

April 1982
US \$2.95
(UK £1.80)

80

microcomputing^{T.M.}

the magazine for TRS-80[®] users

A WAYNE GREEN PUBLICATION

Crash Savers:

Your Program May Not Be Lost!

Time Saving Magic—

Utilities Computerize
Your Programming

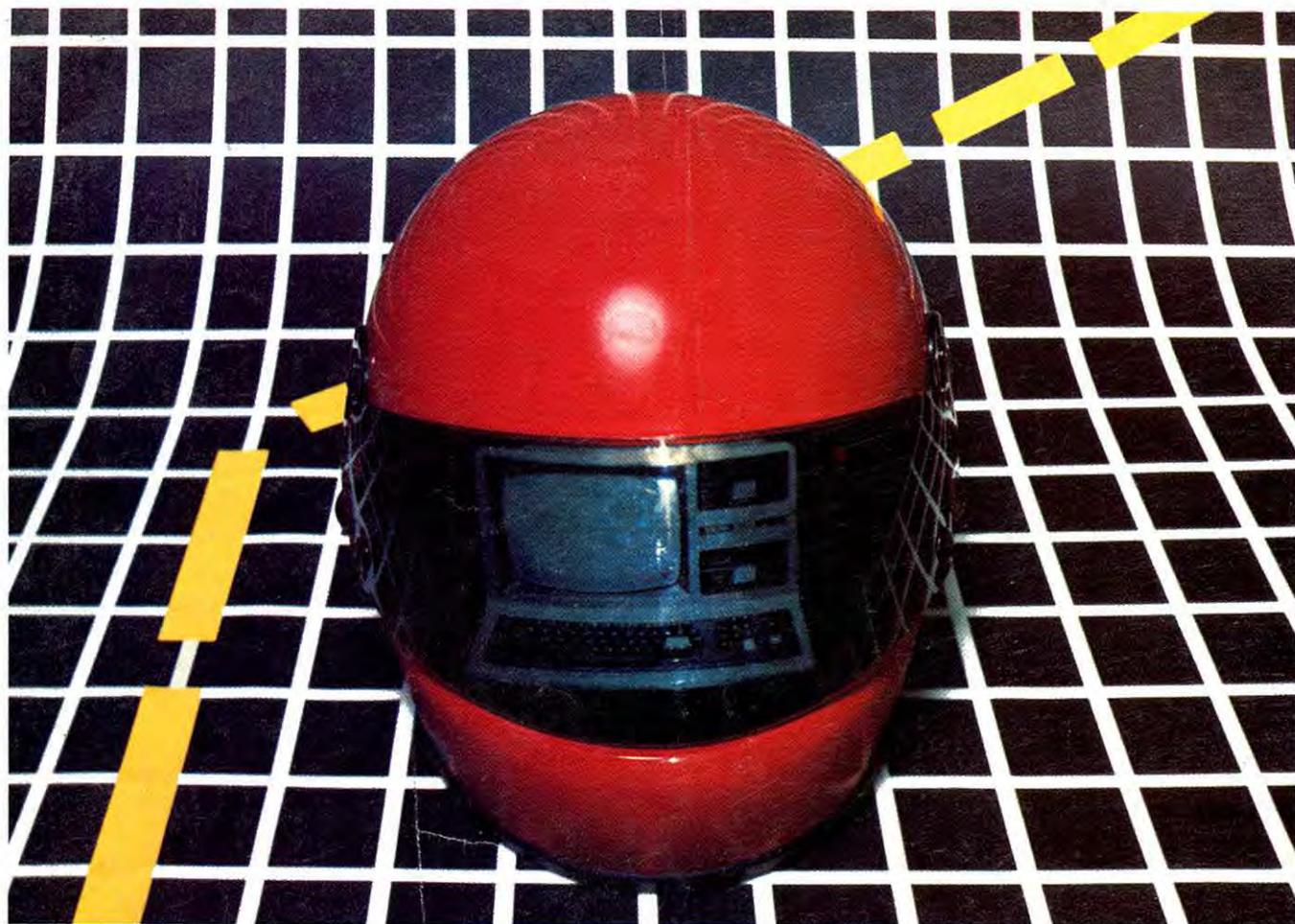
Utilities Buyer's Guide:
What You Need To Know Before You Buy



80 Microcomputing

4/82

#28



Dosplus shifts into overdrive for business.

THE NEW DOSPLUS 4.0 HARD DRIVE SYSTEM MEANS BUSINESS

MAKE A SWIFT SHIFT The DOSPLUS 4.0 Hard Drive System turns your TRS-80 into a powerhouse for business applications. Shifting up to a hard drive is just like moving up from tape to floppy. It makes good business sense. You get the power, the dependability, the speed and capacity of a hard drive to power the software you need to keep your business in top gear.

MIND YOUR OWN BUSINESS The power potential of the TRS-80 driven by DOSPLUS 4.0 Hard Drive System lets you mind your own business just like the big companies do. You can control accounts receivable, accounts payable, inventory, payroll, invoicing and a whole lot more accurately and with confidence because DOSPLUS 4.0 is the only current operating system designed from conception for hard disk operation.

DOSPLUS 4.0 T.C.B. [Takes Care of Business] What good is a DOS if you have to spend so much time getting it to perform properly that your business suffers? The DOSPLUS Hard Drive System takes care of the computer while you take care of your business. It's a smooth, swift and silent business partner with the potential to handle up to 40 megabytes of capacity in 4, 10 meg units." So now you can shift your TRS-80 into over drive with DOSPLUS.

THE DOSPLUS 4.0 FEATURES

- Single volume addressing/Double sided floppies seen

as one drive—Any single file can expand to limit of hard drive (up to 10 meg.)

- Hard disk—disk editing utilities • Incredible I/O speed
- Runs any combination of densities or tracks
- Also operates 8" drives with special hardware—comes with expanded users guide and complete DOS technical section on I/O calls and DCB organization
- "PLUS" ALL OF THE SENSATIONAL NEW DOSPLUS 3.4 FEATURES

THE DOSPLUS 4.0 HARD DRIVE SYSTEM

- Smooth, silent, swift • Error-free disk I/O
- *Add on up to 4, 10 meg units for a total of 40 megabytes!
- Plugs on the 50 pin data bus.—no loss of floppy drives
- Completely self-contained—just plug it in and go
- *10 meg units available Soon.

NOTE: Specify 40 or 80 track when ordering DOS diskette. After initial bootup, user can create any DOS desired.

STARTING FROM
TAKE YOUR \$2995 COMPLETE
MICRO TO THE MAX.

Lifetime warranty on original media.

For more information Reader service card 384

DOSPLUS DOSPLUS first in quality!
First in the industry!



**MICRO-SYSTEMS
SOFTWARE, INC.**

Specializing in the Tandy Line
5846 Funston Street
(305) 983-3390 Hollywood, FL 33023

Outside of Fla. CALL TOLL FREE

1-800-327-8724 ext. 204

TOLL FREE LINES WILL ACCEPT ORDERS ONLY!

For Applications and Technical information,
call (305) 983-3390 or drop us a card

Dealers inquiries invited

So Far, So Good...



**Your Model III is a fine computer.
So why settle for less than
a fine disk storage system?**

A fast, reliable disk storage system — no other device is so vital to the satisfactory performance of your computer. At Percom we build quality, high-performance disk drive systems. From gold-plated connector contacts to goldcad metal chassis structures. From proven design through 100% reliability testing. Percom disk systems are the standard by which others are judged — the industry's "gold standard," in a sense. And since Percom is the largest independent manufacturer of disk systems for microcomputers, you get Percom quality at very competitive prices. Add-on drives for TRS-80* computers start as low as \$399. Complete first-drive systems for the Model III start at only \$599. Put a quality Percom mini-disk storage system in your Model III. And save.

#1 For Your Model III

Percom TFD drives for your TRS-80* Model III computer are available in 40- and 80-track versions with single or dual heads. Single-head 40-track drives store 180 Kbytes; dual-head 40-track drives store 360 Kbytes. Eighty-track drives store slightly over twice these amounts. Of course these are formatted capacities. The Percom Model III controller handles up to four drives so it's possible to access almost three million bytes of on-line program and data files. You get Percom's OS-80/III Basic language DOS with each first-drive system, and your first drive may be either internal (add-in) or external (add-on). Percom TFD drives work with Model III TRSDOS and other Model III disk-operating systems. First-drive systems are pre-assembled. Installation is accomplished with simple tools.

#1 For Your Model I, Too

Percom TFD add-on drives for the TRS-80* Model I computer are available with the same features and the same quality control measures as TFD Model III drives. As for Model III drives, all Percom Model I drives are double-density rated. Install Percom's popular DOUBLER II in your Model I Expansion Interface and upgrade your Model I to provide the same storage capacity as the Model III.

Watch for Announcement of Percom's Low-Cost Hard Disk System for the Model III!

To order, or for the name of your authorized Percom retailer,
call toll free 1-800-527-1222.



PERCOM DATA COMPANY, INC.
11220 Pagemill Road • Dallas, Texas 75243
(214) 340-7081

PRICES AND SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

*TRS-80 is a trademark of Tandy Radio Shack Corporation which has no relationship to Percom Data Company, Inc.
PERCOM, DOUBLER II and OS-80/III are trademarks of Percom Data Company, Inc.



Yes...I'd like to know more about
the best for my TRS-80 computer.
Send me free literature about
quality Percom products.

MODEL I MODEL III

Send to
PERCOM DATA COMPANY, INC. Dept. 8-M
11220 Pagemill Road, Dallas, TX. 75243

NAME _____

STREET _____

CITY _____ STATE _____

ZIP _____ PHONE NUMBER _____

80 Contents

PUBLISHER/EDITOR

Wayne Green

EXECUTIVE VICE PRESIDENT

Sherry Smythe

ASSISTANT TO PRESIDENT

Matt Smith

ASSOCIATE PUBLISHER

Edward Ferman

ASSISTANT PUBLISHER

Jeff DeTray

MARKETING

Debra Boudrieau, Director; Ginny Boudrieau, Bulk Sales Manager

ADVERTISING

924-7138

Penny Brooks, Coordinator; John Gancarz, Hal Stephens, Susan Martin: Sales. Marcia Stone, Office Manager.

New England Advertising Representative:

John A. Garland, Garland Associates, Inc., Box 314 SHS, Duxbury, MA 02332. 617-934-6464.

DESIGN

Denzel Dyer, Howard Happ,

Laurie MacMillan, Joyce Pillarella,

Diana Shonk, Susan Stevens,

Donna Wohlfarth: Consultants

PRODUCTION

Nancy Salmon, Manager; Michael Murphy, Assistant. Frances Benton, Betty Butler, Fiona Davies, Matthew Hale, Patty MacKowsky/Allen, Theresa Ostebo, Scott Philbrick, Dianne Ritson, Deborah Stone, Irene Vail, David Wozmak. Judy Wimberly, Ad Coordinator; Steve Baldwin, Bruce Hedin, Jane Preston: Advertising Production.

PHOTOGRAPHY

Paul Babich, Sandra Dukette, Bryan

Hastings, John R. Schweigert, Thomas

Villeneuve, Robert M. Villeneuve

TYPESETTING

Sara Bedell, Debbie Davidson, Michele

DesRochers, Beverly Jackson, Stephen

Jewett, Elizabeth Lockhart, Anne Rocchio,

Kelly Smith, Karen Stewart

80 Microcomputing (ISSN 0199-6789) is published monthly by 1001001 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 \$25 for one year and \$53 for three years. In Canada, \$27.97—one year only, U.S. funds. Canadian distributor: Micro Distributing, 409 Queen St. West, Toronto, Ontario, Canada M5V 2A5. BC Canadian distributor: Graymar Data Services, Ltd., #4 258 E. 1st Ave., Vancouver, BC V5T 1A6. 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 Microcomputing, P.O. Box 782815, Sandton, South Africa 2146. All U.S. and Canadian subscription correspondence should be addressed to 80 Microcomputing, Subscription Department, P.O. Box 981, Farmingdale, NY 11737. Please include your address label with any correspondence. Postmaster: Send form 3579 to 80 Microcomputing, Subscription Services, P.O. Box 981, Farmingdale, NY 11737.



Paid Audited Circulation

Manuscripts are welcome at 80 Microcomputing, we will consider publication of any TRS-80 oriented material. Guidelines for budding authors are available, please send a self-addressed envelope and ask for "How to Write for 80 Microcomputing." 80 Microcomputing is published monthly by 1001001 Inc., a subsidiary of Wayne Green, Inc. Entire contents copyright 1982 Wayne Green 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.

Cover by William Giese

Buyer's Guide Cover Photo by Charles H. Freilberg

*TRS-80, Scripsit and TRSDOS are trademarks of Tandy Corp.

Basic Misinterpreter

86*

by David Busch

Speak of the Devil! Dave says he's received such a demand for KTI products that he thought it would be a good idea to produce. . . er. . . acquire some. Here is his first offering, an item he says is "a significant technological regression."

BIPED

112

by Kerry Leichtman

In Stamford, CN, American business is owning up to the confidence President Reagan has placed in it to help the disadvantaged, and using computers to do it.

Dateline: Sri Lanka

128

by John P. Mello Jr.

Some observers of the computer scene contend there is no computer humor, but David Busch doesn't seem to have noticed. Our roving jokester takes his eye off the infamous Kitchen Table Inc. to talk about himself.



Buyer's Guide to Utilities

135

Here they are—assemblers, editor/assemblers, monitors, disk zappers, renumberers, tape utilities, file utilities, and more.



Make Butterflies—Not Bugs

152

by Jake Commander

So you're a new kid on the block and your idea of a utility is something you own in Monopoly. Well, Uncle Jake, who has written a few utilities in his day, will help open your eyes and your mind.

BUSINESS

- 298 **One Twelfth of a Misery**
Giving the usurer his due. *James K. Krapf*

EDUCATION

- 294 **Vocabulary Test**
Cramming—silicon style. *Paul Kalkstein*
- *302 **King Komputer**
An end to the reign of the yardstick. *Dana B. Allison*

GAME

- 222 **Computer Repeat**
A test of memory and keyboard dexterity.
Randolph A. Fontenot

GENERAL

- 76 **ROM Bibliography**
A little summer reading. *Paul Secord*
- 124 **A Night on the Town**
Even computers need a change of venue. *David Gunn*
- 182 **Model II Disassembler**
Modifying Wuebker. *Richard L. Faber*
- 258 **Sublime Simulations**
How they work. *James E. Keogh*
- 262 **Vexed by the Void**
Planet 02 where are you? *Randy M. Resnick*
- 328 **A Handy, Dandy, Tandy Table**
If you are a carpenter. . . . *R. Gene Langston*

HARDWARE

- 220 **A New Generation of Characters**
A lowercase chip in search of an 80. *Walter C. Park Sr.*

HOME/HOBBY

- *270 **Bringing the Supermarket to its Knees**
Beg for mercy, Mr. Whipple. *J.A. Kraynak*
- 274 **To Catch a Thief**
A program to make cat burglars yowl. *David G. Kuhn*

REVIEW

- 70 **Line Printer VIII**
More for \$100 less. *Richard Wallace*
- 82 **Line Printer VII**
You don't have to shuffle off to Buffalo to get one.
James E. McKenna
- 94 **Snow Shovel for Your Video**
Toro for your tube. *Ronald H. Bobo*
- 98 **Spelling Checquer**
Five spelling checkers compared. *M. M. Finetrock*
- 278 **Dot Matrix Bargains**
The price is right for this quintet. *Harley Dyk*

TECHNIQUE

- 254 **Model I Do Files**
For the lazy among us. *Philip Jackisch and Gordon Knapp*
- 290 **Worm Pills for Basic**
Syntax does not a programmer make.
Dan Keen and Dave Dischert
- 332 **Total Recall**
Fortran never forgets. *J. Gary Bender*

SERIES

- 264 **Technological Destiny—Part I**
Manifest in the silicon sun. *Gary Dillio*

UTILITY

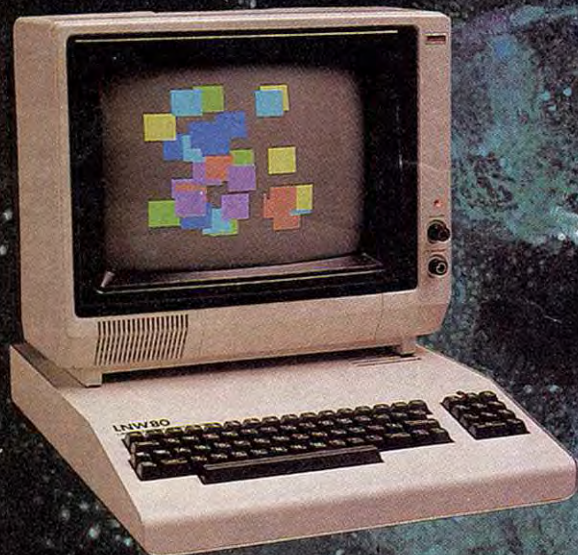
- *167 **BAM!**
Learn ML from a 14 year old. *Jeff Byrkit*
- 176 **Model II Terminal Driver**
CP/M, Cobol and compatibility. *James E. Korenthal*
- *188 **Rapid System Loader**
Machine language loading in the fast lane.
David C. Hedinger
- 206 **LÖC-Editor**
Error-trapping homebody. *Jon Mark O'Connor*
- *208 **Zubroutines**
Run silent, GOSUB. *Peter Ashley*
- *214 **Direct Access**
Disk routines from Basic with ease. *Harold B. Fink*
- 226 **Memory Size?**
Read this before you throw your keyboard against the wall.
Hugo T. Jackson
- 234 **SYSTEMized Basic**
SAVE SYS FORMAT. *Greg Browne*
- 240 **Using Test1A**
What Tandy left out. *Claude T. Moultrie Jr.*
- *244 **Command Interpreter**
Take a PEEK at your 80s ML routines. *Roger C. Alford*
- *250 **Model III Master Directory**
Found at last! *Wilbur A. Muehlig*
- *306 **CP80**
A monitor like the big boys'. *Brian Cameron*

DEPARTMENTS

- 7 **Remarks** *Wayne Green*
- 10 **Proof Notes**
- 12 **Input**
- 28 **Kitchen Table Software** *David Busch*
- 32 **80 Accountant** *Michael Tannenbaum*
- 40 **Reviews**
- 66 **Education 80** *Earl R. Savage*
- 338 **Reader Service**
- 342 **Calendar**
- 346 **Soft Bits** *Roger Fuller*
- 354 **News**
- 370 **Medical Opinion** *Philip R. Mills, M.D.*
- 374 **Reload 80**
- 378 **Money DOS** *J.M. Keynes*
- 382 **Copernica Mathematica** *Bruce Douglass*
- 388 **New Products**
- * **on LOAD 80 tape**

GALAXY OF FEATURES

A **GALAXY** of features makes the **LNW80** a remarkable computer. As you explore the **LNW80**, you will find the most complete, powerful, ready to run, feature-packed personal and business computer ever made into one compact solid unit.



MODEL I COMPATIBILITY – The **LNW80** is fully hardware and software compatible with the Model I. Select from a universe of hardware accessories and software – from VisiCalc® to space games, your **LNW80** will launch you into a new world of computing.

FULLY LOADED – A full payload includes an on-board single and double density disk controller for 5 1/4" and 8" single or double sided disk drives. RS232C communications port, cassette and parallel printer interfaces are standard features and ready to go. All memory is fully installed – 48K RAM, 16K graphics RAM and 12K ROM complete with Microsoft **BASIC**.

QUALITY CONSTRUCTION – Instrumentation quality construction sets **LNW80** computers apart from all the rest. Integrated into the sleek solid steel case of the **LNW80** is a professional 74-key expanded keyboard that includes a twelve key numeric keypad.

HIGH RESOLUTION GRAPHICS & COLOR – The stunning 480 X 192 resolution gives you total display control – in color or black and white. The choice of display formats is yours; 80, 64, 40 and 32 columns by 24 or 16 lines in any combination of eight colors.

PERFORMANCE – Lift-off with a 4MHz Z80A CPU for twice the performance. The **LNW80** outperforms all computers in its class.



Our down to earth price won't send you into orbit

LNW Research Corp.

2620 WALNUT Tustin, CA. 92680
(714) 641-8850 (714) 544-5744

Monitor and Disk drives not included
TM Personal Software, Inc.

80 REMARKS

by Wayne Green

"A letter from a chap in Maryland lists in detail how he saved \$913.72..."

Month Change Coming

In order to thwart the people who handle the newsstand circulation of *80*, we will be running a double month in one issue of 1982. Every subscriber will get the twelve issues bargained for; just the date on the issues will change.

Newsstand distribution is handled through a network of about six hundred distributors. Each of these firms service as many as several hundred newsstands or magazine sections in supermarkets, discount stores, book stores, and so on. We run into problems with the date on the magazine cover. The chaps who stock the magazines and return the unsold copies do not keep track of how many days or weeks a magazine has been on sale. They look at the cover month and, if the month is about up, pull the unsold copies.

Since *80 Micro* comes out fairly late in the month listed on the cover, we found some newsstands had the issues on sale for less than a week before they were removed as unsold copies. By moving the date on the cover ahead one month, each issue will get a full month on the newsstands and thus be available when people come looking for it.

The newsstand sales of *80* have been surprisingly strong, considering the date problem, so we're anxious to increase these sales. So far we have tested newsstand sales in only a few areas of the country, but we would like to go national with it once we solve the cover date problem.

We'll get the computer to move all subscription renewal dates one month later and then sit back, waiting to answer the piles of letters from readers who have not read this or future announcements, beefing about losing an issue on their subscription.

Fortunately, these hot heads are in the minority. I am just as proud as I can be of you—the reader. You buy the magazine, you write great articles for it, you write interesting letters, and you buy the products advertised with abandon. The advertisers tell me that they do far better with their ads in *80* than any other magazine.

If you do have trouble with any firm, including mine, let me know. ■

The No Monitor Debacle

An easy way, it was thought, to cut about \$50 from the manufacturing cost of a desktop computer was to leave the monitor off and let the user plug in a television set. After all, \$50 saved up front can bring down the retail price by \$150 to \$200, which is significant.

The development of micros with color capability made the additional cost of a built-in color monitor even more onerous. When we see those \$79 black and white television sets and those \$250 color sets in the discount stores, we tend to push out of our mind what we know about manufacturing and distribution.

Those low-priced tv sets are possible because somewhere, using almost 100 percent automation, a very large factory is churning those sets out by the hundreds of thousands or more. They are then shipped by the boatload and merchandised via discount stores, where there is a minimum of overhead.

It is impressive to visit one of these truly mass production factories. One that I toured not long ago was about 50 miles out in the country from Seoul, Korea. Even though the worker wage was miniscule by our standards, the factory was thoroughly automated. One man stood and watched as a mammoth machine inserted parts into the tv set boards. The parts had been automatically put on a strip for this inserter by another machine, which took strips of the parts and restripped them in the order they would be inserted.

The production line was continuous and so perfect that all but the final test station had been removed, and that really wasn't necessary. New employees train on a small pseudo-production line until they are ready to move to the big line, which seemed to move for miles through the huge plant.

Burning-in tests, glue drying, and other wait periods which normally call for the removal of the set from the moving belt were accommodated by the belt going above the work area and circulating during the necessary delay. The belt then returned the products to the work level for the next steps in the process.

Production engineers figure each dou-

bling of the quantity of merchandise manufactured results in a lowering of the unit cost by about 15 to 25 percent. Thus, if we are making an Apple computer and figure the whole system sells for about \$4,000 with disks and so on, if we increase production from 100,000 per year to 1,000,000 units, our selling price will be down around \$1,750. At six million the selling price is down to about \$1,000. You get the picture.

If you leave the monitor off a computer you create some serious problems for the customer and the dealer. First, the definition of characters on most television sets is crummy. This does not enhance the image of the computer. If you're going to have decent looking readouts your monitor is going to have to be a dedicated monitor. It is going to have to have a much wider bandwidth than television sets provide. And bandwidth determines the sharpness of the picture. The wider the bandwidth, the sharper the image.

But since monitors are needed in thousand lots, not in millions, their cost is high compared to a tv set. When you consider there is less technology involved in a monitor and that, if the quantities were of the same magnitude as tvs they would cost considerably less, there are some emotional problems (particularly for engineers, who understand the problem) involved in paying more for less.

There are other difficulties too. In a business environment we rarely have a television set which can be commandeered for use with a computer. In that case there is obviously no saving to the buyer of the system when the manufacturer sells only the computer and no monitor.

In the home we have another situation. Sure, we have a tv set in the home—a couple of them, at least. But these were bought for watching television, not to be preempted for use with a computer. The person who drafts the family tv set to play a game or build some business charts is going to have several very angry family members raising hell. The average home tv set is in use over seven hours a day. This doesn't leave much time for the computer.

I would be remiss if I didn't add one more straw to your load. Once you see a color computer you get all excited about it. This is one of the reasons Apple has

done so well. Radio Shack's color system has done surprisingly well, considering that there is virtually no software for it. That's the power of color; but with the market for color monitors less than miniscule, the price for these gadgets is all out of proportion to color tv sets. It's worse than the black and white monitor versus tv difference. It's those small quantities again.

Most color computer owners make do with a tv set, managing to live with a really terrible display. This can only have a chilling effect on the sale of color systems, so our manufacturers are going to have to tackle this obstacle soon.

The bottom line is that there are no benefits to the consumer in buying a computer which does not have a dedicated monitor. The apparent savings are paid for by having to accept poor displays or by having to pay a bundle for a decent monitor—which is obviously no saving. ■

Saving Money

In the December issue I asked readers to let me know how much they had been

able to save without violating warranties when buying TRS-80 systems from *80 Micro* advertisers. A letter from a chap in Maryland lists in detail how he saved \$913.72 through our advertisers rather than buying at his local Radio Shack store. He patronized Perry in Michigan, Texas Computer Systems and Data Resources in Denver. Most of the Model III, 48K, two disk system came from Perry. The Epson printer and cable came from Texas, and disks and a disk box from Data Resources.

His cost in Maryland would have been \$4,000.03 according to his documentation, versus \$3,086.31—and that includes the cashier's check and postage.

This fellow got fast deliveries and full warranties, and is very, very happy.

How about you? Any more success stories with our advertisers which I can pass along?

If you have any problems with advertisers—heck, if you have trouble even with non-advertisers, please let me know the details. The normal procedure I prefer is: Write to the firm which has caused you aggravation, giving them as dispassion-

ate an explanation of the details as you can, and suggest a solution to the problem. Then send the original to them and a copy to me. Note: It can be helpful if you mark on the bottom of the letter that I am getting a copy.

There have been cases where I have not been able to help customers. But for the most part these things end up favorably. I make it a point to do all I can to see our advertisers are doing all they can to give you good products and good service. Oh, I get shafted now and then, just as you do, but not often.

If you do write and wish not to be identified just let me know. ■

TRS-80 Service Research

Readers: Having problems with your system? Write to us about it. What was the problem, how long did it take to get a solution, what was involved, how much did it cost?

Send us the details—we'll compile the information and publish it, to help you get better, cheaper service.

PIONEER SOFTWARE ANNOUNCES CRAYON

BUY CRAYON AND SAVE BIG ON PRINTING COSTS !!!

CRAYON IS A REVOLUTIONARY GRAPHICS AND TEXT EDITOR THAT ALLOWS YOU FREE OR FORMATTED ENTRY OF GRAPHICS AND TEXT. OVER <90> COMMANDS HELP MAKE ALL THE FOLLOWING JOBS EASY.

- 1). TYPESET LOGO'S - LETTERHEADS - ENVELOPES - BUSINESS CARDS AND OTHER OFFICE FORMS. THIS AD WAS TYPESET FROM AN MX-80 PRINTOUT THEN SHRUNK. COST = \$4.50
- 2). SAME AD TYPESET AT A PRINTSHOP WOULD COST = \$200.00 +
- 3). CREATE REAL CARTOONS WITH CRAYON AND THEN RUN YOUR CARTOONS FROM BASIC AT SPEEDS UP TO 35 FRAMES/SECOND.
- 4). CREATE SCREENS OF GRAPHICS+TEXT AND THEN EASILY USE THESE FROM BASIC+ASSEMBLY PROGRAMS OR FROM SCRIPSIT!
- 5). MANAGES DIRECTORIES ON ALL OF YOUR DISKETTES, PRINTS THEM OUT AND ALLOWS SEARCHES AND COMMENTING.
- 6). DRAW ANYTHING YOU DESIRE ONTO THE SCREEN AND PRINT IT OUT OR SAVE IT TO DISK/TAPE - UP TO 30 SCREENS/FILE.
- 7). MANAGE AN APPOINTMENT SCHEDULE, KEEP RECORDS, LISTS OR MENU'S. SAVE/RECALL INFORMATION EASILY AND QUICKLY.
- 8). ALL VIDEO WORKSHEET FUNCTIONS PERFORMED ON SCREEN.

- 1). USER FRIENDLY / 40 PAGE DOC'S-OFFSET PRINTED-INDEXED
- 2). NINE CHARACTER USER DEFINED CURSOR. ----->
- 3). 16 LETTER COMMANDS FOR EASY GRAPHICS ENTRY. TYPE
- 4). VIEW SCREENS DIRECT OR IN SEQUENCE FAST.
- 5). MOVE PICTURE PARTS AROUND SCREEN WITH EASE.
- 6). DO ALL OF THE FOLLOWING ON VARIABLE LENGTH LINES-> COPY-FILL-DELETE-EXCHANGE-MOVE-PULL-UC-LC-INVERT GRAPHICS-PRINT-JUSTIFY TEXT-BUFFER-RESTORE-PRINT SCRIN
- 7). UTILITIES INCLUDE-> MASK - BASIC'S PRINT(Q) NUMBERS CURSOR LOCATION AND VALUE-3 SELECTIVE CLS'S-PATTERN-MINIBUG-CONVERT HEX/DEC-HEXDUMP-SEARCHES-CENTERING!
- 8). FULL DISK / CASS I/D WRITE-LOAD-APPEND-COPY-KILL-DIR SCREENPRINT- OUTPUT CODES TO DRIVE ANY PARALLEL PRINTER!! PROFESSIONALLY WRITTEN & SUPPORTED-NO BUGS-FREE BROCHURE! CASS MOD 1+3=\$35.00 / DISK MOD 1 OR 3 =\$45.00 10K PROGRAM --> ADDRESS ALL DEALER INQUIRIES TO INSTANT SOFTWARE <- FOR ORDERS / PIONEER SOFTWARE 1746 NW. 55TH. AVE. # 204 LAUDERHILL, FL. 33313 PHONE=(305) 739-2071

CHECKS - MONEY ORDERS / PREFERRED - COD'S ACCEPTED ALSD

INNOVATION / QUALITY / SUPPORT
AT A REASONABLE PRICE

PIONEER SOFTWARE
1746 NORTH WEST 55TH. AVE. #204
LAUDERHILL, FLORIDA 33313
PHONE 1-(305)-739-2071

PIONEER

AT LAST !!! PRINTER HELP FOR SCRIPSIT USERS

SCRIPTR IS A DISK OR CASSETTE BASED UNIVERSAL PARALLEL PRINTER DRIVER MODIFICATION FOR DISK/CASSETTE SCRIPSIT. COMPARE FEATURES AND YOU'LL BUY SCRIPTR!!

