

January 1985  
USA \$4.00  
Canada \$4.50

# 80micro

T.M.

A CWC/I PUBLICATION

the magazine for TRS-80\* users

## Speed Demon

### The 80 Micro Basic Compiler

**Model 4 Scretsit  
Gets an Overhaul**

**NovaCalc: A Basic  
Spreadsheet Treat**

**Thirteen Patches  
To TRSDOS 1.3**

**How to Get More  
From Your DMP**

Also:  
The Next Step  
BBS Express  
Basic Takes  
Project 80  
2000 Plus





# IF SWAPPING DISKS ISN'T YOUR IDEA OF STAYING IN SHAPE...

Radio Shack's new DoubleDuty utility gives your Model 4 the muscle of two computers and makes disk-swapping a thing of the past!

## **Partitioned Memory Saves Time and Effort**

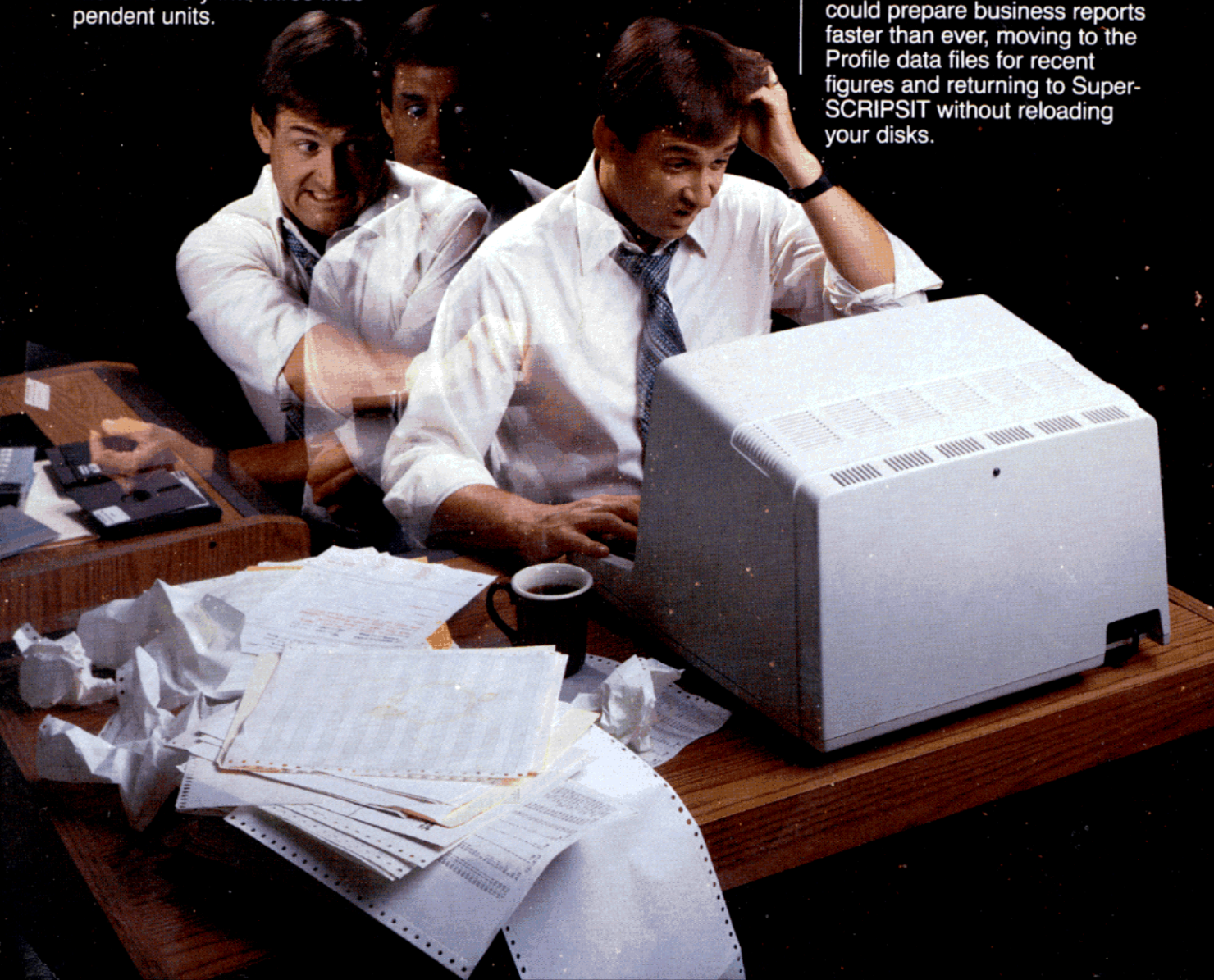
Just load DoubleDuty when you begin work, and throughout the day it improves your Model 4's performance by dividing the 128K memory into three independent units.

Two 64K partitions operate like separate computers. Load both with software designed for a 64K system and work with either program without reloading. The third partition allows you to perform TRSDOS library commands without exiting. And DoubleDuty does all this without a permanent—or expensive—change to the Model 4's memory!

## **Get the Most from Your Model 4**

Once DoubleDuty frees you from time-consuming disk swapping, you'll discover that you can accomplish more at the computer in less time.

Just think of the advantages of having the new Profile® 4 Plus filing system and Super-SCRIPSIT® word processing loaded at the same time. You could prepare business reports faster than ever, moving to the Profile data files for recent figures and returning to Super-SCRIPSIT without reloading your disks.





# ...GIVE YOUR MODEL 4 NEW DOUBLE-DUTY AND TAKE IT EASY!

## Introducing Profile 4 Plus

Our new Profile 4 Plus (26-1635, \$249.95) makes advanced data base management available to Model 4 owners. It's based on the same powerful system already used by Model 12 and Model 16 users. Profile 4 Plus offers you plenty of options for data manipulation, so you can personalize your filing system.

## Add Model 4 Word Processing

Add SuperSCRIPSIT (26-1595, \$199.00), and your Model 4 becomes an advanced word processor with multiple ed-

iting features that let you delete, insert and move blocks of text easily. SuperSCRIPSIT supports proportional-spaced printing, multiple line spacing, underline, boldface, super and subscripts, multiple columns, 80 x 24 display and reverse video to aid in editing.

## See All Three Today

Visit your nearest Radio Shack Computer Center and see how easy it is to build on your Model 4's potential with DoubleDuty and advanced Radio Shack software.

**Radio Shack**  
The Technology Store™

A DIVISION OF TANDY CORPORATION

Double Duty requires 128K Model 4. All other programs require 64K Model 4. Prices apply at participating Radio Shack Computer Centers and at participating Radio Shack stores and dealers.



**Send me the new 1985 Computer Catalog.**  
Mail to: Radio Shack, Dept. 85-A-408  
300 One Tandy Center, Fort Worth, Texas 76102

NAME \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_  
PHONE \_\_\_\_\_

175



**Model 4  
Producer Version  
Now Available**



# The **PRODUCER**

## The Professional Program Writer.

### **YOU CAN MULTIPLY YOUR PRODUCTIVITY WITH THIS SENSATIONAL SOFTWARE BREAKTHROUGH**

Beginners can now program with no experience necessary.  
Professional programmers now have a tool to save days and weeks of time.

#### **THE PRODUCER WRITES CUSTOM PROGRAMS FOR YOU!**

Why buy expensive Data Base programs that are only half effective and require the original Data Base system disk to run the finished program? The Producer is a Program Generator that can create the exact programs you want.

You don't need any previous programming experience since The Producer writes all the code for you. And when the program is finished, it runs without the support of the original Producer system disk.

#### **What Kind of Programs Can The Producer Write?**

With the Producer you can create impressive, sophisticated and functional software to manage your data. The only limit is your imagination. You can quickly and easily create programs to manage such things as mail lists, personnel records, inventory control, library catalogs, loan calculations, personal finances, and maintenance schedules.

You may never again need to buy a canned program to perform a needed task related to data storage and retrieval. The Producer can write all those programs for you, including the capacity to do all standard calculations and to generate both on-screen and printed reports. The freeform report generator even allows you to design reports on your preprinted forms.

#### **How Does The Producer Work?**

The Producer itself is a sophisticated program based on years of research and development. But The Producer was written with the end user in mind and the program generation process is quite simple.

You can begin by using a planning form designed to help you organize your program ideas. The Producer then asks you a series of simple English questions to enable those ideas to be translated into a program format. You use the computer's arrow keys and graphic characters to draw the data entry screen just the way you want it.

Then with the press of a button, the program generator takes over and does all that complex coding for you in a matter of minutes. The result is a complete program, capable of running by itself. That means your customized programs may be used independently of The Producer. (A feature not possible with Data Base creations.) You may duplicate your Producer generated programs and even sell them for others to use, without paying royalties.

#### **How Difficult Is The Producer Process to Learn?**

The Producer software package makes learning simple. An easy to follow tutorial takes you through each step of The Producer process as you sit at the computer. (This includes audio cassette tapes with the Model I/III versions.) This hands-on experience not only teaches you the process but allows you to create a program of your own design while you learn. The tutorial is all you need to get started.

Later, if you have need for more specific information, you can turn to the fully indexed Producer Reference Manual. The 200 pages of documentation cover virtually any question you may have so you will never be left guessing what to do next. The Producer package also includes a quick reference card to streamline your program operation and, should you ever need technical assistance, you may call a Producer Software technician for free counsel and trouble shooting.

#### **Is It True That I Can Both Create and Edit At Will With The Producer?**

Yes! Unlike most other program generators, The Producer gives you complete freedom to design the screen any way you wish. Experiment, rearrange, "cut and paste" between trial screens. That's the kind of versatility you get. And even after your program is complete, you can change your mind. With The Producer you can edit and refine finished programs without starting over. That's a real time saving.

#### **What Are Some Other Outstanding Features Of The Producer?**

- Our B-Tree file structure gives extremely fast access to data, allows global search and replace, data entry by batch mode and automatic file rebuilding.
- The Screen Generator is the best anywhere at any price and gives full screen control including graphics. You can add, insert, or delete, and move blocks of text on screen and between screens.
- All math calculations are supported including subtotals and global recalculations.
- The Freeform Report Generator gives you an amazing versatility to design text placement, interfield calculations, and formats. You can even print reports on your standard forms.
- The Producer package also includes a free Home Inventory program and a one year subscription to The Producer Newsletter.

### **The Producer \$199.95**

**Available now for TRS-80  
Models I, III, IV**

Ask about DATA SHUFFLER,  
New Sort/Merge Program \$34.95

**Order toll free:**

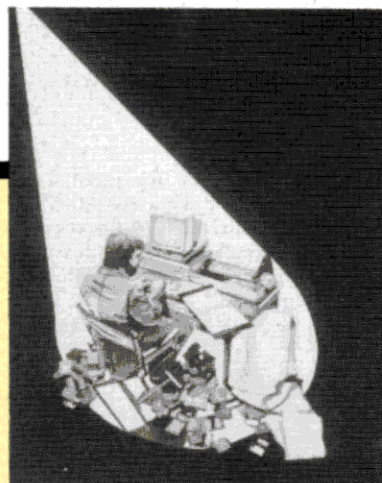
**1-800-433-5355**

**Texas 817 274-6998**





**O**wning a computer program that writes programs for you may seem like a science fiction dream. But that's exactly what The Producer does. You can now enjoy professional quality programs, custom written for your specific needs!



## Here's a sampling of what Producer users are saying:

"This program has paid for itself over and over." People tell us this repeatedly. First time computer users have successfully been able to generate programs with The Producer that rival the professional quality of programs available through commercial sources.

"There are only two things you need to say about The Producer: it's easy to use and it's powerful!" The woman who told us this had used several computers before but had no programming experience. Now she is saving time, money and effort by creating the programs she needs for her office.

"Owning The PRODUCER is like having a professional programmer on call-24 hours a day. I particularly like the fact that if I design a program to do a specific job today, and later discover it is inadequate to my changing needs, I can regenerate the program with corrections in a matter of minutes." That's right. The PRODUCER gives you the ability to edit or expand your programs in any way you choose.

"The screen generator alone is worth the price! I created a professional data entry screen in minutes just after opening the package." With our screen generator, you are the artist and you are never locked into what someone else has designed for you.

"How did I ever live without it." This often heard quote comes from experienced programmers who are now using The Producer to generate programs in a fraction of the time it previously took to them to write programs.

"The Freeform Report Generator is an amazing feature. I never thought a product like this could give me the ability to get reports on my preprinted forms, but The Producer does it all." Yes, you can put the text anywhere on the page you want, do up to 100 interfield calculations, etc. And the Freeform is now a part of The PRODUCER package.

## OTHER QUOTES FROM PRODUCER USERS

"The PRODUCER package I received was excellent. The finest software package I have ever purchased. Far beyond my expectations."

S.R. Foster, Pensacola, Florida

"I'm in love with The PRODUCER. It's one of my favorite programs."

R. Selsback, Burlingame, California

"The value of the deal, everything included, was the best I've seen to date."

G. Slusher, Martin, Kentucky

"Excellent! Above and beyond other software."

R. Hapgood, Henrietta, Texas



"The PRODUCER is the best all purpose program generator I have used. (We have tried almost all of them). The generated code is bug free, well commented and efficient."

A. Copella, Northbrook, Illinois

"This is by far my number one software and I will use it anywhere and everywhere I possibly can, both personal and in business."

R.A. Neuman, Okemos, Michigan

"The program I created with The Producer meets my needs exactly and I can change it easily as different conditions require. You can't do that with other software."

Neal Bloomenfader

"One of the best I've seen. We write about 20 volumes of material per year. Take it from a pro, it's good."

J. Crespi, Sherman Oaks, California



"Thank you for an excellent program. I agree that The PRODUCER will change the entire concept of program creation in the future. But for now, you stand as the best data base management system I can buy."

E. Sung, Vancouver, B.C.

"I think The PRODUCER will make the software hackers upgrade their products to this high level quality of the PRODUCER. I'm sure you realize that there is a lot of garbage on the market."

D.J. Smith, Lombard, Illinois

"The Producer is among the best systems I have used in ten years of professional data processing."

Dennis R. Cutshall, APO NY.

## New from Producer Software THE DATA SHUFFLER \$34.95

### All purpose Sort/Merge program

Many of you have been asking for it, so here it is. With Data Shuffler you can perform powerful sort and merge functions in conjunction with your data files. • Sorts up to 32767 Records • Sorts key size up to 256 bytes • Does up to 9 sort keys in ascending and/or descending order • Includes a complete sort parameter builder program, etc.

Data Shuffler is available now for TRS-80 Models I, III, and 4. Call us to place your order for immediate shipment.

## The PRODUCER

The Professional Program Writer

76

TRS-80 Model I Version

TRS-80 Model III Version

TRS-80 Model IV Version

**\$199.95**

(including Model 4-P)

**1-800-433-5355 Texas (817) 274-6998**

We accept money orders, cashier's checks, VISA, Master Card and American Express.



SAVE TIME  
WITH  
FASTER



**F**ASTER speeds up most TRS-80 BASIC programs by 20-50%. It analyses programs while they run, then displays a simple change to sequence variables so the ROM will find them faster.

You can use FASTER to speed up programs you've bought as well as programs you've written.

"If you... would like a significant increase in the run-time speed, then buy FASTER."

80 MICRO (April, 1982)

Models I & III, 16-48K Tape or Disk, all DOS's. **\$29.95**

## QUICK COMPRESS

This ultra-fast machine language program reduces the size and increases the speed of most BASIC programs. It removes blanks and remarks in less than 3 seconds.

Models I & III, Tape or Disk **\$19.95**  
SPECIAL: FASTER & QUICK **\$39.95**

## ERRATIC Disk Drives?

### RPM TO THE RESCUE



Find out if your drives need adjustment before you begin to lose files. **SAVE** on repair bills. This easy-to-use program measures the rotational speed and fluctuations of your disk drives, and warns you if they are running too fast, too slow, or unevenly.

80 MICRO (April, 1982) said: "If your drives have problems I recommend RPM before paying to get it repaired."

Customers agree:

"EXCELLENT — Has paid for itself already! Saved the cost of Radio Shack's doing the speed adjust!" (D.M.)

Models 1, 3 and 4 (in 3 mode). We suggest you order a copy before you need it.

RPM **\$24.95** ✓2

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

**PROSOFT**

Dept. G, Box 560, No. Hollywood, CA 91603

(818) 764-3131 Information and Same-Day Processing

TERMS: VISA, MC, checks, COD. Please add \$2.00 shipping in U.S. or Canada. \$5.00 overseas, sales tax in Ca. Most orders filled within one day.

## CUT YOURSELF LOOSE WITH TRASHMAN™



**T**HIS PROGRAM IS A MUST FOR EVERYONE WHO USES "BASIC" ON A TRS-80. It reduces string compression delays by 95% or more. You suffer from these delays whenever you run a BASIC program. Your computer locks up for seconds, or minutes, and you may even think it's "crashed."

**TRASHMAN FIXES THE PROBLEM!** As soon as you start to use it, those delays will almost disappear. The program is very easy to use, so you don't have to be a computer programmer to take advantage of it. It's written in "machine language" and uses only 578 bytes of memory for itself, plus 2 bytes for each "string" in your program. It works with other machine language programs and all the major operating systems.

**IT SHOULD HAVE BEEN BUILT INTO THE COMPUTER IN THE FIRST PLACE**, but since it wasn't, look at this chart, and then order your copy today.

# STRINGS	SECONDS DELAY NORMAL	PERCENT IMPROVEMENT TRASHMAN
10	.1	.1
250	11.8	0.7
500	45.8	1.6
1000	179.6	3.5
2000	713.2	7.8
		98.9

(Note: Not for use with The Home Accountant)

"... in those programs that use hundreds of strings arrays, the time saved is outstanding." 80 MICRO, Jan. '83

Works great, had 45 sec. delays in printing, now almost no delays. D.T.

"We have installed TRASHMAN in one of our most major programs and it has reduced the run time by over one-third! A.W.L.

TRASHMAN is available on Disk for the TRS-80 Models I & III for just **\$39.95** ✓1

Attention Software Publishers: TRASHMAN may be licensed for use with your packages. Call for details.

PUBLISHER  
Peter Hutchinson

EDITOR-IN-CHIEF  
Eric Maloney

MANAGING EDITOR (EDITORIAL)  
Peter E. McKie

MANAGING EDITOR (PRODUCTION)  
Deborah M. Sargent

REVIEW EDITOR  
Ryan Davis-Wright

COPY EDITORS

Robert Mitchell (New Products)

Penelope Hamblin

ASSISTANT EDITOR

Catherine Geary

TECHNICAL EDITORS

Bradford N. Dixon

Mare-Anne Jarvela

Keith Johnson (Load 80)

Dave Rowell

Beverly Woodbury

EDITORIAL ADMINISTRATION

Carole Macioci

ASSOCIATE EDITORS

Hardin Brothers

David Engelhardt

John B. Harrell III

Terry Kepner

Thomas L. Quindry

## ADVERTISING SALES

SALES MANAGER  
William Smith

SALES REPRESENTATIVES

Richard J. Alden

Michael Wozmak

1-800-441-4403

WEST COAST OFFICE

1060 Marsh Road

Menlo Park, CA 94025

415-328-3470

SALES MANAGER

Giorgio Saluti

SALES REPRESENTATIVES

Allison Walsh

Karen Letendre

MPA



Cover by Joe Heiner

The left bracket, [, replaces the up arrow used by Radio Shack to indicate exponentiation on our printouts. When entering programs published in 80 Micro, you should make this change.

80 formats its program listings to run 64-characters wide, the way they look on your video screen. This accounts for the occasional wrap-around you will notice in our program listings. Don't let it throw you, particularly when entering assembly listings.

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. 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.

Entire contents ©copyright 1984 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.

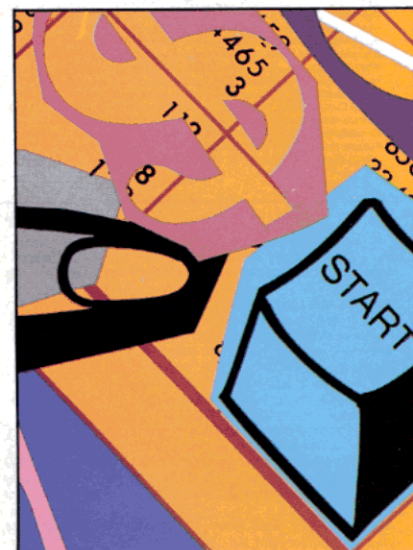




page 42



page 60



page 82

## On the Cover

- 42. Running Like the Wind** by Thomas L. Quindry  
Learn the true meaning of speed with this revamped version of 80's Basic compiler. (Models I and III; Load 80)
- 60. Model 4 Scripsit the Write Way** by Clifford Knight  
Boost the power and convenience of Model 4 Scripsit with this complete package of enhancements. (Model 4; Load 80)
- 82. NovaCalc** by Daniel Garms  
Why pay for the higher-priced spread? This full-featured spreadsheet is yours for the taking. (Models I and III; Load 80)
- 98. Picture Perfect** by Glen E. Sparks  
Create custom graphics characters with your Radio Shack dot-matrix printer. (Models I, III, and 4; Load 80)
- 112. Patch Work** by Andy Levinson  
Thirteen patches to mend the holes in TRSDOS 1.3. (Model III)

## Features

- 106. On the Record** by Jane Goodale  
Indexed random-access files give you the benefits of direct access without wasting space. (Models I and III; Load 80)
- 116. Formula Solutions** by Mike O'Neal  
Get to the root of cubic, quadratic, and linear equations. (Models I, III, 4, 1000, and 2000; Load 80)

## Departments

- |   |  |
|---|--|
| <b>6. Load 80 Directory</b>   | <b>120. Project 80</b><br>by Roger C. Alford                               |
| <b>8. Side Tracks</b><br>by Eric Maloney  | <b>132. BBS Express</b><br>by J. Stewart Schneider<br>and Charles E. Bowen |
| <b>12. Input</b>  | <b>136. Basic Takes</b><br>by Richard Ramella                              |
| <b>16. Feedback Loop</b><br>by Terry Kepner   | <b>140. The Next Step</b><br>by Hardin Brothers                            |
| <b>21. Pulse Train</b>  | <b>146. 2000 Plus</b><br>by John B. Harrell III                            |
| <b>29. Reader Exchange</b>  | <b>157. Tidbit #17</b>   |
| <b>32. Debug</b>  | <b>166. New Products</b>   |
| <b>34. Reviews</b><br>T/Maker<br>CGP-220 Color Printer<br>The Producer<br>How to Get the Most Out<br>of CompuServe<br>Zeus Editor/Assembler<br>The Source |  |



# LOAD 80

**L**oad 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.

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, 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, you must convert the

programs from Model III TRSDOS to Model 4 disk using the Model 4 CONV 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 key 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 \$21.97 or on cassette for \$11.47, including postage. Direct subscription problems or orders for Load 80 to Lori Eaton, c/o *80 Micro*, 80 Pine St., Peterborough, NH 03458.

## Directory

### FastBas

Article: Running Like the Wind (p. 42)  
System: Models I and III, 32K RAM.  
Language: Basic

An updated version of *80 Micro*'s Basic compiler.  
Cassette filespec: B, C, D, E  
Disk filespec: FASTBAS/BAS, LIST2/BAS, LIST3/BAS, PONG/BAS.

### ScriptAid

Article: Model 4 Scripts the Write Way (p. 60)  
System: Model 4, 64K RAM, one disk drive.  
Language: Assembly/Basic

An enhancement package for Model 4 Scripts. Disk filespec: ENHANCE/OVL (system), REKEY/OVL (system), PRTRDRIVE/BAS, HELPBILD/BAS. Requires editor/assembler.

### NovaCalc

Article: NovaCalc (p. 82)  
System: Models I and III, 48K RAM, one disk drive.  
Language: Basic

A Basic spreadsheet program.  
Disk filespec: NOVACALC/BAS.

### Graphics

Article: Picture Perfect (p. 98)  
System: Models I, III, and 4, 16K RAM.  
Language: Basic

Create your own graphics characters on your Radio Shack dot-matrix printer.  
Cassette filespec: J, K, L, M, N, O, P.  
Disk filespec: GRAPAPER/BAS, CHARGEN1/BAS, CHARGEN2/BAS, STRINGS3/BAS, SUBGRAF4/BAS, SUBGRAF5/BAS, SUBGRAF6/BAS.

### Random Files

Article: On the Record (p. 106)  
System: Models I and III, 32K RAM.  
Language: Basic

Three programs that create and read random-access disk files.  
Cassette filespec: G, H, I.

Disk filespec: RANDISKU/BAS, RANDISK1/BAS, LOOKDISK/BAS.

### Cubic

Article: Formula Solutions (p. 116)  
System: Model I and III, 16K RAM cassette, 32K RAM disk; Models 4, 1000, 1200, 64K RAM, one disk drive.  
Language: Basic

Programs for solving cubic, quadratic, and linear equations.

Cassette filespec: G, R.  
Disk filespec: CUBIC1/BAS, CUBIC3/BAS, CUBIC4/BAS.

### Interrupt

Article: Project 80 (p. 120)  
System: Models III and 4, 16K RAM  
Language: Assembly

Demonstration program: How to use the 8259A interrupt controller with the Project 80 general-purpose I/O board.  
Cassette filespec: INTRPT (source code). Requires Apparat editor/assembler.  
Disk filespec: INTRPT/SRC (source code). Requires Apparat editor/assembler.

### BBS

Article: BBS Express (p. 132)  
System: Model III, 48K RAM, two disk drives.  
Language: Assembly/Basic

A routine for locating message numbers.  
Cassette filespec: BBS1/(source code), S.  
Source code requires editor/assembler.  
Disk filespec: BBS1/SRC (source code), BBS2/BAS. Source code requires editor/assembler.

### Demo

Article: The Next Step (p. 140)  
System: Model III, 32K RAM, one disk drive.  
Language: Assembly

Demonstration program to create a beep generator.  
Cassette filespec: DEMO1, DEMO2, DEMO3 (all source code).  
Disk filespec: DEMO1/SRC, DEMO2/SRC, DEMO3/SRC (all source code). Requires Apparat Editor/assembler.

ART DIRECTOR  
Beth Krommes  
PRODUCTION SUPERVISOR  
Dion Owens  
PRODUCTION ASSISTANT  
George Gardos  
AD/GRAPHICS PRODUCTION  
Gary Cloett

PRODUCTION MANAGER  
Joyce Pillarella  
MANUFACTURING CONSULTANT  
Susan Gross  
TYPESETTING MANAGER  
Dennis Christensen  
FILM PRODUCTION MANAGER  
Robert M. Villeneuve  
DARKROOM MANAGER  
Nathaniel Haynes

VICE PRESIDENT/GENERAL MANAGER  
Debra Wetherbee  
VICE PRESIDENT/FINANCE  
Roger Murphy  
ASSISTANT GENERAL MANAGER  
Matt Smith  
ASSISTANT TO VP/FINANCE  
Dominique Smith  
DIRECTOR OF MARKETING SERVICES  
Pamela Esty  
DIRECTOR OF CIRCULATION  
William P. Howard  
ASSISTANT CIRCULATION MANAGER  
Frank Smith  
DIRECT AND NEWSSTAND SALES MANAGER  
Raimo Wiren  
1-800-343-0728  
DIRECTOR OF CREDIT SALES  
AND COLLECTION  
William M. Boyer  
EXECUTIVE CREATIVE DIRECTOR  
Christine Destrempe  
PUBLIC RELATIONS  
Michele Christian  
FOUNDER  
Wayne Green

*80 Micro* is a member of the CW Communications Inc. group, the world's largest publisher of computer-related information. The group publishes 92 computer publications in 19 major countries. Nine million people read one or more of the group's publications each month. Members of the group include: Argentina's *ComputersWorld/Argentina*; Australia's *Australia Computerworld*, *Australian Micro Computer Magazine*, *Australian PC World* and *Directories*; Brazil's *DataNews* and *MicroMundo*; China's *China Computerworld*; Denmark's *Computerworld/Danmark* and *MicroVerden*; Finland's *Mikro*; France's *Le Monde Informatique*, *Golden (Apple)* and *GPC (IBM)*; Germany's *Computerwoche*, *Microcomputers*, *PC Welt*, *Software Markt*, *CW Edition/Seminar*, *Computer Business* and *Commodore Magazine*; Italy's *Computerworld Italia*; Japan's *Computerworld Japan* and *Perso Com-World*; Mexico's *ComputersWorld/Mexico* and *Computumundo*; Netherlands' *CW Bemerlux* and *MicroInfo*; Norway's *Computerworld Norge* and *MikroData*; Saudi Arabia's *Saudi Computerworld*; Singapore's *The Asian Computerworld*; Spain's *ComputersWorld/España* and *MikroSistemas*; Sweden's *ComputerSweden*, *MikroData* and *Min Hemdat*; the UK's *Computer Management* and *Computer Business*; Europe: the U.S. *Computerworld*, *HOT CoCo*, *InfoCider*, *InfoWorld*, *MacWorld*, *Micro Marketworld*, *PC World*, *Run*, *73 Magazine* 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 Lori Eaton, 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 microfilm 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 Raimo Wiren, Retail Sales Manager, *80 Micro*, Pine St., Peterborough, NH 03458, (603) 343-0728.



# FAST SORT! FAST I/O!

**NEW**

**FOR TRSDOS® 6**

©1984 Logical Systems Inc.

## DSM4

### The Disk Virtual Sort Utility for the Model 4/4P!

**F**inally, the utility many of you have been asking for — a versatile Disk Sort utility for the Model 4. **DSM4** is a high speed, disk virtual sorting utility which eliminates the burden of sorting from your applications software. **DSM4** will create and maintain index files for you. Since the sort is disk virtual, your only limitation is the amount of available disk space, not available memory. **DSM4** can sort almost any type of field in a file. The length of each field may be up to 253 bytes. The field types that **DSM4** will handle include compressed integer, single precision and double precision fields, in addition to ASCII data. Single and double precision numbers may be in the format used by Model 4 Microsoft BASIC, or may be in 'C' floating point format (as implemented by Manx AZTEC 'C').

With **DSM4**, disk files can be up to 65535 logical records, with an LRL of 1 to 1024 bytes. You may specify up to 24 select fields to determine which records will be included in the sort. Any type of relation (e.g. equal to, less than, greater than or equal to, etc.) may be applied to your selection criteria. In addition, logical operators (AND/OR) may be used. For instance, "sort by Zip all people with a last name of either Smith or Jones". Additional fields may also participate in the sort. Example: sort in Zip Code order and alphabetically within the same Zip Code.

Sorting may be in either ascending or descending order. **DSM4** may be instructed to skip records that match a user specified "deleted record" value. You may also save a "template" of the sort/select specifications to disk, and control **DSM4** with JCL.

Perhaps the most impressive feature of **DSM4** is the speed of the sort operation. Compare these statistics to the sorting method you are currently using: Select, sort and create an index of 1000 records. Selecting and sorting on a name, zip code, and two double precision fields (41 characters) will take under 30 seconds from floppy disk, under 20 seconds on hard disk.

**\$99**

plus shipping and handling

## OVERDRIVE

### Get That EXTRA BURST of Performance With Dynamic Track Buffering!

**T**he **OVERDRIVE** utility from LSI gives you that extra burst of speed from your 128K Model 4 or 4P. **OVERDRIVE** dynamically buffers tracks on up to two disk drives in your system using your alternate memory. This can add up to as much as a several hundred percent speed increase in disk I/O. Also, **OVERDRIVE** places all the system overlay modules (1-5 and 9-12) in alternate memory for almost instant access. All this is done in just 32K of your alternate memory, so you can still use the system Spooler or memDISK if you desire.

Some typical speed increases:

	Without OD	With OD	Increase
FED II search a 28K file	47 seconds	8 seconds	490%
Load a 4K BASIC program	23 seconds	15 seconds	53%

Note: TRSDOS 6.2 is required but not included.

**\$99**

plus shipping and handling

Prices and specifications subject to change without notice.



8970 North 55th Street  
P.O. Box 23956  
Milwaukee, WI 53223

## TOLL FREE ORDERLINE

**(800) 248-3535**

For information (414) 355-5454

Write or call for our  
**FREE CATALOG**



# Tandy Charts a New Course

I've recently heard some complaints from long-time TRS-80 owners that Tandy is selling out by stepping into the MS-DOS market. They're disgusted by what they see as a "me-too" philosophy, and nostalgically think back to the Model I days when Tandy was a pioneer in the industry.

I have to disagree. The Models 1000, 1200, and 2000 do not indicate a sell-out, but a recognition by Tandy that it cannot survive, let alone thrive, outside the mainstream.

It's easy to get sentimental about the Model I. But this sentimentality has clouded some people's perceptions of Tandy's role in the microcomputer market. They think that because Tandy was one of the first, it therefore should be at the forefront of new and creative technology.

History says otherwise. Through the years, Tandy's success has depended on effectively packaging proven technologies. It has shown a remarkable propensity for cashing in on whatever electronic consumer product happens to be hottest. It did so with stereos. It did so with CBs. And most recently, it is doing so with telephones.

In all cases, Tandy's strategy was to make an inexpensive product, sell it by the truckload through its Radio Shack retail chain, and provide convenient after-sale support. The company's method for selling computers is essentially the same.

You could argue that at some point in the distant past, Tandy could have aggressively established its Z80 computers and TRSDOS operating system as de facto industry standards, as Apple and IBM eventually did with their products. But that would have been asking the company to be something it was not.

Staying with its proprietary DOS would spell the end of Tandy as a microcomputer manufacturer. It would be like selling stereo systems that don't play 12-inch records. So let's not



mourn the decline of the Z80 computer, but instead be thankful that Tandy had the good sense to join the rest of the world.

## 1985—The Comeback Year?

1985 could very well be the most important year in Tandy's history, for it will reveal whether the company can reestablish itself as a vigorous participant in the microcomputer marketplace. The three key factors are how well the Model 1000 does, how well Model 4 sales hold up, and how well Tandy can impress itself on the consciousness of the buying public.

My gut feeling is that the 1000 is going to do well. This is the type of machine Tandy does best: inexpensive and expandable. The company should sell a good many just to its current user base. Model I/III and Color Computer owners in particular should see the Model 1000 as their chance to enter the MS-DOS market at a reasonable price. If Tandy can also reach businesses that want a cheap alternative to an IBM PC or want to add to their current installment of PCs, the 1000 could become the company's all-time best seller.

How quickly the 1000 market develops is another matter. This is where the Model 4 comes in. Tandy must continue to sell the system during the

transition to MS-DOS. To do so, it must sell the machine creatively, by further reducing the price, bundling software, and adding enhancements. (For instance, the company might extend the 4's life if it could get Zilog's 16-bit Z800 in quantity.)

Lastly is marketing, which in Tandy's case means getting more visibility. The issue of Tandy's image has been beaten to death with a tire iron, and rightfully so. The Model 1000 is Tandy's chance to put all that criticism to sleep.

Tandy is finally realizing that selling TRS-80s is not the same as selling stuffed-animal radios and batteries. The computer marketplace is highly competitive, and exposure is critical. Unfortunately, Tandy's machines do not get the shelf space, and therefore the visibility, in retail stores that other systems do.

The beauty of the 1000 is that it can create its own visibility. While the machine won't be in non-Radio Shack retail stores, its software will. Furthermore, computer magazines will have to reckon with the 1000 when discussing MS-DOS machines and IBM clones. All Tandy needs to do is prime the pump with an intelligent advertising and promotion campaign.

Marketing the Model 4, on the other hand, is going to present problems. It has become *machina non grata* in the computer industry. Take, for instance, a recent cover article in *Personal Computing* comparing the Apple IIc and the IBM PCjr. The 4 is lumped with the Kaypro in a couple of throwaway lines, and dismissed as having "inferior graphics/color capabilities, very little entertainment or educational software and very little expandability." Considering the 4's price, power, and software base, it deserves more respect.

All in all, Tandy has reason to be guardedly optimistic. If it plays its card right, this could be the year the company makes its comeback. ■



**NEW!**

**OUTLINE** **CAMEO** **Pretorian**  
**Rotunda** **LOMBARDIAN** **celtic**  
**Nostalgia** **INCISED TRAJAN** **Playbill**  
**LIQUID CRYSTAL** **Old English** **CHAINED**  
**MOON LITE** **CLIMBING** **USA** **ANTIQUE**  
**BANNER** *Elegant* **REV BAN**  
**SHADOW** **ROMAN** **CITY** **Mini Cubes**  
**Chancery Medium** **BELLS** **Small Boldface**  
**CIRCUS** **Music** **Bricks** **Small Bold Italics**

These were printed by DOTWRITER on an Epson MX-80.

# See What You Can Do With DOTWRITER 4.0!

Now available for the Model 4, too!

**D**OTWRITER lets you create spectacular, eye-catching letterheads, catalogs, invitations, or even books. It is just what you need to turn your dot-matrix printer into a versatile typesetting machine. And it's available for the Model 4 (yes, in native mode) as well as for the Models I and III.

## What is DOTWRITER?

**D**OTWRITER 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 (white on black), and even print right-justified proportional text.

DOTWRITER includes the printing program, complete documentation, and fourteen useful sets of typefaces (60 to 90 characters in each set). We will also give you the 105-page Letterset Reference Catalog free with your order.

To use DOTWRITER, just write your text with any popular TRS-80 Word Processor, add the necessary format-

ting commands, and DOTWRITER will do the rest.

**25 more disks are available separately.** Each has 3-12 complete typefaces (60-95 characters in each set).

These disks cost less than \$25 each, and may be purchased at any time.

**If you want to create your own logos,** modify our typefaces, or even design entirely new typefaces, then you will also want to order the "Letterset Design System" (LDS). We offer LDS at half-price when you order it along with DOTWRITER. LDS operates in Model III mode on the Model 4.

Versions are available for Epson MX-80 with Graftrax, MX-100 with Graftrax-Plus, RX-80, FX-80, C. ITOH 8510/1550, Microline 84/92/93; Radio Shack's DMP series 200-2100, CGP-220 & Gemini 10X, 15X. Please specify printer and computer!

Our print samples were done on an Epson. Sizes vary on other printers. Some of the samples shown here are taken from the additional Letterset disks.

Two disk drives and at least 48K of memory are required. LDS is not available in native Model 4 mode.



## Send for free print samples!

We've only shown you a few of the 180 DOTWRITER fonts. If you want the best in graphics printing, we suggest you order DOTWRITER today, toll-free.

**Please specify printer and computer when ordering.**

<b>DOTWRITER</b>	
(Models I, III)	\$79.95
<b>DOTWRITER (Model 4)</b>	99.95
<b>Letterset Design System</b>	39.95
<b>Special: DOTWRITER and LDS</b>	99.95
<b>Additional Letterset disks (4-12 per disk)</b>	17.95 and 24.95
<b>Letterset Reference Catalog</b>	10.00

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

**PROSOFT**

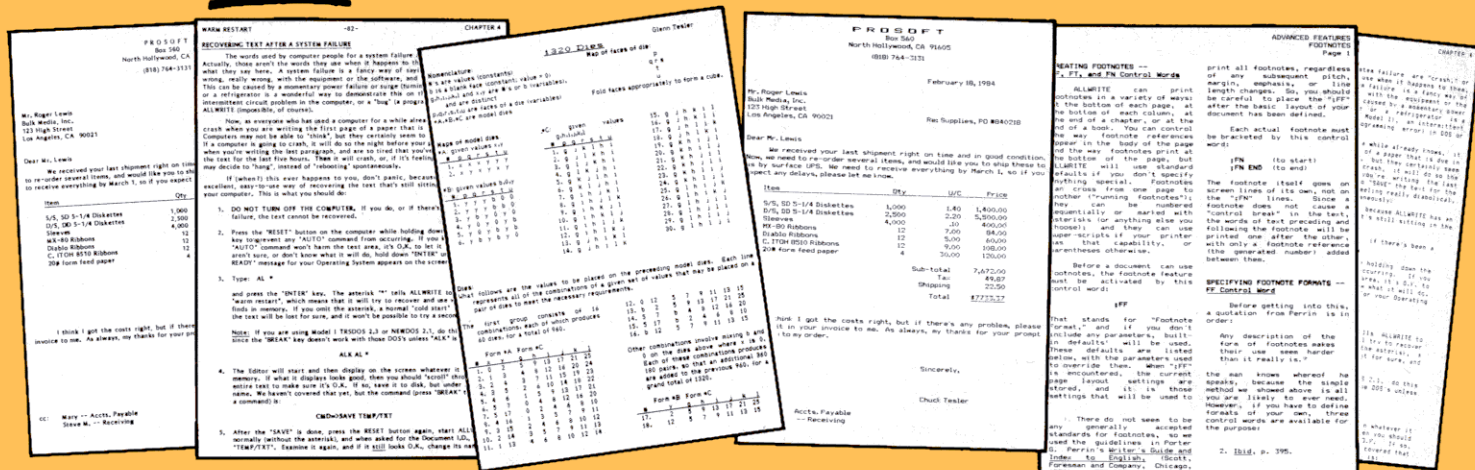
Dept. C, Box 560, No. Hollywood, CA 91603  
 (818) 764-3131 Information and Same-Day Processing

TERMS: VISA, MC, checks, COD. Please add \$3.00 shipping in U.S. or Canada, \$15.00 overseas, 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 is based on the proven methods that made NEWS-CRIP-T the most popular independently produced TRS-80 word processor, but it also has the speed and new features our customers have asked us for. 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...without annoying blinking or screen flicker. 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 will skip bad sectors, read the rest of the file,

### 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.



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.

NEWSCRIPT's documentation was acclaimed in every review, and ALLWRITE's 350-page book is even better. 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 20 years, and understand the importance of good documentation.

To make installation easy, we include Tiny DOSPLUS for the Models I and III, and special, pre-tailored versions of both TRSDOS 6.2 and DOS-PLUS IV for the Model 4, all at no extra charge. The Model I and III versions work equally well with all major DOS's.

### 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. There is no time limit to our support: if you are our customer and you need help, just call or write. We give free updates for 90 days, and charge little or nothing for minor updates thereafter.

## 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.)

*"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

*"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.)

*"NEWSCRIPT 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, on-going 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.

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

## 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.

### Attention NEWSCRIPT Owners

You can trade in your copy of NEWSCRIPT at very substantial savings. Please call our technical line for details.

#### 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.

~~\$249.95~~    **\$199.95**

### 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.

Model 4 version available at Radio Shack: Cat. No. 90-0242

30



## NICE Perspective

I found R. Walter Steur's review of NICE (October 1984, p. 39) shallow and overly negative. Steur ignores the fact that NICE is one of the most flexible and versatile TRS-80 packages available.

NICE isn't perfect; its documentation, for example, leaves much to be desired. Yet, when considering its performance and capabilities, I think NICE deserves a four-star rating.

*Michael R. Keller  
Skowhegan, ME*

## Where's The Disk?

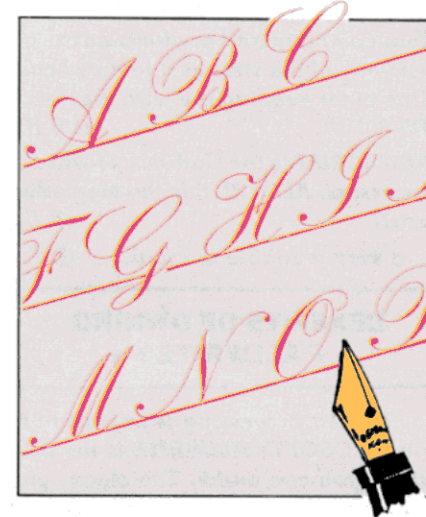
Contrary to what's stated in Table 1 of Hardin Brothers' "Making Your Selection: Choosing the Right Editor/Assembler" (September 1984, p. 60), Radio Shack's Series I Editor/Assembler includes only the Model III disk in its package. In place of the Model I disk that I wanted were instructions for exchanging the enclosed disk for a Model I disk. If it's the Model I disk that you're after, I advise that you open the package before buying the product.

*G. F. Mueden  
New York, NY*

## Communicating

I disagree with what M. J. Batham refers to as "drawbacks" in her review of Videotex Plus (September 1984, p. 168). First, hex codes are required only if you use the SETCOM feature on an automatic log-on. If you use the clear-Q keys to configure the program, you're presented with a chart of baud rates or UART configurations. Then, all you have to do is select the number conforming to the baud rate of the desired configuration.

Secondly, Batham states that you can't go back into DOS without logging off or redialing the host computer. I do this all the time; just exit using clear-X, and then reload Videotex Plus. You will, of course, lose



information sent by the host computer while you're out of Videotex Plus.

Finally, control-P doesn't send the signal that prints the contents of the buffer; rather, it sends a control-P to the host computer. It's clear-P that prints what's contained in the buffer.

*L. J. Kuttan  
St. Louis, MO*

The inaccuracies in M. J. Batham's review of Videotex Plus can't be ignored. The program is capable of generating a true break signal; p. 23 of the User's Guide and the on-screen help menu both state that the F3 function key generates this.

You turn on the printer with clear-or control-R, while clear- and control-P is sent to the RS-232 board. In addition, Videotex Plus doesn't support XMODEM protocol, but instead supports CompuServe's B protocol.

*Adam Rubin  
Wappingers Falls, NY*

*In reviewing Videotex Plus, I tested the program extensively using the Model 4 to communicate with CompuServe and a local IBM-type BBS. Hex codes are required to use Videotex Plus's auto log-on feature. Pages 8-11 of the manual explain how to input hex codes, yet it's confusing to a user who doesn't know hex.*

*The only way to return to DOS is to*

*exit the program which, in turn, makes you lose information from the host computer. Other telecommunications programs allow a return to DOS while capturing data in the buffer.*

*Control-P on my version (1.00.00) toggled the printer, allowing it to print the contents of the buffer. Page 25 of the manual explains the clear-P option to print the buffer contents. The use of both P and R are similar, with R acting as a print screen function, and P as a print buffer option.*

*Adam Rubin is correct in stating that the F3 key generates a break, yet the break key doesn't initiate a true break. When following the instructions on p. 31 of the manual, I had no difficulty with file transfer using the XMODEM protocol. In doing this, I also used the No option to turn off the XON/XOFF support.*

*M.J. Batham  
Des Plaines, IL*

## 80 ALERT

*Occasionally, 80 Micro receives letters from advertisers who have changed their status, or from readers who have had difficulties with our advertisers. Most of these problems are resolved to the satisfaction of all parties, but some problems appear to be insoluble.*

*As a service to our readers and advertisers, 80 Alert posts the names of advertisers we are unable to reach, or who have changed their address or status. Anyone who has current information about a manufacturer or distributor, or who has an advertiser complaint, should write to 80 Alert, c/o 80 Micro, 80 Pine St., Peterborough, NH 03458.*

*80 Micro has been informed that Micro Management Systems Inc., 2803 Thomasville Road E., Cairo, GA 31728, has stopped taking orders until further notice.*



# PRICES SLASHED!

**Our Same Super Service at New Lower Prices**

**ELECTRIC  
WEBSTER**  
W/Corrections

**105<sup>95</sup>**



HYPHENATION  
OR  
GRAMMAR

**37<sup>95</sup>**

**Le Script** 97<sup>95</sup>

**NewScript**  
77<sup>95</sup>



**93<sup>50</sup>**

**DOT WRITER**  
W/Letterset Design System  
**71<sup>95</sup>**

## SOFTWARE

NEWDOS80/V.2	\$ 97.50
COMREF for Newdos80	13.95
MICRO CLINIC Mod 1	24.50
MICRO CLINIC Mod 3	28.50
ARRANGER II	44.95
TRASHMAN	32.50
FASTER	22.95
R.P.M.	21.50
DSMBLR II	33.95
PRO-DUCE	33.95
SUPER UTILITY +3.2	62.95
ZORLOF II	49.95
MScript	55.95
EDAS IV	84.00
PRO-CREATE	84.00
OMNITERM	64.95
CYBERCHESS	24.95
TALLYMASTER	54.75
MAXI CRAS	74.95
MAXI MANAGER II	146.95
ENBase	132.50
SBSG Accounting Modules	
Model 1 or 3	165.00
Model II	240.00
MAS80 Accounting	
Syst.	299.95
EDIT-Basic Editor	33.50
PASSWORD 300	
Modem	184.95
PASSWORD 1200	
Modem	339.95
VOLKSMODEM w/cable	81.90

VERBATIM DATALIFE DISKS	
5 1/4" SS/DD	22.95/10
5 1/4" DS/DD	29.95/10

**WRITE FOR OUR  
FREE CATALOG**

**DOSPLUS 3.5**  
**\$50<sup>95</sup>**

**DOSPLUS 4A**  
with M-ZAL  
**115<sup>95</sup>**

**6.X PLUS**  
Improve Your TRSDOS 6.2  
**37<sup>95</sup>**

**MTERM**  
Special Price thru 1/31/85  
**\$49<sup>95</sup>**

**MOD4 Speedup Kit**  
By Alpha Technology, Inc.  
**75<sup>00</sup>**

**TEAC DRIVES**  
FD55A 40 Track 145.95  
FD55B 40 Track Double 179.95  
FD55F 80 Track Double 199.95  
The above Teac Drives are half height bare drives and include a full year limited warranty.

- Free Use of Credit Cards
- Friendly, Honest, Reliable Service

- Toll Free Order Line

- 24-Hour Shipping for Items in Stock
- Large Selection-Call for Items Not Listed

We accept Visa, MasterCard, check, cash money orders, COD, and POs on approval. In the 48 continental States, please add \$2.50 for UPS standard shipping. Alaska, Hawaii, FPO, U.S. Mail, and foreign orders are charged actual shipping & handling charges. COD orders are charged an extra \$2.00 and require cash or certified check upon delivery.

When ordering by mail include your telephone number, credit card information, computer model, memory size, and number of drives. Colorado residents add appropriate sales tax. Prices are subject to change without notice.

**TOLL-FREE ORDER LINE**

**1-800-468-4474**

**COLORADO/TECHNICAL**

**(303) 861-9250**

**AMI** applied  
microsystems,  
inc.

**612 Washington, Denver, CO 80203**



# LET'S KISS 1 MILLION MUTE TRS-80's GOODBYE.

**NEW  
MODEL 4  
VERSION !**  
**VS-100**  
*Voice Synthesizers.*

SEE REVIEW IN  
DECEMBER 80 MICRO



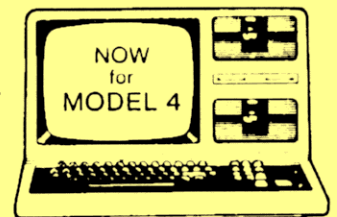
## **TALKER 4.0** Text to Speech Software

*Includes all the features of TALKER 1.4 and TALKER 2.0 (see next page) and:*

*Full Model 4 support, in Model 4 and III modes!*

*Including these powerful features:*

- ☐ Automatic keyboard echo (letter by letter or word by word, with or without punctuation).
- ☐ Automatic screen echo
- ☐ Pitch and speed control
- ☐ Speech is as easy as: PRINT★ "I'll say anything"
- ☐ Relocates itself into high memory (uses only 6¼K)



TALKER 4.0 on disk only (also includes TALKER 2.0 for use in model III mode)..... \$39.95

## **"Doctor SIGMUND"** will amaze you

**See Artificial Intelligence working!**



If you want to show off your computer, run "Doctor SIGMUND" and see their expressions as your TRS-80 has an intelligent conversation with you.

If you have our VS-100 voice synthesizer, Sigmund actually talks back to you. Even YOU will be impressed.

Doctor SIGMUND, for Models I, III and 4 (48K required). Available on disk only.....\$29.95



**ALPHA** Products

79-04 Jamaica Ave., Woodhaven, NY 11421

**800-221-0916**

9 AM to 5 PM E.S.T.

In NY call: (718) 296-5916.

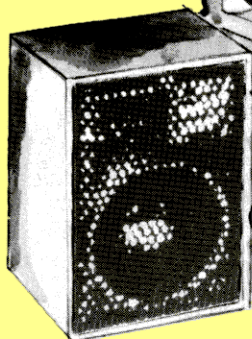


**GIVE YOUR COMPUTER A**


# VOICE

**As Well as a Mind**

**VS-100  
VOICE  
SYNTHESIZER**  
FOR RADIO SHACK MODELS  
I, III, 4P and Color Computer



Introducing  
the "No Compromise"  
Voice Synthesizer at a  
price that speaks for itself!  
Price includes synthesizer, module,  
power supply, 40 page manual,  
editing and demo software.

Call our "NEW" Demo Hot-Line  
 212 296-0399  
And hear it for yourself!

**VS 100**  
**\$ 69<sup>95</sup>**

Speaker not included,  
add \$5.95  
**Text to Speech software:**  
• Talker 1.4.....\$19.95  
• Talker 2.0.....\$29.95

## An Impressive List of Features:

- Unlimited vocabulary.
- Automatic inflection.
- Proven VOTRAX technology.
- We use the famous VOTRAX SC01 phoneme synthesizer.  
4 programable pitch level.
- Built in audio amplifier with volume control.
- You can add voice to any basic program in minutes.
- Super efficient: one single line in Basic will produce a full sentence!
- Works with any speaker (or add \$5.95 for handsome speaker module).
- Price breakthrough: same performance as units costing hundreds of dollars.
- Voice editor will help you create unlimited number of words, sound effects, etc.
- Hundreds of applications—now cost effective in education, robotics, speech therapy, monitoring, games, aid to handicapped, security, prompting...
- Fully assembled and tested.
- Ready to plug in and talk.
- Plugs into 50 pin I/O bus on Model 3
- As usual our 15-day money back guarantee protects you

## Text to Speech Software for the VS-100

### TALKER 1.4

- ✓ Unlimited vocabulary translation of English text to speech
- ✓ Very easy to use: In BASIC simply type PRINT "I talk"
- ✓ Reads numbers up to 999 trillion
- ✓ Reads many abbreviations correctly (such as Mrs., Mr., lb., Co., etc.)
- ✓ Very fast machine language program is only 4.5K long
- ✓ Loads in high memory

Only \$19.95. Specify disk or tape

### TALKER 2.0

- ✓ Same features as TALKER 1.4 plus:
- ✓ Automatic keyboard echo option
- ✓ Automatic video display echo option
- ✓ Punctuation pronunciation if desired
- ✓ And many control codes for increased versatility
- ✓ Self relocatable program is only 6¼K long
- ✓ New BASIC command: PRINT! prints and talks.

\$29.95. On disk only

**NEW!**

 **ALPHA Products**

79-04 Jamaica Ave., Woodhaven, NY 11421

✓17

(718) 296-5916

**Toll Free Order Line**

**800-221-0916**

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

Hours: 9-5 Eastern Standard Time

Add \$3.00 Per Order For Shipping  
And Handling. We Accept Visa.  
Mastercard, Checks, M.O. C.O.D.  
Add Sales Tax. Overseas, FPO  
APO: Add 10% Dealer Discounts  
Available C.O.D. add \$3.00 extra.



Send any questions or problems dealing with any area of TRS-80 microcomputing to Feedback Loop, 80 Micro, 80 Pine St., Peterborough, NH 03458.

**Q:** I've been helping a friend upgrade his Model I from 16K to 48K. He's had problems with the Model I's random-access memory and I was thinking of speeding up the RAM-refresh signals. Dennis Kitz, in *The Custom TRS-80*, says "locate Z69, and cut the trace running from pin 5 to pin 12. Connect pin 12 to pin 13. This speeds the memory-select process (from MREQ and RD) just a tad."

However, an old *80 Micro* Exclusive Oracle column says "Find Z89, locate the circuit trace running from pin 5 (it runs back underneath Z69). Cut that trace. Jumper pins 10 and 12 of Z69 with a short piece of wire." I figure one of them must be right. I'd appreciate it if you could tell me which one.

Also, what is Dennis' full address? I have no street address, and my post office says it can't deliver a letter without one. (Steven Maguire, Port Richey, FL)

**A:** Not to worry; the two methods are electronically equivalent. The first is slightly more reliable. Both generate the memory-select signal a cycle ahead of design, giving the memory more time to react and deliver data.

Your post office people are naive. Dennis Kitz' complete address is Roxbury, VT 05669. When the total population of a town is about 100, street addresses are superfluous.

**Q:** An LNW ad on the back of *80 Micro* says that the Team computer is compatible with Radio Shack's Models I, III, and 4. How compatible is compatible? I've had



quite a few problems with my Model III due to lack of cooling and/or ventilation. Also, I'm at the point where I need the added capabilities of a machine like the LNW. So overall, how would you rate the Team?

I use Cobol and SuperScript with TRSDOS 1.3 and I want to move them to DOSPLUS 3.5 (or 4.0 if I get the LNW). How can I do this without knowing the passwords? I have patches from MicroSystems to make them work under DOSPLUS, but how do I move the programs?

Finally, when I write (in Cobol) to a DMP-2100 printer, the underline feature turns on and I have to turn off the printer to reset it. Can you or anyone else help me with this one? (Rick C. Chandler, Brentwood, TN)

**A:** Get a cooling fan for your Model III. Radio Shack sells muffin fans that'll do the job. If you want something a bit more attractive, look for a 4-inch box fan at a local electronics store. It shouldn't cost more than about \$20.

Model I/III/4 software seems to be better than 90 percent compatible with the LNW. I can't give an opinion on the computer as I haven't seen it.

As for the passwords for SuperScript and Cobol, MicroSystems should be able to give them to you, or tell you how to get the job done. I be-

lieve their Transfer utility will move the program by ignoring the passwords and protection levels, but the programs will still have these attributes on the new disks. Check your manual for more information.

I don't know what to suggest for your printer problem except doing a dummy write, turning off the printer, resetting the underline, and continuing with the job. Try looking up the underline codes in the DMP-2100 manual and sending the turnoff code in a Write command.

**Q:** I have a 48K, dual-drive Model III on which I use Scriptit to write novels. I desperately need more RAM. Is there a way to increase the RAM in my machine? Do you know of a patch that adds underlining to Scriptit?

Second, are you familiar with Holmes Engineering's Sprinter Three? Does it work? What, if any, problems are associated with it? (Howard Davis, Vail, CO)

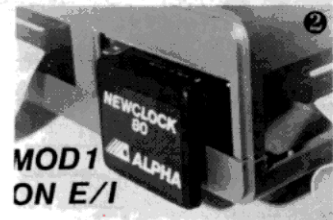
**A:** Unfortunately, you can increase the amount of available RAM, but Scriptit won't recognize it. If the buffer space is inadequate for the file size you're using, I suggest that you get a new word processor such as Newsprint, which lets you chain individual buffers into one long printed manuscript. Acorn Software's SuperScript program patches Scriptit to add features like underlining and boldface. You can order the package from Acorn at 634 N. Carolina Ave. S.E., Washington, DC 20003, 202-544-4259; \$50.

Sprinter Three speeds up CPU operation. Cassette and disk I/O automatically slow down to normal CPU speed to maintain compatibility with other Model IIIs. You can increase CPU clock speed by 50 percent; increases of 100 and 150 percent are possible but you might have to replace some of your computer's integrated



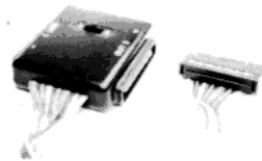
## Newclock-80 \$69.95

**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: plugs into the 50-pin I/O bus. Compatible with all operating systems.



## Printswitch \$59.00

**Do you have 2 printers? Get a Printswitch.** Stop plugging and unplugging those printer cables. With the Printswitch, you can have 2 printers connected to your computer and you can select either one at the flick of a switch. Works with any printer, plotter, or device that uses the parallel printer port. Simply plug the 14 inch Printswitch cable into your computer, and plug your existing printer cables into the Printswitch. This is the nicest unit on the market. Superior quality board with gold plated edge connectors. For Models I, III, 4 and 4P.



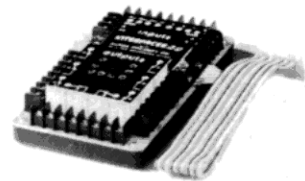
## Alpha Joystick \$27.95

**When it's time for fun, don't be without your Alpha Joystick.** Do you know that most action games are joystick compatible? Stop pounding on your keyboard and enjoy real arcade control. The joystick can also be used with BASIC programs; simply do J=INP(0) to read the joystick position (8 directions and fire button). Model I: plugs into keyboard or expansion interface. Model III, 4 and 4P: plugs into 50-pin I/O bus. The Alpha Joystick comes fully assembled and tested. ready to plug in and enjoy. (Specify Model I, or Model III, 4).



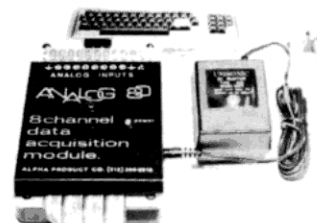
## Interfacer-80 \$159.00

**Low cost input and output device.** The outputs consist of 8 relays (rated 2 Amp @125V), easily controlled using "OUT" commands. For example, OUT 0,0 turns all the relays off. Eight LED's show the states of the relays. The 8 inputs are optically isolated, so it's safe and easy to connect external devices (switches, sensors, thermostats, etc.). Simple "INP" commands read the inputs. Connection: Mod I: 40 pin bus. Mod III, 4, 4P: requires 50-pin I/O bus converter (\$39.95). plugs into 50-pin I/O bus. Comes complete with power supply, cable, and detailed manual. (Up to 8 interfacers can be connected to your TRS-80 using our Y- cables).



## Analog-80 \$139.00

**8 channel 8 bit Analog to Digital converter.** Your TRS-80 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 8 Analog-80's can be connected to your TRS-80 for a total of 64 channels! Connection: Model I: 40 pin I/O bus. Model III, 4, 4P: requires 50-pin bus adapter (\$39.95). Comes complete with power supply, cable, and manual.



## Special Cables

### 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

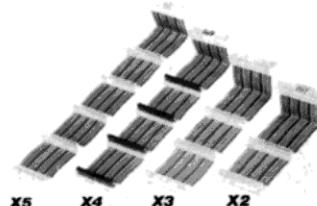
Disk drive cable (34 pin): •2-drive...C162:\$32 •4-drive...C163:\$45

Extension cable, 4 foot: •For printer and drive (34-pin)...C165:\$22

•For Mod I bus (40-pin)...C167:\$24 •For Mod 3 & 4 bus (50-pin)...C169:\$28

Keyboard to E/I (40-pin, 8'')...C161:\$21 If this is confusing, send for our Cable Flyer.

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



## NO RISK

We know that ordering by mail can sometimes be a hassle, but with Alpha, you are fully protected.

- 1) Our 15 day money back guarantee protects you from disappointment.
- 2) All our products are tested on a TRS-80 and warranted to 90 days (parts & labor)
- 3) We ship 90% of our orders within 24 hours.
- 4) We are committed to help you

## Green Screen \$12.50

**Do you eyes a favor,** put on a green screen. Tens of thousands are in use for a good reason: 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)



**ALPHA Products**

79-04 Jamaica Ave., Woodhaven, NY 11421

✓ 17

(718) 296-5916

Toll Free Order Line

800-221-0916

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

Hours: 9-5 Eastern Standard Time

Add \$3.00 Per Order For Shipping And Handling. We Accept Visa, Mastercard, Checks, M.O. C.O.D. Add Sales Tax. Overseas, FPO APO: Add 10% Dealer Discounts Available C.O.D. add \$3.00 extra.



circuits (memory and associated chips) with higher quality chips.

**Q:** I have some comments about Model 4 software. I recently purchased CP/M+ from Radio Shack, and my biggest complaint is that a number of files are missing.

My Model 4 has double-sided drives. The CP/M+ manual provides instructions for reconfiguring the Basic input/output system (BIOS) and Basic disk operating system (BDOS). The only problem is that the CP/M+ package lacks the necessary BIOS or BDOS files. When I requested help, Radio Shack told me that it wasn't going to support CP/M+ and that I'd have to go to Digital Research to get the necessary files.

I also requested help with installing Wordstar 3.0. CP/M+ is configured to be a DEC VT52 terminal, but the installation program doesn't include a configuration file for this terminal. I finally bypassed the problem by installing Wordstar as a Heath H19/H89 terminal, which is DEC VT52-compatible.

I configured my system to use the click filter, which produces a noise each time you press a key. The click filter conflicts with SuperScript. I asked the computer service rep at the local Radio Shack if there were any patches to get around the problem. After two weeks, I was told that the two programs conflict and that I'd have to turn off the filter when using SuperScript. I already knew this. *(Gerald Crosby, Columbus, OH)*

**A:** Thanks for writing. Does anyone know of a patch that takes care of the SuperScript problem?

**Q:** Regarding Christopher Jensen's question about using Enhanced VisiCalc on the Model I (April 1984, p. 14): Logical Systems Inc., maker of LDOS, has a patch that lets you run Enhanced VisiCalc on both the Models I and III. It works under LDOS or SmallDOS. The patch is public domain and comes on a disk of patches called the Fix Disk. The disk is \$10; you can reach Logical Systems at P.O. Box 23956, Milwaukee, WI 53223, 414-355-5454. *(Robert M. Connors, APO NY)*

**A:** If it isn't too much of an expense, readers should get LDOS when they want to use Model

III software on a Model I. They'll also have to buy a double-density modification (and most Model III software requires the additional drive space available with double density) but that's still cheaper than a new Model 4.

**Q:** I recently bought a secondhand Model III and took it home in my car. When I tried to call a directory for the drive 1 disk, I got an error message (data lost during disk I/O). I had Radio Shack align both drives, which cost me \$60, but the problem returned after a week. Radio Shack fixed the drives again, at no charge.

The computer worked fine for two months. Then I took it to work in my car, and it did it again. I have a sneaky feeling that the ride in my car is shaking the computer and moving the drives out of alignment. Is this possible? Is there a special disk I can use to protect the drives when transporting the computer; if not, can I realign the drives myself? *(Dorothy Belk, Little Rock, AR)*

**A:** The problem is definitely vibration, but your drives shouldn't be that sensitive. I suspect that the alignment screw is a bit loose in its fittings. If you must move the computer around, get the Disk Drive Analyzer from J & M Systems (137 Utah NE, Albuquerque, NM 87108, 505-265-1501; \$79 for single-sided drives) so you can test your drives. This program and disk are the next best thing to having a professional technician with an oscilloscope look at your drives.

**Q:** I've been having problems saving longer programs on my Radio Shack Series I Editor/Assembler. Could it be the computer or tape recorder? Is there a limit to the size of a file the editor/assembler can save? The manual doesn't mention any such limitations. *(Rodney Maglente, Chicago, IL)*

**A:** Series I is limited to a maximum file size of 211 lines (note that the limit is lines, not memory). If you're having problems with files smaller than that, I suspect that the tape recorder head is drifting as you're writing or loading a file, but that should give you some type of error message when the file fails to load properly. If you aren't getting the er-

ror message, I'm stumped. Does anyone else have ideas or comments?

**Q:** Here's an additional suggestion for Don Schenbarger (March 1984, p. 15) regarding the "Diskette?" prompt. If the cable from the disk drives' controller board to the CPU board doesn't make good contact, the prompt can appear, so the problem could be hardware related.

I'd like to know the relationship between Model I Scripsit and my version, 3.2. Craig Lindley's patch program for Model I Scripsit (October 1982, p. 276) doesn't work with my version. Does Scripsit 3.2 occupy different memory locations? Is there a disassembled listing of version 3.2 available so that I can install some of the patch functions?

Also, would you recommend a good disassembler program for the Z80A as used in the Models III and 4? I'm interested in one that converts machine hexadecimal code into symbolic or mnemonic code. *(Stephen A. Torkko, North Bend, OR)*

**A:** Patches for programs on the Model I invariably don't work on Model III versions of the same program. The problem is that disk and printer I/O routines are almost totally different. If you want patches that make Scripsit much easier to use, try Acorn's Superscript. For more information, see my answer to Howard Davis' letter above.

I don't know of any disassemblies of Scripsit 3.2 you could buy. Can anyone else help? I'm not familiar enough with the disassemblers currently on the market to make a suggestion.

**Q:** I have a late-issue Model I with an RS Expansion Interface, for which I bought double-sided drives (Tandon TM-100-2). To date, I've been unable to access the second side. My DOSPLUS 3.5 and LNW 5/8 doubler perform flawlessly as long as I've configured only one side. I run into problems when I try to generate a double-sided master of DOSPLUS. I've tried several copies of DOSPLUS and even had the SYSGEN utility replaced, suspecting it was at fault. I feel that I have some kind of hardware problem, and that the computer isn't physically accessing the second side. Any suggestions? *(Chuck Fullgraf, Aiken, SC)*



**A:** To the best of my knowledge, DOSPLUS 3.5 works with double-sided drives. Before you try SYSGENing the system disk, use the CONFIG command to access the second drive as a double-sided drive. Once DOSPLUS knows that the second disk has two sides, you should be able to verify and use both sides of any disk in that drive. Don't forget that you have to use double-sided disks; single-sided disks won't format as double-sided unless you've altered them properly.

As soon as you finish with the CONFIG command, format a double-sided disk. If the second side fails to verify, check the configuration of your system and make sure that the disk in drive 1 reports as being double-sided. If it is, and you still can't format both sides of a disk, you definitely have a hardware problem.

Call LNW to make sure your doubler supports double-sided drives. Then check with MicroSystems Software and see if you're doing anything wrong with the CONFIG command, and ask for advice. Finally, take your drives to a technician and have them checked out; they might have a jumper that needs to be set, or some other such silliness.

Once you get DOSPLUS working on both sides of your second drive, you can then SYSGEN a master DOSPLUS disk for use in drive zero.

**Q:** I bought a Model 4 from Displayed Video, but I didn't receive a TRSDOS 6.0 registration card. How do I get one? Can I expect TRS-80 equipment from dealers like Displayed Video to be equal in quality to all-Radio Shack equipment?

Also, is there a way to solve the problem of losing characters when words wrap around in SuperScripsit? Do any software companies offer modifications to SuperScripsit? The features I have in mind are indexing, footnoting, and so on. Since software firms seem to be advertising less in magazines like *80 Micro*, where can I learn about new programs for the Model 4?

Finally, why can't I directly transfer files between a Model 4 and a Model 100 via the cassette interfaces? Is it absolutely necessary to have an RS-232C interface? (Hugh Ruppensburg, Athens, GA)

**A:** Only Tandy gives out registration cards, but you're in luck. Tandy just released TRSDOS 6.2. If you go to a local Radio Shack store and ask for the updated DOS, you should get a new registration card with it. And they shouldn't charge you for the update.

Buying from third-party companies that provide their own memory and drive upgrade is a *caveat emptor* situation. Usually you get equipment equal in performance to standard Tandy devices, but that's not a guarantee. Sometimes you'll get equipment superior to Tandy's. Rarely will you get inferior equipment, but it's possible. In 99 percent of the cases, as long as you stay within the normal operating specifications of a standard Model 4 (that is, don't try to add speed-up kits, super-high-density drives, etc.) you won't be able to tell the difference between standard and non-standard Model 4's.

I haven't heard of any solutions for SuperScripsit's losing characters during wraparound, and I don't know of any companies selling patches or enhancements for the Model 4 version. To find out about new software, check the New Products section of this magazine. If you're looking for a word processor with automatic indexing and table-of-contents capability, give Prosoft's Allwrite serious consideration (for a review, see p. 35 of the November 1984 *80 Micro*).

While the Models 4 and 100 use the same techniques and baud rates to save data to tape, there's one big difference: The Model 100 saves a title before the data, and the Model 4 doesn't. The Model 100 rejects Model 4 tapes because they aren't identified by a title, and the Model 4 rejects Model 100 tapes because the computer requires a line number before the title. You need a machine-language routine that creates a title when saving programs from the Model 4, or one that ignores the disparities in the files when you're loading from one machine to the other.

**Q:** I've had the same problem as Robert Goodman (April 1984, p. 16) with the automatic 60-line count in Basic. If he begins each print series with a PRINT CHR\$(28), the auto line count will reset to zero. (Galen F. Tustison, San Marcos, CA)

**A:** In other words, before starting a print job, line up the paper to the top of the page, send a CHR\$(28) to the printer, then start printing. Now the six-line skip will occur at the page perforations, making for a clean print-out. Thanks for the advice.

**Q:** Does anyone know where I could beg, borrow, or steal a Micro Design MDX-2 expansion interface board? Micro Design has discontinued it. I'll accept a slightly used or damaged board, but I'd prefer a board in its case, with the complete set of manuals. (Steve Winokur, Hershamp, PA)

**A:** All right, folks: Does anyone out there know where Steve can get an MDX-2 board?

**Q:** I'm looking for Forth for my Tandy 2000. Laboratory Microsystems Inc. of Marina del Rey, CA, has a package, but it's based on the 8086 microprocessor. I've read that the 2000's 80186 has the 8086 instruction set in it, and therefore Forth should execute. Is this true? Also, does the 2000 have a math coprocessor included, or can I use the 8087-3? Better yet, do you know of a version of Forth written specifically for the Tandy 2000? Is Microsoft planning to publish one for its MS-DOS system? (Ron Watkins, Tucson, AZ)

**A:** Yes, 8086 Forth will run on the Tandy 2000, but you must make sure you have a version designed for that computer. Just as you can't run Z80 SuperScripsit on every Z80 computer, you can't run 8086 Forth on every 80186 computer. The program must be customized to use the computer's keyboard, video, and disk drives.

Before investing in a commercial program, try contacting Forth Inc., 2309 Pacific Coast Highway, Hermosa Beach, CA 90254. They own the Forth trademark and are responsible for distributing FIG-Forth, the public-domain version available for almost all computers. ■

*Terry Kepner is a writer and programmer, and an Associate Editor of 80 Micro. He's been writing about microcomputers since 1979.*





# 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. Add \$5 per drive shipping unless otherwise specified. All drives have a one year warranty on parts and labor.

### COMPLETE FULL SIZE 5.25" DISK DRIVES

40tk Single Side Tandon TM100-1	\$ 169
40tk Dual Side Tandon TM100-2	209
80tk Dual Side Tandon TM101-4	279

### COMPLETE HALF-HIGH 5.25" DISK DRIVES

1ea 40tk SS TEAC FD-55A in dual case	\$ 189
2ea 40tk SS TEAC FD-55A in dual case	324
1ea 40tk DS TEAC FD-55B in dual case	243
2ea 40tk DS TEAC FD-55B in dual case	424
1ea 80tk DS TEAC FD-55F in dual case	297
2ea 80tk DS TEAC FD-55F in dual case	522

### COMPLETE 8" DISK DRIVES

Add \$10 shipping per 2-drive case.

2ea SS TM848-1E's in dual case with fan	\$ 699
2ea DS TM848-2E's in dual case with fan	799

### BARE 5.25" & 8" DISK DRIVES

Add \$4 shipping per drive.

40tk SS, Full Size, Tandon TM100-1	\$ 129
40tk DS, Full Size, Tandon TM100-2	169
80tk DS, Full Size, Tandon TM101-4	239
40tk SS, Half-High, TEAC FD55-A	129
40tk DS, Half-High, TEAC FD55-B	169
80tk DS, Half-High, TEAC FD55-F	239
8" SS, Thinline, Tandon TM848-1E	290
8" DS, Thinline, Tandon TM848-2E	360

### TRS-80 MODEL III/4 DISK DRIVE KITS

Add \$8 shipping per kit.

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..... \$199

### OTHER DRIVE GOODIES

Add \$2 shipping.

TRSDOS 1.3 Disk & Manual for Model III	\$23
TRSDOS 2.3 Disk & Manual for Model I	23
TRSDOS 6 x Disk & Manual for Model 4	29
LDOS for the Model I or III	69
NEVDOS 80 v2.0 for the Model I or III	93
2-drive cable for Model I/III/4	24
2-drive cable for IBM PC	40
4-drive cable for Model I	34
Extender cable, 7' long	13
5.25" power supply & encl., white or silver	59
8" power supply, fan & enclosure, beige	159

### TRS-80 MODEL I DOUBLE DENSITY CONTROLLERS

Add \$3 shipping.

Aerocomp "DDC" Really the best by test	\$99
Aerocomp "DDC" with LDOS	149
Aerocomp "DDC" with NEVDOS 80-v2.0	189
LNDoubler 5 1/8" if you need 8" drives	169

### MEDIA & SUPPLIES

5" Diskettes SSDD, Lifetime Guarantee. Pk of 10	\$16
5" Diskettes DSDD, Lifetime Guarantee. Pk of 10	21
5" Flipsort, holds 75 Diskettes	19
8" Diskettes SSDD, Lifetime Guarantee. Pk of 10	29
8" Diskettes DSDD, Lifetime Guarantee. Pk of 10	34
8" Flipsort, holds 50 Diskettes	29
5.25" or 8" Head Cleaning Kit	9
Letter Size 20 lb. Tractor Paper, 2900 sheets	25

### TRS-80 SPECIAL EQUIPMENT

12" Green Phosphor Monitor	79
12" Amber Phosphor Monitor	84
16K 200 nsec RAM Guaranteed 1 year (8 chips)	13
64K 200 nsec RAM Guaranteed 1 year (8 chips)	64
64K RAM plus Genuine PAL for Model 4 upgrade	74

## ROSE GETS RIGHT! NOW---ROSE'S MOD 4 CP/M \$ 69

Complete with Manual

Rose has developed this streamlined version of CP/M 2.2 that lets you run most of your favorite CP/M programs. They are in stock, ready to ship to you at this unprecedented low price.

### SPECIAL SOFTWARE DEALS

Add \$4 shipping.

WordStar 3.3 (Specify MM or R/S format)	\$250
MailMerg. SpellStar, Starindex	220
WordStar Professional (Above 4 Programs)	450
DataStar Data Entry & Retrieval	175
ReportStar Report Generator	150
InfoStar Advanced DBMS (Above 2 Programs)	300
dBASE II Complete With Disk Tutorial	385
Super Utility Plus 3.2 by Kim Watt	59
CP/M 2.2 for Model 4 by Monte Zuma	199
Pickles & Trout CP/M 2.2m for the Model 2-12-16	179
Floppy Version	179
Same thing but the Radio Shack Hard Disk	219

Please add \$5 handling charge to orders under \$50

**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 Documentation Fee if order is \$500.00 or more. 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. 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**

Copyright 1984 by Total Access

TRS 80 is a Trademark of the Tandy Corporation  
CP/M is a Trademark of Digital Research.

## CP/M® & 80 COLUMN FOR YOUR MODEL III

No need to buy a new computer when you can use the Holmes VID-80 CP/M, 64K RAM and 80 column modification. This kit is easy to install and requires no soldering. You 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. Now you will be able to use most of the CP/M programs that normal people do, such as dBASE II and WordStar. The regular cost of this kit is \$524.00. Now Rose will fix you up for only..... **\$399**

## SUPER SALE

Same as above except complete with WordStar 3.3 installed and ready to run. Only..... **\$499**

### PRINTERS & ACCESSORIES

ANADIX DP-9725, 240cps plus COLOR	1395
PROWRITER 120cps, 10" Wide Friction/Tractor	339
PROWRITER 2, 120cps, 15" Wide Frict/Trac	595
STARWRITER F10-40cps Daisy Wheel	995
LPRINTMASTER F10-55cps Fast Daisy Wheel	1199
Rutishauser Bidirectional Tractor	199
Rutishauser Sheet Feeder, A Best One	695
A Good, Cheap Sheet Feeder for the F10's	475



# Hard Facts About Tandy's New Software

## Tandyland

**Radio Shack's fall line-up** of new software had something for everyone, with offerings for the Models III, 4, and 2000. Tandy 2000 owners will notice a new terminal package called Softerm-2000 on the shelves as well as two programs from the popular PFS series, PFS: Graph and PFS:Write. The introduction of new business software for the 2000 shows Tandy's continued commitment to its first MS-DOS machine despite the debut of its IBM-compatibles.

For the Model 4 owner, fall brought new business programs, including Financial Management, Profile 4, Radio Shack's Money Decision series, and an educational package called Introductory Science.

Model III gamers weren't forgotten, either; Computer Diplomacy, Frogger, and Zaxxon are now available for the Model III. Radio Shack also sells a Model 4/4P version of Zaxxon.

**Meanwhile, Tandy's entry into the IBM-compatible world** means some big changes in Radio Shack's software market. Unlike the good old days, when Radio Shack was the primary software source for its proprietary TRSDOS operating system, the Shack now has plenty of competition for Model 1000/1200 software sales.

When *80 Micro* asked if the introduction of the new machines might put Tandy out of the software business, Tandy 1000 buyer David Frager responded, "Tandy will continue to produce software for all its machines as the need for software arises. If we

edited by Bradford N. Dixon



Photo 1. The Tandy 1200.

see a need that isn't being filled by a third party MS-DOS software company, we will definitely examine if we should provide the product."

Frager also noted that Radio Shack's Express Order software program won't offer much MS-DOS software for the Tandy 1000 because users can get MS-DOS titles at other computer stores. Nonetheless, Radio Shack Computer Centers will carry selected third-party titles that they deem to be high-quality products.

Among third-party MS-DOS products Radio Shack is stocking are Ashton-Tate's Framework and dBase III, all of the PFS titles from Software Publishing, and MicroPro International's WordStar Professional.

**Model I/III/4 owners who move over** to Tandy's new hardware offerings, the Models 1000 and 1200, may be in for a case of sticker shock when they start checking out the price of MS-DOS software. For example, Lotus' son of 1-2-3, the integrated package Symphony, sports a price tag of \$695.

Print and television advertising campaigns have made Symphony a visible product. But sales and conversions from 1-2-3 haven't lived up to expectations, and price may be partly to blame. Turning to Symphony's chief competitor, Ashton-Tate's Framework, won't save you money—it retails for the same price.

For those who don't mind spending as much on a program as a lot of people spend on a computer, Symphony and Framework should run as-is on the Models 1000 and 1200.

**Almost as soon as Tandy** introduced the Model 1200

(Photo 1), its "mirror-image" IBM PC XT work-alike, rumors about where the computers were being manufactured started to fly. According to the most prevalent rumor, Tandon Computer Inc. was the manufacturer.

When *80 Micro* asked Ed Juge, Tandy's director of computer marketing, about the story, he said that company policy dictates that the company's sources remain confidential. Juge noted that he, too, had heard the rumor, but would neither confirm nor deny it.

**Radio Shack Computer Centers** are polishing their image with a slick new flyer aimed at potential computer buyers for business, education, and home use. It's a vast improvement over the old flyers that were stuffed into Sunday newspapers.

Called "Radio Shack Computer Center Answers," the brochure (Photo 2) poses questions from a hypothetical computer buyer; the answers, of course, highlight a Tandy machine that exactly meets the ques-



tioner's needs. The flyer looks like a newsletter printed on glossy stock.

This new ad campaign may well bring attention to the quality image Tandy wants to communicate to buyers. It's yet another example of the Shack's long-overdue effort to solve its image problem.



Photo 2. Tandy's new brochure, "Radio Shack Computer Center Answers."

**Bulletin:** "There is a new version of TRSDOS 6 which contains several improvements and also includes some new features not previously available in this operating system. Upgrading to this new operating system is required."

These words are taken from a Tandy customer service bulletin dated March 15, 1984; similar notifications are mailed out for upgrades of other operating systems or software. The final paragraph of these customer service bulletins instructs the software owner to pick up an upgrade at the local Radio Shack Computer Center. All well and good, but what's a customer to do when he gets to the computer center and there's no upgrade waiting for him? It's bad enough when the new software isn't in the local store; sometimes a customer may be told it's out of stock at the Fort Worth warehouse as well.

Fear not, there is a way to get the first available upgrade even though the warehouse is empty. Tell the manager of your computer center to order the upgrade with your name and address on it. Then, the next time the warehouse receives a shipment of the upgrade, your order will be flagged and sent.

It seems that computer center managers can order upgrades in two

ways: for their own inventory or by customer name and address. Inventory ordering has a lower priority than special orders and when shipments come into the warehouse, they aren't earmarked for the stores needing upgrades. If the stock is there, it's sent out, but if it isn't, then the store manager has to try again later. Only personal orders are flagged.

The logic behind the arrival of cellular remote telephones in some Radio Shack Computer Centers became a little clearer last fall with the announcement that Radio Shack had worked out a customer referral arrangement with mobile telephone companies in five major markets. The companies involved are NYNEX Mobile Communications, PacTel Mobile Access, NewVector Communications, Contel Cellular, Gencom, and Bell Atlantic Mobile Systems Inc.

Tandy's press release didn't say exactly how much Computer Center space would be devoted to telephones, but considering the number of computers available from the Shack, things may get a little crowded in those stores that support the new marketing venture.

## New Threads

"Phone booth journalism" was the phrase reporters used to describe how Radio Shack's Model 100 changed their reporting habits at last year's Republican National Convention.

According to Tandy, the lap-top portable revolutionized political reporting in the 1984 election. Press planes were full of reporters using Model 100s to write stories; when the planes landed, reporters raced for phone booths to transmit their stories to host computers back at the newsroom.

Reporters from the *Wall Street Journal*, the *New York Times*, the *Washington Post*, and the Associated Press were among those using Tandy lap-tops at the convention. Tim Gallivan, AP's news technology editor, notes that AP owns about 200 Model 100s. Gallivan says that, to his knowledge, AP was the first news organization to adopt the notebook-style computer for remote reporting;

the wire service had the computers even before Tandy distributed them nationally.

**With one foot in the grave,** Lobo Systems of Santa Barbara, CA, introduced a \$795 Model 4P clone that runs LDOS and CP/M software. The Mini Max, as it's called, is designed to go head to head with Radio Shack's transportable. Lobo already has a Model III work-alike in its Max-80, which retails for \$945.

Lobo's president, Robert Bledsoe, quoted in the Oct. 15, 1984 *InfoWorld*, said he didn't see any problem in staying with a CP/M machine or in competing against Radio Shack. Bledsoe hopes sales will offset some of Lobo's \$1 million in liabilities. "There's enough demand for CP/M-based machines," he said. "If we can sell 100 to 200 machines a month, that will meet our needs. We aren't looking for high volume."

Lobo may be the last of only a handful of one-time Radio Shack clone manufacturers. According to the *InfoWorld* piece, LNW Computers of Tustin, CA, the only other surviving clone maker, was reportedly out of business as of late September 1984.

**Another ruling from the courts in the complex area of software copyrights:** Federal Judge W. Arthur Garrity of Massachusetts ruled on Aug. 31, 1984, that copyrighted programs published in a computer-user magazine may not be put on disk, duplicated, and sold by a third party.

*Nibble Magazine*, for Apple users, had sued Amtype Corp. for copyright infringement for selling the magazine's programs on disk. *Nibble's* publisher, Micro-Sparc Inc., already provides such a service by selling program disks for \$20-\$30.

In its defense, Amtype said it offered a "typing service" to readers of *Nibble* and other similar publications. Amtype charged between \$7-\$10 for putting all the programs from a single *Nibble* issue on a floppy disk.

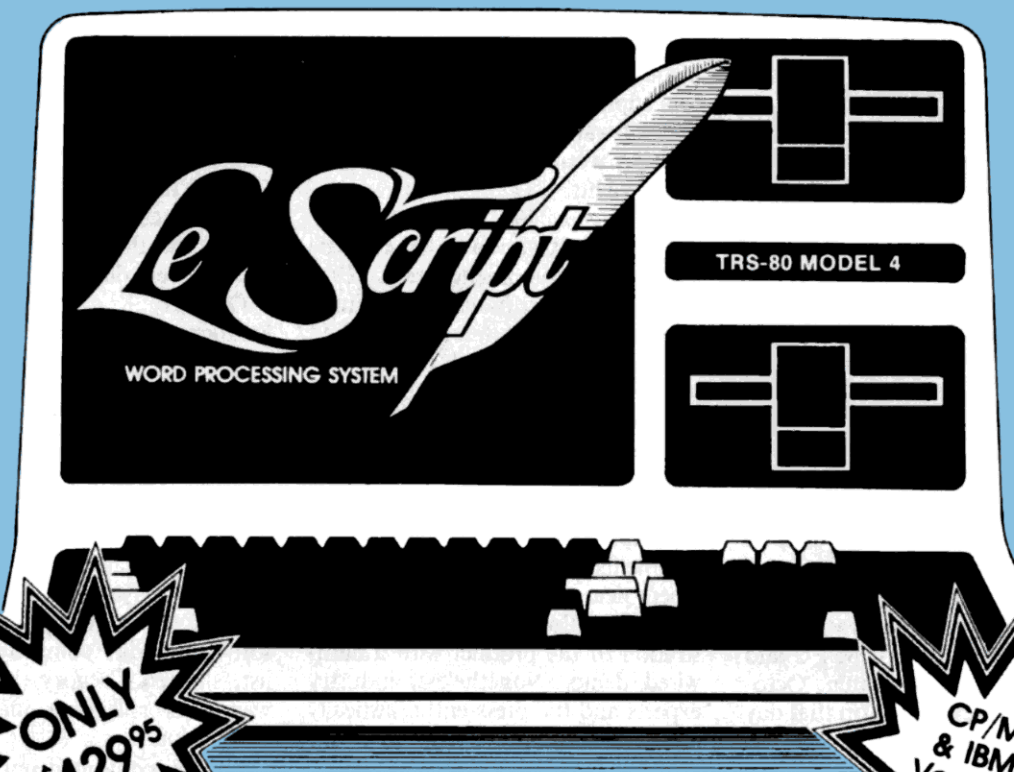
Judge Garrity was to rule on possible damages at a later date.

## MicroTrends

**The folks at the Hewlett-Packard Personal Computer Group in Cuper-**



# TRS-80 MODEL 4 Word Processing Program



ONLY  
\$129.95

"For \$129.95 you'll be  
hard-pressed to find a better  
overall word processing product."

(LSI JOURNAL, January, 1984)

CP/M  
& IBM  
Versions  
\$199.95

- ☐ 80x24 DISPLAY using TRSDOS 6 or any MODEL III DOS. Built-in FORM LETTER and MAIL-MERGE capabilities.
- ☐ Built-in HYPHENATION capabilities.
- ☐ 55 separately programmable MACRO FUNCTION KEYS.
- ☐ Performs PROPORTIONAL-SPACE right-margin justification on over 80 different printers (all drivers included FREE).
- ☐ Integrates with ELECTRIC WEBSTER spelling checker.
- ☐ Keyboard entry and printing of 31 European Characters and special symbols.
- ☐ LeScript also available to run on TRS-80 MODEL I, MODEL III, LNW-80, LNW-TEAM (80x24), Holmes VID-80 (80x24), and Lobo MAX-80 (80x24).
- ☐ CP/M and TRS-80 MODEL II versions now available (only \$199.95).
- ☐ MODEL 2/12/16 Versions now available for TRS-DOS 2.0, TRS DOS 4.2 and CP/M.

## 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.

✓ 141

## 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



tino, CA, released some statistics last fall that put them in third place in the personal computer market. The former third-place company was Tandy Corp.

Hewlett-Packard made a point of the fact that it couldn't confirm or deny the validity of the statistics that put the firm right behind IBM and Apple. However, HP credits its apparent rise to third place to the success of the HP 150 Touchscreen Personal Computer.

As for market share, IBM holds first place in the \$1,000-\$6,000 desktop/portable market with 33 percent of sales, Apple comes in second with 20.7 percent, and HP is a distant third with 6.1 percent. Tandy Corp. now holds fourth place, according to the information supplied by HP, with 5.2 percent of the desktop/portable market (see Table 1).

Manufacturer	Percent Market Share
IBM	33.0
Apple	20.7
Hewlett-Packard	6.1
Tandy	5.2
DEC	3.0
NEC	3.0
Others	29.1

Table 1. Hewlett-Packard's ranking of the top firms in the \$1,000-\$6,000 desktop/portable market.

#### What's ahead for the business office?

Frost and Sullivan, a New York market research firm, recently released a study predicting that personal computers will shape the course of office automation over the next five years. That isn't hard to believe, but the dollars involved may come as a surprise.

The report indicates that word processing applications sales will increase by 23 percent to \$10.7 billion by 1988. Unit sales for word processing equipment are expected to increase by 30 percent yearly. That's because of the inroads personal computers have made into the managerial and professional ranks: According to the wordy report, "The multifunctional capability of both word and data processing of the desktop computer makes it well suited to the needs and tasks performed by those in these job levels."

Frost and Sullivan considered as word processors dedicated units and

even electric typewriters, but predicted that personal computers will become the major component of the word processing market for the next five years.

**Speaking of growing computer use,** some new figures show a startling leap in the number of computers available to public school students. According to Quality Education Data, a Denver research marketing firm, the number of students per microcomputer has dropped by half since 1983. During the 1983-84 school year, the national average was 170 students per micro; by the beginning of the 1984-85 school year, that average had improved to fewer than 85 students per computer. The top school district is Florida's Broward County, where the ratio is 23.4 students per computer.

QED's report, called "Top Fifty Districts," also showed some gains by IBM in the battle for the educational dollar. Big Blue's share jumped from 4.6 percent of all micros in schools in 1983-84 to 6.05 percent for the current school year.

Apple computers, however, still dominate the education market, with a 47.9 percent share among large school districts. Radio Shack holds second place with 22.4 percent and Commodore is in third, according to the report, with 10.4 percent. IBM remained in fourth place despite its increased infiltration (see Table 2).

### Hot Items

**Software Arts of Wellesley, MA,** the company that developed the classic spreadsheet program VisiCalc, has been working for some time to come up with another blockbuster program. Now it may have one: a PC desktop management program called

**Spotlight.** Belonging to the new genre of microcomputer accessory software, Spotlight acts as a calculator, note pad, appointment calendar, telephone book, and index file deck. In fact, the program sounds very much like the Tandy DeskMate program that comes bundled with the Tandy 1000.

Desktop management programs have gained attention since Apple introduced one with their Macintosh a year ago, and the price for such programs remains fairly reasonable. Spotlight retails for \$150, a moderate price for professional software, but not exactly chopped liver. If the program is comparable to the Tandy DeskMate, then the rock-bottom price of the Tandy 1000 is even more of a bargain.

**Yes, but can you back it up?** Elite Software Systems of Albany, NY, is staking some serious money on its claim that its new encryption program, Encomp, defies piracy. The company is so confident of its MS-DOS-based product, it's offering a \$10,000 reward to any individual who can break the code. Elite will award an additional \$2,000 to the dealer who sold the program.

**IBM's relentless quest for more memory** in less space took another step forward recently as the computer giant began producing volume quantities of a 256K chip.

The 50.5-square-millimeter chip occupies only twice as much area as a 64K chip and makes it possible to assemble more than 4 million characters on a 7- by 9-inch circuit card. The significance of all this becomes clear when you consider that in terms of real storage, you could put the contents of a 1,400-page book on a single chip. ■

Manufacturer	Number of Units		1984 Market Percentage
	Fall 1984	Fall 1983	
Apple	35,256	15,879	47.9
Radio Shack	16,495	10,098	22.4
Commodore	7,700	3,494	10.4
IBM	4,449	1,676	6.0
Atari	3,200	3,106	4.3
Texas Instruments	3,180	952	4.3
Franklin	2,151	1,102	2.9
Others	1,139	525	1.5

Table 2. 1984 computer market shares in the top 50 U.S. school districts.

Verbatim®  
**3M IBM**



TOLL FREE 1-800-321-3552  
IN OHIO & OTHER INQUIRIES 216-481-4993

Star **NEC**

**SANYO**

OKIDATA EPSON

Datalife

TAVA PC

KAYPRO II

BASF

**NEW  
LOW  
Prices**

**IF ANYTHING  
BEATS OUR SELECTION,  
IT'S OUR PRICES!**



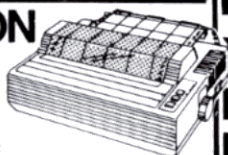
**EPSON**

**RX80  
\$269**

- 100 cps
- Tractor paper feed
- 128 Typestyles
- 7 graphic modes
- Proportional space
- 10" carriage

**EPSON**

**FX100  
\$659**

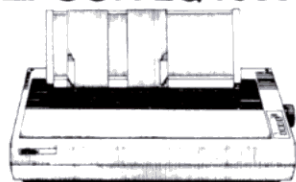


- 160 cps
- Tractor paper feed
- 128 Typestyles
- 7 graphic modes
- Proportional space
- 15" carriage

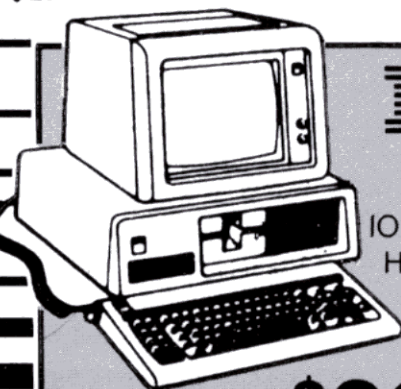
**EPSON FX80**

160 CPS,  
10" carriage... **\$449**

**EPSON LQ 1500**



includes parallel interface, 200  
CPS, bi-directional, sheet  
feeders available. **\$1199**



**IBM**

**PCX**

10 MEGABYTE  
HARD DRIVE

NOW ONLY

**\$2995**

Includes MDS controller, 10 megabyte hard drive and  
memory, CPU, IBM keyboard, 256K RAM, mono/-  
parallel board, monitor and single 320K floppy drive.  
Easily expandable.

**SANYO**

The MBC 555-1

**\$1199**

System Package  
INCLUDES...

Sugg. Retail Price	Sugg. Retail Price
MSDOS .....\$60	INFOTAR .....\$495
SPELLSTAR .....\$250	WORDSTAR .....\$495
MAILMERGE .....\$250	
CALSTAR .....\$250	

**\$2999 VALUE**

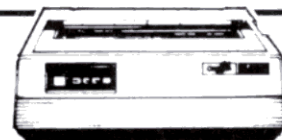
Features include 8088 Microprocessor, 128K RAM expan-  
dable to 256 RAM, parallel printer port, graphics capabili-  
ty, game paddle port, 8087 math co-processor port. Also  
available with double-sided disk drives — \$1359.00.



**OKIDATA 92**

The most advanced  
dot matrix printer  
in its price range.

**\$439**



**OKIDATA 93**

- 160 cps
- Tractor paper feed
- Proportional space
- 15" carriage

**\$679**



**COMREX II**

13 CPS Printer

**\$439**

COMREX III .....	\$689
STAR GEMINI 15 .....	\$449
STAR DELTA 10 .....	\$479
OKIDATA 82 .....	\$349
OKIDATA 93 .....	\$679
OKIDATA 84 .....	\$799
NEC 8023 .....	\$399
NEC 2030 .....	\$899
NEC 3530 .....	\$1599
BROTHER HR 15 .....	\$459
BROTHER HR 25 .....	\$699
BROTHER HR 35 .....	\$959
PANSONIC 1090 .....	\$299
PANSONIC 1091 .....	\$349

**WE'RE GIVING  
MAIL ORDER  
A GOOD NAME!**

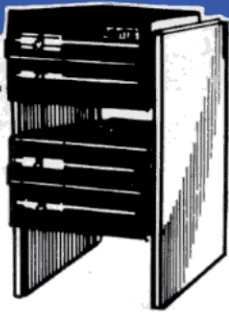
**DATA SUPPLIES**

22295 Euclid Ave.  
Euclid, Ohio 44117

A SUBSIDIARY OF THE COMPUTER WAREHOUSE, INC. OF OHIO

**IF ANYTHING  
BEATS OUR  
SELECTION  
IT'S OUR PRICES!**





As low as  
**\$199**

## DISK II™

MODEL III & IV DISK UPGRADE

NOW ADD UP TO 4  
INTERNAL DISK DRIVES TO A  
RADIO SHACK MODEL 3 &  
MODEL 4. UP TO 1.3  
MEGABYTES OF DISK  
STORAGE!

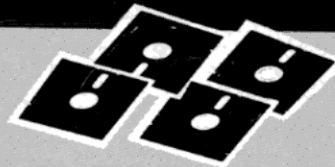
- Gold Plated Edge Connectors • Metal Disk Drive Brackets • All Hardware and Cables • Switching Power Supply • 1 hour or less for installation • 40 80 Track supported • Single Dual Head supported • 100% compatible • No Soldering needed • 180 days warranty on Controller.

DISK II w/o Drives .....	\$199.00
DISK II	
w/one Teac 55A 40 Track Drive ....	\$345.00
DISK II	
w/two Teac 55A 40 Track Drive ....	\$495.00
DISK II	
w/two Teac 55B 40/40 Dual Drive ..	\$595.00
DISK II	
w/four Teac 55B 40/40 Dual Drive ..	\$995.00



**TOLL FREE 1-800-321-3552**

IN OHIO & OTHER INQUIRIES 216-481-4993



## BULK DISKETTES

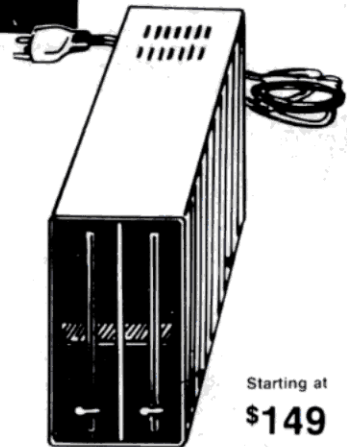
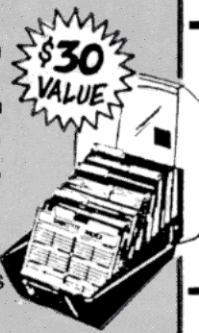
SSDD  
IN  
QUANTITIES  
OF 200  
OR MORE

**99¢** ea.

SSDD ..... \$1.29

## FREE FLIP FILE

With purchase  
of 100  
SSDD Diskettes  
at 1.29 ea.



Starting at  
**\$149**

## BARE DISK DRIVES

The extremely reliable Teac slim-line now requires half the power plus includes our exclusive 6-month double extended MFR warranty. (Was 3 months).

- TEAC 5 1/4" 55A 40 TRK ..... \$149
- TEAC 5 1/4" 55B 40/40 TRK .... \$199
- Tandon TM100-1 40 TRK ..... \$149
- Tandon TM100-2 40/40 TRK ... \$219
- Tandon TM100-4 80/80 ..... \$319

### PRINTER BUFFERS

#### FOR MOST COMPUTERS QUADRAM MICROFAZER

Parallel to Parallel w/8K .....	\$149.00
Parallel to Serial w/8K .....	\$179.00
Serial to Serial w/8K .....	\$179.00
Serial to Parallel w/8K .....	\$179.00
Each Add's 8K Upgrade .....	\$ 10.00

All come with pause control and copy feature, and can be upgraded to 512K.

### SPRINTER

#### Double Your Speed

Speed-up cuts computer operation time in half, saves time and money. Fast 4 MHz Z80B CPU included, installs in 15 minutes with no soldering or cutting.

SPRINTER III for MOD III .....	\$109.95
SPRINTER I for MOD I .....	\$109.95

## TANDON DRIVES REPAIRED

**\$29<sup>95</sup>**

PLUS PARTS  
& SHIPPING

DRIVE PARTS FOR TANDON, TEAC, MPI  
CALL FOR PRICES!

### MODEL III & IV

#### RS-232 Communication

Direct replacement for RS-232C, fully tested and burned in, easy installation, 120 day warranty.

RS-232 .....	\$59.95
--------------	---------

### MODEL IV — 64K MEMORY EXPANSION

Guaranteed 1 full year  
Set of 8

4164 RAM CHIPS .....	\$39.95
w/PAL CHIP to go from	
64 to 128K .....	\$64.95

### 16 K RAM SPECIAL MEMORY UPGRADE

4116, 200ns. Guaranteed one full year.  
\$17.95

**NOW ONLY \$11.95**  
with the purchase of \$25 or  
more! (while supply lasts)



## COMREX CR 700 PRINTER SWITCHING DEVICE

**\$59<sup>95</sup>**

Now you can change between printers or devices with the push of a button. You can plug two printers into your computer or any other parallel device with the new Comrex CR 700 Switching device.

**Micro  
DATA SUPPLIES**

22295 Euclid Ave.  
Euclid, Ohio 44117

A SUBSIDIARY OF THE COMPUTER WAREHOUSE, INC. OF OHIO

**NEW  
LOW  
PRICES**



**TOLL FREE 1-800-321-3552**

IN OHIO & OTHER INQUIRIES 216-481-4993

## ORGANIZE AND PROTECT



### ROLLTOP 100

Disk File Model #RT100

Twice the capacity (100 - 5 1/4" Disks) of the leading "flip top" file. It includes 10 diskette dividers and anti-skid feet. An outstanding design... \$36.00

Locking Model #RT100L \$46.00

**FREE BOX  
OF DISKETTES**  
WITH PURCHASE OF PAC 100  
Limited Time Only!

## BUSINESS PAC 100

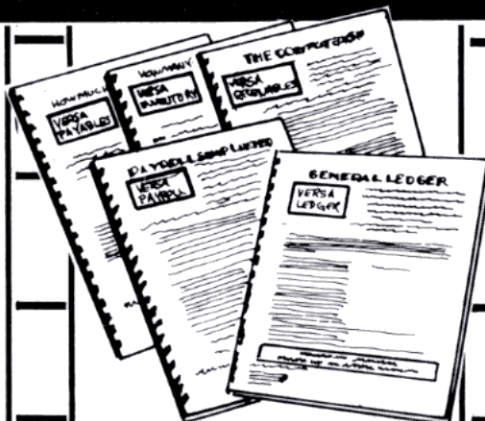
READY-TO-RUN  
BUSINESS PROGRAMS

**\$99<sup>95</sup>**

INCLUDES

128 Page Users Manual • Inventory Control • Payroll • Bookkeeping System • Stock Calculations • Checkbook Maintenance • Accounts Receivable • Accounts Payable.

**PLUS 90 MORE!**



### VERSABUSINESS SERIES

The Most Powerful Business  
Software Ever!  
Model I, III & IV

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

**VERSARECEIVABLES** ..... \$84.95  
A complete menu-driven accounts receivable, invoicing and monthly statement generating system. Keeps track of all information relating to who owes you or your company money and can provide automatic billing for past due accounts.

**VERSAPAYABLES** ..... \$84.95  
Designed to keep track of current and aged payables, keeping you in touch with all the information regarding how much money your company owes and to whom.

**VERSAPAYROLL** ..... \$84.95  
Powerful and sophisticated yet easy to use! Complete employee records are maintained and all necessary payroll calculations are performed automatically.

**VERSAINVENTORY** ..... \$84.95  
Just what you need to maintain complete control of your inventory system. Gives you instant access to data on any item. Keeps track of all information related to what items are in stock, etc.

**VERSALEDGER II** ..... \$129.95  
This complete accounting system grows with your business. Can function as a simple personal checkbook register, a small business bookkeeping system or a large corporate general ledger system!



### ELECTRIC WEBSTER

w/correcting feature ..... \$119.00  
Hyphenation feature ..... \$ 39.00  
Grammatical feature ..... \$ 39.00

#### COMPLETE SYSTEM

All four programs ..... \$189.00  
"Cadillac" of Spelling Checkers  
80 Micro 9/82.  
Available on Model I, III & IV

### ELECTRIC PENCIL Version II

Disk Version ..... \$79.95  
Tape Version ..... \$69.95

*Le Script* **\$104<sup>95</sup>**

Model I, Model III, & IV  
LNW-80, PMC-80 MAX-80.

### NewsScript

7.1 ..... \$99.95  
With Labels ..... \$114.95

### MISC.

#### Avery Tabulables

5000 - 3 1/2 x 15/16" ..... \$15.95  
5 1/4" File Box for 75 Diskettes ..... \$19.95  
LABELMEAKER Kit w/400 1 up labels ..... \$29.95  
Casslabel Kit w/200 Cassette Labels and  
200 1 up Labels ..... \$34.95

## Verbatim

DATALIFE Premium Diskettes at Affordable Prices

5 1/4" MD525-01 IS/D Den (box of 10) **\$19.95**

Special Savings! Soft Sector Diskettes

5 1/4" 2S D Den (MD550-01) **\$31.95**

5 1/4" 2S 4 Den (MD557-01) **\$49.90**

8" 1S D Den (FD34-8000) **\$43.95**

**micro  
DATA SUPPLIES**

22295 Euclid Ave.  
Euclid, Ohio 44117

A SUBSIDIARY OF THE COMPUTER WAREHOUSE, INC. OF OHIO

**NEW  
LOW  
PRICES**





**TOLL FREE 1-800-321-3552**

IN OHIO & OTHER INQUIRIES 216-481-4993

**If Anything Beats Our Selection . . . It's Our Prices.** Look no further if you're shopping for rock bottom prices and fast personal service. When you call M.D.S. you receive the fastest delivery available anywhere. We now have a bigger and better facility to serve you in the most efficient way possible. Call us, you'll be glad you did.

*Russ Knott*



### THE HOME ACCOUNTANT

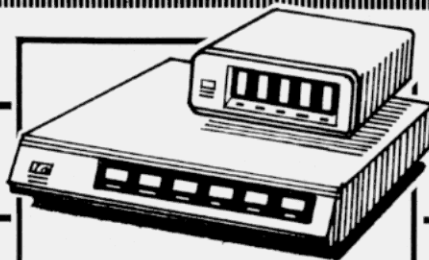
The #1 best selling program for home and small business accounting is now available for TRS-80 Model 3. handles up to 99 accounts, five checkbooks, multiple income accounts, and can split transactions to any number of accounts. Prints net worth statements, income statements, as well as custom designed reports. Displays a bar chart and trend for any selected category. It's easy to use and yet provides all the power you'll need (by Continental Software, requires Model 3, 2 drives, 48K) . . . \$62.95

**NEWDOS/80 Version 2.0**  
MOD I or III . . . . . \$89.95

**NEWDOS/80 Version 2.25**  
For Hard Drives . . . . . \$129.

Let your TRS-80™ Test Itself With  
**THE FLOPPY DOCTOR & MEMORY DIAGNOSTIC**  
Disk Drive & Memory Diagnostic Program  
by David Stambaugh

For MODEL I . . . . . \$24.00  
For MODEL III . . . . . \$26.00



### POWER DIRECTORS

Choosing a Line conditioner for your computer is pure logic!

Model P22 . . . . . \$74.95

Model P2 . . . . . \$99.95

Model P12 . . . . . CALL

Call or write for free brochure!

### BOOKS

#### OTHER MYSTERIES

TRS-80 DISK . . . . . \$19.95

Microsoft Basic Decoded . . . . . \$24.95

The Custom TRS-80 . . . . . \$24.95

Basic Faster & Better . . . . . \$25.95

How To Do It On The TRS-80 . . . \$24.95

TRSDOS 2.3 Decoded . . . . . \$24.95

The Custom Apple . . . . . \$24.95

Machine Language Disk I/O . . . \$25.95

CP/M Printer . . . . . \$15.95

THE WAIT IS OVER

## CP/M Exclusively for the Model 4 Montezuma Micro

Now, for the first time, you can unleash the powerful features resident in your MODEL 4 computer. Open up the vast store of CP/M software such as Wordstar, dBase II and Multiplan, along with thousands of others!

- Includes INTERCHANGE: a utility that allows reading, writing and copying 20 different manufacturer's disk formats such as IBM, KAYPRO, OSBORNE, XEROX, etc.

- Complete with the following CP/M utilities: ASM, DDT, DUMP, ED, LOAD, PIP, STAT and SYSGEN.

- NO copy protection. Backups may be made for your own use and protection.

