

80 micro

the #1 magazine for Tandy users

MARCH 1986
USA \$4.00
CANADA \$4.50
A CWC/I PUBLICATION

Check Out These Features:

Dave's MS-DOS Column

Feedback Loop

Project 80

Spreadsheet Beat

The Next Step

DO IT YOURSELF!

Create Your Own Data Base Manager

THE MODEL 600

**Is Tandy's
New Portable
Worth the Price?**

A DIFFERENT ANGLE

**How to Rotate
Hi-Res Graphics**

DAVE'S MS-DOS COLUMN:

**What You Should Know
About Interrupts**

COLOR COMPUTER OWNERS!

**Now Including Features
From Hot CoCo Magazine**



Circle 75 on Reader Service card.



Meet the disk-based Tandy 600.



A breakthrough in portable computing power and versatility.

Get a portable that matches the performance of a desktop computer. The amazing Tandy 600 features a 16-bit microprocessor, an 80-character by 16-line display, a built-in 3 1/2" disk drive that stores 360K of data and 32K RAM (expandable to 224K*).

Five resident applications

With the Tandy 600's larger display and expanded memory, Multiplan spreadsheet analysis can hold more information. Word processing is as easy as using MS-Word. You'll have quicker access to documents, and better storage with the built-in disk drive. File is an electronic data base for names and addresses, expenses, client billing, inventory and more. And you can keep a large number of different files on the pocket-size diskettes. With Telecom and

the Tandy 600's built-in modem, you're able to communicate with other computers over phone lines and access national information networks. Telecom will even dial the phone number of anyone listed in the File program. Calendar helps you keep track of your daily tasks and activities.

The easy-to-learn resident System Manager lets you run each application, exchange information between applications and manage the files created. And you can add BASIC/ROM (26-3904, \$129.95) to write your own programs.

Tandy . . . Clearly Superior™

If you've been looking at portable computers, compare them with the Tandy 600 (26-3901, \$1599). You'll be amazed at what it can do!

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

Radio Shack®
COMPUTER CENTERS

A DIVISION OF TANDY CORPORATION

Send me a free
Tandy 600 brochure.

Radio Shack, Dept. 86-A-148
300 One Tandy Center
Fort Worth, TX 76102

Name _____
Company _____
Address _____
City _____
State _____
Zip _____
Phone _____



GREAT PROGRAMS, AND FREE SHIPPING TOO!

Worthy notes for this month include the addition of Portable Software's Football Strategy game to our lineup. With INFOCOM dwindling, a replacement had to be found. We think you will be pleased with the results! On the less pleasant side, all \$23 Misosys utilities have increased to \$28, and the very popular book by Roy Soltoff, "Programmer's Guide", has been taken out of print and is no longer available. Also, there are apparently a few (very few!) of you who may be disappointed by the fact that our Prez. missed doing the blurb this month, as such you will have to do without his silly and sometimes painful pun.

PASCAL-80

Easiest version of Pascal to learn! Editor and Compiler are already in memory. Nearly complete subset of standard PASCAL. Offers also many extensions to Pascal, including calls to machine language, screen control, random access files and more!

Models I/III (List \$79) \$59.50

PRONTO

Specifically designed for the 128K TRS-80 Model 4/4P. Window controller program with many applications. Includes calculator, calendar, a sort utility, terminal facility, address cards, on-line help facility and much more "Sidekick" for the Model 4!

Models 4/4P \$54.50

ZBASIC 3.0

ZEDCOR's brand new basic compiler. Device independent graphics, 54 digit numeric accuracy, built-in interactive Editor and Compiler, structured Programming Constructs, and much more! The commands stay the same for any and all computers!

MODELS I/III and 4 \$79.50

PUBLIC DOMAIN DISKS

A fine collection of software from The Alternate Source!

Public Domain Disk (specify #1-#12) Each \$ 9.50
 Public Domain Package #1-#6 \$49.50
 Public Domain Package #7-#12 \$49.50
 Public Domain Package #1-#12 \$89.50

EDAS/PRO-CREATE

One of Misosys' most popular utilities. Both a Full Screen Text Editor as well as a powerful Macro Assembler. Assembler supports nested macros, includes, and conditionals. Works excellently under most DOSes.

Models I/III and 4 \$69.50

SUPER UTILITY

The indispensable first-aid kit for the TRS-80 users. Contains over 60 different utilities for repairing, reviving dead files, reformatting, manipulation of files, and lots more!

Super Utility Plus (Models I & III) \$59.50
 Super Utility 4/4P \$69.50
 Super Utility MSDOS \$79.50

PACKAGE DEAL!

*** MTERM ***
 *** MSCRIPT ***
 *** DOSPLUS IVa ***

A complete operating system has just become very affordable! This new deal offers an operating system that is much faster and easier to use than TRSDOS. Not only is DOSPLUS IVa itself very user-friendly, it also offers a built-in menu driving system, and of course, GREATLY enhanced BASIC. Other included features of DOSPLUS IVa are: Text Editor, Linker, Assembler; Directory Verification/Repair, Disk Mapping, and File & Disk Editing. As if that is not enough, you now also get MSCRIPT with your purchase of DOSPLUS IVa. That's right, one of the easiest and most convenient to use word processors goes with your purchase. Also, MTERM Smart Terminal (one of the best full featured TRS-80 terminal programs available) is included in this deal. In addition to all of the remarkable features of MTERM, it will also enable you to log on to local Bulletin Boards and tell your friends about this fantastic deal!

DOSPLUS IVa / MSCRIPT / MTERM Package Deal
 Models 4/4P (List \$329.85) \$159.50

SUPERCROSS XT

Designed specifically for transferring data and program files between TRS-80 disks and those of other computers

Models I/III or 4 \$ 89.50
 with Convert Basic option \$ 99.50

• WORD PROCESSOR • SPREAD SHEET • GRAPHICS •
 • DATA BASE • & MORE!

This integrated software package for the Models 4/4P, as well as for MSDOS, combines many functions to become one of the best software deals available for any computer. Included are Word Processing, Spread Sheet Analysis (which provide a full range of mathematical functions), Relational Database Management (allows merging, multiple selection criteria, restructure of DataBase, Multiple Sorting etc.), Spelling Checker (55,000 word dictionary, correction feature, ability to create personal and professional dictionaries), Bar Chart Graphics (created directly from SpreadSheet data and supported on any printer), and finally, Data Encryption. If you are worried about learning T-Maker, worry no longer. It has excellent documentation and comes equipped with a Tutorial on the disk. Not only is it a great program, but it is also at a great price!!!

Model 4/4P (List \$299) \$184.50
 MSDOS version (List \$450) \$294.50

LE SCRIPT

Great printer support, full Model 4 support and much more! On a 128K Model 4, you can have over 90K of text buffer for use on a single file. Model 4 features available while running in Model III mode. By far LeScript is our most popular program!

Models I/III or 4 (List \$129.95) \$94.50

WORD PROCESSING PACKAGE DEAL

LeScript and Electric Webster together!! Needless to say, these two great programs work excellently together!

W.P. Package (List \$279.90) \$199.50

ELECTRIC WEBSTER

Includes 50,000 word dictionary. Features fast checking, interactive correcting and personal dictionary expansion. (Specify computer and word processor when ordering)

Electric Webster (Models I/III or 4) (list \$149.95) \$129.50

Grammar or Hyphenation options (List \$49.95) Each \$38.50

APPLICATIONS/BUSINESS

T-Maker (Model 4/4P)	\$184.50
(MSDOS Ver.)	\$294.50
TFC BBS	\$ 99.50
Powerdot II	\$ 34.50
POWERMAIL PLUS	\$ 94.50
POWERMAIL PLUS w/Txt Merge	\$124.50
LESCRIPT	\$ 94.50
LESCRIPT CP/M	\$149.50
LESCRIPT MS/DOS	\$149.50
ZORLOF II	\$ 49.50
MSCRIP	\$ 52.50
LAZYWRITER	\$ 99.50
TYPEITALL	\$ 99.50
PowerScript (New Version)	\$ 34.50
PowerDriver	\$ 24.50
Electric Pencil	\$ 74.50
Electric Pencil w / Spell Check	\$139.50
EDX Text Editor (Mod I/III)	\$ 24.50
TEXTPRESS	\$ 39.50
ELECTRIC WEBSTER	\$129.50
E.W. Options (each)	\$ 38.50
E.W. MS/DOS (Includes options)	\$149.50
Datagraph with Pie Option	\$109.50
Graphit	\$ 34.50
PowerDraw	\$ 34.50
Mumford's Disk Indexer	\$ 34.50
Howe's System Diagnostic	\$ 89.50
J & M's Disk Drive Analyzer - I	\$ 84.50
J & M's Disk Drive Analyzer - III	\$ 74.50
ENBASE Data Base Manager	\$ 64.50
EDIT (Models I/III)	\$ 18.50
AFM (Auto File Manager)	\$ 94.50
Home Accountant (Model III)	\$ 54.50
VersaLedger II (Models I/III)	\$134.50
Versa Series (Models I/III)	each \$ 89.50
TAS's ZMAIL Mail List	\$ 24.50
Macro Typing Tutor	\$ 24.50
Lazycomm Terminal	\$ 29.50
Disk Term Terminal	\$ 59.50
MTERM Smart Terminal	\$ 59.50
DOSPLUS 3.5 (Models I/III)	\$ 54.50
DOSPLUS IVA (Model 4/4P)	\$114.50

GAMES

SUPREME RULER PLUS	\$26.50
FLIGHT SIMULATOR	\$29.50
NUCLIX	\$14.50
APE	\$14.50
SIFTER SHIFTER	\$ 8.50
BATTLE OF ZEIGHTY	\$ 8.50
WARRIORS AND WARLOCKS (D&D ADV.)	\$39.50
THE ADVENTURE SYSTEM	\$34.50
FOOTBALL STRATEGY	\$29.50

THE BOOKSHELF

Using Super Utility	\$14.50
ROM ROUTINES Documented	\$16.50
Model III Assembly Language	\$15.50
The C Programming Language	\$17.50
Programmer's Guide to TRSDOS 6	\$14.50
TRS-80 Disk and Other Mysteries	\$16.50
Basic Decoded and Other Mysteries	\$23.50
TRSDOS 2.3 Decoded	\$23.50
Machine Language Disk I/O	\$23.50
The Custom TRS-80	\$23.50
How To Do It On the TRS-80	\$23.50
Basic Faster and Better	\$23.50
DFBLIB or BFBDEM Disks	each \$17.50
Basic Disk I/O	\$23.50
DFBLOAD Disk	\$23.50

INFOCOM

Better be careful out there... Infocom's latest adventure seems to be the phasing out of their TRS-80 line. We will do our best to keep these popular games in stock, but once they run out, they are gone for good. Hitchhiker's Guide is our first casualty!

"Standard Level"	Each \$34.50
PLANET FALL	WITNESS
ENCHANTER	CUTTHROATS
"Intermediate Level"	Each \$39.50
ZORK II	ZORK III
SORCERER	INFIDEL
"Very Difficult Level"	Each \$42.50
DEADLINE	STARCROSS
SUSPENDED	

UTILITIES

Alcor C Compiler	\$ 82.50
Alcor Multi-Basic Compiler	\$ 82.50
Super Utility 4/4P	\$ 69.50
Super Utility 3.2	\$ 59.50
Super Utility MSDOS	\$ 79.50
Supercross XT	\$ 89.50
Supercross XT w/CnvBasic	\$ 99.50
Autoloader	\$ 34.50
PRONTO (Model 4/4P)	\$ 54.50
Other MISOSYS Utilities	each \$ 28.50
Edas/PRO-CREATE	\$ 69.50
DSMBLER III/PRO-DUCE	\$ 28.50
Edas/Dsmbler Combo	\$ 94.50
DIS' n' DATA I/III	\$ 37.50
DIS' n' DATA (Model 4/4P)	\$ 46.50
TASMON Monitor (Models I/III/4)	\$ 34.50
Howe's Monitor #5	\$ 23.50
CNVBASIC (Models I/III/4)	\$ 27.50
Model 4 TOOLBELT	\$ 39.50
TOOLBOX for LDOS	\$ 39.50
TRAKCESS (Mod I)	\$ 19.50
TRAKCESS (Mod III)	\$ 24.50
PRO-ESP Utility Set (Model 4/4P)	\$ 23.50
6.2 Plus Enhancements	\$ 36.50
Impakt Utility	\$ 29.50
NEWBASIC w/Analyst	\$ 34.50
Analyst only	\$ 19.50
ALE - Assembly Language Editor	\$ 39.50
M-ZAL Macro Assembler (Model III)	\$ 79.50
Mumford's Instant Assembler	\$ 44.50
Instant Assembler (Model 4/4P)	\$ 59.50
ZEN Assembler	\$ 34.50
PASCAL 80 Compiler	\$ 59.50
PASCAL 80 for CP/M	\$ 36.50
LC / PRO-LC Compiler	\$114.50
SBE Compiler	\$ 46.50
ACCEL 3/4 Compiler	\$ 44.50
ZBASIC Compiler	\$ 79.50
HartFORTH/PRO-HartFORTH	\$ 69.50
Backrest Utility	\$ 84.50
MULTIDOS Version 1.7	\$ 79.50
MULTIDOS (Model 4/4P)	\$ 89.50

ELECTRONIC NOTEBOOKS

KSOFT

SUPERLOG 4	\$99.50
SUPERLOG 3 (I/III)	\$99.50
LOG (Model I)	\$44.50
LOG (Model III)	\$44.50

MONTHLY SPOTLIGHT AFM

The brand new data base manager from PowerSoft. The key-word of this program is "FLEXIBLE". Free-form entry system allows you to enter your data any way you please. Consists of three modules: AFM (Auto File Manager), AFR (Auto File Reporter), and AFU (Auto File Utility). Features fully sorted output by all fields, fully relational, form letter output, relational lookup, mail labels, and much more. Probably the best Data Base Manager available for the TRS-80!

\$94.50

CONVERSION PROGRAMS

BASIC 3 TO 4 CONVERT	
Model 4/4P ONLY (list \$49.95)	\$39.50
BASIC 4 TO 3 CONVERT	
Model I/III (list \$49.95)	\$39.50
BASIC GW CONVERT	
Model 4/4P ONLY (list \$99.95)	\$89.50
CONVERT BASIC	
Models I/III and 4 (list \$29.95)	\$27.50

OUR GUARANTEE:

We sell only top-quality software. If, however you are unsatisfied with a product, you may return it within 10 days (in good condition) for a refund, less \$2.50 handling charge for programs under \$50 (\$5 for programs over \$50). We also ask for a letter stating the reason for your return.

We will also beat any competitor's price by \$1.00 (same conditions as competition, i.e. shipping charges etc.) if you tell us where they advertise their price.

TO ORDER:

We accept orders by phone or mail. Specify your TRS-80 Model, exact program(s) wanted, and method of payment. We accept VISA, MasterCard, Check, and Money Orders (C.O.D. orders add \$2.50 and Gov't Purchase Orders add \$5.00). Electric Webster orders please specify Word Processor. Free shipping to continental U.S. and Canada. All prices are in U.S. Funds. Prices subject to change without notice.

ORDERS & INFORMATION

(416) 575-3201

10 a.m. - 7 p.m. Monday to Saturday

JMG SOFTWARE INTERNATIONAL

3235 Lockport Road
Niagara Falls,
N.Y. 14305

801 Mohawk Road West
Hamilton, Ontario
Canada L9C 6C2

(416) 575-3201

POWERSOFT NEWSFLASH #5

Advertisement

Thank you for reading our latest installment of PowerSoft's Newsflash. This space will contain information that doesn't really fit into a regular ad-type format. Please let us know your comments. We'd appreciate knowing if you like these columns and if they are of value to you. **Thanks to all those who have already written or called with your support.** We appreciate hearing from you as well as your orders! If you are a new computer owner, welcome!

Do you have our Catalog #6? If you are not on our mailing list and haven't received one by now (it's got a blue cover), and would like a copy - please drop us a note or call and ask for a one. Groups, schools, and clubs may write and request whatever number needed. We're here to help you. We know about PC's as well as TRS-80's. Adding a hard drive and have questions? We know hard drives inside and out. If you are a member of CompuServe™, we have a support SIG there that you can reach from any prompt by typing: **GO PCS-56. Try It!** You can often get your questions answered that night. If you can recommend our products to your associates, please do! See our ad elsewhere here for descriptions of a few more of our products. Thank you!

NEW ITEMS FOR THE MONTH

We're working on some goodies here in-house that we're not quite ready to talk about yet, but in the meantime we've picked up distribution of two software jewels! These programs (described below) are for the TANDY 1000, 1200, and 3000 (as well as the PC and compatibles). These are both in-stock and we're ready to ship! Sorry, the 2000 is not supported by either of these two products.

* DoubleDOS *

True multi-tasking and concurrent operation of two PC programs. Similar in concept to Double-Duty™ for the Mod 4, except that BOTH programs can be left running at once! (This is not a replacement DOS, but a multi-tasking utility for DOS. Not associated with Percom's DOUBLDOS)

This product is one of the greatest little software enhancements we've run across for the PC, and for a low price too! It allows you to divide your memory in two and run two applications concurrently at the same time! The percentage used by either bank is settable up to you. Also, both banks can access the same files on all drives. It will run on 128K, but 256K is more practical - or 512K. The more the better - up to 640K. (Memory is SO cheap now, why not fill it up?)

Stop waiting on your computer! While it is sorting, printing long files, or backing up, just switch to the other section of memory by hitting ALT-ESC keys and load in something else and start working right away! A built-in Printer Buffer (settable from 1-64K) frees up your printer a lot faster too! Run Data Communications or Electronic Mail "invisibly" in the background while you use your PC for something else. Programmers can compile programs "in the background" while you edit or debug your code in the "foreground". You can keep 1-2-3™ running your sales ledger all day, but still do word processing, communicating, or whatever you want without disturbing 1-2-3™ or any processing it may do. As you know, the PC type-ahead buffer is woefully small at 16 characters. Another side benefit to using DoubleDOS is that it brings type-ahead up to a whopping 128 characters! Not just at the DOS level, but to just about ANY application (except telecommunications programs). GREAT for programs you use where you know all the answers to the prompts ahead of time! Just like using type-ahead on LDOS/TRSDOS 6 on the TRS-80! What an improvement to the PC! (hee-hee) Really though, this program is a MUST... especially at only \$49.95 complete.

* DISK OPTIMIZER *

Another neat program we just picked up for PC/MS-DOS (again works with all the TANDY PC machines except the 2000) is called DISK OPTIMIZER. If you are familiar with the fact that after using a diskette or hard disk for a period of time, the allocation of sectors gets to be quite a mess. Killed files leave holes. Long files get spread all over the disk in multiple segments. This slows things down. And it doesn't get better. It gets worse the longer you use your drive without reformatting the drive and recopying your files back to it (hardly anyone does). Your drive gets bogged down with scanning the entire drive just to load in all the segments of a data file. Hard drives especially, but floppies data disks are definitely affected too. On the TRS-80™, we had several utilities to clear out un-used granules and get all the segments back together. DISK-OPTIMIZER is the first we've seen for the PC. It makes your PC run noticeably faster. It also reduces the chance of disk I/O error. An included utility allows you to compare performance before and after use of the OPTIMIZER. - Only \$49.95 complete!

UPDATES - Last month we mentioned that Cornucopia would soon be implementing ELECTRIC WEBSTER support for our program PowerSCRIPT 4.2. We are happy to announce that Phil at Cornucopia has already finished the job for Models I, III, and 4! Ownership of EW version 4.7 is required as well as PowerScript 4.2.2. Versions of PowerScript earlier than 4.2.2 may be updated for only \$5. Contact us or Cornucopia for further details if this is something you've wanted. Also note that Cornucopia has a demo package for the Model 4 for only \$5! See their ad elsewhere for details and try it out! If you are a SCRIPSIT™ user, see our ad elsewhere in this issue for details on PowerSCRIPT 4.2! It adds a LOT of great features to SCRIPSIT, as well as providing full printer control. See the July '85 issue of 80-MICRO for 4 1/2 STAR review!

POWERSOFT

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

TRS-80™, SCRIPSIT™, & Radio Shack™ are registered trademarks of Tandy Corp. • MS is a registered trademark of MICROSOFT • 1-2-3™ is a reg. trademark of LOTUS Development Corp.

PUBLISHER
Peter Hutchinson

EDITOR-IN-CHIEF
Eric Maloney

MANAGING EDITOR
Peter E. McKie

SENIOR EDITOR
Penelope Hamblin

REVIEW EDITOR
Ryan Davis-Wright

COPY EDITORS
Marilyn G. McMaster

Trudy Nelson

TECHNICAL WRITERS
Bradford N. Dixon

Dave Rowell

TECHNICAL EDITORS
Mare-Anne Jarvela

Beverly Woodbury

LOAD 80 TECHNICAL EDITOR
Keith Johnson

EDITORIAL ADMINISTRATION
Whitney Karr

ASSOCIATE EDITORS
Hardin Brothers

David Engelhardt

John B. Harrell III

Terry Kepner

Thomas L. Quindry

ADVERTISING SALES

DIRECTOR OF SALES
William J. Smith

SALES MANAGER
Peter KJ Montross

SALES REPRESENTATIVE
Michael Wozniak

1-800-441-4403

WEST COAST OFFICE
1060 Marsh Road

Menlo Park, CA 94025

415-328-3470

SALES MANAGER
Abisson Walsh

ADVERTISING COORDINATOR
Judy Walker

ADVERTISING SECRETARY
Kelly DeKoning

MARKETING/PROMOTION DIRECTOR
Jane Butterfield



Article submissions from our readers are welcomed and encouraged. Inquiries should be addressed to: Submissions Editor, 80 Pine Street, Peterborough, NH 03458. Include an SASE for a copy of "How to Write for 80 Micro." Payment for accepted articles is made at a rate of approximately \$50 per printed page, all rights are purchased.
*TRS-80, Script, and TRSDOS are trademarks of Radio Shack, a division of Tandy Corp.

80 Micro (ISSN-0744-7868) is published monthly by CW Communications/Peterborough Inc., 80 Pine 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 and Mexico \$27.97—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 1986 by CW 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.



page 27



page 34



page 48

Features

- 27. **Tandy's Model 600: You Can Take It with You**
by Bradford N. Dixon
Tandy's new laptop weighs in.
- 34. **To Each His Own** *by Hardin Brothers*
This data base manager lets you add a personal touch. (Models 4 and 1000; Load 80)
- 44. **Making Adjustments** *by Gerard Kiernan*
A simple way to ensure good driving habits. (Models III and 4)
- 48. **Points of View** *by Glen E. Sparks*
Routines to turn your graphic images around. (Models III and 4; Load 80)
- 56. **The Disappearing DOS** *by Craig Chaiken*
Execute system functions from within DOS. (Models I and III; Load 80)
- 60. **Circular Reasoning** *by Nate Salsbury*
Reducing source code through an Assembly-language loop hole. (Models I, III, and 4)
- 68. **We Interrupt This Program** *by Dave Rowell*
Traffic control for the Model 1000.

Departments

- | | |
|--|---|
| <ul style="list-style-type: none"> 6. Load 80 Directory 8. Side Tracks
<i>by Eric Maloney</i> 12. Input 14. Feedback Loop
<i>by Terry Kepner</i> 19. Pulse Train
<i>by Bradford N. Dixon</i> 23. Reader Forum 27. Reviews
<i>edited by Ryan Davis-Wright</i>
Tandy's Model 600
MRAS
KAMAS
REF
Infoscan
Micro Memo
Interactive File Control 68. Dave's MS-DOS Column
<i>by Dave Rowell</i> 74. MS-DOS New Products
<i>edited by Mare-Anne Jarvela</i> | <ul style="list-style-type: none"> 80. Basic Takes
<i>by Richard Ramella</i> 84. The Next Step
<i>by Hardin Brothers</i> 94. Spreadsheet Beat
<i>edited by John B. Harrell III</i> 112. Tidbit #35 112. Tidbit #36 118. Express Checkouts 120. HOT CoCo Section
A Fine Fix
Point Fixing
Ample Justification
Animal House
Check PPoint
Doctor ASCII
Color Monitor 160. New Products
<i>edited by Mare-Anne Jarvela</i> 168. Fine Lines |
|--|---|

LOAD 80

Load 80 gathers together selected programs from this issue of *80 Micro* and puts them on a magnetic medium for your convenience. It is available on tape or disk, and runs on the Models I, III, and 4.

Load 80 programs are ready to run, and can save you hours of time typing in and debugging listings. Load 80 also gives you access to Assembly-language programs if you don't have an editor/assembler. And, it helps you build a substantial software library.

Using Load 80 is simple. If you own a tape system, load the Load 80 tape as per the instructions provided. If you own a

Model I or III disk system, you boot the Load 80 disk and transfer the files to a TRSDOS system disk according to simple on-screen directions. If you own a Model 4, copy the Model 4 programs from the Load 80 disk to your TRSDOS 6.X disk using the COPY command.

Not all programs will run on your system. Some Model III programs, for instance, will run on the Model 4 in the Model III mode, but not in the Model 4 mode. You should check the system requirements box that accompanies the article to find out what system configuration individual programs require.

If you have any questions about the programs, call Keith Johnson at 603-924-9471. Yearly subscriptions to Load 80 are \$199.97 for disk, or \$99.97 for cassette. Individual loaders are available on disk for \$21.47 or on cassette for \$11.47, including postage. To place a subscription order, or to ask questions about your subscription, please call us toll free at 1-800-343-0728 between 9 a.m. and 5 p.m. Or, you can write to Load 80, 80 Pine St., Peterborough, NH 03458.

Directory

Data Base

Article: To Each His Own (p. 34).
System: Model 4, 64K RAM.

General-purpose data base manager.

Language: Basic.

Cassette filespecs: B, C, D, E, F, G, H.

Disk filespecs: MAIN/BAS, DEFINE/OVL, ADD/OVL, READ/OVL, SELECT/OVL, INDEX/OVL, REPORT/OVL.

DOS Utilities

Article: The Disappearing DOS (p. 56).

System: Models I and III, 32K RAM; Apparat editor/assembler.

Access Model I/III, system functions from DOS Ready.

Language: Assembly.

Cassette filespecs: POKE (SRC), POKE (CMD).

Disk filespec: POKE/SCR, POKE/CMD.

Rotation

Article: Points of View (p. 48).
System: Models III and 4, 48K RAM; hi-res board.

Create two- and three-dimensional images for your programs.
Language: BasicG.

Cassette filespecs: I, J, K, L, M, N, O, P, Q, R.

Disk filespecs: LINE/BAS, SPIRAL/BAS, POLYGON/BAS, RADAR/SUB, SPOKES/BAS, BOX/BAS, SPIN/BAS, CUBE/DAT, FACE/DAT, BLK HOLE/DAT.

Sort

Article: Out of Sorts? Try This One (p. 84).

System: Model 4, 64K RAM; EDAS editor/assembler.

A fast Model 4 sort.

Language: Basic.

Cassette filespecs: SORT (CMD), S.

Disk filespecs: SORT/SRC, SORT/CMD, TEST/BAS.

BAS, OVL, SUB, DAT = Basic SRC = source code CMD = object code

ART DIRECTOR
Anne Fleming
PRODUCTION MANAGER
Dion Owens/Kanner
PRODUCTION ASSISTANT
Emily Hall
AD/GRAPHICS PRODUCTION
Gary Cioeci
DESIGN CONSULTANT
Margaret Baker-Salmon

GRAPHIC SERVICES MANAGER
Dennis Christensen
MANUFACTURING MANAGER
Susan Gross
FILM PREPARATION SUPERVISOR
Robert M. Villeneuve
TYPESETTING SUPERVISOR
Linda P. Canale

PRESIDENT/CEO
James S. Povec
VICE PRESIDENT OF PLANNING AND CIRCULATION
William P. Howard
VICE PRESIDENT/FINANCE
Roger Murphy
ASSISTANT GENERAL MANAGER
Matt Smith
CIRCULATION MANAGER
Frank Smith
DIRECT AND NEWSSTAND SALES MANAGER
Raino Wirein
1-800-343-0728
DIRECTOR OF CREDIT SALES
AND COLLECTION
William M. Boyer
EXECUTIVE CREATIVE DIRECTOR
Christine Destrempe
FOUNDER
Wayne Green

Cover photograph by Edward Justice

80 Micro is a member of the CW Communications/Inc. group, the world's largest publisher of computer-related information. The group publishes 57 computer publications in 20 major countries. Nine million people read one or more of the group's publications each month. Members of the group include: Argentina's *Computeworld/Argentina*, Asia's *The Asian Computerworld*, Australia's *Computerworld Australia*, Australian *PC World*, Macworld and *Directions*, Brazil's *DataNews* and *MicroMundo*; China's *China Computerworld*; Denmark's *Computerworld/Danmark*, *PC World* and *Run(Commodore)*; Finland's *Mikro*; France's *Le Monde Informatique*, *Golden (Apple)* and *OPC (IBM)*; and *Distributique*; Germany's *Computerwoche*, *Microcomputerwelt*, *PC Welt*, *SoftwareMarkt*, *CW Edition/Seminar*, *Computer Business*, *Run* and *Apple*'s, Italy's *Computerworld Italia*, and *PC Magazine*; Japan's *Computerworld Japan*; Mexico's *Computerworld/Mexico* and *ComputoMundo*; The Netherlands' *Computerworld Benelux* and *PC World Benelux*; Norway's *Computerworld Norge*, *PC WORLD* and *Run (Commodore)*; Saudi Arabia's *Saudi Computerworld*; Spain's *Computerworld/Espana*, *Microsistemas/PC World*, *Commodore World*; Sweden's *ComputerSweden*, *Mikrodatorn*, and *Svenska PC*; the UK's *Computer Management*, *Computer News*, *PC Business World*, and *Computer Business Europe*; Venezuela's *Computerworld Venezuela*; the U.S.' *Computerworld*, *HOT CoCo*, *iCider*, *InfoWorld*, *MacWorld*, *Micro Marketworld*, *PC World*, *Run*, *73 Magazine*, *Focus Publications*, *On Communications*, and *80 Micro*.

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 Load 80 Circulation: Address correspondence to Load 80, 80 Pine 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, ATTN: Rita B. Rivard, Customer Service Manager. 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 Raino Wirein, Retail Sales Manager, *80 Micro*, Pine St., Peterborough, NH 03458. (800) 343-0728.

TANDY IS DANDY...

...until you want more memory

Your Tandy 1000 is a good machine.
A lot of computer for the money.

But you need to add more memory to
get the best performance possible.
Tandy wants a lot of money for that.
Too much money.

But, now there's another way to upgrade
your memory. The Zuckerboard
Expansion Memory card. A high quality,
reliable board at a very reasonable price.

So, if you want to get the most out of
your computer, you have a choice.

You can go to Tandy, and Tandy will get
the most out of you.

Or, you can come to us. We'll fill up your
computer without emptying your wallet.

Board Configuration	Tandy Memory Plus	Zuckerboard Expansion Memory
with 0K	N/A	\$ 69
with 256K	\$319.95	\$109
with 512K	\$519.90	\$149
Clock Option	\$ 99.95*	\$ 39
Warranty	90 Days	2 Years
	*with mouse	



CALL TOLL-FREE TO ORDER

(800) 624-4920
CA (800) 458-6200

Dr. Dr. Zucker



It's another ZUCKERBOARD



1287 Lawrence Station Road • Sunnyvale, CA 94089 • (408) 734-4631

ZUCKERBOARD is a Trademark of Advanced Transducer Devices, Inc.
Tandy 1000/1200 are Trademarks of Radio Shack, a Division of Tandy Corporation.

There Is Joy In Mudville

Fort Worth was a restless town a little more than a year ago. The Model 2000 had bombed. The Model 4 was living on Geritol. Sales of the Color Computer were down. Expectations for the Model 100 remained unfulfilled. The Model 1000 was still an unknown quantity. Before the dust had settled, Tandy's profits for fiscal 1985 had dropped 33 percent over the previous year.

But by the 1985 holiday season, Tandy executives were smiling once again. The Model 1000 was a success, becoming the workhorse of the Tandy line and vying with Compaq for king of the compatibles hill. Sales in Radio Shack Computer Centers were up. Third-quarter revenues were up. Analysts on Wall Street were up. The dark, roiling thunderclouds had scattered, and a warm sun bathed the Texas soil.

The people in Fort Worth certainly deserve a bit of cheer. Whatever Tandy's faults might be, the company has tried to correct them. It has increased its support of third-party vendors. Customer service—one of Tandy's biggest strengths, though maligned by some—has improved. Marketing efforts, if still a tad unsophisticated, have increased. And Tandy computers continue to offer some of the best price-performance ratios in the industry.

Tandy supporters are often frustrated by this plodding, frightfully dull computer retailer. It is a conservative company in a volatile industry, and it responds slowly to market conditions. Fortunately, Tandy has the brute force to afford a wait-and-see game. Its corporate philosophy is that good things come to those who wait. Tandy's patience has paid off.

Magazine Massacre

1985 wasn't a good year for computer magazines. Several of the big ones dropped off the edge of the earth, most notably *Computers & Electronics*, *Creative Computing*, and *Popular Computing*.

I was most saddened by the demise of *C & E*, which practically launched the microcomputer in 1975. A lot of history went down the tubes there. *Creative Computing* never appealed to me; it felt too much like a comic book. I never understood what *PopCom* was all about, or who it was written for. Gossip around



Basic Computing (80 Northwest Publishing)
Business Computing (Penwell)
Computers and Peripherals (CAP Magazine)
Color Computer Magazine (Ziff-Davis)
Color Computer News (REMarkable Software)
Compute!'s PC & PCjr (ABC/Compute!)
ComputerFun (Viare)
Computers & Electronics (Ziff-Davis)
Core (Softkey)
Creative Computing (Ziff-Davis)
Databar (Databar)
Educational Computer (EC)
HOT CoCo (CW Communications)
Jr (CW Communications)
K-Power (Scholastic)
Microcomputing (CW Communications)
Microkids (Cloverdale/Warner)
Microsystems (Ziff-Davis)
PC Consumer (Van Data)
PCjr (Ziff-Davis)
Peelings II (Peelings II)
Personal Computer Age (PCA)
Personal Software (Hayden)
Popular Computing (McGraw-Hill)
Small Business Computers (SBC)
Softalk (Softalk)
Softalk IBM (Softalk)
St. Game (Softalk)
St. Mac (Softalk)
Timex-Sinclair User (Computer Communications)
Microcomputer News (Tandy)
Whole Earth Software (Point)

Table. Defunct computer magazines.

Peterborough—homes for both *80 Micro* and *PopCom*—is that it tried to be a business magazine when its readers were mostly home users.

It's interesting to note that all three were general-interest publications, and all started before 1980 (*Popular* began as *onComputing*, while *C & E* was previously *Popular Electronics*). The microcomputer market changed more quickly than the magazines could.

The Table is a list of magazines you might have read once that are no longer with us. Some passed away in 1985, others in 1984. The names of the publishers appear in parentheses.

Microcomputer magazines are like bullfighters, living hard and dying young. By my count, only two that started before 1980 are still around—*Dr. Dobb's Journal* and *Byte*. (*80 Micro's* first issue was January 1980.)

The lesson behind all of this: Don't get a lifetime subscription to a microcomputer magazine.

By the way, if you used to read *Basic Computing*, its publisher, Irv Schmidt, has launched a new magazine called *CodeWorks* (3838 S. Warner St., Tacoma, WA 98409). It's a modest little bimonthly consisting almost entirely of Basic programs for MS-DOS and TRS-DOS machines.

If you like to program in Basic, *CodeWorks* is worth checking out. Subscription is \$24.95 a year.

HOT CoCo Debuts

Beginning this month, *80 Micro* will incorporate features from *HOT CoCo* magazine in a special section to be called, appropriately enough, *HOT CoCo*.

The new section will include two of *HOT CoCo's* monthly columns—Doctor ASCII and Scott Norman's Color Monitor (formerly The Computer Room)—as well as programs and tutorials. In addition, we'll be including CoCo product information in our regular New Products section.

We welcome *HOT CoCo's* subscribers and hope they continue to enjoy *HOT CoCo* in its new form, as well as the many other columns and articles in *80 Micro*.

By the way, the *HOT CoCo* section will be in addition to our regular coverage, and will not replace any I/III/4 or MS-DOS material. ■

★ ★ ★ ★ ★
80 MICRO
JUNE, 1985
 Easy to use: ★ ★ ★ ★ ★
 Good docs: ★ ★ ★ ★ ★
 Bag free: ★ ★ ★ ★ ★
 Does the job: ★ ★ ★ ★ ★



Circle 91 on Reader Service card.

DOTWRITER printed these on an Epson MX-80.

See What You Can Do With DOTWRITER!

DOTWRITER lets you create spectacular, eye-catching signs, invitations, letterheads, large sideways banners, catalogs, or even books. It is just what you need to turn your dot-matrix printer into a versatile typesetting machine. And it is available for your TRS-80 Model 4/4P (yes, in native mode), as well as for the Models I and III.

WHAT IS DOTWRITER?

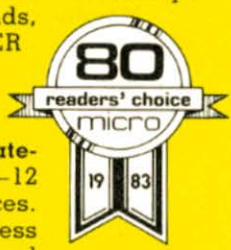
DOTWRITER uses the "bit-image" graphics of your printer to produce the kinds of stunning results shown inside the box. It is a full-function text printing program, so you can inter-mix different character sets, do centering, paragraphs, pagination, magnification, draw horizontal and vertical lines, reversals (black on white), and even print right-justified proportional text.

DOTWRITER includes the printing program, complete documentation, and fourteen useful typefaces (60 to 90 characters per typeface). We will include the 170-page Letterset Reference summary at half-price (\$10.00) with your order.

To use DOTWRITER, just write your text with any popular TRS-80 Word Processor (such as ALLWRITE or

SuperScript), add the necessary formatting commands, and DOTWRITER will do the rest.

36 more letter-set disks are available separately. Each has 3-12 complete typefaces. The disks cost less than \$25 each and you may purchase them at any time.



SIDEWAYS SPREADSHEETS

If your VisiCalc spreadsheets are too wide for your printer, our "LONGVIEW" option may be just what you need. It is an add-on that turns spreadsheets sideways so that DOTWRITER can print them down the page instead of across. LONGVIEW comes with three additional fonts.

EQUIPMENT REQUIREMENTS

DOTWRITER needs a TRS-80 I, III, 4 or 4P with 2 disk drives and 48K of memory. Separate versions of DOTWRITER support EPSON MX-80 with Graftrax, MX-100 with Graftrax-Plus, and FX, JX, RX, C, ITOH 8510/1550; MICROLINE 84-2/92/93; RADIO SHACK DMP 110-2100/CGP-220; GEMINI 10X/15X and other STAR printers.

We printed our samples on an Epson; sizes may vary on other printers. Many of the fonts shown above are available at extra cost.

Send for free print samples! We've only shown you a few of the 240 DOTWRITER fonts. For the best in TRS-80 graphics printing, we suggest you order DOTWRITER today, toll-free.

Please specify Printer and Computer when ordering.

DOTWRITER	\$99.95
LONGVIEW	29.95
Additional Letterset disks (3-12 fonts/disk)	24.95
	3 for 49.95

Letterset Reference Book 20.00

FREE bonus disk with two Banner fonts when you order DOTWRITER!

ORDER NOW, TOLL-FREE
(800) 824-7888, oper. 422

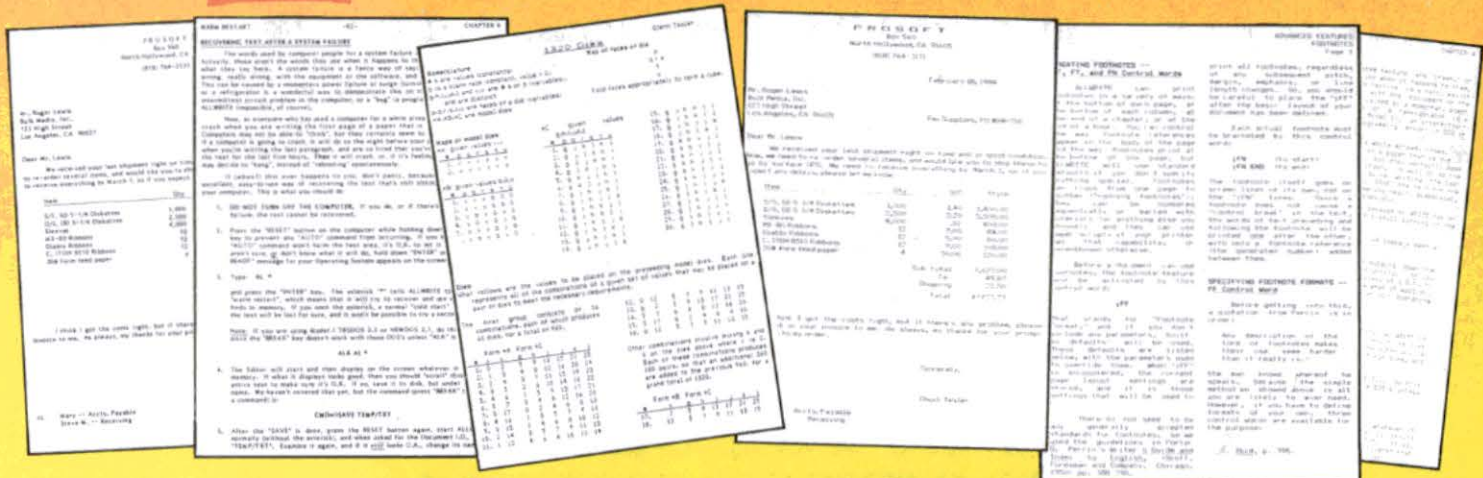


Dept. C, Box 560, No. Hollywood, CA 91603
 (818) 764-3131 Information and Same-Day Processing

TERMS: VISA, MC, checks, COD. Please add \$3.00 shipping in U.S. or Canada. Sales tax in CA. Most orders filled within one day.

ALLWRITE!

The Premier Word Processor for Your TRS-80 Model I, III, or 4



These were printed by ALLWRITE; shown 20% actual size.

We are proud to offer you the one Word Processor that will satisfy all your writing needs: ALLWRITE. It sets new standards for text editing and printing, and will give new life to your TRS-80. Let us tell you why...

In an attempt to push the public into expensive 16-bit computers, many manufacturers have been saying that the TRS-80 is obsolete. The truth is that the software, not the hardware, makes the difference. And the best word processor of all is now available *only* on the humble TRS-80, not on those expensive 16-bit machines!

ALLWRITE will save you time and let you produce the highest-quality, most professional-looking letters, term papers, and reports available on a micro-computer.

Allwrite Can Save You Time!

Reads a 25,000 character file (10 printed pages) from disk in SIX SECONDS... does a global search-and-replace in FOUR SECONDS... outruns even the fastest popular micro-printer.

ALLWRITE'S Screen Handling Makes Word Processing Easier Than Ever

Change text width at any time; wide lines shift left and right as you type. ALLWRITE preserves double-blanks between sentences, uses the entire screen for text, and displays a complete Status Screen at the touch of a key. Scroll by line, partial screen, full screen, to top or end of file, or to any marked point. Move cursor by character, word, tab, line, or screen.

You can set and change on-screen tabs and store them on disk. The print-time tabbing features are incredibly versatile: they allow left, right, and centered tabs, and even line up your decimal points.

ALLWRITE shows you where you forgot to turn off underlining, boldface, italics, or double-width. Special on-screen Preview feature shows page breaks and page layouts... including underlining and boldface. In "Summary" mode, ALLWRITE quickly flags formatting errors

without wasting time printing all the text. These standard features make document preparation faster and easier than ever!

State-Of-The-Art File Handling

There is no upper-limit on document size with ALLWRITE, because it chains files *backwards* as well as forwards, even across diskettes. Switch from one chained file to another in less than six seconds by pressing two keys. Select portions of other files for inclusion at print time... great for stock paragraphs.

ALLWRITE salvages text from bad disks! If a sector goes bad, you won't lose the entire file, because it

TAKES FULL ADVANTAGE OF YOUR MODEL 4.

The model 4 version of ALLWRITE uses **the entire 80-by-24 screen**. On a 64K machine, you can edit **over 34,000 characters** of text. On a 128K machine, you can edit **THREE FILES AT THE SAME TIME!** The second and third files can be over 32,600 characters each, for a total of **almost 100,000 characters** of text in memory.

will skip bad sectors, read the rest of the file, and then show you where the lost text belongs. This advanced error recovery turns a disaster into a feeling of profound relief.

User-Definable Soft Keys Reduce Typing Time

You can store 22 phrases or commands at a time into "soft-keys," then press just two keys to retrieve them. This makes frequently-used phrases and formatting controls a snap to use. You can store these definitions on disk and build a library of hundreds of pre-programmed keys to fit every one of your applications.

Our specially-designed templates fit right on your keyboard to let you see your settings at all times. Each template is also a Reference ("Cue") Card, so it is always right in front of you when you need it, without using up valuable screen space.

ALLWRITE Is Easy To Learn

ALLWRITE's commands and control keys are easy to remember because they use the first letters of common English words: 'CE' stands for 'Center,' 'Search' and 'Replace' do just that, and so forth. The on-line HELP menu offers over fifty screens of topics.

ALLWRITE's superb documentation will get you started quickly. Portions of it are designed for beginners, with every feature clearly explained in step-by-step tutorial style. Since you won't always be a beginner, other parts of the book offer advanced topics. There is a cross-reference summary chapter, a 14-page comprehensive index, and a detailed Table of Contents. We've been developing computer programs and manuals for over 23 years, and understand the importance of good documentation.

ALLWRITE works with all major DOS's on Models 1, 3, and 4/4P.

PROSOFT'S On-Going Customer Support

Perhaps the best reason of all for having ALLWRITE is the continuing support we offer you: friendly, expert, direct support that is unsurpassed in the micro-computer industry.

Note to students: with its Footnote, Table of Contents and Index features, ALLWRITE is ideal for your reports and Term papers.

Note to teachers: ALLWRITE makes it very easy to generate multiple-choice exams and answer keys. Ask for free instructions when ordering.

"ALLWRITE is a professional system that sets a new standard in word processing. It's powerful and easy to learn and use."
80 MICRO, Nov., 1984

Customer Comments

"This is the best software package I have ever received . . . superb, easy to use, fast, and has more features than the business word-processor at the office." (E.R.L.)

"Your company and products have to be one of the strongest factors I can think of for keeping me with the TRS-80!" (J.R.H.)

"NEWSSCRIPT is the Cadillac of word processors. ALLWRITE is the Mercedes Benz!!" (B.E.)

". . . a very readable manual." (D.S.)

BENEFITS OF OWNING ★ ★ ALLWRITE ★ ★

If Word Processing is important to you, PROSOFT's ALLWRITE is the best choice you can make. The clean, professional appearance it adds to your letters and reports will make an excellent impression on people. We will be happy to send you free print samples so that you can see for yourself how good ALLWRITE will make you look.

You probably know that quality word processors for CP/M and the IBM-PC sell for \$300-500, and they don't have ALLWRITE's capabilities or speed . . . or PROSOFT's proven, ongoing support. Now, for a fraction of the cost of a new computer, you can have the most complete word processor of all. And you won't have the headaches of starting all over again with a new, different computer.

HUNDREDS OF USEFUL CAPABILITIES

ALLWRITE comes with just about every useful word processing feature . . . standard. Here are some highlights: excellent right-justified proportional printing on most printers having that ability; powerful Form Letter and Mailing Label preparation; Instant counts of words, characters, lines, changes; block Move, Copy, Delete, Putfile, Getfile, and List; delete by character, word, line, sentence, paragraph, or block; insert and one-key insert; great RS-232 printer support; accepts all 256 ASCII codes from keyboard; intermix pitches on same line (printer-dependent); 1.5 line spacing, 6, 7, 8, 12 lines per inch (printer-dependent); does multiple-columns on all printers; perfect alignment of hanging indents; variables, logic statements, conditional printing; wildcard Directories; integrated with Electric Webster and DOTWRITER for Models I, III, and 4 (these are sold separately); "Legal" line numbering; paragraph, list, and figure numbering; supports most popular printers (all "printer drivers" included); compatible with high-memory drivers; fully explains all DOS and ALLWRITE error messages; wildcard search-replace; tabs, search-replace, other settings remembered across files; word reversal; up to nine levels of boldface; flexible page titles; footnotes at bottom of page or end of document; Table of Contents and Index generation; and PROSOFT's unmatched text formatting and printing capabilities.

How To Order

You can order by phone or mail. For quickest delivery, call our Technical Support line. Please specify your TRS-80 model (I, III, or 4, 48K, at least two disk drives), and your printer(s). Our price includes normal shipping in the U.S. and Canada. The sooner you order, the sooner you will begin to benefit from the ALLWRITE! Word Processor.

Allwrite for the TRS-80

\$199.95

Circle 30 on Reader Service card.

ORDER NOW, TOLL-FREE

(800) 824-7888, oper. 422

PROSOFT®

Box 560, No. Hollywood, CA 91603

(818) 764-3131 for Technical Information and Same-Day Processing.

Terms: VISA, MasterCard, checks, C.O.D. California residents please add sales tax. Most orders filled within one day.

ProSoft Protest

I appreciate the effort Dave Dalton gave to covering eight different products in his word processor overview ("Prose and Cons: Advanced Model 4 Word Processing," November 1985, p. 37).

There were two kinds of errors in the review. The first occurs on page 38, where Dalton says that "Routine jobs like inserting, deleting, moving blocks, or simply scrolling all seem faster and more efficient with LeScript." Inserting and deleting are essentially instantaneous in both Allwrite and LeScript, and it takes the same number of keystrokes, or one fewer keystroke, in Allwrite than it does in LeScript.

Regarding "faster," here are timings done on a 32K Model 4 using floppy disks (the disk I/O would be twice as fast for Allwrite with a hard drive, but the other timings aren't affected by disk I/O):

Operation	Allwrite	LeScript
	(in seconds)	
Read 32K file into memory from disk	3.8	30
Search for "xxx" (not found)	1.8	13
Globally replace all "e" by "*****"	2.9	22
Block move about 2K bytes	0.5	8
Scroll 10 screens downward	1.5	9
Resave file to same disk	25	about 60

In all cases, Allwrite is several times faster than LeScript. It's possible that there's a later, much faster version of LeScript, and if so, please let me know what the current timings should be.

The second error affects Allwrite, Lazywriter, and LeScript. The chart on page 38 indicates that only SuperScript can do something with files bigger than memory. That is false. All three of the other listed word processors can chain files together to allow the user to at least print something that's bigger than memory, as indicated later in the chart.

Allwrite goes quite a bit further than this: The chains are used by the editor during text preparation, so the user can go forward and backward from one segment to another by pressing just two keys. Search-and-replace arguments are retained when this chaining occurs, so it's possible to scan through the entire 650,000 characters of the Allwrite manual (from a hard drive) in less than 10 minutes. SuperScript can't handle a file of that size on floppies, but Allwrite allows the user to change disks as often as necessary (it would take about 20



minutes to do the scan from floppies.)

Allwrite's structured file approach forces the user into good work habits by limiting each file to about 33-35K, but allowing the user to chain the files together, and even to keep three files in memory at once (for a total of 99K, if the extra 9K matters). To scan through the three files comprising 90K will take about 45 seconds, including reading all three from disk, searching through all three, and saving the one changed file back to disk.

Chuck Tesler
ProSoft
N. Hollywood, CA

What's Mr. Tesler complaining about? You'd think I accused Allwrite of being slow. In fact, I like Allwrite very much, and I think my comments reflected that. I said this about Allwrite: "The editor is fast, powerful, and friendly." When I said that LeScript's editor is fast and efficient, the comparison was not with Allwrite alone but with the Model 4 word processors as a group. For example, inserting with SuperScript is a pain.

Project 80, Roger C. Alford's monthly column, will return in the April issue.

80 Micro's BBS is open 24 hours a day. It offers programs you can up-and download, special-interest groups, and a classified section. You can reach the board at 603-924-6985; UART settings are 300/1,200 baud, 8-bit words, 1 stop bit, no parity.

Tesler apparently misunderstands what is meant by files bigger than memory. Perhaps I should send him a disk containing a 140K text file (long text files do exist, good work habits notwithstanding) and ask him what word processor he'd like to read it with. SuperScript, obviously.

I pointed out that SuperScript's ability to handle long files reduces its speed and efficiency. I pointed out in the table that Allwrite can chain files together for printing, and I praised in the text of the article Allwrite's ability to link disk files, even across disks. These are more or less the same points that Tesler makes. He refers to my comments as errors. In fact, they're quite accurate.

—David Dalton

Model 4 Lament

I bought a Model 4 in August 1985 from a local Radio Shack. I now have a \$799-plus computer sitting in my living room. Next to it I have two game disks that I also bought from Radio Shack, a few game and household programs that I've written myself, and a few more that I can use on the TRS-80 that I found in different books and magazines.

I have a subscription to 80 Micro and read every word of every issue, but most of it is just too much for me. Likewise, I've read all of the literature that came with my Model 4 several times, but again most of it is over my head.

Since I bought my computer, I met a guy at work who owns a Commodore and a whole line of equipment and programs for it. He has two disk drives, two printers, two monitors, one hard disk, and nearly 200 programs. He bought his original system for about the same price I paid for the Model 4, but it's much less now. Most of the programs he got for free, due to Commodore's greater popularity and "user support."

All I ever hear from him is what a bad choice I made in buying my "Trash-80." I ask you, can I really tell him that he's wrong and have any ground to stand on?!

Paul R. Withun
El Paso, TX

Do any of our readers have a response for Paul?

—Eds.

Send your correspondence to Input, 80 Micro, 80 Pine St., Peterborough, NH 03458. We reserve the right to edit letters.



SPRING SPECIALS



The ALPHA SPEECH SYNTHESIZER

Outstanding performance and value for only:

This is your chance to experience the power and pleasure that speech adds to your TRS-80. If you could read the thousands of testimonials we have received you would be convinced. Instead, our unconditional 15-day money back guarantee fully protects you.

Watch your friends faces when your TRS-80 starts talking.

\$ 49^{95*}

Thousands sold at \$75.90

*When purchased with text to speech software.



80 Micro review 12/84

Easy to use? ★★★★★

Good docs? ★★★★★

Bug free? ★★★★★

Does the job? ★★★★★

TALKER 4.0

Unlimited vocabulary Text-to-Speech Software. Powerful, yet easy to use; even non-programmers can enjoy it. Talker 4.0 features:

- Automatic video and/or keyboard echo (if you want it).
 - Pitch control • Voice-speed control • Spelling mode
 - Says numbers (up to 999 trillion) • Simple BASIC commands • Much more!
- Only \$39.95

Small Print: Hardware Power supply, speaker and manual included. Model I unit plugs into keyboard or expansion interface 40 pin bus. Model III, 4.4P unit plugs into 50 pin I/O bus. Model 4P needs short 50 pin extension cable \$14.95. Use our "Y cable" (see next page) if your bus is already used. **Software** Works with all DOSes (not CPM), is 6.2K long, and relocates itself to the top of available memory. **Manual** available for \$5.

Dr. SIGMUND

Artificial Intelligence at work! If you want to show off your computer, run "Dr. SIGMUND" and see their expressions as your TRS-80 has an intelligent conversation with you. Even you will be impressed!

PERSONALITY TEST

By Dr. James E. Hord, Jr. for your ultimate entertainment. This elaborate personality test will amaze you, and puzzle your friends. Besides talking to you, it will print a painfully accurate report.

TALKING WORD PROCESSOR

By George McCoy of Rehab Research. The Alpha Speech Synthesizer was chosen for this functional word processor with full speech capability. A perfect example of computer speech.



Each of these three programs require 48K and are available on disk only. The Alpha Speech synthesizer is required for speech. Each program is only \$29.95

SPECIAL: ALL THREE FOR ONLY \$59.95

NEWCLOCK

The right time at the right price! Keep the time and date with quartz accuracy, even when your computer is off. The backup lithium battery (included) will last for over 2 years. Software on tape or disk, please specify. Use "TIMES" once to set the clock. Use "SETCLK" to set your computer's internal clock (at power up) or use "TSTRING" so that the "TIMES" function reads the Newclock.

Connection: Model I: plugs into the keyboard or expansion interface. Model III, 4.4P: plugs into the 50-pin I/O bus. 4P needs short 50-pin extension cable \$14.95. Compatible with all operating systems.

Model I \$39.95

Model III,4 \$59.95



Circle 17 on Reader Service card.

800-221-0916

Orders Only. NY & info call (718) 296-5916

Hours: 9-5 Eastern Time

Add \$3.00 per order for shipping. We accept Visa, MC, checks, M.O. C.O.D. add \$3.00 extra. N.Y. residents add sales tax. Shipping to Canada is \$5.00 Overseas. FPO, APO add 10%



ALPHA Products

79-04 Jamaica Ave., Woodhaven, NY 11421



Send your questions or problems dealing with any area of Tandy/Radio Shack microcomputing to Feedback Loop, 80 Micro, 80 Pine St., Peterborough, NH 03458.

Q: I have a Model III and a DMP-400 printer. As I sit and write to you, the cursor on my SuperScripsit 1.02.08 (with all the patches sent from Radio Shack) sets up a blink when I pause to think what I want to write. With the hours I spend writing, it's not long before I'm hypnotized, cross-eyed, and cross!

I've tried POKE 16412,1 in DOS and then calling Scripsit, but suppose Scripsit "resets" with the DOS in it (now you know I know just enough about machine-language to be dangerous!). I called Radio Shack Consumer Service and they know of no "turn-off-the-blinker" patches.

It seems that somewhere between Model III Basic DEC. CHR\$(code) and SuperScripsit USR systems DEF FN key and DEF FN printer code there should be a solution. I am frankly unable to understand the instructions given in the SuperScripsit manual for programming the code sequences if an instruction doesn't start with a printer width code. I've taken off all other printer utilities and the help file on my working copy. (Marjorie Wootton, Roswell, NM)

A: The function-key definitions SuperScripsit uses are only for manipulating text and sending special codes to the printer. Sorry, but that isn't the way to do it.

Unfortunately, I don't know of a way to disable the blinking cursor. The problem is that SuperScripsit uses its own video display routine to control the cursor. Can anyone else help?

Q: I have a 128K Model 4 with two disk drives. I'm interested in plotting graphs of three-dimensional equations of the form Z-F(x,y). Can you tell me the differences between Radio Shack's high-resolution board and the one called the Grafyx Solution from Micro-Labs Inc.? I'm interested in the price/performance ratio, documentation, commands, programs available for each, and the feasibility of my installing the Radio Shack version. Also, should I be concerned with the possibility of overheating? Are there any other boards I should consider?

Finally, can you please explain the dif-



ferences between TRSDOS 6.1 and 6.2? Thanks. (Douglas E. McMontgle, Fortuna, CA)

A: Never having worked with either high-resolution graphics board, I can't really tell you their differences. Installing the Grafyx Solution board is easier; it does add more Basic commands so you can control the board, but beyond that I'm not sure (see the November 1985 issue of 80 Micro, p. 119, for a review of the Grafyx Solution board). Do any readers have comments on the two boards?

Yes, you can install the Radio Shack board, but such installation isn't for the electronics novice. If you decide to install the board yourself, make sure you also get the installation instructions with it (unless you specifically order them with the board, they aren't sent). Radio Shack National Parts Division (900 E. Northside Drive, Fort Worth, TX 76102, 817-870-5662) can ship the board directly to you.

Overheating problems depend on where you are. In the Southwest, for example, computer overheating is always a factor to consider in a non-air-conditioned room. If you're worried, it's easy to install a small muffin fan at the rear of the computer to combat the heat.

Most of the differences between 6.1 and 6.2 are hidden in the interior—a few sections have been rewritten to increase the speed and response of the DOS. There are also fewer bugs to contend with. If you're currently using 6.1, you'll find it advantageous to switch to the newer version.

Q: My 4K Model I is in excellent condition. I'd like to upgrade it as economically as possible.

What are the limits of the highest fea-

sible upgrade? What are the approximate costs? Can I do part or all of the work myself? (Harold B. Harrington, New Castle, PA)

A: For the Model I the limits are fairly low: 64K RAM, internal RS-232 board, parallel printer port, and double-density disk drives. You can, of course, install a hard disk drive, but that's simply plugging a cable into the correct connector. The biggest system I've heard of had 64K RAM and four 80-track, double-sided disk drives.

The costs depend on where you get the materials. Upgrading the RAM is cheap—you can buy the 16K chips for about \$10 per set of eight. The Expansion Interface can run anywhere from \$100 to \$400 depending on what's in it and where you buy it. You can buy the disk drives for about \$100 each with case and power supply. The double-density adapter will cost you another \$100. And then there's the RS-232 board, another \$100 if you can find one for your Expansion Interface.

The upgrades are fairly simple to do yourself, whether you're electronically inclined or not. The biggest prerequisite is attention to detail. Never start an upgrade if you don't understand every detail involved. If you're a meticulous person and can use a soldering iron, the upgrades can be simple and fun. If not, you probably shouldn't do the job yourself.

I'd suggest getting a used Model III or 4 (adding drives to those machines costs about the same as adding them to the Model I, but the end result is more attractive). You should be able to pick up a used Model III for the same price you'd pay to upgrade your Model I.

Q: I have a Model III, a DMP-200, and disk SuperScripsit. Where can I get the necessary patches to take full advantage of the DMP-200 with Scripsit? (Ronald R. Oglesby, Denver, CO)

A: The later versions of SuperScripsit include drivers for all the Radio Shack printers. If your copy doesn't have one for the DMP-200, check with your local Radio Shack store about getting one added to your disk. With the correct driver installed and the printer control functions available in SuperScripsit, you should be all set.

Q: I have a two-drive Model III and use TRSDOS 1.3. I have about 1,850 names and addresses on my run

The Amazing A-BUS

Hobbyists, Engineers, Scientists, OEMs, universities, the A-BUS is for you!



What is the A-BUS? The A-BUS is the best way to connect a variety of **Input** and **Output** cards (such as analog converters, relays, sensors, motor controllers, etc.) to your computer.

A typical **A-BUS** system consists of: • An adapter card and cable to connect your computer to the **A-BUS** standard • The **A-BUS** motherboard, with several slots in which you plug the different Input and Output cards. • Your choice of cards listed below, depending on your application. (Many more cards will be released soon.)

The "A" stands for Amazing, and here is why:

① The **A-BUS** works with any TRS-80 models I, III, 4, 4P, 4D, 1000, even 100, 200 and CoCo. In addition, it will also work with IBM or Apple computers. Should you ever move to another system, your investment is protected. Only the low cost adapter card has to be changed!

② The system is expandable to meet current and future needs easily.

③ Low cost and reliability will ensure your project success.

A-BUS Adapter for Model I Plugs into 40-pin I/O card edge (on KB or E/I) AR-131...\$39

A-BUS Adapter for Models 3,4,4P,4D Plugs into 50-pin I/O bus. AR-132...\$49

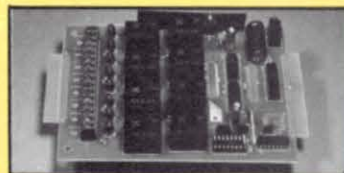
Cable (3 ft.) Computer to **A-BUS** CA-163...\$29

A-BUS Motherboard, for up to 5 cards (not needed if using only one card) MB-120...\$99



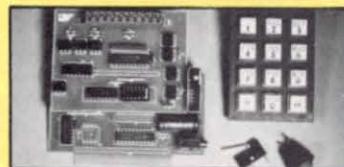
A-BUS *new* **Relay Card: RE-140...\$129**

This industrial grade output card includes **8 relays**. (Contact rated 2 Amp @ 125V) All the decoding necessary is included which means that you can connect up to 64 cards (which is 512 relays.) Easily controlled using "OUT" commands. For example OUT 0,0 turns all the relays off on card #0. Eight LED's show the states of the relays.



A-BUS *new* **Isolated Input Card: IN-141...\$49**

This optically isolated input card makes it safe and easy to connect external devices (switches, sensors, thermostats, keypads) to your computer. Simple INP commands read the status of the eight inputs. Full address decoding allows up to 64 input cards (that's 512 channels) per computer.



A-BUS *new* **Analog Input card: AD-142...\$119**

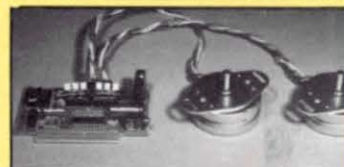
8 channel 8 bit Analog to Digital converter. Your computer can read voltages, temperatures, pressures, light levels, etc. • Input range: 0 to 5.1 Volts. • Resolution: 20mV. • Conversion time: 120 microseconds. In BASIC, you can take up to 100 readings per second. • Port address: selectable. Up to 64 Analog-80's can be connected to your computer for a total of 512 channels!



A-BUS *new* **Dual Stepper Controller: ST-143...\$69**

Don't be afraid of stepper motors anymore. The special package (below) includes everything you need to get familiar with steppers: • Controller card drives 2 steppers (12V bidirectional) ST-143...\$69 • Stepper: 48 steps per revolution, up to 300 steps/second. MO-103...\$15 • Power supply PS-126...\$10

Special Package: Controller, two steppers and power supply: PA-181.....\$99



Disk drive extender cable (8'')...C160:\$9.95

Y-Cable for Mod I bus (40 pin): • X2-40...\$29 • X3-40...\$44 • X4...\$59 • X5...\$74

Y-Cable for Mod 3 & 4 bus (50-pin): • X2-50...\$34 • X3-50...\$49 • X4-50...\$64

Disk drive cable (34 pin): • 2-drive...C162:\$32 • 4-drive...C163:\$45

Our cables are made with high quality gold plated connectors to ensure utmost reliability.

Special Cables



Green Screen.....\$12.50

Do your eyes a favor, put on a green screen. Tens of thousands are in use because they work. Contrast is enhanced and eye fatigue is greatly reduced. Our green screen is curved; it fits right on the face of the tube. (Fits Models I,II,III,4,12,16)

Printer-Switcher.....\$59

A must if you have two printers, plotters, or any devices using the standard parallel printer port. End the hassle of plugging and unplugging cables. You can select either device at the flick of a switch. For Models I,III,4,4P,4D.



 **ALPHA Products**
79-04 Jamaica Ave., Woodhaven, NY 11421

800-221-0916

Orders Only. NY & info call

(718) 296-5916

Hours: 9-5 Eastern Time

Circle 17 on Reader Service card.

Add \$3.00 per order for shipping.
We accept Visa, MC, checks, M.O.
C.O.D. add \$3.00 extra.
N.Y. residents add sales tax.
Shipping to Canada is \$5.00
Overseas. FPO. APO add 10%



time and data disks. I need to use Scripsit with this mailing list.

Can I transfer all these names and addresses to Scripsit so I wouldn't have to type them in again? Can I use any other DOS system besides 1.3? (*Vernon Shirley, Moultoon, IL*)

A: I assume that what you want to do is merely transfer the names to a format your word processor can read. That's simple enough for a Basic programmer. If you aren't familiar enough with Basic to do it yourself, check with a local TRS-80 user's group to see if anyone might be interested in helping you.

What you want is a program that will read the mailing-list file into a new set of files, each of which is small enough to load into your word processor. The task is fairly simple, but time-consuming while it's working. If the data file is random-access, your program will need to read each name/address and send it out to the new file with carriage returns inserted at the proper places so the entry looks like a normal name and address instead of having all the information on one line. The program can also remove any of the mailing-list auxiliary information kept with each name/address entry (for example, the sorting codes, which you might not want to fool with).

If you want a way to merge the mailing list with letters, the task becomes more difficult, and could be impossible to implement depending on the word processor and mailing-list program you're using.

You don't have to use TRSDOS 1.3 (you can use NEWDOS/80, DOSPLUS, MULTIDOS, or LDOS for the task), but you should talk with the manufacturers before buying any of them. Depending on what you want to do, you might find some DOSes harder to work with than others. And only MULTIDOS makes it easy to switch back and forth between itself and TRSDOS 1.3.

Q: Recently I installed two disk drives in my Model III by myself. Unfortunately I didn't use Tandon drives but bought TEAC FDD-50A drives on sale.

After buying TRSDOS 1.3, I noticed that the DOS hung up in an "auto function engaged" operation right after I input the month/day/year and time. I couldn't proceed with the DOS. I encountered no problems when I replaced my TEAC drives with a friend's Tandon drives.

I believe the stepping rate required for my TEAC drives is slower than Tandon's. To use my drives I want to increase the stepping rate within TRSDOS 1.3. Can you suggest how I can modify my TRSDOS? (*Ed Filipczak, Sycamore, IL*)

A: If you'll check the August 1985 issue of *80 Micro* (p.75), you'll

find a patch that lets you modify the stepping rate used by TRSDOS 1.3 with the disk drives. I believe that the TEACs use a stepping rate of 12 milliseconds (ms), whereas TRSDOS assumes your drives can step at 6 ms.

Q: One of the most useful commands on my Model I Level II Basic is PRINT CHR\$(31), which clears the screen from the current cursor position to the end of the screen. I'm currently converting to a Tandy 1000, which doesn't have the PRINT CHR\$(31) command. The equivalent command on the Tandy 1000 is control-Z.

How do I execute a control-Z from a Basic program? (*Joseph Malacria, Yonkers, NY*)

A: Control-Z is just CHR\$(26). Try putting that after a Print command in your Basic program.

Q: I have a 128K Model 4 with two disk drives and a Line Printer VI currently running under TRSDOS 6.2. In the accompanying manuals, I read that one can program up to 12 multitasking routines with varying priorities.

Is it possible to hook up a dumb terminal to my Model 4, have it access the upper 64K of memory while the 4 runs on the lower 64K, and do all this through the multitasking SVCs? If this isn't feasible, is there another way to do it? Are there any software packages available to do this for me? If this can be done, how much programming would be required? Would I need to make any hardware modifications? (*Paul H. Butler, Greenwich, NY*)

A: Be careful how you use the word multitasking. It has several meanings and a lot depends on your definition. For example, TRSDOS 6.2 is already running in a multitasking environment: It steals time away from your programs in order to keep the clock properly updated. Some applications that access a disk will turn off this multitasking before they begin to prevent system crashes and other unpleasant results.

In fact, if you examine your manual under the System command, you'll see the Smooth option explained. This option makes it possible for you to continue typing while the DOS accesses the disk drives, without losing characters. Its drawback is that some drives might lose characters every once in a great while when transferring data to the CPU.

Perhaps you misunderstand what the manual means by multitasking. This refers to minor chores that need to be done at periodic intervals, or when the CPU receives certain priority signals. These tasks are given priorities: The CPU ignores a low-order demand until it com-

pletes a higher-order task. If the CPU is executing a high-order task when a higher priority demand is made, it stops the lower task and puts it aside until it finishes the higher one. This is known as time-sharing the CPU, where two or more tasks have equal access to and demand for it.

You want to have two programs executing simultaneously. In that situation, the Z80 slows down by over 50 percent. The CPU has to divide its time into "slices." During time slice A the CPU services one task, during slice B the other. In between these two slices the CPU must stop what it's doing, save all its registers and temporary memory areas, and reload all the data it saved from the previous time-slice switch into the proper places.

The end result is that the computer takes almost three times as long to run a program as it does with only one task. When one of the two tasks accesses a disk drive, the other is locked out until the disk drives finish transferring all the data. In that time, anything you type in is ignored. Using the TRSDOS 6.X SVCs won't deliver what you want; you'd find one or the other of you locked out and forced to wait.

If it were practical to time-share on the Models III and 4, someone would have done so long ago. Unfortunately, the drawbacks are too costly.

Q: Do you know of any multifunction boards to fit the Tandy 1000? At minimum I'd like clock/calendar, serial port, and memory. (*Hank Fritze, Renton, WA*)

A: Computer Plus (P.O. Box 1094, 480 King St., Littleton, MA 01469, 800-343-8124) has several boards listed in their advertisement but no details on their features. Micro Mainframe (11285-E Sunrise Gold Circle, Rancho Cordova, CA 95670, 916-635-3997) also has a multifunction card for the 1000, called the 4N1. The board with the most features seems to be the TanPak from Hard Drive Specialist (16208 Hickory Knoll, Houston, TX 77059, 713-480-6000). And PBJ (P.O. Box 813, 5725 Kennedy Blvd., N. Bergen, NJ 07047, 201-861-0126) has a board called the MFB-1000. Give these companies a call and ask for details about the boards they sell. (For reviews of these boards, see *80 Micro*, January 1986, pp. 36 and 121.)

Q: I'm having a problem installing Radio Shack's high-resolution graphics kit (catalog number 26-1125). I need more detailed instructions about modifications necessary to the Model III to accommodate the graphics board. (*Richard F. Seipp, Newfoundland, Canada*)

A: The board is supposed to be Radio Shack-installed and they assume that the technician has been to one of their training courses on how to fix/upgrade the Tandy computer line. This does make it tough on the do-it-yourselfer.

I can't give any details that aren't already listed in the instructions. You do have to cut a few traces on your Model III CPU board and reroute a trace to another chip. If you're having difficulty getting the chip numbers to match your computer, then you must get an addendum sheet that details how to connect to your particular CPU version. Call Radio Shack National Parts Division (900 E. Northside Drive, Fort Worth, TX 76102, 817-870-5662) for information.

Q: Regarding the article "Little Wonder" (December 1984, p. 73): I have a two-drive 48K Model III and use TRSDOS 1.3. I changed line 380 from Q="DIR" to Q="D" as directed for TRSDOS 1.3, but I always get a "Syntax error line 380" when attempting to access the directory.

Also, in the print/display mode, page 80: "If you choose to display or print only certain sections of the file, Easydata displays a new set of prompts to selectively retrieve only specified files. . . and so forth. I don't understand these instructions and would like to see an example or two so that I can start experimenting on other combinations.

FIELD?	This is clear.
CONDITION (= # > <)?	Example?
COMPARE WITH ?	Example?
CONNECTIVE (AND/OR)?	Example?

(Siegmond T. Gayer, Houston, TX)

A: First, change the statement from 'Q\$="D"' to 'Q\$="D:"'. TRSDOS 1.3 requires a colon between the directory specifier and the drive unit specifier. The finished command, as given to the system by the CMD command, should read "D:n" where n is the drive number. Don't put any spaces between the colon and the drive number. Change line 38 to include a print statement just before the CMD command to see if the string Q\$ actually contains the proper command sequence.

As an example of searching sections of the file, let's say you have a field called "Age." Furthermore, you want to print out only those entries with a value above 21. First, tell the program to use the Age field (which you already understand). Next you can choose whether to select only those fields that are either equal to, less than, more than, or not equal to the age you give it (the program is actually going to take the character string you give it in answer to the next prompt and compare that string to each mailing-list entry under the field "Age"). You want to select

only those names whose ages are greater than 21, so answer the prompt with a greater-than sign. The string you want to compare is 21, so that's what you type in in answer to the prompt.

Finally, the "Connective?" prompt is trying to determine if you want more than one string compared to the Age field. This is handy for searches in which you want printed only the ages 21 and 22. You can select once for both strings rather than running the program twice. Or you may have multiple strings in a field and want to print only those names that match both strings you type in in answer to this series of prompts.

That should be enough to get you started using the program; the rest you can figure out by trial and error.

Q: I own a 48K Model III. Every so often the computer goes berserk for no apparent reason. Uppercase becomes lowercase, the cursor and any graphics change form, certain keys don't work anymore, and the cursor just takes off across the screen, sometimes printing garbage along the way. It happens with any program at any time.

If I take the top off the computer and set it aside, the problem disappears. I then put everything back together and it works fine for a day, a week, or even a month or two.

I've talked with the managers of several Radio Shack service centers across the United States and they gave me a few ideas, but some made no sense. One said that it was probably voltage spikes. Granted I don't have a protector, but why would this problem present itself after I've owned the Model III for a year? The computer has always been in the same place, and the current in Venezuela, where I live, is fairly good—115V 60 Hz.

Another suggested that the CPU was getting too hot, but sometimes the problem starts two minutes after I turn the unit on. A third suggested that sometimes the insulation between the CPU board and the mounting screws becomes worn and certain circuits could ground out. I put some insulation around the holes and it corrected the problem for about four months, but now it's back!

Yet another suggestion was that I might have a defective chip in the RAM sector of the CPU. A new set of chips would cost me about \$150 and I'd hate to spend that amount of money and still have the problem. Please let me know what you think. It's driving me wild! (Brad Corson, M-104 Jet Cargo International, Miami, FL)

A: Humidity is likely the culprit. The Tandy computer wasn't de-

signed to work in a high-temperature, high-humidity environment such as that found in Venezuela. It's possible for microorganisms to feed off the insulation and short things out; that might be why reinsulating stopped the problem temporarily.

It doesn't have to be the CPU that's overheating, either. The early Color Computers frequently had a bad solder joint in the power supply. When it became too hot, the joint would flex and separate for a microsecond, just long enough to cool slightly and unflex. This produced almost exactly the same symptoms your Model III displays.

I suggest you get a small box fan to mount at the rear of the computer and see if that helps. At the very least it will eliminate the possibility that overheating is the problem. Anyone else care to comment?

Q: I have a Model III and will be installing Aerocomp's single-drive upgrade kit and 48K of memory. Which operating system offers the best performance/dollar value? Is LDOS worth the extra \$10 over DOSPLUS 3.5? (Bill Rollins, Honolulu, HI)

A: Which DOS you use is a very personal preference. DOSPLUS includes a number of special Basic commands (such as INPUT@ as a match for PRINT@) that make for faster and more efficient programs. MULTIDOS is the most like TRSDOS, but it's faster, easier, and more powerful. It has a full set of programming commands built into Basic that really make it easy to create and debug programs.

LDOS and NEWDOS/80 are for real program and hardware hackers. Both offer lots of features to customize the operation of your computer to special equipment and needs. LDOS 5.1.3 for the Model III is very similar to TRSDOS 6.X, and you can swap many programs between the two without problems. That isn't necessarily true for the other DOSes. While they can run some TRSDOS 6 programs, you usually must spend some time converting them to your DOS.

In the December 1985 column (p. 17), Edward R. King of Bloomington, IL, asked about a Model I Level II driver for lowercase. H.T. Samuels, 6924 Wittman Drive, Fort Myers, FL 33907, has such a driver available.

Terry Kepner is a freelance writer and programmer. He writes monthly columns for Portable 100 Magazine, Pico, and 80 Micro. He's been writing about microcomputers since 1979.

\$99

**SALE EXTENDED
BY POPULAR DEMAND**

You've been seeing this ad for years.
Now come join us in the fun!
The PRODUCER is three years old
and we're
throwing
a spectacular
half price
birthday party!

*
Call Orders
Toll Free
1-800-433-5355

The PRODUCER
Winner of
★★★★★
FIVE STARS
in 80 MICRO Magazine's
Software Review



The PRODUCER Professional Program Writer

Beginners can program with no experience necessary.
Professional programmers can save days and weeks of time.

You can quickly create programs
to manage such things as
mail lists, personnel records,
inventory control, catalogs,
loan calculations, schedules,
personal finances.
The only limit
is your imagination!

**THE PRODUCER
CAN SAVE YOU MONEY!** Why buy
expensive data base programs that never
quite do what you want. The PRODUCER
can write all your data storage and
retrieval programs for you -- quickly,
easily, and to your exact specifications.
Investing in The PRODUCER is money
saved over and over again.

**THE PRODUCER
CAN SAVE YOU FRUSTRATION!** No
more frustrating dependence on
inadequate software that someone else
packaged for mass consumer use. With
The PRODUCER you can design and
write custom software to meet your exact
needs. You can become a programmer
even though you have no previous
programming experience. The
PRODUCER helps you plan what you
want and then writes all the code for you at
the push of a button.

**THE PRODUCER
CAN SAVE YOU TIME!** What formerly
was impossible for novices, can now be
done with ease. What formerly took
professional programmers days and
weeks, can now be accomplished in
minutes. After a few hours going through
The PRODUCER's easy to follow Tutorial,
you will have an incredible time saving
tool at your fingertips. Most PRODUCER
users testify that they can create complete
programs from start to finish in as little as
fifteen minutes. You will soon be
wondering how you could ever have done
without The PRODUCER.

WITH THE PRODUCER YOU CAN ENJOY THESE OUTSTANDING FEATURES

- An easy-to-follow tutorial that takes you step by step through The PRODUCER process. It's all you need to get started and even lets you create an actual program as you learn.
- The best screen generator available anywhere. You have full screen control including graphics. You can add, insert, delete and move blocks of text on screen or between screens.
- Full support for all math functions, including subtotals and global calculations.
- A B-Tree file structure, that gives extremely fast access to data, allows global search and replace, data entry by batch mode and automatic file rebuilding.
- The freemove Report Generator provides amazing versatility to design text placement, interfield calculations and formats. You can even print reports on your standard forms.
- Full editing control at all times. You can easily edit and refine at any point including the finished program, without having to start over. That's a feature not found on other products. The screen generator lets you experiment, rearrange, "cut and paste" between trial screens and change your mind any time you wish.
- A fully indexed reference manual of over 200 pages gives you complete technical support at your fingertips. You may never need to read it, but it is all there just in case.
- Outstanding technical support. Your PRODUCER package comes with four free issues of The PRODUCER quarterly newsletter. And should you ever need direct technical assistance, you may call a Producer Software technician for free counsel and trouble shooting.
- No payment of royalties. That's right. Provided you give proper credit, you may sell PRODUCER generated programs without paying royalties. Finished programs do not need the original PRODUCER system disk to run, so they are easy to duplicate and distribute. The PRODUCER can put you into the programming business for friends and associates.

★★★★★
"The longer I used The Producer, the more impressed I was. After only one month, it had found a place among my most often used software."
Hardin Brothers
Reviewer, 80 Micro

"The Producer is an excellent package, capable of doing everything I wanted it to."
Hardin Brothers
Reviewer, 80 Micro

"The Producer will allow you to develop a data base program in a couple of hours that would take months to program and debug by hand."
Charles Knight
Reviewer, Basic Computing

"The Producer is certainly one of the better buys in today's software marketplace."
Charles Knight
Reviewer, Basic Computing



TRS-80 Models
I, III, IV, 4-P
Requires 48k, 2 Disk Drives

~~\$199.95~~

1-800-433-5355

Texas 214-456-0074

Ask about DATA SHUFFLER
All purpose Sort/Merge program
\$34.95

We accept money orders, cashiers checks,
VISA, Master Card, and American Express

Arlington, Texas 76004

Add \$5 shipping
\$20 International

Please specify which TRS-80 you
use: TRS-80 Model I, III or IV

SPECIAL!
The Producer & Data Shuffler
just \$125 When purchased together.
Save \$110!

ANNIVERSARY SALE

There's No Business Like Show Business

Hot Items

No blockbuster computer introductions came out of Comdex/Fall 1985, the big annual computer dealers' exposition in Las Vegas last November. But, as usual, plenty of new hardware was on display, and the show set some industry trends for 1986.

Tandy officially introduced the Tandy 3000, an IBM PC AT workalike, during the show. However, the announcement lacked the hoopla that accompanied the debuts of the Models 2000 and 1000 in years past. Instead, at an invita-

tional press conference, Fort Worth's powers that be proclaimed Tandy's stability and corporate commitment to providing "high-quality products at very affordable prices" (see Tandyland below).

The Tandy booth featured an impressive display of computers, with the Models 1000, 3000, and the new Tandy 600 laptop getting prominent billing (see Photo 1). Tandy showed no Model 4Ds, 100s, 200s, or CoCos; the emphasis was entirely on their MS-DOS line. However, Tandy senior vice president Ron Stegall assured me that they weren't slighting their older machines, and especially that Tandy would continue to support the 4 (see Face to Face, p. 20).

Tandy's new 3000 and 600 had plenty of competition at Comdex—PC AT clones and laptops were everywhere. But two kinds of peripherals drew more attention than any computer: laser printers and optical disk storage.

While Hewlett-Packard's Laser Jet printer pretty much had the field to itself through most of 1985, that's all changed. More than 40 companies displayed laser printers at Comdex. Though features like speed and buffer capacity differed from model to model, the printers' price tags were remarkably similar, hovering around the \$2,995 mark. But prices are on the way down. One newcomer to the laser printer market, QMS Inc., unveiled a six-page-per-



Photo 1. The Tandy booth at Comdex/Fall.

minute (ppm) machine priced at \$1,995.

Laser printers' high-quality output and speed should make them the "must-have" item of the year for small- and medium-sized businesses. But the products I saw had something in common besides price: lack of availability. Most vendors weren't expecting volume delivery for several months, and waiting lists were the rule.

The other hot item for 1986 is optical disk storage, which exploits the technology used to manufacture and play compact audio disks. CD-ROM applications, which permit storage of huge amounts of data on a read-only compact disk, are beginning to come to market. For example, the Grolier Publishing Co. is selling its entire encyclopedia on a single optical disk for \$199, including the data base software required to find information in two seconds or less.

Archival use is the first step in applying optical technology to mass storage. The next wave is digital read and write (DRAW), also called write once, read many (WORM), which should soon be available and affordable. Sony introduced a DRAW product at Comdex that was due for shipment in volume early this year.

Beyond its great capacity, optical storage is appealing for two reasons. First, disks last an estimated 30 years. Second, the medium is extremely reliable,

with an error rate of 1 bit per 10 bits for disks and players. These factors, along with predicted prices of \$500 or so for disk drives, make optical technology worth watching in 1986.

Developments on the horizon include integrated data, video, and audio on a single optical disk; and erasable optical disk technology (EDRAW), which should reach consumers in 1987.

Tandyland

At its unveiling of the Tandy 3000 last November, Tandy rolled out the heavy

artillery, including CEO John Roach and Radio Shack president Bernie Appel. In fact, Tandy executives probably outnumbered the few dozen invited members of the press.

Appel outlined plans to spend \$80 million over the next five years remodeling Radio Shack stores to make them the "technical store of the future." As for computer products, Appel said the Tandy 1000, though only a year old, had replaced the Model 4 and Color Computer as the mainstay of Radio Shack's computer business. As the star of the Tandy line, the 1000 is now sold in all Radio Shack stores; the Model 4D is available only at Computer Centers and Plus Computer Centers. According to Appel, the 1000 is the top-selling IBM PC-compatible in North America.

Next, Roach reminded reporters that Tandy's strength is in the home, education, and small-business markets. He pointed out that consumers spend four times as much money on microcomputers as on VCRs, and noted that, despite what some analysts are saying, micros continue to be the "hottest thing since sliced bread."

Vice president of computer merchandising Graham Beacham outlined Tandy's overall marketing strategy in introducing the Tandy 3000, targeted at the 15 million small businesses in the U.S. The machine's operational compatibil-

ity with the IBM PC AT and 12 megabytes of memory under the Xenix operating environment make it the single most powerful system Tandy offers. Tandy hopes the 3000 will become the centerpost of its Vianet networking system, working in connection with Tandy 1200HDs and 1000s.

With the MS-DOS line generally geared toward business, Beacham sees places for the 1000, the portables, and the Color Computer in the home market; and the 4D and the 1000 holding places in education.

Last on the docket came Ron Stegall, senior vice president of Tandy's Business Products Division. He emphasized that the 3000 was for buyers needing high-performance compatibility in small- and medium-sized businesses.

Stegall mentioned data processing, office automation, and educational administration as examples of potential uses for the new machine.

Tandy has set up a Training Support Organization in 60 cities to help buyers learn how to use its machines, either at Radio Shack Computer Centers or on location.

Update

Searchers after a more readable display for laptop computers are taking interest in a new flat-panel electroluminescent display (ELD) from Planar Systems of Beaverton, OR.

Planar's product, called the EL8353M, features 640- by 200-pixel resolution and full 80-column by 25-line text. Unlike most liquid crystal displays (LCDs)

now in use, the ELD offers high contrast and a wide viewing range. The panel weighs 16 ounces in its portable configuration and draws 12-14 watts of power, considerably more than current LCDs. Planar's president, Steven Hix, predicts that they'll be able to get the screen's power draw down to 5 watts.

The screen's current price is also high at \$775 each in quantities of 1000. But Hix forecasts a drop to well below \$300 over the next two years.

The new screen provides an alternative to LCDs, which are cheap but often unreadable, and to gas plasma displays, which are readable but power-hungry and expensive. According to Planar, three large vendors will use ELDs on new laptops this year. Speculation is that the three are Compaq, Data General, and IBM. ■

Face to Face

During Comdex/Fall, I spoke at length with Tandy senior vice president Ron Stegall. Our conversation covered a variety of subjects; here's a sampling.

On the Model 4/4D's status: "The 4 continues to sell well. . . it would be a big mistake to stop supporting the Model 4." Will the 4 be alive a year or 18 months from now? "I don't think there's anything magic about 18 months. Don't get in your mind that we have a date out there because that's not my philosophy about how a product goes."

About persistent rumors that the 4 is doomed: "[The] press understands MS-DOS, but doesn't understand the installed base of the 4 and how it continues to sell. We intentionally came out with the 4D including DeskMate to get rumors [of the demise of the 4] stopped."

Stegall said the 4's performance is "excellent in education" and Tandy considers it a capable computer for home and small-business use. But the latest 1986 Radio Shack catalog contains no new Model 4 software products, and Tandy has no plans to produce any in-house. According to Stegall and others at Tandy, "Third-party software for the 4 is a fact of life." And for the product itself? "We believe that as time goes on, because of just the sheer quantities that the 1000 is selling, that the price advantage of the 4 is going to slowly slip away."

On Tandy's role in education: According to Stegall, the Tandy 1000 isn't hurting educational sales of the 4 because "large Model 4 customers

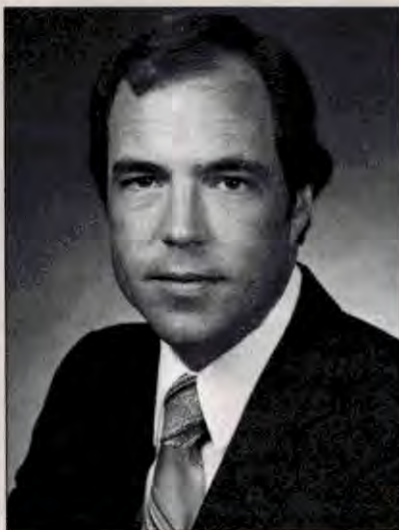


Photo 2. Tandy senior vice president Ron Stegall.

continue to buy Model 4's. What's neat is [the Tandy 1000 has] taken over where Apple once was." Tandy also sees a place for the new Tandy 3000 in education.

On the Tandy 3000: Microsoft's Xenix multiuser operating system "is important to the 3000 and we're going to tout it as an application in business." Tandy foresees offices using the 3000 as a hub ringed by 1200s and 1000s; this hinges on the first quarter introduction of Xenix V.

But Tandy already has a Xenix machine in the Tandy 6000, and with it owns a big piece of the corporate multiuser pie. Stegall had this to say about competition between the two machines: "Unix software has not come in the numbers that some would have us believe. The great ma-

majority of software developed for the 6000, we own. When software for the 286 comes under Xenix, it could provide some competition for the 6000, but that's not where it is today."

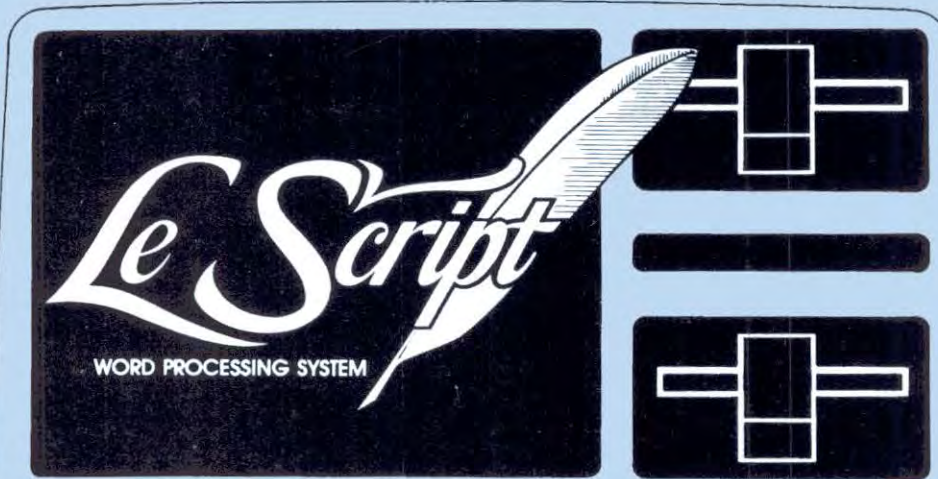
On the future of the Color Computer: "Tandy computer users are basically in the home and small business. The Color Computer, the Model 4, and the 1000 are the machines used by these masses." Anticipating the Christmas season, he noted that the CoCo "continues to sell unbelievably well. It's very seasonal and we're going to sell absolute truckloads during this next two months."

Is the CoCo losing ground to the 1000? "Nobody can sell an \$88 machine and make money at it. The 1000 is also in the home market, but they are in different markets simply by the difference in price."

On future products from Tandy: Since the hottest new products Comdex were laser printers and CD-ROMs, I asked when Tandy would get into those areas. "Laser printers are absolutely wonderful technology," said Stegall. "It's still overpriced but that price is dropping so rapidly that you've got to believe we're looking very, very hard at it."

Stegall wasn't quite as definite about CD-ROM technology. "[CD-ROMs are] an interesting theory, but there are a lot of things that have to be answered, a lot of ground that has to be plowed, and even after all that ground has been plowed, you still have a huge pricing curve before it can ever be what everyone wants in their living room. We're looking at it. We have people following it closely, but it's not going to be in next year's book." ■

TRS-80 AND IBM-PC Word Processing Program



Computers Supported
 IBM-PC
 IBM-XT
 Tandy 1000
 Tandy 1200
 Tandy 2000
 Model 4
 Model 2
 Model 12
 Model 16
 Modem 4 CP/M
 Model 2 CP/M
 Max-80
 LNW

ONLY
\$129.95

"I'd say that LeScript comes the closest to being the right word processor for the largest number of people."

(80 Micro, November 1985)

CP/M
& IBM
Versions
\$199.95

- 80 x 24 DISPLAY using TRSDOS 6 or any MODEL III DOS.
- Built-in FORM LETTER and MAIL-MERGE capabilities.
- Built-in HELP SCREENS.
- 55 separately programmable MACRO FUNCTION KEYS.
- Performs PROPORTIONAL-SPACE right-margin justification on over 120 different printers (all drivers included FREE).
- Integrates with ELECTRIC WEBSTER spelling checker.
- Keyboard entry and printing of 31 European Characters and special symbols.
- IBM-PC, XT, Tandy-1000, Tandy-1200, Tandy-2000 versions for color or Monochrome, now only \$199.95.
- MODEL 2/12/16 versions now available for TRSDOS 2.0, TRSDOS 4.2 and CP/M. \$199.95.
- LeScript also available to run on TRS-80 MODEL I, MODEL III, LNW-80, LNW-TEAM (80 x 24), Holmes VID-80 (80 x 24), and Lobo MAX-80 (80 x 24). \$129.95

CALL 1-305-259-9397

ANITEK

ANITEK SOFTWARE PRODUCTS
 P.O. BOX 361136 □ MELBOURNE, FL 32936



FREE SHIPPING WITHIN THE U.S.; OUTSIDE THE U.S. ADD \$10.00 FOR SHIPPING. FLORIDA RESIDENTS ADD 5% SALES TAX. ALL ORDERS PREPAID BY CHECK, MONEY ORDER, CREDIT CARD OR C.O.D. Circle 141 on Reader Service card.

FREE

TRIAL-SIZE DISK OFFER

Fill out and return this coupon to receive a free trial-size copy of the LeScript word processing system - a \$25.00 value.

Name _____

Address _____

City _____

State _____

Zip _____

Telephone _____

My system is:

- | | | |
|--------------------------------------|--|--|
| <input type="checkbox"/> Model I/III | <input type="checkbox"/> Holmes VID-80 | <input type="checkbox"/> CP/M LNW-TEAM |
| <input type="checkbox"/> Model 4 | <input type="checkbox"/> Model II | <input type="checkbox"/> CP/M VID-80 |
| <input type="checkbox"/> MAX-80 | <input type="checkbox"/> CP/M Model 4 | <input type="checkbox"/> TANDY-2000 |
| <input type="checkbox"/> LNW-TEAM | <input type="checkbox"/> CP/M MAX-80 | <input type="checkbox"/> IBM PC. |

Send to: ANITEK • P.O. Box 361136 • Melbourne, FL 32936

More Goodies from PowerSoft

SuperCross/XT

EASILY TRANSFER FILES FROM THE TRS-80™
TO MS-DOS™ OR CP/M™ AND BACK!

80-MICRO summed it up: "The value of this program far exceeds its price... if you work with different computers, it's a must."
4-STAR Review - July 1985 issue

HUNDREDS OF ENTHUSIASTIC COMPLIMENTS ON FILE!
"Don't be confused by competitors that are really BASIC translators with very limited file transfer capabilities!"

SuperCROSS/XT will allow you to COPY files back and forth between different operating systems, including PC/MS DOS 1.x, 2.x/3.x (single or double-sided), CP/M+, or CP/M 2.2 on your TRS-80™ Model 4/4P, III, or I/DD. You can do this with your existing hardware and SuperCROSS/XT, eliminating modems, cables, and terminal program transfers. SuperCROSS/XT runs as a ICMD file under your TRS-80 operating system. Data files, spreadsheet files, and text files can also be moved between machines, like years of Visicalc™ files, business letters, legal drafts, or medical records, for example.

Comments and letters on file from registered users are unusually enthusiastic about this product and its ease of use. *It WILL do what you think it will do, it's easy, and it WORKS GREAT!* New features in SuperCROSS/XT include "tagging" files for multiple COPY's or KILL's to eliminate many unnecessary keystrokes!

CNVBASIC/CMD, available separately, "preps" your BASIC programs before sending over with SuperCROSS/XT. It will make most of the syntax and spacing changes required for converting Model III BASIC programs for use on MS-BASIC, CP/M BASIC, or Model 4 BASIC. Complex or commercial business packages written in BASIC probably will not convert 100% over by our or any other BASIC translator.

Important! Specify Model I/DD, III, or 4 computer type required.

SuperCross/XT (70 disk formats)	\$ 99.95
CNVBASIC/CMD alone	\$ 29.95
BOTH COMBO Special! - Save \$10	\$119.95

Tandy 1000 and other PC compatible users:

Do you have problems with copy-protected disks on your Tandy 1000, 1200, 3000, IBM, or other PC compatible? *We don't mean trading software, but making archival backups of your purchased MASTER disks and running your protected business applications from your hard disk.* We have a program called **COPY II PC** that will handle these tasks for you. **COPY II PC** will backup most protected PC software. It also makes using your hard disk as convenient as it was designed to be! No longer will you need to use a "key disk" on most software (applications - not games). You can run directly from your hard disk with **NOKEY**, included with the **COPY II PC** package. Insert **NOKEY** in your **BATCH** file for fast, easy, automatic execution of your "protected" applications. This is sold for making archival backups of your own purchased software for your own use or running from your own hard drive only. **TANDY 1000 requires memory card because of needed DMA chip that resides there.**

>> Not for Tandy 2000 <<

Minimum requirements: **TANDY 1000** (memory board required), 1200, 3000, IBM™ PC™, XT™, AT™, or other "real" compatibles including Leading Edge, AT&T 6300, Compaq, etc. One or two disk drives and at least 128K required on most machines.

COPYII PC with Nokey only \$39.95

Do you really like Scripsit™, but wish it did a whole lot more? You'd like a lot of new features without relearning a whole new system or spending much additional money? **Our PowerScript 4.2 is just the answer.**

PowerScript 4.2 adds two categories of additions to **SCRIPSIT™**. Directory/File functions (DIR, FREE, KILL CHAIN, LINK), and embedded printer control functions. With all the smarter printers out there, it doesn't make any sense to use a "dumb" word-processor anymore. In this case, "dumb" means it can't really control your printer to its fullest capacity. If you notice, there are MANY word processors out there for the TRS-80™ besides the ones from Tandy. We could recommend any one of these, **IF YOU WANTED TO BUY SOMETHING NEW.** One of the problems, however, is that you need to learn all new commands. The second problem (maybe the main one) is that you need to shell out a lot more money to buy it! **PowerSCRIPT 4.2** gives you many new features, while retaining the commands you already know - at a very low price! All your previous files will, of course, be compatible. **PowerScript 4.2** received a **4 1/2 star rating** in 80-MICRO's July 85 issue. Supports Mod I, III, and 4 versions of **SCRIPSIT™**.

Add all this power to your program for only \$39.95!

Reference Manual for Scripsit™

New! Contains easy to follow instructions on getting the most from **SCRIPSIT™** for Mod I, III, or 4! Explains all the mysteries and ends confusion on commands you never understood. Meant to supplement your manual, but will stand alone in its completeness. Contains extensive Index to the III manual (which doesn't have one). **only \$7.95!**

SUPER UTILITY Combo Specials

Attention Super Utility Users: (registered or otherwise)

Our ever-popular book **INSIDE SU™ 3.x** has been revised and renamed to now include all the changes that have occurred in the past two years since it was last revised. This perfect-bound, large format, slick 100 page+ book explains all the ins and outs of using these powerful utilities to the fullest of their capabilities. If you own **SU™ 3.x**, **SU4/4P**, or **PowerTOOL** this book will really add to your knowledge and maybe explain some things you didn't understand before. Lots of tips, hints, and suggestions are included, as well as helpful information for the novice as well as the "pro". Disk theory is explained as well. The book is now shipping, and a real value at only \$19.95, its list price, but this month we're offering it for **only \$15!** Save \$5! If you are a new Model 4 owner and a new **SU4** owner as well, then **NOW** is the time to get some great reading material!

Don't own Super Utility yet?? Buy our world-famous SUPER UTILITY™ 3.2 or SUPER UTILITY 4/4P and add our new edition of USING SUPER UTILITY for only \$5 extra! Save \$15!

Super Utility™ 3.2 for the TRS-80™ I, III, 4(III)	\$79.95
Super Utility 4 for the TRS-80™ Model 4/4P/4D	\$79.95
USING SUPER UTILITY Book Sale price	\$15.00

>> Special combo SU with new book for only \$84.95! <<

Super Utility for the TRS-80 is "protected". It comes with two copies of the program however. Upon registering, you may order an unprotected copy for \$20 (U.S.) at your option.

Do you use hard drive on your TRS-80?

We have a complete line of **Supreme Hard Disk Driver** packages that offer *much greater flexibility and superior performance* over the standard drivers supplied by Tandy or other hard drive manufacturers for the TRS-80 Mod 4, III, or I. They allow you to split up your hard drive into partitions of differing sizes, and also allow you to define granule sizes and other optimizing operating characteristics to achieve maximum use from your drive. The drivers (once relocated) are very small, less than 256 bytes. Most hard drive companies either sell or recommend our drivers. These drivers can also be used to allow a hard drive to be shared between **LDOS 5.1** and **TRSDOS™ 6** for Model 4 owners! If you have the 15 meg or 35 meg Tandy drive, you can now format it for full usage - NOT just 5 meg (Mod I, III or 4 mode)! If you have a 4P, you can boot directly off the Tandy hard drive without a disk! **Just turn on the power.** Call or write for complete details. **only \$99**

Whether you use our software driver or not, you NEED to use BACK/REST! Shame on you if you're not backing up your data!

>> See the 5-Star review in the Oct '85 Issue! <<

If you've invested good money into a hard drive system, it doesn't make any sense not to have a **BACKUP routine**. **BACK/REST** makes that job easier and saves much time. And **TIME IS MONEY. Don't delay! Save HOURS!** **BACK/REST** will work with all hard drives that use **LDOS** or **TRSDOS 6**.

Hard Drive COMBO Specials!

BACK/REST 1.3 for TRSDOS 6™ & LDOS	\$ 99.95
LDOS ToolBox	\$ 49.95
<i>Hard Disk Repair & Recovery Tools for LDOS - Mod III</i>	
Model 4 ToolBelt	\$ 49.95
<i>Hard Disk Repair & Recovery Tools for TRSDOS 6 - Mod 4, 4P, 4D</i>	
Mod 4 ToolBelt and LDOS ToolBox Combo	\$ 75.00
<i>useful if your hard drive is split Mod 4 and III</i>	
BACK/REST and your choice of TOOLBOX	
for LDOS or MOD 4 TOOLBELT	\$139.95
BACK/REST and BOTH sets of tools	\$159.95
BACK/REST and our Supreme Rigid Driver* (save \$50!)	\$149.95

*add either **LDOS TOOLBOX** or **Model 4 ToolBelt** for only \$29.95 more!

Fine print: Visa or MasterCard gladly accepted. Flat rate shipping on any item or combination of items from this ad is only \$3 (UPS ground). Blue Label or overnight available at extra cost (\$3 and \$13.50). COD orders will have \$3 added to the total. Canadian airmail is \$4 and other foreign airmail will be actual cost. Foreign customers, please use charge card. Checks and orders not drawn on US banks will be returned. **Specials end 3-30-86. Texas residents must add appropriate sales tax.**



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



Rerun

P.G. Quartermain wrote to say he appreciated **Thomas L. Guindry's upgraded Basic compiler, FastBas, for the Models I and III** ("Running Like the Wind," January 1985, p. 42). However, he notes that if you want to write a Basic program and merge it with the compiler, you must first store FastBas on disk in ASCII format. Since line 2710 is a few characters too long, you get a "Direct input of data" error when you attempt the conversion. To circumvent the problem, Quartermain suggests deleting IFPN=37 from line 2710 and inserting this line:

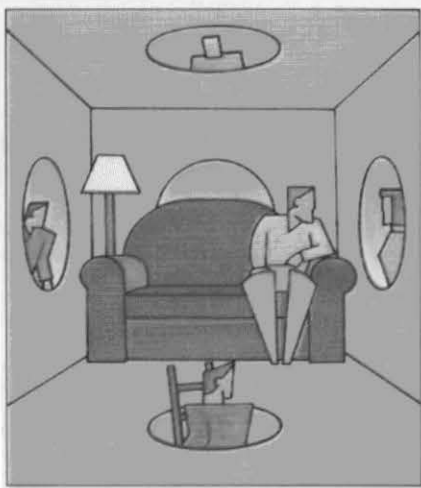
```
2705 IFPN<->37GOTO2720
```

Improved Script

Readers are evidently still getting good mileage from **Scriptsit**. David L. Trafton of Bethesda, MD, developed a **patch to conquer a Model III/4 incompatibility problem**. Trafton uses Model 4 Scriptsit for editing telecommunications files on the Model 4P at work, but he prefers Model III Scriptsit for general word processing on the 4P and his Model III at home. While using LDOS with Model III Scriptsit appeared to afford the necessary compatibility for TRSDOS 6.2 files, he found that LDOS 5.1.4 wouldn't work properly with Scriptsit 3.2. Using a patch to bypass the Scriptsit code that tests for the operating system version tricks Scriptsit 3.2 into thinking it's working under TRSDOS 1.3 and eliminates the difficulty (see Program Listing 1).