- 1). ENTER/EXIT SCRIPSIT AT WILL WITHOUT LOSING TEXT BUF.
- 2). OUTPUT ANY CODE (S) (8-255), DIRECT FROM THE TEXT.
- 3). LETTER COMMANDS CONTROL <ALL> MX-80 TYPE FONTS FROM THE TEXT PLUS VAR-LINESPACING, FORMS CONTROL + MORE
- 4). CREATE FORM LETTERS AND REPEATING FORMS WITH EASE BY SPECIFYING AREAS TO INSERT TO DURING PRINTOUT.
- 5). DISPLAY ONLY MODE, SHOWS WHERE PAGES WILL START/END.
- 6). EDIT DURING PRINTOUT FOR ERRORS, CHANGES, GRAPHICS.
- 7). INCORPORATE FULL GRAPHICS PICTURES INTO A PRINTOUT.
- 8). MACRO'S FOR DRAWING BORDERS LIKE YOU SEE HERE. -->
- 9). EFFORTLESSLY VIEW A FILE WITH OUR SPEED READER MODE
- 10). INTERACTIVE ERROR CHECKING MODE FINDS ERRORS FAST.
- 11). START PRINTING AT ANY PLACE IN THE TEXT BUFFER WITH HEADERS, FOOTERS AND PAGE NUMBERS IN PLACE.
- 12). UNDERLINE WITH <ANY> CHARACTER EVEN GRAPHICS.
- 13). 6 SAMPLE PROGRAMS / DESIGNED FOR NON-PROGRAMMERS.
- 14). 65 PAGE MANUAL, BOUND, INDEXED, PHOTO-OFFSET PRINTED.
- 15). RETURN PROG+DOC FOR REFUND-\$5.00 IF NOT SATISFIED.
- 16). 2 VERSIONS INCLUDED WORK WITH ANY PARALLEL PRINTER

PATCH --> CONVERT SCRIPSIT/LC FOR MODEL 3 OPERATION \$1.00
DISK SCRIPTR MOD 1/3 = \$40.00 MOD III. VERSION WORKS WITH MODEL I. SCRIPSIT/LC - NO USER PATCHING REQ. FOR MOD 1/3 CASSETTE SCRIPTR MOD 1/3 = \$40.00 WORKS WITH SCRIPS VER. 1.0 MOD 1/3 (REQ. 32K+ LOWER CASE) SCRIPTR IS A 4.5K PROG. INSTANT SOFTWARE MAKES USE OF SCRIPTR IN TYPESETTING IT'S DOCUMENTATION. SCRIPTR IS FULLY DOCUMENTED AND BUG FREE. CHECK READER SERVICE FOR \$5.00 COUPON. FREE BROCHURE!!!

<<<< PLEASE INCLUDE THIS INFORMATION WHEN ORDERING >>>>

NAME	MODEL 1 OR 3	CASSETTE/DISK	
ADDRESS	TYPE PRINTER	SCRIPSIT VER #.	
CITY/STATE/ZIP/PHONE	MEMORY CONFIG.	PAYMENT METHOD	

CHECKS - MONEY ORDERS / PREFERRED --- COD'S ALSO ACCEPTED



META TECHNOLOGIES



26111 Brush Avenue, Euclid Ohio 44132
CALL TOLL FREE 1-800-321-3552 TO ORDER
IN OHIO, call (216) 289-7500 (COLLECT)

1001 THINGS TO DO WITH YOUR PERSONAL COMPUTER

BY MARK SAWUSCH

333 pages \$10.95

333 pages, written in simple terms, of "what-to-do" and "how-to-do-it". Suitable not only for microcomputers, but for programmable calculators as well. Includes program listings, formulas, a glossary of computer terms and more! Definitely a MUST BUY!

"TRS-80™ DISK AND OTHER MYSTERIES"

by Harvard C. Pennington

132 pages written in PLAIN ENGLISH packed with HOW TO information with details, examples and in-depth explanations. Recover lost files and directories, remove file protection, make BASIC programs unlistable. How to use SUPERZAP, recover from DOS errors and MORE!

TRS-80™ DISK \$19.95

"OTHER MYSTERIES" VOLUME II

by James Farvour

Call now and place your order for this new book, "MICROSOFT™ BASIC DECODED & OTHER MYSTERIES for the TRS-80™", from IJG, Inc. A primer for cassette and disk BASIC on the TRS-80™, the information provided applies to similar MICROSOFT™ BASIC interpreters.

MICROSOFT™ BASIC DECODED . \$24.95

"OTHER MYSTERIES" VOLUME III

by Dennis Kitz

THE CUSTOM TRS-80™ \$28.95
CALL FOR AVAILABILITY

"OTHER MYSTERIES" VOLUME IV

"BASIC FASTER AND BETTER"

If you program in BASIC, you want this book! Time-tested and proven, the techniques and routines can be used in thousands of ways to make your programs smaller, faster, and look truly professional.

BASIC FASTER & BETTER \$24.95

EPSON

MX-80, MX-80FT, MX-100

PRINTERS NEW LOWER PRICES!

EXTRA-LONG
10 ft. RIBBON

CABLE \$24⁹⁵

CONNECTS EPSON PRINTER
& TRS-80 MICROCOMPUTER

40-TRACK, SINGLE/DOUBLE-DENSITY, FAST ACCESS,
5 1/4-inch TANDON

DISK DRIVES

\$289⁹⁵ complete

FOR MODEL I and MODEL III

Includes Case, Power Supply
and External Drive Connector

DISK DRIVE

EXTENDER CABLE

\$9⁹⁵

for VISTA, MICROPOLIS,
MTI, PERTEC, SHUGART,
PERCOM & OTHERS

Single Sided, Soft-Sector'd 5 1/4-inch,
PARAGON MAGNETICS™
PLAIN JANET™
DISKETTES
\$19⁹⁵ box of 10

These are factory fresh, absolutely first quality (no seconds!) mini-floppies. They are complete with envelopes, labels and write-protect tabs in a shrink-wrapped box.

Box of 10 Diskettes \$19.95

PARAGON magnetics™ *Gold*

Introducing MTC's premium generic diskette. Single-Sided, Soft-Sector'd, DOUBLE-DENSITY, 5 1/4-inch diskettes with reinforcing HUB-RINGS. Individually 100% ERROR-FREE certified. Invest in GOLD!

PARAGON MAGNETICS GOLD \$23.95

VERBATIM'S PREMIUM DISKETTES DATALIFE™

Seven data-shielding improvements mean greater durability and longer data life. These individually, 100% error-free certified diskettes feature thicker oxide coating, longer-lasting lubricant, improved liner, superior polishing and more! Meets or exceeds IBM, Shugart, ANSI, ECMA and ISO standards.

VERBATIM DATALIFE™ DISKETTES
5 1/4-inch (box of 10)
MD525-01 \$26.95
8-inch FLOPPIES
Double-Density, FD34-8000 . \$43.95

'RINGS' & THINGS

HUB RING KIT for 5 1/4" disks. . . . \$10.95
HUB RING KIT for 8" disks. \$12.95
REFILLS (50 Hub Rings) \$ 5.95
CLEANING KIT for 5 1/4" drives . . . \$24.95
5 1/4-inch diskette case \$3.50
8-inch diskette case \$3.95
5 1/4-inch File Box for
50 diskettes \$24.95
8-inch File Box for
50 diskettes \$29.95

TRS-80 is a trademark of the Radio Shack Division of Tandy Corporation. DATALIFE is a trademark of VERBATIM. PLAIN JANE, PARAGON MAGNETICS, are trademarks of MTC.
© 1981 by Meta Technologies Corporation

**MOST ORDERS
SHIPPED WITHIN
ONE BUSINESS DAY**
Products damaged in transit will be exchanged.

**PRICES IN EFFECT
THRU
May 31, 1982**
Prices, Specifications,
and Offerings subject to
change without notice.
8205

WE ACCEPT
• VISA
• MASTER CHARGE
• CHECKS
• MONEY ORDERS
• C.O.D.

• Add \$3.00 for shipping & handling
• \$3.00 EXTRA for C.O.D.
• Ohio residents add 6.5% sales tax.

Proof Notes

the editors look at the issues

MANAGING EDITOR
Debra Marshall

SENIOR EDITOR
Pamela Petrakos

NEWS EDITOR
John P. Mello Jr.

REVIEW EDITOR
Michael Nadeau

NEW PRODUCTS EDITOR
Janet Fiderio

EDITORS
Lynn Rognsvoog, Carolyn Nolan,
Steven Frann, Kerry Leichtman

TECHNICAL CONSULTANT
Jake Commander

TECHNICAL EDITORS
Dennis Kitsz: Contributing Editor;
G. Michael Vose: Features, Editor;
Art Huston: Editor

PRODUCTION EDITOR
Susan Gross

LAYOUT EDITORS
Joan Ahern, Bob Dukette, Sharon
Phinney, Sue Hays, Anne Vadeboncoeur

PROOFREADERS
Peter Bjornsen, Caron Taylor, Patrice
Laughner, Louis Marini

EDITORIAL ADMINISTRATION
Pat Graham
Nancy Noyd

Back in the dark ages of mainframe computers, utilities were an intricate part of the machine's software system. In fact, you had to call up a utility program in order to make your applications program run. Called systems utilities, they performed general functions such as sorting and disk I/O. With the advent of minis and micros, programs were designed to stand alone and the need for systems utilities diminished. This change is attributed mostly to the development of high-level languages. Now high-level languages are the norm, and utilities play just as important a role. In essence, they are diagnostic tools that the programmer uses to create good, memory-efficient, high speed programs. This is not to undermine the seriousness with which most computerists regard utilities, but utilities are to microcomputers what a magic hat is to a magician. They enable the programmer to perform tricks. For instance, operating systems have a variety of built-in utilities that enable the programmer to do just that—perform what many would consider magic. After all, if you are a serious tinkerer, what more could you ask?

Since we know that you are always refining your know-how and polishing your technique, we have packed this issue with a plethora of original utility programs along with a comprehensive Buyer's Guide. Editor Lynn Rognsvoog, our in-house Buyer's Guide specialist, has compiled a section on what the consumer will find in the marketplace. Lynn's in-depth look will help you narrow your choices in the search for perfect utilities and start you on your way to expertise in the subject.

Lynn presents 20 manufacturers and ten major categories of utilities. Editors and assemblers; assemblers; disassemblers;

Basic editors; monitors; disk zappers; tape utilities; file utilities; renumberers and compressors; and general utilities will all be featured.

Jake Commander, international programmer and successful author of several utility programs, gives us an extensive tutorial on utilities. Jake will examine not only the various types but how they can help you, both on the hardware and software level.

Also featured is "BAM (Beginners Advanced Monitor)" that, as the author says, "... taken in gradual doses, can help you learn machine code without having to look up one-letter commands. It can help make the change from Basic to machine code like learning a few new words rather than learning a whole new language..." Author Jeff Byrkitt decided to make each command in BAM a full word, so both the beginner and advanced programmer (who are equally beset by forgetfulness at times) can remember what each command is supposed to do. Jeff also wrote this innovative program "so that you professors can change it, expand it, and add to it, thus impressing your boss when he comes over for dinner and wants to know about machine code." A well-taken word of advice from Jeff—don't tell anyone a fourteen-year old wrote it by himself.

David Busch, wizard and creator of Kitchen Table, Inc. is featured in a special interview that, yes, folks, is for real.

And finally, beware of April whimsies produced by the creative minds of our own in-house editors.

Enjoy and April Fools'!

Pamela Petrakos
Senior Editor

Subscriptions:

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

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

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

Dealers: Contact Ginny Boudrieau, Bulk Sales Manager, *80 Microcomputing*, Pine St., Peterborough, NH 03458. (800) 258-5473.

The left bracket, [, replaces the up arrow, ↑, used by Radio Shack to indicate exponentiation, on *80 Micro's* printouts. When entering programs published in *80 Microcomputing* 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.

Due to the death of his close friend and teacher Philip K. Hooper, Dennis Kitsz' columns will not appear this month.

Article submissions from our readers are welcomed and encouraged. Inquiries should be addressed to: Submissions Editor, 80 Pine Street, Peterborough, NH 03458. Include a SASE for a copy of our writers' guidelines. Payment for accepted articles is made prior to publication, at a rate of approximately \$50 per printed page; all rights are purchased. Authors of reviews should contact the Review Editor, 80 Pine Street, Peterborough, NH 03458.



META TECHNOLOGIES



26111 Brush Avenue, Euclid Ohio 44132
CALL TOLL FREE 1-800-321-3552 TO ORDER
IN OHIO, call (216) 289-7500 (COLLECT)

MTC AIDS-III™

MODELS I & III . . . \$69.95 MODEL II . . . \$99.95

Introducing the latest addition to MTC's family of data management systems, AIDS-III. NO PROGRAMMING, easy to use. COMPLETE PACKAGE including demonstration application, documentation and MAPS-III (see below).

- Up to 20 USER-DEFINED FIELDS of either numeric- or character-type.
- CHARACTER-type fields may be any length (total: up to 254 characters).
- NUMERIC-type fields feature automatic formatting, rounding, decimal alignment and validation.
- Full feature EDITING when adding or changing records:
 - ENTER FIELD (can't type-in more characters than specified).
 - BACKSPACE (delete last character typed).
 - DELETE FIELD contents.
 - RESTORE FIELD contents.
 - RIGHT-JUSTIFY FIELD contents.
 - SKIP FIELD (to next or previous field)
 - SKIP RECORD (to next or previous record)
- SORTING of records is MACHINE CODE assisted.
 - 200 RECORDS (40 characters) in about 5 SECONDS.
 - ANY COMBINATION of fields (including numerics) with each field in ascending or descending order.
- SELECTION of records for Loading, Updating, Deleting, Printing and Saving is MACHINE CODE assisted.
 - Specify up to 4 CRITERIA, each using one of 6 RELATIONAL COMPARISONS.
 - LOAD or SAVE selected records using MULTIPLE FILES.
 - Example: Select records representing those people who live in the state of Colorado, but not in the city of Denver, whose last names begin with "F" and whose incomes exceed \$9000.00.
 - Example: Select records representing those sales made to XYZ COMPANY that exceed \$25.00, between the dates 03/15 and 04/10.

MAPS-III (MTC AIDS PRINT SUBSYSTEM), included at no charge, has the following features:

- Full AIDS-III SELECTION capabilities.
- Prints user-specified fields DOWN THE PAGE.
- Prints user-specified fields in titled, columnar REPORT FORMAT, automatically generating column headings, paging and (optionally) indentation.
- Can create a single report from MULTIPLE FILES.
- Prints user-defined formats for CUSTOM LABELS, custom forms, etc.

BELOW ARE TESTIMONIALS from owners of AIDS systems. These are absolutely authentic statements and are typical of the comments we receive.

"This program will do more for my business than all the other programs I have, combined."

David Wareham, Vice President (EDP), National Hospital and Health Care Services Inc.

"We have 32 different Data Base Management packages for the TRS-80. AIDS-III is easily the best. It also makes it easier for us to step up to our Model II since the package is available for both computers."

Jack Bilinski, President, 80 Microcomputer Services

"Your AIDS program is far and away the finest information management system that I've ever seen. I am currently using it to maintain a clear picture of the demographic data on all the kids in our residential treatment program and it is working for me superbly."

Frank Boehm, Director, Front Door Residential Treatment Program

MTC CALCS - III™

Models I & III \$24.95
Model II \$39.95

MTC's most popular AIDS subsystem. Use for report generation involving basic manipulation of numeric data. Features are:

- Columnar Headings
- Optional Indentation
- User-specified Columnar Totals
- Columnar values computed using constants and/or column values
- Balance forward calculations
- Use for accounting, inventory, financial and other numeric-based systems. in

EPSON PRINTERS

DISK DRIVES

DISKETTES

BOOKS and more!!

AIDS OWNERS! WE HAVE WHAT YOU'VE BEEN WAITING IV. . .

MTC CALCS-IV™, that is.

- More Computations
- Save Report Formats on Disk
- Faster, and more!

MTC CALCS-IV™ \$39.95
For Models I & III \$39.95
For Model II \$59.95

MTC AIDS MERGE-III™

This subsystem will combine up to 14 AIDS-created data files into a single, large file. An optional purge capability removes duplicate entries while performing the merge operation (can even be used to eliminate duplicates in a single file). Machine-code assisted for high-speed performance. MERGE-III™ properly handles files sorted by any combination of fields, including numerics, with each field in ascending or descending order.

MTC AIDS MERGE-III™ \$19.95
For Models I & III \$19.95
For Model II \$29.95

THE COMPLETE MTC AIDS-III™ PACKAGE

SAVE \$\$\$\$

Includes MTC AIDS-III™
CALCS-III™ and MERGE-III™

*A comprehensive system
at a competitive price!*

MODEL I & III \$99.95
MODEL II \$149.95

Add \$25 for CALCS-IV™

AIDS/P™ IS COMING!

TRS-80 is a trademark of the Radio Shack Division of Tandy Corporation. DATALIFE is a trademark of VERBATIM PLAIN JANE. AIDS-I, AIDS-III, CALCS-III, CALCS-IV, MERGE-III are trademarks of MTC.
© 1981 by Meta Technologies Corporation

**MOST ORDERS
SHIPPED WITHIN
ONE BUSINESS DAY**

Products damaged in transit will be exchanged.

PRICES IN EFFECT
THRU
May 31, 1982
Prices, Specifications,
and Offerings subject to
change without notice.

8205

WE ACCEPT
• VISA
• MASTER CHARGE
• CHECKS
• MONEY ORDERS
• C.O.D.

• Add \$3.00 for shipping & handling
• \$3.00 EXTRA for C.O.D.
• Ohio residents add 6.5% sales tax.

80 INPUT

"Under normal conditions our printhead will not need replacing for over 200 million characters of printing."

Microline 80 Printhead Warranty

I want to make a few comments about the Okidata Microline 80 printer.

We frequently use many of its character size and graphics features. During our first year of ownership we used the Microline 80 very little, we now use it for many things and are very pleased with it.

Approximately 13 months after purchase, one of the printhead solenoids became inoperable. The printhead was warranted for only one year. We ordered a new printhead from the company and the printer has been working since then.

Okidata's full-page advertisements appearing in many computer magazines state, "The head is warranted for 200,000,000 characters. That translates to over nine years..." We estimate the number of characters printed during the first 13 months of ownership to be only a small fraction of 200,000,000 characters!

How can Okidata's telephone sales personnel tell us the warranty lasts one year while those full-page advertisements say "...over nine years..."?

*Wayne Field, President
Mountain States Computer Corp.
Colorado Springs, CO*

Okidata Replies

Thank you for your letter concerning your Okidata Microline 80 printer. We are pleased you like the printer and are enjoying its many features.

I am sorry for any inconvenience the ad, mentioned in your letter, may have caused you. Since it has caused some confusion in the minds of some of Okidata's valued customers, like yourself, we have discontinued the ad for further publication. Its intent was to convey to potential buyers that under normal conditions our printhead will not need replacing for over 200 million characters of printing. (Test results are available on request.)

Because it would be extremely difficult for Okidata to accurately keep track of printhead usage based on number of

characters printed, and some do fail for mechanical reasons, we offer a one year limited warranty.

The failure of your printhead appears to be an extraordinary case. So that we can evaluate it and determine its reason for failure, would you please send it to us if it is still available. This will help us catch any possible manufacturing mistakes.

I hope you will continue to use and enjoy the many quality features and reliability built into your Microline 80 printer.

*William S. Gore II,
Manager/Marketing Services
Okidata Corp.
Mt. Laurel, NJ*

Word Processor Update

Thanks for the very informative article on word processing ("A Fast Round Up," *80 Microcomputing*, November 1981) by Gordon McComb. We have added several more features to the current version of our Word Processor since Mr. McComb wrote his article. These include: global search/replace; headers; page centering; merging (merges date, name, address, and salutation for printing form letters); envelope/label printing (addresses envelopes or labels); variable column width option (from 1 to 6.4 inches); two-column print option (to print flyers, newsletters, and so on); and a line centering option (to center titles or any other line of text). In addition, our word processor now allows the user to develop and print four different sizes of characters, all within the same document, on various dot matrix printers like Radio Shack's Line Printer II, IV, V, VI, VIII, the Epson MX-80, MX-100, and many more.

Blanton Software Service's (4522 Briar Forrest, San Antonio, TX 78217) word processor is now priced at \$24.95 for tape and \$29.95 for disk (Model I, III, or Color Computer)—prices include shipping. In Mr. McComb's article he emphasized the importance of getting a word processing system which "suits your needs" and "fits the capabilities of your present inventory of hardware." We wholeheartedly agree! To help our customers put a "lasso" on

that word processor which suits their needs and system, we offer a money back guarantee if they are not satisfied with ours. They may return our word processor and we will refund all but \$2 to cover our handling and shipping costs.

*Tommy Blanton
Blanton Software Service
San Antonio, TX*

Digital Innovations

Our product, the DC-80, appeared in the New Products column (*80 Microcomputing*, May 1981), but, unfortunately, due to the postal strike in Canada all the people who wrote to us during this time had their mail returned "Service Discontinued" which apparently left the impression that we were out of business. We are in business and are offering our product in the U.S. for \$49.95 plus \$3 per unit for shipping. You can order it from us at the address below.

*Donald F. Matheson
Digital Innovations
37 Stony Brook Drive
Kitchener, ONT N2M 4L6 Canada*

Super Utility

Regarding Jerry Latham's letter "Program Bugs" (*80 Input*, November 1981) concerning bugs in Super Utility and inaccurate allegations as to the way Mr. Watt "fixes" his bugs, I, as Kim Watt's publisher, would like to respond.

First of all, Mr. Latham talks about a bug in Super Utility that "eats" sector five of track 17. Kim did indeed duplicate this bug, and fixed it. The cost for this "fix" and in fact for the latest version of Super Utility is only \$1. That's right...\$1! Mr. Latham inaccurately accused Mr. Watt of charging \$25 for this fix. What Kim is charging \$25 for, is the new Super Utility Plus, which is a complete rewrite of the program and works with all current DOSs, Models I or III. This is a \$25 upgrade and you need to specify Model I or III. The Plus



META TECHNOLOGIES



26111 Brush Avenue, Euclid Ohio 44132
CALL TOLL FREE 1-800-321-3552 TO ORDER
IN OHIO, call (216) 289-7500 (COLLECT)

Let your TRS-80™ Teach You **ASSEMBLY LANGUAGE**

REMSOFT's unique package, "INTRODUCTION TO TRS-80® ASSEMBLY PROGRAMMING" includes ten 45-minute lessons on audio cassettes, a display program for each lesson providing illustration & reinforcement, and a text book on TRS-80® Assembly Language Programming. Includes useful routines to access keyboard, video, printer and ROM. Requires 16K - Level II, Model I.

REMASSEM-1 \$69.95
FOR DISK SYSTEMS \$74.95

MICRO SYSTEMS SOFTWARE'S **DOSPLUS 3.4**

Fast. Smooth. Easy. Maximum features and powerful options:

- Multi-key, multi-array BASIC sort
- Controlled screen entry (INPUT @)
- TOTAL device routing supported in DOS and BASIC
- Last DOS command is repeatable
- DISKDUMP utility and more!
- Tape-to-Disk/Disk-to-Tape utility
- More reliable, much improved BACKUP
- Can read 40-track disks in 80-track drives
- 200+ page user's guide (includes technical reference section)

Specify MODEL I or MODEL III \$149.95

Let Your TRS-80™ Teach You **ASSEMBLY LANGUAGE DISK I/O TECHNIQUES**

REMSOFT does it again! REMDISK-1 is a concise, capsulated supplement to REMASSEM-1. Package consists of two 45-minute lessons on audio cassettes, and display programs providing illustration and reinforcement. Provides specific track and sector I/O techniques, and sequential and random file access methods and routines.

REMDISK-1 \$29.95

APPARAT'S **NEWDOS/80 Version 2.0**

Enhanced version of NEWDOS/80 featuring:

- Model I double density support
- Directory size is tripled
- Dynamic merge of BASIC programs
- Peripheral handling routing
- Enhanced DISASSEMBLER
- Includes SUPERZAP and more!
- Enhanced Model I/Model III compatibility
- Selective clearing of variables
- Page by page listings of BASIC programs
- Command chaining

Specify MODEL I or MODEL III \$149.00

EPSON Printers

DISK Drives

DISKETTES

BOOKS and more!!

Michael Shroyer's **ELECTRIC PENCIL VERSION II**

for
Model I and Model III

An expanded version of the critically acclaimed original word processing system! Includes all features of Version I plus many new extensions. Runs under most disk operating systems, has improved video text handling, loads any ASCII file for editing (including BASIC files), single sheet mode for printing on letterhead and more! Simple to use, features 2-key commands. An incredible package at an incredible price!

SPECIFY MODEL I OR III
Disk Version \$79.95
Tape Version \$69.95

CALL FOR AVAILABILITY

Let your TRS-80™ Test Itself With **THE FLOPPY DOCTOR & MEMORY DIAGNOSTIC**

by David Stambaugh

A complete checkup for your MODEL I or MODEL III. THE FLOPPY DOCTOR-Version 3 completely checks every sector of single or double density 35-, 40-, 77-, or 80-track disk drives. Tests motor speed, head positioning, controller functions, status bits and provides complete error logging. THE MEMORY DIAGNOSTIC checks for proper write/read, refresh, executability and exclusivity of all address locations. Includes both diagnostics and complete instruction manual.

SYSTEM DIAGNOSTICS \$24.95
For MODEL III! \$29.95

MORE PRODUCTS



TRS-80 is a trademark of the Radio Shack Division of Tandy Corporation. DATALIFE is a trademark of VERBATIM. PLAIN JANE, AIDS-I, AIDS-III, CALCS-III, CALCS-IV, MERGE-III are trademarks of MTC.
© 1981 by Meta Technologies Corporation

MOST ORDERS SHIPPED WITHIN ONE BUSINESS DAY
Products damaged in transit will be exchanged.

PRICES IN EFFECT THRU May 31, 1982
Prices, Specifications, and Offerings subject to change without notice.
8205

WE ACCEPT
• VISA
• MASTER CHARGE
• CHECKS
• MONEY ORDERS
• C.O.D.

• Add \$3.00 for shipping & handling
• \$3.00 EXTRA for C.O.D.
• Ohio residents add 6.5% sales tax.

version retails for \$74.95, so the owner that paid \$49.95 for the original Super Utility ends up paying the same as if he bought it off the shelf new. He does not lose anything in the upgrade process.

Original owners of Super Utility may always get the latest version of the program for a \$1 upgrade fee.

Original and upgraded owners of Super Utility Plus may always get the latest version of that program for a \$3 upgrade fee.

To upgrade from regular Super Utility to Super Utility Plus is \$25, plus we need the master disk returned to us with the order.

*Dennis A. Brent, President
Breeze/QSD Inc.
Dallas, TX*

Customized Commands For Mod III

Regarding my article "Customized Commands" (*80 Microcomputing*, November 1981), the six paragraphs beginning on the lower left of p. 298, "I normally load this program. . ." and ending with lines in the third column just above "Make It Work" should all be inserted onto p. 294 just below the second line in the fourth column. . . "MERGE to make a tape."

To make the programs in Customized Commands work with the Model III, change all occurrences of JP 0072H (C3 72 00) (in Listing 1—lines 260, 350, 380; in Listing 2—line 230; and in Listing 3—line 400) to JP 1A19H (C3 19 1A). In Listing 4, change two occurrences of 114,0 to 25,26 in line 25. In Listing 4a, change 114,0 to 25,26 in line 20.

*Dale W. Rupert
Bethel, CT*

ZBug for Model III

ZBug (*80 Microcomputing*, January 1981), works great on the Model III. However, you cannot use the copy function to its full potential. You could use this routine to upgrade any machine language program from 500 baud to 1500 baud even if the program normally resides in the same space as ZBug.

The following modification will let you change the cassette load/save rates before every tape I/O. The routine replaces a ROM routine used in the Model I with the Cass? routine, new to the Model III.

Load ZBug and use the Set function to change the two bytes starting at 4548H, 45CAH, 4661H, 475FH, and 47DDH from

1202 to 4230. Then WRITE 4300 4F1B 4338 ZBug.

Now you can load/save at either speed by answering the Cass? prompt just before ZBug loads or saves.

*Douglas DeTardo
Hollywood, FL*

Prime Numbers

I would like to share the onliner shown in Program Listing 1 with *80 Microcomputing* readers. It will output prime numbers up to 7660 on a 16K machine. It is based on the sieve of Eratosthenes and is quite fast for a Basic program. For example, it will generate all the prime numbers less than 1000 and print it to screen in 8.7 seconds.

*Louis Pelletier
Maniwaki, Quebec*

LPRINT to PRINT

A recent Tandy TRS-80 Newsletter listed a little program to change all the LPRINTs to PRINT and vice versa by changing the 178s to 175s. However, a problem arises if 178 or 175 is used as a line number indicator, or to point to the end of the line.

This short program (see Program Listing 2) avoids those memory locations that hold the pointers and line numbers and so cuts down the odds for error by a few million.

I use 26841 as the memory start point with Model III TRSDOS. Use 17129 as the start point for Level II and 17384 as the start point for Model III tape.

*Norman E. Cook
Saint David Lakes Resort
Saint David, AZ*

Locations 16548,9 always point to the start of Basic in any configuration.—Eds.

Using TRS-80s in Europe

I am having problems dealing with Radio Shack on my Model I system. I am in the US Army and on orders to Frankfurt, Germany. I wrote a letter to Tandy and asked about conversion instructions to operate the computer on 230 VAC/50Hz. It is a common practice for Americans to use step down transformers to convert the 230 VAC down to 115 VAC, but the power frequency stays at 50Hz.

I was shocked to get my response from Mr. Ted Rosenberg, Customer Relations Manager, which stated in part ". . . while we understand your desire to take your computer with you, we must suggest that you leave it at home. . ."

```
1 DEFINT A-Z:CLS:INPUT"PRIMES UP TO":L:DIMA(L):V=
INT(SQR(L)):PRINT2,:FORB=3TOLSTEP2:IFA(B)NEXT
:ELSEIFB>VPRINTB,:NEXT:ELSEFORC=B*BTOLSTEP2*B:
A(C)=1:NEXT:PRINTB,:NEXT
```

Program Listing 1

```
60009 CLS:CLEAR1000:'Norman E Cook, St. David, Arizona
60002 PRINT "<1> Change all LPRINTS to PRINT
60003 PRINT "<2> Change all PRINTS to LPRINT
60004 KBS=INKEYS:IFKBS=""THEN6004
60005 IF KBS="1" THEN PRINT:
PRINT "Changing LPRINT to PRINT":
C=175:D=178:
GOTO 60008
60006 IF KBS="2" THEN PRINT:
PRINT "Changing LPRINT to PRINT":
C=178:D=175:
GOTO 60008
60007 GOTO 60004
60008 FOR I=26841 TO 32767
60009 P=PEEK(I)
60010 IF P=C THEN POKE I,D
60011 IF P=D THEN 60013
60012 NEXT
60013 IF PEEK(I+1)=0 THEN 60014
ELSE I=I+4:
60014 IF PEEK(I+2)=0 THEN END
ELSE I=I+4:
NEXT
```

Program Listing 2

FREE

DISCOUNT & BONUS COUPONS

for

**PRINTERS, DISK DRIVES, DISKETTES, SOFTWARE, BOOKS
and MORE!**

No gimmicks! For **BIG SAVINGS** on top-quality products from well-known suppliers, just circle **14** on your Reader Service Card and mail it today, or send your name and address to:

**FREE COUPONS
P.O. Box 32010
Cleveland, Ohio 44132**

NOTE: There is absolutely nothing phony about this offer. The companies extending these unusual bargains want and appreciate your business. The least expensive method of introducing top-quality products is by direct mail. The companies save money . . . and so do you. No tricks, no obligation. Just good business . . .

