price on the trading day. When you decide to open a position in a stock, you can opt to buy it, sell it short, purchase put and call options and spreads, or open a straddle. If you're unfamiliar with any of the terms, a 77-page supplementary manual explains their meanings.

You can also place orders to buy or sell stocks at a specified price, or you can write a stop-loss order to sell a stock automatically if its price drops below a specified level. Most of the transactions you would execute or strategies you would employ on the market are available with American Investor.

As the simulation progresses, you can take long or short positions in any of the stocks and deal in options if they are actually available on the exchange. The program pays dividends automatically, issues margin calls if you don't have enough cash to meet federal requirements, and purchases or sells stocks according to your orders. It takes several minutes to page through all the screens and interpret them, so the program provides a fast-advance feature for skipping through daily sessions without reviewing the data.

The program calculates your net worth daily. You can stop at any time to inspect your portfolio; the program reports how much of each stock you own, what it cost, its current value, and the percentage of unrealized gain or loss. You can get a complete report on any stock, including an indicator of the effects on profitability if you sell today.

At the end of each trading month, the program issues a detailed financial report. Graphs display your net worth and compare it to the performance of the Standard and Poor's 500. Another graph displays your annualized return on investment.

## Live One Romantic Fantasy After Another!



**\$29.95**

At Last!  
A Computer Game  
Just for the Thrill of it!  
**Wild Adventure!**

A new, exciting experience every time you play.

Available for IBM-PC and compatibles, TRS-80 Models 4, 4P, & 4D (2 disks), and Apple II E & C (2 disks).

Gray Fox Enterprises  
Dept. M, Box 8092  
Belleville, IL 62222



© COPYRIGHT 1987, GRAY FOX ENTERPRISES

Circle 38 on Reader Service card.



# TRS-80 • MS-DOS SOFTWARE SAVINGS

## DiskCount Data

WHERE  
QUALITY PROGRAMS  
MEET COMPETITIVE PRICES

2701-C.W. 15th • SUITE 612 • PLANO, TX 75075 • (214)680-8268

### Hi Resolution Grafyx

THE GRAFYX SOLUTION by Micro Labs Run the best Hi-Res board on your Mod III or 4/4P. Far superior to Radio Shack's board, this gem will open up a new world of graphics applications. Graphics basic is included along with 39 other Hi-Res demos & applications and a detailed user manual. All major operating systems are supported and the Hi-Res screen can be printed on 20 popular printers. Installation is simple with a clip-on internal board. Hi-Res, text & Low-Res graphics can all be displayed simultaneously. This board is the finest Hi-Res modification on the market and additional Hi-Res software is available. Call for further details. Specify Mod III, Mod 4, 4P or 4D when ordering. Originally priced at \$299.95.  
**WAS \$199.95 NOW \$144.95**

### Electronic Bulletin Boards

You too can be a sysop. Run your own BBS and open up your computer to the outside world. . . Imagine a real time electronic message center in your own home.

#### COMPLETE SYSTEMS

INFOEX-80 I or III (will run on hard disk) . . . 99.95  
FAST-80 for the Model 4/P/D . . . 74.95  
BBS-PC IBM or Compatibles . . . 250.00  
Call for additional details

### Brand New! Hi-Res!!

Pro-Draw. . . The final word in hi-res graphics editing for the TRS-80, its many features make it ideal for any type of graphics creation or designing whether you are interested in making pretty pictures or complicated schematic drawings. Works with your high res graphics board. Works with all major Mod III and 4 DOSes including LSDOS 6.3.  
Bargain priced at **\$57.95**

### Speed Reading. . .

Read faster, understand more and have more free time. . . Use your computer to double or triple your reading speed without skipping words. Power Reading trains you to read groups of words at a glance—in clusters. No skipping words as in Speed Reading. Learn to instantly switch from pleasure reading to study reading; always at increased speeds. Automatically adjusts to individual abilities. With Power Reading techniques, you read every word to increase comprehension and make reading easier and more enjoyable. Better than expensive classes. Power Reading Mod III/4 **\$34.95.**

### TRSCROSS

TRSDOS to MSDOS conversion utilities  
A must for converting TRSDOS type files to the PC/ST/AT & compatibles. TRSCROSS does the conversion on the IBM & compatibles.  
Includes Basic Utilities

**\$89.95**

### Alcor

ALCOR C LANGUAGE complete program development system. . . everything necessary to edit, compile, and execute C programs . . . **\$64.95**  
ALCOR MULTI BASIC complete program development system for creating, compiling, and executing BASIC programs . . . **\$64.95**  
ALCOR PASCAL complete, compact and efficient Pascal system for small computers **\$64.95**

### TRS-80 Software

Le Script I/III/4 . . . 109.95  
Power Drivers for Superscript and Epsons  
C.Itoh Prowriter, Starwriter and Okidata 92 for I/III/4. Specify printer . . . 24.95  
Multidos version 2 Mod I/III . . . 79.99  
Specify . . . 79.99  
Multidos 80/64 ver. 2 Mod 4 . . . 89.95  
Fast/CMD run TRSDOS 1.3 in 4 at 4MHz . . . 29.95  
J&M Memory Minder Model I . . . 84.95  
J&M Memory Minder Model III/4 . . . 74.95  
The Toolbox for LDOS Model I/III . . . 44.95  
The Toolbelt for TRSDOS 6 . . . 44.95  
Pascal-80 I/III . . . 59.95  
Zuess Editor/Assembler I/III/4 . . . 74.95  
System Diagnostic I/III/4. Specify . . . 69.95  
Accel 3/4 Basic Compiler I/III . . . 44.95  
Dostamer Model 4 (or MS/DOS) . . . 49.94  
Z-Basic Compiler 3.1 I/III/4 . . . 79.95  
Specify . . . 19.95  
Monitor 5 I/III/4. Specify . . . 49.95  
Test Question Data Bank III/MS . . . 34.95  
Test Generator/Drill III . . . 49.95  
Football Scouting III . . . 39.95  
Basketball Statistics III . . . 39.95  
Baseball Statistics III . . . 49.95  
Student Schedule Data Base III . . . 39.95  
Teacher Evaluation III . . . 24.95  
Powerdraw I/III . . . 24.95

### Datagraph Printer Graphics

Transform your Visicalc or Multiplan files into high resolution custom graphs on your TRS-80 computer and graphics printer. High resolution—60 x 72 data points/inch. Large data capacity—1000 input data points/graph. Selectable graph sizes—from 1" sq. to 7" x 24". Standard Data Source—plots data from Visicalc or Multiplan spreadsheets using the DIF™ or SYLK formats. Graph Feature Selection—fill out pre-formatted worksheet form with Visicalc or Multiplan program. Minimal Entry Requirements—enter only name of datafile and location therein of data to be plotted. Multiple Function Graphs—plots set per graph. Specify model #, printer, & Visicalc or Multiplan.  
Datagraph . . . **\$74.95**  
Datagraph w/Pie Chart Option . . . **\$109.95**

### Super Directory

Index all of your diskettes and disk files with SUPERDIRECTORY. This unique program will read all of your disk files, generate a master library sorted by file name or extension along with the appropriate disk number. Your master index can be sent to the printer or brought to the screen. We even include an editor so you can add one line of comments to each file in the library. While SUPERDIRECTORY runs on the Model I or III (4/4P/4D in the MOD III mode), it will read and index Model 4 diskettes while in the Model III mode. When ordering, Model I or Model III must be specified. Also, please inform us if you are going to run it on the Model 4P as an additional file is needed. Retail 49.95 **SALE \$29.95**

### MSDOS Software

Alge Blaster . . . 44.95  
BPI General Accounting . . . 249.95  
Certificate Maker . . . 49.95  
Computer S.A.T. (H.B.J.) . . . 79.95  
Copy II PC . . . 29.95  
Cornerstone (Infocom) . . . 94.95  
DAC Easy Accounting . . . 54.95  
DosTamer . . . 49.95  
F-15 Strike Eagle . . . 29.95  
Fast Back 5.1 . . . 149.95  
Flight Simulator . . . 39.95  
GATO . . . 34.95  
Home Accountant Plus, The . . . 79.95  
LeScript . . . 179.95  
Managing the Market . . . 129.95  
Managing Your Money . . . 149.95  
Microsoft C Compiler . . . 349.95  
Microsoft Learning DOS . . . 39.95  
Microsoft Macro Assembler . . . 129.95  
Microsoft Quick Basic Comp . . . 79.95  
Microsoft Windows . . . 79.95  
Microsoft Word . . . 299.95  
Multiplan . . . 149.95  
NewsRoom Pro (New) . . . 99.95  
Norton Utilities 4.0 . . . 79.95  
1 Dir . . . 79.95  
PC Tools (Great Utilities) . . . 49.95  
PFS 1st choice (Includes File, Write, Plan and Access) . . . 129.95  
Printworks . . . 59.95  
Prodesign II . . . 249.95  
Sargon III . . . 34.95  
Sideways . . . 54.95  
Superkey . . . 59.95  
The Print Shop . . . 49.95

The Print Shop Graphics Library . . . 29.95  
The Twin (1-2-3 Clone) . . . 79.95  
Typing Tutor III (Simon & Schuster) . . . 34.95  
Websters New World Spelling Checker . . . 54.95  
Websters New World Thesaurus . . . 59.95  
Word Perfect 4.2 . . . 299.95

### Hi-Res TRS-80 Software

Backgammon . . . 29.95  
Biorythm & USA Map . . . 19.95  
Bizgraph . . . 75.00  
Dogcatcher Mod IV Only . . . 19.95  
Draw . . . 39.95  
Pro-Draw . . . brand new 57.95  
Fractals . . . 19.95  
G Basic 3.0 for R/S board . . . 49.95  
Life & Spirograph . . . 24.00  
Mathplot . . . 39.95  
Slideshow . . . 19.95  
Surface Plot . . . 39.95  
Tournament Chess . . . 49.95  
Tournament Reversi . . . 29.95  
xTCAD . . . just reduced 239.95  
3D Plot . . . 39.95  
3-D Tic Tac Toe . . . 19.95

**Send for Our New  
Catalog  
TRS-80 & MS-DOS  
Software**

Mail your order in today, or for immediate shipment,  
**CALL 214-680-8268/OPEN MON.-FRI. 10-7 CST**

Mail orders, send cash, check, or money order. Please add \$3.00 for UPS Shipping or \$5.00 for US Postage & Insurance. COD's send an additional \$3.00 COD fee. All COD's will require cash or cashier's check upon delivery. Foreign orders are welcome. All shipping charges assumed by purchaser. When ordering by mail, please specify computer and model number.

and   Cheerfully Accepted.



# Introducing CheckMaster II. The Powerful, Flexible, COMPLETE Checking System, for Only \$39.95.

With CheckMaster II, all the tools are included: payee and payer files for recurring transactions; check processing for computer printed checks, handwritten checks, ATM transactions, and fully automatic check runs; deposit processing to manually or automatically record deposits; and register processing for various reports, inquiries, and reconciliation. Edit any transaction, reprint checks; balance is automatically updated. There's even a Mail Label Generator, plus a utility that enables you to define special items, such as your check format, label format, and printer control table. Accommodates any size check.

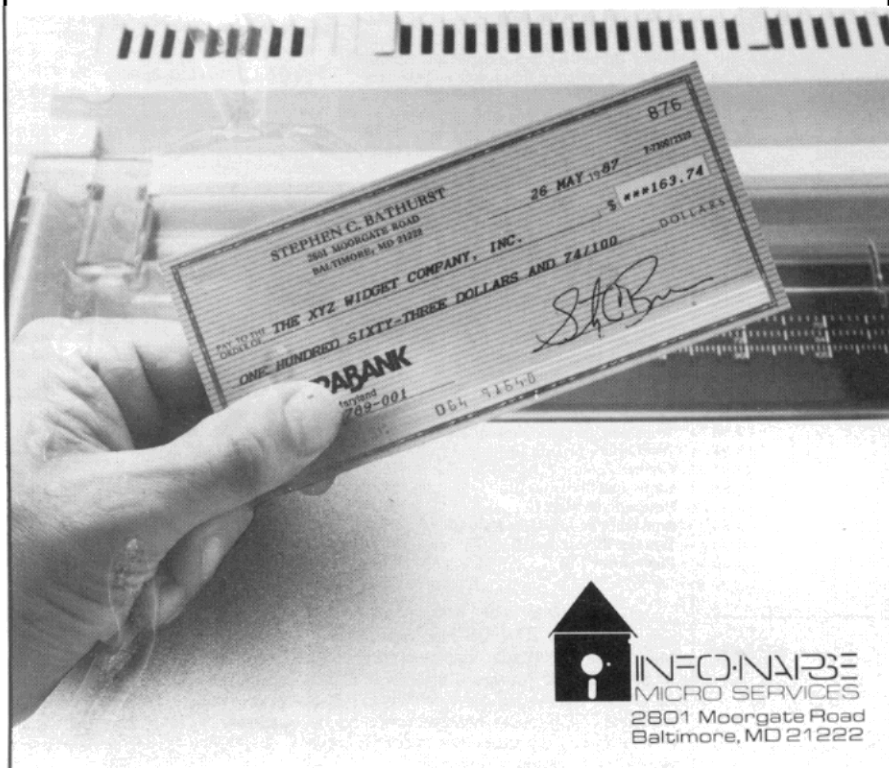
CheckMaster II comes complete with a 200-page User's Guide, but you'll rarely need it. That's because the system will communicate with you in plain English.

## To order CheckMaster II.

Send \$42.35 (includes shipping and handling charges) to INFO-NAPSE Micro Services, or for C.O.D. orders, call toll free 1-800-323-5669.



System Requirements: PC or compatible, MS-DOS 2.0 and above, 512 RAM and a printer. Tandy™ 2000 version available.



## REVIEWS

### Millionaire II

Millionaire II incorporates similar features into a game. Each player begins by selecting from five status levels, ranging from Novice, with a net worth of \$10,000, to Broker, with a net worth of \$100,000. The objective is to make a million dollars.

Windows at either side of the main menu show the players' net worth, interest paid and earned, and the net change from the previous week. Players can research the corporate history of any stock they are considering or see how the stock tracks with its industry.

After completing research, you can buy or sell short the stock or purchase options (if your status permits). The program lets you view your portfolio and graph your net worth at any time. At the end of the game, which covers 77 weeks, the computer reports your net worth and investment success—or lack of it.

### Conclusion

Both programs teach you something about the market. The American Investor is particularly effective with its impressive graphics and detailed information. The simulation is about as exciting as stud poker played for matchsticks, but it lets you play the market without risking more than the price of the package. ■

**The American Investor (\$149.95) requires 512K, MS-DOS 2.x, two floppy drives or one floppy and a hard disk, and a color graphics adapter (CGA) or Hercules graphics card.**

**Millionaire II (\$59.95) requires 256K and MS-DOS 2.x.**

**Britannica Software, 185 Berry St., San Francisco, CA 94107, 415-546-1866.**

## Forms Generator

by Wynne Keller

**A** form generator lets you design a form, save it to disk, and then either print it out as is or return to the template, fill it in, and print it out in finished form.

Except for drawing grids, EZ-Forms does a fine job of creating forms. It also performs a variety of math functions within a form. The program comes with more than 100 ready-made forms on a disk; additional disks can be purchased at \$39 each. A special font disk for the Hewlett-Packard Laserjet printer is also available.



Like most form generators, EZ-Forms has one limitation you should be aware of: It won't put lines and text in the same space, because a line counts as a character. Thus, you can't type text onto a line unless you use two rows, type the line on the bottom row, and float the text on the row above it. I found it useful to keep two versions of some forms: a lined version I could fill out by hand or on a typewriter and an unlined version I could fill out on the computer.

To design a form, you start by giving it a name and selecting a size—the minimum is 23 rows, and the maximum is 126 rows by 255 columns.

Although you can create borders easily, there's no direct command to create a grid. To make a line, you mark its beginning and end points, then press a function key to draw it. In the graphics mode, you can even create simple drawings with the cursor keys. This feature is a pleasure to use; it's as easy to erase what you don't want as it is to create what you do. Diagonal lines, however, are not supported. If your linear artwork looks a bit ragged, the Patch function straightens it up by erasing extra nubs and connecting intersections that don't quite work.

It's possible to design forms so that users can use the tab key to jump from entry to entry when filling them out. To do so, it's necessary to replace all blank spaces (such as spaces between words) that aren't meant to receive input with tilde marks (~). The tildes are not printed. Though this sounds cumbersome, it works easily: Just fill the entire page with tildes, then type your form over them.

EZ-Forms supports ASCII file import or export. An option converts any special characters to blank spaces, preventing some word-processor codes from wrecking your form.

The most obvious use for EZ-Forms' math feature is customer invoicing. You can arrange a form to work with a formula that will total entries each time you fill it out. The formulas look like hieroglyphics and using them takes some effort, but this is a potentially important feature.

EZ-Forms has a number of block functions. It's annoying, though, that block markers don't appear on screen; you can't tell if you've marked the area you intended. The program supports wordwrap (from one line to the next) only within a marked block.

You can mark a master form for automatic date, time, and form counting. Each time such a form is filled out, the computer displays the correct date and time and the number of times the form has been completed.

If you have pre-printed forms, such as invoices, you can use your computer to fill them out. Design an EZ-Form to match them, fill it out on the computer, feed the pre-printed forms through your printer,

and print only the data you entered. The EZ-Form will not be printed over the pre-printed forms. The program's limited ASCII data-base file-merge function might be useful in combination with this feature.

EZ-Forms offers a number of print options. You can specify the number of copies, draft or final mode, and whether you want six or eight lines per inch, compressed or normal print, and extra dark or normal graphics. You can print several forms as a batch. You can also number forms incrementally as they print. A quick-print function lets you see your work on paper before you leave the edit mode.

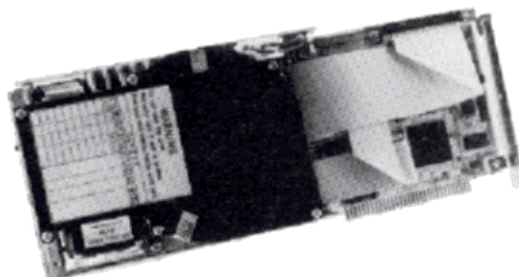
EZ-Forms has much to recommend it. Any problems I encountered were only minor annoyances. Designing forms isn't dif-

ficult, but the program comes with so many ready-made forms that you might not even need to devise your own. Your results will be near print-shop quality on a laser printer and quite satisfactory on a good dot-matrix machine.