From Greeley, CO, comes Michael ShROUT's advice on **loading Scriptsit files into DeskMate**. First, create a DeskMate file consisting of a single 1AH character (control-Z)—call it Append/DOC for convenience. Use the S.A command to save the Scriptsit file in ASCII, adding DeskMate's normal /DOC extender. Finally, to link the Scriptsit and DeskMate files, type in APPEND APPEND/DOC TO FILE NAME/DOC (STRIP).

Scriptsit ends a file with a 00H character while DeskMate uses 1AH. If you don't change 00H to 1AH, DeskMate lets you scan beyond the end of the file into active memory; editing in that area can cause disastrous results. Transferring files from DeskMate to Scriptsit is easy: Scriptsit accepts DeskMate's /DOC files without changes.



Tandy Twosome

Michael ShROUT also worked out a way to **use DeskMate with Memdisk on a three-drive system**. After booting a normal TRSDOS 6.2 system disk, you can type in DO FILE NAME to execute ShROUT's five-line JCL (job control language) file (see Program Listing 2). Then insert the DeskMate disks, and type in DM and press the enter key.

When you use Text, DeskMate's word processor, you can save and load to drive 2. Be aware, though, that files on this drive don't show in the main menu unless you use the Swap function. Files must also contain a /DOC extension for Text to load them from drive 2.

A **bug in TRSDOS 1.3** moved Adam Rubin of Wappinger Falls, NY, to write a **set of patches** (see Program Listing 3). Apparently, TRSDOS 1.3 opens all files with the LRL (logical record length) given in the directory, even if you request a different length. Rubin's modifications let you alter record size.

Continued Support

When LNW Research Corp. went out of business, they left a lot of users high and dry. Two readers wrote to request **assistance in tracking down a source for LNW products**. Although parts and software for LNW equipment are becoming scarce, you can still get them from Erb's Computer Systems (10840 Hunter Ave., Whittier, CA 94601, 213-699-6684). Erb also repairs LNW equipment if it was factory built.

Tandy's **DWP-210 has joined the ranks of discontinued products**. That isn't news to DWP-210 users like Thomas

W. Towne, Peter G. Taylor, and Glen Cahn who tried to buy a bidirectional tractor feed (catalog number 26-1443) for it. Amy Arrut, assistant manager of marketing information, acknowledged that Tandy is currently backordering this item as of November 1985. According to Arrut, Tandy plans to deliver the bidirectional tractor feeds already on backorder; they'll continue to repair the DWP-210.

Error Messages

Andy Levinson's **Model 4 scroll-protection routine** (Reader Forum, December 1985, p. 25) contains a **typographical error**. The published routine omitted a minus sign; the correct equation for the fourth array variable is $N\%(3) = -1384$.

Bugs invaded **Roxton Baxter's article on solving equations** ("Finding Your Roots," February 1986, p. 48). Lines 5020-5040 of the Basic subroutine that allows you to change the value of R3 should read as follows:

```
5020 Y(3)=(X(1)+X(2))*U(1)-X(3)
5030 Y(4)=0.026*LOG(X(1)/6.4E-15)-X(4)
5040 Y(5)=0.026*LOG(X(2)/6.4E-15)-X(5)
```

The list of Solver's solutions for the unknown values X(1)-X(5) (when R3 is 1000) should contain five equations. Delete the fourth equation listed, X(4)=3.193.

Program Listing 1. Scriptsit Patch.

```
PATCH SCRIPTSIT/CMD:0 (D0B,43-18 05)
PATCH SCRIPTSIT/CMD:0 (D0B,DB-18 10)
End
```

Program Listing 2. JCL file for DeskMate.

```
system (drive=2,driver="MEMDISK")
D
D
Y
set *CL to COM/DVR
End
```

Program Listing 3. Set of patches for altering record length of TRSDOS 1.3 files.

```
PATCH *2 (ADD=502D,FIND=3E03635F1A,
CHG=1313131A77)
PATCH *2 (ADD=5032,FIND=7723131A,
CHG=233A0E50)
PATCH *2 (ADD=503F,FIND=10,CHG=11)
End
```




MONTEZUMA MICRO

PRESENTS

MONTE'S TOOLKIT

\$49

WOW!
ANOTHER
NEW
PRODUCT
FROM
MONTE

REQUIRES: Montezuma Micro CP/M® 2.2 version 2.21+

Monte's Toolkit is a collection of utilities that will prove useful to every owner of Montezuma Micro CP/M (you all are owners, aren't you?). It's a disk full of programs that perform functions that are difficult, cumbersome or expensive to do any other way. Monte has tried, in his own way, to briefly explain each function for you below. Read on and be saved.

DOUBLECROSS™ allows unlimited file transfers between CP/M®, IBM-DOS and Model 3/4 LDOS® /TRSDOS® with unsurpassed ease and speed. In fact, you can move just about anything from any disk to any other disk but you might have to make changes for program operation. Lotus 123® just flat won't run on your Model 3 and I doubt that you could ever modify Scripsit® enough to run on the IBM. Simple menus guide you through the operation with minimal keystrokes. Just tag the files you want in the directory display and go. You won't get doublecrossed with **DBLCROSS**.

FREEFORM™ formats and backs up Model 3/4 LDOS/TRSDOS and IBM MS & PC-DOS (versions 1.x, 2.x and 3.x), both single side and double side plus there is a special "clone" copy when you just don't know or care what you have. Just insert a disk and copy away. All you have to know about the disk is how to get it into the drive. The Analysis feature lets you look at and print the actual structure of a disk - even the ones with "funny" formats.

WSPR lets you print to almost any printer using almost any control code. It's nearly magic and does a whole lot more than I can talk about here including letting you print *anything* your printer can print.

FILEFIX™ gives you the ability to "fix" your "files" by adding line-feeds when your files are going from CP/M or IBM-DOS to LDOS/TRSDOS or take them away if you are transferring the other way. You can remove the control codes from a WordStar® document thereby converting it to a non-document file. The fix will also fix up Scripsit files so they can be used by CP/M and IBM-DOS based wordprocessors (you know - the real ones). All this is accomplished with the use of simple menus and boy, it is fast.

SYS2M requires 128K and our CP/M. The CCP and the BDOS are moved to drive M and the BIOS is modified to allow a Warm Boot from Drive M. So what you say. Well, you still have to have a disk in drive A but it no longer has to have the CP/M system resident. It can be anything. This little jewel copies frequently used programs to drive M and searches there first for all program requests resulting in much faster program loading. Slick isn't it?

AUTO is a little goodie that lets you issue multiple commands from the command line. Eliminates the *pain* of Submit. As in all the other parts of **MONTE'S TOOLBOX**, complete and comprehensive instructions are included and it's available right now.



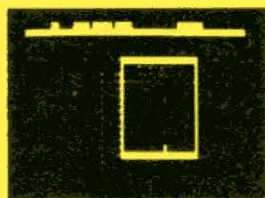
MONTEZUMA MICRO

PRESENTS

MONTE'S WINDOW™



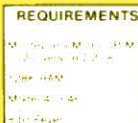
NOTEPAD



CALENDAR

WINDOWS ON
YOUR MODEL 4!

TAKES NO
USER RAM!



CALCULATOR

Pop Up Menus!

\$49

Easy to Use!



INDEX
CARD FILE

A touch of the keyboard opens a window in your screen for - a Note Pad, an Appointment Calendar, a Calculator, even a Mini Data Base. All yours for just \$49! Need RAM? Monte's Christmas gift to you - 64K and the window, both for \$99!

Once Upon A Time,

Monte Zuma, our Founder, President and King, has always had trouble keeping his desk organized. The Sidekick™ from Borland International would solve the problem, but alas, it was not available for CP/M®. So Monte asked his favorite nephew, the legendary LaMont E. Zuma (distant cousin to Rondo Talbot, a direct descendant of Monte Zuma himself) to work on the problem as best he could during recess at the home. LaMont, a true legend in his own time, really outdid himself this time. A touch of both shift keys halts your application program in its tracks and up pops **Monte's Window™** ready to use. What could be simpler? Put an end to the fumbling and pawing around the pile of papers on your desk. You will find **Monte's Window™** indispensable. When you are finished, break back to your application program and it resumes without error. **Monte's Window™** is truly a breakthrough. See for yourself - Look through **Monte's Window™** on your Model 4. How did you ever get along without it? See the page opposite for order information. **Monte's Window™** is available right now.



MONTEZUMA MICRO

PRESENTS

MONTE'S BASIC

Your TRSDOS BASIC (01.01.00) will work the same, for the most part, under CP/M as it does under TRSDOS. However, for the most part isn't good enough. But, with some changes provided by our **BASCON**™ program, you can be 100% compatible with the standard BASIC used with CP/M. True, you lose some of the TRSDOS BASIC features while gaining new features such as FILES, NULL, RESET, etc. **BASCON** alters your TRSDOS BASIC, which was included with your Model 4 when you bought it, so that it will function under CP/M. You must have the unaltered original TRSDOS BASIC as above in order to convert with **BASCON**. The program operation is fully automatic and quick. The resulting BASIC runs any CP/M 2.2 BASIC program that previously required MBASIC™. Programs written for TRSDOS BASIC may require modification to run correctly under the converted BASIC. Fully compatible with MBASIC. We even provide for additional documentation that is keyed by page number to your TRSDOS BASIC manual. **MONTE'S BASIC** is available right now.

\$49

©Copyright 1985 by Montezuma Micro. All Rights Reserved.

CP/M...The Software Key That Unlocks Your Model 4

CP/M is the standard 8-bit Z-80 operating system and many thousands of programs have been written to run under this system. With Montezuma Micro's CP/M you can run these programs on your Model 4/4P. Think about all those nationally known programs you've wanted to use. Programs like WordStar, dBASE II; SuperCalc; MultiPlan etc. With our version of CP/M 2.2 all those public domain programs on bulletin boards across the USA are available for free downloading. CP/M is the missing link that joins all this software to your Model 4/4P. Montezuma Micro's CP/M comes ready to use and requires no hardware modifications. This product has been awarded the best and highest ratings in the reviews and we are continuously improving it with you in mind. With our CP/M you get more than just a DOS. You get the other half of your Model 4/4P.

AVAILABLE NOW FOR IMMEDIATE SHIPMENT - Less Hard Disk Drive Support..... \$169
Optional Hard Disk Drive Support \$ 30

(Radio Shack 5M, 12M, 15M, 35M • Aerocomp/Percom 5M, 10M, 15M, 30M • BI-Tech 5M, 10M, 11M, 15M, 20M, 30M, 40M)

FEATURES

- Full range of floppy drive support. Dual-head and/or 80 tracks.
- Optional hard disk support allows positioning and selective assignment of logical drives. Easy backup routine.
- Memory drive allows the use of the other 64K RAM bank on 128K machines.
- Modem 7, a powerful public domain communications program furnished at no charge, allows for file transfer and remote database access such as CompuServ and The Source.
- CONFIG is our flexible utility that allows complete control of all operating parameters from menus. Format, read and write more than 30 different manufacturer's disk formats with more being added rapidly.
- Disk Utility Program allows fast format, backups and verifying of ours and other manufacturer's disks.
- These CP/M utilities are included: ASM; DDT; DUMP; ED; LOAD; MOVECPM; PIP; STAT; SUBMIT; SYSGEN; and XSUB.

WHY BUY OURS?

	MONTEZUMA MICRO	RADIO SHACK
Transient Program Area (TPA) Bytes free in MBASIC	55K	52K
Bytes free of formatted disk	30,776	18,488
64K Memory drive	196K	160K
Double-Side/80tk drive support	YES	NO
Format, read/write other CP/M formats	YES	NO
Communication program included	YES	NO
Share HD with TRSDOS/LDOS	YES	NO
Assign multiple drives to HD	YES	NO
Boots from Hard Disk (4P)	YES	NO
Popular terminal emulation	YES	NO
User defined function keys	9	3
Timely product support	YES	NO

128K MEMORY UPGRADE

Our upgrade kit includes 64K RAM, a genuine PAL chip and instructions for installation. This kit will upgrade your 64K Model 4 to 128K and allow the use of our MEMLINK program and the TRSDOS 6.x MEMDISK. Guaranteed 1 year.

A BARGAIN AT ONLY \$74 Model 4
\$64 Model 4P - No PAL

This popular software is available for the Model 4/4P using our CP/M.

WordStar Fast memory-mapped version 3.3	\$250
MailMerge Multi-purpose file merging program ...	125
SpellStar 20,000 word proof-reader on a stick	125
StarIndex Creates indices and Tables of Content... ..	85
DataStar Data entry and retrieval is yours	175
ReportStar Report generator and file manipulator....	150
InfoStar The above two programs	300
dBASE II with Disk Tutorial.....	385
CBASIC version 2.8.....	85
TURBO PASCAL by Borland. This is the one.....	45

ORDER INFORMATION

Call now and your order will be shipped immediately. We accept American Express, MasterCard and Visa plus we ship COD (cash or cashier's check only). Credit cards are not charged until your order is shipped. Add \$4 shipping per item on orders within the 48 states. Suitability of the software is the responsibility of the purchaser as there are **NO REFUNDS**. Defective items will be replaced upon their return, postpaid.

ORDER NOW . . . TOLL FREE

800-527-0347
800-442-1310

The Toll Free lines are for orders only.
 Specifications subject to change without notice.

CP/M is a Trademark of Digital Research, Inc.; Interchange and Memlink are Trademarks of Montezuma Micro. TRS-80 is a Trademark of the Tandy Corporation; WordStar, MailMerge, SpellStar, StarIndex, InfoStar, ReportStar, DataStar, SuperSort and CalcStar are Trademarks of MicroPro International Corporation. Multiplan is a Trademark of Microsoft.

Copyright Montezuma Micro 1984.



MONTEZUMA MICRO

214-339-5104
 Redbird Airport, Hangar #18
 P.O. Box 32027
 Dallas, Tx 75232

"WE KEEP YOU RUNNING"



NEW!
CONV4TOPC
 For TRS-80 Mod 4 users.
 Plus other great utilities.

CONVERT MOD I/III BASIC PROGRAMS and FILES For Use On The IBM PC, TANDY 1000, 1200HD, 2000

Here's time and money saving news for thousands of TRS-80 Mod I and Mod III owners who would love to move up to state-of-the-art hardware! EMSI's conversion package contains utilities to solve both problems facing those who want to upgrade:

PROBLEM 1—HOW DO I GET FROM HERE (Mod I/III) TO THERE (PC)? Do I need to retype everything, buy modems, RS232's, cables, and communications software?

ANSWER: None of the above! Use the HYPERCROSS utility included with our package! HYPERCROSS makes the entire disk transfer process very simple—and fast. All the work is done right on your Mod I/III. HYPERCROSS lets you format a diskette readable by all PC's in one drive and copy files directly to it from a Mod I/III diskette. After the transfer, take the PC diskette out of your Mod I/III and put it in your PC. Simple as that! (Mod I's need a doubler.)

PROBLEM 2—ONCE I'M THERE, HOW DO I CONVERT MY MOD I/III PROGRAM TO RUN ON A PC?

ANSWER: Use our CONV3TOPC utility to do 95% or more of the conversion for you. It automatically inserts all required spaces between keywords, replaces PRINT@'s (even those with variables) to LOCATE's, adjusts TAB addresses, corrects the exponentiation symbol, replaces the % symbol in USING statements with a backslash, removes down arrows, optionally removes REM's and flags and lists unresolved line numbers. It even allows for Mod I/III screen PEEKs and POKEs.

And, our thirty page user guide is packed with examples and hints showing how to make any manual program changes required after using CONV3TOPC.

"... It's the best such program I've seen, well worth it's higher price over similar programs. ... The conversion program performed flawlessly."

Mr. Gary Shade, 80 MICRO, May 1985 (4 1/2 stars).

"Truly, a Superior Quality Software Package. Count me among your list of satisfied customers."

Waltham, MA

"I would gladly recommend the package to anyone making the change to an IBM type machine."

Wauwatosa, WI

"What a time saver. Thanks for a great product."

Denver, CO

"Excellent! The manual alone... is worth the price."

Westport, CT

"The fine points of conversion you cover in the manual are excellent."

Salem, OR

"An excellent product. Thank you for the service."

Mapa, CA

"Works like a charm! Congratulations."

Odenton, MD

CONV3TOPC V2.0 \$139.95

(Package includes: HYPERCROSS and CONV3TOPC)

AVAILABLE WORLDWIDE through Radio Shack's Express Order Software (Cat.No. 90-0345)

Visit a R/S Computer Center and review the CONV3TOPC DEMO. It provides complete package details and will answer all your questions. If your store doesn't have the DEMO yet, ask them to order it thru ICST-FC# = FCO-925.

OTHER EMSI SOFTWARE

THE NORTON UTILITIES LIST \$99.95, OUR PRICE \$59.95

CONV3TOPC V2.0—(WITH Hypercross)	\$139.95	CONV3TOPC V2.0—(WITHOUT Hypercross)	\$119.95
CONV4TOPC V1.0—(WITH HYPERCROSS)	\$139.95	CONV4TOPC V1.0—(WITHOUT HYPERCROSS)	\$119.95
Same as CONV3TOPC V2.0, but specifically for mod 4 BASIC and FILES		CONV3TO4—Mod I/III to Mod 4 BASIC	\$49.95
CONV3TOPC V2.0 DEMO (Runs on any PC)	\$20.00	HYPERCROSS—Mod 4, PC-DOS formats	\$49.95
HYPERCROSS—Mod I/III, PC-DOS format	\$49.95	ISAM ROUTINES—Incorporate these routines in your PC BASIC programs. They provide keyed access to random files & complete file maint.	\$69.95
CROSS REFERENCE—For PC BASIC programs. Lists all referenced variables, line numbers, etc.	\$24.95	RAMDISK—Create superfast pseudo disk drive (eg. create a 90K RAM drive C: and still have 60K for BASIC on 256K PC).	\$49.95
FASTSORT—Machine language SORT callable from PC BASIC. Great PC subst. for Mod III BASIC's CMD"O" command.	\$24.95	INSIDE TRACK—Over 60 PC utilities that compliment PEEK's 'n POKEs package. Too many functions to mention.	\$44.95
PEEK's 'n POKEs—Over 50 utilities that enable PC BASIC programs to access and modify PC/MS-DOS system functions.	\$29.95		

800-922-0786

(NJ residents 201-879-5982)

EDUCATIONAL MICRO SYSTEMS, INC.

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 1/2 lbs.). NJ residents add 6% sales tax.



Tandy's Model 600: You Can Take It with You

by Bradford N. Dixon

★★★★

The Tandy 600 comes with 32K, one 3½-inch disk drive (360K), and Microsoft Works, an operating system manager with a word processor, calendar, data base manager, telecommunications, and spreadsheet. Tandy/Radio Shack, One Tandy Center, Fort Worth, TX 76102. Catalog number 26-3901. \$1,599.

Easy to use: ★★★★★

Good docs: ★★★★★

Well made: ★★★★★

Does the job: ★★★★★



Photo 1. Tandy's Model 600 laptop.

The Tandy 600, the latest addition to Tandy's line of portable computers, is the best combination yet of a functional, full-featured laptop. But compare it with the ideal laptop some of us have in mind and the 600 doesn't measure up: Although it runs a low-power 8088, it isn't IBM PC-compatible; it weighs in at a porky nine and a half pounds (11 with the external power supply); and the screen is still hard to read.

Hardware

The Tandy 600 sports some significant differences between it and its predecessors, the Models 100 and 200: a single-sided double-density 3½-inch microfloppy drive (which stores 360K), an 80-column by 16-line liquid crystal display (LCD), and an 80C88 central processing unit (CPU). Unlike the 100 and 200, which use an 80C85, the 600 contains a low-power CMOS version of the 8088 microprocessor used in the Tandy 1000, 1200, and virtually all other IBM PC-compatibles.

The 600 comes with a measly 32K RAM standard, with internal upgrade boards in 96K increments (\$399 apiece) for a maximum, but oddball, RAM configuration of 224K. While this is contiguous RAM, your data files for any application can't exceed 64K.

Unfortunately, while these differences

represent improvements over Tandy's older laptops, they're also disappointing. The LCD still isn't particularly readable, except under the best lighting conditions, even though the size and form of the characters are acceptable. Tandy uses the 80C88 that could run MS-DOS software but doesn't, and Tandy doesn't guarantee that the microfloppy disk drive will read other MS-DOS 3½-inch disks.

Software

However, the 600 does offer a powerful package of applications comprising Tandy's best bundled-software offering to date. It is grouped around an operating system manager called Microsoft Works, which runs the software and coordinates disk input/output with the internal microfloppy drive. (Microsoft Works was originally developed for the Zenith ZP-150 laptop.)

Like Tandy's other laptops, the 600 has a text/word processor, a schedule/calendar program, a data base manager, a telecommunications module, and a spreadsheet (Multiplan in a ROM cartridge). In a change from previous laptops, Tandy offers Basic as a \$129.95 optional plug-in ROM cartridge. While it's inconvenient to buy Basic, you can still have all the applications and Basic available by transferring Basic onto a disk.

The Good Word

Like other portable users, Tandy 600 owners will probably use their laptops primarily as word processing workstations away from the office. The 600's word processor is functionally similar to Microsoft Word and provides word processing features lacking in the Model 100 and Tandy 200 Text programs.

Beyond the standard abilities to insert, delete, save, and print text, Word offers an advanced search-and-replace capability and a full variety of printout options. You can specify margin settings, set tab positions, define paragraph formats, center, justify, indent, and set page breaks and page numbering.

While working in Word, you move the cursor using the arrow keys for single spaces, the shift/arrow combination to move the cursor from word to word, and the control/arrow combination to move the length or width of a document.

Options for manipulating the text in a Word file appear on the command line near the bottom of the display. By highlighting the command-line cursor on the command of interest or pressing the first letter of a Word command, you can copy, delete, edit, format, insert, jump, merge, print, replace text, search, and set cursor and screen options.

Beyond these options, you can view extended text selection commands by pressing the F1 function key. The other function keys activate extended select commands to control text block manipulations, such as block moves, block copies, and block deletes.

The Word module is the best of Tandy's laptop word processors. It formats text as you'll see it on paper and gives you much greater control over the final look of a document than its predecessors on the Models 100 and 200. Although it will take some time to get used to, Word very capably performs almost anything you want to do.



Photo 2. The Model 600's liquid crystal display.

Dated Material

Like the calendar module in Tandy's DeskMate program, the 600's calendar acts as a scheduler and appointment book with an alarm option to remind you of upcoming events.

You can set a reminder start and end time for an event on a specified date. Unlike DeskMate's reminder, you can set each event with a priority level from urgent to low priority, and you sort items by priority or by other criteria. In addition, if you activate the alarm function, you can have it remind you of upcoming items before the event takes place.

The Calendar command line lets you copy calendar information to another file or within Calendar, delete Calendar information, jump to a month calendar screen, and print information from a Calendar page. You can also transfer information from the calendar data base to Word and insert it into a document.

For those of you who use desktop items like this, Calendar will be of some value. Many portable users are on the road with their machines and would rather be reminded of appointments by their computer than rely on an old-fashioned appointment book.

Circular File

For maintaining a Telcom phone book file, or storing names and addresses (or even favorite recipes), the 600's File program is certainly adequate. Yet, because it manages information in a horizontal format, it is difficult to use for anything other than lists.

You use the arrow keys to move from field to field and enter information in the fields you set up. The only time you press the enter key is to exit the edit mode of the program and return to the command mode.

As in the other applications, File has copy, delete, and edit options, and print commands, but has additional commands to find, insert, jump, lookup, and move data unique to this module.

The Find command lets you search your file for matches of up to two criteria.

Insert takes information previously copied into the scrap buffer and puts it into another place in your data base. Jump moves the cursor to the specific row and column you identify. Lookup takes information from a specific column in one data base file and puts it in a column of the same name in the file you're currently using. The Move command will take a block of information from one point in the data base and move it to another location within the same file.

File was initially described as a PFS:File work-alike, but I found it much less versatile than any desktop data base manager. Nonetheless, as a program used to store large amounts of information in a list type format, File is certainly useful. Prospective purchasers should be aware that File is the weakest module amongst the programs.

In Contact

The Telcom module is far and away the most comprehensive of the 600's built-in programs. You can set up files for automatic log-ons and prompt responses, and you can set it to activate at a specified time, call a remote computer, perform necessary tasks, and log-off. You can create a phone book of frequently called numbers with communications parameters set automatically when you auto-dial the remote computer. In fact, the only thing wrong with Telcom is that the chapter in the user's manual doesn't contain enough information about it.

You can configure Telcom to automatically answer incoming calls as well as automatically dial out for remote computing. It supports both XON/XOFF and XMODEM file transfer protocols and can separate files too large for its download buffer into smaller files. Unfortunately, the documentation barely scratches the surface in telling you about Telcom's full abilities.

In addition to telephone communications, you can transfer files with Telcom to a desktop unit using a direct connection through the machine's RS-232C

port and a null modem. Transfer rates are the same as on the 100 and 200, ranging from 110 baud to 19,200 baud.

Money Minder

Plan is the on-board name for this version of Microsoft Multiplan and it is functionally the same as the desktop version. If you aren't familiar with spreadsheets you'll find the simple tutorial in the user's manual easy to follow and will soon be building a variety of templates.

With a focus on the nontechnical user, Tandy's choice to stick with Multiplan makes the machine less intimidating and lets Tandy 200 owners upgrade to a more powerful machine without having to learn a new spreadsheet. You can interchange Multiplan files with Word, Calendar, and File files.

The User's Manual

The Tandy 600's user's manual's most glaring flaw is a dearth of application examples. That's OK for straightforward modules like Word and Calendar, but File, Multiplan, and especially Telcom need more examples.

The manual's layout is easy to follow and the appendixes at the back answer questions about formatting disks and transferring files from one application to another. But this is one machine where you need to read the manual. If you start in on the machine without doing so, you'll become hopelessly lost and frustrated.

Conclusion

Tandy believes there is a definite need for a low-priced laptop computer with an 80-column display and disk storage. The market for portables centers on business applications. Word processing, number crunching, data management, and an ability to send and receive information over the telephone are crucial for the success of a portable computer. The Tandy 600 provides all these features in a manageable package at an affordable price.

But I can't wholeheartedly recommend this machine. Once again, Tandy has opted for a proprietary operating system. They've provided a machine with a base configuration of a meager 32K of memory when even 128K is considered skimpy. And the 600 uses an LCD that could well be obsolete a year from now.

The 600's strengths are its powerful software applications, which are head and shoulders above anything previously offered by Tandy. However, the machine can't be considered anything more than an intermediary step between the needs of current portable owners and the MS-DOS-compatible technology which will be available next year for the same price. ■

Big-League Assembly-Language Programming

by Hardin Brothers

★★★★★

MRAS runs on the Models I, III (48K) and 4 (64) and requires two disk drives. Misosys Inc., P.O. Box 239, Sterling, VA 22170, 703-450-4181. \$74.95.

Easy to use: ★★★★★☆

Good docs: ★★★★★☆

Bug free: ★★★★★★

Does the job: ★★★★★★

Misosys's EDAS has been one of the best TRS-80-compatible assemblers available for the last several years. MRAS, Misosys's new assembler, is significantly more powerful, but significantly more complex, too. It's best suited to writing and maintaining complex Assembly-language programs rather than small utilities or modules you add to Basic programs.

If you use one of the older TRS-80 editor/assemblers, you may find it tough to adjust to MRAS at first. It isn't just a single program but a combination of seven separate tools, each used for a specific function.

To use MRAS, you write the source code for several program modules using its text editor, assemble each to a separate relocatable file, combine those relocatable files into a library with the MRAS librarian, and finally link the modules together to produce an executable program. If you are writing a small program, you can take shortcuts through several of the steps and produce a direct assembly of a /CMD program. But MRAS's real power is most apparent when you start to work on a major project. You can also automate many of the development steps with customized job control language (JCL) files.

The Editor

You don't need to use MRAS's editor to write your source code. You can use any text editor or word processor, as long as it saves text in ASCII format and terminates a file properly (you can get around this last restriction, too).

However, MRAS's Said text editor is flexible enough that it may become your favorite. Said's command structure is straightforward and easy to learn. If you're used to another editor, you can change the Said commands to fit whatever editing style you prefer.

Said is a full-screen editor that operates in four modes: insert and type-over (like most word processors), line insert for large chunks of new text, hexadecimal

mode for any of the possible 256-character values, and quote mode to disable the cursor-movement keys and enter their character values when you press an arrow key. You can easily shift among modes at any time.

Like many text editors, you can use Said to delete single characters, words, lines, blocks of text, everything from the cursor to either the beginning or the end of the file, or all the text in memory. Said also has an undelete function that recalls and replaces text erased from the last delete command.

Said has a macro-key facility that can store up to 64 keystrokes and then repeat them a specific number of times. The macro command is useful if you find yourself having to type in the same sequence of keystrokes, since Said learns the sequence while you use them.

You can mark up to 10 blocks of text with Said and then move or copy them to other parts of your source code, save them as separate files, or print them separately from the rest of the source code. Said can also perform normal search-and-replace functions and can merge files from disk into the file on which you're working.

If you use a Model 4 with more than 64K of memory, Said can store blocks or separate files in the additional banks of memory. You can then switch between one bank and another or copy blocks of text between files stored in separate banks.

Said has a built-in decimal, binary, and hex calculator. It can issue DOS commands and automatically change entire words to upper- or lowercase. It also has a help menu you can display constantly or call up when you need it. But the help screen is only valid if you use the default Said commands rather than configuring the editor with your own set of commands.

While Said can't handle the line-numbered source code that some editor/assemblers produce, it includes a special program (FIXUP) that converts the source code of almost any editor/assembler into the Said format and also translates Said files to most editor/assembler formats.

The Assembler

The heart of the MRAS development package is the stand-alone assembler. It is upwardly compatible with version 4 of EDAS and can properly assemble any source file created with it.

While you can use MRAS to create /CMD files like most other assemblers, you can also create relocatable files. You can't run a /REL file because it's partially assembled, but you can link one together with other /REL files and then assemble the whole into a /CMD program.

The advantage of using relocatable

More powerful, but more complex than EDAS.

files is that you can create a number of modules to perform specific functions, which you can later link into any program you write. Since these modules are already assembled, you don't have to reassemble them each time you want to make a change in your program or correct a bug. Once you get used to the system of creating and testing modules separately, the process of writing Assembly-language programs becomes faster and easier. And you won't have to wait while the assembler recompiles a large program after you change a single line.

Although MRAS is compatible with EDAS and PRO-CREATE, it has many new features. You can force the assembler to scan the macro table before the opcode table if you want. Using this option, you can change the effects of the standard Z80 opcodes and could, conceivably, use MRAS as a cross-assembler for a different computer.

MRAS has several new expression operators useful in complex macro instructions, including those to obtain the low or high byte of a word value and others to test whether one value is less than, greater than, less than or equal to, or greater than or equal to another value.

The assembler supports a number of new pseudo-ops, including ones to assemble the system date or time as a byte string, to assemble a value as a four-digit hex string, to define a module's /REL file name, to select one of four segment program counters, and to declare symbols as global or external. Ten new conditional pseudo-ops and a half-dozen new miscellaneous pseudo-ops let you select assembler switches from within a source code module and write macro instructions that can handle any number of arguments.

You can also reset the default radix for numerical expressions at any point in a source code file. And /REL files can pass requests to the linker to search specific library files.

The Librarian

The most efficient way to work with MRAS is to create many small /REL files and link them together to make your final program. However, the number of /REL files on your disks may soon become unmanageable. That's when you need a library manager.

The library manager's purpose is to collect individual /REL files into single-file libraries of related modules. MLIB,

the librarian included with MRAS, starts by reading a library of /REL files into memory. You can then delete or add new files to the library, extract files for export to other libraries, and view a map of files already in the library along with their entry points and external symbols.

When you finish working with a library, MLIB can write it back to disk as either a /REL library or an /IRL library. The /REL library is compatible with Microsoft's M80 assembler and L80 linker, which are part of Radio Shack's Fortran packages. The /IRL library is more convenient and allows easier linkage of individual modules into a final program.

The Linker

After you create a number of /REL files, you use the linker program (MLINK) to pull them together into a single, executable program. MLINK is a command-driven program similar to the L80 linker. It accepts the same commands, but it also has several new capabilities. You can specify the load addresses for the code, data, and common segments of your program; specify the order in which to save the segments in the /CMD file; choose whether you want to add a comment or copyright notice to the beginning of the /CMD file and whether you want to have a five-character header at the beginning of the program; decide whether you want memory space allocated with the DS (define space) pseudo-op saved as bytes of zero hex on the disk; and specify whether you want MLINK to abort to DOS if it encounters an error during processing.

Like MLIB and MRAS, you can use MLINK either in an interactive mode or run by a job control language file. However, unless you are used to the L80 linker or a similar program, you may find the MLINK program the least friendly part of the MRAS package. It prints error messages and gives you information about the program it is building but never prompts for commands. This isn't a criticism but rather a warning that MLINK operates much the way other linkers do. You will have to study the manual carefully as you create your first programs with MLINK.

If you write a large program, MLINK may run out of memory while reading your /REL files and creating a /CMD program. If so, it will open a disk file and shift into a virtual memory mode to complete the linking process. Its virtual memory organization guarantees that MLINK can create any program that will fit in your computer; you won't have to worry about whether it will run out of room.

Overlays

Large programs or ones that must op-

erate in limited sections of memory often get around space problems by using a system of overlays to load parts of the program into the computer as needed. The concept behind the use of overlays is fairly simple, but their actual execution can require hours of careful programming.

MRAS provides a powerful facility, through its linker and a special /REL file, that makes programming with overlays simple. You can have your program make calls to the MRAS overlay handler with the Z80's registers properly set and then issue special instructions to MLINK at link time. MRAS does the rest for you. The overlay system can handle up to 35 overlay subprograms—enough for almost any application program.

Cross-Reference

The final program in the MRAS package is a cross-reference utility identical to the XREF program included with EDAS and PRO-CREATE. You can use it to generate a list of all symbols any program module uses or to create an assembler source file of EQU commands for use in another program's source code file.

XREF is simple to operate, although you must remember to instruct MRAS to create a special file for XREF to use.

Conclusion

The MRAS manual is a terse but adequate 100 pages, with only six pages devoted to an advanced tutorial. The rest is a reference to each of the MRAS tools.

The documentation does assume that you're an experienced Assembly-language programmer. If you haven't had much experience with relocating assemblers, you may have to reread some sections several times to understand them.

I did find the manual too brief in several places. A few more sentences on the differences between /REL and /IRL libraries and a clearer explanation of how to use segments would have eliminated confusion. However, the documentation is quite similar to the EDAS manual and it seems both accurate and complete.

The Model 4 version of MRAS runs under any version of TRSDOS 6.X. The Model I/III version runs under LDOS 5.X, DOSPLUS 3.5, TRSDOS 1.3, and TRSDOS 2.3. The documentation does note that while operation on a Model I or III under a DOS other than LDOS is possible, it may require some patches.

While MRAS may be complex, it is also the most powerful assembler available for the TRS-80 computers. Applications developed with it will be able to take full advantage of the computer's potential. If you are serious about Assembly-language programming, MRAS is both a powerful development tool and an excellent value. ■

KAMAS: CP/M's ThinkTank

by John B. Harrell III

★★★★☆

KAMAS (version 1.2) runs on the Model 4 (64K) and requires Montezuma Micro CP/M 2.2 and two disk drives. KAMASOFT Inc., P.O. Box 5549, Aloha, OR 97007, 503-649-3765. \$149.

Easy to use: ★★★★★

Good docs: ★★★★★

Bug free: ★★★★★

Does the job: ★★★★★

Outline processors, like MS-DOS's ThinkTank or Framework, haven't been available for 8-bit computers because of so-called limitations in memory and speed. However, KAMAS (Knowledge and Mind Amplification System) brings much of ThinkTank's power and versatility to your Model 4.

KAMAS is a first-rate outline processor. You generate outlines, each element of which is called a leaf, and whole ideas become branches of a tree-structured topic. Each leaf contains enough text to convey a complete thought. You can also use KAMAS as a flexible data storage and retrieval system and a limited data base manager.

KAMAS is actually a complete programming language, and it was used to develop the program. The best thing about KA-

The Star Ratings

80 Micro's star ratings reflect our reviewer's impression of a product.

In most cases, the overall rating is an average of the ratings in each of the four specific categories. However, some overall ratings may be higher or lower than this average, depending on the reviewer's subjective opinion.

The stars mean:

- ★★★★★ Superior;
- ★★★★★ Excellent;
- ★★★ Good;
- ★★ Fair;
- ★ Poor.

The ratings terms translate as follows:

Easy to use: How easy is it for the new user to use the hardware/software/book?

Good docs: Is the documentation clear and helpful in explaining the product's use and anticipating user problems?

Bug free: Did the reviewer encounter any bugs while using the product?

Does the job: How well does the product do what it was designed for?

MAS is its extensibility: If you don't like the way it does something, you can write your own approach to the problem.

Features

You receive the software disk and four documentation manuals with over 500 pages of text and a reference card. The documentation is organized into three volumes with a fourth supplement containing installation instructions and a Getting Started chapter. If your only goal is to write and edit outlines, you can start work in just a few minutes.

KAMAS isn't copy protected and after you make back-up copies, you first install the system. Your version should come preconfigured for your type of CP/M if you specified system information when you ordered it.

However, you can also elect to perform a detailed configuration of your system. You must specify each facet of how your CP/M installation handles the video display. You have to specify the disk drive search order, which tells KAMAS how to search for files. You can also select editor commands similar to either WordStar or Perfect Writer. I used the WordStar variation and had no difficulty.

The latter part of the installation manual is the Getting Started section, which walks you through the development of a rudimentary outline.

Developing Ideas

Each project begins with the selection of a topic, which is also the name of the CP/M file that will contain your information. KAMAS maintains the elements of a topic in a tree structure and each of these elements relates to a level.

All levels (except for the top) have a parent item that precedes it in the structure. Each parent item has subdivisions called children. An item preceding a level is that level's ancestors and each child of a parent item is its descendants.

Each item in the topic is a stem, with a stem and its descendants called a branch (see the Figure). Stems can have a title and a text section called the leaf, and the title may be subdivided into a key and a subtitle. The text part of any leaf may contain up to 2,420 characters (about 30 full lines of text).

After deciding what your outline name will be, you prepare a topic to contain the outline. KAMAS will then create and initialize the CP/M file containing the topic.

With the topic created, you can begin to add ideas to it from either the command level or the full-screen editor. I found the full-screen editor the better technique. It lets you visualize one full screen of structure while you develop your ideas. If you are a haphazard

thinker like me, it's easier to quickly jump from one stem to another instead of typing in the key name.

Editing the outline structure is easy in either mode. The normal command level (called Rove) provides the same functions as the outline editor but operates remotely. Because it doesn't use your working storage to hold the titles, it can edit much larger outlines.

After defining a stem in the structure, you can easily move into the leaf editor. This is another full-screen editor for entry of the leaf text. Your installation choice determines whether this editor mimics Perfect Writer or WordStar commands. However, this set of editor commands isn't the same as those used earlier: a glaring inconsistency.

After completing the outline, you can format it with various commands and print it to a printer or disk file. You have several global formatting options available and controls you can put on each stem.

KAMAS will win no prizes for sophisticated printer control. It assumes that it only communicates with the CP/M LST device. KAMAS will produce an output file compatible with WordStar that you can easily modify into a polished document.

You can also use a menu mode for working on your outline. You use these menus to move up or down in your outline structure for editing or querying the data base. You may also invoke a Job

Execute (JEX) command on any stem containing a program from the menu.

Inside KAMAS

Outline processing only touches the surface of the KAMAS system. The outline processor is built around a threaded, interpretive language, specifically designed to support the outline processor.

You start each session in the lowest operating level. First-time users are shielded by an automatic job execution procedure (AUTOJEX) which initializes the system and puts it in the KAMAS topic environment mode (Rove). This is where you spend most of your time initially.

Entering the Expanded Topic Environment (TOPICVOC) from Rove takes you to the first level of the programming environment. TOPICVOC contains the commands to manipulate the outline structures. This is similar to Basic, with a calculator mode and a programming mode. Unlike working in Basic, you must enter all expressions in reverse Polish or postfix notation. For example, the expression to add A to B and multiply the result by C would be written in postfix as: A B + C *.

The next level is the Language Environment (LANGVOC), which contains the commands and operators that let you perform the manipulations.

The last level is the System Environment (SYSVOC), containing the lowest

TOPIC—(a data base of text)

Topics contain structured text organized into hierarchies. There can be any number of levels within a topic or any number of items on a level. Topic files can range in size from 8K to 8 megabytes. On a disk with about 200K, you can have a topic with a maximum of about 1500 items if you do not have any leafs (which would be unusual). You can access 16 of these topics at the same time.

BRANCH (a part of a topic): Each branch within a topic is made up of an item with all of its descendants.

STEM (a single item in a topic): A stem is the basic unit within a topic.

TITLE (a part of a stem): A title can consist of up to 94 characters.

KEY—the required part of a title: A key is part of a title up to 31 characters long. Every key in a topic must be unique.

SUBTITLE—an optional part of a title: A subtitle is the secondary part of a title up to 63 characters long.

LEAF—an optional part of a stem: Each leaf can be up to 2420 characters long.

In this example, each line beginning with the capitalized word is a title and the capitalized word is the stem key. The paragraph under these titles is the leaf text.

Figure. Example of a KAMAS outline structure.

Continued on p. 114

“I am amazed at the broad spectrum of technical articles you publish, for both novice and advanced programmers . . .”



If you're still wondering which magazine you should buy for your TRS-80*, here's what **80 Micro** readers have to say about their #1 system-specific information source—

●“Not only is the magazine very professionally done, but I have found something in almost every issue that has been worth the price of the subscription . . .”

*Roger L. Holstege
Millersville, MD*

●“I was greatly impressed by your magazine. I got more useful information from that one issue of **80** than I have from countless other sources . . .”

*John M. Crittenden
Jackson, MS*

●“I have found **80 Micro** to be the most valuable magazine pertaining to home computers on the market . . .”

*William C. Hardin, Jr.
Charlotte, NC*

80 Micro is the magazine for every TRS-80 user—from beginner to advanced. **80 Micro** is full of tutorials, free programs, hardware modifications, new product announcements, product reviews, debugging tips, and more.

And an **80 Micro** subscription is risk-free. *If you're not completely satisfied, you'll be reimbursed for all undelivered issues.* See what **80 Micro** can do for you. It's #1 for a lot of people. Fill out this order form and send it in now.

*TRS-80 is a trademark of Radio Shack, a division of Tandy Corp.

Yes! I want a no-risk subscription to the magazine for beginner to advanced TRS-80 users. Send me 12 issues of **80 MICRO** for \$24.97! I'll save 48% off the newsstand price!

Payment Enclosed

Bill me

Name _____

Address _____

City _____ State _____ Zip _____

Canada & Mexico, \$27.97. Foreign surface, \$44.97. 1 year only,
US funds drawn on US bank. Please allow 6-8 weeks for delivery.

80micro • PO Box 981 • Famingdale, NY 11737
363B8

DiskCount Data

WHERE
QUALITY PROGRAMS
MEET COMPETITIVE PRICES

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

•FREE• FREE SPECIALS •FREE•

Order over \$100.00 and select one of the following ABSOLUTELY FREE. Order over \$200.00 and you may select any two items: Meltdown Disk • Superkeys Disk, Mod III • The Green Window CRT Screen • Varkeep & Screenpacker Plus Disk • Master Directory Disk, Mod III • Agri-Calc Feeder Pig Module •

IF YOU BOUGHT YOUR SOFTWARE ELSEWHERE, YOU'RE PROBABLY STILL WAITING.

Join the list of thousands of our satisfied customers who know that we ship 95% of our orders within 48 hours. If we are out of a product, we'll let you know when we can ship it and won't keep you waiting. Our great prices complement our outstanding service.

ELECTRIC WEBSTER

WITH CORRECTING FEATURE

LIST 149.95 SALE 129.95

HYPHENATION OPTION 38.95

GRAMMAR & STYLE 38.95

TRS-80 I/III/4 SPECIFY

AND FOR MSDOS

the incredible

WEBSTER'S NEW WORLD

SPELLING CHECKER

ONLY \$59.95

Works with any ASCII type word processing file and incorporates full correcting features.

APPLICATIONS

- Macro Typing Tutor I/III/4 39.95
- ST-80 III 69.95
- Masterdirectory Mod III 29.95
- Superdirectory Mod I/III 44.95
- Datagraph I/III/4/Max 69.50
- Datagraph Pie Chart Option 29.95
- The Basic Checkbook I/III 64.95
- Mterm I/III/4 59.50
- Loan Amortization III 29.95
- PowerMail Plus I/III/4 94.95
- Text-Merge for PowerMail 49.95
- PowerMail w/Text-Merge 124.95
- Inventory Control/ICS Pro 148.00
- Ultratrem I/III 44.95
- Ultratrem 2.0 w/auto-logon 59.95
- Modem-80 I/III 39.95
- Modem-80 4/4P 79.95
- SPS Statistical Analysis Mod I 150.00
- SPS as above for Mod III inquire

WINDOWS ON MOD 4

NOW PRO-NTD FROM MISOSYS ALLOWS MODEL 4 USERS TO CREATE AND USE WINDOW OVERLAYS ON THE MOD 4 SCREEN AT THE TOUCH OF A SINGLE KEY. COMES COMPLETE WITH THE WINDOWING UTILITY, ROTATING INDEX FILE, ADDRESS FILE, APPOINTMENT SCHEDULER, CALENDAR, 2 CALCULATORS, CARD FILER, NOTEPAD, PHONE LIST & AUTO DIALER, AND A MINI TERMINAL. A TRULY INCREDIBLE SOFTWARE SET FOR ONLY 54.95

Requires 128K MOD 4 & TRSDOS 6.2

SCHOOL UTILITY AND EDUCATIONAL

- Test Question Data Bank 49.95
- Test Generator/Drill 34.95
- Football Scouting 49.95
- Basketball Statistics 39.95
- Baseball Statistics 39.95
- Computer SAT III-1000-1200 79.95

HI RESOLUTION GRAPHICS

THE GRAPHICS SOLUTION by Micro Labs \$189.95
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 dip-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 detail. Specify Mod III, Mod 4, 4P or 4D when ordering.
WAS \$299.95 REDUCED TO \$199.95 SALE \$189.95

HI-RES SOFTWARE

- 3D PLOT 39.95
- MATHPLOT 39.95
- BASIC 39.95
- SLIDESHOW 19.95
- PCHAR 14.95
- DRAW 39.95
- BIZGRAPH was 98.00 now 75.00
- LET'S WRITE MUSIC 49.95
- XTCAD was 449.95 now 345.00
- SURFACE PLOT 39.95
- G BASIC 3.0 FOR R/S BOARD 49.95
- TOURNAMENT CHESS 49.95
- TOURNAMENT REVERSI now 29.95
- 3-D TIC TAC TOE now 19.95

BOOKS, WALL CHARTS & MISC

- Using SuperUtility (new issue) 17.95
- Super Utility Tech Manual 3.x 13.95
- TRS-80/Z-80 Assembly Library 31.95
- TRS-80 Disk & Other Mysteries 19.95
- The Custom TRS-80 & Other Myst 26.95
- Microsoft Basic Decoded 26.95
- Machine Language Disk I/O 26.95
- Basic Disk I/O & Other Myst 26.95
- How To Do It On The TRS-80 26.95
- TRSDOS 2.3 Decoded & Other Mys 26.95
- Basic Faster & Better 26.95
- Advanced Basic Faster & Better PC, 1000, 1200 19.95
- Green Screens I/III/4/4P 16.95
- Diskettes SSD 10 in Plastic Bx 15.00
- Colored Sentinel Disks 17.00
- Profile 3+ Commands Wall Chart* 4.00
- Visicalc Commands Wall Chart* 4.00
- Superscript Wall Chart* 4.00
- Model III Basic Wall Chart* 4.00
- Model 4 Basic Wall Chart* 4.00
- Mod 4 by Jack (user guide) 9.95

*Charts not shipped as separate order

THE FBN GENERAL LEDGER

Absolutely the finest G/L on the market MOD III.
RETAIL \$300.00 NOW 149.95

DATA BASES AND INFORMATION MANAGERS

AUTO FILE MANAGER

The newest entry in full fledged data bases is Powersoft's Auto File Manager (AFM). It incorporates total screen flexibility, form letter output, fully relational look up and custom report generation with mathematical functions. This remarkable new product from the SuperUtility boys is priced at a low \$99.95. Model I/III 4/4P(III Mode).

INFOSCAN

If you need a super fast screen oriented information manager with fixed windows and 1 second lookup by keyword, then this little jewel is for you. Infoscan files can have different information in each record and each record can have it's own form. Very simple to use. Mod I/III or 4/4P(III Mode) \$44.95.

WORD PROCESSORS & PRINTER DRIVERS

- Elastic Pencil I/III 74.99
- Lazy Font I/III/4 44.95
- M-Script I/III/4 53.50
- LeScript I/III/4/Max 104.95
- LeScript MSDOS-1000-1200 179.95
- PowerDriver-E Epson I/III/4 29.95
- PowerDriver-P Prowriter I/III/4 29.95
- PowerDriver-S Starwriter I/III/4 29.95
- PowerDriver-O Okidata 92 I/III/4 29.95
- PowerDriver-FX (FX/RX) I/III/4 29.95
- Epson Driver Compiler 29.95
- PowerScript for Scripsit I/III/4 34.95

NOTE: If your printer driver is not listed, call, we have more.

MSDOS SOFTWARE

RAMDISK for your PC or MSDOS compatible. Now you can define a virtual disk drive all in memory and you can make it any size you want. A terrific software package at only \$29.95.

Call us for all of your MSDOS software needs. IBM-PC, TANDY 1200/1000, Leading Edge PC, etc. We have thousands of programs available at great prices.

THE HOME ACCOUNTANT ONLY 54.95

By Continental Software
An Outstanding Financial Planner

• Maintains up to 100 budget categories • Keeps track of up to 5 checkbooks • Prints checks, if desired • Prints a personal balance statement, income and expense summary • Prints net worth statement • Provides fast bank reconciliation • Allows the extensions on multiple diskettes • One program handles cash, checkbooks, credit cards and other liabilities and expenses • Unlimited annual transactions, fiscal or calendar year • Transactions may be "split" among different budget categories • Flags transactions for tax purposes • Maintains transaction history • Provides Hi-Res graphics for any category by bar graph.
The program itself does just about everything you'd ask of a "personal finance package" — Popular Computing, November, 1982
MOD III

UTILITIES

- J&M Memory Minder I 84.95
- J&M Memory Minder III/4 74.95
- The Toolbox for LDOS 44.95
- LC Compiler/EDAS I/III or 4 124.95
- ALCOR C Complete System 83.95
- ALCOR Multi-Basic Compiler 83.95
- AOS Superkeys Key Macros Mod III 35.00
- 6.2 Plus. (Enhance TRSDOS 6.2) 36.95
- The Toolbelt Mod 4 44.95
- AOS Utils +1 Varkeep/Scrnprk 49.95
- Impakt for Basic I/III 34.95
- Pro-Cess Mod 4 24.95
- Pro-Create Mod 4 74.95
- Pro-Cure Mod 4 39.95
- Pro-Duce Mod 4 24.95
- Pro-Pads Mod 4 39.95
- Pro-LC Mod 4 124.95
- Pro-Zcat Mod 4 24.95
- Zues Editor/Assembler I/III/4 74.95
- System Diagnostic I/III/4 89.99
- Trashman 32.50
- Faster 22.95
- RPM 21.50
- DSMBLR III I/III 24.95
- Accel 3/4 Basic Compiler I/III 44.95
- Monitor 5 I/III/4 22.95
- Hyperzap Disk Utility I/III/4 49.95
- Z-Basic Compiler 3.0 79.50

GRAPHICS AND GAMES

- Powerdraw I/III 24.95
- Graphit (Line Graphing) 34.95
- AOS Utils. Screenpacker Plus 49.95
- PowerDot II I/III Spec. Printer 34.95
- Meltdown (Nuclear Powerplant) 19.95
- Gamepak-3 (Funface, Match, etc.) 29.95

T/MAKER

A complete word processor, spelling checker, data base manager and spreadsheet with graphics. Fully integrated Mod 4/4P only.

Retail \$299.00

HOLIDAY SPECIAL . . . ONLY \$189.95

SUPERDOS

Over 15 enhancements to TRSDOS 1.3 29.95

FAST/CM/DM

Run TRSDOS 1.3 at the high speed in Mod 4/4P 29.95

OPERATING SYSTEMS

- CP/M 2.2 Montezuma Mod 4 159.95
- R-Shack HD Driver for CP/M 2.2 30.00
- Monte's Window 49.00
- Monte's Toolkit 49.00
- Dosplus 4A With M-ZAL 114.95
- Dosplus 3.5 I/III 54.95
- Multidos 1.71 I/III 79.00
- Multidos 80/64 89.95

MOD 4 BY JACK

A complete re-write of the Mod 4 manual in English! Only \$9.95

SUPER UTILITY PLUS

By POWERSOFT

SALE

VOTED AS THE OUTSTANDING UTILITY BY 80-MICRO READERS

PROTECTED MEDIA

BUY SUPERUTILITY PLUS

3.2 FOR MOD I/III OR 4/4P FOR MOD I/III/4 AT \$74.99 AND RECEIVE THE NEW BOOK USING SUPERUTILITY PLUS FREE
A \$100.00 VALUE FOR ONLY \$74.99
SUPERUTILITY/PC NOW \$84.95

BBS-80 ONLY 74.95

A COMPLETE SYSTEM AT A FRACTION OF THE COST OF SIMILAR SYSTEMS. MOD I OR III SPECIFY

TRSDOS-MSDOS-CPM

HUGE SALE ON CONVERSION UTILITIES

- CONVERT BASIC 29.95
- SUPERCROSS/XT 90.00
- SUPERCROSS/XT W/CONVBASIC 99.95
- HYPERCROSS/XT 2.0 90.00
- HYPERCROSS/XT 1.8 79.95

THESE UTILITIES ARE A MUST FOR CONVERTING TRSDOS TYPE PROGRAMS TO YOUR MSDOS OR CPM COMPUTER. ALL MENU DRIVEN. THEY DO THE COMPLETE CONVERSION ON YOUR TRS-80. MOD 1 NEEDS DOUBLE DENSITY.

Specify MOD 1DD, MOD III, MOD 4

DiskCount Data

214-680-8268

Monday - Friday 10:00 to 8:00 CST
Saturday 10:00 to 5:00 • Closed Wednesdays

Send Cash, Check or Money Order. Please add \$3.00 for UPS Shipping or \$4.00 for US Postage & Insurance. COD's send an additional \$3.00 COD fee. All COD's will require cash or certified upon delivery. Foreign orders are welcome. All shipping charges assumed by purchaser. When ordering by mail, please specify computer model number.

Phone Your Order In Today Or Mail To:

DISKCOUNT DATA, 2701-C WEST 15th, SUITE 612, PLANO, TX 75075



Cheerfully Accepted

To Each His Own



by **Hardin Brothers**

***An all-purpose,
customizable
data base
management system.***

A data base manager should be a very personal thing. Like shoes that mold to your feet, it should be able to change its shape to suit individual needs and idiosyncracies. The Basic Data Base System (Program Listings 1-7) is a general-purpose program in a structured, modular form that makes it easier to modify. If you're not a programmer, BDBS is ready to run as is.

BDBS lacks the speed and special features of commercial programs, but it has all the standard functions you'd expect in a data base manager. The program handles up to 500 records (more, with a few modifications), each with a maximum of 40 fields. You can design custom input screens and report forms, search through the data base for specific information, select a subset of the data base for special reports, and sort records quickly. You also get the ability to develop fancy sorts and indexes.

I'll first explain how to use the BDBS. Later on, I'll explain some of the more unusual programming techniques I used and make some suggestions about modifying the program.

First Things First

Before you can store information in any

data base, you need a clear idea of what you're going to store and how you want your information to look. Let's assume that you want to keep track of the price of ice cream at several local stores and the best flavor available at each store. Each record in your data base will contain a store name, the price for a carton of ice cream, the date when you last shopped at that store, your nomination for the best flavor the store sells, and some general comments about the store. You might eventually want to know who sells the best pistachio ice cream, perhaps, or the average price of a carton of ice cream. You can answer both questions easily with BDBS.

To run the data base manager, get into Basic and run Listing 1, Main/BAS. You'll see the main menu, which lists nine choices (see the Figure). Because you're starting a new data base, pick option 1. Definitions. After a short pause while Basic loads in the Definitions subprogram, BDBS asks for the name of your new data base. You can enter any name of eight letters or less. Icecream seems like a logical choice. The program also asks what disk drive you want to store Icecream on; if you have a two-drive system, you should probably put the data base on

Photograph by Edward Justice

a newly formatted disk in drive 1.

Next you'll see a menu with the options of defining a data base, defining an input screen, and defining a report form. Until the data base is defined, nothing else makes much sense, so press the 1 key to begin.

To define a data base, you'll need to know how many fields you want in each record, and what type of information will be stored in each field. BDBS accepts three types of fields: numeric fields (the price of the ice cream), date fields (when you last shopped at a store), and alphanumeric character fields (everything else). BDBS requires 4 bytes of disk space to store a numeric field and 3 bytes for a data field. You can set the length of a character field as you see fit. The total number of bytes required by all the fields in a record must not exceed 256, a limitation that is set by the way TRSDOS and Basic handle data files.

BDBS asks for the number of fields in your data base (five in our example) along with a type designation and length for each. For example, the first field in our ice cream data base will hold the store name, so it will be an alphanumeric field with, say, a length of 30 characters. The second field will be the price of a carton of ice cream, so we'll designate it as a numeric field and BDBS will automatically assign it a length of 4.

After you define the fields, BDBS displays a chart showing what you've designated. If you're satisfied with the results, you'll probably want to dump the chart to your printer (press control-*) . If you want to change something, BDBS will take you through the definition process again.

Designing an Input Screen

Once you define a data base, you need to create an input screen. The process will be much easier if you first use a piece of graph paper to plan the layout of your screen. BDBS itself uses the screen's top two and bottom two lines; the 20 lines in the middle are yours to define.

During the screen definition process, you must enter a prompt label for each field. For example, you might label the first field "Store:," the second "Price:," and so on. BDBS knows that you need eight spaces to enter a date (all dates must be in the standard mm/dd/yy format) and assumes that you will want the input area for a character field to be the same length as its disk space. However, it asks you to

specify how many characters can be entered in a numeric field. In our example, four or five should be enough, since it's difficult to imagine a price higher than \$99.99 (five characters, including the decimal point) for a carton of ice cream.

You have to tell BDBS where to put each prompt message and corresponding field input area on the screen. The program asks for each field's vertical and horizontal coordinates, and gives you the allowable range for each answer. Here's where preplanning pays off, because it's up to you to make sure that fields don't overlap and that they're spaced as you want them. After you define the input parameters for each field in the data base, BDBS shows you the input screen you've created and asks for your approval.

Now the program returns you to the definitions menu. You can define a report form if you wish, or leave that for later. The process is similar to defining an input screen. You specify a header for each page of the report and indicate which fields should appear where. You also can get a count of records by a nonnumeric field, or a total of the values contained in a numeric field. This way, you can find averages. For example, if you needed to know the average cost of a carton of ice cream, you could ask for a sum of the price field and a count of any other field. When the report is complete, you can divide the total cost by the count to get the average.

Each record in the report can take up as many lines on a printed page as you want, so you can either produce a columnar report or one that looks more like entries on individual filing cards. It's also easy to create mailing labels using BDBS.

To use the BDBS report form intelligently, you may have to review the Print Using symbols in your Basic manual, since you're really creating a Print Using format string for each field. For example, you might define the report form for the first two fields in our ice cream data base like this:

```
Store: \           \  
Cost per carton: $#.#
```

You can redefine the input screen and the report forms at any time, but not the fundamental data base definitions. Experiment with the input and report forms until you find ones that you like.

Setting Records

When you return to the main menu from the Definitions program module, you can begin to enter information into your data base. However, first you must choose option 2 on the main menu, which lets you open a data base for use. Then you can tell BDBS that you want to add new records to the data base.

**You can define
a data base,
an input screen,
or a report form.**



System Requirements

**Models 4 and 1000
Basic**

MAIN/BAS

Lines	Description
240-320	Top menu. Because the Chain Merge command destroys the subroutine stack, all routines end with GOTO 240. Do not change that line number!
500-520	Open a data base for work (Top menu choice 2). Reads /DEF file information for all other routines to use.
600-604	Close and release an active data base. Updates the /DEF file, closes all files, and leaves data base in the same state as during initialization.
700-706	Overlay handler. Loads in a program overlay unless it is already resident in memory.

Lines 1000-1118 are subroutines available to all program modules.

1000	Test whether a file exists on disk. Returns - 1 in TEST.FLAG if file exists, zero if it does not exist, 1 if illegal file name, or 2 if some other error occurred.
1012	Print "press any key" at bottom of screen, empty the type-ahead buffer, and wait for a keystroke.
1018	Prompt for a yes/no answer, and return uppercase "Y" or "N" only. Ignores all input except for "Y", "N", "y", and "n".
1024	Open and read the /INP file.
1030	Open and field the /DAT file. Uses the array F\$(x) as fielding variables. File buffer #2 is reserved for /DAT.
1040	Display a blank input form on the screen. Assumes that 1024 has already been called.
1046	Display an input form with information from the current record in the /DAT file buffer.
1054	Write the /DEF file to disk. Called at the end of each overlay that has the capability of changing the Key\$(x) strings.
1060	Calculate how many active records are currently in the data base.
1064	Formatted input for text strings. Swallows the carriage return at end of the input string. Guarantees that the input string will be no more than Q characters long.
1068	Same as 1064, but allows numeric input only.
1070	Actual formatted input subroutine.
1086	Handle screen input of a text string for field Loop.
1090	Handle screen input of a numeric value for field Loop.
1094	Handle input of a date string for field Loop. Checks the validity of the input to be sure it is in date-string form.
1102	Put field numbers, in inverse video, on an input-screen form. Assumes the input form is already on the screen.
1106	Read the next active physical record from /DAT into buffer #2. Assumes that there is a record to read.
1114	Read the next pointer from a /SEL or /IND file (through buffer #3) and use that to read a physical record from /DAT file into buffer #2. Assumes that there is a pointer and record to read.
1118	Strip trailing blanks from the string Q\$.

DEFINE/OVL

2000-2012	Get name and drive of file to define. Test to be sure the name is legitimate.
2016-2026	Main Definition menu.
2030-2060	Get definitions (number, type, and storage length) of data base fields. Verify with user that they are correct.
2062-2074	Get maximum number of records from user. Create Key\$(x) strings; create /DAT file on disk (if there is no room, now is the time to find out). Write /DEF file to disk.
2078-2114	Define the input screen. User must know where each field will be. Ask for input length of numeric fields; use /DEF file data for text strings and set date fields to 8-characters long. Save input screen to /INP file.
2118-2134	Begin defining report form. Get page length and page header from user.
2138-2152	Define look of each record in report form. User must know where each will be located, how many fields will appear on each line, etc.
2154-2160	Get number of records to print on each page of the report form. Verify that the number is possible.
2164-2186	Get fields to total or count and the printed label that will appear with each sum.
2190-2204	Create /RPT file to save the report form definitions.

ADD/OVL

2000-2020	Get data base records from user. Verify that each is okay before saving it in the data base and updating Key\$(x). Refuse input if data base is full.
-----------	---

READ/OVL

2002-2010	Main Read/Search/Modify menu. Asks whether to use all records or just those in the /SEL or /IND files.
2014-2032	Control routine if /SEL or /IND key file is being used to limit which records will be accessible.
2036-2048	Control routine if all physical records will be accessible.
2052-2060	Display one record and handle user instruction.
2066-2068	Erase the current record (remove from Key\$(x) string and blank screen).
2072-2076	Modify information in current record.
2080-2096	Jump to new record after verifying that the record exists and is accessible.
2100-2142	Search forward from current record to match a search string, value, or date.

SELECT/OVL

2000-2010	Main Selection menu. Allows creation of selection criteria, reading criteria from disk, and forming a new /SEL file of selection keys.
2014-2016	Read selection criteria from disk.
2020-2110	Define selection criteria. Prompt for a field number, then a comparison operator, then either a constant (string, date, or numeric depending on field that was chosen) or another field of the same type for comparison. Then prompt for a conjunction (And or Or) to next comparison. Verify correct entry with user.
2114-2144	Very short subroutines to make comparisons and conjunctions. Comparison results are stored in the Result(x) array; conjunction results are accumulated in the variable Select.
2148-2160	Set up to use /SEL or /IND keys, or all records, for new selection key file.
2164-2190	Create a new /SEL file by testing each record against the selection criteria. Store the physical record number of those that pass in the /SEL file along with a count.

INDEX/OVL

2000-2008	Main Index menu. Choose whether to index all records or those with keys in the /SEL file.
2012-2018	Set up to use /SEL file or all records.
2022-2032	Get field to sort on from user and determine which type of sort is needed.
2036-2052	Use Shell method to sort by a numeric field. Save keys to records in sorted order in /IND file.
2056-2078	Use Shell method to sort on a text or date field. Save keys to records in sorted order in /IND file.

REPORT/OVL

2000-2010	Main Report menu. Choose /SEL, /IND, or all records for report.
2014-2026	Set up to use appropriate group of records for report.
2030-2040	Read in the report form definitions from the /RPT file.
2044-2054	Get output destination (screen, disk file, or printer) and open that destination as a logical file on buffer #1.
2056-2082	Read each record and send to output destination. Include page header and pad spaces at the end of each page as appropriate.

Table 1. Line descriptions.

1. Definitions
2. Use Existing Data Base
3. Add Records to Data Base
4. Read/Search/Modify Records
5. Build Selection Key
6. Build Sort Index File
7. Print Reports
8. Release and Close Data Base
9. End Program

Figure. Main menu.

The process of entering information is quite simple. BDBS displays a blank input screen with a row of dots in the field where you are to type. If you are entering information in a numeric field, the program will accept only numbers, a decimal point, and a minus sign—any other key you press will be ignored. If you're entering a date, BDBS checks whether it's in the proper format before letting you continue to the next field. When you've finished typing in information in the last field on the input screen, BDBS asks first if you want to store that information, then asks if you want to add another record.

The Read/Search/Modify subprogram is a great deal more powerful than the Add subprogram described above. Its first menu gives you the options of working with a Selection file, an Index file, or all records in the data base. Until you have created a selection or index file, you will

have to make the third choice.

Next, you'll see the first record in your data base file. Your options are displayed at the bottom of the screen: move to the next record, erase the record displayed on the screen, jump to a particular record, search for specific information, or modify the contents of the displayed record. After you use each option a couple of times, its workings should be clear.

The search option, however, needs some explanation. It searches only for exact matches, and is case-sensitive. For example, if you ask it to search the ice cream flavor field for "Pistachio," it will not find an entry of "pistachio" or "Pistachio Nut." Also, it only searches forward from the present record (to allow searching for more than one record containing a specific key word). If you want to search through the entire data base, jump to record 1 and then begin your search.

Selections and Indexes

The Selection and Index subprograms are the two most powerful sections of BDBS. The indexing routine is easier to understand, so we'll start with it. In the parlance of data bases, a sort index is a list of records as they would be stored if they were in sorted order. It is highly inefficient to actually sort the records on disk; it is much faster to build an index to the records.

The Index program asks you to select one of the data base fields for sorting. It then reads through the records in the data base to find what each has stored in that

field. Finally, it sorts that information and stores the results in a special disk file.

You can then use the Index file in the Read/Search/Modify routine, in the Selection routine, and in the Report routine so that you can work with records in sorted order. For example, after entering information about the stores and their ice cream flavors, you could then sort your file by date, by store name, by ice cream flavor, or by cost and produce a report that displays records in that order.

The Selection routine is a little more complicated. It asks you to specify a set of criteria and selects the records that fit the criteria. Like the Index routine, it doesn't actually move any records around on disk or in memory; rather, it builds its own list of pointers to your information.

When you define the selection criteria, you're actually establishing a set of logical requirements that each record must pass in order to be included in the selection file. BDBS asks for a field to work with, then a logical operator, and finally either a constant or another field (in the same record) to test against the first field. You can link up to six comparisons together with the logical conjunctions And and Or. (And means that a record has to pass both comparisons to be included; Or means that it only has to pass one or the other.)

BDBS evaluates the entire expression of comparisons and conjunctions from left to right. It doesn't allow parentheses, so you might have to experiment a bit to define a complex set of criteria correctly. You can

save your criteria in a disk file for later use.

You can test records from the entire data base, the most recent selection file, or the sort index. By combining several steps through sorting and indexing, you can develop some very sophisticated selection processes.

Printing Reports

The report generator uses the report definition that you developed earlier (see above). Records can come from a selection file, a sort index, or the entire data base. You can send your report to the video screen, a disk file, or your printer.

If you want fancier formatting than BDBS allows, you can invoke the TRSDOS Forms Filter before entering Basic and running BDBS, or you can send your report to a disk file and format it with your word processor.

Understanding the Programs

If BDBS satisfies you as is, you can stop reading, type in the Listings or take the program off the Load 80 disk, and start playing. But if you want to modify BDBS to fit your own special needs, adapt some of its techniques to your own programs, or convert it for use on a computer other than a Model 4, the following sections are for you.

Much of the code is straightforward and should be easy to understand with the help of Tables 1-4. However, my use of logical operations and user-defined functions might seem strange to many of you.

Many programmers only vaguely understand that Basic has two different operators, both represented by the equals sign. In the statement:

A = 5

the equals sign assigns a value to the variable A. However, in the statement:

IF A = 5 THEN PRINT 'OKAY'

the equals sign tests whether the value in A is 5. Many languages use different symbols for these two operations; the Basic interpreter depends on an instruction's context to determine which operation you intend.

Although it may look like gibberish at first, the following line is quite proper Basic:

A = 5: PRINT A = 5: A = 3

Basic will print:

- 1 0

indicating that the first test, A = 5, is true and the second test, A = 3, is false.

In general, anything that can go between If and Then produces either a -1 or a zero when Basic evaluates its "truth." Also, anything that evaluates a numeric value can go between an If and Then. If the value is zero, Basic interprets it as false; otherwise, Basic interprets it as true. Therefore, you can write a statement like:

IF A THEN PRINT "OKAY"

and Basic will print "okay" if A has any value other than zero.

TANDY[®] COMPUTERS

WITH THE
MANUFACTURERS
WARRANTY

ALWAYS AT "S"



- DISK DRIVES
- PRINTERS
- MODEMS
- SOFTWARE
- ALL RADIO SHACK PRODUCTS

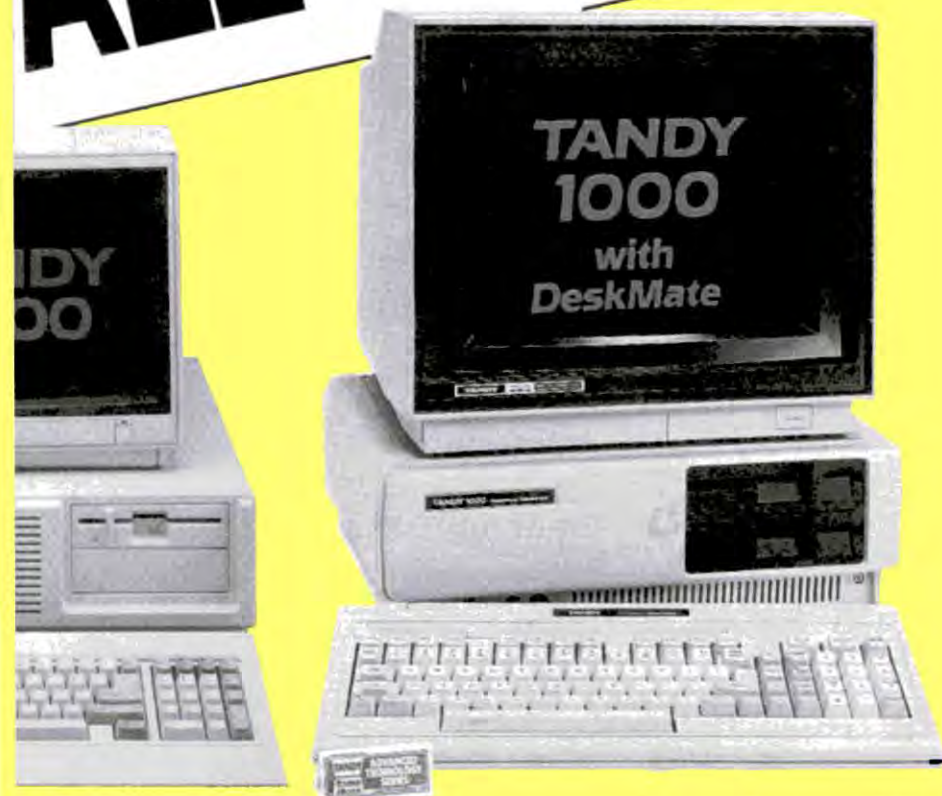
CHECK OUR SALE PRICES -- CALL -----



DFW COMPUTER CENTER

Customer Service 817-481-SALE (9 am-5 pm CT)

SALE" PRICES



Do You Want A Real Warranty. . .

or will you settle for a vague promise?

Since 1977, we have operated a Radio Shack Authorized Sales Center (ASC), in the city of Grapevine, Texas. This will be significant for you only if (a) you want a warranty which you can exercise easily, if necessary and (b) the reassurance of our long term stability and business ethics.

When you buy a Tandy/Radio Shack product from us the Tandy/Radio Shack Warranty will accompany it and the warranty and service will be available to you, anywhere in the U.S.

We will not install any foreign parts which might, and probably will, have an adverse affect upon your warranty. We will assist you in obtaining local support, should you experience difficulty, and will make an offer to buy-our-product-back* (hardware) if it dissatisfies you, within 30 days.

"We ship fast." has always been our motto and if anyone is offering you a lower price, we suggest you ask about the foreign parts (and warranty) before closing the deal. We will "NOT meet-or-beat" a lower price so you can be sure you have our best quote the first time, and our toll-free phone lines (outside Texas) make the quote easy for you to get, from 9 a.m. - 5 p.m. central time, Monday thru Friday. (*For a small handling charge)

TOLL FREE 1-800-433-SALE

326 Main St. Grapevine, Texas 76051

TEXAS BUYERS ADD 5 1/4% SALES TAX.

Most of the tricky sections of BDBS are based on the way Basic handles these logical operations. For example, four of the user-defined functions at the beginning of the program, FN CHKDATE, FN ROOMEXIST, FN NUMERIC, and FN CHARACTER, are designed to return either a -1 or a zero. Later in the program (line 2016 of the ADD/OVL module, for example), you'll find statements like:

```
IF NOT FN ROOMEXIST THEN . . .
```

which make direct use of the Boolean, or logical, value returned by the function.

BDBS also uses an unusual method of handling dates. It accepts date strings only in the form mm/dd/yy and prints out all dates in that form. However, it's difficult to sort dates in that form and wasteful of disk space to store them that way. Internally, BDBS converts dates to three-character strings: The first character is CHR\$(yy) (the character formed by the year), the second is CHR\$(mm), and the third is CHR\$(dd). These strings can be sorted just like any others and require only 3 bytes of disk space instead of the 8 bytes that standard date form requires.

Program Organization

Main/BAS is always in memory when BDBS is running. It contains the Dimension statements for arrays that stay in memory, definitions of functions, the main menu, an overlay handler, three short routines called from the main menu, and a group of subroutines that are available to all sections of BDBS. All other sections of BDBS load in as overlays when you call them from the main menu.

Basic's Chain Merge instruction, which calls the overlays without losing the user functions or variables in memory, destroys the GOSUB/Return stack. Therefore, each overlay must know the address of the main menu so it can return there when it's finished. If you modify Main/BAS, don't renumber line 240 (the beginning of the main menu) or any of the subroutines unless you're also willing to change all of the overlay routines.

The Define subprogram (Listing 2) is long, but not very complicated. Its main job is to prompt for the information it needs to build the data base definitions, verify that information with the user, and save everything to disk.

Model 4 Basic differs from other versions in its method of placing the cursor at a specific screen location. BDBS makes extensive use of Print@ and often uses a single value instead of horizontal and vertical coordinates. If you are programming on a Tandy 1000, you have to change

```
PRINT @ POSN,"something"
```

to

```
LOCATE (POSN MOD 80,POSN\80): PRINT "something"
```

Notice here and elsewhere in the program.

Variables	Program Module						Description
	Main	Define	Add	Read	Select	Index	
BLANK.LINE\$	•				•	•	String of 79 spaces for clearing screen line
BLANK.LINES		•					Number of blank lines between records on report form
CMP\$					•		User choice of constant or field for comparison
COMP(x)		•			•		Array of comparison operators for select process
COMP					•		Temporary storage for one comparison operator
CONJ(x)		•			•		Array of conjunctions for selection process
CONJ					•		Temporary storage for one conjunction operator
DAT.FILE\$		•					Temporary string to hold name of data base /DAT file
DEF.MENU\$		•					User response to Definitions menu
DRIVE\$	•	•	•	•	•	•	Number of disk drive containing data base files
DUMMY\$	•						Place-holder for /DAT file fielding subroutine
DUMMY\$					•		Empty string for dimensioning SORT\$() array
EOL(x)		•				•	Boolean array showing where to place (CR)s in report form
EQUAL.LINE\$		•					String of 79 equals signs for input screen formatting
F\$(x)		•		•	•	•	Field variables for buffer of /DAT file
F.NUMBER(x)						•	Array of field numbers for fields in report form
FALSE		•		•			Basic's value (0) for Boolean False
FIELD.NUMBER(x)		•					Array of field numbers to be displayed on report form
FIELD.SUMS		•				•	Count of fields to be totaled/counted on report form
FIELDS(x,y)		•	•	•	•	•	Field parameters: (1,y) = record length; (2,y) = field type
FIELDS						•	Number of fields included in printed report
FILE\$		•	•	•	•	•	Name, without extension, of active data base
FOUND				•			Boolean variable for search routine
GAP					•		Interval between comparison records for Shell sort
HEADER\$(x)		•				•	Lines of text printed at top of each report page
HEADER.LINES		•				•	Count of lines of lines of report header text
HERE			•				Temporary value of current record number
HOLD1				•			Holds current record number during search
HOLD2				•			Holds current PTR value during search
I.FIELDS		•					Number of input fields
I.HEAD\$		•					Header line for input screen
IN(x,y)		•	•	•	•		Input field info: (1,y) = Input length; (2,y) = screen location
IND.FLD						•	User choice of field to sort on
IND.MENU\$						•	User selection from top Index menu
INDEX(x)						•	Pointers to records after sort
JUMP				•			User choice of record to jump to
KEY\$(x)		•	•	•			Index of active/inactive records in /DAT file
LABEL\$(x)		•				•	Field labels for printed reports
LENGTH		•					Characters available in /DAT record for definitions
LOOP		•	•	•	•	•	General For. . .Next loop counter
LP		•	•				Secondary For. . .Next loop counter
LVAL!						•	Temporary value for left side of comparisons
LVAL\$						•	Temporary value for left side of comparisons
LVAL						•	Temporary value of field number for left side of comparisons
LVAL(x)		•				•	Field list for left side of comparisons
MAIN.MENU\$		•					User choice from main menu
MAX		•					User choice of number of records in data base
MAX.REC		•					Maximum number of records on printed report page
MOD.CHOICES\$				•			User choice at modification menu
MORE				•			Boolean: more records available for scanning?
N.LOOP		•					Counter for field numbering routine
NUM.RECS		•			•	•	Number of records available
NXT				•			Boolean value used during Search routine
OKAY		•		•			Boolean: used for loop control
OLD.OVL\$		•					Current overlay in memory
OUTFILE\$						•	Output file for report form
OUTPUT\$						•	User response to output menu
OVL\$		•					Name of requested overlay
PADS						•	Number of blank lines at bottom of report page
PAGE.LINES						•	Printed page length
PIC\$		•					Print Using string for displaying definitions

	Main	Define	Add	Read	Select	Index	Report	
PROMPT\$(x)	•	•	•	•				Input screen field labels
PTR	•			•	•			Pointer to record numbers and sort items
Q	•	•		•	•	•		Field length for formatted input routine
Q\$	•	•		•	•	•		String returned by formatted input routine
Q1\$	•							Input string for formatted input routine
Q1	•							Counter for formatted input routine
QLOOP	•							Loop counter for formatted input routine
QQ\$	•							Temporary variable for blank-stripping routine
QLP	•							Temporary loop counter for formatted input routine
R.COUNT				•				Count of records available to Read routines
RD(x)				•				Array of record numbers available to Read/Search
REC				•				Physical disk-file record number
REC.PTR					•			Pointer to record number for Select routines
RECLN	•	•						Length of /DAT file record
RECORDS.PER.PAGE		•			•			Number of records per printed report page
REPORT.LINES		•			•			Number of lines per record in printed report
REPT.REC					•			Pointer to record number for Report routines
RESULT					•			Boolean variable for result of comparison test
RESULT(x)					•			Array of comparison results
RPT.MENU\$					•			User response to top Report menu
RVAL!					•			Temporary value for right side of comparisons
RVAL\$					•			Temporary value for right side of comparisons
RVAL\$(x)					•			Field numbers or constants for right side of comparisons
RVAL					•			Temporary value of field on right side of comparison
S.PTR					•			Pointer to parse array elements in Select
SEARCH				•				Field number for search routine
SEL(x)					•			Array of record numbers used by Select routine
SEL.MENU\$					•			User response to top Selection menu
SEL.COUNT					•			Count of records chosen by Select routine
SELECT					•			Boolean result of comparison
SORT!(x)					•			Array of values to be sorted
SORT\$(x)					•			Array of strings to be sorted
SORTLOOP					•			For. . .Next counter for sorting loops
SRC.CHOICE\$				•				User response to second Read/Search menu
SRC.MENU\$				•				User response to top Read/Search menu
SUM.FIELDS\$(x)		•			•			Field labels for printed report forms
SUM.FIELDS(x)		•			•			Numbers of fields to be summed/counted
SUMS.COUNT(x)					•			Accumulators for sum/count routine
TEMP	•							Temporary value for /DAT file fielding
TEST\$	•	•	•	•	•	•		Full name of file to test for existence
TEST.FLAG	•	•	•	•	•	•		Flag showing whether file exists
TOTAL.FIELDS	•	•	•	•	•	•		Total number of fields in data base
TRUE	•	•		•				Basic's value (- 1) of Boolean true
TYPE					•			Temporary value of comparison type
TYPE\$		•						User designation of field type
TYPE(x)					•			List of comparison types
X.COORD		•						Horizontal screen position of field and prompt
Y.COORD		•						Vertical screen position of field and prompt
YN\$	•	•	•		•			Value ('Y' or 'N') returned from yes/no routine

Table 2. Program variables. All are integers unless typed otherwise.

I used the backslash integer division sign, not the standard forward slash representing real number division.

Add (Listing 3), the second overlay, is short and to the point; you should have no trouble understanding it when you read through the listing.

The Read overlay (Listing 4), which handles search, modify, and scan functions, is more complicated. One problem I

had was setting up routines that could jump back and forth between different records, yet still scan forward one record at a time when necessary. Another was moving from one function to another from the Modify menu without losing track of active records or falling off the end of the list of records. The result might not be elegant, but it seems to work well.

The most unusual subprogram, and

the one that was most fun to devise, is Select/OVL (Listing 5). The challenge was to find a way to put the user's selection criteria in a form that the computer could understand. So I set some ground rules for the format of the selection criteria, and I used Boolean operations extensively.

The first ground rule is that the left side of every comparison must be a field. The right side of the comparison can be either

another field or a constant. The left-side field numbers are stored in an array called LVAL(), the right-side constants or field numbers in an array called RVAL\$(). If you specify a constant for the right side, it's stored in RVAL\$() exactly as you type it in. If you specify a field, it's stored as CHR\$(127) plus the field number.

My second solution was to write 12 short subroutines (lines 2114-2138 of Select) to do the actual comparisons. Each stores a true or false value in the array called Result(); after all comparisons are made, results are combined with two short conjunction routines (2142 and 2144). The comparison routines for strings (including dates) and for numbers must be separate, but you need only one set of conjunction routines, since they always operate on Boolean values.

Compared to Select, Index (Listing 6) was easy to write. I used a modified Shell sort, since it's fast and also simple to write and debug. However, the Shell sort has an undesirable side effect: It doesn't guarantee that items of equal value will retain their relative positions after the sort. That is, if records 5 and 18 have the same value in the sort field, you can't tell which will come first in the final sorting index. You might want to change Index to use an Insertion sort or a Quick sort if this bothers you.

The final overlay program, Report (Listing 7), isn't very complex. It reads the report definition, then reads each record and prints it out. It must keep track of the number of records printed per page (the MOD operation in line 2056 works well for that).

Report's method of sending output to the printer, the screen, or a disk file might not be self-evident. TRSDOS 6 sees devices like the screen and printer as almost identical to disk files in structure. After you specify an output channel in line 2046, the program opens an output file either to disk, to the *DO device (the screen), or to the *PR device (the printer). Once the output channel is open, the program is no longer concerned about where the output is going; everything is printed with a Print #1 command. Print Using, Tab, and the other print commands still work normally when the destination is a file/device buffer. However, printout formatting using the Forms Filter works only if the output is indeed being sent to the printer.

Modifications

The program's modular structure should make writing and testing modifications fairly simple. If you use an MS-DOS machine, you don't have to restrict records to 256 bytes; they can be 512 bytes or longer. Just be sure you issue the correct commands when entering Basic from DOS. (Model 1000 users need to make some changes to get BDBS to run; see the Model 1000 changes below.)

You might want more than one sort or

selection index available at a time. It wouldn't be difficult to set up some extra menus to choose, for example, among 10 files of each type, stored on disk as /SLO to /SL9 and /INO to /IN9. You could probably add a single subroutine to Main/BAS that would ask for such a selection every time the program is ready to open a /SEL or /IND file.

You could use the INSTR() function in the search routine and perhaps make it a choice in the comparison menu. Or you might want to add an option that allows sorting on several fields linked together.

Model 1000 Changes

To run the program on a Model 1000, you should make several changes in the listings.

In Main/BAS, delete line 8 and change line 320 to:

```
320 CLOSE:CLS:END
```

Eliminate PRINT CHR\$(24):: in line 1070. Eliminate PRINT CHR\$(24);" ";CHR\$(24):: in lines 1076 and 1078. Eliminate PRINT CHR\$(17):: in line 1102.

Change the variable Key\$ to Kee\$, since Key is a reserved word in Model 1000 Basic.

Change the backslash in all file names with extensions to a period.

You also have to rearrange file names to use Model 1000 syntax.

For example, in line 508 of Main, the statement:

```
TEST$ = FILE$ + "/DEF:" + DRIVE$
```

should be:

```
TEST$ = DRIVE$ + ":" + FILE$ + ".DEF"
```

and in line 1030:

```
OPEN "R".2, FILE$ + "/DAT:" + DRIVE$, RECLEM
```

should be:

```
OPEN "R".2, DRIVE$ + ":" + FILE$ + ".DAT", RECLEM
```

Change all Print@ statements to Locate statements. You don't have to change most of the row, column numbers. However, you need to change any zero to a 1, since Locate locations start at 1 and Print@ statements start at zero.

For example PRINT@ (23,0) should be LOCATE 23,1. For proper Locate syntax, the following changes must be made. In Main, change line 80 to read DIM IN(3,40). Whenever IN(2,variable) appears, add ,IN(3,variable). For example, in line 1024 you should use:

```
INPUT #1, PROMPT$(LOOP), IN(1,LOOP), IN(2,LOOP), IN(3,LOOP):NEXT LOOP
```

in line 1040:

```
LOCATE IN(2,LOOP), IN(3,LOOP):
```

and in line 1096:

```
IF NOT OKAY THEN LOCATE IN(2,LOOP), (IN(3,LOOP) + LEN(PROMPT$(LOOP))):WEND
```

In Define/OVL, line 2014 should read:

```
IN(2,LOOP) = Y.COORD: IN(3,LOOP) = X.COORD
```

Line 2112 should read:

```
WRITE #1, PROMPT$(LOOP) + " ", IN(1,LOOP), IN(2,LOOP), IN(3,LOOP):
```

In line 2048 of Report/OVL, change *PR to PRN and in line 2052, change *DO to CON.END.

Taking Out the Trash

One of Microsoft Basic's greatest weaknesses is its method of string storage and its infamous garbage collection routine that puts your computer in a coma for several minutes at a time. I haven't found garbage collection to be a problem with BDBS, partly because I took some precautions when writing the program. For example, most of the arrays that the overlays need are erased from memory before control returns to the main menu.

Also, wherever possible, I avoided filling up memory with extra copies of strings. The routine that strips trailing blanks from a string (for example, line 1118 of Main/BAS) doesn't move or copy the string it is working with. Rather, it changes Basic's count of the number of characters in the string with the POKE and PEEK commands.

Also, the sort routine uses the Swap command both for speed and to avoid copying strings, and I used the LSET command to copy strings into an array for sorting in the Index overlay. I can't guarantee that your computer will never stop for garbage collection with BDBS, but it will probably do so less often and for shorter periods of time than with some other Basic data base programs.

End of File

The more I use BDBS, the less I like the time Basic takes to chain from one program to another. However, without chaining of some sort, the program is too large for a 64K Model 4. You could always have one program simply run another, but then you'd have to include the same subroutines in several different programs, and also find a way to pass variables between the programs, perhaps through a special disk file.

A second solution would be to compile BDBS, but that would involve a fair amount of rewriting to make it fit your compiler's syntax. The easiest solution, of course, is to learn to live with the delays and appreciate the rest of the power of BDBS. ■

Send us your modifications to DBMS. We'll publish the best ones in a future issue.

You can write to Hardin Brothers at 280 N. Campus Ave., Upland, CA 91786. Enclose a stamped, self-addressed envelope for a reply. You can also contact [htm](mailto:htm@CompuServe.com) on CompuServe's WESIG (PCS-117).

Name	Definition
Main/BAS	(can be renamed) Controlling program for entire data base system. Contains array definitions, Open/Close/End routines, and all common subroutines.
Define/OVL	Creates definitions for data base, input screen, and report form.
Add/OVL	Adds new records to the data base.
Read/OVL	Contains modules to read through the data base, search for specific information, and modify records already in the data base.
Select/OVL	Creates selection key of data base records based on up to six comparison tests.
Index/OVL	Creates sorted-order key of data base records, in ascending order, based on any individual field in data base.
Report/OVL	Creates reports based on data base records.
Data Base Files:	
name/DAT	Holds actual data. Created full-sized during data base definitions; file size never changes after that. Direct access.
name/DEF	Fundamental definitions of data base: number of fields, total record length, record length and type for each field, keys to active/inactive records. Sequential.
name/IND	Count and record numbers of records in sorted order. Sequential.
name/INP	Input screen definitions: screen header, input prompts, input length and screen position for each field. Sequential.
name/RPT	Report definition: lines per page; lines in page header; text of page header; number of fields; labels, field numbers, and end-of-line markers for each field; number of fields to total or count; field numbers of total/count fields, and display labels for each. Sequential.
name/SEL	Count and record numbers of records that match selection criteria. Sequential.
name/SLC	Selection criteria generated by menu choice 1 in Select/OVL. Sequential.

Table 3. Program and data base file names.

Functions	Description
FN CONDENSE\$(x\$)	Condenses a date string to a 3-character, sortable string FN.
EXPONE\$(x\$)	Expands one character of condensed date string to a two character digit string.
FN EXPDATE\$(x\$)	Expands condensed date string to eight character mm/dd/yy format.
FN CHKDATE\$(x\$)	Simple validity check of date string.
FN ROOMEXIST	Returns Boolean TRUE if more room exists in /DAT file.
FN NEXTREC	Returns record number of first open slot in /DAT file.
FN NUMERIC(x\$)	Returns Boolean TRUE if x\$ is a digit or '.' or '-'.
FN CHARACTER(x\$)	Returns Boolean TRUE if x\$ is a printable character.
FN OKAY(x\$)	Programmed-defined function used in formatted input routine.

Table 4. User-defined functions. Untyped functions return integer values.

PRONTO

Window Controller and Applications' Manager

PRONTO supplied applications can turn your 128K Model 4,4P TRS-80 into a sophisticated business or personal machine rivaling the best of them. That's because PRONTO comes with many useful and powerful menu-driven time savers and work organizers. PRONTO includes eleven applications, a complete HELP facility, a data file sort program, a 99-page user manual, and is easily installed just by typing, PRONTO.

PRONTO. While you operate other programs, you can request its services with a single keystroke. PRONTO saves you typing with its EXPORT and IMPORT functions which allow you to move data across windows between programs.

PRONTO APPLICATIONS MODULES

- ADDRESS: Mailing Labels and Rolodex™ Cards
- BRINGUP: Tickler File and Appointments
- CALENDAR: Any Month From 1582 to 4902
- CALCULATOR: Four Function Floating Point
- RPN CALC: Seven Function in Bin, Oct, Dec, Hex
- CARD: 480 Character 3 x 5 Cards for Notes and Data
- CHARSET: Display All Video Characters
- DIALER: Telephone Number List and Auto Dialer
- DOSAVE: Save Entire Screen to Disk
- TERM: A Really Small Terminal Program
- TYPER: Line-Buffered Typing to Your Printer

CHECK OUT THESE FEATURES!

- ✓ User Definable Activation Characters
- ✓ Run Memory Resident Modules With "F" Keys
- ✓ Direct Access to Disk Applications
- ✓ BOOT Directly to an Application with PRUN
- ✓ Interface to DOS Library Command
- ✓ Data IMPORT and EXPORT Across Applications
- ✓ Comprehensive On-Line HELP Facility
- ✓ DATAFILE SORT Utility is Provided
- ✓ Window Device Driver for BASIC is Supplied
- ✓ Comes With Full Technical Specifications
- ✓ 99 Page User Manual is Provided

At Home

Use the CALENDAR and BRINGUP applications to keep track of medical and dental appointments for the family. Use it for birthdays and that all-important anniversary. Parties and other events can be scheduled, too. The 3 x 5 CARD filer is great for jotting down notes which won't get lost. Enter receipts, or just use it to easily log your children's development. PRONTO's export function lets you transfer the notes directly to most word processors. The ADDRESS file can keep your mailing list handy. Easy editing keeps it current.

At the office

The ADDRESS file data base can print both Rolodex cards and mailing labels for you. Forget about that 30-button dialer; use the DIALER telephone list to autodial hundreds of numbers through your modem. Dialing macros gives you very long number support. Use the BRINGUP tickler file and appointment book to schedule up to 12 times per day by time. Arrange your appointments. Log when payments are due. With PRONTO's 4 function CALCULATOR, you can use your computer for quick math and clear your desk of that old TI. PRONTO even turns your printer into a TYPEwriter!

only \$59.95 VA residents add 4% Tax
plus S&H (\$3 US, \$4 Canada, \$10 Foreign)



MISOSYS, Inc.
PO Box 239
Sterling, VA 22170-0239
703-450-4181 M/C, VISA, CHOICE

PRONTO is also available at Radio Shack via Express Order (90-0350).

Making Adjustments

Alter disk drive speed on your Model III or 4 without opening the case.



Photo 1. The potentiometer and small brass adjusting screw seen through the disk drive latch.

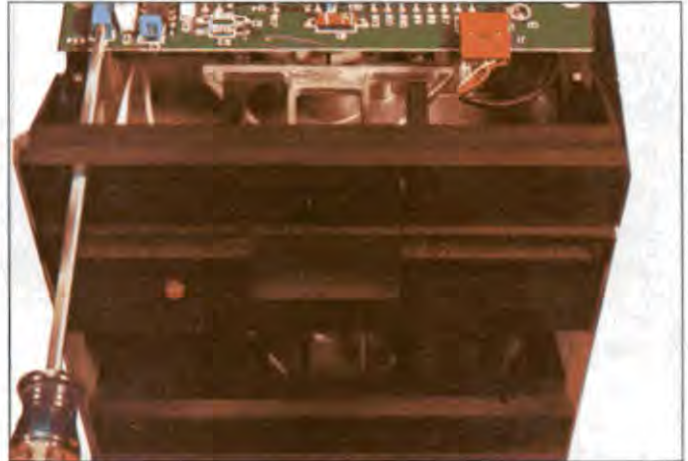


Photo 2. Use a screwdriver to adjust the speed through a hole drilled in the front of the drive.

Two of the most common causes of disk input/output error are dirty heads and incorrectly timed drives. Keeping the heads clean is easy—just use a commercial cleaning kit. But adjusting drives on a Model III or 4 usually requires opening the computer case, which voids your warranty. And even if your warranty has expired, disassembling your computer isn't an easy job.

If you have the right type of disk drive, you can adjust drive speed without taking your computer apart. I'll describe how to drill a small hole in your drive's faceplate so you can access and adjust the drive speed control with a screwdriver.

Driver's Ed

Open the drive latch and, using a flashlight, look up through the drive slot to the left of the printed circuit board on top of the drive. If you see a blue potentiometer with a small brass adjusting screw like the one in Photo 1, you're in business.

The potentiometer controls drive speed, which should be 300 rpm. When you drill a 1/8-inch hole in your disk drive plate to get at the adjusting screw, you can use a small screwdriver to vary drive speed.

Use the template in the Figure to position the hole. I used a sharp wood bit and

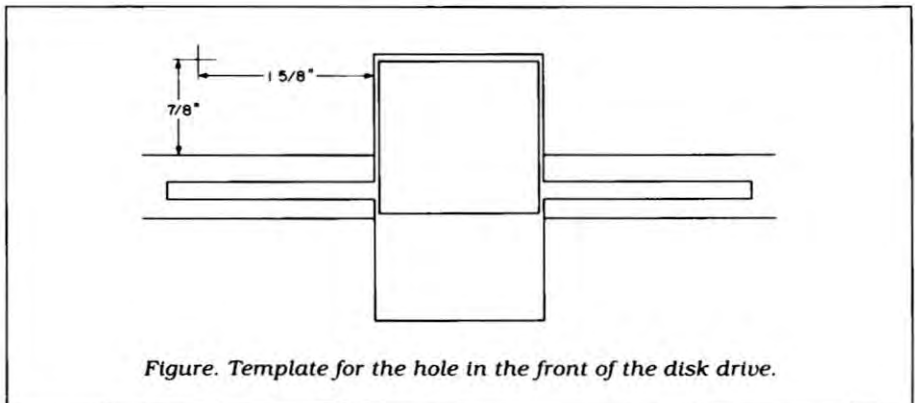


Figure. Template for the hole in the front of the disk drive.

a variable-speed drill at low speed. This gave me a clean hole without a lot of dust. If you have a 2-inch-long screwdriver with a blade smaller than 1/4 inch, you can make a smaller hole.

Insert your screwdriver into the hole and, while looking through the open latch, fit the blade into the adjusting screw (see Photo 2). With the screwdriver in place, run a commercial timing program, or use the Assembly-language drive timer in the September 1984 issue of *80 Micro* ("Keeping Time," p. 72). Turn the screw clockwise to increase the speed, counterclockwise to reduce it.

The whole process is quick and easy, which encourages me to keep my drives at the proper speed. I've also found that using a disk from another computer sometimes requires different speed settings to get it to work properly. ■

Editor's note: Our local repair center technician said the hole wouldn't void your warranty for repairs, but if your disk drive ever needs replacement, you must pay the full price for a new drive—you can't turn in the old drive for credit. He also warned that dust from the drilling could cause problems.

Write to Gerard Kiernan at Manhattanville College, Purchase, NY 10577.

Related Articles

Goodwin, Mark D., "Keeping Time," September 1984, p. 72. A Model I/III/4 disk drive timing program.

Meyer, Vincent E., "Drive Ways," September 1984, p. 42. Disk drive maintenance and repair for TRS-80s.

System Requirements

Models III and 4

Powerful Programming Tools At Bargain Prices

C compiler

for the model 1 or 3 using TRSDOS, LDOS, NEWDOS, DOSPLUS, or MULTIDOS; includes full screen text editor and advanced development package

List Price ~~\$250.00~~
Sale Price \$89.95

Multi-Basic compiler

for the model 1 or 3, or 4 using TRSDOS, LDOS, NEWDOS, DOSPLUS, or MULTIDOS; includes full screen text editor and advanced development package

List Price ~~\$250.00~~
Sale Price \$89.95

This is a full K & R standard implementation of C that includes a Unix compatible function library. The package also includes a 450 page manual with a tutorial on using the C language. If you've been wanting to learn C, this is the package you need.

Features Include

char	8 bits	initializers
short	8 bits	typedef
int	16 bits	static
unsigned	16 bits	auto
long	32 bits	extern
float	32 bits	struct/bit fields
double	64 bits	union

Execution speed on the Model 3 for 10 iterations of the prime number program published in Byte, Jan 83, page 284.

LC Compiler	105 secs.
Alcor C	78 secs.

Special Bonus

Buy one version for \$89.95 and get the version for the other model for only \$21.

Multi-Basic is a TRS-80 BASIC compatible compiler. The Model 4 version supports everything in the TRSDOS 6 BASIC interpreter except the COMMON statement. The same support is provided in the Model 1 and 3 versions so programs are portable. The CMD statement is the only statement from the Model 1 and 3 BASIC interpreters that is not supported.

Multi-Basic also supports advanced language features like multi-line procedures and functions, recursion, and dynamic string management (no long pauses for garbage collection).

Execution speed on the model 3 for 10 iterations of the prime number program published in Byte, Jan 83, page 286.

BASIC Interpreter	4570 secs.
Multi-Basic	89 secs.

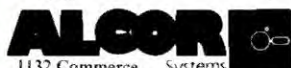
Special Bonus

Buy one version for \$89.95 and get versions for the other two models for only \$21 each.

Sale Price Extended Through October 31

C Compiler

Circle version(s) _____
 One version (\$89.95) _____
 Both versions (\$110.95) _____
 Add 6% sales tax (Texas only) _____
 Shipping \$6 USA / \$28 foreign) _____
 Total _____



1132 Commerce Systems
 Richardson, TX 75081
 (214) 238-8554

Circle 215 on Reader Service card.

Name _____
 Street _____
 City _____
 State _____
 Zip _____
 Country _____
 Phone _____

Also available for CP/M & MSDOS
 \$89.95 each

MC Visa Money Order Check COD
 Card # _____ exp _____

Multi-Basic Compiler

Circle version(s) _____
 One version (\$89.95) _____
 Two versions (\$110.95) _____
 Three versions (\$131.95) _____
 Add 6% sales tax (Texas only) _____
 Shipping \$6 USA / \$28 foreign) _____
 Total _____

Multi-Basic is a trademark of Alcor Systems
 TRS-80 is a registered trademark of Tandy Corp.
 MSDOS is a trademark of MicroSoft
 CP/M is a trademark of Digital Research
 Unix is a trademark of Bell Laboratories
 LC is a trademark of MisoSoft

\$777

5 MEG HARD DRIVE

NEW!



**Comes complete with cable
and choice of software driver*
(CPM, LDOS, TRSDOS)**

- 10 Megabyte Hard Drive **\$899**
- 15 Megabyte Hard Drive **1095**
- 30 Megabyte Hard Drive **1495**

SYSTEM FEATURES

- For TRS-80 Model 3-4-4P
- One Year Parts & Labor Warranty
- Size Rated After Format
- Continuous Duty Power Supply
- Error Checking & Correcting
- Continuous Duty Fan
- Size 11.5" x 12.5" x 5.0"
- All Contacts Gold Plated

*Model 3 requires LDOS

Model 4 requires TRSDOS 6.2 or Montezuma Micro CP/M 2.2

There are firms which offer benefits, experience or products seemingly too good to be true. Now why would you want to expose yourself to unhappiness when Aerocomp has a proven record of thousands of happy, satisfied TRS-80 customers. Just take a minute to look through back issues of this magazine. You won't find many companies that have been around as long as Aerocomp. We fully support TRS-80 computers and most all operating systems including CP/M 2.2. Aerocomp leads the way to low hard disk prices so you can afford to enjoy the benefits of increased storage and faster disk I/O. These units are precision engineered, tested and delivered complete and ready to use, right from our stock. Each unit is guaranteed for one year parts and labor. You can count on us to be here if you should ever need us. As always, your satisfaction is assured with our 14 day free trial offer. If, for some reason, you are dissatisfied with our drive merely return it for a full refund (less shipping). How can you go wrong? Specify the software driver of your choice and start enjoying your computer's real capability. Do it today! Call our toll-free number now!

See opposite page ▶▶▶▶▶

MODEL I DOUBLE DENSITY BOARD

Copyright 1985

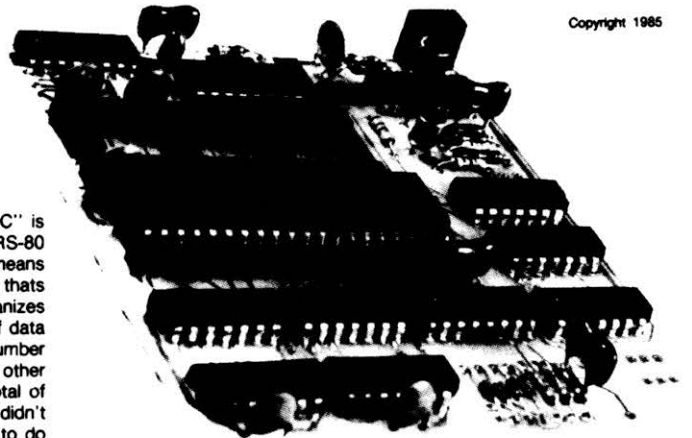
Add 80% more capacity to your disk system with the Double Density Controller (DDC) from Aerocomp.