"It is not our style to tell powerful executives only what they want to hear."

Apple makes a power supply card which you can exchange with the standard card for operation on European power. I understand that the TRS-80 does not have such modular construction, but I cannot believe that the smart folks down in Fort Worth cannot figure out a conversion for the TRS-80.

I would think that a power inverter (the ones used with recreational vehicles to convert 12 VDC to 115 VAC/60Hz) could be configured to do the job externally. I would also suspect that a comparison of the schematics of the US and European version of the TRS-80 (Yes, Tandy makes a European version TRS-80!) would show the differences of components that I would have to switch or modify. What I really suspect is that Tandy already knows how to do the conversion much easier.

How about it, Radio Shack? I have spent \$3000 on my TRS-80 and really enjoy it. Is your best advice really to "leave it at home for three years"?

Major Ed Marble
Fort Leavenworth, KS

Radio Shack Replies

I must apologize for the difficulty that you have had in obtaining correct information about using your TRS-80 Model I on 230 VAC/50Hz power systems.

The keyboard/CPU and expansion interface will each require a new external power supply. The cost is 100DM, (\$46 U.S.) for both. The video monitor and disk drives will require substantial modifications. The video modifications are 250 DM (\$114 U.S.) and the disk modifications are 175DM (\$80 U.S.) each. The total cost for the 110 VAC/60Hz to 220 VAC/50Hz for your system (with two drives) would be 700DM (\$320 U.S.) Please note that the prices given are valid at this time. Fluctuating international monetary rates may cause them to vary slightly.

The conversions would take approximately 2-4 weeks depending on parts availability. You will be given all components removed and the units can be re-modified prior to your return for approximately 1/2 the cost of the original modifications.

You did not specify which of our printers you are using. If you let me know which printer you have, I will find out what steps need to be taken for conversion and the approximate cost. Of course, we have no way of knowing what effects these modifications will have on the operation of the Percom Doubler.

I hope this provides you with the information you asked for, and again, I apologize for the misunderstanding.

Bill Walters,
Consumer Information Manager
Radio Shack
Fort Worth, TX

Relocate TRS-80 Disassembler

When I saw Carl Wuebker's "TRS-80 Disassembler" in the August issue it was an answer to my prayers. The first thing I tried was taking T-Bug apart, but that did not work because this program overlaps T-Bug.

I made the changes shown in Program Listing 3 to solve my problems. Change the first few lines. Line 4000 needs a small addition and add line 3425.

Frank Pallanch
Edina, MN

Congratulations

Congratulations on your first two years! I have enjoyed every issue and have received many great programs from your pages and have purchased from several of your advertisers.

One thing about the magazine that bugs me is the never-ending petty griping about Radio Shack. I have had my TRS-80 for over three years. I have had a couple of problems with it, but the Radio Shack peo-

ple have been cooperative and helpful, both locally and in Fort Worth.

Rather than complain about the things Radio Shack left out of the machine or does not supply for it, we should all be grateful for the opportunity this gives hundreds of suppliers to sell us a wide variety of hardware and software (and advertise in 80 Microcomputing).

How about looking for a different axe to grind for a change?

Tom Kilbride
Waco, TX

Gripes

Tom, you know as well as I do that it is human nature to gripe far more than it is to compliment. If we didn't think the TRS-80 was just about the best system available we wouldn't bother publishing 80. It is a super system, but where it does have problems 80 provides a medium for communications between users... and perhaps even more important, back to the factory. Often it seems as if customer problems fall on deaf ears with companies as huge as Radio Shack, which probably has a lot to do with 80 getting a lot of the gripes. We all know that the top management for firms as large as that often have a serious problem in getting all the facts for making decisions, so perhaps 80 helps since we pull no punches. There is a tendency to tell powerful executives only what they want to hear which, despite some grinding of high official teeth at Fort Worth, is not our style. In the long run both the TRS-80 and Radio Shack will, I believe, be better served by our airing of gripes. I personally know all of the top people at Radio Shack and assure you they are a darned good group, no matter how apoplectic I may make them now and then. We are not inclined to be Pollyannish up here in the heart of Yankee territory. — Wayne

```

5  TRS-80 DISASSEMBLER FROM 80 MICROCOMPUTING AUGUST 1981 PAGE 240—REVISED 12/29/81
   FOR HEX STARTING LOCATION AND TO WORK AT ALL MEMORY LOCATIONS—F. T. PALLANCH
10  CLEAR 3000
20  GOSUB 2200
29  'HEX TO DECIMAL AND TWOS COMP.
30  HXS = "0123456789ABCDEF"
40  INPUT "STARTING LOCATION (HEX ) ";AS
41  L = 0:FORI = 1TO16:FORJ = 1TO4
42  IF MIDS(AS,J,1) = MIDS(HXS,I,1) THEN L = L + (I-1)*16((4-J))
43  NEXT J:NEXT I:L1 = INT(L+.5):PRINT "DECIMAL  L = ";L1:L = L1:IF L>32767 THEN
   L = L - 65536:PRINT "TWO'S COMP. L = ";L:PRINT
50  P = 0

3425 IF L<0 THEN C = C + 65536

4000 C = L:IF L<0 THEN C = L + 65536

```

Program Listing 3

We're not soft on software

Data resources continues its commitment to professional quality TRS-80® software with the Silver Edition Software Series...selected programs from talented and popular authors.

Data Resources New subsystems for Aids III AIDS DISK SORT

Designed for files that are too large to sort "in memory" with AIDS or for when you don't want to wait while AIDS loads the records. Records are physically rearranged on disk.

MODEL I..... \$24.95

AIDS FILE EDITOR

Allows you to update and edit records in AIDS data files without loading the file into memory. Now you can change a single record in a mailing list quickly and easily with random access selection.

MODEL I..... \$24.95

AIDES DATA ENTRY MODULE

Designed for inputting data directly into AIDS files. Fields may be fixed to repeat the same data. The key-in routines are improved in speed—no more over keying. Data can be added to the end of an existing file or a new file can be created. Files are automatically opened and closed so even if the computer is turned off in the middle of work, no more than 255 keystrokes can be lost.

Data Resources New subsystems for Aids III AIDS DISK SORT

Designed for files that are too large to sort "in memory" with AIDS or for when you don't want to wait while AIDS loads the records. Records are physically rearranged on disk.

MODEL I..... \$24.95

AIDS FILE EDITOR

Allows you to update and edit records in AIDS data files without loading the file into memory. Now you can change a single record in a mailing list quickly and easily with random access selection.

MODEL I..... \$24.95

AIDES DATA ENTRY MODULE

Designed for inputting data directly into AIDS files. Fields may be fixed to repeat the same data. The key-in routines are improved in speed—no more over keying. Data can be added to the end of an existing file or a new file can be created. Files are automatically opened and closed so even if the computer is turned off in the middle of work, no more than 255 keystrokes can be lost.

MODEL I..... \$24.95

AIDS SYSTEMS BY METS TECHNOLOGIES

MTC AIDS III

This easy to use system allows even a novice TRS-80 user to create data files custom configured for many applications, from cash flow analysis and financial journals to price lists and record keeping. It requires NO PROGRAMMING and is complete with features for adding, deleting, sorting, updating and printing.

MODEL I or III \$69.95

MTC CALCS III

Performs numeric calculations of data contained in AIDS files. Ideal for financial applications.

MODEL I or III \$24.95

MTC CALCS IV

The same features as CALCS III with more powerful formulas and the ability to store report formats.

MODEL I or III \$39.95

MTC MERGE III

Combines up to 14 AIDS data files into a single file. Duplicates may optionally be purged, and sorted order of records is maintained.

MODEL I or III \$19.95

SPECIAL

AIDS III Super Systems

AIDS III & CALCS III & MERGE III

MODEL I or III \$99.95

AIDS III & CALCS IV & MERGE III

MODEL I or III \$109.95

B.T. ENTERPRISES UNITERM/80

By Pete Roberts

This is the state-of-the-art in communications software. It configures itself for either Model I or Model III and can be used with any standard modem, both RS-232 and Bus-Decoding. Especially designed to use the extended commands in NEWDOS/80, but fully compatible with all major DOS systems.

For Model I and III..... \$89.00

THE MICRO ACCOUNTING SYSTEM

This is the finest accounting system available for your TRS-80. Ideal for small business, this integrated General Ledger, Accounts Receivable, Payable System includes a Checkbook manager. We offer something no other general business package can give you—a money back guarantee. If you are not totally satisfied, return the package within 60 days and receive a full refund. Write for sample reports and full descriptions.

MAS/80 complete \$489.00

**1981 DATA RESOURCES CORP.
TRS-80® IS A TRADEMARK OF TANDY
CORP.**

Prices in effect April 1, 1982 to May 1, 1982 and subject to changes

THE FLOPPY DOCTOR

By Dave Stambaugh

FLOPPY DISK/MEMORY DIAGNOSTIC programs are designed to thoroughly check out the two most trouble prone sections of the TRS-80, the disk system (controller and drives) and the memory arrays.

MODEL I..... \$24.95

MODEL III..... \$29.95

NEWDOS/80 Version 2.0 for MODEL I and III

The hottest Disk Operating System is now available in its latest version. This is the ONE from Apparat, Inc., the people whose systems have made the TRS-80 the reliable computer..... \$149.00

MODEL I DOUBLE DENSITY PACKAGE NEWDOS/80 Version 2.0 and the LNDOUBLER

Everything you need to convert your TRS-80 Model I, to run double density. Complete with software, hardware, and instructions, installs in minutes with NO SOLDERING, WIRING OR CUTTING..... \$229.95

LNDOUBLER Alone \$149.95

DYSAN DISKETTES

Single density \$36.95

Double density \$39.95

Dysan 40 track 5¼" soft sectored diskettes packaged 10 to a box.

HEADCLEANER KIT April only \$17.95

Kit contains two cleaning disks with instructions to assure proper operation of all types of 5¼" disk drives.

PAPER

White or Green Bar..... 3300 sheets

9½ X 11" tractor feed \$29.95

14¾ X 11" tractor feed \$39.95

Shipped by truck, freight charges collect.

Data Resources (800) 525-8394

**Business & Professional Center
8000 East Quincy
Denver, Colorado 80237
(303) 698-1263**

✓ 15

**To order call toll free: 800-525-7958
Mastercard and Visa welcome
Checks - COD - Money Orders also
accepted
Orders shipped UPS free.**

**Colorado residents add 6½ per
cent sales tax**

Attractive discounts to dealers

**AIDS III®, CALCS III®, MERGE III®, ARE
TRADEMARKS OF
METATECHNOLOGIES**

CC—A Good Investment

Your January 80 *Remarks* column concerning the future of the Color Computer causes me to write. I agree with what you say, but feel you are incorrect in your assertion that Radio Shack is going to abandon the CC.

When I was searching for a personal computer the price I could afford was of prime concern. I felt that the Apple II and TRS-80 Model II/III's were beyond my budget. It was not until after I purchased and upgraded my CC that I became convinced I had made a good choice. The initial impression the CC makes on people is that of an expensive toy to play TV games on. If one delves into the capabilities of Extended Color Basic and the extensive machine language capabilities of the 6809E microprocessor, the CC stands out as an enormous bargain.

Software for the CC has been painfully slow in appearing on the market, but is now beginning to come. One excellent example of this is a word processor package called TELEWRITER which I recently purchased and am using to produce this letter.

Perhaps Radio Shack's most serious mistake is in not selling and promoting others' hard/software. I have an Epson MX-80FT printer. It required, in part, the help of an electronics engineer friend to interface the computer and the printer.

Here's hoping Radio Shack continues to support the Color Computer.

John Bentley
North Reading, MA

Color Computer Lives

As the publisher of several magazines it seems you have the power to print virtually any personal opinion of yours as well as any unsubstantiated rumor no matter how far wrong you are. In the past we have tended to ignore your monthly misinformation about Radio Shack as it did no one harm, except perhaps yourself.

I must, however, take strong exception to your 80 *Remarks* column of January 1982, in which you state that we are likely to drop the TRS-80 Color Computer.

That statement is absolutely untrue and is causing unnecessary anxiety on the part of our Color Computer owners. We just finished a terrific Christmas season with the Color Computer in which we sold out our entire warehouse supply. Contrary to your comments about no advertising, the Color Computer had more advertising September-December than

*"So, Wayne, sorry,
but you are
dead wrong."*

any other TRS-80, which included a great deal of national tv advertising.

Our March computer catalog will list 26 Program Paks and 8 cassette programs for the Color Computer, and we have over 40 Program Paks, cassette and disk packages in the works. In addition to the current peripherals there are three additional hardware products for the Color Computer in design.

So, Wayne, sorry, but you are dead wrong. The Color Computer will not be dropped in 1982, or in 1983 for that matter. It is a highly successful product and stands a good chance of being the number one unit selling computer in America this year.

If you believe in responsible journalism you will publish this letter as soon as possible, and, in the meantime, I will send it to those customers who are calling us who, unfortunately, believe that if something is in print, it is true.

You are also wrong on the Pocket Computer. We sold more of those the first 12 months of its life than we sold Model I's the first year of its life. And we just introduced its new brother.

John Shirley, Vice President
Merchandising Computer Products
Radio Shack
Fort Worth, TX

Who's At Fault?

Mr. Shirley, your letter is appreciated. I hope it will quell any further rumors about the Color Computer. Of course you understand that it is difficult for journalists to print other than rumors when the moves of Radio Shack are shrouded in such total secrecy and it seems that even true rumors are denied. Unless there is a more open relationship with the press I am afraid that this is going to be a continuing problem and journalists will continue to be accused of irresponsibility. Mr. Shirley, we really try, sometimes against overwhelming odds.

The crescendo of ads for the Color Computer at Christmas time was not surprising. I think most of us expected it to be promoted as a Christmas toy up against the Atari, Bally, Mattel and other game computers. The owners who have been

frustrated are those with the technical understanding of the system who realize what the power and potential of it really is. They feel that with some Radio Shack support this system could give Apple one hell of a run for their money. They wonder if Radio Shack understands how good the system is?

We here at Wayne Green Inc. have been hoping for much more in the way of technical articles and programs to be submitted for publication in this magazine and by Instant Software. Perhaps your letter will create a feeling of confidence which will result in better customer and third party support of the Color Computer. I hope so. —Wayne

Peterborough, RAH! RAH! RAH!

In writing for and reading a large amount of magazines, I have come to the conclusion that 80 *Microcomputing* is the best of the lot for the TRS-80 user, and I am constantly recommending it to my friends. However, I am at a loss to what appears to me as a running gag that I don't know about. My question is: "What's the story on Peterborough, New Hampshire???"

Let me clarify myself: A short time ago, I noticed a contest in "The Alternate Source" magazine. The contest rules were shown, but when it came to the prize, it said "No, it's not a trip to Peterborough" — what prompted this? Is Peterborough the loveliest place in the country? The ugliest? Is there some sort of shrine there? What?

Then I began noticing the large amount of activity going on in that town of less than 4,000 people. McGraw Hill, certainly a large firm, is located there, along with Wayne Green Inc. which seems to own everything! Also, there's a town nearby called Greenfield. Does Wayne Green own that, too?

I must admit, I have only been in the New Hampshire/Vermont area once and I fell in love with it. It is just perplexing that the "Big Cheeses" of the computer world all reside in that particular niche of New Hampshire which I had never heard of until now. Please tell this poor California boy "What's so great about Peterborough?"

Tim Knight
Moraga, CA

It's just a nice, simple, quiet, small, picturesque, clean, friendly New England town. Not far from Greenfield is a town called Greenville. Wayne doesn't own either... yet.—Eds.

YOU'VE GOT OUR NUMBER

(800) 525-8419

Mini Diskettes

Box of 10 \$26.95 2 boxes \$39.96
Shannon Magnetics' soft-sectored 5¼" double density, single sided, mini disks in shrink wrapped boxes of ten with jackets, labels and tabs. Fully guaranteed for one year against defects.

Headcleaner Kit

\$24.95 April only \$17.95
Verfin kit contains two cleaning disks with instructions to assure proper operation of all types of 5¼" disk drives. Removes dirt and debris which can cause read/write errors and lost data without harsh chemicals.

Diskette/Headcleaner Combo

\$42.90
Combo special includes box of 10 diskettes and Verfin headcleaner kit as described above.

Dysan diskettes

Single density \$36.95 Double density \$39.95
Dysan 40 track 5¼" soft sectored diskettes packaged 10 to a box.

Paper

White or Green Bar
3300 sheets of 9½ X 11" tractor feed \$29.95
3300 sheets of 14⅞ X 11" tractorfeed \$39.95
Shipped by truck, freight charges collect.

Diskette File Box

\$19.95
Flipsort diskette file box with capacity for fifty 5¼" diskettes.

Diskette/File Box Combo

\$109.95
Fifty Shannon Magnetic 5¼" diskettes as described above packaged in Flipsort diskette file box.

Tandon Disk Drives for TRS-80 Model I or Model III

Single drive with cabinet and power supply \$289.00

Two drives in horizontal cabinet and power supply \$489.00

Two-drive cabinet only \$75.00

Two drive cabinets are designed to fit under Epson or Okidata printer or under the monitor and above the expansion interface with provision for easy access to drive edge card connections. No drive extender cables needed. Call for complete pricing and compatibility information.

Ribbon Cables

Model I or III printer \$18.95

2-drive disk cable \$19.95

4-drive disk cable \$29.95

Shannon Magnetics

1650 South Laredo Court
Aurora, Colorado 80017

To order call toll free: 800/525-8419

16

Mastercard and Visa welcome
Checks & Money Orders also accepted
Orders shipped UPS free.

Colorado residents add
6½ per cent sales tax
Attractive discounts to dealers

Here's just a taste of our great prices.

To really feast your eyes, send for our new catalog.

Great prices are only one feature of our new catalog. More importantly, we think you'll find it to be a well-written, well-organized reference tool.

When you receive our catalog, you get with it our commitment to help you keep it up to date.

Unlike most catalogs that are obsolete the moment they're printed, ours is designed to accommodate all the rapid-fire changes in micro-computer hardware and software. Its loose-leaf-binder format makes it a snap to add the new pages we'll send out on a regular basis.

Our new catalog was developed on exactly the same principles as our business — to offer you the lowest possible prices combined with the highest quality of service.

PRINTERS

ANADIX DP 9500	1295.00
ANADIX DP 9501	1295.00
C-I-TOH 25 CPS PARALLEL	1440.00
C-I-TOH 25 CPS SERIAL	1495.00
C-I-TOH 45 CPS PARALLEL	1770.00
C-I-TOH 40 CPS SERIAL	1870.00
EPSON MX-80	\$CALL
EPSON MX-80 F/T	\$CALL
EPSON MX-100 GRAPHIC	\$CALL
EPSON GRAFTRAX	90.00
IDS-445G PAPER TIGER	779.00
IDS-460G PAPER TIGER	945.00
IDS-560G PAPER TIGER	1195.00
MALIBU 200 DUAL MODE	2695.00
NEC SPINWRITER 3510 S. RO	2095.00
NEC SPINWRITER 3530 P. RO	2095.00
NEC SPINWRITER 7710 S. RO	2595.00
NEC SPINWRITER 7730 P. RO	2595.00

NEC SPINWRITER 3500 SELLUM	2295.00
OKIDATA MICROLINE 80	389.00
OKIDATA MICROLINE 82A	549.00
OKIDATA MICROLINE 83A	799.00
OKIDATA MICROLINE 84	1199.00

16K RAM SPECIAL 13.95

Set of 8 NEC 4116 ns with instructions. Guaranteed one full year.

MODEL I, III SOFTWARE

LAZY WRITER MOD I	169.00
LAZY WRITER MOD III	169.00
MICROPROOF SPELLING CHECK	84.95
PROSOFT NEWSSCRIPT MOD I, III	99.00
PROSOFT MAILING LABELS MOD I, III	29.95
PROSOFT NEWSSCRIPT/LABELS MOD I, III	115.00
SPECIAL DELIVERY MOD I, III	119.00
X-TRA SPECIAL DELIVERY MOD I, III	179.00
TRACCESS MOD I	24.95
OMNITERM SMART TERMINAL MOD I, III	89.95
MAXI-MANAGER MOD I, III	89.95
DOS PLUS 3.4 MOD I	89.00
DOS PLUS 3.4 MOD III	89.00
DOS PLUS 4.0 MOD I	129.00
DOS PLUS 4.0 MOD III	129.00
LDOS 5.1 MOD I, III	159.00
MICROSOFT EDITOR ASSEMBLER + MOD I	24.95
MICROSOFT FORTRAN MOD I	165.00

DISKETTES

ALPHA DISKS 21.95

Single sided, certified Double Density 40 Tracks, with Hub-Ring. Box of 10. Guaranteed one full year.

VERBATIM

MD 525-01, 10, 16	26.50
MD 550-01, 10, 16	44.50
MD 557-01, 10, 16	54.95
FD 32 or 34-9000	36.00
FD 32 or 34-8000	45.60
FD 34-4001	48.60

DYSAN

5 1/4" SS/DD, BOX OF 10	45.00
-------------------------	-------

DISKETTE STORAGE

5 1/4" PLASTIC LIBRARY CASE	2.50
8" PLASTIC LIBRARY CASE	3.50
PLASTIC STORAGE BINDER WITH INSERTS	9.95
PROTECTOR 5 1/4"	23.95
PROTECTOR 8"	29.95

TRS-80 MOD I HARDWARE

PERCOM DATA SEPARATOR	27.00
-----------------------	-------

PERCOM DOUBLER II	159.00
TANDON 80 TRACK DISK DRIVE	429.00
TANDON 40 TRACK DISK DRIVE	289.00
LNW DOUBLER WITH DOSPLUS 3.4	159.00
LNW DOUBLER 5/8 WITH DOS PLUS	209.00

ISOLATORS

ISO-1 3-SOCKET	53.95
ISO-2 6-SOCKET	53.95

MODEMS

NOVATION CAT ACOUSTIC	145.00
NOVATION D-CAT DIRECT CONNECT	165.00
NOVATION AUTO-CAT AUTO ANSWER	219.00
UDS 103 LP DIRECT CONNECT	175.00
UDS 103 JLP AUTO ANSWER	209.00
D.C. HAYES STACK Smart Modem	249.00
LEXICON LX-11	109.00

CP/M® SOFTWARE FOR MOD II

MICROSOFT

MICROSOFT BASIC-80	299.00
MICROSOFT BASIC COMPILER	319.00
MICROSOFT FORTRAN-80	369.00
COBOL 80	599.00

MICRO PRO

WORDSTAR	310.00
MAILMERGE (REQUIRES WORDSTAR)	110.00
SPELLSTAR (REQUIRES WORDSTAR)	199.00
SUPERSORT	195.00
DASTAR	245.00
CALCSTAR	239.00

OTHER CP/M® SOFTWARE

SPELLGUARD	239.00
SUPERCALC	229.00
COMM X TERMINAL SOFTWARE	82.00
dBASE II	599.00
P & T CP/M® MOD II TRS-80	175.00
C BASIC 2	115.00
PASCAL Z	349.00
PASCAL MT+	439.00
PASCAL/M	205.00
SYSTEMS PLUS —	
G/L, A/R, A/P, P/R	1799.00
CONDOR I	579.00
CONDOR II	849.00

FAN FOLD PAPER (Prices F.O.B. S.P.)

9 1/2 x 11 18lb WHITE 3,000 ct	29.00
14 7/8 x 11 18lb WHITE 3,000 ct	39.00

SUPPLIES

EVERY TABULABLES

1,000 3 1/2 x 15/16	8.49
3,000 3 1/2 x 15/16	14.95
5,000 3 1/2 x 15/16	19.95

CORVUS

TRS-80 MOD I, II, III

Controller, Case/P.S., Operating System, A&T

5 MEGABYTES	3245.00
10 MEGABYTES	4645.00
20 MEGABYTES	5545.00
MIRROR BACK-UP	725.00

SPECIALS

SPECIAL NO. 1

TRS-80 DISK AND OTHER MYSTERIES, BOX OF VERBATIM DISKS, PLASTIC LIBRARY CASE

44.50

SPECIAL NO. 3

NEWDOS/80 2.0, BOX OF VERBATIM DISKS, PLASTIC LIBRARY CASE

149.00

SPECIAL NO. 4

MICROSOFT BASIC COMPILER, BOX OF VERBATIM DISKS, PLASTIC LIBRARY CASE

179.00

SPECIAL NO. 5

MICROSOFT BASIC DECODED AND OTHER MYSTERIES, BOX OF VERBATIM DISKS, PLASTIC LIBRARY CASE

49.95

DOUBLE DENSITY SPECIAL

PERCOM DOUBLER II, NEWDOS/80, BOX OF VERBATIM DISKS, PLASTIC LIBRARY CASE

279.00

COMMUNICATION SPECIAL MOD I & III
NOVATION MODEM, OMNITERM TERMINAL SOFTWARE.
ACOUSTIC SPECIAL (CAT)

219.00	
DIRECT CONNECT SPECIAL (D-CAT)	239.00
SERIAL CABLE	25.00

DISK LIBRARY SPECIAL

RACET DISKCAT CATALOGING PROGRAM, FLIP SORT (50 DISK CAPACITY), 50 STICK-ON DISK LABELS

59.95

TWO NEW 'OTHER MYSTERIES' BOOKS

THE CUSTOM TRS-80	24.95
MICROSOFT BASIC FASTER AND BETTER	24.95

TRS-80 GAMES

All games are disk versions. Cassette versions may not be available.

TEMPLE OF APSHAI	34.95
HELLFIRE WARRIOR	34.95
STAR WARRIOR	34.95
RESCUE AT RIGEL	24.95
CRUSH, CRUMBLE & CHOMP	24.95
INVADERS FROM SPACE	17.95
PINBALL	17.95
STAR TREK 3.5	17.95
MISSILE ATTACK	18.95
STAR FIGHTER	24.95
Z-CHESS III	24.95
ADVENTURE NO. 1, 2, & 3	34.95
ADVENTURE NO. 4, 5, & 6	34.95
ADVENTURE NO. 7, 8, & 9	34.95
DUEL-N-DROIDS	17.95
STARFLEET ORION	21.95
INVASION ORION	21.95
OLYMPIC DECATHLON	24.95
MONTY PLAYS MONOPOLY	31.95
SARGON II	31.95
BLACKJACK MASTER	27.95
ROBOT ATTACK	17.95
GALAXY INVASION	17.95
SUPER NOVA	17.95
TUESDAY MORNING QUARTERBACK	26.95
LUNAR LANDER	18.95
THE MEAN CHECKER MACHINE	21.95
GAMMON CHALLENGER	18.95
SPACE ROCKS	18.95
PIGSKIN	17.95
ZOSSED IN SPACE	18.95
ARCADE-80	21.95
COMBAT	18.95
SPACE INTRUDERS	17.95
SILVER FLASH	17.95
MORTON'S FORK	26.95
PROJECT OMEGA	21.95

CP/M is a registered trademark of Digital Research.

Alpha Byte is proud to feature the finest business software available for the TRS-80 from Occupational Computing Co., Inc.

OCC A/R WITH BILLING AND INVENTORY CONTROL

One step posting prints an invoice, reduces inventory, posts to customer ledger and accumulates sales analysis. Can be set up as Open Item or Balance Forward system.

Model I,III	750.00
Model II	1495.00

OCC PAYROLL

Includes: Multiple Pay Frequencies, Salary or Hourly, Automatic Deductions (Federal, State, FICA, Disability Insurance), Commissions, Bonuses, Tips, Complete Journal, Check Writer, Check Register, Quarterly 94IA and Yearly W-2 Reports.

Model I,III	350.00
Model II	495.00

OCC UNION REPORTING

Features: Interfaces with OCC Payroll (Data entry is from employee time card), Flexible Local Set-up (Union Codes and Classifications), Computation and reporting of Various Funds (Vacations, Dues, Pensions, Health & Welfare, Industry, Training, Promotion, Contract Administration).

Model II	495.00
----------------	--------

OCC ORDER ENTRY

Features: Allows On-Line Entry and Maintenance of Customer Orders. Supports Credit Memos, Standard & Non-Standard Discounts and Total Back-Order Control. Automatically Interfaces to OCC A/R, Billing and Inventory Control.

Model II	995.00
----------------	--------

OCC MANUFACTURING INVENTORY CONTROL

Features: Bill of Material 'Explosion' maintains inventories in up to 10 levels of sub-assemblies and/or components. Allocates and relieves raw materials based on input of production schedules and completions thru the bill of Materials Explosion: Update and Prints Bill of Materials Cost Report. All or selected ranges of assemblies are 'Exploded' into the lowest level components; quantities and unit prices are extended for each component to give a unit cost for the entire assembly. Prints Inventory Exception Report and Suggested Purchase Orders. Automatically interfaces to OCC A/R, Billing and Inventory Control and OCC Order Entry Systems.

Model II	995.00
----------------	--------

All OCC Software is supplied with user oriented manuals that include easy user installation instructions. OCC Software is written in Radio Shack Basic and runs under TRSDOS. OCC Software uses Keyed Sequential Access Method (KSAM) File structure, Binary searches and fast Machine Language Sorts to insure the fastest possible execution. OCC's Exceptional Screen Control Format makes data entry as easy as filling out a form. Related OCC Software packages interface to form complete MENU DRIVEN Accounting systems.

If you have a serious business application then you should consider OCC Software. Call for a complete description of any of OCC's Business Packages.

We guarantee everything for 30 days. If anything is wrong, return the item and we'll make it right. And, of course, we'll pay the shipping charges.

We accept Visa and Master Card on all orders; COD orders, up to \$300.00.

Add \$2.00 for standard UPS shipping and handling on orders under 50 lbs. delivered in continental U.S. Call for shipping charges over 50 lbs. Foreign, FPO and APO orders, add 15% for shipping. Californiana add 6% sales tax.

Prices quoted are for stock on hand and are subject to change without notice.

31245 LA BAYA DRIVE,
WESTLAKE VILLAGE, CA 91362

Alpha Byte COMPUTER PRODUCTS

To order, or for information, call:

(213) 706-0333

To use our 24-hour modem order line, call: (213) 883-8976.

80 AID

Enhanced Word Processor

I recently programmed my TRS-80, Level II, 48K machine for the Basic Word Processor described in your May 1980 issue.

Can text entry be speeded up by replacing the INKEY\$ function with some other statements?

The program's cassette function is of limited value; has anyone modified his program for disk storage?

I would like to be able to expand this program into generating enhanced bold, underlined and headlined (whose size is software programmable) text. Does anyone have such program mods?

I notice the program will not justify text that has been previously justified and then edited or compiled. It appears to have some other defects and limitations. I am interested in all improvements of it made by your readers.

*John J. Williams
P.O. Drawer 537
2011 Crescent Drive
Alamogordo, NM 88310*

CC Chips

Cheers for Dennis Kitz and for his excellent article on upgrading the TRS-80 Color Computer (80 Applications, November 1981)! The memory expansion, 16K to 32K, is a straightforward project and a bargain at \$17.50 plus a little time.