**EZ-Forms Executive 1.2 requires 384K. EZX Corp., 403 Nasa Road 1E, Webster, TX 77598, 713-338-2238, \$89.**

## Call our Professionals

Our 11th Year in the Tandy Market Place



### HARD CARDS

For your Tandy 1000, 1000A, 1000SX, 1000TX, 1000HL, and IBM PC/XT compatible.

21 Meg Formatted	.....\$379.
32 Meg Formatted	.....\$479.
48 Meg Formatted	.....\$579.
64 Meg Formatted	.....\$749.

For the Tandy 3000, 4000, and IBM AT compatible.

32 Meg Formatted	.....\$699.
48 Meg Formatted	.....\$849.
64 Meg Formatted	.....\$999.

### EXTERNAL HARD DRIVES

For the Tandy 1000EX, 1000HX.  
21 Meg Formatted .....\$549.

32 Meg Formatted	.....\$649.
48 Meg Formatted	.....\$749.
64 Meg Formatted	.....\$849.

### INTERNAL HARD DRIVES

For your Tandy 1000, 1000A, 1000SX, 1000TX, 1000HL, and IBM PC/XT compatible.

21 Meg Formatted	.....\$299.
32 Meg Formatted	.....\$369.
48 Meg Formatted	.....\$459.
64 Meg Formatted	.....\$559.

For the Tandy 3000, 4000, and IBM AT compatible.

21 Meg Formatted	.....\$479.
32 Meg Formatted	.....\$579.
48 Meg Formatted	.....\$679.
64 Meg Formatted	.....\$779.

**MegaHaus**  
**1-800-426-0560**

**Order information:** Call us to place your order via VISA, MASTERCARD, DISCOVER, AMERICAN EXPRESS, WIRE TRANSFER, or C.O.D. Purchase orders are accepted from government agencies. Orders placed with personal checks are held for check clearance. All packages are shipped via UPS. Tandy/RadioShack are trademarks of Tandy Corporation, IBM is a trademark of International Business Machines Corporation. Please send all mail to MegaHaus, P.O. Box 517, Kemah, Texas 77555-0517.

**Warranty:** One year minimum warranty on all products sold, ask for details.  
**Refund policy:** If you're not happy with our products for any reason, return it to us insured within 90 days from our ship date for a 100% refund less shipping cost.

Circle 19 on Reader Service card.



# The Electronic Placeholder

by Alan L. Zeichick

It can happen to anyone. Someone trips over your computer's power cord, or there's a sudden blackout. The annual budget, the Great American Novel, the data base you slaved over is gone.

Bookmark is a utility designed to prevent such catastrophes. At periodic intervals, Bookmark makes a copy of working memory—system and video RAM—and stores it on your hard disk. If the system collapses suddenly, Bookmark can reload the stored work session and resume execution at the point where it was saved.

## Setting Up

The Bookmark package contains one 5¼-inch, non-copy-protected system disk, a good 16-page user's manual, and, appropriately enough, a little bookmark (which doubles as a quick-reference card). A 3½-

inch disk is optionally available from Intellisoft.

Bookmark has one of the easiest installation procedures I've seen. While logged onto the hard disk, place the Bookmark disk in drive A and type A:LOADMARK. Unlike other products that ask you what type of monitor and disk you have, Bookmark finds out for itself; its device summary menu correctly listed my 640K RAM, MS-DOS 3.1, color graphics adapter, hard disk, and single serial and parallel ports.

Bookmark doesn't use, or protect, memory described by the Lotus-Intel-Microsoft Extended Memory Specification (LIM/EMS). If you rely on LIM/EMS, then Bookmark's not for you.

You'll need to decide which hard disk to use (the default is C), which directory to store the backup file in (the default is the root), and whether you want a single or double backup. Double backups use the two-tape backup theory; if there's calamity

during the actual backup process, and the current backup is destroyed, there's always an earlier one available. It's a practical theory, but in practice, it consumes twice the hard-disk space.

You're also given the opportunity to install a device driver that extends the computer's type-ahead buffer from 15 to 127 characters, and to select password protection. The password protection is only for restoring a stored work session and doesn't provide any protection against general access to the computer.

The Bookmark software, once installed, consumes over 750K of hard-disk space. The Bookmark program is about 29.5K, a small hidden configuration is a mere 17 bytes, and the hidden read-only backup file, named BM1.CKP, occupies 721,920 bytes on my 640K system.

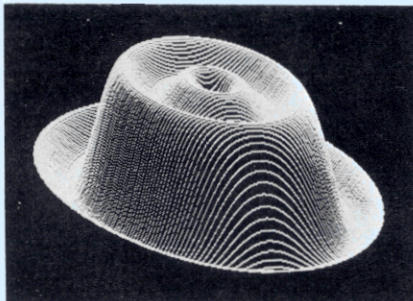
## Taking Off

You insert a command invoking Bookmark at the end of your hard disk's Autoexec.BAT file; whenever the computer boots, you're asked, "Resume, y/n?" If the response is "yes," Bookmark restores the previous work session; this took about 16

Circle 464 on Reader Service card.

## Grafyx Solution™ Save \$150.00

### Hi-Resolution Graphics for Mod 4/4D/4P/III



**Superior Hardware.** The Grafyx Solution provides 153,600 pixel elements which are arranged in a 640 × 240 or on the Model III a 512 × 192 matrix. Hundreds of new business, personal, engineering, and educational applications are now possible. The hi-res display can be shown on top of the standard display containing text, special characters, and block graphics. This simplifies program debugging, text labeling, and upgrading current programs to use graphics. The Grafyx Solution fits completely within any tape or disk based Model 4, 4D, 4P, or III. Installation is easy with the plug-in, clip-on Grafyx Solution board.

**Superior Basic.** Over 20 commands are added to the Basic language. These commands will set, clear or complement points, lines, boxes, circles, ellipses, or arcs. The hi-res screen can be printed on any of 30 popular printers or saved or loaded to disk without leaving Basic. Areas may be filled in with any of 256 patterns. Sections of the screen may be saved and then put back using any of five logical functions. Labels can be printed in any direction. The viewing area can be changed. The entire screen can be complemented or cleared. Graphics Basic provides dot densities of 640 × 240, 320 × 240, 160 × 240, and 160 × 120, all of which can be used in the same display.



**Superior Software.** The board comes with over 40 programs and files which make it easier to use, serve as practical applications, demonstrate its capabilities, and serve as programming examples. The software works with TRSDOS 1.3, 6.1.2, 6.2, 6.3; Dosplus 3.4, 3.5, 4; LDOS; and Newdos80. The Grafyx Solution is also supported by 30 optional applications programs: Draw, Bizgraph, xT.CAD, 3D-Plot, Slideshow, Mathplot, Surface Plot, Chess, etc.

The Grafyx Solution package is shipped complete for \$149.95 (reduced from \$299.95). The manual only is \$12. Payment may be by check, Visa/MC, or COD. Domestic shipping is free on pre-paid orders. Texas residents add 7% sales tax.

**MICRO-LABS, INC.** 214-235-0915  
902 Pinecrest, Richardson, Texas 75080



seconds on my Tandy 1000. If you answer "no," the Autoexec batch file continues or you're returned to MS-DOS.

By default, Bookmark saves your work every five minutes or every 2,000 keystrokes, whichever comes first. On my system, each save took about 10 seconds. You can change the backup schedule in three ways: by manually initiating a backup with a hot key, by selecting different values in the Loadmark installation program, or by command-line options you've added to your Autoexec.BAT file. Backups can be at any time interval, after any number of keystrokes. I found the default values satisfactory.

Command-line options include Auto, which causes an automatic restoration of the work session after a reboot; Console, which invokes a backup immediately after the conclusion of disk I/O; Delete, which deletes passwords and removes the BM1.CPK file; and Off, which disables the automatic backup process. Bookmark suggests you use the Auto option when you run your computer unattended, as in a remote bulletin-board system; if there's a power failure, the system can resume wherever it left off.

The Bookmark owner's manual is well written and describes the installation and program options clearly. The manual includes an index, a two-page description of Bookmark's error messages, and two pages of technical advice. These notes offer suggestions about using Bookmark with modems, RAM disks (Bookmark saves the contents of RAM disks located in regular memory), streaming tape drives, and memory-resident utilities.

A note warns you to remove the CPK files before optimizing or unfragmenting the hard disk. This is accomplished painlessly by typing BOOKMARK DELETE from MS-DOS; the CPK files will be automatically re-created the next time you boot your computer.

### Potential Problems

Bookmark worked effortlessly on my Tandy 1000 and didn't conflict with any of my RAM-resident software. However, I'm more concerned about unusual situations in which data may be lost or corrupted.

Imagine you're entering data into an accounting system. You've typed in transaction 3000, and the automatic backup takes place. After the backup, you type in the next few transactions, up to number 3010, and the power goes out. A few minutes later the power comes back, and your system reboots.

If you didn't have Bookmark, you'd reload your accounting software and check on the status of transactions 3009 and 3010. If the software saves each transaction to disk, you may only have lost one or two. But with Bookmark, you're restored to transaction 3000—the last backup. Who knows if the accounting software in RAM

accurately knows what's stored on the disk, and what effect reentering data will have on the contents of the hard disk? The results might be disastrous.

Bookmark's RAM-snapshot backup approach may not be appropriate for all software or workstation situations. Bookmark's not at fault here and in fact recognizes the pitfalls by letting you turn the program off or on in batch files.

### Summary

If you're conscientious about saving your work, you probably don't need Bookmark. The product meets its manufacturer's claims, but I recommend it only if you

have a specific application that's well suited to Bookmark's automatic execution restart, or if people are constantly tripping over your power cord. Otherwise, just train yourself to save your work often. ■

**Bookmark 1.2 requires 256K, MS-DOS 2.1 or higher, and a hard disk. Intellisoft International, 70 Digital Drive, P.O. Box 5055, Novato, CA 94948, 415-883-1188. \$99.95.**

## HAVE YOU CHECKED OUR PRICES?

### Why pay more than you have to—Call

**1-800-FOR BIG D  
(1-800-367-2443)**

**And Get The  
LATEST DISCOUNT  
PRICES AVAILABLE**

- Cash or credit card convenience
- Same day processing
- Special return policy

**FULL CATALOG  
SELECTION**



Circle 301 on Reader Service card.

## BIG D COMPUTERS

North Dallas / Fort Worth • Hwy 114, Roanoke, TX 76262  
Only 15 miles to TANDY warehouse for best discount/delivery

**Call 1-800-FOR BIG D 1(800) 367-2443**



# Attention: Tandy 1000 Fans!

## 80 Micro's Starter Pack 1000

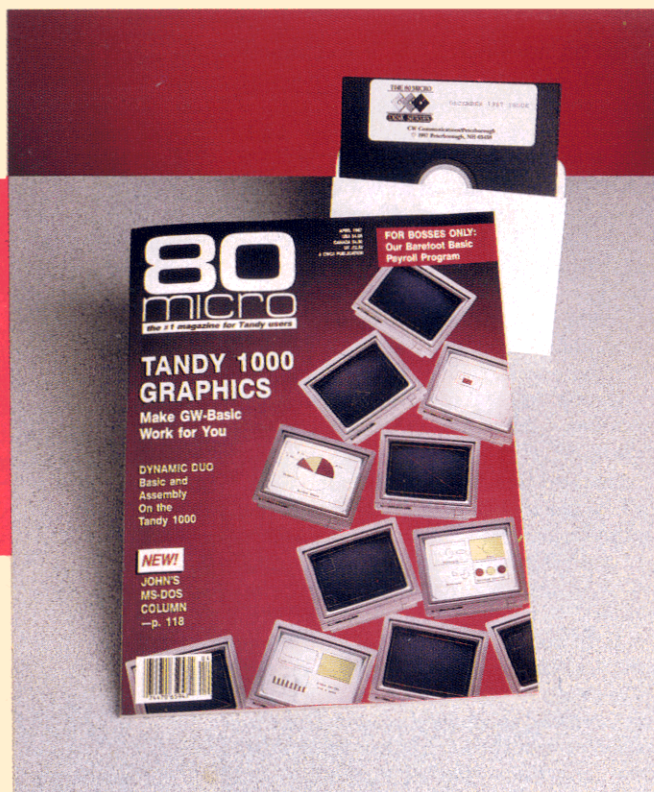
A computer as powerful and versatile as the Tandy 1000 calls for software to match. That's why you and your computer need 80 Micro's Starter Pack 1000. Designed exclusively for Tandy 1000 users, the Starter Pack disk contains 13 essential, educational, and entertaining programs, selected for you by the editors of 80 Micro.

### You Want It . . . You Got It!

Whether you want to tame your finances, plan a schedule, perform a calculation, or write a letter, the Starter Pack 1000 can help you do it better. Check the lineup! Here's the entire list of 13 Starter Pack programs you can use and enjoy right away:

- **Letter Perfect** -- spelling checker program for ASCII files that works with Deskmate.
- **In the Marketplace** -- commodities futures trading simulator.
- **Time Keeper** -- manages several projects simultaneously, and calculates time spent on each project.
- **Clear-Cut Trends** -- draws, displays, and prints hi-res line and bar graphs.
- **Don't be Late** -- critical path scheduling brings your projects in on time.
- **Made-to-Order Sorts** -- creates custom sorts by answering 10 prompts.
- **Next Generation Software** -- recreates the agricultural experiments of Gregor Mendel.
- **Savings and Loan** -- compares payment schedules calculated by simple interest and by the Rule of 78's.
- **Putting Things Precisely** -- makes Basic programs more accurate with routines that calculate values with up to 16 digits.
- **Finding Your Roots** -- solves linear or non-linear equations for their roots.
- **To Each His Own** -- lets you set up your own data base manager.
- **Screen Save** -- memory-resident program that blanks out your screen to avoid unnecessary wear and tear.
- **MicroTab** -- tabulates the results of opinion polls.

Tandy 1000 is a registered trademark of Tandy Corporation



### Docs on Disk

The Starter Pack is an easy and cost-effective way to build your library of Tandy 1000 software. Documentation? No problem! Full instructions for running the programs are contained on each Starter Pack disk. Read the docs right on the screen or print them out for reference.

### Value -- in the 80 Micro Tradition

It's a terrific value. You get all 13 programs for your Tandy 1000, complete documentation, plus the confidence of ordering from 80 Micro, the #1 magazine for Tandy users. All for just \$26.50 postpaid.

Place your order today. Simply return the coupon or the attached order card, or call toll-free 1-800-258-5473. (In NH, please dial 1-924-9471.)

**YES!** Send me the high-powered 80 Micro Starter Pack 1000 disk at \$26.50 ea. (Price includes postage and handling.)

☐ Payment Enclosed    ☐ MC    ☐ AE    ☐ VISA

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

Signature \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_

Zip \_\_\_\_\_

**SP387**

**Mail To: THE 80 MICRO DISK SERIES  
80 ELM STREET, PETERBOROUGH, NH 03458**



## 80 MICRO'S LIST of ADVERTISERS

March 1988

R.S.#	Advertiser	Page#
378	A.T.D.	CII
378	A.T.D.	1
3	Abracadata	54
11	Aerocomp	50
141	Anitek Software	9
152	BCCompc	75
21	Best of Model 4	79
1	Best of Model III	79
301	Big D Computers	63
95	Center Computer Service	54
421	Clone Computers	28
404	Clone Computers	29
133	Computer Discount of America	22
18	Computer Plus	12
29	Cornucopia Software	44
282	DFW Computer Center	39
40	Discount Computer Supplies	35
204	Diskcount Data	59
85	Educational Micro	40
	<b>80 Micro</b>	
549	<b>Classified Ads</b>	<b>78,79</b>
548	<b>Micro Source Ads</b>	<b>79</b>
	<b>Starter Pak 1000</b>	<b>64</b>
27	FirTrack	25
214	Fort Worth Computers	14,15
*	G.E. Information Service	CIII
38	Gray Fox Enterprises	58
20	Howe Software	6
46	Hypersoft	55
	Info-Napse Micro Services	60
515	Intuit	17
41	Matthew Electronics Inc.	65
250	Marymac Industries	43
19	Megahaus	61
225	Merritt Computer Products	70
464	Micro-Labs Inc.	62
60	Micro Systems	65
37	Microtech Consultants	57
416	Montezuma Micro	2
424	Montezuma Micro	3
167	National Computer Supply	37
232	Nocona Electronics	24
*	NRI Electronics	33
*	NRI Electronics	49
22	Nuclear Subroutines	79
5	Pacific Computer Exchange	70
44	Parsons Technology	7
124	Perry Computers	67
308	Powersoft	4
449	Professor Jones	76
16	Quarterdeck	CIV
75	Radio Shack	10,11
55	Renco Computer Printer Supplies	58
15	Shamrock Computer	38
81	Total Access	45
227	Trisoft	76
247	True Data Products	73
4	Utility Pak	79
6	Zeus Computer	19

\*This advertiser prefers to be contacted directly.

Advertising Sales (603) 924-7138  
or (800) 441-4403  
West Coast Sales (415) 328-3470

## HARD DRIVES &amp; MORE

## TANDY 1000, 1000SX &amp; TX HARD DRIVES

20 Meg Internal Hard Disk	339.00
30 Meg Internal Hard Disk	379.00
40 Meg Internal Hard Disk	449.00
20 Meg Hard Card	439.00
30 Meg Hard Card	499.00

All Hard Drives and Hard Cards have 40 ms to 65 ms access time, depending on model. All include a WD controller and are Pre-Formatted and Tested.