- The CONFIGURATION program supports a full range of 5 1/4" disk drives: 335, 40, 77 and 80 tracks, single and dual sided in any combination as well as the standard Model 4 drives.

- Includes MODEM 7, a powerful public domain communications program for file transfer and remote data base access.

- Supports 80 x 24 video, reverse video, direct cursor addressing and more.

- Utilizes the Model 4 function keys and allows user defined keys.

- Auto execute command for turnkey applications.

- FORMAT utility permits up to 52 disk formats to be constructed, all menu drive.

**\$159.95**

#### WE ACCEPT

- Visa
- Mastercard
- Checks
- Money Orders
- C.O.D.

MOST SCHOOL,  
GOVT. AND  
FORTUNE 1000 CO.  
P.O.'S ACCEPTED  
Add 3% Serv. Chg.  
Min. order \$50

ADD \$3.00 FOR  
SHIPPING  
& HANDLING  
\$6.00 Extra for  
C.O.D. Orders  
Ohio Residents  
Add 6% Sales Tax

# 3M

5 1/4" 1S/DD/SS - Box of 10 . . . . . \$19.95

5 1/4" 2S/DD/SS - Box of 10 . . . . . \$31.95

Purchase 10 boxes of disks and you pay only . . . . . \$18.95 per box.

**micro  
DATA SUPPLIES**

A SUBSIDIARY OF THE COMPUTER WAREHOUSE, INC. OF OHIO

22295 Euclid Ave.  
Euclid, Ohio 44117

MAIL ORDER  
PRICES ONLY

Prices, Specifications, Offerings,  
subject to change without notice.

## Lazy Writing

After many unsuccessful attempts at trying to get my Model 4 to use the spooler with Lazy Writer, I wrote to AlphaBit Communications, Inc. The solution, though not included in the manual, is simple. Copy the SYS-DRV/CMD file, found on the Lazy Writer disk, for 6.X.X to P1/CMD. When the spooler is operational, it's automatically used with Lazy Writer. I use this JCL file to activate the spooler:

```
1 SET *LM CLICK/FLT
2 FILTER *KI *LM
3 SPOOL *PR TO TEXTFILE:1 (MEM=5,
DISK=5)
4 L X X1
5 //STOP
```

Lance K. Mertz  
Snohomish Publishing Co.  
114 Ave. C  
Snohomish, WA 98290

## Better Positioning

I merge this one-line utility with my programs to get each PRINT@ correct on first trial:

```
65000 X = PEEK(16416) + 256*(3ANDPEEK
(16417)):PRINT @1016,X;" "X,CHR$(14);:
Z = PEEK(14400):Z = 2*Z:Z = Z/2:
PRINTCHR$(15);:PRINT CHR$( - 27*(Z = 8)
- 26*(Z = 16) - 24*(Z = 32) - 25*(Z = 64));:Y$ =
INKEY$:IF Y$ = " " AND Y$ < "I"
AND X < 1023 THEN PRINT Y$;:GOTO
65000 ELSE 65000
```

You'll get a nondestructive cursor that you move with the arrow keys, while your program displays the position in the lower right corner. You can even use this as a screen editor since it accepts alphanumeric input.

Thomas Eggarter  
Chatadata Inc.  
Ramirez Mitchell 358  
5700 San Luis, Argentina

## International Style

Daisy-wheel printer owners who type in foreign languages will be pleased to know that Radio Shack released a



daisy wheel, Scandia, that includes both Spanish and Danish characters. You access them via the SuperScript System Code utility.

Carlos Ortiz  
119-37 Metropolitan Ave. #30  
Kew Gardens, NY 11415

## CLOADing

I'm able to run "Catacomb Conquest" (August 1984, p. 78) on my cassette-based Model III using "NODOS 80" (1983 Anniversary Issue, p. 96). Hopefully, "NODOS 80" will let me run other disk-based programs from 80 Micro.

Norman Jennings  
1605 Walton Street  
Cornwall, Ontario  
Canada K6H 1W3

Due to hardware interface problems, the bar code reader program originally scheduled for this issue has been delayed; we will publish the program as soon as we resolve these problems.

Also, because of Tandy's involvement with the Radio Shack showcases, Ask Tandy will not appear this month; the column will resume in February.

—Eds.

## For Geminis Only

Glenn Parkinson's FORMGEM ("Character Sketching," March 1984, p. 156) works perfectly on the Gemini-10X printer with only two changes. First, change the CHR\$(136) in line 1390 to CHR\$(8), and then change the CHR\$(132) in line 1430 to CHR\$(4).

Mark Allen Reed  
Box 368  
West Lebanon, NH 03784

I recently purchased Model 4 SuperScript only to find that none of the printer drivers furnished with the program works with my Gemini-10X.

The drivers send a CHR\$(15) to the printer, resulting in condensed-mode printing. You can prevent this code from reaching the printer with forms filter. Type in these instructions at TRSDOS Ready:

```
SET *FF FORMS/FLT
FILTER *PR *FF
FORMS (XLATE = X'0F00')
SYSGEN (YES)
```

The first two lines set the forms filter, while the next line converts all CHR\$(15)s to CHR\$(0)s. The last line writes the configuration to disk, and the printer driver now works properly.

Jerome D. Khutts  
Route 2, Speedway St.  
Campbell, MO 63933

## Reader Aid

After unsuccessfully trying to run Model III graphics programs on the Model 4P, I realized that the Model 4P doesn't contain a Model III ROM. Because of this difference, the Model 4P prints incorrect graphics. Any suggestions?

Jim Gonsalves Sr.  
2257 Manhattan Place  
Santa Clara, CA 95051

We had the same difficulty and found that POKE 16892,02 corrects this problem on the Model 4P.

—Eds.



## READER EXCHANGE

Can anyone suggest a professional astrological program to run on a 48K Model III with twin double-density drives? The program should be able to print natal and harmonic charts.

Roger G. Dawson  
22 Lancaster Road  
Preston, Lancashire  
England, PR1 1DA

I'm looking for the automatic sequential dialer program that was first seen in the movie *War Games*. I've been told that its name is AMODEM-90 and that it's a public-domain program.

Richard H. Epson  
1440 Sumner Ave.  
North Charleston, SC 29406

I give up—how do I get to the last level in *Deathmaze 5000*? Also, I'm trying to locate a copy of a game program called *Space Age 21*.

George D. Madison  
P.O. Box 649  
Winchester, OR 97495

### Error Trap

In line 8 of "Double Trouble" (Reader Exchange, October 1984, p. 29) BACKUP SYS:0 should read BACKUP SYS0:0.

Gil Seiler  
126 Boas Drive  
Santa Rosa, CA 95405

Incorporate this change in Alain Cirkovic's *Easydata* program ("Little Wonder," December 1984, p. 72) to get a directory in TRSDOS: Change Dir to D: in line 380.

—Eds.

## DEBUG

Listed below are modifications to X-Mart ("Attention Shoppers," August 1984, p. 75) to eliminate the syntax error that occurs in line 290 when you try to exit the program. Delete line 1210 and make the following changes:

```
290 D1=LEFT$(C3,X-2):D2=MID$(C3,X,
LEN(C3)-1):IFC3="QUIT" 1210 ELSEIF
QH<>0THEN340
```

```
1210 PRINT@576,"SURE? ";GOSUB
1300:IFN=0THENPRINTA:GOTO 280
ELSEF=1
```

Also, to eliminate two additional

bugs, change lines 710 and 740 to read:

```
710 IFC2="CAN"THENIFJ=58THEN
IFE(38)=2THENPRINTDZ:FORT=1
TO800: NEXT:E(38)=0:GOTO80ELSE=
BELSEA=DELSEIFC2="POC"THEN
IFE(21)=1 THENIFE(40)=2THENE(40)=
0:I(40)=J:PRINTDF:FORT=1TO800:
NEXT:GOTO80ELSEA=BELSEA=D8
```

```
740 IFC2="WAL"THENIFE(5)=2THENE
(5)=1:E(46)=1:I(5)=J:I(46)=J:A="YOU
NOW HAVE AN"+B(5)+"AND A"+
B(46):Q=Q+2ELSEA=B
```

Finally, several readers have had problems after they have been ar-

## EASY TO USE INTEGRATED SOFTWARE FROM PEL-TEK ■ ALL THREE MODULES, ONLY \$99.00

Word Processing from Pel-Tek

### word machine 3.0

FOR TRS-80 48K Mod I/III/4\*

#### Easiest to use Word Processor anywhere

- On screen formatting — what you type is what prints on the printer
- Works with all printers
- Graphics mode for TRS-80 block graphics (printer support needed)
- Embedded forms control — to skip lines, eject paper, terminate printing
- Embedded file retrieval during printout (called from text) allows chaining a document to any virtual length
- Pause feature — enter data into text line fields during printout, great for forms or form letters, especially when used with Multiple Copy feature
- Insert/delete characters, lines, files, anywhere in your text
- Text centering
- Embed ASCII codes in your text to control your printer
- Headers, Footers, page numbering
- "Warm start" from DOS READY
- Line oriented
- Full screen text editing
- Supports unmodified Model I for lower case
- Integrates with Spell Check/Correct and DBLCOM communications packages
- FREE . . . INDOOR SOCCER and JUMPY arcade games included!

Proofreading From Pel-Tek

### spell check/correct system

Integrates with the Word Machine 3.0  
FOR TRS-80 48K Mod I/III/4\*

#### Superb 30,000 Literal Word List

- Includes prefixes, suffixes, many proper names and geographic locations
- Integrates with the Word Machine 3.0 without duplicating files
- Can check ASCII files created by any Word Processor
- Streamlined menu driven operation makes it easier to use than any other Spelling Checker
- Allows expansion of a secondary User Dictionary with words from your text
- Or create/edit your own User Dictionary using any Word Processor
- Expand the main dictionary to up to 60,000 words automatically with words from the User Dictionary (Model III)
- Works with a single disk configuration
- Does spelling checking AND spelling corrections — no extra charge for the corrections feature
- Less than 1/2 the price of any competing TRS-80 product, and performs better based on independent testing
- Integrates with the Word Machine 3.0 with uninterrupted operation

Communications from Saturday Software

### dblcom

Integrates with the Word Machine 3.0  
FOR TRS-80 48K Mod III/4\*

#### Unique Split Screen for Sending/Receiving

- Split screen feature avoids text "collisions" in Conference or "C.B." modes
- Prepare transmission text lines on bottom screen while normal transmissions are received on upper screen
- Large capture buffer for incoming/outgoing text
- Printer spooling of buffer to save connect time
- Dump buffer to printer, disk or communications line
- Send all 26 ASCII control codes
- Status line shows printer, buffer, and UART status
- Supports 110, 300, 1200 Baud
- Selectable UARTS
- Auto Dialing
- Optional line feed after carriage return
- Optional local echo for half-duplex
- Access to D.O.S. from within the program
- Integrates with the Word Machine 3.0 to create or edit buffer text using Word Processing facilities

VISA • MASTERCARD • CHECK  
Money Orders Accepted  
Add \$2.00 Postage and Handling  
Add \$3.00 for C.O.D.

\* Software operates on Mod 4 in Mod III mode  
\* Spell check will not work with Super Scriptset

PEL-TEK  
P.O. Box 1026  
Southampton, PA 18966  
Order Line: 1-800-523-2445, Ext. 19  
In PA: 1-800-346-7511, Ext. 19

PRICES	STAND ALONE	WITH WORD MACHINE 3.0 INCLUDED
Word Machine 3.0	\$35.00	
Spell Check System	50.00	\$65.00
DBLCOM System	50.00	65.00
Spell Check & DBLCOM		99.00

**SPECIAL #1****LC Compiler & book: \$114.50**

Save \$55.00 on an ideal compiler for anyone interested in the "C" programming language. The MisoSys LC compiler combined with "The C Programming Language" book and the EDAS Editor/Assembler. For Model I/III under LDOS or DOSPLUS IV, Model 4 under TRSDOS6 or DOSPLUS IV. (Total Value is \$170.00). And LC alone, without book, is an astounding \$99.50!

**SPECIAL #2****DOSPLUS 3.5; \$49.50**

A new low price on this great Model I/III DOS! Features include ease of use, powerful and versatile commands, device independence, and many extra utilities included free. This is the best DOS at any price, and the best DOS deal of the year! (Total DOS deal of the year! owners: DOS \$99.95) (Model 4 owners: If you buy DOSPLUS 3.5 added for only \$49.50!)

**SPECIAL #3****NEWBASIC Enhancement Package: \$34.50**

Buy the excellent NEWBASIC enhancement package to add powerful commands to you Model I/III Basic, and we'll throw in either "The Analyst" (program speedup utility) or "The Collector" (string-delay fix utility) for FREE! (Total value: \$64.85)

**SPECIAL #4****SUPREME RULER PLUS: \$26.50**

Order this fine strategy game for one to nine players and receive either "Battle of Zeigtry" or "Sitter Shifter" for FREE. For Model I/III, 48K. (Also available on cassette. Total value: \$35.00)

**JMG Software's YEAR END SPECIALS Continue!**

We've reached into our product line and pulled out the great specials outlined above. We've made some incredible deals, so get 'em quick before the prices go back up. And, of course, we still have our everyday great values as outlined below. Remember, we are THE source for TRS-80 Model I, III and 4 software!

**LESCRIPT-\$94.50**

(By Anitek; list \$129.95) We've made this excellent word processor affordable: loads of features, great printer support, ease of use, and more. For models I/III or 4; makes use of extended features on Model 4 including 128K RAM if you have it. (Ask for a free demo disk if you're not sure about it.)

**DOSPLUS IVa-\$109.50**

(By Micro Systems; list \$169.95) A great price on a great DOS; for the Model 4 this is by far the best DOS around. It beats TRSDOS 6 in speed, versatility, and power. Compatible with programs and media for TRSDOS 6; also comes with the M-ZAL Editor/Assembler program and other utilities. Most users rate it a 10 out of 10 on our reply cards!

**DOTWRITER 4.0-\$69.50**

(By Prosoft; list \$99.95) Use the full power of your printer with this excellent custom-character set program. Use one of the many supplied or available character styles, or make your own with the LDS utility included. Model I/III or Model 4 (specify); also specify printer brand (Epson, DMP, Okidata, Prowriter or Gemini).

**ElectricWebster \$99.50**

(By Cornucopia; list \$149.95) A fine spelling checker program, integrates with most word processors. Has a 50,000 word dictionary, and it allows you to add your own words also. A Grammar-checking option is available for \$38.50 extra.

**KSoft's LOG and SUPERLOG 4**

These "Electronic Notebook" programs are like a "memo pad" available instantly, even when running other programs. LOG is for Model I or III at \$44.50; SUPERLOG-4 has many advanced features and is available for \$99.50 (list \$119.50) for the Model 4. Once you start to use it you'll wonder how you ever did without it!

**TASMOM \$29.50**

(By TAS; list \$39.95) An excellent machine language monitor/debugger. Available for Model I/III or Model 4 (specify). Loads of features, this is one of the best programs of its type. The price will soon go up to \$34.50, so get 'em quick...

**TO ORDER:**

We accept orders by phone or mail. When ordering please specify the Model of TRS-80 you own, the exact program(s) wanted, and the method of payment. We accept Check, Money Order, VISA, MasterCard, and Gold. Please enclose \$2.50 for shipping costs. For Electric Webster and Dotwriter, please mention your word processor and printer brands.

**TAS Journal & Disk: \$15.00**

The Alternate Source Programmer's Journal has published a "Special Issue", full of great information for any serious users and programmers.

**New - JMG's APPLICATIONS "TOP TEN"**

Want to know what's popular in the TRS-80 software world? We've compiled this list of the "top ten", in order, based on our sales for one month ending in November.

1. LESCRIPT (\$99.50)
2. DOTWRITER 4.0 (\$74.50)
3. DOSPLUS (\$59.50 / \$129.50)
4. TAS Journal & Disk (\$15.00)
5. ZORLOF II (\$49.50)
6. Electric Webster (\$118.50)
7. TASMOM (\$29.50)
8. Tallymaster (\$54.50)
9. Analyst/Collector (\$19.50 ea.)
10. DSMBLR III/PRO-DUCE (\$34.50)

**COMMUNICATIONS**

We sell many communications/terminal programs, and here's a partial listing:

MODEM-80	\$34.50
LAZYCOMM	\$29.50
MTERM	\$64.50
MTERM Mod 4	\$64.50
Ultraterm 2	\$64.50

**"TOLL FREE" ORDER LINE:  
(416) 389-6086**

Instead of a regular toll free number, we deduct \$2.00 from your order to pay for your phone charge (which is usually less than \$2). That way you come out ahead, we come out ahead, and everyone is happy. And if you order by mail, ask for our "Toll Free Discount" and deduct \$2.00!

(Phones are staffed 10 A.M. to 7 P.M., Monday to Saturday, except Wednesday).

**OUR PRICING POLICY:**

We will beat any legitimate price advertised for any product that we carry. If you find a lower price advertised, our price will be \$1.00 less, under the same conditions (eg. same shipping and other charges, etc). To receive the lower price you must mention the location of the other ad when ordering.

**WRITE FOR OUR  
FREE CATALOG!****OUR GUARANTEE:**

We sell only top-quality software. If, however, you are unsatisfied with a product you have purchased from JMG, you may return it (in good condition) within 10 days for a refund, less a \$2.50 handling charge for programs under \$50 (\$5.00 for programs over \$50). We also ask that you send us a letter stating the reason for your return.

**JMG SOFTWARE  
INTERNATIONAL****THE FINE PRINT:**

Shipping Charges are \$2.50 in Canada and U.S. Overseas surface shipping is \$5.00, \$10 for air mail. All prices in U.S. Funds. Add \$1.50 for COD Charges. Model III programs will all run on a Model 4 in III mode.

**3235 LOCKPORT ROAD  
NIAGARA FALLS, NY 14305****OR****710 UPPER JAMES ST.  
HAMILTON, ONTARIO  
CANADA L9C 2Z8****Phone: (416) 389-6086**



rested for jaywalking. After falling asleep they can move around, but can't manipulate objects. This isn't a bug! After moving around approximately 20 times, the player once again wakes up in jail. Because you're not actually playing during the dream, you can't manipulate items. Pay attention to the message that appears during the dream—it helps you escape from jail.

*Joshua Barinstein  
124647 Victory Blvd.  
N. Hollywood, CA 91606*

"The Direct Approach" (September 1984, p. 96) does work on the Model 4P, contrary to what's stated in the Key Box. Also, the following changes prevent garbage collection: Line 10010 should contain an OUT 132,142 immediately following the POKE, while line 10200 should contain an OUT 132,135 immediately following its POKE.

*Seth Monger  
4694 Coos Bay Wagon Road  
Roseburg, OR 97470*

Please note the following corrections for "Bugs from Outer Space" (March-August 1984). Line 100 of Text6B should read:

00100;\*\*\*\*PART6B

Change line 350 of TEXT6D to read:

00350 ERROR1 JP 7637H ;8637H for Mod3 TRSDOS

The buffer for adding scores to the scoreboard isn't properly closed. The Program Listing corrects this problem.

To assemble Text6E, load the completed game using System or Load, and then load Text6E. Save the complete game as described in the August 1984 issue (p. 88).

*Roger Smith  
505 Ridge Lake Road  
Crestview, FL 32536*

Send correspondence to Reader Exchange, c/o 80 Micro, 80 Pine St., Peterborough, NH 03458.

## Program Listing. Correction to "Bugs from Outer Space."

```

00100 ;****PART6E
00110 ;CORRECTS BUGS IN SCOREBOARD
749A 00120 ORG 749AH ;849AH FOR MOD. III TRSDOS
749A CD1578 00130 CALL OOPS ;PATCH
7815 00140 ORG 7815H ;8815H FOR MOD. III TRSDOS
7815 D5 00150 OOPS PUSH DE ;SAVE DE
7816 3E20 00160 LD A,32 ;A=SPACE
7818 0606 00170 LD B,6 ;6 CHARACTERS
781A 12 00180 OOP10 LD (DE),A ;STORE SPACE
781B 13 00190 INC DE
781C 10FC 00200 DJNZ OOP10 ;LOOP
781E D1 00210 POP DE ;RESTORE
781F CD0362 00220 CALL 6203H ;7203H FOR MOD. III TRSDOS
7822 C9 00230 RET
0000 00240 END
00000 Total Errors
OOP10 781A
OOPS 7815
    
```

End

# SUPERTAX™ Get Supertax by Rockware Data and get the jump on your 1984 Income Tax Planning

## THIRD SUCCESSFUL YEAR! • THOUSANDS ALREADY IN USE!

Use SUPERTAX personal income tax programs to calculate your tax liability now and have plenty of time to make year-end investment decisions to improve your position. SUPERTAX was developed by a practicing CPA with a Master's degree in tax accounting. Highly acclaimed by tax pros, CPAs and tax preparers, SUPERTAX is easy to understand and a pleasure to work with. Available for TRS-80 (2 drives), Apple II+, IBM-PC, Kaypro II and Sanyo MBC-550 Series.

- SUPERTAX is fully screen-prompted and includes a manual loaded with valuable tax information, instruction and guidance.
- SUPERTAX instantly recalculates your entire return when you change any item.
- SUPERTAX prints directly on IRS forms.
- SUPERTAX DATA can be stored on a diskette.
- SUPERTAX updates are available at 50% discount to registered SUPERTAX owners.
- SUPERTAX is an essential addition to your personal software library—best of all it's tax deductible.

### FOR TAX PLANNING

Using either screen or printer output, SUPERTAX generates clear and concise summaries of Page 1 and 2 and Schedule A of FORM 1040 allowing you to see at a glance and to quickly comprehend your tax situation. This program also prints an OVERALL SUMMARY of the return showing Adjusted Gross Income, Itemized Deductions, Taxable Income, Regular Tax and Payment Due or Refund—all of which are calculated by the program. SUPERTAX also calculates the moving expense deduction, investment credit, taxable capital gains, political and child care credits, medical limitations, and much more. Input is fast and easy and changes can be made in seconds. This program actually makes tax planning a breeze.

### FOR RETURN PREPARATION

SUPERTAX PRINTS THE INCOME TAX RETURN: This program prints page 1, page 2 of the FORM 1040, Schedules A, B, C, W and G (income averaging) of the FORM 1040 as well as FORM 3468 (investment tax credit) on standard IRS government forms or on blank computer paper for use with transparencies. Any item of input can be changed in seconds and the entire return is automatically recalculated to instantly reflect the change.

TRS-80, Apple II+, IBM-PC, Kaypro and Sanyo are trademarks of Tandy Corp., Apple Computer, Inc., International Business Machines, Non-Linear Systems, Inc. and Sanyo Business Systems Corp. respectively.

### FOR DEPRECIATION CALCULATION

SUPERTAX also includes a stand alone depreciation program which calculates and prints your complete depreciation schedule using both the old rules and the new ACRS rules. Output from the depreciation program is designed to serve as a supplement to IRS FORM 4562. **\$99**

**New—PREPARER'S EDITION:** includes all of the above, PLUS, it will also print Schedules D, E, SE and FORM 6251. The PREPARER'S EDITION also prints preparer data at the bottom of page 2 of the FORM 1040. **\$149**

**TO ORDER** Send Check or Money Order to ROCKWARE DATA CORP. P.O. Box 365, Plano, TX 75074, or call 214-596-0588. VISA and MasterCard accepted. Add \$3.00 shipping on all orders. TX residents add state tax.

**Rockware Data Corporation** 512

**NEW! Lower Prices!!**

**wabash®**

six-year warranted

**DISKETTES!**

**\$11.90/box (10)**

5 1/4" single -side, single-density; double-density  
add \$2/box. Add \$3 per order shipping. In Illinois  
add 7% sales tax.

**Library Case-\$1.50** (with disk purchase)  
Immediate shipment on VISA, MasterCard or  
Money order; add 14 days for personal checks.

**CALL TOLL FREE**

**(800) 222-1248**

**In Illinois Call (312) 882-8315**

**DEALERS! SCHOOLS! USER GROUPS!**

Call for our volume discount prices! ✓367

**DIGITAL IMAGES**

**1185 Tower, Schaumburg IL 60195**

## LNW SERVICE

**QUALITY REPAIRS ON ALL  
LNW FACTORY ASSEMBLED  
PRODUCTS INCLUDING:**

- TEAM AND ALL LNW80 MODEL COMPUTERS
- SYSTEM EXPANSION II
- LNDOUBLER AND LNDOUBLER 5/8
- LNW DISK DRIVES

### COMPUTER UPGRADES:

- CP/M 2.2
- HARDWARE 80 x 24
- MODEL 4 UPGRADE
- TEAM UPGRADE

### OTHER PRODUCTS AVAILABLE:

- HARD TO FIND LNW PARTS
- LNW SOFTWARE

Editor Note:

This space open for specials!

**WILSON TECHNICAL SERVICE**

8:00 AM\*5:00PM(PST)  
VOICE 714-531-8136

AFTER 5:00 PM(PST)  
DATA 714-531-8136  
300/1200 BAUD

✓123

### Attach Your Printer to SuperSCRIPT

Easily and automatically attach your printer to SuperSCRIPT with an ALPS software driver program. **Over 100 different printers supported.** No need to learn special codes. Call or write for latest Product Review Sheet describing features supported on each printer (underline, bold, proportional, etc.) Two years experience. Customer support.

\$49 or \$59 each, depending on printer

### Use Memory as Superfast Disk Mod 4(III)

\$39

Speed up programs by using your extra memory as a drive. Use MEMDISK as your System Drive, or load files into memory for instant access. Easy to use with 1 simple command. No program changes required to access MEMDISK as if it were a disk drive. An entire MEMDISK can quickly and easily be saved to (or loaded from) floppy disk. Uses 80K of 128K memory (64K on 4P). (LDOS only.)

### TIME-SAVERS FOR TANDY 2000

(and IBM PC)

**IMPROVE PERFORMANCE & FLEXIBILITY  
OF YOUR PC APPLICATIONS**

#### Use Memory as Superfast Disk

\$49

RANDISK - Use spare memory as a disk to speed up applications. (You specify RANDISK size.) Appears to programs as a disk, but gives instant access. Easy to install and use. Superfast!

#### Directory / File / Backup Tools

\$59

1. **Display alphabetized 5-column directory listings.** View entire directory at a glance on 1 screen.
2. **Find a file** - search thru all directories for a file name and display all occurrences.
3. **Directory Tree** - display directory tree structure below any name in easily readable form.
4. **Backup only modified file** - speed up and automate backup operation. Stores in same format as original for direct access. Great for hard disks!

#### User Tool Assortment

\$59

1. Define a command as one key. Keyboard aid - less typing and faster data entry by defining any command string as 1 key, then press key to perform.
2. Count lines on files. Displays count.
3. Dump files in Hex and character (with scrolling).
4. Change ownership & attributes of files. You can make files hidden, read-only, or reset to original.

#### Attach a Serial Printer

\$49

With 2 easy commands, you can attach a serial printer to the RS 232 port. Complete instructions.

More ALPS Tools are available. Call or write for catalog. All products are guaranteed to perform as advertised. We provide full customer support.

**ALPS**

23 Angus Road  
Warren, New Jersey 07060  
201-647-7230

✓74

- **DISPLAYS CORRECT SPELLINGS:** If you don't know the correct spelling, 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.

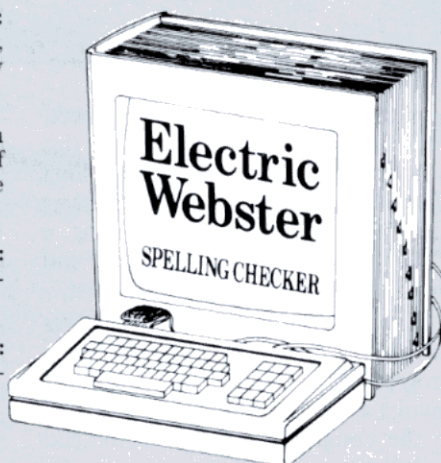
- **HYPHENATES AUTOMATICALLY:** (Optional). Inserts discretionary hyphens throughout text.

- **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 2 1/2 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:** into 12 different word processing programs: WordStar, Spellbinder, Palantir, NewScript, Lazy Writer, SuperScripts, Scripts, Electric Pencil, CopyArt, Superscript, Zorlof, and LeScript (specify). Begins proofing at the stroke of a key; returns you to word processing automatically.



### "The Cadillac"

of spelling checkers  
80 Microcomputing, 9/82

**VOTED #1:** For the second straight year, Electric Webster was voted the #1 spelling checker in the 80 Micro Reader's Choice Awards. (1/83, 1/84)

"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.

### 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*

"Now there's a program called Electric Webster that would let me write to Presidents and Kings and never feel embarrassed. Miss Mulberry would give Electric Webster an A+, and so will you." *Computer User, 1/84*

Performance "Excellent"; Documentation "Good"; Ease of Use "Excellent"; Error Handling "Excellent". *Info World, 8/82*

### LOW PRICES:

TRS-80 Electric Webster	\$ 89.95
w/Correcting Feature	\$149.95
Hyphenation	\$ 49.95
Grammar & Style Checker	\$ 49.95
CP/M, PC/DOS or MODEL 2000	
Electric Webster	\$209.95
(with Correcting Feature)	
Hyphenation Option	Included*
Grammar & Style Option	Included*

\*Limited Time Only



**CORNUCOPIA  
SOFTWARE**

✓45

(415) 524-8098

Post Office Box 6111 Albany, California 94706



# T/Maker: Functional CP/M Integration

by Eric Grevstad

edited by Ryan Davis-Wright

**T**he age of integrated software didn't begin with the IBM PC and Lotus 1-2-3. Since 1980, programmer Peter Roizen has been merging CP/M-80 applications into T/Maker, fitting the software concept of today with the hardware and operating system of yesterday. T/Maker includes word processing, spreadsheet, and data base management capabilities in one package.

The latest T/Maker (version 4.01) is no threat to new PC packages like Lotus' Symphony or Ashton-Tate's Framework, but the CP/M world has nothing else like it. If you have the patience to learn its syntax, T/Maker delivers genuinely flexible integration. It's an impressive piece of programming, as long as you don't compare it to dedicated word processors or spreadsheets.

## A Clean Slate

To give T/Maker a high compliment, it's as close to a blank sheet of paper as a Model 4 program can get. When you boot up the system, it presents you with a blank screen.

T/Maker has a switchable menu to execute its English-language commands and supplies on-line help for its sometimes cryptic keyboard functions. While the program may seem difficult to use at first, T/Maker tries to make things easy for you.

Don't be afraid when you open the box and five disks fall out. You'll need the first disk each time you start the program (and whenever you want help), but you'll do most of the work

with the second (editing, spreadsheet, data base, and printing) and third (list processing, graphics, and spelling checker with 15,000-word dictionary) disks. The fourth disk contains a 35,000-word auxiliary dictionary, and the fifth is a demonstration/tutorial.

Since T/Maker usually reserves drive B for data, you'll be swapping program disks in and out of drive A. Invoke a disk-3 command with disk 2 in the computer, and a "Command Failed: Nonexistent" message prompts you to try again.

You can change the data drive or other defaults with a program called TModify, which also lets you reconfigure the T/Maker keyboard rather than use its standard pattern, awkward for things like cursor movement.

Some of this has already been done for the Model 4/4P version. The arrow keys function and an addendum to the manual tells you how to emulate other CP/M terminals (the TRS-80's break key works the same as others' escape keys, and control-L replaces the

missing tab key). While T/Maker comes configured for 128K RAM and CP/M Plus, it also includes set-up instructions for Montezuma Micro's 64K CP/M 2.2.

## Commands And Conversations

While other programs prompt you with question marks, T/Maker's interface is a chatty "What Next?" You answer it with English commands: "Create" starts a new file and prompts you for a file name, and "Edit" brings you into the file. You can save time by entering commands together (Create Newfile Edit, or Align

Save Print It), though the instructions grow less grammatical as they grow more detailed; Print Nonstop From 10 To 30 It, for example, prints pages 10-30 of the current file without format queries.

Many of T/Maker's vital commands only work downward. A command to align or print text, for example, affects only the portion of the current (RAM-based) file below the top line shown on-screen. In most cases, you'll either move to the top of the file beforehand or use T/Maker's framing command, which is similar to a spreadsheet's ability to freeze a column of labels while viewing other data.

T/Maker's most important command, though, doesn't directly affect anything. Edit (E) removes the "What Next?" prompt and activates T/Maker's editor, the heart of the T/Maker system. It's a free-form program that lets you put anything you want anywhere on the screen, but it's a slight exaggeration to call it a word processor.



Illustration by Katherine Mahoney

You create every T/Maker file, whether it's a document, spreadsheet, or data base, through its editor.

As mentioned, the editing screen is initially blank. Pressing break and then the ? key calls up a status line that indicates the current file's name, length, free space, current cursor position, and carriage-return mode. (To explain the last, break-R rotates among manual returns, word wrap after 63 characters, and spreadsheet-style horizontal scrolling, while break-

search and search-and-replace functions (break-' and break-' respectively) are fast and accurate.

## Words Under Wedges

Oddest of all is T/Maker's approach to margin setting and justification. Instead of embedding commands or keystroke sequences, you set line width by typing in pairs of wedges (<< >>) delimiting text boundaries. The wedges shape the text below until T/Maker encounters the next set of wedges. Minor changes, such as a right wedge of ->> versus >>, yield justified, ragged, or centered copy for block-style or indented paragraphs.

T/Maker doesn't format text until you leave the editor and use the Align command, which reads the wedges and adjusts the text accordingly. It also runs paragraphs together unless there's a blank line or a single period between them, turns columnar tables into prose if you forget the "do not align" wedges (>> <<), and puts two spaces after question marks, exclamation points, and periods (including the one in Mr. Jones).

While T/Maker's word processing features make you long for Scripsit, its spelling checker is quite good, in an odd sort of T/Maker way. Entering the Proof command (with the first line of your file at the top of the screen) produces a handy table tallying the file's total number of words, unique and unfamiliar words, and the average number of characters per word and words per sentence.

When you return to the editor, you'll not only find the unrecognized words tagged in your file but a double list, with two copies of each offending word per line, appended to it. Fix the second sample of each word and it'll be changed throughout your file when you issue the Correct command, or added to the dictionary with Amend. You can even ask for help, changing the second sample to something ambiguous like "rhy?hm" and asking T/Maker to spell it.

## Monster Math

I also like T/Maker's skill with lists and tables. Once you learn the lingo, it sorts and shuffles columns of data easily and quickly. If the first item is at the top of the screen, the command Sort A N 12 32 puts the numbers in columns 12-32 in ascending order.

You could also sort a list of characters, or sort in descending order.

A similar command, Tally, is more explicitly mathematical. It takes lists (files with plus signs in the first column of each line), breaks them into categories by column number and, if you want, sums the numeric values associated with them. For example, I could tally the second and third columns of a list of dinner guests, their sex and their ages, and learn there were three males and four females, with combined ages of 82 and 103, respectively.

The further you get into mathematical work, though, the more T/Maker's word-based structure hinders you. It works best with vertical lists. With plus and minus signs running down the left margin and an equals sign at the bottom, the Compute command can solve the list as if it were an algebra problem.

Beyond this, you're into T/Maker's spreadsheet. Like its other program features, the spreadsheet is great at merging data into business letters but terribly difficult to master. If you can imagine a word processor with no Delete Word function, imagine a spreadsheet with no cells, parentheses, or automatic recalculation for "what-if" changes.

T/Maker's way of defining column widths (up to 50 computable columns) isn't necessarily bad. The top line of a spreadsheet is an example line (labelled "ex") and contains maximum width numbers such as 99,999.99. Any numbers below them, even if not perfectly lined up, will be realigned to match the examples (with or without commas, and with the same number of decimal places).

The rest is like VisiCalc in reverse Polish notation. All mathematical functions (from + and / to exp and abs) appear not in row and column intersections, but externally, running down the left side or across rows atop or between spreadsheet entries. This system works for simple sums, but calculating a specific cell without anything like a cell formula is murderous.

In addition, T/Maker doesn't use parentheses. Its inflexible method of operation is to do all additions, subtractions, multiplications, and divisions in that order. To overcome this, you must sprinkle the spreadsheet with instructions: ac1 (first step, compute for all subsequent rows), jc2 (second,

## T/Maker Integrated Software



**T/Maker Company**  
2115 Landings Drive  
Mountain View, CA 94043  
415-962-0195  
Models II, 4/4P (requires CP/M),  
Tandy 2000  
128K RAM  
Two disk drives  
\$450

*Easy to use?* ★ ★ ☆ ☆ ☆  
*Good docs?* ★ ★ ★ ★ ★  
*Bug free?* ★ ★ ★ ★ ☆  
*Does the job?* ★ ★ ★ ☆ ☆

I toggles an insert mode. A ruler below the status line helps you set margins and tabs.)

Running under Model 4 CP/M, the editor suffers from poor typing response and keybounce (if I were using it to write this, it'd be a review of Tt/Mmaker) and it lacks some useful functions, such as cursor movement that wraps around lines or a way to delete words as well as characters. There are no true block-move operations, but you can copy lines one at a time into a 40-line buffer for movement (first in, first out) elsewhere.

On the positive side, the editor's embedded print commands are convenient: ".single" and ".double" control line spacing, and ".newpages" starts a new page if fewer than five lines are left on the current one. Footnotes are handled automatically, and



just compute for the next row), rc3 (third, rarely compute only on subsequent rows derived from other rows).

After studying the manual's examples and typing them in, I'll admit that T/Maker's spreadsheet can do some sophisticated things, such as built-in notations for functions like growth rate and rounding interim values. But doing them requires learning a whole new approach (even stranger than dBase II language) that applies to no other spreadsheet on the market. The system almost requires enough pre-planning with pencil and paper to defeat the whole purpose of spreadsheet work.

## Keeping Records

Clearly, the spreadsheet is T/Maker's worst feature. I'm a lot happier with its data base manager which, while requiring similar pains in setting up, performs swiftly and capably once the job is done.

The data base, as you'd expect, is a text file created with the editor. It begins with sections (<form>...<end> and <record>...<end>) describing how a record will appear on the screen and how T/Maker will file it. A record can have up to 120 fields of 80 characters apiece, with field lengths defined by curly braces (left-shift/@ and right-shift/@ on the Model 4 keyboard).

Once you define a data base, the Update command works much like the regular editor, letting you review or alter records one at a time (the search function for individual items is unchanged, the "next word" cursor movement command becomes "next record"). As with lists, you can rearrange a data base alphabetically or numerically, in ascending or descending order.

For more precise work, the Select command finds groups of records easily. Altering all the records in a data base is as easy as reentering the file, changing the form and record definitions, and adding another definition for use with the Set command (such as Status = Prime When Income > \$50,000).

T/Maker is no R:Base or Profile, but its data base is a nice variation on the text-oriented theme. When using Update, for example, the break-? status line changes from an editing ruler to an indication of how many more

records of the current length can fit in a file.

## Mixed Impressions

There are other good things about T/Maker. While it doesn't have windows, the List command lets you look at a second file without losing the current one in RAM. It's a breeze to chain, merge, and insert different files of different types for printing (one print command strips away ugly example and instruction lines from the spreadsheet).

The command menu is handy for beginners, though users will soon skip it in favor of stringing together multiword commands. The help screens are excellent: well-organized, well-written, and valuable even to seasoned users who haven't used a particular function in a while.

And the documentation is first-rate. There is a superbly organized 400-page manual and two reference booklets, as helpful and readable as anything I've seen in some time. It's relevant to remember that T/Maker has been around since 1980, gathering a group of hardcore fans. It's not only thoroughly debugged, but thoroughly documented.

I also used T/Maker on the Tandy 2000, and liked it better on that machine than on the Model 4. It was considerably faster, not so much in terms of commands like Align (for which T/Maker goes to disk) but in terms of general feel and responsiveness. The 2000 T/Maker has a full invaluable implementation of function keys: PgDn sure beats break/control-P for "move to end of line."

Is T/Maker worth \$450? It's certainly worth the increase from the prior version, T/Maker III (still available at \$275, but with no spelling checker, no data base, and no on-line help). It does look good when you compare its cost to several separate programs, which aren't able to merge or create such versatile files. And none can compare to its blank-paper approach only now being seen in MS-DOS products like Aura and Enable. On the other hand, the standalone programs beat T/Maker's performance in some vital areas.

T/Maker is an extremely versatile, somewhat awkward text editor with fast and intelligent search functions and limited mathematical capabilities.

If Framework is the sleek new Porsche of integrated software, T/Maker is an old Plymouth Road Runner with a big V-8 and a bad clutch. While it may be inefficient and hard to maneuver around town, it has great power and performance on the straightaway.

I wouldn't choose T/Maker's editor over a real word processor and I wouldn't choose its spreadsheet at gunpoint, but it's the closest thing to real integration that CP/M will ever see. It is certainly worth considering. If you only want to learn one set of commands, it's worth using. ■

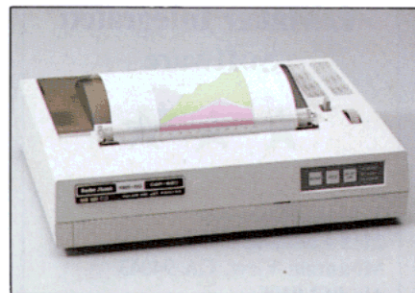


Photo. The CGP-220 printer.

## Color Me Beautiful: Radio Shack's CGP-220 Color Printer

by **Bradford N. Dixon**  
80 Micro Technical Editor

**R**adio Shack's CGP-220 ink jet printer is compact, quiet, and colorful. But the CGP's most remarkable feature is its low price: For \$699, home computerists and small-business users can get high-quality color printouts of screen graphics.

The CGP-220 is compact (15 3/4 by 11 5/8 by 4 1/4 inches) and lightweight, weighing only a little over 12 lbs. It has a spare and uncluttered design, with the operating switches on the unit's right front side. The Ready, Alert, and Power indicators are also located there. The Reset, Paper Feed and On/Off line switches are touch sensitive, lying flat on the front.

The slots for the ink jet's color and black ink packets are hidden from view by a door on the front. The ink packets come inside plastic cartridges so you never handle the ink. On the left, underneath the paper cover, is the ink pump. Before you can do any printing, you have to prime the ink jets with a few short pushes on the green pump lever.



**MODEM — 80**

TRS-80 Model I/III or TRS-80 Model 4

**FEATURES**

- File transfers with remote operation of TRS-80 Model I or III from a terminal or another TRS-80 via modem — transfer files from or to an unattended computer.
- Error free file transfers with another TRS-80 or a computer using the CP/M program "MODEM", used widely on computer bulletin boards (CP/M user Group disk #25).
- Configured for use with MicroNet, the Source, Forum 80. Redefine parameters, character set, control characters to interface with Dow Jones, WestLaw, and other BBS. Electronic mail capabilities.
- Written in assembler code for speed and minimum memory requirements, 110 to 9600 bps Baud Rate, Function Key Template, Novice and Advanced Level Documentation, Index and Glossary.

**BENEFITS**

- Handles files of unlimited length, even in a 32K system and 1 disc drive. With the "XMODEM/CMD" utility, files may be transferred with a 16K computer.
- Prepare file off line with word processor, or included program "SAVE/CMD". If first transmission attempt fails, data is still safely on disc and available for a second try.
- Open Transmit/Receive (T/R) files before going on line. Toggle T/R files On/Off independently. In specialized application, T/R different files simultaneously. Control codes for remote operations.
- Transmit single lines from a file, allowing transmission to be intermixed with keyboard input, providing more flexible response to prompts from the remote. Permits file transfer to a system that cannot accept full speed transmission or does not use control codes to start/stop file transmission.
- DOS commands and programs which execute in the lower 16K may be executed while maintaining position in T/R files. Previous screen contents restored at completion of DOS command.
- Over 2000 satisfied users since 1981.

**NEW ENHANCED Model 4 Version -****Has all I/III features PLUS:**

- Menu-prompted Configuration and Save To Disk for: 1) Format options and/or Terminal Settings; 2) Code Translation Tables for Transmit, Receive, Video, & Printer; 3) Control Code Table; 4) Toggle On/Off options of: Line Feed (accept/drop), Send Slowly, & Receive Disk-Buffer; 5) Timed Character and/or Line Delay setting; 6) Set Prompt Character.
- Specific Transmit/Receive commands for CP/M or MSDOS text files.
- Utilize optional 64K RAM as Receive Buffer • System Status Lines

**BENEFITS:**

- Configurations easily defined from menu. Load from disk individually or as a set for specific Host protocol, either from within program or on bootup.
- Permits compatibility with a vast array of computer networks and provides a high level of customization, including use of your own encrypted codes.
- Download larger files from Bulletin Boards without losing data.
- **MODEM 80 is 100% Radio Shack compatible and is fully supported by the author Leslie Mikesell.**

MODEM 80 Model I/III sells for only \$39.95 + \$2.00 S&H  
 MODEM 80/MAX (Lobo) sells for only \$49.95 + \$2.00 S&H  
 MODEM 80 Model 4 sells for only \$79.95 + \$2.00 S&H

COD Orders Require a \$5.00 S&amp;H

✓ 303

Available from:

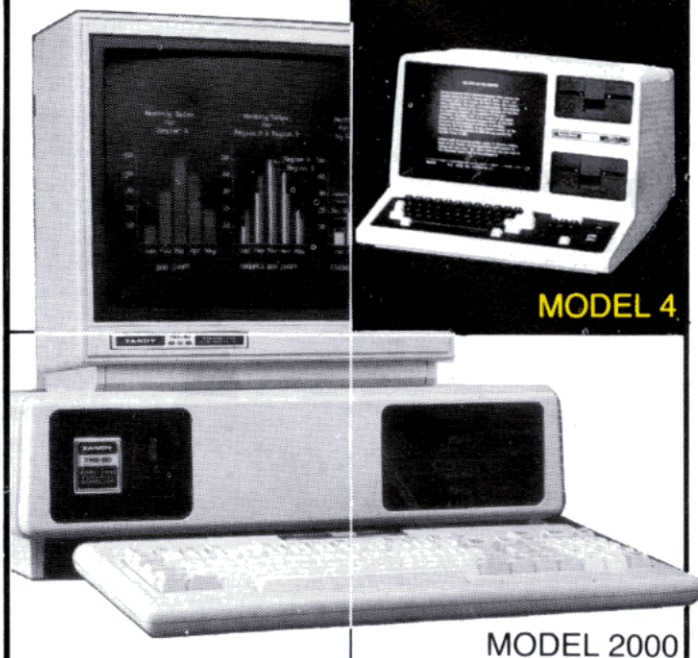
**ALTERNATE CHOICE**

9505 W. Brown Deer Road  
 Milwaukee, WI 53224  
 (414) 355-4544

Dealer Inquires Welcome

**TRS-80®**

✓ CHECK OUR PRICES

**ALWAYS AT  
SALE PRICES****WITH MANUFACTURERS  
WARRANTY (IN USA).****MODEL 4****MODEL 2000****CALL TOLL FREE****To get YOUR  
SALE PRICE-DIAL****1-800-433-SALE****(9am - 5pm C.S.T.)****WE SHIP  
FAST!**

✓ 282

**DFW COMPUTER CENTER**  
 326 MAIN ST., GRAPEVINE  
 TEXAS 76051 (817) 481-7283



REGD: TANDY CORPORATION

**ATTENTION  
SUBSCRIBERS**

We occasionally make our mailing list available to other companies or organizations with products or services which we feel might be of interest to you. If you prefer that your name be deleted from such a list, please fill out the coupon below or affix a copy of your mailing label and mail it to:

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

Please delete my name from mailing lists sent to other companies or organizations.

Name \_\_\_\_\_

Address \_\_\_\_\_

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

80 MICRO

**MODEL 4-P****MODEL 1200**



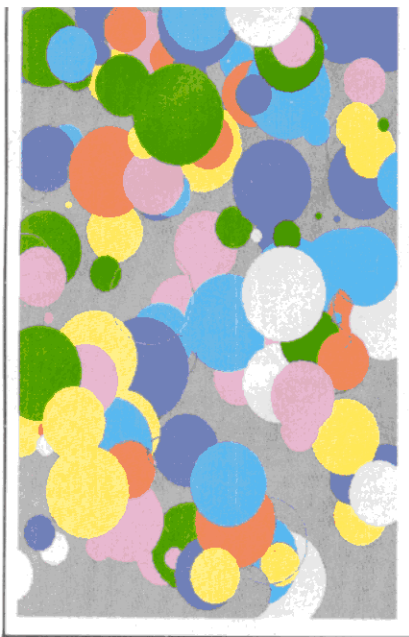


Figure 1. The CGP-220 took about three minutes to make this screen dump graphic.

The power cord connector is on the back, with parallel and serial interface connectors, as well as a 600-/2,400-baud switch.

### Features and Performance

After you're acquainted with the machine and have inserted one of the three sheets of paper included with it, you can start printing. While the print

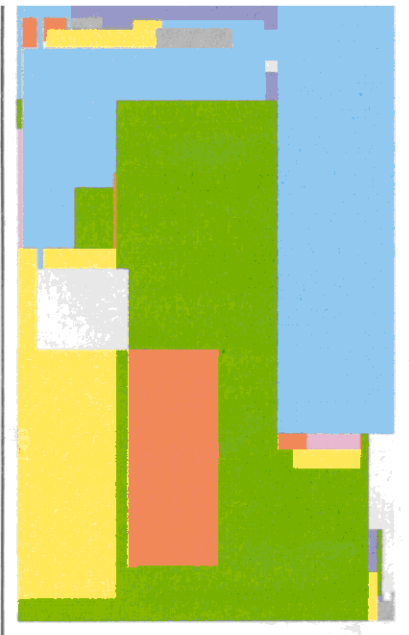


Figure 2. All the designs were printed clearly, with no color bleeding.

speed is an unimpressive 37 characters per second (for the full ASCII and special-character sets) this is of little importance, since you'll probably use the machine almost exclusively for graphics. In the graphics mode, the CGP-220 moves along at 2,630 dots per second and features bidirectional scanning. The printout in Fig. 1. took about three minutes to produce.

The ink jet prints in seven colors (black, red, green, blue, yellow, magenta, and violet) by mixing the yellow, magenta, and cyan base colors from the color packet cartridge. Even the most demanding designs are clear and sharp, and none exhibit color bleeding (see Fig. 2).

The quality of the paper used to produce the screen printouts makes a lot of difference in its final appearance. The CGP-220 will print on cut sheets or on roll paper, but not on form-feed paper. Radio Shack sells roll paper (catalog number 26-1333, three rolls for \$9.95) and single sheets (catalog number 26-1341, 250 sheets for \$6.95) for the ink jet printer. While I tried other types of stock, including high-quality bond paper, photocopy machine paper, form-feed paper (without the pin holes), and special paper from a Diablo ink jet printer, the Radio Shack paper produced the best results.

### Using the CGP-220

The easiest way to use the ink jet printer is in the text mode, the default mode at power-up. You select the color of print desired and whether you want normal or elongated characters as the print style. You can issue print commands in all print modes from Basic without the cumbersome use of DIP switches inside the printer.

While print quality in the text mode isn't as good as Radio Shack's other dot-matrix printers, it is readable.

The CGP-220 was made to create graphics and in that capacity it performs superbly. When you use it with Tandy's Model 2000, which has one of the best screens available for color graphics, you lose virtually none of the resolution in transferring a picture from the screen to paper. Although there are differences in color because of code incompatibilities in the computer and the printer, you can avoid these with careful programming.

The MS-DOS disk that comes with

the Model 2000 contains a screen dump program for the color printer (CGPDMP.BIN) which you call from Basic when you want a screen dump. On Radio Shack's Color Computer, another screen dump program is available that transfers intricate designs from the CoCo's screen onto paper.

CGP-220 users don't have to use a Model 2000 or a CoCo to get a lot out of the printer. Programmers using the Models I, III, or 4 can also take advantage of color graphics by programming the printer directly from Basic in the CGP-220's bit-image mode or the color-scan mode.

The bit-image mode lets you address each of the 640 horizontal dots per line and seven vertical dots to produce colorful designs and business

### CGP-220 Color Printer



Tandy/Radio Shack  
One Tandy Center  
Fort Worth, TX 76102  
\$600

Easy to use?	★★★★☆
Good docs?	★★★★☆
Bug free?	★★★★☆
Does the job?	★★★★☆

graphics without a color computer. Of course, the biggest drawback to using one of Radio Shack's non-color computers is that you can't see what you're creating until it's printed. Another disadvantage of using a Model III or 4 with the CGP-220 is that you can't use the screen dump command to produce hardcopy because the character set in the printer does not recognize TRS-80 block graphics. If you press the shift/down-arrow/asterisk key combination on a Model III, any block graphics on the screen will appear as periods on the CGP-220.

The color-scan mode on the ink jet printer is similar to the bit-image mode, but allows for greater manipu-

lation of color. This mode uses large amounts of memory, however, and programming in it is difficult from Basic.

## The Documentation

The printer's manual makes using the machine effortless. It's well-written and easy to understand, with examples to illustrate the CGPs capabilities.

The manual's lengthy table of contents directs you to areas that describe advanced features without searching through the 52-page book. Separate chapters in the manual describe the process of color printing, setting up the printer, descriptions of the various control codes, and lessons on the three kinds of printing available with the CGP-220.

Radio Shack also provides extensive appendices with additional programming tips, care and maintenance sug-

*While the text quality  
isn't outstanding,  
it's adequate as  
dot-matrix printers go.*

gestions, troubleshooting aids, and schematic diagrams of the machine. Any user can get the most out of the manual whether a novice or a seasoned programmer.

## Conclusions

With a machine like this, you'll want to try out different color combinations and graphics. The CGP-220's ink cartridges let you print up to 4 million characters before you have to replace them. Replacement ink cartridges cost \$9.95 for the black ink pack and \$14.95 for the tri-color. I've used the CGP-220 for many complex screen shots for three months and still have plenty of ink left.

While the text quality isn't outstanding, it's adequate as dot-matrix printers go. In terms of the graphics this machine produces, it's tough to beat for the price. Radio Shack has the CGP-220 listed with their Model 100 and Model 2000 as part of their Advanced Technology Series of products. ■

## Programming with The Producer

by Hardin Brothers

The Producer won't land you a job in Hollywood, but it will let you create your own Basic data-handling programs with a minimum of bother. Even if you know nothing about programming, you can develop your own powerful data base managers. And if you're only moderately skilled in Basic, The Producer will create working program modules that you can easily add to your own software.

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.

## Using The Producer

The Producer comes in a hefty package that includes the documentation (several hundred pages) in a three-ring binder with reference dividers; a sample evaluation disk; the master disks, which include automatic backup routines; and a three-hour cassette tutorial, which helps you through any rough places in the documentation.

The easiest way to explain how The Producer works is to describe how you would use it to create a data-handling program. When you boot up the Producer's master disk, an Auto program reserves some high-memory space and runs the main program. When the menu comes up, you turn on the printer, press the A and I keys, and print a planning form.

Using the form, you pick the program's name, state its main purpose, list the fields you want included in each record, and make any calculations that your program will apply to those fields.

Then return to the main menu, format a disk, and start to define your program. The Producer comes with a stripped-down version of DOSPLUS 3.4 that you must use to create the program, although you can transfer the completed program to any DOS.

The Producer includes a more-than-adequate editor to create an input screen for your program. You can mix graphics and text, and add large-font letters, borders, message areas, and field areas.

When you're satisfied with the screen's appearance, The Producer

## The Producer Professional Program Writer



Software of the Future  
P.O. Box 1245  
Arlington, TX 76004  
Models I, III, and 4, 48K RAM  
Two disk drives  
Printer optional but recommended  
\$199.95

Easy to use? ★★★★★  
Good docs? ★★★★★  
Bug free? ★★★★★  
Does the job? ★★★★★

translates it into lines of Basic and then goes to a screen definition mode. It asks you to define the location and length of each of your fields, as well as the characters allowed for input for each. You must also define an area for The Producer to use for messages. There is an optional custom prompt area in which you can display messages that will help the program's operator respond to each field question.

After you draw and define the screen, you enter a mode called Edit Basic Data. Here you can create custom prompts for each of the fields defined earlier. These prompts will appear either when the program's user begins to enter data in each field or when he presses the clear key; the choice is yours.

Also, while in the edit mode, you define the calculations to be used on the numeric data in various fields. You may decide to either save the results of the calculations along with the rest of the information in each record or display the results for the user's benefit.

## The First Draft

Finally, you're ready to create the first draft of the finished program. One of the selections from the main

Continued on p. 160



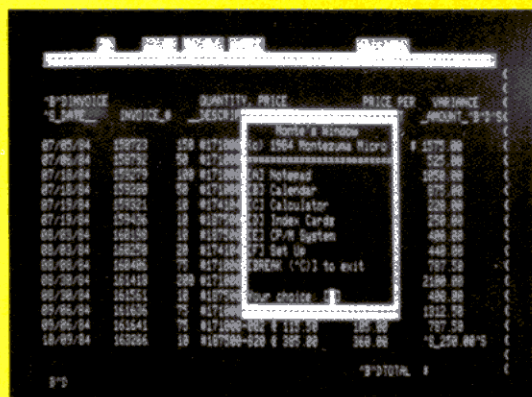
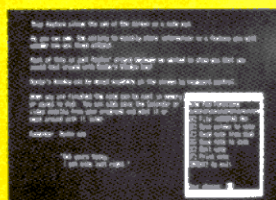


# MONTENZUMA MICRO

PRESENTS

## MONTÉ'S WINDOW™

NOTEPAD



CALENDAR



**WINDOWS ON  
YOUR MODEL 4!**

**TAKES NO  
USER RAM!**

411



### REQUIREMENTS

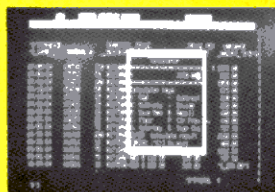
Montezuma Micro CP/M®  
2.2 version 2.21+

128K RAM

Model 4 or 4P

8-bit Fever

CALCULATOR

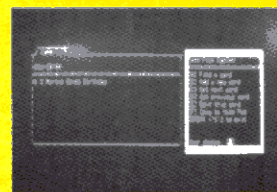


**Pop Up Menus!**

# \$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.



# 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.

## 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

## WHY BUY OURS?

	MONTEZUMA MICRO	RADIO SHACK
Transient Program Area (TPA)	55K	52K
Bytes free in MBASIC	30,776	18,488
Bytes free of formatted disk	196K	160K
64K Memory drive	YES	NO
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

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.



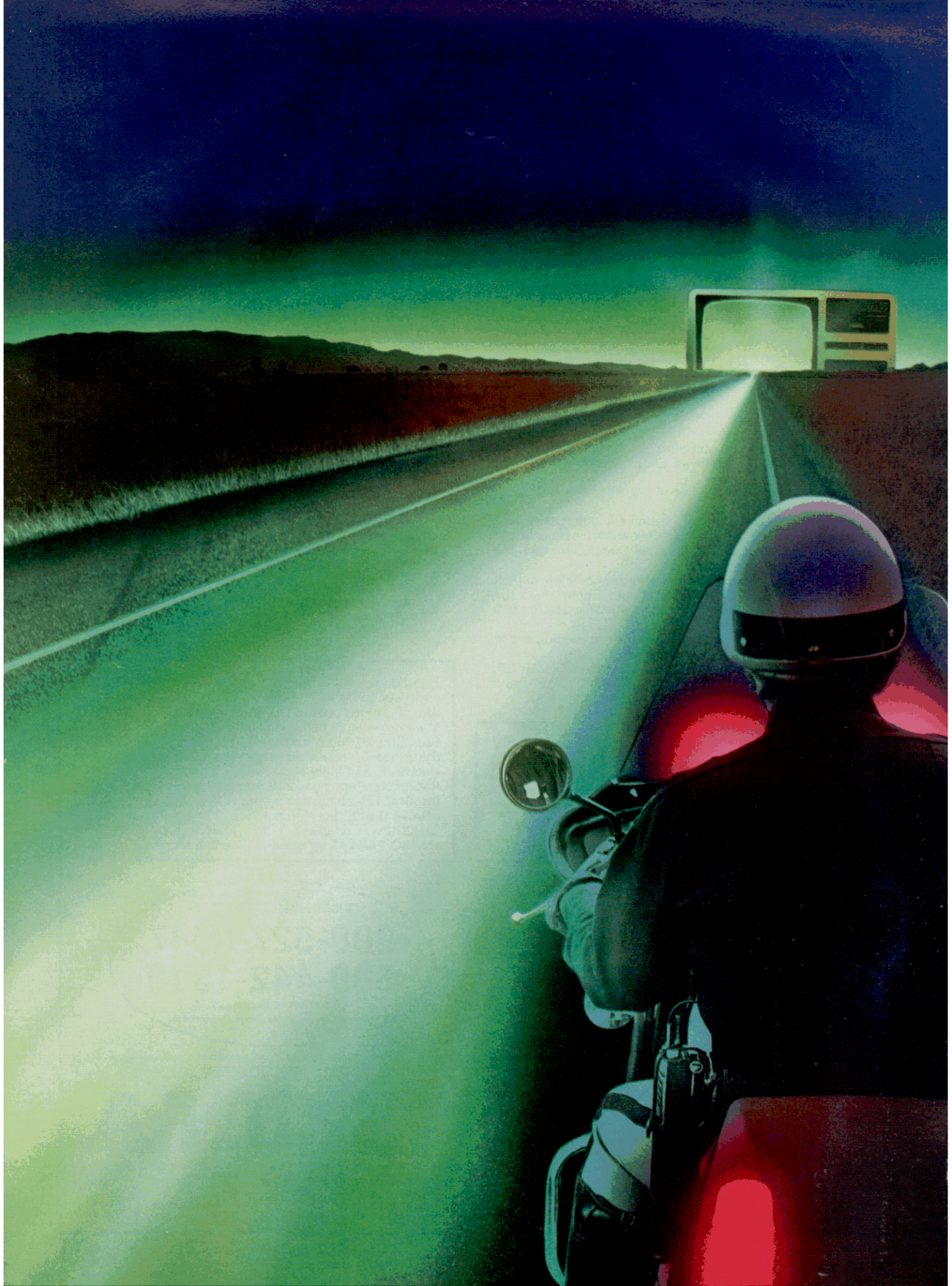
**MONTEZUMA  
MICRO**

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

VISA MasterCard

"WE KEEP YOU RUNNING"







# Running Like the Wind

by Thomas L. Quindry

**80's own Basic compiler is back and better than ever—it compiles more Basic commands and it's easier to use than our original version, and it now runs under any Model I/III DOS.**

**A**fter hours of painstaking programming and debugging, you've come up with the ultimate arcade game—The Flying Slim Whitman Records—where you try to blast away the disks as they speed past you; “Una Paloma Blanca” garners a 500-point bonus. But when you run the program, the records move more slowly than they did up the *Billboard* charts.

Your problem lies with the way Basic executes program instructions: The Basic interpreter breaks down program statements into machine-language commands before executing them. You can circumvent this time-consuming process by running your program through a Basic compiler, a program that converts Basic statements to machine code. Since the compiler does some of the work of the Basic interpreter, the resultant program runs faster.

I wrote an enhanced version of Dr. Dimitri P. Bertsekas's Basic compiler (“A Basic Compiler in Basic,” October 1982, p. 122). My version, which I call FastBas, compiles more Basic commands, is easier to use, and runs under any DOS on the Models I and III. (For a comparison of FastBas with commercial compilers, see the sidebar.)

When FastBas converts Basic programs to machine language subroutines, programs run faster. Programs that use primarily integer arithmetic and graphics run 50–100 times faster, while programs written mostly in single-precision variables execute 3–20 times faster.

The programs you're compiling must stringently follow Basic programming rules for correct compilation. FastBas doesn't accept all Basic commands, but all compilable commands run in Basic. I

suggest running and debugging your program in Basic, then compiling it.

## Compiler Basics

To understand how Basic compilers work and how they increase execution speed, you must first understand how your TRS-80 handles programming functions.

The TRS-80 ROM contains a machine-language program that interprets Basic programs line by line. If you run a line 1,000 times during the course of a program, the machine-language program interprets the statements in that line 1,000 times.

The Basic interpreter calls specific machine-language subroutines in ROM for each statement. Because of the extensive error-checking that takes place during this process, the program runs slow compared to machine-language programs.

A compiler, on the other hand, looks at each Basic statement once. It interprets the statement, then writes a machine-language subroutine for it and stores that subroutine in memory. The compiler then interprets the next statement and puts the machine-language subroutine in memory after the previous subroutine. Once the compiler changes all Basic statements to machine-language subroutines, you can save and run the compiled program.

How much faster compiled programs run varies with the nature of the program. Compiled programs still contain many inefficiencies in coding relative to bona fide machine-language programs.

## Program Changes

I rewrote as few lines of the original program as possible and didn't renum-





ber it so that readers who have keyed in the original can modify their programs.

Lines 0-500 in Program Listing 1 contain a sample Basic program for you to compile. Note that the last line compiled must be an End statement.

Many of FastBas's subroutines appear before the main program to speed up compilation. The main program starts at line 1000.

Most of the statements I added are string functions. FastBas can compile the Basic commands to input a string value, and then find a string's VARPTR, ASC, and VAL. The program also interprets string concatenation (addition), and redefines strings from other string values. It also accepts Dimension (DIM) and Clear statements (see Tables 1-4 for a complete list of compilable statements and functions).

Program Listing 2 uses the string Input function and the ASCII (ASC) function to let you answer yes/no questions. The ASCII function finds the ASCII value of the first character of the input string and acts on it using IF statements.

This program also exemplifies the use of the Dimension and Clear functions. FastBas accepts only one Dimension statement in the first line of the program you're compiling. You can, however, precede Dimension with a Clear statement, as in line 10.

For best results, put Clear and Dimension on a line separate from other program statements. Also, you can't GOTO the line containing the Dimension statement from within a compiled program.

Listing 2 also shows you how to use the Dimension statement in both Basic and compiled programs. The Dimension statement sets up the variable storage table and tells you how many of

each type of variable exist. In this sample, DIM A\$(40) tells the compiler that the program uses one string, A\$, and that the maximum string length is 40 characters. The equivalent statement in Basic (Run) sets up a string array with a dimension of 40.

Although Basic doesn't need a 40-string array, setting one up doesn't affect program execution, and you can test the Basic version before compiling it.

Program Listing 3 demonstrates how to use VARPTR (variable pointer) with PEEK and POKE commands to simulate uncompileable Length (LEN) and LEFT\$ functions. By using substitute programming techniques, you can simulate other uncompileable functions, such as RIGHT\$ and MID\$.

The VARPTR function identifies the memory location of each string used. As in Basic, the VARPTR function for strings points to a 3-byte table that gives the length of the string in the first byte and the location of the string in the next 2 bytes.

No specific string variable table exists for FastBas, so VARPTR creates a table for the requested string. FastBas always stores the table below the variable buffer in memory.

VARPTR moves the correct string length and location values to the 3-byte table. Only one VARPTR location is active at a time. Once the program in Listing 3 obtains the VARPTR, it stores the values at the VARPTR location in other variables before seeking another string location.

The Clear command clears all variables to zero. It's not needed at the beginning of the program you're compiling, since FastBas automatically zeros the variable storage area.

If you don't want variables automatically zeroed, make the USR call to your

compiled program 13 bytes higher than specified in the addresses given after compilation. This lets you compile several machine-language subroutines that the USR function calls from your Basic program. Each subroutine can then use the previously defined variables.

You can put the Clear command anywhere in the program you're compiling. FastBas ignores any digits after the Clear statement up to the colon or end of the program line (whichever comes first), but you can include them if they're necessary to run the uncompiled program. For instance, "Clear 200:" in the compiled program gives the same results as "Clear:" in the Basic version.

## Compiling Basic Variables

FastBas accepts three variable types—integers, single-precision, and string variables—and you can't do much variable mixing. When using integer variables, the only way to include single-precision variables in the same statement is to use the integer (INT) function. FastBas allows only addition and subtraction with integer variables.

You must first define the values acted on within the functions PEEK, POKE, VARPTR, ASC, VAL, and so on as integer variables or integer numbers without using arithmetic operations. The values must be integer variables or integer numbers between -32767 and 32767 without arithmetic operations.

FastBas can perform close to a full set of mathematical operations with single-precision variables. This includes the four basic math functions plus exponents, logarithms, random numbers, trigonometric functions, and so on.

The hierarchy of FastBas's mathematical operations is not as sophisticated as in Basic. The order of a Basic mathematical evaluation is exponentiation, followed by multiplication and division, then addition and subtraction.

FastBas evaluates operations from right to left, using the order of parentheses. This simplified system speeds compilation, but requires careful use of

General Statements	Description
Clear	Integer value is optional
CLS	Clears screen
DIM	Same syntax as Basic except for strings (see text)
END	Mandatory statement to return to Basic from USR subroutine
GOSUB (line number)	
GOTO (line number)	
REM or '	
RETURN	

Table 1. General statements that can be compiled.

## The Key Box



Models I and III  
32K RAM Disk Basic  
Cassette Basic

# Basic Compiler Comparison

by Hardin Brothers

Compiler	Fast Bas	Accel 3/4	Bascom	Vivace!	WIBASIC	ZBasic 3.0
<b>Available for Models</b>	I/III All DOSes.	I/III All DOSes.	III/4; only supported on TRSDOS but appears to work with other DOSes.	III/4 TRSDOS only.	I/III All DOSes.	I/III/4; all DOSes plus Apple, IBM-PC, Model 2000, Lobo & CP/M80.
<b>Source File Location</b>	Lines 1-500 of compiler program.	In memory with Accel and Disk Basic.	On disk as an ASCII file.	On disk as a tokenized file.	In memory with WIBASIC compiler and interpreter.	In memory with ZBasic compiler & editor or on disk in tokenized form.
<b>Compile to</b>	Memory only.	Memory only.	Disk /REL file, then linked into a CMD file.	Disk file.	Memory or disk.	Memory or disk.
<b>Compatible with Disk Basic</b>	Moderate. Supports integer and single-precision only. Several commands not supported.	Complete. Compiles only those commands it can optimize. Leaves others for Basic interpreter.	Very high, with a few minor differences.	Complete, though the Model III version had sporadic problems with file commands.	Uses its own version of integer Basic that is different from TRS-80 Basic, especially error-trapping and file-handling.	Uses its own version of Basic that is similar to Disk Basic, plus extra commands including structured loops (Repeat/Until & While/Wend) and graphics commands.
<b>Location of runtime? library</b>	All necessary code compiled into each command.	Separate disk file.	Separate disk file.	Separate disk file.	Compiled into CMD program.	Compiled into CMD program.
<b>Chaining with common variables</b>	No program chaining possible.	Chaining possible but no variables can be passed.	Chaining with any or all variables passed.	Model 4 only.	Possible, but requires tricky programming.	Can merge source programs, can't chain.
<b>Speed of compiled program †</b>	Moderately fast.	Moderately fast.	Very fast.	Relatively slow. Model 4 version was slower than original Basic program in benchmark test.	Very fast.	Fastest of all compilers in benchmark tests.
<b>Ease of use</b>	Moderately easy to use.	Easiest to use and understand.	Several options in both compiler and linker can cause confusion at first. Compiled program can be easily linked to Fortran and MACRO-80 programs.	Easy to use except I found the program sometimes had difficulty reading its own protected disk.	Compiling is easy but programs can be difficult to develop because of differences between Basic and WIBASIC.	Easy to use and understand. Most differences between Basic and ZBasic are enhancements, and the syntax feels "normal."
<b>Other Comments</b>	Best choice for developing USR routines for your Basic programs.	Best feature is its ease of use. Requires both a runtime library and Disk Basic to run CMD program.	All math functions can be double-precision. Best choice for very large and complex programs that require chaining.	Supplied on protected disk. Slow execution speed of compiled programs. I found erratic bugs in both the compiler and completed programs.	Compiled programs are very fast. Requires learning a completely new version of Basic.	Speed of compiled programs and power of extensions to Basic make this a top choice for programs that do not require chaining. Source code compatibility with other computers may be a major asset for some.
<b>Supplier &amp; Cost</b>	This issue of 80 Micro & Load 80	Allen Gelder Software \$99.95	Radio Shack \$195	WittSoft, Inc. \$49.95	WittSoft, Inc. \$49.95	Simutek Computer Products \$89.95

† Benchmark used for compilers except Fast Bas was a combination of all programs in "Marking Time" (May 1984, p. 100). Programs were run compiled and uncompiled under various DOSes and versions of Disk Basic.



parentheses for proper evaluation. The use of parentheses doesn't slow compiled programs.

The compiler accepts 26 integer variables, denoted A%-Z%, and 286 sim-

ple single-precision variables, denoted by A-Z, or by a letter followed by a single decimal digit. Possible simple single-precision variables are A, A0-A9, B, B0-B9, . . . Z, Z0-Z9.

You can represent one- and two-dimensional arrays using the letters A-Z. Two-dimensional arrays must be square. For example, array B with dimensions B(34,34) is acceptable, but B(34,35) is not.

Denote string variables using A\$-Z\$. The maximum length for each string is the same. The program uses the same maximum length for string literals in Print statements.

If FastBas doesn't find a Dimension statement in the first line of your program, it uses default values for all variables (see line 1010 of Listing 1). Regardless of the dimension, FastBas has a minimum of integer and single-precision values from A%-Z% and A, A0-Z, Z0, respectively.

The Dimension statement doesn't have to include all types of variables. FastBas zeros variables not included, in the case of arrays, or takes minimum values. The minimum simple single-precision variable value is a letter from A-Z.

The compiler sets strings A\$-Z\$ to a character length of 40 unless otherwise specified in the Dimension statement. I recommend that the string length remain at a minimum of 40 so you can use print statements in your program. You can specify a minimum of one string, A\$, with the Dimension statement.

You can dimension more than one variable of each type in one Dimension statement. This is so the equivalent Basic program doesn't cause an error.

Only the last variable specification of each type sets the maximum dimension. For instance, Dimension C(20,20), B(2,2) is permissible, although in the compiled program, the maximum two-dimensional array is B(2,2).

The program hasn't saved enough space to store the C array. Changing the Dimension statement so it compiles to Dimension B(2,2),C(20,20) saves space for both arrays. This is important, since FastBas doesn't check for illegal arrays.

FastBas doesn't error-check variables, either. This can produce problems or work to your advantage. In the case of the defaulted variable values, the program has reserved memory for one-dimensional and two-dimensional arrays.

FastBas stores all arrays sequentially and computes the location of each array value. You'll probably dimension the maximum array location to 20, but you can define larger arrays.

You can include an array with a max-

#### Integer Statements

+ and -	The only math operations allowed with integer variables. Example: A% = A% + B% - 7
For . . . To . . . Next	Requires integer variable or integer number. Follow Next with the specified integer. Example: FOR N% = A% TO B% : . . . : NEXT N% FOR N% = A% TO 10 : . . . : NEXT N%
If . . . Then (Line number) Else	Any combination of =, <, > conditions are valid. Replace Then with GOTO or Then GOTO. Only specify line numbers after Then or GOTO. Any number of If . . . Then . . . Else statements can follow each other. Example: IFA% >= B% GOTO 400 IFA% >= 45 GOTO 400 ELSE IFA% < 30 GOTO 400
Input	Don't include strings in quotation marks. Example: Input A%
INT	Changes single-precision expression to integer expression. Computed value of single-precision expression must be between - 32767 and 32767. Example: A% = INT(R*256 - 65536)
Let	Optional. You can only define integer variables to an expression that includes single-precision when using INT. Example: LET A% = B% A% = B%
PEEK	Requires integer variable or integer number. Mathematical operations are not acceptable. Example: A% = PEEK(A%) A% = PEEK(- 450)
Point	Same as PEEK. Integers must be between 0 and 127, and 0 and 47 respectively. Example: A% = POINT(C%, 34) A% = POINT(23, 34)
POKE	Same as PEEK. Second Integer must be between 0 and 255. Example: POKE A%, B% POKE - 3445, B% POKE - 3445, 45
Print	You can mix integers, single precision, and strings, as well as messages between quotes. Example: PRINT "The answer is "; A% PRINT A%; B; " "; S\$
PRINT@	Location is integer variable or integer number between 0 and 1023. Otherwise same as Print. Example: PRINT@C%, "The answer is "; A% PRINT@320, A%; B; " "; S\$
Reset	Same as PEEK and Point. Example: RESET(C%, 34) RESET(23, 34)
Set	Same as PEEK. Example: SET(C%, 34) SET(23, 34)

Table 2. Integer statements that can be compiled. Integer statements except Let require definition to an integer variable and can't include math operations. They must be between - 32767 and 32767.

# HOWE SOFTWARE PRODUCT GUIDE

## SYSTEM DIAGNOSTIC

Is your computer working correctly? **Are you sure?** Find out for certain with System Diagnostic, which has complete diagnostic tests for every component of your TRS-80™ Model 1, 3 or 4.

- **ROM:** checksum tests.
- **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.

Individual or continuous testing mode, reports optionally written to line printer. Separate versions for Models 1, 3, and 4. (Cassette and ROM tests not included in Model 4 version.)

**System Diagnostic** ..... \$99.95

## SMALL BUSINESS MANAGEMENT SYSTEM

A complete system for using your computer to manage a small business.

- **Order Entry:** enter orders, print invoices, change past invoices. Use pre-printed forms or plain paper.
- **Bookkeeping:** complete general ledger by user-defined categories. Print monthly or year-to-date summaries and ledgers.
- **Accounts Receivable:** show balances due from unpaid invoices at any time.
- **Accounts Payable:** show amounts you owe for unpaid bills in any category.
- **Inventory:** complete summary of products sold by part number and prices charged. Limited to 1,000 8-character part numbers (2,000 for MS-DOS).
- **Installation package** tailors the programs to your business.

Requires a minimum of two floppy disk drives or hard disk, 80-column printer. Available for: TRS-80™ Models I, III, 4, 2, 12, 16 (TRSDOS), or 2000, IBM-PC, and most CP/M computers.

**Need more information?** Ask for our detailed description of this program with sample forms and reports.

**All versions** ..... \$250.00

## TYPITALL — The most powerful TRS-80 Word Processor

TYPITALL is a word processor which is upward compatible with SCRIPSIT™ for the TRS-80™ Models 1, 3 and 4. If you know SCRIPSIT™, you can start using TYPITALL immediately. Even if you have never used a word processor before, you will find TYPITALL easy to learn, and full of so many powerful features that you'll wonder why other word processors don't have them. Following is a list of some of TYPITALL's features. (If you need to know more, ask for our free catalogue.)

- Send **any** control or graphic/special character to the printer.
- Print the formatted text **on the screen** before going to the printer.
- Send the formatted text to a **disk file** for later printing.
- **Merge** data from a disk file during

printing. Names, addresses, or any other text can be inserted during printing.

- Print during 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.
- **Spelling checker** with 29,500 word dictionary available.
- Verify 3,500 word document in **less than two minutes**.
- True Model 4 (**80 x 24 display, TRSDOS 6**) and Model I/III versions.

"If you like SCRIPSIT™, you'll probably love TYPITALL." 80 Micro.

**TYPITALL Demo Version** ..... \$49.95  
**TYPITALL Complete Version** ..... \$129.95  
**TYPITALL with Spelling Checker** ..... \$179.95

## HOME BUDGET and CHECKBOOK ANALYST

Combines the functions of a checkbook program with budget analysis, comparisons, summaries and projections.

First, it is a checking program, which can be used to maintain your checking account. Enter deposits, print check registers, compute your current balance.

More important, the program analyzes both your income and expenses and keeps track of your budget. While it comes with a classification for home expenses, these can easily be modified, so that program can be used for a business.

Income is classified in up to 32 categories. Expenses are broken into up to 12 main categories, each of which can be further divided into 12 subcategories. Checks can be divided into split transactions, and cash expenses can be included. (Only one checking account allowed.)

The program computes monthly and year-to-date income and expense summaries, and projections for the rest of the year based on data through a known month. Monthly expenses can be compared to a preestablished budget.

**Model 1/3/4 disk version** ... \$59.95  
**Model 1/3/4 cassette version** ... \$29.95  
**Model 2/12/16 version** ..... \$69.95  
**MS-DOS or CP/M version** ... \$69.95

## SMALL BUSINESS ACCOUNTING

Based on Dome Bookkeeping Record #612, this program keeps track of income, expenses, and payroll for a small business.

Complete ledgers are maintained for both income and expenses. The program computes monthly, through last month, and year to date summaries.

The payroll section (not included in cassette version) contains provision for up to 99 employees with up to six categories of deductions. The program can print both checks and summaries of payroll for one employee or all employees.

**Model 1/3/4 disk version** ... \$59.95  
**Model 1/3/4 cassette version** \$29.95  
**Model 2/12/16 version** ..... \$69.95  
**MS-DOS or CP/M version** ... \$69.95

## MONITOR #5

A comprehensive machine language monitor and debugger for the TRS-80 Models I, III, or 4.

**Display** memory in ASCII or hex. **Disassemble, move** and **compare** blocks. **Search, modify** memory. **Relocate** object programs. Read and write **cassettes** or **disk files**. Input and output of **disk sectors**, bypassing DOS. **RS-232-C commands** for terminal, send and receive. **Complete debugging package** includes **setting** and **displaying registers, single stepping** through machine instructions, setting **breakpoints**, and executing programs.

**Monitor #5** ..... \$22.95

## Howe Software

14 Lexington Rd., New City, NY 10956

Developing software for TRS-80 computers since 1979.

24-Hour TOLL-FREE Order Number:

Outside California call:

(800) 428-7825, ext. 169

Inside California call:

(800) 428-7824, ext. 169

Visa, Master Card, or COD orders only.

For information call:

(914) 634-1821

Add \$3.00 postage & handling.  
 New York residents add sales tax.

\*TRS-80 and SCRIPSIT are trademarks of Tandy Corp.





imum dimension of A(60) in your program if you don't use arrays B and C. FastBas specifies the maximum letter for arrays as at least C, so dimensioning Z(20) accommodates a single array of A(520) just as easily as dimensioning

A(520). An example of this appears in the sample program in Listing 1.

The added commands for string input and for string concatenation don't check for string length. However, the original string definition function does

check, so the same rules apply as for arrays. If you expect a string to be twice as long as allocated due to these functions, don't use the next higher string variable.

## Passing Variables

Two special functions, DEFUSR and USR, pass variables from Basic to a machine-language subroutine and back. You can use them to speed up a Basic program by having only part of it compile into a machine-language USR subroutine (see sample program in Listing 1).

A Basic program that calls the compiled subroutine starts at Line 10000. Line 10060 calls the machine-language subroutine compiled from lines 0-500. FastBas's DEFUSR function is in line 1310. Note that you must dimension the Basic portion of the program sufficiently when arrays pass back from the machine-language subroutine to Basic.

If the If statement condition has executed the Clear 50 command in line 1316, running the sample program (by pressing the enter key) results in the error message "Subscript out of range" in line 1340. To run the program, press the break key and type in RUN 10000.

Line 30 in the sample program instructs the compiler to write code to pass the variable N% to the USR subroutine using the statement N%=0+N%. Line 40 transfers the value of the A array in the same fashion.

After the USR subroutine performs its function, the redefined A array transfers back to Basic in line 140 by A(I%)=1\*A(I%).

The values of the variables on the right side of each equation are from lines 10000-10090 in the uncompiled Basic part of the program. They don't have to be the same variable name as on the left of the equals sign in lines 30, 40, and 140, but I recommend using identical variable names to assure complete compatibility with the uncompiled program. To try the program in Basic, change line 10060 to GOSUB30 and change line 500 to RETURN.

## Manipulations in Memory

FastBas doesn't compile in a fixed memory location, but determines where protected memory begins and compiles from that point. If the program exceeds memory limits, it lowers the high memory pointer (HIMEM) by 512 bytes and restarts compilation. This process

Single-precision Commands +, -, *, /, and [ (exponent)	Description
ABS	Accepted math operations. Can include single-precision expressions with integer variables. Placement of parentheses is important. Example: A = A%B*((C/7)[2]
ATN	Can use single-precision expressions, single-precision variables, or integer variables in parentheses. Example: A = ABS(4*B%-76)
COS	Same as ABS. Example: A = ATN(4*B%-76)
EXP	Same as ABS. Example: A = COS(4*B%-76)
If...Then (Line number) Else	Any combination of =, <, > conditions are valid. Can replace Then with GOTO or Then GOTO. Only specify line numbers after Then or GOTO. Any number of If...Then...Else statements can follow each other. If first value is an integer variable, it must follow rules for integers. Example: IFA>=B%GOTO 400 IFA>=45*3GOTO400ELSEIFA< CGOTO400IFA>=45*3THEN400 ELSEIFA<CTHEN400
Input	Don't put quotation marks around string expressions in Input commands. Example: Input A
Let	Optional command. Can define single-precision variables to an expression that includes integer expressions. Don't include integer commands in the expression, only integer variables and single-precision variables and expressions. Placement of parentheses crucial for correct evaluation. Example: A = 50 + TAN(355/(113*4)) + (A%*256)
LOG	Same as ABS. Example: A = LOG(4*B%-76)
Print	Same as integer Print. (Table 2)
PRINT@	Same as integer PRINT@. (Table 2)
RND(0)	Random number greater than 0 and less than 1. Example: A = RND(0)*10
SIN	Same as ABS. Example: A = SIN(4*B%-76)
SQR	Same as ABS. Example: A = SQR(4*B%-76)
TAN	Same as ABS. Example: A = TAN(4*B%-76)

Table 3. Single-precision functions that can be compiled. These functions can use math operations.

80x24  
IN MODEL III MODE

## DRV80

- Allows Model III programs to use 80x24 mode on a Model IV
- Modifies PRINT @, TAB, SET, etc to access entire 80x24 screen
- Permits PEEK and POKE to all 1920 screen locations
- Adds SOUND and 10 other BASIC enhancements
- Integrates into any DOS
- Functions with both BASIC and machine language programs
- Allows intermixing of 80x24 and 64x16 modes

**ONLY \$39.95**

Call about Model III 80x24 upgrade

The Logical Place  
PO Box 308  
Keyser, WV 26726  
(301) 786-5013

Dealers  
Invited

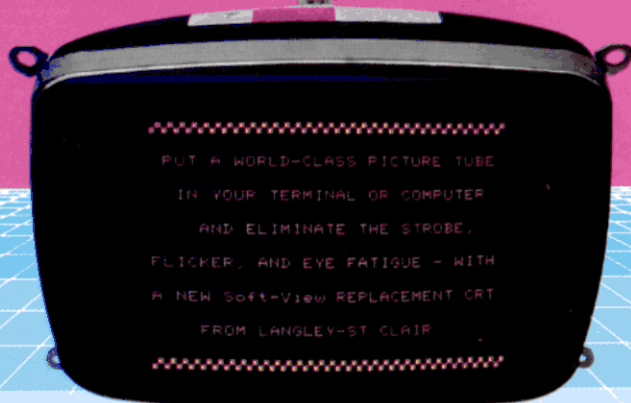
✓161

## Put an Amber CRT in Your Computer

Now you can eliminate the strobe, flicker and fatigue from your computer terminal with a new amber **Soft-View™** replacement CRT from Langley-St. Clair.

Available for the TRS-80, TeleVideo, Kaypro, Heath, DEC, Zenith, IBM PC, Apple III and a wide variety of other monitors. These new replacement display tubes use amber phosphors which exceed the European standards for persistence and color. And the "decay" or fade-out rate of the phosphor is the same as the "refresh" or scanning rate of the computer screen, so the display glows gently, rather than flickering like a strobe light — an annoying problem with inexpensive green phosphor tubes.

- 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



Call now to order your 'Soft-View™' CRT from Langley-St. Clair—\$99.95\*

**800 221-7070**

In New York call 212 989-6876

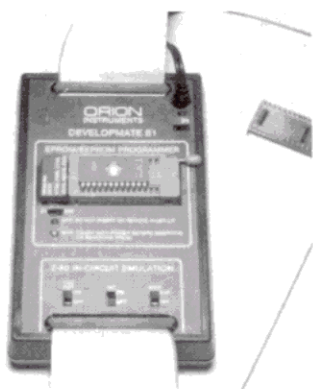
✓462

**Langley-St. Clair**  
Instrumentation Systems, Inc.  
132 W. 24th St. New York, NY 10011

Please specify computer and model number when ordering. Dealer inquiries invited.

TRS-80, TeleVideo, Kaypro, Heath, DEC, Zenith, IBM PC and Apple II are registered trademarks of Tandy Corp., TeleVideo Corp., Nonlinear Systems, Inc., Heath Co., Digital Equipment Corp., IBM, and Apple Computer, Inc. Soft-View is a trademark of Langley-St. Clair Instrumentation Systems, Inc.

## CONVERT YOUR TRS-80 MODEL I, III, OR 4 INTO A DEVELOPMENT SYSTEM



Now you can develop Z-80 based, stand-alone devices such as games, robots, instruments and peripheral controllers, by using your TRS-80 as a development system. The DEVELOPMATE plugs into the expansion connector of your TRS-80 and adds **PROM PROGRAMMING** and **IN-CIRCUIT-EMULATION** capabilities to your system (with or without expansion interface).

Complete instructions and sample schematics are included to help you design your own simple stand-alone microcomputer systems. THESE SYSTEMS CAN BE AS SIMPLE AS FOUR ICs: one TTL circuit for clock and reset, a Z-80, an EPROM, and one peripheral interface chip.

When the In-Circuit-Emulation cable is plugged into the Z-80 socket of your stand-alone system, the system becomes a part of your TRS-80. You can use the full power of your editor/assembler's debug and trace program to check out both the hardware and the software. Simple test loops can be used to check out the hardware, then the system program can be run to debug the logic of your stand-alone device.

Since the program is kept in TRS-80 RAM, changes can be made quickly and easily. When your stand-alone device works as desired, you use the Developmate's PROM PROGRAMMER to copy the program into a PROM. With this PROM, and a Z-80 in place of the emulation cable, your stand-alone device will work by itself.

The DEVELOPMATE is extremely compact: Both the PROM programmer and the In-Circuit-Emulator are in one small plastic box only 3.2" x 5.4". A line-plug mounted power supply is included. The PROM programmer has a "personality module" which defines the voltages and connections of the PROM so that future devices can be accommodated. However, the system comes with a "universal" personality module which handles 2758, 2508 (8K), 2716, 2516 (16K), 2532 (32K), as well as the new electrically alterable 2816 and 48016 (16K EEPROMs).

The COMPLETE DEVELOPMATE 81, for Model I, with software, power supply, emulation cable, TRS-80 cable, and "universal" personality module ..... \$329

**DEVELOPMATE 83, Model III/4 version, same as above ..... \$329**  
**PM2 PERSONALITY MODULE for 2732A EPROM ..... \$15**  
**PM3 PERSONALITY MODULE for 2764 EPROM ..... \$15**

**ORION**  
Instruments

✓151

172 Otis Avenue, Dept. M, Woodside, CA 94062  
(415) 851-1172

Master Charge and Visa phone orders accepted.  
California residents please add 6 1/2% sales tax.





String Commands	Description
ASC	ASCII value of a string. Example: A% = ASC(D\$)
CHRS	Requires integer variable or integer number in parentheses. Example: B\$ = CHR\$(A%) + CHR\$(65)
Input	Don't include string expressions in quotation marks. No error-checking for string length. Example: Input A\$
Let	Optional command. Can define string variables as string expressions that include string concatenation and redefinition. No error-checking in string length occurs for concatenation and redefinition. Example: A\$ = B\$ A\$ = "First String" + CHR\$(C%) + "B\$"
Print	Same as integer Print. (Table 2)
PRINT@	Same as integer Print@. (Table 2)
VAL	Compiler truncates any decimal value to an integer. Example: A% = VAL(D\$)
VARPTR	Example: A% = VARPTR(D\$)

Table 4. String functions that can be compiled. You can define many string commands with integer variables.

Program Listing 1. FastBas and sample Basic compilation program.

```

0 ' *** PROGRAM LINES 10-500 AND 10000-10090 ARE A SAMPLE PROGRAM
READY FOR COMPILATION. RUN 1000 TO COMPILE.
10 ' *** NUMERICAL ARRAY SORTING (FROM LEVELII MANUAL)
20 ' *** PASS ARRAY A FROM BASIC TO USR ***
30 N%=0+N%
40 FOR I%=1 TO N%:I%=1*I%:A(I%)=0+A(I%):NEXT I%
50 ' *** SORTING PROGRAM BEGINS ***
60 D%=1
70 D%=D%+D%:IFD%<N%THEN70
80 D%=INT((D%-1)/2):IFD%=0 THEN 140
90 T%=N%-D%:FORI%=1TOT%:J%=I%
100 L%=J%+D%:IFA(L%)>A(J%) THEN 120
110 T=A(J%):A(J%)=A(L%):A(L%)=T:J%=J%-D%:IFJ%>0 THEN100
120 NEXTI%:GOTO80
130 ' *** PASS ARRAY A FROM USR TO BASIC ***
140 FOR I%=1 TO N%:I%=1*I%:A(I%)=1*A(I%):NEXT I%
500 END
501 '***** BASIC COMPILER *****
502 '*** COPYRIGHT 1981 BY D. P. BERTSEKAS, BELMONT, MASS.
503 '*** PERMISSION TO USE; NOT TO SELL
505 '*** ENHANCEMENTS 1984 BY T. L. QUINDRY, BURKE, VA.
506 '***
507 '***** PEEK & POKE ROUTINES *****
512 POKEM,P:PRINTP;:M=M+1:IFM<-12-MR*16384THENRETURNELSECLS:PRINT@
320,"PROGRAM HAS EXCEEDED PROTECTED MEMORY SIZE"
513 PRINT:PRINT"LOCATION TO COMPILE LOWERED BY 512 BYTES AND PROGR
AM BEING RERUN":POKE16562,PEEK(16562)-2:FORN=1TO2000:NEXT:GOTO1000
514 PC=PEEK(Q):PN=PEEK(Q+1):Q=Q+1:IFPC=32THEN514ELSEIFPC=0C=2:RETU
RNELSERETURN
518 IFPC<65ORPC>90THEN522ELSERETURN
520 IFPN<>37THEN522ELSEQ=Q+1:RETURN
522 PRINT:PRINT"ERROR LINE #";L1(L-1):END
524 PRINT@0,F$;:PRINT@64,CHR$(30):RETURN
529 ' ***** SINGLE PRECISION ASSIGNMENT ROUTINES *****
530 ' ROUTINE TO FIND VAR. ADDRESS PARAMETERS
535 GOSUB514:GOSUB518:V1=PC-65:IFPN<48ANDPN>57ANDPN<>213ANDPN<>40A
NDCP<>1THEN522
538 IFPN>47ANDPN<58MI=PN-47:GOSUB514ELSEMI=0
540 IFPN=213Z1=1:RETURN

```

Listing 1 continued

repeats until the program reaches a minimum HIMEM limit or until the program completely compiles.

The variable storage area is located above the compiled program and extends down from the top of memory as needed. All compiled subroutines use the same variable table area, so if you put more than one compiled program in memory, write the Dimension statement to accommodate the largest compiled subroutine.

If interference from the top of the compiled program and the allocated variable table area occurs during compilation, FastBas relocates the compiled program, corrects its jump addresses to accommodate the allocated area for variable storage, and corrects the HIMEM pointer.

Compilation can occur too low for the compiler to work. If the HIMEM pointer is too low in memory, FastBas adjusts it upwards and the program compiles at the higher memory position.

FastBas requires about 1,650 bytes above the Basic program to run. However, if FastBas relocates the HIMEM pointer to the minimum allowable value and you get an out-of-memory error, change the value + 1650 in line 1007 to a higher value.

## Compilable Commands

Tables 1-4 list and define compilable Basic commands and explain how to use them. Table 1 lists general statements that compile. Table 2 lists the compilable integer statements. Table 3 lists compilable single-precision commands, and Table 4 contains compilable string commands.

Remember that functions that apply to integer variables give integer results, and the values that go within parentheses of the functions must be integer values or integer variables.

FastBas can't carry out arithmetic functions within parentheses when using the special integer functions, and has limited error-checking for this type of error. If FastBas finds an illegal operation, it ignores any remaining expressions on that program line.

Array locations must be integer variables. Functions that apply to single-precision variables can have single-precision variables, integer variables, or single-precision expressions within the parentheses of the function.

## Using FastBas

To compile a Basic program, number the program lines from 0-500 and continue it from line 1000 if necessary. Save the program in ASCII, then merge it with FastBas. Delete the lines relating to the sample program, then type RUN 1000 to compile the program.

As an example, try compiling Pong in Program Listing 4. This two-player paddle game demonstrates how much faster compiled code runs compared to a Basic program.

Try running the Basic version first. Use the O and L keys to move the right paddle and the Q and A keys for the left paddle. The game stops when a player gets 16 points. The highest ball speed setting moves very slowly. The compiled program runs so fast that the highest speed setting is impossible.

After you've merged your Basic program and run FastBas, it displays each Basic line number and the compilation address (except for the line containing the Dimension statement), followed by all code in decimal. A colon separates each statement in the line.

By changing the Print statements in lines 512 and 1035 of Listing 1 to LPRINT statements, you can trace where each command compiles in memory.

FastBas's last display indicates the hexadecimal (hex) and decimal values for the start, end, and transfer address of the compiled program, along with the location of the compiled program and the variable table (see the Figure).

In this last screen you have all the information needed to save and run the compiled program or subroutine. Use the start, end, and transfer hex addresses with the Dump command to save the program to disk (see your DOS manual for correct syntax).

When entering Basic, you must protect high memory or your compiled program will crash. Use the decimal notation in the second row under the column labeled Start. When in Basic, define the USR function (DEFUSR) by using the third row value under Start. This is always a negative value.

To load the compiled program into memory, type in LOAD followed by a file name from DOS Ready and hit the enter key. If you're using another DOS, use the equivalent statement. You can save the program using the CMD "L" command from Basic. Be sure to in-

```
COMPILED PROGRAM CONFLICTS WITH VARIABLE STORAGE AREA.
RELOCATING PROGRAM . . .
33 252 249 17 252 247 1 167 5 237 176 201
PROTECTED MEMORY POINTER CHANGED AND PROGRAM RELOCATED TO
```

	START	END	TRANSFER
HEXIDECIMAL	&HF7FC	&HFDA3	&HF7FC
DECIMAL	63484	64931	63484
DECIMAL	-2052	-605	-2052

```
VARIABLES STORED - &HFE3F
TO TOP OF MEMORY - &HFFFF
```

```
<ENTER> TO RUN MACHINE CODE . . .?
```

Figure. Final display after compiling the Pong program.

### Listing 1 continued

```
545 IFPN=40GOSUB514:GOSUB514:GOSUB518:V2=PC-65:GOSUB520:GOSUB514EL
SEIFCP=121=1:RETURN
550 IFPC<>41ANDPC<>44THEN522
555 IFPC=41Z1=2:RETURN
560 IFPC=44GOSUB514:GOSUB518:V3=PC-65:IFV1<0ORV1>=NTTHEN522ELSEGOS
UB520:Z1=3:GOSUB514:IFPC<>41OR(PN<>213ANDCF<>1) THEN522ELSERETURN
564 ' ADDRESS COMPUTATION ROUTINE
565 ONZ1GOSUB570,575,580:RETURN
570 IFMI>ISTHEN522ELSEC1=VF+(V1+MI*26)*4:GOSUB836:GOSUB902:RETURN
575 V7=V1:V8=V2:GOSUB610:RETURN
580 V7=V1:V8=V2:V9=V3:GOSUB620:RETURN
600 ' ARRAY PORTION OF ADDRESS ROUTINE
610 V0=V8:GOSUB912:GOSUB906:C1=VA+V7*DO*4:GOSUB836:GOSUB900:GOSUB9
04:RETURN:' 1-D ARRAY
620 V0=V9:GOSUB912:P=41:GOSUB512:C1=VD+4*NT*DT*DT+2*V7*DT:GOSUB836
:GOSUB900:GOSUB904:P=94:GOSUB512:P=35:GOSUB512:P=86:GOSUB512:V0=V8
:GOSUB912:GOSUB906:GOSUB904:RETURN:' 2-D ARRAY
699 ' ROUTINE TO EVALUATE SINGLE PRECISION EXPRESSIONS
700 GOSUB514:IFPC<>206GOTO704
702 E1=0:D1=0:GOSUB902:GOSUB926:GOSUB926:GOTO714:'TAKES CARE OF LE
ADING <-> SIGN
704 GOSUB730
706 GOSUB514:IFC=20RPC=41ORPC=58ORPC=59ORPC=212ORPC=213ORPC=214ORP
C=141ORPC=202THENRETURN:'PEEK NEXT BYTE; IF TERMINATOR RETURN
708 GOSUB934:'MOVE INTERIM RESULT FROM 4121H STORAGE AREA TO STACK
710 ' MOVE NEW VARIABLE TO 4121H AREA; POP BCDE; OPERATE
712 IFPC=205GOSUB514:GOSUB730:GOSUB936:GOSUB940:GOTO706:'ADD
714 IFPC=206GOSUB514:GOSUB730:GOSUB936:GOSUB942:GOTO706:'SUBTRACT
716 IFPC=207GOSUB514:GOSUB730:GOSUB936:GOSUB944:GOTO706:'MULTIPLY
718 IFPC=208GOSUB514:GOSUB730:GOSUB936:GOSUB946:GOTO706:'DIVIDE
720 IFPC=209GOSUB514:GOSUB730:GOSUB936:GOSUB948:GOTO706:'EXPONENTI
ATE
722 GOTO522:'ERROR TRAP
729 ' ROUTINE TO EVALUATE CONSTANTS, VARIABLES & FUNCTIONS IN SING
LE PRECISION EXPRESSION & MOVE THEM TO 4121H STORAGE AREA
730 IF(PC<58ANDPC>47)ORPC=46GOSUB845:RETURN:'CONVERT CONSTANT TO 4
-BYTE REPRESENTATION; MOVE IT & RETURN
732 IFPC=222GOSUB514:IFPC<>40THEN522ELSEGOSUB514:IFPC<>48THEN522EL
SEGOSUB514:IFPC<>41THEN522ELSEP=205:GOSUB512:P=240:GOSUB512:P=20:G
OSUB512:RETURN:'RND(0)
734 IF(PC<220ANDPC<229)ORPC=217ORPC=40THEN756ELSEIFPC<65ORPC>90THE
N522:'IF FUNCTION GOTO 758
736 V4=PC-65:IFPN>47ANDPN<58THENME=PN-47:GOSUB514:Z2=1:GOTO746ELSE
IFPN<>40ANDPN<>37THENME=0:Z2=1:GOTO746ELSEIFPN=37THENZ2=4:GOSUB514
:GOTO746
738 GOSUB514:GOSUB514:GOSUB518:V5=PC-65:GOSUB520:GOSUB514
740 IFPC<>41ANDPC<>44THEN522
742 IFPC=41Z2=2:'1-D ARRAY
744 IFPC=44GOSUB514:GOSUB518:V6=PC-65:GOSUB520:Z2=3:GOSUB514:IFPC<
>41THEN522:'2-D ARRAY
746 ONZ2GOTO748,750,752,754
748 IFME>ISTHEN522ELSEC1=VF+(V4+ME*26)*4:GOSUB836:GOSUB902:GOSUB93
2:RETURN
750 V7=V4:V8=V5:GOSUB610:GOSUB932:RETURN
752 V7=V4:V8=V5:V9=V6:GOSUB620:GOSUB932:RETURN
754 V0=V4:GOSUB912:P=34:GOSUB512:P=33:GOSUB512:P=65:GOSUB512:P=205
```

Listing 1 continued



clude the /CMD extension in the filename if you save the program this way.

Model I TRSDOS doesn't have an equivalent command to load from Basic; load from DOS instead. If you use Model III TRSDOS and the Dump command, return to DOS by rebooting instead of using CMD "S".

If the compiled program contains an INPUT\$ function and the string is more than four characters long, calling the

routine from the Basic command mode instead of from a Basic program results in a syntax error on return to Basic. However, this doesn't affect operation of the compiled program.

If you compiled Pong, the final screen should look like that in the Figure. Assuming you're using TRSDOS 1.3, you then reboot the computer and type in DUMP PONG (START=0F7FC,END=0FDA3,TRA=0F7FC)

and hit the enter key to save the compiled program.

To load Pong, type in LOAD PONG/CMD from DOS, hit the enter key, type in BASIC - M:63484, hit the enter key, and type in DEFUSR = -2052:A=USR(0) and hit the enter key. The compiled program starts running immediately.

## Troubleshooting

FastBas checks for some syntax errors during compilation. However, other errors go undetected until you try to run the program.

If the compiled program runs but gives different results than its Basic equivalent, check arithmetic operations. The compiler and the interpreter carry out the order of arithmetic operations in a single-precision variable differently. Check also if a machine-code variable appears in the right side of an assignment statement before it's initialized.

If the compiled program crashes, check the For...Next loops; make sure they're set up properly and that the program doesn't jump out of a loop.

## Modifications

Analyzing the code in memory with a disassembler provides many clues to machine-language programming. For example, you can examine single-precision math routines and write similar code in your programs using the compiled routines as a guide.

All essential statements used in writing FastBas are in the list of compilable statements, so it's possible to rewrite the entire compiler and structure it so the program can compile itself.

However, the size of the Basic program that you must write, the number of GOTO and GOSUB statements, and the size of the resulting code might make it impractical.

Also, you'd have to change many of the variables to single-precision to have the program compile itself, so an increase in speed of more than three times is unlikely.

It's an intriguing project, however, and I'll leave that as a challenge to anyone who cares to try. ■

*Thomas L. Quindry is an Associate Editor of 80 Micro. Contact him at TLQ Enterprises, 6237 Windward Drive, Burke, VA 22015.*

Listing 1 continued

```
:GOSUB512:P=204:GOSUB512:P=10:GOSUB512:RETURN:' CONVERT' INTEGER VA
R. TO SINGLE PRECISION
756 IFPC=40 THEN 776:' PARENTHESIS
758 Q=Q+1
760 IFPC=221 THEN 778:' SQR
762 IFPC=217 THEN 780:' ABS
764 IFPC=223 THEN 782:' LOG
766 IFPC=224 THEN 784:' EXP
768 IFPC=225 THEN 786:' COS
770 IFPC=226 THEN 788:' SIN
772 IFPC=227 THEN 790:' TAN
774 IFPC=228 THEN 792:' ATN
776 GOSUB700:GOTO794
778 GOSUB700:GOSUB952:GOTO794
780 GOSUB700:GOSUB954:GOTO794
782 GOSUB700:GOSUB956:GOTO794
784 GOSUB700:GOSUB958:GOTO794
786 GOSUB700:GOSUB960:GOTO794
788 GOSUB700:GOSUB962:GOTO794
790 GOSUB700:GOSUB964:GOTO794
792 GOSUB700:GOSUB966
794 IFPC<>41 THEN 522
796 RETURN
800 ' ***** CONVERSION ROUTINES *****
809 ' ROUTINE TO FIND LSB & MSB OF INTEGER NUMERIC STRING
810 C$="":IFPC=206 THEN PC=45:GOSUB818:ELSEGOSUB816:IFC$="" THEN C1=-1:
RETURN
812 C1=VAL(C$)
814 D1=C1/256:E1=C1-D1*256:IFC1<0 THEN D1=D1+256:C1=-C1:RETURN:ELSER
ETURN
816 IFPC<48 OR PC>57 THEN RETURN
818 C$=C$+CHR$(PC):GOSUB514:GOTO816
835 ' ROUTINES TO FIND LSB & MSB OF ADDRESSES ABOVE 1ST 32K
836 D1=C1/256:E1=C1-D1*256:D1=D1+256:RETURN
840 Z=VT+V1+V1:P1=Z/256:P=Z-P1*256:P1=P1+256:RETURN
844 ' ROUTINE TO CONVERT NUMERIC STRING TO 4-BYTE SINGLE PRECISION
REPRESENTATION
845 C$=CHR$(PC)
846 GOSUB514:IF(PC<58 AND PC>47) OR PC=46 C$=C$+CHR$(PC):GOTO846
847 R=VAL(C$):GOSUB848:E1=33:D1=65:GOSUB902:C1=B3:GOSUB910:P=35:GO
SUB512:C1=B2:GOSUB910:P=35:GOSUB512:C1=B1:GOSUB910:P=35:GOSUB512:C
1=B0:GOSUB910:Q=Q-1:RETURN
848 IFR=0 THEN BE=0:B1=0:B2=0:B3=0:RETURN
849 Y1=1:Y2=2:N=1:IFY1>R THEN 852
850 IFY2<=R THEN Y1=Y1+Y1:Y2=Y2+Y2:N=N+1:GOTO850
851 GOTO853
852 IFR<Y1 THEN Y1=Y1/2:Y2=Y2/2:N=N-1:GOTO852
853 BE=N+128:X1=0:R=R-Y1:GOSUB856:B1=B
854 GOSUB857:X1=X:GOSUB856:B2=B
855 GOSUB857:X1=X:GOSUB856:B3=B:RETURN
856 GOSUB857:X2=X:GOSUB857:X3=X:GOSUB857:X4=X:GOSUB857:X5=X:GOSUB8
57:X6=X:GOSUB857:X7=X:GOSUB857:X8=X:B=X1+X1+X2:B=B+B+X3:B=B+B+X4:B
=B+B+X5:B=B+B+X6:B=B+B+X7:B=B+B+X8:RETURN
857 Y1=Y1/2:RT=R-Y1:IFRT<0 X=0:RETURN:ELSEX=1:R=RT:RETURN
879 ' ROUTINE TO POKE STRING IN TEMPORARY STORAGE AREA
880 C1=MF:GOSUB836:GOSUB900:NN=1
881 IFPC=34 GOSUB890:RETURN
882 GOSUB889
883 IFPP=1 AND PEEK(Q)=32 Q=Q+1:PC=32:NN=NN+1:GOTO885
884 GOSUB514:NN=NN+1
885 IFPP=1 AND (PC=34 OR C=2) GOSUB890:RETURN
886 IFPP=0 AND (PC=58 OR C=2) GOSUB890:RETURN
888 GOTO882
889 P=62:GOSUB512:P=PC:GOSUB512:P=18:GOSUB512:IFPC<>0 THEN P=19:GOSU
```

Listing 1 continued

## TRS-80 COMPUTERS

MODEL IV 64K	\$959.00	MODEL 2000 w/HD	\$2060.00 3360.00
2 DISKS RS 232		COLOR COMPUTER	
MODEL IV P	850.00	64K	170.00
MODEL 12	2999.00	MODEL 100 8K	350.00
ONE DISK	2339.00	MODEL 100 24K	500.00

Tandy 1200 HD IBM compatible \$2599  
Terminal OT100 \$699

## DISK DRIVES

15 MEG HD	\$2099.00
COLOR DISK 0	275.00
COLOR DISK 1	229.00

## PRINTERS

### ALL OKIDATA

GEMINI 10X	270.00
GEMINI 15X	380.00

DMP-110	\$ 299.00	DMP-120	\$ 379.00
DMP-105	159.00	DMP-430	699.00
DMP-500	1064.00	DMP-2100	1598.00
DMP-420	680.00	DWP-210	459.00
DWP-510	1149.00	CMP-2150	3135.00

Langley St. Clair Green and Amber Screen \$89.00

## BODEX CORP.

224 E. MAIN ST.  
MARLBORO, MASS. 01752  
Phone (617) 485-5115 or 481-1029  
TRS-80 Trademark of Tandy Corp.

✓ 381

## Multi-User Manufacturing Control Software

(XENIX™ OPERATING SYSTEM)



## AT LAST

A system designed  
specifically for manufacturing

- INVENTORY CONTROL
- MATERIAL REQUIREMENTS PLANNING
- CUSTOMER ORDER ENTRY
- ACCOUNTING

Features: —Menu Driven—System Security  
—User Designed Data Base  
—Customization Available

For More Information, Call or Write: **Software Concepts**  
5786 Annarue Place  
Columbus, Ohio 43229  
(614) 895-7196

✓ 192

XENIX™ IS A TRADEMARK OF MICROSOFT CORPORATION

## EXPAND TRS-80 MEMORY

### TRS-80 to 16K, 32K, or 48K

- \*\*Model 1 = From 4K-16K Requires (1) One Kit
- Model 3 = From 4K-48K Requires (3) Three Kits
- Color = From 4K-16K Requires (1) Kit

\*\*Model 1 equipped with Expansion Board up to 48K Two Kits Required  
— One Kit Required for each 16K of Expansion —

TRS-16K3 200ns for Color & Model III. . . . \$8.95  
TRS-16K4 250ns for Model I. . . . . \$6.95

### TRS-80 Color 32K or 64K Conversion Kit

Easy to install kits come complete with 8 ea. 4164-2 (200ns) 64K dynamic RAMs and conversion documentation. Converts TRS-80 color computers with D, E, ET, 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.

