

Your **Tandy** MS-DOS Advisor

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

The 1000 HX:
World's Greatest
Home Computer?

80 micro

NEW DRIVES FOR OLD

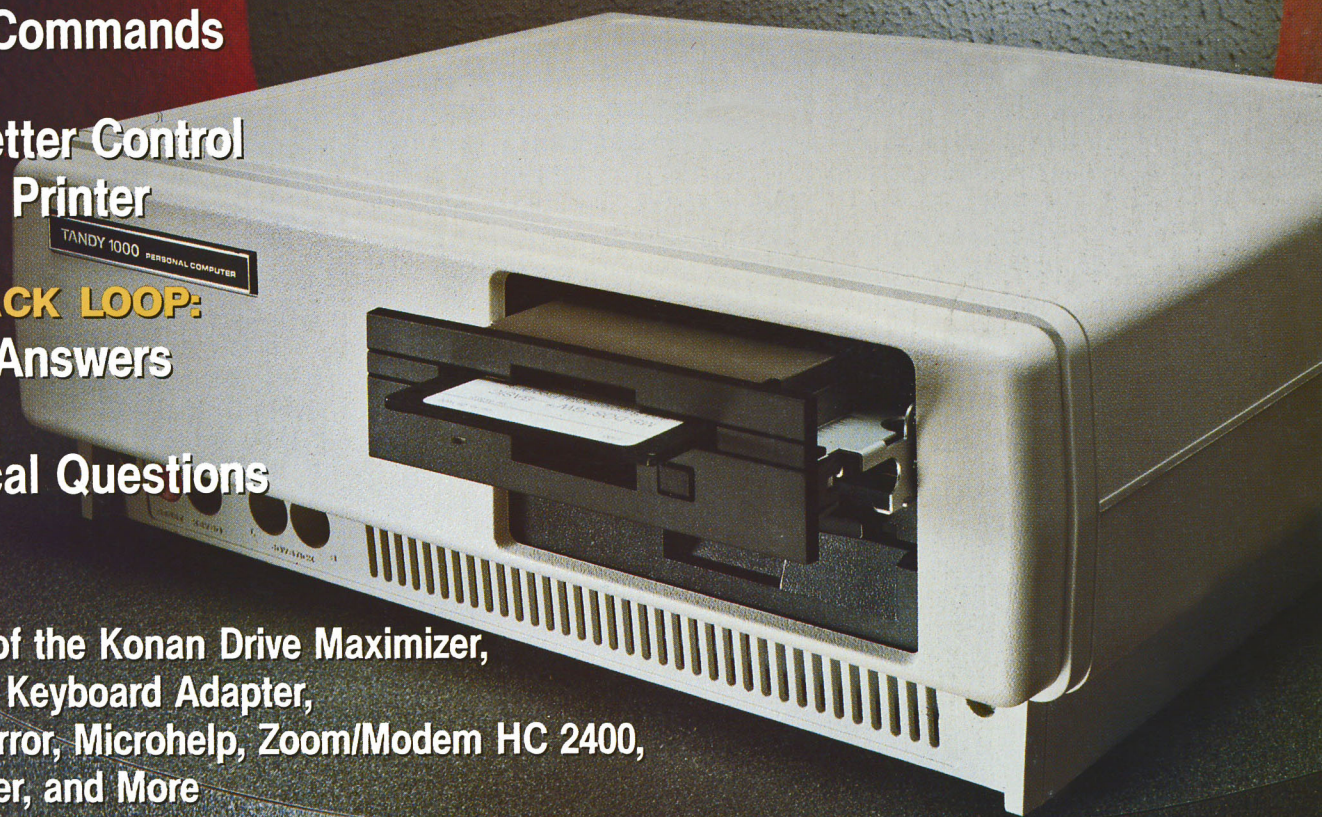
Install a 720K Drive Yourself

How to Make
Macro Commands

Take Better Control
Of Your Printer

FEEDBACK LOOP:
Expert Answers
To Your
Technical Questions

PLUS:
Reviews of the Konan Drive Maximizer,
Universal Keyboard Adapter,
Magic Mirror, Microhelp, Zoom/Modem HC 2400,
Rightwriter, and More





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



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.

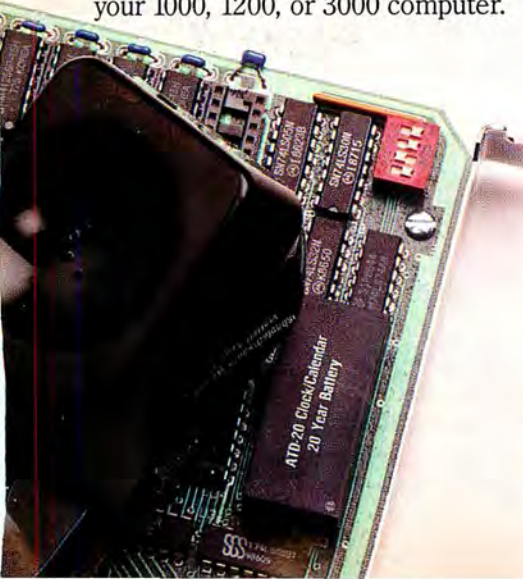
It has a selectable serial port of COM 1, 2, 3 or 4; a selectable parallel port of LPT 1, 2 or 3; and a game port that supports dual joysticks on one connector.

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.



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

© 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 NLQ, tractor	\$179
NX-15 120cps NLQ, 5K buffer, 132 column..	329

ND-10 180cps, 12.6K buffer, NLQ, tractor ..	\$289
ND-15 Same as above but 132 column	399
NR-15 240cps, 12.6K buffer, 132 col, NLQ ..	469
NR-10 Same as NR-15 but 80 column	369
NB-15 300cps, 16K buffer, 132 col, NLQ	749
NB-2410 216cps, 5K buffer, 24-wire LO	469
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
SuperGross/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

Telephone: (214) 631-7900
Facsimile: (214) 634-8303

©1988 by Montezuma Micro. All rights reserved.

Prices and specifications subject to change without notice.

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	87
Borland Turbo Lightning	62
BPI Entry 1 Accounting System	59
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	38
Microsoft Project	249
Microsoft Word/Spell	239
MultiMate Advantage II	279
Multiplan	122
Newsroom	38
Newsroom Professional	78
Paradox 2.0	325
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)	58
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 PASCAL Tutor	25
Borland Turbo BASIC Database Toolbox	63
Borland Turbo BASIC Editor Toolbox	59
Borland Turbo BASIC Telecom	63
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
Fantasy 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	68
Microsoft Windows 2.02	64
Mirror - Crosstalk Clone	39
Norton Commander	39
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	39

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 Phobos	25
Leisure Suit Larry	26
Managing Your Money	129
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 II	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 29

"SERVING YOU SINCE 1980"

Our "Final TRS-80 Ad in 80-Micro" Sale.

**Final SUPER-SALE on all TRS-80 software.
All new packages • Hurry before supplies run out.**

We are dropping our TRS-80 oriented advertising from *80-MICRO* and putting more efforts into direct mail. PowerSoft is NOT closing and will still be supporting the TRS-80 with products. Some programs will be dropped, however, when there are no more manuals, unless the demand tells us different. If you are not on our mailing list and have never bought a product from us, be sure to write and ask to be put on our new TRS-80 mail-list. There are not many TRS-80 software houses left, and we'd like to keep in touch with those users still interested. If you buy a product or write, you are automatically added. Watch your mail!

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

Super Utility + Mod III & I - Disk repair plus 65 other great functions with full manual. \$49.95
 Super Utility + 4 (same as above for TRS-80 Model 4, 4P, 4D) \$49.95
 Using Super Utility+ extra 175 pg. bound book FREE with purchase of SU+! Book by itself, \$12.00

Utilities for Hard disk and/or floppies:

LDOS™ ToolBox (Hard Disk Check, Repair, Modify, and much more!) \$29.95
 Model 4 ToolBelt (same for Model 4 TRSDOS 6 use. OK for 6.3) \$29.95
 Back/Rest Super Fast Hard Disk Backup & Restore! Save time and aggravation! \$39.95
 Superior Hard Disk Drivers for Tandy disk systems. Mix Model III and 4. \$49.95
 TRS-80 Game Disk - Android Nim, Snake Eggs, Dancing Demons, BeeWary, 2 more! \$ 7.95

Other Useful Utilities, Add-on's and Applications:

PowerMail Plus (specify 4, III or I). 5 Star mailing list-data system! \$59.95
 FREE Text-Merge Form Letter Module (reg. \$29.95) with purchase of PowerMAIL! \$FREE
 PowerSCRIPT - major enhancement for SCRIPSIT 4, III and I (not for SuperScripts) \$24.95
 PowerDraw (animated TRS-80 screen graphics! Easy to use. Great for kids.) \$19.95
 PowerDOT 2.0 for printers. Mix text with graphics. Build new fonts. Specify printer type! \$19.95
 ST-80 III Communications w/ FREE mini - BBS and Host! Specify Mod III or I. \$39.95
 PowerDriver Plus for SuperSCRIPSIT™ & SCRIPSIT PRO™
 Allows EPSON or compatible printers to be fully utilized with SuperScripts. \$19.95

Do you have data from your TRS-80™ that you'd like to bring over to MS-DOS? Like your word processing files, spreadsheet files, database files, maybe some PFS™ or DeskMate™ files, etc.? Without retyping, of course. BASIC program conversion built right in, including PRINT@s.

TRSCROSS™ will read and convert "TRS-80" data on a PC.

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. TRSCROSS can read 80 track diskettes on a 1.2 MB high capacity drive, as well as 40 track disks. Converts while copying! Everything is done in ONE STEP! Easy and fast. Allows you to transfer files both directions too. Save yourself LOTS of time and trouble!

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. Thousands of happy customers! This really works - and FAST!*

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

Glowing review in the 1/87 COMPUTER SHOPPER!

FOUR STAR review in the 2/87 80-MICRO! • Highly recommended in The Lawyer's PC™!

>> Read & Write TRS-80™ disks in your PC or compatible! <<

Only \$89.95

In Stock - Same day Shipping! Call today to place your order!

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



POWERSOFT

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

Please add \$3 shipping/handling. COD add \$2 more. Texas residents must add 8% sales tax. Orders must be prepaid. Visa/MC OK • Orders shipped within 24 working hours. No returns, exchanges or refunds on TRS-80 sale items.

Publisher	Jim McBrian
Associate Publisher	William J. Smith
Editor-In-Chief	Michael E. Nadeau
Managing Editor	Dorothy Rosa
Review Editor	Mark Reynolds
Associate Editor	David L. Andrews
Technical Writer	David S. Veale
Technical Editors	Mare-Anne Jarvela Beverly Woodbury
Contributing Editors	Hardin Brothers Harry Bee David Goben Thomas L. Quindry
Advertising Sales Director	Brenner K. Fuller 1-800-441-4403
Classified and MicroSource Advertising Sales	Keith Johnson 1-800-441-4403
Advertising Coordinator	Whitney Karr
Marketing Director	Melinda J. Baker
Staff Administrator	Janet Calhoun
Art Director	Lou Ann Morin
Ad/Graphics Production	Holly Vance
Director of Corporate Production	Dennis Christensen
Manufacturing Manager	Susan Gross
Typesetting Manager	Linda Palmisano
Typographer	Lisa Jaillet
President	Michael S. Perlis
Vice President/ General Manager	Roger Murphy
Business Manager	Renee Dynan
Director of Credit Sales And Collection	William M. Boyer
Circulation Director	Frank S. Smith
Circulation Manager	Bonnie Welsh
Direct Marketing Manager	Paul Ruess
Newsstand Sales	Linda Ruth 1-800-343-0728
Audits and Statistics Manager	Cecile Giguere
Special Products Director	Paul Finch
Founder	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 "80 Micro's Author's Guidelines." Payment for accepted articles is made at a rate of approximately \$50 per printed page; all rights are purchased.

Contents

APRIL 1988

Features

28 Smaller Is Bigger

Adding a 3½-inch drive to your 1000 is cheap and easy.
John M. Gregg

33 Sending Printer Codes from Your 1000

Learn how to write batch and command files that give you greater control over your printer.
Bill Newmiller

39 Tandy's 1000 HX: Easy Home Companion

Innovative ideas hit the home market in the right spot.
Eric Grevstad

43 Making Macros

Save keystrokes by assigning often-used key combinations to macro commands.
Jack Alban

51 A Routine to Watch Over Me

Catch typing mistakes on the fly with this error-trapping subroutine.
Leonard Jackson



On Our Cover

With patience and a few simple tools, anyone can install a 3½-inch drive in a Tandy 1000. See how on page 28.
Photography by Larry Dunn

The program listings included with 80 Micro run on all fully MS-DOS-compatible Tandy computers unless otherwise noted.

Departments

6 The 80 Micro Disk Series Index

8 Side Tracks

Michael E. Nadeau

10 Feedback Loop

16 Pulse Train

Ron White

18 Info Line

22 Reviews

Konan KXP-230Z
Drive Maximizer
Universal Keyboard Adapter
Enhanced Keyboard
Magic Mirror
Microhelp Utility
Zoom/Modem HC 2400
Rightwriter 2.1

65 Index to Advertisers

69 Reader Forum

70 Fine Lines

Harry Bee

72 How to Use 80 Micro Program Listings

73 The Next Step

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.

HARD DRIVES & MORE

TANDY 1000, 1000SX & TX HARD DRIVES

20 Meg Internal Hard Disk	319.00
30 Meg Internal Hard Disk	359.00
40 Meg Internal Hard Disk	449.00
20 Meg Hard Card	399.00
30 Meg Hard Card	479.00

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 & 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

EGA CARDS For The 1000SX & TX, 3000's

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 5¼" Floppy Drive	99.00
720k 3.5" Floppy Drive	129.00
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	Shipping add \$6
P.O. Box 1750	VISA, M/C, COD, Check, M.O.
Glen Burnie, MD 21061	MD Res. add 5% Tax

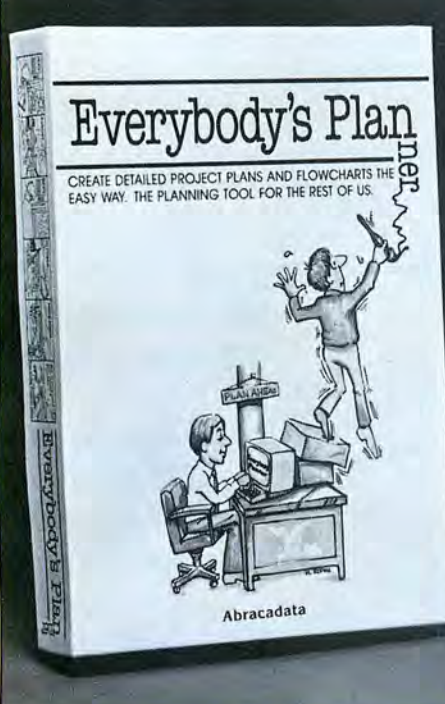
(301) 768-1890

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.

Abpracadata

Abpracadata

the source of plan-making software

Dept. PCR	P.O. BOX 2440 EUGENE, OR 97402 (503) 342-3030
-----------	---

The 80 Micro Disk Series

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

To order, call toll-free 1-800-343-0728, 24 hours a day, seven days a week, or mail your request to us with payment enclosed. The price for each disk is \$24.97, including postage and handling.

QUARTERLY DIRECTORY

July-September 1987

July

Tally and Track, p. 44; Taking Stock of Your Stock, p. 50; The 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 Osterreich; BRAZIL'S DataNews, PC Mundo, Micro Mundo; CANADA'S Computer Data; CHILE'S Informatica, Computacion Personal; DENMARK'S Computerworld Denmark, PC World Denmark; FINLAND'S Tietovilkko, 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, 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/Lehbar-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 _____



Software Makers Discover the 1000

I'm a great fan of computer games. Until recently, though, the pickings for MS-DOS machines have been slim and unimaginative. Companies that specialize in entertainment software concentrated on computers such as the Commodore 64/128 and Apple II. Anything done for MS-DOS was just ported over from another system, losing much in the translation.

But a couple of events in the MS-DOS market have forced these companies to adjust their emphasis. The cost of a basic MS-DOS system is now competitive with the traditional "home" computers, and some types of games have become popular among business users.

I recently attended the Consumer Electronics Show (CES) in Las Vegas. CES is Mecca for anyone selling home entertainment software and equipment. Spend a couple of days there and you quickly get a sense of where the market is headed.

MS-DOS had a big, if not the biggest, presence at the show. Software companies such as Electronic Arts, Spinnaker, Time-works, and Cinemaware announced new MS-DOS game and entertainment software. All see Tandy as the leading vendor in the home computer market.

This is good news, because many of these same companies intend to release software that takes advantage of the 1000's special graphics and sound capabilities.

As I mentioned earlier, games, mainly graphics-based ones, do not port over to MS-DOS well. Resolution, the number of colors displayed, and sound quality are reduced because of the limitations of standard CGA graphics and one-voice sound (the lowest common denominators among PC clones).

The Tandy 1000's enhanced CGA allows for simultaneous display of up to 16 colors, and it can produce three-voice sound. In a demonstration of a soon-to-be-released paint program specifically for the 1000, the advantages of Tandy's CGA over standard CGA were obvious. I hope that demo was a sign of things to come; Tandy needs software like that paint program to drama-

■ by Michael E. Nadeau ■

tize the 1000's performance advantages.

I'm looking forward to the new 1000-specific software. It's about time software companies took notice of both the 1000's features and market presence.

Speaking of Games

Again, I like games, and I like the trends I see in this area. Shoot-em-up arcade-style games are fast becoming passe. A new generation of games using state-of-the-art graphics, animation, and speech synthesis based on strategy, problem solving, and chance are moving to the forefront.

As a result, adults now represent a large portion of the game-buying public. Flight and sports simulators, role-playing adventures, and pure strategy games are all hot.

Although *80 Micro's* primary mission is to provide you with practical, hands-on information to help you make better use of your Tandy, we will occasionally write about game software. You know what they say—all work and no play....

Tandy Warranty Update

In February, I criticized Tandy for its 90-day warranty on its computer products, suggesting that it put them at a competitive disadvantage. Since then, Tandy has changed its policy on its 3000 and 4000 line, and I've learned the probable reason for Tandy's reluctance to change its warranty policy.

All Tandy 3000s and 4000s sold after Dec. 1, 1987 now have a one-year warranty. Tandy changed its policy because many of its larger potential customers required a longer warranty.

I applaud Tandy for accepting the demands of the corporate marketplace. However, I hope Fort Worth doesn't stop there. Many small businesses and home users who stretch their budgets to buy Tandy 1000s and 1400s deserve the same consideration.

With ever more aggressive competition, Tandy risks finding itself alone on the wrong side of the warranty issue.

Who Pays for Warranty Work?

When you bring in a computer for repair under warranty, it's the retail outlet, not Tandy Corp., that bears the cost. Radio Shack store managers, therefore, don't want to see a longer warranty that might impact their bottom lines.

In fact, I was told of a survey Tandy sent to its store managers asking if they thought a longer warranty would increase computer sales. The store managers said, of course, that it wouldn't.

Tandy seems to have a good rationale for this arrangement. Radio Shack stores get a better-than-average margin on the computers they sell, partly to compensate for the cost of warranty work. Also, Tandy wants to encourage its dealers to solve their customers' problems, not just replace components or computers because it's convenient and at someone else's expense.

Of course, Tandy wants to keep its dealers happy and must respect their concerns. On the other hand, Tandy must also consider the competitive advantages of a longer warranty. Finding a solution that makes everyone happy—Tandy, its customers, and its dealers—won't be easy, but it's certainly possible.

Attention Professional Deskmate Users

Later this year, we plan to publish an article on using Professional Deskmate's networking features in a small-office environment. First, we need to hear from those of you who have already set up your networks with Professional Deskmate. Tell us how it performs, what problems you encountered, how you did or didn't solve them, and what software/hardware you are using in conjunction with it.

Send a letter describing your experiences to me care of *80 Micro*, 80 Elm St., Peterborough, NH 03458. ■



The ^{New} Entertainment Standard For IBM™ - PC's & Compatibles

In the early '80's, IBM computer owners couldn't find any "fun" software on the shelves to fill those "after business" hours... there just wasn't much out there. Then MicroSoft introduced "Flight Simulator", a great program that's trained a whole generation of armchair computer pilots and set the standard for IBM entertainment software.

But this is 1987... and software buyers with IBM-PC's and compatibles are now looking for a new challenge... searching for excitement... and innovation.

Well the search is over!

MicroProse Software presents... **GUNSHIP**... the attack helicopter simulation that sets a new standard of excellence in entertainment software for IBM-PC/compatible software.

Are you bored with simple line graphics? **GUNSHIP** displays filled, solid-object 3D graphics in fine detail and color.

Do you need more realistic flight characteristics? **GUNSHIP** gives you the industry's smoothest animation with a unique dynamic configuration system. The faster your machine operates, the smoother the flight and animation of graphics will be.

Are you tired of just flying around and looking at scenery? In **GUNSHIP**, you pilot an AH-64 Apache helicopter, the modern Army's most lethal weapon, on combat

missions that require split-second timing, lightning reflexes and intense concentration. Different skill levels make it easy to learn, but difficult to master.

So if you're tired of sightseeing and want to experience the exhilaration of high-tech combat flight simulation... look for **GUNSHIP**... the new entertainment standard for IBM-PC/XT/AT/PS2 and compatibles (not PC-Jr.).

GUNSHIP supports 320x200-line CGA (4 color), EGA (16 color) or Tandy (16 color) and can be operated using a joystick and/or keyboard controls. The simulation requires 256K of memory and can be installed on a hard disk drive.

GUNSHIP is available from a "Valued MicroProse Retailer" (VMR) near you. Call us for locations! Suggested retail price \$49.95. If product cannot be found locally, call or write for MC/VISA order.



MICRO PROSE™
SIMULATION • SOFTWARE

180 Lakefront Drive, Hunt Valley, MD 21030 • (301) 771-1151

IBM is a registered trademark of International Business Machines, Inc. MicroSoft is a registered trademark of MicroSoft Corporation. Flight Simulator copyright 1982, 1984 by Bruce Artwick and MicroSoft Corporation.

Circle 212 on Reader Service card.

The 1000 SX Sound Chip

TALK TO ME

Q. When I bought my Tandy 1000 SX, the Radio Shack dealer told me it had an on-board voice synthesizer capable of producing three voices. Apparently there is a difference between voice and speech synthesis. If the two are different, please tell me where I can get a speech synthesizer. If they're the same, I'd like to know how to make my SX speak or at least learn where I can get reference material that will teach me how to make my computer "talk to me."—*Royce J. Phillips, Pearl Harbor, HI*

A. The 1000 SX contains a chip that has three tone (or voice) generators. They produce sounds that are more musical than speech-like. You can access and control these tones with the Basic commands, Beep, Sound, and Play (see *The Next Step*, January 1988, p. 82 and February 1988, p. 91). Covox Inc. (675-D Conger St., Eugene, OR 97402, 503-342-1271) sells a digital-to-analog hardware device that plugs into the joystick port to reproduce speech, sound, and music from software. It includes a variety of software and costs \$69.95.

MISTAKEN IDENTITY

Q. I have a Tandy 3000 HL with BIOS (basic input/output system) ROM 1.00.00 and MS-DOS 3.02.03. Drive A is 5¼ inches with 1.2 megabyte (MB), and drive B is 3½ inches with 1.44MB. I ran Setup, but the 3½-inch drive formats 1,213,952 bytes. It won't format a 3½-inch, 720K disk. If I use Driver.SYS and assign drive E to B, and DRIVPARM = /D:4 /F:2, drive E will format 720K. Does the computer think the 1.44MB drive is 1.2MB? How can I correct this? If I use format B:/N:9 /T:80, I get an "Invalid parameter" error message.—*Mack Brewer, Kettering, OH*

A. Apparently the computer thinks the 3½-inch drive is a 1.2MB drive. As of press time, Tandy is aware of the situation and is working on a solution. If you registered your DOS with Tandy, you should receive a solution as soon as one is available. You could also keep checking with your local Radio Shack. The latest 3000 HL BIOS ROM is 1.2. You may want to update your ROM to keep current.

DISSONANT CORDS

Q. I recently purchased an Amdek 410A monochrome monitor to use with my Tandy 1000. The power cord and TTL



(transistor-to-transistor logic) video cable appear to be incompatible with my computer. The power cord is designed to plug into the rear of the IBM PC/XT/AT. The TTL video cable is designed to plug into a video interface board and has a 9-pin "D" subminiature connector. Neither of these cords can attach to my computer in their present form. What must I do to use this monitor with my computer?—*Robert G. Dupras, Cumberland, RI*

A. The Tandy 1000 series is IBM compatible—almost. Sound and video are two major differences. The Tandy 1000 is much better as a musical instrument than most other computers. The 1000 also has video modes 5 and 6 that emulate the PCjr instead of the IBM PC. Video mode 5 is 320 by 200 pixels with 16 colors, and mode 6 is 640 by 200 pixels with four colors.

You can use a composite monochrome monitor that plugs into the composite video connector on the back of the computer. You can't use a TTL monitor because the pinouts differ, and the existing hardware doesn't have a switch to implement TTL. Also, the 1000 is not designed to let the video plug into the computer's power supply. The monitor is connected to its own AC outlet.

CLEAN UP THIS DUMP

Q. I have a 1000 SX with 384K, a DMP 130 printer, and a CM-5 monitor that I recently bought to replace my Color Computer. This does just about all I want, except I want to do computer-aided design in color. I added a Transtar-315 and can write text in any of seven colors using CHR\$(20) instead of CHR\$(27). However,

when I go into graphics mode, the screen dump is a mess. How can I print a color graphics screen? I am using DOS 3.2, GW-Basic, and Micro Illustrator.—*Chuck Zoubek, Roseville, MN*

A. To print from Micro Illustrator, type GRAPHICS when you're at DOS level, and press the enter key. (Be sure Graphics.COM, which is on your DOS disk, is in your directory.)

Bring your graphics up in Micro Illustrator, save it by choosing the save option, press enter, and then immediately press the shift-slash (/)-more than (>) keys. This causes Micro Illustrator to emulate the BSave (bit-image save) function of Basic. The Micro Illustrator file will be saved in Micro Illustrator format with the name you gave the file and in bit image format with the name Picture. (the period is part of the file name). Go into Basic, and load the picture into screen 5 with the following lines:

```
10 'Image
20 CLEAR,,32776!
30 KEYOFF:SCREEN 5:CLS
40 LINE INPUT "Name of file to print ;A$"
50 BLOAD A$
60 GOTO 60
```

Now you can dump the screen to printer with shift-print. Since I'm not familiar with your printer, I don't know what special codes you need to send to your printer to print color before loading Picture. into Basic (see "Blazing Black and White," January 1987, p. 56).

BINARY SAVE

Q. A colleague made major revisions to a billing program that took five years for us to develop. He did not make a backup or a printed copy but instead used the GW-Basic 3.20 command, SAVE "Pathname",P to save the program in binary. How can I convert this program to ASCII or compressed format?—*Robin R. Loucks, Millersburg, IN*

A. Load your protected program into Basic, type NEW, and press enter. Type PRINT CHR\$(14), and press enter. A musical note character appears. Put the cursor on the note, and press the insert key. Type 10 PRINT". The quotation mark will be in front of the musical note character. Press enter, type LIST, and press enter again. The protected program should list. There may be garbage between the new first line and the protected program's second line.

SOFTWARE for TRS-80™ MODELS 1, 3, and 4 Only

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.

Send any control or graphic/special character to the printer. Control and graphic characters are included in the text so that you have complete control of your printer. Print formatted text on the screen before going to the printer. Send formatted text to a disk file for later printing. Merge data from a file during printing. Names, addresses, or other text can be inserted during printing — no need for a separate program for "mail merge" capabilities. Print while editing (spooling). Assign any sequence of keystrokes to a single control key. Call up to 16 help screens at any time. Move cursor forwards or backwards by character, word, line, or page. Reenter the program with all text intact if you accidentally exit without saving it. Optional spelling checker comes with 29,500 word dictionary — verify a 3,500 word document in less than two minutes!

SYSTEM DIAGNOSTIC \$69.95

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

ROM: checksum test. **RAM:** three tests. **Video display:** character generator, video RAM, video signal. **Keyboard:** every key contact tested. **Line printer:** character tests. **Cassette recorder:** read, write, verify. **Disk drives:** disk controller, drive select, track seek, read sectors, formatting, read/write/verify data with or without erasing, disk drive timer, disk head cleaner. Single/double density/sides, 1-99 tracks. **RS-232-C interface:** connector fault, data transmission, framing, data loop, baud rate generator.

SMART TERMINAL \$39.95

The intelligent telecommunications program for your TRS-80 Model 1, 3, or 4, or Model 2 CP/M. Memory buffer for sending and receiving files. Automatic transmission and reception of data. Character translations, true BREAK key, help screens, line feed filters, and more.

**TRS-80 MODEL III
ASSEMBLY LANGUAGE \$29.95**

A complete course in assembly language, written for the beginner. Contents include: the Z-80 instruction set, ROM and RAM, using the Editor/Assembler, reading, printing, moving data, arithmetic operations, floating-point and BCD numbers, logical and bit operations, USR subroutines, RS-232-C communications, disk and cassette input and output, the TRSDOS 1.3 disk operating system.

With the book you also receive **Monitor #5**, a comprehensive machine language monitor and debugger. While describing the Model III ROM and DOS, most of the book is also applicable to the **Models 1 and 4**.

MS-DOS & TANDY Model 1000/1200/2000/3000 TRS-80™ Models 1, 3, 4, 2 & 12 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. Monthly and yearly summaries. Fiscal year can start in 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 first and last names, optional second line, address, city, state, zip code, and optional fifth line. Optional lines can be used for telephone numbers, account numbers, or any data. Sort or search for names by **any** field. Print labels in 1, 2, 3, or 4 adjustable columns, on envelopes or master index. Prints **form letters** with any substitutions. Includes 14 used-defined **key groups** for combining different lists into one file. Runs on floppies or hard disk, limited only by disk capacity.

**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 a pre-established budget.

**SMALL BUSINESS
MANAGEMENT SYSTEM \$299.95**

A complete **point-of-sale** program for a small business. **Order desk** handles order entry and invoicing. Items ordered automatically deducted from inventory, accounts receivable updated. Includes up to 1,999 8-character part numbers (999 for TRSDOS). Invoices printed on NEBS forms or plain paper.

Bookkeeper keeps general ledger, accounts receivable and payable, produces customer statements. General ledger produces monthly and year-to-date totals. Receivables tracked to invoices.

Inventory produces sales and inventory reports showing items in stock, amounts sold, monthly rates of sale, and profits.

Installation tailors the program to your business.



HOWE SOFTWARE

64 Windmill Road
Armonk, New York 10504-2832

Information and
same day orders: **(914) 273-3998**

Hours: 9:00 A.M. — 5:00 P.M. Monday — Friday.

30-day Money Back Guarantee!

Please allow 2-3 weeks for delivery.

When ordering, please give your computer model number.

*TRS-80 is a trademark of Tandy Corp.

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, Puerto Rico: \$6.00

Air mail overseas: \$17.00.

New York residents please add sales tax.

FEEDBACK LOOP

Save the program in ASCII with the command SAVE "filename",A. This will eliminate the first line of the protected program. You can now load the program into a text editor to remove any garbage and edit it. Be sure to save the program in ASCII when you save it with the text editor.

The New command does not actually erase the program in memory. It changes pointers to indicate that no program is in memory and turns off program protection. This method puts a new first line in memory and links it with the rest of the program in memory.

DOIN' THE DATA FILE TRANSFER

Q. My dad is a longtime Color Computer II owner. He recently bought a 1000 EX so his computer would be compatible with my 1000. How can I transfer a data file from the Color Computer II to the 1000 EX? It's a standard data file that was generated from a Basic program I wrote for him. I know I'll have to rewrite a Basic program on the 1000 EX to read the file once it's transferred, but that's no problem. This is a large data file that he doesn't want to rekey.

Also, can I put the external disk drive

from his Color Computer II on the 1000 EX?—*James W. Moats, Columbus, OH*

A. You could transfer the data file via a null modem cable (serial port to serial port) or via modem. The data file should be in ASCII format for the transfer. For the 1000 EX software, you can use Telecom—a part of Deskmate that's included with the 1000 EX. You would also need communications software for the Color Computer.

Let the Color Computer II keep its disk drive. Even if you could determine how to connect it to the 1000, the 1000's disk controller wouldn't recognize the drive. Also, the Color Computer uses a single-sided drive, and the 1000 controllers and MS-DOS software use double-sided drives.

COMPATIBILITY GAMES

Q. I have an original Tandy 1000 with ROM 1.0. In the past two years, I've found several software packages that don't function properly on my machine. Most of these were games. Can I get a ROM upgrade that will make my machine more compatible?—*Anthony Perez, Tumwater, WA*

A. You don't say what kind of problems you've had with the software packages that won't work, but I can think of at least two

potential problems. One is keyboard differences. In games, the placement of the arrow keys could be a critical problem. The IBM PC has the arrow keys on the numeric keypad. The Tandy 1000 clusters them separately. Sometimes, using the "2," "4," "6," and "8" keys to substitute for the arrow keys will work. Tandy has a keyboard adapter that will let you attach a standard IBM PC-compatible keyboard (for a review of Tandy's Universal Keyboard Adapter, see p. 23 of this issue).

Another potential problem is that some software, particularly games, will bypass the BIOS and talk directly to the hardware. That makes the game faster but limits its portability to the specific machine for which it was written. You can upgrade your ROM, but that will most likely have little effect on making your machine more compatible with most software.

The main improvements in ROM 1.01 are in its ability to work with hard drives and printers. Older 1000s had different ROMs: one had a one-chip ROM, and the other had a two-chip ROM. The ROM is under the disk drive, which makes it necessary to remove the disk drive to access the ROM. If you have a one-chip ROM,

PRICE

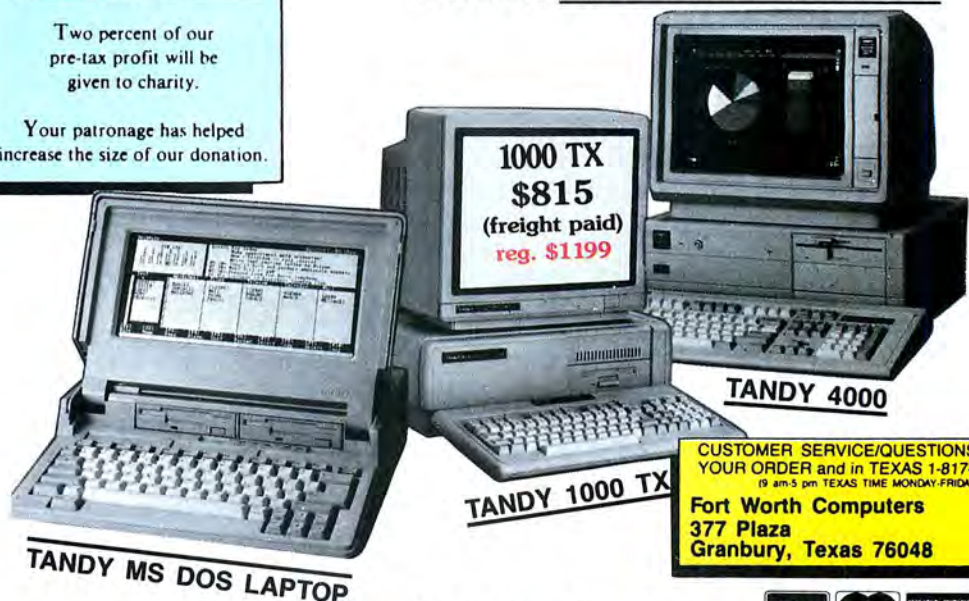
UPDATE

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

TANDY 1000 TX

TANDY 4000

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

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.



PRICES SUBJECT TO CHANGE WITHOUT NOTICE TEXAS RESIDENTS ADD 6.5% SALES TAX



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 (MON-FRI)

FEEDBACK LOOP

remove the old ROM chip, and replace it with the new 1.01 ROM chip.

If you have the two-chip ROM, you'll need to cut wires and solder. The chip doesn't come with directions, so you may want your service center to upgrade the two-chip ROM.

Readers Respond

MAKE IT SAY YES

Two readers sent in suggestions to John Schmidt, who was looking for an easy way to redirect LPrint statements to the screen (see "It Just Said No," November 1987, p. 11). Yoe Itokawa of Birmingham, AL suggests not using LPrint at all. Instead, open a file, and then use Print # statements. Include the following line at the beginning of the program:

```
10 OPEN "PRN:" FOR OUTPUT AS #3
```

Every subsequent use of the statement PRINT #3 followed by a list of data will print the data to the printer exactly as the LPrint statement would. To print to the screen, change line 10 to:

```
10 OPEN "CON:" FOR OUTPUT AS #3
```

To choose the output device every time you run the program, add the next routine to the program's beginning:

```
10 A$="PRN:"
20 PRINT "Choose 1 or 2":INPUT "1 Printer
- 2 Video",CH%
30 IF CH%=2 THEN A$="CON:" ELSE IF
CH%< >1 THEN 20
40 OPEN A$ FOR OUTPUT AS #3
```

Rick Perry of El Sobrante, CA suggests using an Input statement to obtain the name of the output file. Then, by using GW-Basic's Open statement, you could direct the output to the printer, screen, modem, or a disk file. For example:

```
10 INPUT "OUTPUT DEVICE";OUTDEV$
20 OPEN "0",1,OUTDEV$
30 PRINT #1,"Your text!"
```

With a routine similar to the one above, you could redirect output to any device by answering the prompt with a valid device name—LPT1: or PRN for printer; SCRN: for screen; COM1: for modem; and a valid file name for the disk file.

To avoid answering the query every time you run the program, change line 10 to read:

```
10 OUTDEV$="LPT1:"
```

This would redirect output to printer 1. You would have to change the part of line 10 in quotation marks to redirect the output to another device.

Seeking Help

Wayne and Helen Sampson (235 West Forest St., Muskegon, MI 49441) are about to adopt three boys from the town of Fortaleza, Cear , Brazil, where a local dialect of Portugese is spoken.

The Sampsons speak only English—they'd like to find a language program (or other resources) to help them learn a little Portugese (in the appropriate dialect) since the children will be adjusting to a new culture. ■

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.

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

TANDY 3000

MOD 4D

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

VISA MasterCard AMERICAN EXPRESS

PRICES SUBJECT TO CHANGE WITHOUT NOTICE TEXAS RESIDENTS ADD 6.5% SALES TAX

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 (MON-FRI)

Clone

Reg. U.S. Pat. Off.