## TANDY 3000, 3000HL &amp; 4000 DRIVES

20 Meg Internal Hard Drive	339.00
40 Meg Internal Hard Drive	549.00
70 Meg Internal Hard Drive	999.00

All Drives come with a 16 bit Hard/Floppy Controller

60 Meg Tape Backup Unit For MSDOS or Xenix	649.00
4 Meg Memory Board with 4 Megs of 120ns RAM	699.00

## EGACARDS For The 1000SX &amp; TX, 3000's.....149.00

1200/300 Baud Modem Internal w/software	79.00
2400/1200/300 Baud Modem Int	189.00
2 Meg Memory Board with 120ns RAM	399.00
360k 5 1/4" Floppy Drive	99.00
720k 3.5" Floppy Drive	139.00
1.2 Meg Floppy Drive	139.00
RS232/Clock Calendar/Printer Port Board	79.00

All Products Come With A 1 Year Warranty and A 30 Day Money Back Guarantee! **CALL FOR LATEST PRICES!**

Many Other Products  
Call or Write For Catalog  
**Micro Systems**  
P.O. Box 1750  
Glen Burnie, MD 21061  
Shipping add \$6  
VISA, M/C, COD, Check, M.O.  
MD Res. add 5% Tax

(301) 768-1890

Circle 227 on Reader Service card.

## Pickles &amp; Trout

available from

TriSoft

All your Tandy Model-II, -12, -16,  
and -6000 CP/M-2.2 and CP/M-68K  
needs!

From:  
**TriSoft**  
1825 East 38 1/2 St.  
Austin, Texas 78751

1-800-531-5170  
(512) 472-0744



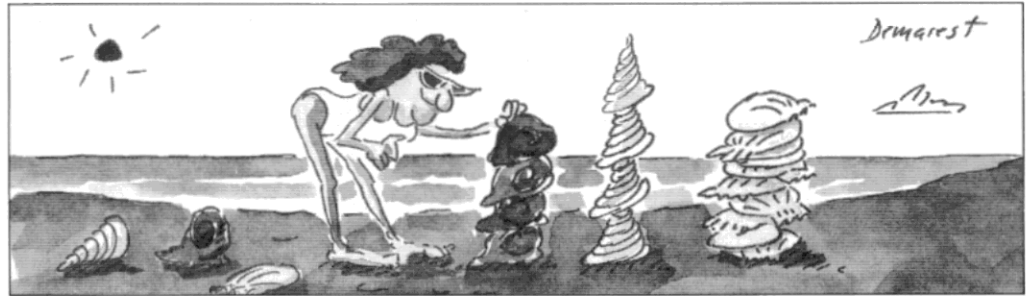
# READER FORUM

edited by Mare-Anne Jarvela

## USING SORT AND SHELL

I am using the Sort command with the Shell command by placing them in Basic programs. The example in the Program Listing will sort and show time started and completed. Lines 1030-1050 delete and rename files. I'm using drive C in the sample.

Shell works with random or sequential files. You can sort on any variable within the file. With sequential files, make sure you provide equal length for all



variables, or the program won't work. Add the following lines to the Listing:

```
900 INPUT N$
995 IF LEN(N$)<25 THEN
N$=N$+" ":GOTO 995
```

If you assume that LEN(N\$)=25, LEN(A\$)=30, and LEN(C\$)=40, and you want to sort on A\$, change line 1010 to:

```
1010 SHELL "SORT /+26 <C:
```

```
JOHNFILE.DAT>C:SORTOUT.DAT"
```

To sort on C\$, change line 1010 to:

```
1010 SHELL "SORT /+56 <C:
JOHNFILE.DAT>C:SORTOUT.DAT"
```

Tom Limerick  
Williamsburg, VA

```
3775 1000 LOCATE 13,1:PRINT"SORTING JOHN'S MAILING LIST ":TIMES
3886 1010 SHELL "SORT <C:JOHNFILE.DAT >C:SORTOUT.DAT"
2940 1020 LOCATE 15,1:PRINT"SORT COMPLETED ":TIMES
1855 1030 SHELL "DEL C:JOHNFILE.DAT"
2954 1040 SHELL "RENAME C:SORTOUT.DAT JOHNFILE.DAT"
2533 1050 OPEN "C:JOHNFILE.DAT" FOR INPUT AS #1
```

Program Listing. Sort routine shows starting and ending times.

## OH, MY ACHING

### BACKSLASH

After using a hard disk on my Tandy 1000 for a while, I became frustrated with the backslash (\) key's inconvenient location on the numeric keypad. I wrote a short data file that allows me to use the control-slash (^/) combination to enter the backslash.

The file is a sequence of codes that inform the ANSI.SYS video driver to substitute the scan code for a backslash with the scan code for a control-slash. Make sure you have ANSI.SYS installed in your system by adding it to your Config.SYS file (DEVICE = ANSI.SYS).

To create the data file with the code sequence necessary to perform the substitution, you need to do two things. First, create the data file with the Copy con routine and then use Debug to fill in the proper binary codes and save the modified file.

Type the following lines from DOS, pressing the enter key at the end of each line:

```
COPY CON CTRLSLSH.DAT
+[0;251;92p^Z
```

Note that you can enter the control-Z by pressing the F6 key. This creates the file CTRLSLSH.DAT with 11 characters plus 1A hexadecimal (^Z) as the terminating

byte. The first byte in this string (+) is not the correct byte for the file; it should be an escape character (27 decimal). Since the Copy con routine can't enter the escape character from the keyboard, you have to use Debug to enter the proper code. Type in the following command:

```
DEBUG CTRLSLSH.DAT
```

When you see the dash (—) press "D" and enter to see what the byte representation of the data file looks like (see Figure 1).

The first four digits of the address might be different on your computer and can be ignored. The bytes marked with xx will vary and can also be ignored. The codes indicated for the first 12 bytes on the first line, including the end-of-file marker 1A hex, should show from address xxxx:0100. If they don't, press "Q" to exit and start again from creating the data file.

If everything matches up, you can continue by typing in and pressing enter after the following lines:

```
-E0100
-52F0:0100 2B.1B
```

(Note that the dash (—) is the prompt provided by Debug.)

Now type D0100 and press enter to check your result. You should see something like

Figure 2. If the first 12 bytes of line 0100 are the same as shown below, you are ready to write the file to disk and exit Debug by typing these lines and pressing enter:

```
-W
-Q
```

Your data file is now ready. To invoke the ^/ feature, all you need to do is send it to the console by entering:

```
TYPE CTRLSLSH.DAT
```

Now try pressing ^/ a few times; you should see a backslash on the screen. Be aware that some application programs don't honor the ANSI.SYS driver and therefore won't recognize the ^/ combination.

Include the command "type CTRLSLSH.DAT" in your Autoexec.BAT file on your boot disk to invoke the ^/ every time you turn on your computer.

For those who are interested in learning more about the ANSI.SYS driver, the CTRLSLSH.DAT file basically consists of four parts of information: the code that notifies the driver that a keyboard

switch follows; the scan code of the key to change; the scan code to which it's to be changed; and the end-of-file marker. Specifically, the first 2 bytes are the escape code, 1B hex, followed by the left bracket code, 5B hex, which tells the driver that a screen control code follows.

The second part of information consists of the next 5 bytes, which make up the scan code for the control-slash given in decimal ASCII format. Scan codes that begin with a zero are called extended ASCII codes and are 2 bytes long. The scan code for ^/ is 0;251. The third part of information is the scan code for the backslash, which is 92 decimal. And finally, the last part is the end-of-file marker (^Z), which is 1A hex.

The ANSI.SYS screen driver provides a myriad of screen control options. The *Programmers Reference Manual* for the Tandy 1000 provides more information about this most useful driver.

Robert A. Petolillo  
Jacksonville, NC

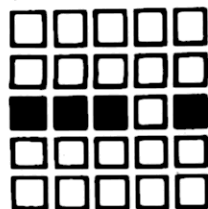
```
52F0:0100 2B 5B 30 3B 32 35 31 3B 39 32 70 1A xx xx xx xx <[0;251;92p>.
52F0:0110 xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx .....
```

Figure 1. Byte representation of data file.

```
52F0:0100 1B 5B 30 3B 32 35 31 3B 39 32 70 1A xx xx xx xx <[0;251;92p>.
52F0:0110 xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx .....
```

Figure 2. Byte representation of modified data file.





# PERRY COMPUTERS

CALL TOLL-FREE FOR PRICES  
**1-800-248-3823**

## TANDY COMPUTERS

1000 HX 256K 1-3 1/2" 720K Drive 8088 Processor 7.16/4.77 MHz.	535.00
1000 TX 640K 1-3 1/2" 720K Drive 80286 Processor 8 MHz.	875.00
3000 5 1/4" 1.2M Drive 640K Ram 80286 Processor 6/12 MHz.	1500.00
3000 HL 512K 5 1/4" 360K Drive 80286 Processor 4/8 MHz.	1110.00
4000 3 1/2" Drive 1Meg Ram 80386 Processor 16 MHz.	1930.00
1400LT 768K 2-3 1/2" 720K Drives Nec V-20 Processor 7.16MHz.	1215.00
Color Computer 3 128K	165.00
102 Portable Computer 24K	375.00

## TANDY PRINTERS

DMP-106 Dot-Matrix	150.00
DMP-130 Dot-Matrix	255.00
DMP-440 Dot-Matrix	595.00
DMP-2120 Dot-Matrix	1325.00
DWP-230 Daisy Wheel	335.00
DWP-520 Daisy Wheel	730.00
LP-1000 Laser Printer	1635.00

## DRIVES

5 1/4 External 1000EX/HX	180.00
3 1/2 External 1000EX/HX	200.00
3 1/2 Internal 1000SX/TX	145.00
Adaptor Kit 1000SX/TX 3 1/2"	25.50
360K Drive Tandy 3000	140.00
1.2 Meg Drive Tandy 3000	215.00
1.4 Meg 3 1/2" Drive 3000/4000	255.00
Color Computer Drive 0	220.00
Color Computer Drive 1 (Internal)	150.00
Portable Drive (100/102/200)	155.00
Tandy 20 Meg Hardcard	595.00
Tandy 20 Meg Cart. Internal	1325.00
Tandy 40 Meg Tape Internal	595.00
Seagate ST-225 20 Meg H.D.	265.00
Seagate ST-251 40 Meg H.D.	495.00
Miniscribe M6085 70 Meg H.D.	905.00
Miniscribe M3053 40 Meg H.D.	705.00
Microscience HH1050 40 Meg HD	705.00
AT Harddrive & Floppy Controller	200.00
AT Harddrive Controller	175.00
Tandy 1000SX/TX Controller	90.00

## ZUCKERBOARD PRODUCTS

0K Board For 1000	55.00
512K Board For 1000	135.00
0K MFB For 1000	98.00
512K MFB For 1000	178.00
0K MFB For 1000-SX	130.00
Serial Board For 1000/SX	55.00
Clock Option Kit	30.00
Clock Board For 1000/SX/TX	37.50
30 Meg Hardcard 1000/SX/TX	495.00
Mono Graphics Card	110.00
300/1200 Baud Modem Card	83.00

## MEMORY CHIPS

64K 150NS (Each)	2.50
256K 150NS (Each)	5.00

## EPSON PRINTERS

LX-800 Dot-Matrix	195.00
FX-86E Dot-Matrix	355.00
FX-286E Dot-Matrix	520.00
EX-800 Dot-Matrix	425.00
EX-1000 Dot-Matrix	585.00
LQ-850 24Pin Matrix	520.00
LQ-1050 24Pin Matrix	715.00
LQ-2500 24Pin Matrix	940.00
GQ-3500 Laser	1580.00
EX800/1000 Color Kit	68.00

## MICE

Microsoft Pntbrush/Menu	115.00
Microsoft Pntbrush/Windows	125.00
Microsoft Pntbrush/Cad	135.00
Mouse Systems Serial	115.00
Logitech Serial Mouse	85.00
Tandy Serial Mouse	42.50
Deluxe Joystick	25.00

## MONITORS

VM-4 Mono Green	95.00
CM-5 Color RGB	220.00
CM-11 Color RGB	335.00
EGM-1 Color EGA	510.00
CM-8 Color (Color 3)	240.00
Amdek 410 Mono	160.00
Amdek 722 EGA Color	485.00
NEC Multisync Color	580.00

## VIDEO ADAPTOR CARDS

Tandy Dual Display	145.00
Tandy EGA Card	235.00
Video 7 Mono/Graphics	135.00
Video 7 Vega/Deluxe	275.00
Hercules Color Card	150.00
Hercules Graphics Card Plus	195.00
Hercules InColor Card	320.00
Zucker Mono/Graphics	105.00
Paradise Color EGA 350	240.00
Paradise Color EGA 480	330.00
Paradise Basic EGA Card	175.00

## EXPANSION BOARDS

Memory Plus/1000	155.00
Memory Plus/EX 128K	110.00
Tandy 512K COCO 3	127.50

## MODEMS

Tandy Plus 300 Baud	75.00
Tandy Plus 1200 Baud	150.00
Hayes 1200 Baud	295.00
Hayes 2400 Baud	445.00
Practical 1200 1/2 Card	115.00
Practical 1200	140.00

## PANASONIC PRINTERS

KX-P1080 I Dot-Matrix	175.00
KX-P1091 I Dot-Matrix	195.00
KX-P1092 I Dot-Matrix	325.00
KX-P1592 Dot-Matrix	425.00
KX-P1595 Dot-Matrix	440.00
KX-P3131 Dot-Matrix	285.00
KX-P3151 Dot-Matrix	450.00

## OKIDATA PRINTERS

Laserline 6 Laser	1840.00
ML-182 Dot-Matrix	250.00
ML-192 Dot-Matrix	370.00
ML-193 Dot-Matrix	550.00
ML-292 Dot-Matrix	555.00
ML-293 Dot-Matrix	705.00
ML-294 Dot-Matrix	1110.00

Please Call for Current Prices  
Send For Complete Catalog

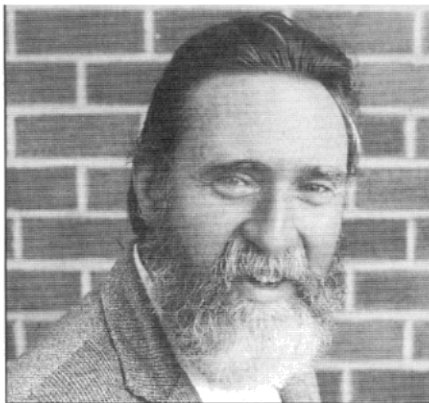
Technical Questions and Information CALL 1-517-625-4161. FOR ORDERS ONLY CALL 1-800-248-3823.

Monday thru Friday 9 am - 5 pm Perry Computers 124 S. Main St. Perry, Mi. 48872

All prices and offers may be changed or withdrawn without notice. Advertised prices are cash prices.  
C.O.D. accepted add 2% (minimum charge \$10.00). MC & VISA add 2%.

Delivery subject to availability. Shipping charges add 1.5% (minimum charge \$5.00). All non defective items require RMA authorization.





# Back to Front

■ by Harry Bee ■

Occasionally, I forget that some of you may have wandered into this corner only recently. In just such a fit of oblivion, I suggested you devise an efficient way to take a list of strings and reverse its order (see "As Time Goes By," December 1987, p. 29). List manipulation, a recurring theme in this column, is important in certain kinds of programs—text editors and data managers, to name two.

I assumed everyone knew that S% is my standard designation for the current size of the list, regardless of how much larger the array may be, and that the first item in the list is number 1. (The zeroth element of the array remains available as a place to put things that need a place to be put.)

Although I took things for granted, a couple of new readers didn't, with fortunate results for the rest of us. Reading S% as the unknown size of some array, they invented ways to find the highest numbered element, also known, as the upper bound, of any array.

## Out of Bounds

Sure, you can argue (correctly) that when you write a Basic program, you know exactly how you've dimensioned each array; that even when a program's events determine a dimension of some array, you'll keep the dimension in a variable, if you intend to use it; that if compiled versions of the language like Quick Basic and Turbo Basic include among their features a function to return the upper bound of an array, it's because they also have the tools, including the upper bound function itself, to generalize subroutines; that interpretive Basic doesn't lend itself to generalization; and that, therefore, a synthesized upper bound routine has no practical value in interpretive Basic.

That's all that practical stuff. But what if you were curious and wanted to find out how and where Basic stores the dimensions of its arrays? What if, just for the heck of it, you wanted to see if you could discover the size of any given array if you had to? How would you go about it?

Lewis Seiden (Tappan, NY) wrote a routine that made creative use of the purposeful error. He climbed the array until

a subscript out of range error message signaled he'd gone too far by one. In general, it looks like this:

```
100 E=0:ON ERROR GOTO 1000
110 X=ARRAY(E):E=E+1:GOTO 110
120 UBOUND=E-1:ON ERROR GOTO 0
130 ' More program code here...
1000 RESUME 120
```

Kenneth Gash (Rancho Palos Verdes, CA) consulted the description of the array in the table where Basic stores such things. When you use the VARPTR function with the lowest element of an array, the address the function returns is 1 byte above the array descriptor. The 2 bytes immediately below the VARPTR address hold the number of elements in the array's first dimension. If it has more than one dimension, each lower pair of bytes describes the next dimension.

I made a general function out of Ken's routine, and Program Listing 1 demonstrates how it works. In the function, FNUbound, the variable D represents the dimension you're interested in. When the lowest element (lower bound) is zero, the number of elements is one more than the highest numbered element, which accounts for subtracting one at the end of the function. That brings up a question or two—just for the heck of it.

Can you write a complementary function, FNLbound, to determine which base, zero or 1, is in force? And can you use such a function to modify FNUbound and make it accurate for both bases? Can you think of a legitimate application for both functions?

## Back to Backward

Meanwhile, I asked you to take a list of strings and reverse its order. S% is the current size of the list, and the first item is number 1. The reversed list had to wind up in the original array. One application of such a routine is to let you change your mind after you sort a list into ascending or descending order. You could sort again, but what a waste of energy!

I also asked you to do the job efficiently,

because I'd seen a couple of examples of how to reverse a list inefficiently. Program Listing 2 shows you both of those subroutines. Both of them work. They reverse lists. Therefore, neither is wrong. According to Bee's first rule of programming, anything that gets the job done is correct, but some routines are more efficient than others. The ideal is the most efficient way to accomplish every task; the most compelling reason to keep working at programming is that ideals are elusive and rarely attained.