TRS-64K2. . . . . \$38.95

### NEW! TRS-80 Model IV 64K or 128K Conversion Kit

Easy to install kit comes complete with 8 each 4164 (200ns) 64K dynamic RAMs and conversion documentation. Converts TRS-80 Model IV computers from 16K to 64K. Also expands Model 4P from 64K to 128K.

TRS-64K2. . . . . \$38.95

(Converts the Model IV from 16K to 64K or will expand the Model 4P from 64K to 128K)

TRS-64K2PAL (Model IV only). . . . . \$59.95  
(8-4164's with PAL Chip to expand from 64K to 128K)

### DIP/IC INSERTER/EXTRACTOR TOOLS

MOS-1416 (Inserts all above RAM pkgs. 14/16 pin). . . \$10.95  
EX-1 (Extracts 8-24 pin pkgs.). . . . . \$ 2.49

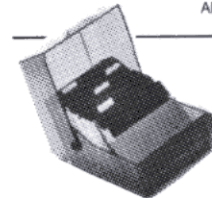


5 1/4" Diskettes  
SSDD = Single Sided Double Density  
DSDD = Double Sided Double Density

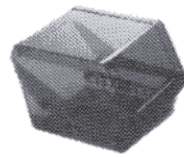
### ULTRA MAGNETICS

Part No.	Description	Boxed	Price
UM51401	SSDD with Hub Ring	10	\$24.95
UM52401	DSDD with Hub Ring	10	\$33.95

All diskettes are soft-sectored and have hub rings.  
Bulk prices available on request.



### DISK MINDER



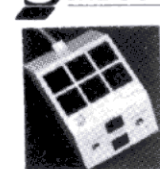
• Attractive, functional disk storage system • 36 (3", 3.25" and 3.5"), 50 (8") or 75 (5 1/4") disk storage capacity • Easy filing and retrieving • Protects disk from dust contamination • Molded from durable smoked plastic with front carrying handle • Size (DM36): 8 1/2" L x 5 1/2" W x 4 7/8" D • Size (DM50 & DM75): 7" W x 6 1/2" H x 9 1/4" D • Weight: 2 lbs.

Part No.	Description	Price
DM36	Stores 36 (3", 3.25" and 3.5") Diskettes. . .	\$19.95 ea.
DM75	Stores 75 (5 1/4") Diskettes. . . . .	\$19.95 ea.
DM50	Stores 50 (8") Diskettes. . . . .	\$29.95 ea.

We also specialize in integrated circuits, custom cables, power supplies, keyboards, and much, much more!  
Give us a call today!

### INDUSTRIES

### Protect Yourself...



### DATASHIELD® Surge Protector

Eliminates voltage spikes and EMI-RFI noise before it can damage your equipment or cause data loss. Six month warranty.

Model 100. . . . . \$69.95

DATA SHIELD® Back-Up Power Source also available.  
Protect your TRS-80 Model computers.

PC200 (200 Watt Rating). . . . . \$299.95

XT300 (300 Watt Rating). . . . . \$399.95

\$10.00 Minimum Order — U.S. Funds Only  
California Residents Add 6 1/2% Sales Tax  
Shipping — Add 5% plus \$1.50 Insurance  
Send S.A.S.E. for Monthly Sales Flyer!

Spec Sheets — 30¢ each  
Send \$1.00 Postage for your  
FREE 1985 JAMECO CATALOG  
Prices Subject to Change



1355 SHOREWAY ROAD, BELMONT, CA 94002  
Phone Orders Welcome (415) 592-8097 Telex: 176043

✓ 534



# WANTED

## Scriptsit™ or SuperScriptsit™ Users ...

Now you can use that fabulous word processor from Radio Shack with your non-Tandy printer! No point in missing out! Your printer CAN work great with SuperScriptsit™!

### PowerDRIVER

These printers are fully supported

EPSON MX-80/100 Series  
EPSON FX/RX 80/100 Series  
Most all EPSON "compatibles."  
C.Itoh 8510 Prowriter  
C.Itoh Starwriter Daisy Wheel  
C.Itoh A10-20 Daisy Wheel  
Okidata 92/93 Dot Matrix

Model 4 Now Supported!

All features of SuperScriptsit™ are supported to the fullest capabilities of the printer involved. Drivers are easy to install, easy to use, and no extra commands to learn!

**PowerDRIVER** Only \$29.95 each  
PLEASE SPECIFY PRINTER TYPE

### PowerSCRIPT

A HIGH-POWER modification for Scriptsit™ from Radio Shack™.

Give Scriptsit™ Full Power! PowerSCRIPT is a modification for the original Scriptsit/LC™ which allows it to work on Model I or III and gives it the power of many of the newer expensive word processors. Define printer codes for ANY printer. Embed printer codes in the middle of a line! Alphabetized directories! User-definable printer filters! User-definable HELP-FILE! Chain files together at print time from any part of the text. Logical EXIT to DOS, optional automatic line-feed after C/R, FETCH, CHAIN, and KILL command and more! Compatible with most major DOS's. Simply use the enclosed INSTALL program, and you will be up and running in NO TIME! Includes full documentation. Get lots of new features for a very small price!

**PowerSCRIPT** Only \$39.95

US-Canada Please add \$3.00 Shipping/Handling. Foreign \$10

**POWERJOFT**  
PRODUCTS FROM BREEZE/QSD, INC.

11500 Stemmons Fwy.  
Suite 125  
Dallas, Texas 75229  
(214) 484-2976



Scriptsit and SuperScriptsit  
are Trademarks of Tandy Corp.

Listing 1 continued

```
B512:RETURN:ELSERETURN
890 Q=Q-1:C=0:PC=0:GOSUB889:IFNN>SLTHENPRINT:PRINT"STRING TOO LONG
":GOTO522:ELSERETURN
899 ' ***** FREQUENTLY USED MACHINE CODES *****
900 P=17:GOSUB512:P=El:GOSUB512:P=D1:GOSUB512:RETURN:'LD DE,ElD1
902 P=33:GOSUB512:P=El:GOSUB512:P=D1:GOSUB512:RETURN:'LD HL,ElD1
904 P=25:GOSUB512:RETURN:'ADD HL,DE
906 P=41:GOSUB512:P=41:GOSUB512:RETURN:' ADD HL,HL; ADD HL,HL
908 P=235:GOSUB512:RETURN:' EXC HL,DE
910 P=54:GOSUB512:P=C1:GOSUB512:RETURN:'LD (HL),C1
912 C1=VT+V0+V0:GOSUB836:P=42:GOSUB512:P=El:GOSUB512:P=D1:GOSUB512
:RETURN:' LD HL,(C1)
914 P=42:GOSUB512:GOSUB840:GOSUB512:P=P1:GOSUB512:RETURN:'LD HL,(P
1P)
916 P=34:GOSUB512:GOSUB840:GOSUB512:P=P1:GOSUB512:RETURN:'LD (P1)
,HL
918 P=195:GOSUB512:P=El:GOSUB512:P=D1:GOSUB512:RETURN:'JP ElD1
920 P=183:GOSUB512:P=237:GOSUB512:P=82:GOSUB512:RETURN:'OR A; SBC
HL,DE
922 P=40:GOSUB512:P=3:GOSUB512:RETURN:'JR Z,3
924 P=225:GOSUB512:RETURN:'POP HL
926 P=229:GOSUB512:RETURN:'PUSH HL
928 P=209:GOSUB512:RETURN:'POP DE
930 P=213:GOSUB512:RETURN:'PUSH DE
932 P=205:GOSUB512:P=177:GOSUB512:P=9:GOSUB512:RETURN:'MOVE VARIAB
LE TO 4121H AREA
934 P=205:GOSUB512:P=164:GOSUB512:P=9:GOSUB512:RETURN:'MOVE FROM 4
121H TO STACK
936 P=193:GOSUB512:GOSUB928:RETURN:'POP BC & DE
938 ' ARITHMETIC OPERATION & FUNCTION ROUTINES
940 P=205:GOSUB512:P=22:GOSUB512:P=7:GOSUB512:RETURN
942 P=205:GOSUB512:P=19:GOSUB512:P=7:GOSUB512:RETURN
944 P=205:GOSUB512:P=71:GOSUB512:P=8:GOSUB512:RETURN
946 P=205:GOSUB512:P=162:GOSUB512:P=8:GOSUB512:RETURN
948 P=205:GOSUB512:P=247:GOSUB512:P=19:GOSUB512:RETURN
950 P=205:GOSUB512:P=12:GOSUB512:P=10:GOSUB512:RETURN
952 P=205:GOSUB512:P=231:GOSUB512:P=19:GOSUB512:RETURN
954 P=205:GOSUB512:P=239:GOSUB512:P=10:GOSUB512:P=205:GOSUB512:P=1
19:GOSUB512:RETURN
956 P=205:GOSUB512:P=9:GOSUB512:P=8:GOSUB512:RETURN
958 P=205:GOSUB512:P=57:GOSUB512:P=20:GOSUB512:RETURN
960 P=205:GOSUB512:P=65:GOSUB512:P=21:GOSUB512:RETURN
962 P=205:GOSUB512:P=71:GOSUB512:P=21:GOSUB512:RETURN
964 P=205:GOSUB512:P=168:GOSUB512:P=21:GOSUB512:RETURN
966 P=205:GOSUB512:P=189:GOSUB512:P=21:GOSUB512:RETURN
968 P=205:GOSUB512:P=167:GOSUB512:P=40:GOSUB512:RETURN
970 P=62:GOSUB512:P=4:GOSUB512:P=50:GOSUB512:P=175:GOSUB512:P=64:G
OSUB512:RETURN
972 P=205:GOSUB512:P=203:GOSUB512:P=9:GOSUB512:RETURN
999 ' ***** MAIN PROGRAM *****
1000 CLEAR200:DEFINTA-P,S-X,Z:DIML1(100),L2(100),A(50),Al(50),D(25
),E(25):FS="BASIC COMPILER"+STRING$(50," "):TS=CHR$(32)+CHR$(50)+C
HR$(32):CLS
1005 Q=PEEK(16548)+256*PEEK(16549):L=1:K=0:FP=0:CF=0:MC=PEEK(16561
)+PEEK(16562)*256+3-65536:M=MC:MR=0'IF YOU HAVE A 32K SYSTEM, MAKE
MR=1; ELSE IF YOU HAVE A 48K SYSTEM, MR=0
1007 FM=PEEK(16633)+PEEK(16634)*256+1650-65536:IFFM>MCTHENCL=FM-3:
GOSUB814:PRINT512,"LOCATION TO COMPILE CHANGED TO PROTECT BASIC P
ROGRAM":FORM1=1TO2000:NEXT:POKE16561,El:POKE16562,D1:GOTO1000
1010 IS=10:DO=20:DT=20:SL=40:NO=26:NT=2:NS=26:'IS=# OF ADDITIONAL
S.P. VARIABLES PER LETTER; DO=DIM OF 1-D ARRAYS; DT=DIM OF 2-D ARR
AYS; SL=LENGTH OF STRINGS; NO=# OF 1-D ARRAYS ALLOWED; NT=# OF 2-D
ARRAYS ALLOWED; NS=# OF STRINGS ALLOWED
1011 Q1=Q:Q=Q+4:GOSUB514:IFPC=184THENGOSUB7100'CLEAR
1012 IFPC=138THENGOSUB7110:IFIS=0THENIS=1'DIM
1013 Q=Q1:PRINT@440,"IS ="IS:PRINT"DO ="DO:PRINT"DT ="DT:PRINT"SL
="SL:PRINT"NO ="NO:PRINT"NT ="NT:PRINT"NS ="NS
1015 VT=-2*26-MR*16384:VF=-4*26*(1+IS)+VT:VA=-4*NO*DO+VF:VD=-4*NT*
DT*DT-2*NT*DT+VA:VS=-NS*(SL+1)+VD:VN=- (SL+1)+VS:PRINT@856,"ZERO VA
RIABLES":GOSUB7136'CLEAR
1020 ' MC=END OF VARIABLE STORAGE AREA AND ALSO THE START OF MACHI
NE CODE; VT=START OF INTEGER STORAGE; VF=START OF SIMPLE VARIABLE
STORAGE; VA=START OF 1-D ARRAY STORAGE; VD=START OF 2-D ARRAY STOR
AGE; VS=START OF STRING STORAGE; VN=TEMP. STORAGE
1021 IPNT=0GOSUB7000:' GENERATE CODE TO STORE 2-D ARRAY ADDRESSES
1025 M1=PEEK(Q)+PEEK(Q+1)*256:L1(L)=PEEK(Q+2)+PEEK(Q+3)*256
1030 GOSUB524
1035 PRINT:PRINT@960," LINE #L1(L);M;";:L2(L)=M:L=L+1:Q=Q+4
1040 IFLL(L-1)>500THEN1210
1045 C=0:GOSUB514:IFC=2THEN1140
1050 IFPC=133ORPC=134ORPC=136OR(PC>137ANDPC<140)ORPC=142ORPC=144OR
PC=148OR(PC>149ANDPC<177)OR(PC>178ANDPC<184)OR(PC>184ANDPC<189)OR(
PC>189ANDPC<202)ORPC=203ORPC=210ORPC=211THENGOSUB522:'ERROR TRA
P
1055 IFPC=215OR(PC>216ANDPC<221)OR(PC>228ANDPC<251) THEN522:'ERROR
TRAP
1056 IFPC=184GOSUB7135'CLEAR
1057 IFPC=140GOSUB514:' LET
```

Listing 1 continued



```

1060 IFPC>64ANDPC<91ANDPN=37Q=Q-1:GOSUB2000:' INTEGER LET
1065 ' SINGLE PRECISION LET
1070 IFPC>64ANDPC<91ANDPN<>37ANDPN<>36Q=Q-1:GOSUB535:GOSUB514:GOSU
B514:IF(PC=49ANDPN=207)OR(PC=48ANDPN=205)GOSUB4000:ELSEQ=Q-2:GOSUB
514:IFPC>213THEN522ELSEGOSUB700:GOSUB565:GOSUB972
1075 IFPC>64ANDPC<91ANDPN=36Q=Q-1:GOSUB4500:' STRING LET
1080 IFPC=178GOSUB2500:' PRINT
1085 IFPC=141GOSUB3500:' GOTO
1090 IFPC=143GOSUB3000:' IF ... THEN
1095 IFPC=145GOSUB3700:' GOSUB
1100 IFPC=146GOSUB3800:' RETURN
1105 IFPC=132THENP=205:GOSUB512:P=201:GOSUB512:P=1:GOSUB512:GOSUB5
14:IFPC<>58ANDC<>2THEN522:' CLS
1110 IFPC=137GOSUB2700:' INPUT
1115 IFPC=129GOSUB5000:' FOR
1120 IFPC=135GOSUB5500:' NEXT
1125 IFPC=130ORPC=131GOSUB6000:' SET & RESET
1127 IFPC=177GOSUB6500:' POKE
1130 IFPC=128P=205:GOSUB512:P=157:GOSUB512:P=10:GOSUB512:P=201:GOS
UB512:' END
1135 IFPEEK(Q-1)=58ORPEEK(Q-1)=149PRINTT$;GOTO1045:' TEST FOR TER
MINATOR & ELSE TOKEN
1140 Q=M1:PRINT:GOTO1025:' START NEW LINE
1200 ' ***** ROUTINE TO ADJUST THE MACHINE CODE JUMPS *****
1210 GOSUB524:IFK=0THEN1250ELSEPRINT@960,"ADJUSTING JUMP ADDRESSES
. . .";
1220 FORI=1TOK:DN=PEEK(A(I))+256*PEEK(A(I)+1):DH=0
1230 FORJ=1TOL:IFDN=L1(J)THENDH=L2(J):PRINTL1(J);
1240 NEXTJ:C1=DH:GOSUB836:POKEA(I),EL:POKEA(I)+1,D1:NEXTI
1250 CLS:IFVN=3>MTHEN1310ELSETR=M-VN+3:MO=TR/256:IFTR<>MO*256THENM
O=MO+1
1260 PRINT:PRINT"COMPILED PROGRAM CONFLICTS WITH VARIABLE STORAGE
AREA."
1280 IFMC-MO*256>FMTHENGOTO1286ELSEPRINT:PRINT"TO RECOMPILE PROGRA
M IN LOWER MEMORY WOULD OVERWRITE YOUR":PRINT"BASIC PROGRAM. TRY T
O REDUCE THE VARIABLE STORAGE AREA BY":PRINT"REDIMENSIONING VARIB
LES. PROTECTED MEMORY HAS BEEN MOVED TO"
1285 PRINT"THE MINIMUM VALUE TO ALLOW THE BASIC COMPILER TO RUN.":
C1=FM-3:GOSUB814:POKE16561,EL:POKE16562,D1:END
1286 PRINT"RELOCATING PROGRAM . . .":M2=M:P=33:GOSUB512:C1=MC:GOSU
B814:P=EL:GOSUB512:P=D1:GOSUB512:P=17:GOSUB512:P=EL:GOSUB512:P=D1-
MO:GOSUB512:P=1:GOSUB512:C1=M2-MC:GOSUB814:P=EL:GOSUB512:P=D1:GOSU
B512
1287 P=237:GOSUB512:P=176:GOSUB512:P=201:GOSUB512:DEFUSR1=M2:MC=MC
-MO*256:M=M-MO*256-12
1288 IFK1>0THENFORI=1TOK1:POKEAL(I),PEEK(AL(I))-MO:NEXTI
1289 IFK>0THENFORI=1TOK:POKEA(I)+1,PEEK(A(I)+1)-MO:NEXTI
1290 PRINT:PRINT"PROTECTED MEMORY POINTER CHANGED AND PROGRAM RELO
CATED TO":GOTO1310
1299 ' ***** ROUTINE TO EXECUTE THE MACHINE CODE DIRECTLY *****
*
1300 GOSUB814:E2=EL/16:D2=D1/16:E1=EL-E2*16:D1=D1-D2*16:IFD2>9THEN
D2=D2+55ELSESD2=D2+48
1301 IFD1>9THEND1=D1+55ELSESD1=D1+48
1302 IFD2>9THENE2=E2+55ELSESE2=E2+48
1303 IFD1>9THENE1=E1+55ELSESE1=E1+48
1304 B$="&H"+CHR$(D2)+CHR$(D1)+CHR$(E2)+CHR$(E1):PRINTB$,:RETURN'C
ONVERSION TO HEX
1310 DEFUSR0=MC:PRINT@384,"START","END","TRANSFER":PRINT"HEXIDECI
MAL",:C1=MC:GOSUB1300:C1=M:GOSUB1300:C1=MC:GOSUB1300:PRINT"DECIMAL
"TAB(15)65536+MCTAB(31)65536+MTAB(47)65536+MC:PRINT"DECIMAL",MC,M,
MC:PRINT
1315 PRINT"VARIABLES STORED - ";:C1=VN-3:GOSUB1300:PRINT:PRINT"TO
TOP OF MEMORY - ";:C1=-MR*16384-1:GOSUB1300:PRINT
1316 IFTR<>0THENPOKE16562,PEEK(16562)-MO:CLEAR50:X=USR1(0)
1320 PRINT@960,"<ENTER> TO RUN MACHINE CODE . . .";
1330 INPUTA$
1340 CLS:X=USR(0):END
1400 ' ***** END OF MAIN PROGRAM *****
1999 ' INTEGER ASSIGNMENT ROUTINE
2000 GOSUB514:GOSUB518:GOSUB520:V1=PC-65:GOSUB514:IFPC<>213THEN522
2010 GOSUB514:IF(PC=49ANDPN=207)OR(PC=48ANDPN=205)THEN2400
2011 IFPC=246THENGOSUB2017:P=126:GOSUB512:GOTO2027' ASC
2012 IFPC<>192THEN2015ELSEGOSUB2017:V1=V3:C1=VN-2:GOSUB814:P=34:GO
SUB512:P=EL:GOSUB512:P=D1:GOSUB512:P=6:GOSUB512:P=255:GOSUB512:P=1
26:GOSUB512:P=4:GOSUB512:P=35:GOSUB512:P=183:GOSUB512:P=32:GOSUB51
2:P=250:GOSUB512:P=120:GOSUB512
2013 C1=VN-3:GOSUB814:GOSUB902:P=119:GOSUB512:GOSUB916:GOSUB514:RE
TURN' VARPTR OF STRING
2015 IFPC<>245THEN2020ELSEGOSUB2017:P=126:GOSUB512:P=254:GOSUB512:
P=45:GOSUB512:P=32:GOSUB512:P=2:GOSUB512:P=55:GOSUB512:P=35:GOSUB5
12:P=245:GOSUB512
2016 P=205:GOSUB512:P=90:GOSUB512:P=30:GOSUB512:P=241:GOSUB512:P=4
8:GOSUB512:P=7:GOSUB512:P=33:GOSUB512:P=0:GOSUB512:GOSUB512:P=183:
GOSUB512:P=237:GOSUB512:P=82:GOSUB512:GOSUB908:GOSUB908:V1=V3:GOSU
B916:GOSUB514:RETURN' VAL
2017 V3=V1:Q=Q+1:GOSUB514:GOSUB518:IFPN<>36THEN522:ELSEQ=Q+1:V1=PC

```

Listing 1 continued

# WHEN YOU TYPE "TALLY"

you get what you  
thought those  
"CALC" programs  
would give you:

- easy to use
- simple and logical
- totals by item and category
- every category named
- built-in sorts
- clear documentation



## TALLYMASTER

Whether you're managing  
a home budget or business  
expenses, TALLYMASTER  
gives you better  
understanding and control.

Customers told us:

"Looks like just what I need to  
keep track of Income & Expenses  
in my Real Estate appraisal  
business." (L.E.)

"Well-packaged, clear  
instructions, easy to  
use." (G. L. G.)

"Just what we need for In-  
house Budgets." (N. Ariz. Univ.)

And, '80 MICRO gave it a Five  
Star review: "I recommend Tally-  
master to every user who wants a  
good, easy, accurate bookkeep-  
ing system, and to anyone inter-  
ested in home or small business  
budgeting and bookkeeping."  
(July, 1983)

All this for only **\$79.95**  
(TRS-80 Models I, III, 48K, disk)

Also available for MS DOS  
128K, disk. Has Function Key support and  
an even faster sort.  
Special price: \$99.95

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

## PROSOFT®

Dept. G, Box 560, No. Hollywood, CA 91603  
(818) 764-3131 Information and same-day processing  
TERMS: VISA, MC, checks, COD. Please add \$2.00  
shipping in U.S. or Canada, sales tax in CA.  
Most orders filled within one day.



```

-65:MF=VS+V1*(SL+1):C1=MF:GOSUB814:GOSUB902:GOSUB514:RETURN' LOCAT
E STRING
2020 IFPC=216:GOSUB514:GOSUB700:GOSUB970:P=205:GOSUB512:P=61:GOSUB5
12:P=11:GOSUB512:IFPC<41:THEN522ELSEGOSUB514:GOSUB916:RETURN:' INT
2025 IFPC<229:THEN2030ELSEV3=V1:GOSUB514:GOSUB514:GOSUB810:IFC1=-1
THENV1=PC-65:GOSUB518:GOSUB520:GOSUB514:GOSUB914:P=126:GOSUB512ELS
EP=58:GOSUB512:P=E1:GOSUB512:P=D1:GOSUB512:' PEEK
2027 P=38:GOSUB512:P=0:GOSUB512:P=111:GOSUB512:V1=V3:GOSUB916:GOSU
B514:RETURN:' PEEK
2030 IFPC=198:THENV3=V1:GOSUB600:P=42:GOSUB512:P=33:GOSUB512:P=65:
GOSUB512:V1=V3:GOSUB916:RETURN:' POINT
2032 V2=V1:Q=Q-1:GOSUB514:IFPC=206:ANDPN<47:ANDPN<58:GOSUB810:GOSUB90
2:GOTO2040ELSEIFPC=206:THENV1=0:D1=0:GOSUB902:GOTO2040
2035 GOSUB810:IFC1<-1:GOSUB902ELSEV1=PC-65:GOSUB518:GOSUB520:GOSUB
914:GOSUB514
2040 IFPC=58:ORC=2V1=V2:GOSUB916:RETURN
2045 IFPC=206:ANDPN<47:ANDPN<58:SG=205ELSESG=PC:GOSUB514
2050 GOSUB2060:IFSG=205:GOSUB904ELSEGOSUB920
2055 GOTO2040
2060 GOSUB810:IFC1<-1:GOSUB900:RETURNELSEV1=PC-65:GOSUB518:GOSUB52
0:P=237:GOSUB512:P=91:GOSUB512:GOSUB940:GOSUB512:P=P1:GOSUB512:GOS
UB514:RETURN
2099 ' INTEGER VARIABLE TRANSFER ROUTINE
2400 IFPC=49:ANDPN=207:CH=1ELSECM=0
2410 Q=Q+1:GOSUB514:MF=VN:GOSUB880:Q=Q+1:GOSUB902:P=205:GOSUB512:P
=13:GOSUB512:P=38:GOSUB512
2420 IFCM=0:P=26:GOSUB512:P=111:GOSUB512:P=19:GOSUB512:P=26:GOSUB51
2:P=103:GOSUB512:GOSUB916:RETURN:' TRANSFER BASIC VARIABLE INTO US
R VARIABLE
2430 GOSUB914:P=125:GOSUB512:P=18:GOSUB512:P=19:GOSUB512:P=124:GOS
UB512:P=18:GOSUB512:RETURN:' TRANSFER USR VARIABLE INTO BASIC VARI
ABLE
2499 ' PRINT ROUTINE
2500 GOSUB514:IFPC=58:ORC=2P1=13:GOSUB2670:RETURN
2502 IFPC<64:ANDPC<96:THEN2600ELSEGOSUB514
2503 ' PRINT 0
2504 IFPC=58:Q=Q-1:GOSUB2580:C1=C1+15360:GOSUB514:GOSUB814:GOSUB902
ELSEV1=PC-65:GOSUB518:GOSUB520:GOSUB514:GOSUB914:D1=60:E1
=0:GOSUB900:GOSUB904
2508 IFPC<247:P=34:GOSUB512:P=32:GOSUB512:P=64:GOSUB512:GOTO2600EL
SEGOSUB514:IFPC<40:THEN522ELSEGOSUB2580:GOSUB910
2510 GOSUB514:IFPC=205:GOSUB514:IFPC<247:THEN522ELSESEP=35:GOSUB512:G
OTO2508
2512 IFPC=59:GOSUB514
2514 IFPC<58:ANDC<2:THEN522ELSERETURN
2580 C$=""
2585 GOSUB514:IFPC<41:ANDPC<44:THENC$=C$+CHR$(PC):IFPC<48:ORC<57:TH
EN522ELSEGOTO2585
2590 C1=VAL(C$):RETURN
2599 ' SINGLE PRECISION EXPRESSION & STRING PRINT ROUTINE
2600 IFPC<64:ANDPC<91:ANDPN=36:Q=Q+1:V1=PC-65:C1=VS+V1*(SL+1):GOSUB26
00:GOTO2630
2610 IFPC=34:PC=PEEK(Q):Q=Q+1:MF=VN:PP=1:GOSUB880:PP=0:GOSUB2680:GO
TO2630
2620 Q=Q-1:GOSUB700:GOSUB970:P=205:GOSUB512:P=189:GOSUB512:P=15:GO
SUB512:GOSUB968:' SINGLE PRECISION PRINT
2630 IFPC=44:THEN522
2640 IFPC=59:GOSUB514:IFPC<58:ANDC<2:THEN2600ELSERETURN
2650 IFPC=58:ORC=2P1=13:GOSUB2670:RETURN
2660 GOTO522

```

```

2670 P=62:GOSUB512:P=P1:GOSUB512:P=205:GOSUB512:P=58:GOSUB512:P=3:
GOSUB512:RETURN:' SCREEN CONTROL ROUTINE
2680 GOSUB836:GOSUB968:GOSUB902:GOSUB968:GOSUB514:IFPC=34:GOSUB514:RETURNELS
E:RETURN:' PRINT STRING
2699 ' INPUT
2700 P=205:GOSUB512:P=179:GOSUB512:P=27:GOSUB512:GOSUB514:IFPN=367
HENGOSUB518:GOSUB908:Q=Q+1:V1=PC-65:MF=VS+V1*(SL+1)-1:C1=MF:GOSUB8
14:GOSUB902:GOTO4707ELSEP=35:GOSUB512:P=205:GOSUB512:P=108:GOSUB51
2:P=14:GOSUB512
2710 IFPN=37:P=205:GOSUB512:P=127:GOSUB512:P=10:GOSUB512:V1=PC-65:G
OSUB840:E1=P:D1=P1:GOSUB902:P=237:GOSUB512:P=75:GOSUB512:P=33:GOSU
B512:P=65:GOSUB512:P=113:GOSUB512:P=35:GOSUB512:P=112:GOSUB512:GOS
UB514:GOSUB514:IFPC<58:ANDC<2:THEN522ELSERETURN
2720 Q=Q-1:CP=1:GOSUB535:CF=0:P=58:GOSUB512:P=175:GOSUB512:P=64:GO
SUB512:P=222:GOSUB512:P=4:GOSUB512:GOSUB922:P=205:GOSUB512:P=204:G
OSUB512:P=10:GOSUB512:GOSUB565:GOSUB972:GOSUB514:IFPC<58:ANDC<2:TH
EN522ELSERETURN
2999 ' INTEGER IF - THEN ROUTINE
3000 GOSUB514:IFPN<37:THEN3100ELSEGOSUB520:V1=PC-65:GOSUB914:GOSUB
908:GOSUB514
3005 IFPC=212:ANDPN=213:ORPC=213:ANDPN=212:W1=1:Q=Q+1:GOTO3035
3010 IFPC=214:ANDPN=213:ORPC=213:ANDPN=214:W1=2:Q=Q+1:GOTO3035
3015 IFPC=212:ANDPN=214:ORPC=214:ANDPN=212:W1=3:Q=Q+1:GOTO3035
3020 IFPC=212:W1=4
3025 IFPC=214:W1=5
3030 IFPC=213:W1=6
3035 GOSUB514:IFPC<58:ORPC=206:GOSUB810:GOSUB902:ELSEGOSUB518:GOSUB52
0:V1=PC-65:GOSUB914:GOSUB514
3040 IFPC<20:ANDPC<21:1:THEN522ELSEGOSUB514:IFPC=141:GOSUB514
3045 GOSUB810:IFC1<0:ORC1<500:THEN522
3050 P=205:GOSUB512:P=57:GOSUB512:P=10:GOSUB512
3055 GOTO3150
3099 ' SINGLE PRECISION IF - THEN ROUTINE
3100 Q=Q-1:GOSUB700:GOSUB934
3105 IFPC=212:ANDPN=213:ORPC=213:ANDPN=212:W1=1:Q=Q+1:GOTO3135
3110 IFPC=214:ANDPN=213:ORPC=213:ANDPN=214:W1=2:Q=Q+1:GOTO3135
3115 IFPC=212:ANDPN=214:ORPC=214:ANDPN=212:W1=3:Q=Q+1:GOTO3135
3120 IFPC=212:W1=4
3125 IFPC=214:W1=5
3130 IFPC=213:W1=6
3135 GOSUB700:GOSUB936:GOSUB950
3140 IFPC<20:ANDPC<21:1:THEN522ELSEGOSUB514:IFPC=141:GOSUB514
3145 GOSUB810:IFC1<0:ORC1<500:THEN522
3150 D=D1:E=E1:ONW1GOTO3155,3160,3165,3170,3175,3180
3155 GOSUB3185:GOSUB3200:RETURN
3160 GOSUB3185:GOSUB3190:RETURN
3165 GOSUB3195:RETURN
3170 P=40:GOSUB512:P=3:GOSUB512:GOSUB3200:RETURN
3175 P=40:GOSUB512:P=3:GOSUB512:GOSUB3190:RETURN
3180 GOSUB3185:RETURN
3185 P=202:GOSUB3300:RETURN
3190 P=242:GOSUB3300:RETURN
3195 P=194:GOSUB3300:RETURN
3200 P=250:GOSUB3300:RETURN
3205 P=195:GOSUB3300:RETURN
3300 GOSUB512:K=K+1:A(K)=M:P=E:GOSUB512:P=D:GOSUB512:RETURN
3310 K1=K1+1:A1(K1)=M:RETURN
3499 ' GOTO ROUTINE
3500 GOSUB514:GOSUB810:IFC1<0:ORC1<500:THEN522ELSESED=D1:E=E1:GOSUB320
5:RETURN
3699 ' GOSUB ROUTINE
3700 GOSUB514:GOSUB810:IFC1<0:ORC1<500:THEN522ELSESED=D1:E=E1:P=205:GO

```

```

5999 ' POINT, SET & RESET
6000 IFPC=130 THEN NW=1 ELSE IFPC=131 THEN NW=128 ELSE IFPC=198 THEN NW=0
6010 MA=M
6020 GOSUB 514: IFPC<>40 THEN 522 ELSE GOSUB 514: GOSUB 810: IF C1=-1 GOSUB 518
6030 GOSUB 520: V1=PC-65: GOSUB 840: D2=PI: E2=P: C2=1 ELSE E2=EI: C2=0: IF PC<>44
    THEN 522
6040 IF C2=1 GOSUB 514: IFPC<>44 THEN 522
6050 GOSUB 514: GOSUB 810: IF C1=-1 GOSUB 518: GOSUB 520: V1=PC-65: GOSUB 840:
    IF C3=P: C3=1 ELSE E3=EI: C3=0: IF PC<>41 THEN 522
6060 IF C3=1 GOSUB 514: IFPC<>41 THEN 522
6070 GOSUB 514: IFPC<>58 AND C<>2 THEN 522
6080 IF C1=MA: I+8+C2+C3: GOSUB 836: GOSUB 902: M=M-1: GOSUB 3310: M=M+1: GOSUB 9
    26: EI=126: D1=7: GOSUB 902: P=62: GOSUB 512: P=W: GOSUB 512: P=245: GOSUB 512
    6088 IF C2=1 THEN P=58: GOSUB 512: P=E2: GOSUB 512: P=D2: GOSUB 512: ELSE P=62:
    GOSUB 512: P=E2: GOSUB 512
6090 P=245: GOSUB 512
6100 IF C3=1 THEN P=58: GOSUB 512: P=E3: GOSUB 512: P=D3: GOSUB 512 ELSE P=62: G
    6110 EI=80: D1=1: GOSUB 918: RETURN
6120 ' POKE ROUTINE
6130 GOSUB 514: GOSUB 810: IF C1=-1 THEN GOSUB 518: GOSUB 520: V1=PC-65: GOSUB
    514: GOSUB 514 ELSE GOSUB 902
6140 IFPC<>44 THEN 522
6150 GOSUB 514: GOSUB 810: IF C1=-1 GOSUB 518: GOSUB 520: V1=PC-65: GOSUB 840:
    IF D1=PI: P=58: GOSUB 512: P=EI: GOSUB 512: P=D1: GOSUB 512: GOSUB 514 ELSE P
    =62: GOSUB 512: P=EI: GOSUB 512
6160 IFPC<>58 AND C<>2 THEN 522
6170 P=119: GOSUB 512: RETURN
6180 ' ROUTINE FOR CODE TO STORE 2-D ARRAY ADDRESSES
6190 GOSUB 524: PRINT "CODE TO STORE 2-D ARRAY ADDRESSES": PRINT: C1=V
    6200 GOSUB 836: GOSUB 902
6210 IF V=1: C1=VD+4*NT+DT*DT: GOSUB 836: P=221: GOSUB 512: GOSUB 902: C1=4*DT: GOS
    6220 C1=NT+DT: GOSUB 814: P=1: GOSUB 512: P=EI: GOSUB 512: P=D1: GOSUB 512
    6230 P=221: GOSUB 512: P=117: GOSUB 512: P=0: GOSUB 512
    6240 P=221: GOSUB 512: P=35: GOSUB 512
    6250 P=221: GOSUB 512: P=116: GOSUB 512: P=0: GOSUB 512
    6260 P=221: GOSUB 512: P=35: GOSUB 512: GOSUB 904: P=13: GOSUB 512
    6270 P=13: GOSUB 512: P=194: GOSUB 512: P=EI: GOSUB 512: P=D1: GOSUB 3310:
    GOSUB 512
    6280 P=5: GOSUB 512: P=14: GOSUB 512: P=255: GOSUB 512: C1=M-18: GOSUB 836: P=
    6290 GOSUB 512: P=EI: GOSUB 512: P=D1: GOSUB 3310: GOSUB 512
    6300 PRINT#856, "MAIN CODE BEGINS": RETURN
    6310 GOSUB 514: Q1=Q: IFPC=50 THEN 7104 ELSE IFPC<>2 THEN GOTO 7100 'CLEAR
    6320 Q=Q+4
    6330 GOSUB 514: RETURN
    6340 IS=1: DO=0: DT=0: NO=0: NT=0: NS=2 'DIM
    6350 C$="": GOSUB 514: Q1=Q: IFPC=58 THEN Q=Q-4: Q1=Q: RETURN ELSE IFPC=2 THEN
    6360 PRINT#856, "MAIN CODE BEGINS": RETURN
    6370 GOSUB 514: Q1=Q: IFPC=50 THEN 7104 ELSE IFPC<>2 THEN GOTO 7100 'CLEAR
    6380 Q=Q+4
    6390 GOSUB 514: RETURN
    6400 IS=1: DO=0: DT=0: NO=0: NT=0: NS=2 'DIM
    6410 C$="": GOSUB 514: Q1=Q: IFPC=58 THEN Q=Q-4: Q1=Q: RETURN ELSE IFPC=2 THEN
    6420 PRINT#856, "MAIN CODE BEGINS": RETURN
    6430 GOSUB 514: Q1=Q: IFPC=50 THEN 7104 ELSE IFPC<>2 THEN GOTO 7100 'CLEAR
    6440 Q=Q+4
    6450 GOSUB 514: RETURN
    6460 IS=1: DO=0: DT=0: NO=0: NT=0: NS=2 'DIM
    6470 C$="": GOSUB 514: Q1=Q: IFPC=58 THEN Q=Q-4: Q1=Q: RETURN ELSE IFPC=2 THEN
    6480 PRINT#856, "MAIN CODE BEGINS": RETURN
    6490 GOSUB 514: Q1=Q: IFPC=50 THEN 7104 ELSE IFPC<>2 THEN GOTO 7100 'CLEAR
    6500 Q=Q+4
    6510 GOSUB 514: RETURN
    6520 IS=1: DO=0: DT=0: NO=0: NT=0: NS=2 'DIM
    6530 C$="": GOSUB 514: Q1=Q: IFPC=58 THEN Q=Q-4: Q1=Q: RETURN ELSE IFPC=2 THEN
    6540 PRINT#856, "MAIN CODE BEGINS": RETURN
    6550 GOSUB 514: Q1=Q: IFPC=50 THEN 7104 ELSE IFPC<>2 THEN GOTO 7100 'CLEAR
    6560 Q=Q+4
    6570 GOSUB 514: RETURN
    6580 IS=1: DO=0: DT=0: NO=0: NT=0: NS=2 'DIM
    6590 C$="": GOSUB 514: Q1=Q: IFPC=58 THEN Q=Q-4: Q1=Q: RETURN ELSE IFPC=2 THEN
    6600 PRINT#856, "MAIN CODE BEGINS": RETURN
    6610 GOSUB 514: Q1=Q: IFPC=50 THEN 7104 ELSE IFPC<>2 THEN GOTO 7100 'CLEAR
    6620 Q=Q+4
    6630 GOSUB 514: RETURN
    6640 IS=1: DO=0: DT=0: NO=0: NT=0: NS=2 'DIM
    6650 C$="": GOSUB 514: Q1=Q: IFPC=58 THEN Q=Q-4: Q1=Q: RETURN ELSE IFPC=2 THEN
    6660 PRINT#856, "MAIN CODE BEGINS": RETURN
    6670 GOSUB 514: Q1=Q: IFPC=50 THEN 7104 ELSE IFPC<>2 THEN GOTO 7100 'CLEAR
    6680 Q=Q+4
    6690 GOSUB 514: RETURN
    6700 IS=1: DO=0: DT=0: NO=0: NT=0: NS=2 'DIM
    6710 C$="": GOSUB 514: Q1=Q: IFPC=58 THEN Q=Q-4: Q1=Q: RETURN ELSE IFPC=2 THEN
    6720 PRINT#856, "MAIN CODE BEGINS": RETURN
    6730 GOSUB 514: Q1=Q: IFPC=50 THEN 7104 ELSE IFPC<>2 THEN GOTO 7100 'CLEAR
    6740 Q=Q+4
    6750 GOSUB 514: RETURN
    6760 IS=1: DO=0: DT=0: NO=0: NT=0: NS=2 'DIM
    6770 C$="": GOSUB 514: Q1=Q: IFPC=58 THEN Q=Q-4: Q1=Q: RETURN ELSE IFPC=2 THEN
    6780 PRINT#856, "MAIN CODE BEGINS": RETURN
    6790 GOSUB 514: Q1=Q: IFPC=50 THEN 7104 ELSE IFPC<>2 THEN GOTO 7100 'CLEAR
    6800 Q=Q+4
    6810 GOSUB 514: RETURN
    6820 IS=1: DO=0: DT=0: NO=0: NT=0: NS=2 'DIM
    6830 C$="": GOSUB 514: Q1=Q: IFPC=58 THEN Q=Q-4: Q1=Q: RETURN ELSE IFPC=2 THEN
    6840 PRINT#856, "MAIN CODE BEGINS": RETURN
    6850 GOSUB 514: Q1=Q: IFPC=50 THEN 7104 ELSE IFPC<>2 THEN GOTO 7100 'CLEAR
    6860 Q=Q+4
    6870 GOSUB 514: RETURN
    6880 IS=1: DO=0: DT=0: NO=0: NT=0: NS=2 'DIM
    6890 C$="": GOSUB 514: Q1=Q: IFPC=58 THEN Q=Q-4: Q1=Q: RETURN ELSE IFPC=2 THEN
    6900 PRINT#856, "MAIN CODE BEGINS": RETURN
    6910 GOSUB 514: Q1=Q: IFPC=50 THEN 7104 ELSE IFPC<>2 THEN GOTO 7100 'CLEAR
    6920 Q=Q+4
    6930 GOSUB 514: RETURN
    6940 IS=1: DO=0: DT=0: NO=0: NT=0: NS=2 'DIM
    6950 C$="": GOSUB 514: Q1=Q: IFPC=58 THEN Q=Q-4: Q1=Q: RETURN ELSE IFPC=2 THEN
    6960 PRINT#856, "MAIN CODE BEGINS": RETURN
    6970 GOSUB 514: Q1=Q: IFPC=50 THEN 7104 ELSE IFPC<>2 THEN GOTO 7100 'CLEAR
    6980 Q=Q+4
    6990 GOSUB 514: RETURN
    7000 IS=1: DO=0: DT=0: NO=0: NT=0: NS=2 'DIM
    7010 C$="": GOSUB 514: Q1=Q: IFPC=58 THEN Q=Q-4: Q1=Q: RETURN ELSE IFPC=2 THEN
    7020 PRINT#856, "MAIN CODE BEGINS": RETURN
    7030 GOSUB 514: Q1=Q: IFPC=50 THEN 7104 ELSE IFPC<>2 THEN GOTO 7100 'CLEAR
    7040 Q=Q+4
    7050 GOSUB 514: RETURN
    7060 IS=1: DO=0: DT=0: NO=0: NT=0: NS=2 'DIM
    7070 C$="": GOSUB 514: Q1=Q: IFPC=58 THEN Q=Q-4: Q1=Q: RETURN ELSE IFPC=2 THEN
    7080 PRINT#856, "MAIN CODE BEGINS": RETURN
    7090 GOSUB 514: Q1=Q: IFPC=50 THEN 7104 ELSE IFPC<>2 THEN GOTO 7100 'CLEAR
    7100 Q=Q+4
    7110 GOSUB 514: RETURN
    7120 IS=1: DO=0: DT=0: NO=0: NT=0: NS=2 'DIM
    7130 C$="": GOSUB 514: Q1=Q: IFPC=58 THEN Q=Q-4: Q1=Q: RETURN ELSE IFPC=2 THEN
    7140 PRINT#856, "MAIN CODE BEGINS": RETURN
    7150 GOSUB 514: Q1=Q: IFPC=50 THEN 7104 ELSE IFPC<>2 THEN GOTO 7100 'CLEAR
    7160 Q=Q+4
    7170 GOSUB 514: RETURN
    
```

*Listing 1 continued*

```

SUBS3300: RETURN
3799 , RETURN
3800 GOSUB 924: P=233:GOSUB512:RETURN
3999 , SINGLE PRECISION VARIABLE TRANSFER ROUTINE
4000 IFPC=49ANDPN=287 THEN CM=1ELSE CM=0
4010 GOSUB514:GOSUB514:MF=VN:GOSUB880:GOSUB514:GOSUB902:P=205:GOSUB512:P=13:GOSUB512:P=38:GOSUB512
4020 IFCM=93GOSUB908:GOSUB932:GOSUB565:GOSUB972:RETURN
4030 GOSUB930:GOSUB565:GOSUB932:GOSUB924:GOSUB972:RETURN
4499 , STRING ASSIGNMENT ROUTINE
4500 GOSUB514:V1=PC-65:MF=VS+V1*(SL+1)
4510 GOSUB514:IFPC<>36 THEN522
4520 GOSUB514:IFPC<213 THEN522
4530 GOSUB514:IFPC=247 THEN4600 ELSE IFPC>64 AND PC<91 THEN4700 ELSE IFPC<>34 THEN522
4540 PC=PEEK(Q):Q=Q+1:FP=1:GOSUB880:FP=0
4550 GOSUB514:IFPC=34 GOSUB514
4560 IFPC=205 AND PN=247 THEN GOSUB908:GOTO4710
4570 IFPC=205 AND PN=34 THEN PC=PEEK(Q+1):Q=Q+2:FP=1:NN=1:GOSUB881:FP=0:GOTO4550 ELSE IFPC=205 THEN GOSUB514:IFPC>64 AND PC<91 AND PN=36 THEN Q=Q+1:GOSUB908:P=43:GOSUB512:GOTO4705 ELSE522
4580 RETURN
4599 , STRING ASSIGNMENT USING CHR$
4600 CL=MF:GOSUB836:GOSUB902
4610 GOSUB514:IFPC<>40 THEN522 ELSE C$=" "
4615 GOSUB514:IFPC>64 AND PC<91 THEN V1=PC-65:GOSUB520:GOSUB514:IFPC<>41 THEN522 ELSE P=58:GOSUB512:GOSUB840:GOSUB512:P=119:G
4620 IF(PC<48 OR PC>57) AND PC<>41 THEN522
4630 IFPC<>41 THEN C$=CHR$(PC):GOSUB514:GOTO4620
4640 CL=VAL(C$)
4650 GOSUB910
4660 GOSUB514:IFPC=205 GOSUB514:IFPC<>247 THEN P=35:GOSUB512:Q=Q-2:G
4670 IFPC=58 OR C=2 THEN P=35:GOSUB512:CL=0:GOSUB910:RETURN ELSE GOTO522
4699 , STRING ASSIGNMENT USING PREVIOUSLY DEFINED VARIABLE
4700 IFPN<>36 THEN522 ELSE Q=Q+1:CL=MF-1:GOSUB814:GOSUB902
4710 V1=PC-65:MX=VS+V1*(SL+1)-1:CL=MX:GOSUB836:GOSUB908
4720 P=35:GOSUB512:P=19:GOSUB512:P=26:GOSUB512:P=119:GOSUB512:P=18
3:GOSUB512:P=32:GOSUB512:P=249:GOSUB512:GOTO4660
4730 IFPC=205 AND PN=247 THEN Q=Q-1:P=43:GOSUB512:GOTO4660
4740 IFPC=205 AND PN=34 THEN GOSUB908:GOTO4570 ELSE IFPC=205 THEN GOSUB514:GOSUB518:IFPN<>36 THEN522 ELSE Q=Q+1:P=43:GOSUB512:GOTO4705
4730 RETURN
4999 , FOR ROUTINE
5000 CL=M+7:GOSUB836:GOSUB514:GOSUB520:V1=PC-65:GOSUB840:
5010 GOSUB514:D(V1)=D1:IF(V1)=E1:IFPC<>213 THEN522
5020 GOSUB514:IFPC<50 OR PC=206 GOSUB810:J1=0:ID=D1:IE=E1:ELSE J1=1:V2=PC-65:GOSUB520:CL=VT+V2:GOSUB836:ID=D1:IE=E1:GOSUB514
5030 IFPC<>189 THEN522
5040 GOSUB514:IFPC<50 OR PC=206 GOSUB810:J2=0:FD=D1:FE=E1 ELSE J2=1:V3=PC-65:GOSUB520:CL=VT+V3:2:GOSUB836:FD=D1:FE=E1:Q=Q+1
5050 IFJ2=0 THEN P=33 ELSE P=42
5060 IFJ1=0 THEN IE1=IE:D1=ID:GOSUB902
5070 IFJ1=1 THEN P=42:GOSUB512:P=IE:GOSUB512:P=ID:GOSUB512
5080 GOSUB916:IFPEEK(Q-1)<58 AND PEEK(Q-1)<0 THEN522 ELSE RETURN
5099 , NEXT ROUTINE
5100 GOSUB514:GOSUB518:GOSUB520:V1=PC-65:GOSUB914:GOSUB928:GOSUB93
5110 GOSUB926:GOSUB920:GOSUB924:P=35:GOSUB512:P=194:GOSUB512:P=E(V1):
5120 P=D(V1):GOSUB3310:GOSUB512:GOSUB924:GOSUB514:RETURN

```



```

7136 C1=VN:GOSUB814:P=175:GOSUB512:GOSUB902:P=119:GOSUB512:C1=VN+1
:GOSUB814:GOSUB900:C1=MR*16384-VN-1:GOSUB814:P=1:GOSUB512:P=EL:GO
SUB512:P=DL:GOSUB512:P=237:GOSUB512:P=176:GOSUB512:RETURN/CLEAR
7200 . ***** END OF THE COMPILER *****
10000 . ***** BASIC PORTION OF THE ARRAY SORTING PROGRAM *****
10010 DIM A(400):INPUT "ARRAY DIMENSION",N$
10020 FOR I=1 TO N:A(I)=200*INT(RND(1)):NEXT I$
10030 FOR I=1 TO N:PRINT A(I$):NEXT I$
10040 PRINT "PRESS A KEY TO RUN"
10050 A$=INKEY$:IF A$="" THEN 10050
10060 X=USR(0)
10070 PRINT:PRINT "DONE":PRINT:PRINT "PRESS A KEY TO PRINT THE SORTED ARRAY"
10080 A$=INKEY$:IF A$="" THEN 10080
10090 FOR I=1 TO N:PRINT A(I$):NEXT I$

```

End

Program Listing 2. Demonstration program using string input, ASC, Clear, and Dimension statements.

```

100 CLEAR50:DIMAS(40)
20 CLS
30 PRINT:PRINT "Answer Yes, No, or Quit";:INPUTA$:A$=ASC(A$)
40 'THE ASCII VALUE FOR Q IS 81. q IS 113
50 IFA$=81THEN120ELSEIFA$=113THEN120
60 'THE ASCII VALUE FOR N IS 78, n IS 110
70 IFA$=78THEN100ELSEIFA$=110THEN100
80 'THE ASCII VALUE FOR Y IS 89, y IS 121
90 IFA$=89THEN110ELSEIFA$=121THEN110ELSEGOTO30
100 PRINT"The answer was no.":GOTO30
110 PRINT"The answer was yes.":GOTO30
120 PRINT:PRINT"You asked to quit."
130 PRINT"You are now returned to BASIC."
500 END

```

End

Program Listing 3. Using substitute programming techniques for compilation purposes.

```

100 CLEAR50:DIMB$(60)
20 CLS
30 PRINT"EXAMPLES OF VARPTR(A$), LEN(A$), AND LEFT$(A$,5)"
40 PRINT"USING SUBSTITUTE PROGRAM FOR COMPILATION PURPOSES":PRINT
50 PRINT"ENTER A TEN CHARACTER STRING":INPUTA$
60 B$=A$:A$=VARPTR(B$):PRINT"VARPTR LOCATION IS ";A$:B$=PEEK(A$)
70 IFB$<=10THEN80ELSEPRINT"STRING IS GREATER THAN TEN CHARACTERS":GOTO50
80 IFB$=10THEN90ELSEPRINT"STRING IS LESS THAN TEN CHARACTERS":GOTO50
90 B$=A$+1:B$=PEEK(B$):C$=A$+2:C$=PEEK(C$)
100 B=C$+256+B$:IFB$32768THEN110ELSEB=B-65536

```

End

Program Listing 4. Basic Pong game.

```

110 B$=INT(B):PRINT"STRING LOCATION IS ";B$
120 'THE NEXT LINE WILL NOT GIVE THE SAME RESULTS IN BASIC
130 B$=B$+5:POKEB$,0
140 PRINT"THE ORIGINAL STRING IS . . . ";A$
150 PRINT"THE EQUIVALENT OF B$=LEFT$(A$,5) IS . . . ";B$
500 END

5 DIMA$(40),A1
10 Q$=20:A$=25
15 L$=25:O$=20
20 CLS:PRINT"How fast (1 to 100)?":INPUT D$:CLS:M$=0:S$=0:PRINT
0132,M$:PRINT0186,S$
25 FORY$=9039:SET(0,Y$):SET(127,Y$):NEXTY$
30 C$=1
35 PRINT0158,"Pong";
40 K$=1
45 FORI$=20TO25:SET(7,I$):SET(120,I$):NEXTI$
50 FORX$=1TO126:SET(X$,9):SET(X$,39):NEXTX$
55 Y$=10:Z$=INT(100*INT(0)):X$=Z$+10
60 SET(X$,Y$)
65 FORI$=1TO4:NEXTI$
70 RESET(X$,Y$)
75 V$=PEEK(14337):U$=PEEK(14338):W$=PEEK(14340):Z$=V$+U$+W$
80 IFZ$=0THEN185
85 IFU$<128THEN90:ELSEGOSUB205
90 IFW$<16THEN95:ELSEGOSUB210
95 IFV$<2THEN100:ELSEGOSUB215
100 IFV$<2THEN105:ELSEGOSUB220
105 Z$=PEEK(14400):IFZ$=4THEN500
110 X$=X$+C$
115 Y$=Y$+K$
120 IFY$>39THEN125ELSEIFY$>9THEN140
125 IFX$>122THEN185
130 IFX$<6THEN180
135 B$=POINT(X$,Y$):IFB$<0THEN160
140 IFX$>122THEN185
145 IFX$<5THEN180
150 B$=POINT(X$,Y$):IFB$<0THEN170
155 GOTO60
160 K$=K$
165 GOTO115
170 C$=C$
175 GOTO110
180 S$=S$+1:PRINT0186,S$:IFS$>15THEN190:ELSEGOTO55
185 M$=M$+1:PRINT0132,M$:IFM$>15THEN190:ELSEGOTO55
190 PRINT0982,"Play Again? (Y/N)";
195 Z$=PEEK(14344):IFZ$=2THEN20
200 Z$=PEEK(14338):IFZ$=64THEN500ELSEGOTO195
205 RESET(120,I$):O$=O$-1:L$=L$-1:SET(120,O$):RETURN
210 RESET(120,O$):O$=O$+1:L$=L$+1:SET(120,L$):RETURN
215 RESET(7,A$):Q$=Q$-1:A$=A$-1:SET(7,Q$):RETURN
220 RESET(7,Q$):Q$=Q$+1:A$=A$+1:SET(7,A$):RETURN
500 END

```

End

# back-track

## The Super User Friendly Disk Utility For TRS-80\* Models I, III and 4<sup>III</sup>

- Duplicate Most Protected Disks
- Edit (Zap) Sectors
- Powerful Disk Formater

menu driven with help command for the novice  
short cuts for the experienced user  
self booting, does not require DOS  
simultaneous Hex and ASCII display

reads SD, DD or Mixed Density with auto density detect  
reads single or double sided, 5 1/4" or 8" disks

### YOU CAN NOW

Read, edit, write and step through sectors  
and tracks (including information between sectors)  
Duplicate most CP/M\*\* disks for other P.C.'s  
Duplicate standard format, special format & data disks  
Identify protection secrets and create your own schemes  
Read track address; see actual track and sector numbers  
Repair CRC errors  
Exchange data address marks  
Format 128, 256, 512 or 1024 byte sectors  
Interface with Monitor/Disassembler  
Analyze unknown DOS systems  
Write special tracks; make protected disks  
Print video display through RS232 or parallel port  
AND MORE

✓ 265

**\$38.95 Plus \$1.50 S & H**

for unprotected disk and 31-page manual

Tennessee residents include 4.5% sales tax  
For personal checks allow 2 weeks  
Specify TRS-80\* model I, III, or 4<sup>III</sup>

\*TRS-80 trademark Tandy Corp. \*\*CP/M trademark Digital Research Corp.



(615)482-2007

**RIDGE-TEC, INC.**  
740 Robertsville Road  
Oak Ridge, TN 37830

NEW FOR  
PROFILE® USERS

## PROfix \* III™ RESTRUCTURE & TRANSFER UTILITY \$49.95

For PROFILE® III PLUS  
Model III/4

Needs change—Experience teaches—and if you could redefine your data base  
today, you probably would change a few things—

**WELL, NOW YOU CAN!**

PROfix\*III Provides you, as a user of Profile III Plus, with a powerful, easy-to-use package that allows you to reorganize your data base TO MEET TODAY'S NEEDS, and then moves your existing data into your new file structure.

\*\*\* FEATURES \*\*\*

- EASY TO USE—no special charts to fill out
- FAST—assembly language speed
- RE-ARRANGE FIELDS—even across segments
- DROP OR ADD FIELDS
- 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

Plus \$2.50 for Handling and Postage

Check, M.O., VISA/MC

(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)

Profile is a registered trademark of Tandy Corp.

✓ 186

# TRS-80™ “CAN YOU BUY DIRECT?”

WILL YOU PAY TOO MUCH?

Ask About Our  
“30 DAYS  
Buy-Back-Policy”

MODEL 16B 768K 1 DRIVE  
PLUS 15 MEG HARDDRIVE  
(BUILT-IN)

MODEL 12 768K 2 DRIVES

MODEL 4 128K 2 DRIVES

MODEL 4-P 128K 2 DRIVES

**SAVE SALES TAX\*  
PLUS DISCOUNT**

\*TEXAS RESIDENTS ADD ONLY 4%

## FORT WORTH COMPUTERS

WE ARE SERIOUS ABOUT SAVING YOU MONEY

(Located 30 miles from Fort Worth)

377 Plaza • GRANBURY • NR FORT WORTH, TEXAS 76048

**TOLL FREE NUMBER: 1-800-433-S-A-V-E**

Monday thru Friday — 9:00 a.m. to 5:00 p.m. Texas Time  
(Order Inquiries/Customer Service &) IN TEXAS: 817-573-4111

✓ 214

TM: TRADE MARK  
OF RADIO SHACK





"Twas brillig, and  
the slithy toves"

"Twas brillig, and the  
slithy toves"

"Twas brillig, and  
the slithy toves"

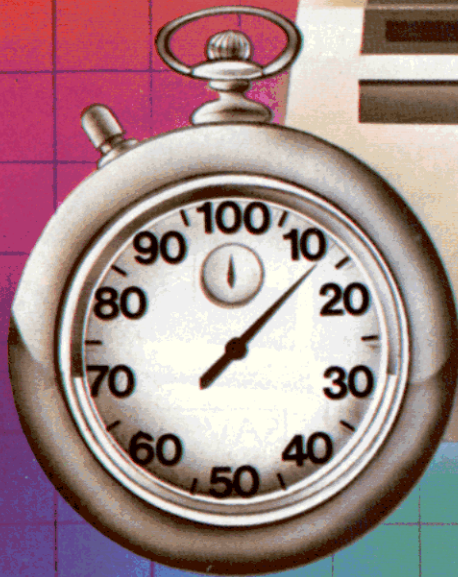
"Twas brillig, and/the slithy toves"

"Twas brillig, and  
the slithy toves"

"Twas brillig, and  
the slithy toves"

"Twas brillig,  
and the slithy toves"

"Twas brillig,  
and/the slithy toves"



M





F

rB

# MODEL 4 SCRIPSIT THE WRITE WAY

by Clifford Knight

What Model 4 Scripsit should have been—ScripAid reassigns Scripsit's command keys, allows text preview on-screen, and provides a potpourri of type fonts.

**L**ike most Model 4 owners, I looked forward to Model 4 Scripsit with great anticipation. But I was disappointed when I found that Model 4 Scripsit was nothing more than a reassembled version of the Model III program. Tandy even included the old keycap "pasties" for Scripsit's command keys. I decided to write a complete enhancement package called ScripAid that includes all the features I want in Model 4 Scripsit.

ScripAid reassigns Scripsit's command keys to their mnemonic counterparts (see Table 1), lets you preview text on your screen before printing it out, and supports compressed, double-width, emphasized, italic, underline, double-strike, and super- or subscript characters (see the Figure).

ScripAid consists of five programs. Program Listings 1 and 2 provide the actual Scripsit enhancements. Program Listing 3 installs the enhancement programs with a

JCL file. Program Listing 4 lets you develop a customized printer driver for ScripAid. Program Listing 5 gives you a help file template.

## The Programs

Program Listing 1, Enhance/SRC, is the source code that implements ScripAid's enhanced commands. It also loads a printer driver and, if applicable, resets the Model 4's extra memory banks and changes Scripsit's start-of-text buffer pointers to allow more memory space for ScripAid routines.

Program Listing 2, Rekey/SRC, contains patches to the command codes that change the more confusing Scripsit commands to easily remembered keys (yes, you can throw away the pasties). It also includes patches that alter the default left- and right-margin settings and the video line width. You can alter these fur-



```

>TM=5
>C=Y
\3*** ScripAid \4printer control demonstration\& ***
>C=N
\#

This is an example of the power of \6\3ScripAid\#\&.

\3You can set the emphasized mode at the start of your text, and then add \6DOUB
LE-STRIKE\& for added visual impact.

\#You can switch to \2DOUBLE-WIDTH\& and back.

Or underline \5here\% and \5there\% as you wish.

Even \1compressed\! and \1'super\&/\7sub\& scripts may be used.

\3Y\#\20\&\3\6U\&\# can \4do it all\& \3 with \6\5ScripAid\%\&.

```

\*\*\* ScripAid printer control demonstration \*\*\*

```

This is an example of the power of ScripAid.

You can set the emphasized mode at the start of your text, and
then add DOUBLE-STRIKE for added visual impact.

You can switch to DOUBLE-WIDTH and back.

Or underline here and there as you wish.

Even compressed and super/sub scripts may be used.

YOU can do it all with ScripAid.

```

Figure. Text with ScripAid commands embedded (top) and as it appears when you print it out (bottom).

ther if you want to boot up the program with other values set. In addition, I modified all prompts and error messages to provide upper- and lowercase characters.

Program Listing 3, the JCL file, installs the Scripsit overlays assembled from the source code so you can use ScripAid.

Program Listing 4, Driver/BAS, lets you customize a printer driver file. It prompts you to assign printer control codes for each ScripAid print command. For instance, \1 is the ScripAid command that prints a compressed character. When Driver prompts you to input the code that makes your printer print a compressed character, you should find the right code in your print-

er manual and type it in.

Every printer requires a different driver as there are no standard printer control codes. Table 2 (p. 65) shows the codes I used with my Epson MX-80 printer. Table 3 (p. 65) defines the print commands you embed in your text.

Program Listing 5, Helper, gives you the information you need to develop a help file.

### Creating ScripAid

Type in and assemble Program Listings 1 and 2, and save them as Enhance/OVL and Rekey/OVL.

Now you're ready to build the JCL file in Program Listing 3. Use the DOS Build command or Scripsit (saved in ASCII format) and write it to the same disk that contains the overlay files. (I recommend that you use a system disk in drive 1 as the target for all the ScripAid files. This way, you'll end up with the entire ScripAid program on a single disk.)

If you're a single-drive user, write all files to drive zero, then delete all references to drive 1 from the JCL file.

To create ScripAid/CMD, first insert a back-up copy (for added security) of the original Scripsit program in drive zero. The system disk containing both the

ScripAid overlay files and the JCL file should be in drive 1. Now type in DO SCRIPaid:1. This executes the DOS commands of the JCL file, transforming your version of Scripsit to the upgraded ScripAid. Single-drive users should copy their Scripsit to a system disk and assemble the two overlay files on the same disk. Then execute the modified JCL (mentioned above) and you're ready to use ScripAid.

Although you don't have to use ScripAid's new print codes, you do have to include at least one printer driver so the program can load and execute. You should name this driver Default/PDC and put it on the same disk as ScripAid. If you have access to more than one printer, you can develop driver files for each printer. When calling ScripAid, specify the driver you want on the TRSDOS command line by typing in SCRIPaid followed by the driver file name.

You can create a driver file for your printer with the help of Program Listing 4. Here, the first screen prompts you to enter either a file name for the file you want to create, or hit control-Q to quit. If you hit the enter key, the program uses the file name Default.

Once you specify the file name,

### The Key Box

Model 4  
64K RAM  
Assembly Language  
Disk Basic  
TRSDOS 6.X.X  
Model 4 Scripsit  
Editor/Assembler







## NOW the One Person Who Cares Most About Your Computer Can Protect Its Data —

# YOU!

**Introducing... Memory Minder from J&M Systems**

The most advanced disk drive testing program on the market.

Until recently, only trained technicians using special equipment could check your disk drives for potential or actual problems. But now, thanks to major breakthroughs by J&M Systems, Ltd. and Dysan Corporation, YOU can be your own computer's technician.

Memory Minder is the most comprehensive disk diagnostic program available for microcomputers. With Memory Minder, you can periodically test disk drives to monitor long-term drift of head alignment, index hole timing, spindle speed, directional seek, and many other parameters. Then, if your head is out of alignment, Memory Minder can accurately align it once again. Early detection and correction of these problems will help protect you against costly data loss and down time.

And with Memory Minder, you don't need a technical background to perform these tests. Simply follow the easy instructions in the manual or on the screen's menu. Now you can

use state-of-the-art software to care for your hardware.

Memory Minder is currently available for IBM, TRS-80, Kaypro and Sanyo systems. Only from J&M Systems. Prices start at \$79.

\_\_\_\_\_ I'd like more information on Memory Minder.  
Please send me your complete brochures.

\_\_\_\_\_ Send me information on other fine products  
from J&M Systems.

I have the following computer: \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

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



✓101

**J & M SYSTEMS, LTD.**

**15100A Central Avenue S.E.  
Albuquerque, N.M. 87123  
505/292-4182**



**“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  
352B8





ScripAid creates two files, one with the extension /PDC for the driver, and one with the extension /HLP for the driver help screen. The next screen displays the file name used, the current code assignments, and the shifted complements for keys 1-9. A prompt at the bottom of the screen gives you the following options: to enter the key you want programmed, to save the current assignments (S), or to abort and cancel all changes (A).

If you hit any of the control-code keys, you'll be prompted to enter up to five decimal numbers that, in turn, form the format control string assigned to the previously selected key. After entering the five values you'll see that they've been assigned to the selected key. If your printer's control sequence doesn't require 5 bytes (values) then hit the enter key in response to the next CODE # prompt to terminate data entry.

Then ScripAid asks you to enter a short description (up to 70 characters) of this control string's function. The program displays this information when you request printer help from ScripAid. When you've finished programming, type in S to save the files. ScripAid then returns you to the first menu) from which you can opt to create another driver or quit ScripAid.

If you want to include a help file with ScripAid, Program Listing 5 will help you build your own. Such a file, however, takes up more than 20K of disk space, which is why I find a quick-reference card more convenient.

## The Source Code

Program Listing 1, ScripAid's source code, is fully commented, but it's important that you understand the main logic flow. First, the program defines the supervisor calls (SVCs) and then assigns the hook vectors to and from Scripsit. Lines 880-1150 alter the sign-

## Reassigned Scripsit Commands

### General Commands

Clear-B	Enter text block
Clear-I	Insert text
Clear-G	Start paragraph
Clear-L	End line
Clear-N	Force new page
Clear-Z	Enter window mode

### Delete Commands

Clear-G	Delete paragraph
Clear-L	Delete line
Clear-S	Delete spaces to left of cursor
Clear-W	Delete word

### Insert Commands

Clear-B	Insert block
Clear-L	Insert line

### Exchange Commands

Clear-B	Exchange block
Clear-G	Exchange paragraph
Clear-W	Exchange words

## Enhanced Scripsit Commands

### Disk-related

Break-Q	Query disk directory
Break-K	Kill named file

### Printer related

Break-P,Cnn	Send CHR\$(nn) to printer
Break-P,T	Send top-of-form character to printer
Break-P,V	Preview text (use 0-9 to control speed, @ to pause, shift/clear to abort)

### Help Screens

Break-HK	Keyboard help file
Break-HP	Printer help file

### Bank Switching

Break-Bnn	Make memory bank nn active buffer
-----------	-----------------------------------

Table 1. ScripAid commands.

ScripAid Commands	Command Descriptions
\1	Set compressed-character mode
\!	Reset compressed-character mode
\2	Set double-width mode
\"	Reset double-width mode
\3	Set emphasized mode (except in compressed, sub-, or superscript modes)
\#	Reset emphasized mode
\4	Set italics mode
\\$	Reset italics mode
\5	Set underline mode
\%	Reset underline mode
\6	Set double-strike mode
\&	Reset underline, sub-, and superscript modes
\7	Set subscript mode
\'	Set superscript mode
\8	
\(	
\9	
\)	

Table 2. Suggested control key assignments for the Epson MX-80 Type III printer.

ScripAid Commands	Printer Codes
\1	15
\!	18
\2	27 87 1
\"	27 87 0
\3	27 69
\#	27 70
\4	27 52
\\$	27 53
\5	27 45 1
\%	27 45 0
\6	27 71
\&	27 72 27 84
\7	27 83 1
\'	27 83 0
\8	
\(	
\9	
\)	

Table 3. Definitions of the print commands.



Program Listing 1. Enhance/SRC, the source code for ScripAid enhancements.

```

00100 ;***** ENHANCE *****
00110 ;
00120 ; An enhancement package for Model 4 SCRIPSIT adding:
00130 ; 1> Directories from command line
00140 ; 2> Kill files from command line
00150 ; 3> Embedded printer control codes
00160 ; 4> Printer codes from command line
00170 ; 5> Formatted output to video monitor
00180 ; 6> Send TOF character to printer
00190 ; 7> Bank switching for 3 text buffers
00200 ; 8> On-line Help available
00210 ;
00220 ; Install via:
00230 ;
00240 ; 1. memory (clear)
00250 ; 2. load scripsit/cmd
00260 ; 3. load rekey/ovl
00270 ; 4. load enhance/ovl
00280 ; 5. dump scripaid/cmd (s=x'3800',e=x'6970',t=x'6810')
00290 ;
00300 ;*****
00310 ;
00320 ;
00330 ; Supervisor Call Equates.....
00340 DSPLY EQU 0AH ;DISPLAY A MESSAGE LINE
00350 LOGOT EQU 0CH ;DISPLAY & LOG A MESSAGE
00360 PAUSE EQU 10H ;DELAY FOR "BC" COUNTS
00370 CHNIO EQU 14H ;PASS TO NEXT MODULE IN DEV CHAIN
00380 ERROR EQU 1AH ;POST AN ERROR MESSAGE
00390 HIGH EQU 64H ;GET/PUT HIGHS/LOWS
00400 FLAGS EQU 65H ;POINT IY TO SYSTEM FLAGS
00410 FSPEC EQU 4EH ;VERIFY FILESPEC
00420 BANK EQU 66H ;MEMORY BANK SVC
00430 FEXT EQU 4FH ;ADD FILESPEC IF NEEDED
00440 OPEN EQU 3BH ;OPEN A FILE
00450 GET EQU 03H ;GET A BYTE FROM FCB OR DCB
00460 CLOSE EQU 3CH ;CLOSE A FILE
00470 CMNDR EQU 19H ;DO CMD & RET
00480 DECHEX EQU 60H ;ASCII -> BIN IN BC
00490 PRT EQU 06H ;CHAR TO PRINTER
00500 KEY EQU 01H ;WAIT F/ KEY
00510 DSP EQU 02H ;CHAR TO VIDEO
00520 KEYIN EQU 09H ;GET A LINE (*KI)
00530 DDIR EQU 22H ;DSP DIR OF DRIVE
00540 REMOV EQU 39H ;KILL A FILE
00550 EXIT EQU 16H ;RETURN TO DOS
00560 KBD EQU 08H ;WAIT FOR KEY
00570 HEXDEC EQU 61H ;CONVERT BIN-> ASCII
00580 VDCTL EQU 0FH ;VIDEO CONTROL SVC
00590 POSN EQU 42H ;POSITION TO RECORD
00600 READ EQU 43H ;READ A RECORD (DISK)
00610 ;
00620 ;
00630 ; Scripsit Address Equates.....
00640 ;
00650 PRCALL EQU 46C9H ;LOCATION OF @PRT SVC CALL
00660 PRTCHK EQU 4AE1H ;GET *PR STATUS ROUTINE
00670 SCRPIN EQU 5416H ;NORMAL RE-ENRTY POINT
00680 ERRIN EQU 5401H ;"INVALID COMMAND" ENTRY
00690 PREND EQU 54EDH ;HOOK F/ END OF PRINT ROUT
00700 SCRIPS EQU 3900H ;ENTRY TO SCRIPSIT
00710 SCRKIT EQU 383DH ;EXIT CODE
00720 DOUT EQU 5554H ;FORMATTED OUTPUT CALL
00730 KSCAN EQU 47B6H ;KSCAN IN SCRIPSIT
00740 OLDBUF EQU 622BH ;OLD TEXT BUFFER START
00750 CKPRPM EQU 4A9CH ;CK PRINT PARMS
00760 PRPMCK EQU 4AF1H ;SCRIPSIT PRINT PARMCK
00770 BRKCK EQU 48EEH ;SCRIPSIT <BRK> PARMCK
00780 BRKTAB EQU 4F6DH ;<BRK> PARM TABLE
00790 RETBRK EQU 48F1H ;RET TO <BRK> ROUT
00800 SCRPF EQU 5F5AH ;SCRIPSIT INT DISK I/O
00810 PRRETN EQU 4BA5H ;RET AFTER *PR OUT
00820 PRCLN EQU 54FCH ;CLEAN UP AFTER *PR
00830 RETVEC EQU 5EB2H ;RETURN VECTOR
00840 WRTVID EQU 4811H ;REWRITE VIDEO IMAGE
00850 ;
00860 ;
00870 ; *** Patch Sign-on Banner ***
00880 ORG 3EFBH
00890 DEFB 78 ;LENGTH OF MESSAGE
00900 DEFM ' * ScripAid * - Model 4 Version 3.1 - (c) 1984 by Paladin
Software - C. Knight'
00910 *LIST OFF
00920 DEFM ' * ScripAid * - Model 4 Version 3.1 - (c) 1984 by Paladin
Software - C. Knight'
00930 *LIST ON
00940 ;
00950 ;
00960 ; *** Patch to eliminate reset of <BREAK> vector ***
00970 ;
00980 ORG 3906H
00990 DEFW 0000H
01000 DEFW 0000H
01010 DEFW 0000H
01020 ;
01030 ;
01040 ; *** Set jumps to extension code ***
01050 ORG PRCALL
01060 CALL PRTOUT
01070 ;
01080 ORG CKPRPM
01090 CALL CKPRM

```

Listing 1 continued



on banner, eliminate the code to reset the break vector (which creates problems with the spooler), and arranges jumps from Scripsit to ScripAid.

The initialization routine, assembled at memory address 6810 hexadecimal (hex), loads the selected or default printer driver and resets buffer pointers in Scripsit, making room for ScripAid. As the routine loads the driver codes, it saves the file name with the extension /HLP for later use as a printer Help file. The routine also verifies and initializes the optional memory buffers, if available.

The code for ScripAid actually starts at line 3050 of Program Listing 1. The PALBRK routine intercepts the break/special-command call and checks for valid ScripAid commands, such as Query, Kill, Bank, and Help. You call these by entering the first letter of each command, followed by any needed parameters.

The CKPARM routine in line 6840 of the source code parses the commands added to the Scripsit Print routine. Then ScripAid scans for Scripsit's invisible and pause commands. A reset carry flag (NC) indicates that Scripsit has located a valid parameter. Under these circumstances, ScripAid relinquishes control to the Scripsit parameter. If the Scripsit parameters aren't found, ScripAid tests for these valid ScripAid commands: video (V), top-of-form (T), and control-code output (C).

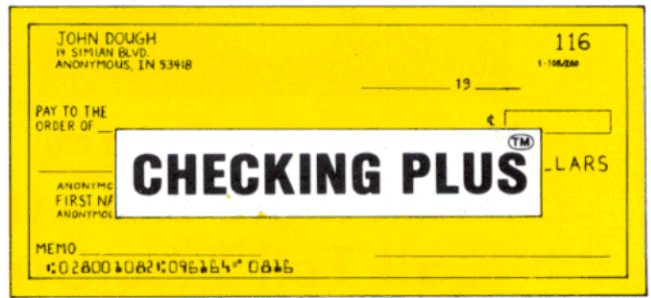
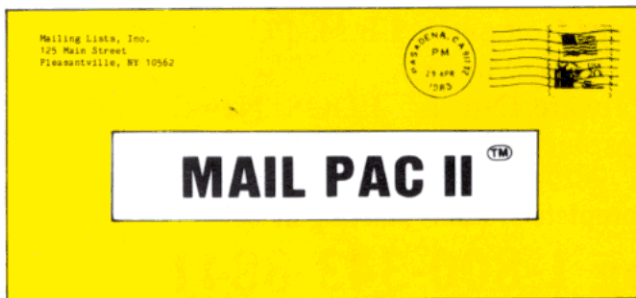
ScripAid outputs formatted text to the video by altering the output SVC number from 6 (@PRT) to 2 (@DSP), which reroutes each character to the monitor instead of to the printer port. Before output begins, however, ScripAid links to the Scripsit routine that scans for the shift-clear (abort output) key sequence. This link calls a ScripAid routine to scan for the @ key (which pauses the output) or one of the number



# ANYONE CAN USE OUR SOFTWARE!



**MAIL PAC II and CHECKING PLUS represent a new generation of computer software. Our software doesn't even need a manual! Anyone can quickly learn to use either package by following simple, explicit on-screen instructions. But, for those of you who insist -- we've included a complete user's manual as well.**



## MAIL PAC II FEATURES:

### High Capacity --

Stores from one to one million names in Zip Code, Numerical or Alphabetical order. The only limitation is your disk storage space.

### Flexibility --

Prints your mailing list on 1, 2, 3, or 4-across labels (with up to 5 user-defined lines on each label) or as a compact, user-designed directory. The record length is completely user-defined, and each field within each of your records is completely variable (allowing storage of any number of characters for any particular address entry). Devote fields to telephone numbers, codes, or even special messages related to each particular name on file.

### Powerful --

A built-in word processor allows you to create personalized form letters for each address on your list (or just a particular group of addresses).

### Ease of Use --

Create new mailing lists, review existing lists, handle changes of address, delete cancelled names, sort lists, and purge duplicate names from your files. Complete on-screen instructions tell you in plain english exactly how to accomplish all of these tasks.

**MAIL PAC II ..... \$99.95**

## CHECKING PLUS FEATURES:

### Complete Check Register --

Checking Plus stores your entire check register in a disk file, and then uses the data to balance your account, track your expenses, and help you make budget projections. Review the entire checkbook, enter checks, deposits, fees and adjustments, mark outstanding checks when paid, and get an instant cash balance at any time. All data can be viewed onscreen or printed out in report form.

### Tax Preparation --

Storage of monthly and yearly totals and other important information aids in income tax preparation, for your personal use or for your accountant.

### Handles the Details --

Store names and addresses for frequently written checks, then print checks to fit standard window envelopes, eliminating the need for extra typing. You can even store any comment, explanation or other message (up to 255 characters) related to a particular check.

### Automatic Monthly Bill Payments --

Enter amounts and names of payees for all of your fixed-cost monthly payments, and then sit back while the system automatically prints checks.

**CHECKING PLUS ..... \$99.95**

Both Programs Require 48K And At Least One Disk Drive (2 Drives For Higher Storage Capacities). And All Hard Disk Systems Are Supported.

**FREE--TRS-80 Mod I,III & 4 programs supplied on DosPlus (minimum system). Complete DosPlus also available.**

FOR YOUR TRS-80™ • APPLE™ • IBM PC™ • NEC™ • OSBORNE™ • XEROX™ • KAYPRO™ • TELEVIDEO™ • ZENITH™ • SANYO™  
DEC™ • TI PROFESSIONAL COMPUTER™ • SUPERBRAIN JR.™ • EPSON™ • Any CP/M™ Computer  
CP/M-based Computers must be equipped with Microsoft BASIC (MBASIC or BASIC-80)

TRS-80 trademark Tandy Corp. - APPLE trademark Apple Corp. - IBM PC trademark IBM Corp. - ATARI trademark Atari, Inc. - OSBORNE trademark Osborne Corp. - XEROX trademark Xerox Corp.  
KAYPRO trademark Non-Linear Systems, Inc. - TELEVIDEO trademark TeleVideo Systems, Inc. - SANYO trademark Sanyo Corp. - NEC trademark NEC Corp. - DEC trademark Digital Equipment Corp.  
ZENITH trademark Zenith Corp. - TI PROFESSIONAL COMPUTER trademark Texas Instruments, Inc. - SUPERBRAIN trademark Intertec Corp. - CP/M trademark Digital Research - EPSON trademark Epson Corp.

## OUR SOFTWARE CATALOG

H & E Computronics, Inc., has mailed more than 1 million software catalogs since 1978. Send \$2 for our new 64-page catalog today! (We also send you our catalog FREE with every order). **DEALER INQUIRIES WELCOME**

## 30-DAY MONEY BACK GUARANTEE

\*\*\* ALL PRICES & SPECIFICATIONS SUBJECT TO CHANGE \*\*\*  
DELIVERY SUBJECT TO AVAILABILITY

**COMPUTRONICS!**

50 N. PASCACK RD., SPRING VALLEY, N.Y. 10977

**24 HOUR ORDER LINE**  
(914) 425-1535

ADD \$3.00 FOR SHIPPING IN UPS AREAS  
ADD \$4.00 FOR C.O.D. OR NON-UPS AREAS  
ADD \$5.00 TO CANADA & MEXICO  
ADD PROPER POSTAGE OUTSIDE OF U.S., CANADA & MEXICO

**NEW TOLL-FREE ORDER LINE**  
(OUTSIDE OF N.Y. STATE)  
(800) 431-2818





```

01100 ;
01110 ORG BRKCK
01120 JP PALBRK
01130 ;
01140 ORG SCRKIT
01150 JP EXIT1
01160 ;
01170 ;
01180 ;
01190 ;
01200 *** SCRIPSIT Extension Code ***
01210 ;
01220 ORG 6810H
01230 ;
01240 ENTRY LD (OLDSP),SP ;SAVE STACK POINTER
01250 CALL INITF ;LOAD DRIVER FILE
01260 CALL BNKONE ;SET PTRS F/ BANK1
01270 CALL CLRBNK ;RESET BANKS 1&2
01280 JP SCRIPS ;GOTO SCRIPSIT
01290 ;
01300 ;
01310 ;
01320 ;
01330 INITF LD A,(HL) ;GET NXT CMD CHAR
01340 CALL EOLNCK ;END OF LINE ?
01350 JR NZ,MOVFSF ;NZ= FIL SPEC
01360 LD HL,DEFNAM ;HL-> "DEFAULT/PDC"
01370 MOVFSF LD DE,FCB ;DE-> FCB
01380 LD A,FSPEC ;SVC
01390 RST 28H
01400 JR Z,FSPOK ;Z= FILESPEC OK
01410 LD HL,BADFIL ;HL-> "BAD FILE" MSG
01420 JP LOGERR ;GOTO LOG ERR & RET
01430 ;
01440 FSPOK LD HL,PDCTXT ;HL-> DEFAULT EXTENSIO
01450 LD A,FEXT ;SVC
01460 RST 28H ;ADD EXTENSION
01470 PUSH DE ;SAVE FCB POINTER
01480 CALL SAVFSF ;FSPEC-> HOLD
01490 LD HL,BANNER ;HL-> BANNER MESSAGE
01500 CALL DSPMSG ;OUTPUT SAME
01510 POP HL
01520 PUSH HL ;HL-> FILESPEC
01530 CALL DSPMSG
01540 LD C,0DH ;C/R
01550 LD A,DSP
01560 RST 28H
01570 POP DE ;DE-> FCB
01580 ;
01590 EXTN LD HL,SCRPF ;HL-> DISK I/O BUFFER
01600 LD B,90 ;LRL=90
01610 LD A,OPEN ;SVC
01620 RST 28H
01630 JP NZ,ERR
01640 LD HL,CTLTAB ;HL-> COMMAND TABLE
01650 ;
01660 RDLOOP LD B,90 ;90 BYTES MAX
01670 LD DE,FCB ;DE-> FCB
01680 LD A,GET ;SVC
01690 RST 28H
01700 JR NZ,EOF ;ERROR COULD BE EOF
01710 LD (HL),A ;STORE IN CMD TABLE
01720 INC HL ;ELSE BUMP PTR
01730 DJNZ RDLOOP ;LOOP 'TIL EOF
01740 ;
01750 EOF CP 1CH ;ERROR = EOF ?
01760 PUSH AF ;SAVE ERROR STATUS
01770 LD A,CLOSE ;SVC
01780 RST 28H
01790 JR NZ,ERR
01800 POP AF ;GET ORIGINAL ERR
01810 JR NZ,ERR ;ELSE RETURN
01820 RET
01830 ;
01840 ;
01850 SAVFSF LD HL,PHLPFS ;HL-> HOLDING AREA
01860 SAVFSL LD A,(DE) ;GET A CHAR
01870 INC DE
01880 LD (HL),A ;SAVE IT
01890 INC HL
01900 CP '/' ;EXT YET?
01910 JR NZ,SAVFSL
01920 LD (HL),'H'
01930 INC HL
01940 LD (HL),'L'
01950 INC HL
01960 LD (HL),'P'
01970 INC HL
01980 LD (HL),0DH ;"HLP" AS EXTENSION
01990 RET ;DONE
02000 ;
02010 ;
02020 ;
02030 EOLNCK CP 0DH ;C/R ?
02040 RET Z
02050 CP 03H ;ETX
02060 RET ;GO BACK W/ STATUS
02070 ;
02080 ;
02090 CLRBNK LD C,1 ;BANK 1
02100 CALL GETCLR ;BANK 2
02110 LD C,2 ;BANK AVAIL?
02120 GETCLR LD B,2 ;SAVE #
02130 PUSH BC
02140 LD A,BANK
02150 RST 28H ;DO IT

```

Listing 1 continued



keys (0-9) used to control video output speed. ScripAid also bypasses the printer ready test and intercepts the end-of-output routine to restore printer output. It ignores any embedded control codes during video output.

The top-of-form (TOF) and control-code routines send characters directly to the printer. A single byte value, 0C hex, is the standard TOF code. The P,C option calls the SVC @HEXDEC, converting the ASCII decimal input to binary for output to the printer.

Line 5020 is the entry to the printer driver routine. After you save this routine, ScripAid tests the last byte sent. If it's a backslash character (\), ScripAid branches to NXTST, where it checks the current character. (To type a backslash, hit the standard slash key and the clear key at the same time.)

If the current character is something other than a backslash character, ScripAid scans the printer control code table. If ScripAid finds a match, it outputs the appropriate control string from the 90-byte control code list loaded when you called up ScripAid.

Note that ScripAid sends control codes only if the printer (SVC 6) is the active output device. This avoids confusion in the video preview mode. An invalid control code translates to a space character for printer output.

The final portion of the source code defines the messages and storage areas ScripAid uses.

## Using ScripAid

As you're writing text, you can embed ScripAid's printer codes directly in your document to activate your printer's special abilities. The Figure shows an example of text with printer codes embedded and of the final product.

ScripAid has two classes of commands: the reassigned Scripsit editing commands and the enhanced com-

# COMPUTRONICS

• • • EVERYTHING FOR YOUR TRS-80™ • ATARI™ • APPLE™ • PET™ • CP/M™ • XEROX™ • IBM™ • OSBORNE™ • • •

\* TRS-80 is a trademark of the Radio Shack Division of Tandy Corp. \* ATARI is a trademark of Atari Inc. \* APPLE is a trademark of Apple Corp. \* PET is a trademark of Commodore  
\* CP/M is a trademark of Digital Research \* XEROX is a trademark of Xerox Corp. \* IBM is a trademark of IBM Corp. \* OSBORNE is a trademark of Osborne Corp.



## BUSINESS PAC 100

### 100 Ready-To-Run Business Programs

★ All orders processed within 24-Hours  
★ 30-Day money back guarantee

(ON CASSETTE OR DISKETTE).....Includes 128 Page Users Manual.....

Inventory Control.....Payroll.....Bookkeeping System.....Stock Calculations.....

Checkbook Maintenance.....Accounts Receivable.....Accounts Payable.....

## BUSINESS 100 PROGRAM LIST

### NAME

### DESCRIPTION

1	RULE78	Interest Apportionment by Rule of the 78's
2	ANNU1	Annuity computation program
3	DATE	Time between dates
4	DAYEAR	Day of year a particular date falls on
5	LEASEINT	Interest rate on lease
6	BREAKEYN	Breakeven analysis
7	DEPRSL	Straightline depreciation
8	DEPRSY	Sum of the digits depreciation
9	DEPRDB	Declining balance depreciation
10	DEPRDOB	Double declining balance depreciation
11	TAXDEP	Cash flow vs. depreciation tables
12	CHECK2	Prints NEBS checks along with daily register
13	CHECKBK1	Checkbook maintenance program
14	MORTGAGE/A	Mortgage amortization table
15	MULTMON	Computes time needed for money to double, triple, etc.
16	SALVAGE	Determines salvage value of an investment
17	RRVARIN	Rate of return on investment with variable inflows
18	RRCONST	Rate of return on investment with constant inflows
19	EFFECT	Effective interest rate of a loan
20	FVAL	Future value of an investment (compound interest)
21	PVAL	Present value of a future amount
22	LOANPAY	Amount of payment on a loan
23	REGWITH	Equal withdrawals from investment to leave 0 over
24	SIMPDISK	Simple discount analysis
25	DATEVAL	Equivalent & nonequivalent dated values for oblig.
26	ANNUDEP	Present value of deferred annuities
27	MARKUP	% Markup analysis for items
28	SINKFUND	Sinking fund amortization program
29	BONDVAL	Value of a bond
30	DEPLET	Depletion analysis
31	BLACKSH	Black Scholes options analysis
32	STOCVAL1	Expected return on stock via discounts dividends
33	WARVAL	Value of a warrant
34	BONDVAL2	Value of a bond
35	EPSEST	Estimate of future earnings per share for company
36	BETAALPH	Computes alpha and beta variables for stock
37	SHARPE1	Portfolio selection model-i.e. what stocks to hold
38	OPTWRITE	Option writing computations
39	RTVAL	Value of a right
40	EXPVAL	Expected value analysis
41	BAYES	Bayesian decisions
42	VALPRINF	Value of perfect information
43	VALADINF	Value of additional information
44	UTILITY	Derives utility function
45	SIMPLEX	Linear programming solution by simplex method
46	TRANS	Transportation method for linear programming
47	EOQ	Economic order quantity inventory model
48	QUEUE1	Single server queueing (waiting line) model
49	CVP	Cost-volume-profit analysis
50	CONDPROF	Conditional profit tables
51	OPTLOSS	Opportunity loss tables
52	FQIOQ	Fixed quantity economic order quantity model
53	FQEOQSH	As above but with shortages permitted
54	FQEOQPB	As above but with quantity price breaks
55	FQEOQCB	Cost-benefit waiting line analysis
56	NCFANAL	Net cash-flow analysis for simple investment
57	PROFIND	Profitability index of a project
58	CAP1	Cap. Asset Pr. Model analysis of project

59	WACC	Weighted average cost of capital
60	COMBAL	True rate on loan with compensating bal. required
61	DISCBAL	True rate on discounted loan
62	MERGANAL	Merger analysis computations
63	FINRAT	Financial ratios for a firm
64	NPV	Net present value of project
65	PRINDLAS	Laspeyres price index
66	PRINDPA	Paasche price index
67	SEASIND	Constructs seasonal quantity indices for company
68	TIMETR	Time series analysis linear trend
69	TIMEMOV	Time series analysis moving average trend
70	FUPRINF	Future price estimation with inflation
71	MAILPAC	Mailing list system
72	LETWRT	Letter writing system-links with MAILPAC
73	SORT3	Sorts list of names
74	LABEL1	Shipping label maker
75	LABEL2	Name label maker
76	BUSBUID	DOE business bookkeeping system
77	TIMECLK	Computes weeks total hours from timeclock info.
78	ACCTPAY	In memory accounts payable system-storage permitted
79	INVOICE	Generate invoice on screen and print on printer
80	INVENT2	In memory inventory control system
81	TELDIR	Computerized telephone directory
82	TIMJISAN	Time use analysis
83	ASSIGN	Use of assignment algorithm for optimal job assign.
84	ACCTREC	In memory accounts receivable system-storage ok
85	TERMSPAY	Compares 3 methods of repayment of loans
86	PAYNET	Computes gross pay required for given net
87	SELLPR	Computes selling price for given after tax amount
88	ARBCOMP	Arbitrage computations
89	DEPRSF	Sinking fund depreciation
90	UPSZONE	Finds UPS zones from zip code
91	ENVELOPE	Types envelope including return address
92	AUTOEXP	Automobile expense analysis
93	INSFILE	Insurance policy file
94	PAYROLL2	In memory payroll system
95	DILANAL	Dilution analysis
96	LOANAFPD	Loan amount a borrower can afford
97	RENTPRCH	Purchase price for rental property
98	SALELEAS	Sale-leaseback analysis
99	RRCONVBD	Investor's rate of return on convertible bond
100	PORTVAL9	Stock market portfolio storage-valuation program

- ☐ TRS-80 Cassette Version \$99.95
- ☐ TRS-80 (Mod-I or III), Pet, Apple or Atari Versions \$99.95
- ☐ TRS-80 Mod-II, IBM, Osborne and CP/M Versions \$149.95

ADD \$3.00 FOR SHIPPING IN UPS AREAS  
ADD \$4.00 FOR C.O.D. OR NON-UPS AREAS  
ADD \$5.00 TO CANADA AND MEXICO  
ADD PROPER POSTAGE OUTSIDE OF U.S., CANADA AND MEXICO

**COMPUTRONICS**  
MATHEMATICAL APPLICATIONS SYSTEMS

50 N. PASCACK ROAD  
SPRING VALLEY, NEW YORK 10977

ASK FOR OUR 64-PAGE CATALOG  
DEALER INQUIRIES INVITED

**NEW TOLL-FREE  
ORDER LINE**  
(OUTSIDE OF N.Y. STATE)  
**(800) 431-2818**

**24 HOUR  
ORDER  
LINE**  
**(914) 425-1535**

ALL PRICES & SPECIFICATIONS SUBJECT TO CHANGE  
DELIVERY SUBJECT TO AVAILABILITY



mands I added. You invoke all of the reassigned Scripsit commands by first hitting the clear key and another key to put you in the appropriate editing mode (clear-D for delete, clear-I for insert, and so on), just as you would with the standard program. Then hit clear and the relevant command key to actually make changes (see Table 1). The reassigned Scripsit commands perform the same functions they did in the original commercial program, so I won't explain them here.

You execute all of my enhanced com-

mands by hitting the break key and an associated character or characters (see Table 1). Query (Q), clears the screen and then, like all ScripAid commands, scans the remainder of the command line for additional parameters, such as a file extension to be matched or a drive specification. Query displays the disk name, creation date, and available space for all visible, non-system files on drive zero as the default. You must specify the extension and/or drive number that you want matched. To return to ScripAid, press any key.

Kill (K) checks for the entry of a valid file name, opens the file, then calls the @REMOV SVC to kill the file from the directory of the specified or default drive. Note that you must first open, like all ScripAid commands, to remove it. When you finish editing text and want to preview what it will look like when it's printed out, press the clear-P-V keys.

Bank (B), followed by any digit from 1 to 3, incorporates the specified 32K memory bank as the active text buffer. Bank 1 is the active bank at power-up and has the largest capacity (35K to 39K depending on your system configuration). Banks 2 and 3 each hold about 32K of text. If a requested bank isn't available, a message is displayed. When switching banks, the selected video line width and paragraph indent are saved or restored.

If you've created your own help file (see Program Listing 5), the ScripAid Help command (H), followed by K (keyboard) or P (printer), calls for the appropriate help screen. These are stored as ASCII files with a record length of 80 bytes. The up- and down-arrow keys page forward and backward through the help file. You should note that the letter H, when not followed by another character, calls for the hyphenation command.

## End Notes

As with any enhancement program, it's necessary to create the enhanced commands around the original program. Whenever you do this, however, you must make some compromises, and ScripAid has two of which you should be aware.

The first problem is that the embedded printer control codes aren't treated as invisible format commands by Scripsit's formatting routines. Because of this, full justification (flush-left and -right margins) won't function properly with embedded codes. To eliminate this problem, you can turn off full justification (J=N) and carefully assemble any lines using special functions.

The second problem concerns text that's previewed on the monitor with the P,V command. If the text contains page number blocks, it's video display is marred by momentary flashes of the editing screen whenever it calculates a new page number. You can avoid this problem by leaving out page number blocks until you're ready to print the document. ■

You can write to Clifford Knight at Box 253, Manomet, MA 02345.

Listing 1 continued

```

02160 POP BC ;GET #
02170 RET NZ ;NZ=NOT AVAIL
02180 LD B,0 ;SELECT BANK
02190 LD A,BANK
02200 RST 28H
02210 PUSH BC ;SAVE OLD BANK
02220 LD A,8CH
02230 LD (8000H),A ;INTO BUFFER
02240 XOR A
02250 LD (8001H),A ;NO TEXT
02260 POP BC ;GET OLD BANK #
02270 LD A,BANK ;@BANK SVC
02280 RST 28H
02290 RET ;DONE
02300 ;
02310 ;
02320 ;
02330 ;BADFIL DEFM 'Invalid filespec!'
02340 ; DEFB 0DH
02350 *LIST OFF
02360 BADFIL DEFM 'Invalid filespec!'
02370 DEFB 0DH
02380 *LIST ON
02390 ;
02400 ;
02410 DSPMSG PUSH DE ;SAVE DE
02420 LD A,DSPLY ;SVC, DISPLAY MSG @ (HL)
02430 RST 28H
02440 POP DE
02450 RET Z ;Z= O.K.
02460 LD L,A ;L= ERROR CODE
02470 LD H,00H
02480 OR 0CH ;SET RETURN BITS
02490 ERR LD C,A ;PASS IN "C"
02500 LD A,ERROR ;SVC, LOG AN ERROR
02510 RST 28H
02520 JR DOSXIT ;RET W/ ERROR
02530 ;
02540 ;
02550 LOGERR LD A,LOGOT ;SVC, DISPLAY & LOG MSG
02560 RST 28H
02570 LD HL,0FFFFH ;SET ERROR RETURN
02580 DOSXIT LD SP,$-$ ;RESET SP
02590 OLDSP EQU $-2
02600 RET ;GOTO DOS READY
02610 ;
02620 ;
02630 FCB DEFS 32 ;FCB FOR PDC INPUT
02640 ;DEFNAM DEFM 'DEFAULT/'
02650 ;PDCXTX DEFM 'PDC'
02660 ; DEFB 0DH
02670 *LIST OFF
02680 DEFNAM DEFM 'DEFAULT/'
02690 PDCXTX DEFM 'PDC'
02700 DEFB 0DH
02710 *LIST ON
02720 ;
02730 ;BANNER DEFB 0FH ;CURSOR OFF
02740 ; DEFB 1CH ;HOME CURSOR
02750 ; DEFB 1FH ;CLS
02760 ; DEFB 0CDH
02770 ; DEFM '*** ScripAid *** (c) 1984 Paladin'
02780 ; DEFM ' Software'
02790 ; DEFW 0A0AH
02800 ; DEFW 0A0AH
02810 ; DEFW 0A0AH
02820 ; DEFB 0D4H
02830 ; DEFM 'Loading driver --> '
02840 ; DEFB 03H
02850 *LIST OFF
02860 BANNER DEFB 0FH
02870 DEFB 1CH
02880 DEFB 1FH
02890 DEFB 0CDH
02900 DEFM '*** ScripAid *** (c) 1984 Paladin Softwa..
02910 DEFW 0A0AH
02920 DEFW 0A0AH
02930 DEFW 0A0AH
02940 DEFB 0D4H

```

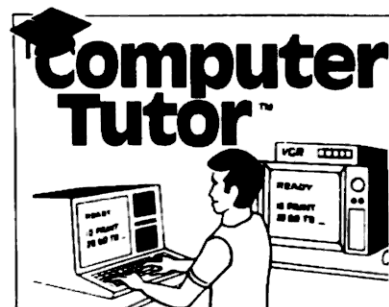
Listing 1 continued

```

02950      DEFB      'Loading driver --> '
02960      DEFB      03H
02970      *LIST ON
02980      ;
02990      ENINIT EQU      $
03000      ;
03010      ;
03020      ;
03030      ;
03040      ;
03050      ;
03060      ;
03070      PALBRK INC      HL          ;HL-> NEXT CHAR
03080      CP          'Q'          ;QUERY?
03090      JR          Z,QUERY        ;IF SO
03100      CP          'K'          ;KILL ?
03110      JP          Z,KILL        ;DO IT
03120      CP          'B'          ;BANK?
03130      JP          Z,BANKS       ;GO TO IT
03140      CP          'H'          ;HELP?
03150      JR          NZ,GOODBK     ;NZ= NOT "H"
03160      LD          C,A          ;ELSE SAVE CHAR
03170      LD          A,(HL)        ;GET NEXT CHAR
03180      CP          0DH          ;CR?
03190      JP          NZ,HELP       ;IF NOT, GET HELP
03200      LD          A,C          ;GET ORIG CHAR
03210      LD          GOODBK HL,BRKTAB ;HL-> BRK PARMS
03220      JP          RETBRK       ;GO BACK
03230      ;
03240      ;
03250      QUERY CALL      SKPSPL+1   ;SKIP SPACES
03260      JR          Z,NOEXT        ;Z= CR FOUND
03270      CP          '/'          ;EXT SPECIFIED?
03280      CALL      Z,MOVEXT        ;IF FOUND
03290      JR          Z,USREXT
03300      NOEXT  PUSH     HL          ;SAVE CMDLINE PTR
03310      LD          HL,EXTMSG-1    ;HL-> "$$$"
03320      CALL      MOVEXT        ;MOVE TO FCB
03330      POP          HL          ;GET PTR
03340      LD          USREXT A,(HL) ;GET A CHAR
03350      CP          '!'          ;DRIVE SPECIFIED?
03360      INC          HL
03370      JR          Z,USRDRV       ;IF SO
03380      CP          0DH          ;CR?
03390      JR          NZ,USREXT     ;IF NOT EOLN
03400      LD          (HL),'0'      ;SET DRV #
03410      USRDRV CALL      CLRVID    ;CLEAR VIDEO
03420      LD          A,(HL)        ;GET DRIVE #
03430      AND          07H         ;0-7 ONLY
03440      LD          C,A          ;INTO C
03450      LD          (PARM1),A      ;SAVE DRIVE #
03460      LD          HL,SCRPF      ;HL-> BUFFER AREA
03470      LD          B,04          ;SET GET FREE
03480      LD          A,DODIR       ;@DODIR SVC
03490      RST          28H
03500      JP          NZ,DSKERR
03510      LD          HL,DRVMSG     ;HL-> "DRIVE:"
03520      LD          A,DSPLY
03530      RST          28H
03540      LD          A,(PARM1)      ;GET DRIVE #
03550      ADD          A,30H         ;CONV TO ASCII
03560      LD          C,A
03570      LD          A,DSPLY
03580      RST          28H
03590      LD          HL,NAMSG      ;HL-> "Pack ID: "
03600      LD          A,DSPLY
03610      RST          28H
03620      LD          HL,SCRPF      ;HL-> FREE STRING
03630      CALL      EIGHT          ;OUTPUT DISK NAME
03640      PUSH     HL              ;SAVE DISK INFO PTR
03650      LD          HL,CREMSG     ;HL-> "Created:"
03660      LD          A,DSPLY
03670      RST          28H
03680      POP          HL
03690      CALL      EIGHT          ;GET INFO PTR
03700      PUSH     HL              ;OUTPUT CREATION DATE
03710      LD          HL,FREMSG    ;SAVE INFO PTR
03720      LD          A,DSPLY
03730      RST          28H
03740      POP          HL
03750      LD          E,(HL)        ;LSB TOTAL SPACE
03760      INC          HL
03770      LD          D,(HL)        ;MSB TOTAL
03780      INC          HL
03790      LD          A,(HL)        ;HL-> LSB FREE
03800      INC          HL
03810      LD          H,(HL)        ;GET MSB
03820      LD          L,A          ;HL= FREE SPACE
03830      PUSH     DE              ;SAVE TOTAL
03840      CALL      KOUT           ;OUTPUT FREESP
03850      LD          C,'/'
03860      LD          A,DSPLY
03870      RST          28H
03880      POP          DE
03890      EX          DE,HL
03900      CALL      KOUT           ;GET TOTAL
03910      LD          HL,BLKLIN     ;HL-> @A0DH
03920      LD          A,DSPLY
03930      RST          28H
03940      LD          A,(PARM1)      ;GET DRIVE #
03950      LD          C,A          ;INTO C
03960      LD          B,2          ;SET DIR F/ "EXT"(HL)
03970      LD          HL,EXTBUF     ;HL-> EXTENSION TO MATCH
03980      LD          A,DODIR
03990      RST          28H          ;DIR TO VIDEO

```

Listing 1 continued



## VIDEO INSTRUCTION TAPES! STEP BY STEP INSTRUCTIONS

USE YOUR VCR SIDE BY SIDE WITH YOUR COMPUTER TO LEARN HOW TO PROGRAM, AND HOW TO USE PROGRAMS. YOUR VCR ALONG WITH YOUR COMPUTER SERVE AS YOUR PERSONAL TUTOR. PAUSE YOUR VCR TO REVIEW AND LEARN AT YOUR OWN PACE.

CAT# TOPIC APPROX. PRICE  
TAPES FOR THE TRS80 MODEL 1, 3, 4.

DOS-1	TRSDOS 1.3	90 MIN	\$39.95
DOS-6	TRSDOS 6.0	105 MIN	\$39.95
DOS-3	NEWDOOS 80	105 MIN	\$39.95
DOS-2	DOSPLUS 3.5	105 MIN	\$39.95
DOS-5	LDOS	105 MIN	\$39.95
DOS-7	CPM 2.2	105 MIN	\$39.95
	MONTEZUMA		
DOS-4	MULTIDOS	105 MIN	\$39.95
EW-1	VISCALC	90 MIN	\$39.95
EW-7	MULTIPLAN	90 MIN	\$39.95
WP-1	LAZY WRITER	105 MIN	\$39.95
WP-2	SUPERSCRIPT	105 MIN	\$39.95
WP-3	SCRIPTSIT	90 MIN	\$39.95
WP-4	NEWSCRIP	105 MIN	\$39.95
DB-1	PROFILE III PLUS	105 MIN	\$39.95
DB-2	PFS FILE	90 MIN	\$39.95
DIO-3	TRSDOS 1.3	105 MIN	\$39.95
	DISK I/O		
DIO-4	TRSDOS 6.0	105 MIN	\$39.95
	DISK I/O		
BP-1	LEARNING MOD 180	180 MIN	\$49.95
	34 BASIC		
BP-2	LEARNING MOD 180	180 MIN	\$49.95
	ONE BASIC		
TC-1	MTERM	45 MIN	\$29.95
UT-1	DOTWRITER	75 MIN	\$29.95

## VHS or BETA FORMAT

Add \$3.00 per order for shipping and handling.  
Add \$3.00 for C.O.D.



TO ORDER PHONE or WRITE  
**LYNN** COMPUTER SERVICE

6831 West 157th Street  
Tinley Park, Illinois 60477  
(312) 429-1915

✓ 115



## Debug Programs Faster!

**DPIT** (for Debugging Programs by Interpretive Tracing) is a sophisticated tool with which you can explore and debug machine language programs. In the **COMMAND** mode, it will step through machine language programs one instruction at a time or a block of instructions, showing you the address, hexadecimal value, Zilog mnemonic, referenced registers contents and referenced RAM contents for each instruction. The 8 different **COMMAND** mode commands include load a program from disk, output to line printer or video display and define up to 15 different trace limits in RAM. The 19 commands in the **DEBUG** mode include block move, execute a **CALL** or **RST**, fill memory, find bytes, jump to address, memory modification in Hex or ASCII and modify flags or registers. **DPIT** includes a comprehensive manual available only on disk.