IBM® QUALITY AT AN AFFORDABLE PRICE!

40MB CLONE 286

\$1599

The Finest AT Clone Yet!

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

With
MS-DOS® 3.3
& GWBASIC
\$79 Extra



STANDARD FEATURES:

- Intel 80286 @ 10MHz - 0 Wait States.
- 1024K (640/384) motherboard. Comes w/512K std. Additional 512K - \$89.
- 80287 Socket.
- 1.2MB Floppy Drive.
- 1.44MB 3.5" Floppy Capability.
- 42.8MB Seagate ST251 Hard Drive.
- 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 BIOS ROM.
- Novell Compatible.
- PC-Write - QModem - ExpressCalc HomeBase - MoneyMaster - Findex Clone Utilities - AutoMenu.
- One Year Parts and Labor Warranty.

CGA. With CGA card and RGB monitor \$1783

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

EGA. With EGA card and EGA monitor \$1978

TURBO CLONE

AT Style Keyboard

\$649

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

With
MS-DOS® 3.3
& GWBASIC
\$79 Extra

STANDARD FEATURES:

- 4.77 - 8MHz Turbo-speed Mainboard.
- 512K RAM. 640K Optional.
- 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).
- LED's for Power, Turbo and Hard Disk Access.

- 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 - AutoMenu
- FCC Class B Certified
- System Hardware Reset Switch on Front Panel.
- Keyboard Lock.
- One Year Parts & Labor Warranty.

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

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

HARD CLONE. Turbo Clone with 21.4MB Seagate ST-225 installed \$899

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. You 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.

"SERVING YOU SINCE 1980"

ORDER TOLL FREE

from anywhere in the lower 48 states and Hawaii.

Circle 61 on Reader Service card.

1-800-527-0347

AD 24

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

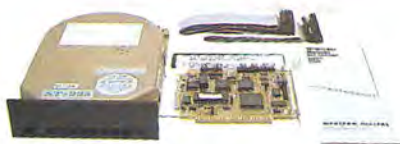


14" VGA/EGA/CGA/RGB/HERC/MONO. 15kHz to 34kHz horizontal scan. TTL and analog inputs plus audio, green text switch, and a tilt/swivel base. 25mHz \$622*

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

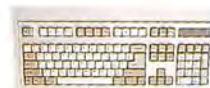
MODEMS

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

Clone **enolD**

Reg. U.S. Pat. Off.

©1988 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.

Circle 87 on Reader Service card.

Over There

TANDYLAND

To those of us who started out with build-it-yourself crystal radio sets and grew up tinkering with electronic doodads, Radio Shacks are an indigenous part of the American shopping mall landscape. With outlets everywhere, the only things you're more likely to find spread across the country are post offices, McDonalds, and candidates for president.

But computer users in Europe, the UK, the Canary Islands, and the Ivory Coast feel as much at home in a Tandy/Radio Shack store as we do.

Tandy's business has grown so much in Europe since its first entry there in 1973 that last summer Tandy Corp. spun off Intertan Canada to handle its products overseas. Tandy retains control over outlets in Central and South America, though inroads are yet to be made in Japan.

While Intertan is a separate corporation from Tandy, John Roach is chairman of the board of both firms. With 2,150 outlets overseen by Intertan, one wonders why Tandy cut itself out of the direct control of a growing market.

"The management of Tandy thought the international group was not getting the full attention of management," explains Robert Mayes, vice president of merchandising for Intertan. "Canada had its own management team, but for the other countries, a VP from the United States would go over there for two or three years and then come back home. It was not a dedicated management team."

"At the same time, there was some feeling that some of the resources that could be used internally were being sent out of the country when they were needed at home."

Intertan still retains close ties with Tandy, scheduling regular meetings between their executives. Although Intertan has embarked on independent product development, most of the products it sells come from Fort Worth.

"We are Tandy in our minds," Mayes said. "We've been that for 16 plus years. That's the direction we're going in."

That doesn't mean that Intertan does everything in Canada and Europe the same way it's done in the United States. The technologies of the countries necessitate changes in Tandy's exported products. Keyboard layouts, for example, may vary, and modifications are often necessary to adapt equipment for different electrical supplies, phone lines, and broadcast frequencies.

More subtle are some of the non-technical changes required to satisfy the local laws, customs, or aesthetic sense. The high-tech black finish on video and audio equipment caught on in Europe sooner than it did in the United States, and sales of those items were in the red until the products turned black.

"In Europe, we started out with an American image and American-looking products. It didn't work," Mayes said. "You don't go in and give away a free flashlight. You just don't do that over there."

In Holland, advertising and promotions are hard sell, Mayes said. In France, design and color are more important in advertising; brochures are even a different shape. But the ads that work in France and the French-speaking regions of Canada bomb in the United Kingdom because they're not considered serious enough. In some countries, Tandy stores cannot legally advertise on television because Intertan isn't the manufacturer of Tandy merchandise.

One advantage of marketing Tandy computers in Europe is that the name doesn't carry the hobbyist connotation that stands between it and more serious acceptance as an office machine in America. The result, according to Mayes, is that there's more emphasis on direct marketing than on store-front computer centers.

Direct marketing and a hodgepodge of advertising is working, Mayes said, especially with the entry of Tandy's MS-DOS computers abroad and with healthy sales of Tandy 1400 laptops.

Although Tandy computers are up against familiar competition abroad—Compaq and IBM, as well as brands not as familiar in the U.S., such as Amstrad—Tandy's not yet feeling much competition from generic clones. But Mayes is already making plans to counter *les clones* when they appear in quantity, as they have in the United States.

Intertan isn't ready to invade the home of the generics: the Orient. "We want to put some maturity into the countries we're already in before we tackle any more," Mayes explained.

MICRO TRENDS

Last month, I wrote about Core Wars, a kind of ultimate hacker's game in which the participants write programs that battle each other for control of an imaginary computer system.

William R. Buckley, head of a society that sponsors Core Wars competitions, described a theoretical real-life version of the game in which a computer "virus" would spread from computer to computer. Sounded like science fiction, right?

In this case, fact is just as strange as fiction. Programmers at the Hebrew University in Jerusalem discovered that a computer virus was spreading among its MS-DOS computers. The virus attaches itself to the operating system, and each time a disk is used, the virus copies itself to the new disk. Analysis of the virus revealed that on the first Friday the 13th of 1988—in May—the virus will erase the files of any disk it's on.

"It might do to computers what AIDS has done to sex," Shai Bushinski, a self-employed computer expert, told the Associated Press. The virus was only discovered because of a flaw in its programming. The virus keeps replicating itself, and programmers noticed that files were growing inexplicably larger.

Members of the Hebrew University staff developed two counter-programs called "Immune" and "Unvirus" that tell users if their disks are contaminated and "disinfect" the disks if they are.

Meanwhile, the same virus (or one similar to it) turned up on disks in the alternative software library of the Tampa Amiga User's Group. The fact that such a virus has entered the U.S. means that if you don't have the antidote programs, you might not want to use your computer at all on May 13—although that's no guarantee as to what might happen when the next Friday the 13th comes around or even what will happen when you boot your machine on May 14.

The figures for Christmas sales of Tandy computers are in, and this year they have more than a dollars-and-cents significance. Sales of Tandy's MS-DOS computers during the fourth quarter of last year were up 28 percent compared to 1986. During the same period, sales of non-MS-DOS machines were down 25 to 44 percent, depending on the model. The non-DOS laptops did better than others.

What this means, if anyone still had any doubts, is that the days of the non-DOS machines are numbered. With prices for low-end DOS computers not much different than those for Color Computers and Model 4s, people are willing to pay a little more to be in the mainstream. ■

Save Up to 60%

Send me 12 issues of **80 Micro** for the low subscription price of \$24.97. I'll save 48% off the cover price.

24 issues \$38.00. Save over 60% off the cover price!*

Payment Enclosed Bill Me
Please make checks payable to 80 Micro.

Name

Address

City

State

Zip

Canada \$45.97 (Canadian Funds). Mexico \$29.97, Foreign Surface \$44.97 (US Funds drawn on US Bank). All rates are 1 year only. Foreign Airmail please inquire. Please allow 6-8 weeks for delivery.



* Basic 2 year subscription rate is \$38.00.

37DB8J



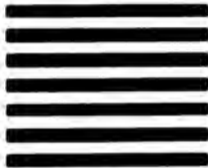
NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

First Class Permit No. 73 Peterborough, NH 03458

POSTAGE WILL BE PAID BY ADDRESSEE

CW Communications/Peterborough
80 Micro
PO Box 981
Farmingdale, NY 11737



FINISH FINANCIAL WORK FIVE TIMES FASTER.

ALL NEW!
For Business and Home

Quicken finishes all this in under 5 minutes!



Introducing 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.

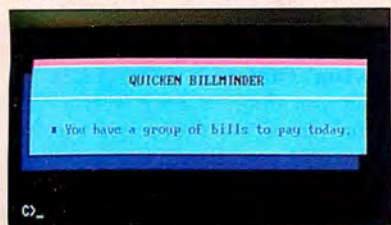
Quicken completes your financial work 5 to 8 times faster than ever before:

- 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 \$49⁹⁵

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

PRODUCT NEWS

UTILITIES

Disk Accelerator

By disk caching and reorganizing and consolidating disk requests, Now! makes your hard and floppy disks read and write up to three times faster.

Soft Horizons, 310 E. 46th St., Suite 18T, New York, NY 10017, 212-972-1581, \$69.95.
Circle 343 on Reader Service card.

Faster Floppies

With Floppy Driver installed in your Config.SYS file, your programs and DOS commands will use your floppy drives from 5 to 20 times faster than they do now.

Concept Technologies Inc., 7151 West Highway 98, Panama City Beach, FL 32407, 800-852-1177 (904-235-2821 in FL), \$79.
Circle 344 on Reader Service card.

LITERATURE

Two for Turbo Pascal

Robert Jourdain's *The Turbo Pascal Express; 250 Ready-to-Run Assembly Language Routines* (\$39.95) is a disk and book package offering a collection of assembly-language routines to make your Turbo Pascal programs faster and more efficient.

Kent Porter's *Stretching Turbo Pascal* (\$21.95) teaches those who have mastered the fundamentals of Turbo Pascal how to get even more from the language.

Prentice-Hall Press, One Gulf + Western Plaza, New York, NY 10023, 212-373-8140.
Circle 349 on Reader Service card.

Desktop Publishing

Daniel Will-Harris's *Desktop Publishing With Style* tells you how to use your MS-

DOS machine to produce camera-ready documents mixing text and graphics. The author discusses the various available software and hardware and shows you design layouts.

And Books, 702 S. Michigan, South Bend, IN 46618, 219-232-3134, \$19.95.

Circle 350 on Reader Service card.

An Encyclopedia of Lotus's 1-2-3

The *Encyclopedia of Lotus 1-2-3* defines and gives examples for every 1-2-3 concept, command, and function and offers useful tips. A three-part indexing system and inner cross reference make it easy to find the information you need.

Tab Books Inc., P.O. Box 40, Blue Ridge Summit, PA 17214, 717-794-2191, \$29.95 (hardbound), \$19.95 (paperback).

Circle 351 on Reader Service card.

EDUCATION

Gamco Math

In Gamco's Math Football: Whole Numbers (\$44.95) and Math Football: Decimals (\$44.95), one or two players can compete at one of four skill levels (addition and subtraction, multiplication, division, or mixed operations). Players gain yardage by correctly answering math problems.

Rounding (\$44.95) offers 10 lessons on rounding whole numbers and decimals and includes a game as a reward for good performance.

Gamco Industries Inc., Box 1911, Big Spring, TX 79721, 800-351-1404 (915-267-6327 in TX).

Circle 345 on Reader Service card.

HARDWARE

Four More Slots

The Addcard plugs into the third expansion slot on your original Tandy 1000 (not the SX, TX, EX, or HX) to give you four slots that can accept 8-inch add-on boards.

Merak Industries, 8704 Edna St., Warren, MI 48093, 800-231-4310, x768, \$89.

Circle 326 on Reader Service card.

Drawing Tablet

What you draw or trace with a regular pen or pencil on the pressure-sensitive, 1024-by-1024 pixel Easy! PC drawing tablet appears on your computer screen. The tablet supports popular graphics software in CGA (color-graphics adapter) or EGA (enhanced-graphics adapter) modes.

Inforite Corp., 1670 S. Amphlett Blvd., Suite 201, San Mateo, CA 94402, 415-571-8766, \$539.

Circle 327 on Reader Service card.



The Easy! PC tablet comes with an interface card that includes one port for the tablet and one for a serial device.

Portable Modem

The Hayes-compatible, 300/1200 baud Maxlink 1200 modem runs on a 9-volt battery (or optional AC adapter), connects to a standard modular phone jack or to an optional acoustic coupler, and turns itself on or off as required.

Maxcom USA Inc., 275 Wyman St., Waltham, MA 02154, 617-890-8822, \$175.

Circle 331 on Reader Service card.

Overhead-Projection Panel

The Data Display is an electronic transparency panel you can use on an overhead projector to project computer images onto a wall or large screen.

Computer Accessories Corp., 6610 Nancy Ridge Drive, San Diego, CA 92121, 619-457-5500, \$1,199.

Circle 328 on Reader Service card.

Compact Laser Printer

Sharp's JX-9300 compact laser printer can produce six pages per minute at 300 by 300 dpi (dots per inch). It comes with 396K of memory (expandable to 1.5MB) and resident Courier and line-printer typefaces. You can download other fonts or add plug-in font cartridges.

Sharp Electronics Corp., Sharp Plaza, Mahwah, NJ 07430, 201-529-9500, \$2,400.

Circle 329 on Reader Service card.

Video Digitizing

The Computereyes slow-scan device connects your PC to any standard video source to capture black and white images that are compatible with popular graphics programs. The package supports Hercules, CGA, EGA, MCGA (multi-color graphics array), and VGA (video-graphics array).

Digital Vision Inc., 66 Eastern Ave., Dedham, MA 02026, 617-329-5400, \$249.95.

Circle 330 on Reader Service card.

BUSINESS AND PROFESSIONAL

Home and Small Business Accounting

The Clan Practical Accountant (CPA) lets you track loans and bills. It can export data to spreadsheets, includes an on-screen calculator, and produces one-page expense and income reports.

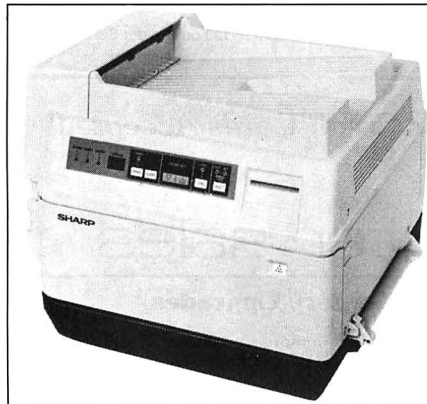
Sir-Tech Software Inc., P.O. Box 245, Charlestown Ogdensburg Mall, Ogdensburg, NY 13669, 315-393-6633, \$79.95.

Circle 333 on Reader Service card.

Integrated Package

Diamond incorporates a spreadsheet that's functionally compatible with Lotus's 1-2-3, a word processor, and a graphics

The portable Maxlink 1200 modem connects to any computer with an RS-232 serial port connector.



Sharp's JX-9300 compact laser printer can produce six pages per minute.

program so you can integrate text, graphics, and numerical data.

Mosaic Marketing Inc., 1972 Massachusetts Ave., Cambridge, MA 02140, 617-491-2434, \$195.

Circle 334 on Reader Service card.

Rory Tycoon

The Rory Tycoon Options Trader (\$49.95) retrieves quotations and analyzes over 50 possible option trades. It is designed for the conservative investor and the aggressive speculator and includes interfaces to Dow Jones News/Retrieval, CompuServe, and Lotus Signal.

The Rory Tycoon Portfolio Analyst (\$150) manages your portfolio, characterizes historical and real-time trading activity, and retrieves quotes from electronic investment services (Analyst interfaces to the same services as Trader does).

Coherent Software Systems, 771 Anthony Road, Portsmouth, RI 02871, 401-683-5886.

Circle 335 on Reader Service card.

Business Planning

Venturplan helps you develop a comprehensive business plan complete with goals, timetables, strategies, policies, and financials. The package consists of nine integrated modules.

Venture Software, 222 Third St., Cambridge, MA 02142, 617-491-6156, \$495.

Circle 336 on Reader Service card.

Business Graphics

Wingraph runs under Microsoft's Windows and automatically produces most types of charts and graphs from numerical data. You can display the images in several formats and in sequence, as a slide show.

Palantir, 12777 Jones Road, Suite 100, Houston, TX 77070, 713-955-8880, \$195.

Circle 337 on Reader Service card.

Text Retrieval

Word Cruncher (\$299) can pre-index, retrieve, and manipulate text data. Its developer, Electronic Text Corp., is also marketing a series of texts to use with Word Cruncher.

The Constitution Papers (from \$39 and up) comprises an electronic compendium of documents dealing with the development of the U.S. Constitution. The American Bookshelf Series (also from \$39) includes electronic collections of writings from American novelists, poets, historians, and philosophers.

Electronic Text Corp., 5600 N. University Ave., Provo, UT 84604, 801-226-0616.

Circle 338 on Reader Service card.

Office and Mail-Management System

Power Desk integrates a full-featured word processor and spelling checker with a name-and-address database, calendar/reminder, calculator, and timekeeper. With the program you can produce labels, envelopes, cards, invoices, reminders, and mail-merged letters with variables embedded in the text.

Software Studios, 8516 Sugarbush Court, Annandale, VA 22003, 703-978-2339, \$99.

Circle 339 on Reader Service card.

Price Cut

EXZ Corp. has dropped the price of EX Forms (from \$89 to \$19), the program that lets you create, store, and fill in your own business and personal forms.

EXZ Corp., 403 Nasa Road., One East, Webster, TX 77598, 713-338-2238 or 800-999-6999, ext. C119.

Circle 340 on Reader Service card.

INFO LINE

FOR THE HOME

Three From Timeworks

PC Quintet (\$99.95) is a multi-tasking, multi-window word processor, database, spreadsheet, business graphics, and tele-communications program. You can work on one or several applications at once and integrate data between them.

Sylvia Porter's Your Personal Investment

Manager (\$149.95) combines portfolio management with graphics, communications, and analysis capabilities to help both beginning and advanced investors.

DOS R (\$59.95) is a set of memory-resident disk-management utilities.

Timeworks, 444 Lake Cook Road, Deerfield, IL 60015, 312-948-9200.
Circle 585 on Reader Service card.

Tax Preparation

Turbotax helps you with your tax-return preparation, tax planning, and tax record keeping. It includes pop-up Internal Revenue Service instructions for the form you're working on and pin-feed 1040s that you

Circle 133 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. \$62

for 1000TX/3000HL
128K RAM Kit—Upgrade your 1000TX from 640 to 768K or your 3000HL from 512K to 640K. \$39

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) \$319
2 Megabytes \$509

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, 1 CDA Plaza, P.O. Box 533, Califon, NJ 07830. Please include full name, address, and phone number.

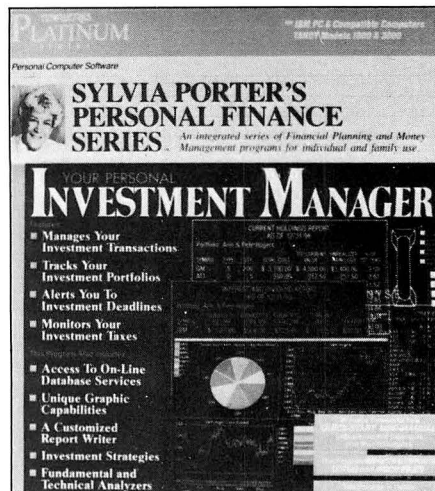
ORDER VIA TELEPHONE - 1-800-526-5313

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 1 CDA Plaza, P.O. Box 533, Califon, NJ 07830



Sylvia Porter's Your Personal Investment Manager offers help to beginning and advanced investors.

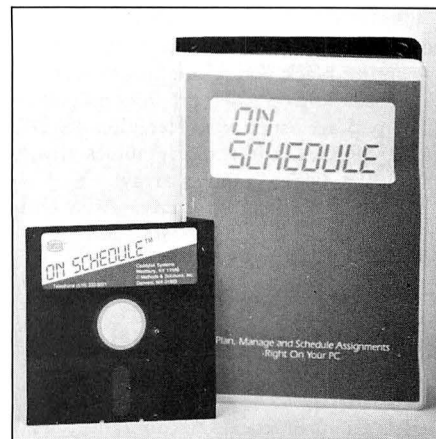
can complete using an IBM- or Epson-compatible dot-matrix printer. Turbotax can search for the form you need and look for omissions in the data you've entered.

Chipsoft Inc., 5045 Shoreham Place, Suite 100, San Diego, CA 92122, 619-453-8722, \$75.
Circle 341 on Reader Service card.

Project Planner

On Schedule tracks one or more projects. It lets you break projects into steps, create schedules, track progress, spot potential problems, and produce reports on each project.

Caddylak Systems Inc., 201 Montrose Road, Westbury, NY 11590, 516-333-8221, \$89.95.
Circle 342 on Reader Service card.



On Schedule can produce daily, weekly, or monthly data on one or more projects.

WORD PROCESSING

Desk Works

Desk Works integrates a full-featured word processor with a calculator, auto-dial phone directory, calendar, and scheduler.

Lanier Business Systems, 1700 Chantilly Drive N.E., Atlanta, GA 30324, 404-329-8000, \$395.

Circle 332 on Reader Service card.

ENTERTAINMENT

More for Trekkies

In Star Trek: The Rebel Universe, you interact with your favorite Star Trek characters to quell a rebellion within the Federation. On-board features include star maps to chart your course, warp speed and impulse powered engines, photon torpedoes and phaser weapons, and a transporter beam.

Simon and Schuster Software, One Gulf + Western Plaza, New York, NY 10023, 800-624-0023 (in NJ, 800-624-0024), \$39.95. Circle 346 on Reader Service card.

Infocom, My Dear Watson

Sherlock: The Riddle of the Crown Jewels casts you as Dr. Watson, upon whose shoulders has fallen the task of finding the crown jewels stolen from the Tower of London. Along your way you can confer with Sherlock Holmes, but the solution is in your hands.

Infocom Inc., 125 Cambridge Park Drive, Cambridge, MA 02140, 617-492-6000, \$39.95.

Circle 347 on Reader Service card.

Lessons David Levine Should Have Learned

In Inside Trader you try to make millions without falling into the clutches of the Securities and Exchange Commission. Plan your strategy from the market quotations, news, and inside tips, but don't get too greedy.

Cosmi, 431 N. Figueroa St., Wilmington, CA 90744, 213-835-9687, \$24.95.

Circle 348 on Reader Service card.

ON LINE

Business E-Mail

The PC-Tpost Electronic Mailbox 3.0 features an e-mail BBS with remote mail deposit and collection capabilities, batch-mail sending/receiving, and direct mail deposit.

Coker Electronics, 1430 Lexington Ave., San Mateo, CA 94402, 415-573-5515, \$129.

Circle 352 on Reader Service card.

USER GROUPS

American Cryptogram Society

ACA deals with all aspects of cryptography and related puzzles. It is not Tandy specific. Membership is approximately 200. The club doesn't have a BBS but publishes its *Computer Newsletter* semiannually for \$15 per year (add \$2 for the computer supplement).

Contact Mike Barlow, editor of the newsletter, at 5052 Chestnut Ave., Pierrefonds, PQ H8Z 2A8, Canada, or write to ACS, P.O. Box 6454, Silver Spring, MD 20906-6454.

Beckley Area Youth Museum Users Group

BAYMUG meets at noon in the Youth Museum (Beckley, WV) on the fourth Saturday of every month. The first hour is

dedicated to software copying, and then three meetings take place concurrently: one for beginners, one for telecommunications, and one for experts. It is not Tandy specific. Dues charged per member are \$25 per year. The club is 3 years old, has 225 members, and operates a BBS (304-877-5157, 300/1,200 baud). The club's public domain library has 1,500 disks.

Route 1, Box 116, Mount Hope, WV 25880. Contact Robert Painter, 304-877-6740.

Valley Computer Club

Southern California's oldest continuously operating user group has 195 members. It

INFO LINE

is not Tandy specific but supports Tandy MS-DOS. The club has a monthly newsletter, access to PC-SIG, and a BBS (213-227-9684, 300/1,200 baud). Annual dues are \$20 per person.

P.O. Box 6545, Burbank, CA 91510. Contact Aaron Epstein, 818-769-1837.

The information in Info Line is taken from marketers' press releases. 80 Micro has not tested this information and cannot guarantee its accuracy.

Circle 19 on Reader Service card.

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

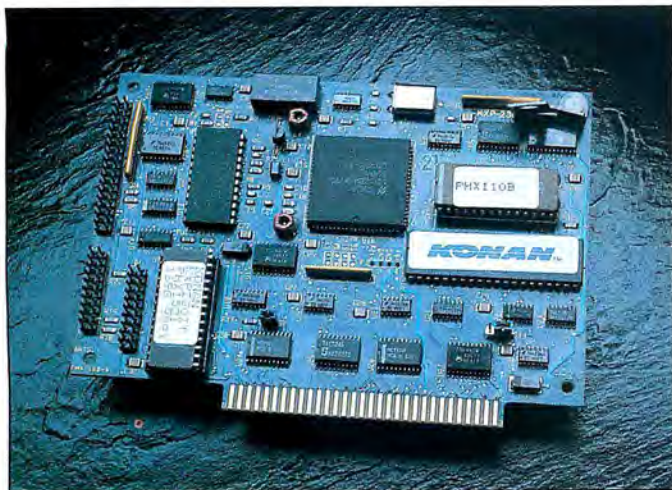
1-800-426-0560

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 77565-0517.

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 30 days from our ship date for a 100% refund less shipping cost.

Some Pain, Some Gain



Konan Drive
Maximizer

by Thomas L. Quindry

The Konan Drive Maximizer is probably the most misunderstood new hard drive product on the market. Some reviewers have raved about its data-storage capabilities; others have panned it for being unacceptably slow. The truth lies somewhere in between.

The Konan is a replacement controller package designed to let you get the most out of your hard drive through increased file storage, automatic defragmentation of files, and error correction.

If you don't understand how to interpret its drive-analysis programs, you might think Konan creates far more extra storage space than it actually does. If you believe that Konan offers high access speed and maximum data compression at the same time, you'll be disappointed; you can have one or the other, but not both.

What Konan Does

With Konan, you divide your single physical drive into a maximum of eight partitions, or logical drives. The first partition should always be the booting DOS partition, while the others can be DOS partitions, "Edisk" (expanded disk) partitions, or non-DOS partitions (not recommended). The Edisk partitions are the key to Konan's maximizing functions; they perform data compaction and include automatic controls to ensure that all files are stored contiguously.

Konan's data-compaction function takes out the dead space between files. Under standard controllers, you don't really get

20 megabytes (MB) of data on a 20MB drive. DOS 3.0 and higher versions allocate a minimum file or cluster size of 2K; even a 30-byte batch file takes up a full 2K of storage under a regular controller. Konan isn't bound by cluster sizes, so a number of small files can occupy the same cluster. This feature alone can save you a tremendous amount of file-storage space if you have small files to store.

Depending on your needs, you may format each Edisk partition for high speed with maximum error correction, single-pass data compression, or double-pass data compression. When used with Konan's disk-caching feature, high-speed formatting provides fast access but at the price of a smaller increase in file storage than with the double-pass data compression format. Double-pass formatting lets you pack more data onto your disk, using an archiving process similar to that of programs like Arc and PKArc, but you pay a high price in access speed.

I found the middle of the road—single-pass data compression formatting—to be best. The high-speed format with disk-caching, which stores often-used programs in memory for faster access, was of little use on my 640K Tandy 1000. From trial and error, I estimate that even the smallest cache requires about 200K. The Konan controller uses 48K plus approximately 32K for each partition. If you were to add a hard-disk management or menuing system plus other background programs, allocating extra memory for a cache would leave no room to run your application programs.

The double-pass data compression format, on the other hand, was just too slow for everyday use—about three times slower than the other formats. I'd recommend this format only for storing seldom-used files. I store about 8MB of programs in archived files; since they were already compressed, I had little to gain from double-pass compression.

The Misconceptions

Konan supplies three programs, CHKEDSK, EDSKINFO, and EDSKBAR, to use with the DOS CHKDSK program for analyzing your Edisk usage. Unfortunately, the statistics you get are often meaningless.

The programs give both the Edisk's physical disk size (the actual size of the disk) and logical size (the amount of data you can theoretically store, using the maximizing functions). The logical sizes appear to be unachievable. For example, I configured three partitions and ran an analysis of each

one. For each partition, the analysis programs reported that I had 33.5MB of logical disk space and 7MB of physical disk space. Despite what you might think, this doesn't mean you could fit 100MB of data onto a 20MB drive. That 33.5MB is actually the total logical disk space, not the amount of space in each partition so you shouldn't total the sizes for all three partitions. The physical disk sizes, however, represent the amounts per partition, and should be totaled.

This means I had a maximum of 33.5MB available on my 20MB hard disk—not a bad improvement but not a dramatic one, either. Remember, though, that this is a maximum value; in reality, you won't get that much, especially if you opt for speed rather than storage space when formatting your partitions.

The Reality

After determining that the single-pass compression format was best for me, I reformatted my drive, creating one Edisk partition plus the DOS partition. The analysis programs told me that my new Edisk partition had a logical size of 67MB, which just wasn't so. When I copied my backed-up files, which had nearly filled my 20MB disk under a regular controller, to the newly formatted disk, I found a barely perceptible increase in storage space. The 8MB of my files that were already archived (compressed) explained the small gain in space.

I then created separate directories and proceeded to "unarchive" many of my files, deleting others to make room. According to the Konan utility programs, I wound up with about 29MB of logical data and files on my 20MB disk. A total of the actual file sizes revealed that in fact I had 20MB of data. Since, as I explained earlier, you normally can't fit 20MB of data onto a 20MB hard disk, there was some benefit from using Konan. The effect of compression with this middle-of-the-road format was minimal.

The Pain and the Gain

With Konan, you gain in some areas and lose in others. You won't have to buy disk-optimizing software to defragment your programs, since defragmentation is automatic. Its file-compaction feature will let you store more than the normal amount of data on your hard drive—possibly 29 or 30 on a standard 20MB hard disk. Konan offers automatic disk caching to speed up file access. According to Konan, you also get advanced error correction.

All is not rosy, however. To take advantage of caching, you should probably buy expanded or extended memory. If you already use a file-compression utility such as Arc or PKArc, you gain little extra space by using Konan. Since Edisk formats are non-standard, some hard drive unformatting utilities might not work with them. Also, because Konan's analysis programs

mix logical and physical drive statistics, you never really know how much disk storage you have. Although high-speed and single-pass compression provide adequate access speed, the double-pass format is painfully slow.

To Spring or Not to Spring

Should you spring the extra money for a Konan controller? It's not a clear-cut decision. For me, the tradeoffs and the

advantages just about balanced each other out. I found that the product comes close to doing what its manufacturer claims but felt that Konan Corp. should explain just what the controller does and doesn't do more explicitly. ■

**Konan KXP-230Z Drive Maximizer requires MS-DOS 3.0 or higher and a hard disk drive.
Konan Corp., 4720 S. Ash Ave., Tempe, AZ
85282, 602-345-1300. \$189.**

Enhanced Keyboard and Universal Adapter



New keyboard and adapter increase software compatibility.

by Eric Grevstad

Anthing you spend hours a day running your fingers over is bound to be a matter of personal preference. Some people love the springy feel and noisy clatter of IBM keyboards. Others prefer a softer touch (I still miss my Model 4P). But a few PC programs show definite distaste for the Tandy 1000 keyboard.

If your favorite software boycotts the arrow keys or demands keypad plus and minus keys separate from the insert and delete keys, you can now plug your 1000 or 1000 SX into Tandy's Universal Keyboard Adapter—a small box with a ROM chip, cable, and socket that fits between your computer and a traditional five-pin, IBM-style keyboard. Plug it in, add a device driver to your Config.SYS boot file, and you're all set.

The best, most reasonably priced mate for the Universal Adapter is Tandy's Enhanced Keyboard, the same unit shipped with the 3000 and 4000. Like others following IBM's 101-key pattern, it combines a grotesque inconvenience—the caps lock where control should be—with many conveniences, led by a numeric keypad with math function keys separate from a cluster

of duplicate cursor arrow, home, end, page up, and page down keys.

Measuring 21 by 9 inches, the Enhanced Keyboard almost dwarfs the 1000—place it centered in front of the machine, sit down as usual, and your hands will miss the home keys. It feels stiff and rubbery at first (like typing on a doormat) but my test unit improved after a few days' break-in.

Compatibility

While a 1000 with the Adapter is incompatible with some 1000-specific software like Deskmate, the adapter and the enhanced keyboard ran all the PC software I tried. Remember, however, that the keypad and cluster on a 101-key board generate different codes; some programs' complex shift- or alternate-arrow or control-shift-home commands, which worked with the keypad, didn't work with the duplicate keys when I reserved the keypad for numbers lock. But having regular cursor, insert, and delete keys along with a keypad is a pleasure.

Unfortunately, I had less luck using the Adapter with another IBM-type keyboard, that of my early-model 1200 HD, and two word processors. While all the keys worked, I occasionally got random extra characters or commands in the middle of typing words

(continued on page 58)

\$549.⁹⁵

Introducing Micro Smart's SMART MICRO™

- **Compatibility** — by far the best and most compatible bios. We guarantee that MS-DOS software will operate flawlessly: Lotus, Symphony, Flight Simulator, Wordstar 2000, Word, DBase, RBase, the list goes on and on . . .
- **One high quality 360K floppy drive.** (Our head technician checks each one.)
- **Turbo Speed** — 8 MHz or 4.77 MHz keyboard or software selectable.
- **256K memory** (You can upgrade to 640K on the motherboard.)
- **FREE Monochrome monitor** with Hercules-compatible graphics card.
- **Slot for 8087 math coprocessor.**
- **1 parallel printer port**
- **AT-style keyboard**
- **8 expansion slot motherboard** with 4 layers for reliability.
- **Continuous and heavy duty 150 Watt power supply**
- **Key lock for security.**
- **Turbo light** — No guessing! If it's green, it's Turbo
- **Modern styling**
- **FCC Class B approved**

SMART MICRO™ OPTIONS

(Sold with complete system)

- **640K Memory Upgrade** \$CALL
 - **Second 360K floppy drive** \$100.00
 - **20 - 72 MB complete in system** \$CALL
 - **EGA exchange with EGA monitor and special EGA card**
Monitor and 132 column card
640 x 350 resolution \$499.95
 - **CGA exchange complete with CGA card and monitor** \$250.00
- (EGA and CGA exchange replaces monochrome card and monitor.)
- **DOS 3.2** \$80.00
 - **Enhanced 101 key keyboard** \$25.00
 - **Tactile 101 key enhanced keyboard** \$40.00
 - **Mouse with serial port** \$109.95
 - **300/1200 modem with software** \$79.95
 - **2400 modem with software** \$169.96
 - **Tilt and swivel base for your monitor** \$9.00



You're in good company with Micro Smart!

In addition to the thousands of home-users who rely on Micro Smart, our clients include:

- | | |
|-----------------------|----------------------------|
| University of Alabama | New England Power |
| Boston University | State of New York |
| Georgia Tech | Tufts University |
| Granite State Power | University of Harvard |
| Harvard University | University of Pennsylvania |
| Holy Cross | U.S. Government |
| Honeywell | Yale University |
| Mass Electric | Xerox Corporation |

Service Counts!

Long waits for your system? **NEVER!** Order it by 2:00 pm on any week day and, if in stock, we will ship it that day. Microsmart provides you with service all year round!

All of our computers are given a primary burn for 48 hours and after setup, are burned again for 72 hours.

We then configure YOUR system and diagnostically check it out.

SERVICE

No one does it better! Shipments are made Monday through Friday. ***All in-stock items are shipped the same day if your order is placed by 2:00p.m.** Orders placed

after 2:00p.m. are shipped the next business day.

TECHNICAL ASSISTANCE

We pride ourselves in our ability to assist in most situations. We will even try, when able, to help you with a competitor's product, or try to steer you in the right direction

\$659.95



SMART MICRO **E**™

- **Compatibility** — by far the best and most compatible bios. We guarantee that MS-DOS software will operate flawlessly: Lotus, Symphony, Flight Simulator, Wordstar 2000, Word, DBase, RBase, the list goes on and on . . .
- **Turbo speed** — 8mhz to 4.77 mhz both keyboard and software selectable.
- **Turbo light** — No guessing! If it's green, it's Turbo.
- **8 expansion slot motherboard** with 4 layer motherboard for reliability.
- **640K memory** — High quality pre-tested chips.
- **FREE amber monitor and Hercules compatible graphics card.**
- **High resolution graphics** — Both the monitor and display card are Hercules compatible.
- We even give you a tilt and swivel based monitor for your comfort.
- **One high quality 360K floppy drive.** (Our head technician checks each one.)
- **Continuous and heavy duty 150 Watt power supply** (15 Watts more than most competitors).
- **A battery backed-up clock calendar.**
- **A slot for a math co-processor chip 8087.**
- **1 Serial port** — you can add a second.
- **1 parallel port** for your printer.
- **1 game port** for joy sticks.
- **AT style keyboard** with 10 function keys.
- **FCC Class B Approved.**



SMART LINK Novell™
Style Network
Complete WITH
software
\$499.95

**Order by 2:00 p.m.
Micro Smart ships
by 5:00 p.m.**

SMART MICRO **E**™ OPTIONS: (Sold with complete system)

EGA exchange with EGA monitor and special EGA card Monitor and 132 column card 640 x 350 resolution \$499.95	Smart Micro E with hard drive
MULTISYNC style multiscan w/monitor and 132 col. card . . \$699.95	21 megabytes — complete system .65ms \$999.95
CGA exchange complete with CGA card and monitor \$250.00	33 megabytes — complete system .65ms \$1,099.95
(EGA and CGA exchange replaces monochrome card and monitor)	42 megabytes — complete system .38 ms \$1,199.95
8087 math coprocessor \$125.00	Dos 3.2 \$80.00
Enhanced 101 key keyboard \$25.00	Mouse \$79.95
Tactile 101 key enhanced keyboard \$40.00	300/1200 baud modem w/software \$79.95
	2400 baud modem w/software \$169.95
	360K floppy disk drive \$100.00
	3½" floppy disk drive \$135.00

for assistance. Just call our well-trained technical staff. You will find them anxious to be of service.