The routine that starts at line 100 of Listing 2 uses a second array, TEMP\$. To transfer the list from the original array to the temporary one and back again, it steps through the entire list twice. The temporary array is temporary only in the way the routine uses it. The list, held in two arrays, takes up twice the memory in the variable table and at least three times the string storage space. If the list and program are long, the routine guarantees garbage collection—those irksome pauses while Basic cleans the deadwood out of its string storage area. You can make the TEMP\$ array truly temporary and improve the routine in the bargain by creating the second array with DIM TEMP\$(S%) at the beginning and destroying it with ERASE TEMP\$ at the end.

The second routine, at line 200, is a big improvement. It uses the original array exclusively, and the loop steps just half way up the list: INT(S%/2). (You can use Fix in place of Integer [INT]). If S% is even, the loop cycles through exactly half the list; if S% is odd, the routine never handles the middle element.

However, to exchange the bottom half of the list with the top, the routine uses a temporary string, and each exchange takes three statements. While the variable table isn't unnecessarily elongated by an extra array, the amount of deadwood left in the string storage area is still enormous. You can eliminate half the arithmetic in the loop by adding 1 to S% once (T=S%+1) at the beginning. You can get rid of the three-step exchange, a throwback to earlier Basic dialects, with a Swap command:

```
SWAP LST$(LOOP),LST$(T-LOOP).
```

James Maher (Oneonta, NY) came up with



a couple more noteworthy improvements. You'll find them in line 1000 of Program Listing 3. In the first place, he figured out that you don't have to fix  $S\%/2$  to define the loop.  $FOR\ L=1\ TO\ 3.5$  will run its last cycle with  $L$  as 3. In the second place, the purpose of  $TOP = TOP - 1$  is much easier to understand than  $S\% + 1 - LOOP$  or even  $T-LOOP$ . The program demonstrates that the routine works equally well for odd and even numbers of elements.

### Side Orders

Fully half the string reversal routines that came in this month didn't use Swap. This is a valuable command, especially when used with strings.

Swap doesn't use the string storage area. When you swap the contents of two string variables, all the command does is quickly and cleanly exchange the pointers between the two string descriptors in the variable table.

Swap or no Swap, when you work with strings, you can't avoid collecting a lot of junk in string storage. Several events will cause Basic to take time out to tidy up the space. The most certain cause of so-called garbage collection is the storage area growing too large to accept another string without crashing into something. If a program gets to that point, you can have piles of deadwood lying around, and your program may slow down noticeably while Basic sorts things out.

In any program that manipulates a lot of string data, it's a good idea to take control of string storage yourself. One way to do that is to write efficient string handling routines. Another aid is the `FRE` function, with which you can pick the places in your program where it's convenient to sweep up and put things away.

The FRE function operates two ways. When you use it with a numeric argument, PRINT FRE(X), it returns the amount of free memory your program has to play with. With a string for an argument, X = FRE(X\$), the function still returns the amount of free memory but after Basic straightens up string storage.

## Reversals

I also asked you to take the same principle you asked used to reverse the order of a list and use it to turn a string around—to turn *reviled* into *deliver*, for example. No one came up with a way to use Swap to do the job, nor did I, short of stuffing each character of the string into an array, which is too much investment for the payoff.

In fact, there is no very efficient way to reverse a string. You could find the string in storage and peek and poke the characters. It's easy on storage space but slow. The equivalent routine using Mid\$ functions and another variable for transient storage is quicker, even though cleaning up string storage is a factor. (See Program Listing 4, line 100.) More importantly, such a routine is eas-

ier to read and understand.

Notice how that routine, which represents the most popular method of string reversal among the ones you sent, follows my suggestion and applies principles from list reversal routines: It steps half way through the string and performs simulated swaps.

Tony Kyle (Oklahoma City, OK) was one of a few who ignored my advice and looked for an easier way. His was the earliest post-marked example of building a second string backwards. (Listing 4, line 200.)

But the grand prize for inventiveness has to go back to James Maher. Instead of a second, temporary string, James builds the reversed string onto the end of the original string and slices it off with a `Right$` function. (Listing 4, line 300.) No, it's not efficient, but it's cute.

## On the Menu

The art and craft of menu making has come a long way since Scripsit on the Model I. These days menus are slick. If you've ever used a product of Software Publishing Corporation—PFS: this or that—you know what I mean by slick. They pop up, pull down, and push over. They're in neat boxes or attractive bars. You can point and shoot at them (i.e., highlight your selection, and press the enter key) or select by number or initial letter. Even when the menu isn't visible, you can still select from it with a function key or a hot key.

I have a dessert menu. On it are Apple Pan Dowdy, Bananes Flambés, Croissants au Courant, Dainty Doughnut Holes, and

Etruscan Ecclairs. If an 80 Micro T-shirt, not to mention fame, is your heart's desire, put the menu in a box or bar, and give me the three methods of selection I mentioned—point and shoot, number, and letter—to branch to subroutines at lines 1000, 2000, 3000, 4000, and 5000. If you want to add more ways to select, that's fine. If you want to include ways to use a joystick or a mouse, that's good too, but make sure that folks without those peripherals can still use their arrow keys. For extra credit, you might set up some hot keys I can use when I can't see the menu.

As always, the routines I'm looking for are small, compact, efficient, and clever. Amusing wouldn't hurt. Don't get too fancy with the menu; it's the selection routine that's important.

### The Rules:

1. Write your program(s) or routine(s) in Basic.
2. Your solution(s) to this month's poser(s) must reach us by March 15, 1988, to be considered for the June 1988 issue and a T-shirt if we use it.
3. Employees of IDG Communications already have T-shirts and are not eligible.
4. Send your solutions, comments, criticism, suggestions, and T-shirt size to: 80 Micro, Fine Lines, 80 Elm St., Peterborough, NH 03458. We cannot return entries.

Harry Bee is a free-lance writer, programmer, puzzle creator, and dreamer. You can contact him at P.O. Box 567, Cornish, ME 04020, or on Compuserve (74076,3461).

**Program Listing 1. Dr. Gesh's upper bound.**

```

3220 100 DEF FNBOUND(V,D)=PEEK(V-2*D)+256*PEEK(V-1-2*D)-1
1682 110 DIM X$(29),Y(444),Z$(11,22)
4130 200 PRINT"The highest numbered element of ":"PRINT
3090 210 PRINT"X$ array =":FNBOUND(VARPTR(X$(0)),0)
3021 220 PRINT"Y array =":FNBOUND(VARPTR(Y(0)),0)
4812 230 PRINT"Z# array, first dimension =":FNBOUND(VARPTR(Z$(0,0)),0)
4898 240 PRINT"Z# array, second dimension =":FNBOUND(VARPTR(Z$(0,0)),0)

```

### Program Listing 2. Two array reversers.

```

100 ' The double reverse -- assuming TEMP$ array properly dimensioned.
3469 110 FOR LOOP=1 TO SX:TEMP$(LOOP)=LST$(LOOP):NEXT LOOP
4739 120 FOR POOL=$X TO 1 STEP -1:LST$(SX-POOL+1)=TEMP$(POOL):NEXT POOL:RETURN
      N
199 '
7146 200 ' The end around.
      210 FOR LOOP=1 TO INT($X/2):TEMP$(LOOP)=LST$(LOOP):LST$(LOOP)=LST$(SX-LOOP+1):
      LST$(SX-LOOP+1)=TEMP$:NEXT LOOP:RETURN

```

**Program Listing 3. James Maher plays fair about turns.**

```

3606 10 DIM LST$(18):FOR L=1 TO 18:READ LST$(L):NEXT L:CLS:SZ=18
6997 100 DATA aak,bog,cam,dot,elf,fig,gum,hat,ink,jug,kit,lap,mud,nut,owl,pig,
2381 100 FOR L=1 TO SZ:PRINT LST$(L):NEXT L
787 110 GOSUB 1000
3136 120 FOR L=1 TO SZ:LOCATE L,25:PRINT LST$(L):NEXT L
3725 130 IF INKEY$="" THEN 130 ELSE IF SZ=18 THEN CLS:SZ=17:GOTO 100
418 999 END
5989 1000 TOP=SZ:FOR BOTTOM=1 TO SZ/2:SWAP LST$(BOTTOM),LST$(TOP):TOP=TOP-1:N
EXT BOTTOM:REPEAT

```

### Program Listing 4. Revised solos deliver!

```

1123 10 LINE INPUT "Enter a string: ";S:LN=LEN(S):S=LN+S:PRINT
2527 20 PRINT "String "TAB(5) "TIMER: PRINT
10148 30 W$=TAB(5) :S1=TIMER:GOSUB 1000:GOSUB 100:PRINT W$TAB(5):GOSUB 1000
      0:GOSUB 200:PRINT W$TAB(5):GOSUB 1000:GOSUB 300:PRINT W$TAB(5):GOSUB
      1000:PRINT:GOTO 10
      99
100 "The hard way.
6023 110 T=LN+1:FOR L=1 TO LN/2:T$=MIDS(W$,L,1):MIDS(W$,L,1)=MIDS(W$,T-L,1):M
      IDS(W$,T-L)=T$:NEXT L:RETURN
200 "Tony Kyle's clear example.
4254 210 T$=W$+"###":FOR L=LN TO 1 STEP -1:W$=W$+MIDS(T$,L,1):NEXT L:RETURN
300 "James Haher's devious thinking.
6777 310 W$=W$+STRING$(LN,32):T=LEN(W$):FOR L=1 TO LN:MIDS(W$,T)=MIDS(W$,L,1)
      :T=T-1:NEXT L:W$=RIGHT$(W$,LN):RETURN
      999
4905 1000 S2=TIMER:PRINT USING "### seconds.":S2-S1:X=FRE(X$):S1=TIMER:RETURN

```



USED  
TRSDOS

USED  
XENIX

**RADIO SHACK  
TANDY OWNERS!**  
Find the computer  
equipment that TANDY  
no longer sells.

**PACIFIC  
COMPUTER  
EXCHANGE**  
buys and sells used TANDY

**TRSDOS  
XENIX  
MSDOS  
COMPUTERS &  
PERIPHERALS**

We sell everything from Model 3's to  
Tandy 6000's and all the printers and  
hard disks to go with them. If we don't  
have it in stock, we will do our best to  
find it for you. We have the largest data  
base of used Radio Shack equipment to  
draw from. All equipment comes with  
warranty. Circle 5 on Reader Service card.

**PACIFIC  
COMPUTER  
EXCHANGE:**  
The One Source For  
Used Tandy Computers:  
1031 S.E. Mill, Suite B  
Portland, Oregon 97214  
503-236-2949



**NEW!**

Circle 255 on Reader Service card.

**SafeSkin™**

**KEYBOARD PROTECTOR**

*Finally! A keyboard cover that  
remains in place during use!*

SafeSkin prevents damage from liquid  
spills, dust, ashes, paper clips, staples, etc.  
This custom fit cover is made of ultra-thin,  
ultra-tough, clear flexible plastic, molded to  
fit every key and contour, allowing normal  
key response and feel. Available for the  
Model 100, Tandy 1000/2000, Model 3  
& 4, IBM-PC, AT, Apple, DEC, Wyse  
and many others. Send \$29.95. Check or  
M.O.. Visa & MC include expiration date.  
Specify computer type. Dealer inquiries  
invited. Free brochure available.

**Merritt Computer Products, Inc.**  
4561 South Westmoreland  
Dallas, TX 75237  
(214) 339-0753

## How to Use 80 Micro Program Listings

Basic program listings in 80 Micro include a checksum value at the beginning of each line. This value is the sum of the ASCII values of all characters and spaces in the line. If a line begins with an apostrophe as the first character after the line number, no checksum is calculated. If a remark is at the end of a line of code, it is not included in the checksum. Use Checksum to enter Basic programs found in 80 Micro and test the accuracy of your typing a line at a time as you enter the program.

To enter a program, load and run Checksum. Enter the program exactly as listed, omitting the checksum number and bar at the beginning of the line. Omit the indentations when program lines continue to a second or third magazine line. Do not type in comments at the end of a line. When you press enter, the line will be redisplayed with a checksum.

Compare this number with the one found in 80 Micro. If they are not the same, you made a typing error. Use the arrow keys to move the cursor to the first space of the line just typed. Press the delete key seven times to delete the checksum. Move the cursor to the error, and correct it by typing over the error or use the insert and delete keys to add or delete information. Press enter and recheck the checksum number.

After you enter the entire program, save it to disk with the Save command.

Checksum simulates Save, List, LList, Load, Files, and New commands and adds three new commands: Basic, Check, and LCheck. The Basic command exits the Checksum program back to Basic, leaving Checksum in memory. Check and LCheck work like List and LList, except they show the checksums along with the listing.

Checksum saves the new program as an ASCII file. By saving the program again with Basic, you shorten it on disk and make it load faster, but you can no longer edit it with Checksum unless you convert it back to an ASCII file by using the SAVE"file name", A command in Basic.

### Program Listing. Checksum.

```

4440 10 'Automatic Checksum Program Version 1.0 by Randall D. Hamilton
20 DIM LS(500),LNUM(500):COLOR 13,1,1:KEY OFF:CLS:MAX=0:LNUM(0)=65536::CLS
1671 30 DEF SEG=&H40:W=PEEK(&H4A)
4380 40 ON ERROR GOTO 620:PRINT:PRINT"Checksum Program Ready."
3389 50 LINE INPUT LS=Y:CSRLIN-INT(LEN(LS)/W)-1:LOCATE Y,1
7499 60 DEF SEG=0:POKE 1050,30:POKE 1052,34:POKE 1054,0:POKE 1055,79:POKE 105
6,13:POKE 1057,28:LINE INPUT LS:DEF SEG:IF LS="" THEN 50
2679 70 IF LEFTS(LS,1)="" THEN LS=MIDS(LS,2):GOTO 70
2204 80 IF ASC(LS)>57 OR ASC(LS)<48 THEN 210
4235 90 BL=INSTR(LS," ") : IF BL=0 THEN BL=LS:GOTO 100 ELSE BL=LEFTS(LS,BL-1)
3089 100 LNUM=VAL(BL):TEXTS=MIDS(LS,LEN(STRS(LNUM))+1)
4974 110 IF LNUM>65529 THEN PRINT"Line number greater than 65529":GOTO 30
4770 120 IF TEXTS="" THEN GOSUB 540:IF LNUM=LNUM(P) THEN GOSUB 550:GOTO 50 ELSE 50
961 130 WORKS=TEXTS
3512 140 IF LEFTS(WORKS,1)="" THEN WORKS=MIDS(WORKS,2):GOTO 140
3482 150 IF LEFTS(WORKS,1)="" THEN AS="" :LOCATE Y,1:GOTO 180
4711 160 CKSUM=0:FOR I=1 TO LEN(LS):CKSUM=CKSUM+ASC(MIDS(LS,I)):NEXT:LOCATE Y,1
12314 170 IF CKSUM<10 THEN AS="" :STRS(CKSUM)+" " ELSE IF CKSUM<100 THEN AS=""
" :STRS(CKSUM)+" " ELSE IF CKSUM<1000 THEN AS="" :STRS(CKSUM)+" "
" ELSE IF CKSUM<10000 THEN AS="" :STRS(CKSUM)+" " ELSE AS=STRS(CKSUM)+" "
870 180 PRINT AS+LS
3408 190 GOSUB 540:IF LNUM(P)=LNUM THEN LS(P)=TEXTS:GOTO 50 'replace line
1253 200 GOSUB 560:GOTO 50 'insert the line
5579 210 TEXTS="" :FOR I=1 TO LEN(LS):A=ASC(MIDS(LS,I)):TEXTS=TEXTS+CHR(A+32*
(A>96 AND A<123)):NEXT
16376 220 DELIMITER=INSTR(TEXTS," ") :COMMANDS=TEXTS:ARGS="" :IF DELIMITER THEN
COMMANDS=LEFTS(TEXTS,DELIMITER-1):ARGS=MIDS(TEXTS,DELIMITER-1) ELSE
DELIMITER=INSTR(TEXTS,CHR(34)):IF DELIMITER THEN COMMANDS=LEFTS(TEX
TS,DELIMITER-1):ARGS=MIDS(TEXTS,DELIMITER)
2210 230 IF COMMANDS="LIST" THEN GOTO 330
4283 240 IF COMMANDS="LLIST" THEN OPEN "lpt1:" FOR OUTPUT AS #1:GOTO 340
4910 250 IF COMMANDS="LCHECK" THEN CKFLAG=1:OPEN "lpt1:" FOR OUTPUT AS #1:GOTO 340
2839 260 IF COMMANDS="CHECK" THEN CKFLAG=1:GOTO 330
5011 270 IF COMMANDS="SAVE" THEN GOSUB 570:OPEN ARGS FOR OUTPUT AS #1:ARGS=""
:GOTO 340
2194 280 IF COMMANDS="LOAD" THEN GOTO 490
9571 290 IF COMMANDS="NEW" THEN INPUT "Erase program - Are you sure":LS:IF LE
FTS(LS,1)="" OR LEFTS(LS,1)="" THEN MAX=0:LNUM(0)=65536:GOTO 30 ELSE 30
4028 300 IF COMMANDS="BASIC" THEN COLOR 7,0,0:ON ERROR GOTO 0:CLS:END
2265 310 IF COMMANDS="FILES" THEN GOTO 520
2381 320 PRINT"Syntax error":GOTO 30
2172 330 OPEN "scrn:" FOR OUTPUT AS #1
2690 340 IF ARGS="" THEN FIRST=0:P=MAX-1:GOTO 380
5903 350 DELIMITER=INSTR(ARGS," ") :IF DELIMITER=0 THEN LNUM=VAL(ARGS):GOSUB 5
40:FIRST=P:GOTO 380
4462 360 FIRST=VAL(LEFTS(ARGS,DELIMITER)):LAST=VAL(MIDS(ARGS,DELIMITER+1))
4797 370 LNUM=FIRST:GOSUB 540:FIRST=P:LNUM=LAST:GOSUB 540:IF P=0 THEN P=MAX-1
2954 380 FOR X=FIRST TO P:NS=MIDS(STRS(LNUM(X)),2)+" "
2049 390 IF CKFLAG=0 THEN AS="" :GOTO 450
881 400 WORKS=LS(X)
3512 410 IF LEFTS(WORKS,1)="" THEN WORKS=MIDS(WORKS,2):GOTO 410
2770 420 IF LEFTS(WORKS,1)="" THEN AS="" :GOTO 450
4635 430 CKSUM=0:AS=NS+LS(X):FOR I=1 TO LEN(AS):CKSUM=CKSUM+ASC(MIDS(AS,I)):NEXT
12314 440 IF CKSUM<10 THEN AS="" :STRS(CKSUM)+" " ELSE IF CKSUM<100 THEN AS=""
" :STRS(CKSUM)+" " ELSE IF CKSUM<1000 THEN AS="" :STRS(CKSUM)+" "
" ELSE IF CKSUM<10000 THEN AS="" :STRS(CKSUM)+" " ELSE AS=STRS(CKSUM)+" "
1324 450 PRINT #1,AS+NS+LS(X)
1567 460 IF INKEYS="" THEN X=P
1677 470 NEXT :CLOSE #1:CKFLAG=0
632 480 GOTO 30
3046 490 GOSUB 570:OPEN ARGS FOR INPUT AS #1:MAX=0:P=0
8316 500 WHILE NOT EOF(1):LINE INPUT #1,LS:BL=INSTR(LS," ") :BL=LEFTS(LS,BL-1)
:LNUM(P)=VAL(BL):LS(P)=MIDS(LS,LEN(STRS(VAL(BL)))+1):P=P+1:WEND
1603 510 MAX=P:CLOSE #1:GOTO 30
2911 520 IF ARGS="" THEN ARG="A":ELSE SEL=1:GOSUB 570
1343 530 FILES ARG:GOTO 30
3610 540 P=0:WHILE LNUM>LNUM(P) AND P<MAX:P=P+1:WEND:RETURN
4677 550 MAX=MAX-1:FOR X=P TO MAX:LNUM(X)=LNUM(X+1):LS(X)=LS(X+1):NEXT:RETURN
6911 560 MAX=MAX-1:FOR X=MAX TO P+1 STEP -1:LNUM(X)=LNUM(X-1):LS(X)=LS(X-1):N
EXT:LS(P)=TEXTS:LNUM(P)=LNUM:RETURN
3211 570 IF LEFTS(ARGS,1)="" THEN ARG=MIDS(ARGS,2):GOTO 570
3565 580 IF LEFTS(ARGS,1)<>CHR(34) THEN 320 ELSE ARG=MIDS(ARGS,2)
3761 590 IF RIGHTS(ARGS,1)=CHR(34) THEN ARG=LEFTS(ARGS,LEN(ARGS)-1)
3278 600 IF SEL=0 AND INSTR(ARGS," ")>0 THEN ARG=ARG+"BAS"
1058 610 SEL=0:RETURN
2218 620 PRINT "Error #":ERR:RESUME 50