The Lowerkit character generator is a gem, especially the improved version now offered by MSB. Both lower and uppercase letters are sharp and well shaped. The hidden (POKE) game characters are a real bonus.

Mr. Kitz's solution for double speed operation (POKE 65495,1) was very timely. Many TRS-80s have MC6821s which hang up at 1.8 MHz. When you use software that POKES the double speed register, your computer must have chips such as the 68-A-21s that can operate at 1.8 MHz. I could locate only 68-B-21s (2 MHz) at \$26 per pair.

This is expensive since the 6821s are only \$5 per pair. Are the As less expensive and if so, where are they available?

Now that more hardware and software specialists are working with the Color Computer they should develop a modification that permits SET graphics to produce 128 by 48 resolution. This would be a boon to lazy hobbyists who want to use Model I programs on the Color Computer with little modification.

*K. Gilleo
Box 409 RR5
Sparta, WI 54656*

Programming with Students

We own a TRS-80 Model III with TRSDOS 1.3 and are interested in corresponding with others who are interested in programming with junior high students.

We have experience teaching at the elementary level, and have taken programming courses at the local junior college. We have done some work teaching children how to program, and hope to do more of it.

We are also writing educational programs (for schools) and entertainment-educational programs (for home use). As of yet we have nothing perfected to the point of selling—we are trying them out with students—but we hope to market them soon.

*Marjorie Crabbe
Crabbe Associates
212 W. Graham Avenue
Lombard, IL 60148*

HPLC-pumps Aid

This is a response to the letter on HPLC-pumps submitted by Kasper Kirschner in the December 1981 issue.

For the past 14 months I have been involved in the automation of routine analysis in a laboratory. Since I had a TRS-80 I investigated ways of interfacing it to HPLC instruments. The Labo-

ratory Data Control constametrics pump which has the provision for outside control through a 5 V signal input is easiest to interface with the TRS-80. All this needs is a digital to analog converter with a 5 V output (such as found from DSI). This allows for 255 steps of flow control of about 0.04ml each. A feedback from the pump output through an analog to digital converter can provide accurate flow control.

Other pumps such as the Beckman 101a and Micromurids have similar interfacing. The Waters Associates 6000A pump presents a bigger investment. Input through the gradient control plug requires a pulse to be generated for motor control. An alternative to inputting through the gradient control is to substitute the manual controls, which is a resistance network, with a resistance network on relays controlled by the computer. This is not approved by the manufacturer and should be considered only if absolutely necessary.

I would be interested to find out if anyone has actually done this since after the final evaluation the company went to a Hewlett Packard computer and I never got the chance to try any of this directly with a microcomputer.

*James W. Murphy
Technician III
Norwich-Eaton Pharmaceuticals
Analytical Services Section
Norwich, NY 13815*

Textbooks

I am serving time in Graterford Prison, PA. There is no real educational program here, and, at 12 cents per hour, my working 120 hours per month does not cover necessities like soap, toothpaste, and so on. If I had other sources of income, I could purchase material to educate myself. As it stands, I am trying to obtain textbooks and other necessary literature toward a computer science education without money. I know I have the ability and will apply myself. Do you have any textbooks or related material to help me? Could you please refer me to others

80AID

who might be willing to help? I have plenty of time I would rather spend educating myself than brooding.

I will be happy to answer any questions and provide whatever information requested. I am also looking for pen pals. My interests are varied and wide ranging.

Thank you in advance.

*Art McDowell F-5922
P.O. Box 244
Graterford, PA 19426*

Break Address Found

Just after mailing my letter concerning returning to Basic on the Model II (80 Aid, January 1982), I decided to fish around in the interpreter myself. To my surprise, it took only a few minutes to locate the break address I needed (6069H).

Program Listing 1 replaces the one accompanying my previous letter. Under TRSDOS 2.0 (and 2.0a), execution returns the user to Basic with the Break function fully operable.

*Gerald Lippey
The Lippey Company
210 South Bundy Drive
Los Angeles, CA 90049*

MX-80 Printer Club?

I have heard that there is an Epson MX-80 printer club. I have been unable to locate it and would appreciate any information about it.

*Ron Goodman
12702 Emelita Street
North Hollywood, CA 91607*

Profile Zaps

I use NEWDOS 80 with my Model III disk system. With a little trouble, I have been able to convert most programs, including Scripsit and VisiCalc, to run under NEWDOS. Recently, I purchased Radio Shack's Profile. When I execute it under NEWDOS, I get an "Error 8," "Device Not Available," as it begins initialization. Do any NEWDOS users know of a zap to Profile to solve this problem?

*John J. Roth
1125 Park Avenue
New York, NY 10028*

Okidata 82A

Every time I see a software program for a printer in your advertisements or as an article in your magazine it seems as though the topic is the Epson MX-80. I own an Okidata 82A, which for the same price (if you shop right) is more for your money. I went back through quite a few issues and cannot find anything, on anything else but the MX-80. Has anyone written a program for the Okidata 82A or does anyone know of a company that offers one for the Model III?

*Doug Kaheri
38344 Wooster
Mt. Clemens, MI 48043*

Copying Tapes

Would any of your readers know of any service bureaus that will copy 1600 BPI tape to eight-inch disks for eventual processing on a Model II?

We have all our Cobol software written for other systems on tape and would like to avoid re-key punching for our Model II.

*Jim Williams
P.O. Box 87
East Brunswick, NJ 08816*

Micros in Library Media Centers

We are interested in gathering information on the use of microcomputers in a secondary school library media center, specifically in the areas of media equipment inventory; card cataloging; acquisitions records; overdue and circulation records; bibliographic information retrieval; and budgeting.

Thank you in advance for any materials you might be able to send us.

*Judith L. Dzedzy
Media Specialist
Council Rock School District
Council Rock High School
62 Swamp Road
Newtown, Bucks Co., PA 18940*

Software Trade

I've written some Level II programs for the Model I that I would be willing to exchange with other readers. For my list please send a stamp and your list.

Anyone out in TRS-80 land who is into pen-pals please write too!

*William Pickell
319 Greenland Drive
Lancaster, PA 17602*

Write Me

I live in a remote area of Michigan and own a TRS-80 Model II. I would like to correspond with other TRS-80 Model II owners.

*James R. Young
P.O. Box 336
Ludington, MI 49431*

LD	HL,0	
LD	A,3	
RST	8	Removes previous break address
LD	HL,6069H	
LD	A,3	
RST	8	Sets new break address
JP	2800H	Branch to Basic

Program Listing 1

80 DEBUg

Chess Tutor Fixes

My thanks to Elio Zambrano of Tucson, AZ for finding a serious error in my Chess Tutor program (*80 Microcomputing*, December 1981). Whenever a player fails in three tries to get the correct move (if the correct move is a king or queen side castle) a SN error occurs in line 890, and the system becomes fouled up. The program does not check for a castle move and

catable RAM to the TRS-80 microcomputer ("ROM Roll-Over," *80 Microcomputing*, November 1981). My findings are based on the schematic of the TRS-80 which is printed in Radio Shack's *TRS-80 Microcomputer Technical Reference Handbook*.

The first bug seems to be a reference to pin 4 of Z72 which Kelch claims is CAS*. His circuit requires a connection to CAS*, however you should make this connection to pin 9 of Z72 which is CAS* and not to pin 4 which is RAS*.

at the same time. I have a fix for this bug in the works which I hope to cover later.

Greg P. Segallis
1 Dixon St.
Port Chester, NY

No More Bugs

I thank Mr. Segallis for bringing to my attention the wiring errors that occurred in the printing of my article "ROM Roll-Over." I compared the magazine copy to my original and I found three errors in pin and chip designations as follows. The pin labeled pin 4, Z38 on chip 4 (A15) should be pin 9, Z38. The pin 11, Z35 label on chip 4 should be pin 11 of Z38 (A14). The designation pin 4, Z72 going to chip 2 (CAS) should have been labeled pin 9, Z72.

In reference to jumping pin 5 of Z24 to +5V I find no problems. Any standard TTL chip can withstand a voltage on its input up to 5.5V as stated in the manufacturers' design guide. If desired you can use a 2K pullup resistor. Likewise, you can tie output Z73, pin 8 to 5V without damage to the chip because of its internal configuration. Instead of jumping pin 5 of Z74 to 5V you may install an open collector inverter between pin 9 of chip 1 in the mod and pin 13 of Z74. (You must remove the shunt between pin 12 and 13 of Z74 and use a pullup resistor on pins 12 and 13 of Z74.)

Finally, Mr. Segallis is correct in that the ROMs are not removed electrically from the bus. However, this will not cause physical or electrical damage to the memory or surrounding circuitry. This again is due to the internal circuitry of the Read Only Memories. Unlike the 4116 static RAMs, the ROMs have a

"Any standard TTL chip can withstand a voltage on its input up to 5.5V."

POKEs into system RAM. The following additional lines will correct this problem.

```
844 IFCI = 44PRINT@CP + (P*6),"O - O - O";
      GOSUB990:GOTO920
848 IFCI = 55PRINT@CP + (P*6),"O - O ";
      GOSUB1050:GOTO920
```

Also, while researching this problem, I discovered a few other errors of varying seriousness. One was an incorrect display of white king on white square; another was an incorrect move in the French Defense; and still another was possible incorrect processing of castling (unrelated to the other castling error). The lines shown in Program Listing 1 should solve all these problems and a few more.

In any case, I apologize to all those who were inconvenienced by these errors, and I hope you get many hours of enjoyment from the program and learn a lot too.

Robert J. Dowd
326 Porter Drive
Lynn Haven, FL 32444

ROM Roll-Over Bugs

There are several bugs in Geary Kelch's modification to add 16K relo-

The next bug occurs when you are instructed to insert a jumper from pin 5 of Z74 to pin 14 (+5V) also of Z74. But this jumper also brings pin 8 of Z79 to +5 volts, and pin 8 is an output of an OR gate. If the OR gate output a low (which would occur frequently), a short would occur and Z73 would probably be damaged. Also, this jumper would cause MEM* to go low even if the CPU was calling the keyboard or video RAM, causing several active outputs on the data bus at once. Again, more shorts and damaged chips would probably occur.

The last bug occurs when the RAM is switched to the lower addresses (0000H-3FFFFH). The RAM outputs become active at these lower addresses; however, so do the ROMs since no provision was made to take the ROMs out of action. Once again there is the problem of multiple active outputs tied together on the data bus

```
340 DATA159,143,145,155,143,191,181,176,179,177,176,191
760 CA = 0:IFCI<>44THEN790
790 IFYM$<"O - O"ORCI<>55GOSUB1110:GOTO830
1130 FORII = 256TO960STEP64:PRINT@II,STRING$(16,32);NEXT
1190 IFCI = 66THENCIS = "DRAWN"
1420 DATA7,5,4,5,0,1,3,7,3,5,2,7,3,2,3,3,0,3,2,8,3,6,2
```

Program Listing 1

WHY

IS THE ALPHA JOYSTICK SUCH A SUCCESS ?

Because of games like these.

THE LATEST BLAST FROM BIG FIVE...

NEW! DEFENSE COMMAND

ALL GAMES:

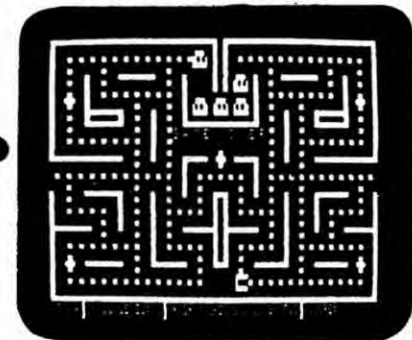
16K Level 2, Mod 1 + Mod 3 Cassette: \$15.95
32K Level 2, Mod 1 + Mod 3 Diskette: \$19.95
10% discount for 2 games, 15% for 3 or more
Games may be played with or without joystick.



SCARFMAN



Actual unretouched photos



DEFENSE COMMAND



Big Five has done it again! Now the most popular arcade game of all time has a fascinating new twist. The Invaders are back! You are alone, valiantly defending the all important nuclear fuel cannister stockpile from a convoy of thieving aliens who repeatedly break off and attack in precision formations. An alien passes your guard, swiftly snatching up a cannister and flying straight off. Quick! you have one last chance to blast him out of the sky. Great action and sound!

SCARFMAN



THE LATEST ARCADE CRAZE now runs on your TRS-80.

It's eat or be eaten. You control Scarfman around the maze, gobbing up everything in your path. You attempt to eat it all before the monsters devour you. Difficulty increases as game progresses. Excellent high speed machine language action game. From The Cornsoft Group. With sound.

CAUTION: Played with the Alpha Joystick, Scarfman may become addictive.



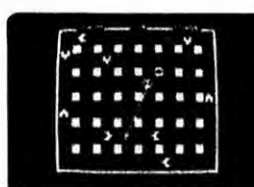
SUPER NOVA

Asteroids float ominously around the screen. You must destroy the asteroids before they destroy you! (Big asteroids break into little ones.) Your ship will respond to thrust, rotate, hyperspace and fire. Watch out for that saucer with the laser! As reviewed in May 1981 Byte Magazine.



LUNAR LANDER

As a vast panorama moonscape scrolls by, select one of many landing sights. The more perilous the spot, the more points scored—if you can land safely. You control LEM main engines and side thrusters. Absolutely the best use of TRS-80 graphics we have ever seen! From Adventure International. With sound.



ATTACK FORCE

As your ship appears on the bottom of the maze, eight alien ships appear on the top, all traveling directly at you! You move toward them and fire missiles. But the more aliens you destroy, the faster the remaining ones become. If you get too good you must endure the "Flagship"... With sound effects!



COSMIC FIGHTER

Your ship comes out of hyperspace under a convoy of aliens. You destroy every one. But another set appears. These seem more intelligent. You eliminate them, too. Your fuel supply is diminishing. You must destroy two more sets before you can dock. The space station is now on your scanner... With sound!



METEOR MISSION II

As you look down on your view, astronauts cry out for rescue. You must maneuver through the asteroids & meteors. (Can you get back to the space station?) Fire lasers to destroy the asteroids, but watch out, there could be an alien FLAGSHIP lurking. Includes sound effects!

THE ALPHA JOYSTICK: REAL ARCADE ACTION

ONLY \$39.95 (MODEL I)

NEW!

MODEL III JOYSTICK
ONLY \$49.95

- ☐ Features the famous ATARI JOYSTICK
- ☐ Works with any Level II or disk system
- ☐ Plugs directly into KB or E/I (next to printer port)
- ☐ Compatible with any other TRS-80 accessories
- ☐ Saves your keyboard
- ☐ Fun to experiment in BASIC. Simply use A=INP(0) to read the joystick
- ☐ Fully assembled, ready to plug in and use.

Price includes Atari Joystick + Alpha Interface + instructions + demo program. The Alpha Joystick is backed by an unconditional money back guarantee. If you are not delighted with it, return it within 14 days for a prompt and courteous refund.



(Model I version shown)

Toll Free Order Line
800-221-0916

Hours: 9AM-5PM, E.S.T.
For Info Call (212) 296-5916

ALPHA Products

85-71 79th Street, Woodhaven, N.Y. 11421

(212) 296-5916

ADD \$2.00 PER ORDER FOR SHIPPING AND HANDLING
WE ACCEPT VISA MASTER CHARGE CHECKS M U
C O D. ADD \$3.00 EXTRA
QUANTITY DISCOUNTS AVAILABLE
NY RESIDENTS ADD SALES TAX
OVERSEAS ORDERS ADD 10%



80 DEBUG

series FET output configuration which presents a high output impedance and a low fan out capability. This is characteristic of FET type logic. The output data presented by the 4116's will dominate when the two memory types are hardwired together. Since the voltage drops across the ROMs, FET output never exceeds its rating, no damage occurs.

Geary Kelch
23 Mapledale Ave.
Glen Burnie, MD 21061

Help for the Home Buyer's Helper

Line 730 of Mr. Clarence Stinson's program "The Home Buyer's Helper" (80 Microcomputing, May 1981) contains an error. It reads:

```
730 RESTORE: J=I: K=J-8+Z
```

This defeats the program's ability to interpolate when faced with a fractional percentage input. Line 730 should read as follows:

```
730 RESTORE: J=INT(I): K=J-8+Z
```

Max Barnett
303 Washington
Columbus, TX 78934

Bells and Whistles

I enjoyed Thomas Quindry's first article of Sargon modifications and was overjoyed to see a second article (80 Microcomputing, December 1981) with even more "bells and whistles."

I have found one minor and one major program bug. On line 5400 the RET instruction is missing. In the training mode the program sometimes incorrectly records a castle. I am not sure if this is a problem with my transcription or a true program bug.

Thomas G. Lareau
R.R. Aux 4 Box 127-A
Edgar, WI 54426

Castling

The problem Mr. Lareau experienced occurs when you use the Manual Play mode of my Sargon Saver program, MODIIB, (80 Microcomputing, December 1981). The way I see it, the incorrect saving of the castling move notation occurs for the player opposite the one in which the manual play mode is invoked. It shows up when you implement the training or the list moves modes. Sargon's own logic formats the move designation before my modi-

"The problem occurs when you use the Manual Play mode."

fication places it into buffer memory. I do not know why Sargon logic changes only this move designation but I can offer a correction. Add or change the following lines shown below:

```
1560      ORG 462BH
1561 CORREC XOR 80H
1562      LD (HL),A
1563      JP 6FECH
4160 MAN  LD HL,CORREC
```

You should also make the changes shown below. (You do not have to make these changes if you have an uppercase only Model I. See my article for details.)

```
4460 BACK2A JR BACK2
4645      RES 6,A
4770      JR BACK2A
5400      RET
```

Also add a COPYRIGHT (C), 1981 by Thomas L. Quindry. This is not to deter readers from keying in the program but to preclude anyone from capitalizing financially on my time and effort. (I have plans for more changes.)

In my own version of MODIIB, I have made further modifications to provide a program which will run on both the

Model III and Model I computers from Radio Shack. (Sargon II by itself would not run properly on the Model III. With my newer version of MODIIB, it will.)

I have received many inquiries about how to get a copy of the tape I offered in my article. I will provide a quality cassette tape with the System program of MODIIB (newer version unless the corrected magazine version is specifically requested) for \$4.50. The operating instructions are the same for both versions and appear in the article.

Finally, many have asked about putting the entire program (including modifications) on disk. I have developed a procedure that allows you to save Sargon II and my modifications to disk. You can also add my modification to the disk version of Sargon II and save it to a new disk. I/O is still by cassette for saving the moves but I have developed a procedure for saving part to disk manually. These procedures are far too long for Debug, but I will send you a fact sheet for \$1. If you also want a cassette with a short program to aid in this transfer, I will provide it for \$4.50 (including the fact sheet). With my newer MODIIB, you can also make a Model III disk.

Thomas L. Quindry
6237 Windward Drive
Burke, VA 22015

Tenant Tracker Fix

My Tenant Tracker program (80 Microcomputing, December 1981) has a small error. If only one record exists for a rental address, the Sorting-Print option will print a report with zeroes the first time you run the sort.

You can solve this problem by having more than one record per rental address or by adding this line to the program: 572 IF J1 = 1 RETURN.

I have also received several inquiries about the availability of a disk version of this program. Anyone interested in such a version, please drop me a note.

George Kwascha
8007 Mahogany Drive
Charlotte, NC 28212

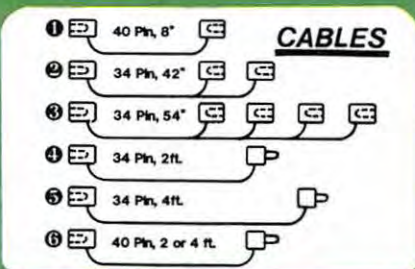
NOW MODEL I AND MODEL III!

Now Model III users can take advantage of the ALPHA I/O system too. Our new MOD III/I BUS CONVERTER allows most port based Model I accessories (such as our ANALOG-80, INTERFACER 2 and INTERFACER-80) to connect to the Model III bus. MOD III/I BUS CONVERTER, complete with all connectors, only \$39.95.



PRINTSWITCH

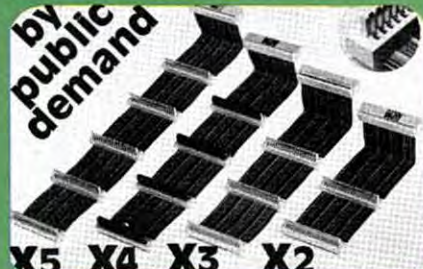
Have 2 printers on line at all times and select printer 1 or 2 by means of a conveniently located switch. End the problem of constantly plugging and unplugging printer cables. PRINT-SWITCH is a compact module that plugs onto the parallel printer port of your TRS-80 and provides an edge connector for each of your two printers. It works with any two types of printers: dot matrix, daisy wheel, plotters, TRS-80 converted electrics, etc. Assembled, tested, ready to use with connector and instructions. For Model I or III (please specify). ONLY...\$59.00



SUPERIOR QUALITY REPLACEMENT & EXTENSION CABLES

Highest quality cable and high force, gold plated contacts ensure the utmost in connection reliability.

- 1 KEYBOARD TO EXPANSION INTERFACE \$21
 - 2 DISK DRIVE CABLE FOR 1 OR 2 DRIVES \$32
 - 3 DISK DRIVE CABLE FOR 3 OR 4 DRIVES \$45
 - 4 DISK DRIVE CABLE EXTENDER \$22
 - 5 PRINTER CABLE EXTENDER \$24
 - 6 40 PIN BUS EXTENDER - 2 ft. \$22 4 ft. \$24
- Custom cable configurations are also available. Call us.



YOU ASKED FOR IT: "EXPANDABUS" X1, X2, X3 AND X4.

CONNECT ALL YOUR TRS-80 DEVICES SIMULTANEOUSLY on the 40 pin TRS-80 bus. Any device that normally plugs into the keyboard edge connector will also plug into the "EXPANDABUS". The "X4" is shown with protective covers (included). The TRS-80 keyboard contains the bus drivers (74LS367) for up to 20 devices, more than you will ever need. Using the E/I, it plugs either between KB and E/I or in the Screen Printer port. Professional quality, gold plated contacts. Computer grade 40 conductor ribbon cable. X2, \$29. X3, \$44. X4, \$59. X5, \$74. Custom configurations are also available. call us.



ANALOG-80: A WORLD OF NEW APPLICATIONS POSSIBLE.

8 DIGITAL MULTIMETERS PLUGGED INTO YOUR TRS-80!! Measure Temperature, Voltage, Current, Light, Pressure, etc. Very easy to use. For example, let's read input channel #4. 10 OUT 0.4 Selects input #4 and also starts the conversion 20 A-IN(P) Puts the result in variable "A" Voila! Specifications: Input range: 0-5V to 0-500V. Each channel can be set to a different scale. Resolution: 20mV (on 5V range). Accuracy: 8 bits (1.5%). Port Address: jumper selectable. Plugs into keyboard bus or E/I (screen printer port). Assembled and tested. 90 day warranty. Complete with power supply, connector, manual. \$139



TIMEDATE 80: REAL-TIME CLOCK/CALENDAR MODULE

Keeps quartz accurate time for 3 years on 2 replaceable AAA batteries (not included). Gives MO/DATE/YR DAY OF WEEK, HR MIN SEC and AM/PM. Features INTELLIGENT CALENDAR and even provides for Leap Year. This compact module simply plugs into rear of Keyboard or side of Expansion interface (may be shipped inside E/I). Includes cassette software for setting clock and patching to any DOS (including NEWDOS 80.2.0). Optional "Y" connector allows for further expansion. For Model I Fully assembled and tested. Complete with instructions and cassette. ONLY \$95.00 "Y" option add \$12.00

GREEN SCREEN WARNING

IBM and all the "biggies" are using green screen monitors. Its advantages are now widely advertised. We feel that every TRS-80 user should enjoy the benefits it provides. But **WARNING:** all Green Screens are not created equal. Here is what we found:

- Several are just a flat piece of standard colored Lucite. The green tint was not made for this purpose and is judged by many to be too dark. Increasing the brightness control will result in a fuzzy display.
 - Some are simply a piece of thin plastic film taped onto a cardboard frame. The color is satisfactory but the wobbly film gives it a poor appearance.
 - One "optical filter" is in fact plain acrylic sheeting.
 - False claim: "A few pretend to "reduce glare" in fact, their flat and shiny surfaces (both film and Lucite type) ADD their own reflections to the screen.
 - A few laugh: One ad claims to "reduce screen contrast". Sorry gentlemen but it's just the opposite. One of the Green Screen's major benefits is to increase the contrast between the text and the background.
 - Drawbacks: Most are using adhesive strips to fasten their screen to the monitor. This method makes it awkward to remove for necessary periodical cleaning. All (except ours) are flat. Light pens will not work reliably because of the big gap between the screen and the tube.
 - Many companies have been manufacturing video filters for years. We are not the first (some think they are), but we have done our homework and we think we manufacture the best Green Screen. Here is why:
 - It fits right onto the picture tube like a skin because it is the only CURVED screen MOLDED exactly to the picture tube curvature. It is Cut precisely to cover the exposed area of the picture tube. The fit is such that the static electricity is sufficient to keep it in place! We also include some invisible reusable tape for a more secure fastening.
 - The filter material that we use is just right, not too dark nor too light. The result is a really eye pleasing display.
- We are so sure that you will never take your Green screen off that we offer an unconditional money-back guaranty: try our Green Screen for 14 days. If for any reason you are not delighted with it, return it for a prompt refund.
- A last word: We think that companies, like ours, who are selling mainly by mail should list their street address have a phone number (for questions and orders) accept CODs, not every one likes to send checks to a PO box offer the convenience of charging their purchase to major credit cards. How come we are the only green screen people doing it? Order your ALPHA GREEN SCREEN today \$12.50



DISK DRIVE EXTENDER CABLE, FREE YOUR MINI-DRIVES.

End the daisy-chain mess once and for all. Fits all mini-drives: Percom, Aerocomp, Shugart, Micropolis, MTI, Vista, Pertec, Siemens, BASF. Easy to install: just remove the drive cover, plug in the EXTENDER CABLE and replace the cover. Now you can change and move your drives without disassembly. Keep the cover on and the dust out. High reliability gold plated contacts, computer grade 34 conductor cable. Tested and guaranteed. Get one for each drive... ONLY...\$8.95



INTERFACER-80: the most powerful Sense/Control module.

•8 industrial grade relays, single pole double throw isolated contacts. 2 Amp @ 125 Volts. TTL latched outputs are also accessible to drive external solid state relays.

•8 convenient LEDs constantly display the relay states.

•Simple "OUT" commands (in basic) control the 8 relays.

•8 optically-isolated inputs for easy direct interfacing to external switches, photocells, keypads, sensors, etc. Simple "INP" commands read the status of the 8 inputs. Selectable port address. Clean, compact enclosed design. Assembled, tested, 90 days warranty. Price includes power supply, cable, connector, superb user's manual... \$159



85-71 79 St. WOODHAVEN N.Y. 11421 Info and order: (212) 296-5916

ADD \$2.50 PER ORDER FOR SHIPPING AND HANDLING ALL ORDERS SHIPPED FIRST CLASS MAIL. WE ACCEPT VISA, MASTER CHARGE, CHECKS, M.O. COD. ADD \$2.00 EXTRA. QUANTITY DISCOUNTS AVAILABLE. N.Y. RESIDENTS ADD SALES TAX.

News From KITCHEN TABLE SOFTWARE, INC.

by David Busch



Things are slowing down at Kitchen Table Inc. right now, but as soon as the auditors, and FTC, FDA, FCC, and FPDE representatives leave, life should be back to normal.

As I am the only reviewer willing to discuss KTI products, I have been asked by KTI's founder, S. N. Hollerith, to answer a few reader questions. Hollerith would prefer to address these queries himself, but he is busy this month. However, bail has been set low, and he should be back on the job within days.

Dear Kitchen Table:

My TLS-8E Model I seems to be stuck in an endless loop. I can't find the Break key. What should I do? Please hurry!

Jon C., Tundra, SD

Dear Jon:

As you have noticed, the TLS-8E Model I does not have an on-off switch. However, you may accomplish the same effect simply by unplugging your ac cord from the wall receptacle. There is also a way to turn off the computer by POKEing a number into memory, but I've lost my issue of *80 Micro* revealing what the proper address is.

You have correctly noted the absence of the Break key. Kitchen Table was afraid the machine's Sri Lankan designers would take the label literally.

If you wish to get out of the loop without losing your program, you will need to hit the Reset key. This key has been much misused in the past, and KTI sought to discourage accidental resets by energizing the key with 110 volts ac. That particular plan caused a few unwanted deaths in the quality control section of Kitchen Table, so the design was abandoned in favor of hiding the Reset key, and not documenting its placement.

I have promised my Kitchen Table

sources not to reveal Reset can be invoked by hitting uppercase X. I was told this particular key was chosen because everyone knows there are no useful words beginning with the capital letter X.

—DDB

Dear KTI:

I find it almost impossible to write personal letters with my Word Whacker software. Can you tell me why?

Rob P. Xavier, Xenia, OH

Dear Rob:

See the above letter.

—DDB

Dear Kitchen Table:

What kind of eraser should I use to clean the contacts on the expansion interface of my TLS-8E Model I?

Norm Jennings, Kent, OH

Dear Norm:

Under no circumstances clean those contacts. Every printed circuit card edge connector in the TLS-8E Model I is precision-coated at the factory with a micro-thin layer of oxidation designed to protect it from electricity. The procedure you are contemplating could result in the unimpeded flow of data from the CPU to the interface. Because the Z-79A microprocessor uses the DIE (Data Interrupt Enable) instruction to time certain functions, the results could be disastrous.

—DDB

Dear KTI:

Can I use silver solder on the PCB edge cards of my TLS-8E Model I?

Big Spender

Dear Big:

The high temperatures needed to melt most high silver-content solder alloys will probably cause the edge card to bend. Your cable connectors then will not seat correctly, and electrical contact will be poor. This technique is acceptable for restoring DIE function if you have inadvertently removed the oxidation from the contacts.

—DDB

Dear KTI:

I plan to operate a small-scale videotext service in my neighborhood without the

approval and consent of my neighbors. Can you tell me the range of the unshielded RF modulator contained in the TLS-8E Model I?

Anonymous, New York, NY

Dear Anon:

In a major metropolitan area like New York, the output of your TLS-8E should be visible on any television screen within three city blocks. You will have the biggest audience when your neighbors are tuned to Channel 5. Good luck!

—DDB

Dear Kitchen Table:

Why don't I ever see advertisements for Kitchen Table products in *80 Micro* or other magazines?

Curious, Tustin, CA

Dear Curious:

Magazines typically stipulate advertisers must send in copy for ads three months prior to an issue's cover date. So far, no Kitchen Table product has remained on the market that long.

The company has developed a workable solution to this problem, however. Ads are now being written for products that don't exist. Once the copy has been sent for publication, KTI will commission a programmer or designer to actually develop the product. This allows considerable freedom to the advertising copywriter, who must also possess some rudimentary knowledge of what computers can and cannot do.

For example, KTI recently had to kill an ad which promised 7500 megabytes of disk storage on a hard disk drive measuring one-half inch in diameter. The writer of the ad was either overly optimistic, or ignorant of the fact anything more than 6800 megabytes is impossible in a hard-disk drive that size.