MONEY BACK GUARANTEE
Absolutely. We don't want you to have a product that you aren't happy with. Just

let us know within 21 days of receipt and, upon return, we will give you a refund (less
(Continued on next page)

TRADEMARKS: IBM Corp.; Lotus Development; Tandy Corp.; Microsoft, Inc.; Micro Smart Inc.

**ORDER TOLL FREE!
1-800-333-8841**

MICRO
SMART INC.
200 Homer Avenue, Ashland, MA 01721
1-617-872-9090
FAX: 617-881-1520



\$999.95

SMART MICRO/AT286™

- **10MHz**
- **Compatibility** — by far the best and most compatible bios. We guarantee that MS-DOS software will operate flawlessly: Lotus, Symphony, Flight Simulator, Wordstar 2000, Word, DBase, RBase, the list goes on and on . . .
- **8 expansion slots** to fill all of your expansion needs.
- **Turbo light** — No guessing. If it's lit, it's Turbo.
- **512K memory** — High quality pre-tested chips (upgradeable to 1MB on the motherboard).
- **FREE amber monitor and Hercules compatible graphics card.**
- **High resolution graphics** — both the monitor and display card are Hercules compatible.
- **We even give you a tilt and swivel based monitor** for your comfort.
- **One high quality floppy drive.** 1.2 meg or 360K. (Our head technician checks each one.)
- **200 watt power supply.**
- **AT style keyboard with 10 function keys.**
- **1 parallel port.**
- **Slot for a math co-processor 80287.**
- **A clock calendar for automatic time and date w/battery backup.**
- **FCC Class B Approved.**

AT 286™ OPTIONS

(Sold with complete system)

EGA exchange with EGA monitor and special ECA card Monitor and 132 column card 640 x 350 resolution	\$499.95	Enhanced 101 key keyboard . .	\$25.00
MULTISYNC style multiscan w/monitor and 132 col. card .	\$699.95	Tactile 101 key enhanced keyboard	\$40.00
CGA exchange complete with CGA card and monitor	\$250.00	Dos 3.2	\$80.00
(EGA, CGA and Multisync exchange replaces monochrome card and monitor.)		Mouse	\$79.95
80287 math coprocessor	\$CALL	300/1200 baud modem w/software	\$79.95
		2400 baud modem w/software	169.95
		360 K floppy disk drive	\$100.00
		3 1/2" floppy disk drive	\$135.00

AT/286 systems complete with Hard Drives

20 megabyte complete systems	\$1,399.95
42 megabyte complete systems	\$1,599.95
60 megabyte and larger	from \$1,799.95



Free Software!

Each of the four systems shown here comes with PC-WRITE word processor, PC-CALC spreadsheet, PC-DESKTEAM, and Smart Utilities.

(Continued from previous page) shipping, handling and insurance).

WARRANTY and AFTER WARRANTY SERVICE

As a team, we have been serving you since 1981. We know how important it is for you to be up and running. In and out of warranty service is treated

Service!

NEW! DIGITAL DISPLAY \$49.95



- **Digital display unit showing speed and activity of the printer and serial port.**

the same. YOU'RE IMPORTANT TO US! All repairs are done within 24 hours!

SPEAKING OF WARRANTIES

We're the best. TWO YEARS on all electronics boards and fifteen months on all mechanicals. Just ask us. We will tell you about our extra advantages.

\$2,299.⁹⁵

SMART MICRO 386™

- 8/16MHz, no wait state. With our FREE 64K memory caching, it's 23MHz.
- **Compatibility** — by far the best and most compatible bios. We guarantee that MS-DOS software will operate flawlessly: Lotus, Symphony, Flight Simulator, Wordstar 2000, Word, DBase, RBase, the list goes on and on . . .
- 1024K memory — High quality pretested chips (640K base; 384K extended), with up to 4MB on the motherboard.
- Battery backed up clock/calendar
- 1 parallel port.
- 8 layer motherboard.
- 8 FULL expansion slots
- Enhanced keyboard.
- High-resolution monochrome monitor with a tilt and swivel base. Hercules compatible.
- 1.2MB floppy drive.
- 3 half-high external device slots.
- 2 half-high internal device slots.
- 200 Watt power supply.
- 64K memory caching.
- 1 serial port (second port \$25.00 additional).
- FCC Approved.



SMART MICRO 386™ OPTIONS:

(Sold with complete system and installed)

- | | | | |
|---|----------|---|---------------|
| • EGA exchange with EGA monitor and special EGA card Monitor and 132 column card 640 x 350 resolution | \$499.95 | • 42 to 150 megabyte drives installed | from \$599.95 |
| • MULTISYNC style multiscan w/monitor and 132 col. card | \$699.95 | • 360K floppy drive | \$100.00 |
| • CGA exchange complete with CGA card and monitor | \$250.00 | • DOS 3.2 | \$80.00 |
| (EGA and CGA exchange replaces monochrome card and monitor) | | • Tape back-up system | \$499.95 |
| | | • 3½" disk drive | \$135.00 |
| | | • 300/1200 modem with software | \$79.95 |
| | | • 2400 baud modem w/software | \$169.95 |
| | | • Mouse w/software | \$79.95 |

We Deliver . . . and Service FAST!

TERMS AND CONDITIONS

The prices quoted here are for cash. We will accept MasterCard, VISA, Discover

Prices, terms and conditions subject to change without notice. Not responsible for typographical errors.

and American Express. COD's are accepted without any deposit. Purchase orders are accepted based on prior

approval. Call today for details!

Our hours are from 9:30 am to 5:30 pm, Monday through Friday and from 10:00 am to 4:00 pm on Saturday.

Dealer Inquiries Invited
CORPORATE AND VOLUME DISCOUNTS \$CALL

ORDER TOLL FREE!

1-800-333-8841

MICRO

SMART INC.

200 Homer Avenue, Ashland, MA 01721
1-617-872-9090

FAX: 617-881-1520

Smaller Is Bigger

Add a 3½-inch drive to your 1000 and double your disk storage capacity.



by John M. Gregg

In step with the industry, Tandy recently introduced three new computers whose specifications include a 3½-inch, 720K floppy drive: the 1000 HX, 1000 TX, and the 1400 LT. With all major manufacturers marketing computers with built-in 3½-inch drives and all software vendors of consequence supplying software in the smaller format, there's little doubt that the new drives will eclipse conventional 5¼-inch drives.

Until recently, owners of earlier 1000-series computers who wanted to upgrade by adding third-party drives have found prices prohibitive. But reputable mail order firms now sell 3½-inch drives, almost ready to install, for just over \$100. As prices drop and software becomes increasingly available, the arguments for upgrading to the smaller drive become more compelling.

While 3½-inch disks cost more than 5¼-inch disks, they offer advantages: about one-third the size of the larger disks, they hold twice as much data. Many users will appreciate this feature.

Consider, for example, the task of backing up a 20MB hard drive. Using 360K disks, you'd need as many as 50 disks; with 720K disks, only half as many. You'd also cut the time it takes to do the job by half!

Laptop users whose machines employ 3½-inch drives find that adding a 3½-inch drive to the stationary system eliminates the need for a cable connection between the two computers. And in environments where careless disk handling is a problem—such as in schools—users find that a fully enclosed, rigid 3½-inch disk outlasts a dozen floppies.

Replacing The Drive

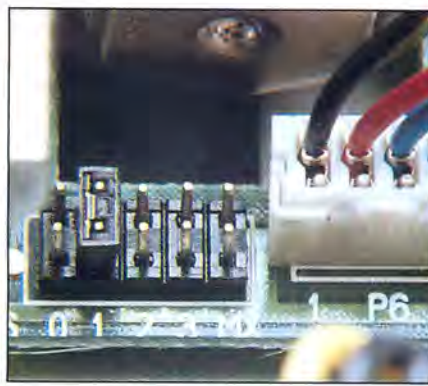
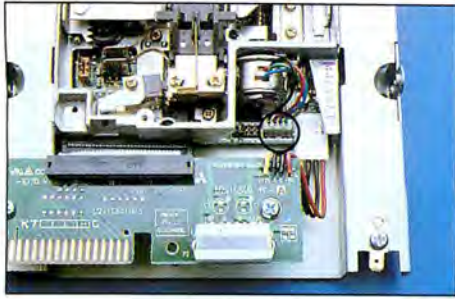
Because I wanted to make my own software available in the smaller format, I opted to replace my Tandy 1000A's drive B with a 3½-inch 720K drive. I chose the Mitsubishi drive, model MF353B, which was available by mail for \$119.95.

Tandy sells a similar drive with an installation kit for under \$200. IBM, Teac, Panasonic, and Toshiba also offer appropriate add-ons.

The vendor's technical support staff advised that I'd have to use DOS 3.2 because previous versions don't support the 720K format. (Though it appears that Tandy has no official policy on upgrading to DOS 3.2, your local store manager may be willing to help.) I did experience stack errors using the Basic supplied with DOS 3.2, but replacing it with the original Basic from DOS 2.11 solved the problem.

The project is fairly straightforward. If you're comfortable working with small tools (chiefly a medium Phillips-head screwdriver and a pair of needle-nose pliers) and keep your wits about you, you'll soon be using your new drive.

Turn your computer off. Disconnect the keyboard and monitor and set them aside. To protect chips, it's a good idea to wear an anti-static wrist strap that ties you to an appropriate ground; Radio Shack sells one for less than \$3.00. Don't stand on a carpeted floor while you work; don't even carry chips in your hands as you walk across a carpeted floor. If you must stand on carpet, consider spraying it with an anti-static compound (check the laundry supply aisle of your supermarket for anti-static spray), and be sure to discharge any static electricity you may have accumulated be-



To configure your 3½-inch drive (left) as Drive B, connect jumper to pin set no. 1 (detail, right).



fore you delve into your computer (just touch any metal object not near your computer).

Remove the two screws from the front of the computer and slide the cover forward and then off. Set it aside.

If drive B is already in place, remove the screws that secure it; two will be on the outermost side and one will be on the inside. The inside screw is likely to have an elongated head protruding from the mount to simplify removal. If the screw head doesn't protrude, you may have to remove any expansion boards and turn the computer on its side to get at it.

Once you've removed the screws, you should be able to push the drive back for clearer access to the connectors. Follow the gray ribbon cable coming from the rear of the lower drive to the upper drive. Remove the 34-pin edge card connector and the white power connector from the drive. Remove the drive by pulling it toward the front of the computer.

The new drive must be configured as drive B. On the back of the Mitsubishi drive, you'll see five pairs of jumper pins just behind the servomechanism. They're easy to see, but you won't be able to reach them easily. Check to make sure the left-hand jumper is attached to pin 1; if it isn't, you'll have to move it. To do this, remove the screw from the top cover of the drive. Using needle-nose pliers, detach the jumper and place it on pin 1. (I understand that the pins on the Toshiba drive are on the bottom and exposed, making this modification easier with that model.)

Insert the drive into the housing from the front. The Mitsubishi fits loosely; if you're using one of these, push it all the way in to make sure it makes contact with the connectors.

Note: The 34-pin connector on the Mitsubishi is configured exactly in reverse of the connector on the Teac drive usually found in the Tandy 1000. If you're installing the Mitsubishi drive, twist the ribbon cable so that it's reversed from its original position, then attach the connector. If you're using a different drive, be sure to check the documentation. The white power connector fits the same way as the original and is keyed.

If you have a 1000 SX or TX, you'll probably need a longer drive cable. An 8-

to 10-inch length of ribbon cable, with the appropriate connectors attached, should be adequate. Crimp the connectors on to the ends, following the configuration of the original cable.

Because the new drive won't fit as snugly as the original, proper grounding is especially important. If no ground wire is included, make one. Crimp a ¼-inch spade connector on one end of a 16-inch length of wire and a U-shaped lug on the other. Secure the spade connector end of the ground wire to the spade connector provided, and fasten the other end under the screw that attaches the drive mount to the chassis on the outermost side.

Start, but do not tighten, one screw on each side of the drive. Start the third screw, then tighten all three, taking care not to strip the threads. If the front plate doesn't line up with drive A, adjust it slightly by loosening a screw on each side and then slowly retightening each screw as you press on the plate.

Replace the cover, then reconnect the monitor and the keyboard.

Testing and Troubleshooting

To test your work, try booting in the usual way. Does DOS look for the A and B drives in the usual way?

If both drive lights turn on and remain lit, shut the computer off and check the connection of the 34-pin ribbon cable. If the connection appears to be correct, verify the pin alignments by comparing the connector with the connector diagram shown in the installation instructions. If alignment is correct, pull the drive to verify that you've positioned the jumper pins correctly. If both of these are as they should be, call the tech department of your drive's manufacturer for help.

Slide the new drive into the empty drive bay above Drive B. Attach the power connector and the drive controller cable; be sure to invert the drive cable before connecting.

If everything seems in order, try formatting a disk in drive B. If you've completed the installation properly, your computer will format a 360K disk regardless of whether you're running DOS 2 or 3. Use the CHKDSK command; if your system recognizes B, you're ready to configure DOS to format 720K.

Other Possibilities

Though details may differ, you can follow these procedures to install a 3½-inch drive in the Tandy 1200 and other MS-DOS machines.

It's also possible to use a driver, the Bas-tech Data Doubler (R1.16), which will allow the use of DOS 2.2. At first I wasn't certain it would perform properly on the Tandy 1000—and sure enough, it didn't. But a telephone call to the supplier caught the driver distributor at that facility, and four days later I had a revised version of the Data Doubler that ran without difficulty. You type one command and the driver installs

Where To Buy Drives

Mitsubishi drives are available from the following suppliers:

Northeast Peripherals

106 Access Road
Norwood, MA 02062
617-769-9110

P.C. Network

320 West Ohio
Chicago, IL 60610
312-280-0002

Task Technology

244 Sobrante Way
Sunnyvale, CA 94086
408-773-0600

True Data

115 South Main Street
Uxbridge, MA 01569
617-278-6555

Ultra-Comp Hardware

2600 N. Broadway
St. Louis, MO 63102
314-621-4999

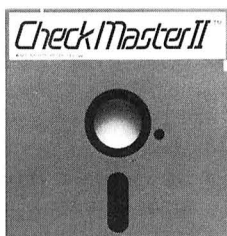
Introducing CheckMaster II. The Powerful, Flexible, COMPLETE Checking System, for Only \$39.95.

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.

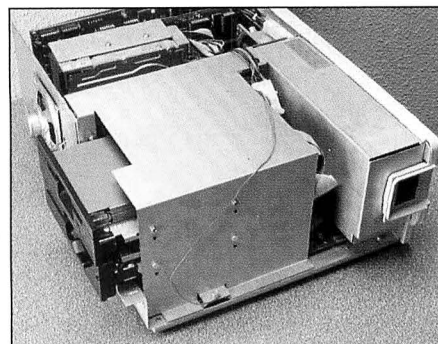


System Requirements: PC or compatible, MS-DOS 2.0 and above, 512 RAM and a printer. Tandy™ 2000 version available.



INFO-NAPSE
MICRO SERVICES
2801 Moorgate Road
Baltimore, MD 21222

720K DRIVE



Completed installation.

itself. Shamrock sells it for \$15 with the purchase of a drive or \$25 separately; Manzana also sells an internal drive that can use DOS 2.11.

The only drawback I foresee with the Bastech driver is its use of Assign.COM so that the 3½-inch drive is recognized as drive B. In Tandy's MS-DOS 2.11, Assign.COM is on the hard disk utility. If you don't have a hard drive, use the drive as drive C or D. This isn't covered in the documentation, but all you have to do is remove the assign command from the Autoexec.BAT.

I tried two other drivers in hope of finding ways to use DOS 2.11 with the smaller drives. One appeared to work only with DOS 3.x. The other, Small Business Systems' Microdisk (available from Micro Sense for \$29.95), isn't as easy to install as the Bastech driver, but isn't difficult to install, either. It also offers the additional advantage of being able to format five sizes, including 720K, 360K, and three unusual sizes: 808K, 812K, and 408K.

I had problems using the Microdisk driver on the 1000. But once again I received good service from the distributor and the fix was easy, if undocumented: all I had to do was add a 1: to the line placed in the Config.SYS file. This driver leaves the drive number as the next logical drive, but you could use Assign.COM to change it.

These drivers offer an inexpensive solution for users who don't want to upgrade to DOS 3.2. I don't see enough difference between them to recommend one over the other.

If you do choose to remain with DOS 2.11, however, be aware that all commercial software sold on 3½-inch disks is formatted in DOS 3.2 or 3.3, and you may have difficulty using disks formatted with higher versions of DOS. Consequently, I'd recommend using only DOS 3.2 or 3.3 for use with 3½-inch drives. ■

Retired from the finance industry, John Gregg teaches science at the middle school level and markets an income-tax program of his own design. He can be reached at 1008 Alton Circle, Florence, SC 29501.



COMPUTER CENTER

Tandy® Computers:
Because there is no better value.™

Save on Business and Home Computers

MS® OS/2 Ready AT®/XT™ Compatible



Save \$835⁰⁰
2730⁰⁰

Reg. Separate Items 3566.85

- System Includes Tandy 3000 HL, EGM-1 Monitor, EGA/CGA Display Adapter, Internal 40-MB Hard Disk, MS-DOS/BASIC and Professional DeskMate™ Software

25-4071/4035/3048/4057/4358/4109

Easy-to-Use System With PFS: Professional File and Write



Save \$656⁰⁰
1240⁰⁰

Reg. Separate Items 1896.95

- Includes PFS:Professional Write and File and Our Exclusive 7-in-1 Personal DeskMate™ 2 Software
- Fast 286-Based Tandy 1000 TX with 640K Memory and 720K 3 1/2" Drive
- Includes CM-5 Color Monitor
- IBM PC Compatible

25-1600/1023/1222

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***

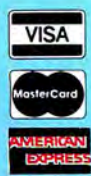
PRICES SUBJECT TO CHANGE WITHOUT NOTICE TEXAS RESIDENTS ADD 6.5% SALES TAX

"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



Attention: Tandy 1000 Fans!

80 Micro's Starter Pack 1000

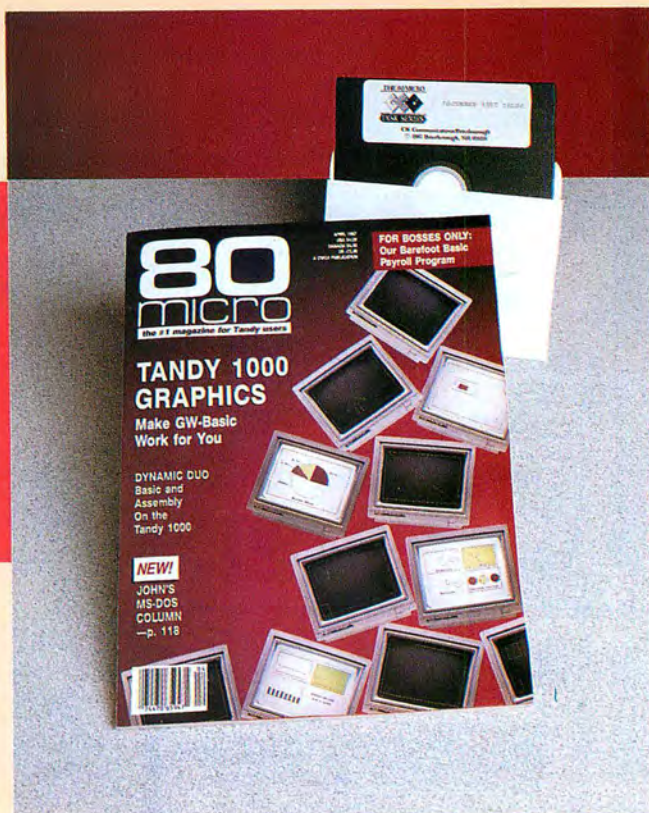
A computer as powerful and versatile as the Tandy 1000 calls for software to match. That's why you and your computer need 80 Micro's Starter Pack 1000. Designed exclusively for Tandy 1000 users, the Starter Pack disk contains 13 essential, educational, and entertaining programs, selected for you by the 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.
- **To Each His Own** – an all purpose customizable data base management system that features sorting and report printing.
- **Custom Character Generator** – design graphics screens and develop custom text fonts.
- **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.
- **Savings and Loan** – compares payment schedules calculated by simple interest and by the Rule of 78's.
- **Screen Save** – memory-resident program that blanks out your screen to avoid unnecessary wear and tear.
- **Brain Breakers** – solve challenging long-division puzzles and rediscover the rudiments of arithmetic.
- **Print No Evil** – prevent accidental screen-print commands from hanging up your Tandy 1000.
- **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 1-800-343-0728. (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 _____

SP487

Mail To: THE 80 MICRO DISK SERIES
80 ELM STREET, PETERBOROUGH, NH 03458

Sending Printer Codes From Your 1000

Increase your typographical options with batch and command files.



by **Bill Newmiller**

Perhaps you've just bought a new dot-matrix printer and can't wait to try out all its character formatting capabilities. Perhaps you're still puzzling over the vagaries of programming printer control codes in Basic. Maybe you've even given up trying because loading the Basic interpreter and then the program has become too much of a bother.

The techniques I describe in this article—how to use batch (BAT) and simple command (COM) files to send control codes from DOS to your printer—will work if you're using DOS 2.00 or greater and have a printer manual that specifies the control codes your printer understands.

Using Batch Files

You can use Edlin to create a short batch file that will place a Tandy printer (DMP-130) into a compressed, or 12-pitch, font. If your printer uses a different control code, you'll have to look it up in your manual

and substitute it for the one I've used.

Begin at the DOS prompt by typing:

```
A> EDLIN COMPRES.BAT
```

and pressing the enter key. Your computer will respond by loading Edlin and setting it up to create a batch file named *Compres.BAT*. After a few seconds, your computer will respond with the Edlin command prompt, which is comparable to the familiar *A>* in DOS:

```
New file
```

```
*
```

To tell Edlin that you want to insert a line, press the *I* key, and press enter. Edlin will respond with:

```
1:*
```

Now Edlin is ready for you to enter the line that will instruct your printer to use its 12-pitch capability. You'll need to send

System Requirements: Dot-matrix printer. Available on April–June Disk Series, on sale in May.

it a two-code sequence consisting of the escape character and a control-W (^W). Printer manuals express "escape ^W" in a number of different ways, including ESC ^W (keyboard equivalents), 27d 23d (decimal ASCII equivalents), and 1B 17 (hexadecimal ASCII equivalents).

Enter the following line:

```
1:*ECHO ^[ ^W > LPT1
```

The "[symbol represents an ASCII code decimal 27, or, as it's often called, an escape code. Because it's a special code, it demands special treatment on the keyboard. You can't enter it by holding down the control key while pressing the left bracket symbol; you have to type control-V first. Your entry will look like this:

```
1:*ECHO ^V[^W > LPT1
```

Press enter, and Edlin will respond with:

```
2:*
```

Leave the editing mode by typing control-Z or pressing F6. Your display will now look like this:

```
New file
  1: ECHO ^V[^W > LPT1
  2:*^Z
*
```

Press the E key, and press enter to tell Edlin you're ending the session. The familiar DOS prompt will return to your monitor. If you look at your directory, you'll notice that you now have a new file called Compres.BAT.

Now type COMPRES, and press enter. Press shift-print to print the screen and check out your new 12-pitch dot-matrix printer.

The Fine Print

Compres.BAT uses the DOS Echo command to redirect a control code to line printer one (LPT1). You may want to use this technique to experiment with control codes for special-purpose options such as double-wide print (great for speech manuscripts) or double-strike print (great for squeezing one more document out of an overused ribbon). You can even generate condensed subscript print.

Generating condensed subscript will require sending not one, but two sequences of control codes to your printer. That's no problem. String the two sequences together into another one-line file composed with Edlin:

```
1:*ECHO ^V[S1^V[^T > LPT1
```

Another way to make printer's output look like the fine print on a new-car warranty is to create two separate batch files: Condens.BAT, to place the printer in condensed mode, and Subscrip.BAT, to place it into subscript mode as well. Your entries

would look like this for CONDENS.BAT
1:*ECHO ^V[^T > LPT1

and for SUBSCRIP.BAT:

```
NEW FILE
1:*ECHO ^V[S1 > LPT1
```

This two-file approach offers the advantage of flexibility and a certain degree of simplicity. Used singly or in combination, these two files provide three different fonts: subscript, condensed, and condensed subscript. However, as you discover increasingly versatile and complex combinations of control codes, you may find it difficult or impossible to remember the sequences of codes you want to send. Using the one-file approach would eliminate the need to remember the correct combinations, but you'd lose the flexibility of the two-file approach.

You may already have thought of one possible solution: writing a batch file that calls the batch files that send the appro-

As long as you
don't tell your friends
how easy these
programs are . . .
only they need
be intimidated.

ropriate printer codes. For instance, you could write a batch file that calls Condens.BAT and then Subscrip.BAT. Such a file might be called Consub.BAT and would contain the lines:

```
1: COMMAND /C CONDENS
2: EXIT
3: COMMAND /C SUBSCRIP
4:*EXIT
```

What's the purpose of Command /C and Exit? The problem with calling one batch file from another is that unless you use Command /C, the batch file will stop executing as soon as it reaches the last line of the first batch file called. See what happens if you write Consub.BAT like this:

```
1: CONDENS
2:*SUBSCRIP
```

Condens.BAT would run, but that would be all. Execution would stop before Consub.BAT could call Subscrip.BAT. The

Command command gets around the problem but at some expense in the use of memory and with some loss in speed of execution. The Exit command will recover the memory used by the Command command.

I should point out an exception to DOS's perplexing difficulty in calling batch files. DOS 3.3 allows you to call other batch files and return from them by using the Call command instead of using the Command command. Nevertheless, you may still notice that as your batch files become longer and more complex, they also become much slower. You can improve your control over the printer—and mystify your friends—by moving on to the second technique for printer control, using Debug to write simple command files.

Using the COM File

Another way to send control codes to your printer involves using Debug to write an assembly language program to send the appropriate control codes to your printer. Don't be put off by the use of the term "assembly language." As long as you don't tell your friends how easy these programs are to understand and write, only they need be intimidated.

Begin in the DOS prompt by entering Debug. You'll soon see the Debug prompt:

```
A>DEBUG
```

Press the A key (for assemble), and press enter. Debug will respond with:

```
XXXX:0100
```

You'll actually see four numbers or letters where I've shown X's. Those numbers define the first part of a memory address, which will vary depending upon your computer and its configuration. For our purposes, however, the first four digits are unimportant.

The second set of digits, 0100, contains the rest of the memory address; these numbers are important to us. For your first example, you'll create a COM file which, like the batch file shown above, sends the control code to make the printer type 12 characters per inch (cpi).

Type the first line:

```
XXXX:0100 MOV DL, 1B
```

Complete the line by pressing enter, and you'll see your computer respond like this:

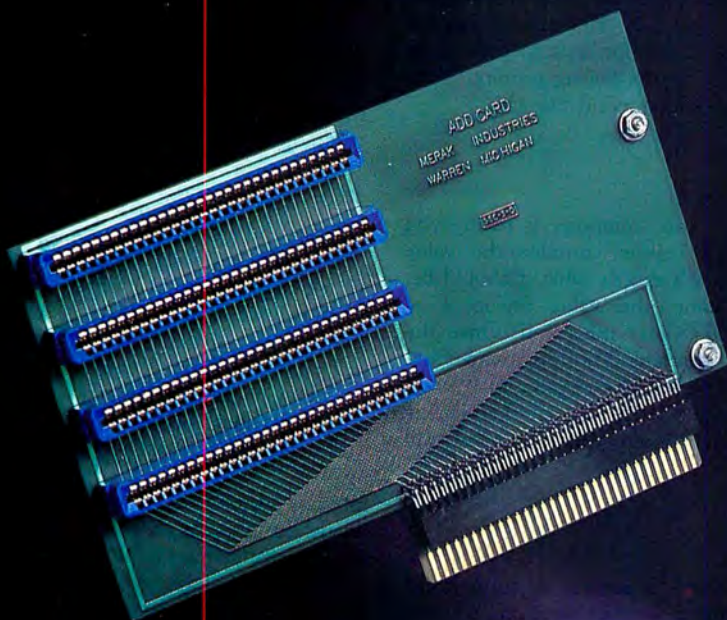
```
XXXX:0100 MOV DL, 1B
XXXX:0102
```

Notice that the memory address increased by two from XXXX:0100 to XXXX:0102, indicating that the first line of code will occupy two bytes of memory.

Continue entering the next five lines just as you entered the first line, remembering

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.

to end each with enter. Your monitor should look like this:

```
XXXX:0100 MOV DL, 1B
XXXX:0102 MOV AH, 5
XXXX:0104 INT 21
XXXX:0106 MOV DL, 17
XXXX:0108 INT 21
XXXX:010A INT 20
XXXX:010C
```

That's all there is to the actual programming. You've probably noticed that I've used only two commands, MOV (short for Move) and INT (short for Interrupt). Here's how they work in the program, one line at a time:

In MOV DL, 1B, the hexadecimal (base-16) number, 1B, is moved to register DL. You may recall that the hex value, 1B, is the same as the ASCII escape character. In Compres.BAT we typed it as ^[. Register DL is a special memory location in your computer's CPU; information placed there can be acted upon in special ways. We'll see how as we examine the next two lines of the program.

In MOV AH, 5, the hex number 5 is moved to register AH. The hex value, 5, when loaded into register AH, becomes a DOS function call when executed by the next line in the program. A DOS function call can be thought of as an order, and register AH is a memory location in the CPU where orders are posted—much like the refrigerator door at my house. The orders on my refrigerator door say things like "Todd, take out the trash." Translated into human terms, DOS function call 5 says, "Computer, take the value in register DL and send it to the printer."

INT 21 (Interrupt 21) is a type of general command that says to your computer, "Don't just sit there—do something!"—just as I sometimes have to tell my son to look at the list of chores posted on the refrigerator door and get moving. Similarly, Interrupt 21 tells your computer to carry out the function call specified in register AH.

The hex value 17 in MOV DL, 17 is moved to register DL. You might recall that hex 17 is equivalent to ^W. Since the DOS function call, 5, already resides in register AH, there's no need to post the order again.

In Interrupt 21, the order to execute the function call specified in register AH goes out once again. Our program has now sent both of the characters (or bytes) required to make it print 12 cpi. Interrupt 20 ends the program. It's like telling my son, "You've done enough chores for now. Go back to doing what you were doing before." For your computer, that will mean going back to displaying the DOS prompt and waiting patiently.

Before running the program, it's necessary to attend to administrative chores:

leaving the assemble mode of Debug, naming the program, writing it to a disk file, and quitting Debug. To leave the assemble mode of Debug, press the enter key one more time; the Debug prompt will return. To name the program, type "N" followed by the program's name:

```
-NCOMPRES.COM
```

Notice there's no space after the "N." Notice also that the name ends with the COM extension. This is important because the COM extension marks your file as special—a file that contains machine language commands your computer can run.

Before you can store the program to a disk file, you need to make sure that the proper information is loaded into a couple of other special memory locations, register BX and register CX. First, check register BX by using the R (for register) command. Type in RBX at the Debug prompt. Your computer should respond like this:

```
-RBX
BX 0000
```

In this case, your computer is telling you that the BX register contains the value 0000, and that's exactly what it should be. If you see some other value, replace it by typing in 0000 after the colon. Once the BX register contains 0000, press enter and continue by checking the value in the CX register. Type in RCX at the Debug prompt. Once again your computer will respond:

```
-RCX
CX 0000
```

You want the CX register to contain the number of bytes in your program. You can determine that by looking at the assembly listing of the commands you typed in, which should still be visible on the upper half of your screen. Notice the last two lines:

```
XXXX:010A INT 20
XXXX:010C
```

Notice that the four-digit value in the memory address following the colon on the last line is 010C and that when you first entered the assemble mode of Debug, the corresponding value was 0100. To find out how many bytes are in your program, subtract the memory address in the first line from the memory address in the last line displayed. Since the memory addresses are written in hex notation, the number of bytes for this program will be C, which is the hex equivalent of 12. So enter the hex value, C, into register CX, and press enter.

```
-RCX
CX 0000
:C
-
```

To write the program to the disk using the W command, press the W key at the Debug prompt, and press enter. Your computer will respond like this:

```
-W
writing bytes
-
```

All that's left now is to quit Debug by entering the Q command:

```
-Q
```

and you're back to the A> DOS prompt.

If you look at your directory, you'll see that you now have a new file called Compres.COM. While it will accomplish the same thing as Compres.BAT, you may notice that it runs a bit more quickly than a batch file and it doesn't cause your printer to execute a line feed. Another advantage of a COM file is that it's easier to include it in a batch file with a list of other commands. For example, a batch file to set up your printer and invoke your text editor could look like this:

```
1: COMPRES
2:*TEXT-ED
```

The second line invokes your editor.

You can write several COM files, each of which would send a different control to your printer. You could then use them in batch files in any combination to give yourself complete control over your printer.

You may find that you want to write a COM file that will send two or more control codes to your printer. The most direct approach would be to add another block of code (prior to issuing Interrupt 20) that loads the control character in DL and issues an Interrupt 21. Using this approach, the assembly language listing for a COM file that places a printer into a condensed subscript mode would look like this:

```
MOV DL, 1B
MOV AH, 5
INT 21
MOV DL, 14
INT 21
MOV DL, 1B
INT 21
MOV DL, 53
INT 21
MOV DL, 1
INT 21
INT 20
```

The two techniques you've just learned should provide an unlimited number of options for putting your printer to work and open the way to a fuller appreciation of the power of DOS. ■

A computer hobbyist for eight years, Bill Newmiller is an Air Force pilot who teaches English at the Air Force Academy. You can contact him (enclose an SASE) at 7645 Hickorywood Drive, Colorado Springs, CO 80920.

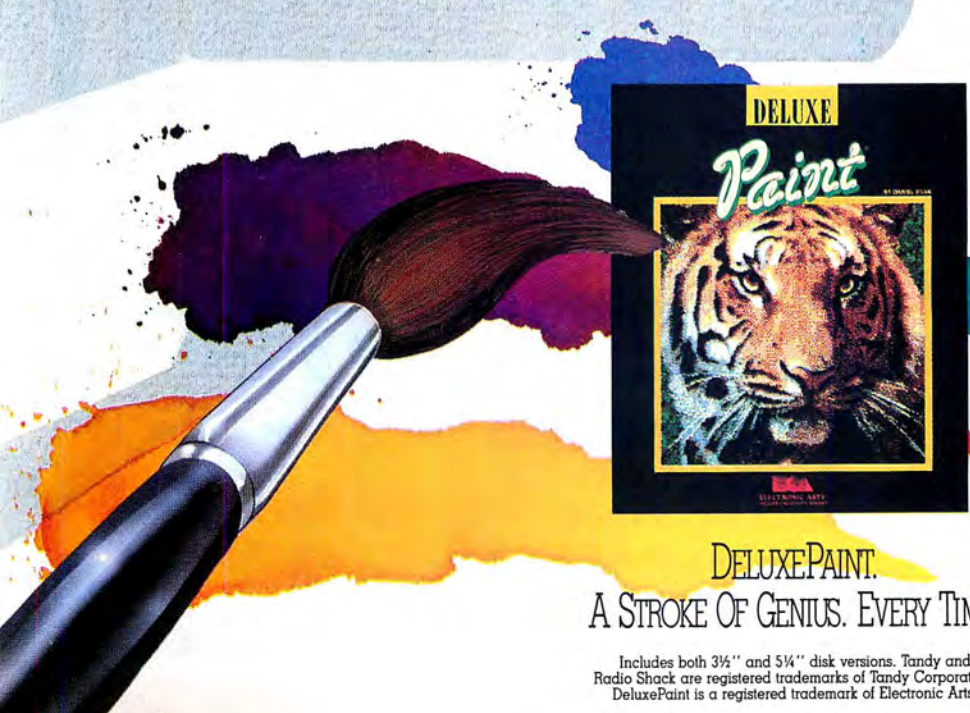
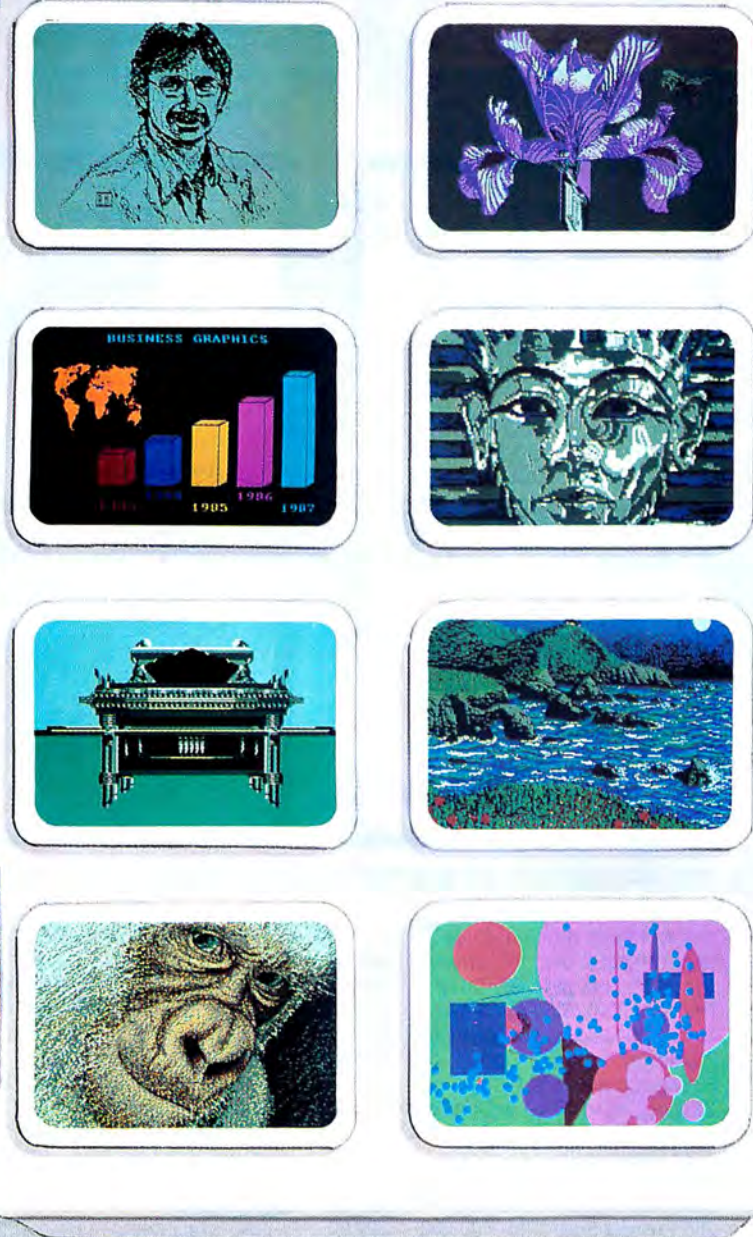
THE ULTIMATE PAINT SET

If your artistic endeavors have been limited to a few, cute stick figures, get DeluxePaint® — and get on with the real thing! Designed specifically for your Tandy's 16-color graphics capabilities, DeluxePaint gives you the power to create mistake-proof masterpieces. Discover the ultimate paint set — it's the most award-winning paint program ever!