```



# Putting AI to Work

■ by Hardin Brothers ■

**A**nyone with even a passing interest in computer technology has certainly heard the term "artificial intelligence" (AI). Whether you believe that computers have intelligence or ever will depends more upon your definition of the term than on computer technology: It's possible to define intelligence to include even the most primitive. If...Then constructs, and it's also possible to define it in such a way that only human beings could ever be classified as intelligent.

More important than the terminology and arguments it has provoked, AI research has resulted in new software technologies that can be applied to a number of programming problems. These techniques are built into Prolog and other AI languages and can be implemented in less esoteric computer languages such as C, Pascal, and Basic. This month, I'll explore one of the fundamental techniques of AI as it might be implemented in a Basic program.

Much of this month's column was inspired by the early chapters of Herbert Schildt's book, *Artificial Intelligence Using C*. Published by Osborne McGraw-Hill in 1987, it's an excellent introduction to AI programming techniques, regardless of what language you prefer to use.

## Searching Data Bases

Most significant computer programs either create or manipulate a group of data. Database programs often search through the data, either collecting a set of records that meet a certain criterion or looking for a specific piece of information. Programming techniques for this kind of search are well known and often depend on indexes or specialized organization of the data records.

AI programs frequently have another purpose for searching through a data base: finding a path from one record to another. This month's programs show how such a search can be performed.

Suppose you have a data base consisting of airline schedule information. A database program could retrieve information about any flight and could probably generate a list of all the direct flights between any two cities. However, if no direct flight is scheduled between the two cities that

you're interested in, the data-base program would be of only marginal use. An "intelligent" program could suggest an indirect route that would get you from one city to another until you reached your destination.

Perhaps the most obvious way to perform such a search would be to make a list of all the possible combinations of flights in the data base and then search the list to see which combinations connect the two cities. Unfortunately, building such a list is nearly impossible if the data base has more than a few entries. A mere 10 items can be arranged in over 3.6 million ways; the list of possible arrangements of 100 flights is more than  $9 \times 10^{157}$ , or 9 followed by 157 zeros. Even if a computer could generate such a list in a reasonable amount of time (and no current computer could), it would still have to search through the list, perhaps forever, to find all the possible routes.

Since such an exhaustive, brute-force search is impossible, an intelligent program must use a different tactic to find possible flights between two cities. Creating algorithms for searches like this is a fundamental problem for AI researchers, somewhat akin to a database programmer's quest for a perfect sort routine.

## Searching and Backtracking

A basic tenet of this kind of database search is that no reasonable way to find all possible solutions exists—but a program can find one or more good solutions to any problem presented to it. Nor is there any reasonable way to prove that any particular solution is the best, since doing so would necessitate generating all possible solution paths.

At first it may be difficult to get used to the idea that a computer program cannot find all solutions—or just the one best solution—to such a seemingly simple problem. If a mailing list program can name everyone who lives in Illinois, it seems logical to expect an airline flight program to list all possible routes from Boston to Boise.

But should flights through Mexico City or Anchorage be included? How about flight lists that require plane changes in 50 different cities? Or one-week stopovers in Aspen? The problem is so complex that you could probably walk from one city to the next before the computer could list all possibilities.

The second important concept in search programs like this, as well as in most AI programming in general, is backtracking. Most such programs work towards a goal one step at a time, in a method reminiscent of a mouse in a maze. If they reach a dead end, they back up to the last decision point, select a different branch, and try again.

Assume that our program is looking for a set of airline flights that will take us from Boston to Boise. It begins by finding a flight from Boston to St. Louis. Then it finds a flight from St. Louis to Denver and one from Denver to San Diego. But then it discovers that there aren't any direct flights—perhaps not even any connecting flights—out of San Diego. It must then backtrack to Denver and try to find another path, perhaps one to San Francisco. But again, it may arrive at a dead end.

Suppose the program backtracks to Denver and discovers that there are no remaining choices to try. It then backtracks to St. Louis and tries other flights from there. Perhaps it finds a flight to Salt Lake City and, from there, a flight to Boise.

In its search, the program has visited "choice nodes" at St. Louis (twice), Denver (three times), and San Diego, San Francisco, and Salt Lake City (once). It obviously needs a way to keep track of where it has been and a method of marking the unsuccessful routes it has tried so that it won't try them again.

The second problem, marking the unsuccessful routes, is easier to solve. As the program explores each choice, it sets a flag to show that a particular route was tried. When it backtracks to look for a different route, it ignores the paths for which flags have been set.

The first problem, remembering where the program has been and to what city it should return, is easily solved with a data



## THE NEXT STEP

structure called a stack. Technically, a stack is a last-in, first-out (LIFO) queue or line of data. Less technically, a stack is analogous to a stack of plates in a cafeteria. The new plates added to the top of the stack are the first ones available to be used.

Almost all programs and all programming languages use stacks internally to keep track of subroutine calls and other program structures. In fact, all microprocessors of which I'm aware use a hardware stack (often a section of regular memory) to do the same. This month's program, however, creates its own stack to control backtracking. It does so by designating a special array as a stack and keeping a separate stack pointer that always contains the index number of the first available position in the stack array.

This month's program uses four stack operations: "pushing" a new piece of data on the top of the stack, "popping" the top stack item off the stack, reading the entire stack from beginning to end to find a history of choices, and clearing the stack of all data. To push a new data item on the stack, the program stores that item at the location `stack(stacktop)`. ("Stack" is the name of the array; "stacktop" is the stack pointer.) After pushing a data value on the stack, the program then increments `stacktop` to point to the next free location on the stack.

Popping a value from the stack is a similar operation. The program decrements the value of `stacktop` to point to the last item pushed and then reads the value at `stack(stacktop)`. This leaves the `stacktop` with the correct value for the next push or pop operation.

Reading the stack is a matter of examining every value stored in the stack array from zero to `stacktop-1` (remember that `stacktop` points to the first unused stack position). To clear the stack, the program sets `stacktop` to zero. Notice that it's never necessary to actually erase the values stored in the stack array. Unused stack positions, locations in the array from `stacktop` to the end of the array, are always assumed to contain garbage values and are ignored by the program.

### The Program

I wrote this month's program in Microsoft's Quick Basic 4, which, in my opinion, is a quantum leap ahead of every other Basic I've seen, both as a programming language and as a programming environment. The program will need revisions to run under other Basics, including earlier versions of Quick Basic.

The most important change necessary will be rewriting the declared subprograms and functions as normal subroutines and

handling the values returned from the functions. Also, the recursion in the `FindFlight` function will have to be eliminated unless you are using Turbo Basic.

To make the program as clear as possible, I have adopted the following convention: Basic's own keywords are always in upper-case letters (Quick Basic does that automatically), names of subprograms and functions are in mixed case, and names of variables are in lowercase.

Program Listing 1 demonstrates the simplest kind of path search. The program knows nothing about geography or which flights are most likely to lead to an acceptable solution. However, it will find a set of flights between any two cities in a data base if such a set exists. Before you read the following description, I urge you to type in the program and try it. The description will then be much clearer.

### First Search Program

Listing 1 begins by declaring a number of functions and subprograms. Actually, Quick Basic (which I'll refer to as "QB4" from now on) writes the declarations automatically; I've rearranged them and added comments. As you read through the program, you can look back at these declarations to find out how the program blocks are related.

Next, the program defines a number of constants, which are values that won't change during the program but will make the program easier to read. The last constant in the list is perhaps the most interesting. If you set the value of `trace` equal to true, the program will display each step it takes. If you set `trace` equal to false, the program will find an answer and display it. The constant `trace` is used by procedures throughout the program to determine if they should report what they are doing.

The next section declares global or shared variables as well as a record structure, `KBItem`, which holds one entry in the data base (or "knowledge base," as AI programmers like to call it). Each record in the data base contains a city of origin, a city of destination, the distance between the two, and a flag used to control traceback. The program creates an array of the data-base records and a variable to record how many items actually exist.

The main program loop begins by calling

New York,	Chicago,	1000
Chicago,	Denver,	1000
New York,	Toronto,	800
New York,	Denver,	1900
Toronto,	Calgary,	1500
Toronto,	Los Angeles,	1800
Toronto,	Chicago,	500
Denver,	Salt Lake City,	1000
Denver,	Houston,	1500
Houston,	Los Angeles,	1500
Denver,	Los Angeles,	1000

Figure. A sample data base for Program Listing 1.

the `Setup` subprogram continually until there is at least one entry in the knowledge base. It then enters a main loop that clears the traceback flags, making all entries available. Next, the program gets the names of the target cities from the user and sends those names to the `FindFlight` subprogram for processing. If `FindFlight` finds a path from the origin to the destination cities, it leaves that path on the stack, and the `PrintAnswer` routine then searches through the stack and prints the result.

### The Routines

QB4 prints out subprograms and functions in alphabetical order, but that isn't necessarily the best order for discussing the logic of a program. I'll therefore follow the order of the declarations at the top of the program; you'll have to skip back and forth in the program to read the individual procedures.

The `Setup` and `Input` routines are fairly standard. The program asks if you want to read the data base from a disk file or type it in directly. The `KeyInput` routine ends by asking if you want to save what you've typed to a disk file. The Figure shows the data base that I used for testing the program. You can either create it with a text editor or select keyboard input the first time you run Listing 1 and then read the data base from the file every other time. Whenever Listing 1 asks for a file name, you can press the enter key to use the default name, if you want, a feature that is built into the `GetFilename$` function.

The interesting part of the program is in the `FindFlight` subprogram and its associated functions. `FindFlight` begins by searching for a direct route from the city of origin to the destination. If it finds such a flight, it pushes its location in the data base onto the stack by calling the `Push` subprogram and then returns. That's all it has to do.

If it can't find a direct flight, it calls `FindAnyFlight` to find a flight from the city of origin to anywhere else at all. If the subprogram finds such a flight, it is pushed onto the traceback stack. The destination of that flight then becomes the new city of origin. `FindFlight` calls itself recursively to look for this new path.

Any time a program routine calls itself, the program is using recursion. This means a routine is invoking itself with new values. The key to writing a recursive routine (besides using a language that supports recursion) is to make sure that there is always a condition that will cause the routine to come to an end eventually. `FindFlight` ends if it finds a direct flight, a flight from the city of origin to anywhere else (after calling itself recursively), or if it can't find any flight at all.

You can eliminate the recursion in `FindFlight`, if you want, by changing the values of `orig$` and `dest$` directly and then using `Gotos` to return to the top of the

routine. However, be sure that you don't alter the original values of `targetorig$` and `targetdest$` in the main program.

If no flight exists from the current `orig$` to anywhere, `FindFlight` attempts to trace back to the last choice point and try again. The last section of the routine pops a value, if one exists, from the stack and then looks for a new route.

The secret to finding a new route is in the `FindAnyFlight` function. This function not only searches the data base to find a flight from one city to anywhere else but also marks the flights that should no longer be considered. Whenever `FindAnyFlight` finds a possible route, it resets the traceback flag for that route. For example, if `FindAnyFlight` is looking for a flight from Denver to anywhere, it may find a flight from Denver to Houston. It then sets the flag for the Denver to Houston flight so it won't choose that flight again. Otherwise, the entire program could lock up in a loop and try the same flights repeatedly.

Both `FindAnyFlight` and `FindMatch` read through the data base, one record at a time, to locate a particular flight. In a more complex data base, this would take too long. Such routines are more likely to use a data-base index, perhaps one based on a B-tree, to determine quickly if a flight exists. I'll explore such indexing techniques in a future column.

Once `FindFlight` ends, by either finding a route or determining that none exists, the `PrintAnswer` routine is responsible for displaying the actual route. It does so by reading through the entire stack and printing the flights it finds. It also adds up the distances between cities and reports the total mileage.

The remainder of the routines provide support for the search. `Push` and `Pop` manipulate the stack. Each must check the condition of the stack to make sure there isn't an overflow or underflow. The `Pop` function returns a value of zero if an underflow has occurred. `Push` reports an error and halts the entire program if there's a stack overflow, since no other routine could then function properly.

All the other routines should be self-explanatory. They are routines that could occur in any program: prompting for a yes/no response, asking if the user wants to run the program again, etc. One thing to notice throughout the program is that fixed-length strings are used for the city names. If you have enabled tracing, this makes the trace reports a little messy but keeps the string comparisons simpler. The `PrintAnswer` routine, however, strips trailing blanks from each city name before printing them.

## Adding Intelligence

Listing 1 isn't very smart. It always selects the first possible record it comes to during each search, regardless of how promising that flight looks. If you ask it to find a

flight from New York to Los Angeles, for example, it finds neither the shortest route nor the route with the fewest plane changes—it finds the first possible answer it can find.

By changing the `FindAnyFlight` routine, you can modify Listing 1 so that it makes more intelligent choices as it moves through the data base.

Program Listing 2 shows one such change. Instead of selecting the first available flight from a city, the `FindAnyFlight` function in Listing 2 looks for the longest possible flight. This algorithm makes the assumption that a longer flight will take you closer to the desired

destination; therefore, you can get there in fewer steps. If you use the `FindAnyFlight` routine in Listing 2, you'll find that, with the sample data base, this assumption holds true.

Program Listing 3 is another version of `FindAnyFlight` that looks for the shortest possible flight from a given city. It is based on the assumption that we can find the shortest route from one city to another by constantly selecting the shortest flight at

## THE NEXT STEP

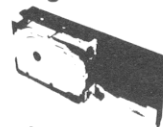
Circle 247 on Reader Service card.

### 10 Meg Hard Card



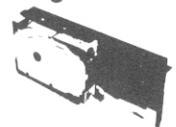
\$379.95

### 20 Meg Hard Card



\$459.95

### 30 Meg Hard Card



CALL

### HARD DISK SALE!



#### Hard Drive Kits

10 Meg	\$279.95
20 Meg	\$339.95

### TANDY 1000 EX

#### 2nd Drive

\$179.95

### Everex Modems

(Hayes Compatible)

Complete with software manuals	
300/1200 Internal	\$119.95
300/1200/2400	\$199.95

### TANDY 1000

#### Cards

300/1200 Modem	\$119.95
300/1200/2400 Modem	\$199.95
Mini IO	\$79.95
2 Meg Board	\$169.95

#### 2nd Floppy

360K	\$119.95
720K	\$99.95
3 1/2"	\$119.95



#### Memory Cards

##### Zucker Memory

• DMA & 512K \$129.95

##### Zucker Multifunction

• Serial  
• Real Time Clock  
• 512K DMA  
• Software \$189.95

Tandy 3000 & 3000HL

### Hard Drive Kits

Includes Drive, Controller & Cable

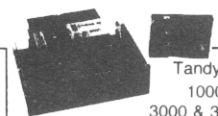
20 Meg	\$399.95
30 Meg	\$599.95
40 Meg	\$699.95
80 Meg	\$999.95

Tandy Model 3, 4, 4P

### Hard Drive Systems

Complete - ready to run

10 Meg	\$499.95
20 Meg	\$699.95



Tandy 1000, 1000SX, 3000 & 3000HL

### Tape Backup

20, 30, 40 Meg Tape Backup	\$399.95
60 Meg Tape Backup Archive	\$659.95

### BODEX CORP.

224 E. Main Street  
Marlboro, MA 01752

Tel. 617-485-5115

Hours: 10 a.m.-7 p.m., Sat. 10 a.m.-5 p.m.