The Story

Some products have what it takes to seem to last forever. Our "DDC" is one of those products. What it does is allow you to operate your TRS-80 Model 1 disk system in double density. In this case double density means almost doubling the storage capacity of your diskettes. Single density, that's the way Radio Shack designed your Model I expansion interface, organizes your disk into 10 sectors per track. Each sector contains 256 bytes of data for a total storage capacity of 2,560 bytes or 2.5K per track times the number of tracks your drive is capable of addressing. Double density, on the other hand, writes 18 sectors per track each containing 256 bytes for a total of 4,608 bytes or 4.5K. That is 80% more data in the same space. Why didn't Radio Shack do that in the beginning, you ask? Well it costs money to do double density because it is more difficult to do than single density and the data is harder to capture reliably. That means more cost and the Model I was meant to be a low-cost computer for the masses. Therefore, no double density for the original Model I.

The Facts

Other companies introduced double density controllers for the Model I but they were not so good. We waited and waited but, even new models failed to correct problems with data separation that kept cropping up. So we went to work and came up with a new design to cure the old problem. At last! A double density controller for the Model I with a higher probability of data recovery than with any other double density controller on the market then or since. Our analog design phase lock loop data separator has a wider capture window than the digital types the others use. This allows high resolution data centering. Our "DDC" analog circuit allows infinitely variable tuning. The attack and settling times are optimum for 5.25" diskettes. The oft-stated fears of adjustment problems rumored by digital dilettantes have been proved groundless by thousands of satisfied users the world over. The bottom line here is state-of-the-art performance and reliability.



ORDER YOURS TODAY

TRS-80 Model I disk system owners who are ready for reliable double density operation will get 80% more storage per diskette; single and double density data separation with far fewer disk I/O errors; single density compatibility; simple plug-in operation. You will need a disk operating system that has the necessary double density software. All the popular DOS's (except TRSDOS) have the drivers. We have put together two special packages in the event you don't already have one of the more popular DOS's.

Please add \$4 handling & shipping

- "DDC" by itself \$ 99**
- "DDC" and LDOS 159**
- "DDC" and NEWDOS 80 2.0 179**

- 40 Track
- 80 Track
- Single Head
- Dual Head
- Bare
- Complete
- Full Size
- Half Size
- 3-1/2", 5-1/4" or 8"

DISK DRIVES

TRS-80 Model III & 4 DISK CONTROLLER and DRIVE KITS

Convert your cassette Model III or 4 to disk operation with one of our complete kits. You receive our own advanced disk controller board with gold plated edge contacts capable of 4-drive operation; our own power supply; plated steel mounting towers complete with RFI shield plus all the cables and hardware necessary. Detailed instructions are included. All you need is a screwdriver and a pair of pliers. System kits come with 40 track single-side drives or just order the basic kit and pick the drives you want from the selection in the next column.

CONTROLLER KIT	\$ 99
(Everything you need - less drives and DOS)	
1 DRIVE SYSTEM	299
2 DRIVE SYSTEM	399
Substitute DS drives for only \$10 each.	
Add \$9 shipping & handling	
Model 3 TRSDOS 1.3 disk/manual	25
Model 4 TRSDOS 6.2.x disk/manual	20
LDOS 5.1.4 disk/manual	69
NEWDOS 80 version 2.0 disk/manual	99
CP/M 2.2 by Montezuma Micro	169
No \$ & H charge when ordered with kit	
MOUNTING KIT AND POWER SUPPLY ONLY	95
Add \$8 shipping and handling	
DISK CONTROLLER ONLY	110
RS-232 BOARD & KIT	69
Add \$4 shipping and handling	

Aerocomp leads the way to the BEST value in disk drives and related peripheral products on the market today. Sound engineering, high performance, quality construction, no-risk free trial, outstanding warranty service and a reputation for doing the right thing make your decision to buy Aerocomp the correct one. Please look over our offerings and make your selection. When you have made your choice call our toll-free number and place your order. If you need assistance in making your selection, please call our information number. It's listed in the box at the bottom of this ad along with the technical assistance number for those of you who want to get right to the nitty-gritty. Thanks, we all appreciate your business and will continue to do our very best to support you.

BARE DRIVES Add \$4 S&H

These drives are completely burned-in and tested for your ultimate satisfaction. Add that extra drive today! These are new factory drives. No blems, seconds, closeouts or defunct manufacturers surplus (MPI, Shugart, etc). Instruction manual included at no extra cost. Service manuals are also available. See "Miscellaneous Goodies" for information.

40tk SS half high TEAC FD35-A	\$ 99
40tk DS half high TEAC FD35-B	109
80tk DS half high TEAC FD35-F	129
40tk SS full size Tandon TM100-1	119
40tk DS full size Tandon TM100-2	119
40tk SS half high TEAC FD55-A	89
40tk DS half high TEAC FD55-B	99
80tk DS half high TEAC FD55-F	119
8" SS Thinline Tandon TM848-1E	260
8" DS Thinline Tandon TM848-2E	335

8" FLOPPY DRIVES Add \$12 S&H

These 8" Thinline drives work with the Model 2 and 16 plus others that use standard drives. The rugged all-steel cabinet has an extra heavy duty power supply rated for continuous operation. A removable air filter allows only clean air to circulate. Cabinets with single drives are supplied with a blank panel to cover the unused space. A second drive can be added at any time. Service manuals are available. See "Miscellaneous Goodies" for info.

1-8" SS Tandon TM848-1E & case	\$ 389
2-8" SS Tandon TM848-1E's & case	649
1-8" DS Tandon TM848-1E & case	439
2-8" DS Tandon TM848-2E's & case	699

MISCELLANEOUS GOODIES \$2 S&H

Model 1 TRSDOS 2.3 disk & manual	\$ 25
Model 3 TRSDOS 1.3 disk & manual	25
Model 4 TRSDOS 6.2.x disk & manual	20
LDOS (specify Model I or III)	69
NEWDOS 80 v2.0 (specify Model I or III)	99
Montezuma Micro Model 4 CP/M 2.2	169
Tandon TM100-1/2 Service Manual	20
Tandon TM848-1/2 Service Manual	20
TEAC FD55A/B/F Service Manual	20
10 SSDD disks in library box, Lifetime Guar	12
10 DSDD disks in library box, Lifetime Guar	15
5.25" drive power supply & enclosure	59
5.25" drive pwr sply & encl w/fan 5V-24V	150
5.25" 1-drive cable, a nice length	19
5.25" 2-drive cable, a 44 inch	24
5.25" 3-drive cable, just the right size	29
5.25" 4-drive cable, the top dog	34
5.25" Extender cable with gold contacts	10

COMPLETE DRIVES Add \$6 S&H

Fits TRS-80 Models 1,3,4 and the Color Computer plus the others that use standard drives. The drive of your choice is mounted in a sturdy, all-steel cabinet. An external gold plated drive connector allows cabling without disassembly of the cabinet. Half-high drives come in a full-size cabinet that will hold and power our half-high drives. Single drives have a panel covering the unused space allowing a second drive to be added at any time. All are shipped fully assembled ready to use. Specify silver or beige cover. Stainless Steel covers are available for \$12 additional.

1-40tk DS 3.5" FD-35B in dual case	\$ 159
2-40tk DS 3.5" FD-35B's in dual case	259
1-80tk DS 3.5" FD-35F in dual case	179
2-80tk DS 3.5" FD-35F's in dual case	289

40tk Single Side full size TM100-1	149
40tk Double Side full size TM100-2	159

1-40tk SS half-high FD-55A in dual case	129
2-40tk SS half-high FD-55A's in dual case	219
1-40tk DS half-high FD-55B in dual case	139
2-40tk DS half-high FD-55B's in dual case	259
1-80tk DS half-high FD-55F in dual case	159
2-80tk DS half-high FD-55F's in dual case	279

FREE TRIAL OFFER

Use your Aerocomp hardware product for up to 14 days. If you are not satisfied for ANY REASON (except misuse, damage or improper handling), return it (insured) in the original shipping container for a full purchase price refund, less shipping. Sorry, this offer does not apply to software. Defective software will be replaced. Any hardware/software specials will be prorated and the software will be charged at the regular unbundled price. We have confidence in our products and we know you will be satisfied.

WARRANTY

We offer a one year warranty on parts and labor against defects in materials and workmanship. In the event service becomes necessary for any reason you will find our service department fast, friendly and cooperative. We want to keep you happy. Out of warranty repairs are also available.

100% BURN-IN and TEST

All our products are burned-in and fully tested prior to shipment. We want you to receive an item ready-to-go. AEROCOMP means reliability!

ORDER NOW!

Call our toll-free number service and place your order. Have your American Express, Mastercard or Visa number ready. We will not charge your card until the day we ship your order. You may order by mail using your credit card, check or money order. Personal and company checks are welcome and cause no shipping delay as long as they are bank printed and the signature exactly agrees with the name printed on the check. We will ship surface COD with no deposit but all COD's require cash or a cashier's check on delivery. Texas residents add 6% State Sales Tax. No tax collected on out of state shipments. Canadian addresses add \$20 to your order if over \$550 for customs documentation.

OUR FAMOUS MODEL I STARTER PACKAGE

If you have a Model I and an Expansion Interface this is what you need to get started with disks. Included is one 40 track single-side disk drive complete with matching silver case and power supply, a 2-drive cable, a TRSDOS 2.3 disk operating system and TRSDOS manual plus all insurance and delivery charges to your door (lower 48 states).

Yours for only **\$ 199**

LDOS 5.1.4 disk/manual	69
NEWDOS 80 version 2.0 disk/manual	99

You can add our renowned "DDC" double density controller to either the Radio Shack or the LNW Expansion Interface for 80% more storage capacity on your drive. Order it at the same time as our starter package above and we'll pay the shipping. Go ahead, you deserve increased density. See the opposite page for the latest technical details.

\$ 89

When purchased with Starter Package

CALL TOLL-FREE
800-527-3582 USA
800-442-1310 TEXAS

For inquiries or information
call 214-339-8324

AEROCOMP
Redbird Airport, Bldg. 8
P.O. Box 24829
Dallas, TX 75224

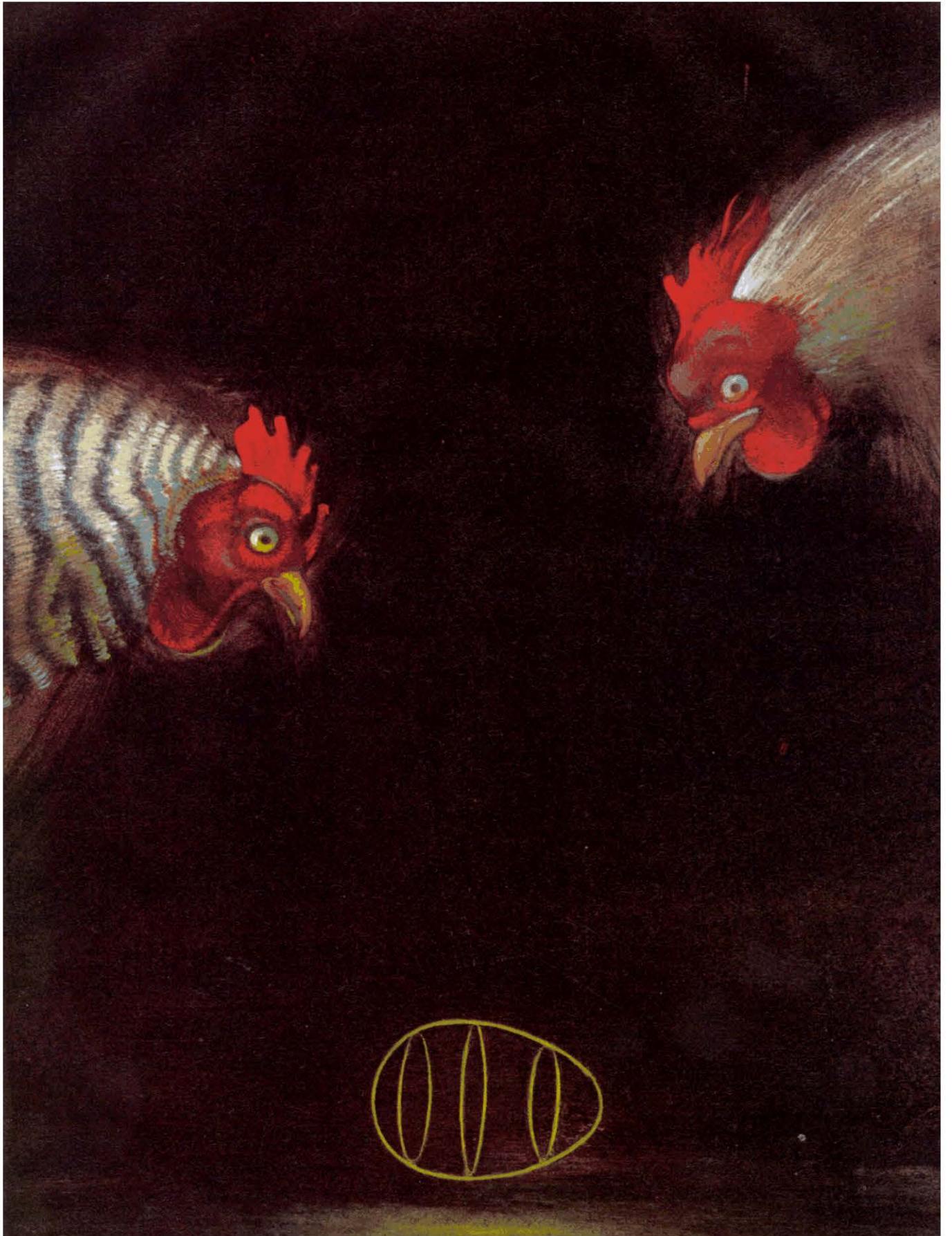


Illustration by Greg Spatnik

Points of View

by Glen E. Sparks

Incorporate two- and three-dimensional images into your programs.

A good program, like a good spy novel, usually benefits from a new twist. Nowhere is this more apparent than in computer graphics: Rotating an image literally adds another dimension to the picture on the screen. I'll provide several algorithms that twist and turn various shapes on-screen. They take you from simple line drawings through the rotation of three-dimensional objects. You can incorporate these techniques into your programs to change an object's perspective, manipulate a design, and produce limited animation.

While this imaging process involves mathematics, you don't have to be a mathematician to experiment with the technique. A computer equipped with Basic can perform all the necessary calculations.

As you run each program, experiment with different variable and input values to produce different shapes. If you see a design you particularly like, list out the program for future reference.

Joining the Movement

Line/BAS demonstrates rotation at its simplest level (see Program Listing 1). It constructs a box within a For...Next loop and repositions the lines forming the sides of the box with each iteration of the loop (see Photo 1). The result is a box that looks like it's fading into the background, turning and getting smaller as it does so.

Spiral/BAS takes things one step further by letting you choose the degree of rotation and the size of the final graphic image (see Photo 2 and Program Listing 2). To get a skinnier, fatter, larger, or smaller spiral than the one in Photo 2, alter the input values for the number of degrees and the radian conversion (DG and AP), as well as the X and Y values. To create a spiral of circles, change line 230 to read:

```
CIRCLE(X,Y).5
```

A common algorithm governs the next three listings. Polygon/BAS (see Program Listing 3) lets you choose the number of sides of a polygon (a many-sided flat-plane object [see Photo 3]). Entering a 1 or 2 in response to the prompt for the number of sides creates a flat line or series of lines; as you increase the number of sides from 3 to 19, you make progressively smaller, nested polygons. Values higher than 20

approximate a circle (see Photo 4).

While the algorithm in Radar/SUB and Spokes/BAS (see Program Listings 4 and 5) is the same, the images created are totally different (see Photos 5 and 6)—proof that you can get a variety of results by adding or subtracting program lines. You might want to explore this process further by introducing GOTO statements to bypass values or statements that send output to the screen.

You can also alter images by superimposing them on other images; I designed Radar/SUB especially for this purpose. To run the routine by itself, add:

```
Line 1 SCREEN 0:CLR
```

In Orbit

Box/BAS (see Program Listing 6), which explores the rotation of a defined object, marks a departure from previous listings (see Photo 7). With Box, you control the size and number of rectangles orbiting in a circle and the projection of the circle itself. You can, for example, project the angle of the circle into the background so that the box appears to be traveling on an ellipse. The small circles on the boxes help highlight their rotation.

Box employs a number of techniques to speed program execution. Using the DEF FN command and storing the rotation algorithms in the program section that defines and initializes variables gives Box a structured format. To rapidly rotate the cube, I restricted calculations to manipulation of variables X1 and Y1. Line 270 uses a simple, quick formula to derive XX and YY from X1 and Y1: Box draws all lines using these four variables and a constant that repositions the line. This technique speeds program execution since Box essentially redraws the same lines instead of recalculating the position of each one individually.



System Requirements

**Models III and 4 with hi-res board
and Basic G
Models 1000, 1200, and 2000
with changes and Basic**

Taking a Spin

The most advanced program in the series, Spin/BAS, lets you rotate an object of your choice (see Program Listing 7). You enter the object's code as the object data statements; Spin scales it and keeps it in the center of the screen while you rotate it. You can view the object head on or from any degree to the right, left, top, or bottom.

Although the image you draw is two-dimensional, Spin gives the illusion of producing a three-dimensional picture by adding a third axis, Z, for depth. To simplify use, Spin limits the range of values for Z; keeping the values between 3 and -3 ensures that the entire image remains on the screen. Negative values bring the image forward; positive values make it recede. To view an object straight on, set the value of Z to zero.

You control the plotting of points using data statements. Spin reads the variables X, Y, Z, and L. Variables X and Y are the actual screen coordinates of those values. Z projects the image into the foreground or background, and L indicates whether Spin plots a point or draws a line. When L equals zero, Spin plots a point; when it equals 1, Spin draws a line from the previous point or endpoint of a line to the current point.

Keep in mind that you need two coordinates to plot one point, so an X and Y coordinate makes up one point on the screen. The Z value affects the placement

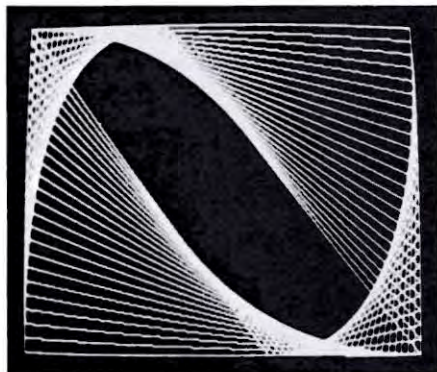
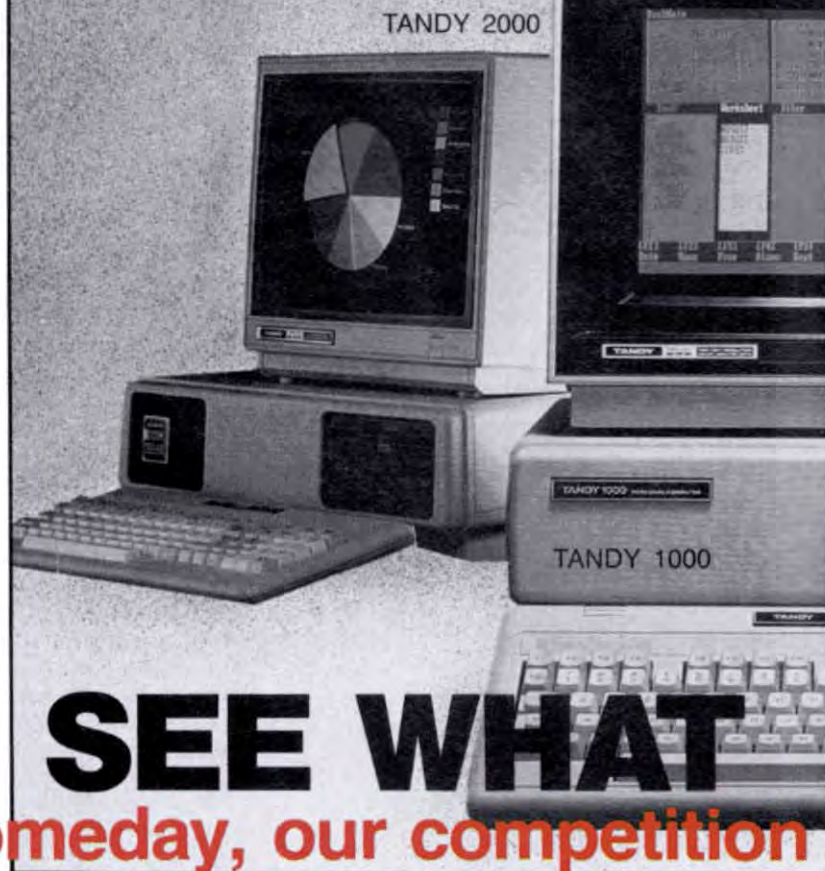


Photo 1. Screen shot of the nested box Line/BAS creates.



Photo 2. Sample output from Spira/BAS. Here, DG = 100 and AP = 150.

TANDY™



SEE WHAT Someday, our competition

TANDY computers are created equal. . .all retailers are not.

A good price is, obviously, very important but there are "other important differences" which the buyer should be aware of, before parting with any money. A good example is "the retailers buy-back policy", to insure the buyer against that expensive mistake, "the call free number for easy price comparison and "credit card ordering for convenience and safety. The price quoted should be "the total price with no road-freight charges (to be added later). Under normal circumstances the order should be "shipped the next business day and a "same day rush-service" should be available.

* For a small restocking fee.

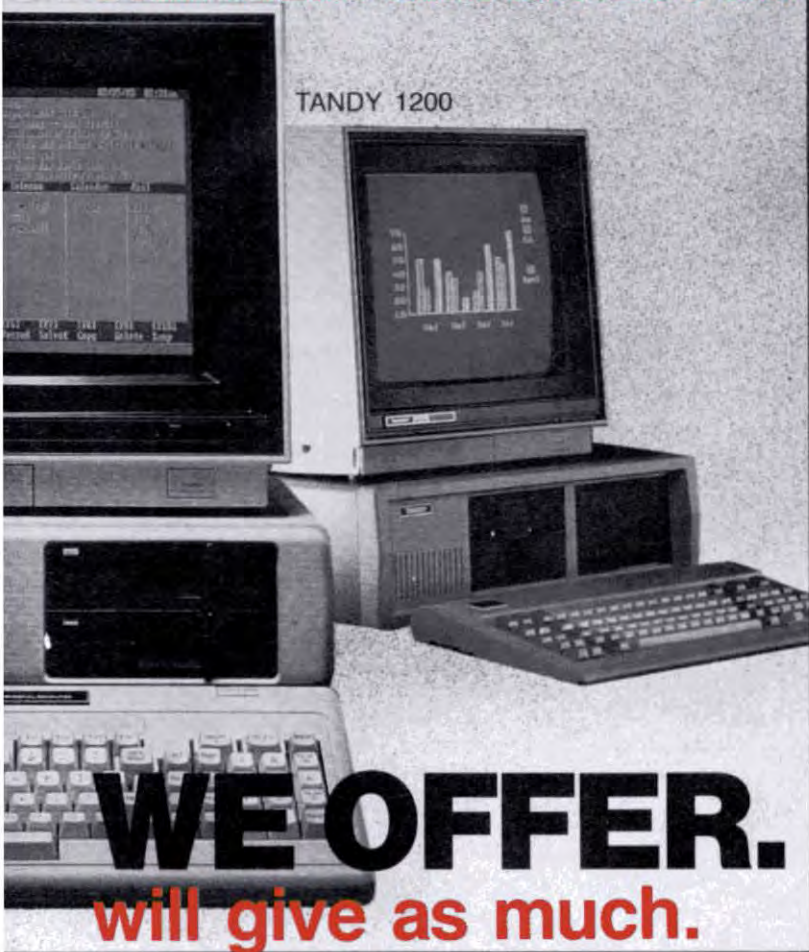
CUSTOMER SERVICE/QUESTIONS ABOUT
YOUR ORDER and in TEXAS 1-817-573-4111
(9 am-5 pm TEXAS TIME MONDAY-FRIDAY)

Fort Worth Computers
377 Plaza
Granbury, Texas 76048



CALLFREE NUMBER:

COMPUTERS and PRINTERS etc.



WE OFFER.
will give as much.

The fact that the majority of orders are from "repeat-buyers is a strong indication of the great satisfaction and trust that our customers feel. However, for those still not convinced we offer references to prove our bona fides and *that the Radio Shack warranty and service will be available, to our customers, NATIONWIDE.

These eight important considerations will be yours when you order from Fort Worth Computers. Call (free) for a price comparison.



Circle 214 on Reader Service card.

FORT WORTH COMPUTERS

(WE ARE SERIOUS ABOUT SAVING YOU MONEY)

Located 30 miles from Ft. Worth

For
Latest
Prices

(1-800-) **433-S-A-V-E**

of that point. Spin uses line statements to create images by creating corners of polygons: by rotating the corner points, you produce the illusion of perspective.

To see how this works first-hand, type in and save Spin/BAS; then type in the data file Cube/DAT (see Program Listing 8a) and save it in ASCII format. Finally, merge the two listings. The first five data statements draw a square. Setting the value of L to zero in the first data statement prevents the program from drawing a line from the initial default setting of 0.0.

The next five data statements are exactly the same except for the value of Z. To project this plane into the background, the program sets Z to -1. The remaining data statements merely use the same X,Y values to connect the foreground and background squares. To ensure that all the points on the screen do not interconnect, the value of L alternates between zero and 1.

Now run the merged program. If the values you supply for the vertical and horizontal inputs are both zero, a square appears on the screen. Changing the vertical value to 10, the horizontal value to 20, and the scale to 1 rotates the cube 10 degrees

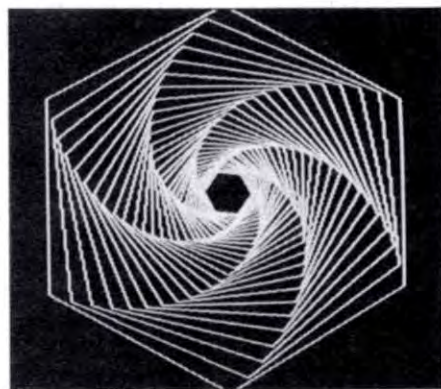


Photo 3. Sample output from Polygon/BAS. SD = 6.

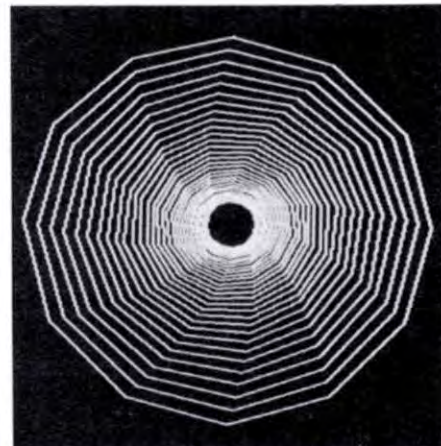


Photo 4. When you specify a number of sides in Polygon/BAS greater than 20, it produces a nested, rotating spiral. Here, SD = 12.

Program Listing 1. Line/BAS.

```
100 'LINE/BAS
110 'also place ,,B and the end of some or all of the LINE command
    s for other effects
120 SCREEN 0:CLR ' go to graphics screen and clear (erase)
130 XC=320:YC=120 'center point of screen
140 X2=2*XC-1:Y2=2*YC-1
150 X=10:Y=10:ST=(Y2-A)/Y2
160 FOR I=0 TO Y2-1 STEP ST*10
170   LINE(X+I,Y)-(X2,Y+I)
180   LINE-(X2-I,Y2)
190   LINE-(X,Y2-I)
200   LINE-(X+I,Y)
210 NEXT I
220 IF INKEY$="" THEN 220
```

End

Program Listing 2. Spiral/BAS.

```
100 'SPIRAL/BAS
110 SCREEN 1:CLS
120 XC=320:YC=120
130 ' input of 50 for DG is fast
140 INPUT"DEGREES ";DG
150 ' input of 60 for AP is fast
160 ' experiment with both of these inputs
170 INPUT"RADIAN CONVERSION (5-360) ";AP
180 SCREEN 0:CLR 'graphics screen
190 DG=DG/AP:PSET(XC,YC)
200 FOR R=0 TO 100 STEP DG
210   X=R*COS(R):X=X+XC:Y=R*SIN(R)
220   Y=Y*.7+YC
230   LINE-(X,Y) 'change this line to CIRCLE(X,Y),5
240 NEXT R
250 IF INKEY$="" THEN 250
260 GOTO 140
```

End

Program Listing 3. Polygon/BAS

```
100 'POLYGON/BAS
110 SCREEN 1:CLS
120 INPUT" SIDES ";SD
130 XC=320:YC=120
140 T=SD/2:TT=SD*SD
150 PI=3.14159:AP=5/11:X=250:SC=.93
160 C=COS(PI/T):S=SIN(PI/T)
170 CI=COS(PI/TT):SI=SIN(PI/TT)
180 CLR:SCREEN 0
190 FOR K=1 TO 30 'how many concentric polygons
200   FOR I=0 TO SD 'SIDES
210     SX=X+XC:SY=Y+YC*AP
220     IF I=0 THEN PSET(SX,SY)
230     LINE-(SX,SY)
240     XN=X*C-Y*S:Y=X*S+Y*C:X=XN
250   NEXT I
260   XN=SC*(X*CI-Y*SI):Y=SC*(X*SI+Y*CI):X=XN
270 NEXT K
280 IF INKEY$="" THEN 280
290 RUN 'for quick experimentation
```

End

Program Listing 4. Radar/SUB.

```
20000 'RADAR/SUB save as ASCII file to merge to program
20010 PI=3.14159:SI=400:SD=20 'SD=number of radiating lines
20020 SP=PI/SD
20030 FOR A=0 TO PI+SP/2 STEP SP
20040   S2=SI*SIN(A)+.5
20050   X=S2*SIN(A)+120 'LAST NUMBER HIGHER MOVES IMAGE TO RIGHT
20060   Y=S2/2*COS(A)+120 'LAST NUMBER MOVES DOWN IMAGE IF HIGHER
20070   IF A=0 THEN 20100
20080   LINE(X0,Y0)-(X,Y)
20090   LINE-(320,120)
20100   X0=X:Y0=Y
20110 NEXT A
20120 FOR CC=1 TO 7:CIRCLE(320,120),R+20:R=R+30:NEXT
20130 IF INKEY$="" THEN 20130
```

End

Program Listing 5. Spokes/BAS.

```
100 'SPOKES/BAS
110 INPUT" SIDES ";SD
120 SCREEN 0: CLR 'go to graphics screen and clear (erase)
130 'initialize variables
```

Listing continued

down and 20 degrees to the left. A three-dimensional figure existed there all along.

Since you are plotting on a two-dimensional surface, you always see one of the coordinates straight in front of you. Your point of view is the same, but the image on the screen gives you the impression of having moved. To make the image smaller or larger (as if you were moving closer or farther away), set the scale from 0.3 to 1.8. If you use values larger than 2.5 (on the Models III and 4), you create the illusion of entering the object or having it zoom past you.

I have included two other data files, Face/DAT (Program Listing 8b) and BLKHOLE/DAT (Program Listing 8c), with which you can experiment. Photo 8 illustrates two possible projections using BLKHOLE/DAT.

If you want to speed the time between rotations for any of these objects and thus produce rudimentary animation, you can write a subroutine to store values X, Y, Z, and L in dimensioned arrays. You therefore won't need to rerun the program and reread the data statements. Instead, you can increment the angles of rotation at the end of the drawing routine and use a GOTO statement to run the routine again. However, you should also clear the screen; otherwise you'll simply superimpose the new drawing over the old one.

Alternatively, you can bring in the values from random-access or sequential files to increase speed. I omitted such features;

**With Spin/BAS,
the image on the
screen gives you
the illusion of
having moved.**



Photo 5. Screen shot of Radar/SUB. Here, SD = 20.

they are system specific and would make transferring the programs to other Tandy computers more confusing.

Machine Specifics

Although written for a Model III or 4 with a high-resolution graphics board, these programs should run on all Tandy computers with minor changes.

For the Models 1000/1200/2000, change the Screen commands to Screen (2) and CLR to CLS. You must also delete line 360 of Spin/BAS.

The system you use determines resolution and therefore affects the size and position of images on the screen. The variables XC and YC represent the center-screen coordinates. To figure the appropriate value for XC for your system, divide the horizontal resolution in pixels by 2; to compute YC, divide the vertical resolution by 2. Keep in mind that zero is a significant digit; if, for example, the range for horizontal pixels is zero to 639 pixels, you have a total of 640 pixels.

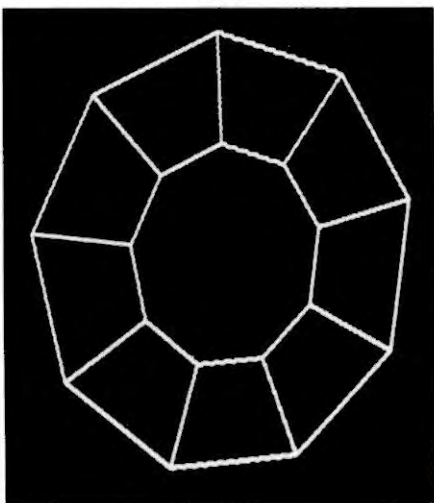


Photo 6. The algorithm used here in Spokes/BAS is the same as that for Radar/SUB, but a few lines have been changed. Here, SD=9.

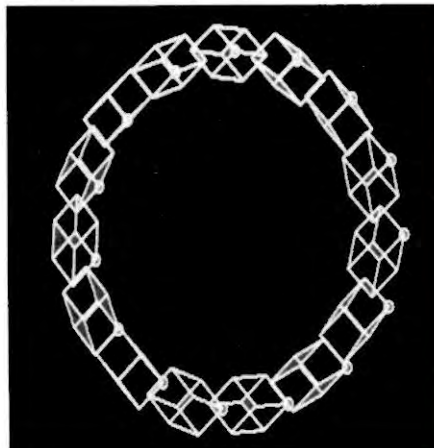


Photo 7. Sample output from Box/BAS. Size = 2, aspect ratio = 2.

Listing continued

```

140 XC=320:YC=120 'center points on screen
150 PI=3.14159:X2=XC:Y2=YC:MT=2*YC
160 MA=YC*3.333:SP=PI/SD
170 'MA=magnitude(size) of image
180 'MT = Move image To (alter to adjust placement on screen)
190 FOR I=0 TO PI+SP/2 STEP SP
200 SZ=MA*SIN(I)+.5
210 TZ=MA/2*SIN(I)+.5:X3=TZ*SIN(I)+MT:Y3=TZ*2*COS(I)+YC
220 X1=SZ*SIN(I)+(YC+20) 'last number adjusts image horizontally
230 Y1=SZ/2*COS(I)+YC 'last number adjusts image vertically
240 IF I=0 THEN 290 'avoid div by zero error
250 'experiment with GOTO statements to bypass one or more lines i
n 260-280
260 LINE(X1,Y1)-(X2,Y2) 'outer ring
270 LINE(X3,Y3)-(X1,Y1) ' outer spokes
280 LINE(X3,Y3)-(X0,Y0) 'inner ring
290 X2=X1:Y2=Y1
300 X0=X3:Y0=Y3
310 NEXT I
320 IF INKEY$="" THEN 320

```

End

Program Listing 6. Box/BAS.

```

100 'BOX/BAS
110 ' rotates box and orbit of box as well
120 CLS:PRINT"SIZE OF RECT = 10 OR SMALLER (MORE RECT'S THE SMALLE
R THEY ARE"
130 PRINT"THE CIRCLE ON THE RECTANGLE HELPS SHOW IT'S ROTATION":PR
INT
140 INPUT" SIZE OF RECTANGLE ";F1
150 PRINT:PRINT"HIGHER NUMBER FLATTENS CIRCLE INTO PERSPECTIVE"
160 PRINT"(DECIMAL FRACTIONS OK)
170 INPUT"ASPECT RATIO OF PATH OF RECTANGLES (2=CIRCLE) ";AS
180 SCREEN 0:CLR 'go to graphics screen and erase it
190 'define and initialize variables
195 XC=320*2:YC=120
200 PI=3.14159:X2=XC:Y2=YC:SD=30:SI=400:SP=PI/SD
210 DEF FN F0(I)=SI*SIN(I)+.5
220 DEF FN F1(I)=SZ*SIN(I)+YC
230 DEF FN F2(I)=SZ/AS*COS(I)+YC
235 'loop for drawing and placing boxes
240 FOR I=0 TO PI+SP/2 STEP (SP*F1)
250 SZ=FN F0(I):X1=FN F1(I):Y1=FN F2(I)
260 IF I=0 THEN 350
270 XX=(X1+X2)/2:YY=(Y1+Y2)/2
280 CIRCLE(X1,Y1),5 'places circle for reference
290 LINE(X1,Y1)-(XX,YY):LINE(XX,YY)-(XX+30,YY+15)
300 LINE-(X1+30,Y1+15):LINE-(X1,Y1)
310 LINE(XX,YY)-(XX+30,YY-15):LINE-(X1+30,Y1-15):LINE-(X1,Y1)
320 LINE(X1+30,Y1+15)-(X1+60,Y1):LINE-(X1+30,Y1-15)'BOT
330 LINE(XX+30,YY-15)-(XX+60,YY):LINE-(XX+30,YY+15)
340 LINE(XX+60,YY)-(X1+60,Y1)
350 X2=X1:Y2=Y1
360 NEXT I
370 IF INKEY$="" THEN 370
380 RUN 'rerun program for fast experimentation

```

End

Program Listing 7. Spin/BAS.

```

100 'SPIN/BAS
110 CLS:PRINT"FOR -VERTICAL- INPUT ONE NUMBER IN RANGE (-60 to 60)
120 PRINT"(NEG NUMBERS SHOW BOTTOM OF FIGURE)"
130 PRINT"NUMBERS HIGHER THAN 60 (120,etc ) START TO INVERT FIGURE
"
140 PRINT:PRINT"FOR HORIZONTAL INPUT ONE NUMBER (-360 TO +360)
150 PRINT"HIGHER NUMBERS TURN FIGURE AROUND ":PRINT
160 INPUT" VERTICAL ";V:INPUT" HORIZONTAL ";HR
170 PRINT"NORMAL SCALE IS 1: <1 MAKES SMALLER : >1 MAKES LARGER"
180 PRINT"YOU MAY USE DECIMAL FRACTIONS:"
190 INPUT" SCALING FACTOR ";SC
200 'initialize and define variables
210 XC=320:YC=120 'center of screen
220 AC=45/ATN(1):T=33.33:AP=3.3334:HU=100
230 DEF FN FA(Z)=Z*COS(RA)+X*SIN(RA)
240 DEF FN FB(Z)=-Z*SIN(RA)+X*COS(RA)
250 DEF FN FC(Z)=-X1*SIN(V1)+Y*COS(V1)
260 CLR:SCREEN 0
270 READ X,Y,Z,L
280 IF X=999 THEN 360 'check for end of data,then end prog
290 IF Y=YC THEN Y=0:GOTO 310
300 IF Y<>YC THEN GOSUB 470
310 IF X=XC THEN X=0:GOTO 330
320 IF X<>XC THEN GOSUB 530
330 GOSUB 400 'perform rotation
340 GOSUB 430 'write to screen
350 GOTO 270 'read in more screen co-ordinates
360 GLOCATE(620,5),0:PRINT#-3,"*" 'indicate on screen when done
370 IF INKEY$="" THEN 370
380 END
390 'perform rotations and plot points on screen
400 RA=HR/AC:X1=FN FA(Z):Z1=FN FB(Z):V1=V/AC:Y2=FN FC(Z)

```

Listing continued

Listing continued

```
410 YP=YC-T*(SC*Y2):XP=(SC*60)*Z1+XC
420 RETURN
430 ' draw to screen
440 IF L=1 THEN LINE-(XP,YP) ELSE PSET(XP,YP)
450 RETURN
460 'conversion to screen co-ordinates
470 IF Y>YC THEN 500
480 A1=YC-Y:F1=A1/AP:F1=F1*.10:F1=INT(F1*HU+.5)/HU
490 Y=F1:GOTO 520
500 A2=Y-YC:F2=A2/AP:F2=F2*-.1:F2=INT(F2*HU+.5)/HU
510 Y=F2
520 RETURN
530 IF X>320 THEN 560
540 A3=320-X:F3=A3/60:X=X-F3
550 GOTO 570
560 A4=X-320:F4=A4/60:X=X-F4
570 RETURN
```

End

Program Listing 8a. Cube/DAT.

```
999 'CUBE/DAT
1000 'front of cube
1010 DATA 260,90,1,0,260,150,1,1,380,150,1,1
1020 DATA 380,90,1,1,260,90,1,1,
1030 'back of cube
1040 DATA 260,90,-1,0,260,150,-1,1,380,150,-1,1
1050 DATA 380,90,-1,1,260,90,-1,1,
1060 'lines that connect front to back
1070 DATA 260,90,1,0,260,90,-1,1,260,150,1,0,260,150,-1,1
1080 DATA 380,150,1,0,380,150,-1,1,380,90,1,0
1090 DATA 380,90,-1,1,999,999,999,999
```

End

(b) Face/DAT.

```
999 'FACE/DAT
1000 'Right side face
1010 DATA 320,60,-2,0,360,60,-2,1,390,70,-2,1,400,85,-2,1
1020 DATA 400,110,-2,1,390,115,-2,1,400,135,-2,1
1030 DATA 380,160,-2,1,350,180,-2,1,320,185,-2,1
1040 'Left side face
1050 DATA 320,60,-2,0,280,60,-2,1,250,70,-2,1,240,85,-2,1
1060 DATA 240,110,-2,1,250,115,-2,1,240,135,-2,1
1070 DATA 260,160,-2,1,290,180,-2,1,320,185,-2,1
1080 'Center line face
1090 DATA 320,60,-2,0,320,80,-1.2,1,320,100,-1,1
1100 DATA 320,145,-1,0,320,165,-1.3,1,320,185,-2,1
1110 'Lines from center to side of face at eyeline
1120 DATA 240,105,-2,0,260,95,-1.5,1,280,80,-1.2,1
1130 DATA 360,80,-1,1,380,95,-1.5,1,400,105,-2,1
1140 'Lines from ctr to side at chin
1150 DATA 260,160,-2,0,300,156,-1.5,1,320,150,-1,1
1160 DATA 340,156,-1.5,1,380,160,-2,1
1170 ' Right eyebrow
1180 DATA 380,105,-1.5,0,360,100,-1.2,1
1190 DATA 340,100,-1.2,1,330,105,-1.5,1
1200 'Right eye
1210 DATA 340,103,-1.5,0,360,103,-1.5,1,360,100,-1.5,1
1220 DATA 340,108,-1.5,1,340,103,-1.5,1
1230 'Left eyebrow
1240 DATA 260,105,-1.5,0,280,100,-1.2,1
1250 DATA 300,100,-1.2,1,310,105,-1.5,1
1260 ' Left eye
1270 DATA 280,103,-1.5,0,300,103,-1.5,1,300,100,-1.5,1
1280 DATA 280,108,-1.5,1,280,103,-1.5,1
1290 'Base nose
1300 DATA 320,100,-1,0,330,115,-1,1,340,135,-1,1
1310 DATA 330,145,-1,1,310,145,-1,1,300,135,-1,1
1320 DATA 310,115,-1,1,320,100,-1,1
1330 ' Front of nose
1340 DATA 320,115,-.5,0,330,135,-.5,1,322,142,-.5,1
1350 DATA 318,142,-.5,1,310,135,-.5,1,320,115,-.5,1
1360 'Connect nose front to back
1370 DATA 322,142,-.5,0,330,145,-1,1,318,142,-.5,0
1380 DATA 310,145,-1,1,310,135,-.5,0,300,135,-1,1
1390 DATA 330,135,-.5,0,340,135,-1,1,320,100,-1,0
1400 DATA 320,115,-.5,1,999,999,999,999
```

End

(c) BLKHOLE/DAT.

```
1000 'BLKHOLE/DAT
1010 DATA 280,180,1.5,0,374,164,1.5,1,432,124,1.5,1
1020 DATA 432,75,1.5,1,374,35,1.5,1,280,20,1.5,1
1030 DATA 185,35,1.5,1,127,75,1.5,1,127,124,1.5,1
1040 DATA 185,164,1.5,1,280,180,1.5,1
1050 'next circle
1060 DATA 280,160,1,0,350,148,1,1,394,118,1,1
1070 DATA 394,81,1,1,350,51,1,1,280,40,1,1
1080 DATA 209,51,1,1,165,81,1,1,165,118,1,1
1090 DATA 209,148,1,1,280,160,1,1
1100 'next circle
```

Listing continued

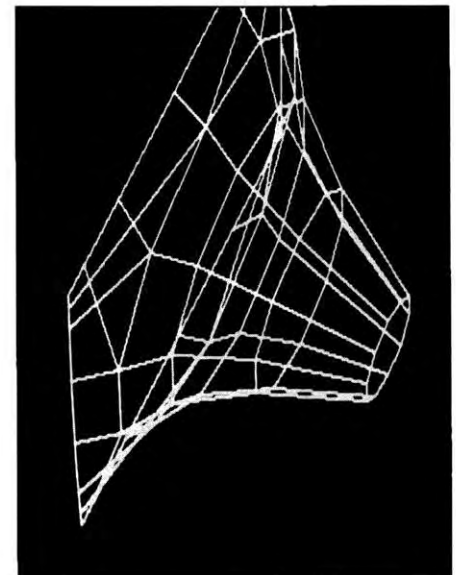
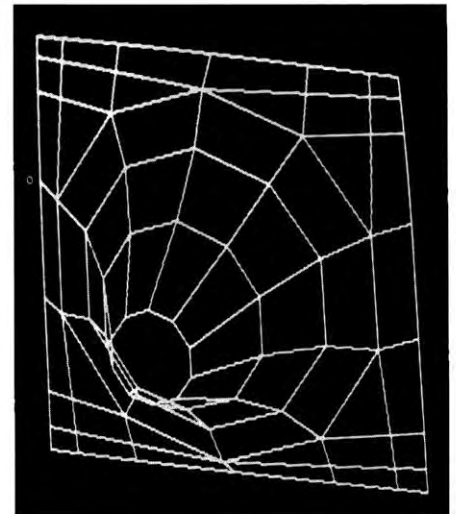


Photo 8. (a) Sample output from merging Spin/BAS and BLKHOLE/DAT. Vertical and horizontal values are set at 20; the scale is 1.2. (b) Here, the vertical input is 10, the horizontal input is 60 and the vertical input is -60.

Your Turn

The opportunity to improve and expand on these models is great. Your output might look slightly different from the figures presented here because of differences in screen resolution. If you're lucky enough to own a Model 1000, 1200, or 2000, you have greater speed and color available for experimentation. Because they are computation-intensive and therefore would slow program execution, I omitted hidden line removal and computation of angles for solid color modeling. With the 8 MHz processing power of the Model 2000 at your disposal, you might find these features worthwhile. ■

Write to Glen E. Sparks at 6186 Custer, S. Rockwood, MI 48179.

Related Articles

Commander, Jake, "Something-Or-Other 3-D," Anniversary 1983, p. 436. Create rotating cubes in two colors.

Fogelin, Eric, "3-D Graphics," March 1982, p. 138. The mathematics of three-dimensional objects.

Leibow, Michael, "Grade-A Graphics," February 1985, p. 45. A graphics editor that lets you create a design, produce a mirror image, rotate it, and display it in reverse video.

Yellin, Bruce, "Rotation," September 1981, p. 154. The basics of 3-D rotation.



Listing continued

```

1110 DATA 280,140,0,0,327,132,0,1,356,112,0,1
1120 DATA 356,87,0,1,327,67,0,1,280,60,0,1
1130 DATA 232,67,0,1,203,87,0,1,203,112,0,1
1140 DATA 232,132,0,1,280,140,0,1
1150 'smallest circle
1160 DATA 280,120,-1.5,0,303,116,-1.5,1,318,106,-1.5,1
1170 DATA 318,93,-1.5,1,303,83,-1.5,1,280,80,-1.5,1
1180 DATA 256,83,-1.5,1,241,93,-1.5,1,241,106,-1.5,1
1190 DATA 256,116,-1.5,1,280,120,-1.5,1
1200 'connect every of vertice of all circles
1210 DATA 280,180,1.5,0,280,160,1,1,280,140,0,1
1220 DATA 280,120,-1.5,1,432,124,1.5,0,394,118,1,1
1230 DATA 356,112,0,1,318,106,-1.5,1,374,35,1.5,0
1240 DATA 350,51,1,1,327,67,0,1,303,83,-1.5,1
1250 DATA 185,35,1.5,0,209,51,1,1,232,67,0,1
1260 DATA 256,83,-1.5,1,127,124,1.5,0,165,118,1,1
1270 DATA 203,112,0,1,241,106,-1.5,1
1280 'connect rest of vertices of all circles
1290 DATA 374,164,1.5,0,350,148,1,1,327,132,0,1
1300 DATA 303,116,-1.5,1,432,75,1.5,0,394,81,1,1
1310 DATA 356,87,0,1,318,93,-1.5,1,280,20,1.5,0
1320 DATA 280,40,1,1,280,60,0,1,280,80,-1.5,1
1330 DATA 127,75,1.5,0,165,81,1,1,203,87,0,1
1340 DATA 241,93,-1.5,1,185,164,1.5,0,209,148,1,1
1350 DATA 232,132,0,1,256,116,-1.5,1
1360 ' grid at top
1370 DATA 100,10,2,0,460,10,2,1,460,190,2,1
1380 DATA 100,190,2,1,100,10,2,1,100,180,2,0
1390 DATA 280,180,1.5,1,460,180,2,1,100,164,2,0
1400 DATA 185,164,1.5,1,185,190,2,1,374,190,2,0
1410 DATA 374,164,1.5,1,460,164,2,1,100,124,2,0
1420 DATA 127,124,1.5,1,127,190,2,1,432,190,2,0
1430 DATA 432,124,1.5,1,460,124,2,1,280,190,2,0
1440 DATA 280,180,1.5,1,100,75,2,0,127,75,1.5,1
1450 DATA 127,10,2,1,100,35,2,0,185,35,1.5,1
1460 DATA 185,10,2,1,432,10,2,0,432,75,1.5,1
1470 DATA 460,75,2,1,374,10,2,0,374,35,1.5,1
1480 DATA 460,35,2,1,280,10,2,0,280,20,1.5,1
1490 DATA 100,20,2,0,280,20,1.5,1,460,20,2,1
1500 DATA 999,999,999,999
    
```

End

Circle 186 on Reader Service card.

New for
Profile users

PROfix * IV™ RESTRUCTURE & TRANSFER UTILITY

NEW! For PROFILE® 4 PLUS Model 4—TRSDOS® 6.2 NEW!

49.95

For PROFILE® III PLUS Model III/4 LDOS® or TRSDOS® 1.3 \$49.95

ALSO

For PROFILE® PLUS Model II/12 \$89.95

PROfix allows you to reorganize your data base TO MEET TODAY'S NEEDS, and then moves ALL or SELECTED fields and/or records of existing data into your new file structure

*** FEATURES ***

- WORKS WITH HARD DISK OR FLOPPY
- CREATE ENTIRELY NEW FILES—selected fields, records
- PROVIDES ARCHIVING—hard disk to floppy
- RE-ARRANGE FIELDS—even across segments
- DROP OR ADD FIELDS
- SHORTEN YOUR FILE—drop unused expansion records
- CHANGE FIELD LENGTHS—R/L justify data
- CHANGE NUMBER OF SEGMENTS
- CREATE SORTED FILE—drop deleted fields
- LITERAL INSERTION—specified fields
- COMPLETE USER MANUAL—with examples

TO ORDER-

Send \$49.95 (Model III/4) or \$89.95 (Model II/12)

Plus \$2.50 for Handling and Postage

Check, M.O., VISA/MC or COD

(for charge card, give expiration date, number)

-To: **BLUE RIDGE SOFTWARE**

230 Chesterfield Road

Lynchburg, VA 24502

for phone orders or more information

Call (804) 239-0574

\$1.00 off on phone orders!

Virginia residents add 4% sales tax

Most orders filled within 24 hours

(allow 2 weeks for checks to clear)

PLEASE SPECIFY VERSION

Profile, TRSDOS are registered trademarks of Tandy Corp

LDOS is a registered trademark of Logical Systems, Inc



Circle 492 on Reader Service card.

Think Big



PCA
TECHNOLOGY, INC.

The PCA Multiboard Suggested Retail Price \$299

Up to 1.5 MB and Multifunction for the Tandy 1000 and other compatibles.

Everything your Tandy 1000, 1200HD or IBM compatible needs for big jobs, but for a small price. DMA on board, RS-232 port, clock/calender, and up to 1.5 MB of Lotus/Intel compatible or system memory. For less than the cost of most ordinary multifunction boards, get all the compatibility you'll ever need. Available now in 10" size (shown) for use up to 1.5 MB, or 6" size for use up to .5 MB.

To order or for more information call 714-991-3121

Dealer inquiries invited.



Technology

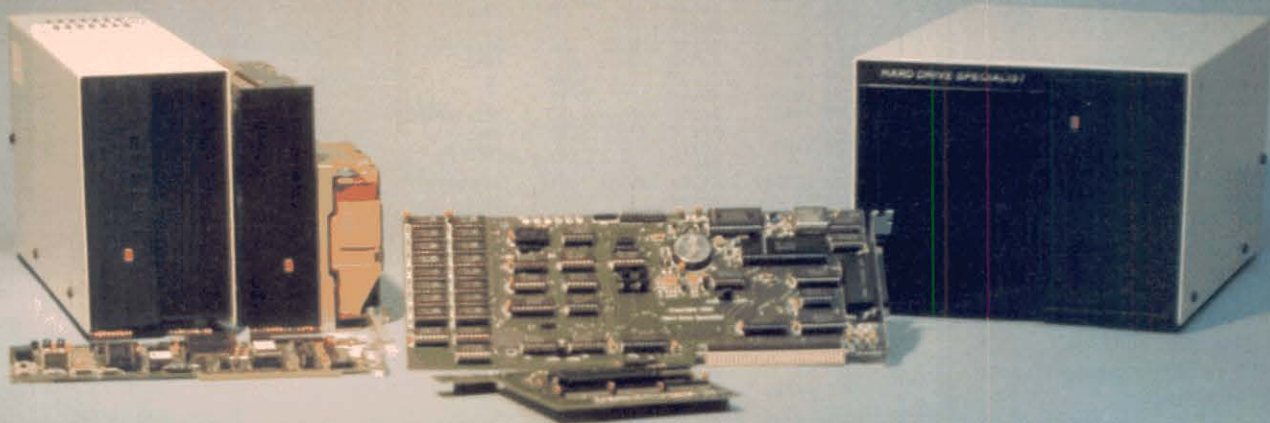
Two Year Warranty

1440 S. State College #2

Anaheim, CA 92806

*Includes DMA for Tandy 1000, \$279 without DMA for other compatibles.

The Best Money Can Buy . . .



Model 1000 Multifunction Boards

TanPak™

The TanPak™ expansion board has been designed to allow expansion beyond the scope of the standard Model 1000. Seven of the most needed functions/features have been combined into one package using only one expansion slot. Your remaining spaces are left free for future expansion needs. Features include memory up to 512K, RS232 Serial Port, Clock-Calendar, DMA, Printer Spooler, Memory Disk, and an Expansion System.

TanPak™ 0K \$329.

TanPak™ Secondary

If you already have a Model 1000 memory board and do not wish to replace it, the TanPak™ Secondary is for you. It retains all the features of the TanPak™, except for the DMA.

TanPak™ Secondary 0K \$249.

8087 Board for the Tandy 1000 \$249.

8087 Upgrade for the Tandy 1000A \$119.

Tandy 1000 Hard Drives

Shop and compare. Hard Drive Specialist has been building hard drive systems for years and have sold thousands of subsystems to satisfied Radio Shack/Tandy customers. Our drives all use buffered seek logic and plated media to result in almost one-fourth the average access found on our competitor's drives. Internal drive systems include an interface card and a half-height hard drive that replaces the top disk drive in both size and power consumption. External units include an interface card, case, power supply, and hard drive unit. All units require a memory board with DMA compatible with the Tandy 1000.

Features Include:

- All sizes rated after formatting.
- One Secondary may be added.
- Error checking and correcting controller.
- Software drivers included.
- Built in power up diagnostics.
- Gold connectors used throughout.
- 1 year warranty.
- Boots directly from Hard Drive.
- Uses Tandy 1000 MS DOS.

10 Meg Internal \$549. External \$699.
 20 Meg Internal \$749. External \$899.
 42 Meg Internal \$1349. External \$1495.
 10 Meg Internal for use with 2 disk drives \$569.
 20 Meg Internal for use with 2 disk drives \$769.

Model 1, 3, 4 Hard Drives

	Primary	Secondary
5 Meg	\$795.	\$595.
10 Meg	\$1095.	\$895.
20 Meg	\$1295.	\$1095.
30 Meg	\$1895.	\$1695.

(Model 1 add \$50.)

Hard Drive Subsystem Features:

- All drive rated after formatting.
- Your choice of DOSPLUS, LDOS, or TRSDOS 6.X Drivers included.
- May be used with NEWDOS 80/Version 2.5
- Up to two secondary drives may be added.
- Error checking and correcting controller.
- Buffered seek drives for improved access time.
- Built in power up diagnostics.
- Plated media for long disk life.
- Heavy duty power supply.
- Gold connectors used.
- 1 year warranty.

Model 3/4 RS232 Kit \$69.

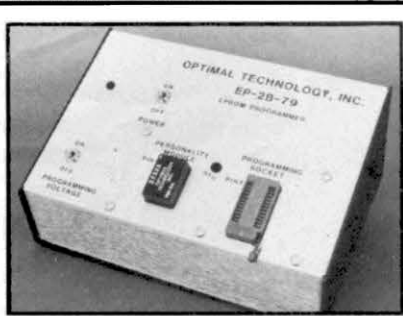
Model 3/4 Disk Controller Board \$99.

HARD DRIVE SPECIALIST

1-713-480-6000
 Order Line 1-800-231-6671
 16208 Hickory Knoll
 Houston, Texas 77059

Ordering Information:

Use our WATS line to place your order via Visa, MasterCard, or Wire Transfer. Or mail your payment directly to us. Any non-certified funds will be held until proper clearance is made. COD orders are accepted as well as purchase orders from government agencies. Most items are shipped off the shelf with the exception of hard drive products that are custom built. UPS ground is our standard means of shipping unless otherwise specified. Shipping costs are available upon request.



EPROM PROGRAMMER For TRS-80 MODELS I, III, 4 or MS-DOS SYSTEMS

Programs, verifies, reads, checks if erased, disk I/O, and edit, 2708 thru 27513 options, depending on particular system.

MODEL EP-2B-79 EPROM PROGRAMMER, TR-24
parallel interface, disk software (specify TRSDOS, CP/M or MS-DOS, and personality module PM-5 for programming 2716, 2758 EPROMs, \$245.00

OPTIMAL TECHNOLOGY
Earlsville, VA
804-973-5482

Circle 374 on Reader Service card.

**PRINTER DRIVERS
FOR SUPERSCRIPST**
(Match your Printer to a Great Word Processing System!)

Easily and automatically attach your printer to SuperSCRIPST with an *ALPS software printer driver program*. No need to learn special printer codes. Call or write for info describing features supported on each printer (underline, bold, proportional, scripts, etc.).

Over 200 Different Printers Supported.
Custom Printer Driver For Each Printer.
Supports all possible printer features.
3 years experience. Customer Support !!!
\$49 or \$59 each, depending on printer.

MSDOS UTILITIES
Tandy 1000, 1200, 2000, 3000
IBM PC/XT/AT
(No Technical Knowledge Required! Easy to Use!)

***** RAMDISK ***** \$49

Use spare memory to simulate one or more superfast disks. Any size. Greatly speed up existing applications. Appears to programs as a disk, but gives instant access. Highly efficient, compact, and thoroughly tested. Includes program to install and change RAMDISK size - no need to use complicated edit programs.

***** FULLBACK ***** \$58

(A Perfect File Backup System!)

Finally, an easy to use backup program that keeps exact images of your files on backup floppies, cartridges, or hard disk. Automatically backup one, several or ALL subdirectories. Backup modified only, or ALL files. Keeps perfectly organized backups - backup structure is identical to original. Supports backup by date, multiple backup copies, large files (up to 32MB). Far superior to DOS BACKUP, easier to use, and much more reliable. Absolutely a MUST for hard disk users.

***** USER TOOLS ***** \$59

(Save time, improve performance, increase flexibility)
KB -- Keyboard aid, generate text with single key.
DI -- 5 keyboard, sorted, fast directory display.
FINDFILE -- Search all directories for file.
DTREE -- Beautiful subdirectory display (Names, size)
CHMOD -- Set file attributes. (Readonly, Hidden, ...)
HEXDUMP -- Display file in hex and character format.
TI -- Report elapsed time for any DOS command.

More ALPS Tools Available. Call or Write for ALPS catalog. Customer Support!!! 9am to 5pm weekdays.
ALPS develops and supports all products in-house, and has 5 years of business experience with microcomputers.

ALPS
1502 County Road 25
Woodland Park, Colorado 80863
303-687-1442

Program Listing. POKE/SRC.

```

5200      00160 START EQU 5200H
402D      00170 EXIT EQU 402DH
021B      00180 PRINT EQU 021BH
          00190 ;
5200      00200 ; ORG START
          00210 ;
5200 7E   00220 SPACE LD A,(HL) ;FIND FIRST PARAMETER
5201 FE0D 00230 CP 0DH
5203 C8   00240 RET Z
5204 FE20 00250 CP ' '
5206 2003 00260 JR NZ,PARAM1
5208 23   00270 INC HL
5209 18F5 00280 JR SPACE
          00290 ;
520B CD2152 00300 PARAM1 CALL GETBYTE ;get address
520E 57   00310 LD D,A
520F CD2152 00320 CALL GETBYTE
5212 5F   00330 LD E,A
5213 7E   00340 LD A,(HL)
5214 FE2C 00350 CP ' '
5216 C26452 00360 JP NZ,ERROR
5219 23   00370 INC HL
          00380 ;
521A CD2152 00390 PARAM2 CALL GETBYTE ;get data string
521D 12   00400 LD (DE),A
521E 13   00410 INC DE
521F 18F9 00420 JR PARAM2
          00430 ;
5221 7E   00440 GETBYTE LD A,(HL)
5222 FE0D 00450 CP 0DH
5224 CA2D40 00460 JP Z,EXIT
5227 CD4252 00470 CALL LEGAL
522A DA6452 00480 JP C,ERROR
522D 87   00490 ADD A,A
522E 87   00500 ADD A,A
522F 87   00510 ADD A,A
5230 87   00520 ADD A,A
5231 4F   00530 LD C,A
5232 23   00540 INC HL
5233 7E   00550 LD A,(HL)
5234 FE0D 00560 CP 0DH
5236 CA2D40 00570 JP Z,EXIT
5239 CD4252 00580 CALL LEGAL
523C DA6452 00590 JP C,ERROR
523F 81   00600 ADD A,C
5240 23   00610 INC HL
5241 C9   00620 RET
          00630 ;
5242 FE20 00640 LEGAL CP 20H
5244 CA2D40 00650 JP Z,EXIT
5247 D630 00660 SUB 30H
5249 FE00 00670 CP 0
524B 3F   00680 CCF
524C FA6252 00690 JP M,ILLEGAL
524F FE0A 00700 CP 0AH
5251 3F   00710 CCF
5252 F8   00720 RET M
5253 D607 00730 SUB 7
5255 FE0A 00740 CP 10
5257 3F   00750 CCF
5258 FA6252 00760 JP M,ILLEGAL
525B FE10 00770 CP 16
525D 3F   00780 CCF
525E F26252 00790 JP P,ILLEGAL
5261 C9   00800 RET
          00810 ;
5262 37   00820 ILLEGAL SCF
5263 C9   00830 RET
          00840 ;
5264 216D52 00850 ERROR LD HL,MERROR
5267 CD1B02 00860 CALL PRINT
526A C32D40 00870 JP EXIT
          00880 ;
526D 0A   00890 MERROR DEFB 0AH,'*** Command Parameter Error ***'
          2A 2A 2A 20 43 6F 6D 6D
          61 6E 64 20 50 61 72 61
          6D 65 74 65 72 20 45 72
          72 6F 72 20 2A 2A 2A
528D 0A   00900 DEFB 0AH,0DH
          0D
          00910 ;
5200      00920 END START
    
```

End

EXECUTE CD4900CD3300CD3B00C30053
Following is the Assembly-language code for the above statement:

```

CALL 0049H :ROM INKEY routine
CALL 0033H :Display character
CALL 003BH :Line print character
JP 5300H :Jump to beginning
    
```

DOS Ready

The five utilities described above let you access almost all the Model I/III features

from DOS Ready. If a needed DOS command doesn't exist, you can simulate it with one of these utilities. And if the excessive typing starts to bother you, you can type in Commando (see "Macro Economics," February 1986, p. 66), which lets you rename long, hard-to-remember commands to short, meaningful, logical names. ■

You can reach Craig Chaiken at 32 Beverly Drive, Avon, CT 06001.

PRINTER SALE

THE STATE OF THE ART

The C.ITOH 3500 is fully IBM/Tandy 1000-1200-2000 compatible and FAST. Using bidirectional, logic-seeking printing across a full width of 13.2 inches, this little beauty prints at a speed of 350 characters per second (CPS). Letter quality printing is available at a rapid 87 CPS—more than twice the speed of most daisywheel printers. Couple that with a quick linefeed of 30 milliseconds per line and a standard buffer of 2K (16K optional, \$50) and you have just about the fastest throughput around. Only 4.7" high and a low noise level of 58 dBA.

Maximum versatility is offered for data and wordprocessing output, spreadsheets and business graphics by a variability of print densities, speeds, character sets and fonts, spacing, forms control and other attributes realized by operator and computer alterable functions, allowing the printer to be tailored to almost any application.

We could rave on and on about this fantastic printer but the proof is using this printer in your application. Try it on our 14 day money-back-if-not-satisfied plan. Don't be printer bound any longer. Call today.



350 CPS only \$1695
(Please Specify Serial or Parallel)
(Shipping Included)



Low Profile Design
ONE YEAR WARRANTY



\$229 (Add \$10 S & H)
List \$299

ProWriter™ Jr. Near letter quality and 105 CPS for data processing. Compatible with all popular PCs. Built-in stand, easy front paper loading. The low cost answer for professional performance.

StarWriter™ Y-10, F-10 40/55. Daisy wheels with speeds ranging from 22 to 58 CPS for the sharpest in letter quality printing. 13.5 and 15-inch carriage widths. Switch-selectable pitches 10,12, and 15. Compatible with all popular word processing software.



As Low As **\$899**
(Add \$15 S & H)

- F10-40 15" wide 40cps Diablo/Qume printwheels . . . \$899
- F10-55 Fastest DW printer at 58cps 15" wide . . . \$999
- F10 Bi-Directional Tractor . . . \$199
- F10 Mechanical sheet feeder . . . \$299



As Low As **\$299**
(Add \$12 S & H)

ProWriter™ 8510S/1550S + NLQ Series Dot Matrix Printers. Near letter quality, 180/120 CPS with throughput speeds of up to 110 LPM for far faster text and graphics than competitors. Models specifically designed to provide the finest performance and flexibility with IBM® and Apple®/Macintosh® microcomputers.

- 8510 BPI IBM Graphics, 120cps 10" friction/tractor . . . \$299
- 8510 SEP IBM Graphics, NLQ and faster at 180cps . . . \$399
- 8510 CEP IBM Graphics, 180cps plus 7 colors . . . \$499
- 1550 EP 15" wide 120cps friction/tractor included . . . \$499
- 1550 BCD Like above but RS232 interface . . . **SPECIAL** . . . \$299
- 1550 SEP 15" IBM Graphics NLQ and a fast 180cps . . . \$599

ProWriter™ 24LQ. The Ultimate Printer. 24-pin dot matrix printer. 6 printers in 1 for all professional printing needs. 200 CPS for data, 133 CPS memo quality, 67 CPS letter quality. Selectable type styles. Up to 7-color graphics at 360 x 360 DPI.



\$999 (Add \$15 S & H)
List \$1299

ORDER TODAY CALL TOLL FREE **800-527-0347/800-442-1310**



MONTEZUMA MICRO

P.O. Box 32027
Redbird Airport, Hangar #8
Dallas, TX 75232
214-339-5104



Circular Reasoning

Discover an Assembly-language programming trick that cuts your source code down to size.

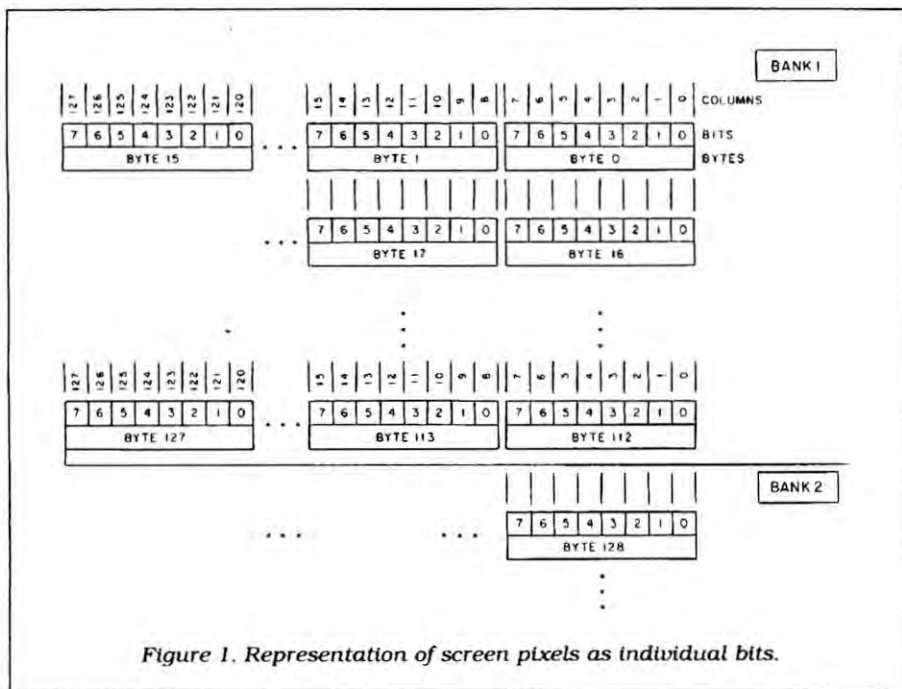


Figure 1. Representation of screen pixels as individual bits.

For... Next loops do a lot of the grunt work in Basic programs, and they save you programming wear and tear. I'll describe an Assembly-language technique that lets you simulate the For... Next structure with the Z80's index registers; in this way, you can control the Bit, Set, and Reset instructions from within a program.

Your resulting source code will be a little harder to follow, but it will be much shorter. You'll save lots of money on printer paper, your printer head will last longer, and your source code will fit into your editor/assembler more easily. Best of all, you'll spend less time typing and more time programming.

Register Here

If you've ever written the instruction LD A,10H or POP HL, then you have at least a nodding acquaintance with the Z80's two index registers, IX and IY. You can load either register with an address—say, an individual record of a data base—and access that data by specifying an offset to the register, "d."

For example, in an employee data base you might allocate 5 bytes for an em-

ployee number, 40 bytes for a name, 9 bytes for a social security number, and so on. When you load IX with the address for a particular employee, IX+0 (or just IX) points to that employee's number, (IX+5) points to his name, and (IX+45) to his social security number. This is much easier than adding and subtracting values to keep one of the Z80's general registers pointing to the required information.

In using the index registers, you can specify offsets as much as 128 bytes from the address to which the index register points. You keep track of where everything is located and where information should go or where it can be obtained with instructions like:

```
LD A,(IX+4)
LD (IY-2),A
```

But have you ever thought about writing the machine-language version of:

```
FOR 'd' = 0-82
  Do neat stuff with (IX+d)
Next 'd'
```

In other words, find a way for your program to vary "d". Unfortunately, no Z80 instruction like "INC d" (Increment d) or

```
LD HL,0H
LD IX,BANK1
BIT 0,(IX+0)
JR Z,$+4
SET 0,L
BIT 0,(IX+16)
JR Z,$+4
SET 1,L
BIT 0,(IX+32)
JR Z,$+4
SET 2,L
.....
.....
.....
BIT 0,(IX+112)
JR Z,$+4
SET 7,L
.....
.....
BANK1 DS 128
BANK2 DS 128
ETC.
```

Figure 2. Sample code for testing bit patterns.

"DEC d" (Decrement d) exists. In fact, tutorials on using the index registers frequently warn against varying "d", although they don't explain why.

As long as you're careful, there's no reason not to create such a program loop. I'll show you how, and I'll start by describing the programming problem that led me to the techniques.

A Bit of Background

Visualize an electric signboard consisting of 48 rows of lights, with each row containing 128 equally spaced bulbs (a total of 6,144 bulbs). The bulbs are randomly lit at any given moment. Your problem is to pick any column of 48 bulbs, note its on/off pattern, and determine if one or more of the other 127 columns have identical patterns.

I was faced with this problem while writing a special graphics program. The lights were actually the Model I/III screen pixels. The program had to be fast, which meant machine language.

It pained me to think of allocating 6,144 bytes in which to store 1's or zeros to in-

System Requirements

**Models I, III, and 4
Assembly language
Editor/assembler**

Did you know? Only one spelling checker:

- works with both Scripsit and Superscriptsit.
- integrates with all other popular word processing programs as well.
- requires *no special document placement!* Even runs on a single drive system.
- displays its dictionary so that you can find the correct spelling of words.
- offers integrated Hyphenation Option and Grammar & Style checker.

Electric Webster

SPELLING CHECKER • AUTO-HYPHENATION • GRAMMAR CHECKER

Displays Correct Spellings: If you don't know the correct spelling of a word, EW will look it up for you, and display the dictionary.

Verifies Corrections: If you think you know the correct spelling of a word, EW will check it for you before making the corrections.

Hyphenates Automatically: (Optional). Inserts discretionary hyphens throughout text.

Grammar & Style Checker: (Optional). Identifies 22 types of common errors. Makes suggested corrections with the stroke of a key. Runs within EW.

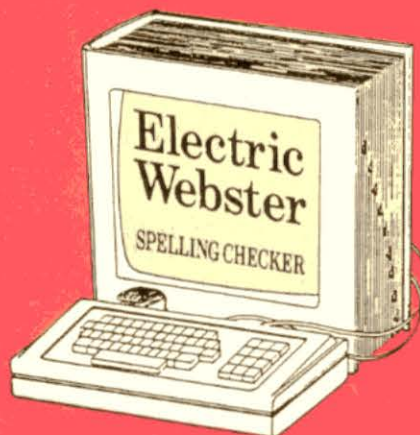
50,000 Word Dictionary: Uses only 2½ bytes per word; add as many words as you wish.

Fast Correcting: In as little as 30 seconds, Electric Webster can return you to your Word Processing program, with your text fully corrected and on your screen.

Integrates: with WordStar, Deskmate, Spellbinder, Volkswriter, Open Access, Allwrite, Newsprint, Lazy Writer, Superscriptsit, Scripsit, Electric Pencil, Copy Art, Powerscript, Zorlof, and LeScript (specify). Begins proofing at the stroke of a key; returns you to word processing automatically.

When ordering, stipulate word processing program and operating system.

**"The Cadillac"
of spelling checkers**
— 80 *Microcomputing*, 9/82



ACCLAIMED:

"Electric Webster is the best. Just read any review in any magazine and I don't believe that you will find even one disagreement to that statement." *CINTUG, Cincinnati's Users Group Mag.* 4/83

"The most helpful program I've found is Electric Webster. After looking at nine proofreading programs, I've settled on Webster..." *Creative Computing* 11/83

This dictionary is not published by the original publishers of Webster's Dictionary or their successors.

Performance "Excellent"; Documentation "Good"; Ease of Use "Excellent"; Error Handling "Excellent". *Info World*, 8/82

"Electric Webster, a fantastic spelling and grammar checker" 80 *Micro* 4/85

Now see for yourself!

Try Before You Buy:

For the second straight year, 80 Micro readers have voted Electric Webster the #1 Spelling checker. Find out for yourself how accurate, fast and easy proof-reading can be. For only the \$5 cost of postage, materials and handling, we will send you a special Electric Webster demonstration disk that works just like Webster, but proofs only half the alphabet. With it, you'll get a coupon worth \$5 towards the purchase of Electric Webster.

LOW PRICES:

TRS-80, Model I/III or IV	\$ 89.95
w/Correcting Feature	\$149.95
Hyphenation	\$ 49.95
Grammar & Style Checker	\$ 49.95

CP/M, PC/DOS, Model 1000/2000	
Electric Webster,	
w/Correcting Feature,	\$169.95
Hyphenation, and Grammar	

Circle 45 on Reader Service card.



Cornucopia Software

POST OFFICE BOX 6111, ALBANY, CALIFORNIA 94706, PHONE (415) 524-8098


```

Line A      NOP
Line B      LD      A,6      ;Explained in text
            RLCA      ;Play with bit 6
            RLCA      ;Shift left 1 bit
            RLCA      ;Shift left again
            RLCA      ;Once more (0011 0000)
TYPE        OR      46H   ; and get (0111 0110)
            LD      (THISBIT),A
            LD      A,3   ;Examine (IX+3)
            LD      (OFFSET),A
TESTBIT     DW      OCBDDH ;Std. starting bytes for
OFFSET      DB
THISBIT     DB      OH    ; BIT b,(IX+3)
            OH    ; Merged code for BIT 6

Do some great stuff here

```

Figure 3. Sample code for creating a program loop to test bit patterns.

dicate on and off respectively. I decided instead to represent a single row's 128 pixels by individual bits in 16 bytes, with 48 groupings of 16 bytes. This brought the byte count down to 768, an 88 percent improvement.

Now look at Fig. 1, which shows the first 128 bytes (eight rows with 16 bytes in each row, representing the 128 pixels of one screen line). I followed the convention of numbering bits from zero to 7, starting at the right. Note that I numbered the bytes in the same fashion. Of course, the bytes aren't really laid out like this in memory, but this scheme makes visualization easier.

Imagine the IX register loaded with

(pointing to) the address of byte zero (bank 1). I needed a routine to load the HL register with the bit pattern of column zero's first eight rows—that would be bit zero of bytes zero, 16, 32, 48, 64, 80, 96, and 112—and then load the DE register with the bit pattern of column 1's first eight rows (bit 1 of the same group of bytes).

Next, I had to compare HL and DE (I used the RST 18 instruction). If they're equal, I loaded IX with the address of byte 128 (bank 2) and repeated the process (load HL with the column-zero [bit zero] pattern of bytes 128, 144, 160, 192, 208, 224, 240, and 256 and DE with the bit-1 pattern for the same bytes). If DE and HL are again equal, point IX to the start of the

next bank of eight rows and continue the process as long as DE and HL remain equal.

If you go all the way through the last (sixth) bank, then you know that column 1 is the same as column zero. (The program I wrote included a way to make note of this identity, but the method is beyond the scope of this article.)

If DE and HL aren't equal at any time during this process, you stop checking, since you know that column 1's bit pattern doesn't match column zero's. Either way, you need to point IX back to byte zero and again load HL with the first 8 bits of column zero. This time, you load DE with the first 8 bits of column 2. Now repeat all the steps outlined above (to check column 1). Continue this sequence out to column 127, always filling HL with the appropriate column-zero bits while DE gets its pattern from the column you're testing.

Figure 2 shows how you can start coding this job. The routine loads HL with the column-zero bit pattern for the first eight rows. A couple of things should be obvious.

First, you're going to do a lot of typing, perhaps even overflow your editor. This sequence is for the first bank only, and I haven't even shown the corresponding code that loads DE with the column-1 information.

Second, the code begs for some sort of

Circle 534 on Reader Service card.



Jameco
ELECTRONICS

Mail-Order Electronics • Worldwide • Since 1974

TRS-80 MODEL 100



PURPLE COMPUTING



M1008K (TRS-80 Model 100 Expansion) . . . \$29.95 ea. or 3/\$79.95

Easy to install module plugs right into the socket increasing memory in 8K increments. Three modules will increase your memory to its full capacity. Complete with module & documentation for installation.

PROMETHEUS MODEMS



PROMETHEUS
PRODUCTS INC.



Intelligent 1200/300 Baud Modem with Real Time Clock/Calendar

The ProModem™ is a Bell 212A (1200/300) intelligent stand-alone modem with RS-232C interface for host computer connection. Hayes command set compatible plus an additional extended command set. Shown with alphanumeric display option.

PM1200 RS-232 Stand-Alone Unit. \$299.95

TANDY 200

M200R (Tandy 200 Expansion) \$99.95 ea. or 2/\$189.95

Easy to install module plugs right into the socket increasing memory in 24K increments. Complete with module and documentation for installation.

TRS-80 MODEL I AND III

Each Kit comes complete with 8-MM5290 (UPD416/4116) 16K Dynamic RAMs and documentation for conversion. Model I: 16K equipped with Expansion Interface can be expanded to 48K with 2 Kits. Model III: Can be expanded from 16K to 48K using 2 Kits. Each Kit will expand computer by 16K increments.

TRS-16K3 200ns (Model III) \$5.95
TRS-16K4 250ns (Model I) \$5.49

TRS-80 MODEL 4, 4P

TRS-64K-2 Expands Model 4 from 16K-64K or Model 4P from 64K-128K. \$ 9.95
TRS-64K-2PAL Expands Model 4 from 64K-128K. \$29.95

Easy to install Kits come complete with: TRS-64K-2 (8 each 4164N-20 (200ns) 64K Dynamic RAMs); TRS-64K-2PAL (8 each 4164's plus PAL chip) and documentation for conversion.

Options for ProModem 1200

PM-OP512K (Communication Buffer Option) \$129.95
BUF512K (512K Memory for PM-OP512K) \$ 54.95
PM-ALP (Alphanumeric Display) \$ 79.95
PM-Special#2 (Incl. PM-OP512K, BUF512K & PM-ALP) \$249.95

TRS-80 COLOR AND COLOR II

TRS-64K-2 \$9.95

Easy to install Kit comes complete with 8 each 4164N-20 (200ns) 64K Dynamic RAMs and documentation for conversion. Converts TRS-80 Color Computers with D, E, T, F and NC circuit boards to 32K. Also converts TRS-80 Color Computer II to 64K. Flex DOS or OS-9 required to utilize full 64K RAM on all computers.

Isobar Surge Suppressors

Part No.	Description	Price
IBAR-2-6	2 Outlet, 6-foot Cord	\$44.95
IBAR-4-6	4 Outlet, 6-foot Cord	\$59.95
IBAR-8-15	8 Outlet, 15-foot Cord	\$74.95

\$20.00 Minimum Order — U.S. Funds Only
California Residents Add 6% or 6½% Sales Tax
Shipping — Add 5% plus \$1.50 Insurance
Send S.A.S.E. for Quarterly Sales Flyer!

Spec Sheets — 30¢ each
Send \$1.00 Postage for your
FREE 1986 JAMECO CATALOG
Prices Subject to Change





Jameco
ELECTRONICS



1355 SHOREWAY ROAD, BELMONT, CA 94002
3/86 Phone Orders Welcome (415) 592-8097 Telex: 176043



Rose

You've Got TOTAL ACCESS

(specializing in TRS80™)

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

QUALITY DISK DRIVES

These drives are complete with power supply, cover and external drive connector. For TRS-80 Model I, III, 4, IBM PC and others. All drives are Double Density and step at 6ms or less. SS means single head, DS is double head. Specify white or silver color cover for no additional charge or my beautiful new Stainless Steel cover for only \$9 additional. Add \$5 per drive shipping unless otherwise specified. All drives have a one year warranty on parts and labor. Bare drives, that is, just the drives themselves are also available for those of you who don't need or want one of my power supplies.

COMPLETE 3.5" - 5.25" - 8" DISK DRIVES

1ea 40tk DS TEAC FD-35B in a dual case	157
2ea 40tk DS TEAC FD-35B in a dual case	255
1ea 80tk DS TEAC FD-35F in a dual case	177
2ea 80tk DS TEAC FD-35F in a dual case	285
40tk SS Tandon TM100-1	\$ 147
40tk DS Tandon TM100-2	157
1ea 40tk SS TEAC FD-55A in dual case	\$ 127
2ea 40tk SS TEAC FD-55A in dual case	217
1ea 40tk DS TEAC FD-55B in dual case	137
2ea 40tk DS TEAC FD-55B in dual case	257
1ea 80tk DS TEAC FD-55F in dual case	157
2ea 80tk DS TEAC FD-55F in dual case	277

Add \$10 S & H per case for these B drives	
2ea SS TM848-1E's in dual case with fan	\$ 647
2ea DS TM848-2E's in dual case with fan	697

BARE 5.25" & 8" DISK DRIVES

Add \$4 shipping per drive.

40tk SS, Full Size, Tandon TM100-1	\$ 99
40tk DS, Full Size, Tandon TM100-2	119
40tk SS, Half-High, TEAC FD55-A	99
40tk DS, Half-High, TEAC FD55-B	109
80tk DS, Half-High, TEAC FD55-F	129
8" SS, Thinline, Tandon TM848-1E	259
8" DS, Thinline, Tandon TM848-2E	333

TRS-80 MODEL III/4 DISK DRIVE KITS

Internal drive kit complete with disk controller, power supply, mounting brackets, cables and all hardware plus step-by-step instructions. This kit contains everything you need (except the Disk Operating System, drive and a screwdriver) to convert your cassette Model III or 4 to fast reliable disk operation. Don't confuse this quality kit with the high-priced ripoffs. Thousands of satisfied customers cannot be wrong. You can join them for only \$189. Same as above but with 1-40tk SS drive \$289. Same as above but with 2-40tk SS drives \$388.

TRS-80 MODEL I DOUBLE DENSITY CONTROLLERS

Add \$3 shipping

Aerocomp DDC Really the best by test	\$ 99
Aerocomp DDC with LDOS	159
Aerocomp DDC with NEWDOS 80 v2.0	179

OTHER DRIVE GOODIES

Add \$7 shipping

TRSDOS 1 3 Disk & Manual for Model III	\$ 24
TRSDOS 2 3 Disk & Manual for Model I	24
TRSDOS 6 x Disk & Manual for Model 4	34
LDOS for the Model I or III	69
NEWDOS 80 v2.0 for the Model I or III	99
2 drive cable for Model I/III/4	24
2 drive external cable for IBM PC	40
4 drive cable for Model I	34
Extender cable, 7' long	9
5.25" power supply & encl., white or silver	59
Stainless Steel Covers	12
8" power supply, fan & enclosure, beige	149

ROSE GETS RIGHT! NOW---ROSE'S MOD 4 CP/M \$ 69

Complete with Manual

Rose has latched onto this slick version of CP/M 2.2 that allows you to run most of your favorite CP/M programs with ease. It even lets you read and write other manufacturers' disk formats. What could be nicer? They are in stock ready for you to use and enjoy.

TRS-80 SPECIAL EQUIPMENT

12" Green Comp. Monitor Add \$10 for TTL	89
12" Amber Comp. Monitor Add \$10 for TTL	84
16K 200 nsec RAM Guaranteed 1 year(8 chips)	9
64K 200 nsec RAM Guaranteed 1 year(8 chips)	19
64K RAM plus Genuine PAL for Model 4	29
256K 150 nsec RAM 1 yr guarantee (8 chips)	39

MEDIA & SUPPLIES

5" Diskettes SSDD, Lifetime Guarantee, 10pk	\$ 16
5" Diskettes DSDD, Lifetime Guarantee, 10pk	19
5" Flipsort, holds 75 Diskettes	16
8" Diskettes SSDD, Lifetime Guarantee, 10pk	24
8" Diskettes DSDD, Lifetime Guarantee, 10pk	29
8" Flipsort, holds 50 Diskettes	22
5.25" or 8" Head Cleaning Kit	9
Letter Size 20 lb. Tractor Paper, 2900 sheets	25

SPECIAL SOFTWARE DEALS

Add \$4 shipping

WordStar 3.3 (Specify MM or R/S format)	\$ 195
MailMerge, SpellStar, Starindex, all 3 for just	99
WordStar Professional (Above 4 Programs)	275
DataStar Data Entry & Retrieval	125
ReportStar Report Generator	105
InfoStar Advanced DBMS (Above 2 Programs)	195
dBASE II Complete With Disk Tutorial	345
Super Utility Plus 3.2 by Kim Watt	59
CP/M 2.2 for Model 4 by Monte Zuma	169
Turbo PASCAL by Bor Land Requires CP/M	44
Turbo Toolbox by Bor Land	45
Turbo TUTOR by Bor Land	35
Pickles & Trout CP/M 2.2m for the Model 2-12-16 Floppy Version	179
Same thing but the Radio Shack Hard Disk	219

CP/M & 80 COLUMN for your MODEL III

No need to buy a new computer when you can use the Holmes VID-80 modification and get CP/M 2.2, 64K RAM and 80 column video. This kit is easy to install and requires no soldering. Even a dolt like you can can end up with a complete 64K CP/M computer with an 80 column screen that is still able to run all your existing Model III software. For the first time you will be able to use CP/M programs that normal people do, such as dBASE II and WordStar. The regular price of this kit is \$524. Now Rose will get you going for only \$299. Add \$5 shipping.

I'll ship you the Holmes deal above PLUS WordStar 3.3 installed, complete with original manuals ready to run for only \$399

**ORDER NOW!
TOLL-FREE**

800-527-3582
Orders Only Please

Call in your order or write to us at the address below. Texas residents call us at 214-337-4346 and deduct \$2.00 from your order but you should remind me 'cause sometimes I forget. If you need technical information or service please call the Texas number as the Toll Free lines are just for orders only. Prices are subject to change without notice and are mail order only. I accept AMERICAN EXPRESS, MASTERCARD and VISA and I will not charge your card until I ship your goodies. You can send a check or a money order. I also accept COD orders but they require cash or a cashier's check upon delivery. If shipping charges are not shown please call for the correct amount. Add \$5.00 handling charge if your order is less than \$50.00. Shipping charges quoted in this ad are for the lower 48 states only. Orders to Canadian address add \$20.00 to pay for doing all those papers for customs. Texans add State Sales tax. No tax collected on shipments outside of Texas. Be sure you know what you are buying. SOFTWARE IS SOLD ON A REPLACEMENT BASIS ONLY - NO REFUNDS. If it is defective call us for instructions. Please order from me now---I need the money and I will not jack you around. I reserve the right to charge up to a ten percent restocking charge if you jack me around. All merchandise carries the original manufacturers' warranty and all repairs or adjustments will be made by the manufacturer or his designated representative.

NEXT DAY SHIPMENT of Goods in Stock.

TOTAL ACCESS
P.O. Box 790276
Dallas, Texas 75379
214-337-4346

*And now,
a couple of words about high-quality
TRS-80 software at a very low price:*



LOAD 80

Utilities, tutorials, home and hobby applications from 80 Micro.

If you've been shopping for software lately, you've discovered that new car buyers aren't the only ones who experience "sticker shock".

For the price of one commercial program, you can fill your gas tank at least three times. Or treat a friend to dinner. Or buy a year's worth of Sunday papers.

But with *Load 80* software, you can spend a lot less and *still* wind up with hundreds of dollars worth of outstanding TRS-80 programs every month.

On every *Load 80* cassette or disk (your choice!), you'll get more than a dozen "ready to run" programs listed in *80 Micro*... tutorials, utilities, games, word-processing, and much more.

Build a versatile software library, quickly and economically. Past issues have included programs such as:

NovaCalc

... a full-featured Model I/III spreadsheet with all the capabilities offered on more expensive commercial products.

Easydata

... a 200-record data base manager for fast information from your Model I/III/4.

Grade-A Graphics

... a deluxe Model III graphics editor that's loaded with options!

And to enjoy your favorite program, all you have to do is "load 80" into your computer. It's that simple. No keyboarding, no debugging. You get complete loading instructions, but should you need assistance, the *Load 80* and *80 Micro* technical editors will be glad to answer your questions.

Don't let software sticker prices stop you from building a top-notch

library. Get a variety of winning programs, for a fraction of the cost, with *Load 80* cassettes or disks.

To order by the month or by the year, simply complete the coupon and drop it in the mail with payment.

For Faster Service, call

 **1-800-258-5473**

(In NH, please dial 1-924-9471.)

Yes. *I want to build an exciting and economical software library with Load 80.* Please send me:

- | | |
|--|--|
| <input type="checkbox"/> 1 year of Load 80 on disk for \$199.97 | <input type="checkbox"/> This month's Load 80 disk for \$21.47 |
| <input type="checkbox"/> 1 year of Load 80 on cassette for \$99.97 | <input type="checkbox"/> This month's Load 80 cassette for \$11.47 |
| <input type="checkbox"/> CheckMO <input type="checkbox"/> MC <input type="checkbox"/> VISA <input type="checkbox"/> AE | |

Card # _____

Exp. Date _____

Signature _____

Name _____

Address _____

City _____

State _____

Zip _____

Prices include postage and handling. Foreign airmail, please add \$1.90 per item or \$25.00 per subscription. US funds drawn on US banks only.

Load 80 • 80 Pine Street • Peterborough, NH 03458

8603

T.K.O.
monitor utility

Four powerful functions to complement your every activity. T.K.O. is a terminal/modem program, screen-oriented line editor, print spooler and macro-key utility that can be called from just about any program. Just think, you can leave BASIC, dial up a BBS, dump a listing to the printer, grab a line of text from the screen and return to BASIC without losing a stitch. We can only hint at the power of T.K.O., you owe it to yourself to give it a try today! (for Model 4/4P/4D with TRSDOS 6.2)

check here to order T.K.O. @ \$69.95

new!
direct

The DOS assist that makes using your Model 4/4P/4D a snap. Just a few short keystrokes and you can select one or more files that can be Executed/Renamed/Listed/Removed and Copied at the touch of a key! Then there's a unique feature that lets you type in more than one DOS library command on the same line, and that's only a few of the features that are provided in this impressive utility! For fast relief from the headaches of dealing with TRSDOS 6.2, take "DIRECT" relief from SOTA Computing Systems Limited

check here to order DIRECT @ \$59.95

NEW
day by day

If what you need is a professional appointment/calender program, here's a full featured economical alternative to those expensive and awkward multi-function utilities like DESKMATE. Day-by-Day is the practical choice for users who want to use their Model 4/4P/4Ds to help organize their busy schedules. With features like auto-reminders, an address book, and printer options, you'll find all the power you could ever want in this well-crafted application. Start doing things everyday with Day-by-Day

check here to order DAY-BY-DAY @ \$59.95

TRScat

At last there's a disk catalogue program for the Model 4/4P/4D. End the frustrating hours of searching for disk files and turn your file cataloging chores over to TRScat. The program includes options for saving, loading, viewing, and sorting files as well as options for preparing printouts of your sorted files. Don't waste your valuable time any longer, order TRScat for your computer today!

check here to order TRScat @ \$39.95

fast 80 BBS
now 300/1200 baud!

The best BBS for the Model 4/4P/4D just got better! **fast80** now supports 300/1200 baud operation and is compatible with every Radio Shack direct connect auto-answer modem (Hayes and compatibles too!) With minimum disk access, lightning fast response, hard drive compatibility, and a large message and user base, **fast80** is the BBS of choice for the discriminating SYSOP. (Requires 128K and runs with TRSDOS 6.2.x or DOSPLUS 4.x) Try before you buy! Call the SOTA BBS at (604) 688-5009 or 24 Hours a Day

check here to order fast80 (2nd Edition) @ \$79.95

NEW VERSION 2.0 NEW

No other FORTH has such features at such an affordable price. Includes a complete string handling package, floating point math, screen editor and beginner's tutorial. With FORTH from SOTA you can run in native (direct disk) or DOS (DOS file) mode. You can easily create /CMD files too! No royalties or site licensing required - for all the programming power you wish you had - order FORTH from SOTA today.

check here to order FORTH @ \$149.95
choose 1 of: DModel I DModel III DModel 4/4P/4D
DCP/M (Ver 2.x) DCP/M Plus (Ver 3.x)

microzap check here to order @ \$49.95

The ultimate disk zapping utility for the Model 4/4P/4D. Runs with TRSDOS 6.2.x or DOSPLUS 4.x and will read Model I-III-4 and CP/M sectors, single or double density, one or two sides, 75 to 80 tracks.

designs check here to order @ \$39.95

A must for the Model 4/4P/4D BASIC or Assembly Language Programmer. Create imaginative screen displays using designs; powerful screen editor - then let designs prepare source files to reproduce your art.

HOW TO ORDER

INSTRUCTIONS: Check off the products you wish to order and remit this ad together with the total amount (US Funds). We accept payment by check, money order, VISA or MasterCard (if paying by check, please remember to include your card number and expiry date). Prices include shipping. Purchase orders welcome but are subject to a \$5.00 handling fee. Prices are higher outside the U.S. and Canada - write for details.

MOST IMPORTANTLY - DON'T FORGET TO INCLUDE YOUR FULL NAME & ADDRESS WITH YOUR ORDER

ORDER TODAY 213-1080 Broughton Street
Vancouver, B.C.
Canada • V6G 2R8

Order by Mail or Phone
(604) 688-5009

SOTA Computing Systems Limited

TRSDOS & TRSDOS are registered trademarks of Radio Shack.

	BIT b, ()			SET b, ()			RES b, ()		
	(HL)	(IX + d)	(IY + d)	(HL)	(IX + d)	(IY + d)	(HL)	(IX + d)	(IY + d)
Byte 1	NOP	DDH	FDH	NOP	DDH	FDH	NOP	DDH	FDH
Byte 2		CBH			CBH			CBH	
Byte 3	NOP	offset	offset	NOP	offset	offset	NOP	offset	offset
Byte 4		46H	*		C6H	*		86H	*

Table. Bytes for controlling Bit, Set, and Reset from within your programs. An asterisk indicates the value you want to OR with the 3-bit, shifted code to designate the bit that the instruction tests or controls.

programming loops to increment "d" by 16 and increment the bits that the Set commands reference.

Stand By for Instructions

Now I'll detour to examine some of Fig. 2's Z80 instructions in detail. BIT b, (IX + d) is a 4-byte instruction, the byte sequence for which is:

- Byte 1 ODDH
- Byte 2 OCBH
- Byte 3 | | | | | :Contains offset 'd'
- Byte 4 |0|1|b|b|b|1|1|0| :Designates the test bit

The three "b" entries in byte 4 are decoded as if they were a 3-bit binary number. For example, 000 represents bit zero, while 110 is bit 6's code. Note that if you're dealing with bit zero, then byte 4 would be 0100 0110, which is 46 hexadecimal.

Another instruction you need is RLCA. Each time you use it, the instruction shifts the A register's contents one position to the left and moves what had been bit 7 into bit zero. If you loaded the A register with 6, the bits' set-up would look like this:

```
|||11|1|0|
```

(The blank bit positions actually contain zeros, but I've omitted them for the sake of clarity.) Now if RLCA executes three times in a row, the A register would look like this:

```
|||11|0|1|1|
```

If you OR 46H, the result would be:

```
|0|1|1|1|0|1|1|0|
```

Enter the Loop

I'll use some of the concepts I just described to program a loop. Take a look at Fig. 3. If you were to assemble this listing, you'd discover that, at Testbit's address, you had the instruction BIT 6, (IX + 3). You're now in a position to set up your loop.

Suppose you wanted to examine bit 6, starting at (IX + 10) down to (IX + 0). In Fig. 3, replace the NOP in Line A with LD B, 10. Change Line C to read LD A, B. Add code of your choice where indicated, and end with DJNZ Line C.

Here's another view of the same idea. Suppose you wanted to test all 8 bits of, say, (IX + 8). You can use the loop you just created. Change Line A to read LD B, 8. Next, change Line B to read LD A, B and

then insert a new line reading DEC A (so that A will range from 7 to zero, while B goes over the range of 8 to 1). Finally, in line C, load A with 8 instead of the 3 and change DJNZ to reference Line B.

The technique I just outlined for manipulating the Bit command works just as well with the Set and Reset commands. Look at their byte sequences:

- SET b, (IX + d)
- RES b, (IX + d)
- Byte 1 DD DD
- Byte 2 CB CB
- Byte 3 offset offset
- Byte 4 |1|1|b|b|b|1|1|0| |1|0|b|b|b|1|1|0|

If you compare these byte sequences with those that described the Bit command, you'll note that the first 3 bytes of each sequence are identical—DD, CB, (offset)—for all these instructions.

Byte 4's format is also the same. The 3 bits that designate the actual bit under consideration are in the same relative position and are coded the same way. The only difference is byte 4's value when all the b's are set to zero. In the case of Set, it's 1100 0100 or C6H, while in the RES group, it's 1000 0110 or 86H.

This means that by changing the value that's ORed at the instruction labeled Type in the loop you created, you can make that loop execute a Bit, Set, or Reset instruction sequence under your program's control. If you set up that loop as a subroutine, your main program could put either a 46H, 86H, or OC6H into (TYPE + 1) before it called the routine, and that would determine which of the three possible instruction sets the loop would perform.

Having dared to do this, why not use the same idea to control the second byte of line C of the loop segment (the LD A,n command)? You can do so from outside the loop or use a nested loop that, effectively, steps the value of "d". As in all machine-language programming, be careful.

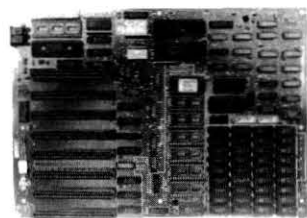
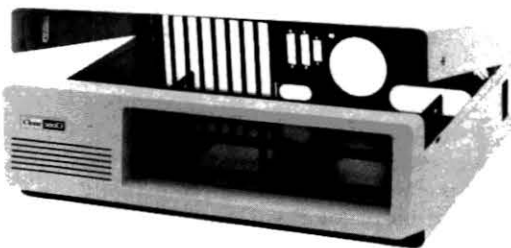
You can extend this concept to the entire family of Bit, Set, and Reset commands. The Table lists the data you'll need to keep your bit-diddling under complete program control. (I put two NOPs into the HL columns to emphasize these commands' parallel construction.)

Write to Nate Salisbury at 610 Madam Moore's Lane, New Bern, NC 28560.

BUILD YOUR OWN IBM CLONE

OR BUY ONE OF OURS COMPLETE FOR LESS THAN A TANDY 1000 AND GET REAL IBM COMPATIBILITY PLUS A ONE YEAR WARRANTY *8 SLOTS
 *ACCEPTS FULL SIZE CARDS (Not the puny Model 1000 type)
 *COMPLETE COMPATIBILITY *NO DMA FUNNY BUSINESS

Start with our high quality steel case with a flip-top that makes changing cards a snap. You won't void our warranty by opening the case. This is the foundation of your system. No cheap, flimsy plastic here. There are 8 slots and 7 of them accept both short and regular full length IBM add-on cards. You have room for up to 4 half-high drives. There is even a place for an additional fan. A speaker and all hardware are included. All you need is a Phillips screwdriver. \$ 89



Now for the heart of your IBM clone: the Main Board. No cost has been spared in manufacturing this fully IBM compatible, 640K RAM (all on the main board), 8 slot Clone of the IBM XT. The latest in technology including the famous NEC V20 8088 CPU chip, gives faster performance than the Tandy 1000 or 2000. There is even a socket for the 8087 numeric coprocessor. The board fits the case like a fine glove. Plug in the power connector, hook up the speaker and you are ready for the next step toward real IBM compatibility \$ 249

Add our 135W (twice IBM's) power supply for all the power you are likely to ever need. It has outputs for the main board plus up to 4 disk drives. The IBM-style side switch mates with our case \$ 99

The Multi I/O card provides for 5 major functions—floppy disk drives (up to 4 DS/DD 360K drives); IBM parallel printer port; 2 serial (RS-232) ports, 1 populated, 2nd optional (\$10); Game port; Battery backup clock/calendar. Includes clock software and internal disk drive cable \$ 149



2X THE POWER OF AN IBM



Standard \$ 89



Deluxe \$ 129

Keyboards are one area where nobody copied IBM. Many feel the standard IBM keyboard leaves a lot to be desired. We have the most popular aftermarket keyboards. The 5150 and the 5151 are capacitive types with the feel professionals demand. Both models offer lighted NumLock and Caps keys and the deluxe model has lighted Power and Cursor Pad keys along with a Reset key and a separate cursor and numeric keypad.

Two video boards are available. The color graphics video card has 3 outputs; RGB TTL; composite color; composite monochrome, plus a light pen port and a connector for an RF modulator. Standard IBM resolution of 320 x 200 four color graphics and 640 x 200 monochrome graphics \$ 99



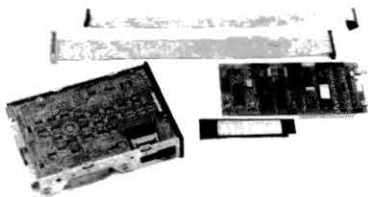
Hi-Res Monochrome \$ 179



Color Graphics \$ 99

Our monochrome graphics display card is Hercules compatible with a 720 x 348 TTL monochrome output. It runs Lotus 1-2-3 graphics and also has a parallel port \$ 129

Want to go with a hard drive? How about a 20MB half-high, low-power hard disk drive? Our complete kit includes the drive, cables, controller and software. It fits right inside your Clone and you can forget the floppy. Boot directly from the hard disk. Future expansion is assured as the controller accepts a second hard drive whenever you are ready \$ 489



The standard floppy disk controller is also available. It controls 2 internal and 2 external floppies like the Multi I/O card. This card comes with the internal 2-drive cable \$ 59



In order to finally see what you are doing we offer 2 monochrome video displays. The TTL display is able to display the hi-res output (720 x 348) of the Hercules or compatible card. This 12" video display has a non-glare display. Green or amber \$ 110
 The composite model is also able to display hi-res monochrome characters and graphics. Green and Amber with a 12" display \$ 99

IF YOU THINK THAT'S A GOOD DEAL...TRY THIS. WE'LL PUT IT TOGETHER FOR YOU AND GIVE YOU A DISCOUNT ON TOP OF EVERYTHING ELSE.