Show your true colors. Go ahead — wear your heart on your screen. Customize hues with instant dithering. Create gorgeous gradient effects or subtle shading. Take a crack at abstract! Play with symmetrical mirrors and tiles to duplicate any design, any geometric shape. Animate images with color cycling and watch static art come alive. Choose from over 100 included inspiring images and emulate the old masters.

Take command of the canvas. With DeluxePaint, ANYTHING can be used as a brush. Invent your own! Select from the built-in curve, line and shape tools. Get artistically inclined — bend, flip, rotate, shear, or resize any piece of art. Spray on streams of color with precision airbrush control. A scratch pad window lets you experiment on images without disturbing your master canvas. Zoom in to work out details and apply the finishing touch!

At \$49.95, DeluxePaint gives you and your family the thumbs-up for any artistic endeavor. Visit your local Tandy®/Radio Shack® Computer Store. Or order DeluxePaint direct by calling 800-245-4525 (in CA, call 800-562-1112). VISA/MC accepted.



DELUXEPAINT.
A STROKE OF GENIUS. EVERY TIME.

Includes both 3 1/2" and 5 1/4" disk versions. Tandy and Radio Shack are registered trademarks of Tandy Corporation. DeluxePaint is a registered trademark of Electronic Arts.



ELECTRONIC ARTS®
Circle 92 on Reader Service card.

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



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



Tandy 3000 \$1529
Tandy 3000 HL \$899
Tandy 4000 \$1959



Tandy 1000 HX \$539
Tandy 1000 TX \$889



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

COMPUTERS

Tandy 1000 HX 1 Drive 384K	539.00
Tandy 1000 TX 1 Drive 640K	889.00
Tandy 1000 SX 1 Drive 384K	649.00
Tandy 3000 HL 1 Drive 512K	899.00
Tandy 3000 1 Drive 640K	1529.00
Tandy 4000 1 Drive 1 Meg. Ram	1959.00
Tandy 1400 LT 2 Drive 768K	1239.00

PRINTERS

Radio Shack DMP-106 80 CPS	169.00
Radio Shack DMP-130A 120 CPS	279.00
Radio Shack DMP-440 300 CPS	539.00
Radio Shack DWP-230 Daisy Wheel	349.00
Tandy LP-1000 Laser Printer	1699.00
Star Micronics NX-1000 144 CPS	229.00
Star Micronics NX-15 120 CPS	359.00
Panasonic P-1080i 144 CPS	199.00
Panasonic P-1091i 194 CPS	229.00
Panasonic P-1092i 240 CPS	349.00
Okidata 292 240 CPS	479.00
Okidata 293 240 CPS	599.00
Okidata 192 + 200 CPS	359.00
Okidata 182 + 144 CPS	259.00

TANDY 1000 ACCESSORIES

Tandy 1000TX 5 1/4" Int. Drive	149.00
Tandy 1000HX 3 1/2" Int. Drive	139.00
Tandy 1000HX 5 1/4" Ext. Drive	199.00
Tandy 1000HX 3 1/2" Ext. Drive	225.00
Tandy 20 Megabyte Hard Card	619.00
20 Megabyte Hard Card	459.00
30 Megabyte Hard Card	499.00
20 Meg. Hard Drive w/Controller	399.00
30 Meg. Hard Drive w/Controller	459.00
128K Memory Plus Expansion Adp.	110.00
PBJ Multi-Function Board (512K)	199.00
PBJ X-Ram EMS Board (256K)	199.00
286 Express Board (for 1000SX)	329.00
256K Ram Upgrade (for 1000SX)	69.00
128K Ram Upgrade (for 1000TX)	44.95
SmartWatch Clock Calendar Chip	34.95
Logitech C7 Serial Mouse	99.00
Logitech Buss Mouse (inc. board)	119.00
Tandy 2 Button Serial Mouse	39.00
Tandy Deluxe Joystick	26.95
Tandy 1200 Baud Modem Board	159.00
Scooter 2400 Baud Modem Board	199.00
CPI 1200 Baud Modem Board	119.00

TANDY 3000/4000 ACCESSORIES

Tandy 360K Disk Drive Kit	159.00
Tandy 1.2 Meg. Disk Drive Kit	249.00
Tandy 1.44 Meg. Disk Drive Kit	239.00
Tandy Dual Display Adapter	169.00
Tandy Enhan. Graphics Adapter	259.00
Paradise Basic EGA Board	189.00
Paradise CGA/MDA Graph. Board	129.00
Quadram EGA + Graph. Adapter	249.00
20 Meg. Hard Drive w/Controller	499.00
40 Meg. Hard Drive w/Controller	899.00
Tandy 4000 1 Meg. SIMM Upgrade	349.00

MONITORS

Tandy VM-4 Green Monitor	99.00
Tandy VM-5 TTL Green Monitor	119.00
Tandy CM-11 RGB Color Monitor	349.00
Tandy CM-5 RGB Color Monitor	249.00
Tandy EGM-1 Enhanced Monitor	559.00
Magnavox 9053 EGA Monitor	459.00

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

The Tandy 1000 HX: Easy Home Companion

Is this the new winner in the home computer wars?



The Tandy 1000 HX matches Apple's ease of use, beats Apple's price.

by Eric Grevstad

This is the best Tandy 1000 yet. I know it doesn't have a fast 80286 chip, its standard memory is too skimpy to run many popular programs, and it's one of the least expandable PC compatibles you can buy. But since the first 1000 appeared in 1984, Tandy's primary mission has been to get MS-DOS into America's homes—to replace the Apple II.

Apple's biggest advantage has been that you can put in a disk, turn it on, and start your program. With its pop-up program

menu and DOS in ROM, the 1000 HX matches Apple's ease of use while beating Apple's price. It's the new winner in the home computer wars.

The Face Is Familiar

In terms of hardware, the HX is a 1000 EX with a 3½-inch, 720K disk drive mounted up front instead of a 5¼-inch, 360K drive on the side. (The EX is still available, but effectively obsolete—\$100 cheaper, but with half the disk storage, an earlier version of Deskmate, and no DOS in ROM.)

The HX's low profile puts the drive button too close to the keyboard, and I accidentally pressed a key while swapping disks during the Diskcopy "Press any key when ready" prompt. The microfloppy drive is quiet, sturdy, and fast, however, and there's room for a second 3½-inch drive inside (\$169.95) and support for an external 5¼-inch drive (\$249.95).

Other specifications—such as ports for the external drive, a parallel printer, two joysticks, an earphone jack with volume control, and composite and RGB monitor ports for the 1000's built-in CGA (color-graphics adapter)-compatible video—match those of the EX. Both of the one-piece 1000s come with 256K of memory and one of Tandy's Plus expansion slots, as opposed to the five conventional slots of the SX or TX.

Because the HX steals at least 16K of system RAM for the video display, and 240K isn't enough for programs like PFS:First Choice and Microsoft Word, many buyers will opt to fill the expansion slot with Tandy's Memory Plus Expansion Adapter (\$129.95), which adds another 128K, a DMA (direct memory access) controller, sockets for another 256K RAM to reach the 640K limit (\$79.95), and two piggyback slots for Plus cards such as a serial port or modem. More budget-conscious

The Tandy 1000 HX (catalog no. 25-1053) comes with 256K RAM; one 3½-inch (720K) disk drive; ports for a parallel printer, external disk drive, and RGB and composite monitors; and MS-DOS 2.11 and Personal Deskmate 2 software. Tandy Corp./Radio Shack, Fort Worth, TX 76102. \$699.

Compatibility Software
 Copyright (C) 1984,1985,1986,1987
 Phoenix Software Associates Ltd.
 and Tandy Corporation.
 All rights reserved.

Microsoft MS-DOS version 2.11
 Copyright 1981,82,83 Microsoft Corp.
 Tandy version 02.11.26
 All rights reserved.
 Licensed to Tandy Corp.

Command v. 2.11



Personal Deskmate 2 features unique self-booting menu.

buyers can use one of the handful of third-party Plus cards.

If you could see under the hood (the only motherboard component not hidden by metal shields and void-your-warranty warnings is the Plus slot), you'd find the same 7.16-MHz Intel 8088-2 processor used in the EX and SX. In the 256K unit, the higher clock speed is thwarted by the lack of DMA; the HX proved as fast at spreadsheet recalculations as a 4.77-MHz PC but 8 percent slower in a Wordstar search and replace, and it took 13 percent longer to draw a BasicA pie chart. Adding extra memory and DMA, the HX becomes roughly 20 percent faster than the PC.

Because the keyboard uses the same 90-key layout as other 1000s, you'll find the same keypad incompatibilities when you run certain PC programs. But it felt great—crisper and lighter than my old 1000. Unlike the SX and TX, the one-piece HX and EX don't have connectors to accommodate different keyboards or adapters.

The Built-In Boot

Ever since I watched a school secretary,

trained on an Apple II, try to start a PC by putting a Wordstar disk in the drive and turning on the power, I've realized the advantages of making the operating system invisible to novice users. Apple does this by licensing its DOS to software companies so that programs come on boot disks. Like Toshiba's T1000 laptop, the 1000 HX does it by putting MS-DOS 2.11 in ROM—a ROM disk seen as a bootable drive C.

While Toshiba's ROM holds almost all of DOS, including utilities like Format and CHKDSK, Tandy leaves the DOS 2.11.26 utilities and GW-Basic 2.02 on disk. ROM contains only the system files, some Deskmate core routines, and the HX's startup menu program. But that's enough to start the machine (3 to 5 seconds after you press the switch) and to run and leave applications without seeing messages like "Insert COMMAND.COM disk in drive A."

The HX not only boots by itself but does so to a friendly blue menu. The on-screen menu lists all the COM and EXE programs and hatch files on your disk; selecting one with the arrow keys and pressing the enter key starts that program. Pressing the space

bar moves it onto the DOS command line if you need to add parameters.

Pressing the escape key or just starting to type a command gives you a normal DOS prompt from which F12 returns to the menu (under Tandy DOS, naturally; IBM DOS 3.2 ran fine, but didn't recognize the ROM drive). Users who graduate from simple one-level program and data disks will have to type a command instead of using the menu to change subdirectories.

Pressing the F1 key launches Personal Deskmate 2, if it's on the current disk; F2 lets you set the date and time if you didn't spring for the \$39.95 Smartwatch chip. Pressing F3 updates the menu list after a disk swap, and F4 reboots the computer from a system disk.

What if you're an expert user and want to turn off the menu, start from an internal or external drive instead of ROM, or use an Autoexec.BAT or Config.SYS file on drive A? What if you're an inexperienced user and always want to go right into Deskmate? A setup program on the DOS disk lets you specify these and other choices such as monitor type, CPU speed, or even the number of disk buffers and files used by the equivalent of Config.SYS in ROM. A 256-bit EEPROM (electronically erasable program ROM) stores your setup information.

I could wish for even more in ROM (such as DOS utilities and Basic), but the HX's self-booting menu is a landmark in MS-DOS home computing. It takes a great idea—DOS in ROM—and goes further, adding convenience for novices without sacrificing flexibility for advanced users. It even lets you stretch your language skills, changing the menu from English to French, Spanish, Dutch, or German.

Deskmate and Documentation

If the HX menu is friendly, its bundled software—Personal Deskmate 2, not the strongest but surely the cutest integrated software available—practically jumps into your lap and licks your face. This program combines seven applications, a clipboard for cutting and pasting between them, and helpful pop-up accessories like a calculator, note pad, and phone list, all on a customizable desktop. Similar to a Macintosh or Microsoft Windows package, Deskmate 2 is a snap to control with the keyboard, mouse, or joystick.

Compared to the Personal Deskmate shipped with the EX, version 2 steps further into Apple territory, adding more colors to the versatile Paint program (up to 16 at once) and a new Music program. The 1000's three-voice sound is no match for the 15-voice synthesizer of the Apple IIgs, but the Music software is excellent, letting



HX menu offers numerous choices, including language and power type.

you copy and paste measures like paragraphs in a word processor and arrange notes and instruments as you like.

The rest of Personal Deskmate 2 is a mixed bag. The desk accessories, calendar, and telecommunications program are impressive, but Text and Worksheet are simple introductions to using word processing and spreadsheet programs, respectively, and Filer is a mediocre card-style database (with the incredible feature of keeping required code in one of the sample data files, which you can't delete as you can the sample data files in other applications). In short, while Personal Deskmate 2 gets only fair marks for productivity, its two creativity programs are fun. It's a remarkably good, easy-to-use implementation of Macintosh-style menus, buttons, and dialog boxes.

The 1000 HX documentation is adequate. The setup and user's guide is fine, but the fat Personal Deskmate 2 manual is almost all reference and no tutorial, which seems odd for a program designed for beginners. Information on DOS is limited to a booklet listing most commands and a plug for Tandy's MS-DOS Reference Manual. A few

items on the DOS disk, from the mouse and RAM disk drivers to the keypad compatibility patch (KEYCNVRT.SYS), aren't mentioned at all.

Pretty Good Deal

Tandy's bargain prices on CPUs sometimes obscure omitted features (extra memory, a serial port) and steep prices on peripherals like video cards or hard disks. This criticism is only partly applicable to the home- and classroom-oriented HX, whose buyers won't need a video card and may never regret that they can't get an EGA (enhanced-graphics adapter). Thousands of families must have been happy to find Tandy's Christmas bundle of the HX and CM-5 monitor under their trees for under \$850.

Still, even if you pay list price for the sharper CM-11 monitor and other options, the HX holds its own. A unit loaded with the CM-11, 640K RAM, Smartwatch, an external 5¼-inch drive (for one drive of each size), serial port, and monitor stand retails for \$1,689—a huge jump over the cost of the HX alone but still \$300 or \$400 less than a comparably equipped Apple IIgs.

Savvy buyers can save money and get more expandability with a packaged PC clone, but they won't get Tandy's reassuring nationwide presence, the advantage of 720K disks, or the wonderful combination of DOS in ROM, the program menu, and bundled software that makes the 1000 HX the first MS-DOS home computer that truly outdoes Apple and Commodore.

As for those of us who aren't home computer customers, I can't help daydreaming about what Tandy or third-party engineers could do with the ingenious HX. How about one with an 80286 processor, 640K plus EMS (expanded memory specification), and a 3½-inch hard disk in the second drive bay? Just because it's the best 1000 yet doesn't mean the HX is the best 1000 possible. ■

Eric Grevstad is a free-lance journalist who's been writing about computers since 1982. He is coauthor of The Computer Guide to the Tandy 1000 (Ashton-Tate, 1985). You can contact him at 80 Micro, 80 Elm St., Peterborough, NH 03458.

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-accounting 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

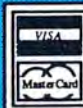
Designed for the maintenance of vendor and A/P invoice files. The system prints checks, voids checks, cancels checks, deletes cancelled checks, and deletes paid A/P invoices. The user can run a Vendor List, Vendor Status report, Vendor Aged report, and an A/P Check Register. This package can be used 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

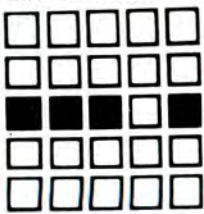
Dealer Inquiries Invited



Ordering Information

Add \$3.00 shipping & handling, MN residents add 6% sales tax.
Visa, Mastercard, COD (add \$3.50), personal checks.

(612) 633-6161



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.	775.00
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	155.00
102 Portable Computer 24K	375.00

TANDY PRINTERS

DMP-106 Dot-Matrix	165.00
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)	160.00
Portable Drive (100/102/200)	155.00
Tandy 20 Meg Hardcard	509.00
Tandy 40 Meg Hardcard	679.00
Tandy 40 Meg Tape Internal	595.00
Seagate ST-225 20 Meg Drive.	265.00
Seagate ST-251 40 Meg Drive.	495.00
Seagate ST-238 30 Meg Drive	285.00
Miniscribe M6085 70 Meg Drive.	905.00
Miniscribe M3053 40 Meg Drive.	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	CALL
0K MFB For 1000	98.00
512K MFB For 1000	CALL
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	465.00
Mono Graphics Card	110.00
300/1200 Baud Modem Card	75.00

MEMORY CHIPS

64K 150NS (Each)	CALL
256K 150NS (Each)	CALL

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
LQ-500 24Pin Matrix	375.00

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	195.00
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

Plus RS-232 Board	49.00
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
ZuckerBoard 300/1200	75.00
1400 LT Internal 1200B Modem	169.00

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

Prices Subject to Change.
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.

Making Macros

Personalized key macro program eliminates needless keystrokes.

by Jack Alban

One of the amazing functions of DOS is its ability to redefine the meaning of certain keys. For example, try putting `DEVICE=ANSI.SYS` in your friend Arnie's `Config.SYS` file and typing:

```
PROMPT $e{"a";"Arnie's hair is thinning!"p
```

at the prompt. Now Arnie will remember you every time he tries to type the letter "a."

These key redefinitions, or key macros, can be quite useful for letters, lengthy commands, or any other character sequences you use repeatedly.

Unfortunately, the DOS macro function is limited. If your word processor uses the ROM BIOS (basic input/output system) but not the DOS services to read and interpret the key buffer, your "a" will appear as an "a" no matter how you redefine it in DOS.

Practical Applications

I developed `Keymac.COM` as a solution to this problem. With only three or four key presses, for example, you can type your complete name and address at the top of a letter.

The program can also help with machine compatibility problems. I wanted to run software designed for my Tandy 1000 on an NEC Multispeed. The 1000 has F11 and F12 keys, but other compatibles may not. With `Keymac.COM`, I was able to redefine the alternate-O and alternate-P to do the work of the two missing keys.

Each time you press a regular key, the keyboard sends out a unique scan code for that key and calls Interrupt (INT) 9. If the key pressed wasn't a shift or toggle key, INT 9 translates the scan code into the 2-byte code that's placed in the key buffer.

As the key is released, the keyboard sends out a second scan code that's the same as the first but with 128 added to it. INT 9 is called again, but this second scan code—called the break code—is discarded.

The 2-byte key code placed in the key buffer is different for each type of key

pressed. The ASCII keys generate a code that contains the ASCII code in the low byte and the scan code in the high byte. Function keys generate a code that has zeros in the low byte and the scan code in the high byte.

The key buffer, where the codes are placed, begins at the memory address `0040:001E` in hexadecimal (hex) code. The buffer is a circular queue; when the position at `0040:003C` hex is filled with a key code, the buffer begins filling up again at `0040:001E` hex. The buffer can hold up to 15 key codes at one time and has a 16th dummy position to assist in manipulating the buffer reads. This gives your Tandy 1000 the ability to keep up with the fastest typist in the world.

After each key press, the memory location `0040:001A` hex (called the head pointer) contains the address of the next key code to be read from the buffer. The memory location at `0040:001C` hex contains the address where the code of the next key you press will be placed.

If no key has been pressed, and no key codes are waiting in the buffer, the head and tail pointers are equal.

If the buffer is full, the tail position is two behind the head pointer position in most cases. A special situation occurs when the head pointer contains the value `01E` hex. In this instance, the buffer is full if the tail pointer contains the value `3C` hex.

How It Works

`Keymac.COM` changes the meaning of your last key press by actually putting new key codes into the key buffer. No matter if your program uses the DOS services or the lower ROM BIOS services to read the key buffer, your key macro will hold up.

The program takes advantage of the fact that the lower BIOS interrupts are re-entrant. That is, through a simple program-

System requirements: Microsoft Macro Assembler. Available on April-June Disk Series, on sale in May.



MACROS

ming trick, you can make INT 9 actually call itself and then return to a procedure that modifies the interrupt. This modification examines the code of the key last pressed. If it is one of your redefined keys, the procedure replaces the key code with a new code or codes. Thus one key press can do the work of 15.

To create Keymac.COM, first type Program Listing 1, Keymac.ASM, in ASCII format with your word processor or Edlin program. Then insert your Microsoft Assembler program in drive B and type:
B:MASM KEYMAC;

Press enter. If the assembler points out no errors, link the program by typing:

B:LINK KEYMAC;

Press enter again. This will produce Keymac.EXE. To turn the program into COM file form, type:

B:EXE2BIN KEYMAC.EXE KEYMAC.COM

Press enter and delete Keymac.EXE.

Installation

To install the program, type:
KEYMAC

Press enter and the program will jump over the data area in Listing 1 to the procedure marked INSTALL:

The first thing INSTALL: does is turn off the interrupts; you're going to reset the vectors of two interrupts, and you don't want those interrupts to be activated while that's in process.

The next step determines the regular interrupt vectors for INT 9 by calling function 35 hex of INT 21 hex. The AL register contains the number of the interrupt being examined.

The vectors (addresses) of INT 9 are returned in the registers ES (segment address) and BX (offset address).

You want to point an unused interrupt (INT 90 hex) to these addresses, so you move the vectors into the DS:DX pair, move 90 hex into AL, and then call function 25 hex of INT 21 hex. From now on, when you call INT 90 hex, it will actually jump to the routine for INT 9.

Next you use the same routine to point INT 9 to your new procedure, which begins at the KEYBOARD: heading. Now turn the interrupts back on. You don't want to keep them off too long, because the time of day function in BIOS is updated 18.2 times a second. If that interrupt is turned off too long, the time of day count falls behind.

Finally, INSTALL: terminates your program, keeping everything before itself still resident in memory. This is done by pointing DX to the first procedure beyond your resident portion. DS is pointed to the current CS, then INT 27 hex is called.

Figure. Scan codes for letter and number keys.

1	2	3	4	5	6	7	8	9	SCN CODE
ESC	1	2	3	4	5	6	7	8	KEY
10	11	12	13	14	15	16	17	18	SCN CODE
9	0	-	=	BCKSPC	TAB	Q	W	E	KEY
19	20	21	22	23	24	25	26	27	SCN CODE
R	T	Y	U	I	O	P	[]	KEY
28	29	30	31	32	33	34	35	36	SCN CODE
RET	CTRL	A	S	D	F	G	H	J	KEY
37	38	39	40	41	43	44	45	46	SCN CODE
K	L	;	'	\	\	Z	X	C	KEY
47	48	49	50	51	52	53	57		SCN CODE
V	B	N	M	,	.	/	SPACE BAR		KEY

It's important that your data entries be at the beginning of your program. If they're at the end of your program, they'll be cut loose with the Install procedure and won't be available when you need them.

When the keyboard calls for INT 9, the computer will jump to your routine beginning at KEYBOARD: Your routine will call the real INT 9, which has been renamed INT 90 hex, and return to and execute your special key macro procedure. Control will be returned to the program or service in progress at the time you last pressed a key.

When you press a key and the keyboard calls INT 9, your special macro procedure again turns off interrupts. You're now going to compare and perhaps change key codes. If you press a key and INT 9 is called right in the middle of your procedure, it will throw everything into a tailspin.

Because you're about to change the flag settings and the value of a number of registers, it's best to preserve them at the outset by pushing them onto the stack.

The register ES is now set to the beginning of your current code segment. This is important because the ES:DI pair will be used to reference data in the data area of your key macro procedure.

First, however, you have to locate your ready key code (if there is one) in the key buffer. Check to see if the tail pointer and head pointer are equal. If they are, you have no key code waiting, and your routine ends.

If there is a code waiting to be read, determine its location using the head pointer at 0040:001A hex and move the actual key code into AX. This code is compared to the code at offset KEYCOMP1. If it's not equal, you drop to the next Compare, and so on. You can make 10 or so Compares without markedly slowing down your keyboard action.

Another Way

DOS provides an alternative method of entering ASCII characters and control

codes. To try it, hold down the alternate key and type the ASCII number for the character on the numeric keypad. For example, enter "A" by holding down the alternate key and typing 65. If a character or control code has been entered in this way, the low byte of the code will hold the ASCII value, and the high byte will be zero.

It doesn't matter to DOS whether you entered "A" by typing "A" or typing alternate-65. The key code for the first is 411E hex, and for the second, 4100 hex, but DOS puts an "A" on the screen no matter which key code was read.

This approach saves steps in creating your key macro program. You have to know the full key code, including scan code, to make the Compare. However, when you put the new key codes of your macro into the key buffer, you need only enter the ASCII value of the key press. The high byte of your key code can be zeros.

The only time you have to enter the full key code is when you're making a function key switch. To keep things simple, Keymac.COM won't allow you to enter a function key code in the middle of the longer ASCII macros at MACRON. The program does allow you to make a function key switch—one full key code for another full key code.

The full function key codes and the ASCII parts of the letter key codes (in decimal) can be determined using SCANASC.BAS, the Basic program provided in Program Listing 2. The scan codes for the letter and number keys are shown in the Figure.

In the sample program, Keymac.ASM, most of the ASCII characters at MACRON are entered in quotation marks. However, the carriage return is really an ASCII code you can enter by typing in 0D hex or 13 decimal (the ASCII for that key) outside of the quotation marks. Be sure to separate it from other characters with a comma.

When you place the Compare code in the data area at KEYCOMPn, you must

People Who Shop—Around Buy—Here

“ALL” TANDY[®] 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

MACROS

enter the full code. Remember to reverse the sequence here, because when the code is placed into memory, it will be reversed again.

Thus 003D hex must be entered here as 3D00 hex. The keycode for alternate-J, which is 0024 hex, must be entered as 2400 hex. The key code for "A," which is 411E hex, must be entered as 1E41 hex.

In Keymac.COM, the first macro causes alternate-J to print "80 Micro" and a carriage return. The second causes alternate-K to perform the function of the F3 key.

After the Compare is made and shown to be equal, the procedure tests to see whether this is to be a function key switch or a full macro substitution. If it is just a function key switch, you will have indicated this at FUNCn by putting a 1 there.

The program uses Boolean logic to test for the logical 1. The command:

```
TEST BYTE PTR CS:FUNCn, 01
```

behaves like the And instruction. The zero flag is set to ZR if a zero is found at the location FUNCn; if a 1 is in that location, the zero flag is set to NZ.

If this is a function key switch, your procedure makes the substitution in the key buffer and jumps to the end of your interrupt routine. If this is not a function key switch, your procedure gets the length of MACROn from LENn. It then jumps to a buffer flush routine. Discard any key

codes already in the buffer by making the value of the buffer tail pointer equal to the head pointer.

Before placing each new key code into the key buffer, your procedure tests for a buffer full condition as described above.

After the key code is placed in the buffer, the routine increments the tail pointer twice to indicate to the ROM and DOS services that a key code is waiting to be read. At this point it checks to see whether you have reached the 03C hex location. If

twice. Finally, all your other registers, including the flag register, are restored, interrupts are turned on, and your procedure returns control to the program or service that was in control before the last key press called INT 9.

You can easily add more key macros to the program. Just copy the key Compare blocks and substitute the new macro number (9, for example) for each number in the macro block names. Then do the same with the Compare loops. Remember to make the final Compare loop like the second one in the sample program.

Once you've typed in the program frame, you can develop different macro programs for different applications. However, you can't run more than one macro program at a time; if you try to do this, they'll interfere with each other.

If all you need are a few simple macros, this program should be adequate. If you need long, intricate key macros, you'll probably have to rewrite INT 9 and perhaps the ROM BIOS and DOS keyboard services as well or—if you prefer—just buy a key enhancer program for about \$50. ■

One key press
can do the
work of 15.

you have, the procedure sets the buffer tail position back to the beginning of the buffer at 01E hex.

As you progress to the end, it's important to remember to pop the CX off the stack. You must pop it both at END: and at OUT: because you pushed it on the stack

Jack Alban is an insurance agent who has been an avid computer hobbyist since 1984. You can contact him by self-addressed, stamped envelope care of 80 Micro, 80 Elm St., Peterborough, NH 03458.

Program Listing 1. To create Keymac.COM, type Keymac.ASM, shown below, in ASCII format, with your word processor or Edlin program.

```

CODE      SEGMENT  TITLE  KEYMAC.ASM
          ASSUME  PARA   PUBLIC 'CODE'
          ORG    CS:CODE,DS:CODE,ES:CODE,SS:CODE
          DB    100H

KEYS      PROC     FAR

START:    JMP     INSTALL          ;jump over data area

MACROCT   DW      2

; KEYCOMPARE BLOCKS-----
KEYCOMP1  DW      2400H
MACRO1    DB      "80 Micro",13
LEN1      DW      09
FUNC1     DB      0
FUNCWRD1  DW      00

KEYCOMP2  DW      2500H
MACRO2    DB      0
LEN2      DW      00
FUNC2     DB      01
FUNCWRD2  DW      3D00H

KEYBOARD:
INT        INT     90H           ;calls the real INT 9

          CLI      ;turn off lower interrupts
          PUSHF   ;save flags
          PUSH    DS      ;save registers to be used
          PUSH    AX
          PUSH    SI
          PUSH    DI
          PUSH    BX
          PUSH    CX

          PUSH    CS      ;point ES to beginning of CS
          POP     ES

          MOV     AX,40H   ;point DS to lower memory where
          MOV     DS,AX    ;key buffer resides

          MOV     SI,1AH   ;point SI to location of head ptr.
          MOV     AX,[SI]  ;move location of head ptr. to AX

          CMP     AX,DS:[1CH] ;compare with tail ptr. to see if
                                ;a keycode has been place in buffer

          JNE     CONTINUE
          JMP     OUT

CONTINUE:
          MOV     SI,AX     ;and set SI to that location
          MOV     AX,[SI]  ;move key code into AX

          MOV     CX,CS:MACROCT ;set up maximum number of compares

;KEYCOMPARE LOOPS-----
CMP1:     MOV     BX,CS:KEYCOMP1 ;set up for and
          CMP     AX,BX         ;make first compare
          JNE     DLOOP1       ;if not equal, move on
          TEST    BYTE PTR CS:FUNC1,01 ;is it fnctn key switch?
          JZ      MLOOP1       ;if no jump, to macro routine

          MOV     AX,CS:FUNCWRD1
          MOV     DS:[SI],AX
          JMP     OUT

MLOOP1:   MOV     CX,CS:LEN1    ;get the macro length in CX
          MOV     AX,OFFSET MACRO1 ;set up DI to point to
          MOV     DI,AX         ;first key macro
          JMP     FLUSH        ;jump to buffer flush

DLOOP1:   DEC     CX           ;decrease count
          CMP     CX,00        ;last compare?
          JNE     CMP2         ;if no, jump to next compare
          JMP     OUT          ;if so, jump to end of INT

CMP2:     MOV     BX,CS:KEYCOMP2
          CMP     AX,BX
          JNE     OUT
          TEST    BYTE PTR CS:FUNC2,01
          JZ      MLOOP2
          MOV     AX,CS:FUNCWRD2 ;move into buffer new
          MOV     DS:[SI],AX    ;function key code
          JMP     OUT

MLOOP2:   MOV     CX,CS:LEN2

```

Listing 1 continued

DiskCount Data

WHERE
QUALITY PROGRAMS
MEET COMPETITIVE PRICES

2701-C.W. 15th • SUITE 612 • PLANO, TX 75075 • (214)680-8268

Hi-Res TRS-80 Software

Backgammon	\$ 29
Biorythm & USA Map	19
Bigraph was 98 NOW	75
Dogcatcher Mod IV Only	19
Draw	39
Pro-Draw . . . brand new	59
Fractals	19
G Basic 3.0 for R/S board	49
Life & Spirograph	24
Mathplot	29
Slideshow	19
Surface Plot	29
Tournament Chess	49
Tournament Reversi	29
XTCAD	239
3D Plot	39
3-D Tic Tac Toe	19

Books & Misc.

Using SuperUtility	\$ 15
SuperUtility Tech Manual	13
Rom Routines Documented I/III/4	19
Green Screen I/III/4/4p	16
TRS-80 for Kids 8 to 80 Vol 1 or 2	7
IBM PC for Kids 8 to 80	7
How to Maintain/Service your Computer	7
Number Syst., Logic & Boolean Algebra	7

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 \$129.95

The Home Accountant

PC/MSDOS or TRS-80 III by Continental Software. One of the worlds most popular financial software packages, the Home Accountant gives you everything you need for the efficient mgt. of your financial affairs.

- Handles cash, checkbooks, credit cards and other liabilities & Expenses.
- Prints a balance sheet & net worth report and checks if desired.
- Provides fast bank reconciliation.
- Keeps track of up to 5 checkbooks.
- Maintains up to 200 (IBM) or 100 (TRS) budget categories
- Supports virtually all printers.
- Allows automatic transactions on most computers.
- Maintains transaction history.
- Search or print out just the info you need eg. tax related items, etc.

MSDOS Version Retail \$150 NOW 79.
TRS-80 III Retail \$99 NOW 69.

Datagraph Printer Graphics

Transform your Visicalc or Multiplan files into high resolution custom graphs on your TRS-80 computer and graphics printer. High resolution—60x72 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

SPS Statistical Processing System

This is the finest statistical package in existence for the TRS-80's. Fully menu driven it contains the following: Descriptive Stats & Plots, Parametric and Non-Parametric Correlation, Regression Analysis, Mean Differences and Analysis of Variance, Test Distributions Cross Tabs for R x X Contingency Tables and Qualitative Variables, Monte Carlo Variable Distributions and Multivariate Analysis of up to 50x50 Correlation Matrices. Model I or III Specify Retail \$200 NOW Only \$99.

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
Call for additional details

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

TRS-DOS to MSDOS conversion utilities
A must for converting TRS-DOS 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

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

LeScript w/Spell-checker	\$ 179
Electric Pencil PC w/PC Proofreader	49
Typing Tutor III (Simon & Schuster)	34
Websters New World Spelling Checker	54
Websters New World Thesaurus	59
The Twin Classic (1-2-3 Clone)	69
Cornerstone (Infocom)	94
PFS 1st Choice 2.0	129
Reflex	129
Copy II PC	29
DosTamer	49
Microsoft Windows	79
Norton On Line Programmers Guides	69
Norton Commander	56
Norton Utilities 4.0	69
1 Dir Plus	79
PC Tools Delux	59
Addition	59
Printworks	59
SideKick (non-protected)	59
Sideways	54
Superje	59
The Home Accountant Plus	79
Managing the Market	119
Managing Your Money	149
Microsoft Learning	39
DOS	39
Microsoft Quick Basic Comp	79
Microsoft C Compiler	349
Microsoft Macro Assembler	129
Certificate Maker	49
Prodesign II	249
The Print Shop	49
Print Shop Graphics Library	29

DAC Easy Accounting 2.0	74
Alge Blaster	44
Loderunner	29
Info 4-in-one Sampler	7
F-15 Strike Eagle	29
Flight Simulator	39
GATO	34
Computer S.A.T. (H.B.J.)	79
Jet	44
Math Blaster	39
Mind Prober	39
NewsRoom Pro (New)	99
Sargon III	34
DBXL	109
PFS Professional File	199
VP Info	69
Dollars and Sense 3.0	149
Azto Sketch Standard	69
Boeing Graph 4.0	299
Boeing Calc 4.0	299
Chartmaster	279
Fontasy	49
FormTool 2.0 w/Greatest Hits	77
GemDraw Plus	226
Generic CADD 3.0	74
PFS First Publisher	79
Picture Perfect	279
VP Graphics	69
Quattro	149
Q & A 2.0	229
VP Planner Plus	129
PFS Professional Write	159
Right Writer 2.1	74
CrossTalk XVI	149
Cruise Control	34
Desqview 2.0	106
Disk Optimizer	42
Mace + Utilities 4.1	74
Magic Mirror	65
Memory Mate	59
Metro (Lotus)	82
Note It Plus	69
Pizzaz	39
Print-Q	82
Print Works	57
Q Dos II	52
SQZ!	69
Tornado Notes	49
VP Expert	69
X-Tree Pro	92
Ace of Aces	29
Advanced Flight Simulator	39
Ancient Art of War	36
Artic Fox	34
Balance of Power	42
Black Cauldon	34
Chestmaster 2000	36
Destroyer	34
Falcon	36
Flight Simulator	39
Graphic Expander	34
Gunship	39
Infiltrator II	37
Jet	39
Kings Quest III	39
Leisure Suit Larry	29
Marble Madness	34
MathBlaster Plus	34
Might & Magic	39
News Master	69
NFL Challenge	74

Patton vs. Rommel	42
Pinball Wizard	26
Police Quest	39
PrintMaster Plus	42
Scrabble	36
SDI	39
Silent Service	27
Space Quest II	39
Starflight	42
Thexder	27
Ultima IV	49
Where in the USA	34
Where in the World	32

TRS-80 Software

Le Script I/III/4 w/Spell-checker	\$ 109
Power Drivers for SuperScript and Epsoms C.Itoh Prowriter, Starwriter and Okidata 92 for I/III/4. Specify printer	24
PowerScript for Scriptit	29
Multidos Version 2 Mod I/III	79
Specify	79
Multidos 80/64 ver. 2	89
Mod 4	89
Fast/CMD run TRSDOS 1.3 in 4 @ 4MHz	29
J&M Memory Minder	84
Mod I	84
J&M Memory Minder	74
Mod III/4	74
The Toolbox for LDOS I/III	44

The Toolbelt for TRSDOS 6	44
Pascal-80 I/III	59
Zuess Editor/Assembler I/III/4	74
System Diagnostic I/III/4	69
Specify	69
Trashman I/III String Compressor	39
TalleyMaster I/III	69
Faster I/III Speed up	29
BASIC RPM Disk Drive Timer	29
Accel 3/4 Basic Compiler I/III	49
Dostamer Mod 4 or MSDOS	49
Z-Basic Compiler 3.1	79
Monitor 5 I/III/4	19
Specify	19
SuperUtility	49
Test Question Data Bank III/MS	49
Test Generator/Drill III	34
Student Schedule Data	49
Base III	49
Powerdraw I/III	24
Powerdot II Mod I/III	39
Spec.Pmtr	39

Meltdown (Nuclear Power-plant) I/III	19
FBN General Ledger Mod III	150
Powermail Plus I/III/4	69
Specify	69
Powermail Plus w/Text Merge	89
The Basic Checkbook I/III	39
Loan Ammortization Mod III	29
Inventory Control ICS Pro Mod I/III	69
SPS Statistical Analysis I or III	99
The Home Accountant Host I/III	69
ENBASE (Data Base) I/III	79
ST-80 III Terminal/Host I/III	69
Ultraterm w/Auto log-on I/III	59
Modem 80 Mod I/III	39
Modem 80 Mod 4	79
MacroTyping (Typing Practice) I/III/4	34
InfoScan I/III	29

Send for A More Complete Listing of Our TRS-80 & MSDOS Software

Mail your order in today, or for immediate shipment,
CALL 214-680-8268/OPEN MON.-FRI. 10-6 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.