### TRUE DATA PRODUCTS

115 So. Main Street  
Uxbridge, MA 01569

Tel. 617-278-6555

Hours: 9 a.m.-6 p.m., Sat. 10 a.m.-4 p.m.



## THE NEXT STEP

each choice node. With the sample data base, it does indeed find the shortest flight from New York to Los Angeles.

Both Listing 2 and Listing 3 make assumptions about the data base in general. If we had a flight from New York to London in the data base and another from London to Chicago, Listing 2 would produce a ridiculous solution, finding a flight from New York to Los Angeles by way of London. On the other hand, if the data base included a number of short flights—from New York to Boston, from Boston to Washington, D.C., from Washington, D.C. to Philadelphia, etc.—Listing 3 would gener-

erate an inefficient total path. Although the algorithms in Listings 2 and 3 know nothing about the nature of the data base, selecting one to use means that the programmer needs to have an idea about how the information is arranged. Some programs generate solutions by several different algorithms and then compare the results before presenting a solution to the user.

Perhaps you'd like to generate more than one solution. You can do this by removing one or more parts of the data base after every solution is generated. Program Listings 4 and 5 show two ways it could be done. The first leaves the traceback flags set on the solution path so none of the original flights can be used in a later solution. Listing 5 removes the final flight from the data base by erasing the name of the city of origin.

It's interesting to note that each modification of Listing 1 results in a different solution or set of solutions if the program is asked to find a flight from New York to

Los Angeles. Even a data base as simple as this one contains many different possibilities, and a slight change in the program can cause a major change in the outcome. Also, the order of the information in the data base is often as important in finding an acceptable solution as the algorithm chosen.

These programs are only an introduction to the kinds of algorithms used in path-finding and goal-finding AI programs. Schildt's book and several new ones provide additional insight into the problems and techniques of AI programming. You may not need to create a full-fledged expert system, but these techniques can often be used to solve otherwise difficult problems in more traditional programs. ■

*Write Hardin Brothers at 280 N. Campus Ave., Upland, CA 91786. Enclose a stamped, self-addressed envelope for a reply. You can also contact Hardin on Compuserve's WESIG (PCS-117).*

### Program Listing 1. Simplest kind of path search finds sets of flights between any two cities if such sets exist.

```

'*****
' Depth-first search program
' This program is designed specifically to search
' a knowledge base of air distances between cities
'
' Compiled with QuickBasic v. 4.0
'*****

'*****
' These routines initialize the database
'*****
DECLARE SUB Setup ()
DECLARE SUB KeyInput ()
DECLARE SUB FileInput ()
DECLARE FUNCTION GetFilename$ ()

'*****
' These routines do the actual searching
'*****
DECLARE FUNCTION FindAnyFlight% (orig$)
DECLARE SUB FindFlight (orig$, dest$)
DECLARE FUNCTION FindMatch% (orig$, dest$)

'*****
' These routines handle the traceback stack
'*****
DECLARE SUB Push (p%)
DECLARE SUB Pop (p%)

'*****
' Miscellaneous routines
'*****
DECLARE SUB ClearFlags ()
DECLARE SUB GetTarget ()
DECLARE SUB PrintAnswer ()

'*****
' Handy utility routines
'*****
DECLARE FUNCTION Again$ ()
DECLARE FUNCTION YesNo$ ()
DECLARE SUB Pause ()
DECLARE FUNCTION Strip$ (s$)

'*****
' Variable declarations:
'*****
DEFINT A-Z

CONST false = 0
CONST true = NOT false
CONST available = true
CONST unavailable = false
CONST forever = true
CONST maxint = 32767
CONST maxsize = 100
CONST trace = false

'*****
' These values don't change
' during the program.
' "const" declarations are
' available to all functions
' and subprograms in this
' module (the entire program)
' Maximum size of database
' Set to true watch the action

DIM SHARED stack(0 TO maxsize)
COMMON SHARED stacktop

COMMON SHARED filename$
DIM SHARED targetorig AS STRING * 20
DIM SHARED targetdest AS STRING * 20
COMMON SHARED defaults$

'*****
' Each entry in the knowledge base has 4 parts:
' a city of origin, a city of destination, a distance, and a flag.
'*****

TYPE KBItem
    origin AS STRING * 20
    destination AS STRING * 20
    distance AS INTEGER
    flag AS INTEGER
END TYPE
DIM SHARED kb(1 TO maxsize) AS KBItem

COMMON SHARED entries 'Number of entries in the
                        'knowledge base

'*****
' Main Program Loop
'*****
default$ = "KBASE.DAT" 'Default database file name

DO
    Setup 'Initialize the database
    LOOP WHILE entries = 0

DO
    ClearFlags 'Make all routes available
    GetTarget 'Get user's origin & destination
    FindFlight (targetorig$, (targetdest$), 'Can we get there from here?
    PrintAnswer 'Let's find out
    LOOP WHILE Again$ = "Y" 'Repeat if user is still curious
    CLS
    END

FUNCTION Again$
'*****
' Does user want to run program again?
'*****
CLS
PRINT "Run program again? ";
Again$ = YesNo$
END FUNCTION

SUB ClearFlags STATIC
'*****
' Clear all knowledge base flags and stack
'*****
FOR lp = 1 TO entries
    kb(lp).flag = available
NEXT lp
stacktop = 0
END SUB

SUB FileInput
'*****
' Read the database from a file
'*****
entries = 0
filename$ = GetFilename$
OPEN filename$ FOR INPUT AS 1

DO UNTIL EOF(1)
    IF entries >= maxsize THEN
        PRINT "The database is full"
        Pause
        EXIT DO
    END IF
    entries = entries + 1
    INPUT #1, kb(entries).origin$
    INPUT #1, kb(entries).destination$
    INPUT #1, kb(entries).distance
    LOOP
CLOSE
END SUB

FUNCTION FindAnyFlight (orig$)
'*****
' Look for a flight from Orig$ to anywhere
'*****
IF trace THEN

```

Listing 1 continued

Listing 1 continued

```

PRINT "Looking for a flight from "; orig$; " to anywhere"
WHILE INKEYS = "": WEND
END IF

FOR lp = 1 TO entries
  IF orig$ = kb(lp).origin$ AND kb(lp).flag = available THEN
    kb(lp).flag = unavailable
    FindAnyFlight = lp
    EXIT FUNCTION
  END IF
NEXT lp
FindAnyFlight = 0
END FUNCTION

SUB FindFlight (orig$, dest$)
'+++++++
' Find a flight path from Orig$ to Dest$
'+++++++
  IF trace THEN
    PRINT "Looking for flight from "; orig$; "to "; dest$
    WHILE INKEYS = "": WEND
  END IF

  '+++++++
  ' First look for a direct flight
  '+++++++
  p = FindMatch(orig$, dest$)
  IF trace AND p THEN
    PRINT "Direct flight found"
    WHILE INKEYS = "": WEND
  ELSEIF trace THEN
    PRINT "Can't find a direct flight"
    WHILE INKEYS = "": WEND
  END IF

  IF p THEN
    Push p
    EXIT SUB
  END IF

  '+++++++
  ' No direct flight so find a flight from Orig$ to anywhere
  '+++++++
  p = FindAnyFlight(orig$)

  IF trace AND p THEN
    PRINT "Found a flight from "; orig$; "to "; kb(p).destination$
    WHILE INKEYS = "": WEND
  ELSEIF trace THEN
    PRINT "Can't find a flight from "; orig$; "to anywhere"
    END IF

    IF p THEN
      Push p
      FindFlight (kb(p).destination$, (dest$))
    END IF

    '+++++++
    ' No flights to anywhere from Orig$, so try to trace back
    '+++++++

    IF stacktop THEN
      Pop p
      IF p THEN
        FindFlight (kb(p).origin$, (dest$))
      END IF
    ELSEIF trace THEN
      PRINT "The stack is empty -- no flights exist"
    END IF
  END SUB

  FUNCTION FindMatch (orig$, dest$)
  '+++++++
  ' Find a direct flight from Orig$ to Dest$
  '+++++++
    IF trace THEN
      PRINT "Looking for a direct flight from "; orig$; " to "; dest$
    END IF

    FOR lp = 1 TO entries
      IF orig$ = kb(lp).origin$ AND dest$ = kb(lp).destination$ THEN
        FindMatch = lp
        EXIT FUNCTION
      END IF
    NEXT lp
    FindMatch = 0
  END FUNCTION

  'Signal that no match was found

  FUNCTION GetFilename$
  '+++++++
  ' Get file name from user or use default
  '+++++++
    PRINT "Enter a file name or press <Enter> ==> ";

```

Listing 1 continued

NEW PRINTERS ADDED! FIND YOURS BELOW		RIBBON SALE			EXACT REPLACEMENTS		
Good This Month		PRINTER	RIBBON SIZE	NEW CARTRIDGES	RELOADS	INSERTS EZ-LOAD™	
MAKE, MODEL NUMBER		SIZE	From the various manufacturers or made in our own shop Ready to use	You SEND your used CARTRIDGES to us WE put OUR NEW INSERTS in them	DROP IN, NO WINDING! EXACT REPLACEMENTS made in our own shop Cartridges NOT included		
Contact us if your printer is not listed. We have many more in stock. We can probably RELOAD your old cartridges.			Inches by Yards				
C ITOH Prowriter 1550-8510, NEC 8023-8025, APPLE DMP - IMAGEW		1/2 x 18	\$4.00/1 \$3.95/6 \$3.90/12	\$3.90/1 \$3.85/6 12 or more	\$3.25/1 \$3.10/12 \$2.95/72		
IBM PROPRINTER (Standard Paper)		(4201) 7/16 x 20	\$18/2 \$ 51/6 \$ 96/12	\$8/1 \$7 ea 2 or more	\$18/3 \$66/12 \$360/72		
IBM PROPRINTER XL		(4202) 7/16 x 27	\$18/2 \$ 51/6 \$ 96/12	\$8/1 \$7 ea 2 or more	\$18/3 \$66/12 \$360/72		
RADIO SHACK-TOSHIBA-COMMODORE-PANASONIC-RICOH			RS LP-I-II-IV, CENTRON	730-737-739-779 (ZIP PACK)	\$12/3 \$45/12 \$252/72		
Carbon Film - DWP 210, DIABLO HYTYPE II Black (1445)		5/16 x 145	\$18/3 \$60/12 \$342/72	\$5 ea 3-11 \$4 ea 12 or more	\$24/6 \$42/12 \$234/72		
DW II, DWP 410-510, RICOH 1200-1300-1600 Black (1419)		1/4 x 145	\$18/3 \$60/12 \$342/72	\$5 ea 3-11 \$4 ea 12 or more	\$2.85/1 \$2.65/12 \$2.45/72		
Blue, Brown Colors (1419)		1/4 x 130	\$21/3 \$72/12 \$414/72	\$6 ea 3-11 \$5 ea 12 or more	\$30/6 \$54/12 \$234/72		
Fabric (Long Life), DWP 210, DIABLO HYTYPE II Black (1458)		5/16 x 17 NOT EZ-LOAD 14 x 25	\$18/2 \$ 51/6 \$ 96/12	\$8/1 \$7 ea 2 or more	\$21/3 \$78/12 \$432/72		
DW II, DWP 410-510, RICOH 1200-1300-1600 Black (1449)		1/2 x 15	\$18/2 \$ 51/6 \$ 96/12	\$8/1 \$7 ea 2 or more	\$21/3 \$78/12 \$432/72		
DMP - 100, LP VII, COMMODORE 1525, GORILLA BANANA (1424)		Inker Loop	\$18/2 \$ 51/6 \$ 96/12				
DMP - 200, 120, 130 (430 INSERTS & RELOADS) (1483)		1/2 x 20	\$20/2 \$ 57/6 \$108/12	\$7/1 \$6 ea 2 or more	\$15/3 \$54/12 \$288/72		
DMP - 400 - 420, LP VI-VIII, PANASONIC KXP-130-1093 (1418)		5/16 x 14	\$4.00/1 \$3.95/6 \$3.90/12	\$3.90/1 \$3.85/6 12 or more	\$3.25/1 \$3.10/12 \$2.95/72		
DMP - 500 (1482)		1/2 x 20	\$22/2 \$ 63/6 \$120/12	\$7/1 \$6 ea 2 or more	\$4.25/1 \$4.05/12 \$3.85/72		
DMP - 2100, TOSHIBA P1340-1350-1351-351 (1442)		1/2 x 20	\$4.00/1 \$3.95/6 \$3.90/12	\$3.90/1 \$3.85/6 12 or more	\$3.25/1 \$3.10/12 \$2.95/72		
DMP - 2200, C ITOH 3500 (1233)		1/2 x 52	\$35 GENERIC \$30	\$18/1 \$16 ea 2 or more	\$30/3 \$ 57/6 \$108/12		
LP III-V, CANON A 1200 (New Only) (1/2 x 5)		1/2 x 15	\$4.00/1 \$3.95/6 \$3.90/12	\$3.90/1 \$3.85/6 12 or more	\$3.25/1 \$3.10/12 \$2.95/72		
STAR MICRONICS RADIX 10		1/2 x 55	\$18/2 \$ 51/6 \$ 96/12	\$7/1 \$6 ea 2 or more	\$15/3 \$54/12 \$288/72		
STAR MICRONICS RADIX 15		1/2 x 25	\$19/2 \$ 54/6 \$102/12	\$8/1 \$7 ea 2 or more	\$18/3 \$66/12 \$360/72		
EPSON LQ 1000		1/2 x 18	\$22/2 \$ 63/6 \$120/12	\$8/1 \$7 ea 2 or more	\$18/3 \$66/12 \$360/72		
MX-FX-RX 70-80-85, LX 80-90 (5/16 x 7)		1/2 x 20	\$14/2 \$ 36/6 \$ 66/12	\$7/1 \$6 ea 2 or more	\$15/3 \$54/12 \$288/72		
MX-FX-RX 100-185-286, LQ 800 (1/2 x 18) LQ 1500 (1/2 x 14)		1/2 x 30	\$18/2 \$ 51/6 \$ 96/12	\$8/1 \$7 ea 2 or more	\$3.25/1 \$3.05/12 \$2.85/72		
EPSON LQ 2500 (INSERTS & RELOADS ONLY)		1/2 x 15		\$7/1 \$6 ea 2 or more	\$4.25/1 \$4.05/12 \$3.85/72		
DX 20-35 Carbon Film (Multistrike), OLIVETTI ET-121-221		5/16 x 290	\$21/3 \$72/12 \$414/72				
NEC Spinwriter-Carbon Film - 2000-3500 (Reloads BCCOMPCO Only) - 5500-7700 (Can Reload Most Types)		5/16 x 145	\$18/3 \$60/12 \$342/72	\$5 ea 3-11 \$4 ea 12 or more	\$24/6 \$42/12 \$234/72		
PC PR 103 / 105A		NOT EZ-LOAD 14 x 15	\$18/3 \$60/12 \$342/72	\$5 ea 3-11 \$4 ea 12 or more	\$24/6 \$42/12 \$234/72		
Pinwriter P1-P2-P6, P-5 (1/2 x 14)		1/2 x 13		\$7/1 \$6 ea 2 or more	\$3.25/1 \$4.05/12 \$3.85/72		
P3-P7		1/2 x 20	\$25/2 \$ 69/6 \$126/12	\$7/1 \$6 ea 2 or more	\$4.25/1 \$4.05/12 \$3.85/72		
COMREX 420 Fabric (INSERTS & RELOADS ONLY)		1/2 x 52		\$10/1 \$9 ea 2 or more	\$30/3 \$57/6 \$108/12		
DX-15, II Fabric		5/16 x 17	\$15/2 \$ 42/6 \$ 78/12				
BROTHER HP-15-25-35 Carbon Film (Multistrike)		5/16 x 82	\$18/3 \$60/12 \$342/72				
OKIDATA Pacemark 2350-2410 Black		1/2 x 100	\$20 EACH	\$20/1 \$18 ea 2 or more	\$36/3 \$132/12 \$720/72		
Microline 293-94		7/8 x 28	\$30/2 \$ 84/6 \$156/12				
Microline 182-183-192-193 292 (7/8 x 16)		Inker Loop	\$20/2 \$ 57/6 \$108/12				
ML-80-82-83-92-93 (Call for ML-84 Prices)		1/2 x 16	\$21/6 \$36/12 \$198/72				
MANNESMAN-TALLEY MT-160, RITEMAN INFORUNNER (Inker Loop)		9mm x 11	\$19/2 \$ 54/6 \$102/12				
MT-180-290		9mm x 13	\$20/2 \$ 57/6 \$108/12				
RITEMAN 15		1/4 x 7	\$22/2 \$ 63/6 \$120/12				
SPIRIT 80 (SP80) COMMODORE 1526 (Multistrike)		1/2 x 35	\$16/2 \$ 45/6 \$ 84/12				
PANASONIC KXP-1080-1090-1091-1092-1592-1595		Inker Loop	\$16/2 \$ 45/6 \$ 84/12				

Circle 152 on Reader Service card.



FREE CATALOG \* FREE CATALOG \* FREE CATALOG

**PROFESSIONAL HANDICAPPING SYSTEMS™**  
"COMPUTER SOFTWARE FOR THE SERIOUS HANDICAPPER"

**INTRODUCES...**

**MARKET MAKER®**  
The Stock Market Analyzer



3-Months of accurate predictions for only **\$69.95**

1. Complete stock, option, and index option analysis.
2. Produces easy to read charts, quickly!
3. Charts 100's of stocks on one disk.
4. Six (6) distinct signals
5. Can be linked with Dow Jones® or entered by hand.
6. The easiest, fastest, most accurate stock market analyzer ever used by PROF JONES.



We can handle all of your handicapping needs! Whether its for Horses, Dogs, Trotters, Lottery, Football or Basketball, we've got it for you!

**DEMO DISKS AVAILABLE!**

**FREE CATALOG** Call Us NOW **TOLL FREE**  
**1-800-553-2256**

FREE CATALOG \* FREE CATALOG \* FREE CATALOG

Circle 41 on Reader Service card.