SPECIAL #1 \$ 795	SPECIAL #2 \$ 888	SPECIAL #3 \$ 1299
Steel Flip-top Case	Steel Flip-top Case	Steel Flip-top Case
135W Power Supply	135W Power Supply	135W Power Supply
640K RAM Main Board	640K RAM Main Board	640K RAM Main Board
Half-high 360K Floppy	Multi I/O Card	20MB Hard Drive
Color Graphics Card	Half-high 360K Floppy	Multi I/O Card
Composite Monochrome Display	Color Graphics Card	Half-high 360K Floppy
5150 Keyboard	Composite Monochrome Display	Monochrome Graphics Hi-Res
DOS 2.11 and BASIC	5150 Keyboard	TTL Monochrome Display
	DOS 2.11 and BASIC	5150 Keyboard
		DOS 2.11 and BASIC

Clone 9no10 **AEROCOMP**

TEL: 214-339-8324 TELEX: 882761 AEROCOMP FAX: 214-337-4981
 Redbird Airport, Hangar #8—PO Box 762426—Dallas, Texas 75376
 Prices and specifications are subject to change without notice.

Add \$60 for air delivery in the lower 48
 IBM is a trademark of International Business Machines
 Tandy is a trademark of Tandy Corp.
 Lotus and 1-2-3 are trademarks of Lotus Development Corp.
 Hercules is a trademark of Hercules Computer Technology
 NEC V20 is a trademark of NEC
 Clone is a trademark of Aerocomp

CALL TOLL FREE WITH YOUR ORDER
 800-527-0347 USA
 800-442-1310 Texas
 214-339-5104 Others

We Interrupt This Program...

If you're wondering why you have to customize PC hard drive controllers for the Model 1000, or why the Tandy Mouse board knocks out serial port 2, you should know about interrupts.

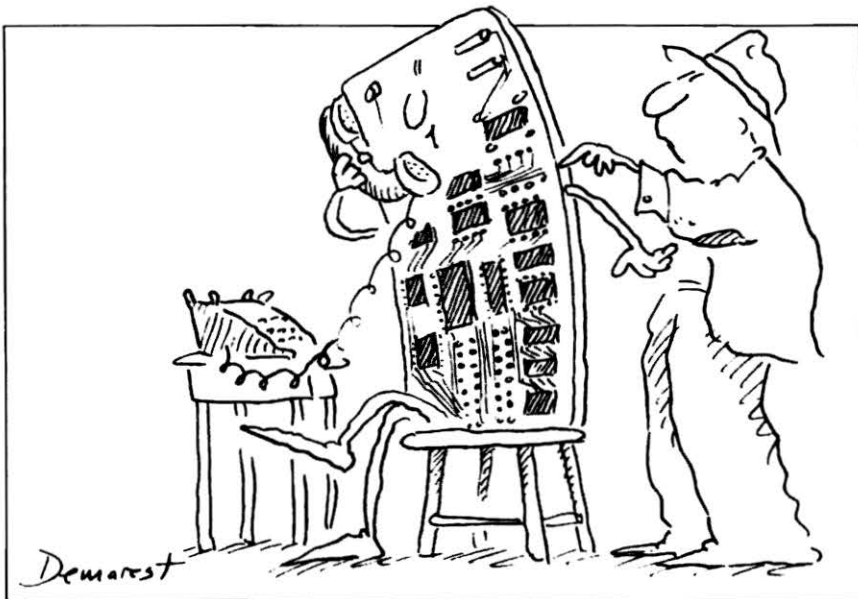
An interrupt is one of the most important features of any MS-DOS computer, and it's built in to the 8088 central processing unit (CPU) of your 1000 or 1200 (and into the 80186-controlled 2000). For whatever reason, the 1000's hardware interrupt assignments differ slightly from the IBM PC's. This can cause incompatibilities if you're not careful.

Breaking In

Interrupts let your computer's peripherals access the CPU. When the keyboard, clock chip, or disk drives need service, they get the microprocessor's attention with an interrupt request. The CPU interrupts the program it's running (at the end of the current instruction), stores its place (the whereabouts of the next instruction) on the stack, and services the request. When the interrupt routine ends, the CPU recovers its place from the stack and continues where it left off.

The clock chip ticks, for example, by sending an interrupt request 18.2 times a second on the 1000 (more often on the 2000). At each interrupt, the CPU momentarily jumps to a routine that increments a counter. The system time is figured from the clock counter. Similarly, the keyboard advertises that you've pressed (or released) a key so that the CPU can act accordingly, usually by storing a value in the keyboard buffer.

What if more than one peripheral needs attention at the same time? Only one of the 8088 CPU's input lines is meant for hardware interrupts. However, Intel supplies another chip (the 8259A) that acts as hardware receptionist and traffic cop for the 8088. (Its functions are partially built into the 2000's 80186.) The 8259A programmable interrupt controller (PIC) receives interrupt request lines from the system hard-



ware, prioritizes requests, and directs interrupts one at a time to the CPU.

PC clones (but not the 2000) have eight interrupt request lines (IRQ0-

IRQ7); most are located on the system bus (a track of parallel signal lines connecting the CPU and everything else) where expansion cards can tap into

*Program Listing 1. Batch file to produce blue DOS screen.
Don't type comments.*

```
ECHO OFF           'turns off display of batch commands
ECHO CTRL-V[[:1:37:44m 'bright white letters on blue background.
ECHO .             'so DOS won't ignore next command
CLS                'clears screen to blue
```

End

Program Listing 2. Long screen paging routine for the Model 1000.

```
10 KEY OFF:SCREEN 0,,0,COLOR 3,4:CLS
20 FOR I=1 TO 24 STEP 4:FOR J=1 TO 80:LOCATE I,J:PRINT CHR$(219);:NEXT J,I
30 SCREEN 0,,1,1:CLS
40 FOR I=2 TO 24 STEP 4:FOR J=1 TO 80:LOCATE I,J:PRINT CHR$(219);:NEXT J,I
50 SCREEN 0,,2,2:CLS
60 FOR I=3 TO 24 STEP 4:FOR J=1 TO 80:LOCATE I,J:PRINT CHR$(219);:NEXT J,I
70 SCREEN 0,,3,3:CLS
80 FOR I=4 TO 24 STEP 4:FOR J=1 TO 80:LOCATE I,J:PRINT CHR$(219);:NEXT J,I
90 SCREEN 0,,0:SCREEN 0,,1,1:SCREEN 0,,2,2:SCREEN 0,,3,3:GOTO 90
```

End

Program Listing 3. Short screen paging routine for the Model 1000.

```
10 KEY OFF:SCREEN 0,,0,WIDTH 80:COLOR 3,4:CLS
20 FOR H=0 TO 3:SCREEN 0,,H,H:CLS
30 FOR I=H+1 TO 24 STEP 4:FOR J=1 TO 80:LOCATE I,J:PRINT CHR$(219);:NEXT J,I,H
40 FOR K=0 TO 3:SCREEN 0,,K,K:SOUND 300*(K+1),1,1:NEXT K:GOTO 40
50 'SCREEN 0,,0:SCREEN 0,,1,1:SCREEN 0,,2,2:SCREEN 0,,3,3:GOTO 50
```

End

System Requirements

Models 1000, 1200, and 2000

WHY PAY MORE...

When you can own for **MUCH LESS!**

Enjoy year round Sale prices with credit card convenience or special discount prices for Cash Purchases.

Same day processing for speedy delivery

Special 30 day return policy.



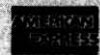
**TANDY®
COMPUTERS**

**FULL CATALOG
SELECTION**

**Customer
Service
9 AM
to
5 PM
Texas
time**



**Model 4
Limited
Quantity**



BIG D COMPUTERS

ROANOKE CENTER-ROANOKE, TX 76272

**CALL 1-800-FOR BIG D
(1-800-367-2443)**

them. The PIC is programmed so that IRQ0 has highest priority and IRQ7 lowest priority. Each line is assigned to a particular peripheral (see the Figure). In the interest of accurate timekeeping, the clock chip uses IRQ0 so it usually gets attention whenever it ticks.

How does the CPU know which peripheral needs attention and where to jump for the right routine? After the PIC sends an interrupt request to the CPU, it waits for an acknowledgement before taking further action. When the PIC receives the OK signal, it replies with the number (zero through 7) of the highest-priority IRQ waiting for service. The CPU uses this number to point to an address in the interrupt vector table. This table occupies the first 1,020 bytes of memory and contains space for 255 4-byte addresses pointing to potential interrupt subroutines. Many of these point to BIOS and DOS subroutines, conveniently called with the INT instruction—the software interrupt.

Some expansion boards (e.g. hard drive controllers) come with their own interrupt service routines programmed in a ROM chip on the board. During the booting process, these boards tie their ROMs into high memory (way above RAM) and stick the address of their ROM

IRQ0	System clock
IRQ1	Keyboard
IRQ2	Hard drive controller
IRQ3	Serial port 2
IRQ4	Serial port 1
IRQ5	Vertical synch (video)
IRQ6	Floppy drive controller
IRQ7	Parallel printer port

Figure. Tandy 1000 interrupt request line assignments.

routines into the proper spot in the interrupt vector table. Expansion boards using interrupts must tie in electrically to the appropriate IRQ line on the system bus. As a result, a hard drive controller can issue an interrupt request and the CPU will jump to a routine in the controller's ROM. RS-232 boards, however, use existing interrupt service routines in the computer's ROM.

If you're a curious machine-language programmer, you can use Debug both to find an interrupt's address in the interrupt vector table (the interrupt number times 4), and to unassemble it. The hardware interrupts are 8 through 15 (IRQ line number plus 8). The Model 1000

Technical Reference Manual gives information on the PIC, and most books on 8086/8088 machine language specific to the IBM PC detail the use of interrupts.

Compatibility Issues

IBM PCs and the Tandy 1200 use IRQ2 for the video vertical synch signal, and IRQ5 for the hard drive controller. The 1000 (and the PCjr) uses IRQ2 for vertical synch. You can't install a PC-compatible hard drive in your 1000 unless the controller board is modified. Not only must the board use IRQ2 instead of IRQ5 (a circuit change), but its ROM software must also put the hard drive interrupt address in a different spot in the interrupt vector table.

The Tandy mouse controller can also cause interrupt problems. You'll notice in the Figure that there's no established IRQ line for a mouse. Tandy chose to use IRQ3, which is normally assigned to COM2, the second serial port. As a result, you can't use COM2 with the mouse board installed (people have tried). Microsoft's mouse plugs into the serial port itself. The effect is the same: only one serial port with a mouse.

ANSI Echos


In my November 1985 column (p. 94), I described how to use the DOS Prompt command to pass control codes to the American National Standards Institute (ANSI) extended screen and keyboard driver. John Harrell has since given me a method I like better: the Echo command. I use Echo because I don't have to fool with the system prompt.

The trick is to get the escape character into the Echo command. The ESC code gets the ANSI driver's attention so that it takes the characters following ESC as control codes. Fortunately, ESC and control-[have the same ASCII code (27), and the EDLIN text editor on your DOS disk lets you put the control code in a line by pressing control-V. To represent ESC using EDLIN, you press the V key while holding down the control key, then press the [key by itself.

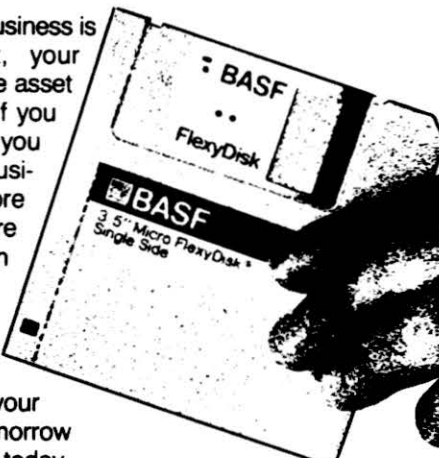
Use EDLIN to make a batch file with Echo statements containing the escape sequences you want to send to the ANSI extended screen and keyboard driver. The batch file in Program Listing 1 is another way to give you a blue screen when using the operating system (but not while running most programs). When you first enter the line using Echo to send the escape code, you'll see exactly what you type: ECHO ^V[1:37:44m. If you then use EDLIN's List command after editing, the line appears as ECHO ^V[1:37:44m.

After exiting EDLIN, you can list the batch file with DOS's Type command:

Circle 351 on Reader Service card.



If your business is like most, your most valuable asset is information. If you lose vital data, you could be out of business. That's why more and more firms now store their irreplaceable data on BASF Qualimetric FlexyDisks. Because they're made right, from the start, we are confident they will give you a lifetime of outstanding performance. Remember, your most vital information is secure for tomorrow when you enter it on BASF FlexyDisks today.



What separates us from our competition? Simply a combination of the best service in the industry, highly competitive pricing, and an ever widening range of products. Above all we care about our reputation and we are willing to work on a lower margin while delivering what others only claim—and we do it all on a day-in day-out basis.

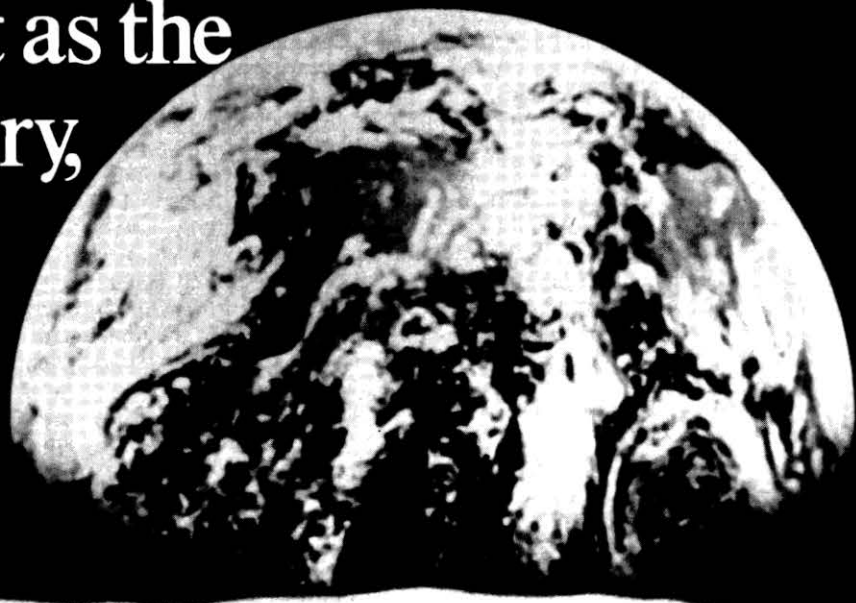
Early in 1986 every subscriber to 80 Micro will receive our New 1986 First Edition Catalog with 16 additional pages and dramatically lower pricing. We want to be your source for computer supplies and accessories.

Lyben Computer Systems

WATCH FOR OUR NEW 1986 CATALOG

1050 E. MAPLE RD. • TROY, MI 48063
(313) 589-3440

If the space program had advanced as fast as the computer industry, this might be the view from your office.



And space stations, Martian colonies, and interstellar probes might already be commonplace. Does that sound outlandish? Then bear these facts in mind:

In 1946 ENIAC was the scientific marvel of the day. This computer weighed 30 tons, stood two stories high, covered 15,000 square feet, and cost \$486,840.22 in 1946 dollars. Today a \$2,000 kneetop portable can add and subtract more than 20 times faster. And, by 1990, the average digital watch will have as much computing power as ENIAC.

The collective brainpower of the computers sold in the next two years will equal that of all the computers sold from the beginning to now. Four years from now it will have doubled again.

It's hard to remember that this is science fact, not fiction. How do people keep pace with change like this? That's where we come in. We're CW Communications Inc.—the world's largest publisher of computer-related newspapers and magazines.

Every month, over 9,000,000 people read one or more of our publications

Nobody reaches more computer-involved people around the world than we do. And nobody covers as many markets. In the United States we publish three computer/business journals. Micro Marketworld, for businesses selling small computers and software. On Communications, the monthly publication covering the evolving communications scene. And Computerworld, the newsweekly for the computer community, is the largest specialized business publication of any kind in this country.

We also offer seven personal computer publications. InfoWorld, the personal computer weekly, is a general interest magazine for all personal computer users.

The other six are monthly magazines that concentrate on specific microcomputer systems. PC World, the comprehensive guide to IBM personal computers and compatibles. inCider, the Apple II journal. Macworld, the Macintosh magazine. 80 Micro, the magazine for TRS-80 users. HOT CoCo, the magazine for TRS-80 Color Computer and MC-10 users. And RUN, the Commodore 64 & VIC-20 magazine.

And we have similar publications in every major computer market in the world. Our network of more than 55 periodicals serves 25 countries. Argentina, Australia, Brazil, Canada, Chile, Denmark, Finland, France, Greece, India, Italy, Japan, Korea, Mexico, The Netherlands, Norway, People's Republic of China, Saudi Arabia, Southeast Asia, South Africa, Spain, Sweden, United Kingdom, United States, and West Germany.

The sooner we hear from you, the sooner you'll hear from our readers

Simply put, we'll make it easy for you to reach your target audience—and for them to reach you. Call today for more information. You'll find the number below.



CW COMMUNICATIONS/INC.

375 Cochituate Road, Box 880
Framingham, MA 01701 (617) 879-0700

TYPE FILE NAME.BAT. Only the Echo statement appears on the screen. The ANSI driver interprets everything after the ESC code as control codes.

The Echo technique creates one problem: The DOS batch file processor doesn't recognize the line following the ESC sequence. Therefore I put the dummy Echo statement in the batch file just to be ignored. The screen doesn't turn completely blue until the CLS command, and you must type in CLS to regain the blue after running black-and-white programs. I find that two DOS prompts appear after running this file if I don't put the first line (ECHO OFF) in the program.

Video Paging

I've finally figured out how to make the 1000's buggy first version of GW-Basic switch video pages without clearing everything off the screen. You can switch video pages with the contents intact as long as you never specify the Burst parameter in the Screen command. Once you do so, any invocation of the Screen statement clears the screen. There's no way (not New, Clear, CLS, nor any permutation of Screen) to get paging back short of leaving and reentering Basic.

To commemorate this event, I wrote a

demo program that creates four video pages and switches rapidly between them. What a test pattern. I wrote two versions: the first (Program Listing 2) is a better demonstration. Line 90 does the actual page-switching.

The second version (Program Listing 3) uses more loops to do the same thing in less space, only it works much faster (too fast) using a loop to change pages. I added the Sound statement to slow it down. You can vary the speed by changing the value in the tone length parameter of the Sound statement. Vary it from 0.1 to 10 (or higher) to get a feel for the screen change. I find the speed difference between the two program versions to be puzzling.

You might use paging to put a series of menus or help screens on pages 1-3 in 80-column text mode (1-7 in 40-column mode). If you use page zero for normal program use, you can quickly display the extra pages with Screen. I couldn't get more than four pages in 80-column mode even with CLEAR ...,32768. I'll experiment more with paging when I start using the newer, fixed version of Basic.

Miscellaneous

Sears stores (with computer departments) sell a cheap (\$350) RGB monitor

that works with the 1000. It can double as a TV. *Consumer Reports* rated it a best buy. Its small but heavy footprint may cause the 1000's plastic case to buckle. The cable is extra.

If you miss TRSDOS's ability to search all drives for a file, you can re-create that ability on MS-DOS with the Path command as follows: PATH A:\;B:\. You can run any program without specifying the drive. The Copy, Rename, Delete, and other functions will not jump drives with MS-DOS 2.11. It's safer that way.

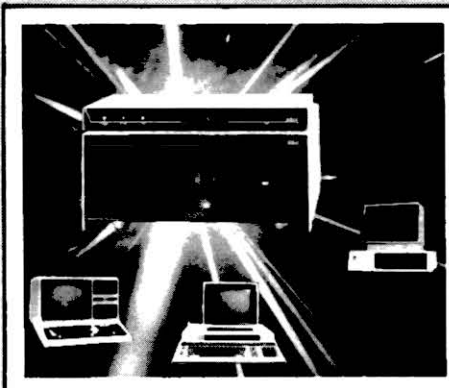
Two keys can make your 1000 appear to hang up. The Hold key is obviously the first, and its effects end when you press it again. The print key, however, can stop your computer cold if your printer isn't ready or hooked up. When it happened to me, I could still call up SideKick, but I couldn't make the DOS command processor budge. I rebooted.

The DOS Print command is handy if you've got a large file to print, but must be doing other things with your computer. You can run other programs while printing. Printing is slower because it gets second priority. ■

You can write to Dave Rowell at 80 Micro, 80 Pine St., Peterborough, NH 03458.

Circle 300 on Reader Service card.

The Bi-Tech Star Network



Able to link 8 computers to a Hard Drive System

IBM PC, XT, AT • Compaq • AT&T 6300 • Columbia • Corona • Eagle • TI Professional • Zenith • Televideo • IBM Compatibles
Tandy Models I, III/4, 2/12/16, 1000, 1200, 2000 •
Epson QX-10/16, Equity I, II, III • NEC APC III

RADIO SHACK MODEL FEATURES:

- 10 Megabyte Removable Cartridge
- 10-60 Megabytes Drive
- Multiple Operating System Segments
- Variable Segment Size Capability

MODEL I/III/4 SYSTEMS —

- DosPlus 3.5 & DosPlus 4
- LDos 5.1
- TRSDOS 6

- CP/M — Hard Disk Support

MODEL III/12 SYSTEMS —

- DP 11
- TRSDOS 2.0 with Racet HSDS
- CPM — Hard Disk Support

MODEL 16 —

- Xenix Support

MODEL 1000/1200/2000 —

- MS-DOS, PC-DOS

SPECIAL CLOSEOUT

2 user MULTIPLEXER (EXPANDABLE TO 4 USERS)
for Models I/III/4 includes 2 Host Adaptors

FOR Bi-Tech Hard Drives, TANDY Hard Drives, most manufacturers

\$495⁰⁰

Special with any purchase of a Bi-Tech MULTIPLEXER SYSTEM.

10 Megabyte Hard Disk

at **995⁰⁰**
complete

Tandy 1000/1200

Internal Hard Disk Upgrade Kits

Includes: Controller, Drive, Cables & Manual

- 10 meg \$595.00
- 20 meg \$795.00

INTRODUCING... A New Line of Bi-Tech Hard Drive Systems

- ★ The same Performance & Quality as our PREMIERE SYSTEMS.
- ★ The New Compact System is designed as an economical alternative.
- ★ Single 1/2 Height Winchester Drive
Sizes: 10-40 Meg Fixed
10 Meg Removable Cartridge
60 Meg Streaming Tape Backup



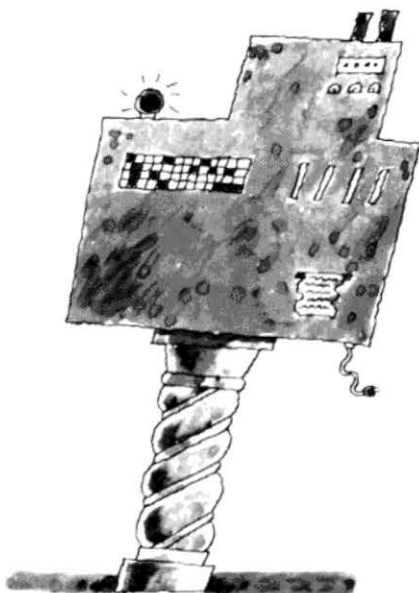
Bi-Tech Enterprises
10 Carrough Road
Bohemia, NY 11716-2996
(516) 567-8155 (800) 645-1155

REFER TO DEPT 110

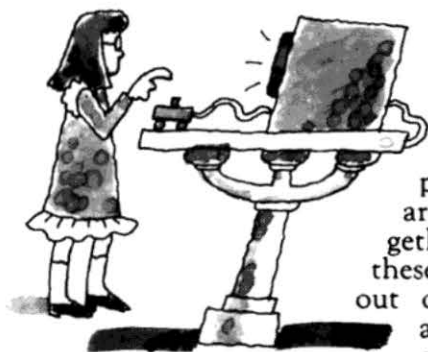
All prices above include 2 1/2" diskettes. Freight, with customers add'l. shipping. Add \$4.00 shipping & handling on all prepaid orders. Add \$7.00 shipping & handling on all prepaid orders. Max. order \$1,000.

WANTED: OLD THINKER TOYS.

CW Communications, ComputerLand and The Computer Museum invite you to send in your early personal computers, software, and memorabilia — you could win a free trip to The Computer Museum in Boston



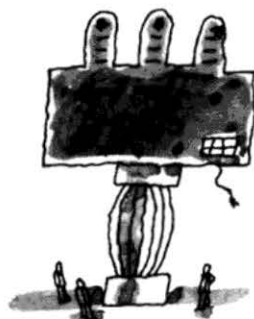
Your old, dusty "thinker toy" may now be ready to become a treasured museum piece. The Computer Museum in downtown Boston — an international museum dedicated entirely to computing — is searching for the very best and most unique relics of the personal computer revolution.



ComputerLand, CW Communications, and The Computer Museum are working together to bring these early relics out of your attic and into the collection of

The Computer Museum. The museum is especially looking for kit machines, prototypes, programs, output, newsletters and memorabilia of early computing from around the world. A selection of the finest items will be used to create an exhibit on the

evolution of personal computers and a catalog highlighting the Museum's collections. If your submission is accepted for addition to the Museum collection, you will be invited to the grand opening of the exhibit and will receive a bound edition of the catalog. If your item is selected as one of the five best "finds", you will also receive an all-expense-paid trip to Boston for the grand opening party.

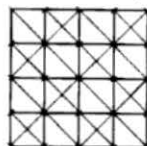


So, get up to the attic, down to the cellar and into your closets, and tell us what you find! Call or write the Museum for an official entry form, or send a photo and description of your items by March 1, 1986

to: The Computer Museum, Personal Computer Competition, 300 Congress St., Museum Wharf, Boston, Massachusetts USA 02110, (617) 426-2800, Telex: 62792318.

ComputerLand

**The
Computer
Museum**



CW COMMUNICATIONS/INC.

Entries will be judged on significance, rarity, date, completeness and condition. Items particularly sought include pre-1980 machines, early serial numbers (get those number 1's out), machines made for purchase outside of North America (even modern machines are sought in this category); first releases of software such as first releases of operating systems, languages and mass-marketed and original applications; and pre-1980 photographs, newsletters, manuals and other records. The Computer Museum is a private non-profit educational institution. All donations are tax deductible according to the provisions of the Internal Revenue Service. Thinker Toys is a registered trademark of George Morrow & Morrow Designs, Inc.

Bars and Stripes

The STROBE from Pro/Digital Systems lets you enter bar code data into an IBM PC or Model 1000 (running MS-DOS 2.1 or greater) as if you typed it in. It automatically recognizes and bidirectionally decodes the bar code formats UPC, Code-39, and Codabar.

The STROBE package consists of a high-resolution red Opticon MSH-510 optical wand, an IBM PC interface, disk-based bar code decoding software, and a manual. The STROBE decoder is transparent to all software and requires no changes to your programs. It is embedded into MS-DOS at power-up and constantly checks the reader wand for activity.

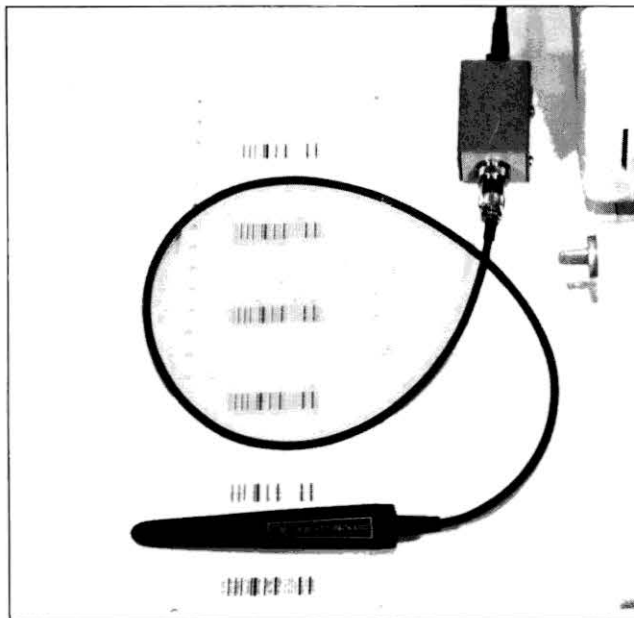
STROBE works with spreadsheets, data bases, Basic, and DOS. With the IBM PC interface, the optical wand reads data through the parallel printer port and permits simultaneous wand and printing. Bar code printing software is optionally available to print bar code labels on any Epson-series printer.

The STROBE package costs \$299.95. You can use optical wands sold by Radio Shack with the program. The interface and the software alone is \$149.95. For more information, contact Pro/Digital Systems, 3825 W. Garden Grove Blvd., Suite 25, Orange, CA 92668, 714-750-5724.

Circle 575 on Reader Service card.

Death Wish

Borrowed Time by Activision is an illustrated text adventure game where you are both the hunter and the hunted. As Sam Harlow, a small-time private eye of the 1930s, you must track down and cross-examine a number of suspects in less than a day. Time and strategy are critical. You must constantly keep an eye over your shoul-



STROBE decodes UPC, Code-39, and Codabar.

der to avoid losing your life to the one suspect who is tracking you.

Borrowed Time includes special on-screen command features such as pull-down windows, point-and-press options, and "most-used command" menus. An expanded parser lets you enter commands in plain English. The program is available for the IBM PC and the Model 1000 for \$39.95. For more information, contact Activision Inc., 2350 Bayshore Frontage Road, Mountain View, CA 94043, 415-960-0410.

Circle 574 on Reader Service card.

Fast Math

Trionix offers an electronic board designed to upgrade the Model 1000 so that it can use Intel's 8087 math coprocessor. The board retrofits the Model 1000 to take advantage of the speed increase for floating-point math calculations. For example, a math program that currently takes 60 seconds without an 8087 will run in 4-5 seconds with an 8087.

The board doesn't use an expansion slot and you install it yourself. You can order the

board with the 8087 (\$235) or without (\$110). It comes with full installation instructions. For further details, contact Trionix, 3563 Roosevelt # B, Carlsbad, CA 92008, 619-434-4439.

Circle 571 on Reader Service card.

Assembly Time

Microsoft offers a new, high-speed version of its Macro Assembler language. Macro Assembler 4.0 is three times faster than the previous version. It requires 128K, one disk drive, and MS-DOS 2.0 or higher.

The new version lets you assemble larger source files with more symbols and more macro text. New assembly switches make the assembler more convenient to use and more efficient. Microsoft's Symbolic Debug Utility supports source-level debugging of programs written using the Microsoft C compiler, Fortran, Pascal, or Macro Assembler. Screen-swapping lets you switch between the debugging screen and the application output.

The assembler comes with an interactive source-level symbolic debugger, linker,

program maintenance utility, library manager, cross-reference utility, and .EXE file-packing and header utility. The program costs \$150, and upgrades for registered owners are \$75. For more information, contact Microsoft Corp., 10700 Northup Way, Box 97200, Bellevue, WA 98009, 800-426-9400.

Circle 577 on Reader Service card.

Hot Flashes

Personal Computer Support Group's LIGHTNING makes disk access two to four times faster on your IBM PC or compatible.

LIGHTNING loads onto your DOS disk if you use floppies, or into the DOS area if you have a hard disk. When you boot the DOS, LIGHTNING loads itself permanently in memory. It works with your data base manager, word processor, or spreadsheet and speeds up loading and saving files.

A copy-protected version of LIGHTNING is \$49.95; unprotected, it's \$89.95. For more information, contact Personal Computer Support Group, 11035 Harry Hines Blvd, 206, Dallas, TX 75229, 214-351-0564.

Circle 578 on Reader Service card.

Worth While

The Scarborough Systems Inc. (55 S. Broadway, Tarrytown, NY 10591, 914-332-4545) offers an upgraded version of its home financial management program, Your Personal Net Worth. It works on the IBM PC AT and is compatible with the Model 1000.

The non-copy-protected program handles up to 10 checking accounts, up to 350 different budget categories, credit card accounts, and thousands of individual entries. It records stock and other investment transactions and documents household valuables, collectibles, and important papers.

Your Personal Net Worth

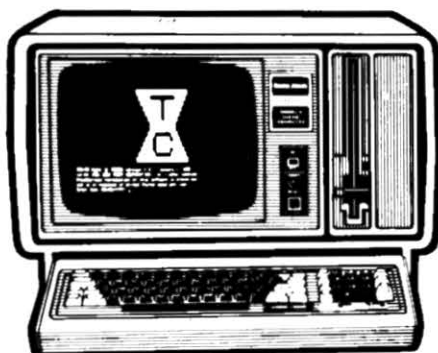
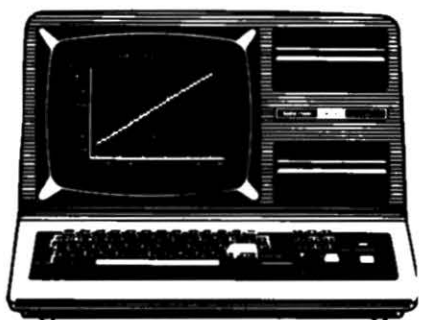
NOCONA

ELECTRONICS

MODEL 4D

MODEL 6000

MODEL 1000



NEW 512K MOD 3000 W/20 MEG HD. . . .2499.00

256K MOD 2000 W/MONO MONITOR . . .	1019.00	512K MOD 3000	1819.00
256K MOD 2000 W/COLOR MONITOR . . .	1299.00	DMP 105 PRINTER	145.00
256K MOD 1200 HD 1 DR.	1499.00	DMP 130 PRINTER	249.00
128K MOD 1000 W/MONO 1 DR.	779.00	DMP 430 PRINTER	585.00
128K MOD 1000 W/COLOR 2 DR.	1119.00	DMP 2100P PRINTER	1019.00
256K MOD 1000 W/10 MEG HD	1439.00	DWP 220 PRINTER	429.00
24K MOD 100 PORT	399.00	DWP 510 PRINTER	999.00
24K MOD 200 PORT	679.00	TRACTOR DWP 220	99.00
NEW MOD 600 PORT	1149.00	TRACTOR DWP II/510	159.00
64K MOD 4D 2DR.	839.00	TRACTOR FEED DMP2100P	99.00
512K MOD 6000 W/15 MEG HD	3779.00	PARALLEL PRINTER SWITCH	96.00
15 MEG HARD DISK	1119.00	PARALLEL PRINTER CONTROLLER	179.00
35 MEG HARD DISK	2059.00	70 MEG HARD DISK	2949.00

NEW DMP 2200 PRINTER 1149.00

100% RS COMPONENTS NO FOREIGN DRIVES OR MEMORY FULL WARRANTY

ALL RS SOFTWARE 20% OFF CATALOG PRICE

CASHIERS CHECK OR MONEY ORDER MUST ACCOMPANY ALL ORDERS

(817) 825-4027

NOCONA ELECTRONICS • BOX 593 • NOCONA, TX 76255

THE RS-232

MODEL III MODEL 4

State of the art technology in board design, our direct replacement of Radio Shack's* internal RS-232 board, mounts inside the Model III or 4 on the existing brackets. All cables, screws and complete mounting instructions are included. Non-technical people will find that installation is quick, straight forward and simple requiring less than 15 minutes to complete.

Total compatibility with Radio Shack* and all existing software is maintained. Software programmable baud rates from 50 to 19,200 baud are supported along with programmable word length, stop bits, and parity. May be utilized in either half of full duplex operation.

Outstanding Value
At
Only **\$69.95**
Guaranteed One Full Year
Dealer Inquiries invited

Please forward payment by a cashier's check or money order.
Visa or Mastercharge also accepted.
Add \$3.00 shipping & handling
(Foreign orders quoted on request)

CompuLogic
4831 SOUTH HAMPTON RD. LB31
DALLAS, TEXAS 75232
214/330-1332

TAX-PREP™ '86

takes the pain out of taxes
Available for use with Multiplan or Lotus 1-2-3

Whether tax preparation is your business or you do your own, TAX-PREP™ '86 saves you money and time while giving you totally professional returns.

Look at these features:

- Easy to use, menu driven.
- 22 IRS Schedules: 1040, A to W, 2106, 2119, 2210, 2441, 3468, 3903, 4562, 4684, 4797, 5695, 6251.
- Automatically computes income averaging, depreciation and alternative minimum tax.
- All forms and schedules linked.
- Complete manual, tutorial, full documentation for each schedule.
- Prints in error free IRS approved format.
- Prints on IRS 1040.
- Used by professional preparers - includes client letter, 1040 transparent overlays.
- Discounts on updates.
- Continuing software support.

To order: specify your computer and Multiplan or Lotus 1-2-3 spreadsheet. Available for TRS-80 Model 4, 4P, II, 12, 16 (TRSDOS); Tandy 1000, 1200, 2000; or CP/M.

TAX-PREP™ '86 is \$129.99 plus \$3 s/h. In PA, add 6% sales tax.

VISA/MC

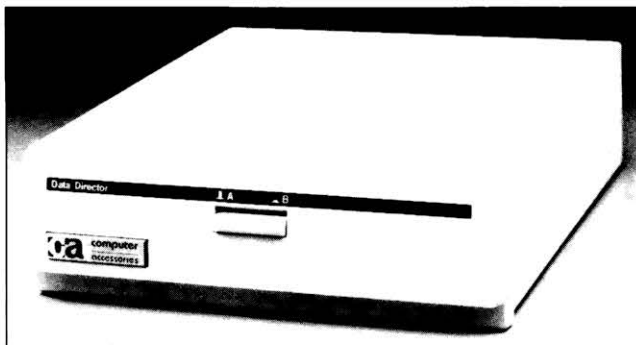
EZWARE

29 Bala Avenue., Dept E, Bala Cynwyd, PA 19004
(215) 667-4064

NEW! EZTax-PLAN PRO™. Develop individual and corporate tax strategies for you or your clients, includes proposed tax law changes, fully adjustable, projects 10 years or more. Now available for Tandy 1000, 1200, 2000, **\$295.**

SEND FOR FREE INFORMATION

MS-DOS NEW PRODUCTS



The Data Director, a data transfer switch.

costs \$99.95. If you already own the program, you can get the upgraded version for \$10. For further information, contact Scarborough Systems.
Circle 576 on Reader Service card.

Data Sharing

Computer Accessories Corp. offers The Data Director (Model Q1020), a two-position data transfer switch that lets two parallel peripherals share the same computer port. It features printed circuit board construction, a sealed push-button switch, a shielded case, and DB-25 female port connectors.

The switch costs \$99.95. For more information, contact Computer Accessories Corp., 6610 Nancy Ridge Drive, San Diego, CA 92121, 619-457-5500.
Circle 570 on Reader Service card.

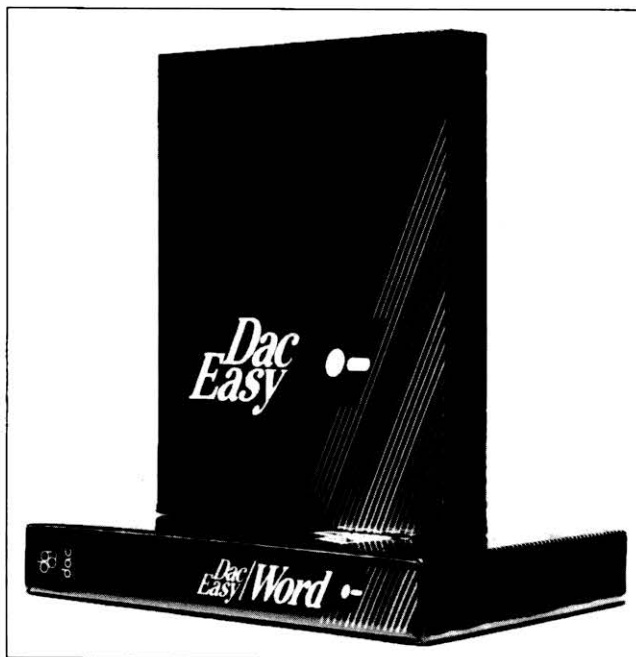
Easy Words

Dac-Easy Word from Dac Software is a full-featured word processor for the 256K IBM PC and compatible computers. You can work on four different documents at once using Dac Windows, automatically hyphenate words with Dac's internal dictionary, merge files, automatically search text, get a word count, and number pages.

Dac-Easy Word costs \$49.95 plus \$7.50 shipping and handling. For further information, contact Dac Software Inc., 4801 Spring Valley Road, Bldg. 110B, Dallas, TX 75244, 214-458-0038.
Circle 573 on Reader Service card.

To the Rescue

The Brown Bag File Recovery System for the IBM PC



A word processor from Dac Software Inc.

YOU ALREADY HAVE HALF OF THE BEST WORD PROCESSING SYSTEM IN THE WORLD

For **\$49.95** more, your MultiMate, Display Write, WordStar, pfs:WRITE, VolksWriter, Writing Assistant or other WP Software¹ can instantly **U** **L** **T** **O** fifty columns of text, automatically create outlines, calendars, newsletters, contracts, easy mail merges, screenplays, scripts, footnotes², boxed copy and lots more. It's fun with

PowerText FORMATTER

TO ORDER, CALL OR WRITE



BEAMAN PORTER, INC.

¹ Any other MS-DOS or AMI WP Software
² In the same page or end of your document

417 HALSTEAD AVENUE
HARRISON, NY 10528
(800) 431-6007
(914) 835-3156 IN NEW YORK

Add \$5 for Shipping and Handling

Check Reader Service

Number 349
for **FREE**
software and
download
information

80 Northwest Publishing
3838 South Warner St.
Tacoma, Washington
98409

TANDY 1000



8087 COPROCESSOR

Does Not Require an Expansion Slot
Operates with Symphony, Lotus 123 Etc.

— — **Faasssstttt** — —

\$110.00 Board Alone, You Provide 8087
\$235.00 Board Including 8087

Easy to follow installation instructions.

Send Check or Money Order to:

TRIONIX

3563 #B Roosevelt St.
Carlsbad, CA 92008
Ph. 619-434-4439

TRS-80™ MODEL 1, 3, AND 4 SOFTWARE

TYPITALL Word Processor **\$129.95**

TYPITALL with Spelling Checker **\$179.95**

Word Processor upwardly compatible with SCRIPSIT — it reads your old SCRIPSIT files and uses the formatting and cursor movement commands you are already familiar with. But it is a completely new word processor with so many advanced features that we can't even mention all of them here.

Send **any** control or graphic/special character to the printer. Control/graphic characters included **In the text** so that you have complete control of all features of your printer. Print the 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, and 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 the text. Optional spelling checker comes with 29,500 word dictionary. Verify a 3,500 word document in **less than two minutes**. True Model 4 (80 x 24 display, TRSDOS 6) and Model 1/III vers.

SYSTEM DIAGNOSTIC **\$99.95**

Is your computer working correctly? **Are you sure?** System Diagnostic has complete tests for every component of your TRS-80 Model 1, 3, or 4 (separate versions necessary for each model).

ROM: checksum test. **RAM:** three tests including every location and data value. **Video display:** character generator, video RAM, video signal. **Keyboard:** every key contact tested. **Line printer:** character tests with adjustable platen length. **Cassette recorder:** read, write, verify data. **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 or double density, 1-99 tracks. **RS-232-C interface:** connector fault, data transmission, framing, data loop, baud rate generator.

SMART TERMINAL **\$74.95**

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** of outgoing data. **Automatic storage** of incoming data. **Character translations**. True BREAK key. Help screens, line feed filters, echo and line printer toggle switches, and more.

TRS-80™ Mods. 1, 3, & 4 - MS-DOS - CP/M SOFTWARE

SMALL BUSINESS ACCOUNTING **\$99.95**

This program is based on the **Dome Bookkeeping Record #612**, and handles **general ledger** and **payroll** for a small business. Category breakdowns are provided for both income and expenses. Monthly, through last month, and year-to-date summaries computed. Start the fiscal year with any month.

Payroll section handles up to 99 employees. Automatic computations for F.I.C.A., federal and state income tax. Three optional deductions also included. Print both payroll and expense checks using same forms. Reports include monthly, quarterly, and year-to-date summaries, 941 and W-2 forms. Simple and easy to learn — ideal for first-time computer users.

MAILING LIST **\$69.95**

Build and maintain mailing lists of up to as many names as you can fit on standard diskettes (1,250 for TRSDOS and CP/M, 2,500 for MS-DOS). Four-line labels with optional line that can be used either for unprinted data or as part of the label. Add, change, delete, or find names. Sort according to data in **any** field. Print labels in 1, 2, 3, or 4 adjustable columns.

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

A complete checkbook program together with budgeting, income and expense analysis, comparisons, and projections. Enter and print checks, enter deposits, and compute your current checking balance. Program also handles non-check expenses, bank debits, and income. Monthly and year-to-date summaries and 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. Handles **order entry, invoicing, inventory, and bookkeeping**, including general ledger, accounts receivable, accounts payable and customer statements. Includes up to 999 8-character part numbers. Items deducted from inventory when orders entered. Handles both customer accounts and single orders. Invoices printed on forms or plain paper and include discounts, sales taxes, and shipping and handling charges. Bookkeeper produces monthly and year-to-date totals. Receivables tracked to invoices, automatically updated as income entered. Inventory reports track sales by part numbers.

HOWE SOFTWARE

14 Lexington Road, New City, New York 10956

Information and same day orders: **(914) 634-1821**

24-Hour TOLL-FREE Order Number:

Outside California: **(800) 428-7825, ext. 169**

Inside California: **(800) 428-7824, ext. 169**

When ordering, please give your computer model number. Terms: checks, Visa, Master Card, or C.O.D. Shipping and handling: \$3.00. Canada, Mexico, Hawaii: \$6.00. Air mail overseas: \$17.00. New York residents add sales tax.

*TRS-80 is a trademark of Tandy Corp.

FX/RX Owners

THIS
(Draft Print)



or THIS
(NLQ Print)

(5 x size)



Install our new LetterWriter NLQ upgrade kit in your printer and you can choose NLQ (or any of 15 other print features) by simply tapping your printer panel buttons. NLQ print has four times the resolution of draft print. That means finer character detail, no visible dots, and impressive-looking documents. The FX version even adds IBM Graphics printer compatibility. With LetterWriter in your FX or RX, you may never need to buy a letter quality printer. Why not get LetterWriter for your printer today?

NLQ 12345abcdefghijklmnopqrstuvwxyz
Draft 12345abcdefghijklmnopqrstuvwxyz



FINGER
PRINT
LetterWriter™
NLQ Upgrade Kit
by:

\$79.95 \$59.95
FX RX

For all FX-80/100 and RX-80/100 printers including F/T and + series. Simple plug-in installation. Complete instructions included.

Dresselhaus Computer Products, Glendora, CA
Call (818) 914-5831 for dealer nearest you.

Circle 181 on Reader Service card.

EXPAND THE TANDY 2000®
TO

896K

OF DOS ADDRESSABLE RAM

Includes RAMdisk Software at No Extra Cost ...
Add 640K of External RAM Memory to TANDY 2000's®
256K of Internal RAM Memory for a total of 896K of DOS Ad-
dressable RAM.

★ ★ New Products Available Soon ★ ★
(Send for catalog)

cost: \$495.00 for a 640K bytes of External
RAM Memory Board (Includes RAMdisk
Software)
Call about our Trade-in Exchange option
if you already use Tandy's 128K External
Memory Board.

for ordering (509) 627-5291
and information call: Hours 9:00-5:00 PST

terms: We accept Check, MO, Visa, Mastercard
Add 7.3% sales tax in Wash.
Add \$3-shipping/handling, \$5 foreign.

TANDY 2000® IS A TRADEMARK OF TANDY CORPORATION
RAMdisk is a Random-Access-Memory based disk

ENVISION DESIGNS

1909 ORCHARD WAY • RICHLAND, WASHINGTON 99352

78 • 80 Micro, March 1986

MS-DOS NEW PRODUCTS

and compatibles works with both hard and floppy disks. It recovers erased files, repairs damaged files, locates a file you misplaced in some sub-directory, and more.

The menu-driven program offers on-line help for each option. The package is \$49.95. For more information, contact Software Resource Group Inc., 15100 El Camino Grande, Saratoga, CA 95070, 408-395-9568.

Circle 579 on Reader Service card.

Fractions

T-1000 Math:Fractions by Viking Educational Software teaches you how to add, subtract, multiply, and divide fractions. A special section covers vocabulary related to fractions.

Step-by-step explanations along with exercises make the program an effective learning aid. T-1000 Math:Fractions is designed for the 128K Model 1000 with one disk drive. It costs \$19.95. The program is also available for the Models I, III, and 4. For more information, contact Viking Educational Software, 910 Soo Blvd., Rice Lake, WI 54868, 715-234-2680.

Circle 572 on Reader Service card.

Corporate Taxes

BNA Corporate Tax Spreadsheet (\$695) from BNA Software lets you do corporate tax planning and audits. The program is a self-contained spreadsheet that runs on the

IBM PC and compatibles with 256K, MS-DOS 2 or higher, and two double-sided floppy drives or one double-sided floppy drive and one hard drive.

Features include automatic calculation of regular, alternative, and minimum taxes (including special transition rules for changes in rates for fiscal-year corporations); net operating loss (NOL) carryovers and carrybacks; and investment tax credit (ITC) limitations.

Contact BNA Software, 1231 25th St. N.W., Washington, DC 20037, 202-452-4453. Circle 580 on Reader Service card.

Keystroke Saver

Productivity Software International's PRD+ helps you speed up data entry and improve accuracy. It's a memory-resident program that runs on IBM PC-compatible computers and works with popular word processors, data base managers, spreadsheets, and graphics and integrated software packages.

The program lets you define and use abbreviations that expand into words, phrases, formulas, or programming commands (up to 240 characters).

PRD+ costs \$195. For more information, contact Productivity Software International L.P., 1220 Broadway, New York, NY 10001, 212-967-8666.

Circle 583 on Reader Service card.

MS-DOS New Products Index

Reader Service Number	Company	Page
574	Activision Inc.	74
580	BNA Software	78
570	Computer Accessories Corp.	76
573	Dac Software Inc.	76
577	Microsoft Corp.	74
578	Personal Computer Support Group	74
575	Pro/Digital Systems	74
583	Productivity Software International	78
576	Scarborough Systems	74
579	Software Resource Group Inc.	76
571	Trionix	74
572	Viking Educational Software	78

New Products listings are based on information supplied in manufacturers' press releases. 80 Micro has not tested or reviewed these products and cannot guarantee any claims.

Turn your PC into a Personal Publisher

Desktop publishing has finally come to your PC with ClickArt Personal Publisher.

Now you can move from first thoughts to finished copy easily and directly—with the professional quality fonts and images, and the sophisticated editing, page-layout and graphics tools of ClickArt Personal Publisher.

The graphical what-you-see-is-what-you-get interface makes creating and editing your layout almost intuitive. ClickArt Personal Publisher gives you sophisticated page formatting ranging from one to four columns, whether you enter your text directly or read it in from a word processing file. Column widths are variable and each line can be individually sized and positioned. There's even a unique PictureWrap feature which flows text automatically around images.

As the first Apple Macintosh picture- and font-compatible program for your PC, ClickArt Personal Publisher gives you access to thousands of images and hundreds of fonts already created for the Macintosh. We've included hundreds of images and a dozen fonts in the basic package.



You can print your results on most popular dot matrix printers such as Okidata and Epson. Or if you want the professional look of near-typeset quality, options are available to support the Apple Laserwriter or the HP LaserJet.

ClickArt Personal Publisher is **\$185** for the dot matrix version. Optional accessories for either the Apple LaserWriter™ or the HP LaserJet™ are an additional **\$150**.

See it at your dealer or call or write us for sample outputs and more information.

ClickArt Personal Publisher requires an IBM PC or compatible with 384K RAM, two disk drives and an IBM Color Graphics or Hercules Monochrome Graphics Card. Mouse recommended but not required.

ClickArt®
PERSONAL PUBLISHER

T/Maker Graphics
2115 Landings Drive
Mountain View, CA 94043
415-962-0195

Circle 266 on Reader Service card
IBM PC is a registered trademark of International Business Machines. ClickArt is a registered trademark of T/Maker Company. Macintosh is a trademark licensed to Apple Computer, Inc.



Getting Your Lines Right With the Basic Editor

The first TRS-80 was the 4K Model I with Level I Basic, in which you could correct typing mistakes in only two ways: Type over the line or backspace to the mistake if you hadn't yet pressed the enter key and retype from that point. The Model I also tended to throw in "xxxxxtrs" characters because of the once-notorious keyboard bounce. Imagine the frolics a fumble-fingered beginner had in debugging even a 10-line program.

Level II Basic quickly appeared. Along with added commands it offered line editing—and a miserably era closed. Today's Tandy computer offer a variety of ways to edit Basic programs. I'll cover what's available on the Model 4/4P.

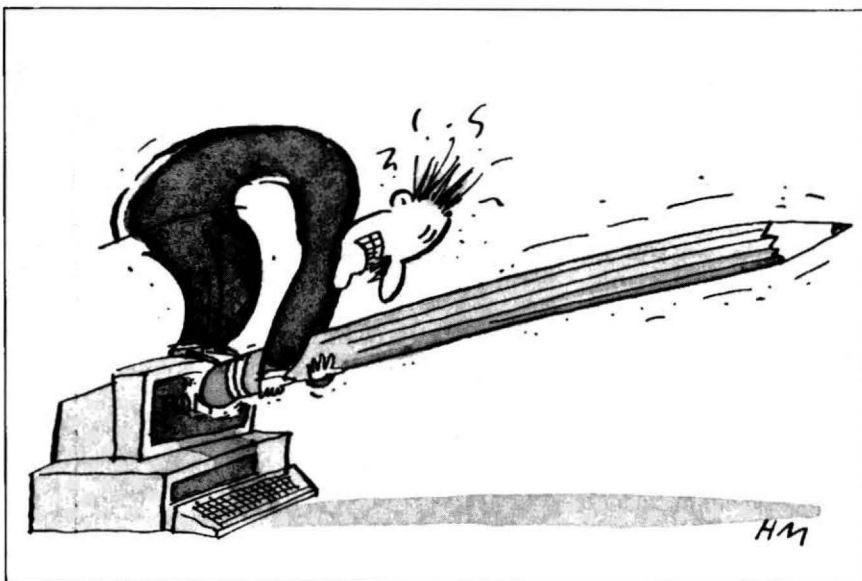
Learn to Edit

I've discovered that many beginning programmers take what they consider to be the line of least resistance. They retype lines again and again rather than stop for a while to learn how to edit. Or they learn a couple of editing commands and make do. I was exactly that way for about three months in 1979, when learning Basic was so heady an experience that there didn't seem to be time to slow down and learn it properly.

So I want you to solemnly repeat after me: "In the interest of saving untold hours in my future programming life, I promise never to change a Basic line by retyping until I learn all there is to know about editing." Having made that promise, you're committed. I guarantee you'll seldom resort to retyping once you know the system.

Follow the Rules

The rules aren't difficult to learn, but you have to put them in your fingers as well as your head. In the same way you learned to type, practicing the editing commands will make your fingers intelligent so they do what's needed without explicit instruction from the brain every



step of the way. That's why I made you promise to forego retyping lines until you learn the editing rules.

To begin, type in this line and press the enter key:

```
100 RUM * SOMETHING WRONG
```

The computer registers the material in memory as a program. It will produce a syntax error when you run it, so you need to correct it. "RUM" should be "REM" for remark.

Type in EDIT 100, meaning "edit line 100," and press the enter key. The line number appears with the cursor positioned after it. Though you can't see any of the line's characters yet, they're there. Tap the space bar. The cursor moves one position rightward, and the "R" of RUM appears. Press the D key for "delete." Basic displays the incorrect "U" between backslashes, meaning it's deleted the character. Now press the I key to get into the insert mode. Press the E and the enter keys, then type in LIST. Now you know both how to delete and insert material within a line.

Note that in typing in Basic material, Basic lists all letters of the alphabet not within quotes or to the right of a REM statement in capital letters, even if you type them in in lowercase. Type in LIST, press the enter key, and this appears:

```
100 REM * SOMETHING WRONG
```

Now for an experiment. Type in EDIT 100 and press the enter key. Hold down the space bar until the cursor reaches the end of the line. It sticks there. Now hold down the left-arrow key. The cursor races leftward to its starting position, while the characters disappear. Go back and forth all you want, then press the enter key. You've made no changes to the line.

Now change the "E" back to a "U" and run the incorrect program. Finding the syntax error, the computer announces it and puts itself in the edit mode for the offending line. For now, press the enter key to leave the line.

Next, type in CLS. This blanks the screen and prints the Ready prompt. Type in EDIT 100. Again, the line number comes up without immediately revealing line contents. How can you edit what you can't see? The sloppy solution is to press the enter key and immediately type in another edit command, but it's simpler to just press the L key. Basic prints out the full line of material and displays a second line with only the line number showing. You're still in the edit mode. The line above remains as reference for the new version you're creating.

The program is now basically correct but paradoxically wrong. The REM statement says "something" is wrong, but it isn't. Let's fix it. Tap the space bar

System Requirements

Models 4 and 4P
Basic

Special for Model 4 Users!

80 MICRO's Utility Pak

Software That Makes Computing Easier

Introducing the Load 80 **Utility Pak**—created specifically for Model 4* users. Featuring 15 outstanding **80 Micro** programs designed to help you write better software and utilize all the features of your Model 4.

Problem Solving Software

No matter what the task, the **Utility Pak** is a source of ideas, solutions, tricks, and shortcuts. There's something for everyone on this disk, from machine language devotees to Basic neophytes.

■ **M3TOM4** converts Model III Basic programs to the Model 4, listing all potential errors.

■ **Finder** is an extension to your Basic editor that lets you replace, copy and move line numbers; find strings in your program; build a cross-reference table; restore an erased program, and more. Eleven enhancements in all.

■ **Crosscheck** automatically cross-references Basic keywords, variables, and GOSUB, GOTO, and Restore statements.

■ **PF/FLT** lets you program your function keys, either permanently or dynamically from DOS.

■ **ECI/CMD** gives you a Unix-like shell that lets you issue multiple commands from DOS Ready, call a library of your last 10 keystrokes, and reissue

any of those commands with a single keystroke. Requires TRSDOS 6.2.

And that's only the beginning. In all, you get **15 top-notch Model 4 utilities**, direct from **80 Micro** to you.

A Must for Model 4 Users!

As a Model 4 user, you'll wonder how you ever got along without the **Utility Pak**. It's that terrific. And, we've put all necessary instructions right on the disk.

Don't wait until your next programming project has you baffled in the middle of the night. Order your own copy of Load 80's **Model 4 Utility Pak** while supplies last! It's the best LOAD 80 package yet.

Simply return the coupon or attached order card today. Or call toll-free **1-800-258-5473**. (In NH, dial 1-924-9471.)

YES! I want to be a more productive programmer. Please send me the Load 80 Model 4 **Utility Pak**** disk for \$26.50 ea. (Price includes postage and handling.)

Payment Enclosed Visa AE MC

Card # _____

Exp. Date _____

Signature _____

Name _____

Address _____

City _____

State _____

Zip _____

* Model 4 and Model III are registered trademarks of Radio Shack, a division of Tandy Corporation.
** Available in March 1986.

LOAD 80 • 80 Pine St. • Peterborough, NH 03458

3-86 SI





Whereis Lookfor

\$29.95 **69.95**

Whereis

Uses SMART Star* to locate files on the floppy or HARD disk and prints out about directories, files, date, etc.

Lookfor

What's his name ____? in 198 ____? File ____? John ____? **Lookfor** can find it to give a listing of all locations used. Includes **Whereis** capability.

Screen - 49.95

Retrieve data that has scrolled off the screen. Great for debugging.

Stack-39.95 Editor-DOS commands.

NoColor — 19.95

All characters & background made clear on monochrome screen. Works for games or business applications.

Spifty Program — 49.95

- Printout graphics, text, etc.
- on a label designed with PC Paint.
- B/W printer.

FILE TRANSFER + CONVERSION Utilities — 149.95

Supports TRS, Apple, CP/M, IBM PC/XT

All software available for Site Licensing

(408) 998-0164

MC/VISA/COD CHECK OK

**PERSONAL
COMPUTER
PRODUCTS**

3080 Olcott Dr. Ste. 130B
Santa Clara, California 95051

IBM is a register trademark of International Business Machines
Macintosh is a register trademark of Apple
Pfs is a register trademark of Software Publishing

BASIC TAKES

to move the cursor over the S in the word "something." Type in 4D, meaning to delete the four characters "some," which appear between backslashes. Now press the I key for insert, type in NO, and press the enter key. List the line to see the corrected version.

Don't Give Up

This is the point at which many programmers quit and go back to the fun of programming. Life becomes a limping series of edit commands, spacing over to the area to change, then deleting and/or inserting. It works, but it's like using a 10-watt bulb as a reading lamp.

I know an excellent Basic programmer whose style was to re-edit a given line for every insert made at a different point in the line. "Once in the insert mode, you can't get out unless you press the enter key to end editing the line," he said. But he was wrong.

At any time after you've pressed the I key, you can press the shift and up-arrow keys together to leave the insert mode. To try it, first type in this line:

100 PRINT "One Three Five"

Type in EDIT 100, press the L key to register the reference line, and space over to the "T." Press the I key to get into the insert mode. Type in TWO and a space. Press the shift and up-arrow keys together. You're out of insert mode. Space over to the "F" and press the I key. Type in FOUR and a space, and press the enter key. List the line to see the result. Note that you didn't have to leave the insert mode after you made the final change. You can continue work on a line, by turns inserting, deleting, and moving back and forth until you're satisfied.

Type in the word EDIT, a space, and a period, and the computer will bring up the line it recognizes as current, either because it's an error line, a just-typed line, or the line most recently edited.

Plus Two

Two additional subcommand modes are X for going to the end of a line, and H for hacking off all line material from the cursor to the end of the line. After you enter a line for editing, pressing the X key takes the cursor to the end of the line and starts insert mode.

You can type in additional material at the end of the line. If you use the left-arrow key to move leftward in this mode, Basic will erase the material. To try it, type in EDIT 100, press the X key, use the arrow key to back up to the space following the final letter in FOUR, type in a double quote mark, and press the enter key. To go to the end of the line and move leftward without erasing, type in X, then press shift/up-arrow to leave the insert mode.

The H command lets you get rid of all characters from cursor position rightward to the line's end. In line-editing mode, space the cursor rightward until it covers the first character of the unwanted material. Press the H key. You are in insert mode and may either type in more material, register the change by pressing the enter key, or leave insert mode to space backward for other changes.

Et Cetera

I think what I've covered will serve you well in 80 percent of your editing. I'll go over remaining editing commands without examples. To use any of them, make sure you're out of the insert mode.

● **Quick forward:** Type in a number and press the space bar, and the cursor jumps rightward that many characters. Nothing is changed. If the number exceeds the number of characters to the right of the cursor, it goes to the end of the line.

● **Quick backward:** Same as above, except press the left-arrow key following the number, and the cursor goes leftward.

● **Change characters:** To change a set number of characters in an overstrike mode, type in a number and press the C key. New material you type in will replace old characters for the number of characters specified. Control then returns to the regular edit mode.

● **Delete characters:** Type in a number and press the D key. Basic erases that many characters, with deleted characters appearing between backslashes.

● **Search:** The form is N for number of occurrences, S for search, and C for character sought, typed in together. For example, 3SP takes the cursor to the third occurrence of the letter "P." The search is exact. If you want a lowercase "p," you'd type in 3Sp. It's a quick and precise way to move the cursor.

● **Search and kill:** The form is similar to the search command. It deletes all material from the cursor to the specified occurrence of a certain character. For example, 1Ks kills all characters from the cursor to the first occurrence of "s."

● **Cancel and start over:** If you muddle a line past the point of knowing exactly what you've done—or for any other reason—press the A key. Any changes made are canceled and the line is again listed for a new editing try.

● **Exit:** Press the E key for exit. The changes made are retained, and editing is stopped.

● **Quit:** Press the Q key to cancel all changes made and quit the editing mode. Basic retains the line as it began. For the beginner, the quit command is very important. Now I press the Q key until April. ■

Write to Richard Ramella at 1493 Mt. View Ave., Chico, CA 95926.

SUPER ROM

Lucid Spreadsheet Write ROM Database Outliner



NOW YOU CAN REALLY HAVE IT ALL!

All on one ROM. Truly the finest four programs available for the Model 100 — guaranteed. Try it for 30 days. If you aren't blown away by the excellence return it for a full refund.

\$199⁹⁵

The four best programs for the Model 100 all on one ROM. 32K of power without using any RAM for program storage. This is the PCSG Snap-In ROM that just presses easily into the little ROM socket in the compartment on the back. You access the four right from the main menu like built-ins.

Write ROM — the definitive word processor for the Model 100. Function key formatting or dot commands. Search and replace. Library feature — inserts words, phrases or whole documents into text from just a code. MAP lets you see a picture of your document. In all there are 60 features and functions. No one can claim faster operation. FORM lets you create interactive forms with on-screen prompts that you can answer from the keyboard. Nothing else for the Model 100 compares with the features of Write ROM. Exactly the same as the Write ROM sold as a single program. Infoworld says it "makes the Model 100 a viable writing unit ... sur-

passed our highest expectations for quality and clarity."

Lucid Spreadsheet: This is the one PICO magazine says "blows Multiplan right out of the socket" and Infoworld performance rated as "excellent" and said "makes the Model 100 compute." Gives you features you cannot get with Lotus 123. Lets you build spreadsheets in your Model 100 that would consume 140-150K on a desktop. Program generating capability with no programming knowledge required. Variable column widths. Includes find and sort with function key control. It's fast, recalculates like lightning. No feature has been taken from the original, only new ones added.

Database: This is a relational data base like no other. You can do everything from mailing lists to invoices. No complicated pseudo-coding, you create input screens as simply as typing into TEXT. You are not limited by size; you can have as large an input screen as you wish. Prints out reports or forms, getting information from as many files as

you like. Complete math between fields. Total interface with Lucid worksheets.

Outliner: Does everything that Think-tank does on a PC but a whole lot better. Includes a Sort for your headlines. Lets you have headlines of up to 240 characters. Has cloning, hoisting and sideways scroll up to 250 characters. Like Lucid, this one sets a new standard for outliners. This is the way to plan and organize your projects.

Present Lucid and Write ROM owners can upgrade for \$100. If you have both it's \$75.

As usual PCSG sells the Super ROM on a thirty day guarantee. If for any reason you are not satisfied, simply return it for a full refund.

We are excited about this product. Super ROM gives the Model 100 the true power of a desktop. No other multi-program ROM has software that compares. But don't take our word for it. We invite you to make that comparison yourself. Priced at \$199.95 on Snap-In ROM.

Got stuck with somebody else's multi-ROM? We'll upgrade it for \$100.

(214) 351-0564

PORTABLE COMPUTER SUPPORT GROUP

11035 Harry Hines Blvd., #206, Dallas, TX 75229

© PCSG

MC, Visa, American Express, Check, or C.O.D.

Out of Sorts? Try This One

One of the handiest features of Disk Basic on most Model I/III operating systems is the CMD"O" sort. Unfortunately, Model 4 Basic has no equivalent. This created a problem for me recently while trying to convert a Model III program to the Model 4. I wrote a sorting algorithm in Basic but it was slow, taking about 90 seconds to order a list of 1,000 strings. So I reached for the assembler and started writing a Model 4 version of CMD"O".

My program had several arrays that it sorted many times while it ran. I needed something that would sort quickly, would reside in memory instead of on disk, could be installed as part of a /JCL program, and required no intervention by the user. The result was a program that could sort string, integer, and single-precision arrays. Program Listing 1 shows a condensed version that sorts only string arrays.

The program loads and protects itself in high memory, passes its address to Basic, and can sort an array of 1,000 random strings in about three seconds. If you add a few elements to an array that is mostly in correct order, the sort will usually take under a second.

What Sort of Sort?

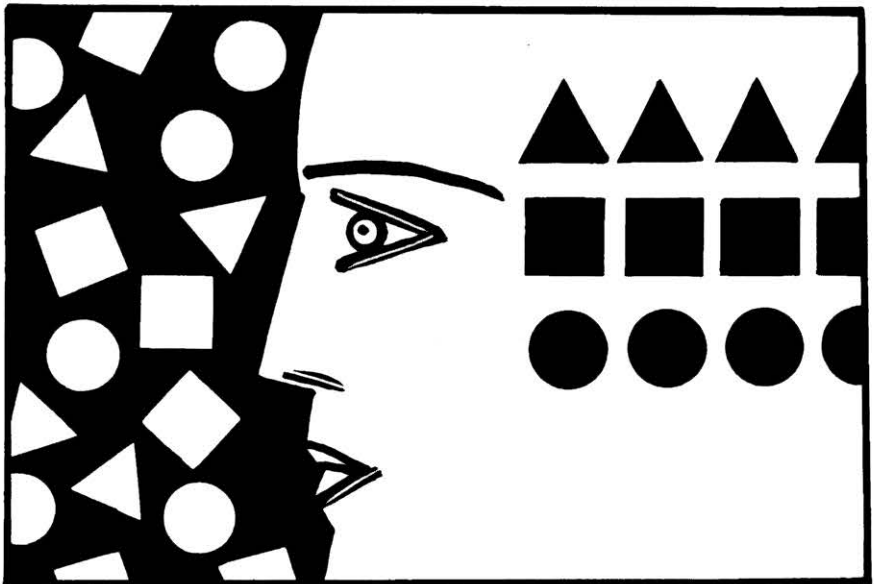
One of the problems I faced was finding an algorithm that was both fast and reasonably easy to write in Assembly language. I first considered using a quick sort, but discarded it because it needs a large amount of stack space and is inefficient when sorting a list that is mostly preordered.

I settled on a Shell sort, because it can quickly sort a mostly ordered list and because it is relatively easy to implement. The Figure, a pseudocode listing for the Shell sort algorithm I used, should make the program in Listing 1 easier to follow.

LOAD
80

System Requirements

Model 4
64K RAM
Basic
Assembly language
Editor/assembler



The Shell sort algorithm works through a process of successive approximations. It divides the list you want sorted into a large number of shorter lists, which it quickly sorts. Then it again divides the partially sorted main list into fewer and longer sublists, which it sorts. The process is repeated until the entire list is in the correct order.

You handle the subdivision by picking a "gap" value and using it to select which items to sort. For example, if you choose a gap of four, one sublist is the

first, fifth, ninth, 13th, and so on elements of the main list. Another sublist comprises the second, sixth, 10th, 14th, and so on elements. When the gap is four, you'll have four separate sublists.

The Shell sort starts with a relatively large gap value to move items quickly toward their correct locations in a list. After each pass through the list, the routine reduces the gap value. Once the list has been sorted with a gap of one, it is in correct order and the sort routine is complete.

A. Calculate initial gap setting	(740-790)
B. If gap < 4 then gap = 4	(810-850)
C. Repeat:	(900-960)
1. Reduce to next lower gap size if gap = 0 then stop.	(970-990)
2. For counter = gap + 1 to array size	&1880-1990)
a. set pointer = counter	
b. compare array element at pointer with element at pointer - gap	(1080-1510)
If elements in wrong order:	(1560-1660)
i. swap and	
ii. set pointer = pointer - gap and	(1740-1810)
iii. if pointer > gap, loop to b.	(1810)
Loop back to 2.	(1810)
Loop back to 1.	(2030-2050)
END.	

Figure. Sort routine pseudocode.

GE introduces GENie. Your low cost way to get on-line, and stay there.*



Imagine having access to quality personal computing SIGs, software, CB simulation, E-Mail and games at 1200 baud. But paying only a 300 baud rate.

Here's GENie™!

GENie stands for the General Electric Network for Information Exchange. It's a part of General Electric Information Services — the world's largest commercial tele-processing network. And now the power of GENie is available to the home computer user.

Now! Up to 2400 baud.

GENie can take you to new highs in speed and keep you there. Because our non-prime time rate for 300 or

1200 baud is only \$5.00* an hour. That's up to 60% less than you're paying now. Or, you can go where few have gone before — with GENie's new 2400 baud service**

So when you're wrapped up in a computer group, or heavily into serious conversation, you can keep your eyes on the screen, not on the clock. (More good news: no minimum monthly charges, and the sign-up fee is just \$18.00.)

What wishes Can GENie grant?

GENie has most everything. Including LiveWire™ CB simulator, RoundTable™ SIGs, bulletin boards, GE Mail™, classic games like Castle-Quest™ and BlackDragon™, conference rooms, newsletters and more.

Sign up from your keyboard: 1-800-638-8369.

Just have your VISA, MasterCard or checking account number ready. Set your modem for half duplex, 300 or 1200 baud. Upon connection enter HHH then press RETURN. At the U#=#prompt enter 5JM11961, GENIE and press RETURN. (For additional information or assistance call 1-800-638-9636, ext. 21.)

Then get on-line with GENie. And stay longer, for less.



INFORMATION SERVICES

General Electric Information Services Company, U.S.A.

*Rate applies to 300 or 1200 baud, Mon.-Fri., 6PM to 8AM, local time, all day Sat., Sun. and nat'l holidays. Subject to service availability. **Additional hourly surcharge applies to 2400 baud service.

Program Listing 1. String array sort.

```

00100 ;-----
00110 ; String Array Sort for Basic Strings
00120 ; Ascending Shell Sort (1,4,13, etc. intervals)
00130 ; Calling Sequence from Basic:
00140 ; CALL SORT% (ADDRESS%,NUMBER%)
00150 ; SORT% is address of this routine (see text)
00160 ; ADDRESS% is the address of first element to sort
00170 ; NUMBER% is total number of elements to sort
00180 ;-----
00190 ;SVCs used:
00200 @DIV16 EQU 5EH
00210 @DSPLY EQU 0AH
00220 @HIGH$ EQU 64H
00230 ;
00240 ;EQUates:
00250 USTOR$ EQU 0013H
00260 CR EQU 13
00270 LF EQU 10
00280 ;
00290 ;MACROS
00300 SVC MACRO #NUM
00310 LD A,#NUM
00320 RST 28H
00330 ENDM
00340 ;
00350 MUL3 MACRO ;HL = HL * 3
00360 LD C,L ; uses BC
00370 LD B,H
00380 ADD HL,HL
00390 ADD HL,BC
00400 ENDM
00410 ;
00420 LDDEHL MACRO ;Load DE, (HL)
00430 LD E,(HL)
00440 INC HL
00450 LD D,(HL)
00460 ENDM
00470 ;
00480 ;-----
00490 ;TRSDOS Memory Header
00500 ORG 03000H
00510 ENTRY JR BEGIN ;Branch to start
00520 OLDHI DW $-5 ;Hold old HIGH$
00530 DB MODDCB-ENTRY-5 ;Calculate length of name
00540 DB 'SSORT' ;Module name
00550 MODDCB DW 0 ;These pointers are unused
00560 DW 0
00570 ;-----
00580 ; On entry, HL==> descriptor of string holding array name
00590 ; DE==> number of array elements to sort
00600 ;-----
00610 BEGIN PUSH DE ;Save DE value
00620 LDDEHL ;Get LOW varptr in DE
00630 LD HL,-3 ;Subtract 3 to count
00640 ADD HL,DE ; array from 1
00650 LD (BASE),HL ;Save BASE of sort area
00660 RL01 EQU $-2
00670 POP HL ;HL==> Number to sort
00680 LDDEHL ;Get number in DE
00690 LD (SIZE),DE ;Save the number
00700 RL02 EQU $-2
00710 ;-----
00720 ; Now calculate starting gap size
00730 ;-----
00740 LD HL,1 ;Starting size
00750 SETHL1 MUL3 ;HL = HL * 3
00760 INC HL ;HL = HL * 3 + 1
00770 CALL DEHLCMP ;HL < DE ?
00780 RL03 EQU $-2
00790 JR C,SETHL1 ;Yes -- loop back
00800 ;
00810 LD DE,4 ;HL => 4 ?
00820 CALL DEHLCMP ;Compare HL, DE
00830 RL04 EQU $-2
00840 JR NC,SORT10 ;Go of HL => 4
00850 LD HL,4 ;Else HL = 4
00860 ;-----
00870 ; Now start the sort
00880 ;-----
00890 SORT10 LD C,3 ;Calculate GAP\3
00900 SVC @DIV16 ;Let TRSDOS do the math
00910 LD (GAP),HL ;Save the GAP size
00920 RL05 EQU $-2
00930 LD A,H ;Down to 0?
00940 OR L ;Merge bytes
00950 RET Z ;Back to Basic if 0
00960 ;
00970 INC HL ;HL = loop counter
00980 LD (COUNT),HL ;Save this also
00990 RL06 EQU $-2
01000 LD E,L ;Copy to DE
01010 LD D,H ;DE = top element
01020 SORT20 LD BC,(GAP) ;P/u gap size
01030 RL07 EQU $-2
01040 OR A ;Clear carry flag
01050 SBC HL,BC ;HL = bottom element

```

Listing continued

One problem with the Shell sort is that it is impossible to analyze completely; the only way to select a "best" series of gap sizes seems to be by trial and error. Many books use a Shell sort algorithm that divides the total number of items in the list by 2 to find the first gap size, and then divides each gap size by 2 to find the next gap size. Some of the same books describe a Shell sort that uses a bubble-sort technique to order each sublist. While you'll find such an algorithm easy to implement, it doesn't produce an efficient sort.

The gap sizes used in Listing 1 are, in reverse order, one, four, 13, 40, 121, and so on. You can determine each number in the series by multiplying the previous value by 3 and then adding 1. The first gap size in the sort is the largest number in the series that is less than the number of items in the array. The first part of Listing 1 calculates the correct starting gap size. After that, the program finds each lower gap by dividing the previous value by 3 and discarding the remainder.

I used an insertion sort instead of a bubble sort on each sublist. According to Donald Knuth's *The Art of Programming*, Volume 3, this implementation of the Shell sort is about twice as fast as the divide-by-2 method. Using an insertion sort instead of a bubble sort should speed things up by a factor of six or more.

Parts of Listing 1 deserve special comment. Basic's string array is a complex data structure. The program stores the array in memory with some informational bytes and then a 3-byte descriptor pointing to the text of each string, which it stores in high memory. The first byte of the descriptor is the length of the string; the next 2 bytes represent the string's address in Basic's string memory area.

The sorting program must be able to keep track of each string's position in the array, of the address of each string's descriptor, and of the address of the actual string in high memory. When the program knows the element number of the string it wants to find, it can multiply that number by 3 and add it to the address of the first element of the array to find the address of the descriptor. It must then use the address stored in the descriptor bytes to find the string.

To compare the third and seventh elements of the array, for example, the program must first find the descriptors of each string, then find the addresses of each string, and finally compare the two strings. The only complicated part of Listing 1 is the shifts from array element number to descriptor address to string address which begins each comparison.

The constant change between addressing modes slows the program

THE NEXT STEP

Circle 137 on Reader Service card

Listing continued

```

01060 LD (BOTTOM),HL ;Save lower element #
01070 RL08 EQU $-2
01080 SORT30 MUL3 ;HL = HL * 3
01090 LD BC,(BASE) ;Get base address
01100 RL09 EQU $-2
01110 ADD HL,BC ;HL=> varptr of lower element
01120 EX DE,HL ;HL = top element
01130 MUL3 ;HL = HL * 3
01140 LD BC,(BASE) ;Get base address
01150 RL10 EQU $-2
01160 ADD HL,BC ;HL=> varptr of upper element
01170 ;-----
01180 ; Now compare the two strings and swap if necessary
01190 ;-----
01200 LD A,(DE) ;Get length of lower element
01210 LD C,A ;Into C
01220 LD B,(HL) ;Length of upper in B
01230 PUSH HL ;Save ptr. to upper element
01240 PUSH DE ;Save ptr. to lower element
01250 PUSH DE ;Save it again.
01260 INC HL ;HL=> addr. of upper element
01270 LDDEHL ;Move address to DE
01280 EX DE,HL ;HL=> upper element
01290 EX (SP),HL ;HL has ptr. to lower element
01300 INC HL ;HL=> addr. of lower element
01310 LDDEHL ;Move address to DE
01320 POP HL ;HL=> upper / DE=> lower
01330 STRCMP INC B ;Test upper element length
01340 DEC B ;Was it 0?
01350 JR NZ,CMP10 ;No -- go
01360 INC C ;Test lower element length
01370 DEC C ;Was it 0?
01380 JR NZ,SWAP ;Upper=0,lower<0 then swap
01390 NOSWAP ;Else no swap
01400 ;
01410 CMP10 INC C ;Test lower element length
01420 DEC C ;Was it 0?
01430 JR Z,NOSWAP ;Lower=0, upper<0 then no swap
01440 LD A,(DE) ;Both non-zero
01450 CP (HL) ; So compare characters
01460 JR NZ,NOTEQ ;Not equal -- end loop
01470 INC HL ;Else point to next
01480 INC DE ; chars. in strings
01490 DEC B ;And reduce length counters
01500 DEC C
01510 JR STRCMP ;And test again
01520 NOTEQ JR C,NOSWAP ;Upper is greater -- don't swap
01530 ;-----
01540 ; Swap the strings' pointers
01550 ;-----
01560 SWAP POP DE ;DE has ptr. to lower element
01570 POP HL ;HL has ptr. to upper element
01580 LD B,3 ;3 bytes to change
01590 SWAP10 LD A,(DE) ;Get byte from lower
01600 LD C,(HL) ;And byte from upper
01610 LD (HL),A ;Lower's byte to upper
01620 LD A,C ;Upper's byte to A
01630 LD (DE),A ;And move to descriptor
01640 INC HL ;Point both regs. to
01650 INC DE ; next byte
01660 DJNZ SWAP10 ;Loop back
01670 ;-----
01680 ; Keep comparing
01690 ;-----
01700 LD HL,(BOTTOM) ;Get old bottom rec. #
01710 RL11 EQU $-2
01720 LD E,L ;Copy into
01730 LD D,H ; DE
01740 LD BC,(GAP) ;Get gap value
01750 RL12 EQU $-2
01760 OR A ;Clear carry flag
01770 SBC HL,BC ;HL = new bottom
01780 LD (BOTTOM),HL ;Save it
01790 RL13 EQU $-2
01800 JR C,NOSW10 ;Go if HL < 0
01810 JR NZ,SORT30 ;Loop if bottom =>1
01820 JR NOSW10 ;Skip pops
01830 ;-----
01840 ; Increment counter until counter > size
01850 ;-----
01860 NOSWAP POP HL ;Clear the stack
01870 POP HL ; by popping 2 values
01880 NOSW10 LD DE,(COUNT) ;Get counter
01890 RL14 EQU $-2
01900 INC DE ;Counter = counter + 1
01910 LD (COUNT),DE ;And save again
01920 RL15 EQU $-2
01930 LD HL,(SIZE) ;Get size
01940 RL16 EQU $-2
01950 CALL DEHLCPM ;And compare them
01960 RL17 EQU $-2
01970 LD L,E ;Copy count to HL
01980 LD H,D ;DE = HL = new count
01990 JR NC,SORT20 ;Loop if SIZE => COUNT
02000 ;-----
02010 ; Done with one gap setting
02020 ;-----
02030 LD HL,(GAP) ;Get the old gap

```

Listing continued

**FOR TRS-80 MODELS 1, 3, 4, 4P
IBM PC/XT, AT&T 6300, ETC.**

WHICH ONE?

Which microcomputer word processor lets you create and edit without retyping, but *won't* slow down your creative process? Knows when to capitalize the first letter while replacing one phrase with another? Can outdent as well as indent? Will do typesetting at your command, even with proportional characters, right justification and tabbed columns? Lets you use the same (extra-capacity) data disks on IBM PC and TRS-80? And eases your learning with common-sense keystrokes, Help menus, good examples and a professionally authored manual?

Hint: it can integrate to communicate from home to office, and will interface with a database for form letters, data tables, and more!

It's the professional's word processor for your IBM PC, Compaq, or TRS-80 Model 1, 3 or 4:

FORTHWRITE in MMS FORTH

With an unusually powerful set of tools and an unusually easy way of helping you to use them.

The total software environment for IBM PC/XT, TRS-80 Model 1, 3, 4 and close friends.

- Personal License (required):
MMSFORTH V2.4 System Disk \$179.95
(TRS-80 Model 1 requires lowercase, DOEN, 1 40-track drive.)
 - Personal License (additional modules):
FORTHCOM communications module \$ 49.95
UTILITIES 49.95
GAMES 39.95
EXPERT-2 expert system 69.95
DATAHANDLER 59.95
DATAHANDLER-PLUS (PC only, 128K req.) 99.95
FORTHWRITE word processor 99.95
 - Corporate Site License
Extensions from \$1,000
 - Bulk Distribution from \$500/50 units.
 - Some recommended Forth books:
STARTING FORTH (programming) 19.95
THINKING FORTH (technique) 15.95
BEGINNING FORTH (re MMSFORTH) 16.95
- Shipping/handling & tax extra. No returns on software.
Ask your dealer to show you the world of MMSFORTH, or request our free brochure.

MILLER MICROCOMPUTER SERVICES
61 Lake Shore Road, Natick, MA 01760
(617) 653-6136

Listing continued

```

02040 RL18 EQU $-2
02050 JP SORT10 ;And loop back
02060 RL19 EQU $-2
02070 ;-----
02080 ; Compare DE & HL
02090 ; Return results in flags:
02100 ; Z: HL = DE
02110 ; NZ & C: HL < DE
02120 ; NZ & NC: HL > DE
02130 ;-----
02140 DEHLCP LD A,H ;Compare
02150 SUB D ; H & D
02160 RET NZ
02170 LD A,L ;Compare
02180 SUB E ; L & E
02190 RET
02200 ;-----
02210 BASE DW $-$
02220 SIZE DW $-$
02230 GAP DW $-$
02240 BOTTOM DW $-$
02250 COUNT DW $-$
02260 ;-----
02270 PROGEND EQU $-1 ;Define end of program
02280 PROGLEN EQU $-ENTRY ;Length of program
02290 ;
02300 ;-----
02310 ; Install in high memory, protect, and
02320 ; put entry address in USTORS$
02330 ;-----
02340 ;
02350 INSTALL LD HL,SIGNON ;HL=> Hello message
02360 SVC @DSPLY ;Say hello
02370 LD HL,0 ;Function: get current value
02380 LD B,L ;B=0: use HIGH$
02390 SVC @HIGH$ ;Get current value
02400 LD (OLDHI),HL ;Save in program header
02410 JR Z,RELOC ;Go if okay
02420 LD HL,MEMERR ;HL=> error message
02430 SVC @DSPLY ;Report the error
02440 LD HL,-1 ;Show extended error code
02450 RET ;Back to TRSDOS
02460 ;-----
02470 ; Relocate program
02480 ;-----
02490 RELOC LD IY,RELTAB ;IY=> Relocation Table
02500 LD DE,PROGEND ;DE=> End of program
02510 OR A ;Clear Carry Flag
02520 SBC HL,DE ;Calculate distance to move
02530 LD C,L ;Transfer
02540 LD B,H ; to BC
02550 RELOC1 LD L,(IY+0) ;Get address to change
02560 LD H,(IY+1) ; into HL
02570 LD A,H ;Get MSB
02580 OR L ;Is it 0?
02590 JR Z,MOVE ;Yes -- go
02600 LDDEHL ;DE = value to change
02610 EX DE,HL ;HL has value to change
02620 ADD HL,BC ;Add the offset
02630 EX DE,HL ;Put new value in DE
02640 LD (HL),D ;Put it back
02650 DEC HL ; into the
02660 LD (HL),E ; program
02670 INC IY ;Bump table pointer
02680 INC IY ; to next entry
02690 JR RELOC1 ;Repeat until done
02700 ;-----
02710 ; Move to high memory and protect
02720 ;-----
02730 MOVE LD DE,(OLDHI) ;DE=> Destination address
02740 LD HL,PROGEND ;HL=> Current end of program
02750 LD BC,PROGLEN ;BC = # of bytes to move
02760 LDDR ;Move it all
02770 EX DE,HL ;Move new HIGH$ to HL
02780 LD B,0 ;B=0 : use HIGH$
02790 SVC @HIGH$ ;Set new HIGH$ value
02800 INC HL ;HL=> ENTRY-point
02810 LD (USTORS),HL ;Save in USTORS$
02820 LD HL,SUCCESS ;HL=> Success message
02830 SVC @DSPLY ;Display it
02840 LD HL,0 ;Show success
02850 RET ;Back to TRSDOS
02860 ;-----
02870 ; Installation messages
02880 ;-----
02890 SIGNON DB LF,'Fast String Sort for Basic',CR
02900 SUCCESS DB 'Installation in high memory successful.',LF
02910 DB 'Entry address is stored at &H0013',LF,CR
02920 MEMERR DB 'High memory not available for installation',LF
02930 DB 'Installation aborted',LF,CR
02940 ;-----
02950 ; Relocation Table
02960 ;-----
02970 RELTAB DEFW RL01,RL02,RL03,RL04,RL05,RL06,RL07,RL08
02980 DEFW RL09,RL10,RL11,RL12,RL13,RL14,RL15,RL16
02990 DEFW RL17,RL18,RL19,0000
03000 ;
03010 END INSTALL

```

End

down: it could make comparisons much faster if the strings had fixed lengths and locations in memory. Fortunately, swapping two strings in a Basic array is fast and easy, and somewhat compensates for the complexity of comparing two strings. All that the program needs to do is swap two string descriptors, not the text of the strings, which does not have to move at all.

On Location

When you move a program such as the main routine in Listing 1 to protected high memory, you can't guarantee in advance where it will be located, because you don't know what filters or other programs are currently installed. One of the problems I had designing the sort routine was finding an efficient way to pass its address to a Basic program.

I came up with several possible solutions. The most obvious was to include another small machine-language routine in the Basic program that would use the @GTMOD supervisory call to find the address of the sort routine. However, writing one machine-language routine just to find the address of another seems inherently inefficient.

Another option is to have the sort routine leave its address at some fixed location in memory so that the Basic program can find it. However, since TRSDOS 6.X has few fixed addresses—almost anything is likely to move to a different address if and when a new version of the DOS is released—it is difficult to find a place to leave the sort routine address.

Some addresses, however, will not or cannot move, most of them in the first page of memory between 0000 hexadecimal (hex) and 0100 hex. For example, the Z80 RST instructions always look to specific addresses, and the *Radio Shack Technical Reference Manual* says that four of the eight 3-byte restart vectors are available for user programs.

The manual also warns that some programs, such as Basic, may use some of those vectors. However, Basic version 1.1 doesn't seem to do so, and you could probably store the address of the sort routine in one of the restart vectors without any problem.

Roy Soltoff's *Programmer's Guide to LDOS/TRSDOS Version 6* briefly references 5 bytes in the first page of memory called USTORS\$. The *Guide* states that those 5 bytes are a "user application storage area." The USTORS\$ area was included in TRSDOS 6.X to maintain compatibility with Model I/III LDOS and is designed to allow one program to leave information in memory that another program can later find.

I have been assured that the USTORS\$ area will "probably" be included, at the

The Smart Answering Machine For IBM-PC and Compatibles



S.A.M.

SAM turns your IBM personal computer into a sophisticated voice messaging center that helps you communicate more effectively with your clients, associates and others.

Now available for Tandy 1000, 1200 and 3000 PC's

Retail Price \$295

- Preprogrammed Outbound Calling: Both Timed and Group Message Delivery
- Stores Separate Personal Messages: Retrievable by up to 999 Different Callers.
- Full Remote Interface with Voice Prompting, Message Retrieval, Message Recording and Programming of All Features.
- Real Voice Recording and Playback.
- Call Screening
- Auto-Dialing Phonebook Data Base
- Date and Time Stamping of All Messages.
- Uses 256K, Floppies or Hard Disk, No Modem Required!
- Stores and Forwards Your Messages to You.

DIALECTRON, Inc.

2035 California St., Suite 17

Mountain View, CA 94040

Dealer Inquiries Welcome

(415) 960-3040

EPD

ENGINEERING INC.

a DATATRON Company

MORE MUSCLE FOR YOUR TANDY 1000—LESS MONEY

Why spend more to expand your Tandy 1000 to 640K when you can spend less and still get more features on a single board! The EPD Half Megaboard + DMA gives you:

Up to 512K additional memory
Serial port
Clock/calendar for less! **\$259**
DMA (0K)
RAM disk & print spooling software

The EPD Half Megaboard + DMA is the price/performer leader!

2-year warranty: EPD offers a 2-year site-replacement warranty (exchange at place of purchase) on all of our board products (on boards with RAM installed by manufacturer).

256K RAM	\$40 additional
512K RAM	\$80 additional

Other outstanding value memory boards from EPD:

	<u>0K RAM</u>
Half Megaboard (0K-512K, serial, w/o DMA	\$199
clock/calendar, RAM disk & print spooling software, fits short slot.)	
2 Megaboard (Lotus/Intel, EMS, EMS, 0K-2 Meg.)	\$249
Half Megaboard + DMA available Feb. 21st	
Limited initial quantities available.	

Call today to reserve yours!
(800) 424-2107 (outside California)
(714) 832-0691 (in California)

*Tandy, Lotus and Intel are registered trademarks of Tandy, Lotus Development and Intel Corporations, respectively.

80micro

Reader Service

TO RECEIVE MORE INFORMATION ON THE PRODUCTS AND SERVICES IN THIS ISSUE, PLEASE TURN TO READER SERVICE CARD.

THE NEXT STEP

same address, in any future release of TRSDOS, and I have not found or heard of any other filters or programs that use it, so it seems to be safe to use for passing a machine-language routine's address to Basic.

The initialization section of Listing 1 puts the address of the sort routine into the first 2 bytes of USTOR\$, and the Basic program in Program Listing 2 finds that address with two PEEK commands (line 110).

The only other peculiarity of using the sort routine in Basic is that you must initialize the variable ADDRESS% before you use it, and your program cannot use any new variables after ADDRESS% has been loaded with the address of the first element of the array you want to include in the sort.

If you create any new variables after calling the VARPTR function, the address that you pass to the sort routine will be incorrect and the results of the sort are likely to be a very strange combination of errors.

The sort routine doesn't do any error-checking before it starts to work. If you tell it to sort more elements than exist in the array, it will happily destroy other arrays or part of Basic's memory area. It

```

Program Listing 2. Test routine.

10 'Test Routine for Machine-Language Sort
20 'Use *Only* with Basic 1.1.0 or later
30 '
40 CLS
50 DIM ARRAY$(1000), SORT%, ADDRESS%, NUMBER%
60 INPUT "Number of strings to sort (2-1000)";NUMBER%
70 IF NUMBER% < 2 OR NUMBER% > 1000 THEN GOTO 60
80 'Build random strings
90 FOR K% = 1 TO NUMBER%:SIZE% = RND(7):FOR J% = 1 TO SIZE%:   ARRAY$(K%) =
ARRAY$(K%) + CHR$(96+RND(26)):NEXT J%:PRINT ARRAY$(K%),:NEXT K%
100 'Find address of sort routine--store in SORT%
110 SORT% = CVI(CHR$(PEEK(&H13)) + CHR$(PEEK(&H14)))
120 CLS:INPUT "Press <RETURN> to begin sorting ";X$:CLS:PRINT "Sort begins: ";
TIME$
130 'Call Sort
140 ADDRESS% = VARPTR(ARRAY$(1))
150 CALL SORT%(ADDRESS%,NUMBER%)
160 PRINT "Sort finished: ";TIME$
170 INPUT "Press <RETURN> to display sorted list ";X$
180 CLS:FOR K% = 1 TO NUMBER%:PRINT ARRAY$(K%),:NEXT K%

```

End

is up to you to insure that the values you pass to it are correct. Program Listing 2 demonstrates how the sort routine will normally be called.

As I said at the beginning of this column, my original program can also sort integer and single-precision arrays. It does so by receiving from Basic an indication of what type of array is to be sorted, and by having separate comparison and swap routines for each type. If enough people are interested, I'll include

a numeric sort in a future column. However, you can always change a numeric array into a string array with clever use of STR\$ and RSET, so Listing 1 should serve most purposes. ■

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).

FastPak Business Mail System

- Correspondence
- Direct Mail
- Mailing Lists
- Addressing
- Form Letters
- Tickler Files
- Newsletters
- Sales Letters
- Credit Letters
- Sales Follow Up
- Collection Letters
- Boilerplating
- Envelopes
- Invoicing
- Labels
- Notices
- Resumes
- 1099 Forms
- Forms Fill-in

Premium
Software
Affordable
Prices

Any place you need a name and address

FastPak Mail from DHA Systems & Software. A complete library of programs that does everything for mail but lick the stamps. No frustration, no learning, no set-up. Easy to use.

Organize all your name, address, and phone files in one place. Input and corrections are easy, just fill in the blanks. Add your own codes. Fast, easy, flexible sort. Select names for special mailings.

Run labels and letters at the push of a button.

FastPak Mail includes a powerful system for merging letters and mail files for any kind of letter writing — from routine correspondence to personalized direct mail letters.

"Your product is excellent . . ." — John Stevenson,
Experts in Direct Marketing

" . . . the best direct mail product aid I ever bought."
— Ralph Thomas, *Thomas Publications*

"FastPak Mail is a bargain to say the very least."

"We are totally amazed at what your mailing list system can do. The sort and merge functions are fantastic, as is the entire package in general."
— Steven Friedman, *SHF Software Systems*.

DHA Systems & Software

832 JURY COURT / SAN JOSE, CA 95112 / (408) 947-1011

Merge - Works with all the popular word processors, Word, Wordstar, Multimate, etc. Create form letters with fill-ins. Easy enough for 1 letter, powerful enough for 5000.

Sort, Select, Combine - Lets you organize your files anyway you want, by zip, names, or special codes.

Conversion - no need to retype your list. Easily convert your existing lists to our format.

Purge - Eliminate duplicate names

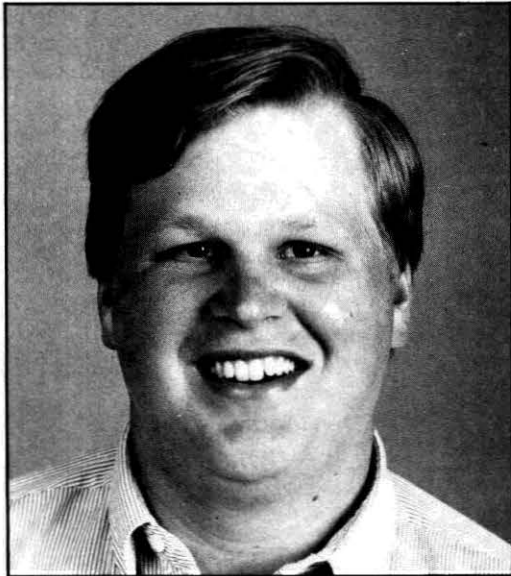
Economical \$79⁹⁵
Easy to buy

Circle 536 on Reader Service card.

TO ORDER TOLL FREE **1-800-FastPak**

Visa/MC welcome

**His name is Chris Schmidt. His callsign is KA1MPL.
He's a new ham-radio operator.**



He uses a micro at work every day.
He learned Morse Code and radio theory in a month and took an FCC test.

For him, there's now more than hardware and software for fun. Like knowing what hams on bulletin boards really mean. Like meeting on the air another one of his 400,000 fellow ops. Like being prepared to help in an emergency.

Would you like to get started? We'll send you the name of a ham in your area who'll help.

American Radio Relay League
225 Main St., Box CS, Newington, CT 06111 (203) 666-1541
Presented as a public service by 80 Micro and CW Communications/Peterborough.

Moving?
Subscription Problems?

Get help with your subscription by calling our new toll free number:

1-800-227-5782

between 9 a.m. and 5 p.m. EST, Monday-Friday. If possible, please have your mailing label in front of you as well as your cancelled check or credit card statement if you are having problems with payment. If moving, please give both your old and new addresses.

**THE SMART WAY TO SAVE YOUR
80 Micro**

You'll find all your favorite issues of **80 Micro** in minutes—and in great condition—with smart-looking binders or file cases from Jesse Jones.

Sturdy, protective file cases make for easy access to each issue, while rugged binders allow magazines to lay flat for easy reference. Both hold 12 issues, are custom-designed in green with gold spine lettering, and are **unconditionally guaranteed.**

Order today!

File Cases: \$6.95 ea.; 3/\$20; 6/\$36.
Binders: \$8.50 ea.; 3/\$24.75; 6/\$48.

YES! Please send me protection for my **80 Micro:**

_____ File Cases _____ Binders

I enclose my check or money order for \$ _____

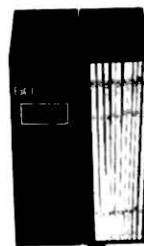
Name _____

Address _____

City _____ State _____ Zip _____

US currency only. Outside US, add \$2.50 per item for postage and handling. Please allow 4-6 weeks for delivery.

MAIL TO: Jesse Jones Box Corp., PO Box 5120, Dept. 80M, Philadelphia, PA 19141



SAVE A BUNDLE

WITH ONE OF OUR BUNDLES

We have put together special bundles of software just in time to save you a bundle of money. Didn't you ever wonder why CP/M was so popular? The reason is the software availability. All programs (except EP) are runs for the Model 4/4P and have been optimized to install and run without hassle. For example, we have memory-mapped WordStar™ and it runs circles around the standard version available elsewhere. We also added printer drivers for the Daisywheel II and the DMP-2100. Our CP/M® 2.2 is the best around. Read the reviews. You *know* the programs. You *know* the prices. This is the years' best value. You owe it to yourself to let these CP/M® programs and thousands of others (many in the public domain) start serving your needs.

Bundle #1
 WordStar®
 MailMerge®
 SpellStar™
 StarIndex™
\$299
 Delivered
 Montezuma Micro CP/M®
 RETAIL VALUE \$1009

Bundle #5
 Electric Pencil™
 Red Pencil™
 Blue Pencil™
\$149
 Delivered
 Works with TRSDOS, NEWDOS-80,
 DOSPLUS and MULTIDOS
 (Model 1,3,4)
 RETAIL VALUE \$240

Bundle #2
 WordStar®
 DataStar™
 ReportStar™
 CalcStar™
\$399
 Delivered
 Montezuma Micro CP/M®
 RETAIL VALUE \$1354

Bundle #3
 WordStar®
 MailMerge®
 SpellStar™
 StarIndex™
 DataStar™
 ReportStar™
 CalcStar™
\$499
 Delivered
 Montezuma Micro CP/M®
 RETAIL VALUE \$1699

Bundle #4
 WordStar®
 MailMerge™
 SpellStar™
 StarIndex™
 dBASE II®
 TurboPascal™
\$599
 Delivered
 Montezuma Micro CP/M®
 RETAIL VALUE \$1553

Save A Bundle on these books and disks

Take advantage of our volume discounts. Buy any three items from this list and deduct \$5 from your total order. Buy four...deduct \$10. Buy five...deduct \$15. Buy six...deduct \$20 and so on. Buy a bunch, save a bundle. Please add \$1 each for shipping. Add \$5 to orders under \$50 for handling.



- TRS-80 Disk & Other Mysteries.** The "How to" book of data recovery for the TRS-80 Model I disk operating system. 128 pages. Retail \$22.50 **Now \$18**
- Microsoft BASIC Decoded & Other Mysteries.** The complete guide to Level II and BASIC. 312 pages. Retail \$29.95 **Now \$24**
- The Custom TRS-80 & Other Mysteries.** The complete guide to customizing TRS-80 Hardware and Software. 336 pages. Retail \$29.95 **Now \$24**
- BASIC Faster & Better & Other Mysteries.** The complete guide to BASIC programming tricks and techniques. 290 pages. Retail \$29.95 **Now \$24**
- BASIC Faster & Better Library Disk.** Contains 121 functions, subroutines and user routines. Search merge, compare and listing routines plus array handlers, BASIC overlays and video drivers. Retail \$19.95 **Now \$16**
- BASIC Faster & Better Demonstration Disk.** Contains 32 demos of the Library Disk contents above. Retail \$19.95 **Now \$24**
- BASIC Disk I/O Faster & Better & Other Mysteries.** Programming tips and techniques to store/retrieve data from disk. 432 pages. Retail \$29.95 **Now \$24**
- BASIC Disk I/O Faster & Better Demonstration Disk.** All of the major demo programs and library of disk I/O subroutines in 25 BASIC programs. Random, Indexed Sequential and TREESAM file handlers included. Retail \$29.95 **Now \$24**
- Machine Language Disk I/O & Other Mysteries.** A guide to machine language disk I/O for the TRS-80. 288 pages. Retail \$29.95 **Now \$24**
- TRSDOS 2.3 Decoded & Other Mysteries.** Detailed explanation of the Model I disk operating system. 298 pages. Retail \$29.95 **Now \$24**
- How To Do It On The TRS-80.** A complete applications guide to the TRS-80 Model I, II, III, 100, and Color Computer. 352 pages. Retail \$29.95 **Now \$24**
- The Custom Apple & Other Mysteries.** Who cares? Retail \$29.95 **Now \$19**

©1984 by Montezuma Micro. WordStar®, SpellStar™, StarIndex™, MailMerge®, DataStar™, ReportStar™ and CalcStar™ belong to MicroPro® International Corporation. CP/M® belongs to Digital Research Inc. dBASE II® belongs to Ashton-Tate, Inc. All the Pencils™ belong to Michael Shrayor. Turbo Pascal™ belongs to Borland International.



MONTEZUMA MICRO

214-339-5104
 Redbird Airport, Hangar #8
 P.O. Box 32027
 Dallas, Texas 75232



ORDER NOW ... TOLL FREE

800-527-0347
800-442-1310

The Toll Free lines are for orders only. Specifications subject to change without notice.