PC - SPRINT 1000

SPEED FOR THE 1000/1000A!!

PC-Sprint makes your Tandy 1000 or 1000A faster than an SX. Your computer is NOT obsolete! Uses NO expansion slot.

- Run your 1000 at 7.38 mhz.
- Run your 1000A at 9.54 mhz!
- 280% speedup (Norton SI rating)
- Speeds up all software—you can see the difference
- "Slotless" plug-in installation
- External speed switch
- Change speed "on the fly" while software is running
- 1000A also includes software speed switching

7.38 mhz! 9.54 mhz! **\$99.95**

Includes:



PC-Sprint circuit card, NEC V20 and/or 8088-2 micro-processor, cables, instructions, warranty, tool, remote mount switch, free BBS subscription to Exec-PC.

Prices and specifications subject to change without notice.

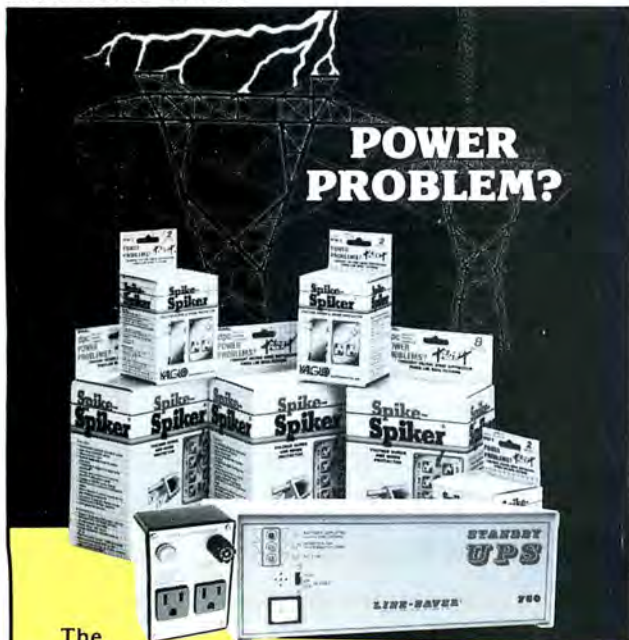
DAS Technologies Inc.

340 W. University Drive,
Suite 17,
Mesa, AZ 85201.

ORDER
HOTLINE
(602) 844-1777



Circle 77 on Reader Service card.



POWER PROBLEM?

The Solution!



Computer Grade
Power Protection Products

TRANSIENT VOLTAGE SURGE SUPPRESSORS
POWER LINE FILTERS • POWER LINE CONDITIONERS
STANDBY UNINTERRUPTIBLE POWER SYSTEMS

1-800-524-0400, in PA 215-837-0700

CALL TODAY FOR FREE LITERATURE

Kalglo Electronics Co., Inc.
6584 Ruch Road
Bethlehem, PA 18017-9359

DEALER-VAR-OEM
INQUIRIES INVITED

MACROS

Listing continued

```

MOV      AX,OFFSET MACRO2
MOV      DI,AX
JMP      FLUSH

OUT:
POP      CX      ;restore registers
POP      BX
POP      DI
POP      SI
POP      AX
POP      ES
POP      DS
POPF     ;restore flags
STI      ;reenable interrupts
IRET     ;end modified INT 9

FLUSH:
MOV      AL,DS:[1AH] ;flush key buffer by making tail
MOV      DS:[1CH],AL ;pointer equal to head pointer

PUTINBUFFER:
PUSH     CX      ;save the count
MOV      BX,1AH  ;set up to move and then
MOV      CX,DS:[BX] ;move into CX the head pointer
CMP      SI,3CH  ;is tail ptr. at buffer's end
JE       BUFFEREND ;if yes, jump to special routine
DEC      CX      ;decrease CX by two and then
DEC      CX
CMP      CX,SI   ;test to see if equals tail ptr.
JE       END     ;if so, buffer is full, so end
JMP     OK_TO_ADD ;else go on to add code to buffer

BUFFEREND:
CMP      CX,1EH  ;is head ptr. at start of buffer
JE       END     ;if so, buffer is full, end

OK_TO_ADD:
POP      CX      ;restore the count
XOR      AX,AX   ;clear AX to zeroes
MOV      AL,ES:[DI] ;move letter of key macro
MOV      DS:[SI],AX ;into buffer
INC      DI      ;point to next letter of macro
INC      SI      ;reset SI to position where next
INC      SI      ;key code will be placed in buffer
CMP      SI,03CH ;are we at end of buffer?
JA       BUFBEGIN ;if so, jump to wrap procedure

RESETBUF:
MOV      DS:[1CH],SI ;set tail pointer to new position
LOOP    PUTINBUFFER ;loop back if not at end of macro
JMP     OUT       ;else jump to end of procedure

BUFBEGIN:
MOV      SI,1EH   ;end of buffer, wrap to buffer start
JMP     RESETBUF

END:
POP      CX
JMP     OUT

INSTALL:
CLI      ;turn off interrupts
MOV      AX,3509H ;get interrupt vectors for INT 9
INT      21H

MOV      AX,ES    ;point ES and DX to old interrupt
MOV      DS,AX    ;vectors for INT 9
MOV      DX,BX
MOV      AX,2590H ;set unused INT 90H to
INT      21H      ;INT 9 vectors

PUSH     CS      ;set DS:DX pair to new procedure
POP      DS
MOV      DX,OFFSET KEYBOARD ;reset INT 9 to this
MOV      AX,2509H ;procedure
INT      21H

STI      ;turn on interrupts
MOV      DX,OFFSET INSTALL ;set DX to just beyond proc.
INT      27H      ;terminate, stay resident

KEYS    ENDP

CODE    ENDS

END     START
    
```

Program Listing 2. SCANASC.BAS determines the function key codes and the ASCII parts of the letter key codes (in decimal).

```

1140 0 REM SCANASC.BAS
2350 10 KEY OFF:FOR X=1 TO 12:KEY X,"":NEXT
2954 20 PRINT"PRESS ANY KEY TO DISPLAY IT'S CODE."
3475 21 PRINT"TO RETURN TO MS-DOS, TYPE [CTRL] [BREAK]."

```

NOCONA

ELECTRONICS



TANDY COMPUTERS



WHOLESALE PRICES TO EVERYONE!

1MG. MOD 4000	*1799.00	DMP106 PRINTER	149.00
512K MOD 3000 HL	*1039.00	DMP130 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	559.00
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	499.00
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 . . STANDARD 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



Rose®

You've Got **TOTAL ACCESS**

(specializing in TRS80™)

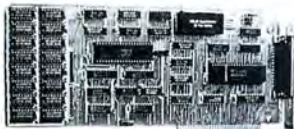
**TO YOUR COMPUTER HARDWARE & SOFTWARE
NEEDS. CALL ROSE TODAY!**



**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..\$42 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..\$168



30 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.

30 Megabyte Hard Disk Drive..\$439



**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

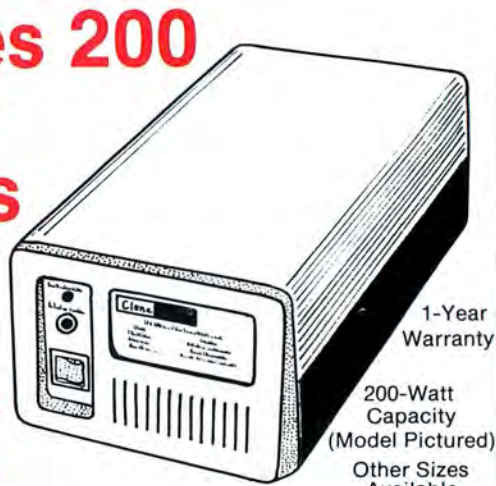
Add \$4 shipping and handling for boards.
Add \$10 shipping and handling for drives.



**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 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... \$72



Rose Gives 200 Watts for 200 Bucks

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

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

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. 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

"Serving You Since 1980" AD 26

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.

©1988 by Total Access. All rights reserved.

A Routine to Watch Over Me

Avoid entering the wrong data and tedious editing.



by Leonard Jackson

Though foolproof data input, editing, and attractive screen design can be elusive, they need not be. Instead of using repetitive Basic Input and Line Input statements, you can use my protected-field input routines.

You can control your keyboard input completely without much internal editing. If you specify a numeric field, you can be sure you entered a number; you need only edit the range. You limit the number of characters that can be accepted when you

specify the field size.

I used a seldomly noticed subroutine from Radio Shack's *TRS-80 Model I, Level II Basic Reference Manual* (p. H/1) as the basis for protected-field input routines you can use on MS-DOS machines in Basic and C.

Neither Basic Input nor Line Input statements give you adequate control over keyboard input. To avoid entering too many characters or the wrong data, you must painstakingly edit each entry. Your computer can help you by displaying instructions in a prompt or message, but this doesn't prevent you from pressing the wrong key (and getting a "Redo" message) or doing the wrong thing (and crashing your program).

When you include the protected-field subroutine in your program, you would have already established the field size and data type. The field size for the input is displayed as a series of discrete field indicator characters (see the Photo). You can enter only as many characters as will fit in the field, and the input of alphabetic data to a field designated for numeric input is prevented. It's easy to set up input editing so that if the program asks you to enter "1," "2," "3," or "4" from a menu and you press "5," it won't accept the incorrect entry. The subroutine verifies the entry, which means you don't need to include many error checking lines, and you won't crash your program.

Integrating the Subroutine

The first steps in preparing for data input (clear screen, write the menu title, etc.) are routine. This procedure doesn't change until you get to the prompts for data input. You might display one prompt and wait for the answer, but I prefer to display all

System Requirements: Basic or C compiler. Available on the April-June 1988 Disk Series, on sale in May.

EMPLOYEE DATA RECORD ENTRY

```

1) EMPLOYEE NAME: JOHN BROWN
2) EMPLOYEE NUMB: 41804
3) EMPLOYEE DEPT: 10
4) WEEKLY SALARY: 221.46
5) DATE OF HIRE: *****
6) JOB TITLE:

```

Photo. The field size is displayed as a series of discrete field indicator characters.

prompts for data input before I move the cursor for the first keyboard entry. This lets you determine in advance what information you need to make screen entries. In setting up the screen, you can use your artistic talents to place prompting statements and print messages at any location and in any order. You can then use the protected-field subroutine to service these prompts in any sequence you like.

To use the protected-field subroutine in a program, set FL, the field-length variable in the Protected Field Example (see Program Listing 1), to the appropriate number of characters to enter. This can be the number of allocated character spaces in a record field you'll use to store this entry or the number of columns available in a report where this data will be printed. If the input is numerical, express the length as a negative integer. In numerical mode you can use the field size to limit the range of values that can be entered. For instance, if the field size is set to -3, the largest number you can enter is 999 and the lowest is -99 (the minus sign in the -99 counts as one character).

Use the Locate statement in Listing 1 to position the cursor at the desired location, and call the protected-field subroutine with a GOSUB statement. All data returned from the protected-field subroutine is in a common string variable, IN\$. Use an Assignment statement with the VAL function for numeric input to move the input to a program variable. Do additional editing before servicing the next input prompt message. After the last screen entry, give the user the opportunity to correct an error, start again, or exit. If the user selects the wrong choice from a menu, give the option to exit without answering all the prompts. Listing 1 shows how these considerations can be addressed in Basic and serves as an example of how you can use the protected-field subroutine in your programming.

Design Considerations

Even if the protected field as presented here seems to be everything you need, it is important to understand it completely. Later, you might add a new twist or come up with an improvement on the routine.

By studying the pseudo code in the Figure,

you can see that the operations required in the protected field routine are as follows:

- Getting a limited number of characters from the keyboard without echoing the characters to the screen as they are entered;
- Verifying each character as it is entered to ensure that it is appropriate for the type of data input required, and for numeric input, checking to ensure that any sign entered is accepted only in the first field position;
- Accepting and displaying all appropriate characters.

For the following discussion, refer to Listing 1. Because the logic is the same regardless of the language you use, I will

explain only the Basic listing, Protected-Field Example (Listing 1), in detail. See Program Listing 2 for a protected-field function for a C compiler.

The Nitty-Gritty

In Basic, INKEY\$ reads a character from the keyboard without a screen echo (line 690). Other languages may not have this function, but you can use a call to function 08 hexadecimal (hex) of interrupt 21 hex or interrupt 16 hex. Listing 2 shows one way this can be done.

After reading a character from the keyboard, you must verify the character to

```

+++++ PSEUDO CODE FOR PROTECTED FIELD SUBROUTINE +++++
***** WRITTEN BY LEONARD JACKSON *****
***** 1721 BRUCE DEVLIN, ELPASO, TEXAS, 79935 *****
start: Set input string variable to null.
      Set decimal-flag to false.
      Set sign-flag to false.
      Set number-of-characters-accepted to zero.
      If field-length is zero
        Set field-length to one
      Endif.
      Display field-indicator-characters to fill specified field size.
      Reposition cursor to beginning of field.
getchr: Get character from keyboard - do not echo to screen.
      Assign the ASCII value of input character to an integer variable.
      If the input string variable is empty and ENTER was pressed
        Assign a space to the input string variable
        Goto exit
      Endif.
      If the input is a lower case character
        Convert to upper case, (optional)
      Endif.
      If the field is full, no printable characters can be accepted
        Goto contrl
      Endif.
      If mode is alphanumeric and the character is printable
        Goto accept
      Endif.
      If mode is numeric and the key pressed is 0 through 9
        Goto accept
      Endif.
      If a decimal point was entered and the decimal-flag is false
        Set decimal flag to true
        Goto accept
      Endif.
      If a sign was entered and sign-flag is false and input string is empty
        Set sign-flag to true
        Goto accept
      Endif.
contrl: If a backspace was not entered
        Goto escape
      Endif.
      If the input string variable is empty, cursor is at start of field
      Endif.
      Move cursor back one space.
      Print a field-indicator-character.
      Move cursor back one space again.
      Decrement the accepted character count.
      Set sign-flag and decimal-flags to false.
      Inspect remaining accepted characters.
        If a decimal point is found
          Set decimal-flag to true
        Endif.
        If a sign is found
          Set sign-flag to true
        Endif.
      Goto getchr.
escape: If the ESCAPE key was pressed
        Move cursor to beginning of field
        Goto start
      Endif.
      If ENTER was not pressed
        Goto getchr
      Endif.
      Overwrite remaining field-indicating-characters with spaces.
      Return to calling module.
accept: Add the input character to the input string variable.
      Increment the count of accepted characters.
      Display the accepted character.
      If the specified field-size is one
        Goto exit
      Else
        Goto getchr
      Endif.

```

Figure. Pseudo code for a protected-field subroutine.



MARYMAC

INDUSTRIES INC.

Radio Shack
Tandy®

Radio Shack
Tandy®

★ COMPUTERS ★
★ PRINTERS ★ SOFTWARE ★
★ MODEMS ★
★ CELLULAR PHONES ★
★ AND MORE ★

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 COMPUSERVE-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

determine if it is appropriate. But first look at line 710. If the first and only key pressed is the enter key, control returns to the caller. I prefer to return a space instead of a null string. On some systems, VAL(" ") is not the zero you usually want in this instance.

Line 720 is a lowercase trap that converts all lowercase characters to uppercase. Depending on your application, you may choose to omit this line.

If you press a key other than enter and the field is full, the character cannot be accepted as part of the input string. In this case, the character is ignored unless you pressed the backspace or escape (ESC) key. Both will free space in the field.

Line 730 handles the field-full condition with a jump to line 780, where a backspace is serviced, or moves the program to line 840 to check for an escape key. At line 880, all characters found to be appropriate are displayed and added to the input string. This verification takes place in lines 740-770. In alphanumeric mode (field length specified as a positive integer), usu-

ally all printable characters with an ASCII value from 32-126 are accepted and displayed. You can easily change this range to meet your specific requirements by changing the appropriate constant in line 740.

Lines 750-770 are for numeric mode (field length specified as a negative integer) input verification. Line 750 accepts the character if it has an ASCII value of a digit character from zero to 9. Line 760 accepts a decimal point but only one. Line 770 accepts a sign but only one and only in the first position of the field.

Lines 780-820 handle the backspace. Line 790 causes the backspace to be ignored unless the count of accepted characters is greater than zero. Line 800 moves the cursor back one space, restores the field indicator character, decreases the count of accepted characters, and removes one character from the input string. If a decimal point is in the remaining input string after the backspace, line 810 sets the decimal flag (WD) to 1. Otherwise the decimal flag is reset to zero. Line 820 checks for a sign

after the backspace. If a sign is found, the sign flag (WS) is set. Otherwise it is reset.

Pressing escape results in a jump to line 840, where the cursor is repositioned at the beginning of the field. A jump back to line 650 restarts the protected-field subroutine. If the key pressed is not enter, line 850 is a jump back to get another character. If the key pressed is enter, line 860 overwrites the remaining field indicator characters with spaces. Line 870 is a return to the calling program.

If you're working in C, you may want to terminate your field of accepted characters with a zero byte or the backslash and zero characters (\0) to facilitate manipulations using string functions.

You'll need to work with the protected-field subroutine for a short time before you'll be comfortable with it. After that, you won't want to be without it. ■

Leonard Jackson is a software engineer for Raytheon Service Co. in El Paso, TX. You can write him at 1721 Bruce Devlin, El Paso, TX 79935.

Program Listing 1. Protected Field Example, a program for demonstrating the use of a protected-field subroutine.

```

10 ' Program: PFLDEXMP.BAS
20 ' Written by: Leonard Jackson
30 ' 1721 Bruce Devlin, ElPaso, Texas 79935
40 '
50 ' PROGRAM TO DEMONSTRATE THE USE OF A PROTECTED-FIELD SUBROUTINE.
60 '
619 70 KEY OFF
811 80 CLS:FLAG=0
3923 90 LOCATE 1,10:PRINT"EMPLOYEE DATA RECORD ENTRY"
2270 100 LOCATE 2,1:PRINT STRINGS(79,205)
2539 110 LOCATE 4,10:PRINT"1) EMPLOYEE NAME:"
2560 120 LOCATE 6,10:PRINT"2) EMPLOYEE NUMB:"
2559 130 LOCATE 8,10:PRINT"3) EMPLOYEE DEPT:"
2586 140 LOCATE 10,10:PRINT"4) WEEKLY SALARY:"
2396 150 LOCATE 12,10:PRINT"5) DATE OF HIRE:"
2242 160 LOCATE 14,10:PRINT"6) JOB TITLE:"
3005 170 LOCATE 23,10:PRINT"<ENTER 'X' TO EXIT MENU>"
2377 180 LOCATE 4,28:FL=20:GOSUB 620:NMS=INS
1243 190 IF NMS="" GOTO 180
1946 200 IF INS="X" OR INS="x" GOTO 610
962 210 IF N GOTO 450
3559 220 LOCATE 23,10:PRINT"<ENTER NUMBER GREATER THEN 9999>"
2798 230 LOCATE 6,28:FL=5:GOSUB 620:NUMB=VAL(INS)
1477 240 IF NUMB<9999 GOTO 230
966 250 IF N GOTO 450
2996 260 LOCATE 23,10:PRINT"<ENTER 10,20,30, OR 40>"
2727 270 LOCATE 8,28:FL=2:GOSUB 620:DPT=VAL(INS)
3607 280 IF (DPT<10 AND DPT<20 AND DPT<30 AND DPT<40) GOTO 270
970 290 IF N GOTO 450
3495 300 LOCATE 23,10:PRINT"<ENTER VALUE BETWEEN 120 AND 640>"
2737 310 LOCATE 10,28:FL=6:GOSUB 620:PAY=VAL(INS)
1997 320 IF PAY<120 OR PAY>640 GOTO 310
965 330 IF N GOTO 450
3062 340 LOCATE 23,10:PRINT"<ENTER MM/DD/YY>"
2412 350 LOCATE 12,27:FL=8:GOSUB 620:DOHS=INS
3228 360 IF (MIDS(DOHS,3,1)<>"/" OR MIDS(DOHS,6,1)<>"/") GOTO 350
3235 370 IF (MIDS(DOHS,7,2)<"00" OR MIDS(DOHS,7,2)>"87") GOTO 350
3212 380 IF (MIDS(DOHS,4,2)<"01" OR MIDS(DOHS,4,2)>"31") GOTO 350
3182 390 IF (LEFTS(DOHS,2)<"01" OR LEFTS(DOHS,2)>"12") GOTO 350
963 400 IF N GOTO 450
2226 410 LOCATE 23,10:PRINT STRINGS(69,32)
2455 420 LOCATE 14,24:FL=15:GOSUB 620:JOBS=INS
620 430 FLAG=-1
2229 440 LOCATE 23,10:PRINT STRINGS(69,32)
4648 450 LOCATE 25,10:PRINT"ENTER LINE NUMBER TO CHANGE OR <ENTER> TO SAVE:"
1805 460 FL=-1:GOSUB 620:N=VAL(INS)
1497 470 IF N<0 OR N>6 GOTO 450
1951 480 ON N GOTO 170,220,260,300,340,410
415 490 CLS
2801 500 LOCATE 5,10:PRINT"EMPLOYEE NAME IS ";NMS
2781 510 LOCATE 7,10:PRINT"EMPLOYEE NUMBER IS ";
1642 520 PRINT USING "#####";NUMB
3084 530 LOCATE 9,10:PRINT"EMPLOYEE DEPARTMENT IS ";
1465 540 PRINT USING "##";DPT
2656 550 LOCATE 11,10:PRINT"WEEKLY SALARY IS ";
1657 560 PRINT USING "$$###.##";PAY
2753 570 LOCATE 13,10:PRINT"DATE OF HIRE IS ";DOHS
2598 580 LOCATE 15,10:PRINT"JOB TITLE IS ";JOBS
4283 590 LOCATE 24,10:PRINT"PRESS ANY KEY TO CONTINUE: ";FL=1:GOSUB 620
631 600 GOTO 80
682 610 CLS:END
620 ' ***** PROTECTED FIELD SUBROUTINE *****
630 ' ***** WRITTEN BY LEONARD F. JACKSON *****

```

```

2298 640 ' ***** 1721 BRUCE DEVLIN, ELPASO, TEXAS, 79935 *****
1241 650 INS="" : WS=INKEYS:WD=0:WL%=WD:WS=0
660 IF FL=0 THEN FL=1
1905 670 PRINT STRINGS(ABS(FL),254);
2851 680 FOR I%=1 TO ABS(FL):PRINT CHR$(29);:NEXT I%
1806 690 WS=INKEYS:IF WS="" THEN 690
873 700 WV%=ASC(WS)
2590 710 IF WV%=13 AND WL%=0 THEN INS="" :GOTO 860
3222 720 IF WV%>96 AND WV%<123 THEN WV%=WV%-32:WS=CHR$(WV%)
1589 730 IF ABS(FL)=WL% THEN 780
2491 740 IF FL>0 AND WV%>31 AND WV%<127 THEN 880
2452 750 IF FL<0 AND WV%>47 AND WV%<58 THEN 880
2475 760 IF WV%=46 AND WD=0 THEN WD=1:GOTO 880
3769 770 IF (WV%=45 OR WV%=43) AND WS=0 AND WL%=0 THEN WS=1:GOTO 880
1277 780 IF WV%<8 THEN 840
790 IF WL%=0 THEN 690
4324 800 PRINT CHR$(29);CHR$(254);CHR$(29);:INS=LEFT$(INS,LEN(INS)-1):WL%=WL%
-1
1926 810 IF INSTR(INS,".")=0 THEN WD=0
3148 820 IF INSTR(INS,"+")=0 AND INSTR(INS,"-")=0 THEN WS=0
691 830 GOTO 690
3429 840 IF WV%=27 THEN PRINT STRINGS(WL%,CHR$(29));:GOTO 650
1322 850 IF WV%<13 THEN 690
2096 860 PRINT STRINGS(ABS(FL)-WL%, " ");
671 870 RETURN
2073 880 PRINT WS;:INS=INS+WS:WL%=WL%+1
2286 890 IF ABS(FL)=1 THEN RETURN ELSE 690
900
910 ' ***** END OF PROTECTED FIELD SUBROUTINE ***** End

```

Program Listing 2. Protected Field in C, a protected-field function written for a C compiler.

```

/*
 * pfld.c - Protected field for user data input from keyboard
 * ***** Written by Leonard F. Jackson *****
 * ***** 1721 Bruce Devlin, ElPaso, Tex. 79935 *****
Usage - To set for numerical data mode, express field size as a negative value.
       To set for alphanumeric mode, express field size as a positive value.
       Entered characters will be left in the global array "hold".
*/

#include "stdio.h"
#include "dos.h"
pfld(size)
int size; /* Field size from calling function. */
{
extern char hold[]; /* Global array for up to 81 characters */
int wd,ws,wl,wv,i,j,scan_code; /* Integers used in this function. */
char *ptr; /* Pointer for array "hold". */
struct REGS regs; /* New structure from template REGS. */
struct REGS *rptr; /* Pointer for structure "regs". */
rptr=&regs; /* Set rptr to point to address of regs */
ptr=hold; /* Set ptr to point to address of hold. */
wd=ws=wl=mv=0; /* Initialize working variables to zero. */
if(size=0) size=1; /* Ensure that field size is not zero. */
i=abs(size); /* Set i to field size. */
for(j=1;j<=i;j++) disp_putc(254); /* Display field indicator characters. */
for(j=1;j<=i;j++) disp_putc(8); /* Return cursor to beginning of line. */
while(wl=13) /* Loop till carriage return is entered. */
{ disp_flush(); /* Update screen. */
rptr->ax = 0; /* Set ax register to zero. */
int86(22,rptr,rptr); /* Interrupt 16 hex to get kbd input. */
scan_code = ((rptr->ax & 0xFF00) >> 8) & 0xFF;
}
}

```

Listing continued

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

Hypercross	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.	\$49.95
PCXZap	Read/Write/Format TRS-80 diskettes in your PC. All DD TRS-80 formats.	\$79.95
Cnv3toPC.BAS	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.	
Cnv4toPC.BAS	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.	\$99.95
PC BASIC RTNS	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.....	\$24.95
FASTSORT	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.	\$24.95

PACKAGE DISCOUNTS

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

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.

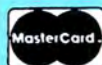
Call today for further details and a free estimate.



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.

WATCH

Listing continued

```

/* Keyboard scan code is in AH. */
if(scan_code==59 || scan_code==60)
  wv=13; /* F1 or F2 key pressed, same as ENTER. */
else
  wv = rptr->ax & 0xFF; /* Set wv to key-ascii value in HL. */
if(wlci) /* Consider character for acceptance */
  /* only if number of characters input */
  /* so far is less than the field size. */
  ( if(size>0 && wv>31 && wv<127) /* If mode is alphanumeric and */
    /* character is printable - accept. */
    { *ptr=wv; /* Move character to address in ptr. */
      disp_putc(wv); /* Display the character on the screen. */
      ptr++; /* Increment ptr to next element. */
      wl++; /* Increment the input character count. */
    }
  else
    if(size<0 && wv>47 && wv<58)
      /* Else if mode is numeric and key */
      /* pressed is 0 thru 9 - accept. */
      { *ptr=wv; /* Move ascii value to address in ptr. */
        disp_putc(wv); /* Display character on screen. */
        ptr++; /* Increment ptr to next element. */
        wl++; /* Increment the input character count. */
      }
    else
      if(wv==46 && wd==0) /* Else if a decimal point */
        /* was entered and a decimal point has */
        /* not been accepted previously - accept */
        { wd=1; /* Set flag to indicate that a decimal */
          /* point has now been accepted. */
          *ptr=wv; /* Move ascii value to addr in ptr */
          disp_putc(wv); /* Display the decimal point */
          ptr++; /* Increment ptr to next element. */
          wl++; /* Increment input character count. */
        }
      else
        { if((wv==43 || wv==45) && ws==0 && wl==0)
          /* Else if a plus or minus sign was */
          /* entered and nothing has been accepted */
          /* previously - accept. */
          { ws=1; /* Set flag to indicate that a */
            /* sign has now been accepted. */
            *ptr=wv; /* Move ascii value to addr in ptr */
            disp_putc(wv); /* Display the sign. */
            ptr++; /* Incr ptr to next element. */
            wl++; /* Incr input character count. */
          }
        }
    }
  }
}

if(wv==8) /* Else if a back-space was entered */
  { if(wl>0) /* If input character count > zero. */
    { disp_putc(8); /* Move cursor back one space. */
      disp_putc(254); /* Redisplay field indicator char. */
      disp_putc(8); /* Now move cursor back again. */
      wl--; /* Decrement input character count. */
      ptr--; /* Decrement ptr to previous element */
      ws=wd=0; /* Reset flags for sign and decimal point */
      if(wl>0) /* If number of chars entered still > zero */
        { for(j=0; j<wl; j++) /* check non deleted characters. */
          { if(hold[j]==46) wd=1;
            if(hold[j]==43 || hold[j]==45) ws=1;
          }
        }
      /* If a decimal point is found set flag indicating decimal point presence. */
      /* If a sign is found, set flag indicating the presence of a sign. */
    }
  }
}

else
  { if(wv==27) /* Else if the ESCAPE key was pressed */
    { if(wl>0) /* If the count of characters input > zero */
      { for(j=0; j<wl; j++) /* Back-space to start of field */
        { disp_putc(8); /* Redisplay field indicator characters. */
          disp_putc(254); /* indicator characters. */
          disp_putc(8);
        }
      }
      wl=ws=wd=0; /* Reset variables to zero. */
      ptr=hold; /* Set ptr to beginning of hold. */
    }
  }
}

}

/* After ENTER or F1 or F2 has been pressed */
/* If numeric mode is indicated. */
/* If hold[0]==45 || hold[0]==46) */
/* If only one character was accepted and */
/* that was a sign or decimal point */
/* then change it to the zero character. */
/* If no characters were entered */
/* Then place a zero character in the first position */
/* and increment ptr to the next element. */
}

}

/* End the accepted string of characters with a zero-byte */
/* Erase unused field positions on screen */
/* by over printing with spaces. */
disp_flush(); /* Update the screen to ensure display is current. */
return(scan_code); /* Return scan code of last key pressed (F1,F2 or ENTER) */
/* Scan code should be 59 for F1, 60 for F2 or 28 for ENTER */

```

End

NEW PRINTERS ADDED! FIND YOURS BELOW. Good This Month		RIBBON SALE			EXACT REPLACEMENTS		
PRINTER MAKE, MODEL NUMBER	RIBBON SIZE Inches by Yards	NEW CARTRIDGES From the various manufacturers or made in our own shop Ready to use.	RELOADS You SEND your used CARTRIDGES to us. WE put OUR NEW INSERTS in them	INSERTS EZ-LOAD™ DROP IN, NO WINDING! EXACT REPLACEMENTS made in our own shop Cartridges NOT included			
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-1-III-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	\$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) NOT RELOAD 1/4 X 25	\$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 \$16ea 2 or more	\$30/3 \$ 57/6 \$108/12			
LP III-V, CANON A 1200 (New Only) (1/2 x 5)	(1414) 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)	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			
- 5500-7700 (Can Reload Most Types)	NOT RELOAD 1/4 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	1/2 x 13		\$7/1 \$6 ea 2 or more	\$3.25/1 \$4.05/12 \$3.85/72			
Pinwriter P1-P2-P6, P-5 (1/2 x 14)	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			
P3-P7	1/2 x 27	\$30/2 \$ 84/6 \$156/12	\$8/1 \$7 ea 2 or more	\$18/3 \$66/12 \$360/72			
COMREX 420 Fabric (INSERTS & RELOADS ONLY)	5/16 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 HR-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 \$18ea 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					

SEND CHECK, MONEY ORDER, OR C.O.D. TO:

BCCOMPCO
800 South 17 Box 246
Summersville, MO 65571 • (417) 932-4196

WE PAY UPS GROUND SHIPPING ON PREPAID ORDERS.
PLEASE INCLUDE STREET ADDRESS FOR UPS DELIVERY
FOREIGN ADD 15% U.S. FUNDS.
MISSOURI RESIDENTS ADD 5% SALES TAX

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, SUPERSCRIPSIT, 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 TASMOM 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 1/111 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 sectored 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 1, 111, 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 1 (needs doubler), 111, 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 1/111/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 1/111/4/4Ps \$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, Miso sys, Prosoft, Tandy and others too numerous to mention.

(continued from page 23)

or sentences—single left quote and home in Xywrite III Plus and F7 and shift-F5 in Textra. My 1200 also refused to boot with the Enhanced Keyboard plugged in, no

matter which of the latter's dip switch settings (AT, XT, or AT&T mode) I tried. But I could start the 1200 with its own keyboard, then unplug the keyboard and install the enhanced board in its place.

The Universal Adapter and Enhanced Keyboard are a good combination for IBM typists or users whose programs stumble over the 1000's layout. Still, unless I had to do a lot of numeric data entry or longed

for a particular program that clashed with the 1000 keyboard, I'd spend the \$220 on more 1000 software instead. ■

The Universal Keyboard Adapter (catalog no. 25-1030, \$99.95) fits the Tandy 1000/1000 SX. The Tandy Enhanced Keyboard (catalog no. 25-4038, \$119.95) fits the adapter and the Tandy 3000/4000 and PC compatibles. Tandy Corp./Radio Shack, One Tandy Center, Fort Worth, TX 76102.

Magic Mirror: Conditional Integration

by David A. Williams

When integrated software first came on the scene, one of the major features touted by the publishers was the ability to cut material from one program and paste it into another. Since then several companies have developed memory-resident programs that enable you to do this with stand-alone programs. With Magic Mirror, a recent entry into this field, you can cut and paste, then edit and format the cut material.

A typical application is cutting data from a spreadsheet and inserting it into a document in your word processor. In this case, your word processor can handle the editing or formatting, but suppose you want to go the other direction. Magic Mirror lets you cut text from a document, edit it, and insert the necessary commands to tell your spreadsheet if the material is column headings or numerical data.

Magic Mirror can keep several different blocks of data separate until you are ready to paste them into another document. You can adjust the buffer size used to store this data, but if you cut more than the buffer can hold, the excess will go into a disk file.

You can capture data manually by moving the cursor over the area you want to save, or use a stored capture pattern. The capture pattern is useful if you routinely cut the same kind of data in the same format. If you choose to use a capture pattern, the program presents a menu listing those available. Each time you create a capture image manually, the program gives you the opportunity to save it for future use.

Several formatting options are available to you, including the ability to insert characters, pad the data with spaces, adjust the line length, insert blank lines, and remove unwanted characters. You can insert characters, including control characters, before or after word fields, lines, or blocks. The collection of such formatting information is called an Image Style Control and you can save these too for use another time.

When you are ready to paste, place the program cursor where you want the data

to go and press the hot key. Magic Mirror enters the data just as if you had typed it.

All this power and flexibility doesn't come cheap. Magic Mirror requires 48K of RAM in addition to the data buffer, which defaults to 6K.

The manual, although somewhat wordy and repetitious, adequately describes the program's operation, but the screen dump illustrations are too small to read. The tutorial section walks you through some simple applications of the program, one of which requires a spreadsheet.

The installation program makes that task very simple. The program is not copy protected, but your name is embedded in the program file the first time you install it. This is periodically displayed along with a warning message about copying software when you load the program.

Cursor and Keyboard Control

How well Magic Mirror works depends largely on what programs you use it with. I had considerable difficulty. Since Magic Mirror depends on the BIOS cursor being on, there is a major problem with programs that use their own cursor. You can't see

where the cursor is until you start marking, making it difficult if not impossible to mark small, isolated areas.

Programs that use their own keyboard handler can also cause problems. Microsoft Word and Multiplan fall into this category. I couldn't get Magic Mirror to work with either one on any of three computers. For comparison I tried two cut and patch utilities I downloaded from a local bulletin board. These both worked with Multiplan, but not with Word. On the other hand, Magic Mirror had no problem cutting and pasting into my text editor or to and from the DOS command line.

Magic Mirror's features are impressive, although cutting and pasting has never been high on my list of priorities. Nevertheless, I have to rate the program unacceptable, unless you can determine if it will work with the programs you want to use it with. Softlogic Solutions says they'll correct the cursor problem in the next update. Check to make sure before you buy it. ■

Magic Mirror, Softlogic Solutions Inc., One Perimeter Road, Manchester, NH 03103, 603-627-9900, \$89.95.

Look What 10K Will Buy

by Ron White

Can you spare 10K of RAM? Even if you think you can't, Microhelp Utility might make you reconsider. It's a memory-resident package crammed with useful functions, yet it takes up a mere 10K. It's worth every byte.

With Microhelp, you can speed up and reconfigure your cursor; retrieve and edit DOS commands; execute a series of DOS commands from the same line; and use aliases, single words that are shorthand substitutes for several DOS commands. You can change colors on a color monitor, eliminate snow, and use the last line on a CGA or EGA display to show the date,

time, and keyboard status.

A screen-save function protects your display from burn-in by turning it off if you don't use the keyboard for a while. You can set up a hot key that blanks the display instantly if someone snoops over your shoulder. And Microhelp makes an honest key of scroll-lock by using it to suspend text-scrolling; if you don't get to the scroll-lock key fast enough, you can reread text that's scrolled off the top of the screen by pressing page up or page down.

Actually, 10K is the minimum memory Microhelp uses. Screen-buffering, which lets you see text that's scrolled off the page, will cost you 8K for the first screen and about 6K for each additional screen you want to be able to review. You decide how

much memory, if any, you want to devote to buffering.

The same goes for aliases. If you're going to use any aliases, you have to give up at least another 1K, but you can fit a lot of aliases into 1K. Aliases are kept in a text file, which you can edit with any word processor so long as you can save the file in ASCII.

Unfortunately, Microhelp's screen buffering can cause problems with some computers. A Tandy 1000 SX hung up when I tried to suspend scrolling or review buffered displays. The function worked fine on more IBM-compatible computers.