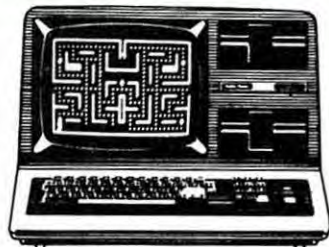
You probably noticed that I, too, was an unwitting victim of misinformation in my recent review of this product. From now on, I pledge to count each byte attributed to any hard-disk drive submitted to me for review.

—DDB

Dear Kitchen Table Inc.:

My copy of KTI Super Adventure seems

IT'S HERE



ALPHA JOYSTICK for MODEL III



Only \$49.95

Works with all games on next page!

Price includes Atari Joystick + Alpha Interface + instructions + demo program. The Alpha Joystick is backed by an unconditional money back guarantee. If you are not delighted with it, return it within 14 days for a prompt and courteous refund.

- Features the famous Atari Joystick.
- Works with any (Level II) Model III.
- Fun to experiment in BASIC. Simply use `A=INP(0)` to read Joystick.
- Saves your Keyboard.
- Fully assembled, complete. Ready to plug-in and use.

TOLL FREE ORDER LINE
(800) 221-0916
(ORDERS ONLY)

JUST IN! LATEST RELEASE FROM BIG FIVE



DEFENSE COMMAND



The Galaxy Invaders have returned in this exciting new twist on the ever popular Invasion theme.

You are in command. You must protect the vitally important nuclear fuel can-

nisters from fleets of attacking aliens.

Plays on Mod I & Mod III, with or without Alpha Joystick. With sound!

16K protected TAPE Mod I + III . \$15.95

32K protected DISK Mod I + III . \$19.95

TOLL FREE ORDER LINE (800) 221-0916

LAST CHANCE

If you don't have your copy of TALKING ROBOT ATTACK or GALAXY INVASION, it might be too late. By legal agreement with Atari Big Five stopped production on

Dec. 1, 1981. Our well stocked shelves will soon be empty. Order yours now before these two are gone forever. Game info on next page.



ALPHA Products

85-71 79th Street, Woodhaven, N.Y. 11421

(212) 296-5916

ADD \$2.00 PER ORDER FOR SHIPPING AND HANDLING
ALL ORDERS SHIPPED FIRST CLASS MAIL
WE ACCEPT VISA MASTER CHARGE CHECKS M.O.
COD ADD \$3.00 EXTRA
QUANTITY DISCOUNTS AVAILABLE
NY RESIDENTS ADD SALES TAX



KITCHEN TABLE SOFTWARE, INC.

to have disappeared from my disk entirely. Can you tell me what happened?

Flabbergasted, Rochester, NY

Dear Flab:

You obviously neglected to use the "Save Game" feature when you were done playing. That option was meant literally. As the disk drive reads KTI Super Adventure into memory, it simultaneously removes all traces of the program from your disk by zeroing the disk sectors. When you opt for Save Game at the end of a session, the program is restored to the disk.

KTI programmers inserted that clever feature as part of the game puzzle. So far, not one of 3,000 purchasers have successfully solved the adventure, judging from the irate mail I have received to date.

—DDB

Dear Rat:

I recently tried copying KTI Super Adventure at a friend's house. Although TRAKCESS seemed to work okay, when I got home and booted the disk, my CRT displayed the words "Sucker!" and then "Disk Error."

What gives? I thought Kitchen Table encouraged program piracy!

Name Withheld by Request
(Has been forwarded to appropriate authorities)

Dear Name:

It is true KTI overlooked most program stealing in the past, but that was before the company came out with Super Adventure—the first program the company has marketed that was any good.

As you may know, the game simulates a session with a microcomputer gone wild. The object is for the operator to regain control before the computer destroys all available disks, double density boards, etc. Super Adventure is very realistic, and we have heard several reports of electrocutions, suicides, and other mishaps by

players who got caught up in the spirit. The game has become an all-time best seller for KTI, outdoing even Dungeons and Dungeons.

As a result, the company has resorted to a fiendish protection scheme.

—DDB

Dear Rat:

So what is it?

Name Withheld by Request

Dear Name:

Glad you asked.

The disk supplied with the game recognizes TRAKCESS, Super Utility, and all other byte-by-byte copying programs but when it senses them it seizes control of the computer, overrides the operating system, and relays information to your CRT, fooling you into thinking the copy program is working. At the same time, false information is written to your disk.

I have pledged to KTI not to reveal the game information is stored on the disk, radially—outward from the center. The read/write head can detect the program only as the stepper motor moves it from track to track, because each consecutive byte is on a different track. Obviously, this read routine requires a special operating system located on the disk in Track 2, Sector 4½.

There is another copy protection feature important to your friend below.

—DDB

Fink:

Where in the heck is my program?

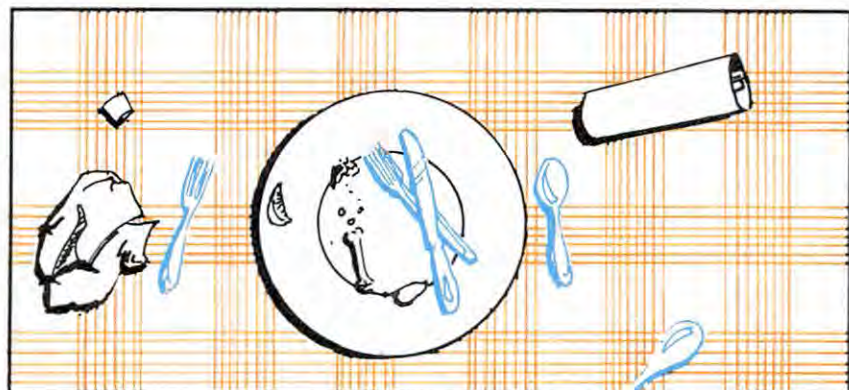
Friend of Name Withheld by Request

Dear Friend:

KTI Super Adventure self-destructs on any attempt to copy it. You may forward your original disk, and \$19.95 for handling to KTI and receive a free backup. As the program only costs \$14.95 at computer stores, I would recommend you simply buy a new copy.

Good luck!

—DDB



Percom Disk Storage

Quality Percom products are available from the following authorized Percom retailers. If a retailer is not listed for your area, call Percom toll free at 1-800-527-1222 for the address of a nearby retailer, or to order directly from Percom.

ARKANSAS		
MICROCOMPUTER SYSTEMS, INC.	Hot Springs	(501) 623-5209
ARIZONA		
SIMUTEK	Tucson	(602) 323-9391
CALIFORNIA		
ALPHA BYTE STORES	Calabasas	(213) 883-8594
BERKELEY MICRO COMPUTERS	Berkeley	(415) 848-7122
COMPUTER INFORMATION EXCHANGE	San Luis Rey	(714) 757-4849
COMPUTER SERVICE CENTER	Hollywood	(213) 851-3434
DESMAR ELECTRONICS	Santa Clara	(408) 988-2208
HOBBYWORLD	Northridge	(213) 886-9200
DISTRICT OF COLUMBIA		
THE PROGRAM STORE	Washington	(202) 337-4691
FLORIDA		
EN TRON, INC.	Largo	(813) 586-5012
MICROSYSTEMS SOFTWARE, INC.	Hollywood	(305) 983-3390
GEORGIA		
COMMERCIAL DATA PRODUCTS	Atlanta	(404) 325-7800
HAWAII		
COMPUTER CENTER	Honolulu	(808) 488-2171
IDAHO		
OFFICE MAGIC COMPUTERS	Boise	(208) 376-4613
IDAHO MICROCOMPUTER	Buhl	(208) 543-6292
ILLINOIS		
GARCIA & ASSOCIATES	Chicago	(312) 782-9750
KANSAS		
BESCO ELECTRONICS	Shawnee	(913) 268-7633
CARDENS, INC.	Hutchinson	(316) 669-8261
DATA SERVICES, INC.	Wichita	(316) 838-9021
KENTUCKY		
COMPUTER MAGIC	Louisville	(502) 893-9334
MASSACHUSETTS		
OMNITEK	Tewksbury	(617) 851-4580
MARYLAND		
DAMASCUS C B	Damascus	(301) 253-2101
MICHIGAN		
ALTERNATE SOURCE	Lansing	(517) 487-3358
MINNESOTA		
THE CODE ROOM	Eden Prairie	(612) 934-1826
MISSOURI		
LEMBERGER CO	Vienna	(314) 422-3353
NEBRASKA		
COLUMBUS TV	Columbus	(402) 564-5531
CURTRONICS	Lincoln	(402) 423-7771
NEW JERSEY		
CHANNEL 1 RADIO SHACK	Medford	(609) 654-7454
DA & D SALES	Bloomfield	(201) 751-8444
NEVADA		
PCS COMPUTER	Las Vegas	(702) 870-4138
NEW YORK		
H & E COMPUTRONICS	Spring Valley	(914) 425-1535
MICRO 80 SYSTEMS	Brooklyn	(212) 748-3236
PROGRAMS UNLIMITED	Jericho	(800) 645-6038
STONY CLOVE	New York City	(212) 391-8337
DATASCAN COMPUTER SYSTEMS, INC.	Selden	(516) 698-6285
NORTH CAROLINA		
HOLIDAY MFG.	Greensboro	(919) 274-6346
OHIO		
FELDMAN ENTERPRISES	Akron	(216) 724-5583
MPS	Wadsworth	(216) 336-2771
PENNSYLVANIA		
COMPUTER ANALYSTS	New Brighton	(412) 846-9323
SUNRISE ELECTRONICS	Chambersburg	(717) 264-8214
TENNESSEE		
COMPUTER WORLD, INC.	Nashville	(615) 244-6094
TEXAS		
PERCOM COMPUTER CENTER	Richardson	(214) 690-0207
COMPUTER TO GO	Austin	(512) 472-8926
BREEZE QSD, INC.	Dallas	(214) 484-2976
TEXAS COMPUTER SYSTEMS	Arlington	(817) 274-5625
UTAH		
MICRO MNEMONICS	Sunset	(801) 825-9317
WASHINGTON		
COMPUTER SERVICES	Kennewick	(509) 582-9759
NORTHWEST COMPUTER SERVICE	Bellevue	(206) 454-4979
WEST VIRGINIA		
BURCO DISTRIBUTORS	Huntington	(304) 453-6387
WISCONSIN		
BYTE SHOP MILWAUKEE	Greenfield	(414) 281-7004
FINAMORES	Marshfield	(715) 384-9610
FOREIGN DEALERS		
AUSTRALIA		
DICK SMITH ELECTRONICS	P.O. Box 321 North Ryde NSW2113	
CANADA		
ALPHA ONE	Edmonton	(403) 454-8409
VALERIOE AND ASSOC	Guelph Ontario	(416) 624-4899
DVR ELECTRONICS	Surrey B C	(604) 576-1045
COTS MICROSYSTEMS, LTD	Ottawa	(613) 741-7937
MICRO COMP ENTERPRISES, INC.	Pickering	(416) 839-4561
MICRO MART	Montreal	(514) 731-9486
MEXICO		
CIBERMATIC, S A	Mexico	(905) 592-3433
COMPUTADORAS Y ASESORAMIENTO	Rio Panuco 14 Mexico 5 D F	
DOMINICAN REPUBLIC		
RADIO SHACK	Santo Domingo	(809) 565-9121

Percom's DOUBLER II* tolerates wide variations in media, drives

GARLAND, TEXAS — May 22, 1981 — Harold Mauch, president of Percom Data Company, announced here today that an improved version of the Company's innovative DOUBLER™ adapter, a double-density plug-in module for TRS-80* Model I computers, is now available.

Reflecting design refinements based on both theoretical analyses and field testing, the DOUBLER II™, so named, permits even greater tolerance in variations among media and drives than the previous design.

Like the original DOUBLER, the DOUBLER II plugs into the drive controller IC socket of a TRS-80 Model I Expansion Interface and permits a user to run either single- or double-density diskettes on a Model I.

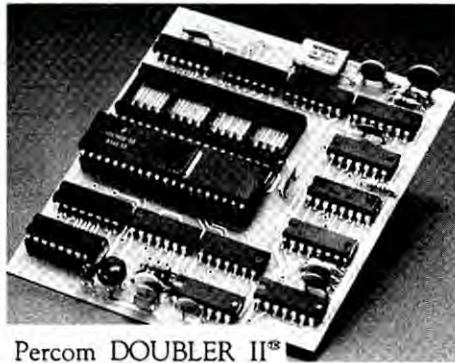
With a DOUBLER II installed, over four times more formatted data — as much as 364 Kbytes — can be stored on one side of a five-inch diskette than can be stored using a standard Tandy Model I drive system.

Moreover, a DOUBLER II equips a Model I with the hardware required to run Model III diskettes.

(Ed. Note: See "OS-80™: Bridging the TRS-80* software compatibility gap" elsewhere on this page.)

The critical clock-data separation circuitry of the DOUBLER II is a proprietary design called a ROM-programmed digital phase-lock loop data separator.

According to Mauch, this design is more tolerant of differences from diskette to diskette and drive to drive, and also provides immunity to performance degradation caused by circuit component aging.



Percom DOUBLER II™

Mauch said "A DOUBLER II will operate just as reliably two years after it is installed as it will two days after installation."

The digital phase-lock loop also eliminates the need for trimmer adjustments typical of analog phase-lock loop circuits.

"You plug in a Percom DOUBLER II and then forget it," he said.

The DOUBLER II also features a refined Write Precompensation circuit that more effectively minimizes the phenomena of bit- and peak-shifting, a reliability-impairing characteristic of magnetic data recording.

The DOUBLER II, which is fully software compatible with the previous DOUBLER, is supplied with DBLDOS™, a TRSDOS* compatible disk operating system.

The DOUBLER II sells for \$219.95, including the DBLDOS diskette.

Now \$169.95!

The Percom DOUBLER II is available from authorized Percom retailers, or may be ordered direct from the factory. The factory toll-free order number is 1-800-527-1222.

Ed. note: Opening the TRS-80 Expansion Interface may void the Tandy limited 90-day warranty.

All that glitters is not gold

OS-80™ Bridging the TRS-80* software compatibility gap

Compatibility between TRS-80* Model I diskettes and the new Model III is about as genuine as a gold-plated lead Kruggerand.

True, Model I TRSDOS* diskettes can be read on a Model III. But first they must be converted and re-recorded for Model III operation.

And you cannot write to a Model I TRSDOS* diskette. Not with a Model III. You cannot add a file. Delete a file. Or in any way modify a Model I TRSDOS diskette with a Model III computer.

Furthermore, your converted TRSDOS diskettes cannot be converted back for Model I operation.

TRSDOS is a one-way street. And there's no retreating. A point to consider before switching the company's payroll to your new Model III.

Real software compatibility should allow the direct, immediate interchangeability of Model I and Model III diskettes. No read-only limitations, no conversion/re-recording steps and no chance to be left high and dry with Model III diskettes that can't be run on a Model I.

What's the answer? The answer is Percom's OS-80™ family of TRS-80 disk operating systems.

OS-80 programs allow direct, immediate interchangeability of Model I and Model III diskettes.

You can run Model I single-density diskettes on a Model III; install Percom's plug-in DOUBLER™ adapter in your Model I, and you can run double-density Model III diskettes on a Model I.

There's no conversion, no re-recording. Slip an OS-80 diskette out of your Model I and insert it directly in a Model III.

And vice-versa.

Just have the correct OS-80 disk operating system — OS-80, OS-80D or OS-80/III — in each computer.

Moreover, with OS-80 systems, you can add, delete, and update files. You can read and write diskettes regardless of the system of origin.

OS-80 is the original Percom TRS-80 DOS for BASIC programmers.

Even OS-80 utilities are written in BASIC. OS-80 is the Percom system about which a user wrote, in Creative Computing magazine, "... the best \$30.00 you will ever spend."[†]

Requiring only seven Kbytes of memory, OS-80 disk operating systems reside completely in RAM. There's no need to dedicate a drive exclusively for a system diskette.

And, unlike TRSDOS, you can work at the track sector level, defining and controlling data formats — in BASIC — to create simple or complex data structures that execute more quickly than TRSDOS files.

The Percom OS-80 DOS supports single-density operation of the Model I computer — price is \$29.95; the OS-80D supports double-density operation of Model I computers equipped with a DOUBLER or DOUBLER II; and, OS-80/III — for the Model III of course — supports both single- and double-density operation. OS-80D and OS-80/III each sell for \$49.95.

Circuit misapplication causes diskette read, format problems. High resolution key to reliable data separation

GARLAND, TEXAS — The Percom SEPARATOR™ does very well for the Radio Shack TRS-80* Model I computer what the Tandy disk controller does poorly at best: reliably separates clock and data signals during disk-read operations.

Unreliable data-clock separation causes format verification failures and repeated read retries.

CRC ERROR—TRACK LOCKED OUT

The problem is most severe on high-number (high-density) inner file tracks.

As reported earlier, the clock-data separation problem was traced by Percom to misapplication of the internal separator of the 1771 drive controller IC used in the Model I.

The Percom Separator substitutes a high-resolution digital data separator circuit, one which operates at 16 megahertz, for the low-resolution one-megahertz circuit of the Tandy design.

Separator circuits that operate at lower frequencies — for example, two- or four-

megahertz — were found by Percom to provide only marginally improved performance over the original Tandy circuit.

The Percom solution is a simple adapter that plugs into the drive controller of the Expansion Interface (EI).

Not a kit — some vendors supply an untested separator kit of resistors, ICs and other paraphernalia that may be installed by modifying the computer — the Percom SEPARATOR is a fully assembled, fully tested plug-in module.

Installation involves merely plugging the SEPARATOR into the Model I EI disk controller chip socket, and plugging the controller chip into a socket on the SEPARATOR.

The SEPARATOR, which sells for only \$29.95, may be purchased from authorized Percom retailers or ordered directly from the factory. The factory toll-free order number is 1-800-527-1222.

Ed. note: Opening the TRS-80 Expansion Interface may void the Tandy limited 90-day warranty.

80 ACCOUNTANT

by Michael Tannenbaum C.P.A.

"... Tandy has confirmed its commitment to the small business computer user."

With the introduction of the new Model 16 and upgrade boards for the Model II Tandy has confirmed its commitment to the small business computer market. The new equipment constitutes an enormous advance in processing potential. In effect Tandy is marketing a minicomputer disguised as a desk-top micro. For a business user the impact of the new equipment could be dramatic. Software packages such as the Tandy three-disk Cobol systems will run much faster. More importantly, users can add more work stations for data entry and retrieval purposes.

The use of multiple work stations is desirable in many accounting applications, especially accounts receivable. Because up-to-date receivable files are important for credit approval purposes a company should post collections as quickly as possible. Multiple work stations speed up the process by allowing several clerks to enter data at the same time. If several users can share the data base for data entry purposes, they can also share it for inquiry purposes. Until Tandy announced the Model 16 this feature was unavailable to TRS-80 microcomputer users.

Order Entry Systems

Tandy's new Order Entry System (#26-4607) will also benefit from a multi work station. Like accounts receivable data, companies usually receive their orders in bulk and they should enter them as quickly as possible. The open and closed order entry files are also subject to inquiry for customer service purposes.

This new system is the front end for the Accounts Receivable system (#26-4604) reviewed in my July 1981 column. Unlike the previous three-disk systems, Order Entry can not stand alone. If you wish to use it, you must purchase Accounts Receivable since the Order Entry system requires receivable files. Order Entry also includes an inventory control module that controls up to 1500 inventory items. If you wish, you can also add an optional Sales Analysis program (#26-4608) which provides extensive sales reports.

Of all applications released to date, order entry will most likely be the hardest

to install. However, once it is installed successfully, it can have a major effect on your client's bottom line. An automated order entry procedure linked to inventory control could significantly reduce inventory requirements. The resulting benefit from the reduction in purchases could easily pay for a Model II or 16. In addition, improved analyses of sales and sales staff performance could provide direction to management, further improving profitability.

In the softgoods industry customers place orders before the merchandise is ready for shipment. Because of this time differential between the order and the shipment, managers require allocation procedures to select finished goods for shipment when they become available. Allocation procedures are quite complicated and difficult to automate. Even after a company has made its allocation decisions, invoicing is generally a complicated procedure. Some customers require an invoice with each shipment and others insist that invoices be sent to a central office for payment.

Softgoods order handling is complicated but hardgoods orders have their unique problems also. Often there are problems defining the correct item price. A company may sell items in many different markets. Each market may have different pricing conventions, discount rules and volume discounts. Decision makers need to know specific customer arrangements to prevent improper pricing resulting in bad will or unexpected loss. After pricing there is the question of availability. Since some items will be out of stock, managers must decide which to back order or cancel. Once an order is selected for shipment, an indication of warehouse location can save much picking labor and cost. This means that the system must be advised where the merchandise is to be stored.

With variable pricing and different sales commission arrangements, monitoring item profitability can be difficult. Hardgoods systems should be able to analyze profitability by item, customer, salesperson and location.

A common factor in both soft and hard-

goods order processing is an on line requirement to track customer order status. Files of open and recently completed orders must be available at all times. This adds to the system's complexity and requires an enormous amount of disk space. Order processing systems are complex and because of this complexity prospective owners should carefully examine them for a fit before attempting installation.

The Tandy Order Entry and Sales Analysis system does not have the reports and categories required for a softgoods order entry system. A company could modify its present system to fit this package's features, but the fit will not be good. The fit for a hardgoods firm, however, will be quite good if the system's capacities are adequate. When used in a floppy disk environment the system can retain up to 300 open orders each with up to 5 line items and control 1500 inventory items. The Accounts Receivable system can handle up to 800 customers, retain up to 2,500 open items, be used with up to 100 salesmen and accommodate 6000 combined general ledger distributions and commissions due.

If the capacities are adequate, this system is an excellent candidate for installation. However, because it is a complex application, you need a good knowledge of the client's business and business environment. Document and review the findings with the client before proceeding. Once you have completed this formality, proceed with installation by defining the all important management reports which you expect the system to provide. Devote special attention to the sales analysis reports. These reports alone can justify the effort to install the system and you must consider their content in advance. If you do not enter the desired information because your client's present system does not classify customers by type or inventory items by category you must establish these classifications before installation procedures begin.

To measure profitability with the sales analysis reports you must have an inventory item cost figure. The order entry system only provides for the average cost method to value inventory. The order entry

INTELLIGENT PRINTER INTERFACE

Free Your Computer from the Mundane Task of Printing

Imagine being able to use your computer seconds after beginning an extensive printout.

Visualize your printout with page breaks, page numbering and titles, margins of your choice, indented carryover lines, on any size paper!

Appreciate the time and money you will save by not waiting on your printer.

SooperSpooler, a buffered printer interface, maintains control over your printer while you go on using your computer for more productive activities. Eliminate waiting while your printer pecks through a long document. SooperSpooler accepts information from your computer at up to 2500 characters per second and feeds it to your printer as fast as it can handle it—without using any of your computers memory or time! As soon as SooperSpooler has stored your document in its buffer, control of your computer is returned to you.

SooperSpooler features include:

- 16K Memory—Will handle most of your printing jobs (expandable, see options)
- Buffer Status Readout—Lets you know just how much data is stored
- Space Compression—Makes the best use of memory on columnar documents
- Pagination—Eliminates printout on page perforations
- Page Stops—For single sheet printouts
- Headers and Page Numbering—Give your listing a professional look
- Indentation on Carryover Lines—Easy to find the beginning of a line
- Self Test Routine—You instantly know that all is well
- All Features Software Controllable—Your program can take over
- Plugs into Most Computer Systems—Standard cables available
- **\$349.00!**—16K parallel I/O unit

Options:

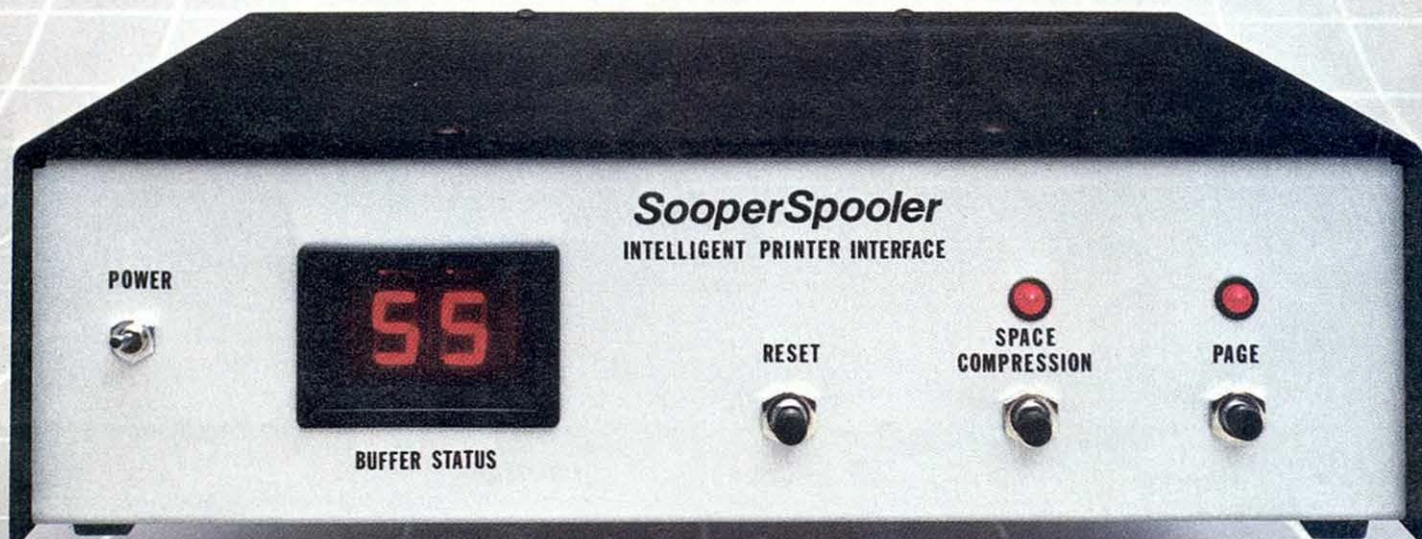
- Serial Board—\$95.00—Gives you the option of any combination of serial or parallel input or output. Can also be used for modem transmission.
- Memory Expansion—\$159.00—Additional 46K for a total of 62K
- Cables—Available per your application.

TM
SooperSpooler by Compulink
—The missing link that gives your microcomputer mainframe printing.

COMPULINK CORPORATION

1840 Industrial Circle, Dept. A
Longmont, CO 80501
(303) 651-2014
Order line: 800-525-6705

Dealer inquiries welcome



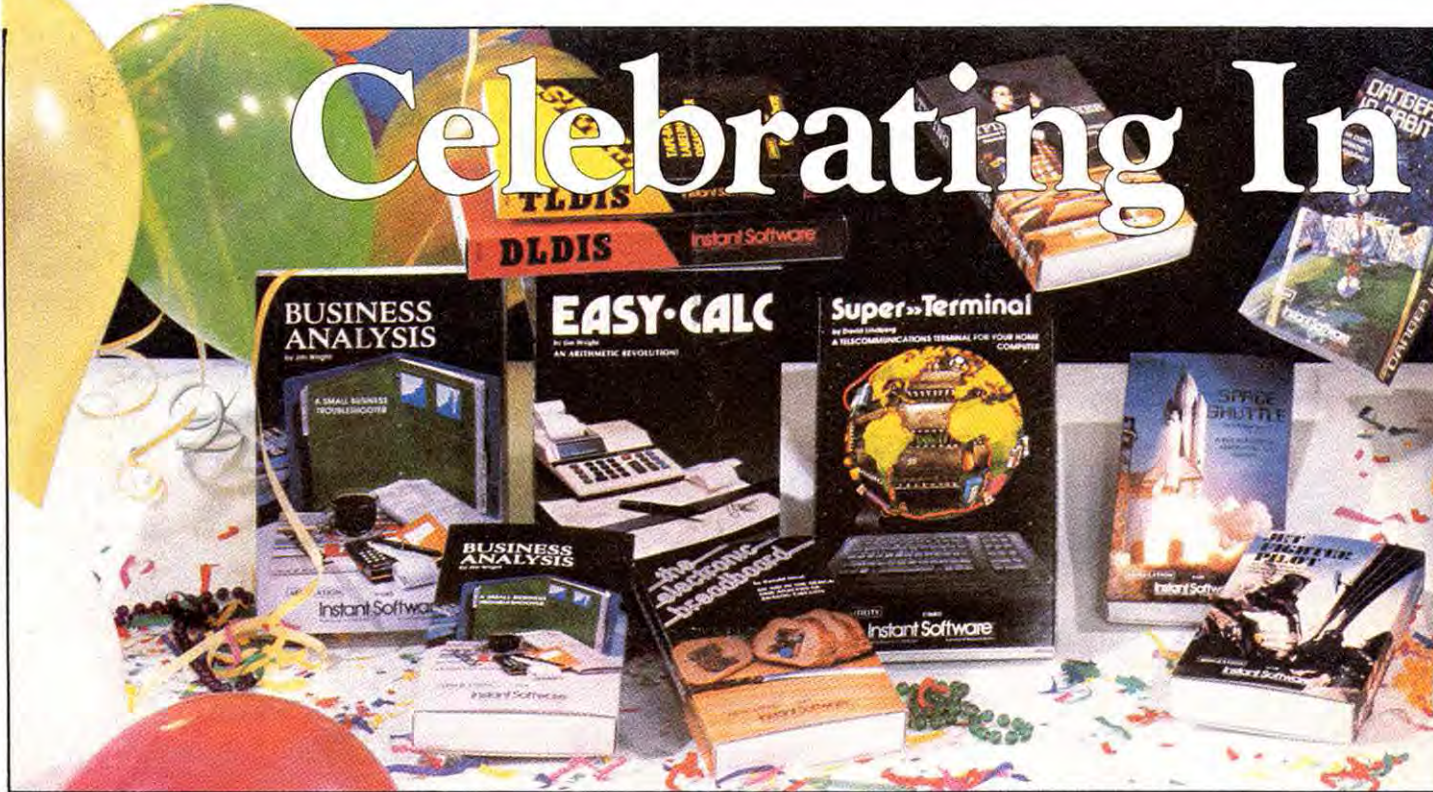
We accept
• VISA
• MasterCard

• Checks
• Money Orders
• COD

Add \$3.00 per order for postage and handling
COD add \$3.00
Colorado residents add sales tax

Prices and Specifications Subject to Change
Without Notice

Celebrating In



Because your computer is

BUSINESS ANALYSIS

Business Analysis is a flexible, professional time series analysis and forecasting package. It features a unique graphing capability and can direct any chart or graph to your printer. Ideal for personal or business applications, *Business Analysis* can be used in sales and stock market analysis, forecasting, product or business planning, and family spending and energy consumption trends. Documentation included. Model I & III, Level II, 16K.

TRS-80; Tape, #0140R-48.....\$75.00
 TRS-80; Disk, #0152RD-48.....\$99.95

EASY CALC

Easy Calc is a unique program that will turn your computer into an electronic worksheet with all the speed and power of a programmable calculator. In addition to the regular calculator features, you can calculate percentages, summations of all rows of columns and other time saving functions. Your worksheets can be merged with Scriptit* word processor files for complete, professional reports. ENTER and SAVE your calculations with a touch of a single key! *Easy Calc's* special library feature allows you to name each file with up to 28 characters. All options are MENU selectable and described in plain English. A detailed User's Manual is provided.