**D P I T** ..... \$32.95

**ORDERING:** Specify Model 1, 3, or 4. Include \$2.50 for postage and handling. Maryland residents add 5% sales tax.

**McSystems Software**  
P.O. Box 44313  
Washington, DC 20026-4313

Listing 1 continued

```

04000 JR NZ,DSKERR
04010 CALL BOTLIN ;CURSOR TO LINE 23
04020 LD HL,VDMSC ;HL-> "CONTINUE?"
04030 LD A,DSPLY
04040 RST 28H
04050 ;
04060 ;
04070 ;
04080 WAITBK LD A,KEY ;@KEY SVC
04090 RST 28H
04100 GOBACK LD C,0FH ;CURSOR OFF
04110 LD A,DSPLY
04120 RST 28H
04130 CALL CLRVID ;CLEAR SCREEN
04140 JP SCRPIN ;BACK TO SCRIPSIT
04150 ;
04160 ;
04170 KILL CALL SKPSPL+1 ;SKIP SPACES
04180 JR Z,GOERR ;IF SO
04190 LD DE,FCB1 ;DE-> FCB
04200 LD A,FSPEC ;@FSPEC
04210 RST 28H
04220 JR NZ,DSKERR
04230 LD B,0 ;LRL=256
04240 LD A,OPEN ;@OPEN TO KILL
04250 RST 28H
04260 JR NZ,DSKERR
04270 LD A,REMOV ;@REMOV
04280 RST 28H
04290 JR NZ,DSKERR
04300 JR GOBACK
04310 ;
04320 ;
04330 GOERR LD C,0FH ;CURSOR OFF
04340 LD A,DSPLY
04350 RST 28H
04360 JP ERRINV ;INVALID CMD
04370 ;
04380 ;
04390 ;
04400 DSKERR OR 0C0H ;SET RET & MSG
04410 LD C,A ;ERROR -> C
04420 PUSH BC ;SAVE ERROR
04430 CALL BOTLIN ;POSITION CURSOR
04440 POP BC ;GET ERROR
04450 LD A,ERROR ;@ERROR SVC
04460 RST 28H
04470 JR WAITBK
04480 ;
04490 ;
04500 TOP POP HL ;FIX STACK
04510 LD C,0CH ;ASCII FORM FEED
04520 LD A,PRT ;@PRT SVC
04530 RST 28H
04540 JR GOBACK ;BACK TO SCRIPSIT
04550 ;
04560 CONTRL POP AF ;FIX STACK
04570 INC HL ;HL-> NEXT CHAR
04580 CTLP1 CALL SKPSPL+1 ;SKIP SPACES
04590 JP Z,GOBACK ;IF END
04600 CP ;DELIMITER ?
04610 JR NZ,CONT1 ;ELSE BUMP PAST
04620 INC HL ;@DECHX SVC
04630 CONT1 LD A,DECHX
04640 RST 28H
04650 LD A,PRT
04660 RST 28H
04670 JR CTLP1 ;LOOP
04680 ;
04690 VIDEO LD A,02H ;@DSP SVC
04700 LD (OUTSVC),A ;SET VIDEO SVC
04710 LD A,0EFH ;RST 28H OPCODE
04720 LD (PASRST),A ;INTO @DELAY CALL
04730 LD HL,0C9AFH ;XOR A & RET OPCODES
04740 LD (PRTCHK),HL ;INTO CHECK ROUT
04750 LD HL,VDWAIT ;HL-> END WAIT ROUT
04760 LD (PREND),HL ;INTO SCRIPSIT VECTOR
04770 LD A,0CDH ;CALL OPCODE
04780 LD (KSCAN),A ;INTO SCRIPSIT
04790 LD HL,DLYCK ;HL-> DELAY CK ROUT
04800 LD (KSCAN+1),HL ;INTO SCRIPSIT
04810 CALL BOTLIN
04820 OR A ;RESET CARRY FLAG
04830 RET ;GO BACK & OUTPUT
04840 ;
04850 ;
04860 ;
04870 PRTCNT LD A,06H ;@PRT SVC
04880 LD (OUTSVC),A ;STORE IT
04890 LD HL,0D5C5H ;PUSH BC & PUSH DE
04900 LD (PRTCHK),HL ;STORE THEM
04910 LD HL,DOUT ;HL-> FORMAT OUT ROUT
04920 LD (PREND),HL ;RESET VECTOR
04930 LD A,28H ;JR Z OPCODE
04940 LD (KSCAN),A
04950 LD HL,0AF02H ;JR 2 BYTES, XOR A
04960 LD (KSCAN+1),HL ;RESET JUMP
04970 XOR A ;NOP OPCODE
04980 LD (PASRST),A ;INTO @DELAY CALL
04990 RET ;GO BACK
05000 ;
05010 ;
05020 PRTOUT PUSH HL
05030 PUSH DE ;SAVE CURRENT CHAR
05040 PUSH AF ;SAVE ACCUM
05050 PUSH BC

```

Listing 1 continued

## LARGE CAPACITY ACCOUNTING PROGRAMS

FOR TRS-80 1, 3, 4 & 4P, LNW, LOBO

★ NEED JUST 2 DRIVES ★  
FOR CAPACITY BELOW

### ACCTS RECEIVABLE \$150.00

5000+ ACCOUNTS 15000+ TRANSACTIONS  
BALANCE FORWARD 99 TRANSACTIONS  
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  
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+ TRANSACTIONS/MONTH  
- BEST LOOKING FINANCIAL STATEMENTS  
- DEPARTMENTAL P & L (UP TO 9)  
- STATEMENT OF CHANGES  
- SUB-TOTALS WHERE YOU WANT  
- FAST FLEXIBLE POSTING INPUT  
- PERCENTAGE P & L

**DEMO AVAILABLE \$20.00 EACH**  
APPLIES TOWARDS PURCHASE

### COMBINATION SPECIALS

1 A/R & G/L FOR ..... \$200.00  
2 A/R, A/P & G/L FOR ..... \$225.00  
HARD DISK VERSION SLIGHTLY MORE

VISA **H.D.P.** MC  
216b Lincoln, Olathe, CA 95965  
916 533 5442  
MON-FRI 8AM TO 4PM  
ADD 3.00 S & H ADD 3.00 COD

CITY SYSTEM LARGE CAPACITY SYSTEM LARGE CAPACITY SYSTEM LARGE CAPACITY SYSTEM LARGE CAPACITY SYSTEM

LARGE CAPACITY SYSTEM LARGE CAPACITY SYSTEM LARGE CAPACITY SYSTEM LARGE CAPACITY SYSTEM LARGE CAPACITY SYSTEM

```

05060 LD A,$-S ;GET PREV CHAR
05070 PRVCHR EQU $-1 ;"\"?
05080 CP '\'; ;GET CURRENT CHAR
05090 LD A,C ;IF PREVIOUS="\"
05100 JR Z,NXTST ;SAVE AS PREVIOUS
05110 SAVPRV CP '\'; ;IF CURR="\" , NO ACT
05120 LD (PRVCHR),A ;DELAY COUNT
05130 JR Z,PRTXIT ;@PAUSE SVC
05140 NOSET LD BC,#30H ;INIT IN "PRINT"
05150 LD A,PAUSE ;GET CHAR
05160 PASRST NOP ;SAVE AGAIN
05170 POP BC ;@PRT SVC
05180 PUSH BC ;RESTORE ACCUM
05190 LD A,PRT ;GET DE
05200 OUTSVC EQU $-1 ;DONE
05210 RST 28H ;2nd "\"?
05220 PRTXIT POP BC ;IF SO
05230 SKPOUT POP AF ;" "
05240 POP DE ;SAVE AS PREV
05250 POP HL ;GET OUTPUT SVC
05260 RET ;@DSP?
05270 ; ;GET CURRENT CHAR
05280 ; ;NZ=@PRT
05290 NXTST CP '\'; ;ASCII SPACE
05300 JR NZ,CTLCK ;SAVE AS PREVIOUS
05310 SAVSPC LD A,20H ;SKIP OUTPUT
05320 JR SAVPRV ;GET OUTPUT SVC
05330 ; ;@DSP?
05340 ; ;GET CURRENT CHAR
05350 CTLCK LD A,(OUTSVC) ;NZ=@PRT
05360 CP 02H ;ASCII SPACE
05370 POP BC ;SAVE AS PREVIOUS
05380 JR NZ,CTLCK1 ;SKIP OUTPUT
05390 LD A,20H ;GET OUTPUT SVC
05400 LD (PRVCHR),A ;@DSP?
05410 JR SKPOUT ;GET CURRENT CHAR
05420 ; ;NZ=@PRT
05430 ; ;ASCII SPACE
05440 ; ;SAVE AS PREVIOUS
05450 ; ;SKIP OUTPUT
05460 ; ;GET OUTPUT SVC
05470 ; ;@DSP?
05480 ; ;GET CURRENT CHAR
05490 ; ;NZ=@PRT
05500 ; ;ASCII SPACE
05510 ; ;SAVE AS PREVIOUS
05520 ; ;SKIP OUTPUT
05530 ; ;GET OUTPUT SVC
05540 ; ;@DSP?
05550 ; ;GET CURRENT CHAR
05560 ; ;NZ=@PRT
05570 ; ;ASCII SPACE
05580 ; ;SAVE AS PREVIOUS
05590 ; ;SKIP OUTPUT
05600 ; ;GET OUTPUT SVC
05610 ; ;@DSP?
05620 ; ;GET CURRENT CHAR
05630 ; ;NZ=@PRT
05640 ; ;ASCII SPACE
05650 ; ;SAVE AS PREVIOUS
05660 ; ;SKIP OUTPUT
05670 ; ;GET OUTPUT SVC
05680 ; ;@DSP?
05690 ; ;GET CURRENT CHAR
05700 ; ;NZ=@PRT
05710 ; ;ASCII SPACE
05720 ; ;SAVE AS PREVIOUS
05730 ; ;SKIP OUTPUT
05740 ; ;GET OUTPUT SVC
05750 ; ;@DSP?
05760 ; ;GET CURRENT CHAR
05770 ; ;NZ=@PRT
05780 ; ;ASCII SPACE
05790 ; ;SAVE AS PREVIOUS
05800 ; ;SKIP OUTPUT
05810 ; ;GET OUTPUT SVC
05820 ; ;@DSP?
05830 ; ;GET CURRENT CHAR
05840 ; ;NZ=@PRT
05850 ; ;ASCII SPACE
05860 ; ;SAVE AS PREVIOUS
05870 ; ;SKIP OUTPUT
05880 ; ;GET OUTPUT SVC
05890 ; ;@DSP?
05900 ; ;GET CURRENT CHAR
05910 ; ;NZ=@PRT
05920 ; ;ASCII SPACE
05930 ; ;SAVE AS PREVIOUS
05940 ; ;SKIP OUTPUT
05950 ; ;GET OUTPUT SVC
05960 ; ;@DSP?
05970 ; ;GET CURRENT CHAR
05980 ; ;NZ=@PRT
05990 ; ;ASCII SPACE
06000 ; ;SAVE AS PREVIOUS
06010 ; ;SKIP OUTPUT
06020 ; ;GET OUTPUT SVC
06030 ; ;@DSP?
06040 ; ;GET CURRENT CHAR
06050 ; ;NZ=@PRT
06060 ; ;ASCII SPACE
06070 ; ;SAVE AS PREVIOUS
06080 ; ;SKIP OUTPUT
06090 ; ;GET OUTPUT SVC
06100 ; ;@DSP?

```

Listing 1 continued

## FOR TRS-80 MODELS 1, 3 & 4 IBM PC, XT, AND COMPAQ

### 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 MMSFORTH

With an unusually powerful set of tools and an unusually easy way of helping you to use them.

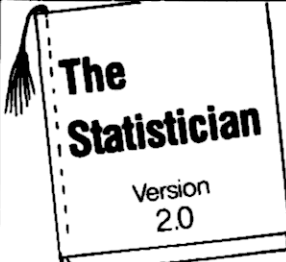
All necessary software (FORTHWRITE and the MMSFORTH System), under Personal License for \$425 (IBM PC). Or with FORTHCOM telecommunications module and the DATAHANDLER-PLUS files management system, for \$550 complete. Corporate Site (multiple users) License is available.

May we tell you more?

MILLER MICROCOMPUTER SERVICES  
61 Lake Shore Road, Natick, MA 01700  
(617) 653-0136

137





**NEW**

**First in  
Its Class  
and  
Looking  
for  
Work.**

**TRS-80 1, 2, 3, 4, 12, 16  
CPM XENIX**

- \* Multiple Regression
- \* Ridge
- \* All Subsets
- \* Backward Elimination
- \* Time Series Analysis
- \* Descriptive Statistics
- \* Transformations
- \* Survey Research
- \* Nonparametrics
- \* XY Plots
- \* ANOVA
- \* Random Samples
- \* Data Base
- \* Search & Sort
- \* Hypothesis tests

Please call **TOLL FREE**  
**1-800-334-0854 (Ext. 814)**



for more information  
or write:  
Quant Systems 194  
Box 628  
Charleston, SC 29402  
VISA-M/C Accepted

# Tax Preparers TAXSTAR★

For Model 3 or 4 with 48K and 2 disk drives

- Will do schedules 1040, A, B, C, D, E, SE, G, W, 6251
- Tax calculations - tables, rates, income averaging
- Uses IRS prescribed computer generated printouts or overlays User friendly
- Automatically calculates excess FICA earned income credit, alternate minimum tax
- Change one figure, program recalculates entire tax return in 12 seconds

**\$279.95 with user manual**

**Professional Tax Software, Inc.**  
26 Lark Lane  
Croton On Hudson, N.Y. 10520  
(914)-271-4723

174

Listing 1 continued

```

06110 EI
06120 LD HL,VDMSG ;HL-> HIT RET TO CONT
06130 LD A,DSPLY
06140 RST 28H
06150 LD A,KEY ;KEY
06160 RST 28H
06170 LD C,0FH ;CURSOR OFF
06180 LD A,DSP ;@DSP SVC
06190 RST 28H
06200 POP HL
06210 POP DE
06220 JP PRTCNT
06230 ;
06240 ;
06250 EIGHT LD B,8 ;8 BYTES
06260 EILLOOP LD C,(HL) ;GET A BYTE
06270 LD A,DSP
06280 RST 28H
06290 INC HL ;HL-> NEXT BYTE
06300 DJNZ EILLOOP
06310 RET
06320 ;
06330 ;
06340 KOUT LD DE,SCRPF ;DE-> BUFFER
06350 PUSH DE ;SAVE BUFFER START
06360 LD A,HEXDEC
06370 RST 28H
06380 POP HL ;HL-> BUFFER
06390 LD B,5 ;OUTPUT 5 BYTES
06400 CALL EILLOOP
06410 LD C,'K'
06420 LD A,DSP
06430 RST 28H
06440 RET ;DONE
06450 ;
06460 ;
06470 MOVEXT PUSH AF ;SAVE CHAR
06480 LD B,3 ;3 CHARS/EXT
06490 LD DE,EXTBUF ;DE-> EXT BUFFER
06500 EXTLP INC HL ;BUMP PTR
06510 LD A,(HL) ;GET A CMDLINE CHAR
06520 CP '0' ;C= <"0"
06530 JR C,FILLUP
06540 CP '9'+1 ;C= "0"->"9"
06550 JR C,OKEXT ;FOLD -> U/C
06560 AND 5FH
06570 CP 'A' ;C= >"9", <"A"
06580 JR C,FILLUP
06590 CP 'Z'+1 ;NC= >"Z"
06600 JR NC,FILLUP ;INTO BUFFER
06610 OKEXT LD (DE),A ;BUMP PTR
06620 INC DE ;LOOP
06630 DJNZ EXTLP
06640 POP AF
06650 RET
06660 ;
06670 FILLUP LD A,'S' ;WCC
06680 DEC HL ;BACKUP PTR
06690 JR OKEXT
06700 ;
06710 ;
06720 ;
06730 ;
06740 BOTLIN LD HL,1700H ;LINE 23, COL 0
06750 LD B,03H ;SET CURSOR OF
06760 LD A,VDCNTL ;@VDCNTL SVC
06770 RST 28H
06780 LD C,1EH ;CLEAR TO END OF LINE
06790 LD A,DSP ;@DSP SVC
06800 RST 28H
06810 RET
06820 ;
06830 ;
06840 CKPARM PUSH DE ;SAVE CMD LINE PTR
06850 CALL PRPMCK ;LOOK F/,P,I ETC
06860 POP HL ;HL-> CMD LINE
06870 RET NC ;NC= PARM FOUND
06880 LD A,(HL) ;ELSE GET NEXT CHAR
06890 CP 'V' ;VIDEO ?
06900 JP Z,VIDEO ;IF SO
06910 CP 'T' ;TOP OF FORM ?
06920 JP Z,TOP
06930 CP 'C' ;CONTROL CODES?
06940 JP Z,CONTRL ;ELSE SET CARRY
06950 SCF ;DONE
06960 RET
06970 ;
06980 ;
06990 HELP CALL SKPSPC ;SKIP SPACES
07000 SUB 'P' ;PRINTER HELP?
07010 LD HL,HLFFS ;HL-> REG HELPPFS
07020 LD A,11 ;12 PAGES IN MAIN HELP
07030 JR NZ,GETHLP ;NZ= NOT *PR HELP
07040 LD HL,PHLPFS ;HL-> PRINTER FS
07050 XOR A ;MAX PAGE=0
07060 GETHLP LD (MAXPAG),A ;SAVE MAX PAGE #
07070 LD DE,FCB1 ;DE-> FCB
07080 LD A,FSPEC ;@FSPEC
07090 RST 28H
07100 JP NZ,DSKERR
07110 LD A,OPEN ;@OPEN
07120 LD B,80 ;80 BYTE LRL
07130 LD HL,SCRPF ;HL-> BUFFER
07140 RST 28H
07150 JP NZ,DSKERR
07160 PAGE0 XOR A ;CURRENT PAGE = 0

```

Listing 1 continued

```

07170 SAVPAG LD (PARM1),A ;SAVE CURR PAGE #
07180 CALL DSPFAG ;OUTPUT A PAGE
07190 JP NZ,DSKERR
07200 CALL BOTLIN ;CURSOR @ LINE 23
07210 LD HL,HLPMSG
07220 LD A,DSPLY ;@DSPLY
07230 RST 28H
07240 HLPLP LD A,KEY ;@KEY
07250 RST 28H
07260 CP 0AH ;DOWN ARROW
07270 RST 28H
07280 CP 0AH ;DOWN ARROW
07290 JR Z,NXTPAG
07300 CP 0BH ;UP ARROW ?
07310 JR Z,PRVPAG
07320 LD DE,FCB1
07330 LD A,CLOSE ;LOOP IF NOT
07340 RST 28H
07350 JP NZ,DSKERR
07360 JP GOBACK
07390 ;
07400 PRVPAG LD A,(PARM1) ;GET CURR PAGE #
07410 OR A ;TEST IT
07420 JR NZ,DECPAG ;NZ, CURR<0
07430 LD A,(MAXPAG) ;ELSE GET LAST #
07440 INC A
07450 DECPAG DEC A
07460 JR SAVPAG ;GO TO IT
07470 ;
07480 NXTPAG LD HL,MAXPAG ;HL-> MAXPAGE #
07490 LD A,(PARM1) ;A= CURR #
07500 CP (HL) ;TEST
07510 JR Z,PAGE0 ;IF AT MAX
07520 INC A ;ELSE BUMP #
07530 JR SAVPAG ;DO IT
07540 ;
07550 DSPPAG SLA A ;A= PAGE*4
07560 SLA A ;SAVE IT
07570 LD C,A
07580 SLA A
07590 SLA A ;A= PAGE*16
07600 ADD A,C ;A= PAGE*20
07610 LD C,A ;INTO C
07620 LD B,00H ;BC= REC #
07630 LD DE,FCB1 ;DE-> FCB
07640 LD A,POSN ;@POSN SVC
07650 RST 28H
07660 RET NZ
07670 CALL CLRVID
07680 LD B,20 ;20 LINES/PAGE
07690 PAGLP PUSH BC ;SAVE LINE COUNT
07700 LD DE,FCB1
07710 LD A,READ ;@READ
07720 LD HL,LINBUF ;80 CHAR BUFFER
07730 PUSH HL ;SAVE IT
07740 RST 28H
07750 POP HL ;HL-> LINE START
07760 LD A,0DH ;C/R
07770 LD (LINBUF+79),A ;FLAG END OF LINE
07780 LD A,DSPLY ;@DSPLY
07790 RST 28H
07800 POP BC ;GET COUNT
07810 DJNZ PAGLP ;ELSE DONE
07820 RET
07830 ;
07840 ;
07850 BANKS CALL SKPSPL+1 ;GET NEXT & SKIP " "
07860 SUB 31H ;CONVERT TO BINARY
07870 JR C,BNKERR
07880 CP 03H ;>"2"?
07890 JR NC,BNKERR
07900 LD C,A ;GET BANK # IN C
07910 PUSH BC ;SAVE IT
07920 LD B,02 ;BANK AVAILABLE?
07930 LD A,BANK ;@BANK SVC
07940 RST 28H
07950 POP BC ;FIX STACK/GET BANK#
07960 JR NZ,BNKERR ;IF ERROR
07970 PUSH BC ;SAVE IT
07980 ;
07990 LD HL,CSRET ;HL-> RET ADDR
08000 PUSH HL ;SET SAME
08010 LD A,1BH ;<SHFT><UP>
08020 JP 39BEH ;GO DO IT
08030 ;
08040 CSRET LD (5ECCH),DE ;SAVE CURRENT LOC
08050 CALL BNK23 ;SET PTRS
08060 POP BC ;GET BANK #
08070 LD A,C ;INTO A
08080 PUSH BC ;SAVE AGAIN
08090 OR A ;TEST IT
08100 CALL Z,BNKONE ;IF Z, SPECIAL RESET
08110 LD A,(CURBNK) ;GET CURRENT BANK
08120 CALL FNDBNK ;HL-> STRG AREA
08130 SVBNKL LD E,(IX+0)
08140 LD D,(IX+1) ;DE-> ADDR TO MOVE
08150 CALL MOVPTP ;MOVE IT
08160 DJNZ SVBNKL ;LOOP
08170 POP BC ;GET REQUESTED BANK#
08180 PUSH BC ;SAVE AGAIN
08190 LD B,0 ;SET SELECT FUNCTION
08200 LD A,BANK ;@BANK SVC
08210 RST 28H ;SET NEW BANK
08220 LD B,1 ;RESET "OLD" BANK

```

Listing 1 continued

## REMsoft, INC.

### THE LIVING TRS-80

#### For Those Who MUST Know More!

Finally, REMsoft has responded to those who have asked for a **beginning level** tutorial. This course was designed by J. Thomas Evans, Jr., for the person who is just starting to explore the wonderful world to TRS-80 computing. The learning objectives the course was designed to provide:

- Skills in the use of BASIC and its editing capabilities.
- A fundamental understanding of the operation of the Z80 processor within the TRS-80.
- An entry-level knowledge of assembly language with some skill in the use of an editor-assembler.
- An understanding of the choices available in the selection of hardware and software as well as an appreciation for the methods of applying the computer to specific tasks.
- A good understanding of the types and availability of other resources which can provide greater levels of knowledge and skill.

Requires 32K and one disk drive. Available for Model III and Model 4 (in Model III mode).

**LIVING TRS (disk) \$79.95**

### Let Your TRS-80® Teach You ASSEMBLY LANGUAGE

Tired of buying book after book on assembly language programming and still not knowing your **POP** from your **PUSH**?

**REMsoft** proudly announces a more efficient way, using your own TRS-80® to learn the fundamentals of assembly language programming... at YOUR pace and YOUR convenience.

Our unique package, **"INTRODUCTION TO TRS-80® ASSEMBLY PROGRAMMING,"** will provide you with the following:

- Ten 40 minute lessons on audio cassettes
- A driver program to make your TRS-80® video monitor serve as a blackboard for the instructor.
- A display program for each lesson to provide illustration and reinforcement for what you are hearing.
- Step-by-step dissection of complete and useful routines to test memory and to gain direct control over the keyboard, video monitor, and printer.
- How to access and use powerful routines in your Level II or Model III Basic ROM

**AVAILABLE FOR I, III and 4 (in MOD III Mode)**

**REMASSEM (tape) \$74.95**

**REMASSEM (disk) \$79.95**

This course was developed and recorded by Joseph E. Willis and are based on the successful series of courses he has taught at Meta Technologies Corporation, the Radio Shack computer Center, and other locations in Northern Ohio.

### REMsoft, INC.

571 E. 185 St.  
Euclid, Ohio 44119  
(216) 531-1338

SHIPPING CHARGES  
\$2.50 WITHIN UNITED STATES  
\$5.00 CANADA AND MEXICO  
OTHER FOREIGN ORDERS ADD 20%  
OHIO RESIDENTS ADD 6% SALES TAX

TRS-80® IS A TRADEMARK OF TANDY CORP



Listing 1 continued

```

88230 LD A,BANK
88240 RST 28H
88250 POP BC
88260 LD A,C
88270 LD (CURBNK),A
88280 CALL FNDBNK
88290 LD HL,DE
88300 LD L,(IX+0)
88310 LD L,(IX+1)
88320 CALL MOVFTR
88330 DJNZ LDBNKL
88340 CALL WRTVID
88350 JZ GOBACK
88360 LD L,(IX+0)
88370 LD L,(IX+1)
88380 BNKERR
88390 LD A,BNKMMSG
88400 LD A,DSPLY
88410 RST 28H
88420 JZ WAITBK
88430 LD A,(DE)
88440 LD HL,(HL),A
88450 MOVFTR
88460 INC HL
88470 INC HL
88480 INC HL
88490 LD A,(DE)
88500 LD HL,(HL),A
88510 INC HL
88520 INC HL
88530 INC HL
88540 INC HL
88550 INC HL
88560 INC HL
88570 INC HL
88580 FNDBNK
88590 LD HL,SVPTR1
88600 LD IX,FRTAB
88610 LD B,22
88620 LD B,0BH
88630 DEC A
88640 RET
88650 ADD A
88660 JZ
88670 INC A
88680 BNKONE
88690 JR SETPTR
88700 BNK23
88710 SETPTR
88720 LD B,11
88730 LD IX,STRTAB
88740 CALL RSTPTR
88750 LD B,2
88760 LD L,(IX+0)
88770 LD L,(IX+1)
88780 LD HL,(HL),E
88790 INC HL
88800 LD HL,D
88810 INC HL
88820 INC HL
88830 DJNZ RSTPTR
88840 RET
88850 INC HL
88860 SRPSPL
88870 LD A,(HL)
88880 CP
88890 SRSPSPC
88900 JR
88910 CP
88920 RET
88930 INC
88940 INC

```

```

;GET "NEW" BANK #
;A = BANK#
;SAVE AS CURRENT
;DE -> STRG AREA
;HL -> ADDR TO MOVE
;LOOP
;RELOAD VIDEO IMAGE
;BACK TO SCRIPSIT
;POSITION CURSOR
;HL -> BANK NOT AVAIL
;GET LSB STR/CURR
;SAVE IT
;BUMP PTRS
;MOVE MSB
;BUMP PTRS
;DONE
;HL -> START OF STORE
;IX -> RELO ADDR
;22 BYTES/AREA
;11 WORDS TO MOVE
;TEST A
;A = FOUND
;HL -> NEXT
;LOOP
;DE -> BANK1 BUFF
;DE -> BANK2&3 BUFF
;IX -> ADDR TABLE
;DO 11 ADDR
;ONE BACK
;DO 2 MORE
;HL -> LOC TO ALTER
;STORE LSB
;STORE MSB
;IX -> NEXT ADDR
;DONE
;BUMP PTR
;GET CHAR
;SPACE ?
;SKIP SPACES
;C/R?
;ELSE GO BACK

```

```

88950 EXIT1 LD B,0
88960 LD A,BANK
88970 RST 28H
88980 LD HL,0000H
88990 LD A,EXIT
8900 RST 28H
8901
8902
8903
8904
8905 CURBNK DEFB $-0
8906
8907 PTRTAB DEFW 5E0EH
8908 DEFW 5E0EH
8909 DEFW 5E0EH
8910 DEFW 5E0EH
8911 DEFW 5E0EH
8912 DEFW 5E0EH
8913 DEFW 5E0EH
8914 DEFW 5E0EH
8915 DEFW 5E0EH
8916 DEFW 5E0EH
8917 DEFW 5E0EH
8918
8919
8920 STRTAB DEFW 3945H
8921 DEFW 3A54H
8922 DEFW 3C16H
8923 DEFW 40A6H
8924 DEFW 40DEH
8925 DEFW 4532H
8926 DEFW 4848H
8927 DEFW 4E3EH
8928 DEFW 5286H
8929 DEFW 58A9H
8930 DEFW 58B7H
8931
8932 DEFW 396EH
8933 DEFW 428EH
8934
8935
8936 SVPTR1 DEFW $-0
8937 DEFW $-0
8938 DEFW $-0
8939 DEFW $-0
8940 DEFW $-0
8941 DEFW $-0
8942 DEFW $-0
8943 DEFW $-0
8944 DEFW $-0
8945 DEFW $-0
8946 DEFW $-0
8947
8948 SVPTR2 DEFW 0FFFFH
8949 DEFW 0FFFFH
8950 DEFW 0FFFFH
8951 DEFW 0001H
8952 DEFW 0001H
8953 DEFW 0001H
8954 DEFW 0001H
8955 DEFW 0FFFFH
8956 DEFW 0001H
8957 DEFW 0005H
8958 DEFW 0044H
8959
8960 SVPTR3 DEFW 0FFFFH
8961 DEFW 0FFFFH
8962 DEFW 0001H
8963 DEFW 0001H
8964 DEFW 0001H
8965 DEFW 0001H
8966 DEFW 0001H
8967 DEFW 0FFFFH
8968 DEFW 0001H

```

```

;SELECT BANK FUNC
;BANK # 0
;BANK SVC
;NO ERROR
;EXIT SVC
;DO IT

```

Listing 1 continued

## DISK-N-DATA EDUCATIONAL SOFTWARE AND DISKS

**SYNCOM** BULK DISKETTE LIFETIME  
ERROR FREE 100% CERTIFIED WARRANTY

SYNCOM diskettes with a lifetime warranty. High quality packed in polybags of 10 with TYVEC envelopes, Labels and Hubbing, 100% errorfree with a Lustrum Finish, a new process that enhances electrical performance, High PlayBack signal, low noise, syncom has a increasing media life, a Quality Disk

SSDD ea- \$139 DSDD ea- \$185  
5 1/4 Qty 20 5 1/4 Qty 20

**MICROPHS** A name in Educational Software dedicated to education. Microphs Program designed for use on: Apple II/IIIe, IBM PC, Radio Shack TRS-80, Commodore 64, PET/CBM, VIC 20

Physics • Chemistry • Calculus • Probability • Scholastic Aptitude Test Analogies, Mathematics, Vocabulary • Physical Science • Spelling • Jr. & Sr. High Mathematics • School Attendance System • Exam Analysis • Exam Generating System • Library Management System • Rolladex System Mail List/Telephone Directory • Recreational Word Games  
EDUCATIONAL CATALOG \$1.00 Free with Order

### Flexible Disk Tray

5 1/4 with Key Locking Lid  
40 Disks capacity \$22.55—\$4.00 shipping  
90 Disks capacity \$37.80—\$5.00 shipping  
Almond Color base with clear top.  
Plastic Dividers which snap lock in.  
Each file tray has a key locking lid.

### Vinyl Storage Sleeves

for three ring notebook  
5 1/4 2-Disks per page  
Catalog Cards included  
Minimum order 20 pages  
Ea. 59¢ \* \$1.50 Shipping

**DISKS-N-DATA** ✓48  
153 Kings Highway  
Brooklyn NY 11223  
Educational Software  
and Disks

Shipping: 5% Diskette. Add \$3.00 per 100 or  
Fewer Diskettes C.O.D. orders. Add \$3.00.  
New York customer. Add 8% Tax  
Payment: Money orders, Bank Check  
Nationwide: 1-800-842-5400  
In New York: 1-212-837-7563

## CONVERT MOD III BASIC MOD 4 IBM PC TANDY 2000

If you own a TRS-80 Mod III and have resisted upgrading to the TRS-80 Mod 4, IBM PC, or Tandy 2000 because your software would not be compatible, good news has finally arrived. EMSI offers 3 powerful utilities for converting your Mod III BASIC programs to run on any of these new machines.

The programs are menu driven, very easy to use and automatically translate 95% or more of even your largest BASIC programs in just a few minutes. They insert all required spaces between keywords, recalculate PRINT@ addresses (or replace them with LOCATES), adjust TAB addresses, correct exponentiation symbols, eliminate unnecessary spaces, remove down arrows, optionally remove REM's, and flag and list unresolved line numbers. User guides explain program operation in complete detail, offer alternatives for revising lines that need manual intervention and numerous hints for easier, more thorough conversions.

**CONV3TO4** Converts TRS-80 Mod III BASIC to **TRS-80 Mod 4** \$ 49.95

Hundreds of satisfied users. Ask to see program review (three stars) at your local Radio Shack Computer Center.

**CONV3TOPC** NEW! Converts TRS-80 Mod III BASIC to IBM PC\* \$139.95

**CONV3TO2000** NEW! Converts TRS-80 Mod III BASIC to Tandy 2000\* \$139.95

\*Includes convenient diskette formatter and file transfer program so that programs and files may be exchanged between machines without modems. Diskettes and guides are packaged in deluxe three ring binders. User Guides available separately for those who want complete details before ordering entire package (\$5.00 cash or MO only, credited to subsequent package order).

TO ORDER, CALL NOW — TOLL FREE (Except NJ)

**800-922-0786**

NJ residents, and local dealers: 201-879-5982 ✓85

### EDUCATIONAL MICRO SYSTEMS, Inc.

P.O. Box 471, Chester, New Jersey 07930

DEALER INQUIRIES INVITED

Terms: VISA, Mastercard, MO, check, or COD. Orders shipped within 24 hrs. Add \$3.00 shipping/handling. Add \$1.65 for COD. Foreign or first class, add first class postage (package wt. 2 1/4 lbs.). NJ residents add 6% sales tax.

NEW

# COPYCAT 3

NOW YOU CAN DUPLICATE VIRTUALLY ALL OF YOUR TRS-80 DISKETTES

COPYCAT 3 will allow you to make an exact duplicate of virtually all of your diskettes even if they are protected. And this includes your games and utilities. COPYCAT 3 automatically analyzes, formats, copies and verifies each track of the diskette you are duplicating. The entire process is amazingly fast, typically less than 70 seconds and even less with verify turned off.

COPYCAT 3 is intended for your personal use only, in making backup copies of your protected software.

COPYCAT 3 will run on the TRS-80 Model 3, 4 or 4P computers.

**COPYCAT 3 . . . . . \$49.95**

Please add \$2.00 for postage and handling. CA residents add 6% sales tax.  
All orders are normally shipped the next business day via first class mail.

## OMNISOFTE RESEARCH

2170 W. Broadway, #501A

Anaheim, CA 92804

(714) 772-5000

Dealer inquiries on your letterhead are welcomed.



✓36



09590	DEFB	0005H	
09700	DEFB	0044H	
09710	;		
09720	;	*** MESSAGES ***	
09740	;		
09750	CLRMMSG	DEFB	1CH
09760	DEFB		1FH
09770	DEFB		03H
09780	;		
09790	BLKLIN	DEFB	0AH
09800	DEFB		0DH
09810	;		;BLANK LINE
09820	;		
09830	VDMSG	DEFB	'Hit <ENTER> to continue...'
09840	;	DEFB	0EH
09850	;	DEFB	03H
09860	;		;CURSOR ON
09870	;		
09880	DRVMMSG	DEFB	0C2H
09890	DEFB		'Drive: '
09900	;	DEFB	03H
09910	;		
09920	NAMSG	DEFB	0C3H
09930	DEFB		'Pack ID: '
09940	;	DEFB	03H
09950	;		
09960	CREMSG	DEFB	0C3H
09970	DEFB		'Created: '
09980	;	DEFB	03H
09990	;		
10000	PREMSG	DEFB	0C3H
10010	DEFB		'Free: '
10020	DEFB		03H
10030	;		
10040	EXTMSG	DEFB	'\$\$'
10050	;		
10060	;		
10070	;		
10080	HLPPFS	DEFB	'ScriptAId/HLP'
10090	DEFB		0DH
10100	;		
10110	BANKMSG	DEFB	'Bank NOT available'
10120	DEFB		03H
10130	;		
10140	LOOKTB	DEFB	'112"34\$56\$67'
10150	DEFB		27H
10160	DEFB		'0(9)'
10170	;		
10180	;		
10190	LIST OFF	DEFB	'Hit <ENTER> to continue...'
10200	VDMSG	DEFB	0EH
10210	DEFB		03H
10220	DRVMMSG	DEFB	0C2H
10230	DEFB		'Drive: '
10240	DEFB		03H
10250	NAMSG	DEFB	0C3H
10260	DEFB		'Pack ID: '
10270	DEFB		03H
10280	CREMSG	DEFB	0C3H
10290	DEFB		'Created: '
10300	;	DEFB	03H
10310	PREMSG	DEFB	0C3H
10320	DEFB		'Free: '
10330	DEFB		03H
10340	EXTMSG	DEFB	'\$\$'
10350	HLPPFS	DEFB	'Use up/down arrows to page, <BREAK> to return to ScriptAId...'
10360	DEFB		0EH
10370	DEFB		03H
10380	HLPPFS	DEFB	'ScriptAId/HLP'
10390	DEFB		0DH

```

19400 BNKMSG      DEFM      'Bank NOT available'
03H              DEFB      '03H'
19410              DEFB      '112"3#4$5%6*7'
19420 LOOKTB      DEFM      '27H'
19430              DEFB      '8(9)'
19440              DEFB      '8(9)'
19450 *LIST ON
19460              DEFB      '19460'
19470              DEFB      '19470'
19480 CCTLTAB      DEFS      90
19490              DEFB      '90 BYTES FOR CTL CODES'
19500 LINBUF       DEFS      80
19510              DEFB      '80 BYTE HELP LINE BUFFER'
19520 EXTBUF        DEFS      3
19530              DEFB      '3 BYTE EXTENSION'
19540 FCBL          DEFS      32
19550              DEFB      '32 FCBS FOR HELP'
19560              DEFB      'HOLDS *PR DRIVER PS'
19570              DEFS      14
19580              DEFB      '$-$'
19590 PARM1         DEFB      '$-$'
19600 MAXPAG        DEFB      '$-$'
19610              DEFB      '$'
19620 LAST          DEFL      'LAST BYTE USED'
19630              DEFB      '19630'
19640              DEFB      'END'
19650              DEFB      'ENTRY'
19660              DEFB      '19660'

```

*Program Listing 2. Rekey/SRC, the source code for keyboard and message modifications.*

```

***** REKEY *****
000108 ; Mnemonic keyboard overlay for Model 4 SCRIPTS
000110 ;
000112 ;
000113 ;
000114 ;
000115 ;
000116 ;
000117 ;
000118 ;
000119 ;
000120 ;
000121 ;
000122 ;
000123 ;
000124 ;
000125 ;
000126 ;
000127 ;
000128 ;
000129 ;
000130 ;
000131 ;
000132 ;
000133 ;
000134 ;
000135 ;
000136 ;
000137 ;
000138 ;
000139 ;
000140 ;
000141 ;
000142 ;
000143 ;
000144 ;
000145 ;
000146 ;
000147 ;
000148 ;
000149 ;
000150 ;
000151 ;
000152 ;

*** Patches for keyboard commands ***

<CLR><X>--> <CLR><L>, Line - Insert routine
ORG 3D79H
DEFB 0CCH

<CLR><Q>--> <CLR><B>, Block - Insert routine
ORG 3D7DH
DEFB 0C2H

<CLR><W>--> <CLR><Z>, Window - Main Commands
<CLR><Q>--> <CLR><B>, Block
ORG 5E28H
DEFB 0DAH
DEFB 0C2H

<CLR><S>--> <CLR><I>, Insert - Main Commands
ORG 5E2DH
DEFB 0C9H

<CLR><X>--> <CLR><L>, Line - Main Commands
<CLR><C>--> <CLR><G>, Paragraph
<CLR><V>--> <CLR><N>, New page
ORG 5E3BH
DEFB 0CCH
DEFB 0C7H
DEFB 0CEH

<CLR><F>--> <CLR><S>, Spaces - Delete routine
<CLR><X>--> <CLR><L>, Line
<CLR><C>--> <CLR><G>, Paragraph
ORG 5E69H
DEFB 0D3H
DEFB 0CCH
DEFB 0C7H

<CLR><Z>--> <CLR><W>, Word - Delete routine

```

*Listing 2 continued*

**END**





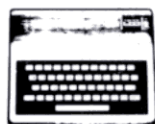
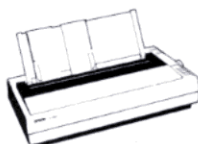
**MARYMAC** INDUSTRIES INC.

**800-231-3680**

**Radio Shack TRS-80's®**

**EPSON PRINTERS**

People you Trust to give you the very best!



- Lowest Price
- Reliable Service
- Quality Products

22511 Katy Fwy., Katy (Houston) Texas 77450  
(713) 392-0747 Telex 774132

✓ 250

# DISK SUPER SAVER

**Nashua**

Professional Magnetic Media

As Low As  
**\$1.18**

**Certified 100% Error Free  
LIFETIME WARRANTY**

5¼"	SS/SD .....	\$1.39
	SS/DD .....	\$1.49
	DS/DD .....	\$1.99
8"	SS/SD .....	\$2.04
	SS/DD .....	\$2.44
	DS/DD .....	\$2.88

Minimum order of 20 diskettes packaged in boxes of 10, with Tyvek sleeves and reinforced hubs. Quantity discounts: 100 deduct 5%, 1000 deduct 15%. We accept MasterCard, Visa, checks and money orders. Most orders shipped within 24 hours. P.O.'s accepted from most schools, govt. agencies and Fortune 1000 companies. Shipping and handling F.O.B. Amherst \$3.00 additional for C.O.D. orders. Prices subject to change without notice.

Send or phone your order to:

**AEC**

✓ 342

P.O. Box 183, Amherst, N.H. 03031  
Toll Free 1-800-431-8031  
In N.H. call 603-673-3137

VISA

MasterCard

ALWAYS AT  
SALE PRICES

# TRS-80®

ALWAYS AT  
SALE PRICES

OUR TRS-80s Have the Radio Shack warranty



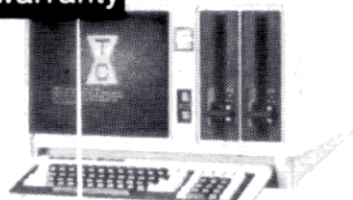
HARD DISK DRIVES



**WE SHIP  
FAST!**

✓ 282

DFW COMPUTER CENTER  
326 MAIN ST., GRAPEVINE  
TEXAS 76051 — (817) 481-7283

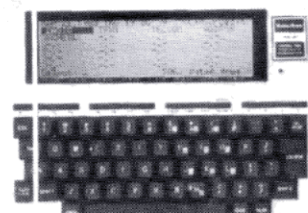


MODEL 12



MODEL 4

To get YOUR SALE price CALL:  
**1-800-433-SALE**



MODEL 100



MODEL 4-P



MODEL 2000



MODEL 16

✓ 282









# NOVA CALC

**Whether you're making five-year fiscal projections or managing your home budget, NovaCalc tracks your finances with all the features of a commercial spreadsheet.**

by Daniel Garms

**F**orget your balance sheets and home-budget programs. Here's a full-featured, menu-driven Model I/III spreadsheet that gives you all the capabilities of its commercial counterparts, including a rapid-entry mode that lets you enter information into the spreadsheet without waiting for the program to recalculate related values.

NovaCalc also totals and averages a series of cells and has a built-in four-function calculator that lets you make calculations before entering the results in the spreadsheet. It accepts label (text), numeric, and formula entries of up to 12 characters.

## Operating NovaCalc

When you run NovaCalc, it prompts you to select 1-, 2-, 3-, or 4-digit precision and to choose from four spreadsheet formats (24 columns by 26 rows, 16 by 39, 12 by 52, or 8 by 78). NovaCalc then displays the spreadsheet with a command prompt and cell status line at the top of the screen.

NovaCalc provides a total of 624 cells. You identify cells by column and row. For example, A01 represents the cell at column A, row 1. Use the arrow keys to move the cell pointer (cursor) from cell to cell.

The slash key (/) puts NovaCalc in the command mode. Press this key and a list of commands appears at the screen top. NovaCalc supports 13 commands (see Table 1). You invoke the desired command by pressing its first character.

The clear key is the escape character. Press it to cancel the current routine and return to the spreadsheet. When used in the rapid-entry mode, the clear key cancels the current routine and updates the spreadsheet for all previous entries made in this mode.

The rapid-entry mode works when you enter data or use the calculator routine. Hit any arrow key instead of the enter key to make another entry without recalculating all the affected cells.

The contents of the cell at the cursor position appear on the cell status line as you make an entry. To recalculate the spreadsheet after an entry, hit the enter key.

Pressing the clear key or executing any command except Alpha, Value, or Calculator (described below) exits the rapid-entry mode and recalculates the spreadsheet. The program also exits the mode if the cursor scrolls to a column or row that's off-screen.

## Labeling Cells

You use the Alpha command (A) to label a cell. When you invoke this command, the cell status line displays a lowercase (a) at the top of the screen and in the cell. However, this simply serves as an indicator; you still have all 12 character spaces available for entering text.

Type in your entry at the prompt and press the enter key to update the spreadsheet or the clear key to cancel the entry.

You can enter any combination of alphanumeric characters as a label ex-

cept an open parenthesis or quotation marks. NovaCalc's value interpretation routine uses an open parenthesis to detect alpha entries. Basic uses quotation marks as delimiters when separating and storing string variables, and NovaCalc saves all variables as strings.

You can't combine cells with label entries in mathematical functions, but you can use label cells in a column or row without affecting the total. The program's value interpretation routine sets the value of any alpha or blank cell to zero.

## Blanking Out Cells

Blank (B) deletes the contents of a cell. It erases cell formulas and values and updates the spreadsheet.

If the cell you're blanking out derives from a formula in another cell, that formula remains unaffected, but the value of the blanked cell equals zero.

## Copying Values

The Copy command (C) copies a cell's value to other cells so you don't have to reenter information. Copy can also link cells so that NovaCalc updates them whenever the source cell changes.

To link cells, type Y at the link prompt, or type N to copy without linking. Once linked, the destination cells contain a value like A01C, for example. A01 represents the source cell and C instructs the value interpretation routine to get the spreadsheet value from the source cell.



Command	Description
Alpha	Alpha command for entering label data
Blank	Blank command clears cell and deletes formula used to create it
Copy	Copy command copies value of one cell to another cell
Delete	Delete command erases cell formula while retaining cell's value
Go To	GOTO command positions cursor at specified cell location
Help	Help command displays explanations for all NovaCalc commands
Load	Load command loads saved spreadsheets
Print	Prints out the portion of the spreadsheet on the screen
Quit	Quit command ends session and prompts you to save data
Replicate	Replicate command projects and modifies over a series of cells
Save	Save command saves data to disk
Value	Value command for entering formulas and values
Calculate (=)	Activates four-function calculator

Table 1. Commands for NovaCalc.

You can't link alpha cells; the program unlinks any cell containing an alpha value prior to copying it to a new location.

The next prompt asks you if you want the cell copied to another cell location (C), or copied several locations down (D) or right (R).

The C option displays the current cursor location followed by an equals sign. You enter the target location. For example, entering A02 at this prompt copies the current cell to the second row of column A and updates the spreadsheet.

When you copy down or right, the program asks you how many times you want to copy the cell. Enter a number and hit the enter key. The program copies the value of the current cell location down or right the specified number of times and updates the screen.

### Deleting Formulas

Delete (D) erases the formula used to calculate a cell without removing the cell's current value. It's useful for unlinking cells created with the Copy command. Press the D key to delete the formula and update the spreadsheet.

### The GOTO Command

The GOTO command (G) lets you move the cursor to any cell by entering its location. This saves moving through the spreadsheet with the arrow keys. GOTO is especially useful when you want to move to a cell that's off-screen, or when you want to print a specific area of the spreadsheet.

GOTO prompts you for a cell location, then makes that location the upper left-hand cell on the display. For example, typing H, 1, and 7 resets the display to show columns H, I, J, and K and rows 17-29. If the cell specified is too far down to display a full screen, Nova-

Calc doesn't print the cell in the upper left-hand corner; instead, it marks the position with the cursor and displays a full screen.

Press the clear key to cancel GOTO and recalculate the spreadsheet. If you specify a cell location outside the limits of the spreadsheet, the program displays an "Entry Error" message and stays at the current cell location.

### The Help Command

The Help command (H) lists NovaCalc's commands and gives you a short definition of each. Press the clear key to return to the spreadsheet.

### Loading a Spreadsheet

To load files from disk, press the L key. Enter the appropriate file number (1-9) at the prompt. The message "Loading" appears on the screen as the file loads.

When the program finishes loading, it recalculates the spreadsheet and resets the cursor position to cell A01.

NovaCalc saves spreadsheet cells in an order dependent on the number of rows and columns. Before loading a file, be sure to choose the appropriate spreadsheet format. Otherwise, cells can reference formulas that don't exist.

### Printing Spreadsheets

The Print command (P) prints out the portion of the spreadsheet on the display (four rows and 13 columns). You can print the values or the formulas.

Print prompts you to hit the enter key when the printer is ready. To cancel the Print command, press the clear key.

The program next asks you to press the D key to print display values, or the F key to print formulas. Press the appropriate key and hit the enter key. The program displays a "Printing" message and prints the spreadsheet.

## Ending a Session

To end a session or restart the program, press the Q key. Quit prompts you to save data before ending the session.

The program then branches to the Save routine or prompts you to return to the spreadsheet (R), create a new spreadsheet (C), or exit to Basic ready (E).

## The Replicate Command

The Replicate command projects and modifies a formula over a series of cells. This saves you from entering similar formulas in contiguous cells. Replicate works down or to the right.

For example, assume columns A, B, and C are labeled Income, Expenses, and Remaining Amount, and the formula for cell C01 is  $C01 = A01 - B01$ . If rows 1-12 represent January through December, and you want the same formula for each month, you must type  $C02 = A02 - B02$ ,  $C03 = A03 - B03$ , and so on.

To do this automatically, type in R to enter the Replicate routine, then type D at the prompt for down, and 11 at the prompt for the number of times you want to replicate the formula.

If the number of rows or columns specified exceeds the number of remaining rows or columns in the spreadsheet, the program adjusts your entry before executing the command.

To replicate a formula to all remaining cells, enter any number exceeding the number of columns or rows in the spreadsheet. Press the clear key to cancel Replicate.

## Saving Spreadsheets

The Save command (S) lets you save up to nine spreadsheet templates and data. The routine prompts you to save the file to a number from 1-9. Select a number or press the clear key to return to the command prompt.

NovaCalc displays a "Saving" message as it saves the spreadsheet to disk, then prompts you to return to the spreadsheet (R), create a new spreadsheet (N), or exit the program (E).

## The Value Command

The Value command lets you enter numeric values or formulas. To make an entry, press the V key, type in the

### The Key Box



### Models I and III

48K RAM

Disk Basic

Printer (optional)

# SOFTWARE PRICE WAR

# \$24.95

**30 Day Money Back Guarantee**

These are complete software systems supplied to you on a **TRSDOS 1.3** system diskette. All systems fully menu driven — user friendly just insert diskettes, reset and go. Systems are supplied with full documentation (although most users report that they don't read it).

## This is a sample of my mail

"Your PAYROLL program is great — I use it for all my accounts — it's quite a time saver." Hampton, NJ

"I received your PAYROLL program yesterday and was impressed by it. Hence I am enclosing a Cashier's check for..." Jacksonville Beach, FL

"A friend showed off his possession of your check register system to me and I want a copy for my personal use." Bloomington, IL

"We have received the first two programs and have found them to be quite sophisticated and are anxious to try another. Please accept my order for..." Durango, CO

All systems are on a TRSDOS 1.3 diskette ready to run on a TRS 80 Model III or Model IV in III Mode.

**AND THE BEST PART... ANY SYSTEM ONLY \$24.95**

## LYNN'S PAYROLL SYSTEM

Complete record keeping & payroll calculation. To include your state's unemployment tax & forms, detailed 941 form, prints paychecks & W-2's.

## LYNN'S ACCOUNTS RECEIVABLE SYSTEM

Single entry — open invoice system. Prints invoice and statements. Built in aging report.

## LYNN'S CHECK REGISTER SYSTEM

Prints checks. Register for any month, reconciliation statement.

1,000 checks per month — 220 expense accounts.

## LYNN'S TRSDOS UTILITY PROGRAMS

For TRSDOS 1.3 includes short directory (file names only), cursor directory (allows cursor access to CMD, BASIC, and "DO" Files), and a 2K Print Spooler. Menu installs utilities on existing TRSDOS Diskettes.

## LYNN'S E-Z MAIL SYSTEM

Sort by name, zip code, state. 2,500 names. E-Z edit.

Joe Lynn



Computer Services  
23501 W. Gagne Lane  
Plainfield, Illinois 60544  
815/436-4477



## LYNN'S MAILING LIST

**\$19<sup>95</sup>** EACH DISKETTE

Over 2,000 names on a diskette. East half or west half of U.S. to be used with Lynn's E-Z mail.

ALSO AVAILABLE:

**VERBATIM DISKETTES \$20**

YES, PLEASE SEND ME:

- ☐ LYNN'S PAYROLL SYSTEM
- ☐ LYNN'S ACCOUNT RECEIVABLE
- ☐ LYNN'S CHECK REGISTER SYSTEM
- ☐ LYNN'S TRSDOS UTILITY PROGRAMS
- ☐ LYNN'S E-Z MAIL SYSTEM
- ☐ VERBATIM DISKETTES
- ☐ I'M INTERESTED — SEND ME MORE INFO.

Please include \$3.00 shipping (plus \$1.65 if C.O.D.)

Illinois residents add 6 1/4% sales tax

5% surcharge for credit card orders

Total amount enclosed \_\_\_\_\_

☐ CHECK/MO ☐ VISA ☐ MC ☐ C.O.D.

CARD # \_\_\_\_\_ EXP DATE \_\_\_\_\_

SIGNATURE \_\_\_\_\_

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

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

**JOE LYNN COMPUTER SERVICES**  
23501 W. Gagne Lane, Plainfield, IL 60544

✓112



numeric value or formula and hit the enter key.

NovaCalc accepts any positive or negative number value as numeric input. Input numeric values requiring a mathematical operator with the Calculator routine.

To input a numeric value, type in the value and hit any arrow key to continue or the enter key to recalculate.

NovaCalc formulas add, subtract, multiply, or divide two cells or a cell and a numeric value. To build a formula, move the cursor to the cell where you want the result to appear. The cell location appears at the screen top in the format A01 = .

Type in a cell location, a mathematical operator, and a numeric value, or a cell location. Now hit the enter key and the program calculates the value and puts it in the cell.

NovaCalc retains the formula used to calculate the cell and displays it on the cell status line when you position the cursor at the cell. The program updates the display for formula changes when it recalculates the spreadsheet.

In addition to the four mathematical operators listed above, NovaCalc also totals (T) or averages (A) a series of cells (see Table 2 for a list of mathematical functions).

To total a series of cells in the same

column or row, enter a starting cell location, press the T key, enter an ending cell location, and hit the enter key.

The program adds the contents of the cell locations from the starting cell to the ending cell and puts the result at the cursor location.

To average a series of cells in the same column or row, enter a starting cell location, type A, enter an ending cell location, and hit the enter key.

NovaCalc averages all cells from the first to the second location and displays the results at the cursor location.

## Using the Calculator Function

The Calculator command adds, subtracts, multiplies, and divides values. To use it, hit the equals key. The routine displays the prompt START WITH <C>ELL VALUE X OR <Z>ERO?

Press the C key to use the current cell value as the starting subtotal. Press the Z key to start with a subtotal of zero.

Calculator displays the message SUBTOTAL=X, where X is the value you specified above, and the prompt ENTER VALUE:.

Type in a value and press the appropriate mathematical function (+, -, \*, or /). Calculator performs the function on the value to create a new subtotal, and displays it at the screen top.

With a starting subtotal of zero, typing 1, 2, 3, and a plus sign adds 123 to zero for a new subtotal of 123 (the program ignores instructions to divide by zero).

When you're finished, hit the equals key to set the cell value to the new subtotal, or hit the clear key to exit the routine.

To use the rapid-entry mode with the Calculator routine, press any arrow key instead of the equals key. This places the value of the subtotal in the cell, but does not update the rest of the worksheet.

## The Final Analysis

While NovaCalc is a full-featured spreadsheet, it lacks the speed of commercial programs. Occasionally, NovaCalc must do a dynamic string allocation. When this happens, the computer goes through memory to clean out the old variables and appears to hang up for several minutes.

However, this is a minor inconvenience when weighed against the cost of commercial spreadsheet programs. If it means saving \$100 or more, most home applications can probably wait a few minutes for the same results. ■

Contact Daniel D. Garms at P.O. Box 3742, Reston, VA 22090.

Mathematical Operator	Definition
A	Averages a series of cells in the same column or row
T	Totals a series of cells in the same column or row
+	Adds second entry to first entry
-	Subtracts second entry from first entry
*	Multiplies first entry by second entry
/	Divides first entry by second entry

Table 2. Mathematical operators for NovaCalc.

Program Listing. NovaCalc spreadsheet program.

```

10 CLS: CLEAR150: A$=STRING$(128,179): PRINT@0, A$: PRINT@267, "NovaCalc
  Financial Package Spreadsheet 1.0": PRINT@896, "Copyright 198
  3 by Daniel D. Garms": FOR D=1 TO 1500: NEXT: CLEAR18000: N$=STRING$(6
  4,32)
20 PRINT@896, "Set decimal precision to how many points? (1, 2, 3
  , or 4) ";
30 I$=INKEY$: IF I$="" THEN 30 ELSE IF I$<"1" OR I$>"4" THEN 30
40 N=VAL(I$): PRINTN: T$=STRING$(N,48): I$="1": T$=I$+T$: N=VAL(T$)
50 PRINT@395, "Format spreadsheet as: ": PRINT: PRINT, "1. 24 column
  s by 26 rows": PRINT, "2. 16 columns by 39 rows": PRINT, "3. 12 co
  lums by 52 rows": PRINT, "4. 8 columns by 78 rows"
60 I$=INKEY$: IF I$="" THEN 60 ELSE IF I$<"1" OR I$>"4" THEN 60
70 IF I$="1" THEN H=24 ELSE IF I$="2" THEN H=16 ELSE IF I$="3" THEN H=12 ELSE
  H=8
80 U=624/H: DIM B$(U,H): DIM D$(U,H): A$="FILE T": CLS
90 REM SCREEN SETUP
100 B=179: I=1: J=1: K=1: L=1: E=0
110 CLS
120 C=J: R=I: PRINT@0, N$: N$: STRING$(4,143): CHR$(191): STRING$(6,143
  ): " ": CHR$(J+64): " ": STRING$(11,143): " ": CHR$(J+65): " ": STRING$(
  11,143): " ": CHR$(J+66): " ": STRING$(11,143): " ": CHR$(J+67): " ": ST
  RING$(6,143): CHR$(191): CHR$(32);
130 R$=STR$(R): R$=RIGHT$(R$,2): IFR>9 THEN 150
140 R$=RIGHT$(R$,1): T$="0": R$=T$+R$
150 PRINT CHR$(32): R$: CHR$(32): CHR$(191): STRING$(57,32): CHR$(191)
  ;
160 R=R+1: IFR=I+13 THEN 180
170 PRINT CHR$(32): GOTO 130
180 REM PRINT CELLS
190 ON ERROR GOTO 2740: PRINT@0, N$: PRINT@0, "NovaCalc Spreadsheet ";
  A$: " (Press </> for commands)";
200 PRINT@64, N$: PRINT@64, " * * * CALCULATING * * * "; C=J: R=I: P=1
  98
210 PRINT@P, CHR$(32): V$=MID$(B$(R,C), 1,1): IF V$>"A" AND V$<CHR$(H
  +65) THEN 290 ELSE IF V$>"0" AND V$<"9" THEN 250 ELSE IF V$="+" THEN 230 ELSE
  IF V$="-" THEN 240 ELSE IF V$="*" THEN 220 ELSE IF V$="/" THEN 270 ELSE 280
220 D$(R,C)="": GOTO 630
230 F#=0: T$=MID$(B$(R,C), 2): S#=VAL(T$): GOTO 350
240 F#=0: T$=MID$(B$(R,C), 2): S#=VAL(T$): GOTO 360
250 F=VAL(B$(R,C)): S=VAL(V$): IF F<S THEN 280
260 F#=0: S#=VAL(B$(R,C)): GOTO 350

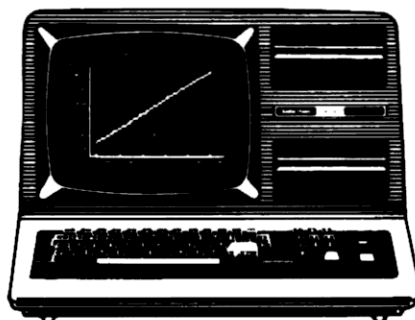
```

Listing continued

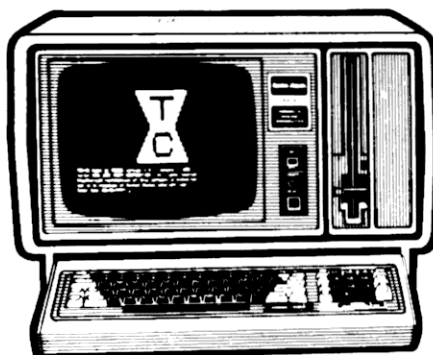
# NOCONA

## ELECTRONICS

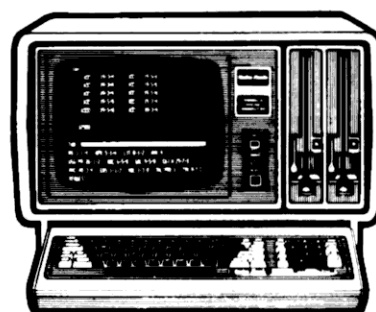
### MODEL 4



### MODEL 16



### MODEL 12



MOD 2000 W/MONO MONITOR .....	2299.00
16K MODEL 4 CASS VERS. ....	579.00
64K MODEL 4 2 DR RS 232 .....	935.00
64K MODEL 4 PORTABLE .....	935.00
80K MODEL 12 1 DR .....	2189.00
80K MODEL 12 2 DR .....	2719.00
256K MODEL 16 1 DR .....	3099.00
256K MODEL 16 2 DR .....	3629.00
256K MODEL 16 1 DR W/HD .....	4999.00
8K MODEL 100 PORTABLE .....	459.00
24K MODEL 100 PORTABLE .....	569.00
15 MEG HD MOD 12/16 W/KIT .....	2318.00
15 MEG HD MODEL III/4 W/KIT .....	1999.00
10 MEG HD MOD 2000 INTERNAL .....	1439.00

MOD 2000 W/COLOR MONITOR .....	2669.00
MOD 2000 1 DRIVE W/HARD DISK .....	3299.00
DMP 105 PRINTER .....	145.00
DMP 110 PRINTER .....	269.00
DMP 120 PRINTER .....	359.00
DMP 200 PRINTER .....	379.00
DMP 430 PRINTER .....	585.00
DMP 500 PRINTER .....	999.00
DMP 2100 PRINTER .....	825.00
DMP 2100 PRINTER .....	1499.00
DWP 210 DAISYWHEEL .....	429.00
DWP 410 DAISYWHEEL .....	539.00
DWP 510 DAISYWHEEL .....	1139.00
DWP II DAISYWHEEL .....	819.00

**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**

✓ 232



# LETTER - WRITER

"WORKS" for YOU

\$19.99  
DISK SALE

THE "BEST" SOFTWARE IS GUARANTEED!  
TRY IT and LIKE IT, or GET a REFUND

The machine code L-W is "A" rated by  
Allenbach's "SOFTWARE REPORTS" for:

EASY USE, DOCUMENTATION, FEATURES

- SCREEN DISPLAYED same as PRINTING.
- Use ANY PRINTER \* GRAPHICS options.
- FULL PRINTING CONTROLS: Columns, lines, pages, FORM LETTERS/LABELS, LEGAL paper LINE NUMBERS \* MASS MAILER.
- FULL TYPING CONTROLS: Copy/Move/Center/Insert/Delete--Characters/ Words/Lines/Blocks/Columns/Files.
- \* OVER 50 ASCII Code/PHRASE typing insertions set up/stored by users.
- \* WARM START and pre-set PAGE SAVE.
- Split screen typing line, see old and new version \* cancel changes.
- Unmodified MI see/print lower case.
- INTEGRATED bookkeeping ADD / SUB.
- EASY ARROW KEYS CURSOR moves: Up/Down/Right/Left Start/End-Lines/ columns/page and WORD WRAP control.
- ONE MODE: Type/Edit/Delete without switching modes--NO TRAINING PERIOD.

WE PAY TAX/USA SHIPPING. Try a L-W for 3 months. Like it or return it for a refund, less our S/H costs of \$3.50.

Models I, III/IV: TAPE 16K \$23.99  
DISK 32K (\* Extra Features) \$37.99

VERBATIM SS/DD (Box of 10 disks) \$19.99

ASTRO-STAR ENTERPRISES 383  
5905 Stone Hill Dr. Information:  
Rocklin, CA 95677 (916) 624-3709

Orders: 1-800-622-4070 Ext. AS  
in IL 1-800-942-7317 Ext. AS

## DISCOUNTS

on all

## TRS-80<sup>®</sup> COMPUTERS

with  
Manufacturers Guarantee

Call or Write For  
Free Catalog and Price List

\*Trademark of Tandy Corporation

**HARMON**  
**Hdw. & Supply**

307 N. Main  
Denver City, Tx 79323  
806-592-2472



✓61

Listing continued

```

270 DS(R,C)=MID$(B$(R,C),4):GOTO630
280 DS(R,C)="ENTRY ERROR ":GOTO630
290 T=LEN(B$(R,C)):IFT<4THEN280
300 W$=MID$(B$(R,C),2,2):X$=MID$(B$(R,C),4,1):V=ASC(V$)-64:W=VAL
(W$):IFV>HORW>U$THEN280ELSEF$=VAL(D$(W,V)):IFX$="C"THEN400
310 Y$=MID$(B$(R,C),5,1):IFY$<"0"ORY$>"9"THEN330
320 T=VAL(Y$):Y$=MID$(B$(R,C),5):S$=VAL(Y$):IFS#<TTHEN280ELSE340
330 Z$=MID$(B$(R,C),6,2):Y=ASC(Y$)-64:Z=VAL(Z$):IFY>HORZ>U$THEN28
0ELSE$=VAL(D$(Z,Y))
340 IFX$="+"THEN350ELSEIFX$="-"THEN360ELSEIFX$="*"THEN370ELSEIFX
$="/"THEN380ELSEIFX$="A"THEN410ELSEIFX$="T"THEN420ELSE280
350 T=F#S$:GOTO550
360 T=F#-S$:GOTO550
370 T=F#*S$:GOTO550
380 IFS#0THEN280
390 T=F#S$:GOTO550
400 T=F#-S$:GOTO550
410 D=1
420 IFV=YTHEN490
430 F$=VAL(D$(W,V))
440 V=V+1:S$=VAL(D$(W,V))
450 T=F#S$:D=D+1:IFV=YTHEN470
460 F$=T$:GOTO440
470 IFX$="T"THEN550
480 T=T#/D:GOTO550
490 F$=VAL(D$(W,V))
500 W=W+1:S$=VAL(D$(W,V))
510 T=F#S$:D=D+1:IFW=ZTHEN530
520 F$=T$:GOTO500
530 IFX$="T"THEN550
540 T=T#/D
550 IFT#>0THEN570
560 T=T#*N:T=T#-.5:T#*=FIX(T#):GOTO580
570 T=T#*N:T=T#+.5:T#*=FIX(T#):
580 Q$=STR$(N):Q=LEN(Q$)-2:P$=" ":T$=STR$(T#):F$=RIGHT$(T$,Q):F=
LEN(T$):IFF<QTHENF=Q+1
590 T$=LEFT$(T$,F-Q):F=VAL(F$):F$=STR$(F):F$=MID$(F$,2)
600 F=LEN(F$):IFF=QTHEN620
610 S$=STRING$(Q-F,48):F$=S$+F$
620 T$=T$+F$+F$:D$(R,C)=T$
630 F=LEN(D$(R,C)):IFF>12THEN650
640 F=12-F:IFV$="("THEN670ELSE660
650 D$(R,C)=LEFT$(D$(R,C),12):F=0:PRINT@P,"%";
660 PRINTSTRING$(F,32):D$(R,C):GOTO680
670 PRINTD$(R,C):STRING$(F,32);
680 R=R+1:IFR=I+13THEN700
690 P=P+64:GOTO210
700 R=I:P=P-754:C=C+1:IFC=J+4THEN710ELSE210
710 IFE=1THEN720ELSE730
720 I=I+13:D=D+1:GOTO1900
730 REMCURSORCONTROL
740 C=L:R=K:R$=STR$(R):R$=RIGHT$(R$,2):IFR>9THEN750ELSER$=RIGHT$
(R$,1):T$="0":R$=T$+R$
750 PRINT@B,CHR$(183);:PRINT@B+14,CHR$(187);
760 L$=CHR$(C+64):T$=" ":L$=L$+R$+T$:PRINT@64,N$;:PRINT@64,L$;
B$(R,C);
770 I$=INKEY$
780 IFI$=" "THEN770ELSEIFI$=CHR$(13)THEN770ELSEIFI$=CHR$(34)THEN7
70ELSEIFI$=CHR$(31)THEN190ELSEIFI$=CHR$(91)THEN790ELSEIFI$=CHR$(
10)THEN840ELSEIFI$=CHR$(8)THEN890ELSEIFI$=CHR$(9)THEN940ELSEIFI$
="/"THEN990ELSE770
790 PRINT@B,CHR$(32);:PRINT@B+14,CHR$(32);:K=K-1:IFK<1THENK=1ELS
E810
800 PRINT@B,CHR$(183);:PRINT@B+14,CHR$(187);:GOTO770
810 IFK<1THEN830
820 B=B-64:GOTO740
830 I=I-1:GOTO120
840 PRINT@B,CHR$(32);:PRINT@B+14,CHR$(32);:K=K+1:IFK>UTHENK=K-1E
LSE860
850 PRINT@B,CHR$(183);:PRINT@B+14,CHR$(187);:GOTO770
860 IFK=I+13THEN880
870 B=B+64:GOTO740
880 I=I+1:GOTO120
890 PRINT@B,CHR$(32);:PRINT@B+14,CHR$(32);:L=L-1:IFL<1THENL=1ELS
E910
900 PRINT@B,CHR$(183);:PRINT@B+14,CHR$(187);:GOTO770
910 IFL<JTHEN930
920 B=B-14:GOTO740
930 J=J-1:GOTO120
940 PRINT@B,CHR$(32);:PRINT@B+14,CHR$(32);:L=L+1:IFL>HTHENL=L-1E
LSE960
950 PRINT@B,CHR$(183);:PRINT@B+14,CHR$(187);:GOTO770
960 IFL=J+4THEN980

```

Listing continued

```

970 B=B+14:GOTO740
980 J=J+1:GOTO120
990 REMCOMMANDS
1000 PRINT@64,"Alpha Blank Copy Del Goto Help Load Print Quit Re
pli Save Val =";
1010 I$=INKEY$:IFI$=""THEN1010ELSEIFI$=CHR$(31)THEN740ELSEIFI$="
A"THEN1030ELSEIFI$="B"THEN1050ELSEIFI$="C"THEN1070ELSEIFI$="G"TH
EN1470ELSEIFI$="H"THEN1600ELSEIFI$="L"THEN1670ELSEIFI$="P"THEN18
50ELSEIFI$="Q"THEN2020ELSEI1020
1020 IFI$="D"THEN1420ELSEIFI$="R"THEN2240ELSEIFI$="S"THEN2050ELS
EIFI$="V"THEN2520ELSEIFI$="="THEN2580ELSEI1010
1030 REMALPHA
1040 T$="(a)";PRINT@0,N$;N$;PRINT@0,"Type entry then depress <E
NTER>";PRINT@64,L$;T$;GOTO2540
1050 REMBLANK
1060 B$(R,C)="":GOTO200
1070 REMCOPY
1080 PRINT@0,N$;N$;PRINT@0,"Link cells? <Y>es or <N>o";
1090 I$=INKEY$:IFI$=""THEN1090ELSEIFI$=CHR$(31)THEN190ELSEIFI$="
Y"THENE=0ELSEIFI$="N"THENE=2ELSEI1090
1100 PRINT@0,STRING$(128,32);PRINT@0,"Copy <C>ell, <D>own, or <
R>ight?";
1110 I$=INKEY$:IFI$=""THEN1110ELSEIFI$="C"THEN1320ELSEIFI$="D"TH
EN1120ELSEIFI$="R"THEN1220ELSEIFI$=CHR$(31)THEN190ELSEI110
1120 PRINT@64,"Type number of rows to copy down then <ENTER> ";:
T$="";F$=LEFT$(L$,3):S$="C":F$=F$+S$:IFB$(R,C)="THENF$="
1130 I$=INKEY$:IFI$=""THEN1130ELSEIFI$=CHR$(31)THEN190ELSEIFI$=>
"0"ANDI$=<"9"THEN1140ELSEIFI$=CHR$(13)THEN1150ELSEI130
1140 PRINTI$;T$=T$+I$:GOTO1130
1150 F=R+1:S=VAL(T$):T=R+S:IFT>UTHENT=U
1160 IFLEFT$(B$(R,C),1)="("THEN1170ELSEI180
1170 E=0:FORD=FTOT:B$(D,C)=B$(R,C):NEXT:GOTO190
1180 IFE=0THEN1210
1190 E=0:F#VAL(D$(R,C)):F$=STR$(F#):IFF#<0THEN1210
1200 F$=MID$(F$,2)
1210 FORD=FTOT:B$(D,C)=F$:NEXT:GOTO190
1220 PRINT@64,"Type number of columns to copy right then <ENTER>
";:T$="";F$=LEFT$(L$,3):S$="C":F$=F$+S$:IFB$(R,C)="THENF$="
1230 I$=INKEY$:IFI$=""THEN1230ELSEIFI$=CHR$(31)THEN190ELSEIFI$=>
"0"ANDI$=<"9"THEN1240ELSEIFI$=CHR$(13)THEN1250ELSEI230
1240 PRINTI$;T$=T$+I$:GOTO1230
1250 F=C+1:S=VAL(T$):T=S+C:IFT>HTHEN=H
1260 IFLEFT$(B$(R,C),1)="("THEN1270ELSEI280
1270 E=0:FORD=FTOT:B$(R,D)=B$(R,C):NEXT:GOTO190
1280 IFE=0THEN1310
1290 E=0:F#VAL(D$(R,C)):F$=STR$(F#):IFF#<0THEN1310
1300 F$=MID$(F$,2)
1310 FORD=FTOT:B$(R,D)=F$:NEXT:GOTO190
1320 S$=LEFT$(L$,3):F$="C":F$=S$+F$:PRINT@64,"Copy ";S$;" to ";:
S$="
1330 I$=INKEY$:IFI$=""THEN1330ELSEIFI$=CHR$(31)THEN190ELSEIFI$<
"0"ORIS>CHR$(H+64)THEN1330ELSEI$=I$
1340 PRINTI$;
1350 I$=INKEY$:IFI$=""THEN1350ELSEIFI$=CHR$(31)THEN190ELSEIFI$<
"0"ORIS>"9"THEN1350
1360 PRINTI$;S$=S$+I$:T=LEN(S$):IFT<2THEN1350
1370 F=ASC(T$)-64:S=VAL(S$)
1380 IFLEFT$(B$(R,C),1)="("THEN1410
1390 IFE=2THEN1410
1400 B$(S,F)=F$:GOTO190
1410 E=0:B$(S,F)=B$(R,C):GOTO190
1420 REMDELETE
1430 F$=LEFT$(B$(R,C),1):IFF$="("THEN190
1440 F#VAL(D$(R,C)):F$=STR$(F#):IFF#<0THEN1460
1450 F$=MID$(F$,2)
1460 B$(R,C)=F$:GOTO190
1470 REMGOTO
1480 PRINT@0,N$;N$;PRINT@0,"Go to which cell? ";
1490 I$=INKEY$:IFI$=""THEN1490ELSEIFI$=CHR$(31)THEN190ELSEIFI$<
"0"ORIS>CHR$(H+64)THEN1490ELSEI$=I$:S$="
1500 PRINTI$;
1510 I$=INKEY$:IFI$=""THEN1510ELSEIFI$=CHR$(31)THEN190ELSEIFI$<
"0"ORIS>"9"THEN1510
1520 PRINTI$;S$=S$+I$:T=LEN(S$):IFT<2THEN1510
1530 S=VAL(S$):IFS>UTHENT740
1540 J=ASC(F$)-64:L=J:C=L:F=0:IFJ>H-3THEN1550ELSEI560
1550 J=H-3:F=H-L:F=F*14:F=42-F
1560 R=VAL(S$):IFR>UTHENT740
1570 IFR>U-12THEN1590
1580 I=R:K=R:B=197:B=B+F:GOTO120
1590 I=R/13+.95:I=FIX(I):I=I*13-12:T=(R-I)*64:B=T+197+F:K=R:GOTO
120
1600 REMHELP

```

Listing continued



## MacInker

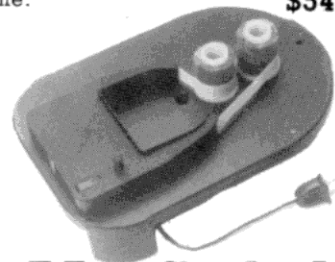
### A Gift For Christmas A Gift For All Seasons

If Shakespeare had had a word processor he would have consumed about 25 cartridges to run a first draft of his works. At an average of \$10/cartridge the cost is \$250. With MAC INKER he would use one cartridge, his total would be 50 cents in ink and his print-out quality would be much improved.

MAC INKER is very simple to use and automatic. Average ink cost/re-inking is 5 cents. We support 535 printers and we have 20,000 units in the field, in the US and in 5 continents.

MAC INKER, a gift for Christmas, that will last for years in many seasons to come.

**\$54.95+**



## MacSwitch

Choose also our popular MAC SWITCH, serial or parallel switch - the ideal companion for the user who has 2 printers or 2 microcomputers or both.

**\$99.00**



Order toll free 1-800-547-3303  
or ask for free brochure

## Computer Friends

6415 S.W. Canyon Court  
Suite #10  
Portland, Oregon 97221  
(503) 297-2321

357



# WHAT THE HECK!

OUR  
CHARTS  
EXPLAIN IN PLAIN  
ENGLISH WHAT THEIR  
MANUALS ARE TRYING TO SAY!

**SuperSCRIPIT®** insert pgs Mod 3 expands training manual; Combines ref. manual info. Inc. chart..... \$16.00  
**Profile III Plus®** 108 insert pgs for Mod 3 manual, expl./examples, 2 16x22 flow charts..... \$16.00  
**GL** insert pgs 3 Disk Manual. How to run it right! Inc. chart shows Cycle, P&L, Bal. Sheet, Terms..... \$16.00

WALL CHARTS showing all commands used & explanations for the following programs:  
(All are 19x25, 2-colors, easy to read — \$5.00 each)  
**SuperSCRIPIT®, MOD 3, Profile III®, VisiCalc®, General Ledger Mod 3, Basic Mod 3, Basic Mod 4.**

**MOD 4 BY JACK** — Newest book showing all Mod 4 DOS and BASIC operations with many clear examples. Replaces operators manual in most cases. Very clear & extensive indexes. 6x9 inches..... \$16.00  
**MOD 4 BASIC CHART** — 2-color wall chart shows most BASIC & DOS 6.1.2 operations with examples..... \$5.00  
**INDEXES** — Detailed indexes, on heavy stock, punched 3 holes, for the manuals of Profile III®, MOD 4 DISK SYS OWNERS MANUAL, SuperSCRIPIT III..... (each) \$5.00  
**MONTHLY NEWSLETTER** — Deals mainly with word processing/data base on Mod 3.4.100. Mailed 1st class with wide range of topics for non-hackers..... \$24.00/yr

© - Copyrights of Tandy or VisiCorp

Send cash, check, money order to:

**CREST SOFTWARE** ✓ 223

2132 Crestview, Suite #12 • Durango, CO 81301

(303) 247-9518

Visa, MC accepted, include card # and expiration date.

(Add \$2.00 Shipping — We use UPS)

## \*TRS-80

### MODEL I-III-IV

(Software Discounts)

- Disk Operating Systems
  - DosPlus 3.5.....\$89.95
  - DosPlus IVA. W/Mzal.....\$129.95
  - DosPlus Hard Drivers \$29.95
  - MULTIDOS 1.60.....\$59.95
- Word Processing
  - MScript.....\$59.95
  - Lazy Writer.....\$115.00
  - Electric Webster.....\$129.85
- Terminal Communication
  - Mterm.....\$59.95
  - LazyComm.....\$34.95
  - BBS-80.....\$69.95
- Assembly Language
  - M/zal.....\$99.95
- Accounting System
  - MicroBusinessSystem.....\$300.00
  - Maxi Manager II.....\$189.95
  - Maxi Cras (Checks).....\$89.95
  - VersaBusiness Series (5) \$84.95
- Bible
  - TheWORD (Complete Bible) \$199.95
  - Bible (Topics) 200sb.....\$49.95
- Diskette File holders 80 \$10.00

## DESIGN SOFTWARE

Toll Free 24 hrs 1-800-622-4070

Illinois Univ 1-800-942-7317

Technical Ser (702) 384-9320

Box 42847 ✓27

Las Vegas, Nv 89104

\*trademark of the tandv corporation

Listing continued

```

1610 CLS:PRINT" * * * HELP ON COMMANDS * * *":PRINT"<A>lpha allow
s cell to contain a non-numeric/formula value":PRINT"<B>lank cle
ars cell and deletes any formula used to create it":PRINT"<C>opy
makes cell equal to value of a specified cell"
1620 PRINT"<D>el(ete) formula used to calculate cell but retain
value"
1630 PRINT"<G>oto positions cell pointer (cursor) at specified c
ell":PRINT"<L>oads a previously saved file (designated files 1 t
hru 9)":PRINT"<P>rints a copy of all rows of displayed columns"
1640 PRINT"<Q>uit ends session giving option to save data to one
of 9 files<R>ep(icate) projects/modifies a formula over a seri
es of cells<S>aves data to one of 9 files":PRINT"<V>al(ue) estab
lishes contents of a cell through keyboard input"
1650 PRINT"<CLEAR> cancels command/action and returns to spreads
heet":PRINT"<=> Accesses built-in five function calculator":PRIN
T:PRINT" * * * DEPRESS <CLEAR> TO RETURN TO WORKSHEET * * *
";
1660 IS=INKEY$:IFI$=""THEN1660ELSEIFI$=CHR$(31)THEN110ELSE1660
1670 REMLOAD
1680 PRINT0,NS;NS;:PRINT0,"LOAD WHICH FILE? (1-9) ";
1690 IS=INKEY$:IFI$=""THEN1690ELSEIFI$=CHR$(31)THEN190ELSEIFI$<"
0"ORIS>"9"THEN1690
1700 C=1:R=1:AS=LEFT$(AS,5):AS=AS+IS
1710 PRINT0,64,"LOADING ";AS;" -- PLEASE WAIT";:IFI$="1"THEN1720E
LSEIFI$="2"THEN1730ELSEIFI$="3"THEN1740ELSEIFI$="4"THEN1750ELSEI
FI$="5"THEN1760ELSEIFI$="6"THEN1770ELSEIFI$="7"THEN1780ELSEIFI$=
"8"THEN1790ELSEIFI$="9"THEN1800
1720 CLOSE:OPEN"1",2,"FILE1":GOTO1810
1730 CLOSE:OPEN"1",2,"FILE2":GOTO1810
1740 CLOSE:OPEN"1",2,"FILE3":GOTO1810
1750 CLOSE:OPEN"1",2,"FILE4":GOTO1810
1760 CLOSE:OPEN"1",2,"FILE5":GOTO1810
1770 CLOSE:OPEN"1",2,"FILE6":GOTO1810
1780 CLOSE:OPEN"1",2,"FILE7":GOTO1810
1790 CLOSE:OPEN"1",2,"FILE8":GOTO1810
1800 CLOSE:OPEN"1",2,"FILE9":GOTO1810
1810 INPUT#2,B$(R,C)
1820 C=C+1:IFC=<HTHEN1810
1830 C=1:R=R+1:IFR=<UTHEN1810
1840 CLOSE:GOTO100
1850 REMPRINT
1860 PRINT0,NS;NS;:PRINT0,"READY PRINTER -- Press <ENTER> or <
CLEAR> to cancel";
1870 IS=INKEY$:IFI$=""THEN1870ELSEIFI$=CHR$(31)THEN190ELSEIFI$=C
HR$(13)THEN1880ELSE1870
1880 PRINT0,64,"Print <D>isplayed values or <F>ormulas?";:IS=INKE
Y$:IFI$=""THEN1880ELSEIFI$="D"THEN1890ELSEIFI$="F"THEN1920ELSEIF
IS=CHR$(31)THEN190ELSE1880
1890 D=1:G=U/13:M=I:I=1:E=1
1900 IFD>GTHEN1910ELSE120
1910 E=0:I=M
1920 PRINT0,64,NS;:PRINT0,64,"PRINTING -- PLEASE WAIT";
1930 SS=""% %:R=1:C=J:LPRINTSTRING$(10,35);" ";CHR$(C+6
4);" ";STRING$(12,35);" ";CHR$(C+65);" ";STRING$(12,35);" ";CHR$
(C+66);" ";STRING$(12,35);" ";CHR$(C+67);" ";STRING$(7,35)
1940 R$=STR$(R):T=LEN(R$):T=3-T
1950 LPRINTSTRING$(T,32);R$;" * ";
1960 IFI$="D"THEN1980
1970 LPRINTUSINGSS;B$(R,C);:LPRINT" * ";:GOTO1990
1980 LPRINTUSINGSS;D$(R,C);:LPRINT" * ";
1990 C=C+1:IFC<J+4THEN1960
2000 LPRINT:R=R+1:C=J:IFR=<UTHEN1940
2010 LPRINTSTRING$(65,35):R=K:C=L:GOTO120
2020 REMQUIT
2030 PRINT0,NS;NS;:PRINT0,"SAVE CONTENTS -- Depress <Y>es to s
ave or <N>o";
2040 IS=INKEY$:IFI$=""THEN2040ELSEIFI$=CHR$(31)THEN190ELSEIFI$="
Y"THEN2050ELSEIFI$="N"THEN2230ELSE2040
2050 PRINT0,NS;NS;:PRINT0,"Save as which file? (1-9)";
2060 IS=INKEY$:IFI$=""THEN2060ELSEIFI$=CHR$(31)THEN190ELSEIFI$>"
0"ANDIS=<"9"THEN2070ELSE2060
2070 C=1:R=1:AS=LEFT$(AS,5):AS=AS+IS
2080 PRINT0,64,"SAVING AS ";AS;" -- PLEASE WAIT";:IFI$="1"THEN209
0ELSEIFI$="2"THEN2100ELSEIFI$="3"THEN2110ELSEIFI$="4"THEN2120ELS
EIFI$="5"THEN2130ELSEIFI$="6"THEN2140ELSEIFI$="7"THEN2150ELSEIFI
$="8"THEN2160ELSEIFI$="9"THEN2170
2090 CLOSE:OPEN"O",1,"FILE1":GOTO2180
2100 CLOSE:OPEN"O",1,"FILE2":GOTO2180
2110 CLOSE:OPEN"O",1,"FILE3":GOTO2180
2120 CLOSE:OPEN"O",1,"FILE4":GOTO2180
2130 CLOSE:OPEN"O",1,"FILE5":GOTO2180
2140 CLOSE:OPEN"O",1,"FILE6":GOTO2180
2150 CLOSE:OPEN"O",1,"FILE7":GOTO2180

```

Listing continued

# HOLIDAY GIFT SPECIALS

## HARDWARE

### MODEL 4 64K MEMORY DISK UPGRADE KIT

Controller Board, Sound Board, Switching Supply, Tower  
Brackets, Cables, Nameplate & Instruction Manual

Retails at \$299.00 Our Price **\$199.00**

### ADD ONS:

#### 64K Memory Kit & Button

Retails at \$85.00 Our Price **\$50.00**

#### 64K-128K Memory Kit (with PAL & Button)

Retails at \$99.00 Our Price **\$60.00**

#### RS 232 III/4

Retails at \$129.00 Our Price **\$79.00**

#### 40 Track S/H Drives

Retails at \$199.00 Our Price **\$150.00**

#### 40 Track Thinline D/H Drives

Retails at \$299.00 Our Price **\$195.00**

### BYTCOM 300/1200 BAUD MODEM

Retails at \$599.00 Our Price **\$499.00**

### MICRO FAZER MP-64

Retails at \$299.00 Our Price **\$199.00**

## SOFTWARE

### DOS PLUS 3.5 Model I/III

Retails at \$149.00 Our Price **\$79.00**

### DOS PLUS 4A with M ZAL

Retails at \$169.00 Our Price **\$109.00**

### DOS PLUS 4 Epson QX-10

Retails at \$169.00 Our Price **\$109.00**

### MAS 80 The micro-accounting system

Retails at \$599.00 Our Price **\$399.00**

### μ Link II TRS-80 Model 4 Communications Software

Retails at \$110.00 Our Price **\$79.00**

## ACCESSORIES & SUPPLIES

### BAR CODE READERS

Hand-held scanners designed to read all common bar  
code formats. Available for the Epson HX-20, the Radio  
Shack Model 100 and the NEC Portable **\$95.95**

### PRINTER STANDS Lightweight/Plexiglass

Regular	<b>\$26.95</b>
Regular w/Shelf	<b>40.45</b>
Large	<b>31.45</b>
Large w/Shelf	<b>44.95</b>
Large w/Slot	<b>44.95</b>
Extra Large	<b>71.95</b>

### RIBBON CARTRIDGES for Epson Printers

MX 80/FX 80/RX 80	
Black, Red, Blue, Green, Brown	<b>\$4.75</b>
MX 100/FX 100/RX 100	
Black only	<b>\$9.95</b>

### 3M DISKETTES

SS/DD 5 1/4"	<b>\$23.50/10</b>	SS/SD 8"	<b>\$25.50/10</b>
DS/DD 5 1/4"	<b>29.50/10</b>	SS/DD 8"	<b>31.75/10</b>
DS/DD 5 1/4"	<b>39.75/10</b>	DD/DD 8"	<b>40.95/10</b>

### \*CENTECH RAINBOW PACK (10 Assorted Colors)

SS/DD Rainbow	<b>\$19.95</b>
DS/DD Rainbow	<b>26.95</b>

### \*DISA-PERF PAPER

Box of 2550 9 1/2 x 11 sheets, 20# white paper,  
clean edge **\$34.95**

### \*NO ZAP II A

Protect your valuable phone & modem equipment from  
surges and/or lightning **\$19.95**

### \*COMPUTER CARE KIT

Includes diskette head cleaner, drive cleaning solution,  
anti-static spray, screen and terminal cleaner, swabs  
**\$19.95**

### \*IDEAL STOCKING STUFFERS

**CALL (800) 645-1165 FOR COMPLETE LISTING OF OUR CLOSE-OUT SPECIALS**

**ALL SPECIALS END JANUARY 15, 1985**



B.T. Enterprises ✓ 300  
10 Carlough Road  
Bohemia, NY 11716-2996  
(516) 567-8155 (800) 645-1165

B.T. Enterprises is a division of Bi-Tech Enterprises Inc.

All prices above include 2% cash discount

Credit card customers add 2% to prices

Add \$4.00 shipping & handling on all prepaid orders

Add \$7.00 shipping & handling on C.O.D. orders

Mastercard/Visa



## YOU COULD BE USING LAZY WRITER - NOW ONLY \$124.95 !

"...the most comprehensive system I have seen to date for the TRS-80 Model I, III, and 4. If you have ever used a professional word processing system that costs at least \$15,000, like a Wang, you are familiar with its powerful features. Now you can have these same features for your TRS-80..."

Baron's Microcomputing Reports

"I would give Lazy Writer my highest recommendation..."  
Stew Schneider in On-Line Today

- works with any printer
- easy to learn - used in many schools
- fast, easy-to-remember editing commands
- Mod 4 version has 80 character screen
- powerful features for advanced users
- good support - free user newsletter



LAZY WRITER FOR MODEL I, III, OR 4 ..... \$124.95

## THIS IS LAZYFONT

LazyFont creates and prints fonts with an Epson or Prowriter printer. Lazy Writer version comes with 15 free fonts and many more available. BASIC version (for use by itself) comes with 8 free fonts. Create your own too!

LAZYFONT FOR MODEL I, III, OR 4 ..... \$49.95  
ELECTRONIC SYMBOL FONT ..... \$49.95  
comes with 41 standard schematics, ready to print

## NEW LOW PRICE ON MULTIDOS 1.6 - ONLY \$59.95

"...every DOS I've tried has either been too slow and weak or too complicated and powerful for me to use. I feel sure that many other people have this same problem, and MULTIDOS is certainly the solution."

Tim Knight in InfoWorld

- If you have many disk formats, MULTIDOS is for you: it reads Mod I&III LDOS, Mod I TRSDOS, Mod I&III NEWDOS 80, Mod I&III DOSPLUS, TRSDOS 6 and DOSPLUS 4; writes to Mod I&III LDOS, Mod I TRSDOS, Mod I&III NEWDOS 80, Mod I&III DOSPLUS, TRSDOS 6 and DOSPLUS 4. Utility programs lets you read Mod I TRSDOS disks and convert the address marks on Mod I TRSDOS disks
- VFU utility lets you COPY, PURGE, or MOVE files by displaying a directory and letting you mark files with the cursor; even copies and moves FROM DATA DISK TO DATA DISK with two drives and from one DOS to another!
- use multiple commands on one line
- fastest BACKUP and COPY; use with one or two drives
- auto density and track recognition; no more PDRIVE hassle
- on-screen HELP with 40 different library commands
- alphabetized directory

## MULTIDOS' SUPER BASIC ADDS MANY ENHANCEMENTS

- leaves over 40K of memory free
- combine program lines, delete spaces with packer
- incorporates BOSS debugging utility
- intelligent global editor
- many more features
- your program displays by page; no more "warp 5" scrolling

MULTIDOS 1.6 FOR MODEL I OR III IS ONLY \$59.95.

## ZEUS - NEW EDITOR/ASSEMBLER FOR THE SERIOUS PROGRAMMER

"All my code has been converted to Zeus. This is the best full feature productivity tool I've seen for serious Z80 programmers."

David Welsh, author of Lazy Writer

- supports undocumented Z80 op codes and standard pseudo-ops
- really FAST assembly
- intelligent error display - shows line number and file containing error, even when you don't print to screen
- easy line editor won't let you enter incorrect syntax
- remembers file name of source and object code; eliminates accidental overwrite
- dynamic renumber; no more "no room between lines"
- calculator mode gives answers in decimal, hex, and binary
- GET command gets files from disk with lightening speed; handles big files so fast you'll think they're small
- doesn't hog memory - lots of room for source code
- easy block move & duplication
- "pages" the screen backward & forward for easy editing
- reads and writes files in ASCII, EDTASM, and Zeus compressed format
- Model 4 version supports 80x24 lines

ZEUS for Model I, III, 4, or MAX-80 ..... \$79.95

AlphaBit Communications, Inc.

call (313) 581-2896

13349 Michigan Ave.  
Dearborn, Michigan 48126

## N.C.I. proudly introduces FORESIGHT I The multi-divisional FINANCIAL SYSTEM

- Accounts Receivable
- Accounts Payable
- General Ledger
- Up to 8 Divisional Income Statements
- Consolidated Balance Sheet
- Aged Analysis Reports
- Transaction Journals
- Printed Customer Statements
- All One On Programme Diskette
- Runs on Newdos 80 MOD III & 4
- On Mod 2000 and IBM compatibles soon
- Your first Balance Sheet Guaranteed

FORESIGHT I will do all of this and much more:

EASY to read—EASY to set up—RUNS on single or double sided drives.

Until now, FORESIGHT I was available only to a select group of businesses and accountants for \$990.00. It can now be yours for:

**AN INCREDIBLE INTRODUCTORY PRICE  
of only \$429.00 U.S.**

To take advantage of this offer, order yours today, or call or write for more information.

Send certified cheque or money order in U.S. funds to:

NAUTILUS COMPUTERS INC.  
2411-117 ST.  
EDMONTON, ALBERTA  
CANADA T6J-3R4  
PH 403-434-3641

379

## DOUBLES DISKETTE STORAGE SPACE! REDUCES DISKETTE COST 50%!



Now! The back of 5 1/4" Diskettes can be used for data storage even with single head disk drives.

- **NIBBLE NOTCH**® Tools make it easy.
- Adds the Precise notch where it's needed.
- Doubles Diskette Space or Money Back!

### NIBBLE NOTCH I

Cuts Square Notch for Apple, II, II+, IIe, IIc, III, Franklin & Commodore.

only \$14.95\* each

### NIBBLE NOTCH II

Cuts Square Notch and 1/4 inch round "index hole." For use with computers other than those shown for NIBBLE NOTCH I.

only \$21.90\* each

## DISK OPTIMIZER SYSTEM

Software for Apple, II, II+, IIe, III and Franklin

- Certifies your "new" Disk 100% Error Free
- 469% FASTER THAN SIMILAR PROGRAMS!
- Removes Bad Sectors • Adds 36th Track
- Performs Disk Drive Speed Check
- Adds DOS and More

only \$24.95\*

## SPECIAL PACKAGE PRICE NIBBLE NOTCH I and DISK OPTIMIZER

only \$29.95 for BOTH \*

\*On all orders add \$2.00 for each item Postage & Handling (\$5.00 each foreign P&H)

Florida Residents Add 5% Sales Tax

SATISFACTION GUARANTEED OR YOUR MONEY BACK!

**ORDER TODAY!**

281



Toll Free 1-800-642-2536  
Florida 305-493-8355

or send Check or Money Order to:



**NIBBLE NOTCH® COMPUTER PRODUCTS**  
4211 NW 75th TERRACE • DEPT. 20 • LAUDERHILL, FL 33319

```

2160 CLOSE:OPEN"O",1,"FILE8":GOTO2180
2170 CLOSE:OPEN"O",1,"FILE9"
2180 PRINT#1,CHR$(34);B$(R,C);CHR$(34);
2190 C=C+1:IFC=<HTHEN2180
2200 C=1:R=R+1:IFR=<UTHEN2180
2210 PRINT#64,"<R>return to spreadsheet or <N>ew spreadsheet or <
E>xit program?";
2220 IS=INKEY$:IFI$=" "THEN2220ELSEIFI$="R"THEN190ELSEIFI$="N"THE
N10ELSEIFI$="E"THEN2230ELSE2220
2230 CLOSE:CMD" "CLS:END
2240 REMREPLICATE
2250 V$=LEFT$(B$(R,C),1):IFV$<"A"ORV$>CHR$(U+64)THEN2740
2260 PRINT#0,N$;N$;PRINT#0,"Replicate formula <D>own or <R>ight
? ";
2270 IS=INKEY$:IFI$=" "THEN2270ELSEIFI$=CHR$(31)THEN190ELSEIFI$="
D"THEN2280ELSEIFI$="R"THEN2420ELSE2270
2280 PRINT#0;PRINT#64,"Type number of rows to replicate down th
en <ENTER> ";T$=" "
2290 IS=INKEY$:IFI$=" "THEN2290ELSEIFI$=CHR$(31)THEN190ELSEIFI$=C
HR$(13)THEN2310ELSEIFI$=" "ANDI$=" "9"THEN2300ELSE2290
2300 PRINT#0;T$=T$+I$:GOTO2290
2310 S$="0":F=R:S=VAL(T$):S=S+R:IFS>UTHENS=U
2320 V$=LEFT$(B$(F,C),1):W$=MID$(B$(F,C),2,2):W=VAL(W$):X$=MID$(
B$(F,C),4,1):W=W+1:IFW>UTHEN2740
2330 W$=STR$(W):IFW>9THEN2350
2340 W$=RIGHT$(W$,1):W$=S$+W$
2350 W$=RIGHT$(W$,2):F$=V$+W$+X$:Y$=MID$(B$(F,C),5,1):IFY$="A"
NDY$<CHR$(U+65)THEN2370ELSEIFY$=" "THEN2410
2360 Y$=MID$(B$(F,C),5):F$=F$+Y$:GOTO2410
2370 Z$=MID$(B$(F,C),6,2):Z=VAL(Z$):Z=Z+1:IFZ>UTHEN2740
2380 Z$=STR$(Z):IFZ>9THEN2400
2390 Z$=RIGHT$(Z$,1):Z$=S$+Z$
2400 Z$=RIGHT$(Z$,2):F$=F$+Z$+Z$
2410 F=F+1:B$(F,C)=F$:IFF=STHEN190ELSE2320
2420 PRINT#0;PRINT#64,"Type number of columns to replicate righ
t then <ENTER> ";T$=" "
2430 IS=INKEY$:IFI$=" "THEN2430ELSEIFI$=CHR$(31)THEN190ELSEIFI$=C
HR$(13)THEN2450ELSEIFI$=" "ANDI$=" "9"THEN2440ELSE2430
2440 PRINT#0;T$=T$+I$:GOTO2430
2450 S$="0":F=C:S=VAL(T$):S=S+C:IFS>HTHEN2460
2460 V$=LEFT$(B$(R,F),1):V=ASC(V$)+1:W$=MID$(B$(R,F),2,2):X$=MID
$(B$(R,F),4,1):IFV=64>HTHEN2740
2470 F$=CHR$(V):F$=F$+W$+X$:Y$=MID$(B$(R,F),5,1):IFY$="A"ANDY$=
<CHR$(H+65)THEN2490ELSEIFY$=" "THEN2510
2480 Y$=MID$(B$(R,F),5):F$=F$+Y$:GOTO2510
2490 Z$=MID$(B$(R,F),6,2):Y=ASC(Y$)+1:IFY=64>HTHEN2740
2500 Y$=CHR$(Y):F$=F$+Y$+Z$
2510 F=F+1:B$(R,F)=F$:IFF=STHEN190ELSE2460
2520 REMVALUE
2530 PRINT#0,N$;N$;PRINT#0,"Type value or formula then depress
<ENTER>";PRINT#64,L$;T$=" "
2540 IS=INKEY$:IFI$=" "THEN2540ELSEIFI$=CHR$(13)THEN2560ELSEIFI$=
CHR$(31)THEN190ELSEIFI$=CHR$(34)THEN2540ELSEIFI$=CHR$(91)ORIS>CH
RS(7)ANDI$<CHR$(11)THEN2730
2550 T$=T$+I$:PRINT#0;GOTO2540
2560 B$(R,C)=T$:GOTO190
2570 REM(=) CALCULATOR
2580 T$=VAL(B$(R,C)):PRINT#0,N$;N$;PRINT#0,"Start with <C>ell v
alue ("T$;") or <Z>ero?"
2590 IS=INKEY$:IFI$=" "THEN2590ELSEIFI$="C"THEN2620ELSEIFI$="Z"TH
EN2600ELSEIFI$=CHR$(31)THEN190ELSE2590
2600 T$=0:F$=0
2610 F$=" "
2620 PRINT#0,N$;N$;PRINT#0,"SUBTOTAL = ";T$;PRINT#64,"ENTER VA
LUE: ";
2630 IS=INKEY$:IFI$=" "THEN2630ELSEIFI$=CHR$(31)THEN190ELSEIFI$=
" "ANDI$=" "9"THEN2640ELSEIFI$="+"THEN2650ELSEIFI$="-"THEN2660ELS
EIFI$="*"THEN2670ELSEIFI$="/"THEN2680ELSEIFI$="="THEN2700ELSE263
0
2640 PRINT#0;F$=F$+I$:GOTO2630
2650 F$=VAL(F$):T$=T$+F$:GOTO2610
2660 F$=VAL(F$):T$=T$-F$:GOTO2610
2670 F$=VAL(F$):T$=T$*F$:GOTO2610
2680 F$=VAL(F$):IFF$=0THEN2630
2690 T$=T$/F$:GOTO2610
2700 IFT$<0THEN2720
2710 F$=STR$(T$):B$(R,C)=MID$(F$,2):GOTO190
2720 B$(R,C)=STR$(T$):GOTO190
2730 B$(R,C)=T$:PRINT#0,"RAPID ENTRY (Press </> for commands <CL
EAR> updates)";PRINT#B+1,STRING$(13,32);PRINT#B+2,LEFT$(B$(R,C
),12);GOTO780
2740 PRINT#64,N$;PRINT#64,"* * * ENTRY ERROR * * *";FORD=1T015
00:NEXT:GOTO190

```

# The Master Handicapper™

Series by Professor Jones

EVALUATES FROM RACING FORM!

Age	Gender	Post (Today)
Class	Jockey (Today)	Post (Last)
Condition	Jockey (Last)	Speed
Consistency	Length	Trainer
Earnings	Time of Year	Workouts

And gives you GRAPHIC REPRESENTATION of finish

## PROGRAM

## GLD. Thoroughbred "Gold" Edition™

A "Full" featured thoroughbred analysis designed for the professional and serious novice. \$159.95 complete

## EGLD. Enhanced "Gold" Edition™

"Gold" Edition with complete Master Bettor™ system integrated onto 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

## GLTD. Limited "Gold"™

Enables Professional Handicappers to assign specific values to the racing variables "they" feel are important.

## PROFESSIONAL HANDICAPPING SYSTEMS

%	%	%
Age 5	Consistency 15	Speed 10
Class 15	Jockey 15	Workouts 0
Condition 10	Trainer 5	Time of Year 0
Earnings 5	Post 10	Consistency 5
100%	Is Everything OK (Y/N)	

Create program weight based on a particular track and fine 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

## GD. Gold Dog Analysis™

The only professional dog handicapper on the market. Includes

- 1) Speed
- 2) Post Today
- 3) Kennel
- 4) Post Last
- 5) Distance
- 6) Condition
- 7) Running Style
- 8) Weight
- 9) All new internal weighting
- 10) NEW class indicator

If you are near a greyhound track, you can't afford not to use this program.

\$149.95 complete

(with integrated Master Bettor™) \$199.95

## MHH. Master Harness Handicapper™

Professional software designed to provide a thorough analysis of all trotter and pacer races in North America and Canada. Features:

Class	Post Positions	Time Finish
Driver	Track Conditions	Time Last Quarter
Days Since Last	Trainer	Track Rating
Gender	Time 1/4	Temp Allowance

\$159.95 complete w/integrated Master Bettor™ \$199.95

## PPX. Professor Jones' Football Predictor, Prof. Pix™

Complete Football Analysis with Data-Base.

- 1) Overlays
- 2) Point Spreads
- 3) "Super Plays"
- 4) "Over/Under" bets
- 5) Data Base Stats
- 6) Holds "100" teams

Highest percentage of winners 1983



\$39.95 complete

\$99.95 with Data Base Management

## MB. Master Bettor™

A compliment to ALL Master Handicapper programs. Includes:

- 1) Win/Place/Show
- 2) Quinella
- 3) Exacta
- 4) Trifecta
- 5) Pick Six
- 6) Daily Double
- 7) Money Management
- 8) Odds Analysis
- 9) and Much More

A perfect program designed to use results from all Master Programs to generate "best bet".

\$59.95 complete

## Model 100 Portable Systems

TP1-Thoroughbred/Pace™ (24K)	\$99.95 complete
DG1-Master Dog Analysis™ (24K)	\$99.95 complete

## LNW Computers

Call for Lowest Prices

Send check / money order / VISA / MasterCard  
(Include expiration date) to:

Prof. Jones  
1114 N. 24th St.  
Boise, ID 83702

TELEPHONE  
(208) 342-6939



TERMS: FREE SHIPPING ALL SOFTWARE.  
Add \$6.00 hardware / C.O.D. Add \$6.00 / Add 3  
weeks personal checks / Add 4.5% ID residents /  
Add \$6.00 outside U.S.A. / Prices subject to change.  
NO REFUNDS ON SOFTWARE

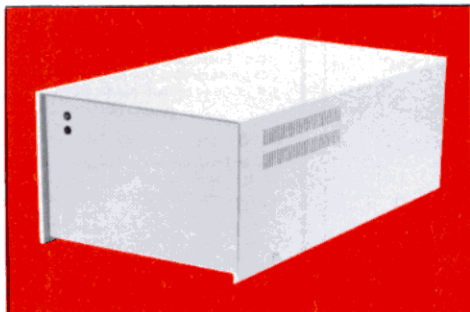
BROCHURE AVAILABLE



DISK DRIVES DISK DRIVES DISK DRIVES DISK DRIVES DISK DRIVES DISK DRIVES DISK DRIVES

# PRICE BREAKTHROUGH

## 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, Apple, Franklin, Max/80.

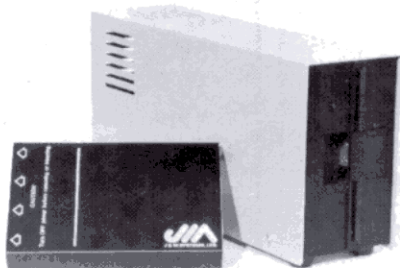
Software Drivers: LDOS, NewDos/80, Dosplus, TRSDOS 6.0, CP/M

CALL FOR NEW LOW PRICE

Warranty - One Full Year

DRIVE A HARD BARGAIN™ Complete Systems Starting at ~~\$999.95~~

**Call Toll Free Ordering 1-800-343-8841**



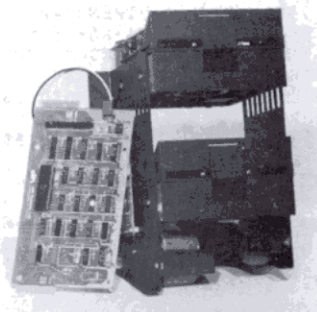
High Quality Lowest Price

**Drive 0, 1, 2, 3**

for the

**Color Computer**

Starting at ~~\$199.95~~ CALL FOR NEW LOW PRICE



**Disk Drive Upgrade**  
for Model III/IV easy to install system

Starting at ~~\$309.95~~ CALL FOR NEW LOW PRICE

## 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. 10:00 am to 3:30 pm

**DEALER INQUIRIES INVITED.**

#### TERMS:

M.C./Visa/Amex and personal checks accepted at no extra charge.  
C.O.D., please add \$3.00.  
Shipping: Please call for amount.  
Not responsible for typographical errors.  
Prices subject to change.

#### CANADA MICRO R.G.S. INC.

751, CARRE VICTORIA, SUITE 403  
MONTREAL, QUEBEC, CANADA, H2Y 2J3  
Regular Tel. (514) 287-1563  
Canadian Toll Free 800-361-5155

#### Service! Service!

All in stock products are shipped within 24 hours of order.  
Repair/Warranty service is performed within 24 hours of receipt unless otherwise noted. We accept C.O.D., foreign and APO orders. School and D&B corporate P.O.s accepted.

TRS/80 Registered Trademark Tandy Corp.

Apple Registered Trademark Apple Computer Corp

IBM-PC Registered IBM Corp.

Franklin Registered Trademark Franklin Corp.

Max/80 Registered Trademark Lobo Int.

LDOS Reg. Logical System Inc.