Though Microhelp Inc. claims its program should increase cursor speed 300 percent or more, I found that, on the average, it increased speed by only 50 percent—a less dramatic improvement than might have been expected, but an improvement just the same. And the speeding cursor stops immediately when you release the arrow key.

There's only one thing about Microhelp that I couldn't live with: a problem that turned up on some systems. The program is supposed to stop the annoying flashing of color monitors during scrolling. This function didn't work with Lotus's 1-2-3 or Word Perfect on a Compaq with an Amdek monitor. In fact, it reintroduced flickering that a special device driver had eliminated. But Microhelp's anti-flashing feature worked fine on the 1000 SX.

That's the worst of it. The rest of Microhelp is too good to pass up.

The control it gives you over DOS command lines is alone worth 10K of memory space. If you enter a mistyped command and get an error message, all you have to do is press the up-arrow key and your command reappears. Now you can use cursor-control and editing keys to correct your command painlessly.

With Microhelp's alias feature, though, you don't have to type in frequently used commands. For example, your alias text file could contain a line that reads `hom = cd c:\finance\budget\home`. This assigns the change directory command to the right of the equals sign to the alias "hom." Thereafter, when you type `hom`, Microhelp executes the associated command. You can also include multiple commands in aliases, so that, for example, you could change to a subdirectory and run a program by typing a single alias.

The ability to ad lib several commands on one line is also nifty. Want to change directories and then display a directory? Just type the Change Directory command, press a special hot key, and a right arrow appears. After the arrow, continue with the next command. You can add commands as long as the total number of characters doesn't exceed 128.

You can set up Microhelp's defaults using a menu that comes with on-line help screens, or you can change the defaults temporarily from batch files if some of your programs balk at Microhelp's assistance. Since Microhelp is already memory resi-

The Microhelp Utilities' main menu.

The Microhelp Utility (C) 1987 Microhelp, Inc. All Rights Reserved						
Cursor		Scroll buffer		Color		Monitor
Blinking cursor	Yes	Buffer size	52	Foreground	End of check	Off
Overstrike size	07 07	Alt monitor	Off	Background	Protection	Off
Insert size	01 07				Line 20-43	On
Keyboard			Aliases			
Buffer on/off	On	Buffer size	01			
Start repeat	03	File name	ALIAS.TXT			
Next repeat	00					
Print intercept	Off	Hot keys				
Case filtering	Off	Form feed	Ctrl-Alt-F			
Other		Multi command				
Auto screen dup	Off	Live screen	Alt-6			
Wake-up alarm	15 38	Blank screen				
Redirect/piping	Off	Exit Save Configure Remove				
Command buffer	01	Press Enter to change your configuration, Help				
Error level	Off	or Tab, Shift-Tab, Pt/Lit arrows or caps letter				

Circle 301 on Reader Service card.

HAVE YOU CHECKED OUR PRICES?

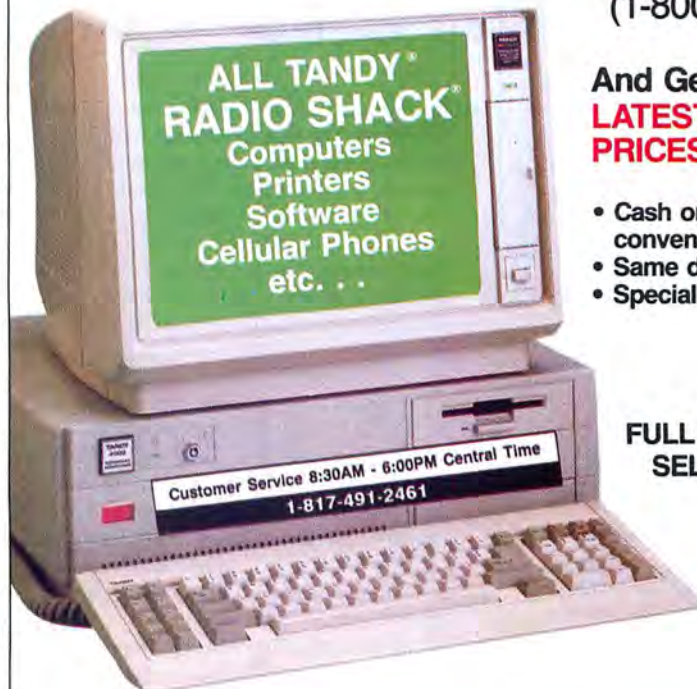
Why pay more than you have to—Call

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



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

Re-ink ANY FABRIC RIBBON automatically for LESS THAN 5 CENTS with
MAC INKER™



Over 11,000 cartridges and spools supported!

- MAC INKER**
 IMAGEWRITER I AND II \$42.00
 UNIVERSAL (cartridge or spool) \$68.50
 MULTICOLOR IMAGEWRITER \$80.00
 MULTICOLOR ADAPTER ONLY \$40.00
 Shipping (first unit) \$3.00

■ Lubricated DM INK EXTENDS PRINT-HEAD LIFE! Black, blue, brown, red, green, yellow, purple, orange - 2 oz. bottle \$3.00; pint \$18.50. Gold, silver, indelible and OCR inks available. Heat transfer MacInkers and ink available plus a complete range of accessories for special applications.

■ Top quality, GUARANTEED, double density ribbon cartridges and reloads available.

■ DEDICATED MACINKERS AVAILABLE FOR EXTRA LARGE OR SPECIAL CARTRIDGES.

MERCURY MODEM

\$149.00

Shipping \$4.00



*100% Hayes™ compatible! ■ 24 month warranty. ■ Status lights. ■ Speaker. ■ 300/1200 baud. ■ Call progress detection.

Quick Link communications software:

- MS DOS and Macintosh \$29.95
 with modem \$15.00
 Cable \$15.00

*Hayes is a trademark of Hayes Microproducts.

A BUFFER AND A DATA SWITCH!

PROTEUS™



The "Siamese" Buffer
 64K \$199.00
 256K \$299.00
 Cable \$10.00
 shipping \$4.00

■ Proteus directs two printers (working simultaneously) and frees your computer for other applications.

■ Now you can merge a form letter with your mailing list, set up one printer with letterhead, the other with envelopes, press "START" and RELAX while

PROTEUS DOES IT ALL—ALL AT ONCE!

■ Compact. ■ 2 parallel ports. ■ Multiple copy capability. ■ "Flexible Capacity" buffer for each port.

1986 "Best Buy of the Year" Award! - Computer Shopper

SPECIAL OFFER: For orders of \$100.00 or more. Tell us in which magazine you saw this ad and get a free keychain, beeper, and flashlight combined! A \$15.00 value!

ORDER TOLL-FREE
1-800-547-3303

In Oregon (503) 626-2291 (24 hour line)

We are and always will be your

Computer Friends®

14250 N.W. Science Park Drive
 Portland, OR 97229, Telex 4949559
 Dealer Inquiries Welcome.

REVIEWS

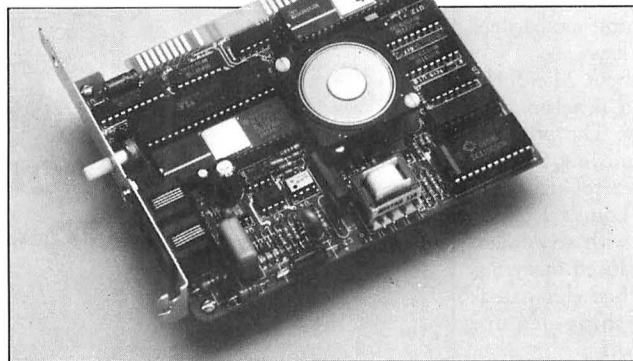
dent, it's a shame you can't pop it up from inside another program. That might have taken more memory than the creators of Microhelp thought it was worth.

Microhelp's DOS command-line en-

hancements and scroll-back feature will make your life much easier. They're the heart of the program; the other functions are nice frills that you probably could live without. Once you see what Microhelp does for DOS, chances are you'll never want to go back. ■

The Microhelp Utility requires 256K and MS-DOS 2.x. Microhelp Inc., 2220 Carlyle Drive, Marietta, GA 30062, 404-973-9272. \$59.

The Zoom/Modem HC 2400 Offers High Speed, Low Price



HC 2400—everything you need for \$199.

by Harry Green

Modem prices have been dropping so rapidly that 2400-baud models now sell for far less than what a 300-baud modem cost only a few years ago. The Zoom/Modem HC 2400 internal modem, for example, comes bundled with the popular Procomm telecommunications program, supplying everything you need for high-speed telecommunications for only \$199.

Up to Standard

The Zoom is compatible with AT&T and the Consultative Committee on International Telephone and Telegraph (CCITT) standards for line discipline. Unlike many other modems that support only AT&T standards for lower speeds, the Zoom also supports CCITT V.21 and V.22 standards at 300 and 1200 baud as well as V.22 standards at 2400 baud.

This compatibility can be important if you plan to take the modem out of North America, or if you plan to communicate directly over the telephone lines to another country. Like most modems, the Zoom/Modem HC can downshift automatically to meet the speed requirements of a slower device.

The Zoom has several other unusual features. Its optional call-progress mode enables it to listen for a dial tone before dialing. This is useful if your local central office is sometimes slow in returning dial

tone, or if you use a private branch exchange (PBX) or long-distance service that returns a second dial tone.

The mounting plate on the modem has two jacks: one for connecting the telephone line, and another for connecting a telephone. The telephone jack connection is handy for manual dialing. The modem has a self-test feature that is activated when power is applied.

It also offers a local analog loopback feature, which transmits a test pattern that is looped to its own receiver to determine whether the modem is sending and receiving correctly.

The Hardware

The Zoom/Modem HC is on a half-length card, which fits the Tandy 1000. There are some drawbacks to internal modems, but if you can afford to give up an expansion slot, they're convenient to use, particularly in portable computers.

The best thing to say about the Zoom is that there isn't much to say. The only option to set is a jumper to select the communications port. You can set the modem's registers with software, but if you're willing to accept the defaults, the Zoom will work right out of the box.

I plugged in my review unit, moved the telephone cord from a Hayes Smartmodem 1200 to the Zoom, and told my telecommunications program, Transend PC/Complete, that it was now talking to a Hayes Smartmodem 2400.

THE 80 MICRO



DISK SERIES

Choose your favorites from this special TRS-DOS software collection available only to **80 MICRO** readers. All disks are fully guaranteed by **80 MICRO** and our technical staff is always available for assistance. Order today while supplies last!

- BEST OF MODEL 4**—only \$21.45. A dozen of the finest Model 4 programs to appear in **80 MICRO**.
- NUCLEAR SUBROUTINES**—only \$21.45. A sure fire arsenal for TRS-DOS users of more than 50 specially selected subroutines designed to help you write better basic programs.
- BEST OF 1986**—only \$21.45. A special collection of the very best TRS-DOS programs published during 1986 in **80 MICRO**.
- BEST OF MODEL III**—only \$21.45. 15 exceptional utilities and applications for the Model III from the pages of **80 MICRO**
- UTILITY PAK**—only \$26.50. 15 outstanding aids for the Model 4 from **80 MICRO**

Checks, money orders or credit cards accepted. Shipping and handling included. Foreign Air Mail, please add \$3.95 per disk.

MC Am Express Visa

Credit Card Number _____

Expiration Date _____

Name _____

Address _____

City _____ State _____ Zip _____

Send payment with order to:

THE 80 MICRO DISK SERIES
80 Elm Street
Peterborough, NH 03458

FOR EVEN FASTER SERVICE
Call Toll Free
1-800-343-0728

LOWEST PRICES EVER!

	MS/DOS	TRS-80
Electric Webster Speller 55% off	\$ 39.99	\$ 39.99
w/Correcting Feature	\$ 79.99	\$ 99.99
"The Cadillac" of Spelling Checkers - 80 Micro, 3/82		
El. Web. Hyphenation 35% off	incl.	\$ 32.49
E.W. Grammar & Style 35% off	\$ 49.99	\$ 32.49
"A fantastic ... Grammar Checker" - 80 Micro, 4/85		
The Works! (All E.W. features)	\$ 119.99	\$149.99
LeScript 1.7 50% off (reg 199.99)	\$ 99.99	\$ 64.99
Allwrite (w/o support) 67% off	N.A.	\$ 64.99
Whoops Instant Speller/Thesaurus	\$ 39.99	N.A.
"delivers its full potential superbly" - 80 Micro 6/87		
Combo (Word Proc. & Speller) 55% off	\$ 129.99	\$ 99.99
Whole Works! (All EW Feat. & W/P)	\$ 199.99	\$199.99

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

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 6/10/88 while supplies last!

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

Circle 111 on Reader Service card.

A Smart Money Manager

"...it earns my unequivocal endorsement."

—Wynne Keller, "80 Micro"

"The program shines when it comes to output."

—PC Magazine, 1/12/88

Free Phone Support / Not Copy Protected
For MS-DOS, PC-DOS & most CPM systems.
Contact CDE to update earlier versions.

Available on 3.5" or 5" disc

CDE SOFTWARE

213/661-2031 (9:30-5/M-F)

948 Tularosa Dr., Dept. M, Los Angeles, CA 90026

Checks & Balances™

- Single entry system centered around the checkbook; 128 user defined accounts
- Handles cash and charge transactions
- View, edit or print any entry for a year with simple but powerful English commands
- Prints checks and has a versatile Rolodex
- Balance sheet, cash flow and profit & loss statements, plus many more reports

Please rush _____ My computer is _____
copies of "Checks & Balances" at \$74.95 each. Add \$3.50 p/h; Calif. res. 6½% tax.
Name _____
Street _____
City/State/Zip _____
Phone # _____
Card # _____ Exp _____
VISA, M/C or Check
Signature _____

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**



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

Miniscribe 32MB 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



REVIEWS

The only perceptible difference between the Zoom/Modem HC and the Hayes 1200 at 1200 baud was the sound of the speaker during call setup. Compared with the Hayes's external speaker, the Zoom's speaker sounds tinny—which isn't surprising with an internal modem, since the speaker is inside the computer's case. If you want better sound quality, the modem offers a jack for an external speaker.

The Software

The Zoom comes with a copy of Datastorm Technologies' Procomm, a user-supported telecommunications package, and a paid-up license to use the program. The marriage is a good one because you can initialize the Zoom/Modem HC as COM ports 1 through 4 on your computer, and Procomm is one of the few telecommunications programs I'm aware of that supports more than COM ports 1 and 2.

Procomm is versatile, yet easy to set up and use. It comes in compressed form on a single disk—it takes a few minutes to decompress the program into usable form. Unfortunately, the 110-page manual is also compressed on disk, and printing it out is no small task.

You operate Procomm by selecting func-

tions from a main menu. Just enter telephone numbers and set operating parameters such as speed, odd or even parity, and so on, and you're ready to start communicating.

Procomm has several features that many telecommunications programs lack. It can set up your computer as a bulletin-board system; in host mode, Procomm sends a string of your choice as a greeting message, synchronizes itself with the caller's baud rate, and offers two levels of password protection. Its versatile command file can be used to operate effectively in unattended mode or to perform automatic log ons.

Procomm supports most common file-transfer protocols, including ASCII, Xmodem, Ymodem, Modem7, Telink, Kermit, WXmodem, and Compuserve B. It includes a translate table that you can use to strip unwanted characters from an incoming file. Procomm will also emulate nine popular ASCII terminals.

Conclusion

Communicating at high speeds saves you time and money, especially if you use your modem to download files. If you're thinking of moving up to a higher-speed modem, or if you're just getting started in telecommunications, the Zoom/Modem HC 2400 with Procomm is an excellent value. ■

The Zoom/Modem HC 2400. Procomm requires 130K, two floppy-disk drives or one floppy and a hard drive, and MS-DOS 2.x. Zoom Telephonics Inc., 207 South St., Boston, MA 02111, 617-423-1072 or 800-631-3116. \$199.

A Useful Kibitzer

```
tell me that for edisk d: I have 33.5 megs of logical disk space
and 7 megs of physical disk space. For edisk e: and f:, it tells
  (( * 17. LONG SENTENCE: 33 WORDS * ))
    (( * 31. COMPLEX SENTENCE * ))
      (( * 9. PUNCTUATION? * ))^
me the same thing, Wow! you say, 100 megs of data will fit on a
20 meg drive. What has been missed is that the logical disk space
  (( * 21. PASSIVE VOICE: been missed * ))
of 33.5 megs is really the total logical space rather than the
logical space for each partition and should not be added while
  (( * 21. PASSIVE VOICE: be added * ))^
the physical disk space is per partition and should be added. You
  (( * 3. UNAK: should be added * ))^
  (( * 21. PASSIVE VOICE: be added * ))^
  (( * 17. LONG SENTENCE: 44 WORDS * ))^
really have a maximum possible 33.5 megs per your hard disk which
really isn't too shabby anyway but not as dramatic. You must
  (( * 6. COLLOQUIAL: shabby * ))^
remember, though that this is a maximum value and in reality, you
B:\KONAN.DAT Doc 1 Pg 5 Ln 8 Pos 10
```

Rightwriter analyzes writing style.

by Harry Bee

Why would I want a writing-style analyzer? Why would anyone? As I approached Rightwriter for the first time, I figured I already knew everything the program could tell me. If I didn't, I'd do well to take up fishmongering. I expected to be seriously aggravated by it, or thoroughly amused, or both. I had visions of Miss Stahl, my 11th grade English teacher,

who believed the rules of grammar ranked higher than the immutable laws of the universe. And I'd seen evidence of the conceptualizing powers of computer software in the nonsense ground out by poetry generators.

Having used Rightwriter for a couple of months, I've changed my mind. True, the program is as exacting as a high school English teacher, and now and then it makes a truly comic judgment; but then I learned a lot from Miss Stahl, and occa-

sionally (not often) even I've come to a ridiculous conclusion.

Contrary to what I expected, Rightwriter is not judgmental. It doesn't presume to correct you. Instead the program analyzes your writing according to prevailing standards of style and points out possible errors and possibly troublesome constructions. You can react to the analysis as you wish.

For Comment

Rightwriter couldn't be much easier to use. You start the program and name the document file you want it to read; it does its analysis and quits. If you're using floppy disks, you need enough room for the program to write its marked-up file. It uses the output of most popular word processors without your having to convert it. In many cases it writes its report in the same format. If all else fails, it can always handle ASCII text files.

Rightwriter delivers up to four kinds of reports. The program always displays a summary on your monitor. This includes the number of words in the document, contrasted with the number of unique words, and four statistical measures of your writing. The four indexes consider the readability and strength of your writing, and how you've used adjectives, adverbs, and jargon.

Unless you order otherwise, Rightwriter creates a second copy of your document into which it inserts specific comments. Each comment, bracketed by symbols that are easy to find when you're editing, appears directly after the word or phrase to which it refers. The comment might suggest a change or ask a pertinent question. For example, it points out catch phrases, such as "there is evidence," with a question like, "Is this explained?"

It remarks on odd punctuation and capitalization; most words that end with "-ization"; negative, wordy, or ambiguous phrases; long or complex sentences (like this one); repetitions; overworked expressions; and verbs and pronouns that don't agree, to name a few. Rightwriter is thorough. And though it can't consider the context of your writing, many of its remarks prove apt and worth considering.

The documentation explains Rightwriter's indexes and comments in detail. Fully half the 70-page manual covers each comment the program can deliver, what it may or may not mean, and what you can do about it if you want to. While the manual is full of textbook information, it's not dry. The section on cliches cautions, "Avoid them like the plague."

At your option, Rightwriter attaches an extended summary to the end of the marked-up document it produces. This repeats the four indexes from the displayed summary, but offers, after any index that falls outside the acceptable range, specific ways to bring the index within tolerance. In addition, the extended summary in-

cludes a list of questionable words marked variously as negative, colloquial and possibly offensive, jargon and possibly meaningless to your average reader, misspelled, and misused.

Finally, the program can provide a list of all the words you've used and the frequency with which you've used each one.

Conclusion

While I made changes in response to Rightwriter's suggestions far less often than I dismissed them, I still found the software occasionally valuable. I can't call it an essential writer's tool, but it's a useful one, if a bit too expensive. Whether you're writ-

ing for a general audience, for colleagues, clients and customers, or for grades, it never hurts to reconsider your writing on the basis of clarity and readability. ■

Rightwriter (version 2.1) runs on the Tandy 1000/1200/2000/3000 (256K) and requires two disk drives. Rightsort Inc., 2033 Wood St., Suite 218, Sarasota, FL 33577, 813-952-9211. \$95.

Circle 247 on Reader Service card.

TANDY ADD-ONS

<p style="text-align: center;">For Tandy 1000, SX, TX</p> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>10 Meg Hard Card</p>  <p>\$299.95</p> </div>	<p style="text-align: center;">1000, SX, TX</p> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>20 Meg Hard Card</p>  <p>\$349.95</p> </div>	<p style="text-align: center;">1000, SX, TX</p> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>30 Meg Hard Card</p>  <p>\$399.95</p> </div>																
<p style="text-align: center;">1000, SX, TX</p> <div style="border: 1px solid black; padding: 5px;"> <p>Hard Drive Kits</p>  <table border="0" style="width: 100%;"> <tr><td>10 Meg</td><td style="text-align: right;">\$279.95</td></tr> <tr><td>20 Meg</td><td style="text-align: right;">\$339.95</td></tr> <tr><td>30 Meg</td><td style="text-align: right;">\$379.95</td></tr> <tr><td>40 Meg</td><td style="text-align: right;">\$499.95</td></tr> </table> </div>	10 Meg	\$279.95	20 Meg	\$339.95	30 Meg	\$379.95	40 Meg	\$499.95	<p style="text-align: center;">1000, SX, TX</p> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>NEW TANDY</p>  <p>1000, SX, TX 49 Meg Hard Card 32 MS (speed) \$599.95</p> </div>	<p style="text-align: center;">1000, 1000A</p> <div style="border: 1px solid black; padding: 5px;"> <p>NEW Cardinal Modems</p>  <p>2400 Baud 300/1200/2400 (Hayes Compatible) Complete with software manuals ONLY \$149.95</p> </div>								
10 Meg	\$279.95																	
20 Meg	\$339.95																	
30 Meg	\$379.95																	
40 Meg	\$499.95																	
<p style="text-align: center;">1000, SX, TX</p> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>Cards</p> <table border="0" style="width: 100%;"> <tr><td>300/1200 Modem</td><td style="text-align: right;">\$119.95</td></tr> <tr><td>300/1200/2400 Modem</td><td style="text-align: right;">\$149.95</td></tr> <tr><td>Mini IO</td><td style="text-align: right;">\$79.95</td></tr> <tr><td>2 Meg Board</td><td style="text-align: right;">\$169.95</td></tr> </table> </div>	300/1200 Modem	\$119.95	300/1200/2400 Modem	\$149.95	Mini IO	\$79.95	2 Meg Board	\$169.95	<p style="text-align: center;">1000, SX, TX, 3000, 4000</p> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>2nd Floppy</p> <table border="0" style="width: 100%;"> <tr><td>360K TEAC</td><td style="text-align: right;">\$119.95</td></tr> <tr><td>720K Mitsubishi</td><td style="text-align: right;">\$99.95</td></tr> <tr><td>3 1/2" Mitsubishi</td><td style="text-align: right;">\$119.95</td></tr> </table>  </div>	360K TEAC	\$119.95	720K Mitsubishi	\$99.95	3 1/2" Mitsubishi	\$119.95	<p style="text-align: center;">1000, 1000A</p> <div style="border: 1px solid black; padding: 5px;"> <p>Memory Cards</p> <p>Zucker Memory • DMA & 512K CALL</p> <p>Zucker Multifunction • Serial • Real Time Clock • 512K DMA • Software CALL</p> </div>		
300/1200 Modem	\$119.95																	
300/1200/2400 Modem	\$149.95																	
Mini IO	\$79.95																	
2 Meg Board	\$169.95																	
360K TEAC	\$119.95																	
720K Mitsubishi	\$99.95																	
3 1/2" Mitsubishi	\$119.95																	
<p style="text-align: center;">Tandy 3000 & 3000HL</p> <div style="border: 1px solid black; padding: 5px;"> <p>Hard Drive Kits Includes Drive, Controller & Cable</p> <table border="0" style="width: 100%;"> <tr><td>20 Meg</td><td style="text-align: right;">\$399.95</td></tr> <tr><td>30 Meg</td><td style="text-align: right;">\$599.95</td></tr> <tr><td>40 Meg</td><td style="text-align: right;">\$699.95</td></tr> <tr><td>80 Meg</td><td style="text-align: right;">\$999.95</td></tr> </table> </div>	20 Meg	\$399.95	30 Meg	\$599.95	40 Meg	\$699.95	80 Meg	\$999.95	<p style="text-align: center;">Tandy Model 3, 4, 4P</p> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>Hard Drive Systems</p> <p>External</p> <p>Complete - ready to run</p> <table border="0" style="width: 100%;"> <tr><td>10 Meg</td><td style="text-align: right;">\$499.95</td></tr> <tr><td>20 Meg</td><td style="text-align: right;">\$699.95</td></tr> </table> </div>	10 Meg	\$499.95	20 Meg	\$699.95	<p style="text-align: center;">Tandy 1000, 1000SX, 3000 & 3000HL</p> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>Tape Backup</p>  <table border="0" style="width: 100%;"> <tr><td>20, 30, 40 Meg Tape Backup</td><td style="text-align: right;">\$399.95</td></tr> <tr><td>60 Meg Tape Backup Archive</td><td style="text-align: right;">\$659.95</td></tr> </table> </div>	20, 30, 40 Meg Tape Backup	\$399.95	60 Meg Tape Backup Archive	\$659.95
20 Meg	\$399.95																	
30 Meg	\$599.95																	
40 Meg	\$699.95																	
80 Meg	\$999.95																	
10 Meg	\$499.95																	
20 Meg	\$699.95																	
20, 30, 40 Meg Tape Backup	\$399.95																	
60 Meg Tape Backup Archive	\$659.95																	

CAM CO
292 E. Maiden Street
Washington, PA 15301
Tel. 412-222-6001
1-800-AT CAMCO
1-800-282-2626
Hours: 9 a.m.-5 p.m., Sat. 9 a.m.-3 p.m.

TRUE DATA PRODUCTS
115 So Main Street
Uxbridge, MA 01569
Tel. 617-278-6555
1-800-635-0300
Hours: 9 a.m.-6 p.m., Sat. 10 a.m.-4 p.m.



One-of-a-kind software, From the One-of-a-kind magazine.

80 MICRO the only magazine geared exclusively toward Tandy MS-DOS users...presents the **80 MICRO Disk Series**. An unbeatable value at an affordable price! With more than 6 programs per disk, you pay less than \$2.50 per program! Documentation is right on the disk—just load and go!

GET THE EDGE

Applications and utilities to help you use your computer more productively and tutorials to make learning easy. Here's a preview of what's ahead for 1988:

- ◆ 3 Voice Music Demø from Hardin Brothers — Make your Tandy 1000 sing!
- ◆ Mailing List program from Bruce Tonkin — Save money — do your own mass mailing!
- ◆ Pull-Down Help Screen — Work smarter — overlay windows for quick reference!
- ◆ Basic Program Compression/Expansion Utility — GWBasic programs to help you work faster!
- ◆ Handy Utilities — To ease your computing tasks, featured in upcoming editions of **80 MICRO**.

All of these great programs are tested by **80 MICRO's** experienced technical team and are fully guaranteed. And, our staff is always available to answer any of your questions!

THE 80 MICRO DISK SERIES...

Quality Programs for the Serious Tandy MS-DOS users.

CALL OUR 24 HOUR TOLL-FREE NUMBER
1-800-343-0728 TODAY

Start enjoying your Tandy more, order the **80 MICRO** Disk Series subscription for only \$69.97 (4 quarterly issues) or try a single disk for just \$24.97.

YES!

I want the advantage!

I need top quality software at an affordable price.

Send me the **80 MICRO DISK SERIES**:

- One year subscription (4 quarterly disks) at \$69.97
- Single disk at \$24.97 each (check off disk choice below)
- | | |
|--|---|
| <input type="checkbox"/> Jan/Feb/Mar 1988 | <input type="checkbox"/> July/Aug/Sept 1988 |
| <input type="checkbox"/> Apr/May/June 1988 | <input type="checkbox"/> Oct/Nov/Dec 1988 |

Payment enclosed MC VISA AE

Card# _____ Exp. date _____

Name _____

Address _____

City _____ State _____ Zip _____

All orders must be prepaid. Price includes postage and handling. Disks ship when last of the three issues of **80 MICRO** are published. Foreign Airmail, please add \$3.95 per disk.

MAIL TO: **80 MICRO DISK SERIES**, IDG Communications/Peterborough, 80 Elm St., Peterborough, NH 03458

THE 80 MICRO



DISK SERIES

FREE INFORMATION!



You can receive **FREE** product information for many of the products featured in this issue of 80 Micro. It's easy!

Simply fill out one of the cards below, circle the corresponding numbers in the chart for products you would like to know more about and mail it. Reader service numbers are on most ads and in the Info Line products section. In 4-6 weeks, you'll receive the free information you requested.

APRIL 1988 (This card valid until June 30, 1988.)

- A. Which Tandy MS-DOS computer(s) do you use most? Check all that apply.**
1. 4000 4. 1200 7. 1000 TX
 2. 3000 HD/HL 5. 1000 EX/SX 8. 1000
 3. 1400 LT 6. 1000 HX 9. Other MS-DOS
- B. Where do you use your Tandy MS-DOS computer? Check all that apply.**
1. At home for business 4. At work for business
 2. At home for recreation 5. At school
 3. At home for education
- C. How many MS-DOS computers do you plan to buy in the next 12 months?**
1. One 3. 5-10 5. 21-50
 2. 2-4 4. 11-20 6. more than 50
- D. Which types of MS-DOS products are you considering purchasing during the next 12 months? Check all that apply.**
1. Entertainment software 5. Printers
 2. Word processing software 6. Monitors
 3. Data-base/business software 7. Modems
 4. Graphics or speed-up boards 8. Other peripherals
- E. How much do you plan to spend on software, hardware, and peripherals during the next twelve months?**
1. Up to \$500 4. \$2500-\$5000
 2. \$500-999 5. More than \$5000
 3. \$1000-\$2499
- F. For what purposes do you use your modem? Check all that apply.**
1. Don't own or use a modem 3. Access on-line services
 2. Access BBSes 4. Telecommunications
- G. How often do you use the program listings in 80 Micro?**
1. Almost always 3. Almost never
 2. Sometimes 4. Never
- H. Do you find the articles in 80 Micro:**
1. Too difficult 2. Too simple 3. Just right
- I. Please rate the following columns on a scale of 1 (never read) to 5 (always read).**
1. Feedback loop 4. Pulse Train 7. Side Tracks
 2. Fine Lines 5. Reader Forum 8. The Next Step
 3. Info Line 6. Reviews

1 6 11 16 21	101 106 111 116 121	201 206 211 216 221	301 306 311 316 321
2 7 12 17 22	102 107 112 117 122	202 207 212 217 222	302 307 312 317 322
3 8 13 18 23	103 108 113 118 123	203 208 213 218 223	303 308 313 318 323
4 9 14 19 24	104 109 114 119 124	204 209 214 219 224	304 309 314 319 324
5 10 15 20 25	105 110 115 120 125	205 210 215 220 225	305 310 315 320 325
26 31 36 41 46	126 131 136 141 146	226 231 236 241 246	326 331 336 341 346
27 32 37 42 47	127 132 137 142 147	227 232 237 242 247	327 332 337 342 347
28 33 38 43 48	128 133 138 143 148	228 233 238 243 248	328 333 338 343 348
29 34 39 44 49	129 134 139 144 149	229 234 239 244 249	329 334 339 344 349
30 35 40 45 50	130 135 140 145 150	230 235 240 245 250	330 335 340 345 350
51 56 61 66 71	151 156 161 166 171	251 256 261 266 271	351 356 361 366 371
52 57 62 67 72	152 157 162 167 172	252 257 262 267 272	352 357 362 367 372
53 58 63 68 73	153 158 163 168 173	253 258 263 268 273	353 358 363 368 373
54 59 64 69 74	154 159 164 169 174	254 259 264 269 274	354 359 364 369 374
55 60 65 70 75	155 160 165 170 175	255 260 265 270 275	355 360 365 370 375
76 81 86 91 96	176 181 186 191 196	276 281 286 291 296	376 381 386 391 396
77 82 87 92 97	177 182 187 192 197	277 282 287 292 297	377 382 387 392 397
78 83 88 93 98	178 183 188 193 198	278 283 288 293 298	378 383 388 393 398
79 84 89 94 99	179 184 189 194 199	279 284 289 294 299	379 384 389 394 399
80 85 90 95 100	180 185 190 195 200	280 285 290 295 300	380 385 390 395 400

- J. Where did you get your copy of 80 Micro?**
1. I have a subscription 3. I received a copy from a friend
 2. I purchased my copy at newsstand or store 4. Complimentary copy came in the mail
- K. If you would like a one year subscription to 80 Micro, please circle 400 on this card. We will bill you \$24.97. (Canada & Mexico \$27.97, Foreign Surface \$44.97, one year only.) Please allow 10-12 weeks for delivery.**

Name _____
 Address _____
 City _____ State _____ Zip _____
 Telephone () _____
 Occupation _____

APRIL 1988 (This card valid until June 30, 1988.)

- A. Which Tandy MS-DOS computer(s) do you use most? Check all that apply.**
1. 4000 4. 1200 7. 1000 TX
 2. 3000 HD/HL 5. 1000 EX/SX 8. 1000
 3. 1400 LT 6. 1000 HX 9. Other MS-DOS
- B. Where do you use your Tandy MS-DOS computer? Check all that apply.**
1. At home for business 4. At work for business
 2. At home for recreation 5. At school
 3. At home for education
- C. How many MS-DOS computers do you plan to buy in the next 12 months?**
1. One 3. 5-10 5. 21-50
 2. 2-4 4. 11-20 6. more than 50
- D. Which types of MS-DOS products are you considering purchasing during the next 12 months? Check all that apply.**
1. Entertainment software 5. Printers
 2. Word processing software 6. Monitors
 3. Data-base/business software 7. Modems
 4. Graphics or speed-up boards 8. Other peripherals
- E. How much do you plan to spend on software, hardware, and peripherals during the next twelve months?**
1. Up to \$500 4. \$2500-\$5000
 2. \$500-999 5. More than \$5000
 3. \$1000-\$2499
- F. For what purposes do you use your modem? Check all that apply.**
1. Don't own or use a modem 3. Access on-line services
 2. Access BBSes 4. Telecommunications
- G. How often do you use the program listings in 80 Micro?**
1. Almost always 3. Almost never
 2. Sometimes 4. Never
- H. Do you find the articles in 80 Micro:**
1. Too difficult 2. Too simple 3. Just right
- I. Please rate the following columns on a scale of 1 (never read) to 5 (always read).**
1. Feedback loop 4. Pulse Train 7. Side Tracks
 2. Fine Lines 5. Reader Forum 8. The Next Step
 3. Info Line 6. Reviews

1 6 11 16 21	101 106 111 116 121	201 206 211 216 221	301 306 311 316 321
2 7 12 17 22	102 107 112 117 122	202 207 212 217 222	302 307 312 317 322
3 8 13 18 23	103 108 113 118 123	203 208 213 218 223	303 308 313 318 323
4 9 14 19 24	104 109 114 119 124	204 209 214 219 224	304 309 314 319 324
5 10 15 20 25	105 110 115 120 125	205 210 215 220 225	305 310 315 320 325
26 31 36 41 46	126 131 136 141 146	226 231 236 241 246	326 331 336 341 346
27 32 37 42 47	127 132 137 142 147	227 232 237 242 247	327 332 337 342 347
28 33 38 43 48	128 133 138 143 148	228 233 238 243 248	328 333 338 343 348
29 34 39 44 49	129 134 139 144 149	229 234 239 244 249	329 334 339 344 349
30 35 40 45 50	130 135 140 145 150	230 235 240 245 250	330 335 340 345 350
51 56 61 66 71	151 156 161 166 171	251 256 261 266 271	351 356 361 366 371
52 57 62 67 72	152 157 162 167 172	252 257 262 267 272	352 357 362 367 372
53 58 63 68 73	153 158 163 168 173	253 258 263 268 273	353 358 363 368 373
54 59 64 69 74	154 159 164 169 174	254 259 264 269 274	354 359 364 369 374
55 60 65 70 75	155 160 165 170 175	255 260 265 270 275	355 360 365 370 375
76 81 86 91 96	176 181 186 191 196	276 281 286 291 296	376 381 386 391 396
77 82 87 92 97	177 182 187 192 197	277 282 287 292 297	377 382 387 392 397
78 83 88 93 98	178 183 188 193 198	278 283 288 293 298	378 383 388 393 398
79 84 89 94 99	179 184 189 194 199	279 284 289 294 299	379 384 389 394 399
80 85 90 95 100	180 185 190 195 200	280 285 290 295 300	380 385 390 395 400

- J. Where did you get your copy of 80 Micro?**
1. I have a subscription 3. I received a copy from a friend
 2. I purchased my copy at newsstand or store 4. Complimentary copy came in the mail
- K. If you would like a one year subscription to 80 Micro, please circle 400 on this card. We will bill you \$24.97. (Canada & Mexico \$27.97, Foreign Surface \$44.97, one year only.) Please allow 10-12 weeks for delivery.**

Name _____
 Address _____
 City _____ State _____ Zip _____
 Telephone () _____
 Occupation _____

F
R
E
E

I
N
F
O
R
M
A
T
I
O
N

PLACE
STAMP
HERE

80 Micro
P.O. Box 306
Dalton, MA 01227

F
R
E
E

I
N
F
O
R
M
A
T
I
O
N

PLACE
STAMP
HERE

80 Micro
P.O. Box 306
Dalton, MA 01227

April 1988

R.S.#	Advertiser	Page#
49	A.T.D.	CII,1
3	Abracadata	6
11	Aerocomp	77
105	Affordable Computer Supplies	78
152	BCCompco	56
21	Best of Model 4	78
301	Big D Computers	59
113	Calc-Data Inc.	78
111	CDE Software	32
61	Clone Computers	14
87	Clone Computers	15
133	Computer Discount of America	20
31	Computer Friends	60
18	Computer Plus	38
29	Cornucopia Software	32
102	DAS Technology	48
104	Datadesk	61
282	DFW Computer Center	31
40	Discount Computer Supplies	35
204	Diskcount Data	47
85	Educational Micro	55
	80 Micro	
	Disk Series	64
324	80 Micro Classifieds	65,78
325	Micro Source	78
92	Electronic Arts	37
214	Fort Worth Computers	12,13
*	G.E. Information Service	CIII
38	Gray Fox Enterprises	74
115	Great Game Products	78
20	Howe Software	11
46	Hypersoft	57
*	Info-Napse	30
83	Intuit	17
77	Kalglo Electronics	48
250	Marymac Industries	53
41	Matthew Electronics Inc.	65
19	Megahaus	21
225	Merritt Computer Products	72
*	Micro Smart	24,25
*	Micro Smart	26,27
60	Micro Systems	6
212	MicroProse	9
37	Microtech Consultants	41
94	Montezuma Micro	2
66	Montezuma Micro	3
167	National Computer Supply	45
232	Nocona Electronics	49
5	Pacific Computer Exchange	72
44	Parsons Technology	7
124	Perry Computers	42
112	Personal Software Co.	78
99	Portable 100	79
308	Powersoft	4
16	Quarterdeck	CIV
75	Radio Shack	66,67
55	Renco Computer Printer Supplies	74
42	Safeware	78
15	Shamrock Computer	62
81	Total Access	50
247	True Data Products	63
6	Zeus Computer	68

*This advertiser prefers to be contacted directly.