MONTEZUMA

P.O. Box 2169
Camp Verde (Lizard Flats)
Arizona 86322

"WE KEEP YOU RUNNING"

COMPUTERS

25-1000 For Model 1000 128K RAM IBM Clone	1699
25-1001 Model 1000 128K RAM w/4 & 256K RAM	1919
25-1070 ZDS of Model 4 64K RS232C Pure R/S	187
25-3136 16K Extended BASIC Color Computer 2	99
25-3136 16K Extended BASIC Color Computer 2	135
25-3589 Pocket Computer 3 with 4K RAM	51
25-3650 Pocket Computer 4	51
25-3670 Pocket Computer 5	102
25-3802 Model 100 24K Portable Computer	539
25-3860 Model 200 24K Portable Computer	849
25-5103 Model 2000 128K IBM Clone Monitor	359
25-5104 Model 2000 W/Hard Disk and 256K	2124
25-6001 Model 6000 200 512K	3824
25-6002 Model 6000 200 512K	4874
25-6050 DT 1 Terminal	339
25-6052 DT 1000 Terminal	675

MODEMS

25-1003 Model 1000 300 300 Baud Internal	\$ 127
25-1013 Model 1000 300 300 Baud Internal	255
25-1084 Model 4P Card Modem Board	89
25-1173 DC Modem II	109
25-1174 Acoustic Coupler Modem	339
25-1176 DC 2212 300 1200 Baud	89
25-1177 DC 4 300 Baud Modem	110
25-1178 DC 3 300 Baud Modem	51
25-1179 Model 1000 300 Baud with cable	74
25-1180 Model 4P Card Modem with cable & PS	29
25-1181 Smartmodem 300 Baud	169
25-1182 Smartmodem 1200 Baud Internal	439
25-1183 Smartmodem 300 1200 Baud	4874
25-1184 Smartmodem 300 1200 uses same software	279

PERIPHERALS

ALSO SEE ADD-ON CARDS UNDER UPGRADES

25-1200 2dr cabinet w/4hd drives	389
12 Green Non-Glare Composite Video Monitor	89
12 Amber Non-Glare Composite Video Monitor	89
12 Green Non-Glare TLI (IBM) Video Monitor	99
12 Amber Non-Glare TLI (IBM) Video Monitor	99

MONTEZUMA'S REVENGE

Video cable for Model 1000 300 Baud

25-3010 Model 1200 VM 3 Monochrome Monitor	186
25-1085 Model 4P Card Modem Board	110
25-1133 Model 3 15MB Hard Disk Inst Kit	85
25-1134 Model 4 15MB Hard Disk Inst Kit	88
25-1183 Model 100 Bar Code Reader	85
25-1185 Color Computer Mouse	51
25-1197 Mouse for Model 1000/1200/2000	85
25-1198 Serial to Parallel Converter	85
25-1208 CCR 81 Cassette Tape Recorder	42
25-1209 CCR 82 Cassette Tape Recorder	42
25-1244 Power Strip/Line Filter	11
25-1326 Amber Glare Panel Model 212/16	42
25-1342 Clear Keycap for Model 3/4	11
25-1410 Model 1000 Modem Cable	11
25-1429 Automatic Power Strip/Surge Protector	59
25-1451 Non-Automatic Power Strip	42
25-1475 Amber Glare Panel Model 1/3/4	42
25-2226 Color Computer Deluxe RS 232C Kit	89
25-3008 Color Computer Joystick	25
25-3012 Color Computer Deluxe Joystick	25
25-3024 Color Computer Mux. Pak Interface	89
25-3025 Color Computer Mux. Pak Interface	42
25-3129 Color Computer HalfHigh Disk Drive 0	297
25-3130 Color Computer HalfHigh Add on Drive	99
25-3131 Model 1000 300 300 Baud	123
25-3132 Model 1000 1200 CAM 2 Color Monitor	391
25-3503 PC 1 Cassette Interface	13
25-3508 PC 1 Cartridge Interface	25
25-3602 PC 2 Carrying Case	25
25-3612 PC 2 RS 232C Interface	33
25-3651 PC 4 Cassette Interface	36
25-3653 PC 4 1K RAM Module	16
25-3654 PC 4 Carrying Case	6
25-3804 Model 100 AC Adapter	5
25-3805 Model 100 Acoustic Coupler	42
25-3809 Model 100 Carrying Case	42
25-3811 Model 100 Soft Carrying Case	34
25-3812 Model 100 Soft Carrying Case	34
25-4154 Model 12/16MB Internal 15MB Hard Disk Kit	2245
25-4155 Model 2/3/4/12/16 15MB Primary Hard Disk	1355
25-4156 Model 2/3/4/12/16 15MB Secondary Drive	1355
25-4157 Model 2/12/16 Installation Kit for 4155	297
25-5111 Model 2000 VM 1 Monochrome Monitor	169
25-5112 Model 2000 CM 1 Color Monitor	509

FURNITURE

25-1324 Computer Table	68
25-1325 Computer Stand	42
25-1326 Printer Stand	42
25-1327 Printer Stand	42
25-1328 Corner for 1356/57 Desk/Stand	109
25-1329 Hutch for 1356 Desk	109
25-1350 Printer Platform	229
25-4303 Deluxe System Desk	128
25-4305 Deluxe Printer Stand	128
25-4306 Terminal Stand	128
25-4307 Printer Stand	128
25-5115 Model 2000 Pedestal	76

PRINTERS & ACCESSORIES

25-1180 GCP 115 Color Graphics Printer	108
25-1196 DT 116 Graphics Pad	90
25-1255 DMP 120 120cps Dual-Mode Printer	269
25-1261 TF 110 Transfer Matrix Printer	269
25-1268 GCP 220 Color Ink Jet Printer	109
25-1269 PCT 64 64K Printer Controller (Buffer)	212
25-1270 DMP 510 43cps Daisywheel printer	1270
25-1271 DMP 110 30cps Daisywheel Printer	1270
25-1274 DMP 210SP 160cps Dual-Mode Printer	1270
25-1275 TRP 100 Printer	255
25-1276 DMP 105 Cheeep Printer	169
25-1277 DMP 430 Not So Cheeep Printer	169
25-1278 DMP 220 High Speed Matrix Printer	509
25-1280 DMP 130 100cps Single-Mode Printer	297
25-1441 B-Directional Tractor for DMP 210	102
25-1442 B-Directional Tractor for DMP 210	109
25-1443 B-Directional Tractor for DMP 210	109
25-1447 B-Directional Tractor for Daisywheel II	188
25-1448 Single Bin Sheet Feeder for DWP-410	672
25-1455 Acoustic Coupler	109
25-1459 B-Directional Tractor for Daisywheel II	63
25-1460 Model 1/3/4 4P Printer Cable	29
25-1468 RS 232C Cable Extender	33
25-1469 Model 100 Printer Cable	13
25-1470 Model 1/3/4 4P Printer Cable	29
25-1480 RS 232C Cable	25
25-1481 RS 232C Cable	25
25-1482 RS 232C Cable	46
25-1483 RS 232C Cable	76
25-1484 RS 232C Cable Extender	33
25-1486 RS 232C Null Modem Adapter	102
25-1488 SW 300 Parallel Printer Switch	59
25-1489 SW 303 RS 232C Printer Switch	59
25-1490 SW 303 RS 232C Printer Switch	59
25-3591 PC 3 Printer	102
25-3605 PC 2 Printer	102
25-3652 PC 4 Printer	68

C.I.TOH

DX 100 Gonca Banana Serial or Parallel 50cps	139
ProWriter Jr 100cps N/LQ Print/Tractor Parallel	229
3520 350cps Parallel IBM Compatible	\$ 199
8510BP 120cps Friction/Tractor Parallel IBM Comp	299
8510SEF 80 Dot 180cps N/LQ IBM Graphics	399
8510CEP 7 Colors 180cps IBM Graphics	499
1550P ProWriter 2 120cps for Wide Paper Parallel	525
1550SCD Same as above except serial interface	299
1550SEF 7 colors 180cps Heat/ink & wiper	599
1550SEP - IBM Graphics 180cps N/LQ	899
F10 40 Stawriter 40cps Daisywheel	999
F10 55 ProMaster 50cps Daisywheel FAST	999
F10 B-Directional Tractor with Plastic Cover	199
F10 Electric Single Bin Sheet Feeder Inst Required	775
F10 Mechanical Single Bin Sheet Feeder	299
24LQ 24pin Dot Matrix 200cps 7 Colors 360cps	999

We have dust covers for most every printer we sell. Be sure to order one with your new printer to keep it like new.

CABLES

We manufacture a great number of different cable assemblies to connect most anything to anything else. Call us with your specific needs. We probably have it on the shelf. All at discount prices, of course.

SUPPLIES

5 25 SSDD Disks/ettes Pack of 10 1 Year Guarantee	\$ 14
8 SSDD Disks/ettes Pack of 10 1 Year Guarantee	18
8 SSDD Disks/ettes Pack of 10 1 Year Guarantee	29
8 DSSD Disks/ettes Pack of 10 1 Year Guarantee	34
5 25 Floppy Holds 75 Disks	16
8 5 1/4 Tractor Paper 200 2900 Sheets	26
14 1 1/2 Tractor Paper 200 2900 Sheets	35
5 25 or 8 Heat Cleaning Kit	9

RIBBONS

We have more ribbons than you do. Way too many types to list here. Add them to your order now. They're cheeep too.

MONTEZUMA'S REVENGE

Model 3 Upgrade
112K + CP/M + 80 COLUMN

This month Monte offers the deal of the year. The Holmes VID-80 is the only plug in printed circuit board which expands the disk display to 24 lines of 80 characters and allows operation of the CP/M 2.2 operating system with a 56K TPA. Both 80 & 24 & 16 modes are available from TRSDOS and BASIC. Reads and writes 18 different disk formats (Kyrpus, Osborne, etc.) A total of 112K of RAM. The extra 48K RAM can be set up as a RAM disk through software routines that are furnished with the supplied CP/M operating system. The VID-80 comes complete with easy to follow installation instructions and operational documentation. No trace cuts or soldering required. Guaranteed for one year parts and labor. Monte can ship this today.

MONTE'S SPECIAL PRICE \$ 279

Add WordStar 3.3 complete and ready to run for 1 00

"WE KEEP YOU RUNNING"

SOFTWARE

Note: In Basic Stack, include all unique computer software packages contain disks for all models. Optional disks are available at extra charge. Be sure to ask for details when you order.

CP/M 2.2 by Montezuma Micro For the Model 4	\$ 169
Rated best by actual test! Get the good one	
NEW! CP/M Hard Disk Driver with Backup & Restore	30
NEW! 5 1/4 MS-DOS & BASIC Disk/Doc/Mod 1200	12
26-0310 TRSDOS 2.3 For the Model 3	12
26-0312 TRSDOS 3.3 For the Model 3	12
26-0314 TRSDOS 3.3 For the Model 3	12
26-0316 TRSDOS 2.3 Doc - Print Card	42
26-0413 Disk Drive Analyzer. Why pay more?	26
26-1502 Model 1/3 Stackpak	42
26-1510 Model 1/3 Trendler	51
26-1511 Model 3 Home Accountant	85
26-1512 Model 4 Target Planner/Calc	85
26-1513 Model 1/3 Cash Spectator	85
26-1514 Model 3 Portfolio Manager	109
26-1515 p/s file for Model 3	106
26-1516 report for Model 3	106
26-1517 p/s file for Model 4	107
26-1520 Model 4 VisiCalc	189
26-1521 Model 3 VisiCalc Business Forecast	189
26-1527 Model 3/4 Formation	85
26-1530 Model 4 Multiplex	42
26-1538 Model 4 Apartment Management	295
26-1539 Model 3/4 W 2 Writer	169
26-1540 Model 3/4 General Ledger	169
26-1541 Model 3/4 Accounts Receivable	169
26-1542 Model 3/4 Accounts Payable	169
26-1543 Model 3/4 Payroll	169
26-1544 Model 3/4 Invoice Writer	169
26-1545 Model 3/4 Inventory Control	169
26-1559 Model 1/3 Manufacturing Inventory Control	169
26-1560 Model 1/3 Field Assesr	169
26-1562 Model 1/3 Project Manager	169
26-1563 Model 1/3 SCRIP/SIT	14
26-1564 Model 1/3 Marigam	14
26-1565 Model 1/3 Microline	14
26-1566 Model 1/3 Medical Office Systems	254
26-1569 Model 3 VisiCalc Enhanced Version	85
26-1571 Model 1/3 Inventory	85
26-1572 Model 1/3 Heat E-Stat	85
26-1580 Model 1/3 Project Manager	85
26-1581 Model 1/3 Personnel Manager	85
26-1582 Model 1/3 Time Manager	85
26-1584 Model 3 Checkwriter 80	127
26-1585 Model 3 Business Checkwriter	127
26-1588 Model 3 MICRO/COVER	42
26-1589 Model 1/3 SCRIP/SIT	169
26-1590 Model 1/3 SCRIP/SIT	169
26-1591 Model 1/3 SCRIP/SIT Dictionary	169
26-1592 Model 1/3 Profiler Plus	169
26-1593 Model 3 Profile Plus L/DOS/hv version	212
26-1594 Model 3 Desktop Plan 80	139
26-1595 SuperSCRIP/SIT For the Model 4	139
26-1596 SCRIP/SIT For the Model 4	14
26-1597 Model 3 Business Graphics Pak	148
26-1598 Model 3 Business Graphics Pak	148
26-1600 Dictionary for the Model 4	85
26-1608 NEW Model 4 Desamata	169
26-1630 TK Solver for the Model 4	255
26-1632 Model 1/3 Oracle	85
26-1922 Model 3/4 Orchestra 90	12
26-2011 Model 1/3 EDAS - Tape Version	255
26-2012 Assembly Language Development Course	126
26-2113 EDAS Disk Edition Model 1/3	29

26-2015 Model 3 Instruction Tapes	21
26-2017 Model 3 Assembly Language Course - Tape	34
26-2018 Model 3 Assembly Language Course - Disk	54
26-2019 TRSDOS 6 + Training Course	69
26-2020 Lower Level for the Model 1/3	42
26-2022 DTP Plot for the Model 1/3	17
26-2025 Construction for the Model 4	42
26-2026 NEW COBOL Query for the Model 4	127
26-2027 Graphics 90 for something	169
26-2190 Model 4 COBOL	34
26-2200 Model 3 FORTRAN	85
26-2200 Model 1 FORTRAN	169
26-2203 Model 1/3 COBOL	169
26-2205 Model 3 COBOL	169
26-2210 Model 3 BASICOM	169
26-2211 Model 3 AICor PASCAL	212
26-2212 AICor PASCAL For the Model 4	212
26-2213 Model 1 L/DOS (3.5 version)	69
26-2214 Model 3 L/DOS (3.5 version)	69
26-2216 CP/M Plus for the Model 4	127
26-2200D The Good CP/M for the Model 4 (Microterm)	169
26-REAL GOOD Hard Disk Driver for MM CP/M	30
26-EVEN BETTER Model 5 Window for MM CP/M	49
26-FAH OUT Model 5 Toolkit for MM CP/M	49
26-WORD MODEL 4 BASICOM TRSDOS BASIC to CP/M	49
26-2217 BASICOM for the Model 4 (Requires CP/M)	165
26-2218 BASICOM for the Model 4	165
26-2219 FORTRAN for the Model 4	165
26-2220 2 Videotape various applications	27
26-2224 Commodore/Dow Jones Sign-up Kit	11
26-2230 Model 4 C Language	212
26-2231 Model 4 Double Duty 120K req.	101
26-2232 Model 3 PILOT	101
26-2233 Model 3 LOGO Disk	85
26-2234 Model 3 LOGO Disk	85
26-2235 Model 3 LOGO Disk	85
26-2236 Model 3 LOGO Disk	85
26-2237 Model 3 LOGO Disk	85
26-2238 Model 3 LOGO Disk	85
26-2239 Model 3 LOGO Disk	85
26-2240 Model 3 LOGO Disk	85
26-2241 Model 3 LOGO Disk	85
26-2242 Model 3 LOGO Disk	85
26-2243 Model 3 LOGO Disk	85
26-2244 Model 3 LOGO Disk	85
26-2245 Model 3 LOGO Disk	85
26-2246 Model 3 LOGO Disk	85
26-2247 Model 3 LOGO Disk	85
26-2248 Model 3 LOGO Disk	85
26-2249 Model 3 LOGO Disk	85
26-2250 Model 3 LOGO Disk	85
26-2251 Model 3 LOGO Disk	85
26-2252 Model 3 LOGO Disk	85
26-2253 Model 3 LOGO Disk	85
26-2254 Model 3 LOGO Disk	85
26-2255 Model 3 LOGO Disk	85
26-2256 Model 3 LOGO Disk	85
26-2257 Model 3 LOGO Disk	85
26-2258 Model 3 LOGO Disk	85
26-2259 Model 3 LOGO Disk	85
26-2260 Model 3 LOGO Disk	85
26-2261 Model 3 LOGO Disk	85
26-2262 Model 3 LOGO Disk	85
26-2263 Model 3 LOGO Disk	85
26-2264 Model 3 LOGO Disk	85
26-2265 Model 3 LOGO Disk	85
26-2266 Model 3 LOGO Disk	85
26-2267 Model 3 LOGO Disk	85
26-2268 Model 3 LOGO Disk	85
26-2269 Model 3 LOGO Disk	85
26-2270 Model 3 LOGO Disk	85
26-2271 Model 3 LOGO Disk	85
26-2272 Model 3 LOGO Disk	85
26-2273 Model 3 LOGO Disk	85
26-2274 Model 3 LOGO Disk	85
26-2275 Model 3 LOGO Disk	85
26-2276 Model 3 LOGO Disk	85
26-2277 Model 3 LOGO Disk	85
26-2278 Model 3 LOGO Disk	85
26-2279 Model 3 LOGO Disk	85
26-2280 Model 3 LOGO Disk	85
26-2281 Model 3 LOGO Disk	85
26-2282 Model 3 LOGO Disk	85
26-2283 Model 3 LOGO Disk	85
26-2284 Model 3 LOGO Disk	85
26-2285 Model 3 LOGO Disk	85
26-2286 Model 3 LOGO Disk	85
26-2287 Model 3 LOGO Disk	85
26-2288 Model 3 LOGO Disk	85
26-2289 Model 3 LOGO Disk	85
26-2290 Model 3 LOGO Disk	85
26-2291 Model 3 LOGO Disk	85
26-2292 Model 3 LOGO Disk	85
26-2293 Model 3 LOGO Disk	85
26-2294 Model 3 LOGO Disk	85
26-2295 Model 3 LOGO Disk	85
26-2296 Model 3 LOGO Disk	85
26-2297 Model 3 LOGO Disk	85
26-2298 Model 3 LOGO Disk	85
26-2299 Model 3 LOGO Disk	85
26-2300 Model 3 LOGO Disk	85

ALL Color Computer Software 25% Off Catalog Price

26-4501 General Ledger I	219
26-4502 General Ledger II	219
26-4503 Payroll	119
26-4504 Accounts Receivable	179
26-4505 Medical Office Systems	499
26-4511 VisiCalc</	

Classical Gas

This month's template was submitted by Guy T. Wicks, Bernville, PA.

I like to keep track of my cars' performance to quickly spot a loss of efficiency that might signal maintenance problems. The best way to determine this is by monitoring fuel consumption and computing the miles per gallon (mpg) on a regular basis. I also like having an up-to-date account of yearly performance and vehicle costs; it's a great help at tax time. Although I've recorded mileage, fuel purchased, and costs for years, I could never seem to find time to do the necessary calculations until I built my CarFuel template.

Template Structure

I divided CarFuel into three sections: data entry, fuel consumption, and year-to-date costs (see the Figure). The first section contains the template's basic data: refueling dates, mileage, gallons purchased, and cost. The column labeled "Tank" lets me note when I completely fill the tank. CarFuel uses the figures entered in the first section to calculate the results for the fuel consumption



and year-to-date areas.

The first column under "Fuel Consumption" computes and displays the miles per gallon you averaged after each refueling stop. If you fill the tank each time you gas up, you'll get an accurate fuel consumption rate. The next column

uses a "moving" average to offset any fluctuation in fuel efficiency calculations caused by not filling the tank completely. CarFuel doesn't begin calculating the moving mpg until you've made five entries; thereafter it "moves" with the newest data, always computing the average

1	2	3	4	5	6	7	8	9	10	11	
1	Auto Data										
2											
3	Vehicle:	Jimmy	Year:	1983	Purchased:	4/6/84					
4											
5	/-----Data Entry-----/				*-----Fuel Consumption-----*			//-----Year to Date-----//			
6	Date	Mileage	Gallons	Tank	Cost	Current	Moving	Annual	Miles	Gallons	Cost
7						MPG	Average	MPG			
7											
8	-----										
10	01/01/85	24,400.0		F							
11	01/04/85	24,781.7	17.40		\$20.50	21.94		21.94	381.7	17.40	\$20.50
12	01/10/85	25,107.3	8.48		\$10.00	38.40		27.33	707.3	25.88	\$30.50
13	01/22/85	25,269.2	14.40	F	\$17.00	11.24		21.58	869.2	40.28	\$47.50
14	01/30/85	25,565.1	4.25		\$5.00	69.62		26.16	1,165.1	44.53	\$52.50
15	02/08/85	25,705.5	16.27	F	\$19.50	8.63	21.47	21.47	1,305.5	60.80	\$72.00
16	02/15/85	25,872.3	6.25	F	\$7.50	26.69	21.97	21.96	1,472.3	67.05	\$79.50
17	02/24/85	26,017.2	5.80	F	\$7.00	24.98	19.37	22.20	1,617.2	72.85	\$86.50
18	03/05/85	26,152.0	5.65	F	\$7.00	23.86	23.10	22.32	1,752.0	78.50	\$93.50
19	03/14/85	26,272.7	5.05	F	\$6.25	23.90	18.13	22.41	1,872.7	83.55	\$99.75
20	03/26/85	26,576.2	7.95		\$10.00	38.18	28.36	23.78	2,176.2	91.50	\$109.75
21	04/04/85	26,706.7	8.48		\$10.00	15.39	25.34	23.07	2,306.7	99.98	\$119.75
22	04/15/85	26,788.4	7.70		\$9.00	10.61	22.14	22.18	2,388.4	107.68	\$128.75

Figure. Spreadsheet template for CarFuel.

GOING PORTABLE?

WHAT ARE THE TWO MOST IMPORTANT CONSIDERATIONS?

SIZE AND WEIGHT!

This printer is half the size and half the weight of your Model 100. Anywhere you happen to be, cruising at 30,000 feet or in a cab to an important business meeting, you can get a quick and quiet printout. A perfect companion for your Model 100/200/600.

FEATURES?

This printer has them all:

- 8½" wide thermal paper
- 512 byte buffer
- Epson MX-80 bit-mapped graphics
- Built-in automatic self test function
- Excellent User's Manual

(ACTUAL print sample)

80 Chars/Line, 40 CPS!

Enlarged!

underlined Emphasized!

CONDENSED gives you 160 chars. per line!

\$99 GRAND TOTAL

You get the printer and a specially made 18" cable (connects printer to your Model 100/200/600 or NEC 8201/8401), 20' roll of paper, a paper holder, and 4 "C" batteries — everything you need to start printing immediately with the push of a button. This price also includes free UPS surface shipping in the cont. USA. There is no surcharge for VISA/MC/Amex — even the phone call is free.

RUGGED

This printer was designed to print over 300,000 lines without maintenance — that's over 104 pages every week for a year.

DIRECT TO YOU

We've been selling this printer to our portable customers and corporate accounts for over a year. Two of our largest accounts, NBC and National Geographic, use them in the field all over the world. To meet the demand we have gone direct to the Japanese manufacturer. Our large volume cost is unbelievable — that's why we can offer it direct to you at this fantastic price, yet still give you great service and support (6 month parts/labor warranty, 30 day money back satisfaction guarantee).

SUPPORT

We stock paper (rolls and sheets), cables, and accessories for the printer. The full accessory kit costs only \$24 and includes a carrying case, 100' roll of paper, and an A/C adapter (saves batteries when A/C power is convenient).

NO RISK

Try it for 30 days, ask your friends and business associates if they've ever seen anything like it. You can return it in 30 days for any reason and get a full refund. Don't let yourself miss this portable printer bargain of a lifetime.

IT'S EASY TO ORDER

Send your order with payment to the address below. Or, if you prefer, credit card orders can be handled by phone—VISA, MasterCard, and American Express are welcome. California residents add 6% sales tax. Checks allow 3 weeks to clear. Institutions and Corporations call for purchase order approval.

1-800-732-5012 TOLL FREE

Orders only (8am. - 5pm. PST)

In California (805) 987-4788

For orders or customer service

If you would like our latest product catalog or to find a dealer near you, please write or call (805) 987-4788

PURPLE COMPUTING

420 Constitution Ave.
Camarillo, CA 93010
Telex: 888661 (PURPLE)

Canada: Canada Portable Computer,
Langley, B.C. (604) 856-8858



\$99

elixir

**ENHANCES BASIC PROGRAMS
PROGRAM SCREENS MADE EASY
MERGE USR CODE WITH BASIC
SOMETHING FOR ALL LEVELS
DOZENS OF UNIQUE FEATURES**

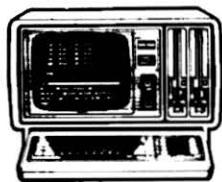
Everything is in BASIC or is imbedded in BASIC, even the screen compilers and their output! Program screens are truly child's play. This form of USR program is the ultimate in speed to install/load startup/run, and saves memory, as do the compiled screens. 30 demo or application programs include screen editor/compilers, a disk verifier, directory system, word counter, piano player, hex utilities, and more. 12K of machine language in 50 USR routines: graphics, text, sound, printing, I/O for disk/screen/memory, keyboard menu control, hex utilities, capture program screens by break key, GOTO N, line address, more. Menu control greatly simplifies program writing and maintenance, while speeding up the action and providing more free memory.

64K mod. 1, 3, 4—2 drives. 1 dr. runs, but inquire first for copy service. \$39.50 + \$2.00 P&H. Send check or money order to:

Donald W. Ady
56 Oak Ridge Avenue
Summit, NJ 07901
Inquiries (201) 277-3365 or SASE

Circle 539 on Reader Service card.

TRS-80 DISCOUNT



**Computers
at Guaranteed
Low Prices***

ATON CP/M FOR II, 12, 16

EPSON & NEC PRINTERS

DYSAN DISKETTES

HAYES MODEMS

**Desert Sound, Inc.
of California**

1-800-835-5247

Factory Authorized Dealer

TRS-80 is a Reg. Trademark of Tandy Corp.

*Call for FREE CATALOG
and Price Guarantee

Calif. Res. Call 619-244-6883

SPREADSHEET BEAT

Cell	Formula
R8C1	REPT(" ",110)
R11:22C6	INT((((RC[-4]-R[-1]) C[-4])/RC[-3])*100 +0.5)/100
R15:22C7	INT((((RC[-5]-R[-5]) C[-5])/SUM(RC[-4]: R[-4]C[-4])*100 +0.5)/100
R11:22C8	INT((((RC[-6]- R10C2)/SUM(R10C3: RC[-5])*100 +0.5)/100
R11:22C9	RC[-7]-R10C2
R11:22C10	SUM(R10C3:RC[-7])
R11:22C11	SUM(R10C5:RC[-6])

Table 1. Multiplan formulas for CarFuel.

of the five most recent entries. You can easily change the number of entries averaged by altering the cell designations used in the moving average formula.

The last column under "Fuel Consumption" provides the mpg rating for the entire year. It encompasses too much data to be useful in predicting mechanical deficiencies, but it can give you a means of comparing vehicles. That's especially helpful when you're buying a new car and want to estimate how real performance might compare to Environmental Protection Agency ratings. Similarly, you can use this information to predict annual vehicle costs for a future budget.

The final section of the template provides a summary of the year's performance. CarFuel gives you the rundown on the total miles traveled, amount of fuel consumed, and total cost after each fuel stop.

Construction Business

The Figure represents my sample template data; Tables 1 and 2 are, respectively, the formulas and formats used in building the spreadsheet. I used Multiplan to construct this template, but you can adapt it to any other spreadsheet by making appropriate changes in the formulas and cell formatting instructions. Table 3 contains the formulas for setting up a similar template using VisiCalc.

My template also assumes that you have a printer capable of printing 132 characters per line. If your printer requires special codes, you can use Multiplan's Print and Options commands to send the appropriate control codes to the printer each time you print the template. Don't forget to use the Print Margins command to set the right margin correctly, or you'll print only half the template lines on a page.

Begin by using the top eight rows as

Cells	Format
Default Template Format	(K:DGOG10) General formatting and alignment of data follows Multiplan rules. Default cell width is 10 characters; the Display Commas option is enabled.
R1:4C1:11	(COD) Formatted in the Continuous Text mode with default alignment.
RSC1:11	(COC) Formatted in the Continuous Text mode with centered alignment.
R6:7C1:5	(COR) Formatted in the Continuous Text mode with right-justified alignment.
R10:22C4	(F2D) Formatted in Fixed Decimal mode with two digits of precision displayed in the default alignment.
R6:7C6:11	(COR) Formatted in the Continuous Text mode with right-justified alignment.
R10:22C3	(F2D) Formatted in Fixed Decimal mode with two digits of precision displayed in the default alignment.
R10:22C:10	(COR) Formatted in the Continuous Text mode with right-justified alignment.

Table 2. Multiplan formats for CarFuel.

label areas. Multiplan requires that you format the text area for continuous display if the text will exceed one column width. For easy viewing, I formatted the entire area prior to entering the data by using the command sequence Format, Cells, Continuous.

Entering the formulas for CarFuel is easy: You enter a single formula and then copy it down the column, covering the cells you expect to fill. (You might want to increase the size of the sheet a few rows at a time—the larger the spreadsheet, the longer it takes to recalculate.) But make sure that you enter the absolute cell references (e.g., R10C2 in the formula in cell R11C8) so that the formulas work correctly when you copy them.

You can still "point" to the appropriate cell using the arrow keys, but don't forget to hit the @ key before moving the key again. This converts the relative cell reference to its absolute equivalent; you need absolute references for computing the year-to-date totals and averages.

Multiplan and most other spreadsheets store the numerical values as binary numbers. If you use decimal fractional digits (as you do when you work with money), your decimal representations might be inaccurate.

In writing CarFuel's formulas, I used a special technique to round the displayed numerical values to two decimal digits. While this still gives a binary value, it minimizes accumulated errors. For example, to round a numerical expression

SPREADSHEET BEAT

Column Formula

E	/F\$
F	@INT((((B9 - B8)/C9)*100 + .5)/100
G	@INT((((B13 - B8)/@SUM(C8...C13)))*100 + .5)/100
H	@INT((((B9 - B8)/@SUM(C8...C9))*100) + .5/100
I	(B9 - B8)
J	@SUM(C8...C9)
K	/F\$ @SUM(E8...E9)

Table 3. Formulas for reworking CarFuel using VstCalc. VstCalc uses letter designations for the columns, so columns 1-11 of the Multiplan worksheet would become columns A-K on a VstCalc worksheet.

to two decimal digits, CarFuel uses the following Multiplan formula:

$INT(\text{numerical expression}) * 100 + 0.5 / 100$

This equation first multiplies the numerical expression by 100 to move the first two fractional digits to the left of the decimal point. Next it adds 0.5 to round any remaining fractional value and uses the INT function to truncate the number to an integer value. Finally, the formula divides the truncated result by 100 to correct the two fractional digits.

One final point—the formula in cell R8C1 contains the string function REPT, which repeats the string (a hyphen in this case) 110 times. It's an easy way of drawing a dividing line across all 11 columns.

Final Tips

Enter the data from each vehicle refueling as soon as possible, and this template will provide a convenient way to track your cars' performance. Like any other tool, it will get "rusty" if you don't use it frequently.

Maintain a separate record for each vehicle to facilitate data entry and retrieval, and keep in mind that you'll spend less time recalculating the formulas if the spreadsheet is small. When you enter a lot of information, you can further reduce your waiting time by setting the recalculation mode to manual using the Options command.

My "car watcher" has been instrumental in managing my vehicle resources. With simple changes, you'll find a permanent home for it also. ■

Write to Spreadsheet Beat c/o John B. Harrell III, 80 Micro, 80 Pine St., Peterborough, NH 03458. We'll pay \$50 for each template we publish. In addition, we'll publish your questions and print advice on using your spreadsheets more efficiently.

GET THE KNOW-HOW TO REPAIR EVERY COMPUTER ON THIS PAGE. AND MORE.



IBM is a Registered Trademark of International Business Machines Corporation.
Epson is a Registered Trademark of Epson America, Inc.
Apple and the Apple logo are Registered Trademarks of Apple Computer, Inc.
Compaq is a Registered Trademark of COMPAQ Computer Corporation.
© 1984 AT&T Technologies, Inc.

Learn the Basics the NRI Way—and Earn Good Money Troubleshooting Any Brand of Computer

The biggest growth in jobs between now and 1995, according to Department of Labor estimates, will occur in the computer service and repair business, where demand for trained technicians will actually double.

You can cash in on this opportunity, once you've learned all the basics of computers the NRI way. NRI's practical combination of "reason-why" theory and "hands-on" building skills starts you with the fundamentals of electronics, then guides you through advanced electronic circuitry and on into computer electronics.

You Build—and Keep—a Sanyo MBC-550-2

The vital core of your training is the step-by-step building of the 16-bit Sanyo MBC-550-2 computer. Once you've mastered the details of this IBM-PC compatible machine, you'll be qualified to service and repair virtually every major brand of computer, plus many popular peripheral and accessory devices.

With NRI training, you learn at your own convenience, in your own home. You set the pace—without classroom pressures, rigid night-school schedules, or wasted time. You build the Sanyo MBC-550-2 from the keyboard up, with your own personal NRI instructor and the complete NRI

technical staff ready to answer your questions or give you guidance and special help whenever you need it.

Your NRI course includes installation and troubleshooting of the "intelligent" keyboard, power supply, and disk drive, plus you'll check out the 8088 microprocessor functions, using machine language. You'll also prepare the interfaces for future peripherals such as printers and joysticks.

100-Page Free Catalog Tells More

Send the coupon today for NRI's big 100-page color catalog on electronics training, which gives you all the facts about NRI courses in Microcomputers and other growing high-tech career fields. If the coupon is missing, write to NRI Schools, 3939 Wisconsin Ave., NW, Washington, D.C. 20016.

Your NRI course includes the Sanyo MBC-550-2 Computer with 128K RAM, monitor, disk drive, and "intelligent" keyboard; the NRI Discovery Lab®, teaching circuit design and operations; a Digital Multimeter; Bundled Spread Sheet and Word Processing Software worth \$1500 at retail—and more.



NRI SCHOOLS
McGraw-Hill Continuing Education Center
3939 Wisconsin Avenue, Washington, DC 20016
We'll give you tomorrow.

CHECK ONE FREE CATALOG ONLY

- Computer Electronics with Microcomputers
 Data Communications
 Robotics & Industrial Controls
 Color TV, Audio, and Video System Servicing

- Electronic Design Technology
 Digital Electronics
 Communications Electronics
 Industrial Electronics

For Career courses approved under GI bill,
 check for details.

- Basic Electronics
 Telephone Servicing
 Small Engine Servicing
 Building Construction

Name (Please Print) _____

Age _____

Street _____

City/State/Zip _____

Accredited by the National Home Study Council

179-036

Continued from page 43

Program Listing 1. Main/BAS.

```

1 ' Generalized Data Base System
2 '   Written by Hardin Brothers
8 SYSTEM "System (Break=No)"
9 '   Initialize & Define Variables
10 OPTION BASE 1: DEFINT A-Z:
20 FALSE = 0: TRUE = NOT FALSE
30 EQUAL.LINE$ = STRING$(80,"="):
40 BLANK.LINE$ = STRING$(79," ")
50 DIM KEY$(2) 'strings for index of used records
60 DIM F$(40) 'fielding variables for random file
70 DIM FIELDS(2,40) '(l,n) = length of field / (2,n) =
   type of field
80 DIM IN(2,40) '(l,n) = field # / (2,n) = condensed
   x,y loc
90 DIM PROMPT$(40) 'prompt for input field
100 DIM TYPE(6) 'type for Selection comparisons
110 DIM LVAL(6) 'Field # for left side of
   comparisons
120 DIM COMP(6) 'Comparison operator
130 DIM RVAL$(6) 'Field # or constant for right side
   of comparisons
140 DIM CONJ(6) 'Conjunctions for
   comparisons/selection
150 DIM RESULT(6) 'Results of individual comparisons
160 DEF FN CONDATES$(A$) = CHR$(VAL(MID$(A$,7,2))) +
   CHR$(VAL(MID$(A$,1,2))) + CHR$(VAL(MID$(A$,4,2)))
170 DEF FN EXPONES$(A$) = RIGHT$("0"+MID$(STR$(ASC(A$)),2),2)
180 DEF FN EXPDATES$(A$) = FN EXPONES$(MID$(A$,2,1)) + "/" +
   FN EXPONES$(MID$(A$,3,1)) + "/" + FN EXPONES$(MID$(A$,1,1))
190 DEF FN CHKDATE(A$) = (MID$(A$,3,1)="/" AND
   (MID$(A$,6,1)="/" AND (VAL(MID$(A$,1,2))>1) AND
   (VAL(MID$(A$,1,2))<=12) AND (VAL(MID$(A$,4,2))>1) AND
   (VAL(MID$(A$,4,2))<=31) AND (VAL(MID$(A$,7,2))<=99) AND
   (LEN(A$)=8)
200 DEF FN ROOMEXIST = ((INSTR(KEY$(1),"0")+
   INSTR(KEY$(2),"0"))>0)
210 DEF FN NEXTREC = INSTR(KEY$(1),"0") +
   TRUE*(INSTR(KEY$(1),"0")=0)*(LEN(KEY$(1))+
   INSTR(KEY$(2),"0"))
220 DEF FN NUMERIC(X$) = (X$>"0" AND X$<="9") OR (X$="." )
   OR (X$="-")
221 DEF FN CHARACTER(X$) = (" "<=X$) AND (X$<="z")
230 ' Main menu (230 - 310)
240 CLS
250 PRINT , "BASIC Data Base System": PRINT: PRINT
260 PRINT , "1. Definitions":
   PRINT , "2. Use Existing Data Base":
   PRINT , "3. Add Records to Data Base"
270 PRINT , "4. Read/Search/Modify Records":
   PRINT , "5. Build Selection Key ":
   PRINT , "6. Build Sort Index File"
280 PRINT , "7. Print Reports":
   PRINT , "8. Release and Close Data Base":
   PRINT , "9. End Program":PRINT:
   PRINT , " Your choice ==> ";
290 MAIN.MENU$ = " ":
   WHILE MAIN.MENU$ < "1" OR MAIN.MENU$ > "9":
   MAIN.MENU$ = INPUT$(1): WEND: PRINT MAIN.MENU$:
300 ON VAL(MAIN.MENU$) GOTO 700,500,700,700,700,700,700,
   600

```

```

310 IF FILE$<>" THEN CLS: PRINT
   "You must close your database (menu choice 8) first":
   GOSUB 1012: GOTO 240
320 CLOSE: SYSTEM "System (Break=Yes)": CLS: END
498 '   Open a database for use
500 CLS: IF FILE$ <> "" THEN PRINT
   "There is a database already in use.": PRINT
   "You must release and close one database before you can"
   : PRINT "open another one.": GOSUB 1012: GOTO 240
502 PRINT "Enter database name -- maximum of 8 characters ":
   INPUT " ==> ",FILE$
504 IF LEN(FILE$)<1 OR LEN(FILE$)>8 OR INSTR(FILE$,"/") THEN
   502
506 PRINT "Drive number (0-7) containing database ==> ":
   DRIVE$ = " ": WHILE DRIVE$<"0" OR DRIVE$>"7":
   DRIVE$ = INPUT$(1): WEND: PRINT DRIVE$
508 TEST$ = FILE$ + "/DEF:" + DRIVE$: GOSUB 1000
510 IF TEST.FLAG = -1 THEN GOTO 516
512 IF TEST.FLAG = 0 THEN PRINT
   "That database does not exist on that drive"
   ELSE IF TEST.FLAG = 1 THEN PRINT "Illegal file name"
   ELSE IF TEST.FLAG = 2 THEN PRINT "Disk Error"
514 FILE$="": GOSUB 1012: GOTO 240
516 CLS: PRINT "Opening ";FILE$: " database.":
   OPEN "I",1,TEST$:INPUT #1, TOTAL.FIELDS:INPUT #1, RECLEN
518 FOR LOOP = 1 TO 40: INPUT #1, FIELDS(1,LOOP),
   FIELDS(2,LOOP): NEXT LOOP
520 INPUT #1, KEY$(1): INPUT #1, KEY$(2): CLOSE: GOTO 240
598 '   Close & Release an active database
600 CLS: IF FILE$ = "" THEN PRINT
   "There is no database presently active":GOSUB 1012:
   GOTO 240
602 PRINT "Close and Release an Active Database": PRINT
   "If you continue, the current database will be closed.":
   PRINT: PRINT "Do you want to continue ";: GOSUB 1018:
   IF YN$="N" THEN GOTO 240
604 CLS: CLOSE: GOSUB 1054: FILE$ = " ": GOTO 240
698 ' Call up overlay if not presently active
700 IF MAIN.MENU$="1" THEN OVL$="DEFINE" ELSE IF
   MAIN.MENU$="3" THEN OVL$="ADD" ELSE IF MAIN.MENU$="4" THEN
   OVL$="READ" ELSE IF MAIN.MENU$="5" THEN OVL$="SELECT" ELSE
   IF MAIN.MENU$="6" THEN OVL$="INDEX"
702 IF MAIN.MENU$="7" THEN OVL$="REPORT"
704 IF OLD.OVL$ = OVL$ THEN GOTO 2000
   ELSE PRINT: PRINT , "Loading program overlay ..."
706 OLD.OVL$ = OVL$:
   CHAIN MERGE OVL$+"/OVL",2000,ALL,DELETE 2000-3000
995 'z Common Subroutines
998 ' Does File TEST$ exist?
   Return TEST.FLAG = -1 (file exists),
   = 0 (file doesn't exist)
   = 1 (illegal file name), = 2 (other error)
1000 TEST.FLAG = -1: ON ERROR GOTO 1004: OPEN "I",1,TEST$
1002 ON ERROR GOTO 0: CLOSE 1: RETURN
1004 IF ERL <> 1000 THEN TEST.FLAG=2: RESUME NEXT
1006 IF ERR = 53 THEN TEST.FLAG=0
   ELSE IF ERR = 64 THEN TEST.FLAG = 1 ELSE TEST.FLAG = 2
1008 RESUME NEXT
1010 '   Pause & prompt for key to continue
1012 PRINT @(23,22),"Press any key to continue":
1014 WHILE INKEY$<>"": WEND: WHILE INKEY$ = " ": WEND: RETURN
1016 '   Yes/No Routine

```

Listing 1 continued

“I am amazed at the broad spectrum of technical articles you publish, for both novice and advanced programmers . . .”



If you're still wondering which magazine you should buy for your TRS-80*, here's what **80 Micro** readers have to say about their #1 system-specific information source—

●“Not only is the magazine very professionally done, but I have found something in almost every issue that has been worth the price of the subscription . . .”

*Roger L. Holstege
Millersville, MD*

●“I was greatly impressed by your magazine. I got more useful information from that one issue of **80** than I have from countless other sources . . .”

*John M. Crütenden
Jackson, MS*

●“I have found **80 Micro** to be the most valuable magazine pertaining to home computers on the market . . .”

*William C. Hardin, Jr.
Charlotte, NC*

80 Micro is the magazine for every TRS-80 user—from beginner to advanced. **80 Micro** is full of tutorials, free programs, hardware modifications, new product announcements, product reviews, debugging tips, and more.

And an **80 Micro** subscription is risk-free. *If you're not completely satisfied, you'll be reimbursed for all undelivered issues.* See what **80 Micro** can do for you. It's #1 for a lot of people. Fill out this order form and send it in now.

*TRS 80 is a trademark of Radio Shack, a division of Tandy Corp.

Yes! I want a no-risk subscription to the magazine for beginner to advanced TRS-80 users. Send me 12 issues of **80 MICRO** for \$24.97! I'll save 48% off the newsstand price!

Payment Enclosed Bill me

Name _____

Address _____

City _____ State _____ Zip _____

Canada & Mexico, \$27.97. Foreign surface, \$44.97. 1 year only.
US funds drawn on US bank. Please allow 6-8 weeks for delivery.

80micro • PO Box 981 • Famingdale, NY 11737
36388

Listing 1 continued

```

1018 PRINT "(y/n) ==> ";
1020 YN$=" ": WHILE INSTR("YN",YN$) = 0:
YN$ = CHR$(ASC(INPUT$(1)) AND &HDF): WEND: PRINT YN$;:
RETURN
1022 ' Open & Read the /INP file
1024 OPEN "I",1,FILES$+"/INP:"+DRIVES$, INPUT #1,I.HEAD$:
FOR LOOP = 1 TO TOTAL.FIELDS: INPUT #1, PROMPTS$(LOOP),
IN(1,LOOP),IN(2,LOOP): NEXT LOOP
1026 CLOSE 1: RETURN
1028 ' Open & Field the /DAT file
NOTE: buffer #2 is reserved for the /DAT file
1030 OPEN "R",2,FILES$+"/DAT:"+DRIVES$,RECLN
1032 FIELD 2, FIELDS(1,1) AS F$(1): TEMP = FIELDS(1,1)
1034 FOR LOOP = 2 TO TOTAL.FIELDS: FIELD 2, TEMP AS DUMMYS$,
FIELDS(1,LOOP) AS F$(LOOP):
TEMP = TEMP + FIELDS(1,LOOP): NEXT LOOP
1036 RETURN 'NOTE: /DAT file is left open!
1038 ' Display blank form on screen
1040 CLS: PRINT I.HEAD$: PRINT @ 80,EQUAL.LINES$;:
FOR LOOP = 1 TO TOTAL.FIELDS: PRINT @ IN(2,LOOP),
PROMPTS$(LOOP);: NEXT LOOP
1042 PRINT @ (22,0), EQUAL.LINES$;: RETURN
1044 ' Display record with current buffer data on screen
1046 CLS: PRINT I.HEAD$: PRINT @ 68,;:
PRINT USING "Record: ###";LOC(2);:
PRINT @ 80,EQUAL.LINES$;: FOR LOOP = 1 TO
TOTAL.FIELDS: PRINT @ IN(2,LOOP),PROMPTS$(LOOP);
1048 IF FIELDS(2,LOOP) = 1 THEN PRINT F$(LOOP);
ELSE IF FIELDS(2,LOOP) = 2 THEN PRINT CVS(F$(LOOP));
ELSE IF FIELDS(2,LOOP) = 3 THEN PRINT
FN EXPDATES$(F$(LOOP));
1050 NEXT LOOP: PRINT @ (22,0), EQUAL.LINES$;: RETURN
1052 ' Write /DEF file to disk
1054 OPEN "O",1,FILES$+"/DEF:"+DRIVES$: WRITE #1,
TOTAL.FIELDS: WRITE #1,RECLN: FOR LOOP=1 TO 40:
WRITE #1,FIELDS(1,LOOP),FIELDS(2,LOOP): NEXT LOOP
1056 WRITE #1,KEY$(1): WRITE #1,KEY$(2): CLOSE #1: RETURN
1058 'Return number of active records in database in
num.recs
1060 NUM.RECS=0: FOR LOOP = 1 TO LEN(KEY$(1)): NUM.RECS=
NUM.RECS+VAL(MID$(KEY$(1),LOOP,1))+
VAL(MID$(KEY$(2),LOOP,1)): NEXT LOOP: RETURN
1062 ' Formatted character input. Enter both input routines
with Q = max. length of input. Result returned in Q$
1064 DEF FN OKAY(X$) = FN CHARACTER(X$): GOTO 1070
1066 ' Formatted numeric input
1068 DEF FN OKAY(X$) = FN NUMERIC(X$)
1070 Q1 = 0:Q$ = " ": PRINT STRING$(Q,"."):FOR QLP = 1 TO Q:
PRINT CHR$(24);: NEXT QLP
1072 Q1$=INPUT$(1): IF FN OKAY(Q1$) AND Q1<Q THEN Q$=Q$+Q1$:
Q1=Q1+1: PRINT Q1$;: GOTO 1072
1074 IF Q1$=CHR$(13) THEN RETURN
1076 IF Q1$=CHR$(31) THEN FOR QLOOP = 1 TO Q1:
PRINT CHR$(24); ".": CHR$(24);:NEXT QLOOP: Q$=" ": Q1=0
1078 IF Q1$=CHR$(8) THEN IF Q1 > 1 THEN PRINT CHR$(24);".":
CHR$(24);: Q$=LEFT$(Q$,LEN(Q$)-1): Q1=Q1-1 ELSE IF Q1 =
1 THEN PRINT CHR$(24);".":CHR$(24);: Q$=" ": Q1=0
1080 GOTO 1072
1084 ' Handle alphanumeric input of current (LOOP) field and
store in buffer
1086 Q = FIELDS(1,LOOP): GOSUB 1064: LSET F$(LOOP) = Q$:
RETURN
1088 ' Handle numeric input of current (LOOP) field and

```

Listing 1 continued

Listing 1 continued

```

store in buffer
1090 Q = IN(1,LOOP): GOSUB 1068:
LSET F$(LOOP) = MKS$(VAL(Q$)): RETURN
1092 ' Handle date input of current (LOOP) field and store
in buffer
1094 OKAY = FALSE: WHILE NOT OKAY: Q = 8: GOSUB 1064:
OKAY = FN CHKDATE(Q$)
1096 IF NOT OKAY THEN PRINT @
IN(2,LOOP)+LEN(PROMPTS$(LOOP)),;: WEND
1098 LSET F$(LOOP) = FN CONDATE$(Q$): RETURN
1100 ' Number fields on input screen
1102 PRINT CHR$(16);: FOR N.LOOP = 1 TO TOTAL.FIELDS:
PRINT @ IN(2,N.LOOP)+LEN(PROMPTS$(N.LOOP)),;:
PRINT USING "##_.";N.LOOP;: NEXT N.LOOP:
PRINT CHR$(17);: RETURN
1104 'Update PTR and move next physical record into buffer 2
1106 PTR = PTR + 1: IF PTR <= LEN(KEY$(1)) THEN
IF MID$(KEY$(1),PTR,1)<>"1" THEN GOTO 1106
1108 IF PTR > LEN(KEY$(1)) THEN
IF MID$(KEY$(2),PTR-LEN(KEY$(1)),1)<>"1" THEN GOTO 1106
1110 GET 2,PTR: RETURN
1112 ' Read next pointer from /SEL or /IND file & move
record to buffer
1114 INPUT #3,PTR: GET 2,PTR: RETURN
1116 ' Strip blanks from end of Q$ string
1118 IF LEN(Q$)=0 THEN RETURN ELSE IF RIGHT$(Q$,1)<>" "
THEN RETURN: ELSE POKE VARPTR(Q$),PEEK(VARPTR(Q$))-1:
GOTO 1118
2000 'This line is necessary for the merge/delete routine
3000 'This line is necessary for the merge/delete routine

```

End

Program Listing 2. Define/OVL.

```

1998 ' Save as "DEFINE/OVL",A after debugging
2000 CLS:
PRINT "Enter data base name -- maximum of 8 characters "
:PRINT " ==> ";: Q=8: GOSUB 1064: PRINT: FILES=Q$
2002 IF LEN(FILES)<1 OR LEN(FILES)>8 OR INSTR(FILES,"/")
THEN 2000
2004 PRINT "Drive number (0-7) to hold data base ==> ";:
DRIVE$=" ": WHILE DRIVE$<"0" OR DRIVE$>"7":
DRIVE$ = INPUT$(1): WEND: PRINT DRIVE$
2006 TEST$ = FILES$ + "/DAT:" + DRIVE$: GOSUB 1000
2008 IF TEST.FLAG <= 0 THEN GOTO 2016
2010 IF TEST.FLAG = 1 THEN PRINT "Illegal File Name":
GOSUB 1012: GOTO 2000 ELSE IF TEST.FLAG = -2
THEN PRINT "Disk Error"
2012 FILES=" ": GOSUB 1012: GOTO 240
2014 ' Definitions Menu
2016 DEF.MENU$ = " ": WHILE DEF.MENU$ <> "9": CLS
2018 PRINT , "Definitions Menu": PRINT :
PRINT , "1. Define Data Base":
PRINT , "2. Define Input Screen":
PRINT , "3. Define Report Form"
2020 PRINT: PRINT: PRINT
2022 PRINT , "9. Return to Main Menu": PRINT :
PRINT , " Your choice ==> ";
2024 DEF.MENU$ = " ": WHILE DEF.MENU$ < "1" OR
DEF.MENU$ > "9": DEF.MENU$ = INPUT$(1): WEND:

```

Listing 2 continued

SUCCESS FOR SALE. CALL: 1-800-343-0728

*CW Communications/Peterborough.
Because System-Specific Magazines Sell Best.*



It's a fact. 67% of the retailers who responded to a recent nationwide survey* agreed—system-specific magazines **are** the best-selling computer magazines.

That's why you should call **1-800-343-0728**** today. System-specific is what CW/Peterborough publications are all about.

Nearly one million microcomputer users buy one or more of our 5 monthly and bi-monthly magazines. They turn to us first because we give readers trustworthy, thorough coverage of the entire system-specific market:

AmigaWorld—Our new bi-monthly publication, exploring the revolutionary Amiga by Commodore.

80 Micro—For users of the TRS-80 line of microcomputers.

HOT CoCo—The magazine for users of Tandy Color Computers.

inCider—The all-in-one journal for Apple II users.

RUN—The Home User's Guide to Commodore computing—complemented by **ReRUN**, cassettes and disks containing the best ready-to-run programs from **RUN**.

Offering your customers the best system-specific information on the market means you'll also receive CW/Peterborough's outstanding dealer benefits:

- Good discounts that lead to increased profits.
- Risk-free sales from our 100% return policy—just save the cover logos from any unsold issues and return them to us within four months!
- A handy toll-free number for easy ordering and friendly customer service.
- Distribution by ICD/Hearst.

* Magazine & Bookseller's Computer Publication Retailer Survey. (March 1985)

**CALL CW/PETERBOROUGH TODAY.
WE'LL BRING SUCCESS TO YOU... AND TO YOUR CUSTOMERS.**

Computer stores contact:
Direct Sales Department
1-800-343-0728

CW Communications
80 Pine Street • Peterborough, NH 03458

**Newsstands only contact:

Gerry Kemmet at
1-516-499-5582
ICD/Hearst

250 West 55th Street • New York, NY 10019

Listing 2 continued

```

PRINT DEF.MENU$
2026 ON VAL(DEF.MENU$) GOSUB 2030,2078,2118: WEND:
FILES$="": CLOSE: GOTO 240
2028 ' Define Data Base
2030 CLS: TEST$ = FILES$+"/DEF:"+DRIVE$: GOSUB 1000
2032 IF TEST.FLAG = -1 THEN PRINT FILES$
'Data Base already defined!': GOSUB 1012: RETURN
2034 TOTAL.FIELDS = 0: WHILE TOTAL.FIELDS < 1 OR
TOTAL.FIELDS > 40: INPUT "Total number of fields in
data base (1-40)"; TOTAL.FIELDS: WEND
2036 CLS: PRINT "Field Types: A = All keyboard characters":
PRINT " N = Numeric":
PRINT " D = Date": PRINT
2038 FOR LOOP = 1 TO 40: FIELDS(1,LOOP) = 0:
FIELDS(2,LOOP) = 0: NEXT LOOP
2040 LENGTH = 256: FOR LOOP = 1 TO TOTAL.FIELDS:
PRINT USING "Field characters remaining: ###";LENGTH:
PRINT USING "Field #": ;LOOP
2042 TYPE$ = " ": PRINT "Field type ==> ";:
WHILE INSTR("AND",TYPE$) = 0:
TYPE$ = CHR$(ASC(INPUT$(1)) AND &HDF):WEND: PRINT TYPE$
2044 FIELDS(2,LOOP) = INSTR("AND",TYPE$): IF TYPE$ = "D"
THEN PRINT "Field length ==> 3":
FIELDS(1,LOOP) = 3: LENGTH = LENGTH - 3
2046 IF TYPE$ = "N" THEN PRINT "Field length ==> 4":
FIELDS(1,LOOP) = 4: LENGTH = LENGTH - 4
2048 IF TYPE$ = "A" THEN WHILE FIELDS(1,LOOP) < 1 AND
(LENGTH - FIELDS(1,LOOP) => 0):INPUT "Field length
==> ",FIELDS(1,LOOP):WEND:LENGTH=LENGTH-FIELDS(1,LOOP)
2050 IF LENGTH < 0 THEN PRINT: PRINT "No more record room":
LOOP = TOTAL.FIELDS
2052 PRINT: NEXT LOOP
2054 CLS: PRINT TAB(20) "Data Field Definitions": PRINT
"Field Type Length"; TAB(40) "Field Type Length":
PRINT "===== "; TAB(40) "===== ";
=====
2056 PIC$ = " ## 1 ###": FOR LOOP = 1 TO 20
2057 PRINT USING PIC$;LOOP,
MID$(" AND",FIELDS(2,LOOP)+1),FIELDS(1,LOOP):;
PRINT TAB(40):; PRINT USING PIC$;LOOP+20,
MID$(" AND",FIELDS(2,LOOP+20)+1),FIELDS(1,LOOP+20)
2058 NEXT LOOP
2060 PRINT TAB(20) "Is this okay ";: GOSUB 1018:
IF YN$ = "N" THEN GOTO 2036
2062 CLS: MAX = 0: WHILE MAX<10 OR MAX>500: INPUT
"Maximum number of records (10-500) ==> ",MAX: WEND
2064 KEY$ = STRING$(MAX+1)\2,"0"): KEY$(1) = KEY$:
KEY$(2) = KEY$
2066 CLS: PRINT "Writing data base definition to disk"
2068 RECLEN = 256 - LENGTH: GOSUB 1054
2070 CLOSE: PRINT "Creating data file on disk":
DAT,FILES$ = FILES$ + "/DAT:" + DRIVE$
2072 OPEN "R",1,DAT,FILES$,RECLEN:PUT 1,LEN(KEY$(1))*2:CLOSE
2074 RETURN
2076 ' Define Input Screen
2078 CLS: TEST$ = FILES$ + "/INP:" + DRIVE$: GOSUB 1000:
IF TEST.FLAG = 0 THEN GOTO 2082
2080 IF TEST.FLAG = -1 THEN
PRINT "Screen file already exists. Replace it ";:
GOSUB 1018: IF YN$ = "N" THEN RETURN
2082 TEST$ = FILES$ + "/DEF:" + DRIVE$: GOSUB 1000:
IF TEST.FLAG <> -1 THEN PRINT

```

Listing 2 continued

Listing 2 continued

```

"Data Base Definition file not found": GOSUB 1012:
RETURN
2084 OPEN "I",1,TEST$:INPUT #1, TOTAL.FIELDS:INPUT #1,RECLEN
2086 FOR LOOP = 1 TO TOTAL.FIELDS: INPUT #1, FIELDS(1,LOOP),
FIELDS(2,LOOP): NEXT LOOP: CLOSE
2088 PRINT "Enter Screen Definitions": PRINT:
INPUT "Screen Heading ==> ",I.HEAD$
2090 IF LEN(I.HEAD$) > 0 THEN PRINT "Center heading ";:
GOSUB 1018: IF YN$ = "Y" THEN I.HEAD$ =
STRING$(40-(LEN(I.HEAD$)\2)," ") + I.HEAD$
2092 PIC$ = "Field: ## Type: !": PRINT:
FOR LOOP = 1 TO TOTAL.FIELDS:
TYPE$ = MID$("AND",FIELDS(2,LOOP),1):
PRINT USING PIC$; LOOP, TYPE$
2094 INPUT "Prompt string ==> ",PROMPT$(LOOP)
2096 IF TYPE$="D" THEN PRINT "Input length ==> 8":
IN(1,LOOP) = 8 ELSE IF TYPE$ = "A" THEN
PRINT "Input length ==>";FIELDS(1,LOOP):
IN(1,LOOP) = FIELDS(1,LOOP)
2098 IF TYPE$ = "N" THEN IN(1,LOOP)=0: WHILE
IN(1,LOOP)<1 OR IN(1,LOOP)>(79-LEN(PROMPT$(LOOP))):
INPUT "Input length ==> ",IN(1,LOOP): WEND
2100 X.COORD = -1: WHILE X.COORD < 0 OR X.COORD >
79-IN(1,LOOP)-LEN(PROMPT$(LOOP)): PRINT
"Horizontal posn.(0-";
79-IN(1,LOOP)-LEN(PROMPT$(LOOP)):"");
2101 INPUT " ==> ",X.COORD: WEND
2102 Y.COORD = -1: WHILE Y.COORD < 2 OR Y.COORD > 21:
INPUT "Vertical posn. (2 - 21) ==> ",Y.COORD: WEND
2104 IN(2,LOOP) = X.COORD + Y.COORD*80
2106 PRINT: NEXT LOOP
2108 GOSUB 1040: PRINT @(23,30),"Is this okay ";: GOSUB 1018
2110 CLS: IF YN$="N" THEN GOTO 2088 ELSE
PRINT "Saving screen definitions on disk"
2112 OPEN "O",1,FILES$+"/INP:"+DRIVE$: WRITE #1,I.HEAD$:
FOR LOOP = 1 TO TOTAL.FIELDS: WRITE #1,
PROMPT$(LOOP)+" ",IN(1,LOOP),IN(2,LOOP): NEXT LOOP
2114 CLOSE: RETURN
2116 ' Define Report Form
2118 CLS: TEST$=FILES$+"/DEF:"+DRIVE$: GOSUB 1000:
IF TEST.FLAG <> -1 THEN PRINT "You must define a
database before creating a report form":
GOSUB 1012: RETURN
2120 OPEN "I",1,TEST$:INPUT #1,TOTAL.FIELDS:INPUT #1,RECLEN
2122 FOR LOOP = 1 TO TOTAL.FIELDS:
INPUT #1,FIELDS(1,LOOP),FIELDS(2,LOOP):NEXT LOOP:CLOSE
2124 TEST$=FILES$+"/RPT:"+DRIVE$: GOSUB 1000:
IF TEST.FLAG = -1 THEN PRINT
"Report definition already exists. Replace it ";:
GOSUB 1018: IF YN$="N" THEN RETURN
2126 CLS:PRINT"Lines per printed page (66 is 'normal') ==>";
: Q=2: GOSUB 1068: PAGE.LINES = VAL(Q$): PRINT
2128 CLS: PRINT "Lines in page header ==> ";: Q=2:
GOSUB 1068: HEADER.LINES = VAL(Q$): IF HEADER.LINES > 0
THEN DIM HEADER$(HEADER.LINES): PRINT
2130 IF HEADER.LINES < 1 THEN GOTO 2138
2132 CLS: FOR LOOP = 1 TO HEADER.LINES: PRINT USING
"Enter header line ##";LOOP: Q=79: GOSUB 1064:
HEADER$(LOOP) = Q$: PRINT: NEXT LOOP
2134 CLS: FOR LOOP = 1 TO HEADER.LINES:PRINT HEADER$(LOOP):
NEXT: PRINT:PRINT: PRINT "Is this header okay ";:
GOSUB 1018: IF YN$="N" THEN GOTO 2132

```

Listing 2 continued

This Publication is available in Microform.



Please send additional information for _____
(name of publication)

Name _____

Institution _____

Street _____

City _____

State _____ Zip _____

**University
Microfilms
International**

300 North Zeeb Road, Dept. P.R., Ann Arbor, Mi. 48106

Listing 2 continued

```

2136 ' Define form for each record
2138 CLS:PRINT"Number of blank lines between records ==> ";
Q=2: GOSUB 1068: PRINT: IF VAL(Q$)<0 OR
VAL(Q$)>(PAGE.LINES - HEADER.LINES-1) THEN GOTO 2138
ELSE BLANK.LINES = VAL(Q$)
2140 PRINT "Number of database fields to use in the report
==> "; Q=2: GOSUB 1068: PRINT: IF VAL(Q$)<1 OR
VAL(Q$)>TOTAL.FIELDS THEN GOTO 2140
ELSE FIELDS = VAL(Q$)
2142 CLS: PRINT "Use 'PRINT USING' symbols to define report
fields": PRINT: FOR LOOP = 1 TO FIELDS: PRINT USING
"Enter information for report field ##: ";LOOP
2144 PRINT "Use which database field ==> ";Q=2:GOSUB 1068:
PRINT: IF VAL(Q$)<1 OR VAL(Q$)>TOTAL.FIELDS THEN PRINT:
GOTO 2144 ELSE FIELD.NUMBER(LOOP)=VAL(Q$)
2146 PRINT "Enter report field format:": Q=79: GOSUB 1064:
PRINT: LABEL$(LOOP)=Q$:
2148 PRINT "Enter carriage return after this field ";:
GOSUB 1018: EOL(LOOP) = (YNS="Y"): PRINT: PRINT:
NEXT LOOP: EOL(FIELDS)=TRUE
2150 CLS: FOR LOOP = 1 TO FIELDS: PRINT LABEL$(LOOP);:
IF EOL(LOOP) THEN PRINT
2152 NEXT LOOP: PRINT "Is this okay ";: GOSUB 1018:
IF YNS="N" THEN GOTO 2142
2154 CLS: REPORT.LINES = BLANK.LINES:FOR LOOP = 1 TO FIELDS:
REPORT.LINES = REPORT.LINES - EOL(LOOP): NEXT LOOP
2156 PRINT USING "The report form for each record requires
## lines including blanks";REPORT.LINES
2158 MAX.REC = ((PAGE.LINES-HEADER.LINES)\ REPORT.LINES):
PRINT USING "Number of records to print per page
(maximum: ##) ==> "; MAX.REC
2160 Q=2: GOSUB 1068: RECORDS.PER.PAGE = VAL(Q$): PRINT:
IF RECORDS.PER.PAGE<1 OR RECORDS.PER.PAGE > MAX.REC
THEN GOTO 2158
2162 ' Now find out about totals
2164 CLS: PRINT "You can total numeric fields and count
string or date fields": PRINT: PRINT "Number of fields
to be totaled or counted ==> ";: Q=2: GOSUB 1068: PRINT
2166 IF VAL(Q$)<0 OR VAL(Q$)>TOTAL.FIELDS THEN GOTO 2164
ELSE FIELD.SUMS = VAL(Q$)
2168 IF FIELD.SUMS < 1 OR FIELD.SUMS > FIELDS THEN GOTO 2190
ELSE DIM SUM.FIELDS(FIELD.SUMS): PRINT: PRINT
"Enter database fields to be counted or totaled ==> ";
2170 FOR LOOP=1 TO FIELD.SUMS:IF LOOP <> 1 THEN PRINT " ";
2172 Q=2: GOSUB 1068: IF VAL(Q$)<1 OR VAL(Q$)>TOTAL.FIELDS
THEN FOR LP = 1 TO LEN(Q$): PRINT CHR$(24);: NEXT LP:
GOTO 2172: ELSE SUM.FIELDS(LOOP) = VAL(Q$)
2174 NEXT LOOP: CLS: PRINT "Count or sum these fields: ";
2176 FOR LOOP = 1 TO FIELD.SUMS: PRINT USING
"Field ##, "; SUM.FIELDS(LOOP);: NEXT LOOP
2178 PRINT: PRINT "Is this okay ";: GOSUB 1018:
IF YNS="N" THEN ERASE SUM.FIELDS: GOTO 2164
2180 CLS: DIM SUM.FIELDS$(FIELD.SUMS): PRINT "Enter label
and 'PRINT USING' string for each totaled or counted
field": PRINT: FOR LOOP = 1 TO FIELD.SUMS
2182 PRINT USING "Field ##: ";LOOP;: Q=70: GOSUB 1064:
PRINT: IF INSTR(Q$,"#") = 0 THEN GOTO 2182
ELSE SUM.FIELDS$(LOOP) = Q$
2184 NEXT LOOP: CLS: PRINT "Example of total/count output:":
PRINT: FOR LOOP = 1 TO FIELD.SUMS:
PRINT USING SUM.FIELDS$(LOOP);LOOP: NEXT LOOP: PRINT
2186 PRINT "Is this okay ";: GOSUB 1018:

```

Listing 2 continued

Listing 2 continued

```

IF YNS="N" THEN ERASE SUM.FIELDS$: GOTO 2180
2188 ' Save it all on disk
2190 CLS: PRINT "Saving report definition on disk":
OPEN "O",1,FILE$ + "/RPT:" + DRIVE$
2192 WRITE #1, PAGE.LINES: WRITE #1, HEADER.LINES:
FOR LOOP = 1 TO HEADER.LINES: WRITE #1, HEADERS(LOOP):
NEXT LOOP
2194 WRITE #1,RECORDS.PER.PAGE: WRITE #1,BLANK.LINES:
WRITE #1, REPORT.LINES: WRITE #1,FIELDS:
FOR LOOP = 1 TO FIELDS: WRITE #1,
LABEL$(LOOP),FIELD.NUMBER(LOOP),EOL(LOOP): NEXT LOOP
2196 WRITE #1, FIELD.SUMS: FOR LOOP = 1 TO FIELD.SUMS:
WRITE #1, SUM.FIELDS(LOOP):
WRITE #1, SUM.FIELDS$(LOOP): NEXT LOOP
2198 CLOSE: IF HEADER.LINES > 0 THEN ERASE HEADERS$
2200 ERASE LABEL$,FIELD.NUMBER,EOL
2202 IF FIELD.SUMS > 0 THEN ERASE SUM.FIELDS, SUM.FIELDS$
2204 RETURN
3000 'This line needed for merge/chain routine

```

End

Program Listing 3. Add/OVL.

```

1998 ' Save as "ADD/OVL",A after debugging
2000 CLS: IF FILE$="" THEN PRINT "You must open a file
(menu choice 2) before you can add to it": GOSUB 1012:
GOTO 240
2002 IF NOT FN ROOMEXIST THEN PRINT "There is no room in the
database for more information": GOSUB 1012: GOTO 240
2004 TEST$=FILE$+"/INP:"+DRIVE$: GOSUB 1000:
IF TEST.FLAG <> -1 THEN PRINT
"Screen input file not found.": GOSUB 1012: GOTO 240
2006 YNS="Y": GOSUB 1024: GOSUB 1030: WHILE YNS<>"N"
'Read /INP file & open /DAT file
2008 YNS="N": WHILE YNS="N": GOSUB 1040
'Display blank form on screen
2010 FOR LOOP = 1 TO TOTAL.FIELDS:
PRINT @ IN(2,LOOP) + LEN(PROMPTS$(LOOP)),;:
ON FIELDS(2,LOOP) GOSUB 1086,1090,1094: NEXT LOOP
2012 PRINT @(23,30),"Is this okay ";: GOSUB 1018: WEND
2014 HERE = FN NEXTREC: PUT 2,HERE: IF HERE <= LEN(KEY$(1))
THEN MID$(KEY$(1),HERE)="1" ELSE
MID$(KEY$(2),HERE-LEN(KEY$(1)))="1"
2016 IF NOT FN ROOMEXIST THEN PRINT @(23,0),STRING$(79,32);:
PRINT @(23,23),"The database if full -- Press a key";:
WHILE INKEY$="": WEND: GOTO 2020
2018 PRINT @(23,0),STRING$(79,32);: PRINT @(23,27),
"Add another record ";: GOSUB 1018: WEND
2020 CLOSE: GOSUB 1054: GOTO 240
3000 ' This line is needed for the merge/delete routine

```

End

Program Listing 4. Select/OVL.

```

1998 ' Save as "READ/OVL",A after debugging
2000 CLS: IF FILE$="" THEN PRINT "You must select a database
(Main Menu choice 2) first": GOSUB 1012: GOTO 240
2002 SRC.MENU$=" ": WHILE SRC.MENU$<>"9": CLS
2004 PRINT,"Read & Modify Menu -- Pick Record Selection
Mode": PRINT: PRINT, "1. Use Selection File":
PRINT, "2. Use Sort Index": PRINT, "3. Use Physical

```

Listing 4 continued

Z-EDIT

A Powerful new ASSEMBLER EDITOR For the Model 4 Series

At last, a full screen Assembler Editor with all of the power of a mainframe editor! If you'd like to break away from a limited function editor, take a look at the power of Z-EDIT. Here are just some of the easy to use functions:

- True full screen capabilities. Arrow keys take you directly where you want to go. Just begin typing where you wish.
- Block moves, copies, and deletes.
- Find and Change commands. Change all or some occurrences of a string.
- Add and repeat lines.
- Page up or down a whole page or a specified number of lines using function keys.
- Tab key. Tab positions may be user-defined.
- Copy all or part of another file into the file currently edited.
- Easy file positioning:
 - Top, bottom, Up, and Down commands.
 - Page up or down a specified number of lines.
- Add characters in the middle of a line without the need to delete anything else.
- Print all or part of a file.
- Many more features!

And would you believe you can get all of this for only \$39.95!!!

FRANK SOFTWARE
1164 Emilie St.
Green Bay, WI 54301

TRS 80 Computers

All Tandy Computer Products Available
Manufacturer's Warranty

Model 1000 Model 4
Model 1200 HD Model 100/200
Model 2000 26-5111 Monitor

Model 3000
New Tandy Printers Available

Unbeatable Year End Clearance Prices

Visa — MasterCard — American Express
Cashier's Check — Money Order

Business Telephone Systems—Discount Prices—
Install your own. Completely modular.
Call for Prices

Computer Specialist available for assistance.

TALLEY COMMUNICATIONS CO.

P.O. Box 193 • 121 N. State St.
Decatur, Texas 76234 • 817-627-2553
Call for other computer, telephone and accessory prices!
Fast Delivery References Available

NEW PRINTERS ADDED! FIND YOURS BELOW. **RIBBON SALE** EXACT REPLACEMENTS

PRINTER MAKE MODEL NUMBER <small>Contact us if your printer is not listed. We have many more in stock. We can probably RELOAD your old cartridges.</small>	RIBBON SIZE <small>Inches by Yards</small>	NEW CARTRIDGES <small>From the various manufacturers or made in our own SHOP Ready to use:</small>	RELOADS <small>You SEND your used CARTRIDGES to us. WE put OUR NEW INSERTS in them.</small>	INSERTS EZ-LOAD™ <small>DROP IN NO WINDING! EXACT REPLACEMENTS made in our own shop. Cartridges NOT included.</small>
BASE 2, DIP 81-82-84-85, MPI 88-99-GX	1/2 x 20	\$20/2 \$57/6 \$108/12	\$7/1 \$6 ea 2 or more	\$15/3 \$54/12 \$288/72
CITOH Prowriter 1550-8510, NEC 8023-8025, APPLE DMP-IMAGEW	1/2 x 18	\$15/2 \$42/6 \$ 78/12	\$7/1 \$6 ea 2 or more	\$15/3 \$54/12 \$288/72
CITOH STARWRITER F-10-40 } Carbon Film Black DIABLO HYTYPE II } Fabric Black	5/16 x 130 NOT LEAD 5/16 x 17	\$18/3 \$60/12 \$342/72 \$18/2 \$51/6 \$ 96/12	\$5 ea 3-11 \$4 ea 12 or more \$8/1 \$7 ea 2 or more	\$24/6 \$42/12 \$234/72 \$21/3 \$78/12 \$432/72
RADIO SHACK-TOSHIBA-COMMODORE-PANASONIC-RICOH Carbon Film - DWP 210 (Hytype II) Black (1445) DW II, DWP 410-510, RICOH 1200-1300-1600 Black (1419) Red, Green, Blue, Brown Colors (1419) Fabric (Long Life), DWP 210 (Hytype II) Black (1458) DW II, DWP 410-510, RICOH 1200-1300-1600 Black (1449)	5/16 x 145 1/4 x 145 1/4 x 130 5/16 x 17 NOT LEAD 1/4 x 25	\$18/3 \$60/12 \$342/72 \$18/3 \$60/12 \$342/72 \$21/3 \$72/12 \$414/72 \$18/2 \$51/6 \$ 96/12 \$18/2 \$51/6 \$ 96/12	\$5 ea 3-11 \$4 ea 12 or more \$5 ea 3-11 \$4 ea 12 or more \$6 ea 3-11 \$5 ea 12 or more \$8/1 \$7 ea 2 or more \$8/1 \$7 ea 2 or more	\$24/6 \$42/12 \$234/72 \$24/6 \$42/12 \$234/72 \$30/6 \$54/12 \$234/72 \$21/3 \$78/12 \$432/72 \$21/3 \$78/12 \$432/72
DMP-100, LP VII, COMMODORE 1525, GORILLA BANANA (1424) DMP-200, 120, (430 Inserts & Reloads Only) (1296) (1483) DMP-400-420, LP VI-VIII, PANASONIC KXP-130 - 1093 (1418) DMP-500 (1482) DMP-2100, TOSHIBA P1340-1350-1351-351 (1442) LP-I-II-IV, CENTRONICS 730-737-739-779 (Zip Pack) (1413) LP III-V (1414)	Inker Loop 1/2 x 20 5/16 x 14 1/2 x 20 1/2 x 20 9/16 x 16 1/2 x 15	\$18/2 \$51/6 \$ 96/12 \$20/2 \$57/6 \$108/12 \$15/2 \$42/6 \$ 78/12 \$22/2 \$63/6 \$120/12 \$15/2 \$42/6 \$ 78/12	\$7/1 \$6 ea 2 or more \$7/1 \$6 ea 2 or more \$7/1 \$6 ea 2 or more \$7/1 \$6 ea 2 or more \$7/1 \$6 ea 2 or more	\$15/3 \$54/12 \$288/72 \$15/3 \$54/12 \$288/72 \$15/3 \$54/12 \$288/72 \$15/3 \$54/12 \$288/72 \$15/3 \$54/12 \$288/72 \$12/3 \$45/12 \$252/72 \$15/3 \$54/12 \$288/72
EPSON LQ 1500 MX-FX-RX 70-80, IBM PC (Standard Paper) LX80 (5/16 x 7) MX-FX-RX 100, IBM PC (Wide Paper)	1/2 x 14 1/2 x 20 1/2 x 30	\$20/2 \$57/6 \$108/12 \$14/2 \$36/6 \$ 66/12 \$18/2 \$51/6 \$ 96/12	\$7/1 \$6 ea 2 or more \$7/1 \$6 ea 2 or more \$8/1 \$7 ea 2 or more	\$15/3 \$54/12 \$288/72 \$15/3 \$54/12 \$288/72 \$18/3 \$66/12 \$360/72
NEC Spinwriter-Carbon Film -2000-3500 (Reloads BCCOMPCO Only) -5500-7700 (Can Reload Most Types) -Fabric -2000-3500 (Can Reload All) -5500-7700 (Can Reload All) Pinwriter P1-P2 P3	5/16 x 145 1/4 x 145 1/2 x 14 1/2 x 13 1/2 x 20 1/2 x 27	\$21/3 \$78/12 \$450/72 \$18/3 \$60/12 \$342/72 \$18/2 \$51/6 \$ 96/12 \$15/2 \$42/6 \$ 78/12 \$25/2 \$69/6 \$126/12 \$30/2 \$84/6 \$156/12	\$5 ea 3-11 \$4 ea 12 or more \$5 ea 3-11 \$4 ea 12 or more \$8/1 \$7 ea 2 or more \$8/1 \$7 ea 2 or more \$7/1 \$6 ea 2 or more \$8/1 \$7 ea 2 or more	\$24/6 \$42/12 \$234/72 \$24/6 \$42/12 \$234/72 \$15/3 \$54/12 \$288/72 \$15/3 \$54/12 \$288/72 \$15/3 \$54/12 \$288/72 \$18/3 \$66/12 \$360/72
OKIDATA Pacemark 2350-2410 Black Microline 182-192-193 ML-80-82-83-92-93 (Call for ML-84 Prices)	1/2 x 100 Inker Loop 1/2 x 18	\$32 each \$20/2 \$57/6 \$108/12 \$21/6 \$36/12 \$198/72	\$20/1 \$18 ea 2 or more	\$36/3 \$132/12 \$720/72
MANNESMAN-TALLY MT-160 MT-180 -Spirit 80 (SP80) COMMODORE 1526 (Multistrike)	9mm x 11 9mm x 13 1/2 x 35	\$19/2 \$54/6 \$102/12 \$20/2 \$57/6 \$108/12 \$16/2 \$45/6 \$ 84/12		
PANASONIC KXP-1090-1091-1092	Inker Loop	\$20/2 \$57/6 \$108/12		
BROTHER HR-15-25-35 } Carbon Film (Multistrike or Correctable) COMREX DX-15, II } Fabric (Call for Comrex 420 Prices)	5/16 x 82 5/16 x 17	\$18/3 \$60/12 \$342/72 \$15/2 \$42/6 \$ 78/12		

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

Listing 4 continued

```

Storage Order":PRINT: PRINT: PRINT
2006 PRINT, "9. Return to Main Menu": PRINT :
PRINT, " Your choice ==> ";
2008 SRC.MENU$=" ":WHILE SRC.MENU$ < "1" OR SRC.MENU$ > "9":
SRC.MENU$ = INPUT$(1): WEND: PRINT SRC.MENU$
2010 ON VAL(SRC.MENU$) GOSUB 2014,2018,2034: WEND: CLOSE:
GOSUB 1054: GOTO 240
2012 ' Use selection file
2014 TEST$=FILES+"/SEL:"+DRIVE$: GOSUB 1000:
IF TEST.FLAG = -1 THEN GOTO 2022 ELSE CLS:
PRINT "Selection file not found": GOSUB 1012: RETURN
2016 ' Use Index File
2018 TEST$=FILES+"/IND:"+DRIVE$: GOSUB 1000:
IF TEST.FLAG <> -1 THEN CLS:
PRINT "Index file not found": GOSUB 1012: RETURN
2020 ' Common code
2022 OPEN"1",3,TEST$: INPUT #3,R.COUNT: IF R.COUNT < 1
THEN CLS: PRINT "That file is empty":GOSUB 1012: RETURN
2024 DIM RD(R.COUNT): FOR LOOP = 1 TO R.COUNT:
INPUT #3,RD(LOOP): NEXT LOOP: CLOSE #3
2026 GOSUB 1024: GOSUB 1030
2028 MORE = TRUE: PTR = 1: WHILE MORE
2030 IF PTR <= R.COUNT THEN REC = RD(PTR): GOSUB 2052:
PTR = PTR + 1: ELSE CLS: PRINT "End of records in
Selection or Index file.": GOSUB 1012: MORE = FALSE
2032 WEND: ERASE RD: CLOSE: RETURN
2034 ' Use physical disk arrangement
2036 GOSUB 1024: GOSUB 1030
2038 PTR = 1: MORE = TRUE: WHILE MORE
2040 IF PTR > LEN(KEY$(1))*2 THEN MORE = FALSE: CLS:
PRINT "No more records in this database.":
GOSUB 1012:GOTO 2048
2042 IF PTR <= LEN(KEY$(1)) THEN IF MID$(KEY$(1),PTR,1)="1"
THEN REC = PTR: GOSUB 2052: GOTO 2046
2044 IF PTR > LEN(KEY$(1)) THEN
IF MID$(KEY$(2),PTR-LEN(KEY$(1)),1) = "1" THEN
REC = PTR: GOSUB 2052
2046 PTR = PTR + 1
2048 WEND: CLOSE: RETURN
2050 ' Display record info & prompt for changes,
continue, stop
2052 GET 2,REC: GOSUB 1046
2054 MOD.CHOICES$ = " ": WHILE INSTR("NQ",MOD.CHOICES$) =
0: PRINT @ (23,0),BLANK.LINE$;: PRINT @
(23,8),"M)odify E)rase record N)ext record J)ump
S)earch Q)uit";:
2056 MOD.CHOICES$ = " ": WHILE
INSTR("MENJSQ",MOD.CHOICES$) = 0: MOD.CHOICES$ =
CHR$(ASC(INPUT$(1) AND 223)): WEND
2058 IF MOD.CHOICES$="N" THEN MORE=TRUE ELSE IF
MOD.CHOICES$="Q" THEN MORE=FALSE ELSE IF
MOD.CHOICES$="M" THEN GOSUB 2072 ELSE IF
MOD.CHOICES$="E" THEN GOSUB 2066
2060 IF MOD.CHOICES$="J" THEN GOSUB 2080:
ELSE IF MOD.CHOICES$="S" THEN GOSUB 2100
2062 WEND: RETURN
2064 ' Erase current record
2066 IF REC <= LEN(KEY$(1)) THEN MID$(KEY$(1),REC,1)="0"
ELSE MID$(KEY$(2),REC-LEN(KEY$(1)),1)="0"
2068 GOSUB 1040: RETURN
2070 ' Modify current record
2072 GOSUB 1102

```

Listing 4 continued

Listing 4 continued

```

2074 LP = 0: WHILE LP < 1 OR LP > TOTAL.FIELDS:
PRINT @ (23,0),BLANK.LINE$;:
PRINT @ (23,0), "Modify which field ==> ";: Q = 2:
GOSUB 1068: LP = VAL(Q$): WEND
2076 GOSUB 1046:LOOP = LP:
PRINT @ IN(2,LOOP)+LEN(PROMPT$(LOOP)),;:
ON FIELDS(2,LOOP) GOSUB 1086,1090,1094:
PUT 2,REC: GOSUB 1046: RETURN
2078 ' Jump to new record
2080 OKAY = FALSE: WHILE NOT OKAY:
PRINT @ (23,0),BLANK.LINE$;:
PRINT @ (23,0),"Jump to what record ==> ";:
Q=3: GOSUB 1068: JUMP = VAL(Q$)
2082 IF SRC.MENU$<>"3" THEN GOTO 2088 ELSE
IF JUMP < 1 OR JUMP > LEN(KEY$(1))*2
THEN OKAY = FALSE: GOTO 2090
2084 IF JUMP <= LEN(KEY$(1)) THEN
IF MID$(KEY$(1),JUMP,1)="1" THEN OKAY = TRUE ELSE
OKAY = FALSE ELSE IF (KEY$(2),JUMP-LEN(KEY$(1)),1)="1"
THEN OKAY = TRUE ELSE OKAY = FALSE
2086 GOTO 2090
2088 IF JUMP < 1 OR JUMP > R.COUNT THEN OKAY = FALSE ELSE
OKAY = TRUE
2090 IF NOT OKAY THEN PRINT @ (23,0),BLANK.LINE$;:
PRINT @ (23,0), "Record not active or number out of
bounds. Press any key";: WHILE INKEY$="" :WEND
2092 WEND
2094 PTR = JUMP: IF SRC.MENU$="3" THEN REC = PTR
ELSE REC = RD(PTR)
2096 GET 2,REC: GOSUB 1046: RETURN
2098 ' Search forward for data
2100 GOSUB 1040:GOSUB 1102: SEARCH =0: WHILE SEARCH < 1 OR
SEARCH > TOTAL.FIELDS: PRINT @ (23,0),BLANK.LINE$;:
PRINT @ (23,0),"Search which field ==> ";:
2102 Q=2: GOSUB 1068: SEARCH = VAL(Q$): WEND: GOSUB 1040
2104 PRINT @ (23,0),BLANK.LINE$;:
PRINT @ (23,0), "Enter search key";:
PRINT @ IN(2,SEARCH)+LEN(PROMPT$(SEARCH)),;
2105 HOLD1 = REC: HOLD2 = PTR:
ON FIELDS(2,SEARCH) GOSUB 2112,2116,2120
2106 IF NOT FOUND THEN REC = HOLD1: PTR = HOLD2: GET 2,REC
2108 GOSUB 1046: RETURN
2110 ' Search for alphanumeric string
2112 Q = FIELDS(1,SEARCH): QQ$=STRING$(Q," "): GOSUB 1064:
LSET QQ$=Q$: Q$ = QQ$: GOTO 2128
2114 ' Search for numeric value
2116 Q = FIELDS(1,SEARCH): GOSUB 1068: Q$=MK$(VAL(Q$)):
GOTO 2128
2118 ' Search for date string
2120 OKAY = FALSE: WHILE NOT OKAY: Q=8:GOSUB 1064:
OKAY = FN CHKDATE(Q$)
2122 IF NOT OKAY THEN
PRINT @ IN(2,SEARCH)+LEN(PROMPT$(SEARCH)),;:
ELSE Q$=FN CONDATES(Q$)
2124 WEND: GOTO 2128
2126 ' Search forward for key: Q$
2128 FOUND = FALSE: IF SRC.MENU$="3" THEN GOTO 2136
2130 WHILE FOUND = FALSE AND PTR < R.COUNT: PTR = PTR + 1:
REC = RD(PTR)
2132 GET 2,REC: IF Q$=F$(SEARCH) THEN FOUND = TRUE
2134 WEND: RETURN
2136 WHILE PTR < LEN(KEY$(1))*2 AND FOUND = FALSE:

```

Listing 4 continued

```

NXT = FALSE: PTR = PTR + 1: IF PTR <= LEN(KEY$(1))
THEN IF MID$(KEY$(1),PTR,1)="1" THEN NXT = TRUE
2138 IF PTR > LEN(KEY$(1)) THEN
IF MID$(KEY$(2),PTR-LEN(KEY$(1)),1)="1" THEN NXT = TRUE
2140 IF NXT THEN REC = PTR: GET 2,REC:
IF QS=F$(SEARCH) THEN FOUND = TRUE
2142 WEND: RETURN
3000 ' This line necessary for the merge/delete routine

```

End

Program Listing 5. Select/OVL.

```

1998 ' Save as "SELECT/OVL",A after debugging
2000 CLS: IF FILE$="" THEN PRINT "You must choose a database
(menu choice 2) first": GOSUB 1012: GOTO 240
2002 SEL.MENU$=" ": WHILE SEL.MENU$<>"9": CLS: PRINT,
"Selection Menu -- Select from active records": PRINT:
PRINT, "1. Establish Selection Criteria":
PRINT, "2. Read Selection Criteria from disk"
2004 PRINT, "3. Select from Records in Index File":
PRINT, "4. Select from old Selection File":
PRINT, "5. Select from All Records": PRINT: PRINT:
PRINT: PRINT, "9. Return to Main Menu": PRINT
2006 PRINT, "Your choice ==> ": SEL.MENU$=" ": WHILE
SEL.MENU$<"1" OR SEL.MENU$>"9": SEL.MENU$ = INPUT$(1):
WEND: PRINT SEL.MENU$
2008 ON VAL(SEL.MENU$) GOSUB 2020,2014,2148,2154,2160: WEND
2010 CLOSE: GOTO 240
2012 ' Read Criteria from disk file /SLC
2014 TEST$ = FILE$+"/SLC:"+DRIVE$: GOSUB 1000:
IF TEST.FLAG <> -1 THEN CLS: PRINT
"Selection Criteria File not found": GOSUB 1012: RETURN
2016 CLS: CLOSE:OPEN "I",3,TEST$: FOR LOOP = 1 TO 6:
INPUT#3, TYPE(LOOP), LVAL(LOOP), COMP(LOOP),
AL$(LOOP), CONJ(LOOP): NEXT LOOP: CLOSE: RETURN
2018 ' Define Selection Criteria
2020 CLS: GOSUB 1024: GOSUB 1030
2022 CONJ = 0: S.PTR = 1: WHILE CONJ<>3 AND S.PTR <=6:
2024 GOSUB 2038: GOSUB 2048: GOSUB 2056:
IF YN$="N" THEN GOTO 2024
2026 GOSUB 2082: S.PTR = S.PTR + 1: WEND
2028 GOSUB 2100: IF YN$="N" THEN GOTO 2022
2030 CLS: PRINT "Save selection criteria to disk":;
GOSUB 1018
2032 IF YN$="Y" THEN OPEN "O",3,FILE$+"/SLC:"+DRIVE$:
FOR LOOP = 1 TO 6: WRITE #3, TYPE(LOOP), LVAL(LOOP),
COMP(LOOP), RVAL$(LOOP), CONJ(LOOP): NEXT LOOP
2034 RETURN
2036 ' Get field for left side of comparison
2038 GOSUB 1040: GOSUB 1102
2040 LVAL = 0: WHILE LVAL < 1 OR LVAL > TOTAL.FIELDS:
PRINT @ (23,0), BLANK.LINE$,: PRINT @ (23,0),;:
PRINT USING "Test # -- Enter comparison field ==> ",
S.PTR;
2042 Q = 2: GOSUB 1068: LVAL = VAL(Q$): WEND
2044 TYPE = FIELDS(2,LVAL): RETURN
2046 ' Get comparison operator
2048 CLS: PRINT, "Pick comparison operator": PRINT:
PRINT, "1. Less Than <":
PRINT, "2. Less Than or Equal <="

```

Listing 5 continued

Listing 4 continued

Circle 48 on Reader Service card.

Now Hypercross Converts Basic!

Now you can CROSS the barrier between computers! Using Hypercross you can COPY files between TRS-80 disks and those from many CP/M and IBM-PC type computers. 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 text files, BASIC, FORTRAN, PASCAL, or C programs. Viscial files, general ledger and accounting files, data bases and even binary files. HYPERCROSS lets you format alien disks and copy files on your own TRS-80 or MAX-80 without using cables.

Formats supported: IBM-PC and MS-DOS compatibles include DOS 1.1, 2.0/3.0 single and double sided and Tandy 2000 CP/M from Ardwerk to Zorka, including all popular TRS80 formats such as Holmes, Montezuma, and Omikron. TRS-80 Color Computer format also supported.

New Feature: Hypercross converts Basic files. Now Hypercross includes a feature to automatically change the tokens in a TRS-80 file to the correct format for CP/M, MS-DOS or COCC. Syntax of the program is not changed.

PRICES Inc. disk manual, S/H. All versions include Basic convert.
Hypercross CoCo with TRS80-Color Computer \$24.95 per
Hypercross CP/M with 40 single sided formats \$24.95 per
Hypercross PC/MS-DOS standard formats \$24.95 per
Hypercross XT/2.0 with 80 CP/M and PC formats \$24.95 per
Hypercross XT/2.0 Plus. Now with 200+ formats inc CoCo \$29.95 per
Upgrade at any time for price difference plus \$5 plus old disk \$129.95 per
Please specify TRS-80 Model I (needs desktop), III, 4/4P, or MAX-80.

Amazing HYPERZAP 3.2G Disk Magic!

Do you want to back up your precious copy of Copyral 3, or SU. Do you want to fix or modify a disk - if so then you need HYPERZAP! On the market for 3 years, HYPERZAP is 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 1/11/IV disk. Autolock mode allows leaves, saves and repairs 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! \$49.95 per

Exciting New Programs

Here is an abbreviated list of some of the new programs we have added to our catalog. Except where noted they are for Model 1, 3 and 4/4P (in 3 model).
Hardcore First Class FORTH for TRS80 1, 3 or 4 versions \$65.00
Pascal Super Editor, Compiler and Run-Time \$65.00
Engima Encrypt your files like in World War II \$29.95
Driver Compiler Make your own printer drivers \$23.95
A.C. Circuit analysis program \$49.95
Mysterious Adventure Series 1-10 3 or 4 per disk \$29.95
Saverul, Fantasy, Temple of Bael, Dreamworld games each \$16.95
Arbus, Concorde, DC-10, Jumbo Flight Simulators each \$24.95
Still available: 60000 Assembler, TMDD, Zipload and Arranger II. each \$24.95



PO Box 51155, Raleigh, NC 27609
(919) 847-4779
Check, COO, Mastercard and Visa Accepted



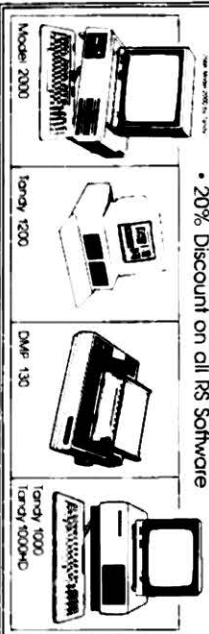
Circle 453 on Reader Service card.

Rocky Mountain Electronics

SALE SAVE SALE
BIG SAVINGS
On our full line of
Radio Shack Tandy
Computers, Printers and Accessories

- Lowest Prices
- Friendly Reliable Service
- Fast Delivery
- Warranty

* 20% Discount on all RS Software



Call 303-841-4044

Rocky Mountain Electronic Sales

10970 S Parker Rd. Parker, CO 80134
7 Days a Week - Mountain Standard Time
Mon - Fri 9am to 6pm
Sat 9am to 6pm
Sun 10am to 5pm

Listing 5 continued

```

2049 PRINT , "3. Equal          =":
PRINT , "4. Greater Than or Equal >=":
2050 PRINT , "5. Greater Than  >":
PRINT , "6. Not Equal        <>":
PRINT: PRINT , "Your choice ==> ";
2052 COMP = 0: WHILE COMP < 1 OR COMP > 6: COMP$ = INPUT$(1):
COMP = VAL(COMP$): WEND: RETURN
2054 ' Get Right value -- either literal or field
2056 CLS: PRINT "Compare with Constant or another Field (C/F)
==> "; CMP$ = " ": WHILE CMP$ <> "C" AND CMP$ <> "F":
CMP$ = CHR$(ASC(INPUT$(1)) AND 223): WEND
2058 IF CMP$ = "F" THEN GOTO 2068
2060 PRINT: PRINT "Enter constant for comparison ==> ";:
Q = IN(1,LVAL): IF TYPE = 2 THEN GOSUB 1068:
RVAL$=STR$(VAL(Q$))
2062 IF TYPE = 1 THEN GOSUB 1064: RVAL$=Q$
2064 IF TYPE = 3 THEN GOSUB 1064: IF NOT FN CHKDATE(Q$)
THEN GOTO 2060 ELSE RVAL$=FN CONDATES(Q$)
2066 GOTO 2074
2068 GOSUB 1040: GOSUB 1102
2070 RVAL = 0: WHILE RVAL<1 OR RVAL>TOTAL.FIELDS:
PRINT @(23,0),BLANK.LINE$,:
PRINT @(23,0), "Enter field to compare with ==> ";:
Q=2: GOSUB 1068: RVAL=VAL(Q$): WEND
2072 IF TYPE <> FIELDS(2,RVAL) THEN RVAL = 0: GOTO 2070:
ELSE RVAL$ = "z"+Q$
2074 CLS: PRINT "Comparison you defined: ": PRINT: PRINT,:
GOSUB 2092
2076 PRINT: PRINT "Is this okay ";: GOSUB 1018: IF YN$="N"
THEN CLS: PRINT "Redo definition for this comparison":
GOSUB 1012
2078 RETURN
2080 ' Get conjunction to next comparison
2082 IF S.PTR = 6 THEN CONJ = 3: GOTO 2088 ELSE CLS:
PRINT, "Select Conjunction to add another comparison":
PRINT: PRINT, "1. AND": PRINT, "2. OR "
2084 PRINT: PRINT, "3. End Selection Criteria Definition":
PRINT: PRINT, "Your choice ==> ";
2086 CONJ = 0: WHILE CONJ < 1 OR CONJ > 3:
CONJ = VAL(INPUT$(1)): WEND
2088 TYPE(S.PTR) = TYPE: LVAL(S.PTR) = LVAL:
COMP(S.PTR) = COMP: RVAL$(S.PTR) = RVAL$:
CONJ(S.PTR) = CONJ: RETURN
2090 ' Print one comparison equation
2092 PRINT USING "Field ## ";LVAL,:
PRINT MID$("< <== >=> <>",(COMP-1)*2+1,2);" ";
2094 IF LEFT$(RVAL$,1)="z" THEN PRINT USING
"Field ##";VAL(MID$(RVAL$,2)) ELSE PRINT CHR$(34)::
IF TYPE=3 THEN PRINT FN EXPDATES(RVAL$);CHR$(34)
ELSE PRINT RVAL$;CHR$(34)
2096 RETURN
2098 ' Show complete criteria defined
2100 CLS: PRINT, "Your selection criteria: ": PRINT
2102 CONJ=0: S.PTR=1: WHILE CONJ <> 3: TYPE=TYPE(S.PTR):
LVAL=LVAL(S.PTR): COMP=COMP(S.PTR):
RVAL$=RVAL$(S.PTR): CONJ=CONJ(S.PTR)
2104 GOSUB 2092:
PRINT TAB(9) MID$("ANDOR END",(CONJ-1)*3+1,3):
S.PTR = S.PTR + 1: WEND
2106 PRINT: PRINT "Is this okay ";: GOSUB 1018
2108 IF YN$="N" THEN CLS: PRINT "Redo selection criteria

```

Listing 5 continued

Listing 5 continued

```

definitions from the beginning": GOSUB 1012
2110 CLOSE: RETURN
2112 ' String comparisons
2114 RESULT(S.PTR) = (LVAL$ < RVAL$): RETURN
2116 RESULT(S.PTR) = (LVAL$ <= RVAL$): RETURN
2118 RESULT(S.PTR) = (LVAL$ = RVAL$): RETURN
2120 RESULT(S.PTR) = (LVAL$ >= RVAL$): RETURN
2122 RESULT(S.PTR) = (LVAL$ > RVAL$): RETURN
2124 RESULT(S.PTR) = (LVAL$ <> RVAL$): RETURN
2126 ' Numeric comparisons
2128 RESULT(S.PTR) = (LVAL! < RVAL!): RETURN
2130 RESULT(S.PTR) = (LVAL! <= RVAL!): RETURN
2132 RESULT(S.PTR) = (LVAL! = RVAL!): RETURN
2134 RESULT(S.PTR) = (LVAL! >= RVAL!): RETURN
2136 RESULT(S.PTR) = (LVAL! > RVAL!): RETURN
2138 RESULT(S.PTR) = (LVAL! <> RVAL!): RETURN
2140 ' Conjunctions
2142 SELECT = (SELECT AND RESULT(S.PTR+1)): RETURN
2144 SELECT = (SELECT OR RESULT(S.PTR+1)): RETURN
2146 ' Use Index File
2148 CLS: TEST$ = FILE$ + "/IND:" + DRIVE$: GOSUB 1000:
IF TEST.FLAG <> -1 THEN PRINT "Index File not found":
GOSUB 1012: RETURN
2150 CLOSE: OPEN "I",3,TEST$: INPUT #3,NUM.RECS: GOTO 2164
2152 ' Use old Selection File
2154 CLS: TEST$ = FILE$ + "/SEL:" + DRIVE$: GOSUB 1000:
IF TEST.FLAG <> -1 THEN PRINT "Old Selection File not
found": GOSUB 1012: RETURN
2156 CLOSE: OPEN "I",3,TEST$: INPUT #3,NUM.RECS: GOTO 2164
2158 ' Use all records in database
2160 GOSUB 1060
2162 ' Main processing loop
2164 IF NUM.RECS=0 THEN CLS: PRINT "There are no records to
select from": CLOSE #3: GOSUB 1012: RETURN
2166 IF TYPE(1) < 1 THEN CLS: PRINT "Selection criteria are
not in memory": CLOSE #3: GOSUB 1012: RETURN
2168 DIM SEL(NUM.RECS): SEL.COUNT = 0: GOSUB 1030: CLS:
PRINT "Records selected: ";
2170 PTR = 0: FOR LOOP = 1 TO NUM.RECS: IF SEL.MENU$ = "5"
THEN GOSUB 1106 ELSE GOSUB 1114
2172 S.PTR = 1: CONJ=0: WHILE CONJ <> 3
2174 IF TYPE(S.PTR)=2 THEN LVAL! = CVS(F$(LVAL(S.PTR))):
IF LEFT$(RVAL$(S.PTR),1)="z" THEN
RVAL! = CVS(F$(VAL(MID$(RVAL$(S.PTR),2))))
ELSE RVAL! = VAL(RVAL$(S.PTR))
2176 IF TYPE(S.PTR)<>2 THEN LVAL$=F$(LVAL(S.PTR)):
IF LEFT$(RVAL$(S.PTR),1)="z" THEN
RVAL$=F$(VAL(MID$(RVAL$(S.PTR),2)))
ELSE RVAL$ = RVAL$(S.PTR)
2178 IF TYPE(S.PTR)=2 THEN ON COMP(S.PTR)
GOSUB 2128,2130,2132,2134,2136,2138 ELSE
ON COMP(S.PTR) GOSUB 2114,2116,2118,2120,2122,2124
2180 CONJ = CONJ(S.PTR): S.PTR = S.PTR+1: WEND
2182 S.PTR = 1: CONJ = 0: SELECT = RESULT(1): WHILE CONJ <> 3:
CONJ = CONJ(S.PTR): ON CONJ(S.PTR) GOSUB 2142,2144:
S.PTR = S.PTR+1: WEND
2184 IF SELECT THEN PRINT LOC(2);:SEL.COUNT = SEL.COUNT + 1:
SEL(SEL.COUNT) = LOC(2)
2186 NEXT LOOP
2188 PRINT: PRINT "Writing Selection File to disk": CLOSE:

```

Listing 5 continued

```

OPEN "O",1,FILES+"/SEL:"+DRIVE$: WRITE #1,SEL.COUNT
2190 FOR LOOP = 1 TO SEL.COUNT: WRITE #1,SEL(LOOP): NEXT:
CLOSE: ERASE SEL: RETURN
3000 ' This line is needed for the merge/delete routine

```

End

Program Listing 6. Index/OVL.