**MATTHEW ELECTRONICS INC**  
**OFFERS**  
**TANDY 1000 OWNERS:**

**SALE!**  
**MASTER/CHASSIS**  
7 user slots plus power supply to expand Tandy 1000, 1000JA, 1000SX. **Save \$50.00! NOW ... \$575.00!**

**SALE!**  
**MASTER/ONE**  
1 MEG Multifunction board for Tandy 1000, 1000JA, 1000SX. All memory installed, plus software. **Save \$100.00! NOW ... \$355.00!**

**EGA BOARD**  
For Tandy 1000, 1000JA, 1000HD. Software switching between Tandy Video and EGA Modes ..... **\$295.00**

**MASTER/FOUR**  
4 MEG Multifunction board for Tandy 1000, 1000JA, 1000SX ..... **\$275.00**  
**OK plus software**

**CALL ME TO ORDER:**  
**1-800-543-2233**  
**OR 805-646-7790 10 AM-4 PM PST**

**MATTHEW ELECTRONICS INC.**  
**386 Avenida De La Vereda Ojai, California 93023**

## THE NEXT STEP

### Listing 1 continued

```

LINE INPUT files
files$ = Strip$(files)
IF files$ = "" THEN
    files$ = default$
END IF
GetFilename$ = files$
END FUNCTION

SUB GetTarget
'+++++++
' Get Target Origin and Destination Cities
'+++++++
CLS
DO
    PRINT "Find flight from ==> ";
    LINE INPUT targetorig$
    targetorig$ = Strip$(targetorig$)
    LOOP WHILE targetorig$ = SPACES(20)
    DO
        PRINT "          to ==> ";
        LINE INPUT targetdest$
        targetdest$ = Strip$(targetdest$)
        LOOP WHILE targetdest$ = SPACES(20)
    END SUB

SUB KeyInput
'+++++++
' Get database from the user
' Save it in a file 'f the user wishes
'+++++++
PRINT "Enter up to"; maxsize; "sets of data. Press <Enter> as origin city"
PRINT "to signal the end of the data list"
PRINT
DO
    IF entries >= maxsize THEN
        PRINT "The database is full"
        Pause
        EXIT DO
    END IF

    PRINT "Origin city ==> ";
    LINE INPUT origin$
    origin$ = Strip$(origin$)
    IF origin$ = "" THEN EXIT DO
    entries = entries + 1
    kb(entries).origin$ = origin$
    DO
        PRINT "Destination city ==> ";
        LINE INPUT destination$
        destination$ = Strip$(destination$)
        kb(entries).destination$ = destination$
        LOOP WHILE destination$ = ""
    DO
        PRINT "Distance ==> ";
        LINE INPUT distance$
        kb(entries).distance = VAL(distance$)
        LOOP WHILE kb(entries).distance = 0
    PRINT
    LOOP WHILE forever

    IF entries > 0 THEN
        PRINT "Save the database in a file ";
        IF YesNo$ = "Y" THEN
            filename$ = GetFilename$
            OPEN filename$ FOR OUTPUT AS 1
            FOR lp = 1 TO entries
                WRITE #1, kb(lp).origin$, kb(lp).destination$, kb(lp).distance
            NEXT lp
            CLOSE 1
        END IF
    END IF
END SUB

SUB Pause
'+++++++
' Wait for user to read the screen
'+++++++
LOCATE 25, 27
PRINT "Press any key to continue";
WHILE INKEYS <> "": WEND
WHILE INKEYS = "": WEND
END SUB

SUB Pop (p)
'+++++++
' Retrieve a database entry from the traceback stack
'+++++++
IF stacktop <= 0 THEN
    ELSE = 0
ELSE
    stacktop = stacktop - 1
    p = stack(stacktop)
    IF trace THEN
        PRINT "Popping "; kb(p).origin$; ", "; kb(p).destination$
        WHILE INKEYS = "": WEND
    END IF
END IF

END IF
END SUB

SUB PrintAnswer
'+++++++
' Print out the list of flights and the distance
'+++++++
distance = 0
FOR p = 0 TO stacktop - 1
    PRINT RTRIM(kb(stack(p)).origin$); " to ";
    distance = distance + kb(stack(p)).distance
NEXT p
IF distance > 0 THEN
    PRINT targetdest$
    PRINT distance; "miles"
ELSE

```

Listing 1 continued

Listing 1 continued

```

PRINT "No path exists from "; RTRIMS(targetorig$);
PRINT " to "; RTRIMS(targetdest$)
END IF
Pause
END SUB

SUB Push (p)
'*****
' Save a database entry on the traceback stack
'*****
IF stacktop >= maxsize THEN
PRINT "Stack overflow -- program halting"
END
ELSE
stack(stacktop) = p
stacktop = stacktop + 1
IF trace THEN
PRINT "Pushing "; kb(p).origin$; ", "; kb(p).destination$
END IF
END IF
END SUB

SUB Setup
'*****
' Read the database from the keyboard or a file
'*****
entries = 0 'Clear the database
CLS
PRINT "Input the database from keyboard or file (k/f) ==> ";
DO
ch$ = UCASE$(INPUT$(1))
LOOP UNTIL INSTR("KF", ch$)
PRINT ch$
SELECT CASE ch$
CASE "K"
KeyInput
CASE "F"
FileInput
END SELECT
END SUB

FUNCTION Strip$(s$)
'*****
' Strip leading and trailing spaces from a string
'*****
Strip$ = LTRIMS(RTRIMS(s$))
END FUNCTION

FUNCTION YesNo$
'*****
' Prompt and wait for a y/n response
'*****
PRINT "(y/n) ==> ";
DO
ch$ = UCASE$(INPUT$(1))
LOOP UNTIL INSTR("YN", ch$)
PRINT ch$
YesNo$ = ch$
END FUNCTION

```

End

Program Listing 2. The FindAnyFlight function looks for the longest possible flight.

```

FUNCTION FindAnyFlight (orig$)
'*****
' Alternate FindAnyFlight function.
' This routine looks for the longest flight leaving a city,
' assuming that longer flights will take us closer to our destination
' and therefore lead to a solution sooner.
'*****
IF trace THEN
PRINT "Looking for a flight from "; orig$; " to
WHILE INKEY$ = "" : WEND
END IF

maxdist = 0
maxpos = false
FOR lp = 1 TO entries
IF orig$ = kb(lp).origin$ AND kb(lp).flag = available THEN
IF kb(lp).distance > maxdist THEN
maxdist = kb(lp).distance
maxpos = lp
END IF
END IF
NEXT lp
FindAnyFlight = maxpos
IF maxpos THEN
kb(maxpos).flag = unavailable
END IF
END FUNCTION

```

End

Program Listing 3. Alternate FindAnyFlight subroutine seeks shortest possible route between cities.

```

FUNCTION FindAnyFlight (orig$)
'*****
' Second alternate FindAnyFlight function.
' This routine looks for the shortest flight leaving a city,
' assuming that selecting shorter flights will lead to a
' solution with a shorter total distance
'*****
IF trace THEN
PRINT "Looking for a flight from "; orig$; " to anywhere"
WHILE INKEY$ = "" : WEND
END IF

```

Listing 3 continued

```

leastdist = maxint
leastpos = false
FOR lp = 1 TO entries
IF orig$ = kb(lp).origin$ AND kb(lp).flag = available THEN
IF kb(lp).distance < leastdist THEN
leastdist = kb(lp).distance
leastpos = lp
END IF
END IF
NEXT lp
FindAnyFlight = leastpos
IF leastpos THEN
kb(leastpos).flag = unavailable
END IF
END FUNCTION

```

End

Program Listing 4. To generate more than one solution, remove one or more parts of the data base after every solution is generated. This approach omits previously tried routes.

```

'*****
' Changes to search for more than one solution:
' 1. Change the main program loop as shown below
' 2. Add the function Another shown below
' 3. Remove the call to Pause at the end of the PrintAnswer routine
'*****

'*****
' Main Program Loop
'*****

default$ = "KBASE.DAT" 'Default database file name

DO
Setup 'Initialize the database
LOOP WHILE entries = 0

DO
ClearFlags 'Make all routes available
GetTarget 'Get user's origin & destination
DO
FindFlight (targetorig$), (targetdest$) 'Can we get there from here?
PrintAnswer 'Let's find out
LOOP WHILE Another
LOOP WHILE Again$ = "Y" 'Repeat if user is still curious
CLS
END

FUNCTION Another
PRINT
PRINT "Press <Space> for another route, any other key to end"
PRINT
Another = (INPUT$(1) = " ")
stacktop = 0 'Reset the stack
END FUNCTION

```

End

Program Listing 5. This approach allows multiple solutions by deleting the city of origin.

```

'*****
' A second way to generate multiple solutions:
' 1. Change the main loop as shown below
' 2. Change Function Another as shown below
' 3. Be sure the Pause is removed from the end of PrintAnswer
'*****

'*****
' Main Program Loop
'*****

default$ = "KBASE.DAT" 'Default database file name

DO
DO
Setup 'Initialize the database
LOOP WHILE entries = 0
DO
ClearFlags 'Make all routes available
GetTarget 'Get user's origin & destination
FindFlight (targetorig$), (targetdest$) 'Get there from here?
PrintAnswer 'Let's find out
LOOP WHILE Another
LOOP WHILE Again$ = "Y" 'Repeat if user is still curious
CLS
END

FUNCTION Another
PRINT
PRINT "Press <Space> for another route, any other key to end"
PRINT
Another = (INPUT$(1) = " ")
IF stacktop THEN
p = stack(stacktop-1)
kb(p).origin$ = "" 'Erase last flight of last solution
END IF
stacktop = 0 'Reset the stack
END FUNCTION

```

End



# THE CLASSIFIED

## 80micro

**NEW LOW PRICE! Only 50¢ per word.** Ads must be received by the 20th of the month 3 months prior to publication. Send your ad today! Ads cannot be accepted without full payment. Please make check payable to 80 Micro and mail to: 80 Micro Classifieds, 80 Elm Street, Peterborough, NH 03458. Attn: Classified manager.

### SOFTWARE

**Test Writing Package**, all types. For IBM compatibles. Satisfaction guaranteed. Thirty day return privilege. Cost \$49.00, single station, \$99.00, site license. Bob King, 105 Elizabeth Lane, Dillon, SC 29536. 1-800-774-9307, 1-800-449-5007.

**IBM Shareware!** \$1.95 per disk. Send for free catalog. PS Enterprise, PO Box 4932, Lake Charles, Louisiana 70606.

**Finally, the ideal label program for all users.** Prints labels sorted by name, zip code, or record number on one, two or three across label sheets. Prints Xref list. Even prints multiple labels per addressee. \$24.95 pp. Family Tree Software, 6418 ambassador Drive, Tampa, FL 33615 (Specify type computer).

**Tandy PC/7 Pipeline**, Design Program prints to screen or printer. Details \$1.00. Send SASE. Basic listing \$3.95. Encoded cassette tape with bonus game program \$5.95. George Chaney, 255 N. Cielo, Suite 657, Palm Springs, CA 92262.

**Bible Concordance** 25 disks \$50.00 or K.J.V. Bible 16 disks \$40.00, both \$75.00. ASCII Text Files comes with program, Utilities \$3.00 for S/H over 500 bible disks, two stamps for catalog. Demo \$3.00. PH# 208-337-4766. BibleSoft Co., Box 308 Dept-T, Greenleaf, Idaho 83626

**Tandy Software—Limited Quantities—** Priced to sell at 80—90% off Radio Shack list prices! Software available for ALL Tandy and TRS-80 Computers. Send \$1.00 & SASE for list. King Micro, Box 72189, Columbus OH, 43207

**Public Domain, Shareware, Model Four and MS-DOS Software** for only \$1.00! Send \$1.00 for catalog(s). SC Software, Box 1226, Taylors, SC 29687

**Public Domain Software for IBM compatibles** Send \$2.00 (refundable with purchase) for Directory Disk set. R.A. Higgins, 307 Park, Clinton, TN 37716

**IBM Compatible Public Domain Software** \$1.00 per disk. Send for free catalog or \$3.00 for catalog on disk. RFR Enterprises, Suite 313, 50 Bumstead Rd., Monson, MA 01057

**Wonder Lotto** for IBM compatible. \$24.95 postpaid. Use with Pick 3/6 for All States! Scientifically analyzes past numbers ... gives most probable next number! Also used for matching. Not a toy—easy to use! **Gamester Software** 9 Southmoor Circle, Kettering, Ohio 45429. Cash/Check/Visa/MC (RUSH credit card orders 1-6 pm (513) 299-2558 Monday-Friday).

**Programs for Home, Business or Fun.** Models 1, 3 and 4. Elite Enterprises, PO Box 4382, Springfield, IL 62706.

**\$\$\$ LOTTO USA \$\$\$** Pick the winning num-

bers in all states that have LOTTO games. Easy to run menu. Lottery games for daily picks, LOTTO 40, 48 etc. Diskette only C-64 or IBM. Allow 3-4 weeks for delivery. Send \$19.95 + \$3.50 S/H. New York residents add tax. To: QUEENS SOFTWARE, PO Box 7297, Grand Central station N.Y., N.Y. 10163-6028

**\$\$\$WIN with Thoroughbred/Harness, Greyhound Handicapping Software** \$52.95. Football, Baseball, Basketball Handicapping Software. . . \$52.95 each. Software Exchange, PO Box 5382-M, W. Bloomfield, MI 48033. Free information. (313) 626-7208. VISA/MC. Orders: 1-800-527-9467.

**Model 4 Software** Don't pay top dollar for application software and utilities. We have the software you need at prices you won't believe (nothing over \$15.00.) Free details. SAF Industries, 200 E. Washington, Grove City, PA 16127-1934

**Readability Analyst.** How to clear is your writing? Find out with Prose, the Readability Analyst. Prose is the Ultimate readability program for any computer; micro, mini, or mainframe. Prose estimates the grade level of your writing, using 11 different readability formulas including the Fog Index, Flesch Reading Ease Score, Dale-Chall Index, and the DRP Index. Prose lets you check the readability of all or part of a document, and displays the text being analyzed on screen. Prose works with ASCII files, and files from Word Perfect (TM), WordStar (TM), WordStar 2000 (TM), PC-Write (TM), and MicroSoft Word (TM). Prose is lightning fast, easy to use, unprotected, and features a Lotus (TM) style interface with pop-up windows. It comes with a detailed user manual that includes a complete overview of readability techniques. Prose will make you a better writer! To order, send \$79.95 to Micro-Brothers, PO Box 339, Lafayette, CO 80026.

**Games! Entertainment Software!** We have quality software chosen specially for your IBM home computer for just \$4.00/disk. New games additions for this month include a collection of great casino games including DRAW POKER, BACCARAT, ROULETTE and BLACKJACK. Play ZAXXON and fly your spacefighter on attack runs on alien bases. And THE KINGDOM OF KROZ is an action packed arcade/adventure game. For entertainment, BONZOWARE is an adult game package of trivia and poker. WORLD displays any area of the globe on your display. PIANOMAN turns your PC into a player piano. And THE LOTTO BUSTER may improve your odds at winning the lottery. We also have education, utilities, home applications and more. 48 HR. SERVICE. MONEY BACK GUARANTEE. Send for FREE detailed catalog. The PC Arcade, 276-M Morehouse Rd., Easton CT 06612.

**Budget/Plus Highspeed Budget Management System.** Friendly program brings you one step closer to a balanced budget. Free user support. For free information write: Elran Software Systems, PO Box 201166, San Antonio, TX 78220

**Free IBM Software** for trying award-winning education programs. Geography, Math, Science, Spelling, Vocabulary, etc. for catalog write: Quaker Enterprises, PO Box 133, Leetsdale, PA 15056. DE

**Disk Service Manual** (\$20), Computer phreaking (\$15), Cryptanalysis techniques (\$15), Absolute computer security (\$15), Integrated software (\$15). Catalog \$1 (100 Computer/Electronic Manuals/Software). Consumertronics, 2011 Crescent, Alamo-gordo, NM 88310. (505) 434-0234.

**Insure Your Computer.** Safeware provides full replacement of hardware, media, and purchased software. As little as \$39 a year provides comprehensive coverage. With blanket coverage, no lists of equipment are needed. One phone call does it all! Call 8am to 10pm ET (Sat 9 to 5). SAFEWARE, The Insurance Agency Inc., 2929 N. High St./PO Box 02211 Columbus, OH 43202 800-848-3469 (Nat); 614-262-0559 (OH)

**TRS-80 Software.** Models 1/3/4/4P/4D. Send \$2 for listing: Practical Programs, 1104 Aspen Drive, Toms River, NJ 08753.

**Computer Software Color computer programs.** Only 50 cents each! Write for our free catalog containing over 600 programs. CoCo Programs, PO Box 1256, Holland, MI 49422.

**BEST OF MODEL III 15** exceptional utilities and applications from the pages of 80 MICRO. Only \$21.45. Send payment with order to: The 80 MICRO DISK SERIES 80 Elm St., Peterborough, NH 03458. Or call toll free 1-800-258-5473

**STARTER PAK 1000** 13 exciting and useful programs to get you up and running on your model 1000. Send payment with order to: The 80 MICRO DISK SERIES 80 Elm St., Peterborough, NH 03458. Or call toll free 1-800-258-5473

**Public Domain Software, Model 3 and 4,** computer programs at affordable prices. Free catalog disks. The JaRick Co., PO Box 22708, Robbinsdale, MN 55422. DE 88

**Games for IBM compatibles.** Public domain, \$4/disk. Buy 3, get one free. Send large SASE with 2 stamps for catalog. KNA Sales, 16 Emerson Rd., Northboro, MA 01532. MA

**Federal Tax Program.** Fifth year, revised for 1987 law changes. TEN most used schedules. MS/PCDOS, TRS-80 III/4, Color Computer. \$47.99. Try-O-Byte, Dept. 80, 1008 Alton Circle, Florence, SC 29501. 803-662-9500. MA

Get the attention you deserve. For only 50 cents per word, your ad will be seen by over 100,000 dedicated TRS-80/Tandy microcomputer users. Ads must be received by the 20th of the month 3 months prior to publication. (For example, ads received by November 20th will appear in the February issue.)

Send your ad today!