Dosplus - Micro Systems Software

Newdos/80 - Apparatus Inc.

# PRICE BREAKTHROUGH

## Super Sale on New Disk Drives

Starting at ~~\$169.00!~~ CALL FOR NEW  
NEW LOW PRICE

Tandon — Siemens — Remex — MPI — Teac — Shugart

40 or 80 Tracks — Single or Dual Head

IBM/PC — TRS/80 — Sanyo Computers -----\$Call

Drive a Hard Bargain™!! For your TRS/80, Color Computer, IBM, Apple, Franklin,  
Max/80, Complete Systems.....from ~~\$999.95~~ CALL FOR NEW  
LOW PRICE

PLEASE CALL FOR OUR MOST CURRENT PRICE REDUCTIONS.

TOLL FREE ORDERING

1-800-343-8841

GENERAL AND TECHNICAL

1-617-872-9090

Disk Drives (0123) TRS/80-IBM-Apple-TI-Franklin-Max/80-LNW .....	▲	CALL
Model I/III/IV Upgrade (Disk Drives - Memory) .....	▲	TOLL
Printers—Daisywheel/Dot Matrix .....	▲	FREE
Double Density Controller (Model I).....	▲	FOR
Color Computer Printer Interfaces .....	▲	NEW
Disk Drive Operating Systems.....	▲	PRICES
Repair Services Now Offered—FAST Turn-a-Round .....	▲	
Apple/Franklin Compatible Add-On Drives with Case & Cable .....	▲	
Diskettes — Lifetime Guarantee — Low-Low Prices .....	▲	
DISK DRIVE CASES AND POWER SUPPLIES (5 year warranty) .....	▲	
Printer Buffers 8K to 512K.....		starting at \$143.95
Model I/III/IV Speed-up Mod.....		starting at \$75.00
Cables—Printer/Disk Drive .....		starting at \$16.00

Warranty on Disk Drives — 1 Full Year Parts and Labor

## 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

DEALER INQUIRIES INVITED.

### TERMS:

M.C./Visa/Amex and personal  
checks accepted at no extra charge.  
C.O.D., please add \$3.00.  
Shipping: Please call for amount.  
Not responsible for typographical errors.  
Prices subject to change.

### CANADA

MICRO R.G.S. INC.

751, CARRE VICTORIA, SUITE 403  
MONTREAL, QUEBEC, CANADA, H2Y 2J3

Regular Tel. (514) 287-1563

Canadian Toll Free 800-361-5155

### Service! Service!

All in stock products are shipped  
within 24 hours of order.  
Repair/Warranty service is performed  
within 24 hours of receipt unless  
otherwise noted. We accept C.O.D.,  
foreign and APO orders. School  
and D&B corporate P.O.s accepted.

TRS/80 Registered Trademark Tandy Corp.

Apple Registered Trademark Apple Computer Corp

IBM-PC Registered IBM Corp.

Franklin Registered Trademark Franklin Corp.

Max/80 Registered Trademark Lobo Int.

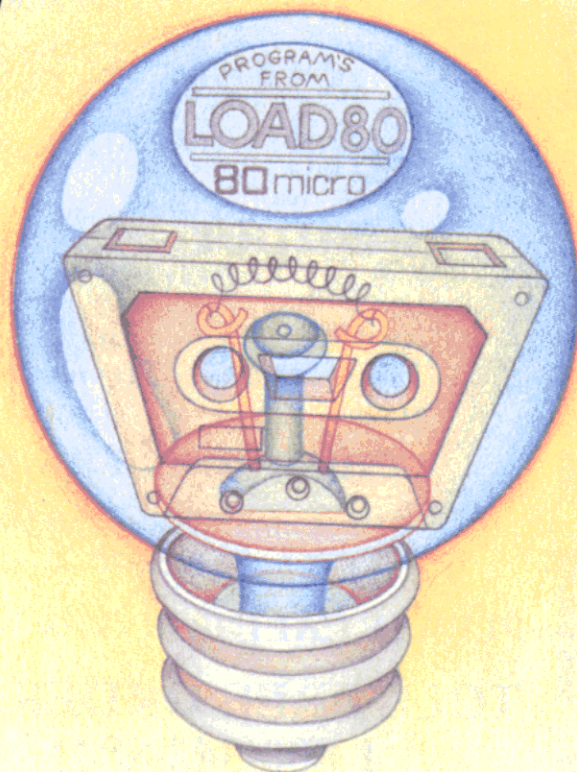
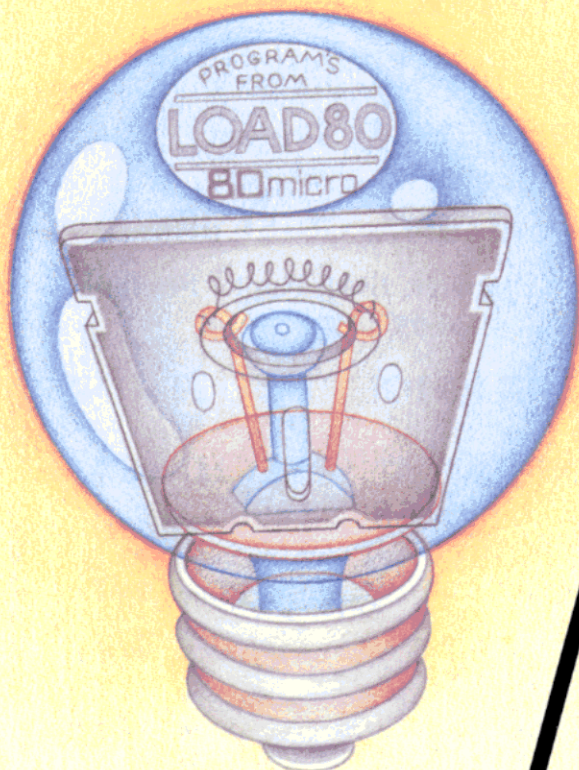
LDOS Reg. Logical System Inc.

Dosplus - Micro Systems Software

Newdos/80 - Apparat Inc.



# GREAT IDEAS IN A DISK



# GREAT IDEAS IN A CASSETTE

**NOW, you can load the major programs from 80 MICRO—automatically.**

**LOAD 80** is a collection of the major programs from each issue of 80 MICRO including: tutorials...utilities...games...home-hobby applications...word processing programs...and more. Each program is on a formatted disk or cassette and ready to run...saving you hours of key-in time. And Model III users can now run **LOAD 80** automatically—our new disk transfer system eliminates conversions.

For less than \$2.00 per program **LOAD 80** gives you a library of over 100 quality programs in just 12 months—delivered to your home each month.

Plus, a year's subscription to **LOAD 80** saves you nearly 30% off the single disk or cassette price—that's enough for a year's subscription to 80 MICRO.

Your **LOAD 80** comes complete with user support. Just call **1-603-924-9471** any business day and you'll receive prompt assistance from our **LOAD 80** staff and the 80 MICRO Technical Editors.

To get your time-saving subscription or monthly issue of **LOAD 80** call toll free **1-800-258-5473** (in New Hampshire dial **1-924-9471**). Or fill out this coupon and send it in today.

## YES! Save me time. Save me money with **LOAD 80**.

- ☐ Send me a year of **LOAD 80** on disk for \$19.97.
- ☐ Send me a year of **LOAD 80** on cassette for \$99.97.
- ☐ Send me this month's **LOAD 80** disk for \$21.97.
- ☐ Send me this month's **LOAD 80** on cassette for only \$11.47.

Prices include postage and handling. Foreign airmail please add 45 cents per item or \$25.00 per subscription. U.S. funds drawn on U.S. bank only.

☐ Check/MO ☐ MC ☐ Visa ☐ AE

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

Signature \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

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



**LOAD 80**



L8501

80 Pine Street • Peterborough, NH 03458



Let us know 8 weeks in advance so that you won't miss a single issue of 80 Micro. Attach old label where indicated and print new address in space provided. Also include your mailing label whenever you write concerning your subscription. It helps us serve you promptly.

Please allow 6-8 weeks for delivery

# MOVING?

☐ Extend my subscription one additional year for only \$24.97.

☐ Payment enclosed  
☐ Bill me

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

If you have no label handy, print OLD address here.

**AFFIX LABEL**  
Name \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Print NEW address here.

Name \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

**80micro.**  
PO Box 981 • Farmingdale, NY 11737



## DISKETTES

FREE SHIPPING  
ON ORDERS OF \$40.00 OR MORE



**1-800-334-DISK**

(617) 839-4404 MASS. RES.



DISK TYPE PRICES PER EACH 10 PER BOX		3M	maxell®	wabash® HIGH QUALITY LOW PRICE
5 1/4" Sing-Side Dbl-Den.	#740 \$2.19 EA.	#MD1 \$2.29 EA.	#MI3A \$1.99 EA.	
5 1/4" Dbl-Side Dbl-Den.	#745 \$2.65 EA.	#MD2 \$2.79 EA.	#MI4A \$2.15 EA.	
5 1/4" Reversible Dbl-Den.	OMNI™ #5321 \$2.45 EA.		Sing-Side Sing-Den. \$1.39 EA.	
AMARAY • DISK FILE • MEDIA MATE 50 \$15.95			#MI1A	

PRINTER PAPER • 540 Sheets • KEEN-EDGE • \$9.95

6 Outlet Surge Suppressor • \$24.00 EA. HEAD CLEANING KITS \$10.95 EA.

QUANTITY	STOCK # DESCRIPTION	PRICE	S & H / TAX	TOTAL
----------	---------------------	-------	-------------	-------

☐ VISA ☐ Mastercard ☐ MONEY ORDER ☐ CHECK ENCLOSED ☐ C.O.D. (Add \$1.85)  
☐ SEND FREE BROCHURES

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

Name \_\_\_\_\_

Address \_\_\_\_\_

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

Phone \_\_\_\_\_

Add \$2.00 Shipping & Handling on orders less than \$40.00. Mass. Residents add 5% tax.

**MAGNETICS, INC.**  
153 MAIN STREET / P.O. BOX 98  
SOUTH GRAFTON, MA 01560

218

School & Municipal P.O.'s welcome!

Free shipping applies to prepaid and credit card orders only.  
Hours: 9 am - 7 pm Mon. - Fri., Eastern Standard Time - Sat. 9 am - 3 pm

# NEW And IMPROVED CP/M-68K

Treat your TRS-80 Model-16 or Enhanced Model-II or -12 to our new Version 1.2 CP/M-68K, now with:

- **Keyboard Typeahead**
- **C compiler with standard and IEEE floating point**
- **Overlay loader**
- **New utilities**
- **68000 assembler**

Option languages\* — CBASIC-68K, PASCAL MT+, FORTRAN-77, PASCAL-68K, BASIC-68K

Version 1.1 users; order a language and receive your version 1.2 upgrade FREE. Upgrade alone only \$25.

**Trisoft**

4102 Avenue G  
Austin, Texas 78751  
(512) 453-2233

\*Requires 256 kbytes minimum except for BASIC-68K.



227



# Picture Perfect

Here's a complete graphics production package—you get the worksheet on which to design your graphics, an easy-to-use coding system to program a dot-matrix print head, and a number of printout options.

**W**hile you're probably not disappointed with the LP/DMP printers from Radio Shack, you might be a little jealous of the graphics capability of the Epson printers. It seems like all the good printer graphics programs run on the Epsoms. But now you can get better and more interesting graphics from your Radio Shack printer by using the graphics technique I've developed.

## Basic Concepts

Program Listing 1 prints out worksheets that let you design and map graphics characters of varying sizes (see Fig. 1). First type in, save, and run Listing 1. Once you start experimenting with your own graphics, you'll need a lot of these worksheets.

The seven numbers (1, 2, 4, 8, 16, 32, and 64) in the worksheet's left-hand column represent the seven controllable print-head wires that, when activated in a specific pattern, create a variety of graphics characters. The print-head pins are numbered this way so that you get a unique sum, in the range of 1-127, for any combination of pins. For example, while the sum of all seven numbers is 127, every combination of the numbers yields a different sum.

The following program prints each of the available TRS-80 graphics characters in a line without gaps. Because of this, you can develop custom graphics characters, made up of individual standard graphics characters, of any length. The CHR\$(30) in line 50 of the program below resets the printer, removing it from the graphics mode. Now, type in and run this program:

```
10 LPRINT CHR$(18) 'set printer to graphics
   mode
20 FOR I = 128 TO 255
30 LPRINT CHR$(I);
40 NEXT I
50 LPRINT CHR$(30) 'set printer to non-graph-
   ics mode
```

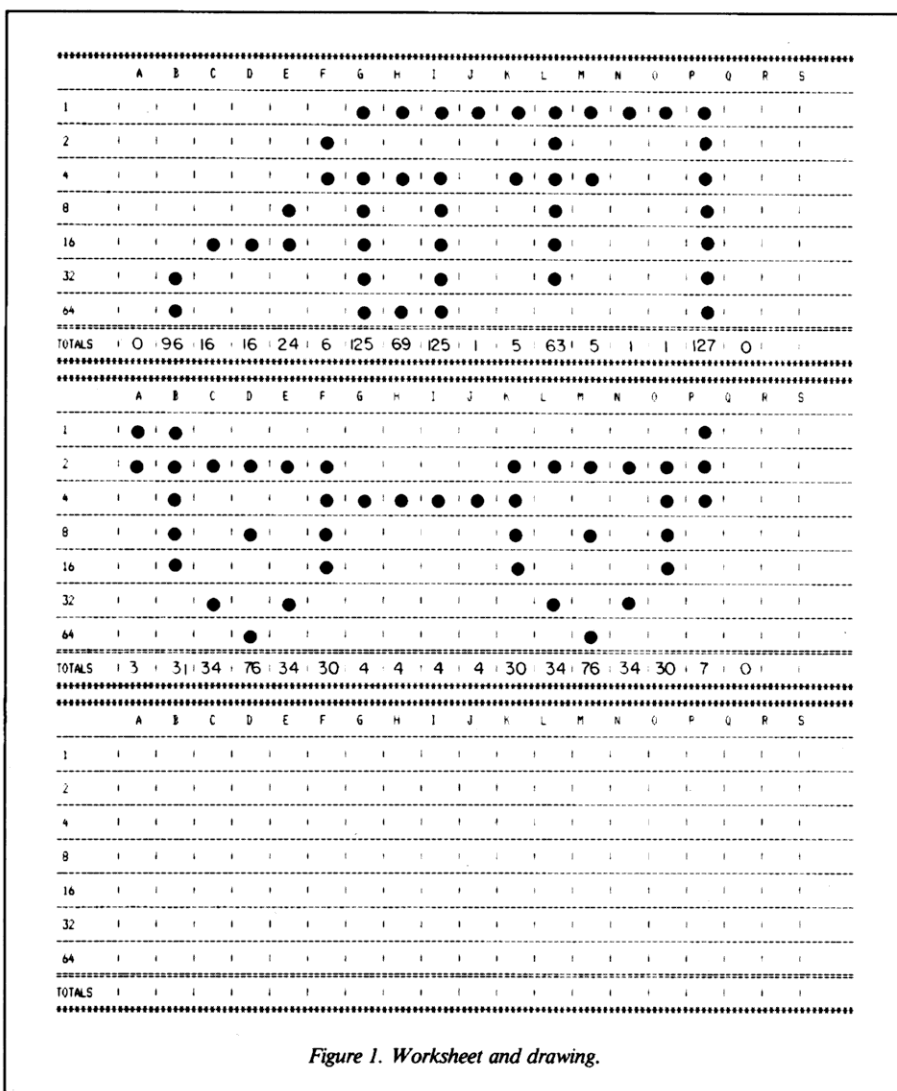


Figure 1. Worksheet and drawing.

## Custom Printing

The graphics characters printed here probably look familiar, especially if you've ever shopped for a printer. Be more creative now and try your skill at customized graphics.

Using a soft lead pencil, put dots in each box of column A of the worksheet you created with Program Listing 1. In

## The Key Box



Models I, III and 4

16K RAM

Basic

Radio Shack LP or DMP printer

From Computer Plus to YOU...

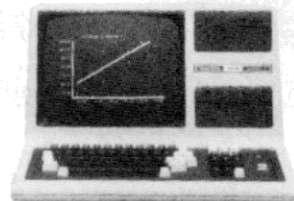
# PLUS after PLUS after PLUS



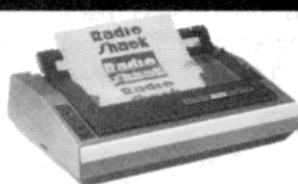
Model 100 8K \$495  
Model 100 24K \$625



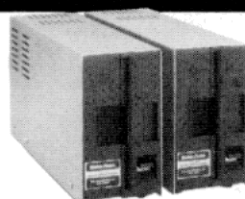
Color Computer II  
w/16K Ext. Basic \$135  
w/64K Ext. Basic \$195



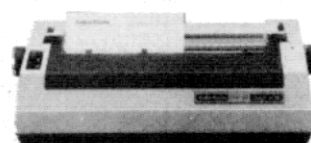
Model 4 16K \$629  
Model 4 64K  
2 Disk & RS232 \$1020



DMP120 \$385



Color Computer Disk Drive  
Drive 0 \$289 Drive 1 \$220



DWP210 \$489  
DWP510 \$1295

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

### COMPUTERS

Model 4 Portable	
64K 2 Drives	1020
Pocket Computer 3	89
Pocket Computer 4	59
Model 2000 2 Drive	2299
Model 2000 W/Hard Disk	3599
Model 12 64K 1 Drive	2360
Model 12 64K 2 Drive	2950
Model 16B 1Dr 256K	3375
Model 16B 2Dr 256K	3965

### MODEMS

Hayes Smartmodem II	215
Hayes Smartmodem 1200	505
Novation Smartcat 1200	410
Novation J-Cat	115
AC-3	125
DC Modem I	89
DC Modem II	160
DC Modem 2212	315

### PRINTERS

Silver Reed EXP500 D.W.	365
Silver Reed EXP550 D.W.	430
DWP410	1159
Gemini Powertype	345
CGP115	159
CGP220 Ink Jet	545
DMP110	299
DMP420	735
Toshiba 1340 (24 wire head)	779
Gemini 10X	265
Gemini 15X	409
Panasonic P1091	315
Smith Corona Fastext	190
Prowriter 8510	345
Okidata	CALL
Epson	CALL

### DISK DRIVES

Model III/4 Drive 0	465
Model III/4 Drive 1	220

Model III/4 Drive 2	259
Model III/4 Drive 3	220
Hard Disk M2000	1525

### ETC.

CCR-81 Recorder	52
Cassette Tapes (10 Pk)	9.95
16K Ram Chips	25
64K Ram Chips	62.95
Model 4 64K Upgrade Kit	79.95
M100 Bar Code Reader	89
64K Printer Buffer	199
Printer Stand	25
Printer Cables	
Printer Ribbons	
Printer Paper	
Computer Books	

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





TOP

0 96 16 16 24 6 125 69 125 1 5 63 5 1 1 127 0

BOTTOM

3 31 34 76 34 30 4 4 4 4 30 34 76 34 30 7 0

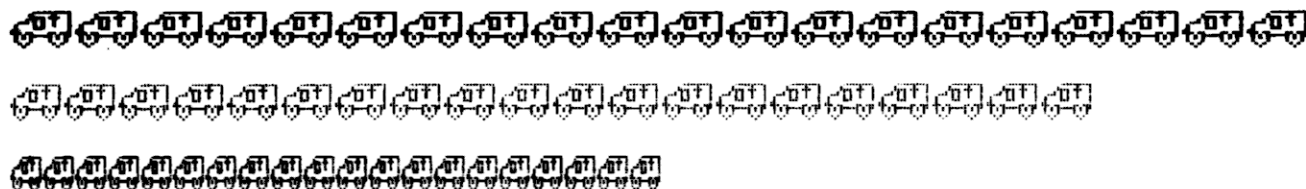


Figure 2. Printout of drawing in Figure 1.

Program Listing 1. Basic program to create work sheets.

```

100 ' GRAPH PAPER FOR CHARGEN/GS1 AND GS2
110 '   SAVED AT GRAPAPER/FRM
120 CLEAR1000
130 LPRINTCHR$(27);CHR$(20)'set to condensed mode
140 CLS
145 PRINT"SET PAPER IN PRINTER AT TOP OF NEW SHEET"
147 PRINT:PRINT"HIT ANY KEY TO START PRINTING"
150 IF INKEY$="" THEN 150
160 FOR FS=1 TO 3 ' loop to set number of forms
170 LPRINTSTRING$(130,"")
175 GOSUB1000
180 B=0
190 FOR I=1 TO 8
200 LPRINT" "
210 IF I<8 THEN GOSUB290 ELSE GOSUB440
220 GOSUB390 'subroutine to put in pin numbers
230 GOSUB310 'lprint column separating bar
240 NEXT I
250 LPRINT" "
260 LPRINTSTRING$(130,"")
270 NEXT FS
280 END
290 LPRINTSTRING$(130,"-")
300 RETURN
310 FOR I=1 TO 19
320 LPRINTTAB(10);
330 LPRINTCHR$(18); 'go into graphics mode
340 LPRINTCHR$(191); 'lprint graphic bar
350 LPRINTCHR$(30); 'come out of graphics mode
360 LPRINT" "; ' six blank spaces
370 NEXT I
380 RETURN
390 'SUBROUTINE TO PUT IN NUMBERS
400 A=2[B
410 B=B+1
420 IF A>64 THEN LPRINT"TOTALS";:ELSE LPRINT A;
430 RETURN
440 'SUBROUTINE TO PRINT TOTAL LINE
450 LPRINTSTRING$(130,"=")
460 RETURN
1000 CL=65
1005 LPRINTTAB(13);
1010 LPRINTCHR$(CL);
1015 LPRINT" ";
1020 IF CL=83 THEN 1050
1030 CL=CL+1
1040 GOTO1010
1050 RETURN

```

End

Program Listing 2. Basic program to enter one-line graphics.

```

100 '*****
110 '   CHARGEN/GS1
120 '*****
130 CLS
140 PRINT"USE GRAPAPER/FRM PROGRAM TO PLOT A SEQUENCE OF PIN FIRINGS"
150 PRINT"THEN ENTER THE TOTAL OF EACH COLUMN IN RESPONSE TO THE P
160 PRINT:PRINT"THE PROGRAM WILL ADD 128 TO EACH TOTAL TO GENERATE
    PRINTER"

```

Listing 2 continued

columns B-F put a dot in the top and bottom row only (pin numbers 1 and 64). In column G, put dots from top to bottom again. Now add the values of each column: 127 for A, 65 for B, 65 for C, 65 for D, 65 for E, 65 for F, and 127 for G.

When you run Program Listing 2, it prompts you to type in the totals for each column. After you enter the numbers, type in 999 to terminate data entry. Your printer should be on, and it will print the following: a tiny box, the pin firing codes (the column values), and a three-line series of the character in different font sizes (elongated, normal, and condensed).

Notice that all the boxes are connected; to print a series of individual boxes, enter a zero before typing in 999. Keep in mind that the program automatically adds 128 to the pin codes because the printer requires that all character codes be in a range of 128 to 255.

Try experimenting with different drawings or simply enter a series of numbers; for example, entering 10 numbers at intervals of 5 (don't forget to type 999) makes a nice line of graphics. This type of graphic can be used in a subroutine to separate reports, or as a more interesting alternative to asterisks.

## Larger Graphics

Single line graphics are nice, but somewhat limited. Program Listing 3, while operating on the same concept as Program Listing 2, lets you print graphics that are twice as high. When mapping out the larger characters, split the character between two worksheets and calculate column totals for each. After tabulating the totals, run Program Listing 3, which, in turn, prompts you to enter these values.

Remember to enter zeros in the blank columns to guarantee alignment. The drawing in Fig. 1 and the corresponding

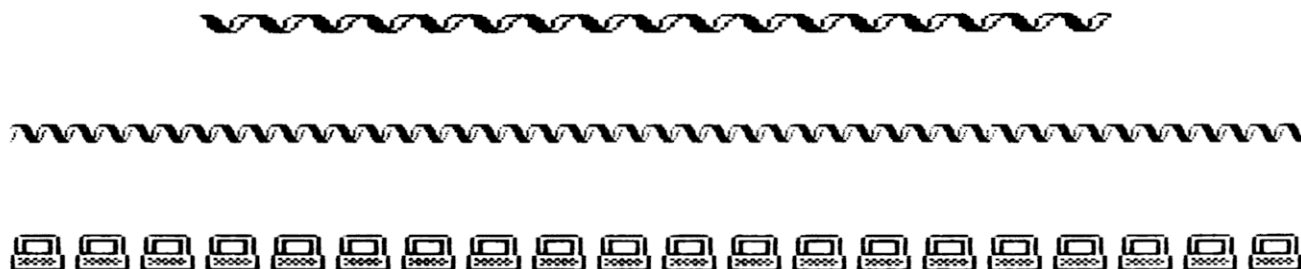


Figure 3. Graphics lines created by Program Listings 4 (top line), 5 and 6 (middle line), and 7 (bottom line).

### *You can expand this technique to print graphics for all purposes.*

printout in Fig. 2 are examples of this size character. (The subroutine in Program Listing 7 is also geared towards the larger graphics characters.)

The subroutines in Program Listings 4-7 illustrate the variety of ways to store and print graphics codes. Program Listing 4, for example, uses CHR\$ code links stored in strings to print a line of graphics characters. I used A\$ and A1\$ only because I didn't want to print off the page when listing the program. Your strings can be much longer if you choose.

Because this particular character is good only when printed in a line, I used a For...Next loop to fill the page from left to right. The string method used here is quite fast, especially when compared with the subroutines in Program Listings 5 and 6.

Program Listings 5 and 6 both use Read Data statements. While one is quicker than the other, they're both slow. I've included these because it's easier to change data statements in each graphics subroutine than to retype the CHR\$ codes. If time isn't critical, this method makes it easy to build a library of subroutines.

You can easily expand the technique discussed here to print graphics of all sizes for all purposes. Playing with combinations of column values is both fun and productive. Happy printing! ■

Write to Glen E. Sparks at 6186 Custer, S. Rockwood, MI 48179.

#### Listing 2 continued

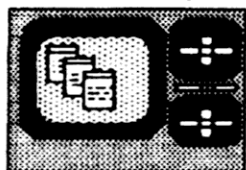
```

170 PRINT"GRAPHICS IN A LINE USING EACH TO THE FONTS AVAILABLE TO
GRAPHICS"
180 PRINT"IT WILL ALSO PRINT OUT THE COLUMN TOTALS FOR REFERENCE."
185 PRINT:PRINT"TYPE 999 TO END INPUT"
190 PRINT:PRINT"HIT ANY KEY TO BEGIN"
200 PRINT:PRINT:PRINT
210 IF INKEY$="" THEN 210
220 CLS
230 CLEAR500
240 DIMN(50)
250 Z=1
260 '*****
270 ' INPUT CODES
280 '*****
290 CLS
300 I=1
305 CL=65
310 PRINT"PIN COLUMN ";CHR$(CL);" ";
315 INPUT N(I)
320 IFN(I)=999 THEN 370
330 IFN(I)>127 THENPRINT"TOO HIGH-MUST BE UNDER 127":GOTO310
350 I=I+1
355 CL=CL+1
360 GOTO310
370 '*****
380 ' SEND TO PRINTER
390 '*****
400 T=I
410 FORI=1TOT
415 IFN(I)=999 THEN N(I)=0
420 A$=CHR$(N(I)+128)
430 LPRINT CHR$(18);A$; ' put into graphics mode and lprint CHR$
440 NEXTI
450 LPRINTCHR$(30) 'set to non-graphic text
460 LPRINTCHR$(27);CHR$(20) 'set to condensed for code number prin
tout
470 FORI=1TO(T-1):LPRINTN(I);:LPRINT" ";
480 NEXTI
490 '*****
500 ' SEND LINE OF CUSTOM CHARACTERS TO PRINTER
510 ' SET CHARACTER FONT FOR LINE OF CUST. CHAR
520 '*****
530 CLS
540 IFZ>1THENLPRINTCHR$(27);CHR$(15) 'get out of Expanded mode
550 ONZ GOTO 590 ,610 ,630 ,650
560 LPRINT CHR$(27);CHR$(14) 'expanded mode
570 GOTO670
580 LPRINTCHR$(27);CHR$(19) 'normal characters
590 GOTO670
600 LPRINTCHR$(27);CHR$(20) 'condensed mode
610 GOTO670
620 RUN240
630 '*****
640 ' PRINTOUT OF CHAR REPEATED 20 TIMES
650 '*****
660 FORI=1TO20
670 FORI=1TO(T-1)
680 A$=CHR$(N(I)+128) 'add 128 to pin number to produce CHR$ code
690 LPRINTCHR$(18);A$; 'go into graphics mode and print char
700 NEXTI:NEXTI
710 LPRINTCHR$(30) 'get out of graphics mode
720 Z=Z+1
730 GOTO 570

```

End





**EN  
FLEUR  
CORP.**

**WINDOWPAD**

YES WE DO WINDOWS SO CAN YOU

Windowpad an integrated windowing and note processing utility is ready for your TRS-80 Model I, III, III/4. Windowpad runs along with your application program or stand alone. Just \$21.25 Post-paid. Send Check or Money Order to EN Fleur Corp. 2494 Sun Valley Cir. Silver Spring MD. 20906-350

☺ [MD. Residents Add 5% Tax] ☺

## SEND AND RECEIVE MORSE CODE

- TRIPLE SPLIT SCREEN
- SPEED: 1-200 WPM

This 4.5k assembly language program runs on your TRS-80 Model I, III, or 4. The decoded Morse Code is displayed on the screen and may be printed. The keyboard buffer is active while either sending or receiving. The output is either tone or keyed. I/O is via the cassette interface. The program runs from tape or disk (TRSDOS 2.3 or 1.3). Use it "on-the-air" or for code practice.

satisfaction guaranteed or your money back  
Cassette with booklet only \$19.95 postpaid.

**ROGO Computer Products**

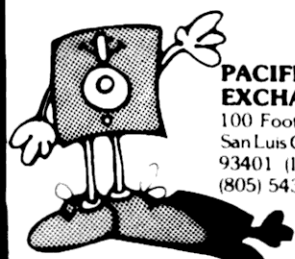
4752 DeBeers Drive  
El Paso, Texas 79924

✓343

# wabash®

When it comes to  
Flexible Disks, nobody  
does it better than  
Wabash.

MasterCard, Visa Accepted.  
Call Free: (800) 235-4137



**PACIFIC  
EXCHANGES**

100 Foothill Blvd  
San Luis Obispo, CA  
93401 (In Cal call  
(805) 543-1037)

✓207

### Program Listing 3. Basic program to enter two-line graphics.

```

100 *****
110 ' CHARGEN/GS2
120 *****
130 CLS
140 PRINT"USE GRAPAPER/FRM PROGRAM TO PLOT A SEQUENCE OF PIN FIRIN
GS"
150 PRINT"THEN ENTER THE TOTAL OF EACH COLUMN IN RESPONSE TO THE P
ROMPTS."
155 PRINT"TYPE 999 TO TERMINATE DATA INPUT"
160 PRINT:PRINT"THE PROGRAM WILL ADD 128 TO EACH TOTAL TO GENERATE
PRINTER"
170 PRINT"GRAPHICS IN A LINE USING EACH TO THE FONTS AVAILABLE TO
GRAPHICS"
180 PRINT"IT WILL ALSO PRINT OUT THE COLUMN TOTALS FOR REFERENCE."
190 PRINT:PRINT"HIT ANY KEY TO BEGIN"
200 PRINT:PRINT:PRINT
210 IF INKEY$="" THEN 210
220 CLS
230 CLEAR500
240 DIMN(50)
241 DIMN1(50)
250 Z=1
260 *****
270 ' INPUT CODES
280 *****
290 CLS
300 I=1
305 CL=65
310 PRINT"PIN COLUMN ";CHR$(CL);"; ";
315 INPUT N(I)
320 IFN(I)=999 THEN 370
330 IFN(I)>127PRINT"TOO HIGH-MUST BE UNDER 127":GOTO310
331 INPUT"BOTTOM HALF ";N1(I)
332 IFN1(I)>127THEN PRINT"TOO HIGH-MUST BE UNDER 127":GOTO331
350 I=I+1
355 CL=CL+1
360 GOTO310
370 *****
380 ' SEND TO PRINTER
390 *****
400 T=I
410 FORI=1TOT
415 IFN(I)=999 THEN N(I)=0
420 A$=CHR$(N(I)+128)
430 LPRINT CHR$(18);A$; ' put into graphics mode and lprint CHR$
440 NEXTI
441 LPRINT""
442 FORI=1TOT
443 B$=CHR$(N1(I)+128)
444 LPRINTCHR$(18);B$;
445 NEXTI
450 LPRINTCHR$(30) 'set to non-graphic text
460 LPRINTCHR$(27);CHR$(20) 'set to condensed for code number prin
tout
465 LPRINT"TOP "
470 FORI=1TO(T-1):LPRINTN(I);:LPRINT" ";
480 NEXTI
481 LPRINT""
483 LPRINT"BOTTOM "
485 FORI=1TO(T-1):LPRINTN1(I);:LPRINT" ";:NEXTI
490 *****
500 ' SEND LINE OF CUSTOM CHARACTERS TO PRINTER
530 ' SET CHARACTER FONT FOR LINE OF CUST. CHAR
540 *****
560 CLS
570 IFZ>1THENLPRINTCHR$(27);CHR$(15) 'get out of Expanded mode
580 ONZ GOTO 590 ,610 ,630 ,650
590 LPRINT CHR$(27);CHR$(14) 'expanded mode
600 GOTO670
610 LPRINTCHR$(27);CHR$(19) 'normal characters
620 GOTO670
630 LPRINTCHR$(27);CHR$(20) 'condensed mode
640 GOTO670
650 RUN240
660 *****
670 ' PRINTOUT OF CHAR REPEATED 20 TIMES
671 *****
680 FORI=1TO20
690 FORI=1TO(T-1)
700 A$=CHR$(N(I)+128) 'add 128 to pin number to produce CHR$ code
710 LPRINTCHR$(18);A$; 'go into graphics mode and print char
720 NEXTI:NEXTI
721 LPRINT""
722 FORI=1TO20
723 FORI=1TO(T-1)
724 B$=CHR$(N1(I)+128)
725 LPRINTCHR$(18);B$;
726 NEXTI:NEXTI

```

Listing 3 continued

Listing 3 continued

```
727 LPRINT""
730 LPRINTCHR$(30) 'get out of graphics mode
740 Z=Z+1
750 GOTO 570
```

End

*Program Listing 4. Subroutine using string method.*

```
2000 'STRINGS/GS3
2010 '2 seconds to load buffer and printout line
2020 'add 128 to each pin column total
2030 A$=CHR$(129)+CHR$(131)+CHR$(159)+CHR$(191)+CHR$(254)+CHR$(252)
2040 A1$=CHR$(240)+CHR$(224)+CHR$(220)+CHR$(194)+CHR$(161)+CHR$(15
3)+CHR$(133)+CHR$(131)
2050 LPRINTCHR$(27);CHR$(14)'set printer to expanded mode
2060 LPRINTCHR$(18)'set to graphics mode
2070 FORI=1TO17
2080 LPRINTA$+A1$;
2090 NEXTI
2100 LPRINTCHR$(27);CHR$(15)'reset printer out of expanded mode
2110 LPRINTCHR$(30)'reset printer to non-graphics mode
2120 RETURN
```

End

*Program Listing 5. Subroutine that prints graphics line.*

```
3000 'SUBGRAF/GS4
3010 'Subroutine to print graphic line (rolling ribbon graphic)
3020 '17 second delay to fill buffer and print
3030 LPRINTCHR$(27);CHR$(20) 'set to condensed mode
3040 LPRINTCHR$(18) 'set to graphics mode
3050 FORI=1TO50
3060 READN:IFN=999THEN3080
3070 IFN=0 THEN LPRINTCHR$(128+N);:GOTO3060
3080 LPRINT;
3090 RESTORE 'set to read data again
3100 NEXTI
3110 LPRINTCHR$(30)' reset printer to non-graphics mode
3120 DATA1,3,7,31,63,126,124,112,96,92,66,33,25,5,1,999
3130 RETURN
```

End

*Program Listing 6. Subroutine that prints graphics line.*

```
3000 'SUBGRAF/GS5
3005 DIMM(20)
3010 'Subroutine to print graphic line (rolling ribbon graphic)
3020 'ONLY 9 second delay to fill buffer and print
3030 LPRINTCHR$(27);CHR$(20) 'set to condensed mode
3040 LPRINTCHR$(18) 'set to graphics mode
3050 I=1
3060 READN:M(I)=N:IFN>255THEN3085
3080 I=I+1:GOTO3060
3085 T=I:FORJ=1TO50
3090 FORI=1TO(T-1):LPRINTCHR$(M(I)+128);:NEXT
3100 NEXTJ
3110 LPRINTCHR$(30)' reset printer to non-graphics mode
3120 DATA1,3,7,31,63,126,124,112,96,92,66,33,25,5,1,999
3130 RETURN
```

End

*Program Listing 7. Subroutine that prints two-line characters.*

```
3000 'SUBGRAF/GS6 double high graphic
3010 DIMM(20),M1(20)
3020 LPRINTCHR$(27);CHR$(14) 'set printer to expanded mode
3030 LPRINTCHR$(18) 'set printer to graphic mode
3040 ' Read and printout top portion graphic
3050 I=1
3060 READN:M(I)=N:IFN>255THEN3080
3070 I=I+1:GOTO3060
3080 T=I:FORJ=1TO20
3090 FORI=1TO(T-1):LPRINTCHR$(M(I)+128);:NEXT
3100 NEXTJ
3110 ' Read and printout bottom portion graphic
3120 I=1:LPRINT
3130 READN1:M1(I)=N1:IFN1>255THEN3150
3140 I=I+1:GOTO3130
3150 T=I:FORJ=1TO20
3160 PRINT:FORI=1TO(T-1):LPRINTCHR$(M1(I)+128);:NEXT
3170 NEXTJ
3180 LPRINTCHR$(30) 'reset printer to non-graphics mode
3190 LPRINTCHR$(27);CHR$(15) 'reset printer out of expanded mode
3200 DATA 0,0,126,1,125,5,5,5,5,5,125,1,126,0,0,0,999
3210 DATA 0,126,65,85,73,85,73,85,73,85,73,85,72,65,126,0,0,999
3220 RETURN
```

End

**NEW PRICES**

25 Pack Complete\*

**BEST BUY!**

**\$159**  
Single Sided Double Density

**\$189**  
Double Sided Double Density

Soft sector 5 1/4" flexible diskettes

\*Complete with hub reinforcing rings, Tyvek sleeves, color coded user labels, and write protect tabs.

**Quality you expect at a price you don't.**

Proven quality at a great price. BECK offers you a full satisfaction money-back guarantee - you can't lose! If you like the quality of 3M, Dysan, Verbatim, et al, you'll like BECK.

- Satisfaction, Money-Back Guarantee
- 100% Certified, 100% Error-Free
- Full 7-Year Warranty
- Tested and Retested 21 Times to 42 Rigid Specifications
- Meets or Exceeds ANSI Standards

For IBM, Apple, TRS, and 97% of popular computers.

Order Toll Free 1-800-232-5634.  
Available in 25-Pack only plus freight.  
Bulk product inquiries welcome.

COD's CASH ONLY  
Corp. Accts Welcome  
No personal checks accepted.

**Order Now Toll Free Door to Door in 48 hrs.**

**1-800-BECK MFG**  
(In New Hampshire call 924-3821)



# DiskCount™ Data

WHERE ✓204  
QUALITY PROGRAMS  
MEET COMPETITIVE PRICES

2701-C W. 15th • SUITE 324 • PLANO, TX 75075 • (214) 680-8268

## FREE SPECIALS

Order over \$100 or more and select one of the following • MELTDOWN • VOYAGE OF THE VALKYRIE • MASTER DIRECTORY • THE GREEN WINDOW.

Order over \$200 and select one of the following  
CLEAN SLATE • PROPIX • GAME PAK 3 • AOS UTILITIES • SUPERKEYS

All MOD III programs specified in this ad will run on the Model 4 (in the MOD III mode).

<b>MASTER DIRECTORY</b> by AOS	<b>NOW</b> 29.95
MOD III Disk Cataloger	
<b>SUPER DIRECTORY</b> by Michtron	<b>44.95</b>
MOD I/III Disk Cataloger	
<b>BASIC CHECKBOOK</b> by Freeman Soft.	<b>64.95</b>
Complete Checkbook Manager MOD I/III	
<b>M TERM</b> by Micro Systems	<b>SALE</b> 64.99
The Total Terminal Package MOD I/III/4 Specify	
<b>LOAN AMORT</b> by Big G	<b>ONLY</b> 29.95
Complete Loan Amortization MOD III	
<b>TEST GENERATOR</b> by Big G	<b>34.95</b>
MOD III Generates True/False Multiple Choice Essay Questions etc	
<b>POWERDRAW</b> by Powersoft	<b>34.95</b>
A Screen Graphics Editor & Program Generator - MOD I/III	
<b>DATAGRAPH</b> by Micro Software	<b>74.99</b>
Stunning Graphics from VISICALC MOD I/III/4 Specify Printer	
<b>POWERDOT</b> by Powersoft	<b>59.95</b>
Hi RES Graphics on EPSON PROWRITER & DMP's Specify	
<b>M-SCRIPT</b> by Micro Systems	<b>79.95</b>
MOD I/III/4 on Same Disk + Word Processor	
<b>LESRIPT</b> by Anitek	<b>109.95</b>
MOD I/III/4 MAX - 80	
<b>CLEAN SLATE</b> by AOS	<b>A 95.00 VALUE 49.95</b>
MOD III Specify	

- Totally User Configurable
- 2 Color Documentation
- Easel Binder • Page Oriented
- Can Be Used As Screen Editor
- Built In Communications Pkg.
- The Complete Wordprocessor
- Clean Slate The Book
- Included At No Extra Charge

<b>CP/M2.2</b> by Montezuma Micro	<b>169.95</b>
Rapid Stack Hard Disk Driver 30.00	
<b>DOSPLUS 3.5</b> by Micro Systems	<b>Now \$69.95</b>
Version 3.5 MOD I/III Version 4A w. MZAL 139.95 Version 3.3 MOD I 39.95	
<b>MULTIDOS</b> by Cosmopolitan	<b>59.95</b>
MOD I/III Specify	
<b>MONITOR 5</b> by Howe Software	<b>ONLY 22.95</b>
MOD I/III/4 Specify	
<b>LDOS TOOLBOX</b> by Powersoft	<b>44.95</b>
Over 20 Utilities to enhance LDOS	
<b>ALCOR C</b> Alcor Systems	<b>250.00</b>
The Complete System MOD I/III Specify	
<b>SUPER KEYS</b> by AOS	<b>35.00</b>
Model III Keyboard Macro Utility	
<b>G.X PLUS</b> by Micro Systems	<b>39.95</b>
Enhance TRSDOS 6.X Now updated for all versions	
<b>TOOLBELT MOD 4</b> by Powersoft	<b>49.95</b>
What LDOS Toolbox did for LDOS This does for TRSDOS 6	
<b>IMPACT</b> by Powersoft	<b>39.95</b>
A set of utilities for Basic MOD I or III TRSDOS (2.3 1.3 and LDOS)	
<b>POWERSCRIPT</b> by Powersoft	<b>34.95</b>
Modification for the Original SCRIPTSIT LC	
<b>POWERDRIVER</b> by Powersoft	<b>29.95</b>

- Interface Superscript with the following printers: Okidata 92/93; Epson FX/RX/MX; Citoh Prowriter; Citoh Starwriter; Star Gemini 10 Series. Specify Printer when Ordering.

<b>ENIGMA</b> by Powersoft	<b>39.95</b>
Encryption Utility for use with Text Files MOD I/III	
<b>BASIC-S</b> by Powersoft	<b>34.95</b>
Basic Compiler System MOD I/III	
<b>M-ZAL 3</b> by CAU	<b>84.95</b>
Modular Z-80 Assembler MOD I/III Specify	
<b>ALC EDITOR/ASSEMBLER</b> by The Alternate Source	<b>38.95</b>
Z-80 Assembler MOD I/III/4 Specify	
<b>SYST. DIAGNOSTIC</b> by Howe Software	<b>89.95</b>
Checks Complete System MOD I/III/4 Specify	
<b>BASE 34</b> by The Alternate Source	<b>44.95</b>
Convert MOD III Basic to MOD 4 Basic Also changes MOD III to 4 graphics Also available BASANY0 and BASE2000	
<b>TRASH MAN</b> by Prosoft	<b>34.50</b>
Basic String Compression MOD I/III	
<b>FASTER</b> by Prosoft	<b>24.95</b>
Speed Up Basic Execution MOD I/III	
<b>RPM</b> by Prosoft	<b>22.50</b>
Disk Drive Timer for MOD I/III or 4 (III)	
<b>ACCEL 4</b> by Alan Gelder	<b>94.95</b>
Basic Compiler MOD I/III	
<b>DSMBLR III</b> by Misosys	<b>34.95</b>
MOD I/III Disassembler	
<b>PRO-SERIES</b> by Misosys	<b>MOD 4</b>

PRO-CSS MOD 4 APPEND CMD FILES	37.95
PRO-CREATE MOD 4 ED/ASSEMBLER	94.95
PRO-CURE MOD 4 TO CP/M TRANSFER	46.95
PRO-DUCE MOD 4 DISASSEMBLER	37.95
PRO-PADS MOD 4 PART DATA SETS	37.95
PRO-ZCAT MOD 4 CATALOG UTIL	27.95

## BOOKS, CHARTS AND MISC.

GREEN WINDOW ALL MODELS	16.95
INSIDER SUPER UTILITY 2.2Z	17.95
SUPER UTILITY TECH MANUAL 3.X	13.95
TRS-80/2-80 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 MYST	26.95
BASIC FASTER & BETTER	26.95
BFB LIBRARY DISK I/III	16.95
BFB DEMO DISK I/III	16.95
TRSDOS 6/LDOS PROGRAMMERS GUIDE	18.95
DISKETTES SSDD TO IN PLASTIC BX	19.50
CLEAN SLATE THE BOOK	15.95
PROFILE 3+ COMMANDS WALL CHART	4.00
VISICALC COMMANDS WALL CHART	4.00
SUPERSCRIPIT WALL CHART	4.00
MODEL III BASIC WALL CHART	4.00
MODEL 4 BASIC WALL CHART	4.00

\*CHARTS NOT SHIPPED AS SEPARATE ORDER

## TRS-80 Encyclopedia

Covers the models I, III and 4 extensively. A must have item for your TRS-80 library. Over 400 pages of valuable information. **ONLY 19.95**

## SURVEY ANALYST

**195.00**

by The Alternate Source

Track Survey Data - Analyze the Results

The brand new survey analyst was developed for marketing and survey research. Field tested on 50 studies over 3 years, this excellent program brings many new features to the TRS-80 world. • Over 100 pages of instructions • Handles single or multiple choice answers and numeric values • Printer output and table format • Up to 510 questions per survey • Extracts and analyzes selected groups or selected questions • Will handle 400 responses to 500 questions on a 40 TRK DD Disk • Many more features. Order today or call for additional information. MOD I/III Specify

## VIDEO INSTRUCTIONAL TAPES

PROFILE III PLUS	36.99
SUPERSCRIPIT	36.99
LAZY WRITER	36.99
NEWDOS-80	36.99
SCRIPTSIT	36.99
TRSDOS 1.3 (MOD III)	36.99
TRSDOS 6 (MOD 4)	36.99
TRSDOS 6 DISK I/O (MOD 4)	36.99
TRSDOS 1.3 DISK I/O (MOD III)	36.99
MULTIDOS	36.99
DOSPLUS	36.99
LDOS 5.0X	36.99
VISICALC	36.99
CP/M 2.2 MONTEZUMA (MOD 4)	36.99
MULTIPLAN (MOD 4)	36.99
PFS FILE (MOD 4)	36.99
MOD I LEVEL II BASIC	46.99
MODEL III BASIC	46.99

**SPECIFY VHS OR BETA**

**HYPERCROSS/XT**  
By Hypersoft **79.95**

**COPY YOUR FILES TO/FROM  
TRSDOS MSDOS CP/M**  
SPECIFY MOD I/DO III or 4

A NEW, OUTSTANDING TRSDOS MSDOS CP/M conversion utility. Hypercross will work with ANY TRS-80 DOS to allow you to format and copy files back and forth on your TRS-80. The following commands are supported: FORMAT, DIR, KILL, COPY, USE, CP, MD, SELECT, HELP, and EXIT. Help displays a summary list of commands. Fully menu driven. HYPERCROSS XT is the finest program we've used. It will support the following ALN's features:

RM, RMDIRS, M, T, Z, and compatible TANDY 2000 and their CP/M. HARDWARE ACCESS: MATRIX ACCESS, ALTOS, ATARI 800, DOS, ROM, M, DEL, VDIS, RUBIN, DEL, RANDO, EAGLE, EPSON, EPSON, GRAPHICS, ACTION, HP125, IBM CP/M, KAYPRO II, K&L, LNU, R, CP/M, LNU, MAX 80, MORRIS, NEC, R, RDT, OSBORNE, PRIMA, SAVVY, SECOMPAR, SUPERBANK, TELETYPE SYSTEM, MASTER, TELETYPE, T&S, 80, LIFEBAT, MICRON, HOLMES, HUR, RIGAGE, and SHUFFLEBOARD. MONTEZUMA 2.2, KS CP/M, XEROX, ZENTH, HEALTH, and ZORBA AND 8 CP/M standard on 8 drives.

**ELECTRIC WEBSTER**  
by Cornucopia Software **ONLY 119.95**

149.95 SAVE 20%  
WITH CORRECTING FEATURE

Reviewed as the best proofreader and spelling checker on the market. Works with SCRIPST LAYZ WRITER, ELECTRIC PENCIL, ZORLOF, NEWSWRIGHT, COPYART, and ACORN'S SUPERSCRIPST. Separate version available for R/S SUPERSCRIPST. Sold with correcting feature for 149.95

OUR PRICE..... 119.95  
HYPHENATION OPTION\*..... 39.95  
GRAMMAR & STYLE CHECKER\*..... 39.95  
MOD I/III

\*Note: hyphenation & grammar options are not available for all word processors. Ask when ordering.

**ICS PROFESSIONAL**  
by Freeman Software **ONLY 148.00**

**INVENTORY CONTROL  
SALES REGISTER  
INVOICING**

This complete retail inventory, invoicing and sales register system will maintain over 2,500 items on MOD III floppies with built in accounting for sales tax, sales type and 9 different sales people. Prints sales registers, invoices and many different inventory reports on 80 or 132 col Printer. Tracks backorders and will also re-order on predetermined quantities. Also maintains cost of entire inventory. A GREAT VALUE!

MOD I/III

**SUPER UTILITY PLUS**  
VERSION 3.2  
By Powersoft **SAVE ONLY 69.95**

SALE..... ONLY 69.95  
MOD 4 Version Now Available

**NEW SUPER UTILITY +  
VERSION 3.2**  
Includes Operators Manual  
and 2nd Backup-Disk

The Book Inside SU + 3.2  
NOW ONLY 17.95

Experience a legend with the  
program voted as the outstanding  
utility of 1982 and 1983.

MOD I or MOD III Protected Media

**ULTRATERM**  
by United Software **JUST REDUCED**

**ULTRATERM NOW 39.95**  
Version 2.0 w/Auto Logon 49.95

This communications package is one of the most versatile available. It includes a full featured intelligent terminal program, host program, direct file transfer function, and file conversion utilities for Bulletin board downloading plus:

- Support for virtually all manual and auto dial modems.
- Exclusive ultra term direct box file transfer function allows full control from the sending computer, and unattended operation at the receiving computer.
- Split screen feature lets you type outgoing messages on the bottom half of the screen while incoming messages are displayed on the top of the screen.
- Full line printer support.
- Universal ASCII format file transmission and reception with memory input/output buffer supports delays between characters, delays between lines, and prompt controlled transmission for compatibility with virtually all systems. A counter continuously displays the amount of free memory remaining whenever the buffer is in use.
- Full featured host program that supports PRN and PRN+ graphics from basic, and automatically verifies and prints to host in the top of memory is included.
- Auto Dial phone numbers stored in program with single key Auto Dial.

MOD I or MOD III

**TEXT PRESS**  
by The Alternate Source **49.95**

ASCII File Compression Utility

Store more files in less space

This new utility will do a binary text compress on ASCII, word processor, or text files for archival purposes. You can define your own special compression key word list or use the standard words included. TEXT PRESS will compress or decompress one or several files. Contains a list utility to list files from DOS without a separate decompress.

MOD I/III Specify

**INFOSCAN**  
By The Small Systems Center **NOW 44.95**

Retail 49.95  
Special 44.95

InfoScan is an information utility that is used to organize, store and retrieve any type of useful information in any format. It combines the features of a word processor, data base manager and information retrieval and display utility. You compose information records on the screen using the word processing feature, in any format you like. Each record is described by 1-17 character key phrase that you specify. Once created the information key's keyphrases can be scanned as a list on the screen using an impressive key scan bracket. You scroll the keyphrases thru the brackets with the arrow keys on your keyboard. When the desired keyphrase is found you press a single key and the corresponding information record is retrieved from disk and displayed on the screen. The record displays in exactly the same format as you used to create it. You can even design your own forms to fill in.

MOD I/III MINIMUM 48K 1 Drive

**BBS-80**  
by MicroSystems Software **ONLY 74.95**

RUN YOUR OWN BULLETIN BOARD

Your computer becomes a min communications network. BBS-80 allows a person to exchange messages or information via the telephone. Access can be completely public, private to authorized users or limited to certain individuals. BBS-80 can have messages on another terminal acting as a rapid electronic mailbox. BBS-80 provides some of the most advanced and most convenient features ever incorporated in a microcomputer bulletin board system including: Users may send private messages that may be ready only by the addressee. Multi-level system security allows up to 15 levels of security in both the message base and the upload/download database. BBS-80 remembers each regular user and stores terminal information, security access levels, last message retrieved during last call. Individual user passwords. Users may upload or transmit data and programs files to BBS-80. These programs may then be downloaded to other BBS-80 users. BBS-80 is self-maintaining. Message space is automatically reclaimed when messages are deleted.

MOD I or III

**THE HOME ACCOUNTANT**  
By Continental Software **ONLY 62.50**

An Outstanding Financial Planner

- Maintains up to 100 budget categories
- Keeps track of up to five checkbooks
- Prints checks, if desired
- Prints a personal balance statement, income and expense summary
- Prints net worth statement
- Provides fast bank responses
- Allows the extensions on multiple disbursements
- One program handles cash, checksbooks, 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 everything you'd ever ask of a personal finance package! — Popular Computing November, 1982

MOD III

**The TRS-80 GRAB BAG** **ONLY 99.95**

68 Programs on 14 Different Cassettes: MOD I or III  
All programs can be moved to Disk  
SAVE 75%  
Retail 449.30

**ELECTRONICS I 4 PROGRAMS**..... 34.95  
**ELECTRONICS II 7 PROGRAMS**..... 34.95  
**ELECTRONICS III 4 PROGRAMS**..... 34.95  
**ACTIVE FILTER DESIGN 5 PROGRAMS**..... 34.95  
**EE LARGER NETWORK 1 PROGRAM**..... 54.95  
**HUSTLY BASIC EDUCATIONAL 6 PROGRAMS**..... 24.95  
**HUSTLY BASIC SCIENTIFIC 7 PROGRAMS**..... 24.95  
**HYVAGE OF VALKYRIE 1 PROGRAM**..... 34.95  
**DESCRIPTIVE STATISTICS 3 PROGRAMS**..... 34.95  
**TIME BOMBERS WORLD HISTORY 3 PROGRAMS**..... 24.95  
**TIME BOMBERS U.S. HISTORY 5 PROGRAMS**..... 24.95  
**PLOTTING GRAPHS FOR LINE PLOTTER 3 PROGRAMS**..... 34.95  
**PLOTTING GRAPHS FOR VIDEO DISPLAY 3 PROGRAMS**..... 34.95  
**HUSTLY BASIC HOUSEHOLD 10 PROGRAMS**..... 24.95

**PRINTER RIBBONS**  
First Quality Brand New-No Reloads

PRINTER	PRICE EA.	BOX OF 6
ANADIX 9500 SERIES/9620/9625	9.00	48.00
C. ITOH 8510 PROWRITER	7.00	36.00
C. ITOH A10/F10/DWP 210 (FILM)	5.00	26.00
DMP 2100/TOSHIBA 1350	8.00	44.00
DW II/DWP-410 (MULTI STRIKE FILM)	6.00	32.00
EPSON MX-80/FX/RX	6.00	32.00
EPSON MX-100	9.00	48.00
LP III/V	6.00	32.00
OKIDATA 80/82A/83A/92/93	4.00	20.00
OKIDATA 84	5.00	26.00

**LC-COMPILE AND EDAS**  
By Misosys **SAVE OVER \$60**

EDAS Retail \$100  
SPECIAL BUY BOTH FOR \$139.99

Now program in the "C" language compiler subset for LDOS. LC generates Z-80 EDAS IV source code as output. Compiled programs run on both MOD I and MOD III. Save \$60.00 with the best LDOS editor assembler package on the market. Over 200 pages of documentation. Requires 2 drives and 48K.

FOR LDOS MOD I/III  
MOD 4 VERSION AVAILABLE

**POWERMAIL PLUS AND TEXT-MERGE** **Now 149.95**

Introductory Offer  
Save 25%

THE FINEST MAILING LIST JUST GOT BETTER. Now merge data from PowerMail Plus to create customized form letters, special mailing items, special label or list formats and more. Easy to use with your existing word processor.

**PUBLISHED BY POWERSOFT**

It sold separately PowerMail Plus..... 124.95  
Text-Merge..... 49.95  
MOD I/III 4 MAX 80 SPECIFY

**MELTDOWN**  
By Micro Mining **ONLY 19.95**

A GREAT GAME  
AT REASONABLE PRICE

A real time simulator of the operation and control of a nuclear power generating station. Screen graphics are utilized to display the actual plant diagram, and a separate control panel screen may be switched in and out while the plant is running. The object of the simulation is to keep the plant at peak performance by reacting to various problems which occur during operation.

MOD I/III

**THE ALTERNATE BASIC**  
by The Alternate Source **64.95**

Write Source Code in ABASIC which converts to MICROSOFT BASIC

This new product for BASIC programming features the ability to build and maintain STRUCTURED BASIC code. No line numbers needed. BASIC text translator. Adds STRUCTURED constructs. Adds label variables. Copy code from routine libraries. Includes extensive help files. FREE library of utility and command subroutines. FREE general purpose translator. A unique and efficient way to write BASIC.

MOD I/III/4/2000 Specify

**SUPERLOG**  
by KSOFT **SALE 114.95**

THE ULTIMATE ELECTRONIC NOTEBOOK

Interrupt activated so your files are available when running another program. Key toggle back and forth between your program and superlog, search for, add or edit data when you want. This interrupt function is compatible with any basic or assembly language program which does not disable the interrupts or system drivers. Help file for printer output included. Basic program for calendar file included.

**SUPERLOG I/III FOR LDOS 5.1X  
SUPERLOG 4 FOR TRSDOS 6.X**

**GENERAL LEDGER**  
By FBN Systems

The Finest We've Found

SAVE 50%

If you're tired of your present ledger, tired of lost data, tired of having to refer to instructions and tired of its non-professionalism, you need the FBN General Ledger.

Multiple Cash Accounts. Departmentalize any account. You select which accounts print on income statement & balance sheet. Real time transaction posting. No more batch processing. Total audit trail. We have what we believe to be the finest general ledger for the Model III on the market. Call for more details or order now. A most pleasant surprise!

**REDUCED TO 149.95**

**DiskCount Data** **214-680-8268**

Send Cash, Check or Money Order.  
Please add \$3.00 for postage and handling, additional \$2.00 for C.O.D.s.  
Foreign orders welcome, please specify air or surface.  
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 W. 15th St., Suite 324, Plano, TX 75075  
Office Hours Mon-Fri 10A.M. to 9P.M. C.S.T.

and Cheerfully Accepted



# ON THE RECORD

Sequential random-access files each have their own advantages and disadvantages for data storage and retrieval. Here's a way to combine the best features of both.

Sequential files use disk space efficiently, but they have their disadvantages. To update records, a program must read and write an entire file. And searching for a specific record can require extensive disk input/output or main memory, depending on the technique you use. Random-access files (also called direct-access files) don't have these drawbacks and, with good planning, they can be reasonably efficient users of disk space.

I'll introduce three Model I/III Basic programs that create and sort indexed random-access files, letting you easily manipulate data stored on disk. First, however, I'll describe how random-access files work.

## Records and Subrecords

Table 1 shows the Disk Basic commands you use to create and access random files. Random-access files store data in buffers. A buffer is one 255-character record; you can define subrecords (i.e., fields) within the buffer using the Field command. The Get command accesses the full record; you need a file-handling program to access the subrecords.

For example, assume you want a file of names and phone numbers that sets aside 25 characters for a name and 12 characters for a phone number. Positions 1-25 in the file buffer contain name characters and positions 26-37 contain the phone number. Each 255-character main record could hold

six of these 37-character subrecords, with 33 unused characters left over.

Here's how you'd open this file and define its fields:

```
10 OPEN 1, "R", "NAMEPHON/RND:1"
20 FOR I% = 0 TO 5
30 FIELD 1,(I%*37) AS DMS, 25 AS NMS(I%),
12 AS PH$(I%)
40 NEXT I%
```

Line 10 opens the file as a random file. If the file already exists, the system finds it. If it doesn't, the system creates it. Line 20 determines that the program creates six subrecords. In line 30, the statement  $(I\%*37)$  AS DMS sets up a pointer to the beginning of each subrecord; the rest of the line describes each field within the record.

Program Listing 1 creates the random-access file described above to hold your data. Program Listing 2 reads the file sequentially. Whether you access the file randomly or sequentially, you always define fields as shown. You access the record using Get to call the full record. Then you use a file-handling program to locate the subrecord you want.

To write a record, you always fill the buffer using LSET (for left-justified data) or RSET (for right-justified data) with a specified subrecord position. These commands pad data that doesn't quite fill the buffer. Then you write the file to disk using Put with the main record number.

## Indexing Your Files

As you can see, reading and writing a random file sequentially isn't too complicated. However, to read a file randomly, your program must have a way to determine the main record number (which I call MR%) and the subrecord number (SR%) of the file in which you're interested. In other words, you need an index of the records stored in the random-access file. I use a sequential index file to point to the random records. It's easy to use and control, and has the advantage of letting you search the index by more than one key word.

One important aspect of random-access files to remember is that fields in random files are absolute in size; you use LSET or RSET to fill the fields to the right or left, with spaces added to fill the buffer. (A sequential file's fields generally vary in size with the data and use a delimiter, like a comma, to define the fields.)

Program Listing 3 demonstrates my indexing technique with a program that catalogues my applications programs. Listing 3 stores data in the fields shown in Table 2. It includes entries for the program name, author, application, and the disk on which it's stored. You could use the same procedure to create a file of names and phone numbers, candidates and votes received, and so on. I've listed all variables at the end of the

## The Key Box



Models I and III  
32K RAM  
Disk Basic  
NEWDOS80 (for sort)

Command	Description
Field	Defines buffer
LSET/RSET	Positions data in buffer
Put	Writes the buffer
Get	Reads the buffer
LOF	Sets pointer to last main record of file

Table 1. Commands for manipulating random files.

Position	Length (in bytes)	Description
1-12	12	Program name
13-16	4	Application
17-24	8	Disk name
25	1	Side
26-27	2	Grans
28-37	10	Author
38-57	20	Description

Table 2. Fields for program reference file.

## *The index file controls access to the random file using the program's name as the key.*

program; they're for reference and shouldn't be typed in.

When you run the program, it displays a menu of three options: adding a new file, changing or deleting a file, or exiting the program. As you update records, the program creates a sequential index file in memory using arrays. The program writes out this index file at the end of the job; the file controls access to the random file and uses the program name as the key field.

Each index file record has the format XXXXXXXX/XXX, MR%, SR%; that is, the program name, the main record number (file or buffer number) and the subrecord number. The variables MR% and SR% of the index file point straight to the random record for any specific program name. Table 3 describes the main routines of Listing 3.

Program Listing 4 creates, sorts, and writes two index files from the main random file in Program Listing 3, one using the program name as the key word, the other using the application. Don't sort or change the index file; it controls the update procedure. The sort in lines 240 and 270 is a system sort available under NEWDOS80 2.0. Alternatively, you can insert a sort for your own DOS (for a TRSDOS sort, see "Proper Arrangements," June 1984, p. 96).

Program Listing 5 searches the random file in Program Listing 3 using the two index files created in Listing 4. By creating an index file that can have any field as the key, you can sort the file or access records in any sequence you want.

This technique has saved me the trouble of finding a good algorithm for randomizing the key field (which would have to be unique) into a main record and a subrecord. I feel that I have better control, and the pointers are so simple that they're less likely to get out of sync and send all my data into never-never land. This method should help programmers manipulate random files more easily and confidently. ■

*You can reach Jane Goodale at 828 N. 121st St., Omaha, NE 68154.*

Lines	Description
10-20	Initialize variables.
30	Read index file. If it doesn't exist, On Error routine takes care of it.
40-50	Initialize and field random file buffer.
70-90	Menu.
100-190	Add to file. Last record added will be displayed first. To duplicate a field from previous record press the enter key. If a deleted record exists (* in program name) the record is put there. Otherwise it's added at the end.
200-260	Change or delete. Asks for program name, displays the record, and positions cursor under each field in turn. Change field by entering new data, or leave as is by pressing enter. Delete record by typing asterisk (*) in the program name field. Line 260 returns to line 230 where 1% is stepped up to find the next occurrence of the same program name, which handles the duplicate key.
400-420	Locate the first deleted record.
500-570	Set variables for input routine.
600	Get data from the random file buffer based on subrecord number XS%.
700-720	Fill random file buffer.
750-760	Fill unused subrecords with x's.
800-810	On Error routine.
900-920	End of job. Writes index file. At this point, I run Listing 4 to create two more index files.
1000-1140	William Barden's Universal Gee Whiz Input routine. See <i>Programming Techniques for Level II Basic</i> , p. 57, for full discussion.

Table 3. Main routines for Program Listing 3.

Program Listing 1. Creates a random-access disk file. Add lines 10-40 from p. 106.

```

100 MR%=1 ' initialize main record number
110 FOR SR%=0 TO 5 ' six subrecords to fill
120 INPUT"ENTER NAME ( '*' TO EXIT );N$
130 IF N$="" THEN GOTO 210
140 INPUT"ENTER PHONE";P$
150 LSET N$(SR%)=N$ ' fill buffer
160 LSET P$(SR%)=P$
170 NEXT SR% ' step up subrecord number
180 PUT 1,MR% ' when six are filled, then Put
190 MR%=MR%+1 ' now step up main record number
200 GOTO 110 'and loop back
210 IF SR%=0 THEN 230 'last record
220 PUT 1,MR% ' otherwise write it out
230 CLOSE 1:END

```

End

Program Listing 2. Reads a random file sequentially. Add lines 10-40 from p. 106.

```

100 FOR MR%=1 TO LOF
120 GET 1,MR%
130 FOR SR%=0 TO 5
140 PRINT N$(SR%),P$(SR%) 'subscripted fields
150 NEXT SR%
160 NEXT MR%
170 CLOSE 1: END

```

End

Program Listing 3. Creates indexed random files.

```

1 REM RANDISKU/BAS JN GOODALE
2 REM CREATE AND/OR UPDATE A RANDOM FILE OF PROGRAM
3 REM AND DATA INFORMATION ON DISKS
8 REM
9 REM INITIALIZE -----
10 CLEAR25000:CLS:PRINTTAB(15)"UPDATE PROGRAM INFORMATION FILE":PR
INT@340,"INITIALIZING":DEFINTA-Z:DIMIP$(500),IM$(500),IS$(500):ES=
"##":H2$="PROGRAM APPL DISK S GR AUTHOR DESCRIPTION":
H3$=STRING$(63,"")
20 MR%=1:SR%=0:N%=0:FI$="DISKINDX/INX:1":FR$="DISKINDX/RND:1":ONER
RORGOTO800:OPEN"I",1,FI$
29 REM READ INDEX -----

```

Listing 3 continued



# BIBLE HIGHLIGHTS 1

- Highlights of the Bible for children, kindergarten through fourth grade.
- Christian learning through animated Bible stories, games and quizzes.
- Covers CREATION, JEWISH TRIBES AND LIFE OF CHRIST.

- A computer software package for TRS 80 Models III and IV. Total program over 70k bytes. 7 sections each less than 16k.
- Specify tape cassette or diskette.

- Price \$19.50. Post paid. Satisfaction guaranteed.

- Send check or money order to:  
**STAR SOFTWARE CO.,**  
DEPT. M80  
2315 WATERBY ST.  
WESTLAKE VILLAGE  
CA 91361

✓43

# NEW

## Genealogy Program

(for 48K Model III/4 Two Disk Systems)

### HOLDS 350 RECORDS PER FILE

- ★ Records filed by name key
- ★ Unlimited records with multiple files
- ★ Allows changes in spelling of surnames
- ★ Shipped on premium diskette

### Comprehensive Documentation

Five Reports: Full Alpha Printout,  
Family Tree, Paternal Line, Maternal  
Line, Descendant Line

**\$49.95** U.S.

Send Check or Money Order to

**MIMAR, INC.**

116 Baywood Drive : Biloxi, MS 39532

✓317

Free Shipping for U.S. Orders

Mississippi Residents add 6% Sales Tax  
Foreign Orders add \$5 Shipping and Handling

Listing 3 continued

```

30 INPUT#1,IP$(N%),IM$(N%),IS$(N%):IFEOF(1)THEN40ELSEN%=N%+1:GOTO3
0
39 REM INITIALIZE RANDOM FILE BUFFERS -----
40 CLOSE1:MR%=IM$(N%):SR%=IS$(N%):GOSUB420
50 OPEN"R",1,FR$:FIELD1,255 AS DX$:LSET DX$=STRING$(255,"X"):FORI%
=0TO3:FIELD1,(I%*57)AS DM$,12 AS PG$(I%),4 AS AP$(I%),8 AS DN$(I%)
,1 AS SD$(I%),2 AS GR$(I%),10 AS AU$(I%),20 AS DS$(I%):NEXTI%:IFN$
="Y"THEN100
69 REM MAIN MENU -----
70 CLS:PRINTTAB(15)"UPDATE PROGRAM INFORMATION FILE":PRINT:PRINTTA
B(20)"1) ADD TO FILE":PRINTTAB(20)"2) CHANGE/DELETE":PRINTTAB(20)
"3) END PROGRAM":PRINT:PRINTTAB(10)".... CHOICE (DO NOT HIT
<ENTER>)"
80 K$=INKEY$:IFK$=" "THEN80ELSEPRINTK$:ONVAL(K$)GOTO100,200,900
90 GOTO70
99 REM ADD TO FILE -----
100 IFN$="Y"THEN120ELSEIFD$="Y"THEN120
110 GET1,MR%:XS%=SR%:GOSUB600:N%=N%+1:IFSR%=3THENSR%=0:MR%=MR%+1EL
SESR%=SR%+1
120 CLS:PRINTTAB(03)"ADD TO FILE : (' ' TO ESCAPE, <ENTER> TO R
EPEAT)":PRINTTAB(25)PRINTTAB(35)
130 IFD$="Y"THENGOSUB400:GOTO100ELSEIFN$="Y"THEN145
140 PRINTPG$:TAB(13)AP$:TAB(18)DN$:TAB(27)SD$:TAB(29)USINGE$;GR%:
PRINTTAB(32)AU$:TAB(43)DS$
145 FORI%=2TO13:ZX=I%*64+128:GOSUB500:IFZA$=" "THEN180
150 XS%=SR%:XM%=MR%:X%=N%:GOSUB700:IFSR%=3THENPUT1,MR%:MR%=MR%+1:S
R%=0ELSESR%=SR%+1
160 N$="N":N%=N%+1:IFN%>500THENN%=500:GOTO900
170 NEXTI%:GOTO120
180 N%=N%-1:IFSR%>0THENGOSUB750:SR%=SR%-1ELSEMR%=MR%-1:SR%=3
190 GOTO70
199 REM CHANGE/DELETE -----
200 CLS:PRINTTAB(24)"CHANGE/DELETE":PRINTTAB(12)"' ' TO DELETE":TA
B(31)"<ENTER> TO LEAVE AS IS":PRINTTAB(18)"PROGRAM NAME :":F$=" "
OT FOUND"
210 ZZ=12:ZC=161:GOSUB1000:IFZA$=" "THEN70ELSEPG$=ZA$:PRINT " : PG$
=PG$+STRING$(12-LEN(PG$)," ")
220 FORI%=0TON%:IFPG$=IP$(I%)THEN240
230 NEXTI%:PRINT " : PRINTTAB(18)"PROGRAM " : PG$:F$:INPUT".....<ENT
ER> TO CONTINUE":K$:GOTO70
240 XM%=IM$(I%):XS%=IS$(I%):GET1,XM%:X%=I%:GOSUB600:PRINT@192,H2$:
PRINTTAB(35)PRINTPG$:TAB(13)AP$:TAB(18)DN$:TAB(27)SD$:TAB(29)USINGE$;
GR%:PRINTTAB(32)AU$:TAB(43)DS$
250 ZX=384:GOSUB500:IFZA$=" "THENPG$=" " : D$="Y":DM%=XM%:DS%=XS%:DR
%=I%
260 GOSUB700:PUT1,XM%:F$=" FINISHED":GOTO230
399 REM LOCATE DELETED RECORD -----
400 D$="N":ZX=192:GOSUB500:IFZA$=" "THEND$="Y":GOTO440
410 XS%=DS%:XM%=DM%:X%=DR%:GET1,DM%:GOSUB700:PUT1,DM%
420 FORI%=0TON%:IFIP$(I%)=" "THEND$="Y":DM%=IM$(I%):DS%=IS$(I%):DR
%=I%:GOTO440
430 NEXTI%
440 RETURN
499 REM SCREEN LAYOUT AND INPUT -----
500 ZZ=12:ZC=ZX:GOSUB1000:IFZA$=" "THEN570ELSEIFZA$<>" "THENPG$=ZA$
510 ZZ=4:ZC=ZX+13:GOSUB1000:IFZA$=" "THEN570ELSEIFZA$<>" "THENAP$=Z
A$
520 ZZ=8:ZC=ZX+18:GOSUB1000:IFZA$=" "THEN570ELSEIFZA$<>" "THENDN$=Z
A$
530 ZZ=1:ZC=ZX+27:GOSUB1000:IFZA$=" "THEN570ELSEIFZA$<>" "THENDSD$=Z
A$
540 ZZ=2:ZC=ZX+29:GOSUB1000:IFZA$=" "THEN570ELSEIFZA$<>" "THENGRA$=V
AL(ZA$)
550 ZZ=10:ZC=ZX+32:GOSUB1000:IFZA$=" "THEN570ELSEIFZA$<>" "THENAUS$=
ZA$
560 ZZ=20:ZC=ZX+43:GOSUB1000:IFZA$=" "THEN570ELSEIFZA$<>" "THENDSS$=
ZA$
570 RETURN
599 REM DEFINE DATA -----
600 PG$=PG$(XS%):AP$=AP$(XS%):DN$=DN$(XS%):SD$=SD$(XS%):GR%=CVI(GR
$(XS%)):AU$=AU$(XS%):DS$=DS$(XS%):RETURN
699 REM FILL BUFFER -----
700 LSETPG$(XS%)=PG$:LSETAP$(XS%)=AP$:LSETDN$(XS%)=DN$:LSETSD$(XS%)
=SD$:LSETGR$(XS%)=MKI$(GR%):LSETAU$(XS%)=AU$:LSETDS$(XS%)=DS$
710 IP$(X%)=PG$(XS%):IM$(X%)=XM%:IS$(X%)=XS%
720 RETURN
749 REM FILL UNUSED SUB RECORDS -----
750 X%=N%+1:XM%=MR%:PG$="X":AP$="X":DN$="X":SD$="X":GR$="0":AU$="X"
:DS$="X"
760 FORXS%=SR%TO3:GOSUB700:NEXTXS%:PUT1,MR%:RETURN
799 REM ON ERROR ROUTINE -----
800 IFERL=20THENN$="Y":RESUME50
810 PRINT"ERROR ";ERR/2+1;" IN LINE ";ERL:END
899 REM END -----
900 CLOSE1:OPEN"O",1,FI$:PRINT"CREATING RANDOM INDEX FILE"
910 FORI%=0TON%:PRINT#1,IP$(I%),",",IM$(I%),",",IS$(I%):NEXTI%:CLO
SEL

```

Listing 3 continued

```

920 CLS:PRINT"END OF UPDATE .... NOW RUNNING PROGRAM INDEX":RUN"RA
NDISK1/BAS"
999 REM BARDEN'S INPUT ROUTINE -----
1000 ZA$=STRING$(ZZ,"."):PRINT@ZC,ZA$:CHR$(14);:ZA=LEN(ZA$):FORZF=
1TOZA:PRINTCHR$(24);:NEXTZF:ZA$=STRING$(ZA,32):ZG=1
1010 ZH$=INKEY$:IFZH$=""THEN1010
1020 IFZH$=CHR$(8)ORZH$=CHR$(9)ORZH$=CHR$(13)GOTO1040
1030 IFZH$=CHR$(32)GOTO1010
1040 IFZH$<>CHR$(8)GOTO1070
1050 IFZG=1GOTO1010ELSEPRINTCHR$(24);
1060 ZG=ZG+1:GOTO1010
1070 IFZH$<>CHR$(9)GOTO1090
1080 IFZG>=ZAGOTO1010ELSEPRINTCHR$(25);:ZG=ZG+1:GOTO1010
1090 IFZH$<>CHR$(13)GOTO1100ELSEPRINT@ZC,CHR$(15);STRING$(ZA+1,32)
;:PRINT@ZC,ZA$;:ZA$=LEFT$(ZA$,ZG-1):RETURN
1100 ZG=ZG+1
1110 IFZG>ZA+1PRINTCHR$(24);
1120 IFZG>ZA+1ZG=ZG-1
1130 PRINTZH$;:IFZH$=""THENZH$=CHR$(129)ELSEIFZH$="":THENZH$=CHR$(
130)
1140 ZA$=LEFT$(ZA$, (ZG-2)) + ZH$ + RIGHT$(ZA$, ZA-ZG+1):GOTO1010
1200 REM
1210 REM VARIABLE LIST
1220 REM VARIABLE DESCRIPTION
1230 REM -----
1240 REM AP$( ) APPLICATION IN SUB RECORD
1250 REM AU$( ) AUTHOR IN SUB RECORD
1260 REM DS$ DELETE SWITCH
1270 REM DM$ DUMMY RECORD FOR BUFFER
1280 REM DN$ MAIN RECORD NUMBER OF DELETED RECORD
1290 REM DN$( ) DISK NAME IN SUB RECORD
1300 REM DS$( ) DESCRIPTION IN SUB RECORD
1310 REM DS$ SUB RECORD NUMBER OF DELETED RECORD
1320 REM DX$ DUMMY STRING FOR START-UP
1330 REM ES$ EDIT STRING
1340 REM FS$ COMMENT STRING ('NOT FOUND' OR 'FINISHED')
1350 REM FI$ FILE SPEC OF INDEX FILE
1360 REM FR$ FILE SPEC OF RANDOM FILE
1370 REM GR$( ) GRANS (OBTAINED FROM MKI$(GR%) IN SUB RECO
RD
1380 REM GR% GRANS
1390 REM H2$ HEADING
1400 REM H3$ HEADING
1410 REM I% TEMP - USED IN FOR NEXT LOOPS
1420 REM IM$( ) MAIN RECORD NUMBER IN INDEX FILE
1430 REM IP$( ) PROGRAM NAME IN INDEX FILE
1440 REM IS$( ) SUB RECORD NUMBER IN INDEX FILE
1450 REM K$ TEMP - INKEY$
1460 REM MR% MAIN RECORD NUMBER
1470 REM N$ NEW FILE SWITCH ("Y" IF NEW FILE)
1480 REM N% NUMBER OF RECORDS ON INDEX FILE
1490 REM PG$( ) PROGRAM NAME IN SUB RECORD
1500 REM SD$( ) SIDE IN SUB RECORD
1510 REM SR$ SUB RECORD NUMBER
1520 REM X% TEMP - I% IN SUBROUTINE 700
1530 REM XM% TEMP - MR% IN SUBROUTINE 700
1540 REM XS$ TEMP - SR$ IN SUBROUTINE 700
1550 REM ZA TEMP - USED IN INPUT ROUTINE 1000
1560 REM ZA$ TEMP - RESULTS OF INPUT ROUTINE
1570 REM ZC TEMP - CURSOR POSITION FOR INPUT ROUTINE
1580 REM ZF TEMP - USED IN INPUT ROUTINE
1590 REM ZG TEMP - USED IN INPUT ROUTINE
1600 REM ZH$ TEMP - USED IN INPUT ROUTINE
1610 REM ZX TEMP - POINTS TO BEGINNING OF LINE FOR INP
UT
1620 REM ZZ TEMP - LENGTH OF FIELD FOR INPUT ROUTINE

```

End

## Program Listing 4. Adds and sorts two indexes.

```

1 REM RANDISK1/BAS JN GOODALE 03/27/82
3 REM CREATE KEY INDEX FILES FOR FIELDS
4 REM OF A RANDOM FILE.
9 REM INITIALIZE .....
10 CLEAR230000:DEFINTA-Z:DIMIP$(500),IAS$(500),IM$(500),IS$(500),S$(
500)
20 FR$="DISKINDX/RND:1":CLS:PRINT"READING PROGRAM INFORMATION FILE
"
50 OPEN"R",1,FR$:FIELD1,255 AS DX$:LSET DX$=STRING$(255,"X"):FORI=
=0TO3:FIELD1,(I*57)AS DM$,12 AS PG$(I),4 AS AP$(I),8 AS DN$(I)
,1 AS SD$(I),2 AS GR$(I),10 AS AU$(I),20 AS DS$(I):NEXTI
100 N%=0:FORMR%=1TOLOP(1):GET1,MR%
110 FORSR%=0TO3

```

Listing 4 continued

## PASCAL -80

The

RUSSIANS

Can't  
Buy it!

If we wanted to, we could sell our other products to the communists, but the Department of Defense won't let us sell them Pascal 80! NOW you can learn the language that is too powerful for the Red Army!

Pascal 80 is the easiest version of Pascal to learn. Hundreds of schools, including top universities are now using Pascal 80 to teach Pascal.

With the editor and compiler in memory, you can compile and run a short program in under 5 seconds. But you also get extensions to Pascal that give you screen control, random access files, calls to machine language and the ability to create turn-key packages. Pascal 80 is a nearly complete subset of standard Pascal, including structured types, records, pointer variables and files.

--TRS-80 Models I, III and 4--  
Pascal 80 - \$79 + \$2 shipping  
Graphics Extensions for Radio Shack hi-res board - \$39  
Pascal 80 Trial Version - \$15

--for CP/M 80 2.2 or 3.0--  
Kaypro, LoboMax 80, Apple, Epson Osborne, and other computers.  
Call or write for other formats  
Pascal 80 CP/M - \$39 + \$2 shipping

Pascal 80 School Package  
(TRS-80 or CP/M versions) - \$279

NEW CLASSICS  
SOFTWARE

239 Fox Hill Road  
Denville, NJ 07834  
201-625-8838





## MUSI-PRINT

### Publish Your Own Music!



- \* Three print styles with multiple strike option.
- \* Simple editing features with full screen view of music.
- \* Prints up to 43 consecutively-numbered pages of music.
- \* Single line, keyboard, voice and full score formats.
- \* All common musical symbols.
- \* Range three lines below staff to four lines above.
- \* For composers, arrangers, teachers and students.

For complete information, write:  
JRM Publications, LTD.  
P. O. Box 10065 229  
Greensboro, NC 27404

Easy to program with your Model I/III/IV,  
48K Disk and Epson MX-80 Printer  
with Grafrax.



#### Listing 4 continued

```

120 IM%(N%)=MR%:IS%(N%)=SR%:IP$(N%)=PG$(SR%):IA$(N%)=AP$(SR%)
130 N%=N%+1
140 NEXTSR%
150 NEXTMR%:N%=N%-1
199 REM MAIN ROUTINE .....
200 CLOSE1:FI$="DISKINDX/INA:1":GOSUB240:W=1:W$="APPLICATION":GOSU
B300
210 FI$="DISKINDX/INP:1":GOSUB270:W=2:W$="PROGRAM":GOSUB300
230 GOTO900
240 CMD"O",N%+1,*S%(0),IA$(0):RETURN
270 CMD"O",N%+1,*S%(0),IP$(0):RETURN
299 REM DO IT .....
300 PRINT:PRINT"WRITING : ";W$:OPEN"O",1,FI$
310 FORI%=0TON%:S%=S%(I%)
320 ONWGOTO330,340
330 F$=IA$(S%):GOTO360
340 F$=IP$(S%):GOTO360
360 PRINT#1,F$;"",IM%(S%);";";IS%(S%)
370 NEXTI%:CLOSE1:RETURN
899 REM END OF JOB .....
900 PRINT " ":PRINT"END OF JOB"
920 END

```

End

#### Program Listing 5. Searches random file using indexes created by Listing 4.

```

1 REM LOOKDISK/BAS JN GOODALE
3 REM SEARCH AND DISPLAY RANDOM FILE OF PROGRAM
4 REM INFORMATION USING A SEQUENTIAL FILE TO
5 REM REFERENCE THE RECORDS
9 REM INITIALIZE .....
10 CLEAR28000:CLS:PRINTTAB(15)"SEARCH/DISPLAY PROGRAM INFORMATON F
ILE":PRINT#340,"INITIALIZING":DEFINTA-Z:DIMIP$(500),IM%(500),IS%(5
00):E$="##":H2$="PROGRAM APPL DISK S GR AUTHOR DESCR
PTION":H3$=STRING$(63,"=")
20 FR$="DISKINDX/RND:1"
30 CLS:PRINTTAB(20)"SEARCH/DISPLAY PROGRAM":PRINT:PRINTTAB(15)"USI
NG ONE OF THE FOLLOWING KEYS :":PRINTTAB(20)"1) PROGRAM":PRINTTAB
(20)"2) APPLICATION"
40 PRINT:PRINT"ENTER CHOICE (DO NOT HIT <ENTER>) --> ";
50 K$=INKEY$:IFK$=""THEN50ELSEPRINTK$:ONVAL(K$)GOTO80,90
60 GOTO30
80 L=12:C$="PROGRAM NAME":C=1:FI$="DISKINDX/INP:1":GOTO120
90 L=4:C$="APPLICATION":C=2:FI$="DISKINDX/INA:1":GOTO120
120 N%=0:OPEN"1",1,FI$
130 INPUT#1,IP$(N%),IM%(N%),IS%(N%):IFEOF(1)THEN140ELSEN%=N%+1:GOT
O130
140 CLOSE1:OPEN"R",1,FR$:FIELD1,255 AS DX$:LSET DX$=STRING$(255,"X
"):FORI%=0TO3:FIELD1,(I%*57)AS DM$,12 AS PG$(I%),4 AS AP$(I%),8 AS
DN$(I%),1 AS SD$(I%),2 AS GR$(I%),10 AS AU$(I%),20 AS DS$(I%):NEX
TI%
150 CLS:PRINTTAB(15)"DISPLAY PROGRAM INFORMATION FILE":PRINT:PRINT
TAB(20)"1) SEARCH":PRINTTAB(20)"2) DISPLAY ALL":PRINTTAB(20)"3)
RESTART":PRINTTAB(20)"4) END":PRINT:PRINT".... CHOICE (DO NOT
HIT <ENTER>) ...> ";
160 K$=INKEY$:IFK$=""THEN160ELSEPRINTK$:ONVAL(K$)GOTO180,240,460,4
70
170 GOTO150
180 CLS:PRINTTAB(20)"SEARCH ON : ";C$:PRINT
190 PRINT"ENTER ";C$:INPUTS$:LC%=1:H1$=S$:LM%=0:GOSUB410
200 S$=S$+STRING$(L-LEN(S$)," "):FORI%=0TON%:IFS%=IP$(I%)THENGOSUB
300
210 NEXTI%:GOSUB360:GOTO150
240 LC%=1:CLS:PRINTTAB(10)"DISPLAY FILE IN SEQUENCE BY : ";C$:H1$=C
$
290 GOSUB410:LM%=0:FORI%=0TON%:MR%=IM%(I%):SR%=IS%(I%):GOSUB310:NE
XTI%:PRINT"END OF FILE":GOSUB380:GOTO150
300 MR%=IM%(I%):SR%=IS%(I%)
310 IFMR%<LM%THENGET1,MR%
320 LM%=MR%:XS%=SR%:GOSUB440
330 PRINTPG$:TAB(13)AP$:TAB(18)DN$:TAB(27)SD$:TAB(29)USINGE$;GR%:
PRINTTAB(32)AU$:TAB(43)DS$
340 IFINT(LC%/10)=LC%/10THENGOSUB380:GOSUB410
350 LC%=LC%+1:RETURN
360 PRINT"END SEARCH ON ";S$:GOSUB380:RETURN
370 REM CONTINUE OR QUIT PROMPT .....
380 PRINT#960,"..Q' TO QUIT ..... <ENTER> TO CONTINUE ";
390 K$=INKEY$:IFK$=""THEN390ELSEIFK$="Q"THENGOTO150
400 RETURN
410 CLS:PRINTTAB(10)"PROGRAM INFORMATION FILE BY ";H1$
420 PRINT:PRINTH2$:PRINTH3$:RETURN
430 REM DEFINE DATA -----
440 PG$=PG$(XS%):AP$=AP$(XS%):DN$=DN$(XS%):SD$=SD$(XS%):GR%=CVI(GR
$(XS%)):AU$=AU$(XS%):DS$=DS$(XS%):RETURN
450 REM END OF JOB .....
460 RUN
470 CLOSE1:PRINT " ":PRINT"END OF JOB";

```

End

## XENIX

## spoolutil

### SPOOL MANAGEMENT UTILITY FOR TRS XENIX

Easy to use menu driven program which allows you to manipulate the reports waiting for printing in the spool queue.

With spoolutil you can:

- suspend/restart printing
- list print queue
- cancel printing
- print extra copies
- change print sequence
- much more !

Requires no knowledge of Xenix commands.

SAVE TIME . . . SAVE PAPER . . . SAVE MONEY

## User menu

### USER FRIENDLY MENUS FOR TRS-XENIX

Easily Create user friendly menus for each user of your Xenix system!

Run Xenix commands and application programs by making menu selections.

Improve system security by limiting user access to choices on menu.

Keeps logs (optionally) on all user activity.

No programming is required!

spoolutil \$99 usermenu \$99 or both for \$185  
SOFTWARE ONE  
VISA 985 Torrey Hill Drive MasterCard  
Columbus, Ohio 43228  
(614) 279-8493

# LOGICAL SYSTEMS

## Catalog

© 1984

### 1. The BASIC Answer

### 2. BSORT/MOD324

### 3. DiskDisk

### 4. FED II

### 5. File Manager

### 6. LSI HELP System

### 7. LS-HOST/TERM

### 8. LED

### 9. LS-QFB/COMP

### 10. LS-UTILITY Disk

Prices and specifications subject to change without notice.

1. **TBA** is a text pre-processor that translates structured BASIC "source" into interpreter executable programs. Supports long variable names and named references/procedures, along with conditional translation. **\$79.**

2. **BSORT/MOD324** is an advanced machine language sort for M4 BASIC. Multiple key/tag arrays, 1 or 2 dimension, string or numeric arrays. MOD324 does most of the restructuring to allow M3 BASIC programs to be run under M4 BASIC. **\$49.**

3. **DiskDisk** allows the partitioning of large volume drives into smaller logical volumes which "look" just like additional floppy drives. This should be considered a must for hard disk or other "large" drive users. **\$99.**

4. **FED II** is an all-purpose File/Disk editor for LDOS or TRSDOS 6. Bytes may be modified in either ASCII or HEX. Location may be done via search string, load address or record number. Shows disassembly of /CMD files. **\$49.**

5. **File Manager** will handle all those COPY, MOVE, PURGE or BACKUP jobs with ease. Faster and more versatile than BACKUP or PURGE, **FM** can also produce a "script" for later execution through JCL. **\$49.**

6. **The LSI HELP System** is a complete series of packages to provide on-line help information to LDOS/TRSDOS 6 users. Packages are available for DOS/BASIC help, Technical help, and the development of additional "HELP" information files. Prices start at **\$29.**

7. **LS-HOST/TERM** is a complete Mod 4 communications system. Includes ADDS25 terminal emulator, XMODEM file transfer utility for error-free transfer, HOST program with password protection and much, much more. Ideal for use with XENIX. **\$199.**

8. **LED** is the LSI full-screen text Editor. Uses all LDOS special features (KSM, filters/drivers, ...). Excellent for editing KSM and JCL source files. T6 version includes "block write to disk" and "insert file at cursor". **\$49.**

9. **LS-QFB/Comp** consists of two utilities. QFB performs a "fast" mirror-image backup of a disk, formatting the destination disk in the process. Comp will compare any two disks or files, with differences to display or printer. **\$49.**

10. **The LS-Utility Disk** is a collection of the most popular LSI filters and utilities re-written for use under TRSDOS 6 on the Mod 4. Includes KSMPLUS, MAX-LATE, CALC, READ40 and much, much more. **\$49.**

\* Versions available for LDOS 5.1 and TRSDOS 6 (Specify when ordering).

\*\* Available for TRSDOS 6 only.

LDOS 5.1

Only  
**\$69.**

TRSDOS is a registered trademark of the Tandy Corporation.

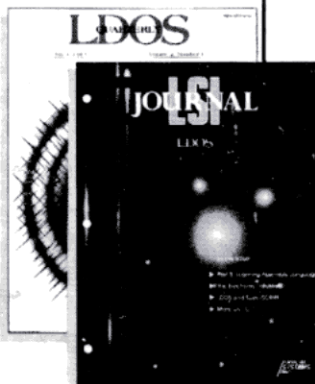
LDOS is a registered trademark of Logical Systems, Inc.

smal-LDOS

Only  
**\$39.**

Now pay only **\$69** for the power of the LDOS operating system, or just **\$39** for the smal-LDOS subset. Specify Model 1 or 3 when ordering.

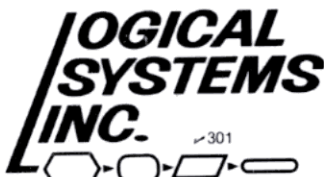
### Publications



"The Source" is "The" commented source code for TRSDOS 6.2. A must for all TRSDOS 6 programmers. Complete three volume set is **\$249.**

SHIPPING & HANDLING NOT INCLUDED

LDOS Quarterly back issues are available, and are highly recommended for all LDOS users.



**TOLL FREE ORDERLINE (800) 248-3535**

Write or call for our free catalog.

8970 North 55th Street / P.O. Box 23956 / Milwaukee, WI 53223



# PATCH WORK

You get a paging directory, pause control for program listings, full error messages, file identification with the Auto command, and more with these 13 patches to TRSDOS 1.3.

**T**ired of TRSDOS 1.3? If your answer is yes, take comfort in the fact that you're not alone. While Model III TRSDOS is a vast improvement over TRSDOS 2.3, it isn't perfect. I've developed a series of patches, however, that promise to smooth some of TRSDOS 1.3's rough edges.

The 13 patches included here make TRSDOS 1.3 a more efficient operating system. They give you an abridged TRSDOS directory, correct a TRSDOS bug for nonexistent files, display a directory one page at a time, pause a program or directory listing with the same command, eliminate the need for a colon with the Directory command, identify a file you load with the Auto command, list free disk space in detail, provide full error messages, refine the TRSDOS Ready prompt, change the TRSDOS boot-up banner, administer a better formatting test for new disks, and eliminate TRSDOS's "Operation Aborted" message. You don't have to install all the patches; rather, you can pick and choose as you please.

## The Patches

You install the patches with the TRSDOS Patch command. It's simple to use. Start at TRSDOS Ready, type in the patches you want, check for typographical errors, and press the enter key to finish the command. If you get an error message, try to figure out what went wrong before continuing. You must copy all the command lines listed in the patch you select. For example, if the patch consists of four patch lines, you must enter all four lines, as four separate TRSDOS commands. Don't enter any other DOS commands until you've completed all patching.

Patch 1, the Catalogue command, gives you an abridged directory from the TRSDOS Ready prompt, eliminating the problems associated with TRSDOS

1.3's Directory command. Patch 1 eliminates TRSDOS's Route command and "Operation Aborted" message, so it doesn't use additional disk, directory, or memory space. The directory listing, however, isn't as complete as the original TRSDOS listing.

To install this patch correctly, first make sure that your TRSDOS 1.3 short directory routine in Basic works and then type in the patch. To call the new command, type CAT or CAT (drive number) from TRSDOS Ready, and press the enter key.

Note that section (a) of Patch 1 contains the two patches issued by Radio Shack (see *TRS-80 Microcomputing News*, October 1981, p. 13). Ignore section (a) if you've already incorporated this change. Type in the patch as listed:

```
(a) Radio Shack fix:
PATCH *10 (ADD = 4E2E, FIND = CD3E4B,
CHG = CD8A50)
PATCH *10 (ADD = 508A, FIND = 4469736B,
CHG = 4FC33E4B)
(b) The Catalogue command:
PATCH *1 (ADD = 50A9, FIND = 4F7065726174,
CHG = 0D7EFE343004)
PATCH *1 (ADD = 50AF, FIND = 696F6E204162,
CHG = FE3030023E30)
PATCH *1 (ADD = 50B5, FIND = 6F727465640D,
CHG = 327142C31944)
PATCH *1 (ADD = 51C9, FIND = 524F55544520
A842, CHG = 434154202020AA50)
```

Patch 2 fixes a bug in TRSDOS 1.3 that results when TRSDOS tries to list nonexistent files in the disk directory hash index table. The code for Patch 2 is:

```
PATCH *10 (ADD = 4E47, FIND = 02, CHG = 03)
```

Patch 3 modifies the Directory com-

mand so that it displays directory files one page at a time. Once you install this patch, type in DIR, press the enter key and the usual long-format directory appears. However, if there are too many entries for one screen, the listing stops and waits for you to press the enter key before displaying the next set of entries. Type in Patch 3 as listed here:

```
PATCH *6 (ADD = 616D, FIND = CD8861B7C8
FE40, CHG = 3A803FD620C8CD)
PATCH *6 (ADD = 6174, FIND = 2806C547AF78
C1, CHG = 7C61CDC901AFC9)
```

Patch 4 applies to TRSDOS 1.3's List command. When you list a file from TRSDOS Ready, the display scrolls unless you pause the listing by pressing the @ key. This patch changes the pause control to the shift-@ key combination. The command is the same as that in Basic, and therefore much easier to remember. The code for Patch 4 is:

```
PATCH *11 (ADD = 5265, FIND = 40, CHG = 60)
```

Patch 5 is similar to Patch 4 except that it applies to TRSDOS 1.3's Directory command. It lets you pause a long-format directory listing by pressing the shift and @ keys at the same time, rather than pressing the @ key alone. The reason for this patch is compatibility: It makes the pause control for both the Basic List and the Directory commands the same. Patch 5 shouldn't be applied if you've installed Patch 3. Here's the code for Patch 5:

```
PATCH *6 (ADD = 6173, FIND = 40, CHG = 60)
```

Patch 6 gives you the option of including (or not including) a colon when naming the disk drive for the Directory command. The code is:

```
PATCH *6 (ADD = 59EC, FIND = 7EFE3A2015,
CHG = 2BCD781D38)
PATCH *6 (ADD = 59F1, FIND = 237ED630DA,
CHG = 06FE3A2010)
PATCH *6 (ADD = 59F6, FIND = 3452FE04D2,
CHG = 237ED630DA)
```

## The Key Box



Model III  
TRSDOS 1.3

Patch 7 works with the Auto command. When you use the Auto function, your computer displays the name of the file you're automatically loading, rather than just the message "Auto Function Engaged." Type in this patch as:

PATCH \*0 (ADD=4F60,FIND=6B4F,  
CHG=2542)

Patch 8 not only tells you where you have free disk space, but also the amount of space, in grans, available. To make room for this patch, I had to modify the password message of the Prot (PW) command. After you add Patch 8, you're asked "New Master?" instead of "New Master Password?" The code for Patch 8 is:

PATCH \*6 (ADD=5D52,FIND=FE28D0,  
CHG=CD4555)

PATCH \*6 (ADD=5542,FIND=2050617373,  
CHG=3F2003FE28)

PATCH \*6 (ADD=5547,FIND=776F72643F,  
CHG=D8F1C3FC5B)

Patch 9 is a one-byte patch that makes an entire error message appear rather than the error number. Once this patch is in place, you'll see the message without having to enter another command. The code for this patch is:

PATCH \*4 (ADD=4E28,FIND=20,CHG=18)

Patch 10 eliminates the row of dots that TRSDOS 1.3 displays after the TRSDOS ready prompt. The code for this patch is:

PATCH \*1 (ADD=4E75,FIND=063E3E,  
CHG=C37E4E)

Patch 11 shortens the TRSDOS 1.3 opening banner from a picture of the computer to a single line. It also skips the time and date prompts when you boot-up. A minor problem with this patch is that new files created usually have garbage for the date, although the file itself isn't affected. If this bothers you, install only the first three of the four patch lines for Patch 11. The code is as follows:

PATCH \*0 (ADD=5039,FIND=20,CHG=0D)

PATCH \*0 (ADD=508A,FIND=28,CHG=0D)

PATCH \*0 (ADD=516C,FIND=D0,CHG=0D)

PATCH \*0 (ADD=4EA9,FIND=CA,CHG=C3)

Patch 12 provides a better formatting test for new disks. Once you install Patch 12, you can expect more disks to fail the formatting test, but it's better to lose a marginal disk than to lose your important data. Here's the code for Patch 12:

PATCH \*7 (ADD=5BEE,FIND=E5,CHG=5B)

Patch 13 eliminates the "Operation Aborted" message. Don't apply this patch if you've already installed Patch

# NEW PRICES ... LOWER THAN EVER !

## LNW'S TEAM COMPUTER \$1095

### COMPUTERS

LNW 80 MOD 296K/CPM	\$1095
PMC 80 16K TRS80 CLONE	450
SYSCOM/BELTRON 64K APPLE	475
SANYO MBC 550 160K DR	735
SANYO MBC 555 2 160K DRVS.	999
SANYO MBC 555 2 320K DRVS.	1200
IBM 64K, 2 DRV., COLOR BD	2475
NEC PC-8201	450
TANDY 2000	2210

### EXPANSIONS

LNW SYSTEM EXPANSION	\$329
HOMES IM2 32K FOR TRS 80 MOD1	129
MDX-6 MOD 3 & 4 UPGRADE	230
HOLMES VID 80+CPM 2.2	350
DOUBLE DENSITY ADAPTER	99
LN DOUBLER 5/8 & DOS+ 3.5	199
HOLMES DOUBLER 5/8	125

### PRINTERS

GORILLA BANANNA	\$149
PROWRITER PAR	339
PROWRITER SER	499
PROWRITER 15" PAR	570
PROWRITER 15" SER	670
F-10 40 CPS PAR/SER	999
F-10 55 CPS PAR/SER	1299
F-10 TRACTOR FEED	195

EPSON RX 80	299
EPSON RX 80 FT	399
EPSON FX 80	460
EPSON FX 100	675

OKIDATA 82A	289
OKIDATA 83A	500
OKIDATA 84P	795
OKIDATA 92P	399
OKIDATA 93P	675

STAR GEMINI 10X	269
STAR GEMINI 15X	415
STAR DELTA 10	465
STAR DELTA 15	550

SILVER REED 500 17 CPS D.WH.	369
SILVER REED 550 20 CPS D.WH.	469
SIEMENS PT88 INK JET	699
TOSHIBA 1350 LETTER QUALITY	1270
JUKI 6100	439

### CRT MONITORS

AMDEK 300 GREEN	\$139
AMDEK 300 AMBER	159
AMDEK COLOR II RGB	429
AMDEK COLOR I RGB	289

TAXAN KG12N GREEN	129
TAXAN KG12NUY AMBER	139
TAXAN RGB VISION I	289
TAXAN RGB VISION III	470
TAXAN APPLE CARD	99
GORILLA GREEN/AMBER	95

## MODEMS

SIGNALMAN MARK VII 300 BD	99
SIGNALMAN MARK XII 1200 BD	279
NOVATION J-CAT 300 BD	104
NOVATION SMART CAT 1200 BD	415
HAYES SMART MODEM 300 BD	205
HAYES SMART MODEM 1200 BD	465

## COMMUNICATIONS SPECIAL

MTERM: SMART TERMINAL PROGRAM AND VOLKSMODEM 300 BD MODEM	\$99
--	------

## DISK DRIVES

TANDON 100-1 40 TRK S/S	\$189
TANDON 100-1 BARE	149
TANDON 100-2 40 TRK D/S	255
TANDON 100-2 BARE	210
TANDON 100-4 80 TRK D/S	350
TANDON 100-4 BARE	299

TEAC FD55A 40TRK S/S	200
TEAC FD55A BARE	165
TEAC FD55B 40 TRK D/S	235
TEAC FD55B BARE	180
TEAC FD55F 80 TRK D/S	260
TEAC FD55F BARE	210

## SPECIAL

TEAC 54A SAME SPECS AS FD55A	\$150
Tandon 55-15540TR	\$99
CHINON 40 TRS/S	\$129
MATSHUSHITA 40 TRD/S	160

## TRS 80 SOFTWARE

LAZYWRITER MOD I	\$149
ELECTRIC WEBSTER MOD I & 3	119
DOS+ 3.5 MOD I & 3	99
MULTIDOS 1.6	79
SUPER UTILITY 3.0	65
OMNITERM 1.6	78
OMNITERM 1.6 MOD IV	78
NEWSSCRIPT 7.6	114
TALLYMASTER	69

## ACCOUNTING SPECIAL

GENERAL LEDGER, ACCOUNTS REC., ACCOUNTS PAYABLE, CHECK REGISTER INTEGRATED SYSTEM ONLY	\$299
--	-------

## 24 HOUR TOLL FREE ORDERS VISA/MASTER CHARGE ONLY: (800) 633-2252 EXT 720

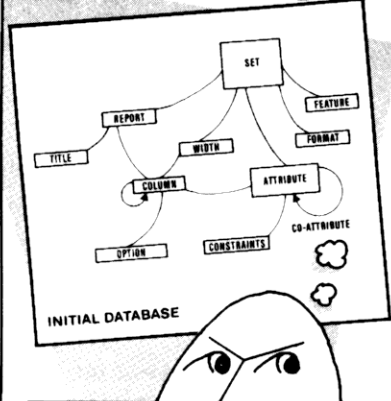
ALL QUESTIONS: (313) 538-1112  
MICHIGAN RESIDENTS ADD 4% SALES TAX-  
SHIPPING. CALL FOR CHARGES. PRICES ARE  
DISCOUNTED FOR CASH AND MONEY ORDER  
(NON CERTIFIED CHECKS ALL 2 WEEKS TO  
CLEAR) MASTER CARD AND VISA ADD 3% NO  
C.O.D. NO NET TERMS.

# VESPA COMPUTER OUTLET

16727 Patton Detroit MI 48219



# POWER ISN'T EASY.



Why did Southern Software, who usually make hard tasks easy\*, develop a database manager that's not dead simple? Because it's a fact of life: true database management is a very deep subject. The world of data relationships can be infernally complex; ENB gives you the freedom to describe this complexity.

**HOW?** It's all in the metaphor. ENB implements ordered sets, with relations/functions between sets. Nice properties fall out of this model. (Example: Editing the set of SETS changes db structure, no re-blocking needed. Do it anytime, with inbuilt reports keeping track of current structure.) Staying on top of power like this can be tough.

**ENB has:** True relational access, integrated data dictionary, variable length fields, generalised records, selection on any criteria, no data redundancy, Basic interface, Scriptit/VisiCalc file exchange, uses any TRS-80 Mod I/III DOS, spans up to 4 drives or hard disk, incl. utilities, 5 action-tutorials, 145 p. manual, lots more.

**Don't think you'll master ENB overnight; power isn't easy. But then, the world's not simple.**

**BUT NOW IT COSTS LESS! \$100**

Regularly \$140.

Now, until December 31, 1984 - \$100 + \$3 s/h CA add 6%

\*ACCEL3/4: Compiler gives huge speed-ups to correct Basic programs without rewriting. Model I/III \$100+\$2 s/h

EDIT: On-line full screen editor for Basic (and SBE) programs. Model I/III \$40+\$1.50 s/h

SBE: Portable machine code development system. SBE/TRS Model I/III \$100 +\$3 s/h SBE/PC/Tandy 2000: \$160+\$3 s/h Soon-SBE/68000.

(415) 681-9371

**Allen Golder Software**

Box 11721 San Francisco, CA 94101

*Patching is  
an easy way  
to change a file;  
all you  
have to do is copy  
and enter  
a few lines of text.*

1. The code for Patch 13 is:

PATCH \*1 (ADD = 50A9, FIND = 4F, CHG = 0D)

One final note—the patches won't take effect until you reboot your disk.

## Before Patching

When installing a new patch, always use a back-up disk as the Patch command permanently modifies the machine-language system programs stored on disk. Only patch more important disks when you're sure that the patches work as expected; a typographical error could ruin your disk in seconds. If you've applied non-Radio Shack patches to TRSDOS 1.3, the patches given here might not work.

One way to avoid errors is to create a do-file. With the Do and Build commands, you only have to type in the patches once. The do-file is then used to correctly patch as many disks as desired. The procedure for using these commands is explained in the TRSDOS 1.3 manual (also see Douglas Payne's "Brick by Brick," 80 Micro, April 1984, p. 58).

Another option is to use a word processing program to create and edit do-files. A do-file is an ASCII file and most word processing programs work with ASCII files. All you have to do is write command lines, each with 63 characters (or fewer), and a carriage return at the end. Then save the file in ASCII format. You should select a file name ending with the /BLD extension. With a word processor, you can create a master file containing all of the patches listed here. From this master file you can delete and combine the various lines to create new, customized do-files that contain the specific patches that you want to install.

## Understanding the Patch Command

The Patch command changes information at a specific location in a disk file. It's an easy way to change a file

since all you have to do is copy and enter a few lines of text. The programmer, on the other hand, must first determine what changes you want made, and then must find available space in the program file to apply those changes. If the file is full, then you must overwrite existing Z80 computer instructions with the new patches. The command format for a patch is as follows: PATCH file-name (ADD = XXXX, FIND = YY, CHG = ZZ).

The first item of information is the file name, necessary so that TRSDOS can find the file and apply the patch. Because TRSDOS 1.3 system files don't have file names, use the format, \*#:\$, to identify the decimal number (#) and disk drive (\$) of that system file.