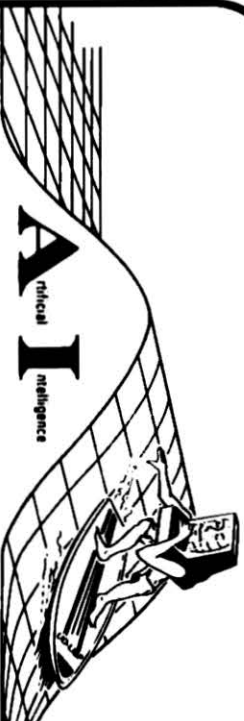
```

1998 'Save as "INDEX/OVL",A after debugging
2000 'This line is necessary for the merge/delete routine
2002 IND.MENU$=" ": WHILE IND.MENU$<"9": CLS: PRINT ,
"Index Menu -- Pick Record Group to Index": PRINT :
PRINT , "1. Use Records in Selection File": PRINT ,
"2. Index All Records in the Database"
2004 PRINT : PRINT : PRINT: PRINT ,
"9. Return to Main Menu": PRINT : PRINT ,
" Your choice ==> " ;: IND.MENU$ = " " :
2006 WHILE IND.MENU$ < "1" OR IND.MENU$ > "9":
IND.MENU$ = INPUT$(1): WEND: PRINT IND.MENU$
2008 ON VAL(IND.MENU$) GOSUB 2012, 2018: WEND: CLOSE: GOTO
240
2010 'Index via /SEL file
2012 TEST$ = FILE$+"/SEL:"+DRIVE$: GOSUB 1000: IF TEST.FLAG
<> -1 THEN CLS: PRINT "Selection File Not Found": GOSUB
1012: RETURN
2014 OPEN"1",3,TEST$: INPUT #3,NUM.RECS: GOTO 2022
2016 'Index all physical records
2018 GOSUB 1060 'Get number of records in database
2020 'Common Code
2022 IF NUM.RECS < 2 THEN CLS: PRINT "I can't sort less than
2 records": GOSUB 1012: RETURN
2024 GOSUB 1024: GOSUB 1030: GOSUB 1040: GOSUB 1102
2026 IND.FLD = 0: Q$ = " ": WHILE IND.FLD < 1 OR IND.FLD >
TOTAL.FIELDS: PRINT @ (23,0), BLANK.LINE$: PRINT @
(23,0), "Enter field to sort on or 'Q' to quit ==> " ;:
2028 Q=2: GOSUB 1064: IND.FLD = VAL(Q$): IF CHR$(ASC(Q$) AND
223) = "Q" THEN RETURN
2030 WEND:IF FIELDS(2,IND.FLD) = 2 THEN GOSUB 2036 ELSE
GOSUB 2056 'numeric & string sorts
2032 RETURN
2034 'Sorting on numeric field
2036 DIM SORT!(NUM.RECS): DIM INDEX(NUM.RECS): CLS:
PRINT "Reading data from disk"
2038 PTR = 0: FOR LOOP = 1 TO NUM.RECS: IF IND.MENU$ = "2"
THEN GOSUB 1106: ELSE GOSUB 1114
2040 SORT!(LOOP) = CVS(F$(IND.FLD)): INDEX(LOOP) = LOC(2):
NEXT: CLS: CLOSE: PRINT "Sorting " ;
2042 GAP = 1: WHILE GAP < NUM.RECS: GAP = GAP * 3 + 1:
WEND: IF GAP < 4 THEN GAP = 4
2044 WHILE GAP > 1: GAP = GAP \ 3: FOR SORTLOOP = GAP + 1 TO
NUM.RECS: PTR = SORTLOOP
2046 IF SORT!(PTR) => SORT!(PTR-GAP) THEN GOTO 2050 ELSE
INDEX(PTR),INDEX(PTR-GAP)
SWAP SORT!(PTR),SORT!(PTR-GAP): SWAP
2048 PTR = PTR - GAP: IF PTR > GAP THEN GOTO 2046
2050 PRINT ".,";: NEXT SORTLOOP: WEND
2052 GOSUB 2078: ERASE SORT!: RETURN
2054 'Sort on a string or date field
2056 DIM SORT$(NUM.RECS): DIM INDEX(NUM.RECS): DUMMY$ =

```

Listing 6 continued

Circle 96 on Reader Service card.



LISP
The preferred symbolic processing language
of the Artificial Intelligence Community

catch the next micro-wave with
UO-LISP

Not "just another pretty dialect" but the most powerful implementation of LISP available in the micro market place. For the professional engineers, researchers, and educators, UO-LISP maintains the power and flexibility inherent in LISP while providing the expected functionality of mainframe LISP systems. (+) **UO-LISP steps beyond the competition and provides a real source to native code compiler.**

CPU Family	Operating System	Production System	Learn System	Production plus Learn System
8086	MS-DOS PC DOS CPM, 86	15000 15000 available soon	8500 8500	18500 18500
Z80	CPM TRS DOS	12500 8000	8500 N/A	16000 N/A

For **MORE DETAIL AND TO ORDER:**
Send for **FREE** brochures and order forms.

NORTHWEST COMPUTER ALGORITHMS
P.O. Box 1747, Novato, CA 94948
415-897-1302

EVERYTHING YOU NEED TO KNOW TO MAKE THE RIGHT CONNECTIONS

Circle 489 on Reader Service card.

*An easy-to-follow primer on requisite hardware and communications software, with critiques of their equipment and programming packages.
 *Popularly priced services for all personal and professional needs—banking, careers, education, investment, news, other people, research, shopping, sports, travel and much more.
 *Bulletin boards, electronic mail and non-network services that cater to local markets also included.

*All listings come complete with addresses and telephone numbers.
 "A ready reference to the steadily widening world of electronic information sources and data bases...A real eye-opener for those who have yet to join the computer revolution." —Kirkus Reviews

INFOMANIA

THE GUIDE TO ESSENTIAL ELECTRONIC SERVICES

Elizabeth M. Ferrarini

Houghton Mifflin Company

2 Park Street, Boston, Massachusetts 02108

c Houghton Mifflin Company 1985

\$14.95, paper. At your bookstore or call toll free: 1-800-225-3362.



Your guide to the on-line jungle. Elizabeth Ferrarini, author of Confessions of an Intromaniac and Associate Editor of LinkUp.

Listing 6 continued

```

STRING$(FIELDS(1,IND.FLD)," "): FOR LOOP = 1 TO
NUM.RECS: SORT$(LOOP)=DUMMY$: NEXT LOOP
2058 CLS: PRINT "Reading data from disk"
2060 PTR = 0: FOR LOOP = 1 TO NUM.RECS: IF IND.MENU$ = "2"
THEN GOSUB 1106 ELSE GOSUB 1114
2062 LSET SORT$(LOOP) = F$(IND.FLD): INDEX(LOOP) = LOC(2)
2064 NEXT LOOP: CLS: CLOSE: PRINT "Sorting ";
2066 GAP = 1: WHILE GAP < NUM.RECS: GAP = GAP * 3 + 1:
WEND: IF GAP < 4 THEN GAP = 4
2068 WHILE GAP > 1: GAP = GAP \ 3: FOR SORTLOOP = GAP + 1 TO
NUM.RECS: PTR = SORTLOOP
2070 IF SORT$(PTR) => SORT$(PTR-GAP) THEN GOTO 2074 ELSE
SWAP SORT$(PTR),SORT$(PTR-GAP): SWAP
INDEX(PTR),INDEX(PTR-GAP)
2072 PTR = PTR - GAP: IF PTR > GAP THEN GOTO 2070
2074 PRINT ".": NEXT SORTLOOP: WEND: ERASE SORT$
2076 ' Write index file
2078 OPEN "O",1,FILE$+"/IND:"+DRIVE$: WRITE #1,NUM.RECS:
FOR LOOP = 1 TO NUM.RECS: WRITE #1,INDEX(LOOP): NEXT
LOOP: CLOSE #1: ERASE INDEX: RETURN
3000 'This line is necessary for the merge/delete routine
  
```

End

Program Listing 7. Report/OVL.

```

1998 ' Save as "REPORT/OVL",A after debugging
2000 CLS: IF FILE$="" THEN PRINT "You must open a file (menu
choice 2) before creating a report": GOSUB 1012: GOTO
240
2002 TEST$ = FILE$ + "/rpt:" + DRIVE$: GOSUB 1000: IF
TEST.FLAG <> -1 THEN CLS: PRINT "Report Definitions not
found": GOSUB 1012: GOTO 240
2004 RPT.MENU$ = " ": WHILE RPT.MENU$ <> "9": CLS: PRINT ,
"Choose Record Set for Report": PRINT
2006 PRINT , "1. Use Selection File": PRINT ,
"2. Use Index File": PRINT ,
"3. Use all active records": PRINT: PRINT: PRINT: PRINT
, "9. Return to Main Menu": PRINT: PRINT , "Your choice
==> ";
2008 RPT.MENU$ = " ": WHILE RPT.MENU$ < "1" OR RPT.MENU$ > "9":
RPT.MENU$ = INPUT$(1): WEND: PRINT RPT.MENU$: ON
VAL(RPT.MENU$) GOSUB 2014,2020,2026
2010 WEND: CLOSE: GOTO 240
2012 'Use Selection file
2014 TEST$=FILE$ + "/SEL:" + DRIVE$: GOSUB 1000: IF
TEST.FLAG <> -1 THEN CLS: PRINT "Selection File not
found": GOSUB 1012: RETURN
2016 OPEN "I",3,TEST$: INPUT #3, NUM.RECS: GOTO 2030
2018 'Use Index File
2020 TEST$=FILE$ + "/IND:" + DRIVE$: GOSUB 1000: IF
TEST.FLAG <> -1 THEN CLS: PRINT "Index File not found":
GOSUB 1012: RETURN
2022 OPEN "I",3,TEST$: INPUT #3, NUM.RECS: GOTO 2030
2024 'Use all active records
2026 GOSUB 1060
2028 'Common code
2030 GOSUB 1030: CLS: PRINT "Reading Report definition
file": OPEN "I",1,FILE$ + "/RPT:" + DRIVE$: INPUT #1,
  
```

Listing 7 continued

```

PAGE.LINES: INPUT #1, HEADER.LINES: IF HEADER.LINES > 0
THEN DIM HEADER$(HEADER.LINES)
2032 FOR LOOP = 1 TO HEADER.LINES: INPUT #1, HEADER$(LOOP):
NEXT LOOP: INPUT #1, RECORDS.PER.PAGE: INPUT #1,
BLANK.LINES: INPUT #1, REPORT.LINES: INPUT #1, FIELDS:
DIM LABEL$(FIELDS), F.NUMBER(FIELDS), EOL(FIELDS)
2034 FOR LOOP = 1 TO FIELDS: INPUT
#1, LABEL$(LOOP), F.NUMBER(LOOP), EOL(LOOP): NEXT LOOP
2036 INPUT #1, FIELD.SUMS: IF FIELD.SUMS > 0 THEN DIM
SUM.FIELDS(FIELD.SUMS), SUM.FIELDS$(FIELD.SUMS): DIM
SUMS.COUNT1(FIELD.SUMS)
2038 FOR LOOP = 1 TO FIELD.SUMS: INPUT #1, SUM.FIELDS(LOOP):
INPUT #1, SUM.FIELDS$(LOOP): NEXT LOOP: CLOSE #1
2040 PADS = PAGE.LINES - (RECORDS.PER.PAGE * REPORT.LINES) -
HEADER.LINES
2042 'Get output destination
2044 CLS: PRINT, "Send Report to: ": PRINT: PRINT,
"1. Printer": PRINT, "2. Disk File": PRINT,
"3. Video display": PRINT: PRINT, "Your choice ==> ";
2046 OUTPUT$ = " ": WHILE OUTPUT$ < "1" OR OUTPUT$ > "3":
OUTPUT$ = INPUT$(1): WEND: PRINT OUTPUT$
2048 CLS: IF OUTPUT$ = "1" THEN OUTFILE$ = "PR": PRINT
"Set printer to the top of a page and turn it on":
GOSUB 1012
2050 IF OUTPUT$ = "2" THEN PRINT "Enter full name of output
file ==> ";: Q = 23: GOSUB 1064: OUTFILE$ = Q$: GOSUB
1000: IF TEST.FLAG = 1 OR TEST.FLAG = 2 THEN GOTO 2050
2052 IF OUTPUT$ = "3" THEN OUTFILE$ = "DO"
2054 OPEN "O", 1, OUTFILES: REPT.REC = 1: PTR = 0
2056 WHILE REPT.REC <= NUM.RECS: IF REPT.REC MOD
RECORDS.PER.PAGE = 1 THEN FOR LOOP = 1 TO HEADER.LINES:
PRINT #1, HEADER$(LOOP): NEXT LOOP
2058 IF REPT.MENU$ = "3" THEN GOSUB 1106 ELSE GOSUB 1114
2060 FOR LOOP = 1 TO BLANK.LINES: PRINT #1,: NEXT LOOP
2062 FOR LOOP = 1 TO FIELDS: IF FIELDS(2, F.NUMBER(LOOP)) = 1
THEN Q$ = F$(F.NUMBER(LOOP)): GOSUB 1118: PRINT #1, USING
LABEL$(LOOP); Q$:
2064 IF FIELDS(2, F.NUMBER(LOOP)) = 2 THEN PRINT #1, USING
LABEL$(LOOP); CVS(F$(F.NUMBER(LOOP))); ELSE IF
FIELDS(2, F.NUMBER(LOOP)) = 3 THEN PRINT #1, USING
LABEL$(LOOP); FN EXPDATE$(F$(F.NUMBER(LOOP)));
2066 IF EOL(LOOP) THEN PRINT #1,:
2068 NEXT LOOP: FOR LOOP = 1 TO FIELD.SUMS
2069 IF FIELDS(2, SUM.FIELDS(LOOP)) = 2 THEN
SUMS.COUNT1(LOOP) = SUMS.COUNT1(LOOP) +
CVS(F$(SUM.FIELDS(LOOP))) ELSE
SUMS.COUNT1(LOOP) = SUMS.COUNT1(LOOP) + 1
2070 NEXT LOOP: REPT.REC = REPT.REC + 1: IF REPT.REC MOD
RECORDS.PER.PAGE = 1 THEN FOR LOOP = 1 TO PADS:
PRINT #1,: NEXT LOOP
2072 WEND
2074 FOR LOOP = 1 TO BLANK.LINES: PRINT #1,: NEXT LOOP:
FOR LOOP = 1 TO FIELD.SUMS: PRINT #1, USING
SUM.FIELDS$(LOOP); SUMS.COUNT1(LOOP): NEXT LOOP
2076 IF OUTPUT$ = "3" THEN PRINT: PRINT: GOSUB 1012
2078 CLOSE: IF HEADER.LINES > 0 THEN ERASE HEADER$
2080 ERASE LABEL$, F.NUMBER, EOL: IF FIELD.SUMS > 0 THEN ERASE
SUM.FIELDS, SUM.FIELDS$, SUMS.COUNT1
2082 RETURN
3000 'This line is needed for the chain/merge routine

```

End

Circle 150 on Reader Service card.

"I Program In BetterBASIC And I Recommend It."

"I've been programming for about eight or nine years in BASIC and I'm really impressed with BetterBASIC. It's got expanded memory, windowing and extensibility. I like the cleverness of the way it's been constructed using workspaces, modules, functions and procedures. Right now I'm working on three custom business applications and all three are being written in BetterBASIC because of all the things it can do. I program in BetterBASIC and I recommend it."

BASIC or call 1-800-225-5800. In Canada call 416-469-5244. Also available for the Tandy 1000, 1200,

AND 2000 AT Tandy/Radio Shack stores.

Summit Software Technology, Inc.™

P.O. Box 99, Balston Park

Wellesley, MA 02157

PRICES:

BetterBASIC	\$199
BetterBASIC Math Module	\$99
RTrieve™ Interface	\$99
Runtime System	\$250
Sample Disk with Tutorial	\$10

Better BASIC.

Because It's The Best.

MasterCard, Visa, Checks, Money Order, C.O.D.

BetterBASIC is a registered trademark of Summit Software Technology, Inc.

IBM PC, XT, AT are registered trademarks of

International Business Machines Corp.

RTrieve is a registered trademark of Savoy Corp.

FileView is a registered trademark of SoftCent, Inc.

If you're using BetterBASIC and would like to be featured in one of our ads, please write to the Director of Advertising at Summit.



Bob Briggs - Software Consultant - North Easton, MA.

640K Now you can use the full memory of your PC to develop large programs.

STRUCTURED Create well organized programs using procedures and functions that are easily identified and understood and completely reusable in future programs.

MODULAR Use procedures and functions grouped together to form "library modules" which are then available to you or anyone else for future use.

EXTENSIBLE Create your own BetterBASIC modules which contain BetterBASIC extensions. This feature coupled with the easy-to-use Assembly Language support, makes this an ideal OEM language.

INTERACTIVE BetterBASIC acts like an interpreter because it responds to the users' commands in an immediate mode. However, each statement is actually compiled as it is entered.

COMPILED Each line of the program is compiled as it is entered into the computer's memory rather than interpreted at runtime.

RUNTIME SYSTEM The optional Runtime System generates stand alone EXE files allowing for the distribution of products written in BetterBASIC with no royalties.

SUPPORTS Windows, Graphics, DOS and BIOS ROM calls, Chaining, Overlays, Local and Global Variables, Recursion, and more.

BetterBASIC Runs on IBM PC, XT, AT and all IBM-compatible. Ask your local dealer for Better-

80 MICRO'S LIST of ADVERTISERS

Reader Service Number	Page	Reader Service Number	Page	Reader Service Number	Page	
72	Aerocomp	67	Jesse Jones	91	NRI Schools	97
82	Aerocomp	46, 47	Load 80 Subscription	64, 65	Optimal Technology	58
215	Alcor Systems	45	Model IV Utility Pak	81	PC America	55
30	Allwrite	10	Subscription	32, 99	P.G. Design Electronics	115
17	Alpha Products	13, 15	University Micro	103	Perry Computers	144
374	ALPS	58	349 80 Northwest Publishing	77	Personal Computer Products	82
141	Anitek Software Products	21	45 Electric Webster	61	Personal Integrated Computers	167
391	ASC Corp.	137	181 Envision Designs	78	Polygon Computers	145
378	ATD	7	286 EPD Engineering	89	Portable Computer Support Group	83
152	BCCOMPCO	105	178 EZWare Corp.	76	Powersoft	22
145	Beaman-Porter, Inc.	77	135 Four Star Software	125	Powersoft	4
301	Big D Computers	69	461 Frank Software	105	Press A Software	117
300	Bi-Tech Enterprises	72	214 Ft. Worth Computers	50, 51	Producer, The	18
186	Blue Ridge Software	55	GE Information Services	85	Professor Jones/Frogg House	145
273	Cer-Comp	153	264 GraFx	158	Prosoft	11
487	Cognitec	121	9 H&E Computronics	CIV	Purple Computing	95
86	Compulogic Corp.	76	455 Hard Drive Specialist	57	Radio Shack	CII, 1
443	Computer Center, The	135	355 H.D.P.	117	Radio Shack	142, 143
357	Computer Friends	117	491 HJL Products	131	Robotic Microsystems	133
18	Computer Plus	139, 159	489 Houghton/Mifflin	110	Rocky Mountain Electronic Sales	107
415	Computer System Consultants	156	175 Howe Software	77	Seatronics	164
45	Cornucopia Software	61	46 Hypersoft	107	Severts-Zorman Eng.	166
369	Delker Electronics	123	109 Instant Software	161	Softest, Inc.	165
539	Desert Sound, Inc.	96	356 Intercomp Sound	156	Software Support	146, 147, 150
282	DFW Computer Center	38, 39	101 J&M Systems, Ltd.	132, 141	SOTA Computing Systems, Ltd.	66
536	DHA Systems Software	90	126 JMG Software International	2, 3	Summit Software Technology Inc.	111
429	Dialectron	89	534 Jameco Electronics	62	Sunlock Systems	136
204	DiskCount Data	33	485 Kaiglo	182	Talley Communications Co.	105
439	Donald Ady	96	Langley St. Clair	116	TCE	126, 127
294	Dorsett Educational Systems	129	372 Lindbergh Systems	163	T/Maker	79
91	Dotwriter	9	351 Lyben Computer	70	Total Access	63
452	Dresselhaus Computer	78	393 Manx Software	116	Traveling Software	113
337	E.D.C. Industries	157	250 Marymac Industries, Inc.	162	Trionix	77
85	Educational Micro Systems	26	505 Microcomputer Tools	165	Trisoft	166
	80 MICRO		299 Microdex Corporation	164	True Data Products	154, 155
	American Relay Radio League	81	464 Micro Labs, Inc.	166	Wholesale PC	151
	Back Issues	116	137 Miller Microcomputer Services	87		
	Classified	133	107 Misosys	43		
549	Classified Ads	167	411 Montezuma Micro	24, 25		
	Corporate Dealer	101	416 Montezuma Micro	92, 93		
	CW Museum	73	424 Montezuma Micro	59		
	CW Inc.	71	281 Nibble Notch	136		
	Foreign Dealers	158	232 Nocona Electronics	75		
	Instant CoCo	152	95 Northwest Computer Algorithms	109		

For further information from our advertisers, please use the Reader Service card. This advertiser prefers to be contacted directly.

Advertising Sales (603) 924-7138
or (800) 441-4403
West Coast Sales (415) 328-3470

TIDBIT #35

Use this Model I/III/4 routine to print out Basic programs saved in ASCII format (SAVE "filename".A). It prints each statement on a separate line for easier reading and debugging.

*Brian Bischof
Louisville, KY*

```

10 REM * EASY - LISTER
20 CLEAR 1000
30 INPUT "NAME OF FILE TO LIST";F$
40 OPEN "I",1,F$
50 LINEINPUT #1,L$
60 G=0
   :LPRINT " "
70 FOR S=1 TO LEN(L$)
   : IF MID$(L$,S,1)<>" " THEN NEXT S
80 FOR P=1 TO LEN(L$)
   :M$=MID$(L$,P,1)
90 IF M$="." THEN 120
100 IF M$=CHR$(34) THEN 140
110 LPRINT M$;
   :NEXT P
   :IF EOP(1) THEN 160 ELSE 50
120 IF G=0 THEN LPRINT " "
   :LPRINT STRING$(S,32);
130 GOTO 110
140 IF G=0 THEN G=1 ELSE G=0
150 GOTO 110
160 CLOSE 1
170 LPRINT " "
180 INPUT "ANOTHER FILE TO LIST ";Q$
   :IF LEFT$(Q$,1)="Y" THEN 30
190 END
    
```

End

TIDBIT #36

The Model III's INKEY\$ statement lets you enter a response without pressing the enter key. However, unlike the standard Input statement, it doesn't provide a blinking cursor prompt to remind the user the program is waiting for a keystroke. Here's a short routine offering the best of both statements: the quick response of an INKEY\$ statement and a blinking cursor. Save it in ASCII, merge it with each program in which you'll use it, and call it as necessary using GOSUB. Leave the main program with a Print statement followed by semicolon, then add the GOSUB call. For example:

100 PRINT "What is your choice?";:GOSUB 50000

The initial call should be GOSUB 50000; subsequent calls within the same program, GOSUB 50005.

*Bud Myers
Washburn, ME*

```

49995 END
50000 P0$="("+CHR$(176)+")":Q0$=P0$:R
0$="( )":S0$=STRING$(3,8)
50005 PRINT Q0$;
50010 K0$=INKEY$: IF K0$=""THEN X0=X0
+1 ELSE 50030
50015 IF X0<12 THEN 50010
50020 X0=0: IF Q0$=P0$ THEN Q0$=R0$ E
LSE Q0$=P0$
50025 PRINT S0$;:GOTO 50005
50030 PRINT S0$;:PRINT "("K0$)";:K0=
VAL(K0$)
50035 FOR Z0=1 TO 222:NEXT:RETURN
    
```

End

Did you think we were content to stop with the ULTIMATE ROM?

Introducing . . .

THE ULTIMATE ROM II

Now Includes
80-Column Display
in TEXT, TELCOM, and BASIC*



Available at Radio Shack Stores by Express Order
Product numbers:
M100 90-0409
M200 90-0410

WE SET THE STANDARD! With the Ultimate ROM, Traveling Software set the standard for packing the most powerful software applications into a single ROM chip. Now with the ULTIMATE ROM II, we are pushing that standard to a new limit.

INTRODUCING T-WORD AND ROM-VIEW 80 The ULTIMATE ROM offers T-Word, a complete word processing system—the fastest yet produced for the Model 100/200 or the NEC PC-8201—and our new ROM-VIEW 80 display-enhancement program. *ROM-VIEW 80 provides an 80-column display option that works with BASIC, TEXT, and TELCOM. And yes, ROM-VIEW 80 does provide full text-editing functions while in 80-column mode! Also included are turbo-charged versions of our popular T-base relational database (rated the number one database for the Model 100 and NEC PC-8201) and the best-selling IDEA! outline processor.

INTRODUCING THE TS-DOS PORTABLE DISK SYSTEM We were so excited about the new Tandy \$199 portable disk drive that we developed a complete disk operating system for it called "TS-DOS". We even put part of TS-DOS inside the ULTIMATE ROM II so you can automatically start TS-DOS anytime (no need to type in an awkward initialization routine). TS-DOS includes many features not included in the Tandy operating system like "save all" and "load all" files at once. And TS-DOS is even available for the NEC PC-8201! It is sold on a 3 1/2" disk for only \$69.95

THE ULTIMATE COMPANION FOR YOUR DESKTOP COMPUTER! The ULTIMATE ROM II has been designed to work as a convenient stand alone system or as the ideal peripheral to your desktop computer. Both T-Word and T-Base files can be easily interchanged with virtually any other desktop word processing or database software including Multimate, WordStar, dBASE III, and R:base 5000. IDEA! outline files can be easily interchanged to and from ThinkTank with our optional \$19.95 conversion utility for IBM and compatibles.

30-DAY MONEY-BACK GUARANTEE Traveling Software is so sure you'll like the ULTIMATE ROM II we are offering a 30-day money-back guarantee—no questions asked. If you are not completely satisfied with the ULTIMATE ROM II, just send it back and we will give you a full refund.

The ULTIMATE ROM II is only \$229.85 Check out the ULTIMATE ROM II at your local Radio Shack computer center today or to order direct, call us toll-free:

1-800-343-8080

On ULTIMATE ROM II

ROM-VIEW 80

Works with TEXT, TELCOM, BASIC
Full text-editing in 80 columns
Right margin can be set 10-80 columns
60-column window with scrolling to 80 columns
Allows 80-column communications in TELCOM

T-WORD

Fast text-editing enhancements like overwrite, word count, search and replace
Fast text-formatting with page plotting
Merges up to 99 items into boilerplate documents
Allows entry of printer controls like boldface, underline, condensed, etc.

IDEA!

New features have been added including optional IBM import/export ThinkTank converter.

T-BASE

New features, including advanced math calculations.

TANDY PORTABLE DISK DRIVE GATEWAY

Built-in support for T-Word to access the new \$199 Tandy portable disk drive

*ROM-VIEW 80 is not currently available for the Tandy Model 200. Model 200 customers will receive a coupon for a free copy of TS-DOS. Trademarks: ThinkTank—Living Videotext, Inc., Guardian—PEAC, Multimate & dBASE and Ashton Tate, R:base 5000—Microim, Inc., WordStar—Micropro, Inc.



Traveling Software, Inc.
11050 Fifth Ave. NE
Seattle, WA 98125
(206) 367-8090

Continued from p. 31

level of operators. This is the basis for the entire language. Think of SYSVOC as the assembler used to write the compiler (LANGVOC). The compiler is then used to write the application primitives (TOPICVOC). These primitives are bound together into the application system (Rove).

You are allowed to use data types of both integers and strings. Integers can be declared as ordinal values (unsigned 16 bits), characters (lower 7 bits), or flags (Boolean flag) and contain only positive numbers. Double integer values have double the normal precision (32 bits) and, unlike ordinals, may contain negative numbers. You may declare arrays of either word ordinals or double integers.

You can use sophisticated looping control statements and other control features which allow development of fully structured programs. Other features allow recursion, redefinition of operators, and command string definition as macros. Programs can be keyed in directly from the command interpreter or may be entered into a leaf text.

Other Topics

KAMASOFT has provided a detailed list of some other applications that are possible. KAMASOFT cites possible uses in an office environment such as managing correspondence files, appointment calendars, meeting agendas, speech notes, client records, and so on.

KAMAS is perfect for developing, indexing, and cataloging notes. You could develop the outline for a book and catalog the notes of all of your references within the outline itself.

Conclusion

I have used Framework on an IBM PC/XT for applications identical to those I can accomplish in KAMAS. It's easier to move around in KAMAS than in Framework and reorganizing data is painless.

For all of KAMAS' seeming complexity, it really is a simple program. But much of its power will be wasted if you only use it to develop outlines and topics.

The documentation provided with the system is excellent and well organized.

KAMASOFT has also released three utility disks for KAMAS. The most recent adds such features as topic output with WordStar print formatting and decimal outline numbers, printing with headers, footers, and page numbers, copying and resizing topics. The disks are available as public domain software for the cost of reproduction and shipping (\$10).

KAMAS is a great productivity tool and it certainly has breathed new life into my Model 4P. But I have two questions: Why did it take so long to be developed, and where is the MS-DOS version? ■

REF: Knowing Where to Go

by Mark D. Goodwin

★★

REF runs on the Model 4 (64K) and requires one disk drive. Salsbury Assoc. Inc., 610 Madam Moore's Lane, New Bern, NC 28560. \$24.95.

Easy to use: ★★☆☆☆
 Good docs: ★☆☆☆☆
 Bug free: ★★☆☆☆
 Does the job: ★★☆☆☆

Modifying a Basic program can be slow and arduous, particularly if someone else wrote it. And before you change anything, you need to understand three things: the program's function, the program's flow, and the function of the program's variables. If you can figure these out, changing a program can be fairly simple.

Although you have to do most of this work manually, a cross-reference program can be of great assistance. REF, a Model 4 utility, can cross-reference program line numbers, variables, integers, and strings of characters. While REF offers some good features, it also has certain constraining limitations that hinder it. For example, it lumps together references for integers and line numbers, without telling you which ones belong to integers and which to line numbers.

REF's abilities to cross-reference line numbers and variables is probably its most useful feature. Having a cross-reference list of the line numbers helps you understand program flow. For example, any line number with a considerable number of references indicates that the corresponding program line is probably the first line in a subroutine. Knowing all the locations of a specific variable hints at the variable's intended function.

Using REF

REF is a machine-language program that resides in high memory. You install it by running the REF/JCL file, which also lets you optionally load a Basic program automatically. Once it's installed, you can execute REF any time by calling it from Basic as a machine-language subroutine. For example, entering X=USR(0) from within Basic passes control from the Basic interpreter to REF.

Once you pass program control to it, REF locates and sorts the Basic program's variables. Next, REF displays a menu with options to display and print a cross-reference list for a string of characters, display the full cross-reference list, display and print the full cross-ref-

erence list starting with a specific variable, display and print a cross-reference list starting with a specific variable, display and print a cross-reference list for a single variable, and return to Basic.

Features and Limitations

Some of REF's features include tagging simple and array variables, indicating variable type, listing variable names without the referenced line numbers, and doing case-sensitive string searches. Although it has some nice features, REF also has a few limitations: Only the first eight characters of a variable name are significant, you can reference only 300 items at a time, and references for integers and line numbers are listed together.

Of these limitations, the combined listing of integers and line numbers is a serious problem. Because the referenced item doesn't tell you whether it's an integer or a line number, the cross-reference list is almost useless for understanding program flow.

REF uses scroll protection while displaying cross-reference listings to indicate how you can pause, continue, or abort the list. Although this is a good feature, REF unfortunately doesn't disengage the scroll protection before it returns control to the Basic interpreter. Therefore, displays can be somewhat confusing.

One problem with REF is the way it interacts with the Basic program pointers. REF uses these program pointers to locate and cross-reference the listing. However, Basic resets these pointers when you run a program. And after running a program, REF can't properly cross-reference it.

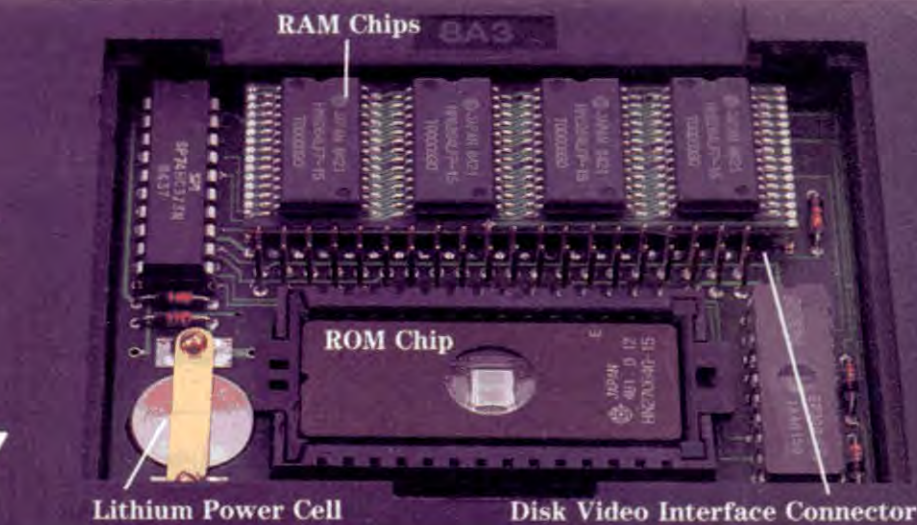
While this problem is described in the documentation as a limitation, it's actually faulty programming. All versions of Microsoft Basic maintain pointers to a Basic program's start and end addresses. And these pointers are constantly maintained by the interpreter. REF isn't using the proper pointers to determine the Basic program's location. Otherwise, executing a program wouldn't cause problems.

Conclusion

The REF documentation consists of a completely inadequate four-page manual. Since REF is fairly easy to use, experienced computer users shouldn't have too many problems. However, novices won't find the manual much help should problems arise. Simply put, the REF manual is a good example of what documentation shouldn't be.

Overall, it's hard to recommend REF. It needs a better manual and its limitations need to be addressed. ■

State of The Art RAM Technology



Circle 470 on Reader Service card.

At last, a 96K Model 100!

“The new PG Design RAM should be in every Model 100 built!”

Miniaturized Technology

Our miniaturized RAM chips are state of the art. They are the most advanced memory chips found anywhere in the world. Their tiny size allows us to keep a low profile in the expansion port of the Model 100. We use a technique called *vapor phase soldering* to ensure that each and every tiny connection is clean — perfect.



The RAM module is precision constructed.

Like The Original

Each 32K RAM bank has its own command of the software that comes in your Model 100. BASIC, TEXT, TEL-COM, ADDRSS, SCHEDL are all there in each bank and you can use them as you would in the original bank. Each bank can be accessed from any of the other banks. We even have an optional data transfer program

which allows data to be transferred from one bank to any other bank. It's flawless!

Simple Installation

“Adding this 64K RAM module to your Model 100 is as easy as putting in new batteries.” Once you've removed the expansion cover on the back of your Model 100, just snap the **PG Design** RAM module in. You can't get it wrong! The pins line up perfectly with the expansion holes in the Model 100 compartment. Snap the cover back on and turn your Model 100 over. Turn it on and enter BASIC. Type in the one line program we supply you and presto—you've got a Model 100 with 96K of RAM. You do not need a 32K Model 100 to utilize the **PG Design** 64K RAM module.

No Need To Remove It

The beauty of this RAM module is that we've enabled you to have a Model 100 with 96K of RAM and we've given you access to the other Model 100 options within the expansion compartment. The DVI connection can be made easily with our rugged connectors. Gone are the flat flimsy pins. And best of all, the ROM slot is clear to insert any ROM modules, (like Tandy's Multiplan on ROM). We designed this RAM module so it wouldn't ever have to be removed from your Model 100. But, if you should remove it, we've installed a lithium

power cell that will keep all the data on the module intact for six months outside the Model 100. Six months! The actual life span of the lithium power cell while in the Model 100 is nearly six years!

Guarantee

We stand behind all the products we manufacture at **PG Design**. If you are not completely satisfied with your purchase, call us! If we cannot solve your problem, return the product to us and we will refund your money. We are positive that you will be completely satisfied with all our products.

Order Today

64K RAM module — \$375

32K RAM module — \$250

If you want only a 32K version of the RAM module, you may upgrade later for only \$150. The 32K version is constructed exactly as the 64K module.

Data Transfer Program — call

Call us at 313/727-2744, or write. We accept Visa and MasterCard, as well as check or money orders. We ship within five days of receiving your order.

Dealer Prices Available

TRS-80 is a trade mark of Radio Shack

Simple Installation!

Model 100

8K RAM Modules—\$29.95 ea. Set of three—\$84.00
(available for NEC 8201A).

Tandy 200

24K RAM Modules—\$109 ea. (\$99 ea. two or more).

PG Design Electronics, Inc. 66040 Gratiot, Richmond, Michigan 48062 (313) 727-2744

**PG
Design**

Put an Amber CRT in Your TRS-80

- Available in medium decay "European Phosphor" (the standard in Europe).
- Made with Lead/Strontium impregnated glass that stops X-ray emission.
- High-contrast double dark face glass that also cuts U.V. radiation.
- Face of tube is etched to stop glare.
- Easily installed. . . comes with pre-mounted hardware.
- Ideal for word processing and programming, yet fast enough for games and graphics.
- Warranted for one full year against manufacturing defects or tube failure.
- Comes with a 30-day money back guarantee.
- Also in green.

Langley-St. Clair

Instrumentation Systems, Inc.
132 W. 24th St., New York, NY 10011

Call now to order your "Soft-View"™ CRT from Langley-St. Clair—\$99.95*

800 221-7070

In New York call 212 989-6876

Please specify computer and model number when ordering. Dealer inquiries invited.

SPECIAL SALE! \$ **69.95**
AMBER CRT'S

Back Issues



Jan. 1980 to June 1980 . . \$3.00 each
July 1980 to May 1983 . . . \$3.50 each
June 1983 to present . . . \$4.50 each
Add \$1.00 per magazine for shipping.
10 or more magazines add \$7.50 per order for shipping.

80Micro

Back Issue Order Dept.
80 Pine Street
Peterborough, NH 03458

Infoscan: Easy to Use, Hard to Get Used To

by Wynne Keller

★★★

Infoscan runs on the Models I and III (48K) and requires one disk drive. DiskCount Data, 2701-C W. 15 Suite 612, Plano, TX 75075. \$49.95.

Easy to use: ★★☆☆☆

Good docs: ★★☆☆☆

Bug free: ★★☆☆☆

Does the job: ★★☆☆☆

For most people, setting up a data base program—with its data fields, screen designs, and report formats—is intimidating, but using it is a breeze once the installation work gets done. Infoscan, however, is the reverse: While its predefined records and report generator simplify setup, they don't provide the flexibility of a full-featured data base. Infoscan is simply an inexpensive information retrieval system.

Setup

Infoscan comes on a Model I disk. Model III users must convert the disk with a DOS utility; if you have only one drive, DiskCount Data will make the conversion for you. This is a needless nuisance—the company should put the Model I format on one side of the disk and Model III format on the other.

Infoscan presents a readable screen display with two windows. One lists Infoscan's functions, the other explains them. After you load Infoscan, it prompts you for a file name. If the file you specify doesn't exist, Infoscan offers to create it. That's all there is to setting up the data base: You don't have to supply field names or lengths, or design reports. A file cannot exceed 350 records, and each record can hold 1,792 characters.

Adding Records

Infoscan makes adding data tedious because, for each record, you must specify a key word, sort group, and screen size. The key word goes into a disk-based index Infoscan creates so it can relocate the record. Each file consists of both a data file and an index file, which you can put on separate disks. You can search records by key words of up to 17 characters.

The sort group is a subdivision of key words that adds a second dimension by which you can sort. For example, if you were entering recipes, one key word might be CHICKEN and the sort group would be MEAT. However, since Infoscan limits the size of sort groups to

three characters, your group in this case would be MEA. You design one data-entry form per sort group. To use it, you must recall it from disk each time you add a record.

You can select a full-screen display of 58 characters by 34 lines or a smaller screen of 36 characters by 56 lines. You may enter text freestyle or superimpose a form on the blank data-entry screen. It is unusual for a data base to allow this much text per record.

To jump from one field to another in a record, you press the shift/enter keys. No matter how many times I did this, I couldn't get used to it. Almost all data bases require that you press the enter key to move from one field to another; I found the need to add the shift key annoying.

Other Functions

Infoscan's report function sends one record at a time to a line printer from the Add, Change, or Scan modes. It prints only the current, on-screen record. You can't get a complete report of all the records in the file as a one-step operation.

Change and Scan operate similarly. While both display a record of choice (found via a key word), Scan won't let you make corrections but Change will. You enter the correct key word directly or find it by going through the key words with the arrow keys.

You delete a record by deleting its key word. Since the program uses variable-record-length disk files, any changes or deletions will free up an equivalent amount of disk space. However, you could run out of space during the Add or Change processes, in which case serious problems occur. For this reason, the manual warns that you must have spare formatted disks always available.

Infoscan could minimize the seriousness of "Disk full" errors, power outages, or pressing the reset key if it provided a reindexing utility to permit a file's recovery if the index is damaged by a power loss. However, Infoscan doesn't reindex on command. If you lose your index, you lose your data, even though it's still on the disk. Understandably, DiskCount Data warns about back-ups in the strongest terms.

Conclusion

Infoscan works best for unstructured data in small batches, permitting a large number of characters in each record. While it uses nice screen displays and is easy to set up, it doesn't allow enough records for business applications, and its report functions are limited. You'll find any data management project time-consuming to enter into the computer. InfoScan is easy to use, but it falls short in other areas. ■

REVIEWS

Mister Editor by Richard Ramella

★★★★

Micro Memo runs on the Model 4 (64K) and requires one disk drive. The Alternate Choice, 9505 W. Brown Deer Road, Milwaukee, WI 53224, 414-355-4544. \$49.95.

Easy to use: ★★★★★

Good docs: ★★★★★

Bug free: ★★★★★

Does the job: ★★★★★

As a line-oriented screen editor, **Micro Memo** works best reshaping and streamlining Basic listings. Like a Swiss Army knife, it offers the right tools for the problem at hand. The Alternate Source touts **Micro Memo** as a text editor as well, and it handles brute-force operations, like global search and replace, better than it does fine-tuning tasks, like inserting single characters. If you work within its bounds, **Micro Memo** is a capable little program.

Numbered Lines

Micro Memo lets you create text, so in theory you can use it to write. Since it's line-oriented, it numbers the 255-character lines it displays. To insert a new line of text into an existing document, you type in an appropriately numbered line. If you run out of line space, you renumber the lines.

I tried using **Micro Memo** as a limited note writer and found my efforts printed with line numbers. Still, I was able to save the text to a Scripsit file without numbers.

It's obvious that **Micro Memo** was meant primarily as a program listing editor, for it provides over 30 commands for reshaping Basic listings. In addition to global search and replace, **Micro Memo** can display all lines with a specified string or all lines not having the string. It shifts material left or right; sets tabs; prints, saves, loads, deletes, and inserts records; and changes characters from upper- to lowercase or vice versa.

It also copies material from one location to another. You can delete or insert material as a continuing operation (without pressing the enter key), an improvement over the Model 4's line-editing system.

Conclusion

Micro Memo's documentation is clear, and it's augmented by a help menu explaining the many options. A special note for Model 4/4P users states that error-handling in **BASCOM**, used to compile **Memo's** utilities, doesn't work correctly. This means a syntax or disk error can dump you out of **Memo** into DOS. I tried to force some of these mistakes on the program but couldn't crash out of it. ■

Circle 355 on Reader Service card.

LARGE CAPACITY ACCOUNTING PROGRAMS
For TRS-80
1, 3, 4, MS DOS
or compatibles
Requires only
48K & 2 Drives &
80 Column Printer

ACCTS RECEIVABLE \$150.00
5000 ACCTS. & 15000 TRANS.
BALANCE FORWARD 99 TRANSACT CODES
30-60-90-120 AGED STATEMENTS SHOW
DATE / INV # / DESCRIP / AMT / & AGEING
SELECTIVE FINANCE CHARGES & RATES.
FAST ENTRY POSTING W/AUDIT REPORT.
SUB-ACCTS. % CREDIT LIMIT DATE OF LAST
PAYMENT. LABELS AND MORE. ADD \$50.00
FOR INVOICING MODULE. OTHER OPTIONS
AVAILABLE - CALL.

ACCTS PAYABLE \$50.00
DERIVED FROM OUR A/R - WRITES CHECKS

GENERAL LEDGER \$150.00
400+ACCTS, 5000+TRANS/MONTH
- BEST LOOKING FINANCIAL STATEMENTS
- DEPARTMENTAL P&L (UP TO 9) + %
- STATEMENT OF CHANGES
- SUB-TOTALS WHERE YOU WANT
- FAST FLEXIBLE POSTING INPUT

DEMO FOR ABOVE \$20.00 EACH + S&H
WITH MANUAL, DISK, SAMPLE DATA

COMBINATION SPECIALS
#1 A/R & G/L FOR \$200.00
#2 A/R, A/P & G/L FOR \$225.00

SUPER P/R PAYROLL - THE BEST \$200.00

VISA H.D.P. MC
2366 Lincoln, Oroville, CA 95966
916/533-5992
MON-FRI 8AM TO 2 PM
ADD 3.00 S&H TO ALL ORDERS ADD 3.00 IF COD

Circle 249 on Reader Service card.

Hunt and Peck is fine for chickens
but you can



Fasttype teaches you how to use the
keyboard on your TANDY 1000
and TRS-80 III/4/4P.

- **Fasttype** is the fun and easy way to learn to type.
- **Fasttype** is machine language fast.
- **Fasttype** is teacher written, classroom proven.

\$39.95/disk plus \$1.50 shipping.
Arizona residents add 5%. Specify
model. Schools: ask about our
network version.



Press A Software
Box 364M
Jerome, AZ 86331
602-634-2688

See Our 4★ Review Nov. 85 80 Micro

Circle 357 on Reader Service card.

From The God of Communications A Divine Modem at a Miracle Price Mercury



Look!

- **100% Hayes Smartmodem* Compatible**, that is **Mercury** runs with all the popular private or public domain, communications software.
- **300/1200 Baud Speed**, software or hardware (dip switch) selectable. The 1200 baud feature will save you a bundle in long distance connections.
- **Auto Dial**
- **Auto Answer**
- **Auto Speed Selection**
- **Audio Monitor**, via speaker with volume control.
- **Front Panel Lights**, give you at a glance full information on the status and mode of your communication. Modem Ready-Terminal Ready -Carrier Detect-Send Data -Receive Data-High Speed -Auto Answer-Off Hook.
- **Clear & Easy to Read Manual**. If modeming is new for you, the **Mercury** Manual will ease your way into the exciting and rewarding world of data transmission.
- **Elegant**, **Mercury** fits tastefully under your telephone set.
- **18 Months Warranty**

\$205.00

Including power supply, telephone cable and manual.
Computer to Modem Cable (\$18.00)-
Shipping \$3.00 anywhere in continental US.

Computer Friends®

6415 SW Canyon Ct.
Portland, OR 97221
(503)297-2321 (24 Hours line)

Order Toll Free
1-800-547-3303

or ask for free brochure.
Dealers Inquiries Welcome.

*Smartmodem Is A Trademark Of Hayes Microproducts Inc

Disk Detail

by Thomas L. Guindry

★★★★

Interactive File Control (IFC) runs on the Models I/III (48K) under LDOS and Model 4 (64K) under TRSDOS 6.X. It requires one disk drive. Misosys Inc., P.O. Box 239, Sterling, VA 22170, 703-450-4181. \$24.95.

Easy to use: ★★★★★

Good docs: ★★★★★

Bug free: ★★★★★

Does the job: ★★★★★

At times, you have no choice but to bite the bullet and reorganize your disk files. Moving, purging, or renaming files requires repetitive and monotonous commands like Directory, Copy, Kill/Remove, Purge, Rename, and List. IFC takes the drudgery out of these operations with a simple and convenient utility that competently handles them all.

Mass Operations

Type in IFC from DOS Ready, and it asks you which drive (zero to 7) you want to access. IFC displays an alphabetized directory for the selected drive, along with the disk name, the amount of free space, the amount of tagged memory, and file information such as protection status, back-up status, approximate file size, and directory date of the file.

IFC provides several one-key commands for individual and universal operations. You can copy, delete, or rename a file from a disk individually by scrolling through the file list and issuing the proper command. You can do the same operations on a series of files with a universal command.

Before you act on a series of files, you have to tag them individually, by attribute or by a wildcard template. You then invoke the universal function command on either the tagged or untagged files. IFC displays a running total of tagged file space at the head of the screen display.

The multiple copying command is IFC's most useful. It is also much safer to use than the LDOS/TRSDOS back-up command for making duplicate copies. The DOS back-up provides a strict sector-for-sector copy and will make a bad copy without so indicating. IFC copies files much like the DOS Copy command does; however if it can't read any file, you have a chance to try again and, if necessary, copy a back-up file from another disk. An added advantage is that IFC will store files in a more contiguous manner.

To execute a mass renaming of files, you must use a renaming template, which uses question-mark and asterisk

characters as wildcard indicators when you rename files so you can control individual, though related, file names.

A help utility lists all IFC commands available, and after a few sessions you won't need the documentation except for wildcard designations. Most of the 19 commands relate to copying, deleting, or renaming files. The others include executing DOS commands, determining free space on a drive, selecting a new drive number, and exiting IFC.

You can list a file in either ASCII or hexadecimal (hex) format with a supplied program you call through IFC or from DOS. When called through IFC, you can only list a file in ASCII or hex. When called from DOS, additional parameters let you control several functions, like sending the output to the printer, numbering each line, expanding tab characters on output, and pausing.

Another IFC feature lets you run the program without a system disk in drive zero. Although the documentation tells you how to do this, it makes no mention of how to set up the necessary system overlays in memory. A README/TXT file supplied on the distribution disk gives rather sketchy information, saying only that you have to SYSRES selected DOS modules. You should refer to the DOS manual to see how to do this.

A Few Problems

IFC works with only a few noticeable problems. The only serious one was its inability to invoke the wildcard command if you entered by way of a JCL file. The program crashes. Also, when returning to the system disk, a crash occurs if the last disk read in drive zero differs in format from the system disk.

I found one minor, annoying flaw and one bug with the ASCII/hex list program. When I used it with IFC, the message, "Press any key to return to IFC," is not preceded by a carriage return. Consequently, this message appeared directly after the last line of ASCII text.

The bug I experienced is related to this flaw and occurred when using IFC's list program from DOS rather than from IFC. When using the printer output option for an ASCII list of a file saved in ASCII format, the last line won't print out unless the file ends with a carriage-return character. The reason, of course, is that the printer must have the carriage-return character to print the line. The list program should compensate for this.

Conclusion

In spite of these nagging flaws, IFC is a must program. It is easy to use, takes up little space, and makes file maintenance a breeze. IFC can make your life a lot easier. ■

The Home Accountant

★★★★

The Home Accountant runs on the Model III (48K) and requires one disk drive. Tandy/Radio Shack, One Tandy Plaza, Fort Worth, TX 76102. Catalog number 26-1511. \$99.95.

Setting up your personal finances is no fun, but The Home Accountant does a good job of keeping track of how your money comes in and where it goes out. It's a versatile program that can easily manage a budget. Unfortunately, The Home Accountant is written in Model III Basic and it can be tortuously slow at times, particularly during disk access.

When you boot up the Home Accountant disk, it automatically goes into Basic and runs the program. It's easy to use, with menus leading you through every step of the way. As you move through the menus, an asterisk appears beside the next item you'll need to properly set up a budget. Many of the screens that accept information are similarly designed, simplifying the start-up process.

You can set up from one to five checkbooks, and budget a certain amount of money for each month (and checkbook). The program shows how closely you followed your budget, and you can track any monthly asset, liability, expense, or income. The budget categories include house and car payments, credit cards, and even food. You can also display a bar graph for each category comparing your actual spending to the amount budgeted.

You can set up payments that The Home Accountant will automatically subtract each month; you have to key in others manually. Each "check" requires certain information, such as the date, to whom you wrote the check and why, and whether or not it has cleared the bank. You can also print checks on your printer with specially made checks you can order. The Home Accountant keeps track of the balances in each checking account as well as the other budget categories as you add to and subtract from them.

You can automatically figure a percentage increase or decrease in spending over a certain period of time. You can get a printout of budgeted and actual amounts for all the budget categories, a personal balance sheet, and a list of what checks you wrote for any or all checkbooks.

If you use LDOS, you can put The Home Accountant and its files on a hard disk. The manual shows how and how to back up the hard disk with floppies.

The program comes with a 154-page manual in a three-ring binder. The introductory section is good, displaying screen diagrams from the program and leading

The File Transfer Program is like two halves that don't add up to a whole.

you through the process of setting up and maintaining your checkbooks.

While the Home Accountant has a somewhat high price, it does a good job of tracking your accounting operations. It may be slow, but it's also flexible enough to handle almost any number of transactions you may have.

—Edward Spitzbarth III

The File Transfer Program

★ ★

The File Transfer Program runs on the Models III and 4 and the Tandy 1000/1200. Personal Computer Products, 3080 Olcott Drive, Suite 130B, Santa Clara, CA 95051, 408-988-0164. \$149.95.

Many computer users need to transfer files between different computers. You can do this with a modem, a null modem cable, or a disk-based program. The File Transfer Program uses a null modem cable to move files from your TRS-80 to your MS-DOS machine. It is, however, slow and it doesn't include any error-checking. It also transfers files from your TRS-80 to your MS-DOS computer only, not the other way around.

The File Transfer Program comes with two disks and minimal documentation. The TRS-80 disk can only send files from your TRS-80 computer, and the MS-DOS disk only receives them. This is like buying two halves of a communication program—only it doesn't add up to a whole.

The program is written in Basic and it's easy to use. The TRS-80 end is set to a default baud rate of 9,600. To test it, I transferred a 19K file in 14 minutes. Using a different pair of communications programs, I transferred the same file in only 28 seconds at 9,600 baud. Actually, the transfer rate of The File Transfer Program is effectively no more than 450 baud. The default on the PC side of the program is set at a more realistic 300 baud.

The PC side of the program does con-

tain four useful utilities. These add or strip combinations of carriage return and line feed characters (CRLF), strip off control codes, strip off the high bit, limit your maximum line length by adding CRLF (but doesn't word-wrap the line), and puts spaces between key words to aid file conversion from the Model III.

Even with the utilities, The File Transfer Program is a poor value. Other programs have far more capability and operate much faster to boot.

—Thomas L. Quindry

Word Processing Simplified for SuperScript

★ ★ ★

Word Processing Simplified for SuperScript (for the Models III and 4). Rosemary Kelly-Bekaert. Softcover, 190 pp., Kelly Enterprises, P.O. Box 247, Holt, MI 48842, 517-694-1799. \$19.95.

Anyone who has used SuperScript is well acquainted with the terrible manuals that come with the program. The tutorial is long and difficult, and the reference manual is inadequate in preparing you to use SuperScript efficiently and effectively. *Word Processing Simplified for SuperScript* is the perfect solution for the accomplished word processor user who doesn't want to wade through all the rhetoric of the Tandy manuals. While this book is neither dull nor intimidating, it is confusing at times.

Word Processing Simplified is divided into five major sections: General Information, Basic Functions, TRSDOS File Management Commands, Working With Blocks, and Advanced Skills. These are followed by summary sheets of the various SuperScript commands, instructions on changing the system defaults, an index, and an answer section for the review quizzes in each section. Each of the sections is subdivided into chapters.

One of the book's drawbacks is that the different sections have independent page-numbering schemes, each starting with page 1. This makes it awkward to thumb through the book looking for a particular page. However, balancing this is a clear and well-designed table of contents, which practically eliminates the need for an index.

The book is laid out more like a reference manual than a tutorial. Each page contains the specific instructions on how to do something (such as make a back-up disk) in a simple and straightforward manner. After each lesson, an exercise lists a couple of practice tasks

to make sure you understand what you just read.

One good feature of the book is the description of commands at the start of each section, which in many cases also makes a good glossary. Each section ends with a review quiz, a fill-in-the-blank affair that tests your knowledge of the section you just read.

The primary fault with the book is the poorly designed format. There is no introduction to explain how to use the manual or its layout. It took me several minutes to figure out that the first exercise wasn't just a part of the rest of the text. Trying to separate where text ends and the exercises start (and end) isn't always simple. They aren't adequately set apart.

Similarly, the various chapters should be clearly separated, perhaps by making each one start on a right-hand page rather than just the page after a completed exercise.

Only after finishing the first section did I discover that the book contained review quizzes. Careful inspection of the table of contents revealed that the answers were in the back of the book, but there isn't any mention of them in the quizzes themselves.

The instructions, exercises, and quizzes are well done. While I found the book to be far superior to Tandy's reference manual as a reference manual, as a tutorial it falls far short of being clear and simple. In the exercises, for example, some typing assignments have deliberate errors. You are expected to type them in, then correct them with SuperScript. To guide you, the typed assignment is reproduced with corrective editing marks in red (so you have two copies, one you type in and the other you use as a guide). This is good, especially the use of the red to indicate changes.

Unfortunately, the book uses standard copy-editor signs to indicate what you are supposed to do. This isn't a problem if you are familiar with copy editing, but if you aren't (and most people are not professional copy editors), you haven't the foggiest idea what these cryptic messages want you to do. A glossary of them, or a reference as to where you can find an explanation of their uses, would have been very helpful.

Word Processing Simplified for SuperScript is a good reference work for the SuperScript user, or a good tutorial for the accomplished word processor user who is switching to SuperScript. It even makes a good exercise book to use with the Tandy tutorial manual. But it isn't recommended for novices looking for a good tutorial to replace Tandy's, or as a book that tells you how to do things that Tandy's manuals don't.

—Terry Kepner

Telewriter-64™

the Color Computer Word Processor

- **3 display formats: 51/64/85 columns × 24 lines**
- **True lower case characters**
- **User-friendly full-screen editor**
- **Right justification**
- **Easy hyphenation**
- **Drives any printer**
- **Embedded format and control codes**
- **Runs in 16K, 32K, or 64K**
- **Menu-driven disk and cassette I/O**
- **No hardware modifications required**

THE ORIGINAL

Simply stated, Telewriter is the most powerful word processor you can buy for the TRS-80 Color Computer. The original Telewriter has received rave reviews in every major Color Computer and TRS-80 magazine, as well as enthusiastic praise from thousands of satisfied owners. And rightly so.

The standard Color Computer display of 32 characters by 16 lines without lower case is simply inadequate for serious word processing. The checkerboard letters and tiny lines give you no feel for how your writing looks or reads. Telewriter gives the Color Computer a 51 column by 24 line screen display with *true lower case characters*. So a Telewriter screen looks like a printed page, with a good chunk of text on screen at one time. In fact, more on screen text than you'd get with Apple II, Atari, TI, Vic or TRS-80 Model III.

On top of that, the sophisticated Telewriter full-screen editor is so simple to use, it makes writing fun. With single-letter mnemonic commands, and menu-driven I/O and formatting, Telewriter surpasses all others for user friendliness and pure power.

Telewriter's chain printing feature means that the size of your text is never limited by the amount of memory you have, and Telewriter's advanced cassette handler gives you a powerful word processor without the major additional cost of a disk.

...one of the best programs for the Color Computer I have seen...

— Color Computer News, Jan. 1982

TELEWRITER-64

But now we've added more power to Telewriter. Not just bells and whistles, but major features that give you total control over your writing. We call this new supercharged version Telewriter-64. For two reasons.

64K COMPATIBLE

Telewriter-64 runs fully in any Color Computer — 16K, 32K, or 64K, with or without Extended Basic, with disk or cassette or both. It automatically configures itself to take optimum advantage of all available memory. That means that when you upgrade your memory, the Telewriter-64 text buffer grows accordingly. In a 64K cassette based system, for example, you get about 40K of memory to store text. So you don't need disk or FLEX to put all your 64K to work immediately.

64 COLUMNS (AND 85!)

Besides the original 51 column screen, Telewriter-64 now gives you 2 additional high-density displays: 64 × 24 and 85 × 24!! Both high density modes provide all the standard Telewriter editing capabilities, and you can switch instantly to any of the 3 formats with a single control key command. The 51 × 24 display is clear and crisp on the screen. The two high density modes are more crowded and less easily readable, but they are perfect for showing you the exact layout of your printed page, *all on the screen at one time*. Compare this with cumbersome "windows" that show you only fragments at a time and don't even allow editing.

RIGHT JUSTIFICATION & HYPHENATION

One outstanding advantage of the full-width screen display is that you can now set the screen width to match the width of your printed page, so that "what you see is what you get." This makes exact alignment of columns possible and it makes hyphenation simple.

Since short lines are the reason for the large spaces often found in standard right justified text, and since hyphenation is the most effective way to eliminate short lines, Telewriter-64 can now promise you some of the best looking right justification you can get on the Color Computer.

FEATURES & SPECIFICATIONS:

Printing and formatting: Drives any printer (LPVII/VIII, DMP-100/200, Epson, Okidata, Centronics, NEC, C. Itoh, Smith-Corona, Terminus, etc).

Embedded control codes give full dynamic access to intelligent printer features like: underlining, subscript, superscript, variable font and type size, dot-graphics, etc.

Dynamic (embedded) format controls for: top, bottom, and left margins; line length, lines per page, line spacing, new page, change page numbering, conditional new page, enable/disable justification.

Menu-driven control of these parameters, as well as: pause at page bottom, page numbering, baud rate (so you can run your printer at top speed), and Epson font. "Typewriter" feature sends typed lines directly to your printer, and Direct mode sends control codes right from the keyboard. Special Epson driver simplifies use with MX-80.

Supports single and multi-line headers and automatic centering. Print or save all or any section of the text buffer. Chain print any number of files from cassette or disk.

File and I/O Features: ASCII format files — create and edit BASIC, Assembly, Pascal, and C programs, Smart Terminal files (for uploading or downloading), even text files from other word processors. Compatible with spelling checkers (like Spell 'n Fix).

Cassette verify command for sure saves. Cassette auto-retry means you type a load command only once no matter where you are in the tape.

Read in, save, partial save, and append files with disk and/or cassette. For disk: print directory with free space to screen or printer, kill and rename files, set default drive. Easily customized to the number of drives in the system.

Editing features: Fast, full-screen editor with wordwrap, block copy, block move, block delete, line delete, global search and replace (or delete), wild card search, fast auto-repeat cursor, fast scrolling, cursor up, down, right, left, begin line, end line, top of text, bottom of text; page forward, page backward, align text, tabs, choice of buff or green background, complete error protection, line counter, word counter, space left, current file name, default drive in effect, set line length on screen.

Insert or delete text anywhere on the screen without changing "modes." This fast "free-form" editor provides maximum ease of use. Everything you do appears immediately on the screen in front of you. Commands require only a single key or a single key plus CLEAR.

*...truly a state of the art word processor...
outstanding in every respect.*

— The RAINBOW, Jan. 1982

PROFESSIONAL WORD PROCESSING

You can no longer afford to be without the power and efficiency word processing brings to everything you write. The TRS-80 Color Computer is the lowest priced micro with the capability for serious word processing. And only Telewriter-64 fully unleashes that capability.

Telewriter-64 costs \$49.95 on cassette, \$59.95 on disk, and comes complete with over 70 pages of well-written documentation. (The step-by-step tutorial will have your writing with Telewriter-64 in a matter of minutes.) To order, send check or money order to:

Cognitex
704 N. Nob St.
Del Mar, CA 92014

Or check your local software store. If you have questions, or would like to order by Visa or Mastercard, call us at (619) 755-1258 (weekdays, 8AM-4PM PST). Add \$2.00 for shipping & handling. CA residents add 6% state tax.

Now available at
Radio Shack stores
via express order.

Apple II is a trademark of Apple Computer, Inc.; Atari is a trademark of Atari, Inc.; TRS-80 is a trademark of Tandy Corp.; MX-80 is a trademark of Epson America, Inc.

Command	Description
Help	Briefly describes all available commands. Scroll by pressing the enter key; at the end, you return to the window screen in the command mode.
Menu	Returns you to the menu to choose another option.
Quit	Ends the program.
Dir	Reads track 17, sector 3 and displays the first eight directory entries.
Track	Changes the track number you want to read.
Sector	Changes the sector number you want to read.
Read	Updates the window after you use the Track, Sector, Drive, or Granule command.
Drive	Changes the drive number you want to read.
Granule	Lets you specify the granule you want to read.
Scan	Lets you scan the disk starting at the current track and sector. The program continually updates the window. Press the clear key to stop at a particular location.
Restore	Restores the head drive to position zero.
Write	Stores information from the window on disk, letting you modify or correct a sector.
Erase	Erases the window with a specified character, usually 255 or FF in hex.
Error	Scans a disk searching for errors and displays the sector of any error encountered. To scan an entire disk, position yourself on track zero, sector 1.
Lock	Locks out a damaged sector, letting you use the remainder of the disk.
Free	Indicates the number of free sectors.
Search	Lets you search for a certain string. If, for example, you wanted to find the string "TIME," you would enter the edit mode, type in TIME at cursor position zero, and return to the command mode.
Print	Performs a screen dump. The routine is for the Gemini 10X printer; all graphics characters are printed by its extended ASCII character set.
CODIR	Copies the directory to the last granule on the disk if that granule is free. Since most errors occur on track 17, this feature lets you recapture most information on a damaged disk.
REDIR	Recovers the directory by copying data from the last granule on track 17—the directory and the FAT table.
Number	Changes the number of tracks to read. It is useful if you use disks formatted for 40 or 80 tracks. Bear in mind that track numbers begin with track zero.

Table 1. Command summary.

Inverse @ = Basic program
 Inverse A = Basic data file
 Inverse B = Machine-language program
 Inverse C = Text file

The ASCII flag in byte 12 displays an inverse @ for a binary file and a full pink graphics character for an ASCII file. Byte 13 locates the beginning granule for a file. If you've killed a file, that byte remains unchanged but the corresponding granule is free. Bytes 14 and 15 indicate the number of bytes used in the last sector of the file. Because a disk doesn't use the final 16 bytes of the directory, they contain inverse @ symbols or full pink graphics characters.

Photo 2 shows the FAT for the directory in Photo 1 (to display this informa-

tion in ZapZ's window, press the enter key to call up the edit mode and scroll forward to sector 2 by pressing the shift/up-arrow keys). The disk uses only the first 68 bytes; the remaining bytes contain inverse @'s. When the value of a byte is 255, that byte displays a full pink graphics character, indicating that the granule is free or has been freed.

In Photo 1, for example, byte zero of the entry for HiScore (fifth line in the window) shows that you've killed the file. Checking byte 13 of the same entry gives you the starting granule number—20 in this case. If you then check the corresponding granule in Photo 2, you'll find that it's free. Once you locate the initial granule of a file, you can use the

Properly used, ZapZ lets you circumvent disk errors.

Granule command to read that sector and look at the file. It should be intact if you haven't saved anything since killing the file.

Opening the Window

ZapZ's editing procedures let you change disk information. When you call up the edit mode, a flashing cursor appears on the first byte of the first line in the window. You move the cursor by pressing the arrow keys; ZapZ updates the cursor position and value of the byte shown at the bottom of the screen.

You can substitute a new character by positioning the cursor and typing in the replacement character. Unfortunately, this doesn't work for all characters because you can't reproduce certain byte values from the keyboard. To modify any byte, press the clear key (from the edit mode); this moves the cursor to the value line. When you type in a decimal or hexadecimal value, ZapZ changes the character at the cursor location accordingly. Be sure to precede hexadecimal values with a dollar sign.

You can also scroll between sectors from the edit mode. Press the shift/up-arrow or shift/down-arrow keys to view the previous or following 256 bytes, respectively. To exit to the command mode, press the enter key again.

Caveat

Properly used, ZapZ can end the input/output-error and lost-file blues. But you must exercise caution, especially with the Write, Erase, and Lock commands: Once you use them, you won't be able to recover the original information. Whenever possible, you should back up any disk you plan to zap, just in case something unexpected goes wrong. ■

Write to Alain Dussault and Luc Jacob, 2165 Manon St., Laval, Quebec, Canada H7S 1V5.

Related Article

McLaughlin, Philip, "What's Disk." *HOT CoCo*, March 1984, p. 46. The basics of disk organization.

Program Listing 1. ZapZ.

```

171# PC=PAR4:DIM COS(2#),PA(4#),
95(1#),ES(1#)
182# GOSUB185#;CLS#;ME=1#24
193# ME=1#24+256
194# RESTORE:POKX=1#24 TO 1535:
READAS=A+VAL("&H"+AS):POKEX,A:N
EXT
195# FORK=1 TO 2#;NEXT K
196# CLEAR3#;29999:DIM COS(2#)
,PA(4#)
197# CLS:PRINT@142,"MENU"
198# PRINT@199,"1...EXPLANATION"
199# PRINT@231,"2...EXAMINE SECT
OR"
1110# PRINT@263,"3...END PROGRAM"
1120# PRINT@359,"";PRINT"YOUR CH
OICE..."
1130# AS=INKEYS:IFAS=""THEN1130EL
SEIFAS<"1"ORAS>"3"THEN1130
1140# IFAS="3" THEN CLS:END
1160# IFAS="1" THEN CH=1:GOTO 47
48
1170# CH=13:GOSUB 2530
1180# GOTO 118#
119# '
120# 'CURSOR
121# '
122# IF CH<># THEN 137#
123# ZZ=PEEK(PO)
124# PC=255:CN=3
125# IF ZZ=255 THEN PC=223
126# AS=INKEYS:IFAS<>"*" THEN 131
#
127# IFPEEK(341)=247 THENAS=CHRS
(94)
128# IFPEEK(342)=247 THEN AS=CHR
S(118)
129# IFPEEK(343)=247 THEN AS=CHR
S(8)
130# IFPEEK(344)=247 THEN AS=CHR
S(9)
131# IFAS<>"*" THEN 136#
132# CN=CN-1:IFCN<>#THEN126#
133# IFPEEK(PO)=ZZ THEN 135#
134# POKEPO,ZZ:GOTO124#
135# POKEPO,PC:GOTO124#
136# POKEPO,ZZ:RETURN
137# AS=CHRS(CH):CH=#:RETURN
138# '
139# 'LINE INPUT
140# '
141# IF LN=# THEN 120#
142# LN=PO:RS=STRINGS(LN,32)
143# PP=PO-1#24
144# CP=1
145# PRINT@PP,RS:
146# GOSUB 120#
147# IF AS=CHRS(12) THEN 156#
148# IF AS=CHRS(13) THEN 155#
149# IF AS=CHRS(18) THEN 153#
150# MDS(BS,CP,1)=AS
151# IF CP>LN THEN 145#
152# CP=CP+1:PO=PO+1:GOTO 145#
153# IF CP<2 THEN 145#
154# CP=CP-1:PO=PO-1:GOTO 145#
155# PO=LN:RETURN
156# PO=LN:GOTO 139#
157# '
158# ' INPUT DIGIT
159# '
160# GOSUB 138#
161# IF MDS(BS,1,1)<>"S"THEN16
#
162# BS=RIGHTS(BS,LEN(BS)-1)
163# BS="&H"+BS
164# AN=VAL(BS)
165# RETURN
166# '
167# ' DISK INPUT/OUTPUT
168# '
169# '
170# DEFUSR#OP*256+DR
171# DEFUSR1=TR*256+SE
172# DEFUSR2=ME
173# EXEC DK
174# '
175# ST=PEEK(AD+6)
176# IF ST=# THEN RETURN
177# FOR X=# TO 7
178# ST=INT(ST/2)
179# IF ST<># THEN NEXT
180# ST=X-1
181# TR=PEEK(AD+2)
182# SE=PEEK(AD+3)
183# OP=PEEK(AD)
184# RETURN
185# '
186# ' MAIN INITIALIZATION
187# '
188# AS(0)="RESTORE HEAD"
189# AS(1)="NO OPERATION"
190# AS(2)=" READ SECTOR"
191# AS(3)="WRITE SECTOR"
192# AA=PEEK(&HC#6)*256
193# POKE &HB#,AA
194# BB=PEEK(&HC#7)
195# POKE &HB1,BB
196# AD=AA*256+BB
197# DK=PEEK(&HC#4)*256
198# DK=DK+PEEK(&HC#5)
199# OP=2:TR=17:SE=3:NT=35:LG=NT
*2-2
200# DR=#:ME=1#24+64
201# ERS(0)="NO ERROR FOUND..."
202# ERS(1)="DATA LOST....."
203# ERS(2)="CRC ERROR....."
204# ERS(3)="RECORD NOT FOUND"
205# ERS(4)="WRITE FAULT....."
206# ERS(5)="WRITE PROTECTED..."
207# ERS(6)="DRIVE NOT READY..."
208# COS(0)="SCAN"
209# COS(1)="WRITE"
210# COS(2)="RESTORE"
211# COS(3)="DRIVE"
212# COS(4)="TRACK"
213# COS(5)="SECTOR"
214# COS(6)="GRANULE"
215# COS(7)="MENU"
216# COS(8)="HELP"
217# COS(9)="READ"
218# COS(10)="DIR"
219# COS(11)="ERASE"
220# COS(12)="ERROR"
221# COS(13)="LOCK"
222# COS(14)="FREE"
223# COS(15)="SEARCH"
224# COS(16)="QUIT"
225# COS(17)="PRINT"
226# COS(18)="CODIR"
227# COS(19)="REDIR"
228# COS(20)="NUMBER"
229# CLS
230# PRINT@7,"DISK MEDICINE"
231# PRINT@32,"#1234567890123456
789012345678901"
232# RETURN
233# '
234# ' REPORT
235# '
236# ZZ=PEEK(PO)
237# PRINT@352,"VALUE : "ZZ,
238# PRINT"5";HEX$(ZZ)
239# PRINT@32#,"COMMAND..."
240# IF ST=# THEN 242#
241# PRINT@33#,"ERS(ST)..."
242# PRINT@384,"TRACK : "TR,
243# PRINT"5";HEX$(TR)
244# PRINT@416,"SECTOR : "SE,
245# PRINT"5";HEX$(SE)
246# PRINT@448,"CURSOR : "CS,
247# PRINT"5";HEX$(CS)
248# PRINT@480,"MODE : "AS(OP)
ON "
249# PRINT"DRIVE"DR:
250# IFST=#THEN 252#
251# FORK=1TO1#;NEXTK
252# RETURN
253# 'SECTOR CHANGE
254# '
255# GOSUB 185#
256# GOSUB 233#
257# GOSUB 166#
258# PO=ME:ZZ=PEEK(PO)
259# CS=PO-ME:GOSUB233#;ST=#:GOS
UB 119#
260# IFAS<>CHRS(12) THEN 264#
261# Z=PO:PO=1#24+36#;LN=3:GOSUB
157#;PO=2:ZZ=AN
262# POKE PO,AN:GOTO 260#
263# IF AS=CHRS(13) THEN 287#
264# IF AS<>CHRS(9) THEN 268#
265# IF PO<ME+255 THEN PO=PO+1
266# GOTO 260#
267# IF AS<>CHRS(8) THEN 271#
268# IF PO>ME THEN PO=PO-1
269# GOTO 260#
270# IF AS<>CHRS(10) THEN 273#
271# IF PO<ME+224 THEN PO=PO+32:
GOTO260#
272# IF PO>ME+31 THENPO=PO-32
273# GOTO 260#
274# IFAS<>CHRS(91)THEN281#
275# SE=SE+1:IFSE<19THEN28#
276# SE=1:TR=TR+1:IFTR<NT THEN 2
8#
277# TR=TR-1
278# GOTO258#
281# IFAS<>CHRS(95)THEN285#
282# IF SE>1THEN SE=SE-1:GOTO28#
#
283# SE=18:IFTR>#THENTR=TR-1:GOT
O28#
284# SE=1:TR=#:GOTO28#
285# IF AS="&ANDAS<="z" THEN P
OKE PO,ASC(AS):GOTO266#

```

Listing continued

The Accessible Computer Experts



DELKER

HARDWARE SPECIALS

Tandy 600	CALL
Tandy 3000	CALL
25-1000 Tandy 1000 2-drive	CALL
Tandy 1000 10MB Hd	CALL
26-3802 Model 100 24K	\$ 449.95
26-3860 Model 200	\$ 849.95
26-3816P 8K Upgrade Model 100	\$ 55.95
26-3127 64K Extended Coco 2	\$ 149.95
26-3129 Coco Drive	\$ 189.95
26-1161 Coco Drive 1	\$ 179.95
26-3124 Multi-Pac Interface	\$ 89.95
Video Monitor Adapters	\$ 34.95
Botek Ser / Par Interface	\$ 69.95
NAP Video Monitor (Grn Amber)	\$ 109.95
Extended Basic w/bk	\$ 39.95
64K (DEI) Memory Upg	\$ 49.95
HJL Keyboard (D E F 2)	\$ 79.95
26-1276 DMP-105 Printer 80 cps	CALL
26-1278 DWP 220 Printer	CALL

MSI SOFTWARE

MSI DISKUTIL	NEW	\$ 19.95
COLOR FINANCE II	NEW	\$ 69.95
MSI NAMEFILE		\$ 24.95
MSI CALENDAR	NEW	\$ 19.95
MSI COLOR PAYROLL	NEW	\$ 99.95
COLOR FINANCE 4		\$ 69.95

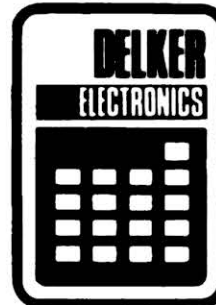
ACCESSORIES

Volsmodem 1200	\$299.95
RS D C. Modem IB	\$ 89.95
Novation J-Cat Modem	\$129.95
USR Password 300	\$179.95
Hayes SM 300 Modem	\$239.95
USR Password 1200	\$399.95
USR Password 2400	\$599.95
CoCo Switcher	\$ 39.95
Elephant Disks ssdd	\$ 18.95
Mach II Joystick	\$ 39.95
26-3030 OS-9 (64k)	\$ 64.95 (disk)
Basic-09 (req OS-9)	\$ 87.95 (disk)
"C" Compiler (OS-9)	\$ 87.95 (disk)
FHL O-Pak (req OS-9)	\$ 34.95 (disk)
Elite Word	\$ 59.95 (d&c)
Elite Calc	\$ 59.95 (d&c)
Color Term Plus	\$ 29.95 (cass)
Deft Pascal	\$ 79.95
26-3012 Deluxe Joystick	\$ 34.95
Tandy 1000 options	CALL

NEW! Dual Double Sides Drives including case, power supply & cable \$375.95

NEW! 26-3128 64K Direct Video CoCo2 \$219.95

TRS-80 Trademark Tandy Corporation
Prices subject to change without notice
Write for our FREE newsletter



Call for prices and availability of your favorite software and hardware. All advertised items subject to availability. Prices do not include shipping and handling. All of the above units are covered by our 120 day carry-in warranty.

DELKER ELECTRONICS, INC.
P.O. Box 897 408 C Nissan Blvd.
Smyrna, TN 37167

■ 800-251-5008 ■ 615-459-2636
(Tennessee)

■ 800-445-2502 ■ 615-254-0088
(Tennessee) (Nashville)

Visa, Mastercard and American Express

Listing continued

```

286# GOTO 260#
287# '
288# ' COMMANDS
289# '
290# Z=PO
291# PO=1#24+33#;LN=1#;GOSUB 157
#;PO=Z
292# FOR X=# TO 2#
293# IF INSTR(1,BS,COS(X))=1 THE
N 295#
294# NEXT X;GOTO 259#
295# ON X+1 GOSUB 413#,338#,297#
,343#,353#,359#,366#,334#,3#3#,3
76#,424#,439#,428#,449#,469#,481
#,514#,518#,523#,528#,351#
296# GOTO 291#
297# '
298# ' RESTORE HEAD
299# '
300# OP=#;GOSUB 233#;GOSUB166#
301# OP=2;GOSUB 233#;TR=#;SE=1
302# GOSUB 166#;RETURN
303# '
304# ' HELP
305# '
306# CLS6
307# PRINT#32,"WRITE WRITE TH
E BUFFER TO THE TRACK AND SECT. ";
308# PRINT#RESTORE RESTORE HEAD
TO TRACK # SECTOR #.
309# PRINT#DRIVE CHANGE OPERA
TIONAL DRIVE. #
310# PRINT#TRACK CHANGE CURRE
NT TRACK. #
311# PRINT#SECTOR CHANGE CURRE
NT SECTOR. #
312# PRINT#GRANULE ADJUST TRACK
AND SECTOR ACCORDING TO
GRANULE #
313# PRINT#HELP DISPLAY BRIE
F COMMANDS SUMMARY. #
314# PRINT#READ READ CURRENT
SECTOR TRACK. #
315# AS=INKEYS:IFAS="" THEN315#
316# CLS6;PRINT#32,"SCAN WIL
L SCAN ALL DISK SEC
TOR FROM THE CURRENT LOC
ATION. #
317# PRINT#DIR PLACE THE CU
RRENT TRACK OVER THE DIR
RECTORY. #
318# PRINT#ERASE ERASES THE C
URRENT BUFFER WITH THE
THE CHARACTER SP
ECIFIED. #
319# PRINT#ERROR FINDS THE FI
RST TRACK WITH AN ERRO
R FROM THE CURRENT LOCA
TION. #
320# PRINT#LOCK FINDS DEFECT
IVE TRACKS AND LOCKS TH
EM ON THE DIRECTORY. #
321# AS=INKEYS:IFAS="" THEN321#
322# CLS6;PRINT#32,"FREE PRI
THE CURRENT AMO
UNT OF FREE SECTORS ON
THE DEFAULT DRIVE. #
323# PRINT#SEARCH WILL FIND TH
E SPECIFIED NUMBER OF CH
ARACTERS FROM THE STA
RT OF THE BUFFER THROU
GHOUT THE DISK. #
324# PRINT#MENU WILL RETURN
YOU TO THE MAIN MEN
U. #
325# PRINT#QUIT TO END THIS
PROGRAM. #
326# PRINT#PRINT SCREEN PRINT
ER ROUTINE EVEN GRAPHIC
CHARACTER. #
327# AS=INKEYS:IFAS="" THEN 327#
328# CLS6;PRINT#32,"CODIR TO
DUPLICATE THE DIREC-
Y ON GRANULE 68. #
329# PRINT#REDIR TO RECOVER T
HE DIRECTO- ULE 68 TO
ON TRACK COPY IT BACK
330# PRINT#NUMBER TO CHANGE TH
E NUMBER OF TRACK TO REA
D OR WRITE TO. #
331# AS=INKEYS:IFAS="" THEN331#
332# CLS;PRINT#7,"DISK MEDICINE"
;PRINT#32,"BY LUC JACOB AND ALAI
N DUSSAULT";GOSUB 166#
333# OP=2;GOSUB233#;RETURN
334# '
335# ' MENU
336# '
337# RUN 106#
338# '
339# ' WRITE SECTOR
340# '
341# OP=3;GOSUB166#
342# OP=2;RETURN
343# '
344# ' DRIVE
345# '
346# Z=PO;LN=1
347# PO=5#9+1#24;GOSUB157#
348# IF AN<# OR AN>2 THEN 347#
349# PO=Z;DR=AN;RETURN
350# '
351# ' CHANGE TOTAL NUMBER OF TR
ACKS
352# PRINT#33#,"";INPUT# OF TR
ACKS";NT:LG=NT*2-2;PRINT#33#,ST
RINGS(2#,32);RETURN
353# ' TRACK
354# '
355# Z=PO
356# PO=1#24+392;LN=3;GOSUB157#
357# IFAN>NT-1 ORAN<# THEN356#
358# PO=Z;TR=AN;RETURN
359# '
360# ' SECTOR
361# '
362# Z=PO
363# PO=1#24+424;LN=3;GOSUB157#
364# IFAN<#ORAN>18 THEN363#
365# SE=AN;PO=Z;RETURN
366# '
367# ' GRANULE
368# '
369# Z=PO
370# PRINT#32#,"GRANULE NUMBER ?
";PO=1#24+336;LN=4;GOSUB157#
371# IFAN<#ORAN>NT*2-3 THEN 370#
372# TR=INT(AN/2)
373# SE=(AN-TR*2)*9+1
374# IFAN>NT-2 THENTR=TR+1
375# PO=Z;OP=2;GOSUB233#;RETURN
376# '
377# ' READ SECTOR
378# '
379# OP=2;GOSUB166#;RETURN
380# '
381# ' EXPLANATIONS
382# '
383# CLS6;PRINT#32,"-EXAMINE SEC
TOR IS A UTILITY DESIGNED TO
MODIFY DISK SECTORS YOU WILL EN
TER THE PROGRAM IN THE COMMAND
MODE. IN THIS MODE ASK FOR 'HE
LP'. IF YOU PRESS <ENTER> THE
SCREEN EDITOR WILL BE ACTIVATE
D. #
384# PRINT#PRINT" YOU CAN CHANGE
THE BUFFER BY TYPING OVER IT
OR CHANGE IT VIA THE <CLEAR
> KEY FOLLOWED BY A DIGIT REP
RESENTING THE ASCII VALUE OF
A CHARACTER ('#' MEANS HEX
ADECMIAL)"
385# AS=INKEYS:IFAS="" THEN385#
386# RETURN
387# '
413# '
414# ' SCAN DISK
415# '
416# T1=TR;S1=SE
417# OP=2;GOSUB 166#;GOSUB233#
418# AS=INKEYS:IFAS="" THEN423#
419# SE=SE+1;IF SE<19 THEN417#
420# SE=1;TR=TR+1
421# IFTR<NT THEN417#
422# TR=T1;SE=S1
423# OP=2;GOSUB166#;GOSUB233#;RE
TURN
424# '
425# ' DIRECTORY
426# '
427# TR=17;SE=3;GOTO 423#
428# '
429# ' ERROR
430# '
431# OP=2;GOSUB233#;GOSUB166#
432# AS=INKEYS:IFAS="" THEN438#
433# IFST<># THEN438#
434# SE=SE+1;IFSE<19 THEN431#
435# SE=1
436# TR=TR+1;IFTR<NT THEN431#
437# TR=#
438# OP=2;GOSUB233#;RETURN
439# '
440# ' ERASE BUFFER
441# '
442# Z=PO
443# PRINT#32#,"CHARACTER TO USE
?";LN=3;PO=1#24+338;GOSUB157#
444# IFAN<#ORAN>255 THEN443#
445# FORX=#TO255
446# POKE X+1#24+64,AN
447# NEXT
448# OP=2;GOSUB233#;RETURN
449# '
450# ' LOCK TRACK
451# '
452# T4=TR;S4=SE
453# GOSUB 429#
454# IFST=# THEN 468#
455# IFTR<17 THEN 458#
456# IF SE>LANDSE<12 THEN468#
457# GOTO 453#
458# T3=TR;S3=SE;TR=17;SE=2
459# OP=2;GOSUB166#
460# GR=T3*2+INT((S3-1)/9)
461# GR=GR+1#24+64
462# IF T3>17 THEN GR=GR-2
463# POKEGR,6#;OP=3;GOSUB166#
464# TR=T3;SE=S3;SE=SE+1
465# IF SE<19 THEN453#
466# SE=1;TR=TR+1
467# IF TR<NT THEN453#
468# OP=2;TR=T4;SE=S4;GOSUB233#;
RETURN
469# '
470# ' FREE SPACE
471# '
472# PRINT#34#,"FREE(DR)
473# RETURN
474# '
475# ' EXPLANATIONS
476# '
477# GOSUB 38#
478# CLS6;PRINT#32," PRESSING <E
NTER> IN THE EDITOR MODE RETURN
S TO THE COMMAND MODE. #;PRIN
T#PRINT#-THE EXAMINE GRAPHICS PR
OGRAM ALLOWS YOU TO LOOK AT A
GIVEN SECTOR IN ANY GRAPHIC M
ODE. #;PRINT
479# AS=INKEYS:IFAS="" THEN479#
480# RUN 106#
481# '
482# ' SEARCH
483# '
484# Z=PO
485# PRINT#32#,"HOW MANY CHARACT
ERS? #
486# PO=1#24+341;LN=3;GOSUB157#
487# IF AN<# ORAN>255 THEN485#
488# FORX=#TOAN-1
489# A=PEEK(1#24+64+X)
490# POKE 3#9#9#9#X,A
491# NEXT
492# A=VARPTR(AS)
493# POKE A,AN
494# POKE A+2,6#75
495# POKE A+3,6#3#
496# T1=TR;S1=SE;OP=2
497# GOSUB233#;GOSUB166#
498# GOSUB5#3#;IF INSTR(1,BS,AS)
<# THEN T1=TR;S1=SE;GOTO513#
499# GOSUB5#8#;IF INSTR(1,BS,AS)
<# THEN T1=TR;S1=SE;GOTO 513#
500# SE=SE+1;IF SE<19 THEN 497#
501# SE=1;TR=TR+1;IFTR<NT THEN 4
97#
502# GOTO 513#
503# A=VARPTR(BS)
504# POKE A,255
505# POKE A+2,6#4#
506# POKE A+3,6#4#
507# RETURN
508# A=VARPTR(BS)
509# POKE A,255
510# POKE A+2,6#4#
511# POKE A+3,6#4#
512# RETURN
513# TR=T1;SE=S1;OP=2;GOTO379#
514# '
515# ' QUIT
516# '
517# CLS;END
518# ' SCREEN PRINT ROUTINE
519# IPPEEK(65314)/2=INT(PEEK(65
314)/2) THEN52# ELSE#PRINT#33#,"PR
INTER NOT ON!";FORK=1#TO1#9#;NEXT
:PRINT#33#,STRINGS(2#,32);GOTO51
9#
520# POKE15#,1;PRINT#33#,"";LIN
EINPUT#DISK NAME. #;NS:PRINT#-2,T
AB(14);DISK IDENTIFICATION. #;N
S:PRINT#-2;PRINT#33#,STRINGS(2#,
32);:PRINT#33#,"PRINTING"
521# FORX=#TO15:FORY=#TO31;C=PEE
K((X*32)+Y)+1#24);IFC=96 ANDC<
=127 THENC=C-64 ELSEIFC=# ANDC<
=31 THENC=C+96 ELSEIFC=255 THENC=
32
522# PRINT#-2,CHR(C); " ";NEXTY
:PRINT#-2;NEXTX:PRINT#-2;PRINT#-
2;RETURN
523# ' SAVING DIRECTORY TO LAST
GRANULE
524# PRINT#33#,"SAVING DIRECTORY
";FORS=2#TO1#;DSKIS DR,17,S,DS(S
),ES(S);NEXT
525# FS=MIDS(DS(2),LG,1);IFNOT((
FS=CHR$(255))OR(FS=CHR$(2#8)))TH
ENPRINT#33#,"LAST GRANULE USED. #
";PORK=1#TO1#9#;NEXT:GOTO532#
526# FORS=2#TO1#;IFS=2# THENMIDS(D$
(S),LG,1)=CHR$(2#8);DSKOS DR,17,
S,DS(S),ES(S)
527# DSKOS DR,NT-1,S+8,DS(S),ES(
S);NEXTS:PRINT#33#,"DIRECTORY SA
VED";PORK=1#TO1#9#;NEXT:GOTO532#
528# ' RECOVERING DIRECTORY FROM
LAST GRANULE
529# PRINT#33#,"RECOVERING DIR";
DSKIS DR,17,2,DS,ES:IFMIDS(D$,LG
,1)<CHR$(2#8) THENPRINT#33#,"NO
DIR SAVED!";PORK=1#TO1#9#;NEXT:GO
TO532#
530# FORS=2#TO1#;DSKIS DR,NT-1,S+
8,DS(S),ES(S);NEXT
531# FORS=2#TO1#;DSKOS DR,17,S,DS
(S),ES(S);NEXT:PRINT#33#,"DIR RE
COVERED!";PORK=1#TO1#9#;NEXT
532# PRINT#33#,STRINGS(2#,32);RE
TURN
533# DATA 2#,2#,2#,2#,2#,2#,2#,2
#
534# DATA 2#,2#,2#,2#,2#,2#,2#,2
#
535# DATA 2#,2#,2#,2#,2#,2#,2#,2
#
536# DATA 2#,2#,2#,2#,2#,2#,2#,2
#
537# DATA 2#,2#,2#,2#,2#,2#,2#,2
#
538# DATA 2#,2#,2#,2#,2#,2#,2#,2
#
539# DATA 2#,2#,2#,2#,2#,2#,2#,2
#
540# DATA 2#,2#,2#,2#,2#,2#,2#,2
#
541# DATA FF,FF,FF,FF,FF,FF,2#,F
#
542# DATA FF,2#,FF,FF,2#,FF,FF,F
#
543# DATA FF,2#,2#,2#,2#,2#,2#,2
#
544# DATA 2#,2#,2#,2#,2#,2#,2#,2
#
545# DATA 2#,2#,FF,FF,2#,2#,2#,F
#
546# DATA FF,2#,FF,FF,2#,FF,FF,2
#
547# DATA 2#,2#,2#,2#,2#,2#,2#,2
#
548# DATA 2#,2#,2#,2#,2#,2#,2#,2
#
549# DATA 2#,2#,FF,FF,2#,2#,2#,F
#
550# DATA FF,FF,FF,FF,2#,FF,FF,F
#
551# DATA FF,2#,2#,2#,2#,2#,2#,2
#
552# DATA 2#,2#,2#,2#,2#,2#,2#,2
#
553# DATA 2#,2#,FF,FF,2#,2#,2#,F
#
554# DATA FF,2#,FF,FF,2#,FF,FF,2
#
555# DATA 2#,2#,2#,2#,2#,2#,2#,2
#
556# DATA 2#,2#,2#,2#,2#,2#,2#,2
#
557# DATA 2#,2#,FF,FF,2#,2#,2#,F
#
558# DATA FF,2#,FF,FF,2#,FF,FF,F
#
559# DATA FF,2#,2#,FF,FF,2#,FF,F
#
560# DATA 2#,FF,FF,2#,2#,2#,2#,2
#
561# DATA 2#,2#,2#,2#,2#,2#,14,#
8
562# DATA #5,2#,#4,#9,13,#B,2#,#
D
563# DATA #5,#4,#5,#3,#9,#E,#5,2
#
564# DATA 2#,2#,2#,2#,2#,2#,2#,2
#
565# DATA 2#,2#,2#,2#,2#,2#,2#,2
#
566# DATA 2#,2#,2#,2#,2#,2#,2#,2
#
567# DATA 19,2#,2#,2#,2#,2#,2#,2
#
568# DATA 2#,2#,2#,2#,2#,2#,2#,2
#

```

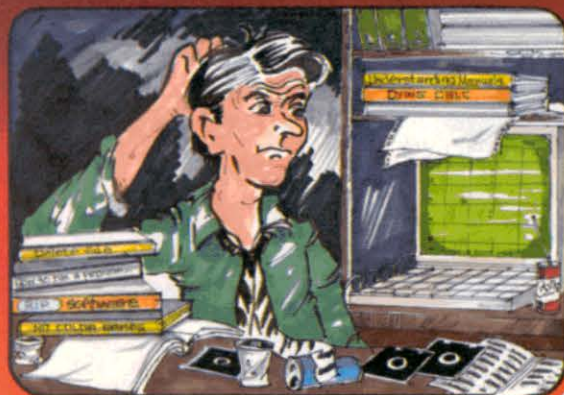
Listing continued

Special Introductory Price

introducing...

PenPal

The Intelligent Choice...



69⁹⁵*

(89.95 CDN)

ADMIT IT! Your computer always had the power, but never the software. Now...Four Star Software presents a product unlike any other. PenPal! This is a package intelligent enough to help you reach new heights of personal productivity. Designed to be learned in less than a day, the entire program is quick and easy, powerful but elegant. A pleasure to use!

Penpal provides you with a package that combines the five most wanted computer applications into one incredibly easy-to-use integrated environment. This sets a new standard of excellence in applications software: What would you pay for a program that does it all, but does it easily?

We invite you to compare PENPAL'S list of outstanding features with any other software currently on the market for any computer! Packages like this cost hundreds more on other machines. PENPAL brings the power of a PC to your CoCo at an Unbelievable and Unbeatable price! We guarantee it...if you are not completely satisfied, return it within 30 days for a prompt refund.

For a limited time, take advantage of our low introductory price. You won't be disappointed you did!

Order your personal copy of PENPAL today to finally realize the full potential of your Color Computer. Available directly from Four Star Software or enquire at your local Computer dealer.

- Twelve function Keys and a continuously displayed reminder line make this program easy to use. No complicated key combinations or commands to remember!
- On-line help function
- Hi-res 51 x 24 display screen
- Common formats and commands in all five modules make this package easy to learn and user friendly.
- Fast and effective 255 by 255 spreadsheet is very versatile. Flexible text editor includes all common features found on others plus centering, justification, and pagination. Efficient database includes advanced indexed sorting capability and much, much more!
- Create full color, presentation quality graphs with variable size labels directly from your spreadsheet in pie, line, dot or bar formats using the Graph-it function. Incredible!
- Upload and download files; access networks, or communicate with other users with built-in Telecom feature. This is not just a simple dumb terminal package!
- Modules interface with each other to form a truly integrated package unlike any you have ever experienced. These are not just separate programs that are selectable from central menu like others offer!
- Comes in an attractive binder set, with reference and tutorial manuals. Requires 64K and minimum of one disk drive.

Order Hotline
416-858-STAR



Four Star Software

P.O. Box 730
Streetsville, Ontario
Canada L5M 2L2

Dealer enquiries welcome
write or call for our
free Catalogue. Add \$2.00
for shipping and handling
overseas order Add \$5.00

More Power
CHILD FILER and CHILD CALC are our elementary database and spreadsheet programs. LIST MANAGER and SIMPLE CALC are designed for the home user. BUSINESS MANAGER and BUSINESS CALC are for professionals.

All of these programs, no matter what level of sophistication, are completely compatible with the other CHILD'S PLAY applications on the same level. And, data can be shared between applications by using our unique NOTE PAD feature.

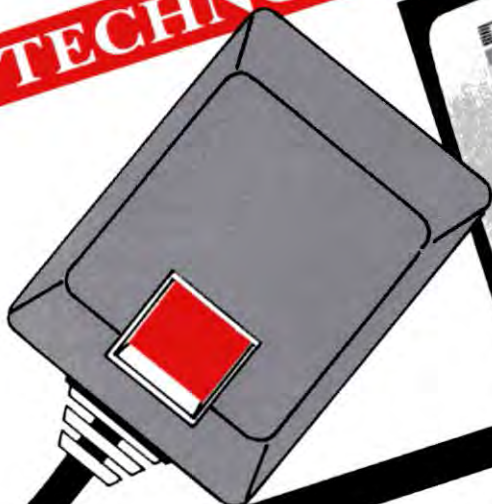
NOW AVAILABLE FOR THE MODEL 4

Available through express order at Radio Shack®.

The CHILD'S PLAY Software Series is available for the Tandy 1000.*

* Tandy 1000 is a registered trademark of Tandy Corp.

TECHNOLOGY



NOTE PAD. DATA TRANSFER FEATURE.

NOTE PAD is the program vehicle we use to transfer data when you jump from one application to another, as well as move, cut, and paste text within your word processing program. Information from your database program is stored in NOTE PAD and made available for sharing with the other CHILD'S PLAY programs. It is a breeze to use and it sure beats retyping lots of data from one application program to another.

We have designed this software series for everyone. It doesn't matter if you are using a computer for the first time, or if you are a seasoned hacker, the CHILD'S PLAY application software series is for you. Write or call for more detailed information about the CHILD'S PLAY software series. Ask for the free TCE catalog with over 75 additional Educational Software titles. Ask about your 80 MICRO discount too.

Educational Level for the Radio Shack® Color Computer

CHILD WRITER 32/64K disk \$54.95
(network version 32/64K) \$99.95

CHILD FILER 32/64K disk \$54.95
(network version 32/64K) \$99.95

CHILD CALC 32/64K disk \$54.95
(network version 32/64K) \$99.95
Elementary Level Series TBA

MEMO WRITER 64K disk \$64.95
(network version 64K) \$129.95
LIST MANAGER 64K disk \$64.95
SIMPLE CALC 64K disk \$64.95
Home Use Level Series TBA

BUSINESS WRITER \$99.95
64K disk
BUSINESS MANAGER \$99.95
64K disk
BUSINESS CALC 64K disk \$99.95
Business Level Series TBA

PROOFREADER \$34.95
(20,000 words) 32/64K
MASTER PROOFREADER \$54.95
(50,000 words) 64K

75 ADDITIONAL EDUCATIONAL SOFTWARE TITLES AVAILABLE



Circle 520 on Reader Service card

Call us!

800/4TC-4TCE

Listing continued

```

569# DATA 2# ,2# ,#C,15 ,#3,2# ,#A ,#
1
570# DATA #3 ,#F ,#2,2# ,#1 ,#E ,#4,2
#
571# DATA #1 ,#C ,#1 ,#9 ,#E ,2# ,#4,1
5
572# DATA 13 ,13 ,#1,15 ,#C,14 ,2# ,2
#
573# DATA 2# ,2# ,2# ,2# ,2# ,2# ,2
#
574# DATA 2# ,2# ,2# ,2# ,#F ,#F ,#F ,#F
#
575# DATA #F ,#2,2# ,#1 ,#F ,#F ,#F ,#F
#
576# DATA #2 ,2# ,#1 ,#F ,#F ,#F ,#F ,#F
2
577# DATA 2# ,2# ,2# ,2# ,2# ,2# ,2# ,2
#
578# DATA 2# ,2# ,2# ,2# ,#F ,#F ,#F ,#F
4
579# DATA #F ,#F ,#2,2# ,#F ,#F ,#F ,#F ,#F
#
F
580# DATA #F ,#2# ,#F ,#F ,#F ,#F ,#F ,#F ,#F
F
581# DATA 2# ,2# ,2# ,2# ,2# ,2# ,2# ,2
#
582# DATA 2# ,2# ,2# ,2# ,#F ,#F ,#F ,#F ,#F
#
583# DATA #F ,#F ,#2# ,#F ,#F ,#F ,#F ,#F
F
584# DATA #F ,#2# ,#F ,#F ,#F ,#F ,#F ,#F ,#F
#
585# DATA 2# ,2# ,2# ,2# ,2# ,2# ,2# ,2
#
586# DATA 2# ,2# ,2# ,2# ,#F ,#F ,#F ,#F ,#F
1
587# DATA #F ,#F ,#2# ,#F ,#F ,#F ,#F ,#F ,#F
F
588# DATA #F ,#2# ,#F ,#F ,#F ,#F ,#F ,#F ,#F
F
589# DATA 2# ,2# ,#F ,#F ,#F ,#F ,#F ,#F ,#F
#
590# DATA #F ,#F ,#2# ,2# ,#F ,#F ,#F ,#F ,#F
#
F
591# DATA #F ,#F ,#2# ,#F ,#F ,#F ,#F ,#F ,#F
F
592# DATA #F ,#2# ,#F ,#F ,#F ,#F ,#F ,#F ,#F
#
593# DATA 2# ,2# ,2# ,2# ,2# ,2# ,2# ,2# ,2
#
594# DATA 2# ,2# ,2# ,2# ,2# ,2# ,2# ,2# ,2
#
595# DATA 2# ,2# ,2# ,2# ,2# ,2# ,2# ,2# ,2
#
596# DATA 2# ,2# ,2# ,2# ,2# ,2# ,2# ,2# ,2
#
End

```

Program Listing 2. Printout.

```

500# 'SCREEN PRINT FOR LPVII OR
DMP-1# PRINTER
501# POKE 15# ,#7 'PROVISION TO C
HANGE BAUD RATE

```

```

502# FOR X=# TO 15 'EACH ROW
503# FOR Y=# TO 31 'EACH COLUMN
504# C=PEEK(((X*32)+Y)+1#24) 'GE
T CHARACTER
505# IF C>#96 AND C<=#127 THEN C=C-
#64 'UPPERCASE
506# IF C>=# AND C<=#31 THEN C=C+
#96 'LOWERCASE
507# IF C>#127 THEN 509# 'GRAPHIC
CHARACTER
508# PRINT # -2,CHR$(C);" "; 'PRI
NT TEXT CHARACTER
509# PRINT # -2,CHR$(18)CHR$(128)
CHR$(C)CHR$(C)CHR$(C)CHR$(C)CHR$(
C)CHR$(3#);" "; 'PRINT GRAPHIC
CHARACTER
510# NEXT X 'NEXT CHARACTER IN R
OW
511# PRINT # -2 'LINE FEED
512# NEXT Y 'NEXT ROW

```

End

Point Fixing

by Edward A. Kimble

High school students have been known to refer to graphing equations as "plodding" points. It's no wonder—figuring enough plotting points to draw a solid graph can require hundreds of time-consuming calculations, and simple jobs like drawing a line between data points can bog you down. Plotter does all this busywork for you. You type in an equation. Plotter does the calculations and then plots the results on a graph (see the Program Listing). Plotter also gives you a variety of options for formatting and printing out your graphs—you can specify color, resolution, size, and position; add grid and tick marks; plot discrete data points; and enter equations as the program runs.

Menu at Work

Carefully type in the program as it appears in the Listing, save it to disk, and type in RUN. An asterisk should appear on-screen as Plotter erases lines 70 and 90 and rewrites the letter "T" on each of these lines. This initializes the system and clears out any equation already stored there.

After a few seconds, Plotter's main menu appears (see the Table). At this point, you can type in an equation and have Plotter calculate and graph data points.

For example, plotting $Y = X$ is literally as easy as ABC—you type in ABC and

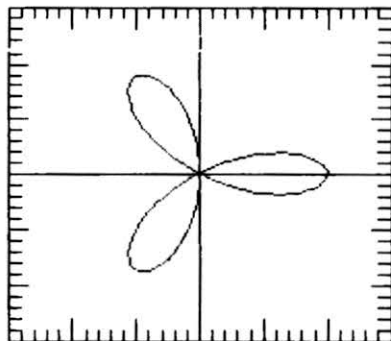


Figure. Sample plot of a polar equation.

press the enter key. Plotter clears the screen (function A); plots a grid, a cross-hair, and tick marks (B); and plots the equation (C). A dash in the screen's lower left-hand corner tells you plotting is in progress. Press any key to return to the main menu.

To plot a function in the form $Y = f(X)$, type in EABC and press the enter key. When prompted for your equation, type it in, substituting the variable T wherever you would normally use X. For

example, you'd enter the equation $Y = 3 * X + \text{SIN}(X)$ as $Y = 3 * T + \text{SIN}(T)$. Using T as the equation variable throughout the program simplifies tokenization and lets you enter parametric equations if you choose. Asterisks should appear on-screen as Plotter tokenizes the equation and stores it in line 90.

Connecting the Dots

To plot data points, type in N from the main menu. You choose from three plot symbols: a point, an "X," or an "O." Next, a prompt asks whether you want the points connected by a line. If you do, press the 1 key; Plotter asks for the points' X and Y coordinates and plots them on the screen, connecting each point with a straight line. Typing in the coordinate pair 99.99 returns you to the main menu.

If you make a fatal mistake when entering data, you can usually recover by typing in GOTO 600. This preserves your equations and most of your option choices, and returns you to the main menu after a Break or FC error.

To change the size of the plot, press J from the main menu. The coordinates for this option are the same as those for the Line or PSET commands: zero to 255 on the X axis and zero to 191 on the Y axis.

If you have the Radio Shack screen dump program as modified for 32K ma-

System Requirements

32K RAM
Extended Color Basic
Printer optional

Now! 500 new programs for the Tandy 1000!