Advertising Sales (603) 924-7138
or (800) 441-4403



MATTHEW ELECTRONICS INC.

**OFFERS
TANDY 1000 OWNERS:**

EGA BOARD

For Tandy 1000, 1000A, 1000HD. Software switching between Tandy Video and EGA Modes **\$295.00**

SALE!

MASTER/CHASSIS

7 user slots plus power supply to expand Tandy 1000, 1000A, 1000SX. **Save \$50.00! NOW . . . \$575.00!**

SALE!

MASTER/ONE

1 MEG Multifunction board for Tandy 1000, 1000A, 1000SX. All memory installed, plus software. **Save \$100.00! NOW . . . \$355.00!**

MASTER/FOUR

4 MEG Multifunction board for Tandy 1000, 1000A, 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 80 MICRO CLASSIFIEDS

How to place your classified ad: Ads must be received by the 20th of the month 3 months prior to publication. The ad runs \$2.00 per word. 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

CoCo Public Domain Software. Over 60 disks full of programs. From \$5 a disk. Free catalog. PD Software, PO Box 13256-M, Houston, TX 77219.

Children's Bible Quiz for IBM Compatibles, \$5.00 postpaid. Proclaim Software, Box 12192B, Norfolk, Va. 23502.

Bible Study Guide for IBM Compatibles, \$8.00 postpaid. Proclaim Software, Box 12192B, Norfolk, VA. 23502.

20 Best PC Utilities on a DS/DD disk. Great collection for hard or floppy PC/MS-DOS systems. Public domain and user-supported. All different, useful; all run on "compatibles." Documentation included. \$5.00. P. Neisler, 610 West Mountain Street, Kings Mountain, NC 28086.

Readability Analyst. How clear is your writing? Find out with PROSE, the Readability Analyst. PROSE is the best readability software available for PC compatibles. PROSE estimates the grade level of your writing using 11 different readability formulas including the Fog Index, Flesch Reading Ease Score, Flesch-Kincaid Formula, Dale-Chall Formula, and the DRP Unit 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™, Wordstar™, Wordstar 2000™, PC-Write™, Multimate™, and Microsoft Word™. PROSE is lightning fast, easy to use, unprotected, and features a Lotus 1-2-3™ style interface with pop-up win-

dows. It comes with a 112 page manual that includes a complete overview of readability research. PROSE costs just \$79.95 (\$9.95 for demo copy). You can also download a free demo copy of PROSE from the MicroBrothers BBS at (303) 730-8137. PROSE will make you a better writer! MicroBrothers, P.O. Box 339, Lafayette, CO 80026.

IBM Public Domain -5 1/4" and 3 1/2" Disks. 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. 3 1/2" Disks \$4.00. 5 1/4" \$3.00. Hundreds to choose from. Echo Disk Copy, Dept. 80, P.O. Box 50132, Mobile, AL. 36605.

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.

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.

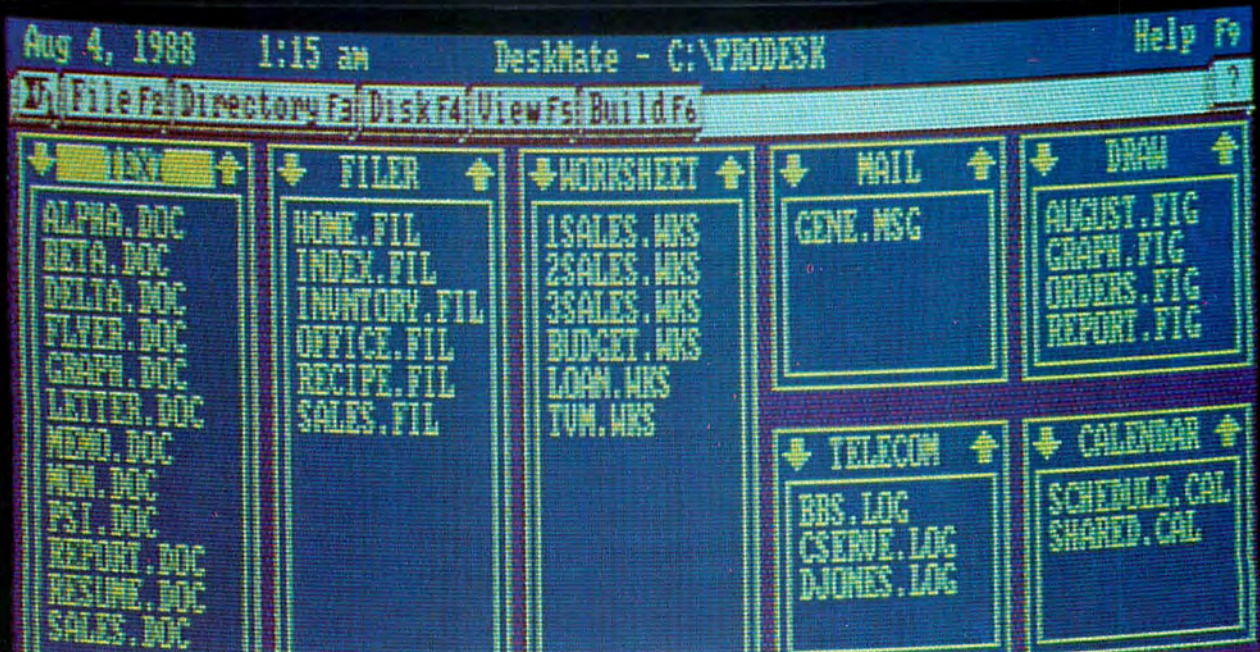
Tandy Software—Limited Quantities— Priced to sell at 60—90% off Radio Shack list prices! Software available for ALL Tandy and TRS-80 Computers. Send \$1.00 & SASE for list. King Micro, Box 72189, Columbus OH, 43207

(continued on page 78)

The western division posted a 16% gain

tomorrow's 9:00 meeting

the same period ending



TandyLink™ and Professional DeskMate™ put your PCs on speaking terms.

Now there's a simple, affordable approach to PC communications.

Introducing a workgroup designed specifically for small offices. Professional DeskMate software and TandyLink will give your department an enormous boost in production and efficiency—without a heavy investment.

Professional DeskMate combines the most valuable office applications in an easy-to-use integrated format. You get text

files to and from directories on other computers in the workgroup. A shared directory lets users see files available on the other machines.

Electronic mail. It's quick and easy to send messages between users. A message can be created at any workstation and sent to any user in the group.

Shared calendar. Professional DeskMate's calendar function allows for long-term planning and scheduling without conflicts. All individual appointments become a part of a shared calendar.

Shared phone list. Each user can maintain a personal file of often-used phone numbers. And since all workstations have access to a large shared file, anyone in the system can access numbers from Professional DeskMate.

Shared use of remote printers. Any user in the workgroup can print files on a single printer. This feature alone saves you a substantial expense in hardware.

Professional DeskMate's state-of-the-art graphical interface simplifies learning. Dialogue boxes and pull-down menus streamline operations. And all functions can be done through the keyboard or a mouse.

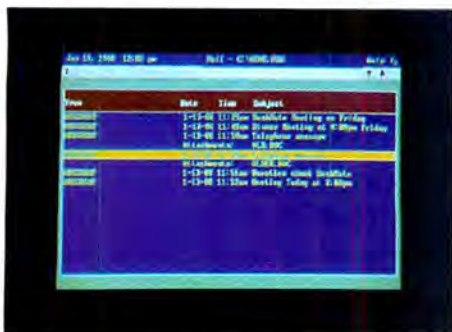
No dedicated file server is needed. A TandyLink work-

group is user installable and operates easily on Tandy and other IBM® PC compatibles. For two stations, all you need is a simple RS-232 connection. For larger workgroups, just add an inexpensive TandyLink card to each computer.



Users can create a common shared appointment calendar—no more conflicts in scheduling!

The Professional DeskMate-TandyLink connection turns individual productivity into real teamwork power. Come to a Radio Shack Computer Center today for a demonstration.



Use Professional DeskMate's electronic mail to transmit messages between anyone in the workgroup.

processing, spreadsheet analysis, filing, telecommunications and business graphics.

And when you use this program in the TandyLink workgroup, every employee can share information and work together.

Transmit files. From anywhere in Professional DeskMate, you can transmit

Circle 75 on Reader Service card.

TandyLink and Professional DeskMate™ Tandy Corp. IBM/Reg. TM IBM Corp.

Send me a 1988 computer catalog.

Mail To: Radio Shack, Dept. 88-A-976
300 One Tandy Center, Fort Worth, TX 76102

Name _____

Company _____

Address _____

City _____

State _____

ZIP _____

Phone _____

Radio Shack®
COMPUTER CENTERS
A DIVISION OF TANDY CORPORATION

HARDCARD For TANDY 1000

20 Meg, 65 ms

\$489⁰⁰

30 Meg, 65 ms

\$689⁰⁰

HARDCARD FOR TANDY 3000 & OTHER XT/AT COMPATIBLES

20 Meg, 65 ms

\$449⁰⁰

30 Meg, 65 ms

\$649⁰⁰

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

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

INTERNAL HARD DISK

For AT, AT Compatibles, & Tandy 3000 & 4000

20 Meg, 65 ms	\$295 ⁰⁰
40 Meg, 61 ms	\$495 ⁰⁰
40 Meg, 40 ms	\$545 ⁰⁰

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

\$170⁰⁰

ALL DISKS ARE FORMATTED

FREE!

DISK ORGANIZER PROGRAM

w/your Hard Disk, Hard Card Order.
Direc-Tree by Micro-Z Co. (\$49⁰⁰ Value)
Run Your Favorite Programs w/2 Key Strokes.

Internal 1200/300 BAUD Modem

Fully Hayes Compatible
w/Software

\$89⁰⁰

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.

READER FORUM

edited by Mare-Anne Jarvela

TIMELY MESSAGES

■ I keep my letters and messages organized by putting them into batch files. From the DOS prompt, type COPY CON file name.BAT, and press the enter key. Type TYPE file name, press enter, and then press the F6 key to end the batch file. DOS will respond with "1 file(s) copied".

To view your newly created file, type file name.BAT from DOS, and press enter. Your file will show on the screen, and you can print by pressing the print key.

You can arrange your files by date. For example, for a file called Mary.TXT made on Nov. 12, type:

```
COPY CON NOV12.BAT
TYPE MARY.TXT
```

Remember to press enter after each line, and end the file by pressing F6. To see your file, type NOV12.BAT from DOS.

This method of filing is good for short messages and reminders. I keep these files on one floppy disk with Com-



mand.COM. The disk will boot, and the remaining disk space is free for the BAT files. If you have a hard disk, you

can keep all these special files in one subdirectory.

Clyde W. Preble,
Mill Valley, CA.

IT'S IN THE KEY

■ On the Tandy 1000, using the Basic command On Key () Gosub interferes with the Inkey\$ function when both are used together. The Program Listing demonstrates how you can access the arrow keys and the page up (PG UP) and page down (PG DN) keys by using Inkey\$.

The characters sent by other keys and key combinations can also be determined and used as control keys with the

Inkey\$ function. Lines 10-30 and 140 display the character returned by any key that shows a character when you enter it from the keyboard. This section also displays the string length and the ASCII code for the first character in the string. Lines 40-130 demonstrate how you can use this information to access the arrow keys and the page up and page down keys when you use Inkey\$ functions.

Robert A. Hood,
Bremerton, WA

Program Listing. Use Inkey\$ to access the arrow keys and the page up and page down keys.

```
5674 10 CLS:PRINT"Usage of INKEY$ Function with Arrow and Page Keys.":PRINT
1806 20 IK$=INKEY$:IF IK$="" THEN 20
4062 30 PRINT"IK$ = ";IK$;" LEN(IK$) =";LEN(IK$);" ASCII Code =";ASC(IK$)
3054 40 IF RIGHTS(IK$,1)="H" THEN PRINT"OK Up Arrow"
3274 50 IF RIGHTS(IK$,1)="P" THEN PRINT"OK Down Arrow"
3947 60 IF RIGHTS(IK$,1)=CHR$(133) THEN PRINT"OK Shift Up Arrow"
4160 70 IF RIGHTS(IK$,1)=CHR$(134) THEN PRINT"OK Shift Down Arrow"
3259 80 IF RIGHTS(IK$,1)="K" THEN PRINT"OK Left Arrow"
3377 90 IF RIGHTS(IK$,1)="M" THEN PRINT"OK Right Arrow"
4190 100 IF RIGHTS(IK$,1)=CHR$(135) THEN PRINT"OK Shift Left Arrow"
4205 110 IF RIGHTS(IK$,1)=CHR$(136) THEN PRINT"OK Shift Down Arrow"
3289 120 IF RIGHTS(IK$,1)="I" THEN PRINT"OK Page Up Key"
3509 130 IF RIGHTS(IK$,1)="Q" THEN PRINT"OK Page Down Key"
624 140 GOTO 20
```

OPTIMIZED HARD DISK

■ Many programs for unfragmenting or optimizing files on hard disks are available for PC-compatible computers. But there's a less expensive, but more time-consuming, method of doing this on the Tandy 1000 HD with nothing but DOS.

Just back up your hard disk with the DOS Backup com-

mand, reformat it (with the command FORMAT C:/S, if you have DOS version 3.2, or HFORMAT C:/S if you have version 2.11), and restore all the files to the empty hard disk. The hard disk should now be completely unfragmented and ready for work.

Zachary Ives
Redwood Valley, CA

DIFFERENT APPROACH

■ I have a different approach to Robert Doerr's INSTR() routine (December 1987, p. 26). The Program Listing works on all Tandy MS-DOS machines. It lists fewer lines in the On...Goto portion of line 20 and requires less setup of any constructs. The Inkey\$ routine is reusable by other routines from other parts of the program, and it automat-

ically limits entry to one character. If you want to see the character you type, you can change line 100 to:

```
100 INPUT H:IF LEN(H)<>1
THEN 100 ELSE RETURN
```

If you want more than upper- and lowercase possibilities, you can replace "/2" with "/3" and the construct can then be "Aa#Bb\$Cc%".

David L. Kuzminski
Petersburg, VA

Program Listing. An INSTR() routine you can modify to fit your needs.

```
1216 10 CLEAR:DEFSTR A-H
4114 20 GOSUB 100:ON ABS(INT(-INSTR("AaBbCc",H)/2)) GOTO 30,40,50:GOTO 20
1160 30 PRINT 30:GOTO 20
1162 40 PRINT 40:GOTO 20
1164 50 PRINT 50:GOTO 20
2517 100 H=INKEY$:IF H="" THEN 100 ELSE RETURN
```

DUMP THAT SCREEN

■ This Basic program (see the Program Listing) lets you screen dump what you want, where you want it, on your printer. It lets you determine the parameters (I use x and y coordinates).

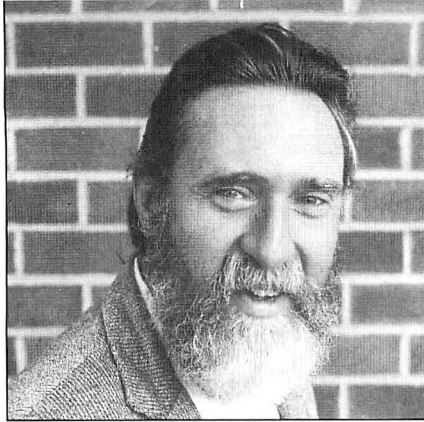
The sample shown in the Listing clears the screen, turns the function keys off, and draws a box. The box starts at

row 1, column 1, and continues through row 25, column 80. Press any key after the box has been drawn and the screen will be dumped to the printer. (Make sure the printer is on.) You can change the character pitch of the printer in line 160 to any pitch you want.

Steve Tension
Safety Harbor, FL

Program Listing. How to use x and y coordinates to dump a screen to the printer.

```
3091 100 CLEAR:KEY OFF:FOR A=1 TO 10:KEY A,"":NEXT:CLS
2513 110 PRINT CHR$(218) STRING$(78,"-") CHR$(191)
3769 120 A=2:WHILE A<25:LOCATE A,1:PRINT " |TAB(80)"|":A=A+1:WEND
3268 130 LOCATE 25,1:PRINT CHR$(192)STRING$(78,"-") CHR$(217);
1560 140 WHILE INKEYS<>":WEND
1712 150 AS=INKEY$:IF AS="" THEN 150
5284 160 X=1:WHILE X<26:Y=1:WHILE Y<81:LPRINT CHR$(SCREEN(X,Y));:Y=Y+1:WEND:X=X+1:WEND
```



The Serial Connection

■ by Harry Bee ■

Last month, you reversed strings and turned sleek into keels and fires into serif. I forgot to ask at the time: Can anyone think of a practical application for a string reversal routine? I can't. That's why I'm asking.

Series Contender

In January, I presented you with six puzzles, each based on a series. The idea was to write routines to reproduce each series and add the next few elements. Among your typically clever responses, Dr. Michael W. Ecker threw me a bone of contention on the subject of series. Doctor Mike, a mathematics professor, is also a regular Fine Lines correspondent, an author, an editor, and publisher of the *Recreational and Educational Computing Newsletter* (129 Carol Drive, Clarks Summit, PA 18411, \$24.00/year.)

Regarding a series of numbers, Mike contends, "There is no such thing as the next number. That is because, given any finite number of numbers, by various means one can always find many formulas that produce those numbers for the first several values but then produce different values for the next number." Mike says that's why you won't find this kind of question on aptitude tests any more. "If you don't provide the rule (on which the series is based), the question is meaningless, as there are infinitely many correct answers." And if you give the rule, you don't leave much of a puzzle to solve.

Mike's exception is worth noting for two reasons: First, it's entirely valid. Second, I disagree.

A couple of examples from your solutions this month show how right Mike is. Take the series 149, 162, 536, 496, . . . Much to my surprise, several of you actually found an expressible relationship among those numbers. For instance, Norman Turkel (Manalapan, NJ) came up with the following:

```
A = 13:B = .46156:C = 11
D% = A*(C + B)
FOR X = 1 TO 4
  C = C + 1
  D% = A*(C + B)
  B = B/2:C = C + 28 + 32*(X = 2)
NEXT X
```

The routine makes the next number in the

series 872.

Coming from another direction, Hamilton Gaillard (New City, NY) figured it this way:

```
FOR N = 1 TO 6
  E = (-775*N^3 + 5733*N^2 - 11696*N
    + 7632)/6
NEXT N
```

This makes the next two numbers -733 and -3926. (And I'm here to tell you that's one fine of an example of a derived third degree equation.)

Since both solutions reproduce the four given elements of the series, both must be correct, which proves Mike's point. So how can I disagree with him?

If Mike's right, then scientific method is worthless, and all science is meaningless. Scientific method depends on inducing, rather than deducing, rules (science) from necessarily incomplete information. There's no way you can examine every star in the universe in order to prove, absolutely, a rule about stars. But if you examine enough stars and star-like things and look at them through the right prism, you can find a rule about stars that you know is true. Science does it all the time and comes up with rules true enough for moon shots and brain surgery, which ain't bad.

Next-in-the-series puzzles are not only fun, they're solvable without equivocation. Mike's point of contention overlooks the puzzler's ethic: A good puzzle gives you enough information to separate the *true* answer from the (sometimes) infinitely many correct ones. A really successful puzzle also includes enough slight of hand to make the information you need less than obvious.

Among January's puzzles were a couple of successful ones, including the one I mentioned above. Below and in Program Listing 1 is what you did with them. Almost everyone nailed the series 99, 98, 94, 76, -20, . . . as one of factorials (1, 1 x 2, 1 x 2 x 3, etc.) subtracted from the constant value 100. The factorials are a distinctive set of numbers, and the give-away here is the -20. Line 100 of Program Listing 1 holds Ham Gaillard's elegant extension of

the series through -40,220.

A lot of hard work and persistence can produce any number of "correct" next numbers—as Ham and Norman did. On the other hand, the true solution to the series 149, 162, 536, 496, . . . depends on ignoring the way I presented the data. Seen through a different filter, the numbers 1, 4, 9, 16, 25, 36, and 49 make a clear picture. The 6, then, is the first digit of 64, which makes the next few elements of the series 481, 100, and 121. The trick here is to find a way to group the set of perfect squares into triplets. Mike Guerard (Wenonah, NJ) does it in line 200 with a loop that depends on the length of an accumulator string exceeding 4. Mike's method represents an excellent and instructive use of While. . . Wend.

Responses to the series 3, 6, 1, 4, 7, 2, 5, 0, 3, . . . included amazing attempts to find a pattern of plus or minus 3 or 5 and make it work. A few of you recognized this series as the remainders of incrementing by 3 and dividing by 8, (N + 3) MOD 8, of which Steve Krattiger's (Valencia, CA) clean routine in line 300 is a clear example. I didn't do it this way. Modulo arithmetic isn't in the top tray of my toolbox. Instead, I used (N + 3) AND 7, which does the same thing differently.

As soon as you translate the characters of the series !#&?*5<D . . . into their ASCII codes, the arithmetic series becomes clear. The increment between each character code increases by one each time. Frank Darr (Houston, TX) walks away with the prize, not only for the beautiful simplicity of line 400 but for his singular way of calculating the incremental increment.

Almost everyone recognized the series 23, 52.9, 121.67, 279.841, . . . for what it is—successive powers of 2.3 x 10 or a variation thereof. Only two of you, however, were able to maintain the precision of the numbers through the next few elements. Mike Guerard was one, and Ed Garcia (Youngsville, LA) was the other. Even with the correct arithmetic, most routines broke down at the sixth element, with 1480.359 instead of 1480.35889. Ed's routine in line 500 renders the numbers precisely for several elements beyond the sixth by declaring

even the constants as double precision numbers. To see what a difference a declaration makes, remove the double precision declarer (#) from the constant 2.3 and see what happens.

To solve the series 182764125216343 . . . , you have to supply your own divisions between the numbers. Once you do that, you see that the next seven digits clearly are 5127291000. Here you have the series of cubes of positive integers literally strung together. David Chestnut (Pataskala, OH) doesn't bother building a string in line 600 but prints everything directly to the screen.

Connect the Dots

Here's another kind of puzzle, which needs a graphic solution. Start with 16 dots in four rows of four each:

```

. . . .
. . . .
. . . .
. . . .

```

All you need do is connect all 16 dots with six (and only six) straight lines drawn without lifting pen from paper and without retracing any part of any line.

The short program in Program Listing 2 sets up the dots. Actually, using Tandy's character set, it puts diamonds on a medium resolution graphics screen. If you don't get diamonds, check your manual for the code to substitute in the CHR\$ function at line 80. If you're using a composite monochrome monitor, make the background color black by changing the Color statement in line 40 to COLOR 0,1. The program also marks the center of each diamond and leaves the graphics cursor at the upper left-hand diamond/dot.

Because this was recently the Space Age, and it's now the Data Age, Information Age, Age of Harmonical Convergings or middle age, depending on whom you read, you don't get to use pen or pencil for this exercise. You get to exercise Basic's Graphics statements to complete the program and solve the puzzle. The rules remain in force, though—each new line must begin from the end of each preceding line. You can't stop to reposition the graphics cursor.

This is a variation of a classic puzzle that calls for nine dots and four lines. It's more difficult with 16 dots, but the idea is the same.

Lava Lamps

Speaking of the Age of Aquarius, if you were young and alive and American in the 1960s, you remember lava lamps. For those of you who were none of the above in that age, a lava lamp is a transparent container, usually some variation of cylindrical, filled with two fluids, neither one soluble in the other. I always assumed the fluids were oil and colored water, but now that I think about it, that can't be right. (I could make a phone call and find out, but I honestly prefer not to know.) Anyway, the container sits above a light bulb. In its dormant state, the denser fluid lurks on the bottom. When you turn on the

lamp, it not only casts a sickly, colored-water-filtered glow, but the light bulb also heats the fluid on the bottom, from which long globules rise to the top of the cylinder where they cool and drift down again. The constant motion casts watery shadows over the shag rug and across the Woodstock poster.

In short, a lava lamp is a fish tank for folks who can't remember to feed the fish, something to look at while listening to Pink Floyd or the Electric Prunes' Mass in F Minor.

I speak of the lava lamp in the present tense because while shopping this past holiday season, I was surprised to see it on sale. It hasn't gone the way of the dodo bird, however much it deserves to. Moreover, it has cousins, a whole category of low-tech fish tanks for the forgetful. I'll presume to call this category *lavalampalia*.

Of course I recognized the fiber-optic lamp-sculptures, kin to the wind chime, also capable of random motion. A couple of vendors had specials on them. At three for \$99.00 they were hard to resist. The most popular of the genre seemed to be something called a wave—in-carcerated surf. My favorite specimen was one that used sand and some sort of heavy liquid to create exquisitely desolate landscapes.

I got to thinking. Since this category of lavalampalia seems to have longevity—two decades isn't bad these days—and seems to be growing, who am I not to contribute what I can? In that spirit I wrote Program Listing 3, which I call Pink Champagne.

The number 4 in line 100 defines five bubbles, the most the slowest Tandy 1000 running MS-DOS 2.11 can handle. Running under DOS 3.2, the program will take a couple more. If you have a speed-up kit, a model with a faster CPU, or if you compile the program, you can increase the bubbles to taste. The idea is that they float smoothly to the surface of the very expensive, very brut wine.

OK. Now that I've humiliated myself, there's no reason for you not to join the fun. Besides, it will give you a chance to play with graphics commands to no worthwhile purpose, just to see what they'll do. So send me your contributions to lavalampalia: programs that do nothing useful but do it constantly and prettily enough to stare at. If you send enough of them, I'll spread the printing of them over several issues.

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 April 15, 1988, to be considered for the July 1988 issue and a T-shirt if we use it.
3. Employees of CW 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. Series solutions.

```

5241 | 100 PRINT "A.":N=1:FOR L=1 TO 8:N=N*:PRINT STR$(100-N)+";":NEXT L:PRINT
      | NT "...":PRINT
9998 | 200 PRINT "B.":L=0:CS="":WHILE L<12:L=L+1:N=L*BS:MIDS(STR$(N),2):CS=C
      | S+BS:WHILE LEN(CS)>4:PRINT " "LEFT$(CS,3);":CS=RIGHT$(CS,LEN(CS)-3
      | ):WEND:WEND:PRINT "...":PRINT
5518 | 300 PRINT "C.":N=0:FOR L=1 TO 16:N=(N+3) MOD 8:PRINT STR$(N);":":NEXT
      | L:PRINT "...":PRINT
4845 | 400 PRINT "D.":FOR L=2 TO 14:PRINT CHR$(32+L*(L-1)/2);:NEXT L:PRINT "
      | ".
      | ".
5344 | 500 PRINT "E.":N#=10#:FOR L=1 TO 7:N=N#*2.3#:PRINT STR$(N#);":":NEXT L
      | PRINT "...":PRINT
6143 | 600 PRINT "F.":FOR L=1 TO 10:N=L^3:PRINT RIGHT$(STR$(N),LEN(STR$(N))-1
      | ):NEXT L:PRINT "...":PRINT

```

Program Listing 2. A dotted puzzle.

```

10 / ***** Connect the dots with 6 straight lines. *****
20 / Draw the lines in one pass.
30 /
2002 | 40 KEY OFF:SCREEN 1,0,0:COLOR 1,1
3612 | 50 R=6:C=12:X=92:Y=43:RSTEP=4:CSTEP=5:XSTEP=40:YSTEP=32
892 | 60 FOR L=0 TO 3
1001 | 70 FOR LL=0 TO 3
2953 | 80 LOCATE R+L*RSTEP,C+LL*CSTEP:PRINT CHR$(4) ' Diamonds.
2184 | 90 PSET (X+LL*XSTEP,Y+L*YSTEP),2 ' Centers.
712 | 100 NEXT LL
605 | 110 NEXT L
923 | 120 PSET (X,Y),2 ' Start in the upper left-hand corner.

```

Program Listing 3. Here's looking at you.

```

3021 | 10 KEY OFF:DEFINT A-Z:SCREEN 1,0,0:COLOR 7,1:CLS
3377 | 20 DRAW "c1;bm30,60:m157,140:nm163,140:m157,190:m100,199"
3732 | 30 DRAW "c1;bm290,60:m163,140:m163,190:m220,199;1120;bm160,142"
2249 | 40 PAINT (160,142),CHR$(8H44)+CHR$(8H11),1
2875 | 50 LINE (47,70)-(273,70),2,&H9249:CIRCLE (160,137),1,2
4525 | 60 DIM BUBBLE(4),SPRAY(37):GET (158,136)-(162,138),BUBBLE:PUT (158,136),
      | BUBBLE
2749 | 70 LOCATE 1,14:PRINT "Pink Champagne";
12986 | 100 FOR L=0 TO 4:IF Y(L)>70 THEN GOSUB 1100 ELSE IF Y(L)=70 THEN PUT (X(L),
      | Y(L)),BUBBLE:W(L)=5:Y(L)=Y(L)-1 ELSE IF Y(L)>60 THEN GOSUB 1200 E
      | LSE IF Y(L)=60 THEN GOSUB 1300:Y(L)=0 ELSE GOSUB 1000:PUT (X(L),Y(L)
      | ),BUBBLE
1153 | 110 NEXT L:GOTO 100
1373 | 1000 Y(L)=73+INT(64*RND)
4056 | 1010 IF INT(2*RND) THEN X(L)=51+1.6*(Y(L)-70) ELSE X(L)=265-1.6*(Y(L)-70)
      | )
707 | 1020 RETURN
4265 | 1100 PUT (X(L),Y(L)),BUBBLE:Y(L)=Y(L)-1:PUT (X(L),Y(L)),BUBBLE:RETURN
1928 | 1200 FOR Y=Y(L) TO Y(L)-2 STEP -1
3678 | 1210 PSET (X(L)+INT(W(L)*RND),Y):PSET (X(L)+INT(W(L)*RND),Y)
1606 | 1220 W(L)=W(L)+2:X(L)=X(L)-1
1662 | 1230 NEXT Y:Y(L)=Y:RETURN
4004 | 1300 GET (X(L),60)-(X(L)+W(L),69),SPRAY:PUT (X(L),60),SPRAY: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



Circle 225 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!:C
LS
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(BLS):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 EL
SE 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<1000 THEN AS=""
"+STRS(CKSUM)+" " ELSE IF CKSUM<10000 THEN AS="" :"+STRS(CKSUM)+" "
ELSE IF CKSUM<100000 THEN AS="" :"+STRS(CKSUM)+" " ELSE AS=STRS(CKSU
M)+" "
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:GOT
O 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)="y" OR LEFTS(LS,1)="Y" THEN MAX=0:LNUM(0)=65536!:GOTO 30:EL
SE 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<1000 THEN AS=""
"+STRS(CKSUM)+" " ELSE IF CKSUM<10000 THEN AS="" :"+STRS(CKSUM)+" "
ELSE IF CKSUM<100000 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," "):BLS=LEFTS(LS,BL-1
):LNUM(P)=VAL(BLS):LS(P)=MIDS(LS,LEN(STRS(VAL(BLS)))+1):P=P+1:WEND
1603 | 510 MAX=P:CLOSE #1:GOTO 30
2911 | 520 IF ARGS="" THEN ARGS="A:"ELSE SEL=1:GOSUB 570
1343 | 530 FILES ARGS: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 ARGS=MIDS(ARGS,2):GOTO 570
3565 | 580 IF LEFTS(ARGS,1)<>CHR$(34) THEN 320 ELSE ARGS=MIDS(ARGS,2)
3761 | 590 IF RIGHTS(ARGS,1)=CHR$(34) THEN ARGS=LEFTS(ARGS,LEN(ARGS)-1)
3278 | 600 IF SEL=0 AND INSTR(ARGS,".")=0 THEN ARGS=ARGS+".BAS"
1058 | 610 SEL=0:RETURN
2218 | 620 PRINT "Error #":ERR:RESUME 50

```



Simple Arithmetic

■ by Hardin Brothers ■

By the end of fifth or sixth grade, most of us could perform the simple arithmetic operations—addition, subtraction, multiplication, and division—confidently and accurately with any numbers given to us. It might take a little time to multiply a pair of 60-digit numbers, but the task is not difficult.

Despite its power, a computer, especially one running Basic, can't do as well. Interpreted Basic can't even subtract 20 from 20.2 without introducing inaccuracies. If your application requires accurate arithmetic, as many financial programs do, interpreted Basic is a poor choice.

Basic and most other popular languages can perform arithmetic accurately if the values remain in integer range, from -32,768 to +32,767. Most implementations of C and some of the new compiled Basics such as Microsoft's Quick Basic and Borland's Turbo Basic can also use long integers, which are accurate between positive and negative 2,147,483,647. One way to write financial programs with such languages is to do all arithmetic with long integers representing cents, not dollars, and then place the decimal point appropriately during input and output. Extensions that manipulate numbers of any length accurately using an internal representation called Binary Coded Decimal (BCD) are available for some languages. If you often write financial programs, even if they're intended only to handle your personal finances and accounts, one of these solutions may be sufficient.

It's interesting and sometimes instructive to find ways around a computer's inherent limitations. This month's program (see the Program Listing) illustrates one method of performing simple arithmetic on integers of almost any length. If you write the program in Quick Basic (as I have) or in Turbo Basic, the numbers can be up to 32,766 digits long. If you use interpreted Basic, you'll be able to use numbers up to 254 digits long. Either should fulfill almost any requirement.

Representing Numbers

Once you leave the realm of a language's

internal numeric formats, you must pick a new method of storing and manipulating numbers. Two methods are frequently used. Long numbers can be stored in integer arrays, with a single digit in each array element, or in strings, with each digit stored in its ASCII form. Both solutions have advantages and disadvantages.

If you use arrays to store large numbers, you'll run headlong into Basic's inflexible memory-management techniques. You must dimension arrays to the largest possible size that might be needed and can resize an array only by erasing it completely and then redimensioning it. Also, if you store a single digit in each array location, you'll be using 16 bits (2 bytes) to hold each digit. If you store more than one digit in each array element in order to save memory space, multiplication and division algorithms turn out to be extremely cumbersome to program.

On the other hand, if you store large numbers in strings, you can take advantage of Basic's flexible string storage techniques. Space is allocated and de-allocated as necessary, without intervention by the programmer. You'll also be able to store one digit in every 8 bits (1 byte), thereby doubling the efficiency of your memory use. On the other hand, your program will run more slowly because you'll have to convert digits to numbers and back again as you work. At the very least, you'll have to work with ASCII codes instead of actual numeric values.

In the past, I've implemented several long-number schemes using arrays, so I decided to use strings to hold the numbers this month. I also decided to write this month's program using Quick Basic 4.0, because it has some of the best built-in program development tools available. I've found I can develop programs in Quick Basic 4.0 about twice as fast as I can with any other language or compiler in my library.

Exploring the Program

This month's listing is intended to serve

as a guide to the algorithms you'd need to add long-integer arithmetic to your own programs. The listing works as a program in its own right, but you'll probably soon tire of merely performing arithmetic on arbitrary numbers. Throughout the program, I've used lowercase names for variables and mixed-case names for functions and subprograms. Words shown entirely in uppercase letters are Basic's keywords.

The function and sub declarations at the beginning of the program show the logical grouping of the program's procedures. Quick Basic 4.0 insists on listing the procedures in alphabetical order, but the groupings shown in the declarations are more natural to the logic of the program and indicate the order in which I will discuss the parts of the Listing.

The main body of the program follows the declarations. First, you're asked to type in two numbers, which are stored in strings. Although Quick Basic allows strings up to 32,767 characters long, its input routine allows only 255-character strings. If you want to allow longer strings, you'll have to use a different input technique.

Next, the strings are sent to two different functions. Fixup turns the input strings into the format the rest of the program expects: a plus or minus sign followed by a string of digits. You may enter the numbers with commas or other interior characters; if so, Fixup and its subfunction RemoveJunk will extract those characters. The second function, Format, turns the strings into a form suitable for output. Leading plus signs are removed, and commas are added between every three digits to make the numbers more readable. The Format function is something like Basic's Print Using, but it accepts the numbers in string form and can handle large numbers. The only limit is that the strings Format creates cannot be more than 32,767 characters long (in Quick Basic or Turbo Basic).

System Requirements: Quick Basic 4.0. Available on the April-June Disk Series, on sale in May.

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
Blue	DMP 200	6.75	8.50
	(m/s) DMP 230	3.75	5.75
	DMP 430	Call For Price	—
Green	DMP 2100	5.75	—
	Apple Imagewriter I/II	3.75	4.75
Brown	Brother HR 15/25/35 m/s	6.00	8.00
	Citizen 120D	5.00	—
	Epson LX 80/90	3.60	4.25
Purple	Epson MX/FX/RX 80/85	3.75	4.25
	Epson MX/FX/RX 100/185	5.50	7.60
Yellow	IBM Proprinter 4201	5.25	7.20
	Okidata 80/82/92/93	1.75	2.25
	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 SUPPLIES
 P.O. Box 475, Manteno, IL 60950 U.S.A.
 1-800-522-6922 • 815-468-8081

THE NEXT STEP

Next, the two numbers you've entered are sent to the four arithmetic routines: Add, Subtract, Multiply, and Divide. Each accepts two strings in the program's internal format and returns a result that's in the same format. The original numbers and the result of each operation are displayed with a subprogram called Display.

The first declared subprogram, ErrorRpt, prints an error message, waits for you to read it, and then returns. It uses Basic's key-ready function, Inkey\$, in two While . . . Wend loops to first empty the computer's type-ahead buffer and then wait for a keystroke.