The second item of information in the Patch command indicates where you should make the changes. This information is provided by ADD = XXXX, the next variable on the command line. The "XXXX" is a hexadecimal number representing a memory address. The third item, "FIND = YY", reveals the contents of the disk file at that patch location. Again, the "YY" represents a hexadecimal number; it's possible to have more than one hexadecimal number in a Patch command.

You should know what's on the disk before installing a patch because TRSDOS 1.3 won't complete the patch if the numbers indicated in Find don't match those on the disk file. The advantage of patching with TRSDOS 1.3 is that while it may take longer, it's almost impossible to install a patch in the wrong location.

The final item of the patch format command, "CHG = ZZ", indicates the new information you want on disk. In doing this, TRSDOS 1.3 checks to make sure that the number of Find bytes you need are equal to the number of Find bytes available. If there's no match, the command is aborted with an error message. Otherwise TRSDOS writes the "CHG" bytes to the disk file where the Find bytes had been. The actual switch is made in memory and then written to disk as a modified file sector. For this reason, you can't write-protect your disk when you're patching a file. If you're skilled in hexadecimal math and machine language, you can make minor modifications to a machine-language program without having to re-create the file with an editor/assembler. ■

Write to Andy Levinson at 11575 Sunshine Terrace, Studio City, CA 91604.

# HAS YOUR COMPUTER SUPPLIER DESERTED YOU?

**Look no further.  
Perry Computers can meet all  
your needs for major brand items.**

**Perry Computers has been in the computer business for seven years, and will be there when you need us. We don't believe in deserting you.**

**Shop With us Toll Free** - Simply call our Toll Free number to place your order. Our knowledgeable & courteous staff will be glad to take your order and answer your questions.

**Choose From Top Quality Merchandise** - All merchandise sold by Perry Computer is name brand with manufacturer's warranty. All items are the same as you would buy locally, 100% original, no upgrades. If a problem does occur, just call us on our **Customer Service Hotline 517-625-4268.**

**FOR ORDERS CALL 1-800-248-3823**

**Watch For Monthly Specials** - On a variety of systems and accessories. If you are stepping up to a more powerful system, expanding or a first time user, be sure to call about products and prices.

**Name Brands** - RADIO SHACK, EPSON, COLUMBIA, SANYO, COMREX, OKIDATA, TRANSTAR, STAR, AMDEK, BOTEK, ELEPHANT, HAYES, VERBATIM, JUKI, SCOTCH, GORILLA, VIDEO PLUS, TELEWRITER, VIP, TOM MIX, C. ITOH, SKC, MANNESMAN TALLY, ANCHOR SIGNALMAN, IDS, KEYTRONICS, MOUSE SYSTEMS, PRINCETON GRAPHICS, ANADEK, CARDCO, TOSHIBA, ORANGE MICRO, MICROBUFFER AND MORE. If you don't see what you're looking for, give us a call. If at all possible we'll get it for you.

 **PERRY  
COMPUTERS**

131 N. Main St., P.O. Box 156, PERRY, MI 48872



# Formula Solutions

Cubic saves you time and frustration  
by solving complex equations.

Complex mathematical formulas have always intrigued me. However, solving these equations by trial and error, or by the quadratic formula, can become tedious and time-consuming. Why not let your computer do the work? I wrote Cubic to solve real or complex roots of cubic, quadratic, and linear algebraic equations.

## Using Cubic

Type in and save Cubic (see Program Listing 1, 2, or 3, depending on your sys-

tem). When you run the program, it displays the prompt seen in the Figure. Cubic always displays the formula for a cubic equation (where the greatest exponent is three) and prompts you to enter values for the variables A, B, C, and D.

To solve for a quadratic equation (where no exponent exceeds 2), you need to zero out the first term in the equation by entering a zero for the value of A.

For a linear algebraic equation (no exponent), enter a zero for both the coefficients A and B.

As an example, consider the cubic equation  $X^3 + 3X^2 - 4X - 12 = 0$ . Coefficient A equals 1 because there's only one X to the power of three, B equals three because there are three X's squared, C equals negative four because four X's are subtracted, and D equals the constant -12. To solve this equation, you enter the values 1, 3, -4, -12, at the coefficient prompt.

Once you enter the coefficients, Cubic displays the real roots of the equation. There are three solutions to this sample problem: 2, -2, and -3.

Cubic then lets you check the veracity of these numbers by prompting you to substitute a number for X in the equation ("CHECK#?"). You can thus reenter and verify Cubic's solutions. This is handy for rechecking suspicious answers.

Consider this quadratic equation:  $-2X^2 + 11X - 15 = 0$ . The coefficients here are A=0, B=-2, C=11, and D=-15. The first coefficient is zero because there's no  $X^3$  term in the quadratic equation; any term not present is considered to have a coefficient of 0. The two solutions to this quadratic are  $X_1 = 2.5$  and  $X = 3$ .

```
THIS PROGRAM FINDS ROOTS OF CUBIC EQUATIONS
OF THE STANDARD FORM: F(X) = A*X^3 + B*X^2 + C*X + D
PLEASE INPUT THE COEFFICIENTS A,B,C,D ? 1,3,-4,-12
```

```
THE FIRST REAL ROOT IS X0 = 2
THE OTHER 2 ROOTS ARE
X1 = -2
X2 = -3
Press <ENTER> to END program. CHECK #? -2
F (-2 ) = 0
Press <ENTER> to END program. CHECK #?
READY
```

Figure. Cubic prompts you to enter equation coefficients, then solves for the equation's roots.

Program Listing 1. Cubic for the Model I.

```
0 ' CUBIC/I VERS 2/15/84 by Mike O'Neal
30 PRINT"THIS PROGRAM FINDS ROOTS OF CUBIC EQUATIONS"
40 PRINT"OF THE STANDARD FORM: F(X) = A*X^3 + B*X^2 + C*X + D"
50 INPUT"PLEASE INPUT THE COEFFICIENTS A,B,C,D ";A3,A2,A1,A0
60 PRINT:IFA3<>0THEN100
70 IFA2<>0THENA=A2:B=A1:C=A0:PRINT"THE";GOTO190
80 IFA1=0THENS0
90 PRINT"THE ONLY ROOT IS X = ";-A0/A1:END
100 'CUBIC
110 S=1:L=0:P=1
120 S=1-S:L=1-L:GOSUB300:IFYS<>YLTHEN140
130 S=-S:L=-L:GOSUB300:IFYS=YLTHEN120
140 H=(S+L)/2:GOSUB290:IFYS<>YHTHENL=HESES=H
150 IFABS(L-S)<PTHEP=ABS(L-S):GOTO140
160 PRINT"THE FIRST REAL ROOT IS X0 = ";H:PRINT"THE OTHER";
```

Listing 1 continued

## Complex Roots

Cubic also works with complex roots. Consider this equation:  $X^2 - 6X + 25 = 0$ . The coefficients are 0, 1, -6, 25, while the solutions are the two complex conjugates  $3 + 4i$  and  $3 - 4i$ , displayed

The Key Box



Models I, III, 4, 1000, and 2000  
16K RAM Cassette Basic  
32K RAM Disk Basic

## Using the quadratic formula, Cubic solves the remaining equation.

as  $3 \pm 4i$  ( $i$  stands for imaginary, meaning the square root of negative one).

To solve  $X^2 = -9$ , substitute 0, 1, 0, 9 into the program for the result  $X = 3i$  or  $X = -3i$ .

### Program Structure

Programmers will notice that Cubic uses the notation  $X*X*X$  to cube a number instead of  $X^3$ , which calls the computer's built-in exponent capability. My reasoning here is that it's more efficient for Basic to multiply the numbers when the exponent is small. With the built-in exponent function, Basic first must logarithmically convert both the  $X$  and the power, then multiply the two numbers together, taking the inverse log to obtain the result.

Cubic first must determine if it's solving a cubic, quadratic, or simple linear equation. Line 100 of all three listings initiates the search for the point where the function crosses the  $X$ -axis. Once the first zero is located, Cubic puts the equation into its quadratic form. Using the quadratic formula, Cubic then solves the remaining equation. If the equation is already quadratic, Cubic jumps to line 190; if it's a linear equation, Cubic uses simple algebra to solve for the answer at line 90.

### Cubic Versions

I've included three versions of Cubic: The first version (Program Listing 1) is for the Model I Level II tape or disk system, the second version (Program Listing 2) is for Model III Disk Basic, the third version (Program Listing 3) applies to the Models 4, 1000, and 2000. Model 1000 and 2000 users must change the  $CHR\$(127)$  in line 260 of Program Listing 3 to  $CHR\$(241)$ .

If you have a Model III tape system simply use Program Listing 1 and substitute line 260 of Program Listing 2 for line 260 of Program Listing 1. This lets you take advantage of the special algebraic symbol, the plus/minus. In addition, Cubic runs on minimum memory system as the Program Listings are only about 1K in length. ■

Write to Mike O'Neal at 220 N. College Avenue, #18, College Place, WA 99324.

Listing 1 continued

```

170 'SYNTHETIC DIVISION
180 A=A3:B=H*A+A2:C=H*B+A1
190 'QUADRATIC
200 PRINT " 2 ROOTS ARE ";
210 D=B*B-4*A*C:IF D<0 THEN 240
220 X1=(-B+SQR(D))/(2*A):X2=(-B-SQR(D))/(2*A)
230 PRINT:PRINT X1 = ";X1:PRINT X2 = ";X2:GOTO 270
240 PRINT "THE COMPLEX CONJUGATES: ";D=-D
250 XR=-B/(2*A):XI=SQR(D)/ABS(2*A)
260 PRINT XR;"XI":PRINT XR-"XI"
270 S=999999:INPUT "PRESS <ENTER> TO END PROGRAM. CHECK #";S
280 IF S=999999 ENDELSGOSUB 310:PRINT "F ("S") = ";Y:GOTO 270
290 YH=SGN(A3*H*H+A2*H*A1+A0)
300 YL=SGN(A3*L*L+A2*L*A1+A0)
310 Y=A3*S*S+A2*S*A1+S*A0:YS=SGN(Y):RETURN

```

End

Program Listing 2. Cubic for the Model III.

```

0 ' CUBIC/III VERS 2/15/84 by Mike O'Neal
10 DEF FNA(X)=A3*X*X*X+A2*X*X+A1*X+A0
20 DEF FNB(X)=SGN(FNA(X)):CC=32
30 PRINT "THIS PROGRAM FINDS ROOTS OF CUBIC EQUATIONS"
40 PRINT "OF THE STANDARD FORM: F(X) = A*X^3 + B*X^2 + C*X + D"
50 INPUT "PLEASE INPUT THE COEFFICIENTS A,B,C,D ";A3,A2,A1,A0
60 PRINT:IFA3<>0,100
70 IFA2<>0,A=A2:B=A1:C=A0:PRINT "THE";:GOTO 190
80 IFA1<>0,50
90 PRINT "THE ONLY ROOT IS X = ";-A0/A1:END
100 'CUBIC
110 S=1:L=0:P=1
120 S=L-S:L=L-L:IF FNB(S)<>FNB(L),140
130 S=-S:L=-L:IF FNB(S)=FNB(L),120
140 H=(S+L)/2:IF FNB(S)<>FNB(H),L=HELSSES=H
150 IF ABS(L-S)<P,P=ABS(L-S):GOTO 140
160 PRINT "THE FIRST REAL ROOT IS X0 = ";H:PRINT "THE OTHER";
170 'SYNTHETIC DIVISION
180 A=A3:B=H*A+A2:C=H*B+A1
190 'QUADRATIC
200 PRINT " 2 ROOTS ARE "
210 D=B*B-4*A*C:IF D<0,240
220 X1=(-B+SQR(D))/(2*A):X2=(-B-SQR(D))/(2*A)
230 PRINT X1 = ";X1:PRINT X2 = ";X2:GOTO 270
240 PRINT "THE COMPLEX CONJUGATES: ";D=-D
250 XR=-B/(2*A):XI=SQR(D)/ABS(2*A)
260 PRINT XR;CHR$(127);STR$(XI);CHR$(105)
270 S=999999:INPUT "Press <ENTER> to END program. CHECK #";S
280 IF S=999999 ENDELSGOSUB 310:PRINT "F ("S") = ";FNA(S):GOTO 270

```

End

Program Listing 3. Cubic for the Models 4, 1000, 2000.

```

0 ' CUBIC/4
10 DEF FN A(X)=A3*X*X*X+A2*X*X+A1*X+A0
20 DEF FN B(X)=SGN(FN A(X)):CC=32
30 PRINT "THIS PROGRAM FINDS ROOTS OF CUBIC EQUATIONS"
40 PRINT "OF THE STANDARD FORM: F(X) = A*X^3 + B*X^2 + C*X + D"
50 INPUT "PLEASE INPUT THE COEFFICIENTS A,B,C,D ";A3,A2,A1,A0
60 PRINT:IFA3<>0 THEN 100
70 IF A2<>0 THEN A=A2:B=A1:C=A0:PRINT "THE";:GOTO 190
80 IF A1<>0 THEN 50
90 PRINT "THE ONLY ROOT IS X = ";-A0/A1:END
100 'CUBIC
110 S=1:L=0:P=1
120 S=L-S:L=L-L:IF FN B(S)<>FN B(L) THEN 140
130 S=-S:L=-L:IF FN B(S)=FN B(L) THEN 120
140 H=(S+L)/2:IF FN B(S)<>FN B(H) THEN L=H ELSE S=H
150 IF ABS(L-S)<P THEN P=ABS(L-S):GOTO 140
160 PRINT "THE FIRST REAL ROOT IS X0 = ";H:PRINT "THE OTHER";
170 'SYNTHETIC DIVISION
180 A=A3:B=H*A+A2:C=H*B+A1
190 'QUADRATIC
200 PRINT " 2 ROOTS ARE "
210 D=B*B-4*A*C:IF D<0 THEN 240
220 X1=(-B+SQR(D))/(2*A):X2=(-B-SQR(D))/(2*A)
230 PRINT X1 = ";X1:PRINT X2 = ";X2:GOTO 270
240 PRINT "THE COMPLEX CONJUGATES: ";D=-D
250 XR=-B/(2*A):XI=SQR(D)/ABS(2*A)
260 PRINT XR;CHR$(127);STR$(XI);CHR$(105)
270 INPUT "CHECK #";S
280 PRINT "F ("S") = ";FN A(S):GOTO 270

```

End



**NEW!  
IN STOCK!!**

# \$777

## 5 MEG HARD DRIVE

**BEWARE!!**



Would you buy from this  
hard drive specialist?

**NO WAITING!!!**

\$10 handling & shipping

Comes complete with cable  
and your choice of  
software driver \* (CP/M, LDOS, TRSDOS)

10 Megabyte Hard Drive .....	<b>\$995</b>
15 Megabyte Hard Drive .....	<b>1195</b>
30 Megabyte Hard Drive .....	<b>1495</b>

### SYSTEM FEATURES

- For TRS-80 Model 3-4-4P
- Size Rated After Format
- Error Checking & Correcting

\*Model 3 requires LDOS

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

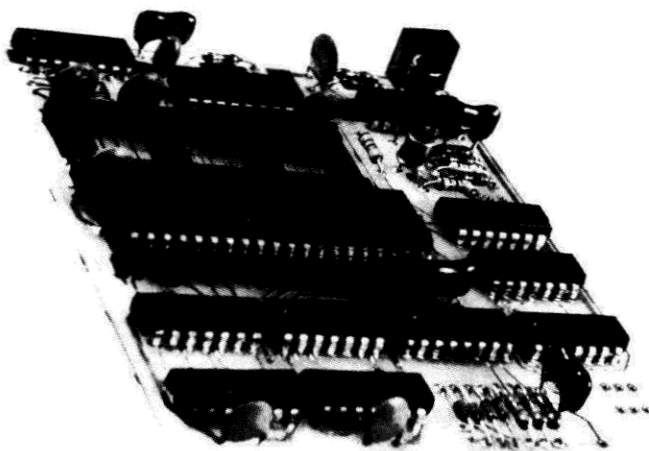
Seriously folks, there are firms that offer benefits or products seemingly too good to be true. There's no reason to expose yourself to possible unhappiness. Aerocomp has proven record of thousands of satisfied TRS-80® customers. Look at the back issues of this magazine. You won't find many companies 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 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 stock. Guaranteed for one year parts and labor. You can count on us to be here if you need us. As always, your satisfaction is assured with our 14 day free trial offer. How can you wrong? Specify the software driver of your choice and start enjoying your computer's real capability. Do it today!

**See opposite page** ▶▶▶▶▶

# "DDC"

## Double Density Controller

**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 1 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 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 1 was meant to be a low-cost computer for the masses. Therefore, no double density.

### The Facts

Other companies introduced double density controllers for the Model 1 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 1 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 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 1 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.

"DDC" by itself.....	<b>\$99</b>
"DDC" and LDOS .....	<b>159</b>
"DDC" and NEWDOS 80 v2.0 .....	<b>189</b>

Please add \$4 handling & shipping

# DISK DRIVES

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

## 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 white enclosure.

40tk Single Side full size (TM100-1).....	\$ 169
40tk Double Side full size (TM100-2).....	209
80tk DS full size (TM101-4).....	299
1-40tk SS half-high FD-55A in dual case.....	179
2-40tk SS half-high FD-55A's in dual case.....	319
1-40tk DS half-high FD-55B in dual case.....	219
2-40tk DS half-high FD-55B's in dual case.....	399
1-80tk DS half-high FD-55F in dual case.....	249
2-80tk DS half-high FD-55F's in dual case.....	449

These 8" Thinline drives work with the Model 2 and 12 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. Add \$12 shipping and handling.

1-8" SS Tandon TM848-1E & case.....	\$ 389
2-8" SS Tandon TM848-1E's & case.....	649
1-8" DS Tandon TM848-1E & case.....	499
2-8" DS Tandon TM848-2E's & case.....	799

## BARE DRIVES Add \$4 S&H

These drives are completely burned-in and tested for your ultimate satisfaction. Add that extra drive today! Please add \$5 for shipping and handling for each drive ordered.

40tk SS full size Tandon TM100-1.....	\$ 129
40tk DS full size Tandon TM100-2.....	169
40tk SS half high TEAC FD55-A.....	129
40tk DS half high TEAC FD55-B.....	169
80tk DS full size Tandon TM101-4.....	239
80tk DS half high TEAC FD55-F.....	239
8" SS half high Tandon TM848-1E.....	290
8" DS half high Tandon TM848-2E.....	360

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.

## 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 Tandon drives (TM100-1) or just order the basic kit and pick the drives you want from the selection in the next column.

CONTROLLER KIT.....	\$ 199
(Complete - Everything you need - less drives)	
1 DRIVE SYSTEM.....	319
2 DRIVE SYSTEM.....	449
CONTROLLER ONLY.....	110
MOUNTING KIT & POWER SUPPLY.....	95
RS-232 BOARD.....	69

## MISCELLANEOUS GOODIES \$2 S&H

Model 1 TRSDOS 2.3 disk & manual.....	\$ 25
Model III TRSDOS 1.3 disk & manual.....	25
LDOS (specify Model I or III).....	69
NEWDOS 80 v2.0 (specify Model I or III).....	119
10 disks in smoke lib box, Lifetime Guar.....	16
5.25" drive power supply & enclosure.....	59
8" drive power supply, encl. & fan, 5V-24V.....	150
5.25" 2-drive cable.....	24
5.25" 4-drive cable.....	34
5.25" Extender cable with gold contacts.....	13

## 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 only. 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.

## 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 **\$239**

You can add our renown "DDC" double density controller to either the Radio Shack or the LNW E/I for 80% more storage capacity on your drive. Go ahead, you deserve increased density. See the opposite page for the latest details.

**\$99**

## 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, Mastercharge 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. Canadians add \$20 to your orders if over \$500 for customs documentation.

## CALL TOLL-FREE

**800-527-3582** USA  
**800-442-1310** TEXAS

For inquiries or information  
or to check on or change an order  
call 214-339-8324

**AEROCOMP**  
Redbird Airport, Bldg. 8  
P.O. Box 24829  
Dallas, TX 75224



# Desirable Interruptions: A I/III/4 Interrupt Controller

**P**ardon the interruption....” While interruptions are considered impolite, sometimes you have to make them, especially in microcomputer systems. Many computers, particularly those involved with real-time or time-sharing applications, require microprocessor interrupts to make proper operation possible.

An interrupt allows an external device to have the processor stop what it's doing and take time to service the external device. If the processor isn't doing something more important (determined by a combination of hardware and software), the processor complies with the interrupt. If the processor is working on something more important (a higher-priority device) it ignores the interrupt request and continues with what it was doing.

Many systems (like the TRS-80 Models I, III and 4), use polling for input/output (I/O) operations to see when you've pressed the keyboard or when it's OK to send a character to the printer. Polling is simply a check to see if a device is ready or needs servicing. In a polling system, the processor continually loops to check the status of various devices. This is fine as long as the processor has nothing else to do. But it can often be doing useful work while waiting on I/O devices. Interrupts allow the I/O devices to interrupt the processor when they need service, permitting it to do useful work in the meantime.

This month's project is an interrupt controller compatible with the Models I, III and 4. The controller board uses an 8259A interrupt controller integrated circuit (IC), which does most

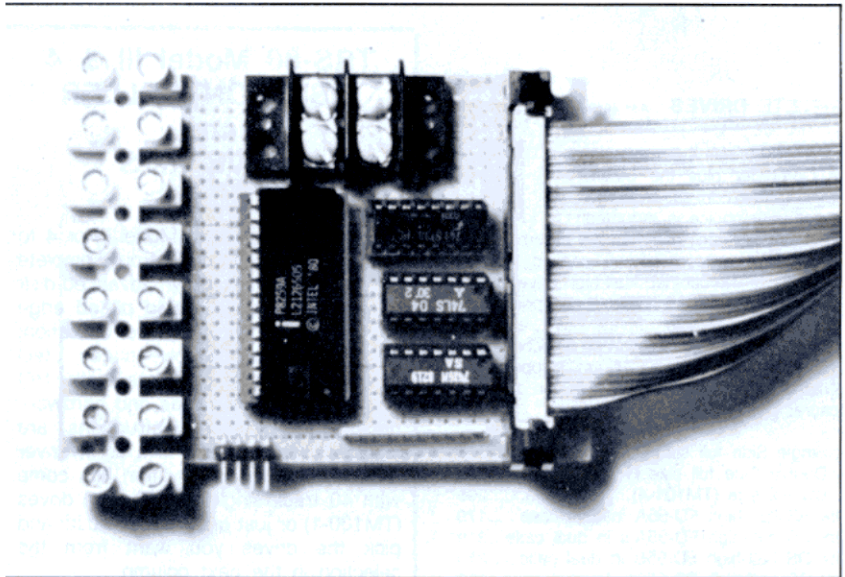


Photo 1. Interrupt controller for Models I, III, and 4.

of the work on the board.

## A Look At Z80 Interrupts

The Z80 has two interrupt input lines (INT/ and NMI/) and uses a combination of two signals to acknowledge an interrupt. The INT/ line is the general-purpose interrupt input, the one most commonly used. The NMI/ line, or nonmaskable interrupt line, is reserved for special emergency situations, such as a power failure.

You can enable or disable (mask) the INT/ line under software control, using the Z80's Enable Interrupt (EI) and Disable Interrupt (DI) instructions. This allows the software to determine when to accept interrupts and when not to. The NMI/ input, on the other hand, is nonmaskable, meaning that you can't disable it with software. Because of this, it's rarely used.

The Z80 has three interrupt modes, mode 0, mode 1 and mode 2, which you can use with the INT/ interrupt input. These modes give the Z80 a considerable amount of interrupt flexibility, allowing effective interrupt use in a variety of system applications. I'll

discuss how the Z80 responds to each of the interrupt modes separately, including the best uses for each one.

## Z80 Mode 0 Interrupts—8080A-Compatible Mode

Interrupt mode 0 is the default mode on processor reset. The Z80 responds to its interrupt input in the same manner as its predecessor, the 8080A. The Z80 looks at the interrupt input at the end of each instruction. If it's active (low) and interrupts are enabled, the processor stops its execution and begins servicing the interrupt request. The response will vary depending on the interrupt mode you're using.

In the case of mode 0, the Z80 sends an interrupt-acknowledge signal to the interrupting device when it accepts an interrupt. It does this by simultaneously bringing the M1/ and IORQ/ signals low. The interrupt-acknowledge signal acts as a read strobe to the interrupting device, telling it to put the opcode (first byte) of an instruction on the data bus. This is a Call instruction pushing the processor's program

## The Key Box

**Models I, III, and 4**  
**16K RAM**  
**Assembly Language**  
**Editor/Assembler**



counter (PC) onto the stack and branching the execution to the beginning of the interrupt service routine.

The 8080A (like the Z80) provides a set of 1-byte Call instructions ideal for this purpose. These eight instructions, called Restart instructions, make a call to a predetermined location in memory (usually occupied by ROM). Because of their bit makeup, you can easily generate them with hardware. The instructions to do so, along with the binary code, are shown in Fig. 1, along with the memory addresses to which they call. The underlined bits indicate the only bits that differ among the eight different Restart instructions.

While the Restart instructions are easy to generate and are the most common in 8080A systems, you can put any 8080A instructions (or Z80 instructions for the Z80) on the bus. For greater versatility in where the computer puts the Call Table service routine in memory, interrupt controllers (like the 8259A used in this month's project) are often designed to generate actual 3-byte Call instructions. This way, you could specify an actual 16-bit address in it. For instructions like this, where the number of instruction bytes is greater than one, the CPU will send enough interrupt-acknowledge signals to read in all the bytes necessary.

Mode 0 is primarily used in systems when you want to maintain compatibility with 8080A systems, or when you're using peripherals (such as the 8259A in this month's project) for use with 8080A-type processors. The Z80's flow response to an interrupt in mode zero is shown in Fig. 2.

### Z80 Mode 1 Interrupts—Restart 38H

This is the simplest and least flexible interrupt mode the Z80 offers. If an interrupt occurs while you're enabling interrupts, the Z80 merely executes a Restart 38H instruction, which is a Call to memory location 0038 hexadecimal (hex). The Z80 produces no interrupt-acknowledge signal, and requires no external hardware. You use this mode in small systems, where the interrupt requirements are minimal and the external hardware required for the other Z80 interrupt modes is unnecessary. This is the one most often used by TRS-80s. The Model I uses it with its 25ms interrupt and disk controller interrupts, and the Models III

and 4 don't even provide the interrupt-acknowledge signal on their expansion connectors, necessary for the use of the other interrupt modes.

Figure 3 illustrates the Z80's flow response to a mode 1 interrupt.

### Z80 Mode 2 Interrupts—Indirect Call

Mode 2 is the most powerful of the Z80 interrupt modes. The Z80 generates an interrupt-acknowledge signal to the interrupting device, and expects a 1-byte vector in response. This vector is actually the low byte of a memory address which, by convention, must be even. The high byte of the address is found in the Z80's Interrupt (I) register, which you must set up with software. The Z80 puts the 2 bytes together to form a 16-bit address in memory, where it then gets the 16-bit address of the interrupt service routine. The I register points to a vector table page in memory, and the input vector byte provides the offset into that table. Since you can program the I register, you can load the vector table virtually anywhere in memory.

Most Z80 peripheral devices support mode 2 interrupts. You can also support it with a little external hardware, in much the same way as mode 0 interrupts. Mode 2 interrupts are used in most Z80 systems that use Z80 peripherals, or that provide the hardware required for the additional flexibility. The Z80's flow response to mode 2 interrupts is shown in Fig. 4.

### The Z80 Nonmaskable Interrupt

You can't disable the nonmaskable interrupt. This allows top-priority response from the Z80 in case of a system emergency. When the Z80 responds to a nonmaskable interrupt, it executes a Restart 66H instruction, performing a call to memory location 0066 hex. The Z80 also saves the enable/disable status of the INT/ interrupt before it disables the interrupts for NMI/ servicing (described below). The Z80's flow response to a nonmaskable interrupt is shown in Fig. 5.

### Interrupt Flip-Flops

The Z80 has two internal flip-flops for interrupt enabling and disabling. These flip-flops, designated IFF1 and IFF2, work with each other to provide the interrupt enable/disable flexibility, as well as temporary enable status storage during servicing of nonmask-

able interrupts. On reset, the Z80 clears both IFF1 and IFF2, preventing maskable interrupts (INT/) from being accepted. When it executes an EI instruction, the Z80 sets both flip-flops, allowing it to accept maskable interrupts. The two flip-flops follow each other most of the time.

When a nonmaskable interrupt occurs, the Z80 saves the current state of

Restart Instruction	Bit Pattern	Call Address
RST 00H	11000111	0000H
RST 08H	11001111	0008H
RST 10H	11010111	0010H
RST 18H	11011111	0018H
RST 20H	11100111	0020H
RST 28H	11101111	0028H
RST 30H	11110111	0030H
RST 38H	11111111	0038H

Figure 1. Restart Instructions.

1. Interrupt occurs.
2. Disable further interrupts.
3. Assert acknowledge.
4. Read byte op-code on data bus.
5. More bytes to come? If yes, then 4.
6. Execute instruction received from interrupting device.

Figure 2. Mode 0 interrupt response.

1. Interrupt occurs.
2. Disable further interrupts.
3. Call memory location 0038H.

Figure 3. Mode 1 interrupt response.

1. Interrupt occurs.
2. Disable further interrupts.
3. Assert acknowledge.
4. Get vector on data bus.
5. Combine vector with I-register value to form address of service routine.
6. Get service routine address and call the service routine.

Figure 4. Mode 2 interrupt response.

1. Interrupt response.
2. Maskable interrupt status is saved.
3. Maskable interrupts are disabled.
4. Call location 0066H.
5. Restore maskable interrupt enable status when done.

Figure 5. NMI response.



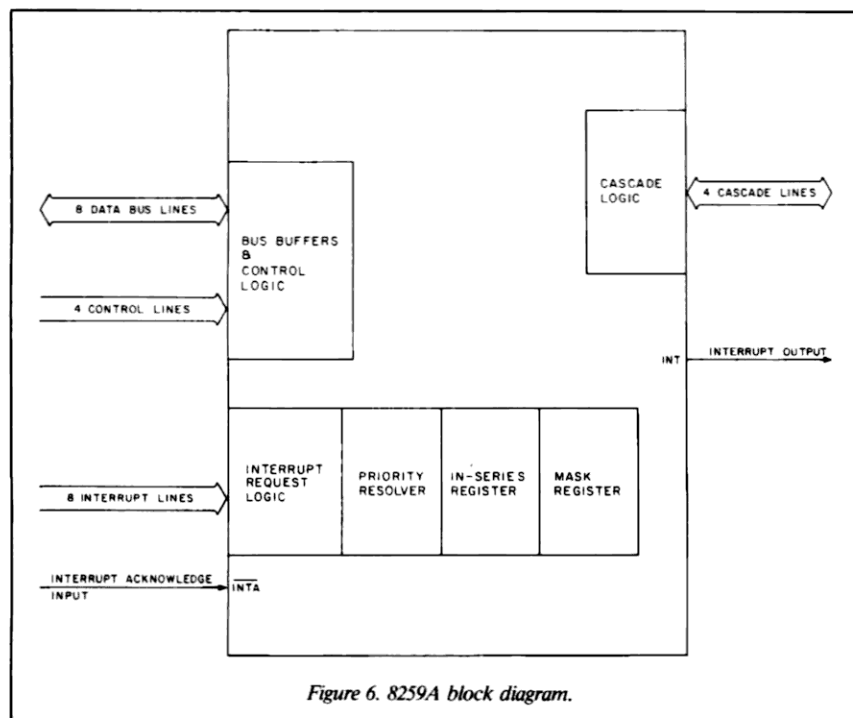


Figure 6. 8259A block diagram.

IFF1 in IFF2, while it clears IFF1 to make sure no maskable interrupts occur while processing the nonmaskable interrupt. When the Z80 executes the RETN (return from nonmaskable interrupt), it transfers the value in IFF2 to IFF1, restoring its original, pre-interrupt value.

### Levels and Edges

Different processors have different ways of determining the validity of an incoming interrupt request. The Z80, for instance, looks for a low level on its INT/ line. When the line is low, the

Z80 assumes that the connected device is requesting an interrupt. Some processors, like the 8085A, look for a high level. When the line is high, the processor assumes that the connected device is requesting an interrupt. Others look for an edge trigger. They expect to see a rising edge or falling edge of a signal for a valid interrupt request. Some even require a combination of an edge and a level.

Each of these triggering modes has its advantages and disadvantages. The level-triggered mode is the most common, and assumes that whenever a de-

vice has its interrupt line at a certain level (either high or low, depending on the processor), it needs servicing. During the service routine, the processor performs whatever operations are necessary for the device to deactivate its interrupt request, before the processor reenables the interrupts.

The edge-triggered mode assumes that a device will activate its interrupt line when it needs service, making the necessary edge trigger, but may not deactivate the line level until some later time. In this case, it is not desirable for the CPU to keep seeing the line as an active interrupt and attempting to service it.

For example, say an interrupt input is positive edge-triggered, meaning that it is triggered by a low-to-high voltage transition. The transition notifies the CPU that a device is requesting an interrupt so the CPU can service the interrupt. At the end of the interrupt service routine (ISR), the CPU reenables interrupts, but the interrupt line is still high. A CPU with a level-triggered input would immediately see the high line as another interrupt request and service the interrupt. The edge-triggered CPU, however, would not recognize another interrupt request until the line returned low, then went high again.

The third type of triggering, a combination of edge- and level-triggering, is often used for nonmaskable interrupt inputs, or in systems with noisy environments. The CPU only checks the interrupt lines between instructions (actually at the end of each instruction). If a low-to-high transition occurs on the line, the CPU sets an internal flip-flop to record the edge. Then, when the time comes to check for an interrupt, the CPU looks for both an active flip-flop, indicating the edge has occurred, and an active (high) input. If both of these conditions are not true, no interrupt service processing will take place.

The advantage of looking for both conditions is two-fold. First, if a glitch (voltage spike) occurs and sets the flip-flop, it will not cause a nonmaskable interrupt, since the line probably won't still be high when the CPU checks it. Second, if a nonmaskable interrupt does occur, the CPU won't recognize another nonmaskable interrupt until the line returns low, then goes high again. The benefits of level-

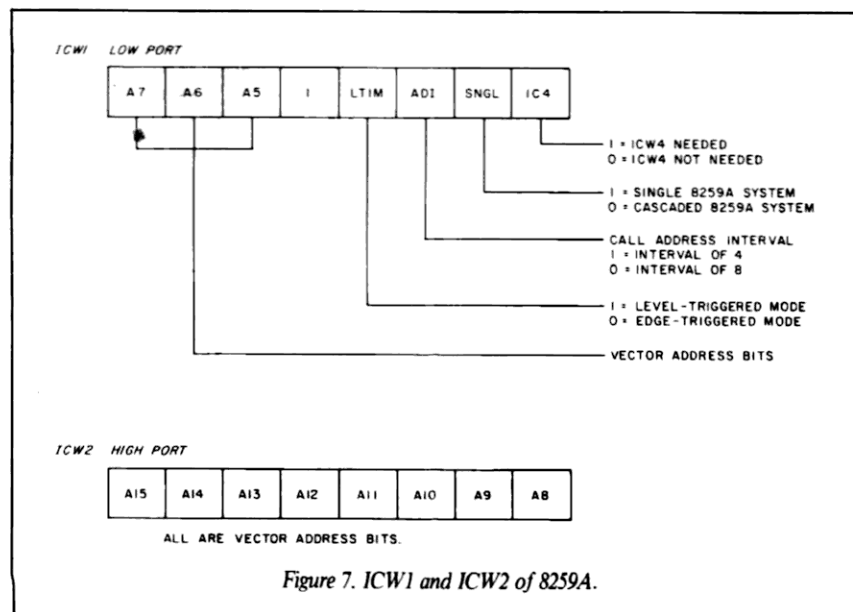


Figure 7. ICW1 and ICW2 of 8259A.

# TAX-PREP™ '85

Easy, 1984 tax templates for MULTIPLAN™ or LOTUS 1-2-3™ users

"The best I've seen, excellent support, good instructions, very easy to get used to." Professional Tax Preparer, NJ.

## SAVE TIME - SAVE MONEY USE YOUR MULTIPLAN or LOTUS 1-2-3 SPREADSHEET

Professional, fully documented, linked templates for preparing 1984 personal income tax returns. Enter data once. User friendly, complete manual & tutorial. All tax tables and computations built in, also use for "what if" tax planning. IRS accepted printout.

Includes all of the following forms and schedules:  
1040, A, B, C, D, E, F, G, R, SE, W, 2106, 2119, 2210, 2441, 3468, 3903, 4562, 4684, 4797, 5695, 6251.

TO ORDER: specify TRS-80 Models 4, 4p, II, 12, or 16 (TRSDOS), 8" CP/M or Tandy 2000. IBM PC, Apple II and Macintosh also available. MULTIPLAN or 1-2-3 REQUIRED (specify which).

**TAX-PREP '85 - \$129.95 plus \$3.00 shipping**  
(PA add 6% tax). Call or write for more information.



17 BRYN MAWR AVE. S8, Bala Cynwyd, Pa 19004 (215) 667-4064



# Electronic Mail.... On A Micro!

As well as Public, Private or Pay BBS.

## Our system offers features such as:

- Multi levels of access to a user.
- High security of system and your files.
- Unattended message transfer to compatible system.
- Fully maintainable from a remote location.
- User configurable to include or exclude most features, allowing you to personalize your system.
- Number of users & messages configurable from 1 to 900, allowing those with large storage to use it.
- Configurable to handle different terminals.
- Supports Hayes type of modem.
- and much much more.

**ORDER NOW - \$AVE \$10.00**  
**when you mention this AD.**

IBM & Compatibles .....\$249.95  
TRS-80 .....\$199.95  
Mail Label Module .....\$59.95  
Terminal for IBM .....\$79.95

*TVG Systems* P.O. BOX 94433  
(604) 946-7910 Richmond, B.C. V6Y 2A8

**Try Our BBS - Call our Data Line - 604-946-0955**

# MULTI-BASIC

The Compatible BASIC Compiler from Alcor  
(Supported Features Chart)

	MBASIC Compiler	CBASIC Compiler	Multi-Basic
IF ELSE/FOR NEXT	*	*	*
WHILE WEND	*	*	*
OPEN/CLOSE	*	*	*
CREATE/DELETE	*	*	*
PRINT/PRINT USING	*	*	*
LPRINT/LPRINT USING	*	*	*
PRINT @	*	*	*
INPUT/LINE INPUT	*	*	*
INPUT #/LINE INPUT #	*	*	*
READ #/READ # LINE	*	*	*
LOC/LOF/EOF/ERROR	*	*	*
FIELD/GET/PUT	*	*	*
RSET/LSET/ERASE	*	*	*
MKDS/MKIS/MKSS	*	*	*
CVI/CVS/CVD/SPC	*	*	*
READ/DATA/RESTORE	*	*	*
TRON/TROFF	*	*	*
DEF FN/RANDOM/RND	*	*	*
DEF USR/SWAP/WAIT	*	*	*
CALL (ASSEMBLY LANG)	*	*	*
DEFSTR/DBL/SNG/INT	*	*	*
DOUBLE/REAL	*	*	*
INTEGER/STRING	*	*	*
GOTO/GOSUB	*	*	*
ON ERROR GOTO	*	*	*
RESUME/RESUME-NEXT	*	*	*
ERL/ERR	*	*	*
ON number GOTO/GOSUB	*	*	*
NAME/RENAME	*	*	*
PEEK/POKE/INP/OUT	*	*	*
SYSTEM/SOUND	*	*	*
SADD/MATCH/UCASES	*	*	*
VAL/TAB/STR\$/VARPTR	*	*	*
SIN/COS/TAN/ATN	*	*	*
LOG/EXP/ABS/SQR	*	*	*
COMMANDS/IF END	*	*	*
INKEY\$/INPUT\$	*	*	*
TIMES/DATES/HEXS/OCTS	*	*	*
STRINGS/SPACES	*	*	*
LEFT\$/RIGHT\$/MID\$	*	*	*
CHR\$/ASC/LEN/SGN	*	*	*
OPTION BASE	*	*	*
ROW/POS/LPOS	*	*	*
DIM/MEM/FRE	*	*	*
MOD/MFRE	*	*	*
GET/PUT (CHARACTER)	*	*	*
KILL/CLS/CLEAR/INSTR	*	*	*
INT/FIX/CINT	*	*	*
CSNG/CDBL	*	*	*
CHAIN	*	*	*
CONSTAT%/CONCHAR%	*	*	*
CONSOLE/LPRINTER	*	*	*
BINARY RANDOM FILES	*	*	*
ASCII RANDOM FILES	*	*	*
255 CHARACTER NAMES	*	*	*
REDIMENSIONED ARRAYS	*	*	*
UNLIMITED STRING SIZE	*	*	*
MULTI-LINE FUNCTIONS	*	*	*
PROCEDURES/RECURSION	*	*	*
FUNCTION TRACING	*	*	*
LOCAL VARIABLES	*	*	*
NESTED FUNCTIONS	*	*	*
OPTIONAL LINE NUMBERS	*	*	*
DESCRIPTIVE LABELS	*	*	*
SINGLE PRECISION	*	*	*
DOUBLE PRECISION	*	*	*
LINK TO PASCAL & C	*	*	*

For TRS80 models I, II, III, 4, 12, or 2000 using TRSDOS, CP/M, or MSDOS and for IBM PC using PC DOS  
Multi-Basic, Pascal, or C \$139  
Add shipping \$6.00 USA, \$28 Overseas

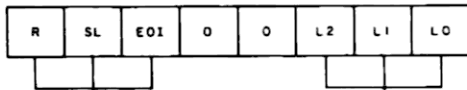


13534 Preston Road, Suite 365  
Dallas, Texas 75240  
(214) 494-1316

Multi-Basic is a trademark of Alcor Systems.  
TRSDOS, TRS80 is a registered trademark of Tandy Corporation.  
CP/M, CBASIC are trademarks of Digital Research.  
MSDOS, MBASIC are trademarks of Microsoft.

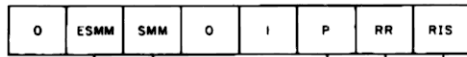


OCW2 LOW ADDRESS



INTER interrupt LEVEL IF  
USING A SPECIFIC EO1  
SPECIFY EO1  
OR PRIORITY ROTATION

OCW3 LOW ADDRESS



USED TO READ ISR  
OR IRR  
I = POLL COMMAND  
0 = NO POLL COMMAND  
USED TO SELECT A  
SPECIAL MASK MODE

Figure 8. OCW1 and OCW3 of 8259A.

triggering and edge-triggering are combined for a double-safe interrupt input.

## The 8259A Programmable Interrupt Controller

The 8259A programmable interrupt controller (PIC), developed by Intel, is a versatile device that provides eight interrupt inputs and a full 3-byte call to the CPU for versatility in locating the interrupt jump table in memory. The basic block diagram of the 8259A is shown in Fig. 6. An 8-bit bus interface handles communication with the CPU and one interrupt output to the CPU. The 8259A takes up two locations in I/O addressing space.

The 8259A provides several features that make it useful for a variety of applications. The eight interrupt inputs are prioritized, allowing higher-priority devices to interrupt lower-priority devices, but not the other way

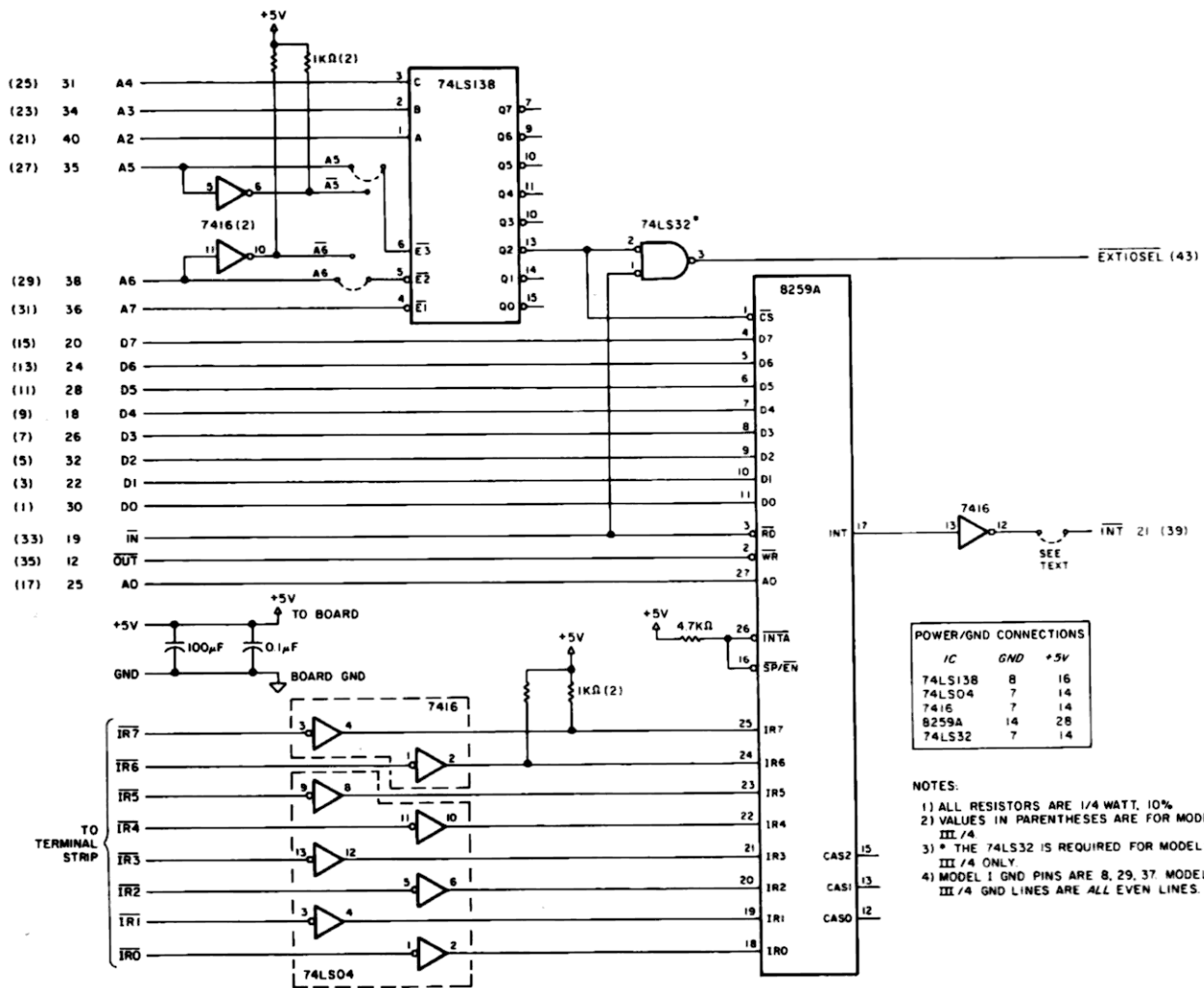


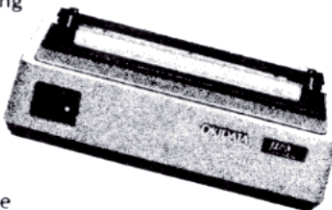
Figure 9. Interrupt controller board.

# PRINTER SALE

## \$189

### ML 80 Features

- 80 cps. unidirectional printing
- 80 columns standard, 132 condensed
- TRS-80 character set
- Graphics 64 block shapes
- Long-life, 7-pin print head, warranted for one full year
- Friction & pin paper feeds
- Parallel Centronics interface



## OKIDATA



**SUNLOCK SYSTEMS**

4217 Carolina Ave.

Richmond, Va. 23222

✓ 456

### ADDITIONAL PRINTER SPECIALS

Epson	Okidata	Brother 15	\$479	Citoh 8510	\$359
RX80 \$299	ML82 \$349	Brother 25	739	Citoh F10	1099
80FT 369	ML83 569	Gemini 10X	279	Sv. Reed 500	429
RX100 529	ML84 975	Man/Tal 80	319	Diablo 620	949
FX80 479	ML92 429	Qume 1140	1349	NEC 2000	849
FX100 649	ML93 699	SCM TP-2+	449	NEC 3510	1499

**TO ORDER CALL TOLL FREE 800-368-9191**

In Virginia call 804-321-9191

We accept MasterCard, Visa and CODs

## DISK TERM VERY SMART TERMINAL

**Terminal Mode:** Transmit an ASCII file from memory or disk. Programmable for unattended execution. Receive a file, write to disk when buffer is full, clear buffer and repeat, all unattended. File can even span disks.

**Transmit and Receive Protocol:** Separate from terminal. Allows transmission of multiple files of any type. Completely programmable for unattended operation at both ends. Even redials if no carrier.

### Other Features:

- Menu Driven
- DOS commands from program
- Supports auto-dial modems
- XON & XOFF changeable
- Operates under DOSPLUS, LDOS, NEWDOS/80, TRSDOS
- Prepare files off-line then upload
- Telephone Directory for auto-dial with modem settings
- Store all settings in configuration files
- Model 3 & 4 transmit and receive at up to 9600 baud
- Auto log-on
- Translation Tables
- Printer buffer 25K to 2.5K
- Programmable Macro-keys

**Model 4 enhancements:** Full 80 x 24 screen. Has split screen option to separate data received and transmitted. Able to use second 64K for buffer.

**Model I, III, & 4** ..... **\$69.00**

Add \$3.00 Postage / Check, Money Order, Visa, & Mastercard  
Indiana Residents add 5% Sales Tax

### INDIANA SOFTWARE DEVELOPMENT CO.

(Division of DonTho Computer Service, Inc.)

723 Franklin Square, Suite 502 • Michigan City, IN 46360

Phone: (219) 879-2941

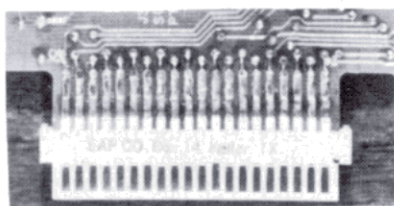
✓ 425

# Gold Plug 80

Eliminate disk reboots and data loss due to oxidized contacts at the card edge connectors.

**GOLD PLUG 80** solders to the board edge connector. Use your existing cables. (if gold plated)

### GOLD PLUG 80 Mod I Mod III



**GOLD PLUG 80 Mod I (6)**

Keyboard/EI (mod I)

Individual connectors

**GOLD PLUG 80 Mod III (6)**

Internal 2 Drive Cable

Mod III Expansion port

**new**

**SPECIAL PRICE**

\$44.95

15.95

\$7.95

48.95

29.95

9.95

Available at your favorite dealer or order direct from E.A.P. CO.

Dealer Inquiries Invited

USA shipping \$1.45  
Foreign \$7.

Can/Mex \$4  
TEXAS 5% TAX

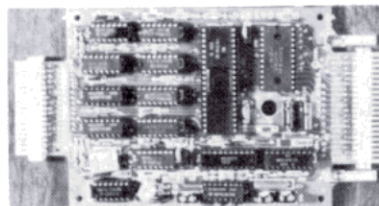


• trademark Tandy Corp

TRS-80+ MOD I, III, COCO,  
TIMEX 1000, OSBORNE,  
T199/4a others

COCO MODULE INSTALLATION AVAILABLE

### COCO Disk Module



Ground tab  
extensions

**COCO Disk Module (2)**

Ground tab extensions

Disk Drives (all R.S.)

Gold Disk Cable 2 Drive

Four Drive Cable

**new**  
**SPECIAL PRICE**

\$16.95

INCL

\$7.95

29.95

39.95

Model I, III/4

**PERCOM HARD DISK**

5 Mb Hard Disk ..... \$ 995.00

10 Mb Hard Disk ..... \$1450.00

**SYNCOM DISKETTES**

(SINGLE SIDED DOUBLE DENSITY)

\$17.95/10

**GOLD PLUG 80-E.A.P. COMPANY**

✓ 216

P.O. Box 14 Keller, TX 76248 (817) 498-4242





around. You can program the inputs as level-triggered or edge-triggered, and you can selectively mask (enable or disable) them. You can cascade up to nine 8259A's together, providing up to 64 prioritized interrupt levels.

The CPU can send two kinds of command words to the 8259A: Initialization command words (ICWs) and operation command words (OCWs).

shown in Fig. 7. While two are shown, you'll use only the first, although you must still send both to the 8259A to meet initialization requirements.

The default mode setting for the 8259A is for 8080A mode, which is what you want. You can also program it to work with the 8086/8088 family of processors. Bit 0 of ICW1 specifies whether or not ICW4 will or won't be

cleared bits enable the corresponding inputs.

The formats for OCW2 and OCW3 are shown in Fig. 8. I'll describe the functions of these operation command words later, when I discuss the operation of the interrupt controller board.

### Building the Interrupt Controller Board

The parts list for the interrupt controller board (as well as the general-purpose I/O board addition) is shown in Table 1, and the schematic is shown in Fig. 9. Some of the parts are optional, depending on what you actually want to build (described in the remainder of this article). The interrupt controller board is shown in Photo 1. The photo does not include the recommended additional reset circuitry described below.

Building the controller board is simple and straightforward. You need only a few easily obtained ICs, along with a handful of passive components. The addressing for the 8259A is jumper selectable, near the 74LS138. The jumper settings I used are indicated by dotted lines on the schematic (the programs described later will assume this addressing). The possible addressing for the device is as follows:

E2	E3	Addressing Range
A6/	A5/	48-4B hex
A6/	A5	68-6B hex
A6	A5/	08-0B hex
A6	A5	28-2B hex (my choice)

Although the hardware reserves four port locations for each jumper setting, the 8259A requires only two. It is double addressed within the port addressing range. That is, the device will appear in the lower two or upper two locations of the chosen addressing range. The convention for such a situation is to use the lower addresses of the addressing range. I will use addresses 28 hex and 29 hex in the programs described later.

Because the 8259A doesn't have internal reset circuitry, the state of its interrupt output line (pin 17) is unknown at power-up. If this is connected (via the 7416 gate) to the TRS-80 interrupt input line at system power-up, a problem will exist if the interrupt is active. This may not be a problem with the Models III and 4 since they have an internal register to enable ex-

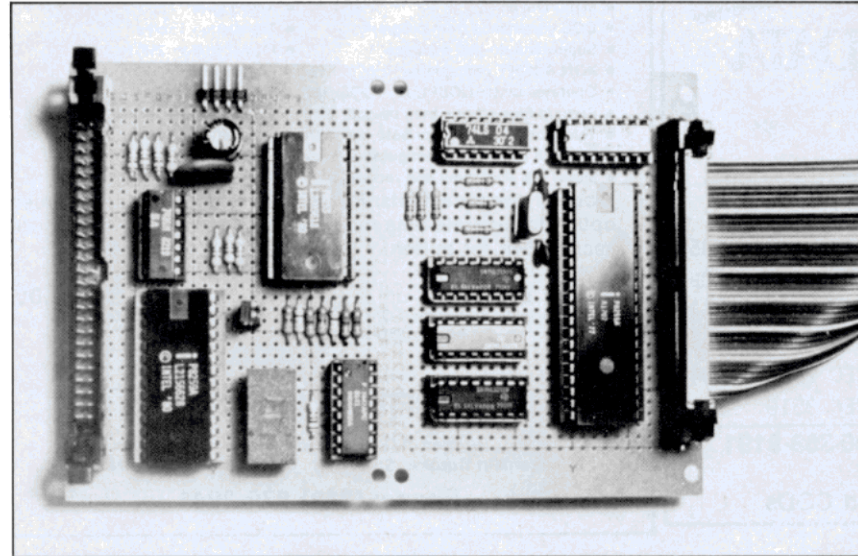


Photo 2. General-purpose I/O board with interrupt controller.

The CPU sends the ICWs only once to initialize the 8259A after power-up. It sends the OCWs at various times as required to perform different operations. OCWs can alter interrupt masks, change priority levels, acknowledge interrupts, and more.

While you have four defined ICWs available, the interrupt controller board will use only two, described here. You'll use all three of the defined OCWs, since they provide the real flexibility in operation.

The interrupt controller is primarily designed to generate a 3-byte call instruction to the CPU when a device requests an interrupt, and the CPU responds with an interrupt acknowledge. Since TRS-80s aren't well-designed for this type of interrupt response (particularly the Models III and 4) you won't use that feature; instead, you'll use its polled mode operation capability.

When you apply power to the 8259A, the state of the device, including its interrupt output line, is unknown, since no reset input is available. Before you use the device, you must initialize it with the ICWs. The two ICWs you'll use are

sent. Since ICW4 specifies optional parameters you won't use, this bit is programmed with a zero. Bit 1 distinguishes whether the chip is by itself or if other PICs are cascaded with it. This bit is programmed as a 1 in our system, since it's by itself. Bit 2 relates to the spacing of service routine call addresses in normal operation, and doesn't apply to our system.

Bit 3 of ICW1 determines whether the inputs will look for level-triggered interrupts (1) or edge-triggered interrupts (0). I will use level-triggered interrupts in my examples, but use whatever meets your needs. Bit 4 must be a 1 to indicate that you're sending ICW1. Bits 5-7 of ICW1 and all of ICW2 provide address bits for the call addresses generated during normal operation. These don't apply to your system either.

Once you initialize the 8259A, you can selectively enable or disable the various interrupt inputs by writing a mask byte (OCW1) to the higher 8259A port (port 29 hex on your board). Any bit that is set masks (disables) the corresponding interrupt input, and

## PROJECT 80

ternal interrupts. I presume (though I am not certain) the initialization software in the TRS-80 disables external interrupts, making it necessary for applications software to enable external interrupts before the CPU accepts interrupts. If this is true, the optional reset circuitry described below is unnecessary. In any case, the optional circuitry can't hurt, and I recommend it at least for all Model I users.

The reason the jumper is shown on the schematic (on the interrupt line going to the TRS-80) is in case you don't want to add the optional reset circuitry, or for some reason don't want the interrupt on the TRS-80's interrupt line. You may not need the jumper in your application. You'll also need a +5V @150mA (milliamps).

The interrupt inputs to the 8259A have inverters on them. The inputs to these inverters can then be connected to a terminal strip to provide you with eight active low interrupt inputs.

### Building the General-Purpose I/O Board Addition

In December's Project 80, I described the construction of a general-purpose I/O board. An interrupt controller would be a valuable addition, so I've provided the schematic for it (see Fig. 10). The parts list is in Table 1, as it is for the stand-alone interrupt controller board described above. The general-purpose I/O board with the interrupt circuitry is shown in Photo 2.

The construction of this addition is straightforward. You address (chip select) the 8259A from an unused pin on the 74LS138 (pin 13). This gives you the same addressing range as for the stand-alone controller board described above, 28-2B hex. The general-purpose I/O board already has two major peripheral devices, and they're designed to provide interrupts to the CPU during various modes of operation. The five possible interrupt pins (two from the 8255A and three from the 8253/4) are connected to the first five interrupt inputs on the 8259A. This allows selective interrupt inputs under software control.

You could use this, for example, to generate an interrupt to the CPU at predetermined points in time, and update something during the interrupt service routine. I'll illustrate this in the programs described later. This also allows the 8255A to generate interrupts

to the Z80 after certain handshaking operations. (I used the same concept in the printer buffer project described in the September/October 1984 Project 80, p. 102 and p. 146.)

I used five inputs to the 8259A, with three unused. I put inverters at these inputs, to make available three general-purpose active low interrupts.

### The Optional Reset Circuitry

The schematic for the optional reset circuitry is shown in Fig. 11. The parts are listed in Table 1, along with the other project parts. The reset circuitry provides a function available on many peripheral devices, and would probably have been put on the 8259A if an extra pin were available.

The reset circuitry is very simple, and requires the addition of only a 74LS74 dual D-type flip-flop and a 74LS32 quad OR-gate (Models III and 4 users may use spare 74LS32 gates from the EXTIOSEL/ circuitry), and a couple of resistors. The interrupt output that was to go to the TRS-80 INT/ line (pin 12 of the 7416) is routed instead to pin 9 of the 74LS32. The TRS-80 RESET/ output line then goes to pin 1 of the 74LS74, the reset line on the first flip-flop. For this to work, you must turn on the interrupt controller before or simultaneous with the TRS-80, so that it can see the TRS-80's power-up RESET/ signal.

Pins 13 and 12 of the 74LS32 connect to the chip select (CS/) and write (WR/) lines on the 8259A, respectively. This creates an active (low) output signal when both input signals are active (low). This creates the necessary clock input to the 74LS74 when the 8259A is written to.

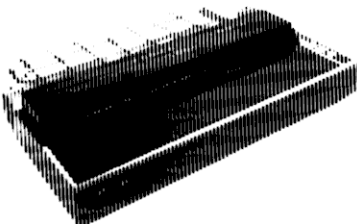
Look at how this circuit works. When you reset the TRS-80, the Q/ (Q not) output of the 74LS74 (pin 6) goes high. This makes the output (pin 8) of the connected OR-gate high, regardless of the other gate input. The second 74LS74 flip-flop is then used as an inverter, to create a low level on its Q (pin 9) output. This then goes to the 7416 gate to get re-inverted to a high level, an inactive interrupt level.

When the computer first writes to the 8259A, however, the clock input (pin 3) to the first flip-flop makes the D-input value (high) appear on the Q output, and the inversion of that to appear on the Q/ output. The low level on Q/ enables the connected 74LS32,

Call ELEK-TEK for

**UNBELIEVABLE  
PRICES!!**

## EPSON PRINTERS



### 80 COLUMN PRINTERS

RX-80	235.00
RX-80FT.	275.00
FX-80	390.00

### 132 COLUMN PRINTERS

RX-100	390.00
FX-100	590.00

### NEW Near Letter Quality PRINTER

**LQ 1500**

200/67 c.p.s. Tractor/Friction

## CALL

### Cables for Epson

CS5622 10 ft. 36/36 pin	
standard parallel	32.00
CS5609 8 ft. 36/25 pin parallel	
for IBM	25.00
CS5618 6 ft. 36/16 pin parallel	
for TI-99/4A	25.00
CS5628 10 ft. 25 pin	
standard RS-232C (fully loaded)	25.00
CS5620 6 ft. parallel	
for TRS 80 Model I-II-IV	22.00
RS1Y RS-232 Y cable for TI-99/4A	25.00

### DUST COVERS AVAILABLE FOR MOST MODELS—\$5.00

### Interfaces

CARDCO 6	65.00
APPLE DUMPLING GX	65.00
GRAPPLER PLUS	105.00
Buffered (16K) GRAPPLER PLUS	165.00
8148 Ser. (For RX or FX Models)	90.00
8181 IEEE-488 Interface	80.00

### Ribbon Cartridges

DPR 182 For EPSON 80 col. printers	4.00
DPR 183 For EPSON 132 col. printers	8.00

**CALL TOLL FREE 800-621-1269**  
EXCEPT Illinois, Alaska, Hawaii

Corp. Accts. Invited. Min. Ord. \$15.00 Mastercard or Visa by mail or phone. Mail Cashier's Check, Money Ord. Pers. Check (2 wks to circ.) Add \$4.00 1st class. (AK, HI, P.R., Canada add \$10.00 first item) \$1.00 ea. add'l ship. & handle. Shipments to IL address add 7% tax. Prices sub. to change. WRITE for free catalog. Return policy for defective on arrival replacements only: 90 day mfr. wty. ALL ELEK-TEK MERCHANDISE IS BRAND NEW, FIRST QUALITY AND COMPLETE.



**ELEK-TEK, Inc.**

6557 N. Lincoln Ave. Chicago IL 60645  
(800) 621-1269 (312) 677-7660



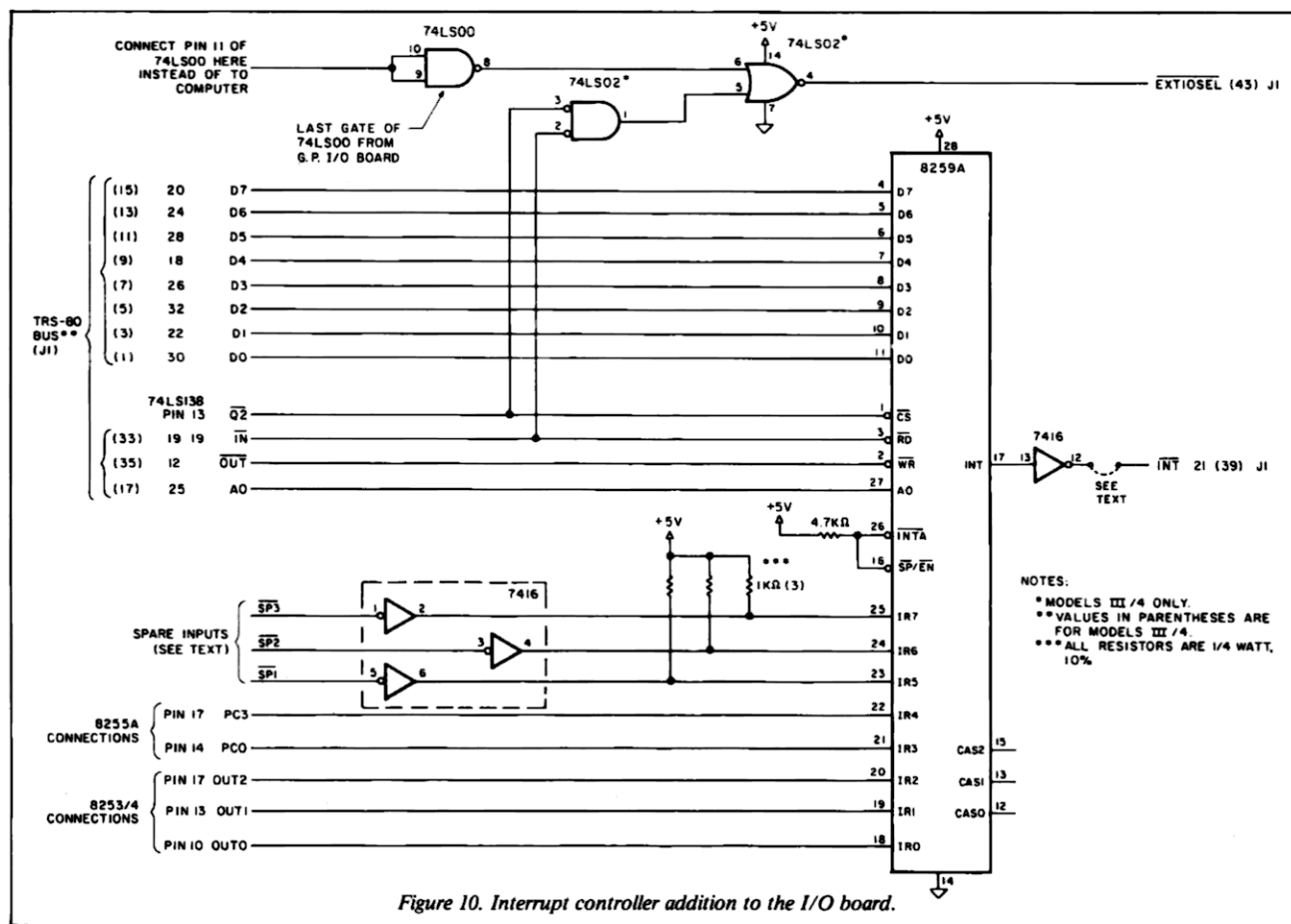


Figure 10. Interrupt controller addition to the I/O board.

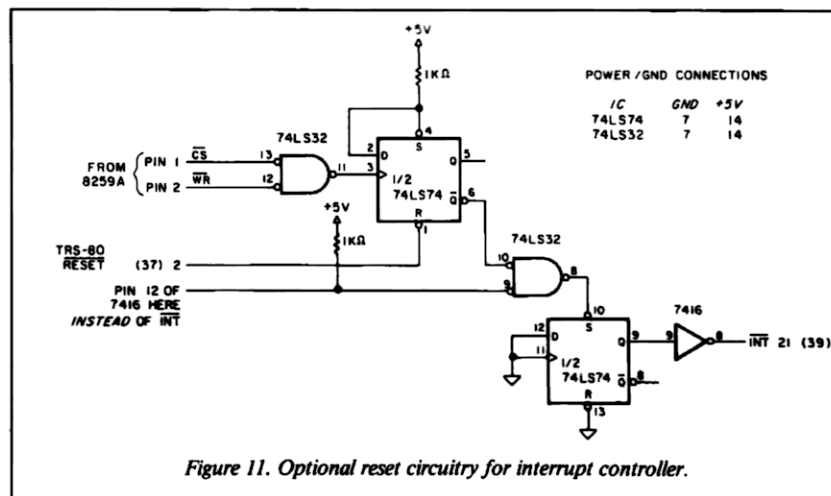


Figure 11. Optional reset circuitry for interrupt controller.

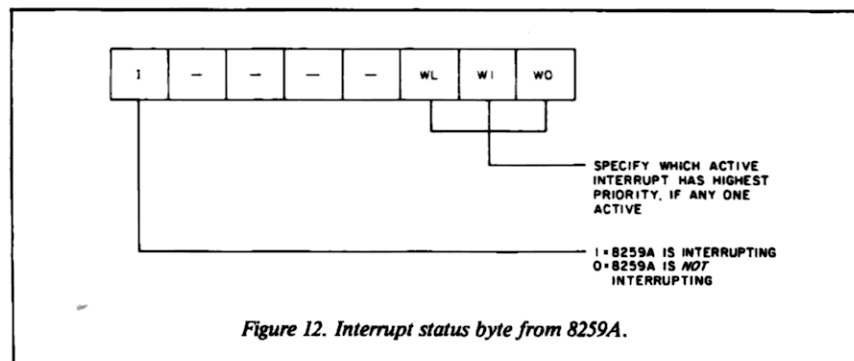


Figure 12. Interrupt status byte from 8259A.

which transfers the interrupt level on its pin 9 input to its pin 8 output, and, after two further inversions, is finally placed on the TRS-80's interrupt line. The interrupt output from the 8259A to the TRS-80's interrupt line will, then, always be enabled until it receives another reset signal. The reason for the double inversion (using the second flip-flop and the 7416) is because of the need to use the open collector 7416 gate, described below.

### Operating the Interrupt Controller

This section concerns both the stand-alone controller board, as well as the general-purpose I/O board addition, since both operate identically. One of the essential requirements of the interface to the Model I bus is to use an open collector driver. Open collector drivers, like the 7416 inverting drivers, don't have the collectors on their output transistors pulled up, as do standard transistor-to-transistor logic ICs. This lets you tie any open-collector outputs together with a common pull-up resistor. The net effect is that, when all the outputs are high, the line is high. When any one of them goes

# DISA.DAT

## Now For

## The Model 4!

## The *Only* Disassembler

## That Even Tracks Down

## DATA!!!



- AUTOMATICALLY identifies such data areas.
- Outputs fully-labeled Radio Shack\* or APPARAT\*\* EDTASM\* source code to display, printer, disk (and cassette -- Models I/III only).
- Can relocate itself to any free RAM area.
- Loads programs from disk (or cassette -- Models I/III only) and displays entry point.

\* For TRS-80 Model I (Level II), Model III, or Model 4 (in Model III mode or under TRSDOS 6.0, in Model 4 mode).

#1354-42 (Model 4 diskette, TRSDOS\* 6.0)..... \$49.95

#1354-22 (Model III/4 diskette, TRSDOS\* 1.3)..... \$39.95

#1354-12 (Model I/III cassette)..... \$36.95

\* Registered Trademark, Tandy Corporation

\*\* Registered Trademark, APPARAT, Inc.

U.S. Funds Only. Add \$2.00 shipping (U.S. & Canada), \$5.00 (overseas air) per item. Ohio residents please add 6% sales tax.



To order, phone (513) 435-4480 (M-F, 9 a.m.-5 p.m. EST), or send check, money order or VISA/MasterCard information (name, address, card number, expiration date, and your telephone number) to:

**PRO/AM SOFTWARE**

220 Cardigan Road  
Centerville, OH 45459 ✓260

Professional Software for  
both Novice and Expert

• Outputs:

"H1929	DEFM	"READY"
	DEFB	ODH
		"
instead of the meaningless "equivalent":		
"AB25	LD	D,D
	LD	B,L
	LD	B,C
	LD	B,H
	LD	E,H
DEC	C	", etc.

# Before this happens, call **SAFEWARE**

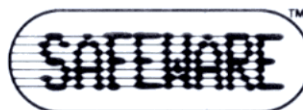
## 800/848-3469

(In Ohio, call  
614/262-0559)

Protects your computer against theft, fire, power surges and other accidental losses. Insures your entire system for as little as \$35 a year — depending on the value of your hardware, software, and media. Full replacement after a low \$50 deductible.

We're SAFEWARE™ the first name in computer insurance. Tens of thousands of satisfied customers. Call toll-free for rates or immediate coverage.

SAFEWARE, The Insurance Agency Inc.  
P.O. Box 02211  
2929 N. High Street  
Columbus, Ohio 43202



✓368

# T80-FS1 Flight Simulator



## See your dealer!

Available for Model I or Model III. \$25.00 on cassette or \$33.50 on disk (with enhancements) All versions require 16K.

If you order direct, please specify whether you have Model I or Model III (the media are different) and whether you want disk or cassette. Include \$1.50 and indicate UPS or first class mail. Illinois residents add 5% sales tax. Visa and Mastercard accepted.

If you don't yet own a disk, don't fret. You can upgrade anytime. Cassette users may send back their cassette (but not the manual) along with \$10 (first class shipping included) and receive the disk version.

# subLOGIC

Communications Corp.  
713 Edgebrook Drive  
Champaign, IL 61820  
(217) 359-8482 ✓71  
Telex: 206995



Program Listing. Demonstration for Model III/4 to illustrate the use of the 8259A interrupt controller with the December Project 80 general-purpose I/O board.

```

00100 ;*****
00110 ; This is a demonstration program for the Model III/4 to
00120 ; illustrate the use of the 8259A interrupt controller
00130 ; with the Project 80 G.P. I/O board. It sets up the
00140 ; various board devices to increment the LED display
00150 ; every second. See column text for a more-indepth
00160 ; description.
00170 ;
00180 ; Written by Roger C. Alford
00190 ;*****
00200 ;
00210 ;
00220 PPICMD EQU 23H ;8255A COMMAND PORT
00230 PPIB EQU 21H ;8255A PORT B
00240 PICP0 EQU 28H ;LOWER PORT OF 8259A
00250 PICP1 EQU 29H ;UPPER PORT OF 8259A
00260 PITCHD EQU 27H ;8253 COMMAND PORT
00270 PIT0 EQU 24H ;TIMER 0 PORT ON 8253
00280 TRSEXE EQU 0E0H ;TRS-80 EXTERNAL I/O ACCESS PORT
00290 TRSINE EQU 0E0H ;TRS-80 INT. ENABLE PORT
00300 TRSRDI EQU 0E0H ;TRS-80 READ INT. STATUS PORT
00310 ;
00320 ORG 7000H ;SAFE ADDR FOR ALL MEM SIZES
00330 ;
00340 ;VARIABLES USED:
00350 INTTBL DEFN TIMERS ;TIMER 0 INTERRUPT
00360 BADINT DEFN ;INVALID INTERRUPT
00370 BADINT DEFN ;INVALID INTERRUPT
00380 BADINT DEFN ;INVALID INTERRUPT
00390 BADINT DEFN ;INVALID INTERRUPT
00400 BADINT DEFN ;INVALID INTERRUPT
00410 BADINT DEFN ;INVALID INTERRUPT
00420 BADINT DEFN ;INVALID INTERRUPT
00430 ;
00440 PPIBYT DEFS 1 ;STORAGE FOR 8255 PORT B BYTE
00450 TIMCNT DEFS 1 ;STORAGE FOR INTERRUPT COUNTER
00460 VECTOR DEFS 2 ;STORAGE FOR TRS-80 ISR ADDRESS
00470 ;
00480 ;
00490 INTRPT DI ;DISABLE Z80 INTERRUPTS
00500 ; FOR INITIALIZATION.
00510 LD A,10H ;WRITE BYTE TO ENABLE
00520 OUT (TRSEXE),A ;EXTERNAL I/O ACCESS
00530 LD A,1EH ;GET 8259A ICW1 -- SINGLE
00540 ; CONTROLLER SYSTEM,
00550 ; LEVEL-TRIGGERED.
00560 OUT (PICP0),A ;SEND TO 8259A
00570 XOR A ;ZERO THE ACCUMULATOR
00580 OUT (PICP1),A ;WRITE ICW2 -- NOT REALLY
00590 ; USED HERE.
00600 LD A,0FEH ;GET INT. MASK BYTE
00610 OUT (PICP1),A ;ENABLE TIMER 0 INT.
00620 LD A,99H ;SET 8255A PORT B FOR
00630 ; OUTPUT MODE 0.
00640 OUT (PPICMD),A ;SEND TO 8255A COMAND PRT
00650 LD A,03H ;SET LED TO '0' AND
00660 ; TIMER 0 FREQ.=250 KHZ.
00670 OUT (PPIB),A ;SEND TO 8255A PORT B
00680 LD (PPIBYT),A ;SAVE VALUE ALSO IN MEM.
00690 LD A,30H ;GET 8253 COMMAND BYTE --
00700 ; SET TIMER 0 TO MODE 0
00710 OUT (PITCHD),A ;SEND TO 8253 COMAND PRT
00720 LD A,24H ;GET LOW COUNT BYTE
00730 OUT (PIT0),A ;SEND TO TIMER 0
00740 LD A,0F4H ;GET HIGH COUNT BYTE
00750 OUT (PIT0),A ;SEND TO TIMER 0
00760 ;
00770 XOR A ;CLEAR THE ACCUMULATOR
00780 LD (TIMCNT),A ;CLEAR THE INT. COUNTER
00790 LD A,(4012H) ;SEE IF ISR ALREADY THERE
00800 CP 0C9H ;LOOK FOR A RETURN
00810 JR 2,NOISR ;IF YES, NO ISR IN SYS.
00820 LD HL,(4013H) ;ELSE, GET ISR ADDRESS
00830 LD (VECTOR),HL ;SAVE IN VECTOR LOCATION
00840 JR INITDN ;FINISH INIT.
00850 NOISR LD HL,NOPROC ;GET ADDR FOR NO PROCESS
00860 LD (VECTOR),HL ;PUT IT INTO VECTOR
00870 INITDN LD A,0C3H ;GET JUMP OPCODE BYTE
00880 LD (4012H),A ;WRITE TO TRS-80 VECTOR
00890 ; TO INSURE IT'S THERE
00900 LD HL,SERVIC ;GET ADDRESS OF OUR ISR
00910 LD (4013H),HL ;SAVE IN TRS-80 VECTOR
00920 LD A,08H ;WRITE BYTE TO ENABLE
00930 OUT (TRSINE),A ;EXTERNAL I/O INTS.
00940 EI ;ENABLE INTERRUPTS NOW
00950 LOOP JR LOOP ;LOOP FOREVER -- JUST
00960 ; WAIT FOR THINGS TO
00970 ; HAPPEN.
00980 ;
00990 ;*****
01000 ; This is the interrupt service routine (ISR)
01010 ; processing code. If the interrupt belongs to the
01020 ; 8259A, it will be processed here. Otherwise, it will
01030 ; be forwarded to the TRS-80.
01040 ;*****
01050 ;
01060 SERVIC PUSH AF ;SAVE USED REGISTERS ON

```

Listing continued on p. 162

low, the line goes low. This is called a wired-OR configuration.

Open collector drivers allow many devices to share the common interrupt line to the CPU. The CPU must, however, have some way to determine what is requesting any given interrupt. While Model I's require the use of open collector drivers, Models III and 4 users could get by with using a 74LS04 instead of the 7416 chip described above, since open-collector drivers aren't required on the external I/O bus. It is, however, recommended that you use the 7416 because it's a better driver and it lets you parallel other devices that use the interrupt line on the bus in the future. The pull-up for the 7416 is internal to the Models III and 4, as well as to the Model I.

As mentioned during the discussion of the 8259A, the operation command words let you set up most of the various options the 8259A allows. I've developed a program for the Models III and 4 that illustrates the use of the 8259A (see the Program Listing). The program uses the functions of the general-purpose I/O board, but should give you an understanding of the operation of the interrupt controller even if you only build the stand-alone interrupt controller board.

You first set up the 8259A by sending the two ICWs, as well as the interrupt mask (the port addressing is important to note). The interrupt mask sent to the 8259A is 0FEH, only enabling interrupt input 0, which is the output of Timer 0 on the 8253. The 8255A is then set up to permit control of the programmable divided clock to the 8253, as well as the LED display. The display is initialized with a 0. The original 8255A value is also stored in a memory location (PPIBYT) for later reference (during the ISR). Another memory location (TIMCNT) is also cleared, to be used as a count register.

Timer 0 of the 8253 is now set up to operate in mode 0 (interrupt on terminal count), which causes the output of the timer to initially go low, but then go high when the count reaches zero. The frequency input to Timer 0, as established by the 8255A, is 250 KHz, the slowest possible frequency. Assuming we would like to update the LED display once each second, the interrupt to the CPU must occur at a frequency that will easily multiply to

Continued on page 162

## SUNDAY DRIVE and THE REVENGE

Two new adventures by  
**Unicorn Software**

**Sunday Drive™:** The bomb has been dropped! Now, you must battle your way through the insanity left behind to find a new life. (TRS-80 Model I, III (IV) 48K Disk\*).

**The Revenge™:** Battle man and beast to gain riches and rewards. Only the stout of heart and the lucky of life will survive. The first five warriors strong enough to complete the battle will win the game treasure (a free copy of *The Revenge II™*). (TRS-80 Model I, III (IV) 32K Disk\*).

**SUNDAY DRIVE and THE REVENGE**  
only \$34.95 ea., includes shipping & handling +.

For the cassette users:

**GERALD™:** The dreaded snake has invaded your home-town and you must save the neighborhood. Mod I, III 16K.

**ISLE OF WONDER™:** As a novice thief, you must earn your way in to the illustrious Thieves' Guild. Mod I, III 16K.

**GERALD and ISLE OF WONDER**  
only \$19.95 ea., includes shipping & handling. +  
"The Software that's not a myth"

**Unicorn Software**

P.O. Box 954 ✓169  
Lancaster, Ohio 43130  
(614) 654-9489

© 1984 Unicorn Software

\*TRS-80 is a trademark of the Tandy Corp.  
+ Ohio residents must add 5.5% sales tax.

## (LISP)

Artificial Intelligence Language  
UO-LISP Programming Environment  
The Powerful Implementation of LISP  
for MICRO COMPUTERS

Excellent for Learning the Preferred Language  
of the Artificial Intelligence Community



This POWERFUL subset of the CP/M based UO-LISP supports, the usual LISP Interpreter Functions, Data Types, LISP Structure Editor, Optimizing LISP Source Code Compiler & Assembler, Assembly & LISP Code Intermixing, Compiled Code Library Loader, Numerous Utility Packages, Comprehensive 150 Page Manual, the High Level Language RLISP, and much more.

TURN YOUR TRS-80 INTO A REAL  
LISP MACHINE FOR ONLY  
**\$49.95**

Above configuration supported on TRS-80 Model I & III running with TRSDOS or any of the TRSDOS compatible systems (send for catalog list), 48K and dual drives and on Model 4 & 4P with Model III TRSDOS.

**TO ORDER:** Send request for UO-LISP Model I, Model III, or Model 4/III with check, money order, or credit card no. with exp. date, add parcel shipping fee of \$3.00 inside U.S. and CN., \$10 outside U.S.

**NEW CP/M configuration** available on TRS-80 Models II, 4, 4P and modified Model III with Holmes VID-80 + CP/M option. Write for your **FREE CATALOG** with details and order forms for CP/M support.

VISA and MasterCard

**Northwest Computer Algorithms**

P.O. Box 90995, Long Beach, CA 90809 (213) 426-1893 ✓95

## UNINTERRUPTIBLE POWER SYSTEMS BY SUN RESEARCH

For complete protection from **Blackout, Brownout, Surge and Spike** specify a **MAYDAY** Uninterruptible Power System by **SUN RESEARCH**.

Eliminate costly downtime and lost data caused by those momentary power losses. Protect your software and hardware from damage caused by sudden drops in line voltage. Isolate your computer system completely from the AC wall circuit with a **MAYDAY** continuous (On-Line) Uninterruptible Power System. Give all your components clean 60Hz sine wave power for efficient operation at a price you can afford.

**MAYDAY™ UNINTERRUPTIBLE POWER SYSTEMS  
BY SUN RESEARCH**

Available in 150, 300, 600, 1000 and 1500 VA Capacities.

Call 1-603-859-7110



**MAYDAY™ Division  
SUN RESEARCH, INC.**  
Old Bay Road  
Box 210  
New Durham, N.H. 03855

✓285





# Getting the Message Across

One of the most important functions of a BBS is its ability to search and find information. Successful BBSes can locate information accurately and efficiently. This month's BBS Express concentrates on finding messages both in memory and on disk.

While it's faster to locate information in memory than on disk, memory space is more limited, which in turn limits the amount of information you can keep in memory. A message header, for example, consists of the message number, subject, date, time, section number, name of sender, and destination. Ideally, all this information should be in memory so you can locate a message quickly. This information requires a total of 92 bytes for each header, or 9.2K of memory if there are 100 messages on board. Unfortunately, however, that's a lot of memory.

To complicate matters further, this header information is in string form, which can easily trigger string garbage collection. The message number, however, isn't in string form. An acceptable solution, then, is to create a fast, in-memory search for the message number, leaving all other searches as disk operations. Because the message numbers are stored economically, memory isn't heavily taxed.

## Storing the Message Number

Your computer's memory stores integers in Z80 least significant byte/most significant byte (LSB/MSB) format. Each integer requires 2 bytes: The first byte contains the least significant byte, while the second byte contains the most significant byte. In message number 256, for example, the least significant byte is 0, and the most significant byte is 1. The VARPTR command returns the address where the BBS stores the least significant byte; it stores the most significant byte in the next position.

Using this information, you build an in-memory index of the message



Illustration by Roy Lewando

numbers that you access with a short machine-language code (see Program Listing 1). The index is simply a string that contains the message numbers in sequential order, making it easy to search for any given message number. The VARPTR (string variable) returns the memory address of a pointer that contains both the length of the string and the memory address of the string's first character. Because this information is all part of the same string, it's easily written to disk.

Now you need to convert the message numbers to and from the Z80 LSB/MSB format. Disk Basic does this: It contains MKIS, which returns a 2-byte string in LSB/MSB format, and CVI, which takes that string and returns a number. In the case of message number 256,  $MKIS(256) = CHR\$(0) + CHR\$(1)$ ;  $CVI(CHR\$(0) + CHR\$(1)) = 256$ . Each time a user leaves a message, the BBS writes MKIS (message number) to the in-memory string. The BBS stores the header for the Nth message in record N, and finds it in the index string at position  $2*N - 1$ . If P is the position in the string, and RN

is the record number of the header for the message, then

$$RN = (P + 1) / 2$$

$$P = (2 * RN) - 1$$

Program Listing 1, in Assembly language, searches the index for the message number. With this message number, you have access to the header, which gives you the secret file name of the text of the message. Label FSRCH calls the PARAM routine which places the length of the string passed from Basic in the B register, and the address of the string's first character in the HL register pair. Basic POKES the message number that you're looking for in SEARCH+1.

## The Key Box

Model III  
48K RAM  
Disk Basic  
Assembly Language  
Two Disk Drives  
Editor/Assembler



# COMPLETE HARD DRIVE \$795.

AS SEEN AT THE RADIO SHACK  
COMPUTER SHOWCASES

## TRS-80 Model 1/3/4 and 4P Primary

5 Megabyte - 795.00  
10 Megabyte - 1095.00  
15 Megabyte - 1295.00  
30 Megabyte - 1895.00

## Secondary

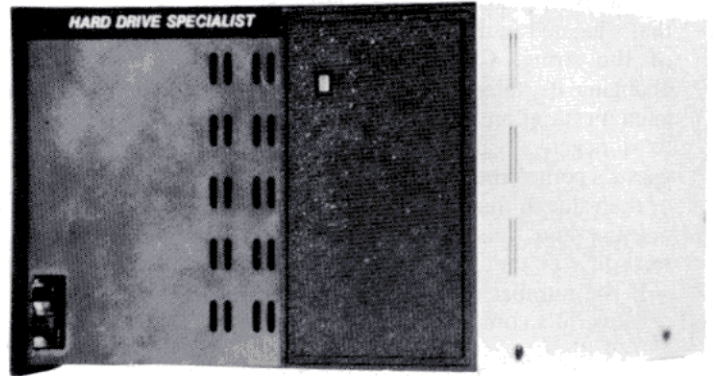
595.00  
895.00  
1095.00  
1695.00

(Model 1 add 50.00)

## TRS - 80 Hard Disk Subsystem Features

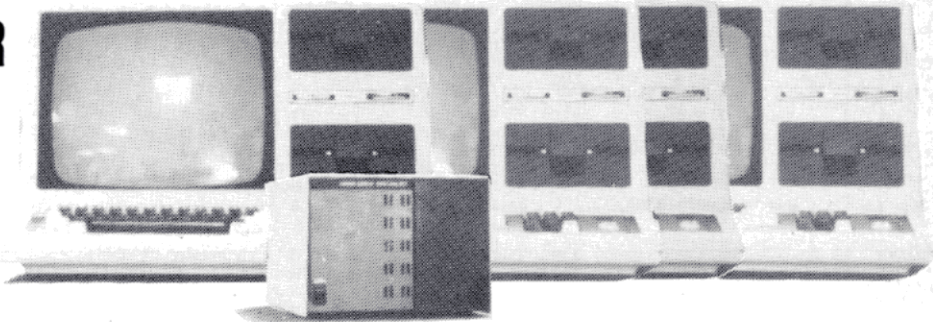
- All sizes rated after formatting.
- TRS-80 Models 1, 3, 4, and 4P full supported.
- Your choice of DOSPLUS, LDOS, or TRSDOS 6.x Software Drivers included.
- Newdos 80/Version 2.5 Systems available.
- Up to two secondary drives may be added.
- Error checking and correcting controller.
- Buffered seek drives for improved access times.
- Built-in power up diagnostics.
- Drives use plated media for long disk life.
- Heavy duty power supply.
- Fan cooled.
- Gold connectors used throughout for high reliability.
- 30 day money back guarantee.
- 1 year warranty.

Shop and compare. Hard Drive Specialist has been building hard drive systems for years and have sold thousands of subsystems to satisfied TRS-80 customers. We fully support TRS-80 Models 1/3/4 and 4P computers on all available hard drive operating systems. We use the latest state-of-the-art drives and controllers. Our drives all use buffered seek logic and plated media to result in almost one-fourth the average access times found on our competitors drives. Plated media results in longer platter life and high resistance to head crashes not found on coated media drives. We utilize high reliability construction throughout including, heavy duty power supply, cooling fan, and gold connectors. We back up our drives with a one year parts and labor warranty and we're so sure you'll like our systems we offer a thirty day money back, no questions asked, guarantee. So when it comes time to buy, look beyond the price and choose the best drive. After all, we are the Hard Drive Specialist!



## HDS MULTIPLEXER

**\$1295.**



ALLOWS USAGE OF UP TO 4 MODEL III OR IV SYSTEMS USING DOSPLUS OR LDOS ON A HDS HARD DRIVE. INCLUDES MASTER CONTROL UNIT, HOST ADAPTERS FOR 2 COMPUTERS, AND 40 FEET OF CABLE. EACH ADDITIONAL HOST ADAPTER ADD \$150. EACH ADDITIONAL FOOT OF CABLE ADD \$1. UP TO 100 FEET PER COMPUTER.

NEW!

## Tandy 1000, Tandy 1200, IBM, Zenith, and Compaq Fixed Disk Drives

10 Megabyte - Internal — \$ 895.  
10 Megabyte - External — \$1195.  
15 Megabyte - External — \$1695.  
30 Megabyte - External — \$2195.  
10 Megabyte - Secondary — \$ 895.  
15 Megabyte - Secondary — \$1395.  
30 Megabyte - Secondary — \$1895.



## MODEL 3/4 BOOT ROM \$39.95

ALLOWS YOU TO BOOT DIRECTLY FROM YOUR HARD DRIVE  
FOR DOSPLUS

### Hard Drive Software

Dosplus 3.4f (Model 1 only) ..... \$99.95  
Dosplus 3.5e (Model 1 drivers for 3.5) ..... \$59.95  
Dosplus 3.5f (Model 3/4 drivers for 3.5) ..... \$59.95  
Dosplus IVf (Model 4 drivers for IV) ..... \$59.95  
Dosplus 4.0a (Model 3/4 only) ..... \$99.95  
LDOS (tm) 5.1.x Drivers (Model 1/3/4) ..... \$59.95  
TRSDOS 6.0 (tm) Drivers (Model 4 only) ..... \$59.95  
Newdos/80 Version 2.5 (Model 1/3/4) ..... \$199.00

**HARD DRIVE SPECIALIST**

### Ordering Information

Use our Watts Line to place your order Via Visa, MasterCard, or Wire Transfer. Or Mail your payment directly to us. Any non-certified funds are held until proper clearance is made. C.O.D. 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 which are custom built. UPS ground is our standard means of shipping unless otherwise specified. Shipping costs are available upon request.

455 1-713-480-6000 Order Line 1-800-231-6671  
16206D Hickory Knoll, Houston, Texas 77059



The BBS then loads this value into the DE pair, transfers the address of the first character in the string to the IX register with the PUSH HL, POP IX instructions, and loads C with 255 to act as a counter.

The BBS loads HL with the value that's located in the first two positions of the string. C is bumped twice, changing its value to 1. Because deleted messages are marked by being set to a negative value (your computer uses 2's complement notation), if bit 7 of the value in the H register is a 1, it's negative and thus ignored as a killed record.

If the number in this position isn't negative, it's compared with the value

*If the message numbers exceed the limit, the BBS removes all deleted messages and text files.*

that we're searching for by the RST 18H instructions. In effect, RST 18H, in 1 byte, subtracts the contents of the

DE register pair from the contents of the HL register pair, ignoring the result yet saving the flag status.

If the RST 18H command sets the zero flag, the BBS has found the message number. But if the Carry flag isn't set, you've gone too far. In either event, the BBS increments the C counter by 1, then divides it by 2 by shifting it one position to the right (SRL C), placing zero in the B register, and moving BC to HL to pass to Basic.

If the message number is still unknown, the BBS bumps IX, to point to the next pair of characters, decrements B, and initiates DJNZ, looping to FSR010 until done. The JP BASIC instruction passes the value in the HL register (the record number that we're seeking) to Basic.

Program Listing 2 shows how Basic interfaces with the code in Program Listing 1. Basic defines FD as the address of SEARCH+1. Line 430 POKES the LSB of the number that you're searching for into SEARCH+1, and the MSB into SEARCH+2. A call to USR3 returns S equal to either the record number you want or to the next-highest record number.

Lines 2730-2840 make up the close-out routine. This is done first by compressing the number of messages on the board so they don't exceed the maximum set by the sysop. If you're under the limit, write the index back to disk. If, however, the message numbers exceed the limit, the BBS removes all deleted messages and text files. Any excess messages are removed with NW\$, a new index string. This new index starts removing messages at the high end of MN\$ until NW\$ is equal to 2\*MX, the maximum number of messages the sysop allows. Everything below that point gets killed, and NW\$ is written to disk. ■

Program Listing 1. BBS code that locates message numbers.

```
01740 ;      SEARCH FORWARD FOR SPECIFIED 2-BYTE STRING
01750 ;
01760 FSRCH  CALL  PARAM      ;GET VARPTR(MN$)
01770 SEARCH LD      DE,0000   ;SEARCH STRING
01780        PUSH  HL
01790        POP   IX
01800        LD    C,255      ;STR. POS. COUNTER
01810 FSR010 LD      L,(IX+0)
01820        LD      H,(IX+1) ;GET FIRST PAIR FOR
CMPR
01830        INC    C
01840        INC    C          ;BUMP STRNG POINTER
01850        BIT    7,H        ;CHECK FOR NEGATIVE
01860        JR     NZ,REVR    ;NEGATIVE - DEAD FILE
01870        RST    18H       ;COMPARE HL/DE
01880        JR     Z,FSR100   ;FOUND
01890        JR     NC,FSR100  ;TARGET>SOURCE
01900 REVR   INC    IX
01910        INC    IX
01920        DEC    B
01930        DJNZ  FSR010     ;LOOP TIL FOUND
01940 FSR100 INC    C          ;STRPOS+1
01950        SRL    C          ; (STRPOS+1)/2
01960        LD     B,0
01970        PUSH  BC
01980        POP   HL
01990        JP     BASIC     ;PASS TO BASIC
```

End

Program Listing 2. BBS code to interface Program Listing 1 with Basic.

```
430 POKE FD+1,INT(MN/256):POKE FD,MN-(INT(MN/256)*256):
S=USR3(VARPTR(MN$)):RETURN
2730 IF (SN=0) OR (LEN(MN$)=0) THEN SL=0:SH=0:SN=0:NW$="":
GOTO 2820
2740 FOR S=LEN(MN$)-1 TO 1 STEP -2:MN=CVI(MID$(MN$,S,2))
2750 IF (LEN(NW$)<2*MX) AND (MN>0) THEN
NW$=MID$(MN$,S,2)+NW$:PS=CHR$(INT((S+1)/2))+PS:GOTO2770
2760 AS="MSG0000/BBS"+DD$:GOSUB860:KILL AS:SN=SN-1
2770 NEXT:IF LEN(NW$)>1 THENSL=CVI(LEFT$(NW$,2)):
SH=CVI(RIGHT$(NW$,2)):GOSUB220 ELSE SL=0:SH=0:GOTO 2820
2780 FOR P=1 TO SN
2790 GET 1,ASC(MID$(PS,P,1))
2800 PUT 1,P
2810 NEXT:CLOSE
2820 GOSUB190:GET 3,1:LSET SL$=MKIS(SL):LSET
SH$=MKIS(SH):LSET SN$=MKIS(SN):LSET SC$=MKIS(SC+1):LSET
ND$=MKIS(ND):LSET NM$=MKIS(NM):LSETDS$=MKIS(DS):PUT 3,1
2830 FIELD 3,255 AS ZM$:LSET ZM$=NW$:PUT 3,3:CLOSE
2840 RUN
```

End

*The BBS Express, 80 Micro's bulletin board system, is open 24 hours a day. Call us at 603-924-6985 to see the finished product. UART parameters are 300 baud, 7-bit words, one stop bit, and even parity.*

*You can reach J. Stewart Schneider and Charles E. Bowen either through their bulletin board at 606-739-6088 or c/o Saturday Software, P.O. Box 404, Catlettsburg, KY 41129.*

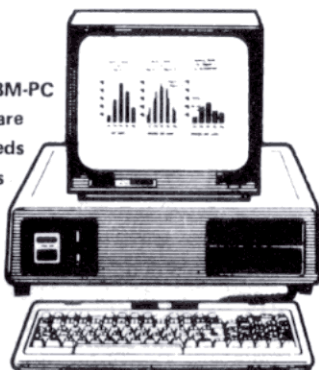
# Stevens' Computer Discount

# SALE

THE ULTRA-HIGH PERFORMANCE MS-DOS PERSONAL COMPUTER

**\$2295.00** Tandy 2000  
26-5103-5111

- More speed and storage than IBM-PC
- Choose from the hottest software
- User-Expandable for future needs
- 128K, two D/S D/D slim drives
- VM-1 green screen monitor



Graphics not included

We also have similar savings on all Radio Shack, Epson, Brother, C'itoh, 3M, Cardco, Hayes, Sanyo and much more

ORDER LINE

215-935-2006

SCD

P.O. Box 525  
Phoenixville, PA 19460

DCS

442

## PROGRAMMING TOOLS FOR YOUR TRS-80™

### INSTANT ASSEMBLER

The INSTANT ASSEMBLER is a powerful machine language development system for the TRS-80. One program contains the editor, assembler, and debugger. It allows you to assemble directly to memory and immediately debug your programs with the built-in single stepping debugger. Quickly switch from assembler to debugger and back again without losing the source code. This feature makes INSTANT ASSEMBLER an excellent learning tool for the beginner and a super fast development system for the experienced programmer. INSTANT ASSEMBLER has many other unique features. It detects syntax errors as source is entered and stores its source in a compressed format that uses only 40% as much memory as other assemblers. It is incredibly fast and will assemble 10K of object code in just 8 seconds. It will also create relocatable code modules that can be saved on disk or tape and linked together for very large or modular assemblies. INSTANT ASSEMBLER comes with a comprehensive 65 page instruction manual and is available in several versions for different machines. The CP/M version does not run on all machines so inquire before ordering.

TAPE INTASM 2.1 for Model 1 and 3 ..... \$39.95  
DISK INTASM 2.1 for Model 1 and 3 ..... \$49.95  
DISK INTASM 3.0 for Model 4 ..... \$69.95  
DISK INTASM 3.0 for CP/M ..... \$69.95

### INSIDE LEVEL II

This book is a comprehensive reference guide to the Model 1 and Model 3 ROMs which allows the machine language programmer to easily utilize the sophisticated routines they contain. Concisely explains set-ups, calling sequences, and variable passage for number conversion, arithmetic operations, and mathematical functions, as well as keyboard, tape, and video routines. In addition, the 18 chapters include a large body of other information useful to the programmer. 80 Micro said "The book has no flaws; it is a perfect gem." Byte Magazine said "I recommend this book to serious machine language programmers."

INSIDE LEVEL II ..... \$15.95

### DEMON DEBUGGER

DEMON (for Debugger and MONitor) is a sophisticated tool with which you can explore and debug machine language programs. The STEP mode has 19 different commands and will step through machine language programs one instruction at a time, showing you the address, hexadecimal value, Zilog mnemonic, register contents, and step count for each instruction. The MONITOR mode has 26 different commands including a labeling disassembler. DEMON is available on tape or disk and includes a comprehensive 40 page manual with many examples.

DEMON 1.0 for Model 1 and 3 ..... \$39.95  
DEMON 2.0 for Model 4 ..... \$39.95

### DISK INDEX

DISK INDEX will assemble an alphabetized index of every disk in your collection. Simply put each disk in the computer one after another, and DISK INDEX will quickly read the program names and free space left. It will recognize any DOS and disk density (except CP/M) and catalog disks for the Model 1, 3, and 4. The whole index or any selected part may be displayed on the screen or printed on paper in several different formats. Display modes include programs grouped by disk name, by program name, disks in order of decreasing free space, and by program showing the number of backup copies of each one. The index itself may be stored on disk for future access and update. A 48K machine will hold up to 255 disks or over 2000 programs in each file, and you can create as many files as you need. DISK INDEX comes with a comprehensive 28 page instruction manual.

DISK INDEX 3.2 for Model 1, 3, or 4 ..... \$39.95

### TELCOM

Mumford Micro offers two telecommunications programs. TELCOM I has most of the features needed to communicate with bulletin boards, time share systems, or for file transfers between two disk-based micros over modems or direct wire. It is menu driven and extremely simple to use. TELCOM II is an enhanced version of this program, which also supports the LYNC protocol which will automatically detect and correct errors in transmission. Files can be sent to or fetched from an unattended computer. The instruction manuals for both programs are available separately for \$5 to help you decide which program is best suited to your needs.

TELCOM I for Model 1, 3, or 4 ..... \$39.95  
TELCOM II for Model 1 or 3 ..... \$69.95

### MODEL I SPEED UP

The SK-2 is a hardware modification for the Model 1 that allows CPU speeds to be increased by 50% or 100%. Speeds may be changed with a toggle switch (not included) or on software command. It can also be configured to return to normal speed any time a disk is active. It mounts inside the keyboard unit with only 4 necessary connections and is easily removed if the computer ever needs service. The SK-2 has been field proven by 3 years of use, and comes fully assembled with socketed IC's.

SK-2 ..... \$29.95

ORDERING: Ten day money back guarantee. Include \$2.50 for postage and handling. California residents add 6% sales tax. Visa, MasterCard and COD orders accepted. SPECIFY MODEL NUMBER. Dealer inquiries invited.

## MUMFORD MICRO SYSTEMS

Box 400-E Summerland, California 93067 (805) 969-4557



## Power Problems?

SURGES!  
SPIKES!  
RF/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 and status lite. **\$89.95.**



**Quad Power Console**—6-stage transient absorber; dual 5-stage filter; common & differential mode protection; pico second response; clamping at 131V; four outlets; fused; master switch; 7' cord and status light. **\$75.95**



**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 and status lite. **\$44.95**

### LINE-SAVER™

Standby Uninterruptible Power System  
—Clean Reliable Power System—



**Model LS-240**—240 watts—VA capacity. Increased back-up time; 11 min. full load, 27 min. 1/2 load, 43 min. 1/3 load. 4-AC outlets, 3-staged transient protection; dual 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. **\$485.00**

Call or write for free literature.

Dealer inquiries invited.

### INSTANT ORDER LINE

800-524-0400 TWX 501-651-2101  
IN PENNA. 215-837-0700

**KALGLO®**

6584 Ruch Rd., Dept 80  
Bethlehem, PA 18107



PA Res. add 6% sales tax; for COD add \$3.00 + shipping & handling. All pre-paid SPIKE-SPIKER orders, freight allowed. All LINE-SAVER orders add \$10.00 shipping & handling.

485



# Arrays Make Data Input An Easy Deal

A Basic array is a list of related data items, either numbers or strings. You store related data under one variable name, and you usually delimit the number of items the array can accept. For instance, the array A(10) holds 10 data items in the array named A. A primary advantage of arrays is that they let you input large amounts of related data quickly.

## Numeric vs. String Arrays

Program Listing 1, Numeric Array, demonstrates how to set an array of numeric variables. It starts with a data statement (line 110) that contains the data the program loads into the array variables. Note the form: I've separated each number in the data statement with a comma.

The dimension statement (DIM) in line 120 creates an array with space for five variables. The program dimensions A to 5 to accommodate the five numbers in line 110.

Line 140 reads the data into array variables A(1)-A(5). To see this, run the program, then print A(1), A(2), and so on.

In Program Listing 2, String Array, the data statement in line 110 contains string data (text) rather than numbers. The strings in a data statement don't need quotation marks, as is necessary when you type in Z\$ = "PLUTO".

Line 115 clears 200 bytes for string storage. The Clear statement must come before the dimension statement. Always clear enough bytes to allow for the string space your program needs for arrays, string variables, and literals.

A string array variable must take the form A\$(X) unless you first estab-



lish it as a string with the DEFSTR statement.

## Rules to Remember

A data statement can be as long as your computer accepts (approximately 255 characters). If you run out of space, you can continue a data list on more data statement lines. Basic reads data sequentially, from left to right, from the lowest to the highest line numbers.

You can put data statements anywhere in a program, but you should put them at the beginning of the program for easy reference.

It's not essential that you dimension arrays containing fewer than 11 items, but I recommend including dimension statements for two reasons: You save memory by defining the limits of arrays and it's good programming practice.

The statement DIM A(10) sets up an 11-item array because arrays start with zero. In Listings 1 and 2, Basic sets numeric array A(0) to a zero value and string array A\$(0) to a null value.

In some programs you might not start with A(0) for reasons of consistency. For example, in the String

Array program in Listing 2, it makes sense to have the array subscript correspond to the month it represents. January is the first month, so you should start with A\$(1).

You can assign an array value with subscripts of zero to 10 without dimensioning an array or giving values to other subscripts in the array. For example, the statement A(10) = 10.5 is legal, even if the program doesn't dimension, read, or assign values to A(0)-A(9).

You can dimension several arrays with one DIM statement by using the form DIM A(50), B\$(Y), Z1(5). To re-dimension an array you must precede it with a Clear statement. Failure to do so results in a Redimensioned Array (DD) error.

A Bad Subscript (BS) error results from using subscripts outside the limits of the array. An Out of Data (OD) error occurs when Basic reads a value into an array without sufficient data. (For more information on error messages, refer to Basic Takes, November 1984, p. 158.)