For Your TRS-80 Color Computer

Apple—Atari—Commodore—TRS 80 I, III, 4 & Color—IBM PCJR—Tandy 1000

New Educational Programs for Grades K-12 and Adult Self-Studies

32 Programs Now Available on Disk for TRS Color Computers



Interactive Tutorial Programs for Home or Classroom Use

Over 1000 programs for your selection with 32 now available on disk for the Color Computer and 500 now available for the Tandy 1000.

"We're Your Educational Software Source"

Subject	No. of Programs
Reading Development	256 (4 on disk)
Reading Comprehension	48 (4 on disk)
Mathematics	128
Algebra	16 (16 on disk)
History	32 (4 on disk)
Spelling	16
Government	16
Physics	16 (4 on disk)

16 Programs in each of the following:

Children's Tales - Carpentry - Electronics
Health Services - Office Skills - Statistics
First Aid/Safety - Economics - Business
Accounting - Psychology - MUCH MORE!

Apple II, TRS 80 I, III, & 4, and Commodore 64 computers require respective conversion kits (plug-in board and stereo cassette player), **\$99.00**. Atari 400/600/800/1200 computers require the Atari cassette recorder and the Dorsett 4001 Educational Master Cartridge, **\$9.95**. For the IBM PC Jr. a cassette adapter cable and a good cassette recorder are required. A Radio Shack CCR-81 or CCR-82 is recommended.

CASSETTES: \$59.90 for an album containing a 16-program course (8 cassettes with 2 programs each); **\$8.80** for a 2-program cassette.

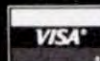
DISKS: \$14.95 for a one-program disk; **\$28.95** for two disks; **\$48.95** for four disks. All disks come in a vinyl album.

Dorsett Educational Software features:

- Interactive Learning
- User Friendly
- Multiple Choice and Typed
- Program Advance with Correct Response
- Full-time audio narration (Cassette Programs Only)
- Self-Paced Study
- High Resolution Graphics
- Easy Reading Text

For more information, or to order call:

TOLL FREE 1-800-654-3871
IN OKLAHOMA CALL (405) 288-2301



DORSETT
Educational Systems, Inc.
Box 1226, Norman, OK 73070

Send for our free catalog of over 1000 Dorsett educational programs for Atari, TRS 80, Apple, IBM PC Jr., Commodore, Tandy 1000, etc.

Dealer Inquiries Welcome

chines, option K will print your graph on a dot-matrix printer. You can use any other screen dump routine as long as you modify lines 130 and 910 in the Listing. However, your routine must reside in the upper 16K of memory and can't conflict with array variable storage. Install a screen print program compatible with line 130, then remove the REM statement from line 910 to activate this option.

The L option provides a printout of your data. To display your data on-screen, press the M and enter keys. In addition to the equations, Plotter displays the limits of the graph for the X and Y axes. It also shows the range of values that the variable T will have during plotting. Since $X = T$ and $Y = T$, it follows that Y must equal X.

Axis Powers

Pressing the enter key alone or choosing option F on the main menu brings up the axis menu. The A option in the axis menu lets you change the distance between grid or tick marks; when you do so, you must specify an origin within the range of plotted X and Y values. This origin specifies the default position of a plotted axis or crosshair and also represents the starting point for the grid and tick marks, with ticks at even intervals on either side of this position.

If you choose the axis (G) or crosshair (I) option from the axis menu, Plotter prompts you for offsets from this origin. You can use these options to place the

- A Erase.
- B Plot axis and tick marks.
- C Plot graph from equation.
- D Change equation options.
- E Enter new equation.
- F Enter axis data.
- G Change scale.
- H Change T limits.
- I Change number of iterations.
- J Change screen window.
- K Send plot to printer.
- L List data to printer.
- M List data to screen.
- N Plot data on graph.

Table. Main menu.

axis or crosshair over a particular feature of the plot. Pressing the enter key twice resets the offset to the original default value of zero.

The axis menu's M option lets you accent tick marks. Specifying a value of 5 for the X and Y axes accents every fifth tick mark.

You can change the plot's color and resolution using the Z option. Pressing only the enter key leaves the present values unchanged.

Vector and Polar Equations

Since you can specify equations for X and Y independently, you can plot vector or parametric equations such as $SIN(T)*I + COS(T)*J$ or $X = SIN(T), Y = COS(T)$. For example, type in GDE from the main menu. Set the point range from -1.5 to 1.5 for both the X and Y axes, leave the origin at 0,0, and change T's range from zero to 6.29.

Next, choose the parametric equation option (option 3) and enter the equations $X = SIN(T), Y = COS(T)$. If you type in ABC to initiate the plot, the computer should plot a circle on the screen. The variable T now becomes the angle of the sweep. If you set T's range from zero to 3.1415, the computer describes only half a circle. Remember that the computer interprets angles in radians, not in degrees.

You can also enter polar equations. If you type in DE from the main menu and then choose equation option 4, the computer prompts you for an equation for radius in terms of angle. Wherever you'd use an A in this equation, type in T, as before. Plotting the equation $R = COS(3*A)$ produces the cloverleaf graph shown in the Figure. If you want to adjust the axis and grid at this point, press the enter key and adjust the tick spacing. Now press the enter key again and you're ready to replot your equation. ■

You can write to Edward A. Kimble at Box 10179, Fort Wayne, IN 46850.

Program Listing. Plotter.

```

10 CLS(0)
20 PRINT*****
30 PRINT***EQUATION PLOTTING PR
  OGRAM***
40 PRINT*****
50 GOTOL1
60 V=PEEK(47)*256+PEEK(48)+37:RE
  TURN
70 X=+T*****
  *****
  *****+1-1
  :RETURN
80 V=PEEK(47)*256+PEEK(48)+37:RE
  TURN
90 Y=+T*****
  *****
  *****+1-1
  :RETURN
100 REM*****
  *SET UP INFORMATION*****
  *****
110 SL=5:SR=245:ST=5:SB=180:RR=1
  :M=1:DIM RS(32),Q(32):XS="T":YS=
  "T":X2=10:X1=-10:Y2=10:Y1=-10:E=
  150:T1=-10:T2=10:E=151:NTS="ABCD
  EFGHIJKLMNOPRSZ":BA=1:GD=1:XI=1:YI
  =1:CH=1:BT=1
120 XM=5:X3=1:Y3=1:YM=5:V6=1:BV=
  1:DD=1:V7=1:V8=0:V9=1:V10=4:PMOD
  EV10=1:W8=1
130 DEFUSR0=J1913
140 FORA=1 TO 32:READ RS(A):NEXT
  :FORA=1 TO 32:READ Q(A):NEXT
150 DATA " ",0,1,2,3,4,5,6,7,8,9
  ,+,-,*,/,(),,.,,T,SQR,EXP,ATN,L
  OG,TAN,SIN,COS,ABS,INT,SGN,RND,P
  IX
160 DATA 32,48,49,50,51,52,53,54
  ,55,56,57,171,172,173,174,40,41,
  175,46,84,155,151,148,153,150,13
  3,149,130,129,128,132,152
170 REM*****
  *EQUATION ENTRY*****
  *****
180 XS="":GOSUB200:YS="":GOSUB20
  0:GOTO600
190 LINE INPUT"ENTER EQUATION FO
  R X AS X=P(T) (DEFAULT: X=T)
  X=":XS
200 GOSUB600:GOSUB260:AS=XS:IF AS
  =" THENAS="T":YS="T"
210 GOSUB270:RETURN
220 LINE INPUT"ENTER EQUATION FOR
  Y AS Y=P(T) (DEFAULT: Y=T) Y
  =" :YS
230 GOSUB800:GOSUB260:AS=YS:IF AS
  =" THENAS="T":YS="T"
240 GOSUB270:RETURN
250 REM*****
  *TOKENIZING ROUTINE*****
  *****
260 FOR R=V TO V+80:POKE R,171:N
  EXT:POKEV,84:RETURN
270 RR=1:M=1:Q=1:POKEV,171
280 T=0:FORA=1TO32:IF RS(A)=MIDS
  (AS,M,RR) THEN T=A
290 NEXT:IF T=0 AND RR=3 THEN PLA
  Y=B:G:G":RETURN
300 IF T=0 AND RR=1 THEN RR=3:GO
  TO280
310 IF T=20 AND MIDS(AS,M,3)="TA
  N" THEN T=25:RR=3
320 IRR=1 THEN M=M+1
330 PRINT**
340 IRR=3 THEN M=M+3:RR=1
350 IF T<21 THEN POKEV+Q,Q(T) EL
  SE POKEV+Q,255:Q=Q+1:POKEV+Q,Q(T
  )
360 Q=Q+1
370 IF M>LEN(AS) THEN PRINT:RETU
  RN ELSE 200
380 REM*****
  *EQUATION PLOT ROUTINE*****
  *****
390 SCREEN1,V11
400 COLOR V7,V8
410 LINE(5,190)-(10,190),PSET
420 FOR U=T1 TO T2 STEP (T2-T1)/
  E
430 T=U:GOSUB 90:GOSUB70
440 IF W8>3 THEN W3=Y*COS(X):W4=
  Y*SIN(X):X=W3:Y=W4
450 X=(X-X1)/(X2-X1)*(SR-SL)+SL
460 IPX>SR THEN X=SR:DA=1
470 IPX<SL THEN X=SL:DA=1
480 Y=(Y-Y1)/(Y2-Y1)*(ST-SB)+SB
490 IF Y>SB THEN Y=SB:DA=1
500 IF Y<ST THEN Y=ST:DA=1
510 IF DA=1 THEN 540
520 IF U=T1 OR DB>.5 THEN LINE(X
  ,Y)-(X,Y,001),PSET
530 IF JE=1 THENPSET(X,Y,1) ELSE
  LINE(X,Y),PSET
540 DB=DA:DA=0
550 NEXT
560 LINE(5,190)-(10,190),PSET
570 IF INKEYS="" THEN 570
580 RETURN
590 REM*****
  *MAIN MENU*****
  *****
600 CLS(0):PRINT"MAIN MENU"
610 PRINT"A-ERASE"
620 PRINT"B-PLOT AXIS AND TIC MA
  RKS"
630 PRINT"C-PLOT GRAPH FROM EQUA
  TION"
640 PRINT"D-CHANGE EQUATION OPTI
  ONS"
650 PRINT"E-ENTER NEW EQUATION(I
  )"
660 PRINT"F-ENTER AXIS DATA"
670 PRINT"G-CHANGE SCALE"
680 PRINT"H-CHANGE T LIMITS"
690 PRINT"I-CHANGE NUMBER OF ITE
  RATIONS"
700 PRINT"J-CHANGE SCREEN WINDOW
  "
710 PRINT"K-SEND PLOT TO PRINTER
  "
720 PRINT"L-LIST DATA TO PRINTER
  "
730 PRINT"M-LIST DATA TO SCREEN"
  :PRINT"N-PLOT DATA ON GRAPH"
740 INPUTZS:IPZS="" THEN ZS="P"
750 FOR O=1 TO LEN(ZS)
760 MS=MIDS(ZS,O,1):KB=INSTR(1,N
  TS,MS)
770 ON KB GOSUB 790,1380,390,174
  0,1750,980,860,900,800,810,910,9
  20,820,1610
780 NEXT:GOTO600
790 PCLSV8:RETURN
800 INPUT"#:":E:RETURN
810 INPUT"LEPT,RIGHT,TOP,BOTTOM"
  :SL,SR,ST,SB:RETURN
820 CLS:IFW8>3 THENPRINT"A=":XS:
  PRINT"R=":YS ELSEPRINT"X=":XS:PR
  INT"Y=":YS
830 PRINT"INC.":(T2-T1)/E:PRIN
  T"XMIN":X1,"XMAX":X2:PRINT"YMIN"
  :Y1,"YMAX":Y2:PRINT"TMIN":T1,"TM
  AX":T2:PRINT"WINDOW-X FROM":SL:"
  TO":SR:PRINT" Y FROM":ST:"
  TO":SB
840 PRINT"X-TIC=":X3:"Y-TIC=":Y
  3:PRINT"# ITERATIONS=":E:PRINT"O
  RIGIN-X=":IX:" Y=":IY
850 IF INKEYS="" THEN850 ELSE RETU
  RN

```

Listing continued

The Ultimate Color Computer

Enhancements
for Productivity
from HJL Products



To achieve maximum productivity with your Color Computer, you have to make it as easy as possible to get information into and out of the system.

This is why we developed the HJL family of high-performance enhancements for ALL MODELS of the Color Computer.

The Keyboard - \$79.95

The overwhelming favorite of serious Color Computer users worldwide, the HJL-57 keyboard has the smooth, consistent feel and reliability you need for maximum speed with minimum input errors. Includes 4 Function Keys and sample function key program. Installs in just a few minutes with no soldering.

The Numeric Keypad - \$89.95

The NumberJack is a self-contained, cable-connected keypad for heavy-duty number-crunchers. Besides the number keys, it has all the cursors, symbols and math keys, including autoshifted (one-touch) ADD and MULTIPLY. Comes complete with 3-foot cable and all necessary connectors for quick and easy installation without soldering.

The Monitor Adapter - \$25.95

This universal driver works with all monochrome monitors, and is easily installed without clips, jumpers or soldering (except in some later CoCo 2s with soldered-in video chips). Here's crisp, clear, flicker-free monitor output with all the reliability you've come to expect from HJL Products.

The Monitor - \$89.95

The GoldStar high-resolution amber monitor brings you the monochrome display that's preferred by most computer professionals today. Once you've used it you'll never connect your computer to a TV set again. The 12-inch diagonal CRT has an etched non-glare faceplate. (Requires adapter sold below)

The BASIC Utility - \$25.95

Quick Basic Plus, a high-performance programming utility, can be used with any color computer that has four function keys. 26 pre-defined BASIC statements, 10 user-defined macros at a time (you can save as many sets of macros as you like), automatic line-numbering, word wrap, global search,

and instant screen dump to printer, make this software the BASIC programmer's dream come true. Comes with re-legendable 3-way reference chart. Specify disk or cassette.

The HJL Warranty

Every HJL product comes with a full, one-year warranty and the exclusive HJL 15-day unconditional guarantee (except software).

Pick a Pair & Save 15%

Now, for a limited time, we'll give you 15% off the price of any two or more products shown here. Just mention this ad when you order.

Call Now, Toll Free

1-800-828-6968

In New York 1-800-462-4891
International calls: 716-235-8358



PRODUCTS

Div. of Touchstone Technology Inc.

955 Buffalo Road • P.O. Box 24954
Rochester, New York 14624

Circle 491 on Reader Service card.

Ordering Information: Specify model (Original, F-version, or CoCo 2 Model Number). Payment by C.O.D., check, MasterCard, or Visa. Credit card customers include complete card number and expiration date. Add \$2.00 for shipping, 3.50 to Canada; except monitors (call for shipping charges before ordering monitors). New York state residents add 7% sales tax. **Dealer Inquiries Invited**

J&M's New JFD-CP Disk Controller Speaks for Itself!

Circle 101 on Reader Service card.

My 28-Pin EPROM socket accepts 64K device or NEW 128K JDOS 1.2.

RS DOS plugs right into this 24-pin EPROM socket. (RS DOS not included)

This new WD1773 controller chip has built-in data separator & precompensation circuits.

My gold contacts ensure high reliability.

Because they are fully buffered, my I/O lines are more dependable.

You can use this 8-bit parallel port to support a Centronics compatible parallel printer or a Winchester hard drive.

Select ROM A or ROM B with this external switch—no need to unplug controller!

JUMPERS: J1 IN—6ms head step rate; OUT—30 ms head step rate
 J2 IN—serial printer; OUT—parallel printer
 Jumper defaults apply only to JDOS.

New JFD-CP DISK CONTROLLER \$149

Our new JFD-CP has redefined the state-of-the-art for Color Computer users. Gold contacts and fully buffered I/O lines ensure maximum reliability, and the JFD-CP is plug compatible with both the original COCO and the COCO-2.

New JDOS 1.2

JDOS implements all RS DOS commands, plus many more, including:

- auto line numbering
- error trapping
- baud rate selection
- OS/9* boot from floppy or hard drive
- Memory Minder†—the most advanced disk drive analysis system on the market (Dysan diagnostic diskette not included)

DRIVE 0 SYSTEM \$289

Upgrade your Color Computer by adding our new JFD-CP disk controller, supercharged JDOS operating system, and a top quality drive with case and power supply: All for only \$289! Comes complete with cable and manual.

- Drive 0 System with one single side drive \$289
- Drive 0 System with one double side drive . . . \$359
- Drive 0,1 System with two single side drives . . \$429
- Drive 0,1 System with two double side drives . . \$499

MEMORY MINDER†

Memory Minder is a disk drive test program now included in JDOS. Used with a Dysan digital diagnostic disk, Memory Minder allows you to check your drives for speed, alignment, sensitivity, hysteresis, and more! You can actually align the drives while viewing the graphics on the screen. No special equipment needed!

DIAGNOSTIC DISKETTES

- 508-200: Tests single side disk drives \$26
- 508-400: Tests double side disk drives \$33

Memory Minder is available on diskette for those who don't own a JFD-CP Controller with JDOS. Includes Dysan diagnostic diskette.

- Single Side Memory Minder Package \$79
- Double Side Memory Minder Package \$99

*OS/9 is a registered trademark of Microware, Inc.

†Memory Minder is a registered trademark of J&M Systems, Inc.

To order, call (505) 292-4182, or send payment with order to:



J&M SYSTEMS, LTD.
 15100-A CENTRAL SE
 ALBUQUERQUE, NEW MEXICO 87123
 505/292-4182

We accept MasterCard and Visa

Listing continued

```

RN
86# INPUT*X-MIN AND X-MAX*;X1,X2
87# INPUT*Y-MIN AND Y-MAX*;Y1,Y2
:GOSUB135#;PRINT*NEW LIMITS FOR
T(Y/N)?
88# SES=INKEYS;IF SES="Y" THEN G
OSUB 99#ELSE IF SES=" " THEN 88#
89# RETURN
90# INPUT*T-MIN AND T-MAX*;T1,T2
:RETURN
91# REM NY=USR(#):RETURN
915 RETURN
92# PRINT#-2," ":IF N#>3 THEN PR
INT#-2,"R=";YS,"A=";XS ELSEPRINT
#-2,"X=";XS,"Y=";YS
93# PRINT#-2,"T-INCREMENT ";(T2-
T1)/E,"NUMBER OF ITERATIONS=";E;
PRINT#-2,"X-MINIMUM=";X1,"X-MAXI
MUM=";X2;
94# PRINT#-2,"*(ORIGIN=";IX,"*";
IY,"*)(X-TIC";X3,"Y-TIC";Y3,")
95# PRINT#-2,"Y-MINIMUM=";Y1,"Y-
MAXIMUM=";Y2;PRINT#-2,"T-MINIMUM
=";T1,"T-MAXIMUM=";T2;PRINT#-2,"
WINDOW EXTENDS FROM ";SL;" TO ";
SR;" ON X AXIS. EACH UNIT EQUIVA
LENT TO ONE DOT
96# PRINT#-2,"WINDOW EXTENDS FRO
M ";ST;" TO ";SB;" ON Y AXIS."R
ETURN
97# REM *****
GRID MENU*****
98# CLS:PRINT*AXIS MENU*:PRINT*A
-TICS/ORIGIN B-NO TICS
99# PRINT*C-GRID D-NO G
RID
100# PRINT*E-COMPLETE F-NO
BOTTOM
101# PRINT* GRAPH S-NO
SIDES
102# PRINT*G-AXIS H-NO
AXIS
103# PRINT*I-CROSS HAIR J-NO
X-HAIR
104# PRINT*K-POINTS L-LIN
    
```

```

ES
195# PRINT*M-TIC ACCENT N-NO
TIC ACCENT
196# PRINT*Z-CHANGE COLOR
197# PRINT*R-RETURN TO MAIN MENU
*
198# INPUT CS:IFCS=" "THENC="R"
199# FOR O1=1 TO LEN(CS):MS=MIDS
(CS,O1,1):KB=INSTR(1,NTS,MS)
110# ONKB GOSUB 113#,114#,115#,1
16#,117#,119#,120#,121#,122#,123
#,124#,125#,126#,127#,112#,118#,
128#
111# NEXT:IFTO=1THENTQ=#:RETURNE
LSE98#
112# TQ=1:RETURN
113# BA=1:GOSUB 134#:RETURN
114# BA=#:RETURN
115# GD=1:RETURN
116# GD=#:RETURN
117# BT=1:DD=1:RETURN
118# DD=#:RETURN
119# BT=#:RETURN
120# GOSUB136#:AX=1:RETURN
121# AX=#:RETURN
122# CH=1:INPUT*X & Y OFFSET PRO
M ORIGIN";XV,YV:RETURN
123# CH=#:RETURN
124# JE=1:RETURN
125# JE=#:RETURN
126# INPUT*ACCENT EVERY X-TH TIC
MARK.X?;Y?;XM,YM:BV=1:RETURN
127# BV=#:RETURN
128# CLS:PRINT*TYPE RETURN FOR N
O CHANGE*:INPUT*MODE?,I (ENTER
# FROM1 TO 4);ES:IFES=" "THEN13#
ELSEV1#VAL(ES):IFV1#<0 OR V1#>
4 THEN128# ELSEMODEV1#,1
129# IF V1#>1 OR V1#>3 THENPRINT
*ENTER NUMBERS BETWEEN 1 AND 4*
ELSEPRINT*ENTER 1 OR #,EQN. MUST
BE SAME COLOR AS GRID
130# INPUT*GRID COLOR";ES:IFES="
 " THEN 131# ELSEV9#VAL(ES):IFV9#
<0 OR V9#>8 THEN130#
131# INPUT*GRAPH COLOR";ES:IFES="
 " THEN132# ELSEV7#VAL(ES):IFV7#>8
OR V7#<0 THEN 131#
132# INPUT*BACKGROUND COLOR";ES:
IFES=" " THEN 133# ELSEV8#VAL(ES):
    
```

```

IPV8#>8 OR V8#<0 THEN 132#
133# INPUT*SCREEN 1,? (ENTER #
OR 1);ES:IFES=" " THEN RETURNEL
SEV1#VAL(ES):IF V1#>1ORV1#<0 TH
EN 133# ELSERETURN:RETURN
134# GOSUB135#:INPUT *X TIC INCR
EMENT,Y INCREMENT";X3,Y3:RETURN
135# INPUT*ORIGIN-X,ORIGIN-Y";IX
,YI:RETURN
136# INPUT*X & Y OFFSET FROM ORI
GIN";CX,CY:RETURN
137# REM*****
AXIS PLOT ROUTINE*****
*****
138# XI=X3/(X2-X1)*(SL-SR):YI=Y3
/(Y2-Y1)*(ST-SB):XT=(IX-X1)/(X2-
X1)*(SR-SL)+SL:YT=(IY-Y1)/(Y2-Y1
)*(ST-SB)+SB:SCREEN1,V1:COLORV9
,V8
139# IF XT>SR OR YT>SB OR YT<(ST
) ORXT<(SL) THEN PLAY"G;B;G;B":R
ETURN
140# IF AX=1 THEN LINE(XT+(CX)/(
X2-X1)*(SR-SL),ST)-(XT+CX/(X2-X1
))*(SR-SL),SB),PSET:LINE(SL,YT+CY
/(Y2-Y1)*(ST-SB))-(SR,YT+CY/(Y2-
Y1))*(ST-SB)),PSET
141# XQ=XV/(X2-X1)*(SL-SR):YO=YV
/(Y2-Y1)*(ST-SB):IFCH=1 AND (XT
-XQ+(SL-SR)/2#)>SL AND (YT+YQ-(S
B-ST)/2#)>ST THENLINE(XT-XQ-(SL-
SR)/2#,YT+YQ)-(XT-XQ+(SL-SR)/2#,
YT+YQ),PSET:LINE(XT-XQ,YT+YQ-(S
B-ST)/2#)-(XT-XQ,YT+YQ-(SB-ST)/2#
),PSET
142# IF BT=# THEN 151#
143# LINE(SL,SB)-(SR,SB),PSET:LI
NE(SL,ST)-(SR,ST),PSET
144# IPV8#>8 THEN155#
145# FE=1:PD=3#
146# FOR A=XT TO SR STEP-XI*FE
147# LINE(A,SB)-(A,SB+(ST-SB)/PD
),PSET:LINE(A,ST)-(A,ST+(SB-ST)/
PD),PSET:NEXT
148# FORA=XT TOSL STEPXI*FE
149# LINE(A,SB)-(A,SB+(ST-SB)/PD
),PSET:LINE(A,ST)-(A,ST+(SB-ST)/
PD),PSET:NEXT
150# IF PD=15 OR BV=# THEN 151#
    
```

```

ELSE PD=15:FE=XM:GOTO146#
151# FE=1:PD=3#:IFDD=#THEN156#
152# FORA=YT TOSB STEP-YI*FE:LIN
E(SL,A)-(SL-(SR-SL)/PD,A),PSET:L
INE(SR,A)-(SR-(SR-SL)/PD,A),PSET
:NEXT
153# FORA=YT TOST STEP+YI*FE:LIN
E(SL,A)-(SL-(SR-SL)/PD,A),PSET:L
INE(SR,A)-(SR-(SR-SL)/PD,A),PSET
:NEXT
154# IF PD=2#THEN155#ELSEIF BV=#
THEN 155#ELSE PD=2#:FE=YM:GOTO15
2#
155# LINE(SL,ST)-(SL,SB),PSET:LI
NE(SR,ST)-(SR,SB),PSET
156# IF DD=# THEN159#
157# FORA=XT TO SR STEP-XI:FORBU
=YT TOSB STEP-YI:PSET(A,BU):NEXT
:FORBU=YT TOST STEP+YI:PSET(A,BU
):NEXT:NEXT
158# FORA=XT TO SL STEP+X1:FORBU
=YT TOSB STEP-YI:PSET(A,BU):NEXT
:FORBU=YT TOST STEP+YI:PSET(A,BU
):NEXT:RETURN
159# RETURN
160# REM*****
DATA PLOT ROUTINE*****
*****
161# INPUT*POINT=1,X=2,O=3";FG:Y
R=#
162# INPUT*LINE=1,NONE=#";JS
163# INPUT*ENTER X&Y(RETURN=99,9
9)"":AQ,AW
164# IF AQ=99 AND AW=99 THEN RET
URN
165# IF AQ#>X1 AND AQ#<X2 AND AW
#>Y1 AND AW#<Y2 THEN 166# ELSE16
3#
166# L1=(AQ-X1)/(X2-X1)*(SR-SL)+
SL:L2=(AW-Y1)/(Y2-Y1)*(ST-SB)+SB
167# SCREEN1,1
168# IF FG=3 THEN LINE(L1-2,L2-2
)-(L1+2,L2+2),PSET,B
169# IFFG=2 THEN LINE(L1-2,L2-2
)-(L1+2,L2+2),PSET:LINE(L1-2,L2+2
    
```

Listing continued

NEW FROM 80 MICRO

Classifieds

GET THE ATTENTION YOU DESERVE

Tell more than 200,000 dedicated, interested TRS-80 users about your product or service with an efficient and economical **80 Micro** classified ad.

You'll reach the most people in the market for the least amount of money!

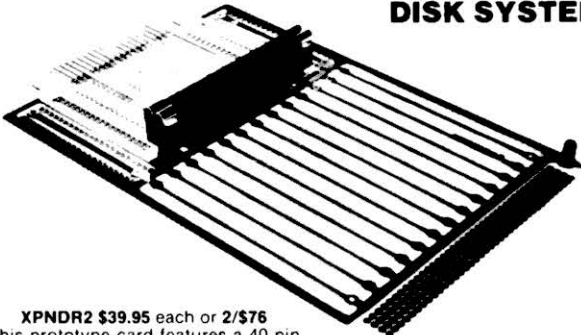
With **80 Micro's** well-established audience of involved buyers, sellers, and swappers, your ad is bound to get fast results!

For more information, write to:

80 Micro
 Attn. Classified Manager
 80 Pine Street
 Peterborough, NH 03458

Circle 458 on Reader Service card.

XPNDR2 for the CoCo DISK SYSTEM





XPNDR2 \$39.95 each or 2/\$76
 This prototype card features a 40 pin connector for projects requiring an on-line disk system or ROM paks. The CoCo signals are brought out to wire-wrap pins. Special gold plated spring clips provide reliable and noise-free disk operation plus solid support for vertical mounting of the controller. The entire 4.3 x 7 inch card is drilled for ICs. Assembled, tested and ready to run.

XPNDR1 \$19.95 each or 2/\$36
 A rugged 4.3 x 6.2 inch bare breadboard that brings the CoCo signals out to labeled pads. Both XPNDR cards are double-sided glass/epoxy, have gold plated edge connectors, thru-hole plating and are designed with heavy power and ground buses. They're drilled for standard 0.3 and 0.6 inch wide dual in-line wirewrap sockets, with a 0.1 inch grid on the outboard end for connectors.

SuperGuide \$3.95 each
 Here is a unique plastic insert that aligns and supports printed circuit cards in the CoCo cartridge port. Don't forget to **ORDER ONE FOR YOUR XPNDR CARDS.**

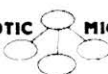
Included with each XPNDR card are 8 pages of APPLICATION NOTES to help you learn about chips and how to connect them to your CoCo

To order or for technical information call:

(206) 782-6809
 weekdays 8 a.m. to noon

We pay shipping on prepaid orders. For immediate shipment send check, money order or the number and expiration date of your VISA or MASTERCARD to:

ROBOTIC MICROSYSTEMS

 BOX 30807 SEATTLE, WA 98103

Listing continued

```

) -(L1+2,L2-2),PSET
1700 IF PG=1 THEN PSET(L1,L2)
1710 IF YR=1 AND JS=1 THEN LINE(L3,L4)-(L1,L2),PSET
1720 L3=L1:L4=L2:YR=1
1730 IF INKEYS="" THEN 1730 ELSE 1630
1735 REM*****
EQUATION OPTIONS*****
*****
1740 CLS:PRINT*1=CARTESIAN, Y=F(X)*:PRINT*2=CARTESIAN, X=F(Y)*:PRINT*3=CARTESIAN, PARAMETRIC*:PRINT*4=POLAR, R=F(A)*:PRINT*5=POLAR, A=F(R)*:PRINT*6=POLAR, PARAMETRIC*:INPUT*8:IF W8>6 OR W8<1 THEN 1740 ELSE RETURN
1750 ON W8 GOSUB 1760,1770,1780,1790,1800,1810:RETURN
1760 XS="":GOSUB200:GOSUB220:RETURN
1770 YS="":GOSUB230:GOSUB190:RETURN
1780 GOSUB190:GOSUB220:RETURN
1790 XS="":GOSUB200:GOSUB1820:GOSUB230:RETURN
1800 YS="":GOSUB230:GOSUB1830:GOSUB200:RETURN
1810 GOSUB1820:GOSUB230:GOSUB1830:GOSUB200:RETURN
1820 LINE INPUT*POLAR EQN. FOR R AS R=F(T) R="":YS:RETURN
1830 LINE INPUT*POLAR EQN. FOR ANGLE A=F(T) A="":XS:RETURN
SUB200:RETURN
SUB1820:RETURN
SUB1830:RETURN

```

End

Ample Justification

by Milton T. Simpson

When it comes to making sense of pages of numbers, neatness counts. Computers and printers should be ideal for making columns of numerical data more intelligible. But, if you've ever tried to print more than one or two columns on Tandy's CoCo-compatible printers, you know that getting figures to line up isn't always a simple matter.

Getting Started with Extended Color Basic suggests converting data to strings, calculating each string's length, and adding spaces at the beginning or end of each string to produce neat columns. This approach has several drawbacks. First of all, the strings and computations use memory and slow down program execution. What's more, you must insert decimal points if you want to display data in decimal format. If you're dealing with money—dollars and cents—you must also add trailing zeros.

Getting an Alignment

Through experimentation, I've discovered a few techniques that make it easier to print columnar data. Both Color Basic and Extended Color Basic accept statements in the form:

```
PRINT# - 2.TAB(tab number)data
```

Extended Color Basic also lets you use the following format:

```
PRINT# - 2.USING,documented format:data
```

Columns1 (Program Listing 1) and the corresponding printout (Fig. 1) show that you can insert a Tab statement anywhere

System Requirements

16K RAM
Extended Color Basic

1	\$ 10	\$.1	\$ 1.01
4	\$ 40	\$.4	\$ 4.04
7	\$ 70	\$.7	\$ 7.07
10	\$ 100	\$ 1	\$ 10.1
13	\$ 130	\$ 1.3	\$ 13.13
16	\$ 160	\$ 1.6	\$ 16.16
19	\$ 190	\$ 1.9	\$ 19.19
22	\$ 220	\$ 2.2	\$ 22.22
25	\$ 250	\$ 2.5	\$ 25.25

Figure 1. Example of printout of left-justified data produced by Columns1.

\$ 1.00	\$ 10.00	\$ 0.10	\$ 1.01
\$ 4.00	\$ 40.00	\$ 0.40	\$ 4.04
\$ 7.00	\$ 70.00	\$ 0.70	\$ 7.07
\$ 10.00	\$100.00	\$ 1.00	\$ 10.10
\$ 13.00	\$130.00	\$ 1.30	\$ 13.13
\$ 16.00	\$160.00	\$ 1.60	\$ 16.16
\$ 19.00	\$190.00	\$ 1.90	\$ 19.19
\$ 22.00	\$220.00	\$ 2.20	\$ 22.22
\$ 25.00	\$250.00	\$ 2.50	\$ 25.25

Figure 2. Example of printout for Columns2. Note the addition of decimal points and leading and trailing zeros.

LINE # = 1	1	\$ 10.00	\$ 0.10	AAAAAAAAA	\$ 1.01
LINE # = 4	4	\$ 40.00	\$ 0.40	AAAAAAAAA	\$ 4.04
LINE # = 7	7	\$ 70.00	\$ 0.70	BBBBBBBBB	\$ 7.07
LINE # = 10	10	\$100.00	\$ 1.00	BBBBBBBBB	\$ 10.10
LINE # = 13	13	\$130.00	\$ 1.30	CCCCCCC	\$ 13.13
LINE # = 16	16	\$160.00	\$ 1.60	DDDD	\$ 16.16
LINE # = 19	19	\$190.00	\$ 1.90	DDDD	\$ 19.19
LINE # = 22	22	\$220.00	\$ 2.20	EE	\$ 22.22
LINE # = 25	25	\$250.00	\$ 2.50	EE	\$ 25.25

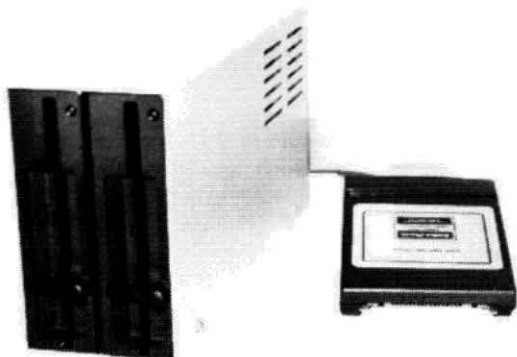
Figure 3. Example of printout for Columns3. TAB(nn)'' '' lets you vary column widths.



64K EXT. BASIC 149⁹⁵

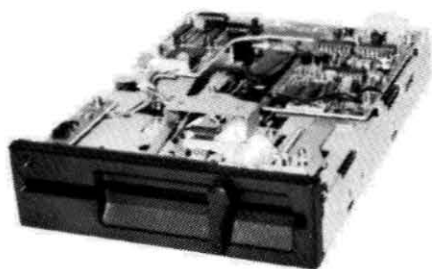
Color Computer II

Monitor Interface for above CoCo II 29.95 plus 7.50 installation. (color & green compatible)



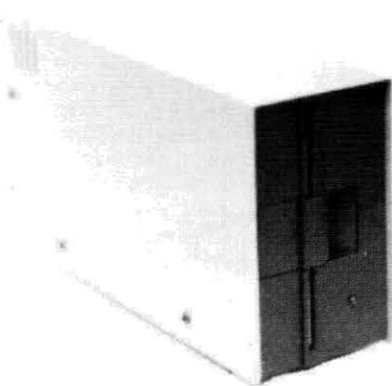
2 Drives 289⁹⁵

Both our drive 0 and 1 in one case, with cable and R.S. controller. The best just got better!



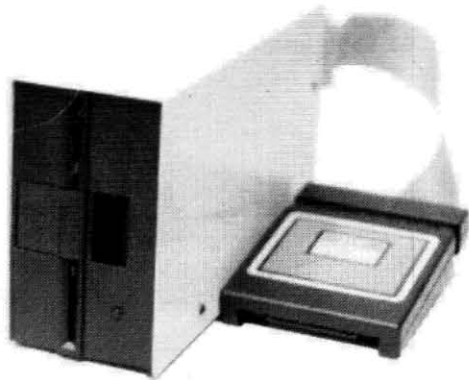
Drive 1 Upgrade 99⁹⁵

Add a second 1/2 height drive to your Radio Shack 26-3129. Comes with 3 minute installation instructions, screwdriver required.



Drive 1 118⁹⁵

**Your Choice
Silver or White**



195⁹⁵ Drive 0

SUPER DRIVE SALE

Special prices on new first quality disk drives. They even have GOLD connectors on the back...Some other places charge 229.00 for dr. 1 and 299.00 for dr. 0, not us! Drive 1 is for mod I, Second Color Computer drive, or external mod III, IV. Drive 1 just plugs into the extra connector on your Drive 0 cable. Both drives are compatible with any version of the Color Computer and all versions of drives. Drive 0 is your first Color Computer drive and comes complete with cable, manual, and R.S. controller. For double-sided, add 45.00 (only for those who have DS-DOS, boards and knowledge) Bare full hgt SSDD drive only 79.95.

THE COMPUTER CENTER

901-761-4565, 5512 Poplar, Memphis, TN 38119

Add \$4.90 for shipping and handling—Visa, MC & money orders accepted

Allow an additional 2 weeks for personal checks—Drive faceplates may vary slightly

Program Listing 1. Columns1. Figures are left-justified; decimal points aren't aligned.

```
10 FORN=1TO25STEP3
20 O=N*10:P=N/10:Q=N+N/100
30 PRINT#-2,TAB(10)N;TAB(20)"$";
O;TAB(30)"$";P;TAB(40)"$";Q
40 NEXT
```

End

Program Listing 2. Columns2. Figures are properly aligned, but column widths are the same.

```
10 FORN=1TO25STEP3
20 O=N*10:P=N/10:Q=N+N/100
30 A$=" $###.##"
40 PRINT#-2,USINGA$;N;O;P;Q
50 NEXT
```

End

Program Listing 3. Columns3.

```
10 DIMN$(5)
20 N$(1)="AAAAAAAAA"
30 N$(2)="BBBBBBBB"
40 N$(3)="CCCCC"
50 N$(4)="DDDD"
60 N$(5)="EE"
70 FORN=1TO25STEP3
80 X=INT((N-1)/5)+1
90 O=N*10:P=N/10:Q=N+N/100
100 A$="S###.##"
110 PRINT#-2,"LINE # = ";N;TAB(15)N;TAB(25)" ";
120 PRINT#-2,USINGA$;O;
130 PRINT#-2,TAB(35)" ";:PRINT#-2,USINGA$;P;
140 PRINT#-2," ";N$(X);TAB(60)" ";:PRINT#-2,USINGA$;Q
150 NEXT
```

End

in a Print#-2 statement. This left-justifies the data immediately following the Tab, placing it at the location you specify.

While this provides an easy way to create columns, left-justifying numbers misaligns their decimal points. Also, this approach doesn't provide decimal points for integers, and numbers like 10.1 in Fig. 1's third column don't line up because they lack trailing zeros.

Columns2 (Program Listing 2) and its sample output (Fig. 2) show the result of combining Print#-2 and UsingA\$ commands. These statements let you align the columns' decimal points, add leading and trailing zeros, and accommodate numerical and string data in any of Extended Color Basic's documented for-

mats—for example, #, \$\$, and ^^^^. Unfortunately, you must set all columns to equal widths.

One further refinement provides maximum flexibility for printing columnar data (see Program Listing 3 and Fig. 3). If you combine the Tab and Using commands with Print#-2, you can create aligned columns of varying widths. The key lies in using TAB(nn)" " to index the location for Print#-2,USING. However, you must insert semicolons to print data on the same line. Use colons or add a program line for the Using statement after inserting a Tab command. Lines 110-140 of Listing 3 illustrate the proper format.

Once you master the technique you'll

be able to line up your numbers perfectly. Of course, you can use the same commands to create tables of alphabetic data. ■

Milton T. Simpson welcomes your comments or questions. Write to him at 831 Hillcrest Drive, Martinsburg, WV 25401. Enclose a self-addressed, stamped envelope for a reply.

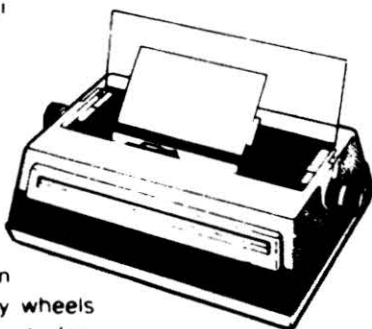
Circle 456 on Reader Service card.

SCM DAISY WHEEL New Smith Corona L-1000

True letter quality printer for less than the cost of an office typewriter! Priced \$500 less than other popular daisy wheel printers!

SALE PRICE:

\$249



FEATURES:

- ★ Friction feed
- ★ 15 cps 120 wpm
- ★ Changeable daisy wheels
- ★ Parallel or serial interface
- ★ Compatible with R/S Apple, etc

SUNLOCK SYSTEMS

210 Connor Rd.
Mechanicsville, Va. 23111

We accept
MasterCard,
Visa and CODs

ADDITIONAL PRINTER SPECIALS

Epson DX10 \$249	Okidata ML83 \$499	Comrex CR11 399	Citoh 7500 \$239
LX80 229	ML192 369	Star SG10 239	Citoh F1040 849
L1500 899	ML84 649	Star P.TYPE 319	Citoh 1550 449
FX85 359	ML193 519	Star SR 10 499	Citoh8510SP 379
FX185 499	ML93 509	Star SD 10 349	Cannon 1092 389
JX 80 499	ML182 239	Star SG 15 399	Citizen M10 279
			Tshiba 351 1099

TO ORDER CALL TOLL FREE 800-368-9191
In Virginia call 804-746-1600

Circle 281 on Reader Service card.

IT'S LIKE FREE DISKETTES



U.S. PAT. 4,488,358

Your 5 1/4" single side disks are usable on the other side. You paid for one side, why not use the other... **IT'S FREE!**

Nibble Notch will **open** your **new** disk. It's easy... won't harm existing data. Try it, you'll be glad you did!

nibble notch II

Cuts square notch and 1/4" round "index hole." For TRS 80 I, III, and IV, Osborne, TI, Kaypro, IBM and others needing "index hole."

Call for
**HIGH QUALITY
DISKETTES**
as low as
99¢

\$21.90*
PLUS P&H
ONLY

**SATISFACTION GUARANTEED
OR YOUR MONEY BACK!**

TOLL FREE 1-800-642-2536

*Add \$2
(\$5 foreign) for
postage & handling.
FL residents
add 5% sales tax.



215-527-1553, 9 am-6 pm ET
or send check
or money order to:

**ORDER
TODAY**

nibble notch®

computer products

707 Matson Ford Rd. Villanova, PA 19085
Shuffle Buffer PKASO U from Interactive Structures
Available: Call for Prices

Animal House

by Chris Cantrell

Guessing games are as old as the hills. They've been played around camp fires, in drawing rooms, and on jet rides. While the name of the game varies, the pattern is the same. Someone thinks of an animal (or object) and the other players ask a series of yes/no questions to try to determine its identity.

On the computer, this game lends itself to the use of a data structure, called a binary tree, to sort questions and answers and reach a conclusion. Zoo (see the Program Listing) is a short guessing game program that demonstrates the logic of binary trees. The computer asks a series of questions about the animal you're thinking of. You respond until the computer makes a guess. Zoo relies on a disk file containing animal names and re-

lated questions: when the program guesses wrong, it adds the correct animal name and a question to the current file.

Running the Zoo

The first time you load and run Zoo, you must press the I (Initialize) key while the program is setting up. Otherwise you'll get an error message because Zoo expects to find a data file to load in. Later, when you have a zoo on disk, you can bypass this option so that Zoo auto-

matically loads the disk file.

Now Zoo starts asking you questions. Think of an animal and answer all questions with a "yes" or "no." If the computer guesses your animal, a new game begins. When the computer guesses wrong, you can expand your zoo file by providing a question and answer to help it differentiate between animals.

Because you're starting without a data file, the program has little information on which to base its guesses. Questioning will be very limited until you build up a list of animals. The Table shows a sample question series, and demonstrates how to add animal names to your data file.

Pressing M brings up the menu. The first two options let you save or load a zoo

System Requirements

32K RAM
Disk Extended Color Basic

Circle 391 on Reader Service card.

HARDWARE & SOFTWARE FOR THE HANDICAPPED

IF YOU KNOW SOMEONE WHO IS HANDICAPPED, TELL THEM ABOUT THIS AD!!!

TALKING SCRIBE

Copyright 1985 by A.S.C. (Written by Scott Cabit)

TALKING SCRIBE is a 100% machine language program which will turn your copy of Computerware's "Color Scribe" into a full featured TALKING word processor.

Use **TALKING SCRIBE** to write and format letters and documents, without ever having to look at the Coco screen! **TALKING SCRIBE** was written especially for the blind, to allow them to write letters, and learn word processing!

TALKING SCRIBE will read or spell your letter or document "AS YOU TYPE IT IN", and can speak all punctuation if you wish as well! It will then read your letter back to you, with or without punctuation and spelling, a line at a time, or in it's entirety!

Proclaimed as the "BEST SPEAKING WORD PROCESSOR" by blind students, **TALKING SCRIBE** outperforms similar programs on other, far more expensive computers!

TALKING SCRIBE comes with a 1/2 hour audio instruction tape for the blind, and requires a 64K Coco or Coco2 with Disk drive and a Tandy SSC speech Pak. **DISK ONLY** (requires Computerware's Scribe)...\$39.95

E.A.R.S. by Speech Systems

EARS is an incredible new concept in computer interfacing! With **EARS**, it is now possible to "train" your Coco to understand your voice, and respond to it in any way you wish! **EARS** is a highly sophisticated Electronic Audio Speech Recognition system that can understand up to 64 different words at one time!

The **EARS** software includes new commands in Basic, such as LISN and MATCH that make using **EARS** incredibly simple! Another Basic command, DRECT, allows you to input programs directly into Basic simply by Speaking! Never touch the keyboard again! Once you have **EARS** "trained" for your words, you can write Basic programs, directory disk drives, list your programs and more entirely by speech!

EARS is already the definitive hardware/software package used by schools for the handicapped, because it really works! With recognition rates from 95% to 98%, **EARS** is a breakthrough that could change the life of a handicapped person! And because of the inexpensive price of today's Color Computer and **EARS**, it is probably the most affordable speech recognition package in the world!

EARS requires a 32K or 64K Coco / Coco2 with a Y-cable needed for disk systems. **EARS**...\$99.95

SPEAKOUT

Copyright 1985 by A.S.C. (Written by Scott Cabit)

SPEAKOUT is a speaking program designed to be used with Tandy's **SSC Speech Pak**. The program was written especially for the blind. **SPEAKOUT** is a 100% machine language program which links into BASIC, allowing it to speak. Four different speaking modes are available by pressing a control key.

- 1) OFF — no speaking of text printed on the screen.
- 2) SPEAKING — speaks only words printed by BASIC, (plus numbers).
- 3) INSTRUCTION — speaks out words, as well as punctuation (for example a " & " printed on the screen will say "ampersand").
- 4) SPELLING — SPELLS out any words printed by BASIC. Also speaks punctuation as in the INSTRUCTION mode.

SPEAKOUT does NOT affect BASIC in any way, and is fully transparent to any Basic programs. Run any Basic programs AS IS, and have anything they print be spoken in any of the above modes! Perfect for TALKING adventures, as well as training the blind to touch type or program in BASIC!

SPEAKOUT requires a 64K Coco or Coco2 with ECB or Disk Basic, and a Tandy SSC Speech pak, and comes with a 1/2 hour audio instruction manual for the blind.

TAPE OR DISK (both include audio instructions)...\$69.95

COMPUTERWARE'S COLOR SCRIBE

A full featured, easy to use word processor with such features as change, search, delete, insert or editing of text. Center lines, change print types, and format "filled" lines for that professional look! Edit and print files larger than memory, up to 150K long! A truly powerful text formatter / word processor!

COMPUTERWARE'S COLOR SCRIBE (DISK ONLY) ...\$49.95

??? Call for prices on our hardware and software packages! ???
(WE SELL COMPLETE SYSTEMS AT A DISCOUNT!)

AUDIO SOFTWARE CONSULTANTS

3529 Genessee Road
LaPeer, Michigan 48446
Telephone: (313) 66403722

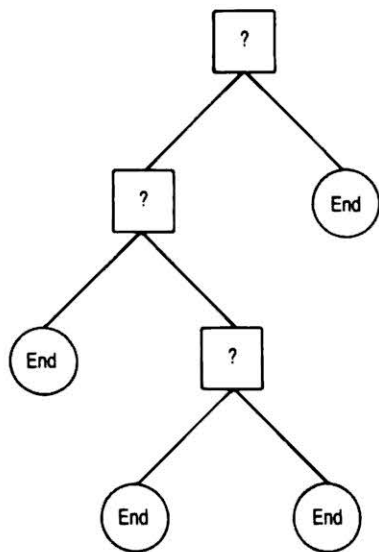


Figure 1. Binary tree structure.

(Animal)	Question	Response
Snake	Does it live on land?	Yes.
	Does it have fur?	No.
	Is it a reptile?	Yes.
	Is it a frog?	No.
	What is it?	Snake.
	Give me a yes/no question to separate it from my guess.	Does it have legs? (No.)

Table. Example of question-and-answer sequence.

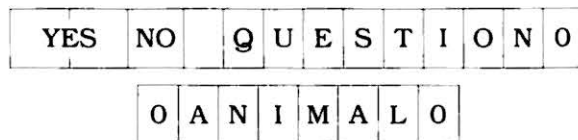


Figure 2. (a) Format of question node. (b) Format of end node.

to or from disk. Disk file names can contain up to eight letters plus a three-letter extension. Call the zoo you use most often Zoo/ONE; the program will load it automatically on startup. You must resave your file to disk each time you add new animals. The third menu option returns you to the game; the fourth prints out a list of the animals in memory.

It's Elementary

While the series of questions and answers may be quite complex, the underlying logic is straightforward. Zoo doesn't organize or remember questions and answers; instead, it maintains a branching data structure to define the animal. Figure 1 shows how the tree works.

A binary tree contains two types of nodes: a question node and an end node. When the program encounters a question node, it asks a question and waits for your response. Each question node connects to two branches, one for a pos-

itive response, the other for a negative response. By following the path of your answers, the program moves through the tree until it reaches an end node. In Zoo, the end node is the animal to which all previous questions and responses lead. Although it might not be the correct animal, it's the best guess the computer can make with the information you've given it.

In the sequence of questions shown in the Table, the computer makes a guess after your response to the third question because it has reached an end node. It has no more questions on file to help it further differentiate reptiles.

Tree Maintenance

I used a method known as branch pointing to maintain the tree in free memory at address &H400. Figure 2 illustrates the configuration of the two types of nodes in memory. In order in RAM, the question node contains a 2-

byte pointer for a "yes" response followed by a 1-byte pointer for a "no." Zoo stores the questions in ASCII format after the pointers. The pointers indicate the address of the next node; the final zero serves as an end marker. The end node—the animal node in this case—contains an initial zero, the animal name in ASCII format, and a final zero as an end marker.

The nodes appear consecutively in memory. To enlarge the tree, you add nodes to the end of the tree and change the pointer so that it indicates the new node. This allows you to insert data without shuffling the entire tree. Zoo, for example, asks questions and jumps to the appropriate memory locations according to the answers you supply. ■

Write to Chris Cantrell, 3276 Old Chisolm Road, Apt. 1111E, Florence, AL 35630.

Program Listing. Zoo

```

10 CLEAR 500,6H4000
20 CLS:PRINT">PRESS 'I' DURING S
TART UP TO INITIALIZE STRUCTU
RE."
30 FOR Z=1 TO 37:READ AS:IF AS="0
" THEN AS=" "
40 IF MIDS(AS,1,1)>="0" AND MIDS
(AS,1,1)<="9" THEN A=VAL(AS) EL
E A=ASC(AS)
50 POKE 6H3FFF+Z,A:NEXT:DATA 64,
25,64,31,D,O,E,S,0,I,T,0,L,I,V,E
,0,O,N,0,L,A,N,D,0,B,0,F,I,S,H,0,0
,B,I,R,D,0
60 ZE=6H4025
70 IF INKEYS="I" THEN 90
80 LOADM"ZOO-ONE":ZE=PEEK(6H3FF
E)*256+PEEK(6H3FFF)
90 CLS:PRINT"*****COCO ZOO*****
*****BY CHRIS CANTR
ELL-1985*****"
100 PRINT:PRINT"> YOU THINK OF A
N ANIMAL AND I WILL TRY TO GU
ESS IT. ANSWER MY QUESTIONS Y
ES OR NO(Y/N). PRESS 'M' FOR
MENU."
110 ZS=6H4000:PRINT:PRINT:GOTO 1
80
120 GS=""
130 GS=GS+CHR(PEEK(X)):X=X+1:IF
PEEK(X)<>0 THEN 130 ELSE RETURN
140 KS=INKEYS:IF KS="Y" THEN Y=2
ELSE IF KS="N" THEN Y=0 ELSE IF
KS="M" THEN Y=3 ELSE GOTO 140
150 PRINTKS:RETURN
160 FOR H=1 TO LEN(PS):POKE X,ASC
(MIDS(PS,H,1)):X=X+1:NEXT:POKE X
,0:X=X+1:RETURN
170 GG=INT(G/256):POKE X,GG:POKE
X+1,G-GG*256:X=X+2:RETURN
180 IF PEEK(ZS)=0 THEN 190 ELSE
ZG=ZS:X=ZS+4:GOSUB120:PRINTGS+"?
":GOSUB140:IF Y=3 THEN GOTO 260
ELSE GZ=Y:ZS=ZS+Y:ZS=PEEK(ZS)*2
56+PEEK(ZS+1):GOTO 180
    
```

Listing continued

From Computer Plus to YOU...

PLUS after PLUS after PLUS



Tandy 200 24K \$739
Model 100 24K \$510



Tandy 1200 HD \$1599
10 Meg. 256K



Tandy 1000 \$710
Tandy 1000 HD \$1539



Smith Corona L-1000
\$259



Color Computer II
w/64K Ext. Basic \$179



DMP105 \$160

BIG SAVINGS ON A FULL COMPLEMENT OF RADIO SHACK COMPUTER PRODUCTS

COMPUTERS

Tandy 1000 1 Drive 128K	710.00
Tandy 1000 HD 10 Meg. 256K	1539.00
Tandy 1200 10 Meg. 256K	1599.00
Tandy 2000 2 Drive 256K	1295.00
Tandy 2000 10 Meg. 256K	2025.00
Model IVD 64K with Deskmate	889.00

PRINTERS

Radio Shack DMP-130	269.00
Radio Shack DMP-430	660.00
Radio Shack DWP-220 Daisy Wheel	469.00
Radio Shack TRP-100 Portable	229.00
Silver Reed EXP-550 Daisy Wheel	425.00
Star SG-10	245.00
Star SG-15	410.00
Star SD-10	365.00
Panasonic P-1091	259.00
Toshiba 351	1175.00
CITOH Prowriter 8510AP + NLQ	345.00
Okidata 192	375.00
Epson LX-80	245.00
Epson FX-85	369.00
Epson HS-80 Portable Ink Jet	339.00

Tandy 1000/1200 ACCESSORIES

Tandy 1000 Disk Drive Kit	159.00
Tandy 1000 10 Meg. Hard Drive	579.00
Hard Drive Controller Board	249.00
256K Ram Board (inc. 128K & DMA)	199.00
512K Ram Board (includes 128K)	169.00
256K Memory Plus Expansion Brd.	249.00
PBJ Multi-Function Board (128K)	259.00
PBJ Multi-Function Board (256K)	279.00
PBJ Multi-Function Board (512K)	299.00
128K Ram Upgrade Kit (NEC)	78.00
256K Ram Upgrade (for PBJ Board)	69.00
300 Baud Modem Board	129.00
1200 Baud Modem Board	249.00
RS-232 Serial Board	89.00
Digi-Mouse/Clock Board	89.00

Tandy 1000/1200 MONITORS

Tandy VM-2 Green Monitor	129.00
Tandy CM-2 RGB Color Monitor	379.00
Tandy VM-3 TTL Green Monitor	179.00
Tatung CM-1360 Color/Gr./Amber	459.00
Tandy 1200 Text Monitor Adapt.	179.00
Tandy 1200 Color/Graphics Adapt	240.00

MODEMS

Radio Shack DCM-3 Modem	52.00
Radio Shack DCM-5 Modem	99.00
Radio Shack DC Modem 2212	315.00
Hayes Smartmodem II 300 Baud	169.00
Hayes Smartmodem 1200 Baud	429.00
Novation J-Cat 300 Baud	115.00

FOR EVERYONE

Network Four Outlet Surge Prot.	69.95
CCR-81 Cassette Recorder	52.00
CCR-82 Cassette Recorder	43.00
C-20 Digital Cassette Tapes (10pk)	9.95
Verbatim SSDD Plastic Box (10pk)	24.95
Verbatim DDDD Plastic Box (10pk)	29.95
Generic SSDD Diskettes (10pk)	17.95
NEC 64K Ram Chips (set of 8)	39.00
Radio Shack 16K Ram Chips (8)	25.00
Locking Disk Box (holds 70)	19.95
Flip N File Disk 50	15.00
Fanfold CleanEdge Paper (2600)	35.00

Radio Shack software 10% off.
Send for complete listing of
brand name software and hardware.

**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

Listing continued

```

19# X=ZS+1;GOSUB 12#;PRINT"IS IT
A "+GS+"?";GOSUB 14#;IF Y=3 TH
EN GOTO 26# ELSE IF Y=2 THEN GOT
O 9#
20# PRINT"I GIVE UP! WHAT IS IT?
":INPUT AS:PRINT"GIVE ME A YES O
R NO QUESTION TO SEPARATE YOUR A
NIMAL FROM MY GUESS.":INPUTQS
:PRINT"AND WHAT SHOULD THE ANSWE
R BE FOR YOUR ANIMAL?"
21# INPUT RS:IF MIDS(RS,1,1)<"Y
" AND MIDS(RS,1,1)<"N" THEN 21#
ELSE IF MIDS(RS,1,1)="Y" THEN Z
=2 ELSE Z=#
22# Z=ZS:ZS=ZG:X=ZS+ZG:G=ZE:GOS
UB 17#
23# X=ZE+4:FS=QS:GOSUB 16#;POKE
X,#:X=X+1:FS=AS:GOSUB 16#;ZG=X:Y
A=Z+LEN(QS)+5:NA=Z2
24# IF Z=# THEN J=NA:NA=YA:YA=J
25# X=ZE:G=NA:GOSUB 17#;G=YA:GOS
UB 17#;ZE=ZG:GOTO 9#
26# CLS:PRINT"*****MENU*****
**
27# PRINT" 1> DISK INPUT
28# PRINT" 2> DISK OUTPUT
29# PRINT" 3> GAME
30# PRINT" 4> LIST ANIMALS I KNO
W"
31# PRINT:PRINT" PUSH A NUMBER"
32# KS=INKEY$:IF KS<"1" OR KS>"4
" THEN 32# ELSE ON VAL(KS) GOTO
33#,34#,9#,35#
33# PRINT" 1>INPUT":INPUT"NAME O
F FILE":AS:LOADM AS:ZE=PEEK(&H3F
FE)*256+PEEK(&H3FFF):GOTO 26#
34# CLS:PRINT" 2> OUTPUT":INPUT"
WHAT DO YOU WANT TO CALL THIS
FILE":AS:Z=INT(ZE/256):POKE &H3F
FE,Z:POKE&H3FFF,ZE-Z*256:SAVEM A
S,&H3FFE,ZE,#:GOTO 26#
35# CLS:X=&H4#25:PRINT"BIRD":PRI
NT"PISH"
36# IF X=ZE THEN 39# ELSE X=X+4
37# IF PEEK(X)<# THEN X=X+1:GOT
O 37#
38# X=X+1:GOSUB 12#;PRINTGS:X=X+
1:GOTO 36#
39# PRINT:PRINT"***ANY KEY FOR ME
NUE***"
40# KS=INKEY$:IF KS="" THEN 40#
ELSE 26#

```

End

Check PPoint

Send your letters, club and BBS notices, and requests for assistance to HOT CoCo, c/o 80 Micro, 80 Ptn St., Peterborough, NH 03458.

Readers Respond

I agree completely with Michael Nadeau's comments on the slowdown in the home computer market (Digressions, *HOT CoCo*, September 1985, p. 4). While his points are valid, he failed to mention the indifference of computer companies after they make a sale. Manufacturers sell high-priced software that doesn't work as claimed and then shrug off most user inquiries. For instance, when I requested help with DynaCalc, the company told me to phone because the response was too complex for a written answer. If they can't explain it in writing, what chance do I have of remembering the explanation after hearing it over the phone?

Then there's the matter of RAM. When you buy a computer with 16K of RAM, you think you understand what "random," "access," and "memory" mean. Until you get home and find out that you don't have 16K of memory you can access randomly. Available memory is closer to 8K.

Adding this information to the points Nadeau makes in Digressions, you see why the home computer buyer feels he's been had and loses interest. Only dyed-in-the-wool electronic hobbyists will continue to use computers when they don't need to.

Juit M. Diver
Tacoma, WA

As far as I'm concerned, you can extend the editorial comment on boring Tandy

TV ads (Digressions, December 1985, p. 5) to cover magazine ads. So often Tandy focuses on children and games. The ad showing a youngster with a CoCo sneering at a jealous playmate with another make of computer turned me off. I was ashamed to own a TRS-80 when I saw it.

Charles H. Hoyt
Camas, WA

Line Drawing

I developed a short program, Lines/BAS, to save memory and time when you write Line statements (see the Program Listing). To use it, you insert data pairs for the horizontal and vertical coordinates of the lines' starting and ending points. If the value of the first horizontal coordinate (A) is greater than zero and less than 256, Lines/BAS uses 128,96 as the default starting point of the line. When other horizontal coordinates fall within this range, Lines/BAS uses the end point of the previous line as the starting point for the next line.

Program Listing. Lines/BAS.

```

10 PMODE 4,1
20 PCLS
30 SCREEN 1,1
40 FOR X=1 TO 1000
50 READ A,B
60 IF A<# THEN XXX 'LAST LINE NU
MBER
70 IF A>256 THEN LINE (A-256,B)-
(A-256,B),PSET:GOTO50
80 LINE -(A,B),PSET
90 NEXT X
XXX END

```

End

However, Lines/BAS accepts values for A that are greater than 256. You can use such values to establish a starting point other than the default origin of 128,96. For example, the sample data in the Listing begins with the data set 500,100. Since A is greater than 256, the program uses line 70 to determine the starting point—244,100. If you use 244,100 as the first data set, Lines/BAS draws a line from 128,96 to 244,100 because the equation in line 80 does not specify a starting point.

To move a line so that it doesn't begin at the end point of the previous line drawn, add 256 to the real value of A you want to use. For example, the following data sequence draws two parallel lines:

```

DATA 500,100,150,100,406,40,244,40.
-1,-1

```

The first pair starts the line at 244,100; the line ends at 150,100. Using 406,40 as the third pair ensures that the next line begins at 150,40. The final data pair is a stop that transfers control to the end statement.

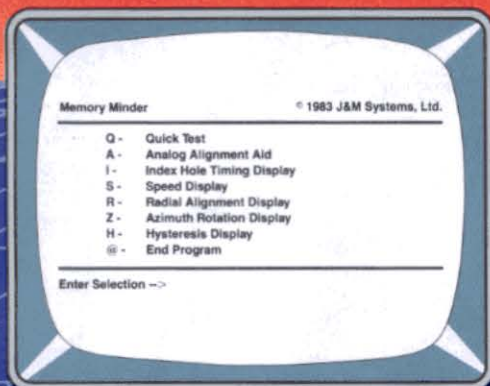
Ross Evans
Prince George, British Columbia

Mail Bag

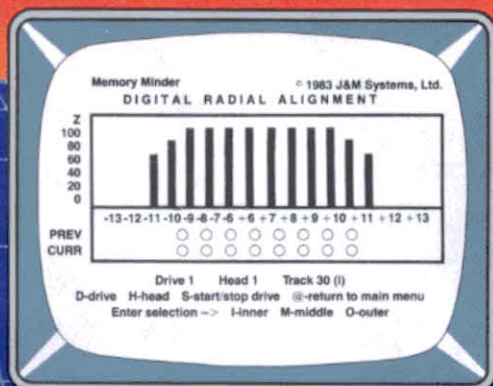
J.D. German's article, "Mail It with Telewriter-64" (*HOT CoCo*, November 1985, p. 34) provided Telewriter with an easy-to-use mailing list generator. German designed the program to print one label at a time; he suggested resetting the margin, rolling back the label to the start, and doing a partial print to print two or three labels across. I found this method too cumbersome and developed another procedure.

MEMORY MINDER T.M.

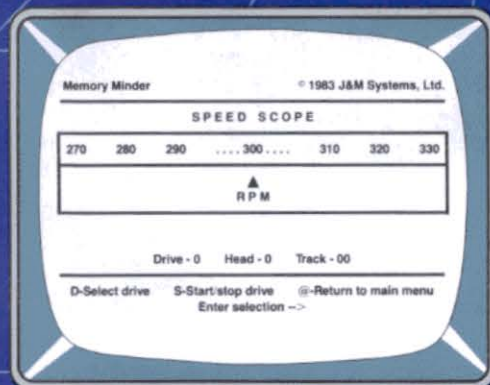
... A UNIQUE APPROACH TO DISK RELIABILITY!



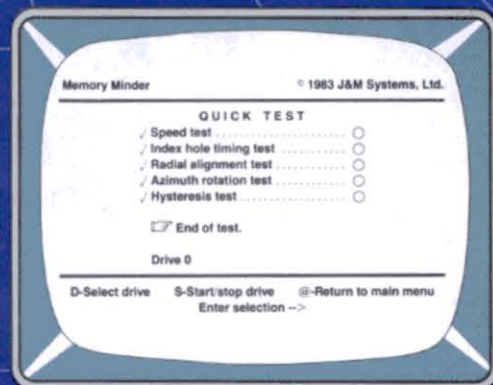
Select any one of seven tests to perform preventive maintenance or to isolate problems. Simple, single-letter commands make MM easy to use! Use MM to align the head, adjust the index hole detector, or adjust the speed.



Use the MM Radial Alignment Test to check the head alignment of your drives. No need for an oscilloscope or other expensive test equipment!



Check the motor speed of your drives. Or, you can even use the Speed Test to adjust the drive speed. No need for any test equipment!



Use the Quick Test to quickly and automatically test five of the most important performance parameters of your drive. Monitor your drives for long term drift. Isolate problems quickly and automatically!

PROTECT YOUR DATA.

Now you can make sure your data is being recorded properly by the use of the revolutionary *Memory Minder*.

The *Memory Minder* from J & M Systems, tests your disk's performance and calibration without any additional equipment! It measures your disk's performance and displays it on your screen.

This is the most comprehensive disk diagnostic program available for your TRS-80 microcomputer. You can even adjust drive alignment while watching the display!

Spot problems *before* they endanger your data! If you own a disk drive, you *need* the *Memory Minder*!

	Price #
TRS-80 Model III/4	
1 - 48 tpi Single Side (Standard)	\$79
2 - 48 tpi Double Side	\$89
3 - 96 tpi Double Side	\$129
Includes 48 tpi & 96 tpi program diskettes	
TRS-80 Model -I	
1 - 48 tpi Single Side Single Density	\$89
TRS-80 Color Computer and TDP-100	
1 - 48 tpi Single Side (Standard)	\$79
2 - 48 tpi Double Side	\$99

MM also available for other models
J & M SYSTEMS IS THE DRIVING FORCE!



J & M SYSTEMS, LTD.
15100-A CENTRAL SE
ALBUQUERQUE, NEW MEXICO 87123
505/292-4182

Circle 75 on Reader Service card.



DeskMate® 7-in-1 software makes your Color Computer better than ever.

Now our popular DeskMate® software is available for disk-based Color Computers! DeskMate (26-3259, \$99.95) features seven popular personal-productivity programs—all on one disk!

A general-purpose *TEXT* entry and editing program performs search and replace, file merge and block select, copy and delete. It's ideal for writing correction-free letters, memos and short reports.

A simple spreadsheet program includes an easy-to-use menu and automatic column formatting. You can use *LEDGER* to do budgeting, sales forecasting, profit-and-loss projections and other "What if...?" calculations.

A four-color picture editor lets



LEDGER

you create lines, charts, graphs, designs and "doodles" on your screen, then print a copy on a dot-matrix or ink-jet printer.

The *INDEX CARDS* personal filing system lets you enter and edit



INDEX CARDS

data and perform simple sorts and searches. It's ideal for keeping track of names and addresses.



TELECOM

TELECOM, a communications program lets you access national information services, plus transmit and receive files from other computers by phone (requires modem).

A simple monthly calendar program displays "to do's" for any date. *CALENDAR* is an easy way to organize your work day.



TEXT EDITOR

A four-function *CALCULATOR*, with memory, is also available within any application without interrupting the screen in the program you are currently using.

If you don't already have a disk drive for your color computer, you can add one for just \$299 (26-3131). The 5 1/4", thinline floppy drive plugs into your Program Pak® port for over 156,000 characters of storage. Add a second drive at any time, too.



CALENDAR

port for over 156,000 characters of storage. Add a second drive at any time, too.

Radio Shack®
The Technology Store™

A DIVISION OF TANDY CORPORATION

Free! New 1986 Software Guide RSC-16.

Mail to: Radio Shack
Dept. 86-A-130, 300 One Tandy Center
Fort Worth, Texas 76102

Name _____

Address _____

City _____

State _____ ZIP _____

Phone _____

Price applies at Radio Shack Computer Centers and participating stores and dealers. DeskMate/Registered TM Tandy Corp.

PERRY COMPUTERS



CALL

1-800-248-3823

COLOR COMPUTERS		LIST PRICE	OUR PRICE
26-3127	64K Extended Color Computer 2	\$199.95	\$175.00
26-3134	16K Standard Color Computer 2	119.95	100.00
26-3129	Thinline DD O for Color Comp	349.95	290.00
26-3018	Extended Basic Kit	39.95	36.00
26-3030	OS-9 with Editor Assembler	69.95	59.50
26-3012	Deluxe Joystick	29.95	25.00
26-1208	CCR-81 Recorder	59.95	50.00
VIP Integrated Library		149.95	139.00
VIP Writer		69.95	59.00
VIP Calc		69.95	59.00
Telewriter Disk			49.00
BoteK Interface			59.00

TANDY 3000			
25-4001	Tandy 3000 1 Disk 512K	\$2599.00	\$1900.00
25-4010	Tandy 3000 1 FD 20 Meg HD 512K	3599.00	2600.00
25-3046	Deluxe Text Display Adapter	249.95	205.00
26-3047	Deluxe Graphics Display Adapter	499.95	395.00
25-4030	512K to 2Meg Expansion Board	499.00	395.00
25-4033	Math Co-Processor for 3000	399.95	339.00
25-4050	1.2 Meg Disk Drive Kit for 3000	299.95	255.00
25-4060	HD Controller Board for 3000	499.00	425.00
25-4062	20 Meg Hard Disk Kit	799.00	679.00
25-4101	MS-DOS 3 1/Basic/Deskmate	99.95	85.00
26-5111	Monochrome Monitor	199.95	165.00
26-5112	Color Monitor	599.95	510.00

TANDY 100, 200, 600			
26-3901	Tandy 600 Port Como 32K 3 1/2 DD	\$1599.00	\$1125.00
26-3904	Basic Rom for Tandy 600	129.95	110.00
26-3910	92K RAM Upgrade for Tandy 600	399.95	340.00
26-3860	Tandy 200 Port Comp 24K	999.00	725.00
26-3866	24K RAM Mem Exp. Chip for 200	249.95	210.00
26-3802	Tandy 100 Portable Computer 24K	499.00	425.00
26-3808	Tandy 100/200 3 1/2" Drive	199.00	169.00
26-3816	8K RAM Upgrade for Tandy 100	119.95	95.00
26-3909	Portable 3 1/2 DD for T100 T200	199.95	169.00
26-3805	Acoustic Coupler	39.95	34.00
26-1409	Printer Cable	14.95	12.70
26-1410	Modem Cable	19.95	17.00

MODEL 4D			
26-1070	Model 4D 64K 2 FD w Deskmate	\$1299.00	\$ 895.00
26-1122	64K Memory Expansion	69.95	65.00
26-1123	Model 3 to Model 4 Upgrade Kit	399.00	385.00
26-1134	Model 4 Hard Disk Kit for 15meg	79.95	67.95
26-1530	Multiplan Model 4	199.00	169.00
26-1595	Super Scripsit Model 4	199.95	169.00
26-1608	Deskmate for Model 4	195.00	175.00
26-1635	Profile 4 Model 4	249.95	200.00
26-2216	CP/M Plus Model 4	149.00	127.00
26-2231	Double Duty Utility	69.95	58.00

MODEL 6000 COMPUTERS			
26-6021	Model 6000 512K 2 FD Computer	4499.00	3125.00
26-6022	Model 6000 512K 1 FD 15Meg HD	5499.00	3795.00
26-6019	Model 6000 256K Memory Kit	199.95	185.00
26-6052	DT-100 Data Terminal	795.00	600.00
26-1245	10 Meg Disk Cartridge System	2195.00	1750.00
26-6018	6000 Interface Kit for 26-1245	119.95	102.00
25-3022	Interface Kit for 26-1245	199.95	160.00
26-4155	15 Meg Hard Drive Primary	1995.00	1355.00
26-4171	35 Meg Hard Drive Primary	2995.00	2545.00
26-4173	Meg Hard Drive Primary	4295.00	3350.00
26-4157	Installation Kit for Primary HD	349.00	295.00

RADIO SHACK PRINTERS

	LIST PRICE	OUR PRICE
26-1276	DMP-105 Dot Matrix Printer	\$ 199.00 \$ 169.00
26-1275	TRP-100 Portable Thermal Printer	299.00 230.00
26-1280	DMP-130 100 cps Tri. Mode Printer	349.00 285.00
26-1268	CGP-220 Color Ink-Jet Printer	699.00 595.00
26-1257	DWP-220 Daisy Wheel	599.00 460.00
26-1277	DMP-430 24 Wire Matrix Printer	899.00 635.00
26-1270	DWP-510 43 cps Daisy Wheel	1495.00 1225.00
26-1274	DMP-2100P 24 Dot Wire Matrix	1995.00 1650.00
26-1279	DMP-2200 HiSpeed Matrix Printer	1695.00 1440.00
26-1269	PT-64 Printer Controller	249.95 210.00
26-1498	SW-302 Printer Switch	119.95 100.00
26-1477	Auto Sheet Feeder for DWP 510	499.95 420.00

TANDY 1200, 2000

25-3000	Tandy 1200 1 FD & 10 Meg HD	\$1999.95	\$1525.00
25-3001	Tandy 1200 2 FD 256K	1499.00	1200.00
25-3010	VM-3 Green Monitor	219.95	185.00
26-3212	CM-2 Color Monitor	459.95	390.00
25-3043	Graphics Display Adapter	299.95	255.00
25-3044	Graphics Master	695.95	540.00
25-3061	Captain Multifunction Board	599.95	475.00
25-3020	TCS-100 Tape Cartridge System	1999.00	1555.00
25-3021	Tandy 1000/1200 Interface Kit	149.95	120.00
25-3130	MSDOS/BASIC	89.95	76.50
26-5103	Tandy 2000 Two Disk	1599.00	1225.00
26-5104	Tandy 2000 1 FD and 10 Meg HD	2499.00	1885.00

TANDY 1000

25-1000	Mod 1000 128K 1 FD & Deskmate	\$ 999.95	\$ 705.00
25-1001	Model 1000 256K 1 FD 10Meg HD	1999.00	1475.00
25-1003	300-Baud Modem Board	149.95	125.00
25-1005	Disk Drive Expansion	199.95	170.00
25-1006	RS-232C Interface 1000/1200	99.95	85.00
25-1007	Hard Disk Control Board	299.95	255.00
25-1013	1200-Baud Modem Board	299.95	230.00
25-1025	10 Meg Hard Disk Drive System	699.95	559.00
25-1501	MS-DOS Reference Manual	34.95	29.00
25-1502	BASIC Reference	34.95	29.00
26-1145	Lotus 123 1000	495.95	420.00
30051030	PJB Multifunction Board 512K		310.00

EPSON PRINTERS

20001015	Homewriter 10	\$ 288.00	\$ 215.00
20001025	LX-80 Dot Matrix Printer	299.00	225.00
20001035	FX-85 Dot Matrix Printer	499.00	385.00
20001040	JX-80 Color Dot Matrix Printer	699.00	485.00
20001050	HI-80 4 Pin Plotter	599.00	390.00
20002010	RX-100 Dot Matrix Printer	499.00	400.00
20002030	FX-185 Dot Matrix Printer	699.00	525.00
20003010	LQ-1500 18 Pin Head with Intl	1495.00	1100.00
20001515	LX-80 Tractor Feed	49.00	25.50
10081010	DX-10 Daisy Wheel Printer	299.00	255.00
10081020	DX-20 Daisy Wheel Printer	459.00	390.00
10081030	DX-35 Daisy Wheel Printer	899.00	765.00

For Technical Questions and Information on our complete line of computer accessories and current prices.

CALL 1-517-625-4161

FOR ORDERS ONLY CALL 1-800-248-3823

Mon., Wed. & Fri. 9-9, Tues. & Thurs. 9-6, Sat. 9-3

124 S. MAIN ST. PERRY, MICH. 48872

All prices and offers may be changed or withdrawn without notice. Advertised prices are cash prices. C.O.D. accepted (\$10.00 charge per carton on C.O.D. Call for further C.O.D. information.) M.C., Visa, add 2%. AX, add 3%. All non-defective items returned will be subject to 10% restocking fee. Defective items require return merchandise authorization. Call for R.M.A. Number before returning. Delivery is subject to product availability.

To print two labels across, set Telewriter's display mode to 64 characters, type in the first line of the first entry, then move the cursor over to the right-hand half of the screen. Type in the first line of the second entry. Repeat this for subsequent address lines and entries. With a little experimentation, you'll find the proper spacing for the second entry. You need separate only the left-hand entries with caret N (^N), the control sequence for advancing to the next label.

*Dave Machlitt
Ventura, CA*

Binary Graphics

When I began using the CoCo's graphics characters, I was unwilling to memorize the pattern codes. Instead, I worked out a system that relies on binary numbers. The method treats each Print@ screen position as a two-pixel by two-pixel block. You can turn each pixel on or off, making it black or the color of the block.

You define the pattern with an 8-bit binary number and POKE the decimal equivalent of this value into the appropriate memory location for a particular screen location. Bit 7, the most-signifi-

cant bit, determines whether a character is alphanumeric or graphic. To create a

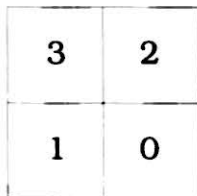


Figure. Configuration of bits zero to 3 of a graphics block.

Code	Color
000	Green
001	Yellow
010	Blue
011	Red
100	Buff
101	Cyan
110	Magenta
111	Orange

Table. Color codes.

graphics character, you must set this bit to 1. Bits 4-6 control the color of the block (see the Table). The remaining 4 bits turn individual pixels in the block on and off (see the Figure). For example, a logical zero in bit 3 turns the upper left-hand pixel off, making it black.

I'll illustrate the procedure by setting up a pattern for the graphics block in the upper left-hand corner of the screen, memory location 1024. If you want to make the left half of this block cyan and the right half black, you must first set bit 7 to 1. Bits 4-6 are 101 (cyan); the appropriate on/off sequence for the block is 1010. The 8-bit binary number for the pattern is 11011010 or decimal 218; therefore the appropriate command for creating and positioning the character is POKE1024,218. (You might find it simpler to divide the binary number in sections (10000000 + 101 + 1010) and compute the decimal equivalent from the sum of the sections (128 + 80 + 10).)

Increasing the memory location by one moves the character one block to the right. Add 32 to reposition the block on the line below.

*Jon Howell
Sherwood, OR*

Circle 538 on Reader Service card.

EUREKA!

L.A. We got it—you found us!

<p>Lifetime Guarantee</p> <h3 style="margin: 0;">DISKS</h3> <p>Bulk 99¢ ea. Sentinel \$1.29 ea.</p>	<p>Dot Matrix</p> <h3 style="margin: 0;">PRINTERS</h3> <p>as low as \$199 Panasonic KXP1090 Daisy Wheel \$289</p>	<h3 style="margin: 0;">SOFTWARE</h3> <p>over 180 titles discounted</p> <p>Games up to 50% Books20% All others . . . 10%</p>
<p>Hi Resolution</p> <h3 style="margin: 0;">MONITORS</h3> <p>start at \$89 Zenith 12" green Color/sound \$195</p>	<p>5 1/4 Half Height</p> <h3 style="margin: 0;">DISK DRIVES</h3> <p>\$75 Bare Hi-Tech W/Case/Pwr \$139 DSTeac . . . \$ 95</p>	<p>Direct Connect</p> <h3 style="margin: 0;">MODEMS</h3> <p>\$59 Volks 300 baud 1200 baud auto \$217 Hayes comp Smart 299</p>
<h3 style="margin: 0;">SYSTEMS</h3> <p>64K Color Computer by Tano \$119 Zenith 256K 2dr Ser/Par/RGB/Mon Turbo mode \$1599</p>	<h3 style="margin: 0;">MISCELLANEOUS</h3> <p>Keyboards . . \$59 Disk Cases . . \$17 Printer Int . . \$48 Video Driver . \$24 Power Strip . . \$19 Swivel Base . \$19 more</p>	<h3 style="margin: 0;">PARTS</h3> <p>• EPROMS • ROMS • CONTROLLERS • MEMORY DRAMS • CABLES • KITS • ICS • PAPER • LABELS • RIBBONS • DAISY WHEELS</p>

POLYGON COMPUTERS

1316 Wilshire Blvd., Suite 206
Los Angeles, CA 90017
(213) 483-8388

Ca Res 6 1/2% tax
Visit our Retail Store
Shipping: \$2 Software
Charges: \$5 Hardware

Circle 499 on Reader Service card.

PROFESSIONAL HANDICAPPING SYSTEMS

• PRESENTED BY PROFESSOR JONES •

<p>GLD. Thoroughbred "Gold" Edition™ A Full featured thoroughbred analysis designed for the professional and the serious novice. \$159.95 complete</p> <p>EGLD. Enhanced "Gold" Edition™ Gold Edition with complete Master Bettor™ system integrated into the same disk. This powerful program will transfer all horses and scores to the bet analysis with a single keystroke. Master Bettor™ included: \$199.95 complete</p> <p>GLTD. Limited "Gold"™ Enables Professional Handicappers to assign specific values to the racing variables they feel are important. Create program weight based on a particular track and line tune it for maximum win percentage. This program is designed for ease of use. The user needs no programming experience. (contains Integrated Bettor™) \$299.95 complete</p> <p>GD. Gold Dog Analysis™ \$149.95 The ONLY professional greyhound analysis available that evaluates ALL variables. Integrated Bettor™ \$199.95 Limited Version \$299.95</p> <p>MHH. Master Harness Handicapper™ Professional software designed to provide a thorough analysis of all trotter and pacer races in the United States and Canada. Integrated Bettor™ \$199.95 Limited \$299.95</p> <p>Professor Pix Football™ Complete STATISTICAL ANALYSIS on Data Base allowing Designated, Statistical Series \$99.95 previous games to be evaluated. w/Win-Loss Power Ratings \$149.95</p> <p>NBA. Basketball™ NBA \$99.95 w/college \$129.95 w/power ratings \$149.95</p> <p>LOT. Lottery Analysis™ Statistical comparison program designed to detect subtle patterns in winning numbers and digits. Lottery (3-4 digit) \$79.95 w/Lotto (Max 99 Digit) \$99.95</p> <p>PC-3 Portable Computer (4k) w/choice of Thoroughbred, Greyhound or Trotter™ \$249.95 (includes portable computer & program)</p> <p>M-100 Portable (32k) w/choice of Thoroughbred, Greyhound or Trotter and Master Bettor™ \$649.95 (includes portable computer and program)</p>	<p>★ ★ ★ ★ ★</p> <p>"Your BEST BET in handicapping software..."</p> <p>Reviewed by Whole Earth Software Guide Corona Data Systems</p> <p>Prof. Jones 1940 W. State Boise, ID 83702</p> <div style="display: flex; justify-content: center; gap: 10px;"> </div> <p>AMEX</p> <p>48 HR. FREE SHIPPING</p> <div style="text-align: center; border: 1px solid black; padding: 5px; margin: 5px 0;"> <p>CALL (208) 342-6939</p> </div> <p style="font-size: x-small;">TERMS: Free shipping all software. Add \$6.00 hardware/\$6.00 C.O.D. UPS Blue \$6.00/Oz. of Country \$9.00/Oz. Residents 4-13 weeks personal checks. Cash price only. Add 2% Visa/MC/AMEX. Prices subject to change.</p>
---	--

FREE CATALOG!

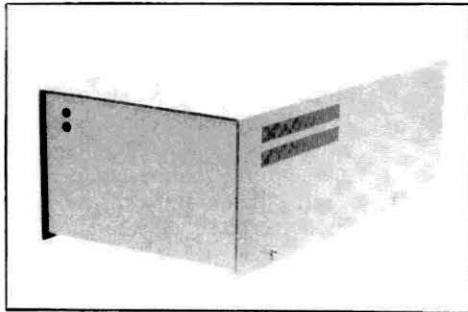
Price Changes
Occur On A
Daily Basis.
Please Call
1-800-343-8841

PRICE BREAKTHROUGH

Price Changes
Occur On A
Daily Basis.
Please Call
1-800-343-8841

80

CALL FOR UNADVERTISED SPECIALS Super Sale on New Hard Drives



Introducing

MEGADISK™

Winchester Hard Drive Ready to run on the TRS 80 Model I/III/IV/4P, Color Computer, I.B.M.-PC, Max/80. Software Drivers: LDOS, NEWDOS/80, DOSPLUS, TRSDOS 6.x

*Montezuma Micro CP/M available

Fully Warranted

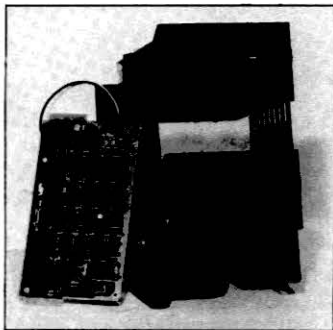
DRIVE A HARD BARGAIN™ starting at ~~\$499.95~~ Call for New low price

MEGAPLEX your Megadisk starting at \$499.95

Use up to 10 computers, multiplexed with 1 megadisk

For the TRS-80 models I, III, IV, 4P and Max/80

Call Toll Free Ordering 1-800-343-8841



\$269.95 SPECIAL

Disk Drive Upgrade Kit
for Model III/IV easy to install
system — no soldering.

Complete with controller, towers,
power supply, 1 disk drive, cables,
and easy to follow instructions.

Starting at \$269.95

Second Drive \$89.95

CANADIAN CUSTOMERS PLEASE CALL 514-383-5293

80

© 1985 SOFTWARE SUPPORT, INC.

1 Edgell Road, Framingham, MA 01701 (617) 872-9090 Telex-383425

Hours: Mon. thru Fri. 9:30 am to 5:30 pm (E.S.T.) Sat. 10 am to 3:30 pm

SERVICE POLICY — Our Professional Technical Staff Is Available To Assist You Monday Through Saturday.

WARRANTIES — Up To One Full Year Parts And Labor. Floppy Disk Drive Power Supplies — Five (5) Years.

SERVICE — 24 Hour Turn-A-Round On All In-Stock Parts. Dealer Inquiries Invited. Call 617-872-9090

Please Call For Shipping,
Handling And Insurance.
Cash Discount Prices

Toll Free 1-800-343-8841

Please Call For Our Latest Price Saving Specials.

Not Responsible for Typographical Errors.
Prices and Specifications May Change
Without Notice.

Prices Change
Every Day.
Please Call
1-800-343-8841
For Lower Prices.

PRICE BREAKTHROUGH

Prices Change
Every Day.
Please Call
1-800-343-8841
For Lower Prices.

DEALER INQUIRIES INVITED

MEGADISK™ HARD DISK DRIVE SYSTEMS

TOLL FREE ORDERING 1-800-343-8841

For the { IBM/PC, Tandy 1000, TRS/80 Models I/III/IV/4P, Compaq, Tava, PC Workalikes, Color Computers, Heath/Zenith, Max/80
Complete with Hardware, Cables, Software and Quikfit Installation

5 Megabytes Internal Mount IBM/PC	starting at \$ 279.95	
10 Megabytes Internal Mount IBM/Tandy 1000	starting at 389.95	
20 Megabytes Internal Mount IBM/Tandy 1000	starting at 489.95	Call
5 Megabytes External System	starting at 499.95	for new
10 Megabytes External System	starting at 749.95	low
20 Megabytes External System	starting at 899.95	prices
Tape Backup System — Internal Or External (IBM/PC)	starting at 449.95	

WOW! NEW LOW PRICES
CALL for unadvertised specials

DOS Systems Available: { IBM/Heath — DOS, 1.0, 2.0, 2.1, 3.0, or later
TRS/80-LDOS, TRSDOS 6.x, Newdos/80, Dosplus, CP/M, COCO DOS, Max/80 LDOS, OS9

FULLY WARRANTIED — PARTS AND LABOR — 24 HOUR SERVICE — CALL TOLL FREE — 1-800-343-8841

FLOPPY DISK DRIVES, POWER SUPPLIES AND CABINETS

Our Disk Drives are UL approved — Our Floppy Drive Cabinets and Power Supplies are Underwriters Laboratory Listed and have passed the required Federal Communications Part 15 Section B-EMI/RFI tests.
Warranty on all disk drives is one full year parts and labor. Warranty on floppy disk drive power supplies is five (5) years. In warranty or out of warranty service is 24 hour turn-a-round on all disk drives and power supplies.

Full Height — Tandon	
100-1 Single Sided 40 tk Bare	\$ 99.95
In Case with Power Supply	139.95
Dual Drives in One Cabinet	239.95
100-2 Dual Sided 40 tk Bare	109.95
In Case with Power Supply	149.95
Dual Drives in One Cabinet	259.95
Half High Drives — Tandon/TEAC	
Single Sided 40 tk Bare	79.95
In Case with Power Supply	119.95
Dual Drives in One Cabinet	209.95
Dual Sided 40 tk Bare	109.05
In Case with Power Supply	149.95
Dual Drives in One Cabinet	259.95

Apple/Franklin Disk Drives
35/40 Track in Case with Cable and Software 129.95

Commodore Disk Drives 236.95
Power Supplies and Cabinets 5 1/4" and Hard Drive Systems starting at 42.00

***** MEGADISK SPECIAL *****

Megaplex your Megadisk. Use up to 10 TRS-80 Model I, III, IV, 4P, Max/80 computers with one hard disk. Prices starting at \$499.95

IBM - PC/XT WORKALIKE

All of our computers have: 8 slot motherboard, 640K, monochrome adapter, parallel printer port, 130 watt power supply, free software, monitor, serial port, clock/calendar — all with our full warranty.

/PC - 2 Floppy Drives - Monochrome Monitor, MS-DOS	\$1,299.00
5meg XTtra - 1 Floppy Drive - Monochrome Monitor, MS-DOS	\$1,599.00
10meg XTtra - 1 Floppy Drive - Monochrome Monitor, MS-DOS	1,799.00
20meg XTtra - 1 Floppy Drive - Monochrome Monitor, MS-DOS	1,995.00
Internal Tape Backup For Any Of Above systems Add	\$449.95
Color for above systems	500.00

PRINTERS

Dot Matrix	
Citizen	\$ Call
Star Micronics — S.G. Series	starting at \$259.95
Panasonic 1090	249.95
Daisy Wheel	
Silver Reed 440 80 Column 12 CPS	315.95
550 132 Column 19 CPS	439.95
770 132 Column 36 CPS	895.00
Olympia 132 Column 14 CPS with Form and Tractor Feed	399.95
Apple/Franklin Printer Interface w/Graphics and Cable	84.95
Printer Cables	starting at 19.95
Printer Paper — Microperf Edge 1000 Sheets	16.95

ELECTRICAL

Surge Protectors — Line Filters — SL Waber — 6 Outlets with Switch	\$ 39.95
Uninterruptible Power Supplies	399.95

MODEMS

Volkmodem 300 Baud	\$ 69.95
Signalman Mark X Autodial	123.95
Mark XII 1200/300 Baud Autodial	284.95

MISCELLANEOUS

Diskettes in 10 Pack	from \$ 9.95
Twoprint Switches	from 99.95
Disk Drive Cables	from 16.00
Maintenance Cleaning Kits	from 12.00
Parallel Printer Buffers 8K	149.95
Floppy Disk Drive Cables	
1 Drive	16.00
2 Drives	18.95
Heath/Zenith 2 Drive Cables — Shielded	24.95

ALL IN-STOCK ITEMS SHIPPED WITHIN 24 HOURS. SAME DAY SHIPPING PROVIDED BY REQUEST WITHOUT ANY EXTRA HANDLING CHARGES.

80 © 1985 SOFTWARE SUPPORT, INC.

1 Edgell Road, Framingham, MA 01701 (617) 872-9090 Telex-383425

Hours: Mon. thru Fri. 9:30 am to 5:30 pm (E.S.T.) Sat. 10 am to 3:30 pm

SERVICE POLICY — Our Professional Technical Staff Is Available To Assist You Monday Through Saturday. WARRANTIES — Up To One Full Year Parts And Labor. Floppy Disk Drive Power Supplies — Five (5) Years. SERVICE — 24 Hour Turn-A-Round On All In-Stock Parts. Dealer Inquiries Invited. Call 617-872-9090

Please Call For Shipping,
Handling And Insurance.
Cash Discount Prices

Toll Free 1-800-343-8841

Please Call For Our Latest Price Saving Specials.

Not Responsible for Typographical Errors.
Prices and Specifications May Change
Without Notice.

Help Wanted

► Raymond L. Kornele (P.O. Box 69, San Jacinto, CA 92383) would like a memory map, software, and information on machine language for the MC-10. He also needs help using the WordsMC program in the book, *Color Computer Programs* (Radio Shack catalog number 62-2313).

► Jim Partridge (27 Cedar Road, Clinton, CT 06413) is in the market for an inexpensive disk drive. Contact him if you have one you'd like to sell or if you want to exchange tips and information on the CoCo.

► James Ellis (319 Croton Ave., New Castle, PA 16101) needs help adding an

opening "book" of moves to his computer chess program.

To Err Is Human

The Listing for Star Merchant (*HOT CoCo*, January 1986, p. 36) contains an error. Line 460 should end with NEXT, not N as printed.

Doctor ASCII

by Richard E. Esposito and Ralph E. Ramhoff

Having technical difficulties? Consult the Doctor for an answer. Due to the volume of mail Doctor ASCII receives, we can't guarantee publication of your query. Please send a self-addressed, stamped envelope with all letters to Doctor ASCII, c/o 80 Micro, 80 Pine St., Peterborough, NH 03458.

Q: How can I add extra features to Telewriter-64? (*Dave McNamara, Saldine, MI*)

A: *HOT CoCo* magazine has published a few suggestions for improving Telewriter (see "Improve Your Telewriter-64," April 1985, p. 40, and The Computer Room, December 1985, p. 18). Software manufacturers have also developed some enhancements.

J & R Electronics (P.O. Box 2572, Columbia, MD 21045, 301-788-0861) offers a 256K upgrade called The Banker (\$29.95 to \$99.95). It includes RAM disk software that you can incorporate directly into Telewriter's program.

Spectrum Projects (93-15 86th Drive, P.O. Box 21272, Woodhaven, NY 11421, 718-441-2807) markets Bob van der Poel's Telepatch (\$19.95). It adds a true block move, overstrike, tpool, key beep, and key repeat.

Telegraphics (\$24.95) from Derringer Software (P.O. Box 5300, Florence, SC 29502, 803-665-5676) lets you print bit-image graphics screens as letterheads; you can then print them from Telewriter's Disk I/O menu.

Q: Can I exchange files between the Tandy 1000 and the CoCo? A Radio Shack salesman told me transfer is impossible because the CoCo uses single-sided drives and the 1000 has dou-

ble-sided drives. (*J.R. Lavalley, Carrollton, TX*)

A: Mark Data Products (24001 Alicia Parkway, No. 207, Mission Viejo, CA 92691, 714-768-1551) markets CoCo-Util for \$29.95. It lets you read, write, and format single-sided CoCo disks on your Tandy 1000 or IBM PC.

D.P. Johnson (7655 S.W. Cedarcrest St., Portland, OR 97223, 503-244-8152) sells PC-XFER for \$45. With PC-XFER and Johnson's SDisk disk driver (\$29.95), you can read, write, and format single-sided MS-DOS disks on your CoCo under OS-9.

Both utilities permit transfer of ASCII text files between machines. If you want to exchange programs, you must transfer them to ASCII and then make appropriate changes in syntax.

Q: I own a CoCo with OS-9 and two disk drives—one Radio Shack and one double-sided TEAC. My TEAC includes patches to make each side operate as a separate drive; I'd like to use it as a single drive with a fast step rate. Would I hurt the drives by running them at the faster 6-millisecond step rate? Can I use Pascal-09 to generate high-resolution

color graphics? (*Dan Doner, Walsh, CO*)

A: To use double-sided disks as a single disk, you need to replace the CCDisk module with a module like the one described on page 39 of the *OS-9 Technical Information Manual*. The module supplied with the CoCo doesn't have the IT.SID routine implemented. D.P. Johnson (see address above) sells SDisk (\$29.95) as a replacement for CCDisk; it implements all the features mentioned in the manual. Johnson also markets Bootfix (\$6), which lets you boot up your system with a double-sided system disk. Bootfix puts the entire OS-9 boot routine on one side of the disk by manipulating sectors and the disk allocation table to avoid confusing the DOS command in the CoCo's ROM.

If your drives can handle operating at the higher step rate, they should run more quietly and last at least as long as they would running at a slower rate. With Pascal-09, you can access high resolution graphics by using pointer variables or Assembly-language routines.

Q: A Radio Shack salesman told me I couldn't connect an Atari 1050 disk drive to my CoCo. Is he correct? (*Joseph Smith, Flushing, NY*)

A: The salesman is right. Prior to introduction of their Motorola-based 68000 520ST, Atari used a non-standard serial interface for their disk drives. The CoCo (like the IBM PC, IBM PC clones, and TRS-80 Models I, III, and 4) uses an industry-standard disk drive interface.

Q: Can I get my CoCo to run faster, possibly by exchanging its 6809E for a 68000 or 68020? Can I substitute an Atari ROM for my CoCo's

Program Listing. Patch to make Telewriter work with the older 1.1 and newer 1.2 ROMs.

```
59 CLOADM**,OF:GOSUB500:POKE39,PEEK
(214):POKE40,PEEK(215):GOSUB330
500 P1=PEEK(40960):P2=PEEK(40961)
501 POKEOF+7931,P1:POKEOF+7932,P2
502 POKEOF+8207,P1:POKEOF+8208,P2
503 POKEOF+9720,P1:POKEOF+9729,P2
510RETURN
```

End

ROM? Can I buy parts to build my own CoCo at a reasonable cost? (*Ray Jungman, Buckholts, TX*)

A: Orbit Electronics markets their Supercomp 68008 board in various configurations from \$99 for a bare PC board to \$389 for an assembled and tested board with 256K RAM and MC68008. With the 68008 board, you'll get a faster processor but virtually no support. In my opinion, the Atari 520ST for \$1,000 is a better buy; it includes an RGB monitor, an 80-track 3½-inch drive, mouse, 68000 microprocessor, 512K RAM, Basic, Logo, GEM windowing environment, and documentation.

The Atari ROM would do you no good because it contains machine-language code for a 6502 microprocessor and thus uses a different instruction set from the 6809E. You can obtain all parts for the CoCo from Radio Shack National Parts Division (900 E. Northside Drive, Fort Worth, TX 76102, 817-870-5662). However, if you're building a CoCo from scratch, you'd find it cheaper to buy a complete CoCo and then cannibalize it.

Q: While visiting the Boston area, a friend of mine bought a 57-key CoCo 2 keyboard (catalog number 277-1019) at a Radio Shack store. It has F1, F2, control, and alternate keys in addition to the usual ones. After checking with three stores in my area, I couldn't find one and was told they can't be ordered. (*Frank Nardis, Painesville, OH*)

A: These were keyboards for the Super CoCo that Tandy canceled because of a slump in the microcomputer industry.

Q: The voltages for the CoCo and CoCo 2 disk controllers differ. Will the Disk Extended Color Basic 1.0 ROM work in a CoCo 2 controller? (*Ray S. Preston, Rarotonga, Cook Islands*)

A: The ROMs are interchangeable. The only difference lies in the resident software; fortunately, the hardware is compatible.

Q: I had trouble using the tape version of Telewriter-64 with ROM version 1.2. Applying information gleaned from the September Doctor ASCII (*HOT CoCo*, p. 13), I figured out a patch to make Telewriter-64 work on both my machines. You need to change line 59 and add lines 500-510 (see the Program Listing). (*Dale Leistico, Lompoc, CA*)

A: Thanks for the information.

Q: I bought a Comrex Cr-1 printer two years ago, and I'm having problems with the ribbon feed. Comrex

Corp. referred me to Brother International Corp. of Piscataway, NJ, for repairs, but their phone has been disconnected. A technician at a local repair center won't touch the printer without a schematic. Can you suggest someone who'll work on the Cr-1? (*David O. Winfrey, Smithsburg, MD*)

A: Adahk Inc. (7260 Collamer Road, East Syracuse, NY 13057, 315-656-3988) repairs most printers for \$59.95 plus parts. Call them and explain your situation. Due to the current industry shakeout, many companies are going under or abandoning the microcomputer market.

An interesting article, "Printer Preservation" by Vincent E. Meyer (*80 Micro*, November 1985, p. 44), tells how to perform do-it-yourself maintenance and repairs on a variety of printers. Printer prices have dropped dramatically in the last two years, though; you may find it cheaper to buy a new printer than to have your old one repaired.

Q: Your directions for the Versadump program ("Printer Answers," *HOT CoCo*, March 1985, p. 24) confused me. What is a memory map and how do I obtain it? (*Jerome Scanlon Jr., San Antonio, TX*)

A: "64K Modification Revisited" (*HOT CoCo*, June 1985, p. 40) contains a program called Enable; it switches memory maps and copies Basic ROMs into memory map 1, which is an all-RAM mode. Enable lets Basic continue running in RAM, but since Basic doesn't need all the space between addresses \$A000 and \$FDFF, you can put your own machine-language program in the unused areas (\$C000-\$FDFF for Extended Color Basic and \$E000-\$FDFF for Disk Extended Color Basic).

After you run Enable, you can offset load the 32K version of Versadump into the upper bank of memory. The 32K version of Versadump starts at address \$7A00; to load it at \$E000, type in CLOADM"PROGRAM NAME",26112. (I obtained 26112 by typing in PRINT &HE000-&H7A00.)

Q: I want to use a Centronics 701 printer with my CoCo; it has a 36-pin parallel interface. Can I buy or build an interface? (*Sudhir Kapoor, Covington, GA*)

A: You have two options. You can use a serial-to-parallel converter like the one made by Botek Instruments (4949 Hampshire, Utica, MI 48087, 313-739-2910); in that case, you won't need a software driver. The alternative, adding a parallel interface card to your CoCo's Multi-Pak Interface, lets your printer

work at its maximum speed but requires a software driver. PBJ Electronics (911 Columbia Ave., Box 813, N. Bergen, NJ 07047, 201-330-1898) sells a parallel interface card that would work.

Q: Why doesn't POKE 65495,0 work after you use the 64K Enable program? (*Milton T. Simpson, Martinsburg, WV*)

A: The POKE in question, frequently called the high-speed POKE, puts the computer in the dual-speed RAM/ROM mode: RAM runs at 1 MHz and ROM runs at 2 MHz. With 64K enabled, your computer never runs in ROM, so you don't benefit from the extra speed.

Q: How can I modify the SDUMPX2 screen print program (Doctor ASCII, *HOT CoCo*, December 1984, p. 89) to work with a Radio Shack LP VII printer? (*Andrew Paulina, Willowick, OH*)

A: We faced the same obstacle when we wrote the Versadump program. The Gemini, Epson, and IBM printers print eight dots per column in graphics mode; Radio Shack printers print only seven. Getting SDUMPX2 to work with a Radio Shack printer would require extensive rewriting. We recognized this immediately and used SDUMPX2 as a starting point in coding Versadump.

Q: I want to upgrade my E-board CoCo to 64K. The machine contains five jumpers; one of them doesn't have a 32K position marked. I understand the rest of "64K Modification Revisited" but need clarification on setting the jumpers. (*John Clanton, Phoenix, AZ*)

A: If the jumper in question has only 4K and 16K positions, set it to 16K. Unless you are upgrading from 4K, the jumper should already be set to 16K.

Q: I'm having a problem getting Possum Run (*HOT CoCo*, March 1984, p. 50) to run from disk. Would your Tapesix program (*HOT CoCo*, September 1983, p. 134) help?

I have a non-Tandy controller with JDOS. Many programs such as Telewriter-64 won't work with it. How can I tell if a program will work with JDOS? (*Frank J. Hoegler, APO, New York, NY*)

A: Since Possum Run isn't a pure machine-language program, Tapesix won't help. With a disk system, the code for a Basic program sits higher in memory (by 2K) and conflicts with the location of POKEd machine-language routines. The problem lies in line 0 and the POKE routine beginning in line 5025 of Possum Run. They POKE machine-language routines into memory starting at address 16000. If the code in your pro-

Announcing. . .