TRS-80; Disk, #0369R3D-48 (Model III version).....\$49.95
 TRS-80; Disk, #0269RD-48 (Model I version).....\$49.95

TLDIS/DLDIS

Tape and disk-based Labeling Disassemblers, *TLDIS* and *DLDIS* are three-pass disassemblers which assign labels (where appropriate) to routines in a machine-code program to give an output which is identical to a hand-assembled source code. Options enable you to send the disassembly to a lineprinter or to tape. *TLDIS* and *DLDIS* have many other special features and come complete with documentation. Model I & III, Level II, 16K.

TLDIS, TRS-80; Tape, #0230R-48.....\$14.95
 DLDIS, TRS-80; Disk, #0231RD-48.....\$19.95

THE ELECTRONIC BREADBOARD

The Electronic Breadboard permits the design and analysis of analog circuits. It can be used to evaluate voltages, currents, impedance and the frequency response of any circuit. This package is ideal for audio component repairmen, ham radio operators, hobbyists, electrical engineers, telecommunications engineers, audiophiles and students of electronics. It is a great training aid! Documentation is included. Model I & III, Level II, 16K.

TRS-80; Tape, #0287R-48.....\$49.95

SUPER>>TERMINAL

The most flexible and powerful microcomputer terminal program available at any price, *Super>>Terminal*, allows you to communicate with almost any other computer system quickly and efficiently. It provides single key auto sign-on, file transfer capabilities which include prompted output and Xon/Xoff code recognition, and a continuous count of parity, framing and overrun errors. These and many more features make communications with *Super>>Terminal* fast, efficient and easy to use. Requires TRS-80* Model I or Model III with 32K memory and one disk drive. Documentation is included.

TRS-80; Disk, #5700RD-48.....\$95.00

TYPING TEACHER

Transform your computer into both a typewriter and an instructor with this complete seven-part package. Includes on-screen diagrams and practice sessions. Your computer becomes a bottomless page for typing practice. The lessons are tailored to the keyboard, but train you to use any standard typewriter. Manual. Model I & III, Level II, 16K.

TRS-80; Tape, #0099R-48.....\$12.95

SPACE SHUTTLE

Instant Software's *Space Shuttle* puts you in the command pilot's seat of America's first reusable space shuttle. Until commercial space flight becomes a reality, this is the closest you'll get to the ultimate flight. Complete with documentation. Model I & III, Level II, 16K.

TRS-80; Tape, #0332R-48.....\$14.95

JET FIGHTER PILOT

After you've flown a few missions with the *Jet Fighter Pilot* package, you'll know you've earned your wings. *Jet Fighter Pilot* is a brilliantly realistic simulation of a real mission putting you in total control of the aircraft. All controls respond the same as they would on a real jet fighter. This combat flying program comes with comprehensive documentation. Model I & III, Level II, 16K.

TRS-80; Tape, #0159R-48.....\$14.95

DANGER IN ORBIT

Danger in Orbit is a real-time, machine-code space game with variable levels of difficulty, superb high-speed graphics, sound effects and automatic scorekeeping. Destroy asteroids with your anti-matter cannon! Prevent alien spacecraft from invading the Terran Defense Network. Avoid alien attacks from hyperspace. Only lightning reflexes and nerves of steel will enable you to survive *Danger In Orbit*. Comes with documentation. Model I & III, Level II, 16K.

TRS-80; Tape, #0237R-48.....\$14.95

SKYBOMBERS II

Skybombers II is an aerial war game pitting two nations against each other. Battlesounds and graphically displayed explosions give each battle a vivid reality. The scores for both countries are constantly updated at the bottom of the display screen. Experience air warfare at its best with *Skybombers II*. Requires 32K RAM, Applesoft in ROM and game paddles. Documentation is included.

APPLE; Tape, #0183A-48.....\$9.95
 APPLE; Disk, #0271AD-48.....\$19.95

BALL TURRET GUNNER (with sound)

Ball Turret Gunner is a deep space, laser attack game. As a member of the *Ball Turret Gunner* service you're at the console of the spaceship: your mission—destroy the enemy! Multiple levels of difficulty, optional sound effects, superb graphics and complete documentation enhance this program. Model I only.

TRS-80; Tape, #0051R-48.....\$9.95

Instant Software!



only as good as the software

GEOGRAPHY EXPLORER:USA

Learn the vital facts about each state in our union in the most fun and fascinating way yet. The program displays computer generated maps of the United States, its seven regions and even its individual states. Questions may be multiple choice, recognition or fill-in format. A unique TEACHER mode allows multiple options of how the material is to be presented. As an added bonus, *Geography Explorer:USA* has the capability of supporting a light pen. The union of sophisticated software with the speed and novelty of the light pen represents a milestone in Computer Assisted Instruction. Fully documented, this program is educational for any age group. Model I or III, Level II, 16K.

TRS-80; Disk, #0071RD-48.....\$49.95

MASTER REVERSI

Master Reversi is a state-of-the-art game that's simple to play, yet infinitely challenging. It is a tournament-winning program that has more features than any other reversi program on the market. *Master Reversi* offers a special library of tournament-level games for you to analyze. Whether you're having fun or studying for the world championship, *Master Reversi* is the game for you. Documentation included. Model I, Level II, 16K.

TRS-80; Disk, #0378RD-48.....\$29.95

AIR FLIGHT SIMULATION

An actual simulated take off, flight and landing, *Air Flight Simulation* is both fun and educational. Basic flight instructions, explanations of basic aerodynamics, principals of flight and well illustrated documentation included. TRS-80* version requires Model I or III, Level II, 16K. APPLE* version requires 16K RAM and Applesoft.

TRS-80; Tape, #0017R-48.....\$9.95
APPLE; Tape, #0148A-48.....\$9.95

COSMIC PATROL

With *Cosmic Patrol* you get the best of the search and destroy space games. Impressive sound option and superb graphics make *Cosmic Patrol* the best of its kind. Defend your interstellar space and prey on the enemy with this fast, real-time action game program. Documentation included. Model I & III, Level II, 16K.

TRS-80; Tape, #0223R-48.....\$14.95
TRS-80; Disk, #0224RD-48.....\$19.95

SANTA PARAVIA AND FIUMACCIO

Build a powerful kingdom from your tiny city-state. Set in the year 1400 AD, in Italy, this challenging program allows you to test all your leadership skills. See if you have what it takes to be a wise and competent ruler. Well documented. TRS-80* version Model I & III, Level II, 16K. APPLE* version requires Applesoft in ROM.

TRS-80; Tape, #0043R-48.....\$9.95
APPLE; Tape, #0174A-48.....\$9.95
APPLE; Disk, #0229AD-48.....\$19.95

Here's how to order:

RETAIL: Ask us for a list of the Instant Software dealers nearest you. If there is not one near you, let us know. Meanwhile, if you would like to order any of the products featured on these pages call toll-free 800-258-5473, or use the handy reply card in this magazine (a photocopy of it is acceptable). Just fill in the necessary information and return it to us. To receive a free copy of our latest catalog, just ask, or check the appropriate box on the reply card. Visa, MasterCard, American Express and personal checks or money orders are accepted. Sorry, no C.O.D.'s. Please add \$2.50 per order for postage & handling.

DEALERS: If you would like to join the hundreds of Instant Software dealers in the United States, Canada and Europe who are already celebrating our software, fill in the coupon below (a photocopy is acceptable) or call toll-free 800-258-5473 and ask for our dealer sales department.

*TRS-80, and Scripsit are trademarks of Tandy Corp. APPLE is a trademark of Apple Computer Co.

Instant Software™

A SUBSIDIARY OF WAYNE GREEN INC., PETERBOROUGH, NH 03458

I want to join the celebration!



Please send me your catalog

free of charge

Dealer name _____

Address _____

City _____ State _____ Zip _____

Your name _____

Telephone (AREA CODE) _____

Instant Software, Inc., Peterborough, NH 03458 RC-48

system does not accommodate FIFO, LIFO, or specific identification methods of valuation. Decision makers use this inventory item cost to value the cost of merchandise they sell. If the accounting recordkeeping system uses a different method, there will be a variance between the sales analysis reports and the financial reports. If at all possible you should avoid this variance. You will obtain the best results if the financial reports ratify the gross profit percentage indicated on the sales analysis reports.

To facilitate this goal, the client should reconcile the financial and the sales analysis reports monthly. The client should prepare a schedule of gross profit reconciliation. This schedule should begin with the sales and profit on the sales analysis report and itemize the reconciling items to the values reported on the financial statements. Reconciling items could be variances from the inventory costs used by the order entry system detected in the purchase journal, custodial losses due to inventory shrinkage and merchandising losses caused by inventory markdowns. This gross profit reconciliation procedure will help keep the system honest.

Once you have defined the output reports you should create the files the system will use. As with the previous three-disk systems, you must select various options and fields during initialization of the files to enable the system to summarize the proper information for the output reports. Do not rush this procedure. The files contain much information and system set-up will take a substantial amount of time.

Hard Disk Systems

The large number of files and the integrated nature of order entry and accounts receivable has complicated my evaluation of this product. Since my review of the receivable system was published in July, I had to reinitialize my receivable files to work with the new system. If I had still been using the floppy disk system this would have been a hopelessly lengthy process. However, as I was starting evaluation for this article, I received my hard disk system. I immediately suspended testing operations and moved all of the files and programs to the hard disk.

The new disk system will work with the three-disk accounting packages with little modification. You can copy the programs from the disks supplied to the hard disk using the new utility FCOPY. Because floppy disk capacity is limited some program overlays such as SCREEN/COB are

repeated on each disk. When this occurs, FCOPY prompts you to overwrite or skip the duplicate program.

After you copy the systems to the hard disk, you can use them without much effort. Some problems may occur when a program overlay does not return to the menu of the subsystem you selected. This will not cause any data loss and can be corrected by hitting the tab key and running the menu of the application desired.

With use of the hard disk, the Cobol accounting system is transformed. Because files and programs are extracted from the disk at comparatively high rates of speed everything executes much faster. The slow plodding systems which I observed became much more usable. In addition, system capacity expands enormously. The hard disk is equivalent to 17 floppy disks. Apparently you can expand the Cobol files without software modifications. Tandy doesn't yet know what the new capacity limitations might be. This is the native environment for these systems and any firm using this system should make acquisition of a hard disk top priority.

Thanks to the new disk's speed I set up test files in the accounts receivable and order entry system in less than a half hour. It was a pleasure to use each application without wondering whether the proper files were mounted on the correct drives. Thanks to a Floppy Off command, the hard disk operating system simply ignores the drive assignments and selects the file requested by the program. When the system prompted me to switch disks I just typed Done and the program found the proper files. Without the hard disk, you must swap disks at the end of every invoicing run. You must also swap disks to run the sales analysis system. The system checks to see that you have mounted the proper disk in the correct drive.

Files to Create

In addition to the accounts receivable files, the order entry system requires creation of inventory, price and commission code files. These files provide the line item identification data, pricing and commission structure used by the order entry program. The pricing and commission files allow great flexibility in pricing sales and commissions. An item can be priced with five separate formulas: by quantity ordered; by customer type; by quantity within customer; by pick quantity with up to three pre-defined prices; or by customer type with up to three pre-defined prices.

If you select one of the first three pricing options, you can also specify up to five levels of price breaks and related dis-

counts. Similar options are offered when setting up the commission code file. The code file allows you to create many different commission payment schedules. Each schedule permits you to establish scaled commissions depending on the price breaks you established in the pricing file. In addition there is a provision for an override commission percentage if you will not be using the price breaks. You can calculate commissions on either the selling price or the gross profit (sales minus cost) of the item. This program can accommodate a highly complex commission structure. If a company installs this system to replace a simple percentage method of calculating commissions, many salespeople may have difficulty understanding how their commission has been calculated. Replacing a simple list of invoices with a voluminous commissions due report will probably compound the problem. Install this system with extreme care.

As indicated above, you can structure or obtain variable prices from the item master file. In addition, the item master file contains other data such as: commission and price schedule codes; item description to be placed on the invoice; quantity on hand; reorder level; quantity ordered but not yet shipped; sales analysis code; sales statistics period and year-to-date; taxability; general ledger account code; location code; back order status indicator; and vendor number.

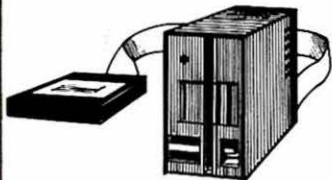
The item master file contains most of the information necessary to control a hardgoods inventory. As expected, the system will generate inventory control reports such as purchasing notices and back order reports. However, the sales analysis subsystem is required to develop more detailed activity reports. Input to the sales analysis system is provided by the files created in the order entry system. Additional sales analysis files are not required.

Once you have created the required files, order processing is easy—that is, if all the data on the customer's order is correct. Because this system edits the customer number and the item numbers, exceptions could delay processing. During initial implementation you should manually pre-edit orders. The system provides a means by bypassing the edit and this option will result in loss of sales data and prevent proper adjustment of inventory balances.

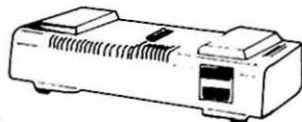
When entering a new order two screens are used. One screen relates to the heading and the other to the line items ordered. Much of the data required for the heading

From Computer Plus to YOU...

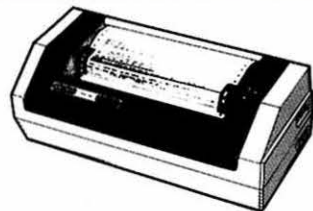
PLUS after PLUS after PLUS



Color Computer Disc Drive
\$470



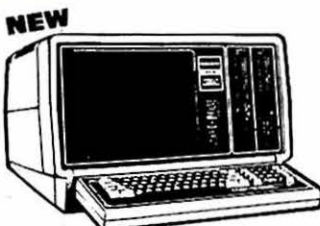
32K Exp. Int. \$334



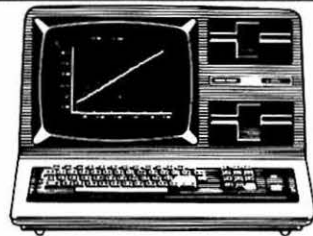
Line Printer VII \$315



Color Computer 4K \$310
w/16K Ext. Basic \$459
w/32K Ext. Basic \$525



NEW
Model 16 128K
1 Drive \$4299



Model III 16K \$839
Model III 48K
2 Disc & RS232C \$2059

BUY DIRECT Here are just a few of our fine offers...
call TOLL FREE for full information.

COMPUTERS

Model II 64K	\$3300
Model III 4K LEV I	599
MODEL III 16K	839
MODEL III 32K	945.50
*MODEL III 32K	881.50
MODEL III 48K	1052
*MODEL III 48K	924
Model III 48K	
2 Disc & RS232 c	2059
Color Computer 4K	310
Color Computer 16K	416.50
*Color Computer 16K	352.50
Color Computer 16K	
w/extended basic	459
Color Computer 32K	
w/extended basic	525
Color Computer Drive 0	470
Pocket Computer 2	230
VIDEOTEX	310

*Computer Plus New Equipment,
with NEC RAM installed.
180 Day Computer Plus Warranty.

**We have the lowest possible
Fully Warranted Prices AND
a full complement of Radio Shack
Software.**

DEALER INQUIRIES ARE INVITED

Prices subject to change without notice.
Not responsible for typographical errors.
TRS-80 is a registered trademark of Tandy Corp.

PERIPHERALS

Expansion Interface OK	\$249
Expansion Interface 16K	355.50
*Expansion Interface 16K	291.50
Expansion Interface 32K	462
*Expansion Interface 32K	334
16K RAM N.E.C. 200 N.S. chips	25

MODEMS

Lynx Direct Connect MII/MIII	235
Auto Ans./Dial	
Telephone Interface II	169
R.S. Modem I D.C.	130
R.S. Modem II D.C.	210

PRINTERS

Daisy Wheel II	1695
Epson MX80	479
Epson MX80 FT	589
Epson MX100	759
Line Printer VII	315
Line Printer VIII	620
Line Printer V	1610

Microline 80	325
Microline 82A	465
Microline 83A	735
Microline 84 Parallel	1090
P. C. Plotter Printer	199

DISK DRIVES

R.S. Model III 1ST-Drive	712
Tandon 40 Track MI	299
R.S. 1 Drive Exp MII	999
R.S. 2 Drive Exp MII	1518
R.S. 3 Drive Exp MII	2040

SOFTWARE

R.S. Software 10% off list	
Newdos 80 MIII	149
ST80III	149

ETC.

Verbatim 5" Double Density	32
Verbatim 8" Data Life	49.95
Ctr-80A recorder	52
C. C. Joysticks	22

call TOLL FREE 1-800-343-8124

computer plus

245A Great Road
Littleton, MA 01460
617-486-3193

Write for your
free catalog



is extracted from the accounts receivable files. If there are no changes to this data, entry is very rapid. If you do not know the customer number, you can invoke an alphabetic search routine by pressing the F1 key. This feature is also available on the second screen when you select line item codes.

If the quantity you keyed in exceeds the inventory on hand and the item master file allows back orders, then the system displays a back order option menu. This menu allows you to cancel the order, ship what is on hand and back order the balance or back order the entire amount requested. If the item can be processed, pricing is done in accordance with the schedule indicated by the item master. There is a provision to specify an additional discount percentage for each line item entered. Pressing the F1 key overrides any predetermined price or discount. This allows complete flexibility over all elements of the order entry process.

Once an order is accepted, you can change or examine it at any time. When the order is selected for shipping, picking

tickets can be generated. These tickets serve as warehouse work orders and the system provides a space to enter actual amounts selected and shipping information. Although the system specifies a location, there are no summary reports by location that you could use to stage picking activities. Warehouse management could use staging reports to control order picking activities and this would be a desirable extension to the system. In lieu of a picking ticket, you could generate an invoice for systems which use a pre-billing processing method.

After picking is complete, you can process the order for billing. Selection of items to be billed is a straightforward procedure. Invoice preparation and printing are handled as separate functions. The system uses a preprinted invoice form. After the invoice has been printed, the system calls for the accounts receivable data disk and transfers the invoice data directly to the accounts receivable activity files. Unfortunately the data is not posted immediately to the customer's receivable record. Posting is deferred until

you give a posting command when you run the receivable system. This procedure complicates customer service because it makes locating customer orders after shipment difficult.

After a customer order has been shipped, the order detail drops out of the order entry file. To trace shipped orders you must mount the accounts receivable system in the disk drives and scan the appropriate files. If you have not posted the invoice items, you will have to scan the unposted data file. You must know the invoice number to do this. Although this procedure complicates post invoicing customer service, you can establish records to keep search time to a minimum.

This system is impressive. However, because of its complexity and the enormous number of data files it requires, it is not at home in a floppy disk environment. It is slow, requires an inordinate amount of disk access time and much disk swapping. On the hard disk it runs beautifully. If this system meets your client's needs, recommend the hard disk expenditure. Your client will be satisfied. ■



THE STOCKING SOURCE

MAGIC SHOW

Transform your computer...

into a Word Processing or Data Processing System by adding one of the NEW Okidata Printers



Microline 83A



Microline 82A

If you require a system printer, the new Okidata Microline 82A, 83A, 84 should be your choice.

These printers feature:

- 9 x 9 Dot Matrix heads rated at 200 million characters continuous duty - true lower descenders
- Full forms control - vertical tab, top of form
- Block Graphics
- Bidirectional, Short Line Seeking
- Dual Interface - Parallel & RS-232C Serial

	LIST
Microline 82A - 80-column, 120 characters per second	\$ 649.
Tractor Optional	\$ 50.
Microline 83A - 126-column, 120 cps, built-in tractor	\$ 995.
Microline 84 - 126-column, 200 cps, built-in tractor	\$1395.
Optional Serial Interfaces - RS-232C:	
HS-RS232 - 256 CharacterBuffer	\$ 130.
HS-RS232 - 2K CharacterBuffer Serial	\$ 150.

NEW OKIGRAPH HIGH RESOLUTION GRAPHICS KITS

FOR MODEL 82A & 83A	\$99.00 List
DUMP ROUTINE DISK	\$65.00 List

ASK FOR OUR INSTANT DISCOUNT
From Roy Hawthorne
Talk To Bill Tokar On Applications

CALL TOLL FREE U.S.A.
1-800-521-2764
MICHIGAN
1-800-482-8393

Remember:
We are open
8:30 AM to
6:00 PM EST
Monday - Friday



No Credit Card Penalty

"The Stocking Source"
24069 Research Drive
Farmington Hills, MI
48024
313-474-6708 ✓8



WAYNE GREEN INC.
PETERBOROUGH, NEW HAMPSHIRE 03458 USA

Winter/Spring 1982

Dear *80 Microcomputing* Subscriber:

We are making a cover date change on *80 Microcomputing*. What would have been your June 1982 issue will be the June/July 1982 issue. We are not combining an issue—simply changing the month listed on the cover. You will still get 12 issues of *80 Microcomputing* in 1982 and 12 issues in 1983, and so on; and we will change your expiration date by adding a month (more on that later) so you don't end up short-changed.

The reason for the cover date change? There has been an increasing demand for *80 Microcomputing* to be sold on major newsstands. Because *80 Microcomputing* is the last publication to be produced each month by the Wayne Green group it has not been getting to the newsstands on time. A complicated production change could have been made, but a simple cover date change will produce the same results—a full month's sale on the newsstand. Thus, the cover date change.

The change has other benefits. . . you, the subscriber, will be getting your magazines well before the local computer stores and newsstands. I've been hearing complaints that they get it first; after the June/July issue they won't (although they will still receive it in the month prior to cover date). Also, advertisers' ads will be assured of the full month on the newsstands, in computer stores and in your hands.

As I have said, you will still get 12 issues this year. *80 Microcomputing* will be in your mailbox every month, but the one you receive in June will say June/July, the one you receive in July will say August, and so on. We will, however, have to change your expiration dates to make up for the missing "cover month" and our computer will do that all at once. Note the upper right hand corner of your address label now and then note it after the date change and you will see a month's difference in the date listed there. If such a change does not occur please write to me at 80 Pine Street, Peterborough, NH 03458, and I will personally see that it is changed.

Thank you for your support of *80 Microcomputing*. I hope you continue to enjoy your subscription.

Sincerely,

Debra L. Boudrieau
Director of Marketing

73 MAGAZINE
KILOBAUD MICROCOMPUTING
80 MICROCOMPUTING
DESKTOP COMPUTING
MICROCOMPUTING INDUSTRY
INSTANT SOFTWARE
LOAD 80
WAYNE GREEN BOOKS
WAYNE GREEN INTERNATIONAL

80 REVIEWS

edited by Michael E. Nadeau

"Faster keeps track of all variables and the number of times they are accessed."

Faster 1.2
XTEND40
RPM
Prosoft
Box 389
North Hollywood, CA 91603
\$29.95, \$19.95 and \$24.95
respectively

by Bruce Powel Douglass

Faster is advertised as a software speed up for Basic programs. Its approach is, however, unique. Faster is not a compiler; it is a program analyzer. It monitors the execution of your Basic programs and keeps track of how your program accesses its variables. It points out which lines you should pay particular attention to, and the variables you should define first.

Faster comes on disk or tape. I reviewed the disk version. It comes without an operating system per se, but it is on one of Kim Watt's special disks. This special disk copies its programs onto one of your disks by itself, saving one-disk-drive owners the hassle of trying to load a non-system disk onto systems disks. It saves Prosoft and the user from buying another copy of TRSDOS.

The manual for Faster is short (11 pages), but is attractively printed, and very well done. The major liability of most software is that the manuals appear to be written by someone making notes to himself—rarely are they directed to the user. Prosoft's Faster manual is an exception. The manual's instructions on how to install the programs on your own disks were incorrect, presumably since the self-copying disk is a new idea, but the self-copying disk came with its own instructions.

The manual discusses how to activate Faster to monitor Basic program execution. It also discusses how to use the output from Faster to modify the Basic programs so they will run faster, as well as some common problems that may occur (none of them happened to me), and some other suggestions for speeding up Basic programs. It even comes with a sample Shell sort to show how it works.

Faster monitors the Basic program.

When you load it from disk, it has a default address (top of memory), or you may specify a memory address if you wish to have other machine-language programs in memory. Thus, Faster also works with hybrid Basic/machine-language programs. Faster keeps track of all variables and the number of times they are accessed. Basic creates a variable list that it must search each time a variable is referenced. If it does not find the variable in the look-up table, then it creates an entry for it at the end of the list. If your most often used variables come at the end of the table, Basic must search longer for the variable. Depending on your program construction and how long the program runs, a variable may be accessed many thousand times.

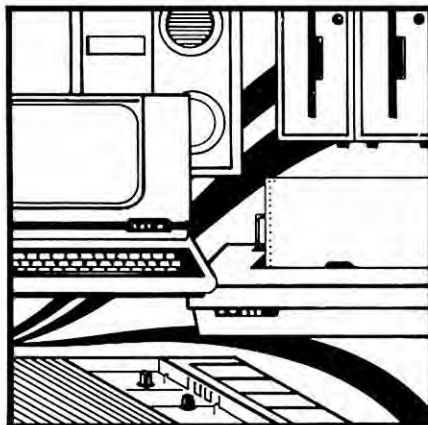
When you think your program has run long enough for Faster to get an accurate picture of how your program operates (you do not have to run it to completion), press Break and then 567 (together) and Faster requests what you wish to know. The options it gives are:

1. C = CLEAR TABLE
2. E = EXIT
3. 3 = SUMMARY
4. D = DETAIL
5. V E P = VIDEO/PRINTER

Some of these set switches. V displays the used variables by page (so it will not scroll off the screen). If the D switch is set, then it displays the number of times the variable was accessed during the trial run. If the S option is set, then it displays just the variables. The variables are displayed in descending order of the number of times they were separately referenced during the program's run. C clears the variables, so if there is a lengthy initialization sequence, you do not have to include it in the analysis. P sends the output to the printer as well as the video. The variable name, type and number of times referenced are displayed in this manner:

```
!% 1183 M$ 960 ZZ! 412 R%( 200  
CHECK THESE LINES: 20 30 500
```

The manual shows you how to set up your variable table to maximize speed.



Most often, you have to add only one or two lines to your program to speed it up significantly. A DIM statement allocates variable space in the variable table for simple variables as well as array variables. Faster tells you to add a DIM statement coming after your allocation to destroy it. Adding a line such as: DIM !%, M\$, ZZ makes your program run faster. The manual advises that normal speed up is between 20 and 50 percent. In the short example given in the manual, the speed-up time I got for generating and sorting 200 random numbers was a little over 20 percent.

Unless you always write very short programs, Faster offers an inexpensive way to speed up your Basic programs. If you get a 30 percent increase in speed, a one-hour sort will take only 40 minutes, and 30 seconds-per-move Othello will take 20 seconds.

If you write modular code with global and local variables, then this program will not be as beneficial. For example, I use the letters I, J and K for local variables, especially in loops, throughout my programs and I make sure that these variables are first in the tables. Except for very simple programs, it is difficult to make all these allocation decisions correctly, and a few errors of this kind may slow execution considerably.

Faster may be slightly overpriced, but if you cannot afford a compiler, and would

like a significant increase in the run-time speed, then buy Faster.

XTEND40

If you have upgraded your system to 40-track drives and you have many 35-track disks, how do you avoid wasting those five extra tracks and 10 extra granules of space? You can get a 40-track formatted disk and copy all your files over, one at a time—a lengthy process—or you can use XTEND40.

In 15 seconds, XTEND40 formats those unused five tracks, verifies them, and updates the GAT sector. If they are already formatted, you receive an error message and are asked if you wish to do it anyway. This enables you to repeat the procedure if a sector gets locked out during the format process.

The manual consists of a single printed page, but the program is so simple to use, nothing more is required. If a track is locked out XTEND40 will not query you for another attempt to format the disk but since the process takes only 15 seconds,

this is only a minor inconvenience. You can easily run through a whole batch of disks in no time at all with XTEND40. The instruction sheet does warn you not to use important disks, but only back-up copies.

The program is simple to use and if you have more than 20 disks to format for 40 tracks, it is worth the investment.

RPM

RPM is a useful, well-written disk-drive timing program. It measures (and gives easy instructions on how to adjust) the drive speed of any drive in your system.

RPM is a hybrid Basic/machine-language program. It gives not only the current speed and deviation from normal (300 rpm), but also shows a continuously updated average and a graphics display of this variation.

The manual is a terse four pages, but is complete and describes fairly well how to adjust the speed. The potentiometer is also known as a trimpot, but it is not

where they say it is for the Pertec drive. The manual says that the potentiometer is located on the upper corner of the main circuit board, but on both of my Pertecs, it is in the lower left corner. A screw head on this trimpot enables you to change the rotational speed of your drives with a slight turn of your screwdriver. Since there is a continuous display, you can easily adjust it to within very narrow limits. I have had a lot of trouble with one of my drives, and I found by using RPM that it was running significantly too slowly. I adjusted the speed, and the performance of the drive improved.

You may change to another drive simply by pressing the number of that drive. The speed variation graph and the averages are reset automatically, as is the number-of-observations counter.

This program is easy to use and provides a good diagnostic tool to locate a problem with your drives. If your drives have problems I recommend RPM before paying to get it repaired (Pertec charges \$100 just to remove the cover). ■

QSD Utility Disk #1-LDOS 5.0.2.
Quality Software Distributors
11500 Stemmons Expressway, Suite 104
Dallas, TX 75229
Model I
\$69.95

by George Bond

The utilities in this collection range from the trivial to how-did-I-get-along-without-it. Many were written by some of the heavies in the home computing field: Kim Watt, Earle Robinson and Tim Mann.

DIRLOWER/FIX is a cosmetic patch. It gives an upper/lowercase readout instead of all caps. Two additional patches, STATUS/FIX and KSMSTAT/FIX, modify the device command to show what special functions, such as double density and the key stroke multiply filter, are active.

There is a mistake in the documentation for KSMSTAT/FIX. The proper password for the /FIX programs is GSLTD not .RRW3.

A fourth utility, the stand-alone STAT/CMD, does about the same thing as STATUS and KSMSTAT, but includes a report on what disk drives are ready.

RESCUE/CMD permits resurrecting killed files that have not been overwritten. It gives a nifty little directory of the killed files for Y/N selection for saving and includes a note if a file is partially overwrit-

ten. Rescue, unlike most of the programs on this disk, works only in single density. For would-be speed typists there is DVORAK/CMD to remap the TRS-80 as a Dvorak keyboard. (If you're not familiar with this keyboard, see *80 Microcomputing*, December 1980.)

*“LZAP can read
some otherwise
unreadable disks. . .”*

Things go uphill rapidly from here. BIN-HEX/CMD is a straightforward conversion program to put binary data into hexadecimal format and back again. This is often needed in data communications work.

Of less clear-cut usefulness is CHANGE/CMD, a drive-routing program. Change allows sending data meant for one drive to a different drive. The command CHANGE 10, blanks out drive 1 and puts drive 0 in its place. Calling for DIR:1 then gives you the directory of drive 0. Writing data to drive 1 puts it on Drive 0. As the documentation says, this does move the “LDOS operating system one

step closer to total device independence. . .” The question, in this case, is why?

CLONE/CMD allows, as its name implies, copying files. You can make single-drive copies on drives other than drive 0. Some disk swapping is required, but not as much as with the XFER command. Also, you can copy a file over itself.