The Fixup function first removes leading and trailing spaces from the strings and then extracts the sign of the number if it exists. If no sign is attached to the number, Fixup assumes that it is positive. Next, it removes any leading non-digits and any leading zeros. If anything remains of the number, Fixup calls RemoveJunk to extract any extraneous characters such as commas. Otherwise, it returns a +0, the standard representation of zero within the program. RemoveJunk merely steps through the string one character at a time, taking out all non-digits. Fixup is also used to put the results from the arithmetic functions back into standard format.

The Format function takes a string in the program's internal format, removes leading plus signs, and adds commas as necessary to prepare the string for output. The Display subprogram begins by creating a string long enough to hold the longest string it has to print on the screen. Then it uses Basic's RSet command to put each of the numbers into that string and display them in a right-justified format. RSet is more often used with random-access files, but it can be helpful if you need to print any strings in right-justified form, a job that Print Using refuses to do. The output from Display looks pleasant on the screen if the numbers are short enough to fit on a single line. If your input or output numbers are more than 78 characters long, your screen output will look messy in any case.

Performing Arithmetic

The rest of the functions in the program do the actual arithmetic. The function Add takes two strings in the standard internal format. It uses the subfunction, Larger, to determine which operand has the higher absolute value, and therefore the sign of the result. If the signs of the two operands are the same, Add calls the Carry routine because an actual addition must be performed. If the signs are different, Add calls the Borrow function because adding numbers with opposite signs is the same as subtracting two

numbers with the same sign.

The Carry and Borrow functions have similar structures. Each begins by making the operand strings the same length and then adding or subtracting from right to left, much the same as most people do. They both have to check for a possible carry or borrow before saving each digit of the result. Notice that neither routine has to worry about possible overflow because the operand in a\$ is larger or equal to that in b\$, and the signs in each operand are replaced by zeros.

The Subtract function is particularly simple. It merely reverses the sign of the second operand it receives and then calls Add.

The Multiply function is more complicated. Multiply could be implemented by calling Add repeatedly, but if the multiplier were at all long, your computer might take forever to calculate a result. Instead, Multiply begins by determining the sign of the result and then removing the signs from both operands. It then moves from left to right through the multiplier, picking out one digit at a time and sending that digit, along with the multiplicand, to a separate function called Mult. Mult returns a partial product, which is added to a running total. The total is also multiplied by 10 before each new partial product is added. The resulting algorithm is similar to the way most people perform long multiplication, except that it moves from left to right instead of vice versa.

Divide is the most complicated function in the program. Like Multiply, it could have been implemented by subtracting the divisor from the dividend repeatedly. Instead, I chose to implement divide using the standard "long division" algorithm that most of us learned in elementary school. The divisor is padded on the right with the appropriate number of zeros and then sent, along with the dividend, to a function called Div to find one digit of the result. Then a multiplication and subtraction are used to adjust the dividend before the next quotient is found. If you trace through Divide using Quick Basic's debugger to watch all of the strings in the routine, you'll soon see how the function works.

The Div routine can't use Basic's built-in division operators to find a digit since it might be sent numbers of immense length. Instead, it repeatedly subtracts the divisor from the dividend to find a digit for the quotient and counts the number of subtractions necessary.

The addition and subtraction routines are relatively quick, but multiplication and division can bog down the computer. The time required to multiply two numbers is proportional to the length of the shorter number. The time required to perform a division, because the subtraction routine must be called repeatedly, is proportional to the sum of the digits in the quotient. Small quotients can be found quickly, as can quotients with many 1's and zeros.

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.

However, a division problem that results in a quotient of all 8's and 9's might take a long time to calculate.

As you study the listing or type it into your computer, pay particular attention to which parameters are passed by value and which are passed by reference. When a parameter is passed by reference to a function, the function can change the original value. When a parameter is passed by reference, either by enclosing the variable in a second set of parentheses or by specifying an expression as the parameter, the called function cannot change the original value. Sometimes the program doesn't care what happens to an operand and passes it by reference, which is faster. At other times,

operands can't be destroyed, so they're passed by value.

If you're going to rewrite the program for interpreted Basic, you'll have to change each of the functions into a subroutine and develop a personal convention for passing strings back and forth between subroutines. Since most of the functions in the program receive either one or two strings, you might want to use two dedicated variables to send values to subroutines and a third to receive results. You could adopt a similar convention if you want to translate the program into a different compiled Basic.

Some of the algorithms in this month's program were adopted from Wayne Amsbury's *Data Structures from Arrays to Priority Queues*

THE NEXT STEP

(Wadsworth Publishing Co., 1985), which is written as a textbook but contains a clear explanation of how several different kinds of data structures can be implemented, both in pseudo-code and Pascal. ■

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. Quick Basic program performs simple arithmetical operations on integers of almost any length.

```

'-----
' Multi-precision arithmetic routines
'
' Input accepted as nnnnnn, +nnnnnn, or -nnnnnn
' for each number. Stored internally as
' +nnnnnn or -nnnnnn
' Original strings are not destroyed by arithmetic routines
'
' Written for QuickBasic 4.0
'-----
DECLARE SUB ErrorRpt (a$) 'Report input errors
DECLARE FUNCTION Fixup$(a$) 'Fix user input errors
DECLARE FUNCTION RemoveJunk$(a$) 'Remove extraneous characters
DECLARE FUNCTION Format$(a$) 'Format for output
DECLARE FUNCTION Reverse$(a$) 'Reverse a string (non-recursive)
DECLARE SUB Display(a$, b$, c$) 'Display three numbers
DECLARE FUNCTION MaxLen$(a$, b$, c$) 'Find longest of 3 lengths
DECLARE FUNCTION Add$(a$, b$) 'Add two numbers
DECLARE FUNCTION Larger$(a$, b$) 'Is |a| >= |b| ?
DECLARE FUNCTION Carry$(a$, b$) 'Add using carry algorithm
DECLARE FUNCTION Borrow$(a$, b$) 'Add using borrow algorithm
DECLARE FUNCTION Subtract$(a$, b$) 'Subtract a - b
DECLARE FUNCTION Multiply$(a$, b$) 'Multiply two numbers
DECLARE FUNCTION Mult$(a$, b$) 'Multiply nnnnnn by m
DECLARE FUNCTION Divide$(a$, b$) 'Divide a \ b
DECLARE FUNCTION Div$(a$, b$) 'Find partial dividend

DEFINT A-Z
CONST FALSE = 0
CONST TRUE = NOT FALSE

Start:
CLS
LINE INPUT "First number: ", item1$ 'Get and check input
IF INSTR(item1$, ".") THEN
  ErrorRpt ("You may only enter integers")
  GOTO Start
END IF

LINE INPUT "Second number: ", item2$
IF INSTR(item2$, ".") THEN
  ErrorRpt ("You may only enter integers")
  GOTO Start
END IF

item1$ = Fixup$(item1$) 'Coreect any problems
item2$ = Fixup$(item2$) ' and put in normalized form
first$ = Format$(item1$) 'Prepare for later output
second$ = Format$(item2$)

Display " " + first$, "+" + second$, Format$(Add$(item1$, item2$))
Display " " + first$, "-" + second$, Format$(Subtract$(item1$, item2$))
Display " " + first$, "*" + second$, Format$(Multiply$(item1$, item2$))
Display " " + first$, CHR$(246) + " " + second$, Format$(Divide$(item1$, item2$))

'-----
' Add two numbers. If signs are the same, use carry algorithm;
' if signs are different, use borrow algorithm
'-----
FUNCTION Add$(a$, b$)
IF Larger$(b$, a$) THEN 'Put larger absolute value in a$
  SWAP a$, b$
END IF
IF LEN(b$) = 2 AND MIDS(b$, 2) = "0" THEN 'Leave early if no work needed
  Add$ = a$
ELSE
  IF LEFT$(a$, 1) = LEFT$(b$, 1) THEN 'Use carry if signs are the same
    Add$ = Carry$(a$, b$)
  ELSE
    Add$ = Borrow$(a$, b$) 'Otherwise use borrow
  END IF
END IF
END FUNCTION

'-----
' To add numbers with opposite signs, we essentially have to
' subtract, borrowing from each column as necessary
'-----
FUNCTION Borrow$(a$, b$)
sign$ = LEFT$(a$, 1)
MIDS(a$, 1, 1) = "0"
MIDS(b$, 1, 1) = "0"
DO WHILE LEN(b$) < LEN(a$) 'Make operands the same length
  b$ = "0" + b$
LOOP
loan = 0 'No borrow yet
c$ = "" 'Create string for result
FOR lp = LEN(a$) TO 1 STEP -1 'Move from right to left
  difference = VAL(MIDS(a$, lp, 1)) - VAL(MIDS(b$, lp, 1)) - loan
  IF difference < 0 THEN 'If we need to borrow
    loan = 1 'Set borrow value
    difference = difference + 10 'Make column result positive
  ELSE
    loan = 0 'Else no borrow in next column
  END IF
  c$ = MIDS(STR$(difference), 2) + c$ 'Save the result
NEXT lp
c$ = Fixup$(c$) 'Normalize result
IF c$ <> "+0" THEN 'Then set the sign
  MIDS(c$, 1, 1) = sign$
END IF
Borrow$ = c$ 'Return the result
END FUNCTION

'-----
' Add two numbers with the same sign. Carry out of each
' column as necessary.
'-----
FUNCTION Carry$(a$, b$)
sign$ = LEFT$(a$, 1)
MIDS(a$, 1, 1) = "0"
MIDS(b$, 1, 1) = "0"
DO WHILE LEN(b$) < LEN(a$) 'Make operands the same length
  b$ = "0" + b$
LOOP
over = 0 'No carry now
c$ = "" 'Room for result
FOR lp = LEN(a$) TO 1 STEP -1 'Move from right to left
  sum = VAL(MIDS(a$, lp, 1)) + VAL(MIDS(b$, lp, 1)) + over
  IF sum > 9 THEN 'If carry is necessary
    over = 1 'Carry 1 to next column
    sum = sum - 10 'Make this column < 10
  ELSE
    over = 0 'Else no carry to next column
  END IF
  c$ = MIDS(STR$(sum), 2) + c$ 'Save the result
NEXT lp
c$ = Fixup$(c$) 'Normalize the result
IF c$ <> "+0" THEN 'If necessary
  MIDS(c$, 1, 1) = sign$ 'include result sign
END IF
Carry$ = c$ 'Return the result
END FUNCTION

'-----
' Display two operands and result in a standard format
'-----
SUB Display(a$, b$, c$)
output$ = STRINGS(MaxLen$(a$, b$, c$), " ") 'Set length of each output string
PRINT
RSET output$ = a$ 'Display first operand
PRINT output$
RSET output$ = b$ 'Display second operand
PRINT output$
PRINT STRINGS(LEN(output$), " ")
RSET output$ = c$ 'Display the result
PRINT output$
END SUB

'-----
' Find a partial quotient by subtraction. Input is the current value of
' the dividend (in a$) and the divisor, possibly with trailing zeroes.
' Both are positive.
'-----
FUNCTION Div$(a$, b$)
count = 0 'No subtractions yet
DO WHILE Larger$(a$, b$) 'Subtract as long as a > b
  a$ = Subtract$(a$, b$) 'Perform the subtraction
  count = count + 1 'Count this subtraction
LOOP
Div$ = Fixup$(STR$(count)) 'Return result in normalized form
END FUNCTION

'-----
' Divide a by b, using a version of the "5th grade" long division
' algorithm. Each digit of the quotient is found by subtraction
' instead of by memorizing "division facts"
'-----
FUNCTION Divide$(a$, b$)
IF LEN(a$) < LEN(b$) OR VAL(b$) = 0 THEN 'Maybe no work is needed at all
  Divide$ = "+0"
  EXIT FUNCTION
END IF
IF LEFT$(a$, 1) = LEFT$(b$, 1) THEN 'If signs are the same
  sign$ = "+" 'result will be positive
ELSE 'If signs are different
  sign$ = "-" 'result will be negative
END IF
MIDS(a$, 1, 1) = "+"
MIDS(b$, 1, 1) = "+"
c$ = "+"
loops = LEN(a$) - LEN(b$) 'Result temporarily starts with '+'
'Count quotient digits

```

Listing continued

THE NEXT STEP

Listing continued

```

FOR lp = loops TO Ø STEP -1 'Do once for each digit
  c$ = c$ + "Ø" 'Multiply previous quotient by 10
  d$ = Div$(a$, b$ + STRINGS(lp, "Ø")) 'Find one digit
  c$ = Add$(c$, d$) 'Add it to the quotient
  e$ = Fixup$(Multiply$(d$, b$) + STRINGS(lp, "Ø")) 'Find number to subtract
  a$ = Subtract$(a$, e$) 'Find new value of dividend
NEXT lp
c$ = Fixup$(c$) 'Result in normal form
IF c$ <> "+Ø" THEN 'Does it need a new sign?
  MIDS(c$, 1, 1) = sign$ 'Set result sign
END IF
Divide$ = c$ 'Return result
END FUNCTION
'-----
' Report an error and wait for user to read it
'-----
SUB ErrorRpt (a$)
PRINT 'Print the error message and
PRINT a$ + CHR$(7) ' a beep
PRINT 'Press any key ...';
WHILE INKEYS <> "": WEND 'Erase type-ahead buffer
WHILE INKEYS = "": WEND 'Wait for keystroke
PRINT : PRINT
END SUB
'-----
' Accept string as entered by user or returned from arithmetic function
' and convert to 'normalized' format: no leading or trailing spaces,
' no leading Ø's, and an explicit leading sign ('+' or '-')
'-----
FUNCTION Fixup$( a$) 'Erase leading & trailing blanks
a$ = LTRIMS(a$)
a$ = RTRIMS(a$)
sign$ = LEFT$(a$, 1) 'Get sign if one exists
IF sign$ = "+" OR sign$ = "-" THEN 'Erase sign if it exists
  a$ = MIDS(a$, 2)
ELSE 'Otherwise number is positive
  sign$ = "+"
END IF
DO
  first$ = LEFT$(a$, 1) 'Erase other leading non-digits
  IF INSTR("Ø123456789", first$) = Ø THEN a$ = MIDS(a$, 2)
LOOP UNTIL INSTR("Ø123456789", first$)
DO WHILE LEFT$(a$, 1) = "Ø" 'Erase leading Ø's
  a$ = MIDS(a$, 2)
LOOP
IF LEN(a$) THEN 'If there's anything left
  a$ = RemoveJunk(a$) 'Remove non-digits (commas, etc.)
ELSE 'Nothing left = Ø
  a$ = "Ø"
END IF
Fixup$ = sign$ + a$ 'Put sign back on
END FUNCTION
'-----
' Prepare number for output. Remove leading '+'; insert commas if
' number >= 1000 or <= -1000
'-----
FUNCTION Format$( a$) 'If it is negative
IF LEFT$(a$, 1) = "-" THEN 'sign will be Ø
  sign = FALSE
ELSE 'sign = TRUE
  sign = TRUE
END IF
b$ = MIDS(a$, 2) 'Remove the sign
IF LEN(b$) > 3 THEN 'If it needs commas
  b$ = Reverse$(b$) 'reverse the number
  c$ = "" 'c$ will hold reversed result
  lp = 3 'A comma every 3 places
  DO
    c$ = c$ + MIDS(b$, lp - 2, 3) + "," 'Get three digits and a comma
    lp = lp + 3
  LOOP UNTIL lp >= LEN(b$)
  c$ = c$ + MIDS(b$, lp - 2) 'Put extra characters on
  b$ = Reverse$(c$) 'Back to normal order
END IF
IF NOT sign THEN 'Add minus sign if needed
  b$ = "-" + b$
END IF
Format$ = b$ 'Return new string
END FUNCTION
'-----
' Return TRUE if |a| >= |b|
'-----
FUNCTION Larger (a$, b$) 'Longer number is larger
IF LEN(a$) > LEN(b$) THEN
  Larger = TRUE
ELSE
  IF LEN(b$) > LEN(a$) THEN
    Larger = FALSE
  ELSE 'lengths are the same -- compare
    IF MIDS(a$, 2) >= MIDS(b$, 2) THEN 'compare absolute values
      Larger = TRUE
    ELSE
      Larger = FALSE
    END IF
  END IF
END IF
END FUNCTION
'-----
' Given three strings, return the length of the longest
'-----
FUNCTION Maxlen (a$, b$, c$)
l = LEN(a$) 'It might be a$
IF LEN(b$) > l THEN l = LEN(b$) ' or b$
IF LEN(c$) > l THEN l = LEN(c$) ' or c$
Maxlen = l 'Return the length
END FUNCTION
'-----
' Multiply a number (a$) by a digit (b$). Both are positive.
'-----
FUNCTION Mult$( a$, b$)
b = VAL(b$) 'Get value of digit
c$ = "" 'Result goes in c$
over = Ø 'No carry yet
FOR lp = LEN(a$) TO 1 STEP -1 'Move from right to left
  digit = VAL(MIDS(a$, lp, 1)) * b + over 'Value of one digit
  over = digit \ 10 'Amount to carry
  c$ = MIDS(STR$(digit MOD 10), 2) + c$ 'Result between "Ø" and "9"
NEXT lp
IF over <> Ø THEN 'If carry out of leftmost column
  c$ = MIDS(STR$(over), 2) + c$ 'add it to the result
END IF
Mult$ = "+" + c$ 'Return a positive result
END FUNCTION
'-----
' Remove extraneous interior characters from a number string
'-----
FUNCTION RemoveJunk$( a$) 'Start at first position
lp = 1
DO
  ch$ = MIDS(a$, lp, 1) 'Get the character
  Maxlen = 1 'Return the length
END FUNCTION
'-----
' Multiply a number (a$) by a digit (b$). Both are positive.
'-----
FUNCTION Mult$( a$, b$)
b = VAL(b$) 'Get value of digit
c$ = "" 'Result goes in c$
over = Ø 'No carry yet
FOR lp = LEN(a$) TO 1 STEP -1 'Move from right to left
  digit = VAL(MIDS(a$, lp, 1)) * b + over 'Value of one digit
  over = digit \ 10 'Amount to carry
  c$ = MIDS(STR$(digit MOD 10), 2) + c$ 'Result between "Ø" and "9"
NEXT lp
IF over <> Ø THEN 'If carry out of leftmost column
  c$ = MIDS(STR$(over), 2) + c$ 'add it to the result
END IF
Mult$ = "+" + c$ 'Return a positive result
END FUNCTION
'-----
' Multiply two numbers. Multiply one number by each digit in the
' other number, keeping the partial products in c$
'-----
FUNCTION Multiply$( a$, b$)
IF Larger(b$, a$) THEN 'Save some time by putting
  SWAP a$, b$ 'smaller value in b$
END IF
IF LEN(b$) = 2 AND MIDS(b$, 2, 1) = "Ø" THEN 'Maybe we have nothing to do
  Multiply$ = "+Ø"
  EXIT FUNCTION
END IF
IF LEFT$(a$, 1) = LEFT$(b$, 1) THEN 'If signs are the same
  sign$ = "+" 'result will be positive
ELSE 'Else result will be negative
  sign$ = "-"
END IF
a$ = MIDS(a$, 2) 'Now remove the signs
b$ = MIDS(b$, 2) 'Result starts positive
c$ = "+"
over = Ø
FOR lp = 1 TO LEN(b$) 'Move from right to left
  c$ = c$ + "Ø" 'Multiply result by 10
  c$ = Add$(c$, Mult$(a$, MIDS(b$, lp, 1))) 'Add this digit
NEXT lp
c$ = Fixup$(c$) 'Normalize result format
IF c$ <> "+Ø" THEN 'If answer is not Ø
  MIDS(c$, 1, 1) = sign$ 'insert proper sign
END IF
Multiply$ = c$ 'Return result
END FUNCTION
'-----
' Remove extraneous interior characters from a number string
'-----
FUNCTION RemoveJunk$( a$)
lp = 1
DO
  ch$ = MIDS(a$, lp, 1) 'Get the character
  Maxlen = 1 'Return the length
END FUNCTION
'-----
' Multiply two numbers. Multiply one number by each digit in the
' other number, keeping the partial products in c$
'-----
FUNCTION Multiply$( a$, b$)
IF Larger(b$, a$) THEN 'Save some time by putting
  SWAP a$, b$ 'smaller value in b$
END IF
IF LEN(b$) = 2 AND MIDS(b$, 2, 1) = "Ø" THEN 'Maybe we have nothing to do
  Multiply$ = "+Ø"
  EXIT FUNCTION
END IF
IF LEFT$(a$, 1) = LEFT$(b$, 1) THEN 'If signs are the same
  sign$ = "+" 'result will be positive
ELSE 'Else result will be negative
  sign$ = "-"
END IF
a$ = MIDS(a$, 2) 'Now remove the signs
b$ = MIDS(b$, 2) 'Result starts positive
c$ = "+"
over = Ø
FOR lp = 1 TO LEN(b$) 'Move from right to left
  c$ = c$ + "Ø" 'Multiply result by 10
  c$ = Add$(c$, Mult$(a$, MIDS(b$, lp, 1))) 'Add this digit
NEXT lp
c$ = Fixup$(c$) 'Normalize result format
IF c$ <> "+Ø" THEN 'If answer is not Ø
  MIDS(c$, 1, 1) = sign$ 'insert proper sign
END IF
Multiply$ = c$ 'Return result
END FUNCTION
'-----
' Remove extraneous interior characters from a number string
'-----
FUNCTION RemoveJunk$( a$)
lp = 1
DO
  ch$ = MIDS(a$, lp, 1) 'Get the character
  IF INSTR("Ø123456789", ch$) = Ø THEN 'If it is not a digit
    a$ = LEFT$(a$, lp - 1) + MIDS(a$, lp + 1) 'remove it
  ELSE
    lp = lp + 1 'Else move to next position
  END IF
LOOP WHILE lp <= LEN(a$)
RemoveJunk$ = a$ 'Return new string
END FUNCTION
'-----
' Reverse a string. This is a non-recursive function to save
' stack space.
'-----
FUNCTION Reverse$( a$)
b$ = "" 'Room for result
FOR lp = LEN(a$) TO 1 STEP -1 'Move from right to left
  b$ = b$ + MIDS(a$, lp, 1) 'Copy each character to result
NEXT lp
Reverse$ = b$ 'Return result
END FUNCTION
'-----
' Subtract b$ from a$ by reversing the sign of b$ and then adding
'-----
FUNCTION Subtract$( a$, b$)
sign$ = LEFT$(b$, 1) 'Get original sign
IF sign$ = "+" THEN 'Change it
  sign$ = "-"
ELSE
  sign$ = "+"
END IF
MIDS(b$, 1, 1) = sign$ 'Change the original
Subtract$ = Add$(a$, b$) 'And then add a$ and b$
END FUNCTION

```

End



SAVE BIG BUCKS NOW ON PERIPHERALS!

NEW LOW PRICES!

MODEL 3/4 HARD DISK DRIVES

As Low As
\$379



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!

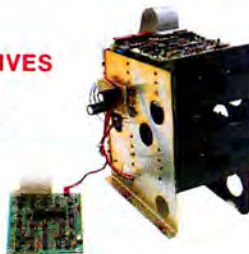
5 Meg **\$379** 20 Meg **\$589**
40 Meg **\$799**

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 ROM 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 blem, seconds, close-outs or a defunct manufacturer's surplus (MPI, Qume, 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 40Ik	\$ 99
720K 5 1/4" TEAC 55F bare drive 80Ik	105
1.2M 5 1/4" TEAC 55G bare drive 80Ik	119
360K 3 1/2" TEAC 35B bare drive 40Ik	89
720K 3 1/2" TEAC 35F bare drive 80Ik	129
1.4M 3 1/2" TEAC 35H bare drive 80Ik	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!

30 MEG HARD CARD



\$395

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.

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 **\$129** 512K **\$168**

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 **\$72**

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.



ORDER TOLL FREE! 1-800-527-0347

"SERVING YOU SINCE 1980"

AD 27

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.

MICRO SOURCE

HOW TO PLACE YOUR AD IN THE MICRO SOURCE

Carefully type your message, or send camera-ready copy. Logos welcome. Each 1/4 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 112 on Reader Service card.

Genealogy

Family Reunion

New version 3.2 provides 32 types of charts, worksheets & reports, including address labels, birthday lists, pedigrees, group sheets, descendants, histories, facts, indexes. Powerful data entry & search capabilities, fancy screens, many user options, fast, fun, easy to learn! \$195 (refunded if not satisfied). MC/Visa/AmEx/COD. Superior value! *Personal Software Company, 1580 E. Dawn Dr., Salt Lake City, UT 84121, 800/327-9835, 801/943-6908.*

Circle 113 on Reader Service card.

CALC - DATA

Menu Driven Pgm. for Home & Sml. Bus.
All Segments on one Disk 5 1/4 or 3 1/2

Savings/Loans	Calculator	Increment-Schedule
File-Search	Inventory	Expenses. Tally.
Text - File	Chg.-Accts.	Check'g & Bank Bal.
Help Access	Payroll	Budget-File
File-Merge	Auto-File	Sorting/Editing
Invoice Records	Phone-File	Instruction Manual
Miscel. Data Fls.	256K	IBM & Compatible

CALC-DATA, INC. (305) 456-0417
460 Tamarind Dr.
Hallandale, Fla. 33009 ----> \$ 34.95
APT RENTAL Records add \$5

Circle 115 on Reader Service card.

Enjoy the Best in Computer Bridge and Other Games

Apple, C-64, IBM/Compat, Mac, Atari ST
Tom Throop's Bridge Baron II™
Bid and Play over a billion random deals
Winner of 1986 & 1987 CES AWARDS
\$49.95

Play Money Bridge

Win cash & other prizes competing against players from the US & Canada Weekly Rubber Bridge & Duplicate tournaments (modem required). First 25 players receive disk and first tournament free.

Other Games Available

Blackjack Chess Pinball
"Boggle" Cribbage Poker

Great Games Products, 8804 Chalon Dr.
Bethesda, MD 20817. For fast service
call: **800-426-3748** In MD call: 301-365-3297
\$4 s & h ea., MD add 5% tax. Check VI, MC accepted

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). SAFEWARE, The Insurance Agency Inc., 2929 N. High St., PO Box 02211, Columbus, OH 43202. 800-848-3469 (Nat); 614-262-0559 (OH)

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
1-800-343-0728**

Circle 105 on Reader Service card.

VIDEO TAPE EDUCATION

DIGIT VIDEO TUTOR

Don't waste your valuable time or add to your frustration by wading through books or manuals!

In less than 2 hours, you can learn quickly and easily, the correct and productive way to make the most out of your computer! Step-by-step instructions conducted in a language that even the most novice computer user can understand. A must for every DOS computer user! Subjects include:

- Format and Copy commands
- How to write an autoexec.bat file
- How to write a config.sys file
- Organizing and managing your hard disk
- Power of Batch files
- and more

Now Only \$ 39.95

(plus \$ 2.50 s/h, TX residents add 7%)

Get it together fast! Send check or money order to:

Affordable Computer Solutions



3111 Andy Lane
Tyler, TX 75701
(214)566-8143
800-356-2203



or circle #105 on reader service card for more information

(continued from page 65)

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 Burnstead Rd., Monson, MA 01057

Programs for Home, Business or Fun. Models 1, 3 and 4. Elite Enterprises, PO Box 4382, Springfield, IL 62708.

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.

Free IBM Software for trying award-winnig

education programs. Geography, Math, Science, Spelling, Vocabulary, etc. for catalog write: Quaker Enterprises, PO Box 133, Leedsdale, PA 15056.

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.

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. All for just \$26.50 postpaid. 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.

Games for IBM compatibles. P/D, Buy/3 Get one Free. Send large SASE w/2 stamps for catalog. KNA Sales, 16 Emerson Rd.,

Northboro, MA 01532.

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.

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, Qubecal, 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.

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

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.

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.

FOR SALE

Modem Owners—Order software, hardware, supplies, on-line at discount prices. Faulkner Supply, 919-383-4905.

BBS

MODEM PARTY LINE! 1-818-842-3322

Nationserv. Online information Network, 3960 Covert Ave., Evansville, IN 47715, (812) 477-5343.

SERVICES

Model 100, 102 & 200 Support (Five-Year-Old Club). Ongoing support for Tandy Model 100, 102 and 200 for Tandy owners. International support by mail, voice, and bulletin board. Free on-line weekly newsletter (300/1200 baud, 8-bit, 24hrs/7days) 415-939-1246. For voice recording 415-937-5039. For INDEX of public domain library, "how to" bulletins, product reviews, write to: CLUB 100, A Model 100 User Group, 984 Hawthorne Drive, Walnut Creek, CA 94596.

Free Adventure Game Hints! 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

Look for our new address

The sky's the limit... ...with Portable 100 magazine.

On the road . . . at home
. . . in the office. . . in the
air. . . the variety of tasks
you can perform with
your Tandy portable is
expanding constantly.

To keep fully informed
and up-to-date about cur-
rent trends, new products,
and new uses for your
laptop, you need **Portable
100** magazine.

From sophisticated input/
output (I/O) calls and
their applications, to sim-
ple disk drives, **Portable
100** magazine covers it all.

Portable 100 gives you
features, news, columns,
and reviews that are
thorough and timely.
And they are written in a
fast-paced, easy-to-read
style, by leading experts
in the computer field.



In upcoming issues you
will discover. . .

- how new peripherals
can make you more
productive.
- more efficient ways
to communicate with
your desktop.
- where to buy low-cost
public-domain
software.
- how your business
can be more profitable
with your portable at
your fingertips.
- where to find the best
bulletin boards and
information services.
- and much more!

Don't miss even a single
valuable monthly issue.
Fill out the coupon below,
or to charge it to your
credit card, call

1-603-924-7949

Send no money now! We
will gladly bill you.



YES! I want to explore ways to be more productive with my
Tandy portable. . . and save 47% off the newsstand
price. Send me a year's subscription (12 issues) of **Portable 100** for \$24.97.

Payment enclosed Bill me
Make checks payable to **Portable 100**

Name _____

Address _____

City _____ State _____ Zip _____

Canada \$45.97 (Canadian funds), Mexico, \$29.97. Foreign
Surface \$44.97. One year only. U.S. Funds drawn on U.S. banks.
Foreign Airmail, please inquire. Please allow 6-8 weeks for
delivery.

4MIC

MONEY BACK GUARANTEE:

If you are not completely
satisfied with **Portable 100**,
you may cancel your sub-
scription and receive a full
refund. Please allow 6-8
weeks for delivery of your
first issue.

Mail to: **Portable 100**, Portable Computing International Corp., P.O. Box 428, Peterborough, NH 03458

Circle 99 on Reader Service card.

90 Days Aren't Enough

Tandy's 90-Day Warranty

■ I agree with Michael Nadeau's position on the 90-day warranty that comes with Tandy MS-DOS systems (see "Are 90 Days Enough?" Side Tracks, February 1988, p. 8).

I bought a Volvo 144S in 1968. It had a six-month warranty, which I accepted because I had confidence in the product. Ten months later, I had an engine problem that the local mechanic said was due to a manufacturing problem. He told Volvo, and it paid for the repair even though the warranty had already expired. Volvo accepted the expense without the advantage of public credit. They could have given me a seven-year warranty. I'm still driving the car (225,000 miles and counting).

I've had two Model 4 and two Model 4P machines for about six years. Five-year warranties on my machines wouldn't have cost Tandy one cent.—*Charles E. Dills, San Luis Obispo, CA*

■ Last year at this time my Tandy 1000A was not quite 11 months old when the RGB monitor died.

The monitor, for which I paid extra, was a CM-2 (I bought the computer when it was bundled with the CM-5). I never abused it; the problem, when discovered, was clearly the result of a production flaw.

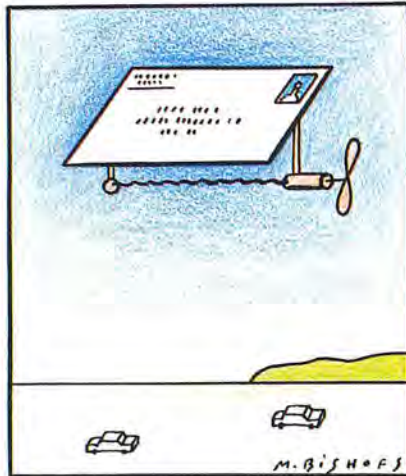
I was shocked to receive a \$300 estimate to repair a monitor that was less than a year old. Tandy wasn't willing to give me any kind of a break on the repairs or the new monitor.

Finally, the store manager paid for half the repair with his own money. He certainly wasn't obliged to do this, since he wasn't even the manager when I bought the computer.

To make matters worse, I'd never been pleased with the images from the RGB monitor that came with my Tandy 1000A. According to former *80 Micro* technical writer Dave Rowell, the problem occurred because the monitor's manufacturer slightly changed the electronics so that some 1000A/RGB monitor combinations delivered fuzzy images (see "Keeping Dates," July 1986, p. 84).

Clearly, this was a design flaw, but Tandy's service department insisted on charging me \$60 for the "enhancement." When they returned the monitor, it wasn't even adjusted properly. I've been able to see scan lines across the screen ever since.

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 603-924-6985; UART settings are 300/1200 baud, 8-bit words, 1 stop bit, no parity.



I didn't appreciate Tandy's extremely limited 90-day warranty that time. Next time I'll know better.—*Stephen King, Riverside, CA*

Corrections and Amplifications

■ The correct address and phone numbers of the Tandy SIG of the Chicago Area Computer Hobbyist's Exchange (CACHE) are 1718 N. Long Ave., Chicago, IL 60639, 312-622-4442 (300/1200 baud), or 312-622-5969 (voice). The correct address of CACHE, the parent organization, is Box C-176, 323 S. Franklin, no. 804, Chicago, IL 60606-7092, 312-653-4114.

■ In the January 1988 Side Tracks column ("Welcome to the New 80 Micro," p. 8), *Code Works* was identified as a monthly magazine covering Models I/III/4. It is published bimonthly.

Roll With the Changes

■ I just read the Input column ("TRSDOS Users Respond," p. 94) in the January 1988 *80 Micro*. It's always bad when a computer line is discontinued or loses support. A computer is an investment; nobody wants to see a computer go the way of the 8-track tape deck, but it happens. As much as we hate it, computer magazines have to adjust their coverage to suit the current trends.

It's more than just a matter of money and advertising. Readers won't read a magazine that covers a computer that is five years out of date just to satisfy a few die-hards who love their "antiques" so much that they're going to keep them all the way to the retirement home.

I've also owned a computer that lost support. I didn't like it, but I knew that I could either keep what I had and try to make the best of it or upgrade to a better

system and enjoy the unlimited capabilities in software and hardware support.

I'm not a millionaire, but I've been able to sell my older systems to first-time users and upgrade from an Altair 8800B to a Tandy MS-DOS machine. Let's not act like babies who've just lost their favorite stuffed animals!

Don't blame the magazines for changing their content. They are responding to the current trends in computing—not just for the advertising dollars but also because readers demand information on these new models. Face it; as good as they were, the days of TRSDOS are over. If you love your TRSDOS machine so much, give it to your kid and get an MS-DOS system (they're on sale).—*Marc Chiarello, Oconomowoc, WI*

A Vote for Basic

■ If a language allows awkward construction and a certain amount of misuse but can still be understood, it's a good language. Richard Crimi said he refuses to program in Basic because it allows for "sloppiness," but if he'd followed his own criterion, he wouldn't have learned English (see "A Vote for Fortran," November 1987, p. 114).

Basic permits awkward construction, but doesn't require it. The fact that both clean and dirty code can do the same job in Basic is a strong point in its favor. Subroutines are a fact of life in programming. Does it really make a difference what mnemonic you use in telling a computer to use a subroutine? The complaint I have with Basic, I would probably have about any interpreted language: It is slow.

Basic compilers don't always speed things up the way you'd expect, but an interpreted Basic program can be tested statement by statement. You can see the values of constants and variables in a program and change them by pressing the break and continue keys. Using the break key to suspend operation of a program, you can resume execution at any line with a direct Goto statement. You can test, save or discard changes without recompiling.

I have a feeling Mr. Crimi studied programming in school. I've observed a similar syndrome among graduates of conservatories of music: They know which music is good and which is bad, and they know why it must be so because they have been told. If the bad music is more popular, that is only confirmation, is it not?—*Patrick A. Gainer, Tanner, WV*

Send your correspondence to Input, 80 Micro, 80 Elm St., Peterborough, NH 03458. We reserve the right to edit letters.



Get the lion's share online with GENie.

"GENie changed my mind about what an online service can do for me! I always knew that GENie offered a princely selection of Special Interest Groups featuring thousands of software files, dynamic bulletin boards, lively discussions and "tips" from the experts. But now GENie gives me more than my share of valuable information services like NewsGrid and USA Today Decisionlines, American Airlines EAASY SABRESM personal reservation system, new and exciting multi-player games and access to Dow Jones News/Retrieval[®]. And the people on GENie are so friendly and helpful they make me feel like a member of royalty!

You don't need to pay a king's ransom to get the lion's share, because only GENie offers you so much online, for less."

B. A. King

Services Available	Compare & Save	Pricing*			
		Registration Fee	Monthly Minimum	Non-prime Time Rates	
				300 baud	1200 baud
Electronic Mail • CB • SIGs/User Groups • Travel • Shopping • Finance • Reference Professional • Leisure • Games • News	GENie†	\$29.95*	None	\$5.00	\$5.00
	CompuServe	\$39.95	None	\$6.00	\$12.50
	Other	\$49.95	\$10.00	\$8.40	\$10.80

*\$18 Registration fee extended to 12/31/87.

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 **XJM11824, GENie** then RETURN.

Need help or more information?
No modem yet? We can help.
In U.S. or Canada call
1-800-638-9636.

GENie[™]
We Bring Good Things Online.



GE Information Services

© 1987 General Electric Company, U.S.A.

*Basic 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 nat'l. holidays. Subject to service availability. Some services offered on GENie may include additional charges.
Dow Jones News/Retrieval is a registered service mark of Dow Jones & Company, Inc.

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.

or compatible computer without DESQview"—InfoWorld, Michael Miller.
 "A colossus among windowing environments"... "will run almost anything"—PC Week, Marvin Bryan.

"Windows, promises, but DESQview delivers"—MICRO-TIMES, Birell Walsh.
 No other environment has consistently pioneered features, openness, and productivity. See for yourself. Send in the coupon. The possibilities are endless with DESQview 2.0.

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-DOS2.0-3.2. 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 5¼" or 3½" floppy diskettes.



Rush me DESQview 2.0! Today!

No. of Copies	Media 3½"/5¼"	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.