Megadisk
More Megabytes For
Less Megabucks!

1-800-343-8841

SOFTWARE SUPPORT, INC.
1 EDGELL ROAD, FRAMINGHAM, MA 01701

TURBO-M™

WHOLESALE PC™ OPENS USA WAREHOUSE TO THE PUBLIC IMPORTER OFFERING LOWEST DIRECT-TO-YOU PRICES FOR HIGH QUALITY HARDWARE FOR THE IBM and TANDY PRODUCTS

Featuring the **TURBO-M** system

TURBO-M XT/PC

Please call for **FREE** Picture and additional specifications

- **System D-Dual Floppy Drives \$1,199.95**
- **System 10-10 Megabyte Drive \$1,499.95**
- **System 20-20 Megabyte Drive \$1,649.95**

All Systems Come Standard with

- 8 Slot Motherboard
- Dual Speed CPU 4.77 6.77 mHz
- One 380K Floppy Disk Drive
- 640K Memory
- 150 Watt Power Supply
- Monochrome Graphics
- High Resolution Monitor
- Tilt and Swivel Base Free
- 5151 Compatible Keyboard
- Serial Port
- Dual Parallel Ports
- Clock Calendar
- **Turbo-M** Software
- PC DOS 2.1
- One Year Full Warranty

Soon to arrive is our **TURBO-M AT/PC 6 & 8 Mhz - Complete System - \$Call**

ADD-IN BOARDS TO HELP YOU BUILD YOUR SYSTEM

TURBO-M Motherboard Dual Speed 4.77 & 8.77	Monochrome Graphics Card with Printer Port	Floppy I/O Card Controls Two Floppy Drives, Serial Port Parallel Port Clock Calendar Game Port	Winchester Hard Drive Controller	10 Megabyte Complete System Drive, Controller, Cables and easy to follow Instructions	20 Megabyte Drive Complete System Drive, Controller, Cables and easy to follow Instructions	Color Graphics Card with Printer Port
\$299.95	\$94.95	\$109.95	\$139.95	\$369.95	\$469.95	\$118.85
150 Watt Power Supply	Multi Function Card with Space for 384K of Memory, Serial Port, Parallel Port Clock Calendar, Game Port	5151 Compatible Keyboard with Separate Cursor and Number Pads	Monochrome Monitor with High Resolution Tilt/Swivel Base	Floppy Drive Card Controls up to Four Drives	P.C. DOS 2.1	Flip Top Cabinet with Speaker
\$89.95	\$89.95	\$124.85	178.85	\$78.85	\$80.00	\$64.85

MEGADISK™ HARD DRIVES

IBM/PC and COMPATIBLES

Systems come complete with drive, controller, cables, hardware and easy to follow instructions.

- 5 megabytes starts at \$239.95
- 10 megabytes starts at \$369.95
- 20 megabytes starts at \$469.95
- 60 megabytes starts at \$1,299.95

TRS/80 MODELS I/III/IV

Systems come complete with one free software driver for TRSDOS 6, LDOS 5.1.x, DOSPLUS 3.4/4, or NEWDOS 80.CP/M is available.

Comes complete with all cables and easy to follow instruction guide. This specially designed system will give a TRUE formatted size as specified below and even higher.

- 5 megabytes \$449.95
- 10 megabytes \$679.95
- 15 megabytes \$749.95
- 20 megabytes \$849.95
- 24 megabytes \$899.95

REMOVABLE MEDIA SPECIAL

5 Megabyte Cartridge Hard Drive Now Specially Priced!

Streaming Tape Backup Systems Now Available with controller, drive and complete instructions

- 10 megabytes external systems complete \$499.95
- 20 megabytes internal systems complete \$489.95
- External system complete \$649.95

SOFTWARE SPECIALS

	Purchased with TURBO-M System	WHOLESALE PRICE
TWIN-LOTUS 123 workalike	\$109.95	\$139.95
P.C. DOS 2.1	FREE	\$ 60.00
POPCORN-WORDSTAR workalike	\$ 49.95	\$ 69.95
Popcorn dictionary	\$ 49.95	\$ 69.95

Warranty Information:

TURBO-M systems come with a full year warranty for parts and labor. TURBO-M systems are guaranteed to run all programs such as LOTUS, SYMPHONY, AUTOCAD, FLIGHT SIMULATOR, DBASE, MICROGRAPFX, WORDSTAR, LEADING EDGE W/P. **MEGADISK hard drives are fully warranted for parts and labor.**

TERMS and CONDITIONS:

All prices are cash discounted. However, we do accept MC, VISA, AMEX & DISCOVER credit cards. Please inquire. C.O.D.'s are accepted-No deposit required. Purchase Orders-Corporate, Government & School P.O.'s are accepted. Please call for details. Shipping Costs are calculated per order. Please call for total. Toll Free Ordering-"Sort of"-we will deduct \$2.00 from your order when placed.

WHOLESALE PC

25 RICHWOOD STREET
FRAMINGHAM, MA 01701

CALL 1-617-620-8882

DIVISION OF SSI

Hours: Mon.-Fri. 10:00 am to 5:30 pm (est) Sat. to 4:00 pm

"Your Satisfaction Is our Goal"

Shipments of all in-stock products are made within 24 hours, same day service is available upon request at no added cost.

Service & Returns: It is our policy to repair all service returns within 24-48 hours. Normally same day turn-around is accomplished. It is necessary to have a (R)eturn (M)aterial (A)uthorization to insure speedy service.

It's
Here!

instant CoCo's Best of '85



A Software Feast for You and Your Color Computer

No matter where, why, or how you use your Color Computer, don't let another day slip by without getting instant CoCo's **Best of '85**. It's a 30-program bonanza of software—the best programs from a whole year of **HOT CoCo** magazine—shipped to you on a single high quality cassette.

The Best of the Best

Highlights of this year's collection include "Homespread," a simple-to-use, yet full featured spreadsheet program. You'll be amazed at your own artistry as you create hi-res graphics with "Paint King." For entertainment, let "Five Card CoCo" turn your Color Computer into a tough Blackjack foe.

You get utilities, games, business and home

applications. In short, the best of the best, carefully selected for you by the editors of **HOT CoCo**.

The Year's Top Programs

From every month of 1985, we've chosen the most popular and significant programs. Software you'll find challenging, entertaining, practical, perhaps even indispensable, including...

- **JANUARY**—"The Adding Advantage"
- **FEBRUARY**—"Space Hawk"
- **MARCH**—"Don't Print There!"
- **APRIL**—"Orbital Observations"
- **MAY**—"Closed for Inventory"
- **JUNE**—"Fabulous Fonts"
- **JULY**—"Date Minder"
- **AUGUST**—"Screen Symmetry"
- **SEPTEMBER**—"Disk Data Recovery"
- **OCTOBER**—"Master World Geography"
- **NOVEMBER**—"Mathematics Helper"
- **DECEMBER**—"Crossword Creator"

No Keyboarding, No Debugging!

Get these programs, and many more, all thoroughly debugged, updated, and ready to run on your Color Computer. All 30 programs run in 32K or less, with many requiring just 16K. Complete documentation is included with each cassette.

Make '86 your year to buy nothing but the Best. Order your copy of instant CoCo's **Best Of '85** today. And while you're at it, order that other great software package...instant CoCo's **Best of '84**, still available in limited quantities!

To order, simply return the enclosed coupon, or call **1-800-258-5473**. (In NH, please call 1-924-9471.)

3-86B

Yes! I want to buy the Best.

Please send me instant CoCo's **Best of '85** for \$16.47 ea.*

Payment Enclosed () Visa () MC () AE ()

Card # Exp. Date

Signature

Name

Address

City State Zip

I WANT EVEN MORE! Please send me the **Best of '84** cassette, while supplies last, for \$16.47 ea.

Prices include postage and handling.
* Best of '85 available in February 1986.

instant CoCo • 80 Pine St. • Peterborough NH 03458

"The CBASIC Compiler"

Now anyone can create fast efficient Machine Language Programs Easily and Quickly without having to use an Editor/Assembler

CBASIC is a fully integrated, easy to use Basic program Editor and Compiler package. CBASIC is 99% syntax compatible with Disk Extended Color Basic programs, so most Basic programs can be loaded and compiled by CBASIC with little or no changes required. The compiler is an optimizing two-pass integer Basic compiler that can convert programs written in Disk Extended Color Basic into 100% pure 6809 Machine Language programs which are written directly to disk in a LOADM compatible format.

The programs generated by the compiler can be run as complete stand alone programs. A built-in linker/editor will automatically select one and only one copy of each subroutine that is required from the internal run-time library and insert them directly in the program. This eliminates the need for cumbersome, often wasteful separate "run-time" packages.

CBASIC WAS DESIGNED FOR BOTH BEGINNING & ADVANCED USERS

CBASIC is a Powerful tool for the Beginner or Novice programmer as well as the Advanced Basic or Machine Language programmer. The Beginner or Novice programmer can write and compile programs without having to worry about Stack Pointers, DP registers, memory allocation, and so on, because CBASIC will handle it for you automatically. All they have to do is write their programs using the standard Basic statements and syntax. For the advanced Basic and Machine Language programmers, CBASIC will let you take command and control every aspect of your program, even generating machine code directly in a program for specialized routines or functions.

CBASIC adds many features not found in Color Basic, like Interrupt, Reset, and On Error handling. It also has advanced programming features that allow machine level control of the Stack and Direct Page registers, variable allocation, automatic 64K RAM control, program origin and even multiple origins. It can even have machine language code generated within a program that executes just like any other Basic program line.

FULL COMMAND SUPPORT & SPEED

CBASIC features well over 100 Basic Commands and Functions that fully support Disk, Tape, Printer and Screen I/O. It also supports ALL the High and Low Resolution Graphics, Sound, Play and String Operations available in Extended Color Basic, and all with 99.9% syntax compatibility.

CBASIC is FAST. Not only will CBASIC compiled programs execute 10 to 1000 times faster than Basic, but the time it takes to develop a CBASIC program versus writing a machine language program is much, much shorter. A machine language program that might take several months to write and debug could be created using CBASIC in a matter of days or hours, even for a well experienced machine language programmer. We had a report from a CBASIC user that claimed "a Basic program that used to take 3 hours to run, now runs in 7 to 8 minutes." Another user reported a program that took 1 to 1 1/2 hours to run in Basic, now runs in 5 to 6 minutes!!

MORE THAN JUST A COMPILER

CBASIC has its own completely integrated Basic Program Editor. The Editor contained in CBASIC is used to Create and/or Edit programs for the compiler. It is a full featured editor with functions designed specifically for writing and editing Basic programs. It has built-in block Move and Copy functions with automatic program renumbering. Complete, easy to use inserting, deleting, extending and overtyping of existing program lines. It is also used for Loading, Saving, Appending (merging), Killing disk files and displaying a Disk Directory. It also has automatic line number generation for use when creating programs or inserting sequential lines between existing lines. You can set the printer baud rate and direct normal or compiled listings to the printer for hard copy. The built-in editor makes program corrections and changes as easy as "falling off a log." If CBASIC finds an error when compiling, it points to the place in the program line where the error occurred. All you have to do is tell the editor what line you want to start editing and when it is displayed, move the cursor with the arrow keys to the place where the error is and correct it. Just like that, it's simple.

HI-RES & 80 COLUMN DISPLAYS

CBASIC is the only Color Basic Compiler that includes its own Hi-Resolution 51, 64 or 85 by 24 line display. It is also the only compiler that supports both the PBJ "Word Pak" and the Double Density 80 column cards. All of these display formats are part of the standard CBASIC compiler package. Not only can these display formats be used for normal program editing and compiling, but CBASIC will also include them in your compiled programs! If you want CBASIC to include the display driver in your program, all you have to do is use a single CBASIC command "HIRES". The run-time display driver that CBASIC includes in your program is not just a simple display, but a full-featured display package. With the Hi-Resolution display package you can mix text & graphics, change characters per line, underline, character highlight, erase to end of line or screen, home cursor, home & clear screen, protect screen lines, and much more. All commands are compatible with our HI-RES II Screen Commander so you can easily develop screen layouts using HI-RES and Color Basic before you compile your program. The same applies to using the 80 column card drivers. What other Basic compiler offers you this kind of flexibility?

64K RAM SUPPORT

CBASIC makes full use of the power and flexibility of the 6883 SAM (Synchronous Address Multiplexer) in the Color Computer. It will fully utilize the 96K of address space available in the Color Computer (64K installed) during program Creation, Editing and Compilation. CBASIC has a special command for automatic 64K RAM control. When used in a program, it allows the user to use the upper 32K of RAM space automatically for variables or even program storage at run-time. It will automatically switch the ROMs in and out when needed. There are also two other commands that allow you to control the upper 32K of RAM manually, under program control. No other Color Basic compiler directly supports the use of 64K RAM like CBASIC.

ALL MACHINE LANGUAGE

CBASIC is completely written in fast efficient Machine Language, not Basic, like some other Color Basic compilers. Because of this, CBASIC can edit and compile very large programs. Even using the Hi-Resolution 51 by 24 line display, it can work with about a 34K program, and the 80 column card versions can handle almost 40K of program. Some of the other Basic compilers can only work with 16K or about 200 lines. Even working with large programs, CBASIC compiles programs with lightning fast speed. It will compile a 24K program to disk in less than 2 minutes! That's without a listing being generated. We've heard stories about some other compilers that take almost 10 minutes to compile a simple 2-3K program. You might inquire about this when you look at some of the other compilers available.

Circle 273 on Reader Service card.

THE FINISHED PRODUCT

Since CBASIC contains statements to support ALL of the I/O devices (Disk, Tape, Screen & Printer), Hi-Res Graphics, Sound, and Enhanced Screen displays, it is well suited for a wide range of programming applications. It generates a complete, Ready to Run machine language program. The finished product or program does not have to be interfaced to a Basic program to perform some of its functions or commands. This may seem obvious to you, but some of the other Color Basic compilers don't necessarily work this way. Some of their compiler commands need a separate Basic program in order for them to work. In some cases, require that a separate Basic program be interfaced to the compiled program to perform I/O functions, like INPUT, PRINT and so on. CBASIC doesn't do this. ALL of its commands are compiled into a single machine language program that does not require any kind of Basic program to make it work.

COMPATIBILITY

You may be wondering about those statements we made earlier concerning 99% or 99.9% syntax compatibility. What does that other 1% consist of? The biggest part of that 1% has to do with string arrays and variables. CBASIC does not use a "String Pool" like Color Basic. It uses absolute memory addresses to locate string variables and arrays. This is why CBASIC's string processing is so fast, it also eliminates the time consuming "Garbage Collection" problem. When CBASIC allocates space for strings, it must know how much space to use for each string. When you Dimension a string variable in CBASIC, you must tell it how much space you want to save for each element. To Dimension an array of 40 strings, 64 characters each, you would DIM DAS(40,64). If a string is not dimensioned, CBASIC will automatically allocate 32 bytes for it. If you want a single string to have enough room for 200 characters you would DIM AX\$(200). For string arrays, you would still access the element you want, the same as Color Basic, to get string #30 from the array DAS, you would still use DAS(30), the only real change is in the DIM statement. For undeclared string arrays of 10 elements or less, CBASIC will automatically reserve space for 10 (0-9) strings of 32 characters. In some other Color Basic compilers, you have to declare EVERY string variable used in the program in a DIM statement. And, to create an array of 40 strings with 64 characters each, you would have to DIM AD\$(2560), and then to access string #30, you would have to multiply 30 * 64 and use a special variable name format or access it one character at a time. Not very compatible or convenient to use, and difficult at best.

CBASIC REQUIREMENTS

CBASIC requires a minimum of 32K RAM and at least one Disk drive. We strongly recommend that you have 64K. CBASIC is compatible with all versions of Color & Extended Basic and both Disk Basic V1.0 and V1.1. Programs compiled on either system will run on systems with different ROMs. CBASIC is NOT compatible with JDOS.

DOCUMENTATION

The Documentation provided with any program is very important to the user. This is especially true when you talk about a program as complete and complex as CBASIC. Even though CBASIC was designed to be the most User-Friendly compiler on the market, we went to great lengths to provide a manual that is not only easy to use and understand, but comprehensive and complete enough for even the most sophisticated user. The manual included with CBASIC consists of approximately 120 pages of real information, not like some manuals that put just one or two short paragraphs on a page. If we did it that way, we could have easily created a three or four hundred page manual. The manual index breaks down each section of the manual and gives a 3 or 4 word description of each section and its items along with page numbers. The manual has three sections, the Editor, Compiler and Appendix. Each of these is divided into subsections, with Section and Subsection titles printed at the top of each page. If you want to, you could find the information you are looking for by simply flipping through the pages and scanning the Section titles on the top of the pages. The Manual itself is an 8 1/2 by 11 Spiral Bound book with durable leather textured covers. Some of the reports we have had from CBASIC users describe the manual as being the Best program manual they have ever used.

COMPARE THE DIFFERENCE

CBASIC is not just another Color Basic Compiler. It is the only complete Basic Compiler System for the Color Computer. Compare CBASIC's features to what other compilers offer and you'll see the difference. When comparing CBASIC to other compilers, you might want to keep some of these questions in mind. Does it support I/O functions? You can't write much of a program without PRINT, INPUT and so on. What about complex string statements, or string statements at all? How large of a program can you write? Can you compile a complex string like: MID\$(RIGHT\$(DAS\$(VAL(IN\$(LEN(LE\$)),3,3)), Can you use two character variable names for string & numeric variables, like Basic. Does it support all the Hi-Res graphics statements including PLAY, DRAW, GET and PUT, using the same syntax as Basic? Do you ever have to use a separate Basic program? Can you take complete Basic programs and compile them without extensive changes? Will they work? How do you edit a program when it has errors compiling?

PRICE VERSUS PERFORMANCE

The price of CBASIC is \$149.00. It is the most expensive Color Basic Compiler on the market, and well worth the investment. We spent over 2 years writing and refining CBASIC, to make it the Best, most Compatible Color Basic compiler available. Most of our CBASIC users already bought one or more of the other compilers on the market and have since discarded them. We even traded in a few of them. If you want a cheap compiler, we'll sell you one of those traded in, at a good price. Before you buy a compiler, compare the performance of CBASIC against any Color Basic compiler. Dollar for Dollar, CBASIC gives you more than any other Color Basic compiler available.

ORDERING INFORMATION

To order CBASIC by mail, send check or money order in the amount of \$149.00 plus \$3.00 for shipping and handling to the address listed below.

To order by VISA, MASTERCARD or COD, call us at: (702) 452-0632 (Monday thru Saturday, 8am to 5pm PST).

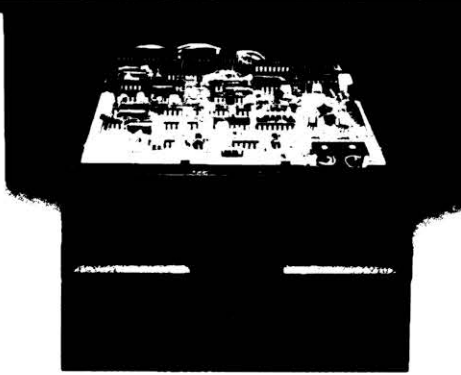
CER-COMP
5566 Ricochet Ave.
Las Vegas, NV 89110
(702) 452-0632

NEW DISK DRIVES

STARTING AT

\$ 89.⁹⁵

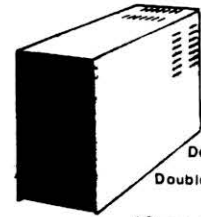
**WITH CASE &
POWER SUPPLY
\$129.95**



TANDON MPI TEAC

Speed 6 ms tk to tk and up
Capacity 250k unformatted
Tracks 40
Warranty **now 1 YEAR**

New Low Price!



40 Tks 6Ms
Double Sided
Double Density

40 or 80 Tracks

1/2 Hght. Teac/Panasonic



We carry only the finest quality disk drives • no seconds • no surplus

SATISFACTION GUARANTEED!!

ALL DRIVES FULLY TESTED & WARRANTED

Complete Disk Drive with Power Supply & Case Teac \$129.95

Two Drives in Dual Case & Power Supply Teac ~~\$279.95~~ CALL

1/2 ht double sided double density Disk Drives (Panasonic/Teac) ~~\$119.95~~

1/2 ht double sided double density Disk Drive with ps & case, ~~\$199.95~~ CALL



How to use your new drive system on audio cassette

Single ps & case \$44.95 Dual 1/2 ht ps & case \$54.95 Dual ps & case ... Call

Color Computer Controller (J&M)



\$129.95

DRIVE Ø FOR RADIO SHACK COLOR COMPUTER

TANDON, MPI OR TEAC DRIVE (SINGLE SIDED 40 TRACKS SPEED 5 MS TRK TO TRK & UP)
POWER SUPPLY and CASE, TWO DRIVE CABLE WITH ALL GOLD CONNECTORS

J&M CONTROLLER, MANUAL and DOCUMENTATION ~~\$249.95~~ \$ SALE!

DRIVE Ø FOR RADIO SHACK COLOR COMPUTER

PANASONIC 1/2 HEIGHT DOUBLE SIDED DOUBLE DENSITY DRIVE 500K unformatted
POWER SUPPLY and CASE, 2 DRIVE CABLE WITH ALL GOLD CONNECTORS

J&M CONTROLLER, MANUAL and DOCUMENTATION ~~\$279.95~~ Super!! SALE!

TAKE ADDED SAVINGS ON TWO DRIVE SYSTEMS

DISKETTES with free library case 10 Diskettes ~~\$17.95~~ \$17.95

Unadvertised Specials ~~\$Call~~ \$Call

Drives cleaned, aligned & tested ~~\$29.95~~ \$29.95

TECHNICAL STAFF ON DUTY, PLEASE CALL FOR ASSISTANCE.

**CALL US TODAY!!
ORDER TOLL FREE**

**(617) 278-6555
1-800-635-0300**

* DEALER INQUIRIES INVITED
(617) 278-6555



TRUE DATA PRODUCTS

9. S. Main
Uxbridge, MA 01569
(617) 278-6555

HOURS MON-SAT 9-6 (EST)

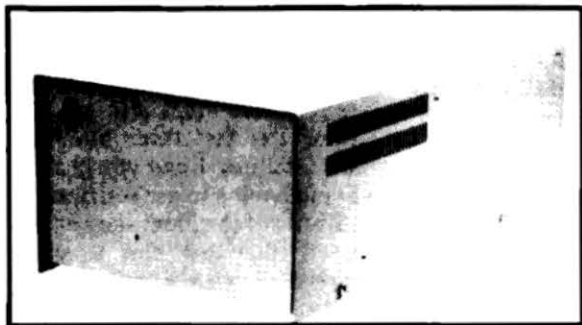
We welcome

- Visa / Master Charge
- Checks (allow 2 weeks for clearing)
- C.O.D. Add \$2.00

New Hard Drives

----- COMPLETE SYSTEM ----- JUST PLUG IN -----

**Call For
BEST PRICE**



Warranty - One Full Year

5 to 20 Megabyte, ready to run on the TRS 80 Model I/III/IV/4P, color computer,

64K UPGRADES \$39⁹⁵

stair

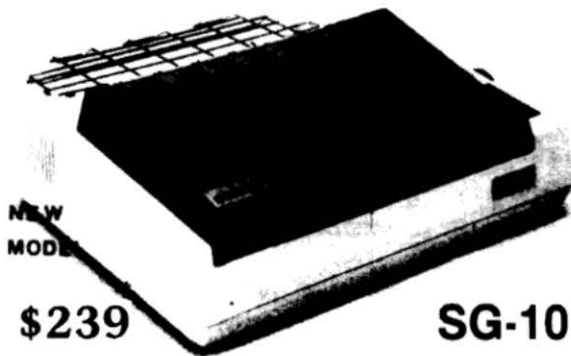
PRINTERS

PRINTER CABLES AND INTERFACES AVAILABLE
Call for current pricing

- 100 - 120 - 160 CPS
- Bidirectional Logic Seeking
- Friction and Tractor
- 9X9 Dot Matrix
- True Decenders
- High Res-Bit Image Block Graphics

- Super Script-Subscript
- Underlining
- Backspacing Doublestrike
- 5 6 8 1/2 10 12 and 17 Pitch
- Programmable Line Spacing
- SIX (6) MONTH WARRANTY

GEMINI 10X (9 Inch Carriage, 120cps) Friction and Tractor \$CALL
GEMINI 15X (15 Inch Carriage, 120cps) Friction and Tractor \$CALL
DELTA 10 (10 Inch Carriage, 160cps) Friction and Tractor \$CALL
POWER TYPE Letter quality



**NEW
MODE**

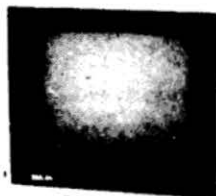
\$239

SG-10

NEW QUALITY VIDEO MONITORS

Starting at **\$79.⁹⁵**

**MONOCHROME
COLOR MONITORS**



VIDEO DRIVER

ENABLES YOUR COCO TO OPERATE WITH A VIDEO MONITOR INSTEAD OF A TELEVISION!

SCREEN DUMP PROGRAM

The best screen dump program for the Epson & Gemini printers ever!! Have the option of standard images or reverse w/regular or double sized pictures **\$19⁹⁵**

SP-3 INTERFACE for Color Computer

- 300-19,200 BAUD rates
- External to printer — No AC Plugs
- Built in modem/printer switch—no need for Y-cables or plugging/unplugging cables

Only:

~~\$59.95~~



COMPLETE SYSTEM

299⁹⁵

**NEW
LOW
PRICE**

now
with
screen
dump

Nothing more to buy!

Dealer inquiries invited



TRUE DATA PRODUCTS

9 S. Main
Uxbridge, MA 01569



**CALL US TODAY!!
ORDER TOLL FREE**

**(617) 278-6555
1-800-635-0300**

INTERCOMP SOUND Announces...

SYNTRAX: A MIDI sequencer for the Color Computer. Controls up to 16 polyphonic tracks of MIDI instruments (synthesizers, rhythm machines, etc.). **SYNTRAX** features include: interactive editor, 30,000+ note storage, transposition, clef and key signatures, chords, complex rhythms, tempo changes, independent repeats for each track, internal/external sync, all MIDI channel control data, and sequence chaining and merging. Requires 64K, disk drive, **COLOR MIDI CONNECTION**.

COLOR MIDI CONNECTION: A MIDI hardware interface with 1 MIDI-in and 3 MIDI-out connectors. The interface plugs into the cartridge slot and comes with a 40-pin female connector (no Y-cable needed).

SYNTRAX \$75.00
COLOR MIDI CONNECTION \$98.00
 Shipping & handling \$ 3.00
 Send check or money order to:

INTERCOMP SOUND
 129 Loyalist Avenue
 Rochester, NY 14624

Circle 415 on Reader Service card.

**MS-DOS AND COCO SOFTWARE
 CMODEM TELECOMMUNICATIONS
 PROGRAM \$100-FLEX, OS/9 OBJECT-
 ONLY versions: EACH \$50-FLEX, OS/9
 menu-driven with terminal mode, file
 transfer, MODEM7, XON-XOFF, etc.**

**SUPER SLEUTH DISASSEMBLERS
 EACH \$99-FLEX \$101-OS/9
 OBJECT-ONLY versions: EACH \$50-
 FLEX, OS/9, COCO**

interactively generate source on disk with labels, include xref, binary editing specify 6800, 1, 2, 3, 5, 8, 9/6502 version or Z80/8080,5 version

**CROSS-ASSEMBLERS EACH \$50-FLEX,
 OS/9, MS-DOS \$100 for 3 \$200 for all** specify for 180x, 6502, 6801, 6804, 6805, 6809, Z8, Z80, 8048, 8051, 8085, 68000 modular, free-standing cross-assemblers in C, with load utilities and macros 8-bit (not 68000) sources for additional \$50 each, \$100 for 3, \$300 for all

Computer Systems Consultants, inc.
 1454 Latta Lane, Conyers, GA 30207

Telephone 404-483-4570 or 1717 to order or to request a catalog.

Most programs in source: you must provide computer, O.S., disk type.

VISA and MASTER CARD accepted; US funds only; add 5% shipping.

FLEX™ Technical Systems Consultants; OS/9™ Microware; MS-DOS™ Microsoft.

HOT CoCo

gram is position independent, change the addresses in the 16000's by adding 16000 (e.g., 16500 becomes 32500). If that doesn't work, you'll need to disassemble the machine-language routines.

With JDOS, you should be able to execute programs if they don't use DOS routines other than DSKON and don't attempt to modify DOS routines by shifting into 64K mode. If you want the additional features of JDOS without its associated compatibility problems, I suggest you invest in ADOS.

Q: I recently purchased an RCA monitor/receiver, intending to use it as a TV and as an alternative to the green monitor I use for my CoCo. After three days, the color input to the monitor stopped working. I swapped the cables between my monochrome monitor and the RCA monitor; the monochrome output appeared black and white on the RCA monitor; the monochrome monitor displayed shades of green.

When I returned the RCA monitor to the store, they played two VCRs using the monitor and said that my computer produces RGB output while my monitor expected composite video. Is the salesman confused? Why did the monitor work for three days if the video outputs

are different? (Lynn Sundberg, San Diego, CA)

A: Most home computers, including the CoCo, modulate their video signal on TV channel 3 or 4. This modulated signal includes audio and composite video combined as if they were being sent by a TV transmitter. All home VCRs provide the same modulated signal; many also provide separate audio and composite video connections.

By connecting the shielded cable with an RCA phono plug to your CoCo before the RF modulator, you can get direct composite video. You'll also need a simple circuit to complete the hookup. Several companies market these video drivers: Computer Plus (800-343-8124) sells Mark Data's Universal Video Driver for \$29.95. (See "The Truth About Monitors," *HOT CoCo*, September 1985, p. 37 for further information on video drivers.)

The other major video interface is called RGB—red, green, blue. It separates the three colors used in a color picture. While this feature provides a high quality signal, it increases the price of the monitor, VCR, and computer. Your interface circuit may need replacement or adjustment if your CoCo usually works fine with a color TV. ■

Color Monitor

by Scott Norman

For this first edition of Color Monitor, I would like to depart from my usual beat, applications software, and discuss an innovative hardware/software combination. The product is Speech Systems' EARS (Electronic Audio Recognition System), and it lets CoCos act on voice commands. EARS is great for high-tech experimenters and should lend itself to some nifty games, but above all it provides opportunities for disabled people to communicate and control their environment.

What You Need And What You Get

To "recognize" speech, a computer takes electronic samples of voice signals and compares them with prerecorded patterns. If they match, the CoCo performs some predefined task.

In technical terms, EARS is a speaker-dependent, discrete-utterance system. Before using it, you must make your own recordings, or templates, against which EARS compares bona fide speech. A template file can contain as many as 64 utterances; each utterance can last up to two seconds (obviously, an utterance can consist of more than a single word).

You must pause briefly between utterances when you program the template to let the computer recognize the beginning and end of each utterance. EARS' documentation claims that a pause as short as 0.2 seconds is long enough, but I often found that simple Basic demonstration programs needed a full second or more to ensure word recognition.

Speech Systems sells tape and disk versions of EARS; both require a 32K CoCo. You'll find a disk drive advanta-

geous, and a 64K computer lets you add a voice synthesizer for total verbal interchange. Although EARS can generate speech, it uses a preprogrammed vocabulary; at present, it comes with only a single file containing the numbers from zero to 9. Speech Systems' own Super Voice is an excellent example of a more flexible synthesizer.

EARS' hardware consists of a plug-in cartridge for the CoCo's external port and a small microphone mounted in a lightweight headset. The cartridge's circuit board uses a General Instruments SP-1000 speech recognition integrated circuit. Speech Systems designed EARS' memory map to mesh with the CoCo disk controller and Radio Shack DOS; unfortunately, EARS doesn't work with JDOS.

You can connect a disk controller and the EARS cartridge to the CoCo by simply hooking them up to a ribbon Y-cable. Speech Systems' voice synthesizers also observe RSDOS and disk controller compatibility; they sell a special three-port cable for running disk drives, a speech recognizer, and a synthesizer simultaneously. The extra power requirements appear to be modest; I didn't detect any additional heat buildup when I ran the complete system.

The microphone, which the manufacturer claims incorporates a special noise-canceling design, plugs into a small jack on the rear of the EARS cartridge. You can plug an external audio amplifier into a second rear jack for higher-quality sound (normally, speech generated by EARS or one of its companion synthesizers comes through the speaker of your TV set or video monitor). A headband on the mike helps maintain a constant mouth-to-mike separation.

EARS' software includes the main machine-language program (also called EARS); a Basic program named EARS-EDIT with which you build word-template files; and a few demonstration routines, such as number-recognition games, demonstrations of synthesized speech, and so on. The EARS program sits in high RAM, intercepts commands from the keyboard or your program, and acts on those requiring its intervention. At run time, EARS adds 15 new key words to Basic.

Unfortunately, fewer than 9,800 bytes remain free for your program at that point. You can increase available memory by the usual technique of releasing graphics pages. No matter what your memory setup, you pay a price for speech recognition capability. However, Speech Systems managed to minimize the impact of the speech synthesizer programs: A special command, Flip, puts them into unused high RAM in a 64K computer.

Speaking Out

In my opinion, developing and testing templates with EARSEDIT is the best way to learn the system—once you've run the demos to build your enthusiasm, that is. You could use some of EARS' new Basic commands to create template files within your own programs, but the convenience of the EARSEDIT menu-driven utility makes your first attempts more successful. Once you develop a feeling for the possibilities and limitations of speech recognition, you can strike out on your own.

The process of building a template consists of typing in a word and then speaking it (in an applications program, EARS returns the string you type in as the recognized word). EARS lets you repeat each word a second time, thus providing the computer with a better statistical sample of your speech patterns with which to form matches.

While each utterance can last up to two seconds, the typed-in version must not exceed 15 characters. You don't need to use the conventional spelling of a word; you could, for example, speak in a foreign language but enter English words from the keyboard. In a more practical vein, you could establish the phrase "number 4" for the character "4"—a useful trick for verbal programming. It pays to use lengthened utterances of this kind for short words; the computer then receives a larger speech sample to chew on.

Software authors who work with the vocally disabled might take advantage of this tolerance for unconventional speech. As long as an individual can consistently make a given utterance for a

Products

All products from:
Speech Systems
38W255 Deerpath Road
Batavia, IL 60510
312-879-6880

EARS

32K required (64K if used with a speech synthesizer) \$99.95, disk or tape

Y-cable

\$28.95

Triple Y-cable

\$34.95

Super Voice

32K required for stand-alone use, 64K with EARS \$79.95, disk or tape, if purchased alone; \$59.95 with EARS



Happy New Year!

—Tandy DR0 System—

#26-3129 — \$159.95 + S & H

Quadrature Fan Module B

Piezo Electric — .11 Watts

Fits IN Coco — No Surge

5 CFM — Low Noise — UL

\$26.95 + 2.50 S & H

6809 CPU Chip — \$ 17.95

RSDOS 1.1 Disk — \$ 22.95

Extended Basic 1.1 — \$ 24.95

Gold Rom "Y" Cable — \$ 22.95

We Stock Amdek Amdisks!

VIP Integrated Library @ - 10%

DynaCalc (RSDOS) @ - 10%

Data Pack II (The Best Term.) @ - 10%

Business Software @ - 10%

E.D.C. carries the most
complete line of software
and hardware in the market.



232 RemotePlus by David Orrin

✓ Requires RS232 Pak or PBJ 2SP

✓ Remote Terminal Program See

✓ Parallel to Keyboard Rainbow review

✓ No Lost or Garbled Data September issue

✓ Error Trapping ✓ Software Clock

✓ Disable Break Key ✓ Inkey\$ Support

✓ New Terminal Program

✓ Conversation Mode

✓ All Ext. & Disk Commands RAINBOW

✓ 20 Commands Added CERTIFICATION

✓ Perfect for BBS SEAL

✓ 4 Versions Incl: Ext., 1.0, 1.1 & JDOS

✓ Much More - Uses 4K

\$24.95 + 2.50 S & H (CA. res. + tax)

Hayes 300 Modem — \$175.00

Amdek 0 & 1 + Cntrl. — \$269.95

SALE ON QUALITY MONITORS



COLOR & MICRO COMPUTERS

Software • Hardware • Support

Educational • Small Business • Games

VOICE (213) 254-6809 10 A.M.-10 P.M.

BBS (213) 258-0640 24 HRS.

300 and 1200 Baud

Extended Hours+Call before coming.

6130 YORK BOULEVARD

POST OFFICE BOX 42718

LOS ANGELES, CA. 90042

MAKE CHECKS PAYABLE TO E.D.C.

The user and computer must undergo training for EARS to work.

given purpose, you can construct programs that respond properly. Whether a casual listener can recognize the utterance is immaterial. Interfaces exist that let the CoCo use EARS to control external circuits; Speech Systems sells such a control unit and appropriate software.

The user and the computer must undergo a little training for CoCo speech recognition to work. EARS failed to recognize some of my utterances unless I was especially careful: The word "six," for example, presented a problem. EARS'EDIT's facility for selectively delet-

ing and reentering templates in a file, along with its menu selection for setting the accuracy required of a match, helped me get things right. Nevertheless, I had to pay attention to inflection when using the system.

Talking speed seemed less critical. Perhaps I didn't push things hard enough, but I felt the "dynamic time warping" compensation technique the SP-1000 chip uses handled reasonable variations in vocal speed.

Using EARS for Real

After you become comfortable with the system and template files, you should start exploring the uses of speech recognition. If you've been using EARS-EDIT in a working session, clear it from memory with a New command. This doesn't affect the EARS machine-language program or the last template file in RAM. New key words—TCLEAR, TLOAD, and others—let you load other files without benefit of EARS-EDIT.

One application described in the EARS manual is spoken Basic programming. While the process is slower than typing,

you'll find it an intriguing way to use speech recognition. You might use it to copy program listings from magazines and books.

First, assemble a file of templates for numbers, Basic key words, and letters. After you type in the new key word DRECT, EARS treats any spoken word as if you'd entered it from the keyboard. You can even indicate that EARS should interpret an utterance as a nonprinting key word: "enter," "backspace," and so on. The 64-template limit restricts you, however. You must choose the subset of key words and letters you want EARS to recognize. You'll have to type in the rest; don't expect EARS to recognize all Basic key words.

EARS' documentation details methods for writing your own Basic program using speech recognition. Instructions rely heavily on EARS key words LISN and Match. LISN produces a template of an utterance, storing it as a Basic string under a preassigned name or holding it in RAM until you invoke Match to compare the utterance against a named template already in memory. EARS asks you to supply a numerical "rejection coefficient"; with it you control the degree of accuracy the computer requires for successful recognition.

Summing Up

Despite its limitations, EARS is a fascinating product. Most restrictions stem from the CoCo's memory size and processor speed, which influence the size of the template and time required for matching speech and template.

The biggest drawback lies in the narrow limits on acceptable pronunciation and inflection. The documentation claims that experienced users might expect to achieve recognition accuracies of 95 to 98 percent; I estimate that I obtained about 90 percent accuracy in my first few days. The manual supplies hints for increasing the system's accuracy, such as recording several templates of a given word in a different tone of voice. These might boost your performance.

Coming Attractions

New trends are taking shape in the CoCo software world. Integrated software packages, "desk accessory" utilities for the office, and programs that use Macintosh-like icons appear with increasing regularity. These products and tenacious rumors for a new big-memory CoCo promise to give me plenty to explore in coming months. ■

Scott Norman is the manager of solid-state science at GTE Laboratories in Waltham, MA. Write to him at 8 Doris Road, Framingham, MA 01701.

Foreign Dealers

You have a large technical audience that speaks English and is in need of the kind of microcomputer information that *CW Communications/Peterborough* provides.

Provide your audience with the magazines they need and make money at the same time. For details on selling *80 Micro*, *InCider*, *HOT CoCo*, and *RUN* contact:

SANDRA JOSEPH WORLD WIDE MEDIA
386 PARK AVE. SOUTH
NEW YORK, N.Y. 10016
PHONE-(212) 686-1520 TELEX-620430

Circle 264 on Reader Service card.

... **VIZIDRAW— CLIPART—** ...

Print Your Graphics On T-Shirts. Send large self-address stamped envelope

MAX-X Pad a patch to run your RS-X Pad with COCOMAX \$14.95 PPD.

MUSX DISKS 1-5. See our review April 85 RAINBOW. Were \$13.95 each NOW \$6.00 EACH PPD

SHRINX—reduce your graphics pictures Reviewed March 85 RAINBOW

Special \$21.95 + \$1 Postage.

GRAPHICOM—Reg. \$29.95—NOW \$19.95 + \$2 Postage.

GRAPHICOM PICTURE DISKS (Art 1, Art 2, Aid 1, Font 1) Special \$19.95 \$2 Postage

CHRIS W. BROWN GRAPHICOM ART DISKS (New Fonts & Graphics—2 Disk Set. \$19.95 + \$2 Postage.

COMPUERVE Starter Kits—\$20 + 2 Postage.

84K CHIPS. Set of 8. \$19.95 + \$1 Post.

BASF SSDD Disks with sleeves 10-\$10 PPD.

Send for our Digitized Pix Demo Disk \$3.50 PPD.

VIDX-VIDEO DIGITIZER

Connects to the RS-232 port of your COCO, no need for Y-CABLES or MULTIPACKS! Runs on minimum 16K to 32K TAPE or DISK. Comes with software easily modifiable to your needs. WHY PAY MORE? Unlimited GREY scale when you use a color camera! The only digitizer that recommends you use a color camera!

VIDX-1 \$99.95 + \$3 Postage

VIDX-2 \$124.95 + \$3 Postage

VIDX-2 Has A RS-232 Switcher Built In

✓ CHECK US FOR OUR LOW PRICES!! SEND FOR OUR CATALOG

To Order Send Check or M. O.

GRAF X
P. O. Box 254
West Mifflin PA
15122-0254



GRAF X

From Computer Plus to YOU...

PLUS after PLUS after PLUS



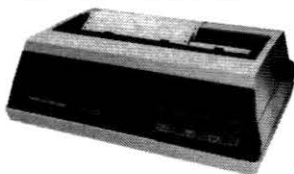
Tandy 200 24K \$739
Model 100 24K \$510



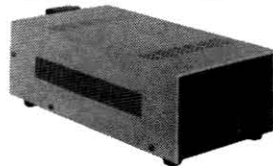
Color Computer II
w/16K Basic \$107.95
w/64K Ext. Basic \$179



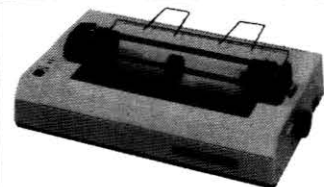
Tandy 1000 \$710
Tandy 1000 HD \$1539



Smith Corona L-1000
\$259



Color Computer Disk Drive
Drive 0 \$239 Drive 1 \$189



DMP105 \$160

BIG SAVINGS ON A FULL COMPLEMENT OF RADIO SHACK COMPUTER PRODUCTS

COMPUTERS

Tandy 1000 1 Drive 128K	710.00
Tandy 1000 HD 10 Meg. 256K	1539.00
Tandy 1200 HD 10 Meg. 256K	1599.00
Model IVD 64K with Deskmate	889.00

PRINTERS

Radio Shack DWP-105	160.00
Radio Shack DMP-130	269.00
Radio Shack DMP-430	660.00
Radio Shack CGP-220	359.00
Radio Shack DWP-220 Daisy Wheel	469.00
Silver Reed EXP-550 Daisy Wheel	425.00
Star SG-10	245.00
Star SG-15	410.00
Panasonic P-1091	259.00
CITOH Prowriter 8510AP + NLQ	345.00
Toshiba 1340	559.00
Okidata 192	375.00
Epson LX-80	245.00
Epson FX-185	369.00

MODEMS

Radio Shack DCM-3 Modem	52.00
Radio Shack DCM-5 Modem	99.00
Radio Shack DC Modem 2212	315.00

COLOR COMPUTER MISC.

Radio Shack Drive Controller	139.00
Extended Basic Rom Kit	39.95
64K Ram Upgrade Kit	39.00
Radio Shack Deluxe Keyboard Kit	24.95
HJL Keyboard Upgrade Kit	79.95
COCO Max Y Cable	27.95
Botek Serial to Parallel Conv.	69.95
Radio Shack CCR-81 Recorder	52.00
Radio Shack Deluxe Joystick	26.95
Amdek Color 300 Monitor	265.00
Amdek Video 300 Green Monitor	139.00
Amdek Video 300 Amber Monitor	149.00
Taxan Color 220 Monitor	245.00
Tatung DM-12VLG Green Monitor	139.00
Tatung DM-12VLA Amber Monitor	149.00
Radio Shack VM-2 Green Monitor	129.00
Mark Data Universal Video Driver	29.95

COLOR COMPUTER SOFTWARE

	TAPE	DISK
Approach Control Simul.	29.95	34.95
Worlds Of Flight	29.95	32.95
Mustang P-51 Flight Simul.	29.95	34.95
Spectral Typing Tutor	19.95	22.95
Dungeon Quest	24.95	27.95

Major Istar	24.95	27.95
Sam Slueth Private Eye	24.95	27.95
Mark Data Graphic Adven.	24.95	27.95
Graphicom (disk only)		29.95
COCO Max by Colorware	69.95	69.95
Color ComE (rom)	49.95	49.95
AutoTerm by PXE Computing	39.95	49.95
Key-264K by Key Color	39.95	44.95
TeleWriter 64	49.95	59.95
Deft Pascal Workbench		89.95
Deft Extra		39.95
Pro Color File Enhanced 2.0		59.95
Telegraphics by Derringer		24.95
Elite Calc	69.95	69.95
Elite Word	69.95	69.95
Elite File (disk only)		74.50
DynaCalc (disk only)		99.95
Word Pack II by PBJ		134.95
VIP Writer (tape & disk)		69.95
VIP Integrated Library (disk)		149.95

Order any 2 software pieces listed and take 10% off their listed price. All Radio Shack software 10% off list. Send for complete list.

**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

Master Control

The Command Center (\$179.95) from Curtis Manufacturing incorporates full power-line surge protection, EMI-RFI filtering, and individual power-switching capabilities for up to five computer components.

The Center sports five receptacles on its back and five push-button switches on its front that let you power a microcomputer and four peripherals. A receptacle circuit breaker and an 8½-foot power cord protect the unit. You operate the main power switch with a key, which also serves as a grounding device.

Other features include a bank of display lights and a digital clock/calendar. For more information, contact Curtis Manufacturing Co. Inc., 305 Union St., Peterborough, NH 03458, 603-924-7803.

Circle 552 on Reader Service card.

Power Struggle

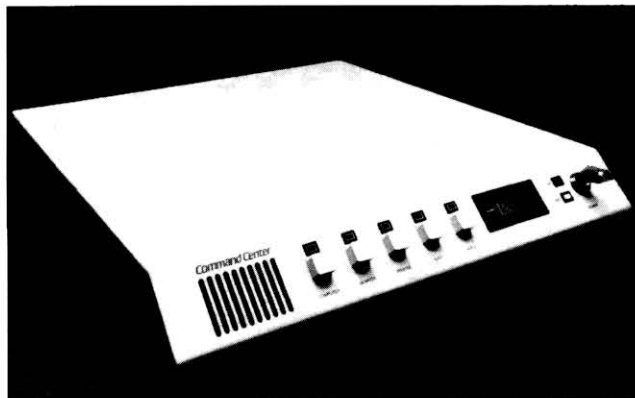
The Power-200 rechargeable battery (\$49.95) runs your Model 100 or 200 for up to 15 hours without recharging. When it needs a charge, you plug it up to your computer's ac adapter. And you can charge the Power-200 while you use the computer.

The battery is 10 inches long with a ¾ inch diameter and weighs 6 ounces. It comes with a velcro strip so you can attach it to the computer. The Power-200 can also power the Chipmunk disk drive, TRP-100 printer, and CCR-82 computer cassette recorder. For more information, contact A.R.M.S., 12131 Old Buckingham Road, Midlothian, VA 23113, 804-794-6675.

Circle 557 on Reader Service card.

A Super Book

PowerSoft Products offers a new version of *Using Super Utility 3.X*, *Super Utility 4/*



Master control for your computer and peripherals.

4P, and *PowerTOOL* (\$19.95). The user's guide tells you about the intricacies of best usage of *Super Utility* or *PowerTOOL* on the Models I, III, and 4/4P/4D. The author, Paul Wiener, describes functions that may not be immediately clear to you, including a step-by-step way to rescue and configure disks. A special section handles various kinds of NEWDOS/80 problems.

For more information, contact PowerSoft Products, 17060 Dallas Parkway, Suite 114, Dallas, TX 75248, 214-733-4475.

Circle 562 on Reader Service card.

Picture This

PIX lets you transfer pictures from one computer to another computer for editing or printing. PIX conversion programs exist for the TRS-80, IBM PC, Macintosh, Commodore-64, Atari XL, Kay-Pro, and Televideo TPC-I computers, and the Epson, Tally, and Okidata printers.

Members of TUG (telecommunications user's group) developed the PIX standard through discussions on bulletin boards. You run your graphics file through a PIX conversion program to make a PIX file and then send the file to another computer or bulletin board for storage or retrieval. PIX conversion programs are in the public

domain. For information on how to get these programs, send a legal-size, self-addressed, stamped envelope to TUG, Box 45254, Seattle, WA 98145.

Circle 565 on Reader Service card.

Family Ties

Quinsept's Family Roots, a genealogical data base program, is available for the Model 4 under TRSDOS. It stores all information (names and generations) on your ancestry, searches through that information, and prints out several types of genealogical charts and forms.

In addition to the the Model 4, Family Roots also runs on the Models 1000 and 2000 and selected CP/M machines. The program is \$185. If you would like more information, you can order the manual (\$15, which is deductible if you buy the program) or contact Quinsept Inc., P.O. Box 216, Lexington, MA 02173, 617-641-2930.

Circle 567 on Reader Service card.

Food Analysis

Diet Analysis from Health Software for the 64K Color Computer tells you how much protein, calories, vitamins, and minerals you get from your daily food intake. You enter food selections from a printed list of 181 foods.

The program compares the

computed totals to your individual minimum daily requirement (MDR) if you're over 18, or recommended daily allowance (RDA) if you're under 19. There are 14 different age/sex categories for the MDR and RDA standards.

Included with Diet Analysis are three programs on nutritional therapy, hypoglycemia, and an individual biorythm grapher. The package is \$10 for a tape and \$12.50 for a disk. For further information, contact Health Software, 1521 Lancelot, Borger, TX 79007, 806-274-3083.

Circle 569 on Reader Service card.

Numbers and Math

Computer Science Press offers *Introduction To Computer Mathematics* (\$27.95) by Russell Merris. The book describes how to use the computer to study probability, statistics, algebra, and geometry. You also learn about interactive computation, computer programming, number bases, number theory, and polynomials and functions.

A special teacher's edition of the book is available (\$32.95) that offers supplemental material, answers to the exercises, and more. For more details, contact Computer Science Press Inc., 1803 Research Blvd., Rockville, MD 20850, 301-251-9050.

Circle 561 on Reader Service card.

Payroll System

A SUPER-P/R Payroll Job Costing (\$77) from Microcomputer Applications is available for the Models I, III, 4/4P, and IBM PC and compatibles. It works together with the SUPER-P/R payroll system (\$213) so you can figure gross payroll by job or function.

During a payroll period, you can enter multiple payroll transactions for an employee using an eight-position job number and then

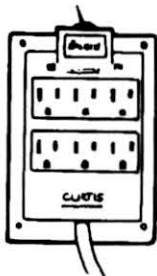
TO ORDER CALL TOLL FREE

800-843-6700

DON'T WAIT UNTIL THE LAST MINUTE!
Take advantage of these GREAT prices

LOOK

DOLLAR DISKS !!



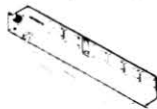
**Protect Your Software
FLIP 'N' FILE /15**

Protect Software from dust, debris and moisture. Stores up to 15 5 1/4 diskettes. List Price \$9.95 **Sale \$7.95**



Also Available	LIST	SALE
Flip 'n' File /50	\$19.95	\$14.95
Data Defender /35	\$ 9.95	\$ 7.95
Data Defender /70	\$26.95	\$19.95
Roll Top /100	\$49.95	\$39.95

**Kill Spikes, Fight Surge!
MAXI Strip**



Protect Valuable electronic equipment and data files from damage. Surge and spike suppressor and noise

filter combination converts one outlet into Six.

List \$34.95 **WOW!!!** only **\$19.95**

Also save on surge suppressors by

CURTIS . . .	LIST	SALE
Diamond	\$49.95	\$39.95
Emerald	\$59.95	\$49.95
Sapphire	\$79.95	\$69.95
Ruby	\$89.95	\$79.95

Diamond Surge Protector: Six Outlet, Switched, Plugs Directly into Outlet, Hot to Neutral and Ground Protection, LA Approved, Lifetime Warranty.
#SP-1 Retail **\$49.95**

**FAN FOLD
COMPUTER PAPER**

	LIST	SALE
15# 1000 Sheets	\$14.96	\$ 9.95
20# 1000 Sheets	\$19.95	\$14.95
20# 1000 Sheets micro-perfed	\$19.95	\$14.95
20# 2500 Sheets	\$32.95	\$26.95

**LOOK !
ONLY \$3.95 FOR THESE
INFORMATIVE AND
EDUCATIONAL BOOKS!**

80 MICRO REVIEW
READ REVIEWS OF SOFTWARE AND HARDWARE.

LOW-COST COSTING
RUN YOUR BUSINESS BETTER WITH COST MANAGEMENT BOOK AND SOFTWARE COMBINATION.

TRS-80 ENCYCLOPEDIAS !!

Get a \$200.00 value for only \$40.00! Ten volumes at \$4.00 each. You get articles on business, hardware, interfacing as well as utilities and tutorials. Call now and get the entire set while supplies last.

ANNOTATED BASIC

Two volumes of basic programming technique. Only 3.95 each

TRS-80 DATA FILES

DB management with simple basic. 3.95

SAVE !! SAVE!! SAVE!! SAVE!!

Save 10, 20, 30 dollars or more on these great programs for your TRS-80.

Night Flight!

Take part in pivotal WWII battle as you takeoff, land and fly photo recon missions to determine the location of enemy ships (cassette only) **ONLY \$8.57**

DOLLAR DISKS !!

WE KNOW OF NO BETTER DISKS AT ANY PRICE. LIFETIME WARRANTY NATIONAL BRAND.

SS/DD ONLY \$1.00 Each
DS/DD ONLY \$1.15 Each

Also . . .
Ultra Magnetic Bonus. Box of 12 22.90
Sentinel DS/DD Color disks 10 pk. 19.95
CDC SS/DD 10 pk. 9.95
CDC DS/DD 10 pk. 10.95
DYSAN DS/DD Box of 10 33.95

CALL FOR OTHER SPECIALS!!

CHECK OUT THESE LOW PRICES ON GREAT TRS-80 PROGRAMS!!

All programs guaranteed to run.
DISK PROGRAMS \$9.97

CASSETTE PROGRAMS \$8.57

GAMES

Sparrow Commander	disk
Kitchen Sink	disk
Space Shuttle	cass.
Battle Ground	cass.
Mystery Fun Hse	cass.
Galactic Empire	c & d
Dragonquest	cass.
Temple of the Sun	c & d
Ball Turret Gunner	cass.
Alien Attack Force	cass.
Cosmic Patrol	cass.
Swamp War	cass.
House of 30 Gables	cass.
Domes of Kilgary	cass.
Flying Circus	disk
Master Reversi	c & d

UTILITIES AND EDUCATION

CASSETTES
Cassette Scope
Terminal -80
Music Master
Programers Converter
Programers Primer
Investors Paradise
Renum Compress
Disassembler
Music Teacher
The Elements
Everyday Russian

DISKS

Disk Editor
Teachers Aide

instant Software

computer centers

TO ORDER CALL TOLL FREE 1-800-843-6700 OR CLIP AND MAIL:

INSTANT SOFTWARE
82 MAIN ST.
KEENE, NH 03431

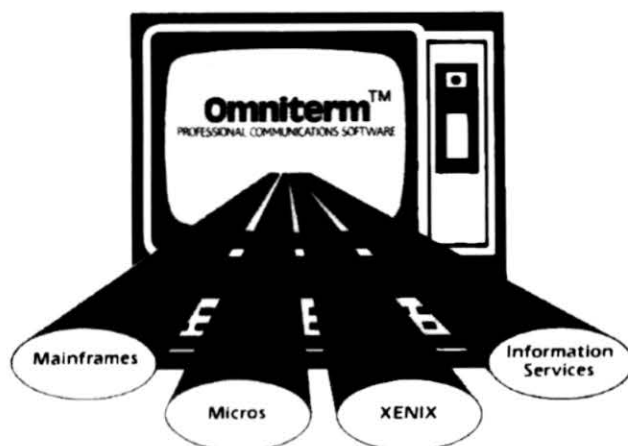
NAME _____
ADDRESS _____
CITY _____
STATE _____ ZIP _____

IN NH CALL 603-352-3763

Some items are limited in quantity.

M.C., VISA, M.O. OR CHECK ACCEPTED
ADD \$3.00 FOR SHIPPING AND HANDLING

Make Great Connections!



- Transfer files directly to/from disk
- Use XMODEM for error correction
- VT100 terminal emulation
- Autodial and logon with any autodial modem

Now available in Radio Shack Stores! Ask for

Omniterm 2 Cat # 25 1160 \$129.95 IBM PC XT AT Tandy 1000 1200HD 2000	Omniterm Plus EOS Cat # 900-0123 \$95.00 TRS-80 Model 4/4P
---	---

Omniterm is a product of Lindbergh Systems, Inc.
95 Nagog Hill Road, Acton, Ma 01720 (617) 263-5049

Circle 250 on Reader Service card.

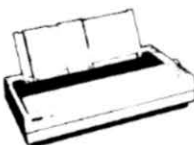
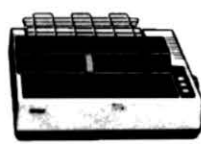
MARYMAC INDUSTRIES INC.

800-231-3680

Radio Shack® Tandy®

EPSON PRINTERS

People you Trust to give you the very best!

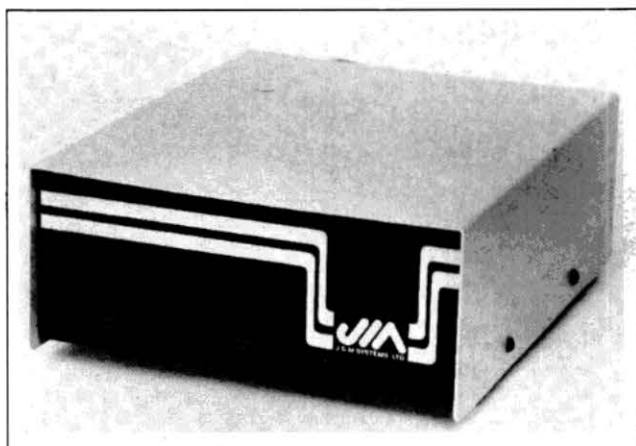


- Lowest Discount Prices
- Reliable Service
- Quality Products

"World's Largest Independent Authorized Computer Dealer"

22511 Katy Fwy., Katy (Houston) Texas 77450
(713) 392-0747 Telex 774132

NEW PRODUCTS



Hard drive system for your Color Computer.

produce transactions of gross wages by employee or number. You can transfer the transactions to the SUPER-P/R payroll file. SUPER-P/R updates employees' current earnings record, calculates all withholdings, and posts miscellaneous deductions.

For more information, contact Microcomputer Applications, 3485 Mock Orange Court S., Salem, OR 97302, 503-364-1090.

Circle 553 on Reader Service card.

CoCo Drive

A new hard drive from J&M Systems for the Color Computer comes in 5-, 10-, and 20-megabyte capacities.

The drive comes complete with case, power supply, cables, OS-9 drivers, and instructions. It runs under the OS-9 operating system and requires J&M Systems' JFD-CP disk controller. You can boot OS-9 directly from JDOS without using a boot floppy.

You can partition the drive into seven logical units or leave it as one large logical unit. The 5-megabyte system (\$495) and the 10-megabyte system (\$650) use 5¼-inch drives. The 20-megabyte system (\$795) uses 3½-inch drives. For more information, contact J&M Systems Ltd., 15100-A Central S.E., Albuquerque, NM 87123, 505-292-4182.

Circle 581 on Reader Service card.

Orderly Letters

Aquarius offers Alphabetizing, a program for early learning and beginning reading

students. The program works on the Models III, 4, and the Color Computer. It uses graphics to illustrate areas such as missing letters, letters that come before/after others, alphabetizing words with pictures, alphabetizing by first letter, and more.

Alphabetizing comes complete with teacher's guide and two disks for \$55. Back-up sets are \$16. For more information, contact Aquarius People Materials Inc., P.O. Box 128, Indian Rocks Beach, FL 33535, 813-595-7890.

Circle 558 on Reader Service card.

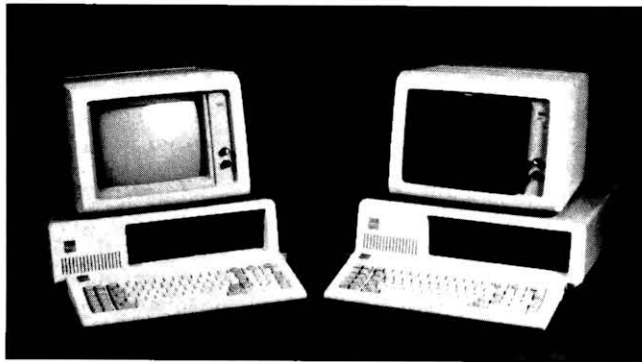
C Functions

Kim Brand's *Common C Functions* (\$17.95) from Que Corp. includes generalized functions and programs you can add to your C libraries. When you write programs, you can pull these functions from the libraries and combine and adapt them as you want. A child's one-page editor and a say-get function similar to that in dBASE II are examples of functions and programs included.

The author also provides many examples of working source code and explains why they work. In addition, the book offers dozens of C functions that teach C coding techniques. All the C code is available on a companion disk (\$49.95), which is sold separately. For more information, contact Que Corp., 7999 Knue Road, Suite 202, Indianapolis, IN 46250, 317-842-7162.

Circle 555 on Reader Service card.

NEW PRODUCTS



ACCO Anti-Glare CRT filter.

Clear View

ACCO Anti-Glare CRT filters are available in several sizes to fit your computer screen. They mount with self-adhesive clips.

The Anti-Glare CRT filters start at \$29.95. For more information, contact ACCO International Inc., 770 S. ACCO Plaza, Wheeling, IL 60090, 312-541-9500.

Circle 566 on Reader Service card.

Tax Solutions

TaxCalc Software's new version of the TaxCalc spreadsheet tax planning template incorporates tax changes made for 1985 and covers more states. Each template works with most spreadsheet programs for what-if analysis of tax liabilities. The templates and the main program, TaxCalc Tax Planner, work on all Tandy (TRSDOS and MS-DOS) computers except the Model I. You need one disk drive. The TaxCalc Tax Planner is available for \$150.

Tax-planning templates are available for Arizona, Illinois, Ohio, Oregon, and Minnesota for \$50 each; and California, New York City, and New York State for \$100 each.

The Planner lets you analyze a specific tax situation and examine alternatives. You can also use it as a tool in checking tax returns. You fill in the data that follows the appropriate tax form and use the spreadsheet's Recalculate command to post all results. The program calculates data by line number for Form 1040, Schedules D and G, Form 4972, and the alternative minimum tax under the Tax Re-

form Act of 1984. State and local templates follow appropriate state or city forms.

For more information, contact TaxCalc Software Inc., 4210 W. Vickery Blvd., Fort Worth, TX 76107, 817-738-3122.

Circle 560 on Reader Service card.

Star Trek

RAM TREK IV is a Model 4 (TRSDOS 6.X) disassembler from En Fleur Corp. that maps inner memory of RAM to a disk. You can disassemble pertinent areas of memory into symbolic, hexadecimal, or ASCII code. The program lets you stack up to 20 windows with independent address locations and modes.

RAM TREK IV lets you select banks zero to 2 for disassembly; debug, trace, and analyze software; mix or match disassembling modes among windows; edit the contents of disk or memory areas; and send disassembled information to the printer. The program costs \$39.95 plus \$2.25 for postage and handling. For more details, contact En Fleur Corp., 2494 Sun Valley Circle, Silver Spring, MD 20906, 301-598-4532.

Circle 556 on Reader Service card.

Note Maker

TCE's Memo Writer (\$64.95) is a word processor for the whole family. It lets you set character size, set tabs, substitute words, and search and replace specific words. It includes three notepads where you can store text and then copy it to other documents.

The program has click-down menus you can use

Circle 485 on Reader Service card.



Power Problems?

**SURGES!
SPIKES!
RFI/EMI!
DIPS!
SAGS!
BLACKOUTS!
BROWNOUTS!**

AEGIS™...Power Conditioning Equipment...THE SOLUTION
Protects From Damaging Voltage Surges, Lost Data, & Costly Down Time



SPIKE-SPIKER®

Transient Voltage Suppressors & Noise Filters
Eleven Models — All Models Rated 120V, 15A

Deluxe Power Console — 2-stage transient absorber; dual 5-stage filter; common & differential mode protection; nano seconds response; clamping at 150V; 8 individually switched sockets; fused; main switch; 7' cord & status lite. **\$97.95**



Quad Power Console — 3-stage transient absorber; dual 5-stage filter; common & differential mode protection; nano second response; clamping at 150V; four outlets; fused; master switch; 7' cord & status light. **\$69.95**



Mini II — Direct AC Plug-In; 2-stage transient absorber; dual 3-stage filter; common & differential mode protection; nano second response; clamping at 150V; two outlets & status lite. **\$45.95**



LINE-SAVER®

Standby Uninterruptible Power System
— Clean Reliable Power System —

Model LS-250 — 250 watts — VA capacity — \$549
Model LS-500 — 500 watts — VA capacity — \$795

Back-up time: 11 min. full load, 27 min. 1/2 load, 43 min. 1/3 load; multiple AC outlets, 3-staged transient protection; 4-staged RFI/EMI filter; sealed rechargeable internal battery; master control switch; test switch; external fuses; detachable 6' cord; external DC connectors for mobil use and extended hold-up time; many more exclusive features.

Call or write for free literature.

Dealer inquiries invited.

KALGLO
6584 Ruch Rd. Dept. 80
Bethlehem, PA 18017



Available at your local dealer or from Kalglo

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

SPIKE-SPIKER orders add \$3.00 shipping & handling

LINE-SAVER orders add \$10.00 shipping & handling

COD add additional \$3.00

PA residents add 6% sales tax

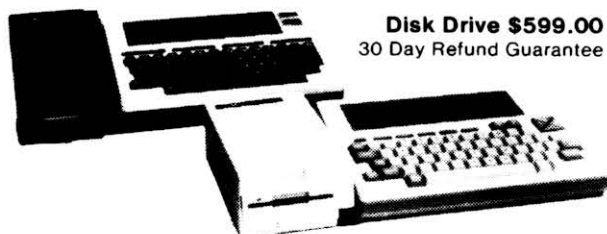
REPS-TERRITORIES AVAILABLE

Circle 440 on Reader Service card.

Personal Integrated Computers

18013 SkyPark Circle, Ste. D., Irvine, CA 92714

COMPARE PERFORMANCE



Disk Drive \$599.00
30 Day Refund Guarantee

PICDISC

- Lg. package software
- **360K** storage per disk
- **318K** file size
- **60x8** display
- Rechargeable during use & powers your computer
- OP system: **CP/M**
- **Direct Disk Access**

TANDY

- No applic. software
- **100K** storage per disk
- **29K** max file size
- **10x8** display
- Not rechargeable
- OP system:
• **Load-Store Only**

NOW: VIDEO INTERFACE FREE BASIC INTERPRETER

For catalog,

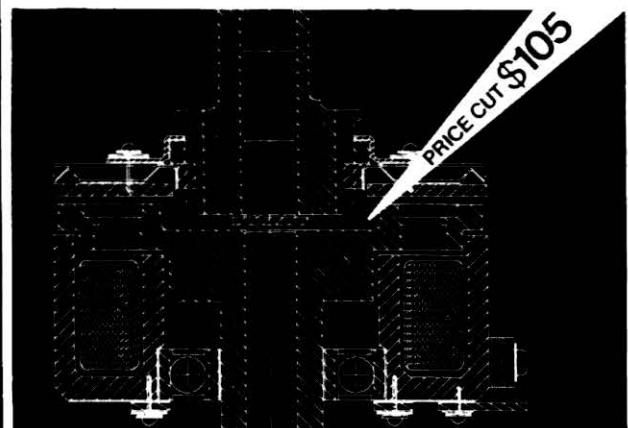
1-800-421-6300 literature 1-714-261-0503

Trademarks: Tandy, Tandy Corp; Cp/M-Digital Research

T.CAD Computer Aided Drafting software for Models III 4 4D 4p 1000 1200

Drafters, Architects, Engineers, Manufacturers, Educators, Students **save time and increase productivity** with xT.CAD Computer Aided Drafting. This affordable general purpose 2-D system offers all essential CAD features for serious production or education. Create precise working drawings, details in all common technical scales. Features include overlays, grids, cursor snap, zoom, pan, block copy, enlarge, reduce, rotate, mirror, clip, merge, upper and lower case text labels, single or multi-pen plotter hardcopy up to 24x36 inches. Developed by practicing design firm and backed since 1984 by friendly, competent support, FREE to registered users.

xT.CAD Professional software

~~\$449.95~~ \$345.00

MICRODEX CORPORATION
1212 North Sawtelle Avenue
Tucson, Arizona 85716
602/326-3502



Circle 371 on Reader Service card.

8 Mhz Super Speed-Up

THE #1 AND ONLY REAL 8-Mhz SUPER SPEED-UP IT USES ADVANCED TECHNOLOGY WITH NO WAIT-STATES. FASTER than most 16 Bit MS-DOS computers! For Models I, III, 4, 4P and 4D ALL DOSes, 4 SPEEDS (2, 4, 6, 8 Mhz). Was even tested during design at 9.25 Mhz. Software and/or hardware controlled \$129.99

SUPERRAM

THE RAMDISK program to use 128K—1 MEG for applications NEWDOS AND TRSDOS 6X with control utilities. Make your RAMDISK physical drive 0. Load whole system and your huge database, business program, etc., in memory FASTER THAN A HARD DISK. Simple installation. You can control everything AUTOMATICALLY: RAMDRIVE # (0-7), ORIG DRIVE # (0-7) format or no-format, first and last MEM BANK. AUTOMATIC RAMDISK initialization and copying of your desired files to RAMDISK. Control utility—redefine ramdisk, check, change, write/enable protect, select memory map 0, 1, 2. Select 64 x 14 or 80 x 24 Video, default or inverted video.

ONLY \$49.50

MEGA MEMORIES

POWERFUL. Now you can run your database and business programs at full speed! Load BASIC in less than a second! RUN YOUR PROGRAM NOW WITH THE SPEED OF THE FUTURE. Due to great interest we've LOWERED our PRICES!

1 MEGABYTE MEMORY was selling for \$399.95	NOW \$299.95
768K MEMORY was selling for \$339.50	NOW \$255.00
512K MEMORY was selling for \$275.50	NOW \$206.50
256K MEMORY was selling for \$164.25	NOW \$125.50

All mega memories with PAL, Dynamic Rams, and Manual.

(NEW!) AUTOMATIC PDRIVE RECOGNIZER

No more PDrive hassle. Search, find and initialize automatic all legal pdrives of unknown NEWDOS diskettes. All within a few seconds!
A must for NEWDOS owners \$29.95

(NEW!) TRSDOS 6.X NEW HARD DISK DRIVER

Now get full access to your hard disk. Original Radio Shack hard disk driver initializes only 403 Tracks, so you aren't able to use all of the tracks on your hard disk. NOW YOU CAN INITIALIZE YOUR HARD DISK WITH TRSDOS 6.X and take full advantage. FORMAT 808 tracks! \$99.50

SEATRONICS—P.O.B. 4607—6202 ZA BORGHAREN—HOLLAND—TELEX 56509 member of Dutch Export Organization. Exhibitor at COMDEX Europe 85/86

Please specify exact system configuration when ordering or requesting information.

VISA—MASTER CARD—ACCES—EUROCARD—EUROCHEQUE—
TRAVELERS CHEQUES

NEW PRODUCTS

with a mouse or a joystick, on-screen underlining, and more. The program works on a 64K Color Computer or a 128K Model 1000. Network versions are available for the Color Computer (Network II, \$129.95) and a 256K Model 1000 (Network IV, 149.95).

The Memo Writer is available via Express Order Software from Radio Shack. For more information, contact TCE Programs Inc., P.O. Box 2477, Gaithersburg, MD 20879, 800-4TC-4TCE.

Circle 568 on Reader Service card

On Line Help

IM-PRESS' 1-Hour Telecomputing by Alford, Retelle, and Wnorowski helps you get the most out of telecomputing. The book includes information on the RS-232 serial communications interface, UARTs, modems, communications software, bulletin board systems (BBSes), and how all these parts work together. The book also contains a glossary of telecomputing terms, ASCII control codes, and resource addresses.

1-Hour Telecomputing costs \$19.95 plus \$2.50 for handling. For further information, contact IM-PRESS, 1412 Rosewood, Ann Arbor, MI 48104, 313-761-2231.

Circle 551 on Reader Service card.

Portable Ware

Queue Software Systems offers C-NUM, a renumbering utility, and C-SORT, a sort utility, for the Model 100. C-BUG, a debug utility, also is available for the Models 100 and 200.

C-NUM (\$19.95) guards against line numbers less than zero or greater than 65,529, increments less than 1, unlisted line numbers, insufficient memory, and ASCII line length greater than 256 bytes. The program is fully relocatable and has complete error-checking.

C-SORT (\$24.95) sorts columnar data. Records may be up to 255 bytes long. You start and end columns within the range 1 to 255. C-SORT prints to the screen, printer, or a cassette or RAM file.

C-BUG (\$19.95) displays

Basic variables and their current values on-screen or on paper. The program is fully relocatable. You can call C-BUG several times from any Basic program to observe changes in variables' values. You'll see the line number followed by a list of variables. Control then goes back to the running Basic program.

For more information, contact Queue Software Systems, 4528 Belleview, Suite 210, Kansas City, MO 64111, 816-322-0936.

Circle 559 on Reader Service card.

Rain Forest Adventure

Treasure of the Aztecs is a high-resolution graphics adventure game for the 64K Color Computer from Compuware. You have to survive the perils of the rain forest and find the missing trail to the great treasure.

The game features special sound effects and four-voice music, over 50 high-resolution graphics screens, an advanced interpreter for full length sentence input, and load and save commands for games in progress. You can use the Radio Shack SSC Speech Cartridge with the game.

Treasure of the Aztecs costs \$24.95 for cassette and \$27.95 for disk (plus \$2 shipping). For more details, contact Compuware, Box 668, Encinitas, CA 92024, 619-436-3512.

Circle 582 on Reader Service card.

Book Worms

The Library Processes System (LPS) Catalog Card program (\$225) from EDUCOMP works on the Models III, 4/4P, and IBM PC-compatibles (including the Model 1000). You need 48K, two disk drives, and a tractor-feed printer with a slit in the bottom, like that on the DMP-400 (so cards can feed from below).

The program handles up to 660 items per disk. It lets you process full sets of catalog cards and book lists. You can add or delete entries, sort alphabetically by author or numerically by call number, and search by key word or groups of call numbers. The program

NEW PRODUCTS

Circle 63 on Reader Service card.

also allows Dewey Decimal and local cataloging (up to 10-place cutter number).

A companion to the Catalog Card program, the Spine/Pocket/Card Labels program (\$125), uses data already en-

tered with the catalog program. It produces two spine labels and two author/title labels. Contact EDUCOMP, 919 W. Canadian St., Vinitia, OK 74301, 918-256-7183.

Circle 564 on Reader Service card.

DIFFERENT TRACK



Wrist Band Mania

The Charleswater STATFREE CP407 elastic style wrist band conducts static charges away from your body via interwoven stainless steel fibers in a lightweight polyester fabric. The bands are washable and come in small, medium, and large sizes.

The ground cords come in 5-foot straight lengths or 6- and 10-foot coiled wires complete with a combination alligator clip and banana jack plug. Prices start at \$15. For more information, contact Charleswater Products Inc., 93 Border St., W. Newton, MA 02165, 617-964-8370.

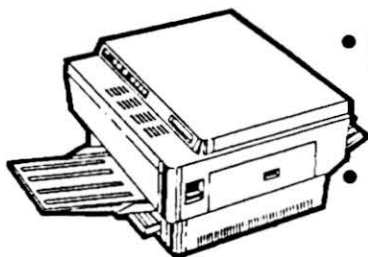
Circle 563 on Reader Service card.

New Products Index

Reader Service Number	Company	Page
566	ACCO International Inc.	163
558	Aquarius People Materials Inc.	162
557	A.R.M.S.	160
563	Charleswater Products Inc.	165
561	Computer Science Press Inc.	160
582	Computerware	164
552	Curtis Manufacturing Co. Inc.	160
564	EDUCOMP	164
556	En Fleur Corp.	163
569	Health Software	160
551	IM-PRESS	164
581	J & M Systems Ltd.	162
553	Microcomputer Applications	160
562	PowerSoft Products	160
555	Que Corp.	162
559	Queue Software Systems	164
567	Quinsept Inc.	160
560	TaxCalc Software Inc.	163
568	TCE Programs Inc.	163
565	TUG	160

New Products listings are based on information supplied in manufacturers' press releases. 80 Micro has not tested or reviewed these products and cannot guarantee any claims.

TEXT PROCESSING: TOTAL SOLUTION!



• SofType Desktop Publishing System

• LEX Word Processing System

- SofType Desktop Publishing System
 - Typesetting direct from word processing
 - Integrated Graphics
 - Special fonts for laser printers (6-40 point)
 - Output from laser printers
 - *This entire ad produced with SofType!*
- LEX Word Processing System
 - The most complete word processor!
 - Easy to learn and use
 - 120,000 word spelling dictionary
 - Mass mailing/database with sorting
 - Calculator/math functions

SofTest Inc.

555 Goffle Road, Ridgewood, N.J. 07450
Phone: (201) 447-3901, Telex: 703593

Available for Tandy Xenix and MS-DOS Computers

Circle 505 on Reader Service card.

ASSEMBLERS

Use your personal computer as a development system for machine language microprocessor programs.

THESE ARE FAST, THOROUGHLY TESTED CROSS-ASSEMBLERS

Full capability to link modules. Relocation and linkage directives. Link/locator program included. Full support of internal registers and labeled internal bits where applicable.

- Macros, Conditional assembly, Built-in editor.
- Cross-assemblers available for most microprocessors.
- Versions for PC DOS and MS DOS machines.
- Download program transfers object files to EPROM programmer.



NEW! \$100 EPROM Programmer

MicroComputer Tools Co.

1255C KENWAL RD., CONCORD, CA 94521

To order call:

(415) 825-4200

MASTERCARD AND VISA ACCEPTED



WHEN THE U.S. ARMY NEEDED PROTECTION —THEY CALLED US!

So did the Royal Canadian Navy, AT&T, Lockheed, Motorola, Clemson University, & the entire Colorado State school system.

ZAPSTAR™ PROFESSIONAL—the most advanced surge suppressor/filter available.

Zener Technology plus 3 MOV's provide maximum protection for your electronic equipment & data.

LIFETIME WARRANTY.
Exceeds IEEE standards.

The People with the Most to Protect—Call Us for Protection. At

\$79.95, Why Settle for Less?

TO ORDER
THE ZAPSTAR™
PROFESSIONAL
CALL TOLL-FREE
1-800-624-8189
IN FLORIDA
(305) 722-7770

ZAPSTAR

Severts Zorman Engineering, Inc.



CP/M-68K

TANDY-6000 MacIntosh

You purchased a computer with an MC68000 16/32-bit processor, one of the most powerful available. **Now you need the software to make it run!**

You need a powerful operating system like **CP/M-68K**. You need full-featured compilers for **FORTRAN-77, PASCAL, C, and BASIC**. And you need the compatibility to run the many CP/M-2.2 programs you are familiar with.

You need

TriSoft

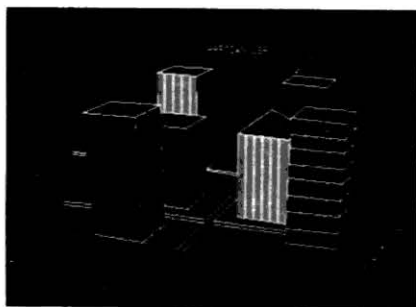
4102 Avenue G
Austin, Texas 78751

1-800-531-5170
(512) 472-0744



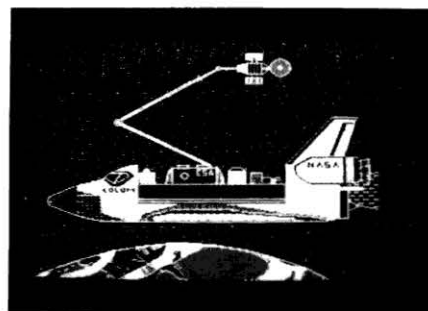
Grafyx Solution™ Save \$100.00

Hi-Resolution Graphics for Mod 4/4D/4P/III



Superior Hardware. The Grafyx Solution provides 153,600 pixel elements which are arranged in a 640 x 240 or on the Model III a 512 x 192 matrix. Hundreds of new business, personal, engineering, and educational applications are now possible. The hi-res display can be shown on top of the standard display containing text, special characters, and block graphics. This simplifies program debugging, text labeling, and upgrading current programs to use graphics. The Grafyx Solution fits completely within any tape or disk based Model 4, 4D, 4P, or III. Installation is easy with the plug-in, clip-on Grafyx Solution board.

Superior Basic. Over 20 commands are added to the Basic language. These commands will set, clear or complement points, lines, boxes, circles, ellipses, or arcs. The hi-res screen can be printed on any of 30 popular printers or saved or loaded to disk without leaving Basic. Areas may be filled in with any of 256 patterns. Sections of the screen may be saved and then put back using any of five logical functions. Labels can be printed in any direction. The viewing area can be changed. The entire screen can be complemented or cleared. Graphics Basic provides dot densities of 640 x 240, 320 x 240, 160 x 240, and 160 x 120, all of which can be used in the same display.



Superior Software. The board comes with over 40 programs and files which make it easier to use, serve as practical applications, demonstrate its capabilities, and serve as programming examples. The software works with TRSDOS 1.3, 6.1.2, 6.2; DOSPLUS 3.4, 3.5, 4; LDOS; and Newdos80. The Grafyx Solution is also supported by over 20 optional applications programs: Draw, Bizgraph, xT.CAD, 3D-Plot, Mathplot, Surface Plot, Chess, Slideshow, etc.

The Grafyx Solution package is shipped complete for \$199.95 (reduced from \$299.95). The manual only is \$12. Payment may be by check, Visa/MC, or COD. Domestic shipping is free on pre-paid orders. Texas residents add 5% tax.

MICRO-LABS, INC. 214-235-0915
902 Pinecrest, Richardson, Texas 75080

THE CLASSIFIED

80micro

HARDWARE

New life for tape systems. Your recorder + \$49.95 interface = Model I/IIIX faster. HHCI, 725 Idelwild, Bel Air, MD 21014. 301-838-7692.

MODEMS, PRINTERS, TERMINALS. Distributor pricing to end users and dealers—FREE SHIPPING CALL 1-800-833-2600 for catalog

TRS-80 Model 3 2 drives \$550.00 213-676-4178

MEGABYTE BOARD FOR THE TANDY 1000, 1200. Multifunction Board includes IM RAM, DMA controller, clock/calendar, serial/expansion port, software for up to 768K rebootable RAMdisk for \$555. Halfmeg only \$395. Matthew Electronics, Inc., 386 Avenida Vereda, Ojai, CA 93023 805-646-7790.

NEWSLETTERS

NORTHERN BYTES newsletter: Specific information for Models I/III/4(D/P). Sample \$2.00. TASIO, 704 North Pennsylvania, Lansing, Michigan 48906. 1-800-253-3200 ext. 700

HORSE RACING

\$\$\$WIN with Thoroughbred, Harness, Greyhound Handicapping Software. . \$29.95, enhanced. . \$49.95. Free information. Software Exchange, PO Box 5382, W. Bloomfield, MI 48033. (313) 626-7208.

SERVICES

Personal Computer Owners Can Earn \$1000 to \$5000 monthly selling simple services performed by their computer. Work at home in spare time. Get free list of 100 best services to offer. Write: C.I.L.C.S., PO Box 60369, San Diego, CA 92106-8369.

Custom Programming Models II, 12, 16, 6000. Basic, Cobol, Profile. Modify acct'g. packages. Call Ann (312) 698-2211.

Get the attention you deserve. 80 Micro is now offering classified ads at a special introductory price. Reach over 100,000 readers with news of your product or service. Classified ads on the pages of 80 Micro get results. Write to 80 Micro, 80 Pine St., Peterborough, NH 03458 attn: Classified manager for information and deadlines.

SOFTWARE

FREE CoCo Catalogue—CoCoNuts, Box 21272, Jamaica, NY 11421.

Profile III + /4 Users! PROAID III + /4 + provides full page reports and more. \$95. Clay Watts Software, 68C North Loop, Cedar Hill, TX 75104. 214-291-1171.

MASK MAKER—TRS-80 Model 4/4P programmers. Never write code for screen displays again! Type directly to video. Outputs Basic, Assembly source, or Himem Module. 20K /CMD program. \$49.95. VISA, M/C.

If you need a 'Meat and Potatoes' Data Base System for your Model I, III, 4 or 4P use PROFILE 3.4. Then add the 'Gravy'! NO-LIMITS from THE YANKEE CO. POX 613 POCONO PINES, PA 18350

Joe Lynn's Payroll System for all TRS-80 and Tandy computers. \$49.95 1-800-243-8563

CONVERSION SERVICES

Media Conversion for Tandy Models to over 500 systems including Mag-tape, Micro Computers, Mini Computers, Word Processors and Type-setters. Pivar Computing Services, Inc., 47 Dundee Rd. Wheeling, IL 60090. 312-459-6010.

DISKS & SUPPLIES

Disks, Program Packaging Low prices on BASF and other disks. Binders, Slips like Tandy 1000, 2000. Much more! Free Catalog. Anthropomorphic, 376 East Saint Charles, Lombard, IL 60148 (312) 629-5160, 1-800-DEAL-NOW.

Circle 549 on Reader Service Card

Get the attention you deserve. For only \$5 per word, your ad will be seen by over 100,000 dedicated TRS-80/Tandy users. Ads must be received by the 20th of the month 3 months prior to publication date. **Send yours today.**

Please Print Carefully. We'll Do Our Best, But We Can't Be Responsible For Illegible Writing.

Name _____

Address _____

City _____ State _____ Zip _____

Telephone _____

CATEGORY _____

_____ (3 words)
 _____ (6)
 _____ (9)
 _____ (12)
 _____ (15)
 _____ (18)
 _____ (21)
 _____ (24)
 _____ (27)

Number of Words _____

Total x \$5/issue = _____

For _____ issue

Make Checks Payable to 80 Micro

NO AD ACCEPTED WITHOUT PAYMENT

80 Pine St., Peterborough, NH 03458

Winning Ways

80 Micro's panel of judges (80 Micro technical editors) picked three winning two-line word processors from the many imaginative entries to the premier November 1985 Fine Lines contest (see Program Listings 1-3). We looked for smoothly working programs marked by effective and elegant programming techniques.

Our winners demonstrate several space-saving tricks and a variety of word processing features considering the contest limitations. However, since the winning lines are long, you'll need to use the edit mode to type in the listings.

Ronald Day (West Caldwell, NJ) used While...Wend loops exclusively in his wordwrapping Model 4 entry (Program Listing 1). Note the endless loop (While 1...Wend, 1 is always true) he uses to read the keyboard and process input. It's a neat way to jump back into the middle of a line of code.

Major features of Day's entry include wordwrap with text entry, and insert (shift/right-arrow) and delete (shift/left-arrow). Wordwrap doesn't work while you insert or delete text. The arrow keys give full-screen editing (with scroll protection), and control/colon dumps the screen to your printer.

Mike Strong (Annville, PA) wrote one of the best Model I full-screen editors (Program Listing 2). His entry also works on the III. To free up space for a Model I printing routine, Strong cleverly used an array (filled from a data statement) to assign functions to the editing keys.

You control the cursor with the four arrow keys, shift/down-arrow/B to home, shift/down-arrow/F to the left margin, and shift/left-arrow to back-space. Pressing the clear key clears the screen, and shift/down-arrow/E erases to the end of a line. Other commands preceded with shift/down-arrow are C and D to turn the cursor on and off, and P to print. But be careful: there's no scroll protection.

Steve Hill (Norwich, CT) used logical comparison instead of an If...Then...Else structure to make space for routines that save (control-S) and load (control-L) a file in his Model 4 program (Program Listing 3). You are prompted at the start for the file name. Hill also had room for insert- and delete-character functions (control-E and control-D). The four arrow keys allow full-screen editing. Control/homes the cursor; the shift/enter keys move it to the left margin. The clear key

clears to the end of the screen.

Honorable mention goes to Adam Rubin (Wappinger Falls, NY) for writing a powerful one-line word processor (Program Listing 4). It performs file input/output.

This Month's Model

80 Micro presents its fourth back-page programming problem this month: a two-line Basic address and telephone directory. Your entry will have to use file input/output, of course. For the sake of 80 Micro's techies, please document your entry. What computer(s) does it run on and how do you make it work? Point out or explain any noteworthy techniques (especially those POKEs and PEEKs). Packed lines of code resist understanding, so help us out. You can also win prizes for submitting problems that we use in future contests.

Please note that we've had to change the deadline from the 21st to the 15th of

each month to meet our production schedule. Otherwise the rules remain the same:

1. Owners of all TRS-80 and Tandy systems with the exception of the Pocket Computers are eligible. We'll consider degree of difficulty when comparing solutions created on different machines.
2. The deadline will always be the 15th of the issue month. Thus, this month's deadline is March 15, 1986. We realize that this doesn't give everyone the same amount of time to come up with their entries (we apologize to our overseas readers especially), but postponing the deadline any longer would add another month to our publishing the answers.
3. Speaking of the answers, they'll appear three issues from the issue in which the problem appears. Thus, this month's winners will make their appearance in the June 1986 issue.
4. Employees of CW Communications are not eligible.
5. We will not, unfortunately, be able to return entries.
6. Specify your T-shirt size. Bumper size not required. ■

Program Listing 1. Ronald Day's Model 4 word processor.

```
30 DIM Z$(22):CLS:FOR I=0 TO 22:Z$(I)=STRING$(80," "):NEXT I:WHILE 1:WHILE X$="" :X
$=INKEYS:WEND:C=ASC(X$):WHILE C<12:PRINT CHR$(C+16);:C=18:WEND:A=ROW(Y):B=POS(X)
:WHILE C=13 OR C=32 AND B>70:A=A+1:B=1:C=0:WEND:WHILE A>22:A=22:WEND:L$=Z$(A)
50 M$=MID$(L$,1,B-1):WHILE C=24:L$=M$+MID$(L$,B+1)+":PRINT@A,0,L$;C=0:WEND:
WHILE C=25:L$=M$+" "+MID$(L$,B,80-B):PRINT@A,0,L$;:C=0:WEND:PRINT@A,B-1,;:WH
ILE C>31:PRINT X$;:MID$(L$,B,1)=X$:C=0:WEND:X$="" :Z$(A)=L$:WEND
```

End

Program Listing 2. Mike Strong's Model I/III word processor.

```
1 IFF# K$=INKEYS:IF K$="" THEN 1 ELSE IF K$<CHR$(11) K$=CHR$(ASC(K$)) ELSE IF K$=CHR$(
91) K$=CHR$(27) ELSE IF K$=CHR$(24) K$=CHR$(8) ELSE IF K$=CHR$(31) CLS
2 DATA 0,28,15,14,30,29,0,24,25,26:IFF#0 FOR I=1 TO 10:READC(I):NEXT I:CLS:PRINTCHR
$(28);:F#=-1:GOTO1:ELSE IF K$=CHR$(16) FOR I=1536 TO 1632:STEP 64:FOR J=1 TO I+63:LPRIN
TCHR$(PEEK(J));:NEXT J:LPRINT:NEXT I:GOTO1:ELSE PRINT K$;:GOTO1
```

End

Program Listing 3. Steve Hill's Model 4 word processor.

```
100 CLS:IF A=19 THEN OPEN"O",1,F$:FOR I=0 TO B:PRINT@1,L$(I):NEXT I:RUN ELSE IF A=
12 THEN OPEN"1",1,F$:FOR I=0 TO 22:LINE INPUT@1,L$(I):PRINT L$(I);:NEXT I:PRINT@0,
;:CLOSE ELSE B=23:DIM L$(B):FOR I=0 TO B:L$(I)=SPACE$(80):NEXT I:INPUT"FILENAME";F
$:CLS
200 I$=INPUT$(1):A=ASC(I$):IF A=12 OR A=19 THEN 100 ELSE R=ROW(0):C=POS(0):I$=CH
R$(A-16*(A<14)):E$=SPACE$(-(A=5))+MID$(L$(R),C+(A=5)+1,(C-80)*(A<6)):MID$(L$(R),
C)=E$:PRINT E$;:PRINT@R-(A=13)+(R=B),C-1,I$;:IF A>31 THEN MID$(L$(R),C)=I$:GOT
O 200 ELSE 200
```

End

Program Listing 4. Adam Rubin's one-line Model 4 word processor.

```
1 INPUT"File";F$:OPEN"R",1,F$,1:FIELD 1,IAS G$:CLS:WHILE NOT EOF(1):GET 1:PRINT
G$;:WEND:A$=INPUT$(1):WHILE ASC(A$)=B=ASC(A$)-8:WHILE(3 AND B)=B:B=B+16:WEND:WHI
LE POS(0)>64 AND B=24:B=2:WEND:A$=CHR$(B+8):PRINT A$;:LSET G$=A$:PUT 1:A$=INPUT$(
1):WEND:CLOSE
```

End

Dac-Easy Accounting "Best Software Value"

InfoWorld
1985 "Product of the Year" Awards



Dac-Easy "Accounting Product of the Year"

PC World
December, 1985

70,000 and more every day. That's how many smart buyers have already streamlined their accounting with the fastest-selling, most highly praised accounting package ever introduced.

Dac-Easy offers seven full feature accounting modules in a perfectly integrated package, with instant access to:

- General Ledger
- Accounts Receivable
- Accounts Payable
- Forecasting
- Inventory
- Purchase Order
- Billing

You can generate over 300 reports from 80 different routines. And best of all, Dac-Easy Accounting can be used to manage either service- or product-based businesses.

Dac-Easy Accounting is non copy-protected, and comes in a handsome package with easy-to-follow documentation.

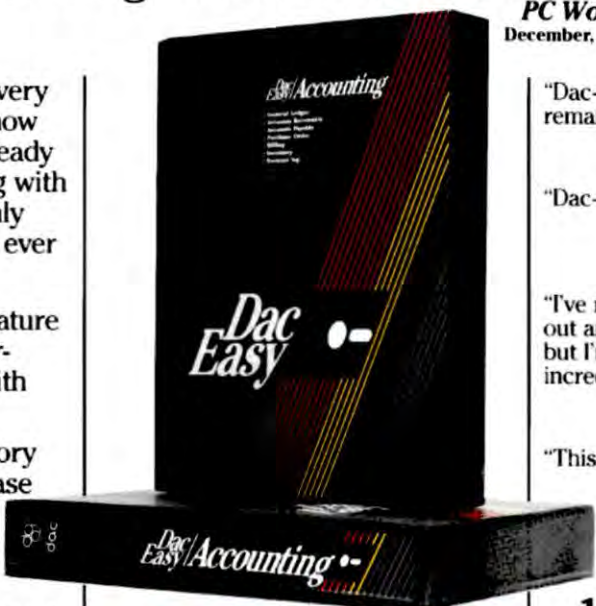
Read what the experts have to say. Compare Dac-Easy with packages sold module by module for *thousands* more. Then join more than 70,000 people who have said "Yes!" to Dac-Easy Accounting.

30-day money back guarantee

Dac Software offers an unconditional guarantee on Dac-Easy Accounting (less postage and handling). There is a \$10 restocking fee if the disk envelope is opened.

Minimum Hardware Requirements:
IBM (PCjr, PC, XT or AT) or other compatibles. (Also available for Apricot and Victor 9000.) 128K memory, one DSDD disk drive, 132 column printer in compressed mode, 80X24, CRT, MS-DOS², PC DOS¹ 2.0 or later.

¹Trademarks of International Business Machines Corp.
²Trademark of Microsoft Corp.



\$69.95

NEW!

Dac Easy Payroll™

ONLY

\$49.95

Dac-Easy Payroll was designed to solve all your personnel and payroll management problems, outperforming systems costing thousands more. And it can either stand alone or integrate perfectly with Dac-Easy Accounting to form a comprehensive business management program. Features include:

- Built-in 1986 federal and state tax tables (all 50 states).
- Automatic federal, state and city withholding calculations.
- FICA and user-defined deductions like union, insurance, etc.
- Prints continuous form checks and W-2s.
- Up to 99 departments, with earning and deduction codes per department.
- Manages hire dates, raises, reviews, terminations, vacations and sick time.
- Generates complete range of management reports.
- Supports hourly and salaried employees, four different payroll periods, tips, piece-rate and after-the-fact payroll, and much, much more!

All for only \$49.95...with the same money back guarantee!

*Hardware requirements — same as Dac-Easy Accounting, except two DSDD floppy disks required.

"Dac-Easy has done something truly remarkable."

InfoWorld Editorial,
December 2, 1985

"Dac-Easy is a genuinely amazing deal!"

PC Magazine,
October 15, 1985
"Editor's Choice"

"I've never before in a review come right out and told readers to buy a product, but I'm doing it now. Dac-Easy is an incredible value."

PC Week,
August 27, 1985

"This is an incredibly good value."

InfoWorld,
September 23, 1985

Call toll free or
return coupon below today

1-800-992-7779

Ask for operator #751

In Texas or
for more information call
214-458-0038

☎ dac software, inc.
4801 Spring Valley Rd., Building 110-B
Dallas, TX 75244

Please rush me _____ copies of Dac-Easy Accounting at \$69.95 per copy and _____ copies of Dac-Easy Payroll at \$49.95 per copy. I've enclosed \$7.50 postage and handling. In Texas, add 6½% sales tax (\$4.28 for each Accounting, \$3.06 for each Payroll). U.S. prices only. Please indicate computer brand _____

- Check Money Order
 AMEX VISA MASTERCARD

Expires _____

Account Number _____

Name _____

Company Name _____

Street Address _____

City _____

State _____ Zip _____

Phone _____

Signature _____

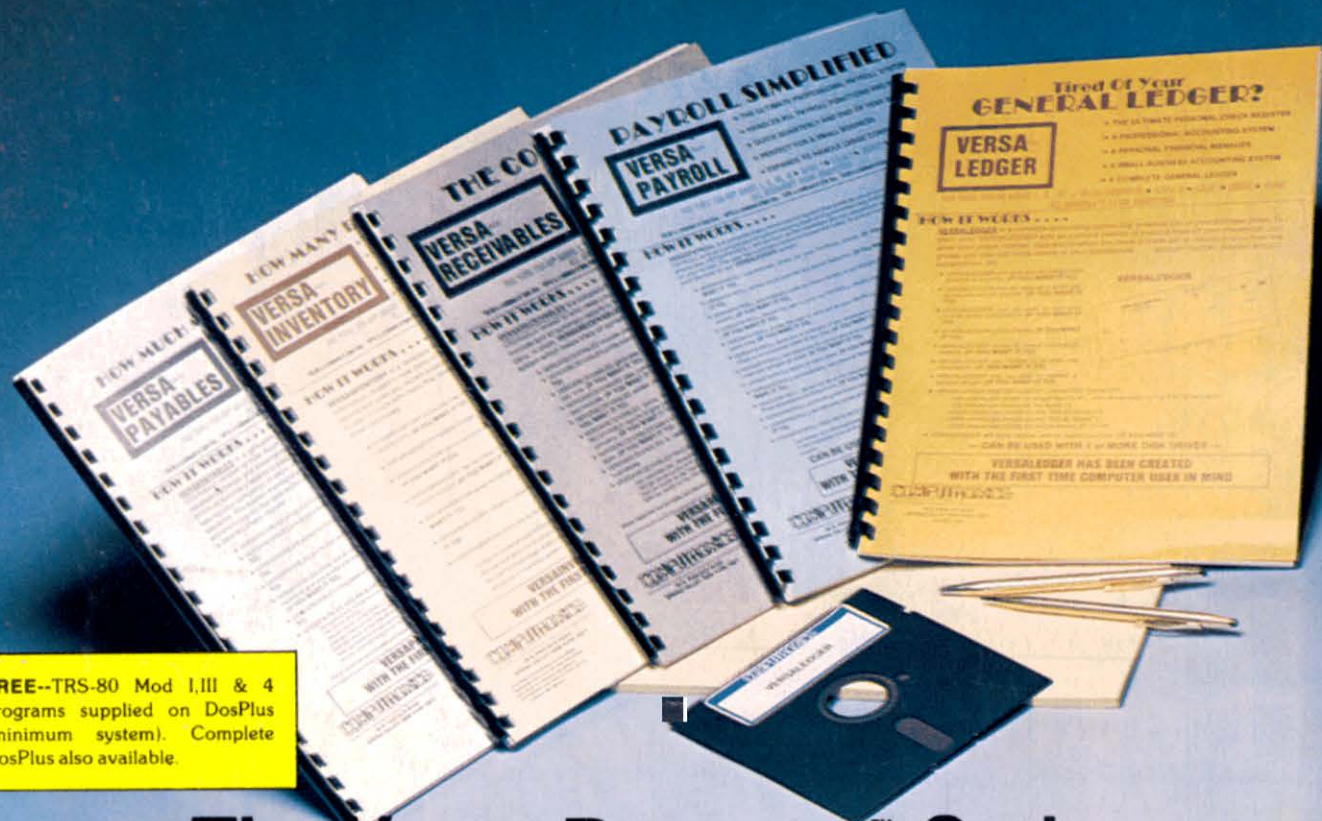
CALL 1-800-992-7779 FOR
IMMEDIATE RESPONSE

Dac Easy Series™

#751

Introducing the Most Powerful Business Software Ever!

TRS-80™ (Model I, II, III, or 16) • APPLE™ • IBM™ • OSBORNE™ • CP/M™ • KAYPRO™



FREE--TRS-80 Mod I, III & 4 programs supplied on DosPlus (minimum system). Complete DosPlus also available.

The VERSABUSINESS™ Series

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

VERSARECEIVABLES™

\$99.95

VERSARECEIVABLES™ is a complete menu-driven accounts receivable, invoicing, and monthly statement-generating system. It keeps track of all information related to who owes you or your company money, and can provide automatic billing for past due accounts. VERSARECEIVABLES™ prints all necessary statements, invoices, and summary reports and can be linked with VERSALEDGER II™ and VERSAINVENTORY™.

VERSAPAYABLES™

\$99.95

VERSAPAYABLES™ is designed to keep track of current and aged payables, keeping you in touch with all information regarding how much money your company owes, and to whom. VERSAPAYABLES™ maintains a complete record on each vendor, prints checks, check registers, vouchers, transaction reports, aged payables reports, vendor reports, and more. With VERSAPAYABLES™, you can even let your computer automatically select which vouchers are to be paid.

VERSAPAYROLL™

\$99.95

VERSAPAYROLL™ is a powerful and sophisticated, but easy to use payroll system that keeps track of all government-required payroll information. Complete employee records are maintained, and all necessary payroll calculations are performed automatically, with totals displayed on screen for operator approval. A payroll can be run totally, automatically, or the operator can intervene to prevent a check from being printed, or to alter information on it. If desired, totals may be posted to the VERSALEDGER II™ system.

VERSAINVENTORY™

\$99.95

VERSAINVENTORY™ is a complete inventory control system that gives you instant access to data on any item. VERSAINVENTORY™ keeps track of all information related to what items are in stock, out of stock, on backorder, etc., stores sales and pricing data, alerts you when an item falls below a preset reorder point, and allows you to enter and print invoices directly or to link with the VERSARECEIVABLES™ system. VERSAINVENTORY™ prints all needed inventory listings, reports of items below reorder point, inventory value reports, period and year-to-date sales reports, price lists, inventory checklists, etc.

VERSALEDGER II™

\$149.95

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

- VERSALEDGER II™ gives you almost unlimited storage capacity (300 to 10,000 entries per month, depending on the system),
- stores all check and general ledger information forever,
- prints tractor-feed checks,
- handles multiple checkbooks and general ledgers,
- prints 17 customized accounting reports including check registers, balance sheets, income statements, transaction reports, account listings, etc.

VERSALEDGER II™ comes with a professionally-written 160 page manual designed for first-time users. The VERSALEDGER II™ manual will help you become quickly familiar with VERSALEDGER II™, using complete sample data files supplied on diskette and more than 50 pages of sample printouts.

SATISFACTION GUARANTEED!

Every VERSABUSINESS™ module is guaranteed to outperform all other competitive systems, and at a fraction of their cost. If you are not satisfied with any VERSABUSINESS™ module, you may return it within 30 days for a refund. Manuals for any VERSABUSINESS™ module may be purchased for \$25 each, credited toward a later purchase of that module. All CP/M-based Computers must be equipped with Microsoft BASIC (MBASIC or BASIC 80)

To Order:

Write or call Toll-free (800) 431-2818
(N.Y.S. residents call 914-425-1535)

- * add \$3 for shipping in UPS areas
- * add \$4 for C.O.D. or non-UPS areas

- * add \$5 to CANADA or MEXICO
- * add proper postage elsewhere

DEALER INQUIRIES WELCOME

All prices and specifications subject to change / Delivery subject to availability.

COMPUTRONICS

50 N. PASCACK ROAD, SPRING VALLEY, N.Y. 10977