Some programs read data lines more than once. This requires a Re-

## The Key Box

Models I, III, and 4  
Basic



★ **FREE SHIPPING** ★  
WITHIN CONTINENTAL 48 STATES  
ON PREPAID CASH ORDERS ONLY

**MICRO IMAGES**  
INDUSTRIES INC.

**MICRO IMAGES**  
INDUSTRIES INC.

**TRY US!**

**We've Made**  
**Retail Prices**  
**A Thing of the**  
**... PAST ...**

**Order Toll FREE**  
**1-800-223-1182**

THIS IS AN ORDER LINE ONLY!  
DIRECT ALL INQUIRIES AND  
N.Y. ORDERS TO:  
(718) 445-7124



**DISK SALE!**

**NASHUA** 5 1/4 S/S D/D Box 10 **17.95**  
**Verbatim** MD525 01 S/S D/D Box 10 **21.95**  
**Maxell** MD-1 S/S D/D Box 10 **21.95**

**\$69.95**  
**OMNITERM**

by Lindberg Systems  
Mdl I/III or IV

**\$109.95**  
**LAZYWRITER**

MDL I, III or IV  
SEE LAZY OPTIONS BELOW

**DOSPLUS**

Mdl I or III 3.5 . . . . **84.95**  
Mdl IVA . . . . . **129.95**  
Mdl II . . . . . **199.95**

**ELECTRIC**  
**WEBSTER**

W/Corr  
**\$118.95**

**DOTWRITER**

4.0 W/Letterset  
Mdl I/III or IV  
**\$84.95**

**NEWSSCRIPT**

Ver. 7.1  
**\$99.95**  
W/Label — \$109.95

**MAXI**

CRAS . . . . **74.95**  
MGR II . . . **149.95**  
STAT . . . **159.95**

**LE SCRIPT**

Mdl I/III or IV  
**\$108.95**

**DATAGRAPH**

Mdl I, III or IV  
**\$69.95**  
Pie Option—\$29.95

**COMPUERVE**  
**STARTER KIT**  
with 5 Free Hours  
**\$33.95**

**TALLY**  
**MASTER**  
Mdl I or III  
**\$59.95**

**MULTIDOS**  
Specify Mdl I or III  
Single or Double Density  
**\$49.95**

**MZAL**  
REL III  
**\$74.95**

**FLIP N' FILE**  
Original-50 Disk  
**\$19.95**

**COPYART II**  
Mdl I or III  
**\$84.95**  
SPECIFY PRINTER

**EPSON PRINTERS**  
**CALL**  
**FOR BEST PRICES**

**LETTER QUALITY**  
**PRINTERS**  
**DYNAX & TTX**  
**CALL FOR BEST PRICES**

**PROSOFT UTILITIES**

**TRASHMAN** - Model I or III . . . . **\$34.95**  
**FASTER** - Model I or III . . . . **26.95**  
**RPM** - Model I or III . . . . **21.95**

**LAZY OPTIONS**

**LAZY FONT (Epson)** . . . . **44.95**  
**LAZY MERGE** . . . . **39.95**  
**LAZY DOC** . . . . **49.95**  
**LAZY Draw, Do, Tab, Calc** . . . **34.95**

**MAIL LIST PROGRAMS**

**POWER MAIL PLUS-Mdl 2/12/16** . . **129.95**  
**POWER MAIL PLUS-Mdl I/III** . . **129.95**  
**POSTMAN MASS MAIL-Mdl I/III** . . **74.95**  
**MAXI MAIL-Model III** . . . . **64.95**

**Z BASIC - MDL I/III** . . . . **79.95**

**MICROTERM - Model I or III** . . . **69.95**

**TZAL - Model III Tape** . . . . **39.95**

**BASIC EDITOR - Model I/III Tape** . **24.95**

**MAS 80 Acctg System**  
Integrated G/L, A/R, A/P & Ck Reg.

Retail \$599.00 **SPECIAL \$399.00**  
Overview — \$5.00 Credited on Purchase

**EPSON PRINTERS . . . . CALL FOR BEST PRICES!**  
**TABCO PAR. DUAL PRINTER SWITCH** . . **69.95**  
**MICRO BUFFER** by Practical 16K Parallel or 8K Serial **139.95**  
**NETWORK 4 PLUG SURGE PROTECTOR** . **59.95**

**PRINTER STANDS**



**SPACE AGE**

**MX 80 No Frills**  
**MX80 Space Age**  
**Microline 82A Space Age**  
**Microline 83A Space Age**  
**NEC 8023A Space Age**  
**MX100 Space Age**  
**Multituse: 18x12x6x1/4**  
**No Frills 132 Col. w/slot**  
**Gorilla Banana**  
**FX80 Space Age**  
**FX100 Space Age**

**NO FRILLS**

Clear **14.95** Bronze **19.95**  
Clear **27.50** Bronze **29.95**  
Clear **27.50** Bronze **29.95**  
Clear **34.95** Bronze **39.95**  
Clear **27.50** Bronze **29.95**  
Clear **34.95** Bronze **39.95**  
Clear **24.95** Bronze **N/A**  
Clear **N/A** Bronze **24.95**  
Clear **N/A** Bronze **19.95**  
Clear **N/A** Bronze **34.95**  
Clear **N/A** Bronze **44.95**

WE HAVE A STAND FOR MOST PRINTERS

**Visit Our Retail Location**  
**WHEN IN THE NEW YORK AREA**

Write or reader service for your free catalog

**RIBBONS**  
**ZIP BOX RELOADS**

	1/2 Doz.	Doz.
Epson MX 70/80-20 Yds	24.00	42.00
Epson MX 100-30 Yds.	30.00	51.00
NEC/Prowriter-14 Yds.	21.00	36.00
Centronics 730/737/739/779 or LP-I/III/IV-16 Yds.	18.00	33.00

All ZIP BOXES are individually sealed black nylon and require no rewinding. Epson Reloads also available in red, blue, brown, green & purple. Any mix allowed

**CARTRIDGES**

	Each	Doz.
Epson MX70/80	7.00	60.00
Epson MX100	10.00	108.00
Prowriter 8510 & Nec 8023A	7.50	75.00
RS LP III/IV	6.50	66.00
RS LP VI/VIII	6.50	66.00
RS DSY WH II or DWP 410 Multi	6.00	66.00
RS DSY WH II - Nylon	6.50	69.00
RS DMP 2100 - Toshiba 1350	9.00	96.00
MICROLINE 80/82A/83A/92	N/A	30.00
MICROLINE 84 1/2 x 40 Yds	5.50	60.00
ANADEx - 9000 Series	10.00	108.00
Diablo Hytype II-Multi Strike	5.50	54.00
Diablo Hytype II - Nylon	6.00	60.00
Qume-Multi Strike	N/A	36.00
NEC—5500/7700-Multi Strike	6.00	60.00
Mannesman Tally 1000	6.50	66.00
TTX 1014	8.00	90.00
Brother HR I (Film)	5.50	60.00
Silver Reed Ex55/77 (Film)	6.50	66.00
Wang System 5	5.00	48.00
Xerox 6/0/620 Memorywriter-Multi	7.00	75.00
IBM DisplayWriter-Multi	8.00	84.00

Note: All cartridges black only  
Minimum order 3 cartridges any mix. For smaller quantities, add \$1.50 per order. All our reloads and cartridges are manufactured by one of the oldest and most reputable ribbon manufacturers in the country

—QUALITY GUARANTEED—

**Micro Images Industries Inc.**

164-06 Crocheron Ave. Dept. L  
Flushing, N.Y. 11358  
(718) 445-7124

HOURS: Mon.-Thurs. 10AM-6PM; Fri. & Sat. 10AM-5PM

VISA

157



**ORDERING INFORMATION**

COD Orders add \$2.00 Minimum credit card order \$25.00 FREE shipping on all prepaid cash orders within the continental 48 states via UPS Ground. Actual shipping and insurance charges apply on all COD orders, credit card orders, approved P/O's and shipments outside the continental 48 states. Certified Ck, M/O, COD and credit cards shipped immediately. Please allow 2 weeks for personal checks. Credit card orders shipped to card address only. Prices subject to change without notice. New York State residents please add appropriate sales tax



Program Listing 1. Numeric Array program.

```
100 REM * NUMERIC ARRAY * LISTING NO. 1 *
110 DATA 10,6,9,23,15
120 DIM A(5)
130 FOR X=1 TO 5
140 READ A(X)
150 NEXT X
160 END
```

End

Program Listing 2. String Array program.

```
100 REM * STRING ARRAY * LISTING NO. 2 *
110 DATA JAN,FEB,MAR,APR,MAY
120 DIM A$(5)
130 FOR X=1 TO 5
140 READ A$(X)
150 NEXT X
160 END
```

End

Program Listing 3. Template program.

```
100 REM * TEMPLATE * LISTING NO. 3 *
110 DIM A(5)
120 FOR X=1 TO 5
130 REM * THIS LINE MUST BE REPLACED
135 A(X)=X
140 NEXT
150 END
```

End

Program Listing 4. Dimension by Variable program.

```
100 REM * DIMENSIONING BY VARIABLE * LISTING NO. 4
110 CLS
120 INPUT "HOW MANY ITEMS IN ARRAY LIST";X
130 DIM A(X)
140 FOR C=1 TO X
150 PRINT "VALUE NUMBER"C
160 INPUT Z
170 A(C)=Z
180 NEXT C
190 END
```

End

Program Listing 5. Coin Toss program.

```
100 REM * COIN TOSS * LISTING NO. 5 *
110 DIM P(2)
120 FOR X=1 TO 10
130 T=RND(2)
140 REM * MODEL 100, MAKE ABOVE LINE: 130 T=INT(1+RND(1)*2)
150 P(T)=P(T)+1
160 NEXT X
170 PRINT
180 PRINT "SCORE: HEADS:"P(1) " TAILS:"P(2)
190 END
```

End

Program Listing 6. Card Dealer Program.

```
100 REM * CARD DEALER * LISTING NO. 6 *
110 CLEAR 500
120 DIM A$(52)
130 RANDOM
140 REM * MODEL 100, MAKE ABOVE LINE: 130 V=VAL(RIGHT$(TIME$,2)):
FOR T=1 TO V: G=RND(1): NEXT T
150 B=1
160 S$="CDHS"
170 R$="A23456789TJQK"
```

Listing 6 continued

## Card Dealer uses arrays to simulate dealing a deck of cards.

store statement to set the data pointer back to the first item in the data list and prevent an OD error.

At the location in the program where you want the pointer to move to the start of the first data line, type RESTORE.

In a program with data on lines 110 and 120, you can type in RESTORE 120 to set the data pointer to the start of line 120 (Model 4 only).

### Programming Techniques

Template, in Program Listing 3, demonstrates another way to establish a numeric array. Type in the listing, then type in 130 A(X)=X. This picks up the incremented value of X and passes it to array variable A(X).

Now substitute INPUT "VALUE"; A(X) for line 130. The program waits for you to input a numeric value and press the enter key.

Here's a change for the Models I and III: 130 A(X)=RND(100). This line provides random input, and is useful in programs that check varied outcomes using the same set of random values.

Dimensioning by Variable, in Program Listing 4, lets you input the dimension of the program array. Line 120 prompts you to set the number of array subscripts. Input 10, and line 130 becomes DIM A(10). The For... Next loop in lines 140-180 lets you set values for A(1)-A(10).

Coin Toss, in Program Listing 5, tests probability against results and shows how array values can change during a program run. P(1) is player 1, who wants heads, and P(2) is player 2, who wants tails.

The For...Next loop in lines 120-160 tosses the coin 10 times. Line 130 generates random output. If it outputs a 1, line 150 increments the P(1) score by 1. If it produces a 2, the program adds 1 to P(2). Line 180 prints the ending scores.

Program Listing 6, Card Dealer, uses arrays to simulate dealing a deck of cards. Line 110 clears 500 bytes. Line 120 reseeds the random number

generator, and in line 150 B = 1 represents the first card in the unshuffled deck.

Line 160 contains the suits: clubs (C), diamonds (D), hearts (H), and spades (S), and line 170 contains the 13 card ranks.

The suit loop (S) starts in line 180 and the rank loop (R) starts in line 190. The four suits and 13 ranks give a total of 52 cards. Line 200 makes the card into the appropriate midstring values of rank (R\$) plus suit (S\$). Line 210 increments B by 1 to set up creation of the next card.

The random dealing routine is in the For...Next loop in lines 230-290. Line 230 starts the loop from 1-52 to ensure that all cards are dealt. Line 260 checks the array string to see if it's already dealt (equal to a dash). If so, the program returns to line 240 for another random number.

Line 270 prints the card chosen, and line 280 changes the array variable to a dash so the program doesn't pick it up again. The program displays the cards in the order they're dealt. Run Card Dealer again and they appear in a different order. This program is a good foundation for creating a card game program.

## Multiple-Dimension Arrays

So far I've discussed only single-dimension arrays. Array variable A(4,4,4) is an example of a three-dimensional array representing width, height, and depth. Such an array might be useful in representing Rubik's cube (although it assumes the puzzle has internal cubes).

As a demonstration of multiple arrays, Annual Profit/Loss in Program Listing 7 uses a double-dimensioned array to figure year-end profits or losses.

The months given as data in lines 110-120 become the values of B\$(1)-B\$(12) in line 160. The DIM statement in line 140 establishes a numeric array, A(12,2), 26 variables, and a string array, B\$(12).

Note the mix of string and numeric arrays. In A(12,2), the 12 establishes a row for each month, and the 2 establishes columns for monthly income and expense figures.

The For...Next loop in lines 150-170 reads the months into the B\$(X) array. The loop in lines 180-260 prints the name of the month and leads into

### Listing 6 continued

```
180 FOR S=1 TO 4
190 FOR R=1 TO 13
200 A$(B)=MID$(R$,R,1)+MID$(S$,S,1)
210 B=B+1
220 NEXT R,S
230 FOR X=1 TO 52
240 C=RND(52)
250 REM * MODEL 100, CHANGE LINE 240 TO 240 C=INT(1+RND(1)*52)
260 IF A$(C)="-" THEN 240
270 PRINT A$(C); " ";
280 A$(C)="-"
290 NEXT X
300 END
```

End

### Program Listing 7. Annual Profit/Loss program.

```
100 REM* ANNUAL PROFIT/LOSS * LISTING NO. 7 *
110 DATA JANUARY,FEBRUARY,MARCH,APRIL,MAY,JUNE,JULY
120 DATA AUGUST,SEPTEMBER,OCTOBER,NOVEMBER,DECEMBER
130 CLS
140 DIM A(12,2), B$(12)
150 FOR B=1 TO 12
160 READ B$(B)
170 NEXT
180 FOR B=1 TO 12
190 PRINT B$(B) " REPORT"
200 PRINT
210 FOR C=1 TO 2
220 IF C=1 THEN INPUT "INCOME";M ELSE INPUT "EXPENSES";M
230 A(B,C)=M
240 NEXT C
250 CLS
260 NEXT B
270 CLS
280 PRINT "PRESS A KEY TO SEE NEXT ENTRY."
290 PRINT "ANNUAL RESULT"
300 PRINT "MONTH";TAB(10);"INCOME";TAB(20);"EXPENSES";TAB(30);
"PROFIT"
310 PRINT STRING$(39,"-")
320 FOR B=1 TO 12
330 T=A(B,1)-A(B,2)
340 PRINT B$(B)TAB(10);A(B,1);TAB(20);A(B,2);TAB(30);T
350 V=V+T
360 Z$=INKEY$
370 IF Z$="" THEN 360
380 NEXT B
390 PRINT TAB(25);"TOTAL";V
400 END
```

End

a loop within a loop in lines 210-240. If the C equals 1, the program inputs income; if it equals 2, the program inputs expenses.

January's income variable is A(1,1) and its expense variable is A(1,2). The subscripts continue to A(12,1) for income and A(12,2) for expenses for December.

Line 230 makes the array variable worth the value you input for M. (You can combine lines 220-230 by substituting A(B,C) for M in line 230 and deleting line 230.)

The second part of the program prints the results, month by month, as well as the month's profit/loss total. The program obtains the results by subtracting each month's expenses from profits (line 330).

Line 340 displays the information, line 350 increments V by the month's total, and line 390 displays the yearly total.

You can use triple- or even quadruple-dimensional arrays. Multiple-dimensional arrays use up memory, however. A 4-by-4-by-4-dimension array sets aside space for 64 variables.

## Next Month

Next month's topic is streamlining programs. Call it packing, call it crunching, it's all about how to make programs shorter and faster. See you then. ■

*You can reach Richard Ramella at 1493 Mt. View Ave., Chico, CA 95926.*



# Teaching Old Basic New Tricks

One of the most fascinating aspects of computer languages like Lisp, Logo, and Forth is that they aren't completely defined; you can customize them to suit your needs. The longer you use them, the more functions your implementation of the language has. The computer constantly "learns" new commands as you program.

Model I/III Basic, on the other hand, seems set in cement because most of its code, as well as Disk Basic's, is stored in unchangeable ROM. Whenever you type in NEW, RUN, or CLEAR, the computer forgets everything you've done and starts with a clean slate. But Basic really isn't set in cement; you can make changes to it. Several commercial products are available that let you extend TRS-80 Basic with new commands. You can also add your own commands to Basic to make it do whatever you want.

During the next few months, I'll describe ways you can add commands to Basic. This month I'll explain some of the fundamental concepts; in future columns I'll include some specific commands as well as methods for hooking them into the Basic interpreter.

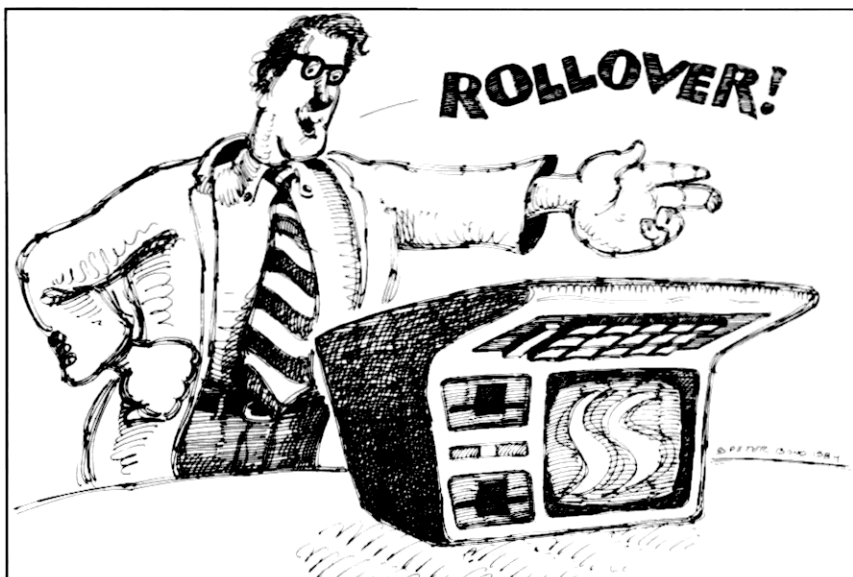


Illustration by Peter Bono

## Basic's Structure

As you'd expect from any large program, the TRS-80's ROM Basic is well-organized. When you run a program, the Basic interpreter begins executing each command with the HL register pointing to the last byte that the computer parsed and executed. The interpreter then skips over spaces, tabs, and line feeds to find the next byte in the program, which it places in

the A register and uses to determine its next action.

Every Basic command is free to use the Z80's registers as necessary as long as it leaves the correct values in HL and AF and restores the stack when finished. Also, the computer executes every Basic command as a subroutine, and each command ends with a RET instruction unless it discovers a program error. You can write your own Model I/III Basic commands as long as they have the structure of a subroutine. In fact, you can do this in several ways.

The real challenge isn't writing new commands, it's finding an appropriate way to hook them into the Basic interpreter. There are four general solutions. You can substitute a new command for a Disk Basic verb, tack one on to the end of a Disk Basic verb as a new syntax form, link one through a DOS exit vector, or (my favorite) hook one into Basic's command interpreter.

## Making the Changes

The Table lists the 3-byte vector addresses for each Disk Basic command

Key Word	Hex Address	Key Word	Hex Address
CVI	4152	FIELD	417C
FN	4155	GET	417F
CVS	4158	PUT	4182
DEF	415B	CLOSE	4185
CVD	415E	LOAD	4188
EOF	4161	MERGE	418B
LOC	4164	NAME	418E
LOF	4167	KILL	4191
MKIS	416A	&	4194
MKSS	416D	LSET	4197
MKDS	4170	RSET	419A
CMD	4173	INSTR	419D
TIMES	4176	SAVE	41A0
OPEN	4179	LINE	41A3

Table. Addresses of the 3-byte vectors for each Disk Basic keyword.

and function. When you use Cassette Basic, it loads each vector with a JP instruction to the L3 error routine (the only exception is that the Model III uses TIME\$).

When you run Disk Basic, it loads each vector with a JP instruction to a routine that supports its command or function. You can replace any Disk Basic verb with a new routine by changing the vector's jump address; if you do so, of course, the original function no longer works.

Program Listing 1 demonstrates this technique; the program turns the Disk Basic Name command into a beep command, and produces a short tone through the cassette port or through the internal speaker of a Model 4 in Model III mode (see line 160 for the change for the Model III mode).

Along with the other listings this month, Listing 1 is an example rather than a working program. The new routine sits in the middle of unprotected memory and bombs if Basic overwrites it. (I'll discuss loading and protecting techniques in a future column.)

You can load Listing 1 from DOS Ready and then enter Disk Basic, or load it once you enter Disk Basic. Then use the DEFUSR command shown in the comments to hook the routine to Basic. Whenever the interpreter comes across the command Name, it will produce a beep and then continue normally. Since the new routine doesn't require any parameters, it doesn't have to worry about updating the HL register; it merely maintains the value that Basic put there.

Three problems accompany replacing a Disk Basic command with a new routine. First, unless you're using Cassette Basic, you have to give up a function to get a new one. Second, the name you choose for the routine generally has no relationship to its new function. And third, only a limited number of Disk Basic commands are available; if you want to establish a full set of new commands, you'll quickly run out of possible hooks.

## The Key Box

Model III  
Assembly Language  
Editor/Assembler



Program Listing 1. Demonstration showing how to replace Disk Basic verbs by changing the vector's JP address.

```

00010 ;Demonstration Routine #1
00020 ;
00030 ;Use of the NAME command in Basic will create
00040 ;a "beep" from the cassette port (or Model 4
00050 ;internal speaker). Disconnects the normal
00060 ;NAME command if your Disk Basic uses it.
00070 ;
00080 ;To initialize:
00090 ; Load from DOS Ready, then enter Basic.
00100 ; Type "DEFUSR = &HA000: A=USR(0)"
00110 ; Then test by typing NAME.
00120 ;
418E 00130 NAME EQU 418EH ;Addr. of NAME vector
0080 00140 TONE EQU 80H ;Change if needed
0080 00150 LENGTH EQU 80H ;Change if needed
00FF 00160 PORT EQU 0FFH ;Use Port 90H for
; Mod 4 in Model III mode
00170 ;
00180 ; Initialization Section:
A000 00190 ORG 0A000H ;Pick convenient addr.
A000 3EC3 00200 BEGIN LD A,0C3H ;Jump instruction in A
A002 210CA0 00210 LD HL,START ;Get routine address
A005 328E41 00220 LD (NAME),A ;Put JP in place
A008 228F41 00230 LD (NAME+1),HL ;Put addr. in place
A00B C9 00240 RET ;Return from USR call
00250 ;
00260 ; Beep Routine called by NAME:
A00C 1680 00270 START LD D,TONE ;Tone and length
A00E 1E80 00280 LD E,LENGTH ; into DE
A010 0EFF 00290 LD C,PORT ;Output port in C
A012 3E02 00300 LD A,2 ;Toggle sound off
A014 F3 00310 DI ;Interrupts off for tone
00320 ;
A015 3D 00330 SNDON DEC A ;A = 1
A016 ED79 00340 OUT (C),A ;Send it out
A018 42 00350 LD B,D ;Get count
A019 10FE 00360 DJNZ $ ;And wait 1/2 cycle
00370 ;
A01B 3C 00380 SNOFF INC A ;A = 2
A01C ED79 00390 OUT (C),A ;Send it out
A01E 42 00400 LD B,D ;Get count
A01F 10FE 00410 DJNZ $ ;And wait 1/2 cycle
00420 ;
A021 1D 00430 DEC E ;Drop length count
A022 20F1 00440 JR NZ,SNDON ;Repeat until done
A024 AF 00450 XOR A ;A = 0
A025 ED79 00460 OUT (C),A ;Turn off cassette port
A027 FB 00470 EI ;Interrupts back on
A028 C9 00480 RET ;Return to interpreter
00490 ;
A000 00500 END BEGIN
00000 TOTAL ERRORS
16670 TEXT AREA BYTES LEFT

```

End

Program Listing 2. Demonstration showing how to create the simple beep generator as a Disk Basic verb followed by an exclamation point.

```

00100 ;Demonstration Routine #2
00110 ;
00120 ;Use of CMD! will create a "beep"
00130 ;from the cassette port (or Model 4
00140 ;internal speaker). Does not disturb normal
00150 ;CMD uses.
00160 ;
00170 ;To initialize:
00180 ; Load from DOS Ready, then Enter Basic
00190 ; Type "DEFUSR = &HA000: A=USR(0)"
00200 ; Test by typing CMD!
00210 ;
4173 00220 CMD EQU 4173H ;Vector addresses
0080 00230 TONE EQU 80H ;Change if needed
0080 00240 LENGTH EQU 80H ;Change if needed
00FF 00250 PORT EQU 0FFH ;Use Port 90H for
; Mod 4 internal spkr
00260 ;
00270 ;
00280 ; Initialization Section:
A000 00290 ORG 0A000H ;Pick convenient addr.
A000 2A7441 00300 BEGIN LD HL,(CMD+1) ;Get orig. addr.
A003 2215A0 00310 LD (ORIG+1),HL ;Stuff address
A006 210DA0 00320 LD HL,START ;Get new addr.
A009 227441 00330 LD (CMD+1),HL ;Sub ours for orig
A00C C9 00340 RET ;Return from USR
00350 ;
00360 ; Beep Routine called by CMD!
A00D F5 00370 START PUSH AF ;Save status flags
A00E 7E 00380 LD A,(HL) ;Get value
A00F FE21 00390 CP '!' ;Time to beep?
A011 2804 00400 JR Z,YES ;Go if yes
00410 ;
A013 F1 00420 POP AF ;Else recover status
A014 C30000 00430 JP $-$ ;Go to orig. routine
00440 ;
A017 118000 00450 YES LD DE,TONE<8+LENGTH ;Tone and len. to DE
A01A 0EFF 00460 LD C,PORT ;Port to C
A01C 3E02 00470 LD A,2 ;Toggle sound off

```

Listing 2 continued



## Listing 2 continued

```

A01E F3      00480      DI                      ;Don't interrupt beep
A01F 3D      00490      ;
A020 ED79    00500      SNDON DEC A              ;A = 1
A022 42      00510      OUT (C),A              ;Send it out
A023 10FE    00520      LD B,D                 ;Get count
A024 3C      00530      DJNZ $                 ;Wait 1/2 cycle
A025 3C      00540      ;
A026 ED79    00550      SNDON INC A              ;A = 2
A028 42      00560      OUT (C),A              ;Send it out
A029 10FE    00570      LD B,D                 ;Get count
A030 3C      00580      DJNZ $                 ;Wait 1/2 cycle
A031 1D      00590      ;
A032 20F1    00600      DEC E                  ;Drop length count
A033 AF      00610      JR NZ,SNDON            ;Loop until done
A034 ED79    00620      XOR A                  ;A = 0
A035 FB      00630      OUT (C),A              ;Turn off port
A036 10FE    00640      EI                     ;Interrupts back on
A037 1D      00650      ;
A038 20F1    00660      POP DE                 ;Restore stack
A039 20F1    00670      INC HL                 ;HL=>Char after "!"
A040 C9      00680      RET                     ;Return to interpreter
A041 0000    00690      END BEGIN
00000 TOTAL ERRORS
16535 TEXT AREA BYTES LEFT

```

End

## Program Listing 3. Demonstration showing how to add a beep function to Disk Basic by interrupting the Basic interpreter as it starts to parse a command.

```

00010 ;Demonstration Routine #3
00020 ;
00030 ;Use of a '!' will create a "beep"
00040 ;from the cassette port (or Model 4
00050 ;internal speaker). Operates by intercepting
00060 ;control from Basic's command interpreter.
00070 ;
00080 ;To initialize:
00090 ; Load from DOS Ready, then enter Basic.
00100 ; Type "DEFUSR = &HA000: A=USR(0)"
00110 ; Test by typing !
00120 ;
4003 00130 INTERP EQU 4003H ;Interpreter link
0080 00140 TONE EQU 80H ;Change if needed
0080 00150 LENGTH EQU 80H ;Change if needed
00FF 00160 PORT EQU 0FFH ;Use Port 90H for
; Mod 4 internal spkr
00170 ;
00180 ;
00190 ; Initialization Section:
00200 ;
00210 ;ORG 0A000H ;Pick convenient addr
A000 00220 BEGIN LD HL,(INTERP+1) ;Get orig. addr.
A003 00230 LD HL,(ORIG+1),HL ;Stuff into program
A006 00240 LD HL,START ;Get our address
A009 00250 LD HL,(INTERP+1),HL ;Sub ours for orig.
A00C C9 00260 RET ;Return from USR
;
00270 ; Beep Routine:
A00D E3 00280 START EX (SP),HL ;Get top of stack
A00E 7D 00290 LD A,L ;Get lsb of return addr.
A00F FE5B 00300 CP 5BH ; and test it
A011 2003 00310 JR NZ,NO ;Go if not xx5BH
A013 7C 00320 LD A,H ;Get msb of return addr.
A014 FE1D 00330 CP 1DH ; and test it
A016 E3 00340 NO EX (SP),HL ;Restore stack & HL
A017 C20000 00350 JP NZ,$-$ ;Go if wrong return addr.
;
A01A CD781D 00370 CALL 1D78H ;Get next character
A01D FE21 00380 CP '!' ;Beep requested?
A01F 2003 00390 JR Z,YES ;Go if it is
A021 2B 00400 DEC HL ;Else fix HL
A022 10F3 00410 JR ORIG ;And leave
;
00420 ;
00430 ;"! Was found
A024 110000 00440 YES LD DE,TONE<8+LENGTH ;Tone and len. in DE
A027 00FF 00450 LD C,PORT ;Port address to C
A029 3E02 00460 LD A,2 ;Toggle for off
A02B F3 00470 DI ;Don't interrupt beep
;
A02C 3D 00480 ;
A02D ED79 00490 SNDON DEC A ;A = 1
A02F 42 00500 OUT (C),A ;Send it out
A030 10FE 00510 LD B,D ;Get tone count
A031 3C 00520 DJNZ $ ;Wait 1/2 cycle
;
A032 3C 00530 ;
A033 ED79 00540 SNDON INC A ;A = 2
A035 42 00550 OUT (C),A ;Send it out
A036 10FE 00560 LD B,D ;Get tone count
A037 3C 00570 DJNZ $ ;Wait 1/2 cycle
;
A038 1D 00580 ;
A039 20F1 00590 DEC E ;Drop length count
A03B AF 00600 JR NZ,SNDON ;Loop until done
A03C ED79 00610 XOR A ;A = 0
A03E FB 00620 OUT (C),A ;Turn off port
;
A03F 23 00630 EI ;Interrupts back on
;
A040 C9 00640 INC HL ;Point to char after !
A041 0000 00650 RET ;Return to interpreter
A042 0000 00660 END BEGIN
00000 TOTAL ERRORS
16253 TEXT AREA BYTES LEFT

```

End

*It doesn't matter which Disk Basic command you choose; the idea is to create a new syntax that would normally be impossible.*

Another technique is to add to the syntax of an existing Disk Basic command. It doesn't matter which Disk Basic command you choose, although CMD is the most likely candidate. The idea is to create a new syntax that would normally be impossible.

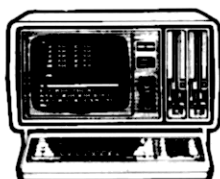
Program Listing 2 shows how you can create the simple beep generator as "CMD!" (or almost any other Disk Basic verb followed by an exclamation mark). However, this technique only works if you pick a Basic command normally used as the first or the only command in a Basic function. Don't try to use commands like INSTR that can only occur after an equals sign.

Written this way, the new command is essentially a filter. When the program invokes the Disk Basic verb associated with the command, it checks to see if the next character(s) is part of the new syntax. If not, control passes to the regular routine for that Basic verb. If you're invoking the new routine, it performs its operations, sets HL properly, and uses a Return instruction to get back to the normal flow of Basic.

Listings 1 and 2 differ in two important ways. First, the initialization section of Listing 2 doesn't destroy the original address in the CMD vector; instead, the program saves that address (at ORIG + 1 in line 430) so that it can jump to DOS's CMD routine when a command other than "CMD!" is interrupted.

Second, the body of the beep routine starts by saving the AF registers on the stack (line 370). Before the interpreter calls a Basic command, the computer processes the character following the command token (the 1-byte representation of the command verb). Basic points the HL register to that next byte, then sets the status flags to indicate whether the byte is a colon (Z

# TRS-80 DISCOUNT



**Computers  
at Guaranteed  
Low Prices\***

**ATON CP/M FOR 11, 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 ✓ 539

Calif. Res. Call 619-244-6883

## POWER HUNGRY?

Inside your TRS-80 Model 4  
is immense POWER  
fighting to get out.  
**SUPERMOD4 frees it!**

### YOU CAN COMMAND THE POWER

If you own a Model 4, and use a Model 3 DOS,  
you can now command a **SUPERCOMPUTER**.

**SUPERMOD4 BRINGS POWER TO YOUR VIDEO** with 80x24, 40x24,  
64x16 and 32x16 video formats, reverse video, up to 24 line scroll  
protect and more. And this is total power: all video control  
commands (print@, tab(), set, reset, point etc.) get the power

**SUPERMOD4 BRINGS POWER TO YOUR KEYBOARD**, the power of  
an audible keylock for accurate typing, the power of easily  
programmable special function keys.

**SUPERMOD4 BRINGS POWER TO YOUR PRINTER**. With its 14K print  
spooler, you can print while your computer does something else.  
You can also send unaltered graphics codes to your printer.

**SUPERMOD4 BRINGS YOU THE POWER OF SPEED**. Using the 4MHz  
CPU clock, all your software runs twice as fast — but not out of  
control. SUPERMOD4 makes sure that the realtime clock and similar  
operations work correctly.

**SUPERMOD4 HAS THE POWER OF INVISIBILITY**. SUPERMOD4 is  
100% software, but all you see is the power, not the program.  
SUPERMOD4 uses NO USER MEMORY! All the powers touch not  
one byte of your memory.

**SUPERMOD4 HAS THE POWER OF INTELLIGENCE**. It knows how to  
do its job, it doesn't need any software or hardware patches. All  
SUPERMOD4 needs is a Model 4 running any Model 3 DOS. It  
works with all software that use the normal I/O drivers.

You control the POWER: select the ones you want,  
and have them work your way.

SUPERMOD4 is so powerful, only a few of its abilities have  
been revealed here. To learn more, send for details.

What is the price of power? Only \$49<sup>95</sup>

Special Introductory Price

Also available: RAMDISK for NEWDOS/80 on the Models 1, 3 and 4.  
Use extra memory as a superfast disk drive. Send for details.



Intelligent Technologies Corp.  
21 Campbell Drive  
Dix Hills, New York 11746

(516) 462-6970 Ext. 8

✓ 148

Terms: checks, money orders or C.O.D. • free shipping in cont. U.S. • N.Y.S. res. add sales tax



## DISKETTES

**\$18.50 ss/DD**

(10 Disks/Box)

5 1/4" SS/DD ..... \$18.50  
5 1/4" DS/DD ..... \$23.50

Ribbon Description	Price Each
APPLE DOT MATRIX ..... (Same as NEC8023)	\$4.29
C.I.TOH PROWRITER 1550-8510 ..... (Same as NEC8023)	\$4.29
EPSON MX 70/80, F & R SERIES RIBBON CARTRIDGE .....	\$3.85
EPSON MX 100 RIBBON CARTRIDGE .....	\$4.99
NEC 8023 .....	\$4.29
OKIDATA 80/82/83/92/93 .....	\$1.85
OKIDATA 84/94 .....	\$2.99

**Satisfaction Guaranteed Since 1967**

**Call (415) 778-2595**

**or write:**

**Argonaut Distributing**  
1104 Buchanan Road #80  
Antioch, CA 94509

Visa/MC/Prepaid — \$3.00 shipping  
C.O.D. Orders — \$4.50 shipping

Authorized Distributor  
Information Processing Products



# Graphics Solutions

## High-Resolution Software and Hardware

**Radio Shack Model 4/4P/III hi-res board owners: GBASIC 3.0.** This enhanced version of Graphics Basic provides an equivalent for all of the Radio Shack commands as well as adding a number of important new ones. The hi-res screen can be printed on any of 20 popular printers or saved or loaded to disk without leaving Basic. The software works with TRSDOS, LDOS, NEWDOS80, and DOSPLUS and uses 1400 bytes less memory. The disk comes with over 40 graphics related programs and a detailed manual which includes entry addresses for interfacing to assembly language. GBASIC 3.0 is required in order to run any of the following programs. \$49.95.

The following eight programs run on a Model 4/4P/III equipped with a Micro-Labs or Radio Shack graphics board:

**DRAW** - A sophisticated full screen graphics drawing and editing program. \$39.95.

**BIZGRAPH** - Create business graphs from hand-entered or Visicalc data. \$98.00.

**LET'S WRITE MUSIC** - An editor which lets you display and print music. \$49.95.

**3D-PLOT** - View three-dimensional data from any perspective or angle. \$39.95.

**MATHPLOT** - Plot equations of the form  $Y=F(X)$  with auto scaling. \$39.95.

**SURFACE PLOT** - Plot three-dimensional equations of the form  $Z=F(X,Y)$ . \$39.95

**BIO RHYTHM & USA** - Chart your biorhythm or learn the states and capitols. \$24.00

**GRAFYX SOLUTION.** Plug-in, clip-on board enhances any Model 4/III to provide 640 x 240 / 512 x 192 dot graphics. Comes with over 40 programs/files including Graphics Basic 3.0 which adds over 20 new commands. \$199.95.

**80-GRAFIX.** Plug-in, clip-on board upgrades any Model III/I to provide 128 user-definable characters. Comes with over 20 programs/files. \$99.95.

**JOY-MOUSE.** Allows a Radio Shack Color Computer joystick and mouse to be connected to any Model 4/4P/III. Hardware provides X, Y position values from 0 to 255. A built-in speaker produces sound from the cassette port. \$99.95.



**G.I.N.A.** Software program for the Model 4/4P/III/I which uses the standard block graphics screen to display a window to a larger 65536 x 65536 dot tablet. The arrow keys are used to draw two or three-dimensional figures. The display can be scaled, shifted, or rotated in any dimension. The final picture is printed in hi-res on Radio Shack, Epson, NEC 8023, or Prowriter printers. \$98.00.

Please specify your exact system configuration when ordering or requesting information. Payment may be by check, COD, or Visa/MC. Domestic shipping is free on pre-paid or COD orders. (Texas residents add 5% sales tax.) ✓ 464

**MICRO-LABS, INC.** 214-235-0915  
902 Pinecrest, Richardson, Texas 75080



flag set), numeric (C flag set) or neither (NZ and NC set).

Many routines start by examining the flags as a first check for correct syntax. If the flags were not correctly restored in line 420, the normal CMD processor would likely report a syntax or type mismatch error.

Program Listing 3 shows a third way to add a beep function to Disk Basic. The program works by interrupting the Basic interpreter as it starts to parse a command. If it finds your special command, the program executes it; otherwise control passes to the normal Basic interpreter.

Basic begins parsing and executing each command in ROM at 1D5A hexadecimal (hex) with an RST 10H instruction. From 0010 hex, the program sends control to RAM location 4003 hex. If you're using Cassette Basic, TRSDOS, or NEWDOS80, 4003 hex contains the instruction JP 1D78H, which sends control to a routine that finds the next character in the program, and adjusts HL to point to it (LDOS, DOSPLUS, MULTIDOS, and the Stringy Floppy system use a different jump at 4003 hex to perform some special instructions).

Listing 3 interrupts the normal flow of control at 4003 hex. First, starting in line 370, it tests the return address on the stack to be sure that this RST 10 hex call came from 1D5A hex. If the return address isn't 1D5B hex, the program gets out of the way by jumping to the original address stored at 4003 hex.

## *Basic changes keyboard symbols to a form completely different from their ASCII codes.*

If the address on the top of the stack was correct, Listing 3 calls 1D78 hex to find the next valid character and checks to determine if it's an exclamation point. If not, the program decrements the HL register once to point to the previous byte and again control passes to the original address (lines 460-500).

Finally, if the program finds the correct return address, and if the next input character is an exclamation point, the program produces a beep. It ends by pointing HL to the next position after the exclamation point and then returning to the Basic interpreter. You must end the routine with HL and the stack set correctly, and with the Z flag set (line 700).

If you want to experiment with this final technique, select new command names carefully. Unless your program carefully checks each name, you must make sure that each new command starts with a character that could not normally appear at the beginning of a Basic command. If, for example, you chose a command A, you could never use a variable that started with the letter A without generating a syntax error.

Also, Basic changes keyboard symbols (such as the arithmetic operators) to a tokenized form completely different from their ASCII codes. If you use one of those symbols as your command name, your program will have to check for the tokenized form.

## Coming Up

Next month, I'll discuss another technique for adding new commands to Basic, and start to develop a program that lets you add many new Basic commands in a single program.

Remember that if you write to me and want a reply, you must enclose a stamped, self-addressed envelope. I am happy to try to answer your questions about Assembly language or use of your Model I, III, or 4. However, because of the amount of mail I receive, I cannot respond if you don't include a stamped envelope. In any case, I always welcome your comments, questions, and suggestions. ■

*Readers who subscribe to Compu-Serve can ask questions or take part in discussions on topics covered by "The Next Step." Go PCS-117 to the Writers' and Editors' Special Interest Group (WESIG) and leave your questions or comments addressed to Hardin Brothers. Feel free to join in conversations started by others.*

*You can also write to Hardin at 280 N. Campus Ave., Upland, CA 91786. Enclose a stamped, self-addressed envelope if you want a reply.*

# TRS 80 Computers

**NEW Computers, Accessories & Software**

**Manufacture Warranty**

<b>26-5103 Model 2000</b>	<b>\$2200</b>	<b>26-5111 Monitor</b>	<b>\$180</b>
<b>26-1069 Model 4</b>	<b>\$970</b>	<b>26-1158 Printer</b>	<b>\$1250</b>
<b>26-4005 Model 12</b>	<b>\$2800</b>	<b>26-1256 Printer</b>	<b>\$1600</b>
<b>26-3802 Mod. 100-24K</b>		<b>26-3801 Mod. 100 8K</b>	

We will match or beat anyones prices: Please Call

Visa — MasterCard — American Express

Cashier's Check — Money Order — C.O.D. with 25% Advance

## TALLEY COMMUNICATIONS CO.

P.O. Box 193 • 121 N. State St.

Decatur, Texas 76234 • 817-627-5585 • 817-627-1017

Call for other computer, telephone and accessory prices!

**Business Telephone Systems—Discount Prices—**  
Install your own. Completely modular.

Call for Prices

References Available

Fast Delivery

**Computer Specialist available for assistance.**

✓ 347

# 80 LIST OF ADVERTISERS

Reader Service Number	Page	Reader Service Number	Page	Reader Service Number	Page
82 Aerocomp Inc. ....	118, 119	214 Fort Worth Computers ....	59, 155	366 Pica .....	149
215 Alcor Systems .....	123	496 Good Software Corp. ....	169	306 Powersoft .....	54
136 Allen Gelder Software .....	114	103 Good Software Corp. ....	171	260 Pro/Am Software .....	129
140 Allied Systems Co. ....	161	185 Gouth Software .....	155	76 Producer, The .....	2, 3
476 Alpha Bit Comm., Inc. ....	92	455 Hard Drive Specialists .....	133	449 Prof Jones/Frogg House .....	93
17 Alpha Products Co. ....	14, 15, 17	61 Harmon Hardware & Supply .....	88	42 Programming & Systems Management .....	170, 135
74 ALPS .....	33	355 HDP .....	72	174 Professional Tax Software .....	74
303 Alternate Choice .....	37	9 H&E Computeronics .....	CIV, 67, 69	8 Prosoft .....	55
342 Amherst Equipment Corp .....	81	175 Howe Software .....	47	182 Prosoft .....	4
141 Anitek Software Products .....	23	425 Indiana Software Development .....	125	91 Prosoft .....	9
400 Anthropomorphic Systems .....	157	148 Intelligent Technologies Co. ....	143	30 Prosoft .....	10, 11
390 Applied Microsystems Inc. ....	13	534 Jameco Electronics .....	53	51 Prosoft .....	175
3 Argonaut Systems .....	143	244 Jaste Enterprises Inc. ....	175	194 Quant Systems .....	74
102 Armstrong Genealogical Systems .....	173	101 J&M Systems .....	63	117 Quick Labels Systems .....	175
16 Autospec .....	165	126 JMG Software International .....	31	75 Radio Shack .....	CII, 1
383 Astro-Star Enterprises .....	88	229 JRM Publications .....	110	129 Remsoft Inc. ....	75
152 BCCOMPCO .....	157	52 JStar Enterprises .....	173	265 Ridge-Tech Inc. ....	59
* Beck Mfg .....	103	485 Kalgio Electronics .....	135	512 Rockware Data Corp. ....	32
7 Bible Research .....	165	462 Langley-St. Clair, Inc. ....	49	343 Rogo Computer Products .....	102, 163
168 BlueRidge Software .....	59	161 Logical Place/K & S Comp. Ser. ....	49	53 Rose Electronics .....	173
381 Bodex Corp. ....	53	131 Logical Systems .....	165	368 Safeware .....	129
300 BT Enterprises .....	91	251 Logical Systems .....	7	203 Scientific Engineering Labs .....	163, 175
299 CB Microdex .....	173	301 Logical Systems .....	111	258 Smart Data Inc. ....	171
86 Compulogic .....	169	115 Lynn Computer Service .....	71	252 Smart Data Inc. ....	173
357 Computer Friends .....	89	112 Joe Lynn Computing .....	85	192 Software Concepts .....	53
18 Computer Plus .....	99	218 Magnetics .....	97	104 Software Factory, The .....	175
45 Cornucopia .....	33	250 Marymac .....	81	80 Software One .....	110
223 Crest Software .....	90	111 MicroSystems .....	72	* Software Support .....	94, 95
539 Desert Sound .....	143	* Micro Data Supplies .....	25, 26, 27, 28	64 Southworth .....	173
27 Design Software .....	90	157 Micro-Images .....	137	444 Southwestern Digital .....	153
282 DFW Computer Center .....	37, 81	464 Micro-Labs Inc. ....	143	213 Standard Software .....	164
367 Digital Images .....	33	181 Micro Systems Software .....	167	43 Star Software Co. ....	108
204 Diskcount Data .....	104, 105	137 Miller Microcomputer Services .....	73	442 Stevens Computer Discount .....	135
* Diskette Connection .....	169	317 Mimar Inc. ....	108	71 Sublogic Communications Corp. .....	129
48 Disks-N-Data .....	77	411 Montezuma Micro .....	40, 41	285 Sun Research Inc. ....	131
62 Displayed Video .....	159	416 Montezuma Micro .....	150, 151	456 Sunlock Systems .....	125
216 EAP Co. ....	125	* Mumford Micro Systems .....	135	189 Tab Sales .....	168
178 EZWare Corp. ....	123	379 Nautilus Computers Inc. ....	92	347 Talley Communications .....	144
125 EC Data/Teptra International .....	172	* New Classics Software .....	109	266 T/Maker .....	CIII
85 Educational Micro Systems .....	77	281 Nibblenotch .....	92	81 Total Access .....	20
45 Electric Webster .....	33	232 Nocona Electronics .....	87	227 Trisoft .....	97
* 80 Micro Load 80 .....	96	54 Nodvill Software .....	163, 175	32 TVG Systems .....	123
Mailing list .....	92	95 Northwest Computer Algorithms .....	131	169 Unicorn Software .....	131
Moving .....	97	127 Noteworthy Software Inc. ....	175	* Vespa Computer Outlet .....	113
Subscription Ad .....	64	36 Omnisoft Research .....	77	211 United Software Associates .....	164
Subscription problems .....	173	201 Optimal Tech. Inc. ....	155	41 Warriors & Warlocks .....	175
134 Elek-Tek .....	164	151 Orion Instruments .....	49	37 Wiley Inc. ....	174
144 Elek-Tek .....	127	207 Pacific Exchanges .....	102, 173	123 Wilson Technical .....	33
172 Engineering Management Consultants .....	173	324 Pel/Tek .....	30	79 Zygotron .....	173
350 EnFleur Corporation .....	175, 102	124 Perry Computers .....	147		
		143 Perry Computers .....	115		
		176 Personal Computer Products .....	162		

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



# A Rematch Between Two Data Base Systems

I'll devote part of this column to clearing up a problem of transferring graphics-based software between the Model I/III and the Tandy 2000. I'll also revisit an earlier topic: my comparison of Profile III+ to dBase II.

## Customized Graphics

Now that you have a tool for converting Model I/III Basic software to run on the Tandy 2000 (see October 1984, p. 178), you may have encountered another problem: Some programs won't convert because they use Model I/III-specific graphics. Paul Opitz's CHAREDIT program in the final issue of the *TRS-80 Microcomputer News* (volume 6, issue 6) solves the problem by letting you customize the Model 2000 character set.

While using Opitz's program to design a complete Russian alphabet, I realized that I could also replicate the Model I/III graphics character set on the Model 2000. The set I created replaces Model 2000 characters 128-191 with the appropriate Model I/III graphics characters. That allowed me to convert many of my Basic programs without any reprogramming. Unfortunately, this method doesn't work with programs that depend on the Set, Reset, and Point commands to display graphics.

The Program Listing (p. 149) supplies Basic subroutines that duplicate the Model I/III's Set, Reset, and Point functions on the 2000. With these subroutines saved to disk in ASCII format, it's a relatively simple (albeit tedious) task to change Model I/III graphics commands to linkages for these subroutines. I recommend editing the ASCII text of the program with a capable word processor.

The GRINIT routine is the heart of the program. It loads the Model I/III graphics character set modified by CHAREDIT and sets up the byte masks for later use. The next three routines are all very similar; they share



Illustration by Phil Garaci

much of the same code. I chose not to put this code in one more subroutine because another function call would have slowed the program down too much. To increase speed, remove all comments and any extraneous blanks, combining as many statements on one line as possible. Table 1 lists the program's variables. The Figure uses a typical character cell divided into graphics pixels to illustrate the variables and their use.

If you'd like the character set editor (CHAREDIT and FONTINIT), the character sets (Russian and Model I/III graphics), and/or the graphics routines in the Listing, send a disk and a self-addressed mailer to me at 1519-A Carswell Circle, Bolling Air Force Base, Washington, DC 20336. Make sure the mailer has correct return postage. For the character set editor, specify the type of display you're using (monochrome/color, graphics/no graphics).

## Battle of the Data Bases—Round Two

In my first column (August 1984, p. 177), I illustrated dBase II's versatility

by comparing its major features to those of Profile III+. I must admit that this was unfair; comparing programs that run under different operating environments is never really fair. However, the Small Computer Co. called my attention to a very powerful extension to the Profile III+ system called filePro-16 (see Table 2). FilePro-16 is available for the Model 2000 and is a single-user, feature-for-

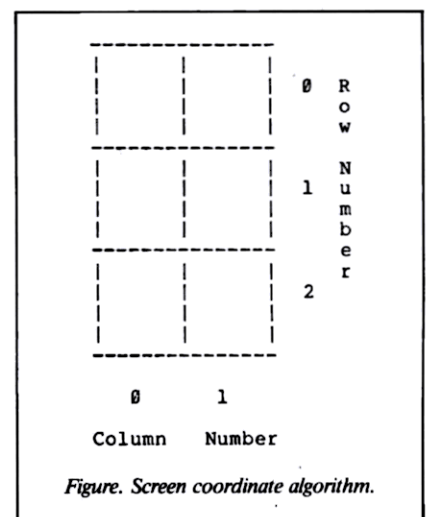
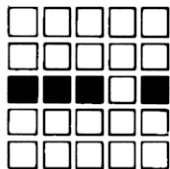


Figure. Screen coordinate algorithm.



# PERRY COMPUTERS

**TRS-80 COMPUTERS**  
**100% PURE RADIO SHACK**

**CALL TOLL-FREE 1-800-248-3823**

## TANDY 2000

## TANDY 1200

	LIST PRICE	OUR PRICE		LIST PRICE	OUR PRICE
26-5103 Tandy 2000 Two Disk	\$2750 00	\$2175 00	25-3000 Tandy 1200 1 Disk and 10 Meg HD	\$ 2999 00	\$ 2550 00
26-5104 Tandy 2000 1 Disk and 10 Meg HD	\$4250 00	\$3475 00	25-3010 VM-3 Green Monitor	\$ 219 00	\$ 185 00
26-5111 Monochrome Monitor	\$ 249 00	\$ 175 00	26-3212 CM-2 Color Monitor	\$ 549 95	\$ 467 50
26-5112 Color Monitor	\$ 799 00	\$ 549 00	25-3040 Monochrome Display Adapter	\$ 219 00	\$ 185 00
26-5140 Hi Res Graphic Monochrome Board	\$ 499 00	\$ 349 00	25-3043 Graphics Display Adapter	\$ 299 00	\$ 255 00
26-5141 Hi Res Color Graphics Chip	\$ 199 00	\$ 145 00	25-3044 Graphics Master	\$ 695 00	\$ 590 00
26-5160 Internal 128K Kit	\$ 299 00	\$ 250 00	25-3061 Captain Multifunction Board	\$ 795 00	\$ 675 00
26-5311 Microsoft Multiplan	\$ 195 00	\$ 166 00	25-3130 MSDOS/BASIC	\$ 89 95	\$ 76 50
26-5352 dBase II (Data Base)	\$ 595 00	\$ 420 00	25-3170 Wordstar Professional	\$ 395 00	\$ 335 00
26-5330 Multimate	\$ 249 00	\$ 205 00	25-3160 Framework	\$ 695 00	\$ 590 00

## MODEL 4 COMPUTERS

## BUSINESS COMPUTERS

	LIST PRICE	OUR PRICE		LIST PRICE	OUR PRICE
26-1069 Model 4 64K 2 Drive Computer	\$ 1299 00	\$ 950 00	26-4005 Model 12 80K 2 Drive Computer	\$3999 00	\$2700 00
26-1080 Model 4P 64K Portable Computer	\$ 1299 00	\$ 950 00	26-6004 Model 16B 256K 1 Drive Computer	\$4999 00	\$3175 00
26-1122 64K Memory Expansion	\$ 79 95	\$ 75 00	26-6005 Model 16B 256K 2 Drive Computer	\$3999 00	\$3390 00
26-1127 Model 4 Internal Drive 1	\$ 499 95	\$ 415 00	26-6006 Model 16B 256K 15Meg HD	\$5999 00	\$4750 00
26-1123 Model 3to Model 4 Upgrade Kit	\$ 799 00	\$ 675 00	26-6017 Card Cage For Model 12	\$ 199 00	\$ 169 00
26-1084 Model 4P Modem Board	\$ 149 00	\$ 127 00	26-4155 15 Meg Hard Drive Primary	\$2495 00	\$2000 00
26-1595 Super Script Model 4	\$ 199 95	\$ 169 00	26-4168 30 Meg Hard Drive Primary	\$3395 00	\$2885 00
26-1635 Profile 4 Model 4	\$ 249 95	\$ 212 00	26-4171 35 Meg Hard Drive Primary	\$3595 00	\$3055 00
26-2216 CP/M Plus Model 4	\$ 149 00	\$ 127 00	26-4157 Installation Kit for Primary HD	\$ 495 00	\$ 410 00

## MODEL 100 COMPUTERS

## COLOR COMPUTERS

	LIST PRICE	OUR PRICE		LIST PRICE	OUR PRICE
26-3801 8K Model 100 Computer	\$ 399 00	\$ 339 00	26-3127 64K Extended Color Computer 2	\$ 199 95	\$ 169 00
26-3802 24K Model 100 Computer	\$ 599 00	\$ 509 00	26-3136 16K Extended Color Computer 2	\$ 139 95	\$ 120 00
26-3804 AC Adaptor	\$ 5 95	\$ 5 00	26-3029 Disk Drive O for Color Computer	\$ 349 95	\$ 295 00
26-3805 Accoustic Coupler	\$ 39 95	\$ 34 00	26-1161 Disk Drive 1, 2, 3, for Color Computer	\$ 279 95	\$ 230 00
26-3816 8K RAM Memory Expansion Chip	\$ 119 95	\$ 95 00	26-3018 Extended Basic Kit	\$ 39 95	\$ 34 00
26-1409 Printer Cable	\$ 14 95	\$ 12 70	26-3030 OS-9 With Editor Assembler	\$ 69 95	\$ 59 50
26-1410 Modem Cable	\$ 19 95	\$ 17 00	VIP Writer		\$ 59 00
26-3809 Briefcase	\$ 49 95	\$ 42 50	VIP Calc		\$ 49 00
26-1183 Bar Code Reader	\$ 99 95	\$ 85 00	Teletwriter Disk		\$ 59 00
26-3806 Disk Video Interface	\$ 799 00	\$ 660 00	Botek Interface		\$ 57 00

## RADIO SHACK PRINTERS

## OTHER MAJOR BRANDS

	LIST PRICE	OUR PRICE		OUR PRICE		OUR PRICE
26-1276 DMP-105 Dot Matrix Printer	\$ 199 00	\$ 169 00	COMPUTERS		PRINTERS	
26-1275 TRP-100 Portable Thermal Printer	\$ 299 00	\$ 230 00	Sanyo	\$ Call	Epson	\$ Call
26-1271 DMP-110 50/25 cps Printer	\$ 399 00	\$ 299 00	Columbia	\$ Call	C. Itoh	\$ Call
26-1255 DMP-120 Printer 120cps Matrix	\$ 499 00	\$ 385 00	Epson	\$ Call	Okidata	\$ Call
26-1257 DWP-210 14cps Daisy Wheel	\$ 599 00	\$ 485 00	Franklin	\$ Call	Star (Gemini)	\$ Call
26-1277 DMP-430 24 Wire Matrix Printer	\$ 899 00	\$ 745 00	Software	\$ Call	Hayes Modems	\$ Call
26-1270 DWP-510 43cps Daisy Wheel	\$1495 00	\$1225 00				
26-1274 DMP-2100P 24 Wire DOT Matrix	\$1995 00	\$1650 00				

**FOR ORDERS CALL 1-800-248-3823**

We also carry a complete line of computer accessories  
(Please call for current prices.)

**FOR INFORMATION CALL 1-517-625-4161**

All prices and offers may be changed or withdrawn without notice. Advertised prices are cash prices. For shipping, add 2% (minimum shipping charge \$3.00). C.O.D. accepted. (\$4.00 charge per carton on C.O.D. Call for further C.O.D. information.) M.C., Visa, A.X., add 3%.

✓ 124

**PERRY COMPUTERS 137 N. MAIN, PERRY, MI. 48872**



feature adaptation of the multiuser Profile-16 system currently available for the Model 16.

FilePro-16 contains an extensive reference manual, program disks, an installation manual, and a start-up manual with a beginner's and an advanced tutorial. The system is huge. Hard disk Model 2000 users will generally have no problem with the program's size, but floppy users will be dismayed at having to use separate creation and runtime disks, as with Profile III+. Remember, Model 2000 disks hold four times as much as Model III disks, but filePro-16's code still doesn't fit on the two program disks—the special character print codes are on another disk.

FilePro-16 is a superior product. The limitations of Profile III+ have been corrected. For example, you can add data and lengthen or shorten any data base file easily. It automatically updates indexes once you define them. You can also build very powerful menus that let you structure applications for easy use by someone unfamiliar with the filePro-16 commands.

FilePro-16's added features are very capable: the ability to spread files over several disks, flexible and numerous input/output format features, and excellent precision in math calculations. FilePro-16 allows over 16 million records per file, and 4,608 characters per record.

With all of these exceptional features in mind, I'll reconsider my original comparison of data base management systems, this time pitting dBASE II against filePro-16. In each of the areas mentioned above, filePro-16 exceeds dBase II's specifications or provides an easier way to perform an operation. Why, then, is there so much demand for dBase II? First, it's essentially universal, providing identical capabilities to any computer that runs CP/M or MS-DOS. Don't discount this feature; it's a most important consideration when you have access to multiple computers.

Probably more important, dBase II, while providing all the data base management functions most people need, is really more of a programming environment than a DBMS. This product's great success derives from its superb flexibility in developing applications. An entire software sub-industry is based on dBase programming.

#### Variable Description

ZX	Specifies the horizontal location of the graphics pixel (0-159)
ZY	Specifies the vertical location of the graphics pixel (0-71)
CX	Character location within the selected row containing the pixel (1-80). This is the integer quotient of ZX/2.
CY	Character location within the selected column containing the pixel (0-24). This is the integer quotient of ZY/3.
CL	Selects the graphics column by examining the remainder from the calculation of CX.
RW	Selects the graphics row number by examining the remainder from the calculation of CY.
BT	Specifies the bit number within the byte for the action to be performed. This value ranges from 0 to 5 and is used to select the appropriate mask from either the SM() or RM() arrays.
CH	Contains the value of the character located in the screen memory at the location specified by CX and CY.

Table 1. Variables used in the Program Listing.

Since these two systems cost the same, I must recommend dBase II as the DBMS system of choice because of its greater wealth of support and portability of data and applications. However, if you also use Profile-16 on the Model 16 computer, you may find filePro more appropriate. These two products are virtually identical and provide unparalleled compatibility. Were filePro-16 less expensive, I'd heartily recommend it for use on the Model 2000.

#### Making dBASE II Better

While I'm on the subject of dBase, I must mention two superior products that I've encountered: DB/RA and dBRx, powerful extensions that overcome some of dBase II's data handling limitations. Although designed specifically for the IBM PC, both run fine on the Tandy 2000.

DB/RA adds the power of one-, two-, or three-dimensional arrays to dBase-II. You can use these arrays with character, logical, or numeric data just as you'd use any other memory variable. In fact, this software extends the number of memory variables available from 64 to over 65,000. A simple statement beginning with the key word Call performs these functions. DB/RA incorporates its own syntax analyzer so these special call statements resemble familiar dBase commands.

dBRx is a math and string extension package making several transcendental functions (sine, cosine, logarithmic, etc.) available for use in data computations. This means you can do most complex calculations within the

dBase II Data Base Manager  
Tandy/Radio Shack  
One Tandy Center  
Fort Worth, TX 76102  
26-5352  
\$495

filePro-16 Data Base Management System  
The Small Computer Company, Inc.  
230 W. 41st Ave., 12th Floor  
New York, NY 10036  
Available through Radio Shack Express  
Order system  
\$495

dBRx—The dBase II Math/Stat Program  
dB/RA—The dBase II Array Program  
Gryphon Microproducts  
P. O. Box 6543  
Silver Spring, MD 20906  
dBRx; \$150  
dB/RA; \$200

Table 2. Model 2000 product index.

DBMS. The package also supplies three string functions (Pack, BTRIM, and NOSPACE) that enhance the appearance of text data when you display it or print it out. Pack compresses multiple blanks into one, BTRIM trims blanks from the left side of a character string (as opposed to the normal Trim function for removing blanks from the right side), and NOSPACE removes all spaces from the text string. ■

You can reach John B. Harrell III  
c/o this column, 80 Micro, 80 Pine  
St., Peterborough, NH 03458, or via  
CompuServe at 73016,1326.

## Program Listing. Graphics conversion routines.

```

8800 *****
8810 GRINIT - set up values for the Model-III graphics routines
8820
8830 No parameters are expected and the values returned are in the
8840 arrays SM() and RM() used by the graphics routines.
8850
8860 GRINIT should only be called once per program execution or an
8870 error will occur when attempting to redimension the arrays.
8880
8890 It may also be necessary to reposition your DATA statements
8900 to prevent conflict with GRINIT.
8910 *****
8920 *****

9000 DIM SM(5),RM(5)
9010 RESTORE 9060 'set up proper location for DATA read
9020 FOR I=0 TO 5
9030 READ SM(I),RM(I) 'read the data masks
9040 NEXT I
9045 BLOAD"mdliact" 'load the graphics character set
9050 RETURN
9060 DATA 1,254
9070 DATA 2,253
9080 DATA 4,251
9090 DATA 8,247
9100 DATA 16,239
9110 DATA 32,223

9900 *****
9910 SET a graphics pixel using Model-III graphics
9920 call by setting ZX and ZY to the location of the pixel
9930 and execute using a GOSUB
9940 ZX must be in the range of 0 to 159
9950 ZY must be in the range of 0 to 71
9960
9970 This subroutine requires initialization by calling GRINIT
9980 *****
9990 *****

10000 CX = INT(ZX/2) + 1: CL = ZX AND 1 ' calculate col (cx) and gr col
10010 CY = INT(ZY/3) + 1: RW = ZY - 3 * (CY-1) ' calculate row and gr row
10020 BT = RW + RW + CL ' bit position within the gr
byte
10030 CH = SCREEN(CY,CX) ' get char at current screen pos

10040 IF CH < 128 OR CH > 191 THEN CH = 128 ' if not graphics -- make blank
10050 CH = CH OR SM(BT) ' set proper bit to turn on
pixel
10060 LOCATE CY,CX: PRINT CHR$(CH); ' locate and replace screen char

10070 RETURN

19900 *****
19910 RESET a graphics pixel using Model-III graphics
19920 call by setting ZX and ZY to the location of the pixel
19930 and execute using a GOSUB
19940 ZX must be in the range of 0 to 159
19950 ZY must be in the range of 0 to 71
19960
19970 This subroutine requires initialization by calling GRINIT
19980 *****
19990 *****

20000 CX = INT(ZX/2) + 1: CL = ZX AND 1 ' calculate col (cx) and gr col
20010 CY = INT(ZY/3) + 1: RW = ZY - 3 * (CY-1) ' calculate row and gr row
20020 BT = RW + RW + CL ' bit position within the gr
byte
20030 CH = SCREEN(CY,CX) ' get char at current screen pos

20040 IF CH < 128 OR CH > 191 THEN CH = 128 ' if not graphics -- make blank
20050 CH = CH AND RM(BT) ' set proper bit to turn on
pixel
20060 LOCATE CY,CX: PRINT CHR$(CH); ' locate and replace screen char
20070 RETURN

29900 *****
29910 TEST a graphics pixel using Model-III graphics
29920 call by setting ZX and ZY to the location of the pixel
29930
29940 and execute using a GOSUB
29950 ZX must be in the range of 0 to 159
29960 ZY must be in the range of 0 to 71
29970
29980 This subroutine requires initialization by calling GRINIT
29990 The function return value is returned in variable ZZ:
30000 ZZ = -1 (TRUE) -- the pixel is currently set
30010 ZZ = 0 (FALSE) -- the pixel is currently reset
30020 *****
30030 *****

30000 CX = INT(ZX/2) + 1: CL = ZX AND 1 ' calculate col (cx) and gr col
30010 CY = INT(ZY/3) + 1: RW = ZY - 3 * (CY-1) ' calculate row and gr row
30020 BT = RW + RW + CL ' bit position within the gr
byte
30030 CH = SCREEN(CY,CX) ' get char at current screen pos

30040 IF CH < 128 OR CH > 191 THEN CH = 128 ' if not graphics -- make blank
30050 CH = CH AND SM(BT) ' set proper bit to turn on
pixel
30060 ZZ = (CH <> 0) ' check if bit is set and return
30070 RETURN

```

End

# DANGER: LOOSE PICO NUTS

It's catching. You, too, will go nuts over briefcase-size computers.

These lap-sized "picocomputers" are the indispensable new tool you'll need to get ahead.

But which pico should you buy?

Read *PICO—The Briefcase Computer Report*, and you'll learn which pico is best for you: your word processing, your spread sheets, your data bases. The best pico for your successful business management.

You need a picocomputer right now. Read *PICO*, and you'll learn which pico is your best investment.



To subscribe:

Call 1-800-227-1053

Or mail in this completed form to:

PICO

150 South Main St.

Woodridge NJ 07075 366

☐ Enter my subscription to *PICO—The Briefcase Computer Report*, 12 monthly issues for \$19.97.

☐ Send me a *PICO* Product Evaluation Kit so I can help evaluate pico products.

☐ Check enclosed ☐ Bill me

☐ MC ☐ VISA ☐ AE 751132

Exp. date \_\_\_\_\_

Card no. \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_ ZIP \_\_\_\_\_



# 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 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™  
Montezuma Micro CP/M®  
**\$299**  
Delivered  
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

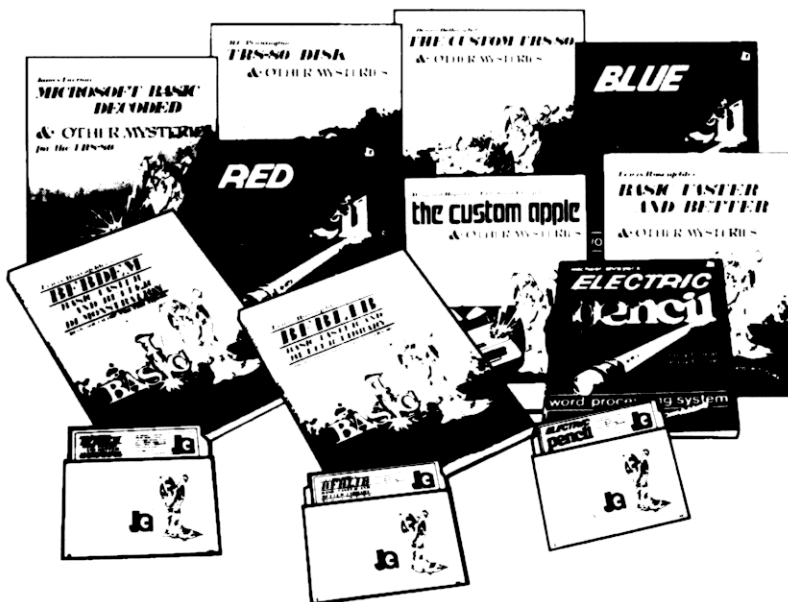
**Bundle #2**  
WordStar®  
DataStar™  
ReportStar™  
CalcStar™  
Montezuma Micro CP/M®  
**\$399**  
Delivered  
RETAIL VALUE \$1354

**Bundle #3**  
WordStar®  
MailMerge®  
SpellStar™  
StarIndex™  
DataStar™  
ReportStar™  
CalcStar™  
Montezuma Micro CP/M®  
**\$499**  
Delivered  
RETAIL VALUE \$1699

**Bundle #4**  
WordStar®  
MailMerge™  
SpellStar™  
StarIndex™  
dBASE II®  
TurboPascal™  
Montezuma Micro CP/M®  
**\$599**  
Delivered  
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**

Due to the nature of this business, there are **NO REFUNDS** on software. We accept American Express, MasterCard, Visa and COD. Your card is not charged until we ship your order. Personal and company checks are accepted without delay (call for details). Delivered prices are for the lower rightmost 48 States only. Prices and specifications subject to change without notice. If you don't understand any of this, just give us a call and we will take the time to explain it until you do. First-timers are always welcome here.

ORDER NOW... TOLL FREE

**800-527-0347**  
**800-442-1310**



**MONTEZUMA  
MICRO**

214-339-5104  
Redbird Airport, Hangar #8  
P.O. Box 32027  
Dallas, Texas 75232

"WE KEEP YOU RUNNING"

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



# MONTESUMA'S REVENGE

P.O. Box 2169  
Camp Verde (Lizard Flats)  
Arizona 86322 ✓416

WE KEEP YOU RUNNING

## COMPUTERS

Model 4 with 2 drives & RS-232C B&K Complete	\$999
26-1067 18K Model 4 Pure Radio Shack	765
26-1069 20K Model 4 B&K RS-232C Pure Radio Shack	1099
26-1080 16K Model 4 Portable 20K & RS-232C	1099
26-3026 18K Color Computer 2	144
26-3027 16K Extended BASIC Color Computer 2	179
26-3127 16K Extended BASIC Color Computer 2	179
26-3134 16K Color Computer 2	99
26-3136 16K Extended BASIC Color Computer 2	35
26-3589 Pocket Computer 3 with 4K RAM	84
26-3590 Pocket Computer 3	84
26-3601 Pocket Computer 2	84
26-3602 Pocket Computer 4	59
26-3801 Model 100 2K Portable Computer	499
26-3802 Model 100 2K Portable Computer	679
26-4004 Model 12 1 Drive	2379
26-4005 Model 12 2 Drive	2951
26-5103 Model 2000 2 Drive 128K	2333
26-5104 Model 2000 W Hard Disk and 256K	3599
26-6004 Model 168 1 Drive	3351
26-6005 Model 168 2 Drive	3925
26-6006 Model 168 with built-in 15MB Hard Disk	5352
26-6007 DT 1 Terminal	499
26-6008 NEW DT 100 Terminal	675

**NEW TANDY "IBM-XT" COMPUTER.** This new computer from R/S is an IBM clone and will run IBM software. Our price is complete with green color monitor, color video board, 256K RAM, a 360K floppy and a 10 Mbyte internal HD. \$2695

## MODEMS

26-1084 Model 4P Modem Board	\$127
26-1173 DC Modem 1B	169
26-1174 Analog Coupler Modem	127
26-1175 DC Modem 1B	139
26-1176 DC 2112 High Speed Modem	339
Anchor Mark 1 Model 300 Baud with cable	74
Anchor 300/1200 Baud Modem with cable & PS	239
Hayes Smartmodem 300 Baud	229
Hayes Smartmodem 1200 Baud	525

## PERIPHERALS

LHM Expansion Interface for the Model 1 complete with 32K RAM & built-in RS-232C	\$319
26-0511 Gemini RS-232C Parallel/Analog Device	14
26-1085 Model 4P Carrying Case	21
26-1131 Model 1/3 5MB Hard Disk Secondary	1399
26-1132 Model 3 15MB Hard Disk Int. Kit	85
26-1134 Model 4 15MB Hard Disk Int. Kit	68
26-1183 Model 100 B&K Barcode Reader	85
26-1185 NEW! Color Computer Koolaid Kit	85
26-1187 NEW! Model 100 Acoustic Coupler	85
26-1198 NEW! Serial to Parallel Converter	85
26-1208 CCR-81 Cassette Tape Recorder	51
26-1209 NEW! CCR-82 Cassette Tape Recorder	42
26-1308 Anti-Glare Panel Model 2 12/16	11
26-1342 Clear Keycover for Model 3/4	11
26-1410 Model 100 Modern Cable	42
26-1429 Automatic Power Shutdown Protector	42
26-1451 Non-Automatic Power Strip/Filter	42
26-1457 Anti-Glare Panel Model 1/3 4	68
26-2226 Color Computer Deluxe RS-232 Kit	17
26-3008 Color Computer Carrying Case	21
26-3008 Color Computer Joystick's Per Pair	11
26-3012 Color Computer Deluxe Joystick/each	33
26-3023 Color Computer 1/2 Disk Drive 1/2 or 3	237
26-3024 Color Computer Multi-Pak Interface	153
26-3025 Color Computer Mouse	49
26-3028 Disk Drive 0 for the Color Computer	239
26-3033 PC 1 Cassette Interface	23
26-3508 PC 1 Carrying Case	13
26-3608 PC 2 Carrying Case	25
26-3612 PC 2 RS-232C Interface	14
26-3615 PC 4 8K RAM Module	118
26-3616 PC 2 8K RAM Module	118
26-3617 PC 4 16K RAM Module	118
26-3653 PC 4 1K RAM Module	16
26-3654 PC 4 Carrying Case	6
26-3804 Model 100 AC Adapter	42
26-3805 Model 100 Acoustic Coupler	42
26-3809 Model 100 Carrying Case	42
26-4154 Model 12/16B Internal 15MB Hard Disk Kit	2245
26-4155 Model 2/3/4/12/16 Internal Hard Disk Kit	2120
26-4156 Model 2/3/4/12/16 15MB Secondary Drive	1695
26-4157 Model 2/12/16 Installation Kit for 26-4155	420
26-5111 Model 2000 VMI 1 Monochrome Monitor	212
26-5112 Model 2000 CM 1 Color Monitor	679

## FURNITURE

26-1305 Model 3/4 System Stand	\$152
26-1306 Universal Printer Stand	85
26-1324 Computer Table	68
26-1325 Platform for 26-1324	24
26-4303 Deluxe System Desk	229
26-4305 Deluxe Printer Desk	128
26-4308 Terminal Stand	161
26-4307 Printer Stand	76
26-5115 Model 2000 Pedestal	178
26-5116 Model 2000 Floor Stand	123
26-5151 Otis-Race Stand	69

## PRINTERS & ACCESSORIES

26-1190 Ponce	179
26-1192 GCP 115 Color Graphics Printer	1059
26-1196 GTP 116 Graphics Pad	797
26-1250 DWP-410 Daisywheel Printer	299
26-1252 DWP-500 2200dpi Printer	1099
26-1254 DWP-200 1200dpi Printer	424
26-1255 DWP-120 1200dpi Dual Mode Printer	424
26-1257 DWP-210 Daisywheel	424
26-1261 TP-10 Thermal Matrix Printer	85
26-1262 DWP-420 1400dpi Triple Mode Printer	849
26-1268 GCP-220 CIO Ink Jet Printer	384
26-1269 PTC-64 64 Pin Printer Controller (Buffer)	1270
26-1270 NEW! DWP-510 Daisywheel printer	1270
26-1271 DWP-110 500dpi Triple Mode Printer	355
26-1274 DWP-210 1600dpi Dual-Mode Printer	239
26-1275 NEW! TRIP-10 Printer	239
26-1276 NEW! DWP-105 New Cheap Printer	169
26-1277 NEW! DWP-430 New Hot So Cheap Printer	765
26-1440 Single B&K Sheet Feeder for DWP-410	144
26-1441 B&K Directional Tractor for DWP-210	144
26-1443 B&K Directional Tractor for DWP-210	144
26-1447 B&K Directional Tractor for Daisywheel 1	144
26-1448 Single B&K Sheet Feeder for Daisywheel 1	672
26-1455 Acoustic Coupler	339
26-1459 Directional Tractor for DWP-410	144
26-1461 Model 1/3 4K Printer Cable	16
26-1468 RS-232C Cable	13
26-1469 Model 100 Printer Cable	25
26-1470 Model 212/16 1000 Printer Cable	29
26-1490 10 RS-232C Cable	36
26-1491 25 RS-232C Cable	76
26-1492 50 RS-232C Cable	144
26-1493 100 RS-232C Cable	33
26-1495 RS-232C Cable Extender	25
26-1496 RS-232C Null Modem Adapter	102
26-1498 SW-302 Parallel Printer Switch	102
26-1499 SW-303 RS-232C Selector Switch	108
26-3505 PC 1 Printer	128
26-3506 PC 2 Printer	128
26-3507 PC 3 Printer	68
26-3508 PC 4 Printer	68

## C.I.T.O.H

8510BPI 120cps Friction Tractor Parallel	\$349
8510SP Hot Dot 180cps Real Fast	495
8510SCP Color High Speed Printer	549
1550P Promoter 3 1200cps for Wide Paper Parallel	549
1550SP Hot Dot 180cps Real Fast & Wide	675
F10-40 Starwriter 80cps Daisywheel	999
F10-55 Promoter 3 1200cps for Wide Paper Parallel	1299
F10 B&K Directional Tractor with Plastic Cover	210
F10 Electric Single B&K Sheet Feeder Int. Required	775
F10 Mechanical Single B&K Sheet Feeder	499
GA-100 Georgia Banana Sheets	175

## ANAEK

DP-9725B 240cps Color Printer	1299
-------------------------------	------

We have just covers for most every printer we sell. Be sure to order one with your new printer to keep it 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 or the shell. All at discount prices of course.

## SUPPLIES

5.25 5.25DD Disquettes Pack of 10 1 Year Guarantee	\$15
5.25 5.25DD Disquettes Pack of 10 1 Year Guarantee	19
8 5.25DD Disquettes Pack of 10 1 Year Guarantee	29
5.25 5.25DD Disquettes Pack of 10 1 Year Guarantee	16
8 5.25DD Disquettes Pack of 10 1 Year Guarantee	19
8 5 1/4 Tractor Paper 20lb 2000 Sheets	25
8 5 1/4 Tractor Paper 30lb 3000 Sheets	35
5.25 or 8 1/2 Tractor Paper 20lb 2000 Sheets	9

## RIBBONS

We have more ribbons than you do. Why too many types to list here. Add them to your order now. They're cheap too.

## MONTESUMA'S REVENGE GREEN or AMBER MONITORS

Modernize your tired old Model 1 with a snappy new 12 high-resolution video monitor with your choice of an Anti-Glare slow decay green or medium decay European Amber screen. Made with Lead/Strontium impregnated frosted glass GU8ES WHAT? The CRT from this monitor also fits the Model 2, 3, and 4 and is brighter than the more expensive Langley. Still. Clear replacement CRT. Just take the tube out of the new monitor and replace your existing CRT. Then install your old B&W CRT into the new monitor and end up with a monitor you can keep or sell. Why spend all that money for just a new tube. Guaranteed for a full year. Model 1 cable available on request at no charge.

MONTESUMA'S SPECIAL PRICE.....\$79

## SOFTWARE

Note: It is Radio Shack policy that not all multi-purpose software packages contain disk for all models. Options that are available at slight extra charge. Be sure to ask for details when you order.

NEW! CP/M 8.2 by Montezuma Micro For The Model 4	169
26-0310 TRSDOS 3.3 For The Model 1	30
26-0311 TRSDOS 3.3 For The Model 3	12
26-0312 TRSDOS 3.3 For The Model 4	12
26-0313 TRSDOS 3.3 For The Model 4	12
26-0314 TRSDOS 3.3 For The Model 4	12
26-0315 TRSDOS 3.3 For The Model 4	12
26-0316 TRSDOS 3.3 For The Model 4	12
26-0317 TRSDOS 3.3 For The Model 4	12
26-0318 TRSDOS 3.3 For The Model 4	12
26-0319 TRSDOS 3.3 For The Model 4	12
26-0320 TRSDOS 3.3 For The Model 4	12
26-0321 TRSDOS 3.3 For The Model 4	12
26-0322 TRSDOS 3.3 For The Model 4	12
26-0323 TRSDOS 3.3 For The Model 4	12
26-0324 TRSDOS 3.3 For The Model 4	12
26-0325 TRSDOS 3.3 For The Model 4	12
26-0326 TRSDOS 3.3 For The Model 4	12
26-0327 TRSDOS 3.3 For The Model 4	12
26-0328 TRSDOS 3.3 For The Model 4	12
26-0329 TRSDOS 3.3 For The Model 4	12
26-0330 TRSDOS 3.3 For The Model 4	12
26-0331 TRSDOS 3.3 For The Model 4	12
26-0332 TRSDOS 3.3 For The Model 4	12
26-0333 TRSDOS 3.3 For The Model 4	12
26-0334 TRSDOS 3.3 For The Model 4	12
26-0335 TRSDOS 3.3 For The Model 4	12
26-0336 TRSDOS 3.3 For The Model 4	12
26-0337 TRSDOS 3.3 For The Model 4	12
26-0338 TRSDOS 3.3 For The Model 4	12
26-0339 TRSDOS 3.3 For The Model 4	12
26-0340 TRSDOS 3.3 For The Model 4	12
26-0341 TRSDOS 3.3 For The Model 4	12
26-0342 TRSDOS 3.3 For The Model 4	12
26-0343 TRSDOS 3.3 For The Model 4	12
26-0344 TRSDOS 3.3 For The Model 4	12
26-0345 TRSDOS 3.3 For The Model 4	12
26-0346 TRSDOS 3.3 For The Model 4	12
26-0347 TRSDOS 3.3 For The Model 4	12
26-0348 TRSDOS 3.3 For The Model 4	12
26-0349 TRSDOS 3.3 For The Model 4	12
26-0350 TRSDOS 3.3 For The Model 4	12
26-0351 TRSDOS 3.3 For The Model 4	12
26-0352 TRSDOS 3.3 For The Model 4	12
26-0353 TRSDOS 3.3 For The Model 4	12
26-0354 TRSDOS 3.3 For The Model 4	12
26-0355 TRSDOS 3.3 For The Model 4	12
26-0356 TRSDOS 3.3 For The Model 4	12
26-0357 TRSDOS 3.3 For The Model 4	12
26-0358 TRSDOS 3.3 For The Model 4	12
26-0359 TRSDOS 3.3 For The Model 4	12
26-0360 TRSDOS 3.3 For The Model 4	12
26-0361 TRSDOS 3.3 For The Model 4	12
26-0362 TRSDOS 3.3 For The Model 4	12
26-0363 TRSDOS 3.3 For The Model 4	12
26-0364 TRSDOS 3.3 For The Model 4	12
26-0365 TRSDOS 3.3 For The Model 4	12
26-0366 TRSDOS 3.3 For The Model 4	12
26-0367 TRSDOS 3.3 For The Model 4	12
26-0368 TRSDOS 3.3 For The Model 4	12
26-0369 TRSDOS 3.3 For The Model 4	12
26-0370 TRSDOS 3.3 For The Model 4	12
26-0371 TRSDOS 3.3 For The Model 4	12
26-0372 TRSDOS 3.3 For The Model 4	12
26-0373 TRSDOS 3.3 For The Model 4	12
26-0374 TRSDOS 3.3 For The Model 4	12
26-0375 TRSDOS 3.3 For The Model 4	12
26-0376 TRSDOS 3.3 For The Model 4	12
26-0377 TRSDOS 3.3 For The Model 4	12
26-0378 TRSDOS 3.3 For The Model 4	12
26-0379 TRSDOS 3.3 For The Model 4	12
26-0380 TRSDOS 3.3 For The Model 4	12
26-0381 TRSDOS 3.3 For The Model 4	12
26-0382 TRSDOS 3.3 For The Model 4	12
26-0383 TRSDOS 3.3 For The Model 4	12
26-0384 TRSDOS 3.3 For The Model 4	12
26-0385 TRSDOS 3.3 For The Model 4	12
26-0386 TRSDOS 3.3 For The Model 4	12
26-0387 TRSDOS 3.3 For The Model 4	12
26-0388 TRSDOS 3.3 For The Model 4	12
26-0389 TRSDOS 3.3 For The Model 4	12
26-0390 TRSDOS 3.3 For The Model 4	12
26-0391 TRSDOS 3.3 For The Model 4	12
26-0392 TRSDOS 3.3 For The Model 4	12
26-0393 TRSDOS 3.3 For The Model 4	12
26-0394 TRSDOS 3.3 For The Model 4	12
26-0395 TRSDOS 3.3 For The Model 4	12
26-0396 TRSDOS 3.3 For The Model 4	12
26-0397 TRSDOS 3.3 For The Model 4	12
26-0398 TRSDOS 3.3 For The Model 4	12
26-0399 TRSDOS 3.3 For The Model 4	12
26-0400 TRSDOS 3.3 For The Model 4	12

26-2190 Model 4 COBOL	169
26-2200 Model 1 FORTRAN	85
26-2201 Model 1/3 FORTRAN	85
26-2202 Model 1/3 COBOL	126
26-2203 Model 1/3 COBOL BASIC	126
26-2204 Model 1/3 COBOL BASIC	126
26-2205 Model 1/3 COBOL BASIC	126
26-2210 Model 3 BASCOM	169
26-2211 Model 3 Acor PASCAL	219
26-2212 Model 3 Acor PASCAL	219
26-2213 Model 3 Acor PASCAL	219
26-2214 Model 3 Acor PASCAL	219
26-2215 Model 3 Acor PASCAL	219
26-2216 Model 3 Acor PASCAL	219
26-2217 Model 3 Acor PASCAL	219
26-2218 Model 3 Acor PASCAL	219
26-2219 Model 3 Acor PASCAL	219
26-2220 Model 3 Acor PASCAL	219
26-2221 Model 3 Acor PASCAL	219
26-2222 Model 3 Acor PASCAL	219
26-2223 Model 3 Acor PASCAL	219
26-2224 Model 3 Acor PASCAL	219
26-2225 Model 3 Acor PASCAL	219
26-2226 Model 3 Acor PASCAL	219
26-2227 Model 3 Acor PASCAL	219
26-2228 Model 3 Acor PASCAL	219
26-2229 Model 3 Acor PASCAL	219
26-2230 Model 3 Acor PASCAL	219
26-2231 Model 3 Acor PASCAL	219
26-2232 Model 3 Acor PASCAL	219
26-2233 Model 3 Acor PASCAL	219
26-2234 Model 3 Acor PASCAL	219
26-2235 Model 3 Acor PASCAL	219
26-2236 Model 3 Acor PASCAL	219
26-2237 Model 3 Acor PASCAL	219
26-2238 Model 3 Acor PASCAL	219
26-2239 Model 3 Acor PASCAL	219
26-2240 Model 3 Acor PASCAL	219
26-2241 Model 3 Acor PASCAL	219
26-2242 Model 3 Acor PASCAL	219
26-2243 Model 3 Acor PASCAL	219
26-2244 Model 3 Acor PASCAL	219
26-2245 Model 3 Acor PASCAL	219
26-2246 Model 3 Acor PASCAL	219
26-2247 Model 3 Acor PASCAL	219
26-2248 Model 3 Acor PASCAL	219
26-2249 Model 3 Acor PASCAL	219
26-2250 Model 3 Acor PASCAL	219
26-2251 Model 3 Acor PASCAL	219
26-2252 Model 3 Acor PASCAL	219
26-2253 Model 3 Acor PASCAL	219
26-2254 Model 3 Acor PASCAL	219
26-2255 Model 3 Acor PASCAL	219
26-2256 Model 3 Acor PASCAL	219
26-2257 Model 3 Acor PASCAL	219
26-2258 Model 3 Acor PASCAL	219
26-2259 Model 3 Acor PASCAL	219
26-2260 Model 3 Acor PASCAL	219
26-2261 Model 3 Acor PASCAL	219
26-2262 Model 3 Acor PASCAL	219



Continued from p. 39

menu is Make Basic Lines, which takes everything already entered (saved in a collection of disk files) and pulls it all together into a single, functioning Basic program. You must answer a few prompts, but the process is nearly automatic. The resulting program contains enough comments so that most people familiar with Basic can modify any of it they choose.

But you aren't finished yet. The Producer has created a program whereby you can input data, store it on disk, and edit it at will. But the report structures need to be defined to make that data useful. Once again there is a menu option, Build Reports, that does most of the work.

While the report generator is flexible, it isn't as impressive as the rest of the package. You select which fields of each record to print and in what order. Also, for each report, you can predefine a range of records used to generate the report, or define prompts so the user can make the selections. You can also define a report to create mailing labels.

The Producer lets you define up to nine different report forms for each data-handling program. The different reports will appear on a menu available to the user of the final program.

## The Freeform Report Generator

The format of the reports generated is limited unless you use the Freeform Report Generator (available with the enhanced Producer package). This program is the best part of the entire package. It lets you use a variety of report formats, complete with extra calculations, subtotal fields, and grand totals. You can even combine information developed with two or more Producer-generated programs if you have some Basic programming skill.

While the Freeform Report Generator is the most complex part of The Producer, it's difficult to imagine any data base report it couldn't generate. But, the Basic programs it does create are the only part of the package that operate more slowly than I would like.

When you're finished developing both the data-entry programs and the final report forms (which you can add to or modify at any time), you're ready to put all of it together in a Basic program. The last selection from the

main menu is Build Program. After answering a few simple questions, The Producer does all the work for you. You can run the final product either under the tiny DOS supplied or transfer it to a DOS of your choice. You could also compile the program with Microsoft's Bascom, though I haven't tried it.

No matter how complex your program development, the finished product is easy to use. It opens with a combination logo/menu page (you can create your own logo if you want) from which you can enter new data for the data base, edit data previously entered, reorganize the structure of a data base for faster access, perform global search and replace operations on your data, go to a report menu, or exit from the program. All of the standard operations are easy to perform.

## Weaknesses

The Producer does have a few weaknesses. First, when defining the record form for the data base, you're limited to information you can fit on a single screen. You can define a total of 32 fields, and the total possible length of each record is limited to 251 bytes. The Producer uses variable-length random-access records to store information, and needs 5 bytes of each record for its binary-tree organization. If you want to use The Producer on NEWDOS80, which allows records longer than 256 bytes, you can alter a Producer program to increase record size, but I haven't yet needed to try.

The system uses a special form of Trashman to speed up string handling and avoid long garbage collection pauses. In general, everything (except reports created with the Freeform Generator) runs fast enough so that all the disadvantages of Basic seem to have been avoided.

The Producer expects that you will want to enter all the string data in uppercase. You can use mixed case easily while creating a program, but only with some unnecessary difficulty in the final program. Such a restriction would make sense on a Model I, but not on a Model III.

The Producer's documentation says that a technical manual was to be available by early 1984, but when I called about it, I was told that no one had even started to write it yet. A quarterly newsletter, as well as techni-

cal help by phone, is available to registered owners.

Overall, The Producer is an excellent package. I've used it to create three separate and very different types of data bases and found it capable of doing everything I wanted it to. If you are looking for a flexible data base manager, seriously consider The Producer. ■

## CompuServe on \$5 a Day

by Gary A. Shade

**H**ow to Get the Most Out of CompuServe is one of the best books I've read. It not only covers the major areas of this mammoth consumer information service in an easy-to-read manner, but it can save you money. It was a pleasure to read, which is something I can't say about most computer-related books.

Information services like CompuServe are the fastest-growing segments of the telecommunications industry. All services of this type charge for the amount of time you go on-line. Many people (myself included) have found this to be costly, especially when you're first learning to use the system. Charles Bowen and David Peyton recognized the shortcomings of CompuServe's documentation. This book will eliminate your fear and apprehension, and ultimately save you money in connect charges.

The 277-page book is arranged in lessons, each dealing with a different

## How to Get the Most Out of CompuServe



Charles Bowen and David Peyton  
Bantam Books Inc.  
666 Fifth Ave.  
New York, NY 10103  
277 pp. spiral bound  
\$12.95

Well written?	★★★★★
Organized?	★★★★★
Thorough?	★★★★★
Readable?	★★★★★

# YOUR BEST BUYS ARE WITH SOUTHWESTERN DIGITAL

## TANDY 1000 / 1200

TANDON DOUBLE SIDED FULL SIZE DRIVES BARE .....	\$189.
TANDON DOUBLE SIDED FULL SIZE DRIVE WITH CASE .....	\$239.
TANDON DOUBLE SIDED 1/2 HEIGHT DRIVES BARE .....	\$159.
TANDON DOUBLE SIDED 1/2 HEIGHT DRIVE WITH CASE .....	\$209.
64K MEMORY (9 CHIPS) .....	\$ 50.
HAYES 1200B .....	\$399.
HERCULES COLOR CARD .....	\$209.
HERCULES GRAPHICS CARD .....	\$379.
PERSYST COLOR CARD .....	\$209.
PERSYST MONICHROME CARD .....	\$259.
QUADRAM COLOR CARD .....	\$219.
QUADRAM EXPANDED QUADBOARD OK .....	\$249.
QUADRAM QUADBOARD II OK .....	\$249.
QUADRAM 512+ 64K .....	\$249.
QUADRAM PARALLEL BOARD WITH 8' CABLE .....	\$ 84.
QUAD I/O PARALLEL, SERIAL, CLOCK, AND GAME	
PORT CARD .....	\$189
SEATTLE RAM +6 OK .....	\$229.
SEATTLE RAM +3 OK .....	\$199.
SEATTLE RAM + OK .....	\$149.
STB SUPER RIO 64K .....	\$349.
STB RIO 64K .....	\$329.

## MODEL III / IV

MODEL 3/4 RS232C KIT .....	\$ 59.
MODEL 3/4 DRIVE KIT WITHOUT DRIVES .....	\$190.
MODEL 3/4 DRIVE 0 UPGRADE .....	\$339.
MODEL 3/4 DRIVE 1 UPGRADE .....	\$149.
MODEL 3/4 DRIVE 0 AND 1 UPGRADE .....	\$499.
MODEL 3 16K UPGRADE KIT .....	\$ 13.
MODEL 4/4P 64K UPGRADE .....	\$ 45.
PAL FOR MODEL 4 64-128K UPGRADE .....	\$ 17.
MODEL 1/3/4 EXTERNAL DISK DRIVE .....	\$169.
MODEL 1/3/4/4P PRINTER CABLE .....	\$ 19.
TANDON SINGLE SIDED 1/2 HEIGHT BARE DRIVE .....	\$129.
TANDON DOUBLE SIDED 1/2 HEIGHT BARE DRIVE .....	\$159.
TANDON SINGLE SIDED FULL SIZE DRIVE .....	\$149.
TANDON DOUBLE SIDED FULL SIZE DRIVE .....	\$189.

## COLOR COMPUTER

DRIVE 0 FOR COCO .....	\$279.
DRIVE 1 FOR COCO .....	\$169.
DRIVE 0 & 1 FOR COCO .....	\$428.
64K KIT (8 CHIPS) .....	\$ 45.
HJL KEYBOARD .....	\$ 69.
MICRONIX KEYBOARD .....	\$ 69.
KEYTRONIC KEYBOARD .....	\$ 79.
PARALLEL PRINTER ADAPTER .....	\$ 50.

### Ordering Information

All prices reflect a pre-made discount for cash, Visa, MasterCard. Orders are at regular price (add 5%). Mail your payment directly to us or call your order in today. All non-certified funds are held for proper clearance.

## PRINTERS

OKIDATA 82 .....	\$329
OKIDATA 93 .....	\$689.
OKIDATA 84 .....	\$875.
PANASONIC 1090 .....	\$279.
PANASONIC 1091 .....	\$339.
PROWRITER 8510 AP .....	\$319.

## DISKETTES

FLIP AND FILE 50 DISKETTE HOLDER .....	\$ 14.
VERBATIM 525-01 DATALIFE BOX OF 10 SS/DD .....	\$ 20.
VERBATIM 550-01 DATALIFE BOX OF 10 DS/DD .....	\$ 26.

## BUFFERS

QUADRAM MICROFAZER PRINTER BUFFER 8K .....	\$129.
EACH ADDITIONAL 8K .....	\$ 6.

## MODEL 1000 HARD DRIVE

# \$775.

10 MEGABYTES READY TO PLUG IN AND GO !

Why waste money? This Hard Drive mounts internal to upgrade your 1000 to the storage capacity of a 1200.

Installation only requires a screwdriver.

## THIS MONTHS SPECIAL

### TECHMAR

### GRAPHICS MASTER

SAVE \$200.

# \$499.

regular \$699.

**SOUTH** 444  
**SW** **WESTERN**  
**D** **DIGITAL**

1-713-480-3296

2515 W. Main #337, Houston, Texas 77098



aspect of the system. You start with the basics: logging on, changing your password, and configuring your system. Each excursion you make on CompuServe builds on what you learned in the previous lesson, giving you the knowledge and confidence to explore further.

The authors state that using the lessons will amount to approximately \$36 worth of on-line time, according to current CompuServe rates. But they demonstrate so many shortcuts and advanced features that the charges seem trivial. Even if you plan on only being an occasional user, the \$36 is still a wise investment.

Bowen and Peyton discuss and access every phase of CompuServe within the lessons, from retrieving the weather forecast for your area to using the bland but popular CB simulator. The lessons include the commands necessary to efficiently use each service. Many of the tips have already cut my on-line time and costs.

## Full Coverage

Both authors have been sysops (system operators) for various CompuServe special-interest groups (SIGs), so they know their way around the system. They even take you on a tour of The Good Earth SIG (HOM-145), of which Dave Peyton is the sysop.

A trip to the new Compu-U-Store is one of the topics discussed in Chapter 14. A consumer can search the store for an item (over 50,000 are stocked) and order it through this service, which offers goods at a discount. While there is a membership fee for using the Compu-U-Store, the authors walk you through by using the free demonstration.

Other topics and lessons include banking by computer, the electronic mall, financial services, and how to buy software through CompuServe. The reader is shown how to prepare an electronic message through e-mail (electronic mail) and how to post it. Similarly, the authors show how to leave a message on the national bulletin board, which all CompuServe subscribers can access and read.

Advanced lessons demonstrate how to turn off the CompuServe menus (saving you time and money) and how to create your own custom menu. An "On-Line Survival Kit" is included in the Appendix that sum-

marizes the commands used in the different areas. It is arranged in a logical, easy-to-reference manner.

## Conclusion

I've been a CompuServe subscriber for nearly three years and I feel comfortable with the services I normally use. Yet I still felt intimidated by the costs of learning new aspects of the network.

During one of my first experiences with CompuServe, I found myself watching screen after screen of text roll by without knowing how to stop it. I frantically searched the manual trying to find the code to terminate it. In frustration, I turned the power off to the modem, disconnecting myself. After calming down, I realized I had just thrown away a half hour of the free time given to new subscribers. I'm sure many other people have had the same type of experience.

The alternative to purchasing *How to Get the Most Out of CompuServe* would be to order the many different user manuals from CompuServe, which explain the areas within the network. But these do little to eliminate the intimidation, confusion, and frustration felt by new users.

This book will save you time and money, from log-on to sign-off. It is for anyone interested in using CompuServe more efficiently, whether a first-time user or experienced veteran. ■

## Great Zeus: A Solid Model I/III/4 Editor/Assembler

by Ronald A. Cangro

When I first got Cosmopolitan Electronics' Zeus Editor/Assembler, I was a little disappointed to find that it had a line-oriented rather than a screen-oriented editor. But my apprehension dissipated when I used the system and found it to be fast, versatile, and full of features not found in other editor/assemblers.

Zeus combines the best characteristics of both a line and a screen editor. You can edit anywhere on the screen by moving the nondestructive cursor, but program changes affect the current line only, speeding correction time. And the assembler supports some impressive features: multiple ex-

pressions on a single line, a three-pass assembly operation that significantly speeds up assembly time, comment blocks at the beginning of the object code, and labels. While Zeus lacked a few things, like a macro capability, a built-in debugger, a direct assembly to memory, tape input/output, and a cross-reference facility, it's a good package for developing small- to medium-sized programs.

## The Editor

The disk has its own operating system, MULTIDOS (also manufactured by Cosmopolitan Electronics), that runs on a Model I, III, or 4. When you boot up Zeus, the familiar DOS logo appears. Loading Zeus from disk automatically puts you in the edit mode.

The Zeus editor has two modes of operation: line-oriented and character-oriented. On boot-up, you're in the line-oriented mode and you invoke all commands with a single keystroke. Most of the letters correspond to the functions they perform: L loads a source file, D deletes a line, and I lets you insert code (see Table 1 for a complete list of commands).

Once you load text in the buffer, you can scroll through it; you display a full page of text (16 lines) by pressing the enter key.

Edit commands let you find specific

## Zeus Editor/Assembler



Cosmopolitan Electronics Co.  
5700 Plymouth Road  
Ann Arbor, MI 48105  
313-688-6660  
Models I, III, and 4  
32K RAM  
One disk drive  
\$79.95

Easy to use? ★★★★★☆  
Good docs? ★★☆☆☆☆  
Bug free? ★★★★★☆  
Does the job? ★★★★★☆

## 70 INCOME TAX PROGRAMS

(For Filing by April 15, 1985)  
TRS-80\* Models I, II, III, 4, 12 & 16

### FEATURES: —

1. Menu Driven.
2. "Save on Disk"
3. BASIC, Unlocked, Listable
4. Name/SS No./F-S carried over
5. Inputs on screen before printing
6. I.R.S. approved REVPROC format printing
7. Prints entire Form/Schedule
8. Calculates Tax etc.
9. For Mod. III/4, CONVERT
10. For Mod. 12/16, use 2.0b
11. Use GREENBAR in triplicate — don't change paper all season!
12. Our 6th Year in Tax Programming
13. We BACK-UP our programs!

For the Tax Preparer, C.P.A., Lawyer and Individual. 70 Tax Programs on 12-5 1/4" Format disks, or on 3-8" Format disks. Order only the disks you'll use.

Programmed for easy-use. Follow the Form or Schedule closely. Check-points along the way. Results on screen before printing.

70 TAX PROGRAMS include: Forms 1040, 1040A, 1120, 1120S, 1065 and 1041. Schedules A, B, C, D, E, F, G, R, SE and W. Forms 1116, 2555, 2106, 2119, 2210, 2440, 2441, 3468, 3800, 3903, 4136, 4137, 4255, 4562, 4684, 4972, 4797, 5695, 5884, 6251, 6252 and 6765.

Also we have TAX PREPARER HELPER includes 12 PROGRAMS such as INCOME STATEMENT, RENTAL STATEMENT, SUPPORTING STATEMENT, IRA, AGRS, 1040/ES, ADD W-2's, PRINT W-2's and others.

5 1/4" disks at \$24.75; 8" disks at \$99. Postpaid. Tryout disks available.



Write:—

### GOOTH TAX PROGRAMS

931 So. Bemiston • St. Louis, Mo. 63105

\*T.M. Reg. by Tandy Corp. Ft. Worth, Tx.



### EPROM PROGRAMMING SYSTEM For TRS-80 MODELS I, III, OR IV

1. Program contents of buffer to EPROM.
2. Verifies contents of buffer against EPROM.
3. Reads contents of EPROM to TRS-80 buffer.
4. Checks if EPROM is erased.
5. Displays contents of buffer.
6. Ability to edit buffer from TRS-80 keyboard.
7. Reads both prom image and command files from disk.
8. Stores prom image files to disk.
9. Fast program mode for duplicating EPROMs.
10. Software sets up programming parameters from EPROM type.

MODEL EP-2A-79 EPROM PROGRAMMER, TR-24 parallel interface, disk software (specify TRSDOS or CP/M), and personality module PM-5 for programming 2716, 2758 EPROMs. \$225.00

Personality modules available for 2708, 2716, TMS2716, 2732, 2732A, 2532, 2764, 2564, 27128, and MCM68764 EPROMs; 2816A EEPROM; 8751, 38E70 MPU \$17 TO \$35.

Optimal Technology

Earlysville, Va 22936

804-973-5482

✓201

# IBM Compatible

## WILL YOU BUY COMPATIBLE?

## (OR) WILL YOU PAY TOO MUCH?

NEW

Ask About Our  
"30 DAYS  
Buy-Back-Policy"

MODEL 1200 640K

IBM  
COMPATIBLE

1 DRIVE PLUS 10 MEG

HARDDRIVE  
BUILT-IN

MODEL 2000 768K

1 or 2 DRIVES PLUS 10 MEG  
HARDDRIVE  
BUILT-IN

"MANUFACTURER'S WARRANTY  
NATIONWIDE"

SAVE SALES TAX\*  
PLUS DISCOUNT

\*TEXAS RESIDENTS ADD ONLY 4 1/8%

SERVICE AND  
WARRANTY NATIONWIDE

## FORT WORTH COMPUTERS

WE ARE SERIOUS ABOUT SAVING YOU MONEY

(Located 30 miles from Fort Worth)

377 Plaza • GRANBURY • NR FORT WORTH, TEXAS 76048

CALL FREE NUMBER: 1-800-433-S-A-V-E

Monday thru Friday — 9:00 a.m. to 5:00 p.m. Texas Time  
(Order Inquiries/Customer Service &) IN TEXAS: 817-573-4111

✓214

TM: INTERNATIONAL BUSINESS MACHINES INC.



text character sequences, exact line numbers, and even lines referenced by a specific label. And you can insert text at any time with dynamic line renumbering, allowing unlimited text insertion between any two lines.

You can edit any character within a specific line by using the Edit command, which puts you in the character-oriented edit mode. This is similar to the Basic interpreter editor, with one exception: you see exactly what you're editing at all times. The nondestructive cursor moves left and right over the line, and you use simple control sequences to delete, insert, or overwrite a character, or to move to the end of a line. Use either the down-arrow or clear keys as the control key.

The editor allows a global search and replace of a particular string. For example, you could change all occurrences of STRING1 to STRG1 in one operation. Single-quoted text and comments remain unaffected unless you specify that option. This is a flexible and useful command although it doesn't work on opcodes and operands. You can also move or duplicate a line (or group of lines) anywhere in the text buffer.

It's possible to display the amount of memory the source text, symbol table, and Get file buffers use, as well as how much memory you have left. This is helpful in gauging where to split your source text.

Although you probably won't realize it until it's too late, Zeus's most useful editing command is X. You use it to recover source text when restarting Zeus. You only have to crash your computer once to appreciate it.

The editor also checks every source line for correct syntax as you enter it. It even checks the source code that you load from an ASCII file or an ED-TASM format file before putting it in memory. This saves a lot of time tracking down elusive syntax errors during assembly.

Since Zeus allows editing and assembling without destroying the source code in memory, you may think this means there isn't much room left for serious programming. But the program allows 34K for source and symbol code, and supports the Get pseudo-op that makes it possible to break your source code into modules and store them on disk. The assembler then reads the disk files in sequence. You could actually use the 34K for symbol table storage only.

One handy feature that Zeus lacks is a keyboard macro capability, which would have made it easier to enter commonly used phrases and words with a single keystroke.

## The Assembler

The assembler has a rich assortment of features. Table 2 lists the available pseudo-ops. It supports the common

Intel and Zilog pseudo-ops, including multiple expressions on the same line with the DB, DW, and equivalent pseudo-ops. This feature alone makes it worth the price.

It handles conditional assemblies using the If...End...If clause and an ERR error switch. Zeus also provides an assortment of subcommands to control assembly listing and printout, error-handling, object-code generation, and symbol tables. Table 3 shows the assembler subcommands available.

While the assembly is in progress, you can pause and restart the listing. It uses 16-bit operations while evaluating expressions. It does multiplication, division, addition, subtraction, and modulo arithmetic as well as the logical Or, And, left and right shift, and exclusive Or in label evaluation.

One of Zeus's unique features is its three-pass operation. During the first pass, the assembler creates the symbol table and defines the values of the DS, End, EQU, and ORG pseudo-ops. After this phase, you can reference all the lines by label names. During the second pass, the assembler does the actual assembly and directs output to the screen and object file. It then sets a flag. All the additional assemblies with this flag set will proceed with pass three; an instant assembly on all processed source code in the buffer. This definitely speeds up development time.

Command	Description
A	Assemble source code
B	Command mode calculator
C	Global change
D	Delete line(s) from the text buffer
E	Edit specific text line
F	Print line with the specified label
G	Printer format command
H	LPRINT line(s)
I	Insert line(s)
J	LPRINT raw data
K	Kill file
L	Load file
M	Move/duplicate text line(s)
N	Reset (new) text buffer
O	Opcode/operand Reference
P	Print line(s)
Q	Quit/exit
R	Reference
S	Save file
T	Print sorted label table
U	Memory used
X	Recover source text on reentry

Table 1. Zeus editor/assembler commands.

Pseudo-op	Description
COMM	Comment
DEFB or DB	Define byte
DEFL or DL	Define label
DEFM or DM	Define message
DEFS or DS	Define space
DEFW or DW	Define word
End	Terminate assembly
ENDIF	Delimit conditional assembly
ERR	Abort assembly
EQU	Equate
Get	Include source from disk file
If	Begin conditional assembly
List	Control printing
ORG	Origin
Page	Eject to top-of-form
SBTL	Subtitle
TITL	Title

Table 2. Assembler pseudo-ops.

## PROGRAM PACKAGING

Complete line of program packaging.

- Tandy 2000 style cloth binders & slips for 5 1/2 x 8 1/2, \$10.50; 10 +, \$9.50.
- Vinyl binders for 8 1/2 x 11 page size. Clear pockets on front and spine for your program identification. Excellent quality.

Ring	1-9	10-50	100 +
1"	4.00	3.25	2.75
1 1/2"	5.00	4.25	3.75
2"	5.50	4.75	4.25

- Vinyl portfolios for games and utilities. For 5 1/2 x 8 1/2 page, with clear pocket on cover, pockets inside for disk and manual.

1-9 \$2.50; 10-49 \$2.25; 50 + \$2.00.

- Many other items for software developers and users. FREE 32 page CATALOG. Min. order \$35.

**ANTHROPOMORPHIC  
SYSTEMS, LIMITED**

## ELEPHANT PREMIUM DISKS

Certified error free. Meets 150% of ANSI standard. Static free plastic packaging to protect your data. Unconditional warranty. Tyvek envelopes, labels and hub rings. Boxes of 10.



	List	1	2-9	10 +
SS/DD	38.50	23.00	19.25	18.00
DS/DD	48.00	28.00	24.00	22.50
DS/QD	67.00	37.50	33.50	32.00

These are the NEW *Silver Premium* disks. Don't confuse with the less desirable yellow package.

376 E. St. Charles Road  
Dept. 80, Lombard, IL 60148  
(312) 629-5160

## UNLIMITED PROFIT POTENTIAL

**WATCH OUT WALL STREET!!** Now available on floppy disk for brokers and active traders. The AMAZING computer program **STOCKER1** uses new Moving Window-Spectral algorithm to forecast stock/commodity market **TURNING POINTS**—not mere trend line/moving averages. Affordable! Easy to use!

**USED BY STOCK/COMMODITY BROKERS & ACTIVE TRADERS**  
Perhaps you too are ready for the **STOCKER1** challenge!

### NEW!

**COMPARE** Your own personal forecast  
— **STOCKER1** — forecast for the Dow Jones industrial average daily closing, with your own method

Dow Jones industrial average  
No. of forecast periods: 16 23 31 2 1 0 0 0 0  
Maximum of error: 0.1223344544677889

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

Plot of actual and forecast for comparison

**STOCKER1** available for:  
IBM PC MS-DOS  
APPLE II, II+, IIe Z80CARD  
TRS80 MOD III, 4, II, 12, 16  
TANDY 2000  
48K MINIMUM  
MS-DOS

**\$299 MASTER/VISA/CHECK**  
INCLUDES FREE HOUR  
IN MODEL SERVICE

**ENGINEERING  
MANAGEMENT  
CONSULTANT**

P.O. Box 312  
Fairfax, VA 22030  
Tel: (703) 425-1296

✓172

WEEKLY / MONTHLY / QUARTERLY too

Invest Trade Options Futures

Does your broker use **STOCKER1**?