Name \_\_\_\_\_  
Street \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_  
Telephone (days) \_\_\_\_\_  
Category \_\_\_\_\_

\_\_\_\_\_ (3 words)  
\_\_\_\_\_ (6)  
\_\_\_\_\_ (9)  
\_\_\_\_\_ (12)  
\_\_\_\_\_ (15)  
\_\_\_\_\_ (18)  
\_\_\_\_\_ (21)  
\_\_\_\_\_ (24)

Total number of words x 50¢/word = \_\_\_\_\_  
Ads cannot be accepted without full payment.  
Make checks payable to 80 Micro and mail to:  
80 Micro Classifieds  
80 Elm Street  
Peterborough, NH 03458  
Attn: Classified Manager

## PUBLICATIONS

**TRS-80 Support Computer News 80.** Support for Model I, II, III, 4/4P and 4D. Monthly Newsletter (\$18) per year. One month sample (\$2). C N Publishing Co., PO Box 680, Casper, WY 82602, 307-265-6483.

**IBM Public Domain—** Send two stamps for free catalog. Our disks have Games/Word Processors/Data Base/Spread Sheets/Graphics/Inventory Control/Budget/Checking/Artificial Intelligence/And Much More. For home or business. All programs on DD/DS high quality disks, only \$3.00 per disk. Hundreds to choose from. ECHO Disk Copy, Dept. 80, PO Box 50132, Mobile, AL 36605.

**Radio Shack, Tandy Owners!** Find the computer equipment Tandy no longer sells. Pacific Computer Exchange buys and sells used Tandy TRS-DOS, MS-DOS, and Xenix computers and peripherals. We sell everything from Model 3's to Tandy 6000's and

all the printers and hard disks to go with them. If we don't have it in stock, we will do our best to find it for you. We have the largest database of used Tandy equipment to draw from. All equipment comes with warranty. Pacific Computer Exchange: The ONE source for used Tandy equipment. Call 503-236-2949. 1031 SE Mill, Suite B, Portland, OR 97214. DE

**Free IBM Software Catalog.** Powerful, quality software of all types, edited and menu-driven to run with A>GO at the prompt. From \$3.75 a disk. Ask for the PACKAGE DEAL: Games #1, Edit, Qubecalc, PC-File+, Qmodem. 6 disks for \$20.00. 3.5 and 5.2 inch formats. Interface Software & Systems, D, Box 329, Cookstown, Ontario, Canada L0L 1L0. Call 705-435-6972. AP

**Disk Service Manual.** (\$20), Computer Phreaking (\$15), Cryptanalysis Techniques (\$15), Absolute Computer Security (\$15), Integrated Software (\$10), Catalog \$1 (40+ Publications/Software). Consumertronics, 2011 Crescent, Alamogordo, NM 88310.

**Tandy 1000 programs/Newsletter.** Send for information. Soda Pop Software, PO Box 653, Kenosha, WI 53141.

## HARDWARE

**Nationserv.** Online information Network, 3960 Covert Ave., Evansville, IN 47715, (812) 477-5343.

## FOR SALE

**Modem Owners—**Order software, hardware, supplies, on-line at discount prices. Faulkner Supply, 919-383-4905. MY

## COMMUNICATIONS

**Free Adventure Game Hint!** IBM & Comp., Please state game and puzzle problem. For that little nudge, send S.A.S.E. to: A.C.T.S. P.O. BOX 32, Williamston, MI 48895

## SERVICES

**MODEM PARTY LINE!** 1-818-842-3322

**Personal Computer Owners Can Earn \$1000 to \$5000 monthly** offering simple services performed by their computer. Work at home in spare time. Free list of 100 best services to offer. A.I.M.M.K., Box 60369, San Diego, CA 92106

**Where Did It Go?** With our "Ultimate Finance" system managing your personal or business money, you would know. User defined categories and analysis bring order to your finances and unlock hidden resources. \$27.95 for package. Post paid. Only on Commodore 64/128. Prism Information Services, PO Box 295, Sterling, MA 01564 AP

**Media Conversion for Tandy Models** to over 1000 systems including Magtape, Micro Computers, Mini Computers, Word Processors and Typesetters. Pivar Computing Services, Inc., 165 Arlington Hgts. Rd., Number 80, Buffalo Grove, IL 60089. 312-459-6010.

# MICRO SOURCE

## HOW TO PLACE YOUR AD IN THE MICRO SOURCE

Carefully type your message, or send camera-ready copy. Logos welcome. Each 1/2th page ad is 13.5 picas square (2 1/4"). Include your complete return address and phone number. Rates are \$300 1x, \$275 3x, \$250 6x, and \$225 12x. Send copy, rate indication, and complete payment in check or money order, made out to Micro Source, to: 80 Micro, 80 Elm Street, Peterborough, NH 03458. c/o Micro Source Manager. Materials due the 15th of each month, 3 months prior to cover date. (Example: material received May 15 will appear in the August issue.) Ads received after the deadline will appear in the next scheduled issue. **No ad will be published unless accompanied by full payment.** There are no agency discounts available.

Circle 48 on Reader Service card.

"The home computer is the most powerful tool ever held by man" (or woman for that matter)! Are you still wasting money with random guesswork? This amazing program will analyze the past winning lotto numbers and produce a powerful probability study on easy to read charts in just seconds. With single key presses from a menu you'll see trends, patterns, odd/even, sum totals, number frequency and more on either your screen or printer. Includes automatic number wheeling, instant updating and a built-in tutorial to get you started fast and easy!

CHECKS & CHARGE CARDS ACCEPTED  
WITH NO SURCHARGE.

All orders shipped same day (except personal checks)

APPLE & IBM Compatibles . . . . . \$24.95  
Macintosh (requires MS Basic) . . . . . \$29.95  
Commodore, Altair & Radio Shack  
Back-Up Copies - \$3.00

Please add \$2.00 for shipping and handling.  
Phone credit given with orders.

**SOFT-BYTE**

P.O. Box 556, Forest Park  
Dayton, Ohio 45405  
(513) 233-2200

Circle 1 on Reader Service card.

## BEST OF MODEL III

15 exceptional utilities and applications from the pages of **80 MICRO**. Only \$21.45. Send payment with order to:

**The 80 MICRO DISK SERIES**

80 Elm St.,

Peterborough, NH 03458

**OR CALL  
TOLL FREE  
1-800-258-5473**

Circle 42 on Reader Service card.

## INSURE YOUR COMPUTER.

Safeware provides full replacement of hardware, media, and purchased software. As little as \$39 a year provides comprehensive coverage. With blanket coverage, no lists of equipment are needed. One phone call does it all! Call 8am to 10pm ET (Sat. 9 to 5). **SAFWARE**, The Insurance Agency Inc., 2929 N. High St., PO Box 02211, Columbus, OH 43202. 800-848-3469 (Nat); 614-262-0559 (OH)

Circle 22 on Reader Service card.

## NUCLEAR SUBROUTINES

A sure fire arsenal for TRS-DOS users of more than 50 specially selected subroutines designed to help you write better basic programs. Only \$21.45. Send payment with order to:

**The 80 MICRO DISK SERIES**

80 Elm St.,

Peterborough, NH 03458

**OR CALL  
TOLL FREE  
1-800-258-5473**

Circle 21 on Reader Service card.

## BEST OF MODEL 4

A dozen of the finest programs to appear in **80 Micro**. Only \$21.45. Send payment with order to:

**The 80 MICRO DISK SERIES**

80 Elm St.,

Peterborough, NH 03458

**OR CALL  
TOLL FREE  
1-800-258-5473**

Circle 4 on Reader Service card.

## UTILITY PAK

15 outstanding aids for the Model 4. Only \$26.50. Send payment with order to:

**The 80 MICRO DISK SERIES**

80 Elm St.,

Peterborough, NH 03458

**OR CALL  
TOLL FREE  
1-800-258-5473**



## Let's All Vote

### Votes From the Raspberry Patch

■ I did not understand the invective Eric Maloney used to describe the Tandy market—in his last editorial, he said it consists of misfits and rednecks (see "Farewells," December 1987, p. 9). Whom does he include in this group? I consider myself neither a misfit nor a redneck.

Maloney has a right to his opinion, but he should justify his opinion with a few qualifying statements.—Edward J. Ganley, Melfa, VA

■ In the December 1987 issue, Peter Hutchinson calls Eric Maloney a "first-rate curmudgeon" (see "Changing of the Guard," p. 109). I agree wholeheartedly—but I don't consider it a compliment.

Maloney said he'll miss Tandy Corp. like he'll miss his last migraine. I feel the same way about his disparaging remarks, belligerent attitude, and propensity to quote an expert (himself).

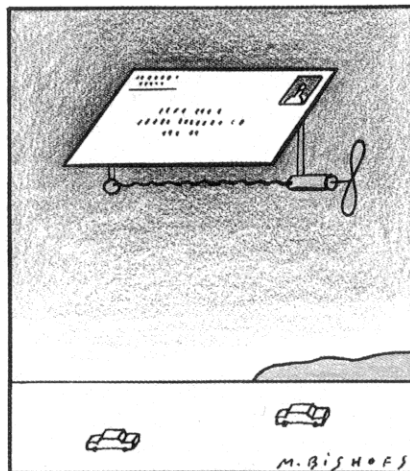
Many owners of Tandy products realize better ones exist, but they also feel they have a good product at a generally reasonable price. Don't just badmouth those items—teach us about them.

With Maloney's departure, I may consider renewing my subscription.—Lowry Riggin, Monroe, LA

■ As a longtime subscriber to *80 Micro* and an owner of Models I, III, 4, and a Tandy 1000 SX, I've fought the battle of Tandy along with your staff and other computerists. We all agree that often the people selling computers don't know enough to help solve our problems, but I've also dealt with Tandy's competitors; I can't say they were much better.

In spite of all this, I stick with Tandy because it answers my questions, solves my problems, and gives me more value for my money than the competition. What sends me into orbit is how Wayne Green used to tell Tandy how to run its business; now we get Maloney lipping off in his Side Tracks column. I suppose they both made a good living all these years because of Tandy. Maloney reminds me of a spoiled kid who has to have the game played his way, or he'll go home.—Larry R. Moore, Mount Vernon, IA

Send your correspondence to Input, *80 Micro*, 80 Elm St., Peterborough, NH 03458. We reserve the right to edit letters.



■ Eric Maloney's constant destructive criticism of Tandy is nauseating. I've agreed with some of his points, but most seem unfounded. Not everyone has had his bad experiences.

Maloney is a good writer, and he exudes an authoritative and knowledgeable style. But he should be wary of how his readers will interpret his editorials. Many of them accept his writing as law.

I've been a Tandy customer for five years and have never found a reason to complain about the service I got from the people at its computer centers. If I had a problem with hardware, they fixed or replaced it. If I had a problem with software, they taught me how to run it correctly or gave me a new copy.

If Maloney knows so much about how a company should market its products, run its manufacturing plants, price its products, and handle its customers, why isn't he the president of a Fortune 500 company? Why doesn't he become president of our great nation and solve the country's economic problems?—Rick Perry, El Sobrante, CA

### A Vote for Eric

■ I would like to commend Eric Maloney for his editorial guts in writing his "Farewells" column. He said what seemed to bother him in a most direct manner.

Unfortunately for Model 4/4P owners, what Maloney said about Tandy was true. Tandy never intended to fully support the Model 4 line for any length of time. Otherwise, it would have reduced the price of the 4 and factory-installed a high-resolution board, color, and considerably more RAM.

Tandy seemed to purposely keep the price high enough to inhibit further sales of the 4 and thereby phase it out completely. We all know the 4 is a "dead duck," and many of us are now looking to upgrade to MS-DOS.—Fred Mass, Gamerville, NY

### A Vote for MisoSys

■ In response to the fireworks between David Williams and Roy Soltoff of MisoSys Inc. (see "At Sixes and Sevens with ED/ASM," December 1987, p. 110), I side with Soltoff. In reply to Soltoff's comment that reviewers should call software publishers and report their response when something is wrong with a product, Williams said he was tired of serving as a quality-control department for software developers.

But I want to know how a business responds to its customers, reviewers or not. I've bought almost \$3,000 worth of hardware and software in eight months. For my company, the sum is quite a bit higher.

I also want tutorials, even when they discuss what is supposedly fundamental knowledge for a data processing manager such as myself. Too much information exists for one person to keep track of, and there isn't a master reference to all the other references. Believe it or not, even professionals use tutorials. Tutorials also sprout legs.

If a company makes the effort to include a tutorial, they must be trying to produce a quality product. Successful products deliver, despite the level of the user's computer illiteracy.

Know what else? I prefer a line editor. That's because I usually correct one line at a time. It's easier to read and correct the target line when it's away from the rest of the text, even if by only one blank line.—David L. Kuzminski, Petersburg, VA

### Missing One

■ In "Save Pictures to Disk," (Feedback Loop, January 1988, p. 13), the number for screen modes 1 and 2 should be 16384, not 6384. I apologize for the inconvenience.—Beverly Woodbury

**80 Micro's BBS is open 24 hours a day. It offers programs you can download, special-interest groups, and a classified section. You can reach the board at 603-924-8985; UART settings are 300/1,200 baud, 8-bit words, 1 stop bit, no parity.**





## Feel like a Fat Cat online with GENie.<sup>TM</sup>

"GENie changed my mind about what an online service can do for me! I always knew that GENie offered enough Special Interest Groups to last me through all nine lives, with thousands of software files, dynamic bulletin boards, lively discussions and "tips" from the experts. But now I'm lapping up valuable information with services like Comp-u-store OnLine<sup>®</sup> shopping service, USA Today Decisionlines, American Express<sup>®</sup> ADVANCE and access to Dow Jones News/Retrieval<sup>®</sup>. And with GENie's LiveWire<sup>TM</sup> CB Simulator and GE Mail<sup>TM</sup> I stay in touch with others who share my interests. I'm a regular guy who feels like a fat cat—making new friends and more informed decisions with GENie.

You don't need to be on the fence about which service to choose, because only GENie offers you so much online, for less."

*J. P. Critter*

Services Available	Compare & Save	Pricing			
		Registration Fee	Monthly Minimum	Non-prime Time Rates	
Electronic Mail • CB • SIGaUser Groups • Travel • Shopping • Finance • Reference • Professional • Leisure • Games • News	GENie <sup>1</sup>	\$29.95	None	\$5.00	\$5.00
	CompuServe	\$39.95	None	\$6.00	\$12.50
	Other	\$49.95	\$10.00	\$8.40	\$10.80

<sup>\*\*</sup>Get 2 Free Hours with Sign-Up.

### Just \$5 per hour. Get online today!

1. Have your major credit card 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 **XJM11814,GENie** then RETURN.

Need help or more information? No modem yet? We can help. In U.S. or Canada call 1-800-638-9636 or write GENie, 401 N. Washington St., Rockville, MD 20850.



*We bring good things to life.*

\*Base rates and services in effect 9/87 apply in U.S. only. \*\*Non-prime time rates apply Mon.-Fri. 6 PM-8 AM local time and all day Sat., Sun., and most holidays. Subject to service availability. Some services offered on GENie may include additional charges. \*\*\*\$10 credit applies.  
© 1987 General Electric Company, U.S.A.



# How to tell the difference between DESQview™ 2.0 and any other environment.

Selecting DESQview, the environment of choice, can give you the productivity and power you crave, without the loss of your old programs and hardware. If you like your existing programs, want to use them together, transfer data between them, print, sort, communicate with or process-in-background, yet still have the need to keep in place your favorite PC(8088, 8086, 80286 or 80386), DESQview is the "proven true" multitasking, multi-windowing environment for you. Best of all, DESQview 2.0 is here now, with all the money saving, time saving, and productivity features that others can only promise for the all-too-distant future.

And with DESQview's new graphics enhancements for Hercules, CGA, EGA, and VGA, Version 2.0 still offers the same award winning and pioneering features for programs that earned DESQview its leadership, only now you can also run desktop publishing programs, CAD programs, even GEM™, Topview™, and Microsoft Windows™ specific programs. In some cases you'll add as little as 10-40K to your system overhead. Now you can have multi-tasking, multi-windowing, break the 640K habit too and still get an auto dialer, macros, menus for DOS and, for advanced users, a new complete application programmer's interface capability. No wonder that over the years, and especially in recent months, DESQview, and now DESQview 2.0 have earned extravagant praise from some of the most respected magazines in the industry.

"Product of the Year" by readers vote in InfoWorld.  
 "Best PC Environment" by popular vote at Comdex Fall in PC Tech Journal's "System Builder" Contest.  
 "—I wouldn't want to run an IBM



One picture is worth a thousand promises.

Attention Programmers: For more information about Quarterdeck's API, and future 386 program extensions, call us today.

#### SYSTEM REQUIREMENTS

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

#### Rush me DESQview 2.0! Today!

No. of Copies	Media 3 1/2"/5 1/4"	Product	Retail Price ea.	Total
		DESQview 2.0	\$129.95	\$
Shipping & Handling			USA \$ 5.00	\$
			Outside USA \$ 10.00	\$
Sales Tax (CA residents)			6.5%	\$
Payment: <input type="checkbox"/> Visa <input type="checkbox"/> MC <input type="checkbox"/> AMEX <input type="checkbox"/> Check			Amount Enclosed	\$
Credit Card: Valid Since _____ / _____ Expiration _____ / _____				
Card Number: _____				
Credit Card Name _____				
Shipping Address _____				
City _____ State _____ Zip _____ Telephone _____				
Mail to: Quarterdeck Office Systems, 150 Pico Boulevard, Santa Monica, CA 90405.				
NOTE: If you own DESQview call us for a special upgrade offer, or send in your DESQview registration card. AST Special Edition users included.				



Quarterdeck Office Systems • 150 Pico Boulevard, Santa Monica, CA 90405 • (213) 392-9851

DESQview is a trademark of Quarterdeck Office Systems. AboveBoard is a trademark of Intel Corporation. Hayes is a trademark of Hayes MicroComputer Products Inc. IBM, PC, Personal System/2 and TopView are trademarks of International Business Machines Corporation. Microsoft Windows and MS are registered trademarks of Microsoft Corporation. Mouse Systems is a trademark of Metagraphics/Mouse Systems. RAMpage is a trademark of AST Research, Inc. GEM is a trademark of Digital Research. Hercules is a trademark of Hercules.