DCAL/CMD is for calibrating disk-drive operating speed. It shows exact and smoothed speeds. It is easy to use and does about the same thing as \$25 stand-alone drive timers (and free, public-domain drive timers that can be downloaded from some bulletin boards). If you need to justify the cost of utility disks, this program goes a long way in arguing for the QSD diskette.

Two filter programs could be useful with some printers. UPCASE/FLT converts all lowercase output to uppercase (some printers cannot handle LC) and AD-DLF/FLT adds a line feed after a carriage return, again something that a few printers look for.

VDISK/CMD verifies the readability of a disk's sectors on a given drive. It provides a quick check of disk quality when things keep going wrong, and provides information useful for fixing things up with LZAP/CMD.

If your disk arrives with everything glitched except LZAP, LPURGE, and LCOPY, you got more than your money's worth.

LCOPY and LPURGE only work in single density. Since they were both written by Kim Watt, who seems to fix his mistakes before most of us realize they are mistakes, they may be usable on double density by the time you read this. Frank Luff's LZAP works equally well on single or double density.

LCOPY's main virtue is that it solves LDOS' slowness problem when doing multiple file copies. It is versatile, allowing prompted selection for copying system files, visible files or all files; setting step speed on the destination disk; prompting for disk mounts; and starting the whole works over if you think you messed something up. If you really get puzzled, you can call up a help file.

For cleaning up a disk, use LPURGE. For us fumble-fingered folks, it has a

super advantage—everything is done in memory until a specific command is issued to rewrite the directory to reflect the purge. Until that command is given, you can change your mind and all is forgiven (and saved). LPURGE allows browsing through the directory, killing any files or, with a single command, killing all visible files, all invisible files, all invisible non-system files, all /CMD files, all /BAS files, all system files or all files except BOOT and DIR. It also allows zeroing out all unused directory entries or disk sectors.

All those options may sound like enough for a single utility, but there is still option M, for more. This option allows, again with a single keystroke, making all files visible or invisible; changing the auto command; removing all passwords, changing passwords and

changing a disk's master password. That is real utility.

LZAP does for LDOS much of what Superzap does for NEWDOS80 plus a few things that Superzap should do but does not. It allows direct entry to debug and return to LZAP. It finds and goes straight to the directory, no matter what cylinder (track) it is on. It finds the location of a file from its directory line, generates hash codes for files, removes passwords, searches an entire sector for a hex byte, and, just like Superzap, allows corrections to be made, byte by byte. If its error-trapping mechanism is shut off (which also cancels some of the more useful automatic functions such as searches), LZAP can read some otherwise unreadable disks, including ones with zapped boot tracks. ■

The Utility Pack

Mike Friedman

B.T. Enterprises

171 Hawkins Rd.

Centereach, NY 11720

Models I & III, 48K

\$49.95

by Sal Navarro

I use almost all of the major operating systems. It would be nice to have a fast spooler that would work with more than one system. Utility Pack has such a spooler. Tom, at B.T. Enterprises, gave me a demonstration. He put the disk in drive 1. He booted up NEWDOS and typed in SPOOLR48. He then loaded a Basic program and typed LLIST. As the printing started the Ready prompt came back on the screen. Then Tom took out NEWDOS, inserted another disk and pressed reset. The printing stopped and LDOS signed on. He then typed SPOOLR48! and the printer continued from where it left off without missing a letter. At the same time Tom called up Space Invaders and started playing while the printer was finishing what it started. "Sold," I told Tom.

At home I used the spooler with DOSPLUS, NEWDOS+, LDOS, NEWDOS80 Ver. 1 and 2, DOUBLEDOS and TRSDOS. It worked with all of them in single and double density. It worked with all the different combinations of line lengths, page lengths and buffer sizes. You can also feed the paper one line at a time from the keyboard by pressing the J and K keys together. Pressing the JL keys executes one top-of-form. To abort an operation press JMN and the printer buffer clears. Older operating systems previously

unable to link printer output with video display can now do so by executing in Basic a PRINT CHR\$(255). The spooler performs well with fast and slow printers. The Spooler requires a 48K memory.

You also get three other programs:

ble with TRSDOS and NEWDOS+. Only one works with LDOS. In mode 1 you just type "ERASE file/bas file 2/cmd file 3.password, etc." It kills each file as you typed it. If an error is encountered, or the file cannot be found, it prints Not Erased

"All the programs are well documented with many examples."

Map, Cat and Erase on the same disk. They only work in single density. Map displays the disk's name, the date and the number of free grants remaining on the disk. Map also shows a detailed graph of the disk usage. It places an X where the granule is used, a period for a free granule and a hyphen for a locked-out granule. It will not show more than 40 tracks. On an 80-track system it only shows the first 40 tracks. The directory must be at the standard location (track 17). Map is invoked by typing in MAP n (n being the drive number).

Cat, short for catalog, alphabetizes your directory before displaying it on the screen. I found this useful when using single-density DOSPLUS to get rid of its directory, which is very distracting and useless if I do not need to know what size the files are. This program has the same limitations as Map, except it reads the entire directory of an 80-track drive.

Erase gives you three different modes for killing files. All three are compatible with NEWDOS80. Only two are compati-

next to the file nothing was done to and Erased next to those killed.

In mode 2 you first call up the directory and type "Erase.!" A flashing cursor appears over the first file in the directory. It can be moved using the arrow keys. To kill the file depress Enter and Clear at the same time. Pressing Break returns you to DOS Ready. In this mode you cannot call up the directory with DIR (A). Doing so might inhibit Erase from finding a file properly. Erase has the same limitations as Cat with the exception of mode I which does work in double density.

Included in the package is the source code for each file. This, I presume, is for people with knowledge of Assembly language who might want to alter them. All these programs will benefit most computerists.

All the programs are well documented with many examples. Utility Pack comes on Model I disk with versions for both Model I and Model III. On the Model III all the programs work in double density and not single density. They have filled a vast void in my software library. ■

A beautiful match, the Smartmodem and the TRS-80. Your TRS-80 can talk with other computers, over the telephone lines. And with no acoustic losses or distortions. Access time-sharing systems and information utilities such as the Source,^{*} CompuServe[†] and MicroNet.

Direct hook-up with no interference noises. The Smartmodem hooks to the telephone line just like a modular telephone, simply insert in a wall jack.

"Love at first sight" — your TRS-80 and the Smartmodem!

Brawny — because it does so many things. Auto-dial and auto-answer features built in. With the Smartmodem, your TRS-80 can automatically dial the telephone, answer the telephone, receive and transmit, and hang up the telephone. Completely unattended.

Pulse dialing or Touch-Tone. ** The Smartmodem can be connected to any telephone system in the U.S. because it allows pulse-dialing, Touch-Tone dialing or a combination of the two. FCC approved.

Program controllable in any language using ASCII character strings. This is a unique

Hayes Stack™

Microcomputer Component Systems

feature of the Hayes Smartmodem.

Brainy — because it does them all so simply. Seven LED indicators on the front panel give you visual signals of the status of the Smartmodem:

MR — Modem Ready, SD — Send Data, CD — Carrier Detected, etc.

The audio monitor feature lets you "listen in" on the call being dialed and the connection made. You are immediately alerted to busy signals, wrong numbers, etc.

Over 30 different commands can be entered directly from your TRS-80 keyboard, including the unique "Set" commands which allow you to select and change various optional parameters such as dialing speed, escape code character, length of

time for a dial tone, and number of rings to answer. There are 17 "Set" commands. *The Smartmodem is completely compatible with the Bell-103 type modems,* the type of modem most time-sharing systems have. Operation can be in full or half-duplex, with a transmission speed of 0-300 baud.

The Smartmodem is ready to "get-together" with your TRS-80.

TRS-80 Model II and TRS-80 Color Computers have RS-232 serial ports and can immediately interface with the Smartmodem. Expansions that permit use of the Smartmodem with TRS-80 Model I and Model III are available through your TRS-80 dealer.

Match your TRS-80 with a Hayes Smartmodem for a sophisticated, high performance data communication system. Available at computer stores nationwide (except TRS-80 dealers) — call or write for the location nearest you. And don't settle for anything less than Hayes.

Hayes Microcomputer Products, Inc.
5835 Peachtree Corners East,
Norcross, Georgia 30092 (404) 449-8791

 Hayes

Your TRS-80[®] computer
and the Hayes Stack[™] Smartmodem.
Beauty, Brains, and Brawn!



Scripnt

John Acres

ACR Consultants

R.R. #2, Box 229

New Palestine, IN 46163

\$27

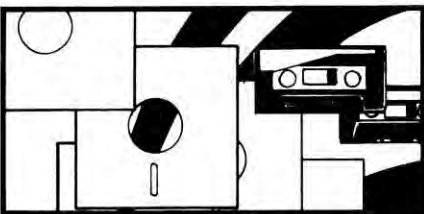
by Richard C. McGarvey

Imagine being able to sit down at your computer and enter data by simply filling in the blanks. Imagine that once filled in, you could edit that same data until it was perfect. What if you could define the field lengths, specify what type of data each field accepts and had a high speed, non-destructive cursor that you could fully control during data entry? With data input like that you could let anyone sit down, fill in data and get perfect results every time. Scripnt does all that and more.

Other programs may use a similar input technique but they do not measure up. Many input routines use flashing cursors and fill in the blank style but you can out-type the cursor. Once completed fields are inaccessible for alteration. The programs are usually tied to a sort routine that makes editing time consuming. Those programs are also usually rigid format programs that limit their use in other program applications.

With Scripnt you can set up your CRT just like a data input form and then fill in the blanks. The Scripnt utility is completely adaptable to any program use.

Scripnt is a well written utility program that allows the Basic programmer to set up his CRT into data-entry fields. The Basic programmer can store formatted data directly on the screen and then write the entire screen onto disk or tape, send it to a printer, and manipulate or use it in calculations. You can also display and edit previously entered data or display the calculated results of Scripnt input data.



Although Scripnt is written in Assembly language (source code is supplied with the documentation), the user enters it in a Basic program. This makes it easily usable by the non-machine-language programmer. The Assembly-language speed is obvious in the high-speed cursor that cannot be out-typed.

Simple PRINT@ statements build a video display. Minor instructions to Scripnt inject the cursor into the first logical field. Scripnt allows up to 80 fields on the screen at a time so you can enter a great deal of data. You can enter data into each field with complete cursor control. When

the end of data entry, returning control to the Basic program. You can reassign or ignore these control keys or you can use other control keys. Shift down arrow and any letter A-Z held at the same time can be a control. Control P, for example, turns on the printer for data output from the dis-

*"You can call John Acres . . .
if you have any trouble.
That should be enough
to help any Basic programmer
get on the right road
to proper Scripnt use."*

the data entry for the entire display is complete, the Enter key or another control key returns the program to Basic. The assigned data will be in Basic variables. From this point on, the Basic program handles the data as if it had been entered with an Input statement.

When the CRT is fielded the cursor can appear only within the data fields. If the entry clerk wants to change the order in which the fields are filled with data he must skip tab to the next field. Shift right arrow skips tab to the next logical field. The next logical field depends on your programming, but if you program right to left and top to bottom, you must skip tab one field to the right. Shift (left arrow) skips to the previous logical field. There is complete wrap for the skip-tab feature. Under non-shift conditions the arrows move the cursor either one space left, right, up or down. They *do not* destroy the data they pass over. The space bar spaces and *removes* any character in its path.

During field specification you can tell Scripnt what type of data to accept in any given field. For example, in a zip-code field you can exclude upper and lowercase letters and include only numbers. In another field you can include only alpha-characters and exclude numbers. This eliminates many common data-entry errors. You can search for punctuation, uppercase alpha, lowercase alpha and numerical entry in any combination. The program ignores all keystrokes that are not specified as acceptable.

Enter, Break and Clear keys are normal control keys. Clear clears all of the data in the fields without clearing the entire screen. Break breaks and Enter signals

play to the printer.

Documentation

John Acres has documented Scripnt well. There are thorough instructions on using Scripnt. Two sample programs show Scripnt at work. He then breaks down the programs (listings are provided) and explains how the important features of the program relate to Scripnt. Two utility programs aid data storage and recovery. You can use these utilities with Scripnt or without it in non-Scripnt programs. A complete source code with comments is provided. Flowcharts document the program's operation. These are seldom seen in program documentation.

There are some problems. The documentation does not lead you by the hand through Scripnt's operation. Some unclear points may cause trouble for an inexperienced Basic programmer on his initial excursion into Scripnt.

You can call John Acres (the documentation includes his phone number) if you have any trouble. That should be enough to help any Basic programmer get on the right road to proper Scripnt use.

As with most software, ACR Consultants offer Scripnt on an "as is" basis. The producer accepts no liability for damage caused by the program's operation or failure. Unlike most software, ACR Consultants offers a 10-day money-back satisfaction guarantee. If you do not like Scripnt or if you cannot use it, you can get your money back.

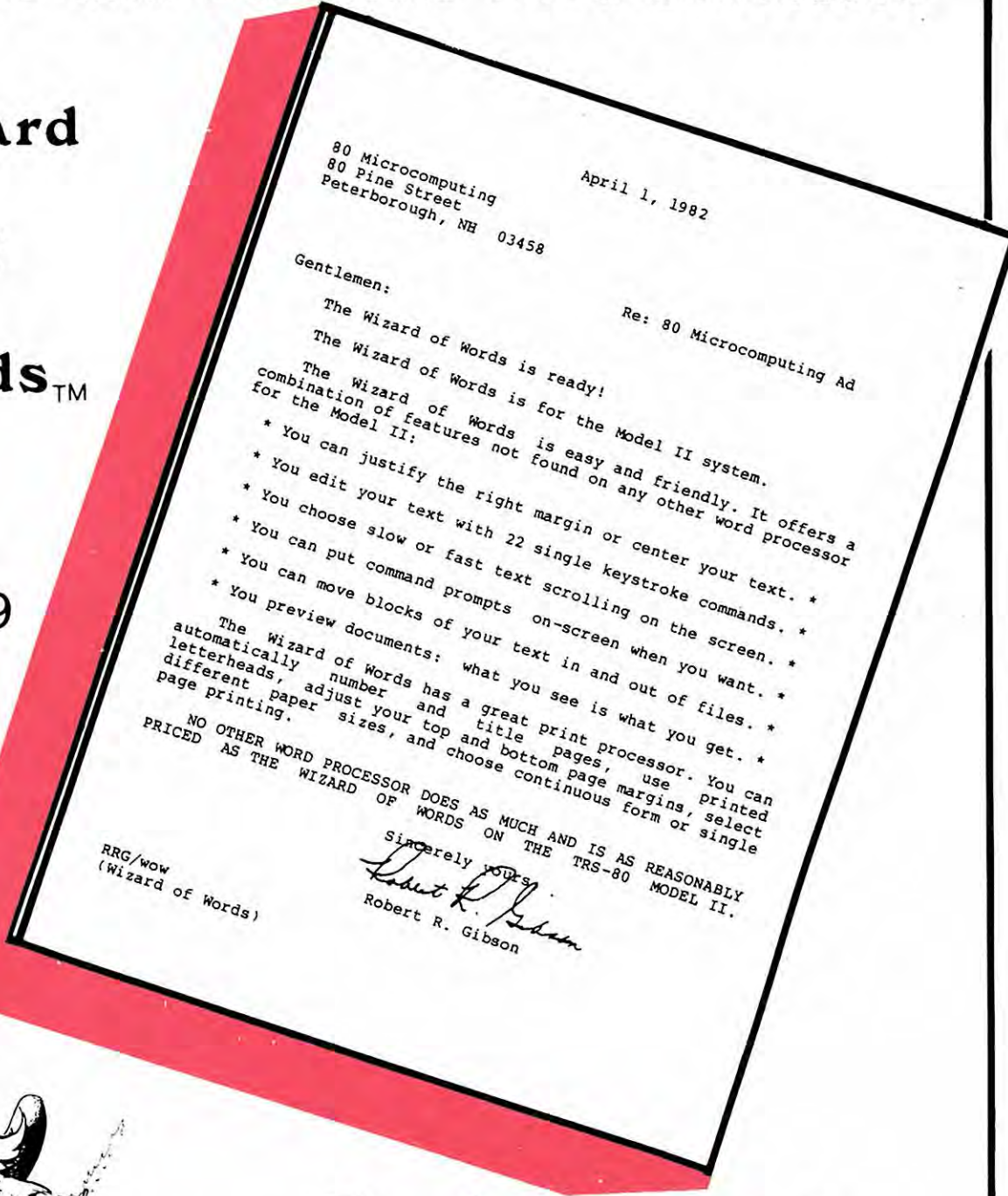
Scripnt is useful if you want to write or update any data collection program, whether it be a mail list, business accounts, recipes, or even hobby data. ■

MODEL II

Business and Personal Word Processor

Wizard
of
Words™

\$259



G · A · P inc.
727 Terminal Bldg.
Lincoln, NE 68508
(402) 476 - 7202

520

Parsector 8

Ants

Space Ace 21

New Starship Battles

Synergistic Solar Inc.

P.O. Box 560595

Miami, FL 33156

\$14.95-\$19.95 cassette

by W.D. Ives

Synergistic Solar has finally answered my pleas and made their software disk-compatible. No matter how good a game is, I am not likely to play it more than a couple of times if I have to struggle through a CLOAD every time I want to relax with a game. I will not buy software, not matter how tempting the ads, unless I know that I can transfer it to a disk after a successful CLOAD.

New Starship Voyages

The weakest offering of the lot, and the only one I cannot recommend, is yet another trek game called New Starship Voyages. This is a fairly good Trek program, but it has been done before, many times, many ways. All of the old standard features are here: one supership with an inexhaustible energy supply blowing away dozens of enemy ships ranging in strength from pitiful to wimpy; a base where what little damage one might suffer can be repaired; a battle computer to make sure you never miss when you fire; a magical device called a "scanner" which infallibly locates every enemy ship in the whole galaxy for you; and so forth.

These ideas are incredibly stale. Synergistic Solar added a few new twists to NSV: Each of the 16 commands, for instance, takes up a different amount of time from the amount you are allotted for each turn.

If you are waiting for someone to do something new and original with the 10-year-old bare bones of Trek games, you will have to wait a little longer. As I said, I cannot recommend this game. If you get a chance to pick it up as a freebie on another order, do so, but otherwise, let it slide.

Ants

In the war-gaming industry someone will inevitably write in and say, "Wouldn't it be neat to have a war game between two colonies of ants?" There are very sound reasons why it would not be very neat, and I will point them out as I discuss the game, Ants.

Brian Rodolante of Miami did it. Ants pits (you guessed it) the Red Ants against the Black Ants. Now, the first problem

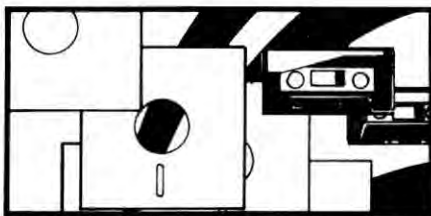
with a game about an ant war is that it is a silly topic; and a silly topic starts off with an awful burden of proof because all games have to trick the player into taking the situation seriously enough to care who wins. It is a testament to the programmer's skills that when I loaded Ants just to make sure of my facts I ended up frittering

"Ants ranks high on the 'mindless entertainment' scale."

away all of yesterday afternoon and two hours today—and that, mind you, on a "silly" game.

The second problem with a game about an ant war is that ants are, after all, insects, and insects are not what one would call masters of the art of war. Strategy to an ant colony consists of finding another colony. Tactics are when ants from the attacking colony walk up to ants from the other colony and try to eat them. Further, if you are going to call them ants, then you can not diddle too much with reality that is, if they are ants, then you, as the leader of the colony, must be limited to making only very basic decisions which only indirectly affect the ongoing conflict. Thus, if you are the queen of the colony, a game would be less than honest if it allowed you any real control over your soldiers and workers on the actual field of battle.

Why did I spend eight hours playing this silly game? Well it is a visually entertaining game. There are eight distinct types of ants (two sides each having



drones, workers, soldiers and guards) in addition to the immobile queens. The mobile ants scurry about on the screen in a charming, and really quite apt, parody of the way real ants move. The sound effects are helpful, too: rapid-fire beeps when the ants move, and lots of zots and fweeps and other noises when anything interesting happens. The game allows six speed settings, ranging from one, where the ac-

tion is so fast it is over before you know it is started, to six, which is the only speed which allows mere mortals to keep track of what is happening on the screen.

The fast speed settings cause the game's action to resemble a berserk version of high-speed Life more than anything else. By the time you look at the screen, things are vastly different and you have to interpret what happened. At all speeds, though, the game remains entertaining. Ants ranks high on the "mindless entertainment" scale, being a game that you will not have to take notes for, that you can expect to finish in 10 minutes, and that stays busy.

But there is more to Ants than entertains the eye. The only command decision that the player in this game gets to make is the type of ant to produce in a given turn. But that is the secret to this game's ability to keep me interested. Once produced, the ants scamper out onto the field, moving either glacially (the guards) or like lightning (the workers), in response to a randomizer that moves the critters in the general direction of the other side of the screen.

If an ant comes up against an enemy, he will attack the enemy if one of his moves directs him into the location occupied by the enemy and one of the combatants will die. In general, stronger ants (like guards and drones) will kill weaker ants (like soldiers and workers), but not always.

You can win two ways: either by getting a bunch of your ants off of your opponent's edge of the screen (which is a task best fitted for the speedy workers, who can zip around the other colony's flanks) or stinging the enemy queen (which means a drive up the middle, work for the plodding, but powerful, guards or the even stronger, but defenseless, drones), and each method requires a different mix of forces.

The challenge of this game is in the selection of the proper force both to counter your opponent and to achieve your own ends. Aside from this decision, the player has no control over the game. Surprisingly, rather than being a source of irritation, this limitation allows the players to sit back and enjoy the graphics and make extensive production plans.

I must also point out some serious deficiencies in the game. First, there are eight different types of ants displayed on the screen, and TRS-80 graphics/letters combinations are really not up to the task. The display is highly confusing at first, so much so as to be completely meaningless to someone new to the game. It was an admirable try, but the game cries for color.

You can get used to it after a few games, though towards the end of the game, when the screen is crowded with ants, the display often lapses into incomprehensibility.

Second, even at the slowest speeds, the game moves too fast. When watching the game, the players never know which ant is going to move next (though there is a rough order to their movement), and by the time you have spotted the one that is going to move, it is already finished. It has also already finished any attacking or defending. A major attack may dissolve without the player ever seeing it disappear.

Finally, this game uses a lot of machine-language subroutines, so the user has to be very careful having other routines in conflict with the ants routines. (The NEWDOS Version 2 Clock function sometimes causes Ants to wander off into the ozone.)

Space Ace 21

Space Ace 21 is an entirely different type of game from Ants. Space Ace 21 is an accurate, complex simulation of ship-to-ship space combat, and definitely not an arcade game.

War-gamers will recognize the three-dimensional movement/display system used in this game as being very similar to the system used in a popular game from Simulations Publications a few years ago called *Battlefleet Mars* and later used in several other games. Space Ace 21, though, has a great deal to offer beyond the old cardboard and paper games.

Space Ace 21 is not a simple game: Without a computer to keep track of the minutiae, I expect that it would be impossible. With the computer, though, the game is quite entertaining—especially if you are looking for a simulation, rather than a game.

"Space Ace 21 is an accurate, complex simulation of ship-to-ship space combat."

The first order of business in SA21 is ship design. Your spaceship is designed on a 3 by 7 grid. Each space can be filled by one of 12 different types of structure: armor to shield adjacent modules; distributors for close-range work; engines; fuel tanks; missile pods, torpedo launchers, and phasers for long-range combat; sensors to improve one's accuracy; cargo; and several required modules. Bridge,

generator and life support modules must be part of every ship's design.

Ship design is a game in itself: You are asked what to place in each area on the grid, and when you decide, the program draws the selected element in the specified location. Thus, not only do you have a theoretical knowledge of how your spaceship is designed, you also see it. The players can experiment with different ship designs, building multi-engine ships with no armor but ferocious acceleration capability; or slow, super-strong tortoises that never get anywhere, but can blast any ship they meet, or anything in between. Even if this game did not perform well in its other areas I would enjoy it for the ship-building alone.

The only problem with the ship-building routines is that they are unforgiving: If you blow your design, there is no going back and fixing things—you have to restart the program. I recommend that new players sketch out their planned designs on a piece of paper before entering the designs in the program. The graphics can be quite confusing until you learn the difference in appearance between a disruptor pod and a missile launcher. I found myself, when I was just learning the game, continually forgetting what I had specified for the earlier pods and unable to figure out what the graphics meant.

The game is played in 10-second turns and is, I repeat, a simulation. Movement is strictly Newtonian—once your ship starts moving at a set speed and in a particular direction, it will continue to move that way until you do something to change its movement. One of the easiest mistakes to make in this simulation is to build up so much speed that you can not brake fast enough and zip past your opponent.

If you want to change your heading, you

must apply thrust to turn your ship in the desired direction—and remember, your velocity from previous turns will not go away. For a neophyte, just getting an opponent's ship within decent disruptor range is an accomplishment to be proud of—for that matter, just not to run out of fuel before getting back to base is somewhat of an accomplishment.

The map of the action is actually a pair

of maps, one showing the two ships in the X-Y plane, and another showing them in the X-Z plane. When seen together, the

"Ship design is a game in itself."

displays provide an easy visualization of the three-dimensional battle area. The scale of the displays is constantly changed to keep the ships distinct from one another.

There are four types of commands: status reports, which will give you a numerical readout on the status of your ship; maneuvers, where you specify any direction changes to be made in the upcoming turn; speed changes, where you decide how much fuel to burn in your maneuvers; and weapons, where you blast the other guy.

The combat is just as much fun as the ship design because your beautiful spaceship is now shot full of holes! Whenever your ship is hit by the enemy's weapons, the program determines how much damage is done to the ship, and pokes holes in your ship's diagram to indicate where and how seriously you have been hit. It is much more meaningful to watch your ship get ripped to shreds by a lucky hit than it is to read some message like "engines down to 70 percent effectiveness." And it is a great deal more fulfilling to watch your own deadly salvos rip great chunks from your enemy's ship. The displays correspond exactly to the simulated reality, also each bit of damage to your ship affects its abilities in some incremental way: reducing acceleration, damage done to your enemy, fuel carried, etc.

Space Ace 21 is a very good game and an excellent simulation. It is one of the best computerized war-games I have seen. I strongly recommend it.

Parsector 8 and 5

Parsector 8 is Synergistic Solar's best game. It is a spacewar game intended for two players, though Parsector 5 has a computer opponent.

The game comes with a sheet of instructions and a template for making a screen divider, which splits the screen in two and allows each player to see only his half of the screen. This secrecy is the reason that Parsector 5 and 8 are such good games.

Computers will be the savior of realistic simulations, as can be seen in Parsector.

Your forces in Parsector are hidden from enemy sight, as are the opponent's actions, though some of these can be interpreted. The action in Parsector is simultaneous, except in a few isolated and unimportant cases, so the game has an overall feel of grand strategy.

Parsector is played in a flat universe of anywhere from two to eight units on a side. Each player controls a mothership. The mothership launches bases, cruisers and flyers which either solidify ownership of an area (in the case of bases) or move independently of the mothership in search of enemy units (in the case of the cruisers and flyers) to fight. In addition, the mothership can fight, launching weapon

bolts either singly or in spreads to destroy enemy ships or bases. Finally, the mothership can move throughout the flat universe, trying to destroy as many enemy bases as possible while leaving as many friendly bases as possible, and more importantly, trying to leave friendly forces in locations and concentrations that will block or slow down enemy attacks.

The trick, of course, is to find the enemy's bases and destroy them while protecting your own. Neither player in a game of Parsector has any idea, initially, of where the enemy is located, or what parsectors are under his control. When a combat turn is completed and your status display reveals that you have lost one par-

sector and two bases, you know that this indicates an enemy attack, but you do not know where! All of this leads to a very stimulating game as the players try to find and attack each other while protecting their own forces.

Parsector is Synergistic Solar's best game, but I must qualify this support. Space Ace 21 is actually a much better design, and a much more realistic game—and it is the best simulation that I have seen to date. However, Space Ace is not an easy game to play. You have to do a lot of hard thinking to win at it. Parsector, while not nearly as good a simulation, is a better game because the players can sit back and relax. ■

Profile II, Profile Plus
Tandy/Radio Shack
Forth Worth, TX
Model II
\$179, \$299 disk

by Craig Hilton

A data base manager (DBM) is a program that allows the user to easily manipulate a collection of data. Most programs only manipulate input data within program parameters. A DBM manipulates data by literally writing a program in either compiled code or Assembly language. We tell the DBM what type of data we want manipulated and in what form, the DBM tells the computer how to go about doing it.

This saves thousands of hours learning to write bug free in Assembly language. It saves us from buying new programs each time our needs change. It lets us concentrate on what we want the computer to do, not so much on how to get the computer to do it.

The ability to develop ideas into useable programs depends on the sophistication of the DBM and the user. Data base manager programs run the gamut of sophistication. The simplest DBM may function as a cross-reference. Increased sophistication can integrate a filing operation with mathematical functions, word processing and subprogram integration.

DBM's benchmark features usually include allowing the user to create guidelines for entering data and customizing the input format. It provides powerful editing capabilities for updating, changing or deleting data coupled with search/sort capabilities. Mathematical computations on

Table 1. Benchmark Comparison

BENCHMARK	Profile II	Profile +
DOCUMENTATION		
What is the level of user sophistication?	beginner	competent
Quality of supporting documentation	sufficient (lacks index)	poor
EASE OF USE		
General use of entire DBM	good	excellent
Editing a file	good	excellent
Creating a file	good	excellent
Screen/Report customization	excellent	excellent
MATHEMATICS		
Mathematical capabilities included	limited (+, -)	yes (standard arithmetic)
CREATION OF THE FILE		
Can fields be altered once created	no	yes
Can one file access another	no	yes
How large is key field	85 characters	85 characters
How many blocks can be chained together into 1 record	3 + key field	3 + key field
Number of data field types	6 (alphanumeric, numeric, protected, + and -)	15 (all as previous + date fields (2), last update fields must fill fields (5))
Maximum number of records possible (key field only) . .	20,000 (with 4 drives)	20,000 (with 4 drives)
Maximum number of records possible (with 500 characters per record)	1800 (with 4 drives)	2400 (with 4 drives)
Can parts of a block be used in chaining together 1 record (selectable record length)	no	yes
EDITING OF THE FILE		
Can one file update other files	no	no
Can groups of records be altered or updated with a single command	no	no
High speed file index capabilities	no	yes
Number of screen/report formats available to a file	4 screen/5 report	4 screen/5 report
SORTING/SEARCHING OF THE FILE		
Number of layered sort levels possible	0	0
Can associated fields be clustered into search groups	no	yes
Maximum sort length	30,000 characters	30,000 characters
Maximum number of sort criteria	36 fields	36 fields
Number of sort comparison criteria	5 (GT,LT,GE,LE,Range)	5 (GT,LT,GE,LE,Range)

Table continues

MISSION: TO DEFEND... AND SURVIVE!



by Jeff Zinn

Now Available: the Futuristic

TRISSTICK

Model 1 AND Model 3 owners may now purchase the new, exciting, and versatile "TRISSTICK". The TRISSTICK is compatible with all of our games and comes packaged with complete instructions for use with your own programs. It features the famous Atari joystick with a molded plastic interface module that simply "plugs in" to your computer: no modification or wiring is required.