# Tidbit# 17

I used to wonder why MULTIDOS disks provide only 75K RAM of free memory in double-density. That was before I realized that I could get 349.5K of memory as opposed to a skimpy 75K with the quick and easy method described here.

First, at the track count prompt, invoke the back-up command using drive zero as the source drive. If you've previously formatted the disk, type in Y to format the 96 tracks; otherwise, the computer does this automatically.

The duplicator program verifies sectors and tracks up to track 35, where it stops and prompts you to press the enter key, responding with the "Data record not found during read" message. Ignore this and type in backup again. Now repeat the procedure described above. This time, however, don't reformat the disk. By not reformatting, you're able to copy the rest of the disk by skipping the verification process.

Now follow the prompts, and when finished, press the enter key, making sure that you have a MULTIDOS system disk in drive zero. To check your free memory, call up a directory of the original disk. You should have a disk with 96 tracks and 349.5K of free memory.

*Barry LaLone  
Lake Orion, MI*

## NEW PRINTERS ADDED! FIND YOURS BELOW.

Good This Month

## RIBBON SALE

## EXACT REPLACEMENTS

RADIO SHACK • CENTRONICS • COMMODORE • EPSON • ANADIX • BASE 2 • IBM • NEC • C. ITOH • DEC • OKIDATA • OTHERS

PRINTER MAKE, MODEL NUMBER (Contact us if your printer is not listed. We can probably RELOAD your old cartridges.)	RIBBON SIZE Inches by Yards	INSERTS EZ-LOAD™ DROP IN, NO WINDING! EXACT REPLACEMENTS made in our own shop cartridges not included.	RELOADS You SEND your used CARTRIDGES to us. We put OUR NEW INSERTS in them.	NEW CARTRIDGES (from the various manufacturers. Subject to availability.)	SILVER DOLLAR WIND TO LOAD WHY DO WE SELL THESE? This is the type ribbon you get if you order from our fel- low advertisers. We sell them for less since we make them ourselves. Do you really like the mess and inconvenience of unwinding and dumping this type ribbon into a waste- basket or out on a newspaper and/or winding it into your cartridge? We don't know why these are being sold. Com- puters should simplify your life, not make it more com- plex just to save a few pen- nies. You are welcome to order these if you cannot af- ford our EZ-LOAD™ IN- SERTS, RELOADS, or NEW CARTRIDGES. But BEWARE! You now know how to avoid disappointment. One more caution: be sure to check the length of any ribbon BEFORE you buy it. For instance, an MX-100 ribbon should be 30 yards long, not 20 as in the MX-80.
BASE 2 - DIP 81/82/84/85 - MPI 88/89/GX	1/2x20	\$15/3 \$54/12 \$288/72	\$7/1 \$6 ea 2 or more	\$20/2 \$57/6 \$ 99/12	
CITOH Prowriter 1550/8510 - NEC 8023/8025	1/2x18	\$15/3 \$54/12 \$288/72	\$7/1 \$6 ea 2 or more	\$15/2 \$42/6 \$ 78/12	
CITOH Starwriter F10Y CARBON FILM BLACK	5/16	\$24/6 \$42/12 \$234/72	\$5 ea 3-11 \$4 ea 12 or more	\$18/3 \$60/12 \$348/72	
DIABLO HYTYPE II FABRIC BLACK	5/16x17	\$21/3 \$78/12 \$510/72	\$8/1 \$7 ea 2 or more	\$18/2 \$51/6 \$ 96/12	
OKIDATA-PACEMARK 2350-2410 Black	1/2x100	\$30/3 \$108/12 \$576/72	\$20/1 \$18 ea 2 or more	\$32 Each	
MICROLINE ML80/82/83/92/93	1/2x16			Spool \$38/12	
RADIO SHACK MICROLINE ML84	1/2x40			Spool \$ 84/12	
CARBON FILM - DWP-210 Black (1445)	5/16x145	\$24/6 \$42/12 \$234/72	\$5 ea 3-11 \$4 ea 12 or more	\$18/3 \$60/12 \$348/72	
DAISY WII-DWP-410-510 Black (1419)	1/4x145	\$24/6 \$42/12 \$234/72	\$5 ea 3-11 \$4 ea 12 or more	\$18/3 \$60/12 \$348/72	
Red, Green, Blue, Brown Colors (1419)	1/4x130	\$30/6 \$54/12 \$288/72	\$6 ea 3-11 \$5 ea 12 or more	\$21/3 \$72/12 \$420/72	
FABRIC (Long-Life) DWP-210 Black (1458)	5/16x17	\$21/3 \$78/12 \$510/72	\$8/1 \$7 ea 2 or more	\$18/2 \$51/6 \$ 96/12	
DAISY WII-DWP-410/510 Black (1449)	1/4x25	\$21/3 \$78/12 \$510/72	\$8/1 \$7 ea 2 or more	\$18/2 \$51/6 \$ 96/12	
LPI-II-IV CENTRONICS 730/737/739/779 (1413)	9/16x16	\$12/3 \$45/12 \$252/72			
DMP-200,120,430 (1296) (1483)	1/2x20	\$15/3 \$54/12 \$288/72	\$7/1 \$6 ea 2 or more	\$27/2 \$81/6 \$162/12	
DMP-500 (1482)	1/2x20	\$15/3 \$54/12 \$288/72	\$7/1 \$6 ea 2 or more	\$24/2 \$72/6 \$144/12	
DMP-2100 - TOSHIBA P1340,1350,51 (1442)	1/2x20	\$15/3 \$54/12 \$288/72	\$7/1 \$6 ea 2 or more	\$15/2 \$42/6 \$ 78/12	
DMP-100, LP VII-Commodore 1525, Gorilla Banana (1424)	Inker/Loop			\$16/2 \$48/6 \$ 96/12	
LP III-V (1414)	1/2x15	\$15/3 \$54/12 \$288/72	\$7/1 \$6 ea 2 or more	\$15/2 \$42/6 \$ 78/12	\$12/3 \$44/12 \$252/72
DMP-400/420, LP VI-VIII (1418)	5/16x14	\$15/3 \$54/12 \$288/72	\$7/1 \$6 ea 2 or more	\$15/2 \$42/6 \$ 78/12	\$11/3 \$40/12 \$228/72
EPSON-LQ 1500	1/2x14	\$15/3 \$54/12 \$288/72	\$7/1 \$6 ea 2 or more	\$22/2 \$63/6 \$120/12	
-MX/FX/RX 70/80 - IBM PC	1/2x20	\$15/3 \$54/12 \$288/72	\$7/1 \$6 ea 2 or more	\$14/2 \$36/6 \$ 66/12	\$12/3 \$44/12 \$252/72
-MX/FX/RX 100 - IBM PC	1/2x30	\$18/3 \$66/12 \$360/72	\$8/1 \$7 ea 2 or more	\$18/2 \$51/6 \$ 96/12	\$15/3 \$54/12 \$288/72
COMMODORE 8023-P - CENTRONICS 152-2	1/2x12	\$15/3 \$54/12 \$288/72	\$7/1 \$6 ea 2 or more		
ANADIX 9000 Series	1/2x30	\$18/3 \$66/12 \$360/72	\$8/1 \$7 ea 2 or more		

**WORRIED ABOUT ORDERING BY MAIL?** Relax. We've been in business for many years and can please the smallest and largest accounts. You receive some of the finest ribbons available made of our own exclusive IMAGE PLUS™ fabric and carbon film. Our ribbons fit your printer exactly. **COMPARE**, but **BEWARE!** We order all our competitor's products and are amazed at what we get. We use the latest state-of-the-art production equipment and are blessed with a fine, dedicated staff. We guarantee everything we make, period. Our ribbons are made fresh daily and our goal is to ship your order within 24 hours. Write for our brochure and price list.

*B.L. Can*

President

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



**BCCOMPCO**  
800 South 17 Box 246  
SUMMERSVILLE, MO 65571  
(417) 932-4196



WE PAY UPS SHIPPING ON PREPAID ORDERS.  
PLEASE INCLUDE STREET ADDRESS for UPS DELIVERY.  
FOREIGN ADD 15% U.S. FUNDS

✓152



Another unique feature is the COMM pseudo-op. This generates a comment block at the beginning of the object file. It lets you identify your object code by listing the first portion or by using a disk-zap utility.

## Additional Assembler Features

Other features abound. The program has a built-in calculator that lets you convert from decimal to hexadecimal and back again. You can access this from the edit mode.

Many assemblers' weak point is in printing out the source listing. Zeus includes a configuration program; in addition to modifying object code to work with different disk operating systems, the ZCON program sets up printer defaults. You can specify the number of printed lines per page, number of characters per line, total number of lines per page, and whether to use a form-feed or line-feed top-of-form. You can output raw data to the printer at any time with the J command. This lets you send special printer codes even when you're in the middle of an edit session.

Labels have also been a sore spot in other assembler packages. Zeus allows every character and character case to be significant. This amount of flexibility makes the code almost self-documenting.

The disk operating system deserves some mention. You receive a minicopy of MULTIDOS called \*ZEUS\* supplied on a single-density disk. It has the capability of operating in double-density mode with automatic hardware recognition and automatic density recognition. Table 3 shows the library commands that are available in \*ZEUS\*.

## Documentation

If there's one area where Zeus could use some improvement, it's in the documentation. The problem is more of quantity than quality. What is documented is done fairly well. There's a section detailing each command operation, a fairly large part on the pseudo-ops, and a brief section explaining the creation of system disks and back-up copies.

The problem is the lack of a tutorial to show you how to load the editor, enter a simple program, then assemble and list it. As it is, a user is on his own and has to sort through the command

Command	Description
Append	Add one file to the end of another
Auto	Automatic, invincible execution of a command or executable file on power-up
Boot	Reboot the system
Clear	Clear memory from 5200 to TOPMEM
Clock	Enable/disable screen clock
CONFIG	Set default drive attributes on power-up (stepping speed, density, and number of sides)
Date	Set date
DIR	Print disk directory (5 options)
Dump	Transfer memory to disk file
Forms	Set printout parameters
Free	List available disk file space
Kill	Remove a file from the disk
LIB	Print a list of the library commands
List	List a file on the video screen
Load	Load an object file from the disk to RAM
Patch	Modify a disk sector
Print	List a file to the printer
Rename	Change a file name
RESTOR	Recover a killed file
SETCOM	Set RS-232 parameters (Model III only)
SETDIR	Alter directory address marks (Model I only)
Skip	Read a 40-track disk in an 80-track drive
Time	Set time
TOPMEM	Set upper memory limit
Verify	Reread disk sectors for errors
\$	Duplicate a single file (similar to Copy)

Table 3. \*ZEUS\* library commands.

examples to understand all of Zeus's features. I'm still not sure how to exit the program back to DOS without resetting the computer.

An index would also have been a useful addition, especially if the documentation were expanded. Also missing is a description of all the Z80 opcodes. The assumption is that the user is familiar with Assembly language and requires a fast, inexpensive, easy-to-use-assembler.

## Conclusion

Zeus is a system that should be used by people who require a powerful package to develop smaller programs. But for people who do a lot of sophisticated programming, it's limited without a macro capability, a built-in debugger, a direct assembly to memory, tape input/output, or a cross-reference facility.

On the positive side, it doesn't require disk overlays. The editor is very capable and as easy to use as a full-screen editor. Best of all, it isn't necessary to transfer it to another operating system because \*ZEUS\* is powerful enough all by itself.

Zeus is a logical progression from the popular EDTASM program. If EDTASM satisfies your programming needs, you may want to check out Zeus. ■

## This is TRSDOS 6.2

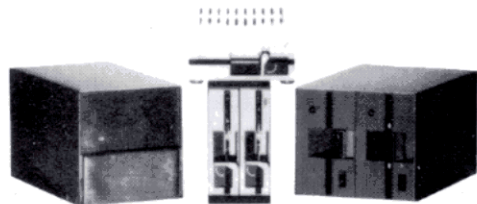
by Hardin Brothers

Logical Systems Inc. has made microcomputer history by publishing the (almost) complete source code for TRSDOS 6.2 in three volumes. To my knowledge, this is the first time that the source code for a new and living operating system has been published for distribution. Of course, these books aren't inexpensive; at \$99 apiece, they may have established a record as the most expensive paperback books ever published.

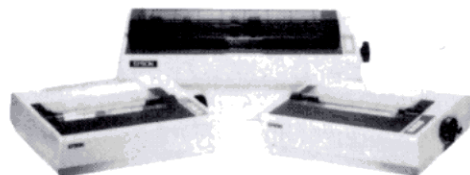
## Inside the Books

For your \$99, you get an 8½- by 11-inch book filled with commented TRSDOS source code. Volume 1, *The System*, contains the source code for Boot/SYS (or Lowcore), SYS0/SYS (also called Sysres, since it always re-

# DISPLAYED VIDEO IS DRIVING DOWN PRICES ON DISKS!



**FREE SHIPPING!**



## TEC'S NEW HALF-HIGH 40 TRACK DISK DRIVE W/CASE & POWER SUPPLY AT AN INCREDIBLE LOW PRICE!

ONE YEAR  
WARRANTY  
ON TEACS

**\$179.00!!!!**

ONE YEAR  
WARRANTY  
ON TEACS

TANDON 40 TRACK TM-100-1 W/CASE & POWER SUPPLY.....\$199.00

**"YOU CAN BUY THE REST BUT WHY NOT BUY ONE OF THE BEST!"**

TEAC'S NEW SLIMLINE 40 TRACK W/CASE & POWER SUPPLY .....\$205.00

TEAC NEW SLIMLINE DOUBLE SIDED 40 TRACK W/CASE & POWER SUPPLY .....\$240.00

TEAC NEW SLIMLINE DOUBLE SIDED 80 TRACK W/CASE & POWER SUPPLY .....\$285.00

DUAL VERTICAL CASE & POWER SUPPLY TO ACCOMMODATE TWO SLIMLINE DRIVES.

\$10.00 ADDITIONAL WITH SINGLE DRIVE PURCHASE

DV'S COLOR COMPUTER 1st DRIVE ONLY.....\$329.00

TWO DRIVE 5 1/4" CABLE (FOR MOST COMPUTERS).....\$23.99 WITH GOLD PLATED CONNECTORS

MODEL 1 DOUBLE DENSITY BOARD.....\$85.00

## SANYO COMPUTERS

MBC550-128K, 16BIT, ONE 160K DRIVE .....\$779.00

MBC550-128K, 16BIT, ONE 320K DRIVE .....\$849.00

MBC555 - 128K, 16BIT, TWO 160K DRIVES .....\$999.00

MBC555 - 128K, 16BIT, TWO 320K DRIVES .....\$1299.00

550 SYSTEMS - INCLUDE: MSDOS, WORDSTAR, CALCSTAR, & EASY WRITER SOFTWARE PACKAGES

555 SYSTEMS - INCLUDE: MSDOS, WORDSTAR, CALCSTAR, EASYWRITER, SPELLSTAR, MAILMERGE, & INFOSTAR SOFTWARE PACKAGES

COMREX AMBER MONITOR 9".....\$89.00

HAYES SMART MODEM 300 BAUD.....\$210.00 1200 BAUD.....\$485.00

ONE YEAR WARRANTY ON TEAC DRIVES/180 DAYS ON TEC & TANDON

## PRINTER PRICES

WE'RE NOT GOING TO MAKE YOU CALL FOR PRICES — HERE THEY ARE IN BLACK AND WHITE!!!

### EPSON

RX80 W/GRAPHTRAX PLUS .....\$275.00

RX80 FT W/GRAPHTRAX PLUS .....\$349.00

RX100 W/GRAPHTRAX PLUS .....\$495.00

FX80 W/GRAPHTRAX PLUS .....\$495.00

FX100 W/GRAPHTRAX PLUS .....\$699.00

LQ1500 200 CPS COMING SOON

1 YEAR WARRANTY ON EPSON PRINTERS

PRINTER CABLE 10' LONG W/GOLD PLATED CONNECTORS STARTING AT\$25.99

PR5000 DAISYWHEEL 15 CPS .....\$395.00

PR5500 DAISYWHEEL 20 CPS .....\$595.00

GEMINI 10X .....\$275.00

GEMINI 15X .....\$395.00

CITOH PROWRITER 8510 .....\$355.00

DWP210 .....\$559.00

DAISYWHEEL II .....\$1149.00

Visit our two  
retail locations at:

886 Ecorse Road

Ypsilanti, MI 48197

(313) 426-5086/(313) 482-4424

or

111 Marshall Street

Litchfield, MI 49252

(517) 542-3280

(517) 542-3939

(517) 542-3947

WE CARRY TRS80 & SANYO COMPUTERS



TO ORDER: Call (313) 426-5086 or (313) 482-4424 or (517) 542-3280

(517) 542-3939 (517) 542-3947

OR WRITE: DISPLAYED VIDEO 111 MARSHALL ST., LITCHFIELD, MI 49252

AUTHORIZED SANYO DISTRIBUTOR

**IMMEDIATE DELIVERY**

180 Days Parts and Labor Warranty  
DEALER INQUIRIES INVITED

\* TRS-80 is a trademark of the Tandy Corporation

Prices & Specifications subject to change without notice



mains resident in memory), SYS1 through SYS5 and SYS9 through SYS13.

Volume 2, *The Libraries*, contains the source code for the library modules SYS6 through SYS8. The final volume of the series, *The Utilities*, includes the source code for almost all the TRSDOS 6.2 utility programs.

The three books contain almost 1,100 pages of code, enough to keep even the most dedicated hacker reading and studying for weeks (if not months). LSI prefaces each program with a short description of the functions it performs. The comments throughout the books are sufficient to give an experienced Assembly-language programmer all the information necessary to understand the programs' inner workings (see the sidebar for examples from *The Source*).

## Who Needs These Books ?

Why would anyone want such a set of books? Radio Shack has exorcised most of the Model 4 TRSDOS bugs. And it's unlikely that anyone will use them to type in all 1,100 pages of code, since TRSDOS is distributed free with the Model 4/4P.

I think there are four important and likely uses for these books. First, some

people (including me) just like to know how things work. How does TRSDOS handle the video screen? How does it parse commands? What happens when you install Memdisk? If you want to know as much as possible about your Model 4, these books (along with Radio Shack's *Model 4*

*Technical Reference Manual*) will provide all the answers a software nut could want.

Also, you may want to make modifications to your personal copies of TRSDOS 6.2. Perhaps you'd like to reinstate the Kill command, in addition to Remove, from DOS Ready.

## Notes from *The Source*

by Hardin Brothers

Below are some examples of technical information culled from *The Source*. Be sure to make any DOS changes to a back-up copy of TRSDOS 6.2—not an earlier version—and to test the new code thoroughly before moving it to your working copies of the system disk.

● Generally, when you reboot your computer, programs in memory are left untouched. However, TRSDOS 6.2 uses memory locations 4300-43FF hexadecimal for the boot routine, so any program in that area will be destroyed.

● If you want to change the definition of the function keys temporarily while in Basic, the lookup table with their values is stored from 0918-091D hexadecimal. The values are stored in this order: F1, shift F1, F2, shift F2, F3, shift F3. You can POKE new values into those bytes, but the computer will react improperly if you try to define them as break, clear, or pause. Be sure to reset the values (or reboot the computer) before using any program that expects the F keys to have their original values.

● You need change only a single byte in SYS1/SYS to activate the Kill command in addition to Remove. LIB will also add Kill to the list of commands it displays if you add this patch:

```
PATCH SYS1/SYS.LSIDOS (X'2054' = "K")
```

● The @DATE SVC puts a formatted version of the system date into a buffer as MM/DD/YY. But it also returns with DE pointing to DOS's date storage area (DATES+0) at 0033H. The storage scheme is:

```

DATES+0 Year (80-87)
DATES+1 Day of month (1-31)
DATES+2 Month (1-12)
DATES+3 Bits 0-7 of day of year

```

```

DATES+4 Bit 0 = bit 8 of day of year
Bits 1-3 contain day of week
Bit 7 set if leap year.

```

You could find the day of the week in Basic with this code:

```

D% = ((PEEK(&H0037) OR 14)/2) - 1
D$ = "SunMonTueWedThuFriSat"
DAYS = MID$(D$, D%*3 + 1, 3)

```

● A 2-byte patch space in the Click/FLT makes the audible click operate on a specific key or set of keys. The current code is:

```

2474 0000 1060 DW 00
2476 201C 1070 JR NZ,LEAVE

```

Also, at 247A hexadecimal, the computer loads the D register with the click tone value and the E register with the click duration value. One interesting change to the Click/FLT is the following:

```
.Patch to CLICK/FLT.FILTER to make
. a beep only when <ENTER> is pressed.
```

```
.First, test for <ENTER>
X'2474' = FE 0D
```

```
.Set the duration
X'247B' = 80
```

```
.Set the tone
X'247C' = FF
```

```
.End of patch.
```

● I dislike the Device command default parameters. I'd much rather have the D parameter default to off and the B parameter default to on. This patch will accomplish that:

```
.Patch to change DEVICE defaults
.Apply to SYS6/SYS.LSIDOS
```

```
.Position to DEVICE Library command
L61
```

```
.Set D parameter to default D = N
X'241E' = 00 00
```

```
.Set B parameter to default B = YES
X'2580' = FF FF
```

```
.End of patch
```

## The Source:TRSDOS/ LS-DOS 6.2



Logical Systems Inc.  
8907 North 55th St.  
P.O. Box 23956  
Milwaukee, WI 53223  
800-248-3535

Volume 1-The System \$99  
Volume 2-The Libraries \$99  
Volume 3-The Utilities \$99  
\$249 for all three

Well written? ★ ★ ★ ★ ☆  
Organized? ★ ★ ★ ★ ★  
Thorough? ★ ★ ★ ★ ☆  
Readable? ★ ★ ★ ★ ★

The necessary bytes are sitting in SYS1/SYS's command interpreter just waiting for you to change a NOP byte (00H) to a 'K'. Perhaps you want to add your own supervisory calls (SVCs) or to determine the side effects of some of the present calls.

You could also use the books to create your own utility programs that take full advantage of what's already available with TRSDOS 6.2. I've experimented recently with a split-screen terminal program for CompuServe's CB simulator and special-interest group conference areas. I have the program working as a dumb terminal, but I'd like to add a capture buffer and other enhancements found in the TRSDOS's COMM program. After studying COMM's source code, I've found ways to add the appropriate patches. I won't have to spend hours duplicating work that has already been done.

Probably the most important purpose of the source code is to give software developers all the help they need in producing packages for the Model 4. The inner workings of the Model I/III ROMs have been published for several years, and have helped software writers considerably. A similar knowledge of the Model 4's operating system may (hopefully) lead to more interesting and complex programs for the Model 4.

## What's Missing

While these books are nearly complete, they do lack a few things. Whenever the code accesses the Model 4's hardware directly through a port, the source lines have been omitted but the object code is still present. I assume these omissions are made to respect Tandy's proprietary secrets and also to mark those sections of code that are specifically Model 4-oriented (the same code is essentially used for Model II, 12, and 16 computers, and LSI hopes that other manufacturers of Z80 computers will begin using TRSDOS 6.2 as well).

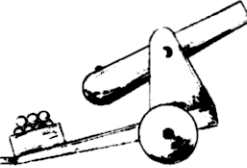
Also, the source code for the Help utility is missing from Volume 3. This last omission is unfortunate, because the Help command can be expanded to cover topics in addition to DOS commands. As of this writing, neither LSI nor Tandy has explained how to do so (I will, however, discuss how to add new Help files in a future install-

ment of The Next Step).

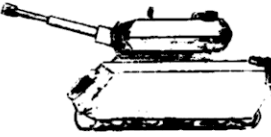
Missing from these books, of course, is the Basic source code (owned by Microsoft) as well as MODELA/III, probably for similar reasons. But I didn't expect to see either of those.

These books are an important addition to my library. It's one thing to be able to use TRSDOS 6.2 well: knowing the source code gives you more in-

sight into how programs interact with the system. Whether you should buy one or all of these books depends on your level of sophistication and the complexity of the programs you need to write. The wealth of information in these books isn't difficult to find or understand, but their cost may deter many hackers and hobbyists from buying them. ■



# COMBAT CHESS™



**For 1600 years Chess has challenged the greatest thinkers of mankind.**

Now in the computer age comes the greatest intellectual challenge of all, computer activated chess, with chess men that move continuously across the chess board, each seemingly on its own accord, but under your direction.

**COMBAT CHESS™** is a totally new dimension both in chess and in computer games. One or any number of chessmen can move continuously across the chess board each capturing or destroying the enemy automatically upon contact according to the rules of chess. You can program your army each time your turn comes around and then you are the observer as your orders are carried out.

Did chess play a part in the greatness of any of the statesmen of History? Perhaps you can discover the answer on your computer. Sharpen your intellect with **COMBAT CHESS**.

We guarantee that **Combat Chess** is the most exciting, the most intellectually stimulating, the most interesting and the most fun of any computer game yet invented or your money back. The game is fast or slow according to your desire and will liven up any party - Requires two players who challenge one another.

**INTRODUCTORY OFFER \$49.95** (Regular price \$69.50)

**Plus shipping - Visa/Mastercard OK - Model III and IV.**

**PROGRAMMERS** -- We will pay \$300 for the best, in our opinion, improvement of the **Combat Chess** disk plus we will pay a 3% royalty for a period of 2 years on any such improvements sold by us. We will also pay the same amounts for the best anti-pirate protection scheme submitted. All submissions must be in our office before May 1, 1985. Those accepted will be notified within 45 days. All submitters will receive a reply. Those wishing to submit a program for consideration may add \$5.00 for a source code disk listing the program in basic. No purchase is required.

## ALLIED SYSTEMS CO.

Trona, Calif. 93562      (619) 372-5355

Box 245      140



# PROJECT 80

Listing continued from p. 130

```

7067 E5      01070      PUSH    HL      ; THE STACK
7068 D5      01080      PUSH    DE
7069 3E10     01090      LD      A,10H      ;WRITE BYTE TO ENABLE
706B D3EC     01100      OUT     (TRSEXE),A  ; EXTERNAL I/O ACCESS
706D DBE0     01110      IN      A,(TRSRDI)  ;CHECK IF EXT. I/O INT.
706F CB5F     01120      BIT     3,A        ;I/O BUS INT.?
7071 201A     01130      JR      NZ,NOTHER ;IF NOT LOW, NOT HERE
7073 3E0C     01140      LD      A,0CH      ;GET OCW2 WORD FOR 8259A
7075 D328     01150      OUT     (PICP0),A  ;CHECK FOR 8259A INT.
7077 DB28     01160      IN      A,(PICP0)  ;GET 8259A RESPONSE BYTE
7079 CB7F     01170      BIT     7,A        ;INTERRUPT GENERATED?
707B 2010     01180      JR      Z,NOTHER  ;IF ZERO, NOT BY 8259A
707D CB27     01190      SLA      A        ;ELSE, DOUBLE VALUE TO
                                ; GET TABLE OFFSET
                                ;CLEAR UPPER BITS
707F E60F     01210      AND     0FH        ;POINT TO TABLE BEG.
7081 210070   01220      LD      HL,INTTBL  ;PUT OFFSET INTO E REG.
7084 5F       01230      LD      E,A        ;CLEAR UPPER OFFSET BYTE
7085 1600     01240      LD      D,0        ;POINT TO INT. VECTOR
7087 19       01250      ADD     HL,DE      ;GET LOW ADDR. BYTE
7088 5E       01260      LD      E,(HL)     ;INCREMENT TABLE PTR.
7089 23       01270      INC     HL        ;GET HI ADDR. BYTE
708A 56       01280      LD      D,(HL)     ;PUT ADDR. INTO HL
708B EB       01290      EX      DE,HL      ;JUMP TO THE SERVICE ROUT
708C E9       01300      JP      (HL)
                                ;
708D 21BC70   01320      LD      HL,RESTOR  ;GET RETURN ADDRESS OF ISR
7090 E5       01330      PUSH    HL        ; AND PUT IT ON THE STACK
7091 2A1270   01340      LD      HL,(VECTOR);GET ISR ADDRESS
7094 E9       01350      JP      (HL)        ;CALL THE SUBROUTINE
7095 1825     01360      JR      RESTOR      ;RESTORE STUFF AND RETURN
                                ;
7097 3A1170   01380      LD      A,(TIMCNT) ;GET INT. COUNTER
709A 3C       01390      INC     A        ;INC. IT FOR THIS ISR
709B 321170   01400      LD      (TIMCNT),A ;SAVE IT AGN IN MEM.
709E FE04     01410      CP      4        ;HAVE FOUR INTS. OCCRD?
70A0 200E     01420      JR      NZ,DONE    ;IF NOT, FINISH UP
70A2 AF       01430      XOR      A        ;ELSE, CLEAR COUNT
70A3 321170   01440      LD      (TIMCNT),A ; IN MEMORY.
70A6 3A1070   01450      LD      A,(PPIBYT) ;GET 8255A PORT B BYTE
70A9 C610     01460      ADD     A,10H      ;INCREMENT LED DISPLAY
70AB 321070   01470      LD      (PPIBYT),A ;SAVE BACK IN MEM.
70AE D321     01480      OUT     (PPIB),A   ;WRITE TO 8255A PORT B
70B0 3E24     01490      LD      A,24H      ;GET LOW TIMER COUNT BYTE
70B2 D324     01500      OUT     (PITT0),A  ;WRITE TO TIMER 0
70B4 3EF4     01510      LD      A,0F4H      ;GET HIGH COUNT BYTE
70B6 D324     01520      OUT     (PITT0),A  ;WRITE TO TIMER 0
70B8 3E20     01530      LD      A,20H      ;GET EOI (OCW2) CMD
70BA D320     01540      OUT     (PICP0),A  ;SEND TO 8259A
70BC 3E08     01550      LD      A,08H      ;WRITE BYTE TO ENABLE
70BE D3E0     01560      OUT     (TRSINE),A  ; EXTERNAL I/O INTS.
70C0 D1       01570      POP     DE        ;RESTORE REGISTERS
70C1 E1       01580      POP     HL        ; FROM STACK
70C2 F1       01590      POP     AF
70C3 FB       01600      EI              ;RE-ENABLE INTERRUPTS
70C4 C9       01610      RET              ;DONE - RETURN FROM INT.
7014         01620      END
00000 TOTAL ERRORS
25366 TEXT AREA BYTES LEFT

```

End

Continued from p. 130

one second. Using the 250 KHz clock, the count value of 0F424H results in a 0.25 second interrupt. Thus, four interrupts will make up one second.

The last part of the initializing section requires that we provide for other system interrupts. If an interrupt occurs and we determine that the 8259A is not interrupting the CPU, we jump to the location otherwise used by the system.

The interrupt service routine first sends a 0CH (OCW3) to the 8259A, telling the 8259A that we are using polled mode. The 8259A then sends back a value which tells the interrupt status of the controller (see Fig. 12). If the high bit (bit 7) is set, an interrupt is being requested. Also, if an interrupt is being requested, the highest priority interrupt is given by the lower three bits of the returned byte. This can be used as an offset into a table of ISR addresses (by first shifting it left one bit).

If the ISR determines that the 8259A did not generate the interrupt, service is passed to the normal TRS-80 ISR. Otherwise, it adds one to its count variable. If four interrupts have not yet occurred, it finishes by restarting the 8253 timer for another 0.25 second interrupt, and issuing a non-specific end-of-interrupt (EOI) to the 8259A via OCW2. This tells the 8259A that servicing is complete for the interrupt just required, and to arbitrate the next lower priority interrupt. Interrupts are then re-enabled, and a return from interrupt is executed.





**Happy!** YES, AND YOU CAN BE TOO. He is moving to the NEW...

TRS → IBM AT  
 APPLE → IBM PC/XT, Jr.  
 or  
 CP/M → Tandy 2000  
 DISK TRANSPORTER IBM PC ↔ Tandy 2000

They are all moving Important Data **FILES & PROGRAMS** to their new computers. The **FILE TRANSFER PROGRAM (FTP)** has conversion utilities and a small adapter for direct connection. **CALL US.** Our FTP can make you happy too.

IBM AT VERSION (WITH SPECIAL CABLE) \$224.95  
 FTP IBM PC/XT OR T2000 \$129.95  
 STATE COMPUTER MODELS WHEN ORDERING CA RESIDENTS 6.5% \$3.00 S&H

**PERSONAL  
 COMPUTER  
 PRODUCTS**

1400 COLEMAN AVE., SUITE C-18 SANTA CLARA, CA 95050  
 TELEPHONE (408) 988-0164 PHONE ORDERS  

IBM, TRS 80 & TANDY, APPLE, CP/M ARE RESPECTIVELY REGISTERED TRADEMARKS OF INTERNATIONAL BUSINESS MACHINES CORP., TANDY CORPORATION, APPLE COMPUTER INC., DIGITAL RESEARCH, INC.

## PROJECT 80

If the interrupt was found to occur from the 8259A, the count variable is cleared (to count four more interrupts) and the LED display is updated by 1. The service routine then finishes by re-starting the 8253 timer and sending the EOI to the 8259A.

### Conclusion

The 8259A interrupt controller provides more capability and flexibility than described here. If you are interested in some of the more advanced applications of the device, you should get a copy of the data sheet from Intel Corporation. Since the G.P. I/O board project also comes in CMOS (which may be important to some of you), the 8259A is available in CMOS from the same sources. ■

### 1983 Intel Microprocessor and Peripheral Handbook

Intel Corporation  
Literature Department  
3065 Bowers Avenue  
Santa Clara, CA 95051

### Zilog 1981 Data Book

Zilog, Inc.  
10340 Bubb Road  
Cupertino, CA 95014

### 1982/83 Mostek Z80 Designer's Guide

Mostek Corporation  
1215 West Crosby Rd.  
Carrollton, Texas 75006

Write to Roger C. Alford at Wash-  
tenaw Digital Systems, P.O. Box  
2014, Ann Arbor, MI 48106.

Quantity	Description	Distributor	Part Number	Price
1	8259A Programmable interrupt controller IC	JDR	8259	6.90
1	7416 Hex inverter/drivers (O.C.)(TTL) IC	JDR	7416	.25
1	74LS04 Hex inverter (LS TTL) IC*	JDR	74LS04	.24
1	74LS138 3-to-8 decoder IC*	JDR	74LS138	.55
1	74LS32 Quad 2-input OR gate (LS TTL) IC†	JDR	74LS32	.29
1	100 µF/35 V electrolytic capacitor (PC mount)*	RS	272-1028	.79
1	.1 µF/50 V disc capacitor*	RS	272-135	.25
6	1k ohm resistor (¼ watt)‡	RS	271-1321	.08
1	74LS74 Dual D-type flip-flop(LS TTL) IC§	JDR	74LS74	.35
1	8 pos. terminal block*	RS	274-687	1.89
1	2 pos. terminal block*	RS	274-656	.60
1	.1" matrix grid prototype board	RS	276-158	1.95
1	40 pos. cable header (W/W)Ω	DK	R241-ND	5.58
1	40 pos. ribbon cable edge connector Ω	DK	R503-ND	3.80
1	40 pos. ribbon cable socket connector	DK	R306-ND	3.73
1 ft.	40 cond. ribbon cable Ω	DK	R007-ND	0.00
1	50 pos. cable header (W/W)π	DK	R247-ND	6.93
1	50 pos. ribbon cable edge connector π	RS	276-1566	4.95
1	50 pos. ribbon cable socket connection π	DK	R307-ND	4.65
1 ft.	50 cond. ribbon cable π	DK	R008-ND	0.00

\* Stand-alone board only.

† Reset circuitry use and Model III/4 required.

‡ One less required for general-purpose I/O board addition. Two less required if reset circuitry not implemented.

§ Use with reset circuitry only.

Ω Model I only.

π Models III/4 only.

#### Addresses:

JDR Microdevices, 1224 S. Bascom Ave., San Jose, CA 95128, 800-538-500 or 408-995-5430 outside California; 800-662-6279 within California.

Radio Shack (RS) National Parts Division, 900 East Northside Drive, Fort Worth, TX 76102, 817-870-5662.

Digi-Key Corp. (DK), Highway 32 S., P.O. Box 677, Thief River Falls, MN 56701, 800-346-5144 or 218-681-6674.

Table 1. Parts list and ordering information.

### NODVILL DIET PROGRAM

\$69.95



**"TAKE A BYTE"**  
MAINTAIN, LOSE OR GAIN WEIGHT

With the NODVILL DIET PROGRAM "Take a Byte" and a TRS-80 D.D. Disk M I III/4 or P-C Compatible.

you can quickly and accurately

- Calculate caloric and nutritive food intake
- Evaluate nutritive value of your diet
- Compare daily diet to individual RDA Chart
- Create personalized daily meals and menus
- Plan varied daily menus based on sound nutrition
- Save records of daily meals and menus for future planning
- Print nutrition charts, food, meal, menu and grocery lists

"Take a Byte" is a Modular BASIC Program

MAIN Program Menu

- (1) Recommended Daily Dietary Allowance (RDA) CHART
- (2) 733 Expandable Random Access FOOD LIST Data File
- (3) 28 Nutritional MEAL LIST Data File Examples
- (4) 7 Balanced DAILY MENU LIST Data File Examples
- (5) GROCERY LIST Program Module
- (6) 25 Page USER'S MANUAL including Charts and Tables

All Data Files can be EXPANDED and MODIFIED systematically and flexibly to reflect your personal diet, your choice of diet book, or your doctor's suggested diet.

For more information: Call (203) 431-6449

To Order: Mail a check or money order for \$69.95 plus \$3.00 (S & H) to:

NODVILL Software  
24 Nod Road  
Ridgely, Conn. 06877

✓ 54

### IEEE-488 TO TRS-80\* INTERFACE

Everything needed to add powerful BASIC GPIB-488 controller capability to TRS-80 Model 1, 3 or 4, Level 2 or DOS with a minimum of 16K.



**488-80C**  
For Model 3 or 4  
Operation



**488-80B**  
For Model 1  
Operation

Model 448-80B or 488-80C Price: \$425  
+ shipping, insurance & tax

WHEN ORDERING SPECIFY DISK OR TAPE  
SCIENTIFIC ENGINEERING  
LABORATORIES

11 Neil Drive • Old Bethpage, NY 11804  
Telephone: (516) 694-3370

✓ 203

\*Trademark of Tandy Corp.

There is no affiliation between Scientific Engineering Laboratories and Tandy Corp. or Radio Shack

## SEND AND RECEIVE MORSE CODE

•TRIPLE SPLIT SCREEN  
•SPEED: 1-200 WPM

This 4.5k assembly language program runs on your TRS-80 Model I, III, or 4. The decoded Morse Code is displayed on the screen and may be printed. The keyboard buffer is active while either sending or receiving. The output is either tone or keyed. I/O is via the cassette interface. The program runs from tape or disk (TRSDOS 2.3 or 1.3). Use it "on-the-air" or for code practice.

satisfaction guaranteed or your money back

Cassette with booklet only \$19.95 postpaid.

ROGO Computer Products

4752 DeBeers Drive  
El Paso, Texas 79924

✓ 343



Call ELEK-TEK for

**UNBELIEVABLE PRICES!!**

# Star PRINTERS

80 COLUMN

GEMINI 10X 120 CPS ..... 250.00  
DELTA 10 160 CPS ..... 360.00  
RADIX 10 200 CPS ..... 530.00

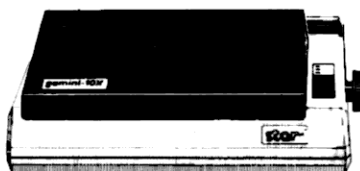
132 COLUMN

GEMINI 15X 120 CPS ..... 365.00  
DELTA 15 160 CPS ..... 490.00  
RADIX 15 200 CPS ..... 630.00

**NEW Letter Quality  
PRINTER**

**POWERTYPE** Better Quality 18 c.p.s. ....

**325.00**



## Cables for Epson

CB5622 10 ft. 36/36 pin standard parallel	32.00
CB5609 8 ft. 36/25 pin parallel for IBM	25.00
CB5618 6 ft. 36/16 pin parallel for TI-99/4A	25.00
CB5629 10 ft. 25 pin standard RS-232 (fully loaded)	25.00
CB5620 6 ft. parallel for TRS 80 Model I-III-IV	22.00
RS1Y RS-232 Y cable for TI-99/4A	25.00

## Interfaces

CARDCO G	85.00
APPLE DUMPLING GX	85.00
GRAPPLER PLUS	105.00
Buffered (16K) GRAPPLER PLUS	165.00
Elek-Tek Dust Covers available for Gemini models	5.00

**CALL TOLL FREE 800-621-1269 EXCEPT Illinois, Alaska, Hawaii**

CORP. ACCTS. INVITED. MIN. ORD. \$15.00 Mastercard or Visa by mail or phone. Mail Cashier's Check, Money Ord., Pers. Check (2 wks. to cr.) Add \$4.95 tax. (AK, HI, P.R., CANADA ADD \$10.00 FIRST ITEM) \$1.00 inc. add'l ship. & handle. Shipments to U.S. address add 7% tax. Prices subject to change without notice. CATALOG, RETURN POLICY: Replacement only for defective on arrival. Thereafter, MFR. Warranty applies. ALL ELEK-TEK MERCHANDISE IS BRAND NEW, FIRST QUALITY AND COMPLETE.

**ELEK-TEK, inc.**

6557 N. Lincoln Ave. Chicago IL 60645  
(800) 621-1269 (312) 677-7660

## INCREASE KEYBOARD SPEED!

Tandy gave HyperType® a  
★ ★ ★ ★ rating for both  
TRS-80 and Tandy 2000

for only \$29.95

★ HyperType® is a complete software program designed to help you make the most of your computer.



★ HyperType® is under your control—you go at your own speed; not at the program's demand.

★ HyperType® uses real words, sentences and paragraphs, not nonsense syllables.

★ Although the text is light-hearted and fun, HyperType® is not a game, but a serious, powerful teaching tool.

★ This is a flexible, easy-to-learn and easy-to-use program that can aid everyone from novices to advanced typists.

**SEE YOUR DEALER NOW**

**STANDARD SOFTWARE**

Suite 1600—121 S.W. Salmon St.  
Portland, Oregon 97204  
(503) 227-0008

213

TRS-80 & Tandy 2000 registered trademarks of Tandy.



-NEW-  
AUTO LOGON

## UNITED SOFTWARE ASSOCIATES

**ULTRA TERM™**  
VERSION 2

-NEW-  
MACRO KEYS



Ultra Term Version 2 is the most powerful communications programs available for the TRS-80. The package includes a full featured terminal program, a self relocating host program, and hex conversion utilities for bulletin board downloading, all at prices for lower than competing programs with less features. Ultra Term features include: Ultra Term supports auto dial modems with an easy to use dial menu capable of supporting any modem that accepts dial commands from the RS-232 port or by pulses on the RTS line or cassette port, including the Radio Shack Modem 2, Hayes Smartmodem, or the Lynx auto dial. Ultra Term Version 2 is the only terminal program for the TRS-80 that has a true prompt controlled auto logon feature. This feature, when used in conjunction with our auto dial feature allows the user to issue a single command to select a number to dial, set RS-232 parameters, dial the number, wait for prompts from the system being called, and answer multiple questions to sign the user onto the system being called. No other TRS-80 terminal program available offers this power and versatility. Ultra Term is the only program that offers a direct to disk file transfer mode that allows full control from the transmitting computer, and unattended operation at the receiving computer. This gives you the ability to transfer multiple files or an entire disk with no one present at the receiving computer. Ultra Term has an exclusive split screen feature that allows simultaneous two way communications from terminal mode and supports line printers with a 1K print buffer. Ultra Term's universal ASCII format file transmission supports delays between characters or between lines, as well as prompt controlled transmission for compatibility with virtually all systems. A counter continuously displays the amount of free memory remaining whenever the buffer is in use. Ultra Term will run on a Model 1 or Model 3 TRS-80 disk system with any TRSDOS compatible operating system (RS-232 and Modem required).

Ultra Term Version 2 retail price: \$79.95

Upgrade for current Ultra Term Version 1 owners: \$24.95 (For Upgrade, you must return your original version 1 disk.)

## INFOEX-80 BULLETIN BOARD SYSTEM

The INFOrmation EXchange bulletin board program contains all the software necessary to set up your own bulletin board service or message center. The Infoex-80 software automatically answers phone calls, displays a logon message or bulletin, allows callers to enter and retrieve messages, and lets users chat (type) directly to the system operator. Infoex-80 supports uploading and downloading in both universal ASCII format and Ultra Term disk file transfer format for accurate and fast file transfer. Infoex-80 allows users to apply for individual passwords, so private password protected messages can be left for any user. The system also keeps track of the number of times each user has accessed the system, as well as the highest message each user has read, and advises each user when messages have been left for them. The program requires a TRS-80 Model 3 (or Model 1 with double density adapter), 2 disk drives, 48K ram, RS-232 interface, any auto-answer modem and a DOS that supports the CMD "Doscmd" from BASIC (Any DOS but TRSDOS).

211

UNITED SOFTWARE ASSOCIATES

24 HOUR BBS: (305) 842-2687

734 FLAMINGO WAY — NORTH PALM BEACH, FL 33408

PHONE ORDERS: (305) 965-3496

Automatic typographic design and specification for books and booklets TRS-80 (4) & CP/M \$545.

# AUTOSPEC

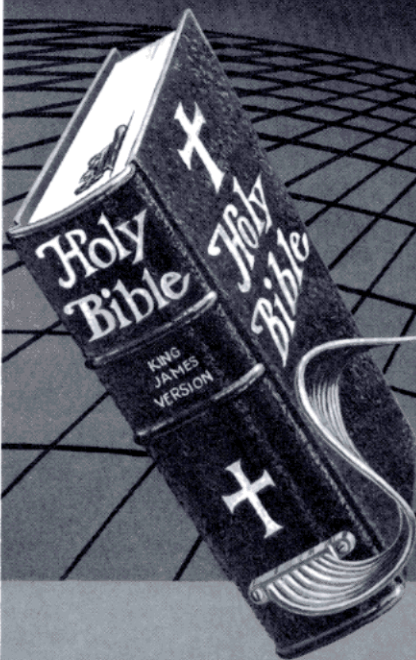
Automatic castoff, character count, and total book(let) length adjustment TRS-80 & CP/M \$395.

# AUTOCAST

✓ 16

AUTOSPEC, Inc., P.O. Box 1037, Pacific Grove, CA 93950 Stanley Rice (408) 649-0890

## New dimensions in Bible study.



### THE WORD processor

the complete KJV Bible on  
disks \$199.95 \*

### TOPICS

an index to over 200 Scripture  
subjects \$49.95 \*

\* plus \$3 postage/handling

For information contact:

**Bible Research Systems**

9415 Burnet, Suite 208

Austin, TX 78758

(512) 835-7981 ✓ 7

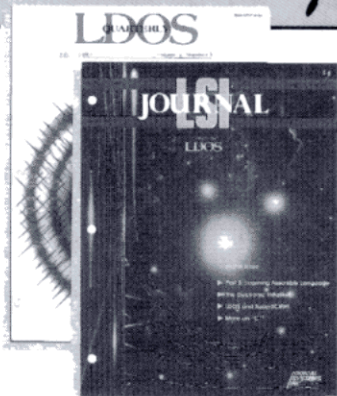
"Software for personal Bible study."

Requires APPLE II +, IBM PC  
and compatibles, TRS80,  
CP/M 2.2 (Z-80), KAYPRO,  
OSBORNE, COMMODORE 64,  
Z-100.

# LOGICAL SYSTEMS

## *Publications*

©1984 Logical Systems, Inc.



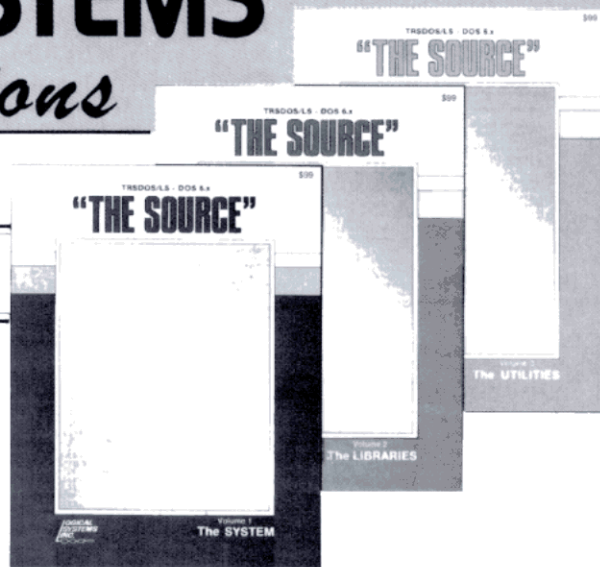
LDOS Quarterly back issues are  
available, and are highly recom-  
mended for all LDOS users.

**NOW  
AVAILABLE**

### LSI CATALOG

LOGICAL  
SYSTEMS  
INC.  
2078 North 55th Street  
P.O. Box 23956  
Milwaukee, WI 53223

Write or call for our  
**FREE CATALOG.**



The TRSDOS/LS-DOS 6.x operating system assembled source  
listings, with comments, as implemented on the TRS-80 Model 4.  
The three volume set of over 1000 pages, covering the **SYSTEM**,  
the **LIBRARIES** and the **UTILITIES** is priced at just \$249 for the com-  
plete set, or \$99 individually.

Shipping and Handling NOT INCLUDED

**LOGICAL  
SYSTEMS  
INC.**

**TOLL FREE ORDERLINE (800) 248-3535**

✓ 131

8970 North 55th Street / P.O. Box 23956 / Milwaukee, WI 53223



### Fast Impressions

The Fastext-80 bidirectional dot-matrix printer (\$259) gives you 80 characters per second (cps) print speed at 10 characters per inch (cpi), and features a line buffer and six-pitch capability.

Fastext-80 also features a self-test switch, an 80-character print line, emphasized or elongated print, and bit-image graphics.

Pitches include pica, elite, condensed, and enlarged printing. The printer supports the 96-character ASCII set and can print in seven languages.

Its drop-in cassette ribbon has a life of one million characters. Fastext-80 comes with friction feed and a Centronics parallel interface. A tractor feed is also available.

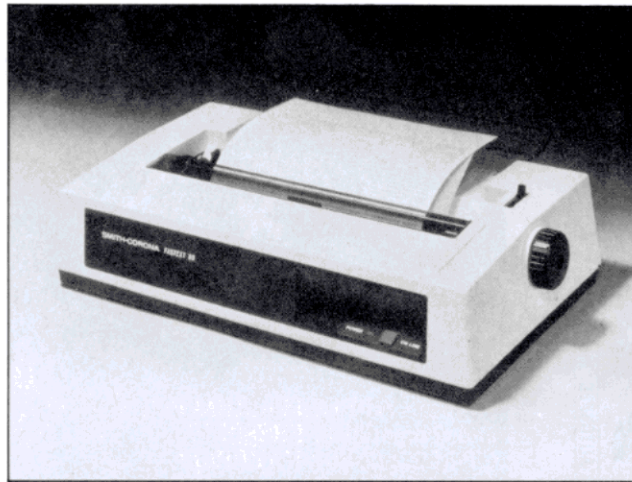
For more information contact Smith-Corona at 65 Locust Ave., New Canaan, CT 06840, 203-972-1471.

Reader Service ✓ 563

### Running with IBM

Xcalibur, from Micro Projects Engineering Inc. (3951 Higuera St., Suite B, Culver City, CA 90230, 213-202-1865), lets you run IBM PC software on the Models I, III, 4, and 4P.

This enhancement board gives you PC compatibility to run MS-DOS 2.11, MultiMate, dBase II, WordStar, MultiPlan, and other popular IBM PC software packages. Add a monochrome monitor card (\$199.95) and



*The Fastext 80 dot-matrix printer prints seven languages in six type fonts.*

128K RAM (\$198) and you can run Lotus 1-2-3.

Xcalibur comes with an IBM-compatible bus connector for use with IBM expansion cards and MS-DOS. It installs easily through cable connections inside your computer.

The Xcalibur board is \$495, and includes an MS-DOS disk. Additional RAM chips and other upgrade hardware are also available.

Reader Service ✓ 552

### Adventures In Pixieland

Pixie Quest, from Seal Software (4 White Birch Court, Turnersville, NJ 08012, 609-228-6169), is a Model I adventure game that leads you and your companions on a trip through the forbidden wood of Balmar and the caves of the evil sorcerer, Tralon.

Your goal is to return pixies Frolic and Pixel to the

village of Brahlee. Along the way you'll find treasures, puzzles, and meet jabowockies, ogres, and evil gremlins.

The game's parallel paths through the woods mean that failure to solve a puzzle won't leave you at a dead end. Ultimately, however, you must cope with every predicament using ingenuity, imagination, and whatever you find on your journey.

Pixie Quest (\$34.95) requires 48K RAM and one drive.

Reader Service ✓ 553

### Programming for Fun

When you're tired of working with your TRS-80, *101 Programming Surprises & Tricks for Your TRS-80 Computer* (\$10.95) gives you games, novelties, and techniques to make computing fun again.

This strictly-for-fun programming guide includes

music and sound programs, animation programs, one- and two-player games, and programming tricks useful for more serious programming applications.

If typing in listings cramps your style, a disk that includes all the programs is available for \$19.95.

For more information contact Tab Books Inc., Blue Ridge Summit, PA 17214, 717-794-2191.

Reader Service ✓ 554

### Model 100 Means Business

Business Finance (\$39.95) is Tandy Corp.'s 12-program financial analysis package for the Model 100. Calculation programs calculate net present value, internal rate of return, financial management rate of return, and depreciation.

Also included are analysis programs for rent or purchase decisions, lease/purchase analysis, machinery replacement, and bond analysis.

An annuity/annuity-due program does calculations for savings accounts, compound interest, annuities, leases, loans, financial modeling, and other investments.

The portfolio analysis program generates a series of portfolio distributions to minimize risk for a given rate of return or maximize return for a given risk.

Business Finance requires 16K RAM and is available from Radio Shack stores.

# Why the user-friendly DOSPLUS IV is looking friendlier than ever.

DOSPLUS IV		TRS * DOS	
FEATURE	COST	FEATURE	COST
File Editing and disk editing	included	Utilities Package	40.00
M-ZAL (Machine Language Development System): Text editor, linker, assembler	included	ALDS	199.00
Built-in speed	included	TRS * DOS 6.2	40.00
Basic Programming enhancement	included	not available	*
Directory Verification repair	included	not available	*
Disc mapping	included	not available	*
Total Cost	<b>\$169.95</b>	Total Cost	<b>\$279.00</b>

Good friends give you good deals on great products. Just like Micro-Systems Software has with its unique DOSPLUS IV program. It's the friendliest, most powerful *and* most complete DOS ever to operate a TRS-80.

In fact, if you wanted all the benefits DOSPLUS IV offers for its low, low price of \$169.95 (including the incredible



M-ZAL) you'd have to pay over \$100 more. And still wouldn't find *all* the features that have been programmed into DOSPLUS IV.

So, check the comparison chart above. Then check out DOSPLUS IV for yourself. You'll discover you get much more program for much less money.

And, after all, isn't that what friends are for?

# POSPLUS® IV

Another fine software package from Micro-Systems Software, Inc.  
**CALL 1-800-327-8724 FOR THE DEALER IN YOUR AREA.**



## NEW PRODUCTS

For more information contact Tandy Corp./Radio Shack, 1800 One Tandy Center, Fort Worth, TX 76102.

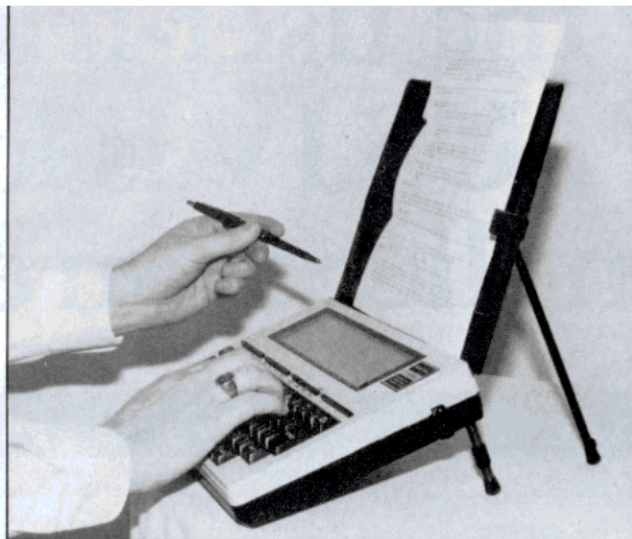
Reader Service ✓ 556

### Computer Card Game

Casino, the card game, is now a computer game. You play against your Model I, III, or 4, as it keeps score, shuffles the cards, and plays dealer.

The game includes an instruction manual with sections on rules of the game and playing strategy. Casino is available on 16K cassette (\$12.95) or 32K disk (\$16.95). Contact Dynacomp (Catalog Dept., P.O. Box 18129, Rochester, NY 14618, 716-442-8960) for more details.

Reader Service ✓ 557



*Workstation 100 makes using your Model 100 easier.*

### Portable Accessories

The Workstation 100 kit (\$45.95) contains six attachments (also available separately) to make your Model 100 more efficient.

The Power-100 (\$29.95) is a rechargeable battery pack that powers the Model 100 for 9-12 hours. Support legs (\$3.95) angle the Model 100 for easier typing.

The kit also includes a clip-folder typing stand (\$7.55), a pen (\$2.75), a mechanical pencil (\$1.75), and a battery case (\$3.95). Attachments are compact enough to fit into the Model 100 carrying case.

Contact A.R.M.S. (12131 Old Buckingham Road, Midlothian, VA 23113, 804-794-6675) for more information.

Reader Service ✓ 555

### The Tax Preparer Cometh

The Tax Commissioner income tax preparation software (\$895) gives attorneys, accountants, and tax preparers a fast and efficient alternative for generating client tax returns.

It prepares returns during a one-stop interview with



## Sales Company

704 W. Michigan Ave.; P.O. Box 8098  
Pensacola, FL 32505 Florida 904/438-6507

**TABCO PARALLEL Printer Switch**  
connect 2 printers to one computer!

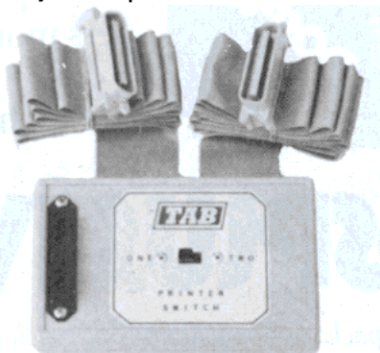
PSM-C/2P—Manual printer switch. Prolongs the life of your printer/interface connectors. Saves time & money! Use your existing printer cable to connect TAB SWITCH to your computer. Comes complete with two 3.5' cables to connect your printers. Straight-forward design makes it easy to set-up & use. 1 year limited warranty.

**ORDER TODAY**

**Only \$69.95**

Other models available

\$2.50 Shipping/Handling  
Florida residents add 5% sales tax



**SAVE A BUNDLE**

**EPSON,**

**OKIDATA,**

**BROTHER,**

**TABCO  
Printer Switches**

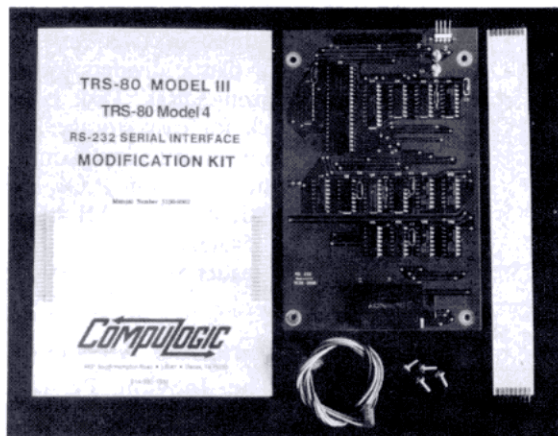
**Custom Printer Cables**

**IJG Products**

**Elephant Memory Diskettes**

**CALL 1-800-874-1551**

# 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 Mastercard also accepted.

Add \$3.00 shipping & handling  
(Foreign orders quoted on request)

**CompuLogic**

4831 SOUTH HAMPTON RD. LB41  
DALLAS, TEXAS 75232  
214/330-1332

✓86

# FREE SHIPPING DISKETTES

West Coast "Call"  
1(800) 621-6221

Central & East "Call"  
1(800) 654-4058

Discounts Starting at 3 Box Quantities

3M	Dysan	maxell	Verbatim
• 5 1/4"	• 5 1/4"	3 1/2" CALL	• 5 1/4" Datalife
s-side 17 <sup>95</sup>	s-side 22 <sup>95</sup>	• 5 1/4" s-side 19 <sup>95</sup>	s-side 18 <sup>95</sup>
d-den. 23 <sup>95</sup>	d-den. 30 <sup>50</sup>	d-den. 25 <sup>95</sup>	d-den. 24 <sup>95</sup>
d-side 27 <sup>50</sup>	d-side 34 <sup>50</sup>	d-side 28 <sup>95</sup>	d-side 30 <sup>95</sup>
s-side quad 33 <sup>95</sup>	s-side quad 45 <sup>50</sup>	s-side quad 36 <sup>95</sup>	s-side quad 39 <sup>95</sup>
d-side quad • 8" 21 <sup>50</sup>	d-side quad • 8" 28 <sup>50</sup>	d-side quad • 8" 31 <sup>95</sup>	d-side quad • 8" 24 <sup>75</sup>
s-side s-den. 26 <sup>00</sup>	s-side s-den. 30 <sup>95</sup>	s-side s-den. 34 <sup>95</sup>	s-side s-den. 26 <sup>95</sup>
d-side d-den. 31 <sup>50</sup>	d-side d-den. 34 <sup>95</sup>	d-side d-den. 34 <sup>95</sup>	d-side d-den. 31 <sup>95</sup>
3M	AMARAY MEDIA MATE		Head Cleaners
DC100A...13 <sup>95</sup>	(3 1/2" ...11 <sup>95</sup> ) (5 1/4" ...11 <sup>95</sup> )		Kits...520
DC300A...18 <sup>40</sup>	DISK MINDERS		Refills...955
DC300XL 20 <sup>25</sup>	(5 1/4" ...16 <sup>75</sup> ) (8" ...21 <sup>50</sup> )		Analyzers 2500
DC600A...24 <sup>45</sup>	BULK PACKED DISKS "CALL"		

Diskettes  
10/Box

the **Diskette Connection**™

Dealer Inquiries  
Welcomed

1(800) 654-4058

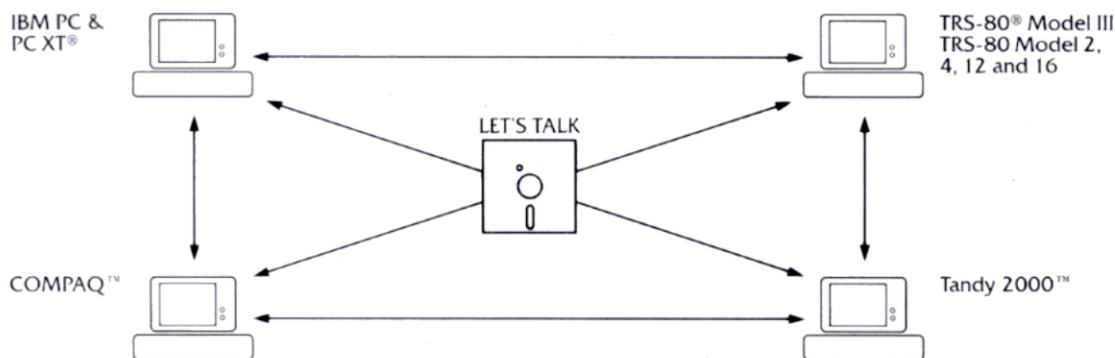


OKLAHOMA  
& NEVADA



\*UP's Delivery Only. Add 3<sup>00</sup> on orders under 35<sup>00</sup> or 20 disk.

# Communications Gap? LET'S TALK™!



LET'S TALK CLOSES THE COMMUNICATIONS GAP BETWEEN TODAY'S POPULAR PERSONAL COMPUTERS.

LET'S TALK is a complete package for fully supported communications between any of these computers. In any direction. Without additional expense.

LET'S TALK is a simple, straightforward program that transfers ASCII data files, including BASIC and VisiCalc®, from one computer to

another. Precisely. Easily. Without professional, expensive data processing expertise.

LET'S TALK allows two computers to communicate directly with each other in a "conversational mode" when not actually transferring data. And, LET'S TALK can send or retrieve files of any size from unattended computers, at three different speeds.

GROWTH AND EXPANSION REQUIRE OPEN COMMUNICATION. LET'S TALK.

**GOOD**  
SOFTWARE CORP.

**Making dollars and sense out of information.**

TRS-80 is a registered trademark of Tandy Corporation. Tandy 2000 is a trademark of Tandy Corporation. Visi Calc is a registered trademark of VisiCorp. IBM PC and PC XT are registered trademarks of IBM Corporation. COMPAQ is a trademark of Compaq Computer Corporation.

a division of the goodman group, inc. 12900 Preston Rd., Dallas, Texas 75230 (214) 239-6085  
LET'S TALK includes all diskettes for each of the above computers. Suggested retail price \$179.00 + \$5.00 shipping

✓496



## NEW PRODUCTS

clients, and eliminates transposition of information and errors that frequently accompany this step in tax preparation.

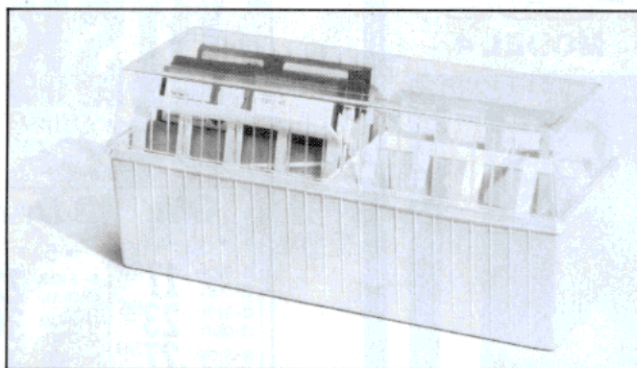
The program displays each tax form. You enter the data, and Tax Commissioner computes and prints out the tax return. You can print data only, or choose from more than 35 pre-printed forms.

Tax Commissioner requires a Model 2000, or a Model III/4 with CP/M 2.2. Contact TAXbyte Inc., 3803 28th St., Moline, IL 61265, 309-764-7245 for more information.

Reader Service ✓ 567

### Super for the Model 4

Super, the data base management system from the Institute for Scientific Analysis Inc., is available



Soho Corp.'s stackable disk boxes are \$4 each.

for the Model 4. Super 2.3 is menu-driven, and features on-screen editing, a calculator program, and a filing system.

The program lets you set up and create data bases, save report formats, print reports, and sort information. Super 2.3 is available for the Models I, II, and III. It costs \$199 and includes a manual. The program is also

available as an upgrade.

For more information contact Institute for Scientific Analysis Inc. at 36 E. Baltimore Pike, Suite 106A, Media, PA 19063.

Reader Service ✓ 564

### Disk Boxing

The D-60 compact disk storage box (\$4) from Soho

Corp. stores up to 60 5 1/4-inch disks.

It features a smoke-tint see-through cover and has four plastic dividers for organizing disks. Disk boxes stack for easy storage. For more information contact Soho Corp. at P.O. Box 20081, Ferndale, MI 48220, 313-543-5209.

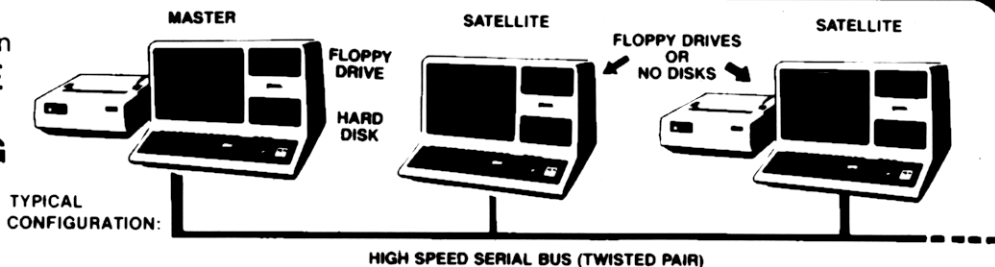
Reader Service ✓ 559

### Graphics Answers

The Inovion Personal Graphics System (PGS) is a 78K RAM stand-alone graphics generator that creates up to 2.1 million different colors.

PGS runs with any computer with an RS-232C port and features a 512- by 480-pixel display, 19-inch monitor, and an icon menu driven by a mouse or trackball.

**NOW** You can have a **UNIQUE** & Powerful **NETWORKING** built into Radio Shack Models III & 4.



After comprehensive field testing in medical & legal offices, PSM, Inc. is releasing the technology necessary to expand the capabilities of your Model III/4 to MULTI-USER, MULTI-PROCESSING, SHARED DATA APPLICATIONS using Winchester 5.25" hard disks. Each workstation is a complete, independent computer which is tied to the hard disk through a high-speed serial bus. Workstations DO NOT NEED ANY DISK DRIVES; they will boot up properly through the serial bus from the hard disk. It will be running under LDOS as if the hard disk was its drive: 0!

#### FEATURES

- Protects existing software investment
- Data file sharing
- Compatible with LDOS 5.1.4
- Shared hard disk [5 to 20 megabytes]
- File/record lockout capability
- Used in active medical offices since 2/83.

PSM-W5:	Model 4 w/64k RAM, 40trk DS Floppy, built-in 5 Mbyte hard disk, master network controller, LDOS 5.1.4, Technical Manual	\$4,975.00
PSM T/O:	Model 4 w/64k RAM, boot PROM, satellite network controller, Tech Manual	\$1,875.00
PSM-U5:	PSM upgrade of your Model III/4 w/64k RAM to PSM-W5: incl'd's 5Mb hard disk, hard disk controller, master network controller, LDOS 5.1.4, power supplies, Tech Manual	\$2,625.00
PSM-U0:	PSM upgrade of your Model III/4 w/64k RAM to PSM T/O: incl'd's boot PROM, satellite network controller, Tech Manual	\$665.00
PSM-NM:	Technical Manual: Incl'd's complete description of PSM networking, and application implementation. Tech Manual purchase will be credited toward later hardware purchase.	\$20.00

**PSM** programming and systems management, inc.

All shipping and handling charges are the customers' responsibility. Technical consultation services available. Modification of Model III/4 to implement networking will void the Tandy warranty.

3866 INDIAN RIPPLE RD., DAYTON, OH 45440 [513] 426-8644

✓ 42

Radio Shack is a trademark of the TANDY CORP.

LDOS is a trademark of LOGICAL SYSTEMS, INC.

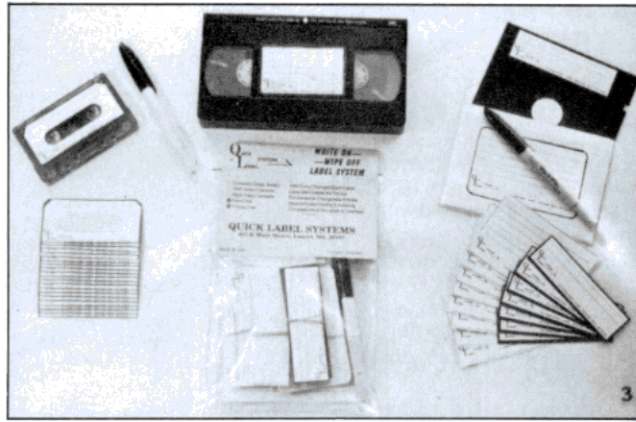
## NEW PRODUCTS

A frame grabber/digitizer lets you freeze a signal from your TV, VCR, or video camera and manipulate the picture.

Synthetic color routines change the color saturation or hue of a group of pixels. PGS retains textures and three-dimensional quality while enhancing colors.

PGS is \$3,495 from Inovion Corp., 195 E. Gentile St., Layton, UT 84101, 801-546-2850.

Reader Service ✓ 566



Cassette and disk labels from Quick Label Systems are re-markable.

cessing other information services.

For more information contact Dell Publishing Co. Inc., 1 Dag Hammarskjold Plaza, 245 E. 47th St., New York, NY 10017.

Reader Service ✓ 560

### Label Mark-ups

The re-markable labeling system from Quick Label Systems (437-B Main St., Laurel, MD 20707, 301-725-0050) lets you erase and reuse disk and cassette labels.

Labels include clear plastic overlays that you can wipe clean and re-mark an unlimited number of times. The kit includes 24 labels, the marking pen, and instructions for \$4.95.

Reader Service ✓ 551

### Computer Calling

You're sitting at home, enjoying a cool glass of Jose Cuervo tequila, when the phone rings. You pick it up, hear a high-pitched tone, and turn to your TRS-80. "It's for you," you say, handing the telephone to

your computer.

The scenario sounds futuristic, but the technology is just a phone call away. William J. Cook's *The Joy of Computer Communication* (\$5.95) shows you how to access the world of computer telecommunications to get stock market quotes,

make business deals, send electronic mail, and do your shopping.

The book also includes instructions for accessing the Dow Jones News/Retrieval Service, banking at home, subscribing to an electronic version of *The Washington Post*, and ac-



### THE NO-RISK DISK ON SALE

#### LIFETIME WARRANTY

Box of ten 5 1/4" TDK diskettes, with labels, envelopes and reinforced hub-rings.

<b>SS/DD</b> Soft or 16 Sector	<b>\$16<sup>50</sup></b>	<b>DS/DD</b> Soft or 16 Sector	<b>\$21<sup>50</sup></b>
<b>SS/QD</b> 96TP1	<b>\$24<sup>50</sup></b>	<b>DS/QD</b> 96TP1	<b>\$31<sup>50</sup></b>

#### STAR™ MICRONICS PRINTERS SALE

Gemini 10X, 120 CPS Bi-directional	<b>\$244<sup>00</sup></b>
Gemini 15X, 120 CPS Bi-directional	<b>\$365<sup>00</sup></b>
Delta 10 160 CPS, 8K Buffer, Dual Interface	<b>\$415<sup>00</sup></b>
Delta 15, 160 CPS, 8K Buffer, Dual Interface	<b>\$650<sup>00</sup></b>
Radix 10, 200 CPS, 16K Buffer, Dual Interface	<b>\$585<sup>00</sup></b>
Radix 15, 200 CPS, 16K Buffer, Dual Interface	<b>\$685<sup>00</sup></b>
<b>PowerType Daisy Wheel Letter Quality,</b> Dual Interface, Bi-directional, Reverse paper feed	<b>\$345<sup>00</sup></b>

Shipping and Handling \$3.00 for any size order of diskettes, \$9.00 for printers. C.O.D. orders add \$1.65. We accept credit cards at NO extra charge. Illinois residents please add 7% sales tax.

Call now TOLL FREE ANYWHERE in the US  
 Nationwide 1 800 336 6875  
 Illinois 1 800 942 5200  
 International 1 312 256 4456  
 9 a.m. - 6 p.m. (Central) Mon. through Fri.

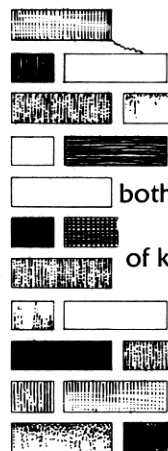


### SMART DATA INC.

P.O. Box 297  
 Wilmette, IL 60091  
 (312) 256-4456

✓258

# BRICKWARE



If you invest in brick and mortar, then you should invest in our brickware, Investor III™. Designed by real estate professionals to work on the IBM PC or TRS-80, Investor III™ is a comprehensive software package that aids in investment analysis of property, whether commercial or residential, small or large. It shows both the tax and cash aspects of an investment opportunity and is flexible enough to allow you to vary a number of key assumptions (such as cash flow, phased investments, multiple mortgages, and tax parameters) and see the results in an instant. So if you are serious about brick and mortar, look at our brickware. It will help you lay a solid foundation for your investment strategy. Contact your local dealer.



✓103

A Division of The Goodman Group, Inc.  
 12900 Preston Road  
 Dallas, Texas 75230  
 (214) 239-6085

**\$249.00 Suggested Retail**  
**Making dollars and sense**  
**out of information.**



## Why E-C DATA claims to manufacture the best TRS-80 Kits in the World...

**We know how.** As Tandy importers to Denmark, we have worked with TRS-80s for over four years, developing national keyboards and character sets, disk kits and DOS'es. The Scandinavian Model 3s came with 80 track drives and 80 track TRS-DOS right from the beginning. Even Model I was supplied with 77 track disk systems - manufactured by E-C DATA.

**We get product information** early and precisely as Authorised Tandy Dealers.

**We use One-Year-Old Technology.** Old enough to be reliable but not obsolete - that's »One-Year-Old Technology«. WD-2793 Controller Chip, 8k CMOS RAM in Flat-Pack versions. State-of-the-Art? Certainly! And reliable.

**We purchase no odd lots** of components to make a Fast Buck. We buy on long-term contracts from leading manufacturers such as Texas Instruments, Western Digital, Shugart and Hitachi, assuring a steady and constantly high product quality.

**We burn in and test everything**, before it is shipped - under realistic operating conditions in TRS-80 Computers.

**We help you** by providing detailed installation and repair manuals. If you get stuck anyway, chances are that you get to talk with the Graduate Engineer who actually designed your kit, if you phone us for help!

## FREE SHIPPING WORLD WIDE!

## 12 MONTHS GUARANTEE!

### FOR MODEL 3 AND 4:

Complete Disk Kit w/ 64k M4 RAM w/o Drives*	265
Complete Disk Kit w/ 32k M3 RAM w/o Drives*	250
Complete Disk Kit M3/4 w/o RAM w/o Drives*	215
Floppy Disk Controller (3 1/2, 5 1/4, 8") M3/4	155
Real-Time Clock/Calendar Option. Add	60
8" Drive Option. Add	10
Disk Installation Hardware w/Power Supply w/o Controller	95
2 to 4 Internal Drives Expansion Power Supply	65
RS-232 (V.24) Communication Interface Kit M3/4	75
First 64k M4 RAM Expansion Kit	65
64k - 128k M4 RAM Expansion Kit w/ PAL U72	70
M4 PAL U72 alone	30
TRSDOS 6.2 for M4**	45
Disk Drive Shugart SA-455 1/2 Hight, DS, 40 Tracks	205
Disk Drive Shugart SA-465 1/2 Hight, DS, 80 Tracks	245

### FOR MODEL 100:

8k Internal RAM Expansion, Low Power CMOS	80
32k Battery Backed Plug-in Extra RAM Bank (32-64k)	325
Bell 103 to CCITT Internal Modem Conversion Kit	65

\* Specify whether you intend to use the Kit with Full or Half Hight Drives!

\*\* Only with Purchase of Disk Kit. Specify 40 or 80 Track Diskette!

TRS-80 and TRSDOS are Trade Marks of Tandy Corporation, Fort Worth, Texas.

### ORDERING:

USA (New York): 1 - 212 - 678 0064

Denmark: 45 - 2 - 818191. Tlx 37825 ec dk

Use whichever is convenient in your time zone - or write us!  
All Products except Disk Drives and DOS Made in Denmark

Dealer Inquiries Welcome!



Payment by Cheque, Money Order or Credit Card. We ship to all Countries, where Hi-Tech Sales are Legal by US Law.

All Prices in US Currency. Local Duty or Taxes not Included.

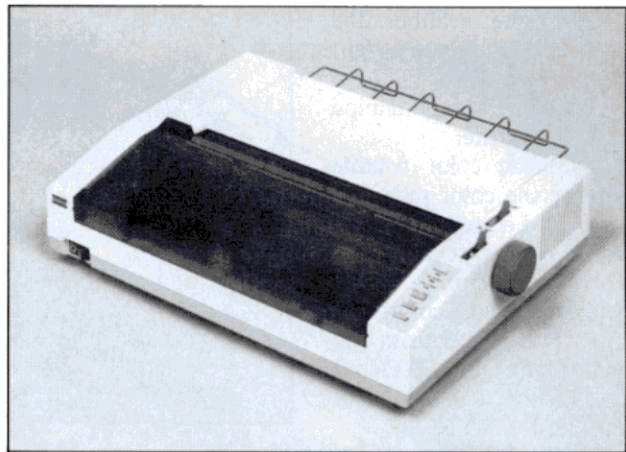
## E-C DATA A/S

✓125



P.O.B. 116 - DK-3460 Birkerød - Denmark

## NEW PRODUCTS



Fujitsu America's compact DPMG9 dot-matrix printer runs at 180 cps.

### Fujitsu Ink

The Model DPMG9 compact dot-matrix printer (\$695) from Fujitsu America Inc. boasts 80-column, bidirectional printing with 180 cps draft-quality printing (25 cps correspondence-quality).

The printer features friction and tractor feeds, automatic perforation skip, 255 character fonts, and a language-select function. It prints international characters, superscripts, subscripts, and images.

The DPMG9 weighs 19 lbs. and measures 12 by 16 by 4 inches. A Centronics interface is standard, with RS-232 interfacing available.

For more information contact Fujitsu America Inc. at 3055 Orchard Drive, San Jose, CA 95134, 408-946-8777.

Reader Service ✓ 561

### Write the Volks

Volkswriter Deluxe (\$295), the popular word processor for the IBM PC, is available for the Models 1200 and 2000.

Features include foreign-language and scientific character sets, on-screen tutorials, multiple fonts and colors, and compatibility with Lotus 1-2-3, VisiCalc, and other commercial spread-

sheet programs.

Volkswriter Deluxe for the Model 2000 takes advantage of the Model 2000's extra memory, faster processing speed, and color capabilities.

Minimum system requirements are 128K RAM and two drives. Volkswriter is available through Radio Shack stores. Contact Lifetree Software Inc. (411 Pacific St., Monterey, CA 93940, 408-373-4718) for more information.

Reader Service ✓ 568

### Tenant Fever

Good Software Corp. (12900 Preston Road, Dallas, TX 75230, 214-239-6085) has announced the Real Estate Investor III package for the Models 1000, 1200, and 2000.

Investor III (\$249) uses your criteria to analyze real estate investment potential, and generates profit projections for potential investments. Projections range up to 20 years for more than a dozen financial criteria. Tax formulas are based on 1985 tax laws.

The quick-test feature generates a rough estimate of an investment's potential. Investor III also performs sensitivity analysis to evaluate the impact of

## Subscription Problem?

80 Micro does not keep subscription records on the premises, therefore calling us only adds time and doesn't solve the problem.

Please send a description of the problem and your most recent address label to:

**80micro®**  
Subscription Dept.  
PO Box 981  
Farmingdale, NY 11737

Thank you and enjoy your subscription.

## TRS-80® GENEALOGY SOFTWARE

**GENSYSTEMS 1.3**  
Models I and III  
TRSDOS® 2.3/1.3  
\$128.45

**G-CRAB 5.0**  
Models 4 and 4P  
TRSDOS® 6.x  
\$195.00

**G-CRAB 5.0**  
Models II, 12, and 16  
TRSDOS® 2.0a/TRSDOS-II® 4.2  
\$195.00

Please write for a free software summary packet.

Send \$2.00 for a descriptive booklet on GENSYSTEMS or send \$2.00 for a booklet on G-CRAB (both releases).

**ARMSTRONG  
GENEALOGICAL  
SYSTEMS**

5009 Utah Drive  
Greenville, TX 75401  
(214) 454-8209

✓ 102

## T.CAD

Computer Assisted Drafting for Models III/4/4P with hi-res graphics. Draw, save, edit, zoom, scale exact technical plans. Plotter hardcopy up to 24"x36". Extended professional version has overlays, text labels, block copy, re-scale, clip, merge, rotate, more.

Software \$249.95 - 449.95

**CB MICRODEX**  
1212 N. Sawtelle  
Tucson, AZ 85716  
(602) 326-3502



✓ 299

## PERIPHERAL SWITCH

### AUTOMATIC SWITCHES FOR TRS-80

Fast, easy, automatic way to share a printer or modem among many computers. No software required. RS232 or centronics. It scans for peripheral request, connects to the peripheral, handles all hardware handshaking, and releases the port. LEDs display channel selected and busy status. Attractive aluminum box. # channels-price:

2-\$200 4-\$250 6-\$300 8-\$350

### MANUAL SWITCHES FOR TRS-80

Uses PC board and aluminum box. # lines switched RS232-10 Cent-20 RS232 1:2 \$59(wow) 1:4 \$99 Centronics 1:2 \$99 1:4 \$179 Free book with each order entitled *Serial and Parallel Explained*



P.O. Box 742571

MC AND VISA  
(713)240-ROSE  
Houston, Tx 77274

✓ 53

## Maxell Floppy Disks

The Mini-Disks  
with maximum quality.



Dealer inquiries invited. C.O.D.'s accepted. Call FREE (800) 235-4137.



**PACIFIC EXCHANGES**  
100 Foothill Blvd., San Luis  
San Luis Obispo, CA 93401  
In Cal. call (800) 592-5935 or  
(805)543-1037

✓ 207

## PASSWORDS Got you down?

TRS-80 Model III owners. Have you ever forgotten, misspelled, or mis-entered a password? Now you can remove passwords from any TRSDOS 1.3 disk file with PASSZAP. It will also remove disk master passwords. PASSZAP is easy to use, with on screen instructions and comes with a complete instruction manual. PASSZAP requires a Model III with at least 32K RAM and one disk drive. Take advantage of our new low price of only \$35.00.

Also CASSETTE HANGMAN that runs on a Model III with 16K RAM and offers play against the computer or a friend for only \$10.00.

TO ORDER: Send check or money order along with your choice of programs. (Utah residents please add appropriate sales tax.)

QUESTIONS?: Please include a SASE with all inquiries.

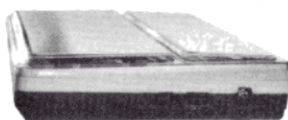


J. STAR ENTERPRISES  
P.O. Box 362  
Orem, Utah 84057-0362

✓ 52

TRSDOS and TRS-80 are trademarks of Tandy Corp.

## FOR MODEL 100



### STRONG VERSATILE HARD COVER

**THE PERFECT SOLUTION** to proper protection of screen, keys and key switch shafts when carrying in a briefcase, its softcase or in any case. Made of .080 inch thick super strong high impact Eastman PETG plastic.

**DESK TOP PROTECTION** from dust, spills and things that get dropped. Optically clear so auto prompted messages are seen at a glance.

**THE ULTIMATE LAP MACHINE!** Invert cover and add prop legs to create a stable interlocked unit at a most comfortable lap use angle.

\$17.95 + \$2.00 S. & H., CHK. OR M.O., TX RES. ADD 5%

Money back satisfaction guarantee! ✓ 64

**THE SOUTHWORTH COMPANY, Dept. D**  
4001 HAWTHORNE AVE., DALLAS, TX 75219

## EPSON® OWNERS

We get letters on a regular basis from customers saying how much they enjoy receiving our lists.

It's probably safe to say that our lists are different from most of the others in that they are as entertaining as they are informative.

The lists are "slanted" toward the EPSON Printer user but should be of interest to the owner of most any microcomputer printer.

Send us your name and address and we'll send you a rather fat envelope filled with computer oriented offers.

## ZYGOTRON

P.O. Box 27

Fremont, Michigan 49412

✓ 279

Lists sent to USA addresses and by mail only \*EPSON trademark of Epson, America Inc.

## ELEPHANT™ Diskettes

### LIFETIME WARRANTY

Box of ten 5 1/4" ELEPHANT™ diskettes, with labels, envelopes and reinforced hub-rings.

SS/ SD	<b>\$14.50</b>	SS/ DD	<b>\$16.50</b>
		DS/ DD	<b>\$21.50</b>

### EPSON PRINTERS — SALE

Dot Matrix, Bidirectional with Logic Seeking, Paper Feed and Tractor Feed:

RX 80 100 CPS	<b>\$239.00</b>
RX 80 F/T 100 CPS	<b>\$285.00</b>
RX 100 100 CPS	<b>\$469.00</b>
FX 80 160 CPS, 2 K Buffer	<b>\$395.00</b>

Shipping and Handling \$3.00 for any size order of diskettes, \$9.00 for printers, C.O.D. orders add \$1.65. We accept credit cards at NO extra charge. Illinois residents please add 7% sales tax.

Call now TOLL FREE ANYWHERE in the US  
Nationwide 1 800 336 6876  
Illinois 1 800 942 5700  
International 1 312 756 4456  
9 a.m. - 6 p.m. (Central Mon. through Fri.)



**SMART DATA INC.**  
P.O. Box 297  
Winnetka, IL 60091  
(312) 256-4456

✓ 252





# BASIC

FOR MODELS I AND III

# JUST GOT BETTER

## INTRODUCING BASRUM. THE ONLY LINKING LOADER & LIBRARY MANAGER FOR BASIC.

BASRUM is designed to manage the subroutines you write and use in your Basic programs. Like an efficient filing system, BASRUM saves you time, energy, and space. Best of all, it makes your program writing FASTER and EASIER.

### HOW DOES IT WORK?

BASRUM lets you store your subroutines in "library" files, separate from the programs that use them. ANY Basic program can then use any routine in any file. You can even load up to 256 routines to a special, protected memory area and use them AFTER you load other Basic programs! Naturally, you can replace or delete any routine from memory at any time.

### SUPER BENEFITS!

NOW you can write a subroutine ONCE, store it on disk ONCE ... but use it in ANY program at ANY time, AUTOMATICALLY! Load them once, use them all day. You can CHAIN from program to program, keeping the existing subroutines, variables, and file buffers. Your Basic programs, being shorter, will LOAD FASTER. NEED MORE MEMORY? You can break long programs into shorter modules and "overlay" the modules. BASRUM gives you complete control of WHAT is loaded, WHEN it is loaded, and WHERE it is loaded.

### THE NITTY GRITTY.

BASRUM was designed specifically for the models I and III for use with any DOS that is compatible with TRSDOS®. Its overlay structure requires only the top 1600 bytes of memory. There is NO LIMIT on the number of working copies.

**SIMPLE ENOUGH FOR THE BEGINNER, VERSATILE ENOUGH FOR THE PRO: IF YOU WRITE PROGRAMS IN BASIC YOU NEED BASRUM.**

**TO ORDER:** Money order, check, VISA, MASTERCARD: \$149.50  
Specify: Model I or Model III

**SPECIAL CHRISTMAS PRICE**

**\$99.50**

Orders must be postmarked by Dec. 31.  
Please add \$4.50 shipping & handling.

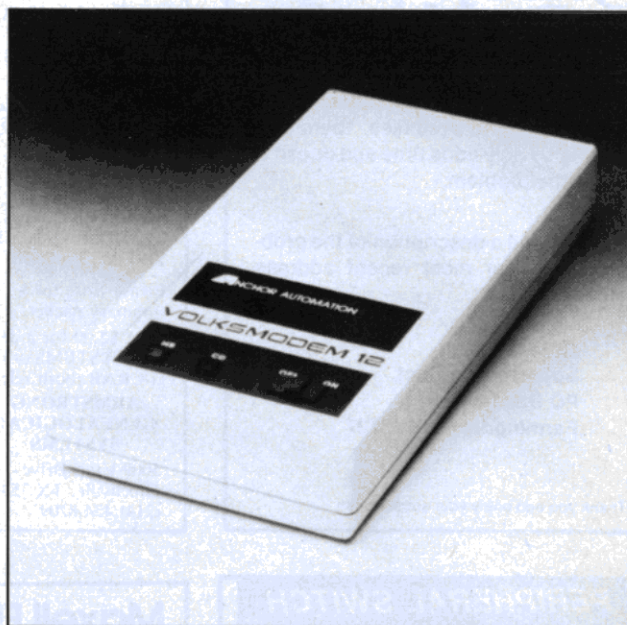
GUARANTEED TO WORK AS  
DESCRIBED OR YOUR MONEY BACK.



by **Wiley, Inc.** ✓37

P.O. Box 1242, Honolulu, HI 96807  
(808) 531-4314

TRSDOS is a registered trademark of the Tandy Corp.  
BASRUM is a trademark of Wiley, Inc.



*The Volksmodem 12 features control from any Hayes-compatible program, with tone or pulse dialing.*

changes in expenses, taxes, appreciation, or other parameters on property investments.

Reader Service ✓ 558

### It's a Volksmodem

The Volksmodem 12 300-/1,200-baud intelligent modem (\$299) features auto dial/auto answer, tone and pulse dialing, busy signal detection, dial tone detection, and telephone set jack.

The unit works with any Hayes-compatible programs. It includes a voice/data switch, two modem configuration switches, status indicator lights, and five programmable set registers. A 12-volt ac adapter is also included.

Contact Anchor Automation (6913 Valjean Ave., Van Nuys, CA 91406, 818-997-7758) for more information.

Reader Service ✓ 562

### Stellar Words

The WordStar word processor program, WordStar

Professional Options package, and WordStar Professional package are available for the Models 1200 and 2000.

WordStar (\$495) features self-help menus, block moves, global word search, justification, and formatting. Print options include boldface, underline, double strike, overprint, superscript and subscript.

WordStar Professional Options package (\$345) contains three utility programs for WordStar. The MailMerge text merging utility creates form letters. CorrectStar checks spelling against three dictionary files (1,500-65,000 words).

StarIndex creates indexes, tables of contents, and lists of figures and tables automatically. Programs are also available separately.

The WordStar Professional (\$695) includes WordStar, MailMerge, CorrectStar, and StarIndex. For more details, contact Tandy Corp./Radio Shack at 1800 One Tandy Center, Fort Worth, TX 76102.

Reader Service ✓ 565



## LOOK!!

Low prices on hard disk drives  
by Percom\* for TRS-80\*\*

Model I, III & 4  
10 meg-\$1295.00  
20 meg-\$1795.00  
30 meg-\$2395.00

all are new and carry full  
factory warranty

Driver & Cable-\$85.00

Call-513-268-2108

Mail certified check or money  
order to:

JASTE ENTERPRISES, INC.

7679 Sweet Potato Road  
Brookville, OH 45309

\*TM Percom Data

\*\*TM Tandy Corp.

✓244

## PLAY CHESS WITH THE MASTERS! INTRODUCING CHESS CLASSICS

Entertaining, educational chess software  
to improve your chess game.

Each disk contains 64 games played by  
masters from Morphy to Fischer  
and Karpov.

Use CHESS CLASSICS to look at a great  
game and see if you can guess the  
winner's move.

Built-in scoring system gives you an  
approx. US Chess Federation rating for  
your success in picking the right move.

Available for TRS-80 Model I, III and IV  
KING PAWN DISK ..... \$59.95  
QUEEN PAWN DISK ..... \$59.95  
BOTH DISKS ..... \$100.00

(CT Residents add 7 1/2 % sales tax)

Send check or money order to:

Noteworthy Software Inc. ✓127

12 Noteworthy Dr., Danbury, CT 06810



## WINDOWPAD

YES WE DO WINDOWS SO CAN YOU

Windowpad an integrated win-  
dowing and note processing utility  
is ready for your TRS-80 Model I  
III III/4. Windowpad runs along  
with your application program or  
stand alone. Just \$21.25 Post-  
paid. Send Check or Money Order  
to EN Fleur Corp. 2494 Sun Valley  
Cir. Silver Spring MD. 20906 ✓350

☺ [MD. Residents Add 5% Tax] ☺

## Quit Wasting Your Time!

Use our friendly programs. They save  
keystrokes, speed up Basic operation,  
and add extra features to most Model  
1/3/4... disk systems. Try them and see  
for yourself (or write for information):

FAST4/CMD ..... \$14.95  
M4... only Full speed, no side effects

AutoPAWS ..... \$14.95  
M1/3/4... Stops scrolling when CRT fills

UTILIPAK ..... \$24.95  
Assorted utility programs for M1/3/4...

MENUGEN ..... \$54.95  
M3/4... Includes BASIC speed-up files

Add \$3 per order packing and post-  
age. Immediate shipment by 1st Class  
Mail.

the software factory

12101 N. Western View  
Oklahoma City, OK 73132-9270

(405) 728-3312 ✓104

VISA MC

## IEEE-488 TO TRS-80\* INTERFACE

Everything needed to add powerful  
BASIC GPIB-488 controller capability to  
TRS-80 Model 1, 3 or 4, Level 2 or DOS  
with a minimum of 16K.



488-80C  
For Model 3 or 4  
Operation

488-80B  
For Model 1  
Operation



Model 448-80B or 488-80C Price: \$425  
+ shipping, insurance & tax

WHEN ORDERING SPECIFY DISK OR TAPE

SCIENTIFIC ENGINEERING  
LABORATORIES

11 Neil Drive • Old Bethpage, NY 11804  
Telephone: (516) 694-3370 ✓203

\*Trademark of Tandy Corp.

There is no affiliation between Scientific  
Engineering Laboratories and Tandy Corp. or  
Radio Shack.

## NODVILL DIET PROGRAM

\$69.95

"TAKE A BYTE"

MAINTAIN, LOSE OR GAIN WEIGHT  
With the NODVILL DIET PROGRAM "Take a Byte"  
and a TRS-80 D.D. Disk M1/III/4 or P-C Compatible.

you can quickly and accurately

- Calculate caloric and nutritive food intake
- Evaluate nutritive value of your diet
- Compare daily diet to individual RDA Chart
- Create personalized daily meals and menus
- Plan varied daily menus based on sound nutrition
- Save records of daily meals and menus for future planning
- Print nutrition charts, food, meal, menu and grocery lists

"Take a Byte" is a Modular BASIC Program

MAIN Program Menu

- (1) Recommended Daily Dietary Allowance (RDA) CHART
- (2) 733 Expandable Random Access FOOD LIST Data File
- (3) 28 Nutritional MEAL LIST Data File Examples
- (4) 7 Balanced DAILY MENU LIST Data File Examples
- (5) GROCERY LIST Program Module
- (6) 25 Page USER'S MANUAL including Charts and Tables

All Data Files can be EXPANDED and MODIFIED systematically and flexibly to reflect your  
personal diet, your choice of diet book, or your doctor's suggested diet.

For more information: Call (203) 431-6443

To Order: Mail a check or money order for \$69.95 plus \$3.00 (S & H) to:

NODVILL Software  
24 Nod Road  
Ridgefield, Conn. 06877 ✓54

**NEW!** "Where is that  
Movie?"  
Find it quickly, easily with  
**VIDEO TAPE  
TRACKER**

Takes the work out of managing  
your video library, easy to use •  
stores over 1,000 titles • prints  
numbered labels • lists by tape and/  
or title • searches by tape, title, or  
performer • very fast • ready to use

**TAPE  
TRACKER** is a  
real time saver,  
and the price is  
right. Make  
your life easier,  
order today  
toll free:

**(800) 824-7888,  
oper. 422**

PLEASE SPECIFY:  
IBM PC 64K 1 disk  
TRS-80 I or III  
48K, 2 disks  
Tandy 2000

**PRO 3071** ✓51

ALL THIS  
FOR ONLY:  
**\$39.95**

Dep't. Box 560  
No. Hollywood, CA 91603  
(818) 764-3131

TERMS: VISA, MC, checks, COD. Please add \$2.00 shipping in U.S. or Canada.  
\$5.00 overseas, sales tax in Ca. Most orders filled within 48 hrs.

**ANNOUNCING**  
SCENARIO: (CASTLE MYRAVELL)  
THE GREATEST ROLE-PLAYING FANTASY  
ADVENTURE EVER WRITTEN  
FOR THE TRS-80

This game is for the strategy buff  
as well as the hack and slash player  
ages 12 and up

**FEATURES:**

- High speed M1/3/4 graphics
- parties of up to 8 characters
- characters recruited from 12 professions
- hand to hand combat
- archery weapons
- 3 classes of magic
- automatic game saving
- backup and recovery utilities
- menu driven operation
- excellent documentation
- newsletter for registered owners

**WILL RUN ON:**  
MODEL I (48K): TRSDOS, NEWDOS80, DOSPLUS  
MODEL III (48K): NEWDOS80, DOSPLUS  
MODEL IV (in III mode)  
2 drives for generation  
1 drive for play  
(C:64 version available - 1x1541 drive)

**PRICE: \$39.95 U.S. (\$49.95 CAN.)**  
CHEQUE OR MONEY ORDER  
payable to 408614 Ontario Ltd.  
allow 2 weeks delivery for  
money order or certified cheque  
6 weeks for personal cheques  
DEALER INQUIRIES WELCOME

**MAIL ORDERS TO:**  
WARRIORS AND WARLOCKS  
56 ECCLESTON DR., SUITE 311  
TORONTO, ONT., CAN.  
M4A 1K9  
(416) 759-8849 ✓41

**QUICK LABEL SYSTEMS**  
**WRITE ON—WIPE OFF  
LABEL SYSTEM**

1000 Entry Changes Each Label  
Label Will Outlast the Device  
Permanent & Changeable Entries  
Ideal for Color Coding & Indexing  
Complete Kit of 24 Labels & Overlays

**1 Quik-Pen & Stor-Pak... \$4.95**

Specify for: ■ Cassette (Data-Audio)  
■ Floppy Disk ■ Hard Disk  
■ VHS Video ■ Beta Video

Write or Call:  
**Quick Label System**  
301-725-0050 ✓117

437-B Main Street, Laurel, Md. 20707  
VISA — MASTERCARD  
\*\*\*DEALER INQUIRIES INVITED\*\*\*



## Able Enable

Enable (\$695), an integrated package for the Model 1200, includes word processing, a spreadsheet, graphics, database management, and telecommunications.

Modules offer fast, easy transfer of data. Enable integrates data from all modules in one window for printing or data transmission. You can create graphs from the spreadsheet or data base program, then insert the graphs, spreadsheet, and data base data into a word processing document on screen.

The system is compatible with files from dBaseII, Lotus 1-2-3, VisiCalc, WordStar, EasyWriter I, and Volkswriter. Enable also lets you use modules simultaneously. For instance, you can use the spreadsheet program, print a report, and receive stock quotes over the wire all at once.

Current owners of Lotus 1-2-3 can buy Enable for \$200, and dBase II users can buy it for \$400, with proof of purchase. For more information contact The Software Group at Northway Ten Executive Park, Ballston Lake, NY 12019, 800-338-4646.

Reader Service ✓ 572

## PFS:Planning

Software Publishing Corp. (1901 Landings Drive, Mountain View, CA 94043, 415-962-8910) offers a full line of PFS: products, including its new PFS:Plan spreadsheet program for the Models 1200 and 2000.

PFS:Plan (\$140) lets you develop budgets, forecasts, and other financial models without learning complex program formulas and command sequences.

Quick entry keys let you generate row and column headings with one keystroke. PFS:Plan displays formulas next to rows and above column headings in English terms.

PFS:Plan accepts files written with Lotus 1-2-3, Multiplan, or VisiCalc, and integrates with all other PFS: series programs.

Other PFS: series programs include the PFS: Write word processor (\$140), PFS:File information management program (\$140), PFS:Report report generator (\$125), PFS:Graph chart and graph program (\$140), PFS:Proof spelling checker (\$195), and PFS: Access communications program (\$195). PFS:File and PFS:Report are also available for the Models III, 4, and 2000.

Reader Service ✓ 571

## On-Line Health

Home Health Guide for Children (\$69.95) solves the problem of deciding when to call the doctor for your child by providing information on 155 health problems.

Dr. Barton D. Schmidt, a pediatrician, describes and defines symptoms and causes of illnesses, recommends action, home care, and preventive measures. Health problems covered range from diaper rash and mumps to common colds, selecting shoes, and emergency situations.

The three-disk Model 4 package features built-in instructions and a menu for easy use. It's available at Radio Shack stores. Contact Clinical Reference Systems (P.O. Box 20308, Denver, CO 80220, 800-821-2794) for more information.

Reader Service ✓ 570

## DIFFERENT TRACK



Sweetware Inc.'s newest microcomputer is getting its licks in the personal computer marketplace.

## Eat-Only Memory

Sweetware Inc.'s newest microcomputer gives users a taste of high technology. It's a state-of-the art keyboard and monitor, constructed entirely of gourmet milk chocolate.

The complete system weighs in at 1.2 lbs.—truly portable. The chocolate keyboard and monitor are \$16.95. A ½ lb. package of two Eat-Only disks is \$11.95 (add \$2 postage per item).

For more information contact Sweetware Inc., 516 Shelburne Road, S. Burlington, VT 05401, 802-862-6939. Reader Service ✓ 569

## New Products Index

### Reader Service

Number	Company	Page
562	Anchor Automation	174
555	A.R.M.S.	168
570	Clinical Reference Systems	176
560	Dell Publishing Co. Inc.	171
557	Dynacomp	168
561	Fujitsu America Inc.	172
558	Good Software Corp.	172
566	Inovion Corp.	170
564	Institute for Scientific Analysis Inc.	170
568	Lifetree Software Inc.	172
552	Micro Projects Engineering Inc.	166
551	Quick Label Systems Inc.	171
553	Seal Software	166
563	Smith-Corona	166
559	Soho Corp.	170
571	Software Publishing Corp.	176
569	Sweetware Inc.	176
554	Tab Books Inc.	166
556	Tandy Corp./Radio Shack	166
565	Tandy Corp./Radio Shack	174
567	Taxbyte Inc.	168

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.

# T/Maker Integrated Software. Simple, Powerful, Well Liked.



## Peelings II

"The program is a pleasure to use... [it] is well implemented, well documented, and is quick in operation. It deserves an AA rating."

— F.M. Remley, 7/83

## InfoWorld

The Newsweekly for Microcomputer Users

"T/Maker is a superb product! I have yet to see anything that comes close to its level of system integration, overall ease of use and general sophistication."

— Tim Daneliuk, 7/11/83

### Excellent

Performance ✓  
Documentation ✓  
Ease of Use ✓  
Error Handling ✓



"...if you regularly prepare documents combining text, charts, and lists, ...if you belong to an organization

that uses several different kinds of microcomputers... if you want to reduce the training burden and improve the capability of sharing files... T/Maker can become the key program in your software library."

— Frank J. Derfler, Jr, 4/84

COMPUTING FOR BUSINESS

## INTERFACE AGE Magazine

"After using T/Maker for some time, my reaction is that this program accomplishes its job simply and without effort."

— Michael Heck, 3/84

## POPULAR COMPUTING

"T/Maker is an excellent choice... Unlike the other (integrated) programs, it is available for the vast number of 8-bit computers running the CP/M operating system as well as for the more powerful 16-bit computers."

— Michael J. Miller, 12/83

## Everything in ONE Program.

Available for Kaypro, TRS-80 Model II, 4/4P, 12, 16 (requires CP/M)

Also available for IBM PC, TANDY 2000, TI PRO, DEC Rainbow, requires 128K.

Suggested Retail: \$450

Ask your local Radio Shack Center for more information or call:

T/Maker Company  
2115 Landings Drive  
Mountain View, CA 94043  
**415 962-0195**

# T/Maker™

✓ 266

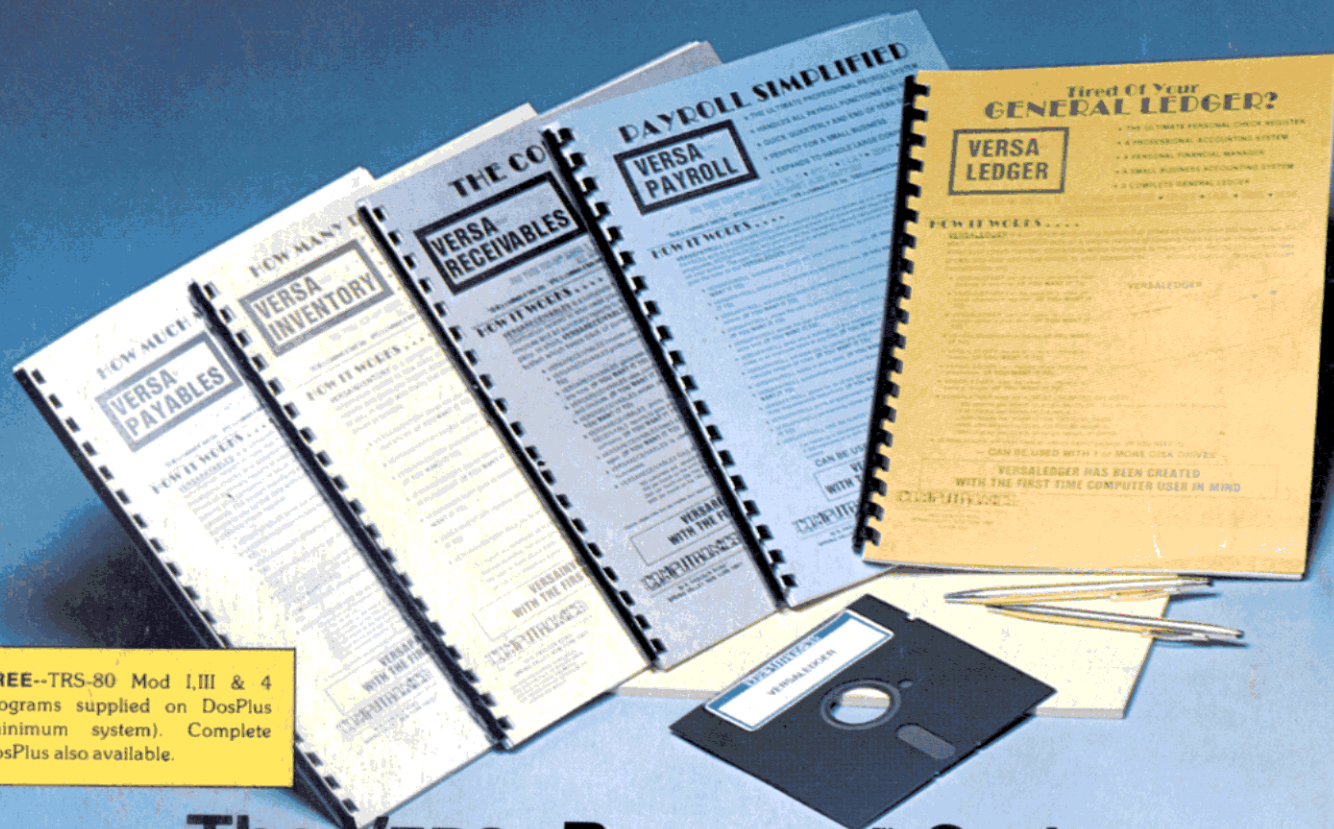
## Integrated Software

Word Processing  
Spread Sheet Analysis  
Relational Data Base Mangement  
Spelling Checker  
Bar Chart Graphics  
Plus On Line Help



# 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 \$5 to CANADA or MEXICO
- \* add \$4 for C.O.D. or non-UPS areas
- \* 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

TRS-80 trademark Tandy Corp. - APPLE trademark Apple Corp. - IBM PC trademark IBM Corp. - OSBORNE trademark Osborne Corp. - XEROX trademark Xerox Corp. - KAYPRO trademark Non Linear Systems, Inc. - TELEVIDEO trademark Televideo Systems, Inc. - SANYO trademark Sanyo Corp. - NEC trademark NEC Corp. - DEC trademark Digital Equipment Corp. - ZENITH trademark Zenith Corp. - TI PROFESSIONAL COMPUTER trademark Texas Instruments, Inc. - SUPERBRAIN trademark Intertec Corp. - CP/M trademark Digital Research - EPSON trademark Epson Corp.