BIG FIVE SOFTWARE

P.O. Box 9078-185 · Van Nuys, CA 91409 · (213) 782-6861

Prices per game: TRS-80 16K Lev2 Mod1 / Mod3 Cassette — \$15.95
TRS-80 32K Lev2 Mod1 / Mod3 Diskette — \$19.95
Joystick (specify Mod1 or Mod3) — \$39.95
10% discount for 2 items ordered, 15% for 3 or more.
Please add \$1.75 per order for shipping, foreign orders add \$6.00.
California residents please add 6% sales tax.

All products ©1982 by Big Five Software.
Programs are all 100% machine language for high quality graphics. Disk version saves high scores to disk & is compatible with TRSDOS. Sound effects are playable through the cassette AUX plug. Please call or write for information on all of our products. TRS-80 & TRSDOS are trademarks of Tandy Corp.

entered data are often made automatically, as are merge functions and high speed indexing. Many systems allow the input of data from unrelated programs and interaction between various files within the system. A sophisticated reporting option lets the user specify (or customize) what type of reports are needed, how they should look and from what data source. Reports can include labels, statements and letters. All DBMs don't have all these functions. That is why we are comparing two systems against these benchmark functions.

The first DBM, Profile II, is simple and comparatively inexpensive. The second, Profile Plus, is the improved version of the first. It is more expensive and more capable. For the average user they offer the features and price to make it an excellent starter system.

Profile II

Profile II functions more as a reliable filing cabinet with cross references. The

"... Profile II is simple and comparatively inexpensive."

Table continued

REPORTING OF THE FILE

Is there a screen report option	no	no
Are subtotals generated on reports	no	no
Is there a label generator option	yes	yes
	(6-99 lines)	(1-8 lines)
What types of reports are available	columnar (single line)	columnar (single line) columnar (double line) summary reports

GENERAL FEATURES

Can non-DBM program data be accessed or tied in.	no	no
Can non-DBM programs be run in conjunction with DBM programs	no	yes
Is the system upward expandable to fixed disk	no	no
Is there a built-in word processor	no	no
	(can interface with Scriptit II)	(can interface with Scriptit II)
Does it support single sheet feed for word processor printers	no	yes

SPEED

Time to allocate 1 block of 1000 records	excellent	excellent
	1 min 20 sec	1 min 5 sec
Time to sort 1000 records on 2 sort criteria	excellent	excellent
	35 sec	31 sec

OVERALL

Cost of program per 1000 records of 1 block length	\$110.	\$132.
Overall evaluation (% of all possible total points)	30%	59%

system is lacking in many areas. The first-time user should purchase the auxiliary manual with cassette tape explanations along with the program. Serious first-time users should consider the Profile Plus additions as being worth the extra \$220.

Profile Plus

Actually this is an add-on package to Profile II, providing some of the features

needed to move Profile II into the true DBM class. The system is well priced. Profile Plus may be the least expensive DBM in its class. The system works quickly. With a few additions it could be a first-class system.

It needs a better documentation package. It also lacks a layered sort capability, subtotal options and tie-in capabilities to non-DBM file data. ■

Star Warrior
Automated Simulations
P.O. Box 4247
Mountain View, CA 94040
\$39.95 disk or cassette

by Dan Cataldo

Star Warrior transforms you into one of the Furies, paid agents of justice and revenge. The oppressed inhabitants of the planet Fornax hired you to free them from the government of the Stellar Union.

The game consists of two scenarios. In the first scenario you have been dropped with one of your fellow Furies onto the surface of Fornax. Your partner's mission is to move south and kill the Governor. To create a diversion, you move north creating destruction and mayhem. You want to be seen and shot at (Furies being either exceedingly brave or incredibly stupid). You select your combat suit, the number

of minutes the scenario will last and level of difficulty. There are five levels.

The second scenario reverses the roles. Your mission must be accomplished as quickly as possible. Find the Governor, kill him and escape. The Governor can move around; his forces will shoot you on sight. There is no time limit to this scenario, but you lose points if you take more than 20 minutes.

Each scenario takes place in an area 7 by 9 kilometers, divided into squares one kilometer on the side. Your monitor displays one square at a time. There are four types of terrain: plains, swamps, mountains and forests. The terrain maps for the two scenarios are completely different.

In Star Warrior plains are represented by a blank monitor screen. The swamps, mountains and forests are represented by randomly scattered symbols. The graphic representation of the Furies is an improvement over other Automated Simulations

programs, such as Morloc's Tower.

Each of the Furies' powered armor suits has different characteristics: flight speed, armor strength, shield strength, invulnerability, decoys, size of blaster and power-gun and number of missiles and blaster charges. Disk version users can build a custom suit. Cassette users can do almost as well by making the appropriate adjustments to the data lines of the program.

The enemy has many different types of weapons: robot tanks, nitron guns, maulers, flitters and infantry. They are all deadly.

The handbook is well designed and easy to understand.

Star Warriors uses a varied assortment of chirps, whines and other interesting noises. If you choose not to use sound the game proceeds much too quickly.

The price seems a bit steep. If you can afford it Star Warrior is a very fine program. ■

HAPPINESS IS...NEWSCRIPT™

THE WORD PROCESSOR FOR BUSINESSMEN AND PROFESSIONALS

We offer you ongoing support by answering your questions and providing reasonably priced enhancements.

A FEW OF NEWSSCRIPT'S STANDARD FEATURES:

- *Form Letters with merging of names and addresses
- *Gives superb appearance to your final documents
- *Comprehensive manual with hundreds of examples
- *Centering, top/bottom titles, indents, pagination
- *Underlining, boldface, double-width, italics†
- *Sub-scripts, super-scripts, proportional pitch †
- *Generates Table of Contents, sorted Index
- *Allows block graphics, special symbols †
- *Search and replace globally or within a range
- *Block move, copy, delete, insert from other file
- *AUTOSAVE, WHOOPS, DIRECTORY, KILL, REPEAT
- *Based on IBM's "EDGAR" and "SCRIPT" systems
- *Supplied ready-to-run on "tiny" DOSPLUS
- *Easily transferred to NEWDOS, NEWDOS/80, LDOS, TRSDOS
- *Includes handy Quick Reference Card

NEWSSCRIPT CONTROLS THESE PRINTERS:

- *EPSON MX-80, MX-100: all 12 fonts, plus underlining and block graphics; italics with GRAFTRAX
- *Centronics 737, 739; Radio Shack L.P. IV, L.P. VIII, Prowriter, Daisy Wheel II, NEC PC-8023A, TEC 8500R, C.I.TOH 8510: Right-justified true proportional printing
- *Good support for: Diablo, Spinwriter, Starwriter, QUME, Microline, Anadex, modified Selectric, standard line printers

NOW AVAILABLE: right-justified true proportional support for Diablo, Spinwriter, Starwriter, and Qume (DaisyWheel Option)**

TYPICAL USER AND REVIEWER COMMENTS:

"There is a new word processor on the market that will change the way people think about the capabilities of the TRS-80. Imagine a powerful mainframe text editor running on a TRS-80, with virtual compatibility between the two versions...on-going support second to none, with superb documentation." (Jim Klaproth, 80-U.S. JOURNAL February, 1982)

the manual:

"It definitely rates the first '10' given to any documentation reviewed in this column." (A.A. Wicks, COMPUTRONICS, October, 1981)

the software: "An excellent Word Processor" (D.H.); "Absolutely fantastic" (S.E.S.); "You have features that I cannot duplicate on my \$14,000 system" (J.B.)

the support: "Your phone information system and the prompt and courteous staff that you provide to help your clients...are worth the cost of the system." (V.H.H.)

REQUIRED CONFIGURATION: 48K TRS-80 with one disk drive. Specify Model I or Model III.

† Some features work only if your printer has the mechanical capability.

** DaisyWheel proportional is extra-cost option.

TO ORDER, CALL NOW, TOLL-FREE:

(800) 824-7888, Operator 422
 CALIF: (800) 852-7777, Oper. 422
 ALASKA/HAWAII: (800) 824-7919
 FOR TECHNICAL INFORMATION CALL:
 (213) 764-3131, or write to us.

Order from your Software dealer, or from:

PROSOFT™ ✓91

DEPT. C, BOX 560 • NO. HOLLYWOOD, CA 91603



NEWSSCRIPT 7.0:	\$124.95
MAILING LABELS OPTION:	29.95
Special: NEWSSCRIPT + LABELS:	115.00
Daisywheel Proportional Option:	49.95
"PENCIL" / "SCRIPTSIT"	
File Convertor:	14.95
Manual Only (180 pages):	30.00
Reference Card Only:	2.50
Electric Webster + Correction Feature:	149.50
Graphics Editor and Programmer:	45.95
DOSPLUS 3.4:	149.95

TERMS: We accept VISA, Mastercard, checks, Money Orders, C.O.D. and even cash. We pay shipping via surface UPS inside U.S.A. Please add \$3.00 for Blue Label, 6% tax in California, and 15% outside North America (air shipment).

Refware Thesaurus

David C. Whitney

David C. Whitney Associates Inc.

P.O. Box 451

Chappaqua, NY 10514

Models I or III, 48K, two disk drives

Builder: \$149.95

Nouns and adjectives: \$39.95 each

User's Manuals for nouns, adjectives and builder: \$9.95

by John P. Mello Jr.

80 Microcomputing staff

Put a thesaurus on disk and save yourself some thumb wear. At first blush, it seems like an unimpeachable idea. But unfortunately, it is an idea that lives and dies by its host—the microcomputer.

If—as David C. Whitney, quoting an English lexicographer, observes in his introduction—the strength of Roget's tome is also its chief weakness, then the same is true of the Refware Thesaurus.

This thesaurus consists of three 5.25-inch disks, one consisting of nouns, one of adjectives, and one a builder allowing you to create a specialized thesaurus of up to 6,200 words. Each disk is sold separately. According to Marketing Director Robin Vaughn, verbs and adverbs are in the prototype stage along with a Model II version of the thesaurus.

All three programs are very easy to use, so much so the three user's manuals seem almost superfluous.

*“All three programs are
very easy to use, . . .
the three user's manuals
seem almost superfluous.”*

After booting up your disk operating system, loading Disk Basic and running the program, a series of “billboards” appear on the screen. One defines nouns or adjectives. Another suggests you can use the thesaurus to find hard-to-spell words: Think of a synonym for the hard-to-spell word and have the thesaurus list synonyms for the synonym. The hard-to-spell word, properly spelled, should be in the list.

The thesaurus lists on your monitor or prints a list of 10 synonyms. However, unlike a conventional thesaurus, it also inserts the synonyms for the word you want replaced in your sentence. In the sentence “The terms of the agreement were not

disclosed,” the thesaurus printed:

The terms of the conclusion were not disclosed.

The terms of the harmony were not disclosed.

The terms of the concord were not disclosed.

The terms of the treaty were not disclosed.

The terms of the pact were not disclosed.

The terms of the concordance were not disclosed.

The terms of the accord were not disclosed.

The terms of the assent were not disclosed.

The terms of the consent were not disclosed.

After you compile your first synonym set, the thesaurus asks if it should find a different group of alternate words for your noun or adjective. If you reply positively, the thesaurus determines if it has such a group and if so, either prints or lists the set.

All this is done very fast; faster than a search through a conventional thesaurus, if you find a suitable word in the first group the Refware Thesaurus gives you. Chances are, however, you won't. Here's why:

Take the word *agreement*. A conventional thesaurus lists 13 synonym categories. Most times, you can immediately spot the category closest to the meaning of the word you are looking for. With the Refware work, the computer chooses the category. If it isn't the correct one, you must request another group of words. This adds to the time it takes to find a synonym in the microcomputer thesaurus. Also, you never know if there is another synonym set, so every time you call up one set, you must call up another to see if it is there and if it is there, to see if

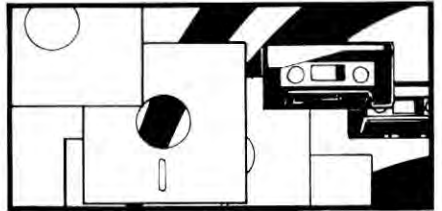
there is a more suitable word on it.

While the microcomputer thesaurus is initially faster than finding a word manually, it oftentimes seems like it is taking longer because you spent time waiting, while time spent thumbing through a conventional thesaurus is time spent doing.

The microcomputer thesaurus, because of disk space considerations, excludes words with more than 12 letters. It contains 6,200 nouns and the same number of adjectives. This is a significant limitation when you consider the fourth edition of Roget's book, published by Harper and Row in 1977, contains 250,000 words.

Another limitation of the microcom-

puter thesaurus is it can't be accessed while you are in a word-processing program. If you are composing with a word processor and need a synonym for a word, you have to break out of the word processor, load Disk Basic, load the thesaurus, find a synonym, break out of Disk Basic, reload the word-processing program, call up the file you were working on and insert the word you were looking for. A cumbersome process to say the least.



The eight utility programs in the nouns and adjectives thesaurus are sold separately as a builder enabling you to construct a reference work and possibly make some extra cash. Thesaurus author Whitney, who has edited the *World Book Encyclopedia*, *Encyclopedia Americana*, *Reader's Digest Almanac* and *Yearbook* said in the user's manuals for the three programs:

“Any user of the Refware Thesaurus Builder who constructs a comprehensive specialized thesaurus that may be useful to others in a given field or profession should send a copy to the Refware division so that it can be evaluated. If the user's specialized thesaurus is judged to be commercially viable, the Refware division will undertake to market it with royalties paid to its author.”

The builder lets you enter synonyms in groups of 10 (“dummy” is used to reserve spaces in blocks with less than 10 words). It also allows listing or printing the blocks or all the words in your thesaurus in alphabetical order. The builder is a tremendous boon for someone preparing a thesaurus, but after it is prepared, the author must face the difficulties accompanying the thesaurus' brethren, nouns and adjectives.

Whitney noted in the user manuals for the Refware works, “With the ever-expanding memory size and storage capacities of microcomputers, it seems likely that massive printed reference works like a (Roget's) thesaurus, will soon go the way of the dinosaur.” After viewing the Refware programs, Roget's heirs needn't sweat over loss of royalties. . . not for awhile yet. ■

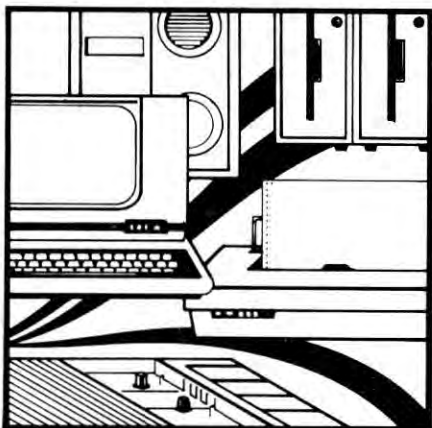
Floppy Disk Controller
 A.M. Electronics
 3366 Washtenaw Ave.
 Ann Arbor, MI 48104
 \$400

by John Ratzlaff

The popularity of the Model III has been accompanied by a veritable host of companies supplying after-market equipment, including disk drives and controllers. These typically offer several advantages over the Radio Shack-installed drives, including lower price and greater flexibility. Most of the available controller kits support double-sided drives.

The A.M. Electronics Floppy Disk Controller Board kit includes the controller board and all mounting hardware, cables and power supply, but not the disk drives. I chose two Tandon double-sided, 40-track drives, without case or power supply. I also purchased DOSPLUS 3.3 from Micro Systems Software. The total cost for my disk system came to about \$1,170.

The installation instructions were thorough and easy to follow. The exceptions were minor. A few nuts and bolts for mounting the controller board were missing and the description of the controller board power supply cable did not match the cable I found. I determined the proper orientation by referring to the pin numbers. There were no traces to cut and no soldering was necessary. I was impressed with the way the kit fit perfectly into the Radio Shack design. The most difficult operation was breaking out the plastic face-plates that cover the disk drive openings in the computer housing.



The disk drives must be configured to the system. I called A.M. Electronics and was told to remove the terminating resistor packs from both drives and break certain DIP jumper connections on the

"I BOUGHT IT"
"My biggest loss
of programming
time using
Snappware's
EXTENDED BASIC
is spent
inserting
my diskette."

SCOTT ADAMS - PRES. OF ADVENTURE INTL.



Reduce your programming time significantly with Snappware's EXTENDED BASIC. The program is written entirely in machine language for super fast execution and is fully integrated into the TRSDOS* BASIC interpreter, requiring no user memory. Here are just some of the ways EXTENDED BASIC can make your programming task easier:

- Quick way to recover BASIC program following a New, System or Accidental re-boot.
- Single character abbreviations for the most frequently used commands.
- Six single key stroke commands to list the first, last, previous, next or current program line. Even edit current line.
- A powerful cross-reference facility with output to display and/or printer.
- Ability to trace a variable through the code.
- Determine easily if a variable is in use.
- Permits programmer to display and/or print the value of any or all program variables.
- Identifies the variable type for all variables.
- Lists each element of any array separately.
- Program line renumbering facilities allowing for specification of an upper limit of the block of lines to be renumbered, relocation of renumbered blocks of code and duplication of blocks of code.
- Cross reference facility for key words and character strings including global replacement of key words.
- Compresses your BASIC program to an absolute minimum by removing extraneous information.
- Merge lines.
- Deletes statements that could not be executed.

If you consider your programming time to be worth money, call us and let us show you how to get more of it.

MODEL II \$200.00
 MODEL III \$125.00

*TRSDOS™ Tandy Corporation



Time saving power
at your fingertips.

CALL TOLL FREE:

1-800-543-4628

OHIO RESIDENTS CALL
 COLLECT: (513) 891-4496

3719 Mantell
 Cinti., Ohio 45236



drives. Which connections to break will differ with different drives. Photo 1 is the completed installation before putting the computer back together.

After installation, I booted the system up and it worked! However, upon at-

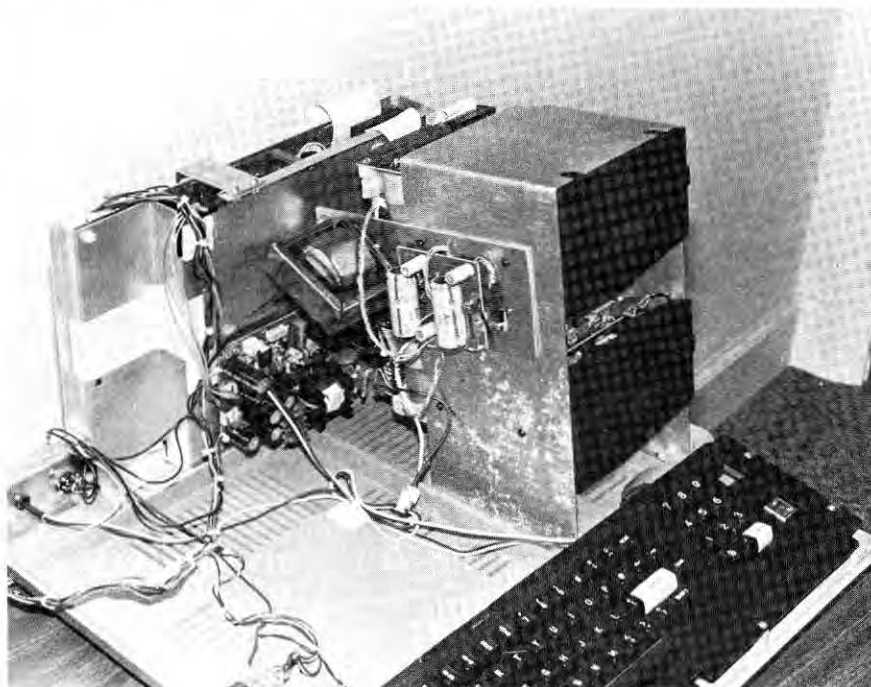
tempting a backup I ran into trouble—DOSPLUS declared about half the tracks on the disk flawed and rejected the backup. At this point I learned one of the disadvantages of assembling your own system from various suppliers: If

something goes wrong, it may be difficult to determine which part is faulty. I ruled out disk failure because it rejected the same tracks every time, even with high-quality disks. I ruled out DOSPLUS failure as TRSDOS did the same thing. I called A.M. Electronics and was told it was probably a faulty controller board.

With the new board installed the system worked perfectly. It was particularly gratifying to be able to ask for DIR:0B (back-side of drive zero). I now have the equivalent of *four* disk drives with a capacity of roughly 720K bytes.

The A.M. controller kit is compatible with all existing Model III DOSs, although TRSDOS will not support the double-sided capability. DOSPLUS was chosen for this reason.

I highly recommend the A.M. Electronics controller kit, along with double-sided drives and DOSPLUS as a reliable, easy-to-assemble, large-capacity system. It must be mentioned, however, that there is a substantial trade-off: Radio Shack will not service, much less honor the warranty on a system with an after-market disk controller and drives installed. If something goes wrong, the unit must be disassembled and the disk system removed before Radio Shack will service the computer. It is easier to find a non-Radio Shack repair facility when servicing is needed. This is an acceptable price to pay for the increased flexibility and lower system cost. ■



A.M. Disk Controller Installed.

IDS 460 printer
Integral Data Systems
Milford, NH 03055
\$1,095

by Dennis J. Wilkins

I now own my third line printer. I use my system for word processing and to print business forms and engineering reports. It took only a few months to realize my first printer was not up to the task.

I looked at new product releases in several magazines and became interested in Integral Data Systems model 440 printer, dubbed the Paper Tiger. I sold my original printer and purchased a 440.

The IDS 440 had a number of good points. Its lowercase was quite legible, though not great. It was considerably faster than my first printer and had more intelligent functions, including auto page feed and out-of-paper sensing. It could print eight different column widths on an 8-1/2-inch wide sheet of paper. I was very

happy with my 440, until I saw a sample printout from the new IDS 460.

I bought the new Paper Tiger in January, 1981. It plugged into the 440 cable and worked on the first try. The type style is nearly as good as a typewriter.

The IDS 460 is a microprocessor-controlled, bi-directional, dot-matrix line printer, available with a 2K character buffer and raster scan graphics option at \$1,095 list. It has a nine-wire ballistic printhead with true descenders. It handles paper widths from 1.5 to 9.5 inches (tractor feed only—an optional single-sheet feeder is available for 8-1/2 by 11-inch paper).

The IDS 460 can underline text with a solid line. The paper can be moved under software control, allowing subscripts, superscripts, or equations to be printed. Up to eight vertical tabs can be programmed. Vertical movement can be controlled to the nearest 1/48th of an inch.

The user controls the margins, tabs and intercharacter spacing. Character widths are available in 4.8, 5.8, 8, 10, 12 and 16.5 characters per inch.

The 460 has constant pitch and proportional spacing modes for all character widths. Fig. 1 shows examples of type size, margin control and proportional spacing. The proportional spacing mode prints letters with a constant space between the end of one letter and the beginning of the next, rather than at a fixed spacing from center to center. Proportionally spaced type looks more pleasing than constant pitch.

The 460 also has form features. Page length can be set at power-up to one of eight lengths. Under software control, the page margins, top, bottom, left and right can be set in increments of 1/48 inch vertically and 1/20 inch horizontally. Line spacing can be set at power-up to six or eight lines per inch, but can be set to any spacing via software in increments of 1/48 inch. The IDS 460 has right margin justification built in. The right margin can be made straight under printer control, even in the proportional spacing mode. Fig. 1 shows an example of this capability also.

The IDS 460, like its 440 cousin, has

both serial (RS-232) and parallel (Centronics style) interfaces built in. The interface is selected by moving jumpers in a socket on the main circuit board. All other logic default controls, including on/off of auto line feed with carriage return, fixed or proportional spacing, parity select and baud rate (for serial interface), form size, line spacing and automatic paging at form boundaries are selected by switches located at the top of the printer.

The 460 (Photo 1) has a footprint 15.75 inches wide by 12.5 inches deep. It is over 12 inches high. This tall design has its advantages. There is room for over 500 sheets of paper under the printer.

The height allows for straightforward placement of the main circuit board behind the paper path. IDS used the extra height to mount the mode select switches, form feed and line feed controls directly on the upper edge of the board without extra cables. The height also provides efficient convection cooling of the circuitry.



The IDS 460 Paper Tiger

The 50-page owners manual includes maintenance and troubleshooting sections, as well as complete operational descriptions. The manual is well written with plenty of line drawings and photographs.

I have printed over four million characters with my 460 so far. I am on the second ribbon (even though the first one wasn't too light when I replaced it—IDS suggests about 5 million characters per ribbon). The ribbon costs about \$13 and is not too messy to replace. It works well, producing even inking across the page. The 460 has performed faultlessly, save one problem.

My IDS 460 will do just about anything. Mine tried to self-destruct when I sent it the right (wrong?) code sequence. Luckily, the only damage was a blown fuse in the

"I BOUGHT IT"

"My biggest loss of programming time using Snappware's EXTENDED BUILT IN FUNCTIONS is spent inserting my diskette."

SCOTT ADAMS - PRES. OF ADVENTURE INTL.



Snappware's EXTENDED BUILT IN FUNCTIONS is a collection of much needed additions to the TRSDOS* BASIC interpreter which greatly extends its convenience and utility. The following features become part of your BASIC language and provide the enhancements without requiring any additional memory. The most important component of EXTENDED BUILT IN FUNCTIONS is an in-memory sort routine, guaranteed to be the fastest general purpose in-memory sort on the market. Along with this you also receive other EXTENDED BUILT IN FUNCTIONS. Here is a sampling:

SRT—Sorts one or more arrays into a specified sequence

FMT—Arranges data into a string variable as with PRINT USING

PDAT/UDATS—Permits user to do arithmetic on dates.

PKS/UPKS—Compresses strings to save disk space.

ETIMS—Shows the difference between two times.

CLEAR—Specifies the number of file blocks to be allocated when you specify high memory and string space.

DELETE—Allows you to dynamically remove portions of a BASIC program.

In addition to these, there are functions unique to Model II and to Model III. The exclusives to Model II are long error messages and PEEK/POKE.

The exclusives to Model III are:

SWAP—Supports exchange of variables with a single statement.

HEX\$—Converts numbers to hexadecimal strings.

RESTORE—Allows you to set READ pointer to location of choice.

If you consider your programming time to be worth money, call us and let us show you how to get more of it.

MODEL II \$100.00
MODEL III \$ 75.00

*TRSDOS™ Tandy Corporation



Time saving power at your fingertips.

CALL TOLL FREE:

1-800-543-4628

OHIO RESIDENTS CALL COLLECT: (513) 891-4496

3719 Mantell Cinti., Ohio 45236



The following was produced on an Integral Data Systems 460G dot-matrix printer.

This is an example of fixed pitch at 12 cpi abcdefghijklmnopqrstuvwxyz.

This is an example of proportionally spaced 10 cpi type abcdefghijklmnopqrstuvwxyz.

Below are samples of all six type sizes :

```

ABCDEFGHIJKLMNPOQRSTUVWXYZabcdefghijklmnopqrstuvwxyz123456789*?<(!#%&'=-@+;)(<
ABCDEFGHIJKLMNPOQRSTUVWXYZabcdefghijklmnopqrstuvwxyz123456789*?<(!#%&'=-@+;)(<
ABCDEFGHIJKLMNPOQRSTUVWXYZabcdefghijklmnopqrstuvwxyz123456789*?<(!#%&'
ABCDEFGHIJKLMNPOQRSTUVWXYZabcdefghijklmnopqrstuvwxyz123456789*?>
ABCDEFGHIJKLMNPOQRSTUVWXYZabcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNPOQRSTUVWXYZabcdefghijklmnopqrstuvwxyz

```

This is an example of margin control and right justification with 10 char/in proportional spacing. The printer keeps track of all margins, and spaces characters to provide even left and right borders as programmed on the printer.

This is an example of margin control and right justification with fixed pitch type. Compare this block of text with the block of proportionally spaced type at the left. Which looks more legible to you? The IDS 460 can print either style.

Figure 1

motor power supply. I called Integral Data Systems and gave them the code sequence that caused my printer to go nuts.

A few days later they called to tell me what caused the self-destruct mode. The problem occurs when an escape code (decimal 27) is sent, putting the printer in the programming mode and then a decimal 3 is sent. This is not a legal sequence and should not occur in practical use. It causes the printer to try to do everything at once.

I have had no other problems with my printer. Its capabilities optimize the operation of several word processors and operating systems. Its form feed, line feed, and forward/reverse feed are conveniently located and logical in operation. One control is useful but not so conveniently located: the print head-to-platen spacing adjustment. This adjustment finely optimizes the printhead spacing for different thicknesses of paper, or multiple part forms. You have to remove the cover to reach it. It is only necessary when a considerable change in form thickness is made. I use it often. Others may never need this feature.

The 460 printing rate varies depending on character size. At 10 cpi, proportionally spaced, it outputs about 150 characters per second. Since it prints in both directions, the throughput is very nearly this great. In enhanced modes it outputs about 80 cps.

The graphics mode provides complete individual dot control. In this mode it prints unidirectionally to assure better line to line synchronization and is slower. There have been a number of screen dump routines published. At least one company has a graphic driver available for high resolution (84 by 84 dots per inch) plots.

The IDS 460 is not the least expensive

matrix printer on the market, but it has about every feature anyone would want and prints the finest looking font of any matrix printer I have seen for under \$1,500. A wide platen version is available (IDS 560) for 15-inch paper capability (\$1,395 suggested retail price). If I had it to do all over again, I would still buy an IDS Paper Tiger. ■

Anderson-Jacobson Selectronic 841
Anderson-Jacobson
521 Charcot Ave
San Jose, CA 95131
\$1,095

by Robert A. Batty

It is difficult to believe after reading ads for the IBM, Wang and DEC word processors costing \$5,000 to \$8,000 that the TRS-80 owner can invest less than \$2,500 in a word processor and get a stand-alone computer that will do things the commercial processors will not. Granted, the TRS-80 system is not as efficient as those costing double or more, but the output can be identical.

As a freelance writer I need a printer that produces high-quality output. Because dot-matrix printer manuscripts are

not acceptable to many editors, the printer for word processing should be a daisy wheel or type-ball model. I chose an Anderson-Jacobson 841 with parallel interface for the following reasons: It is less expensive than the daisy-wheel printer; it is a reconditioned IBM Selectric, noted for superior print quality; it is intended for computer input/output or word-processing applications, and therefore is more rugged in construction than secretarial models; it is compatible with the TRS-80, and although Radio Shack does not support or recommend it, it works well with the cables available from the A J Distributors and Radio Shack; its stand-alone diagnostic will isolate problems to it or the computer; and service on the printer is usually available locally.

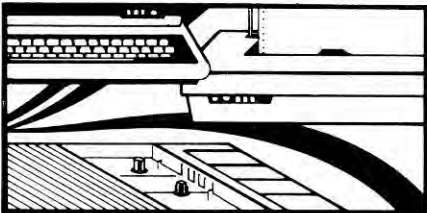
The remainder of the word-processing system consists of cables, the lowercase option, and Scripsit.

This inexpensive word processor has some deficiencies. There is little memory available for text after you enter Scripsit. All that remains for text in a 16K system is 4,100 characters, less than three double-spaced pages. You can overcome this shortcoming by frequently saving the edited material on the cassette tape. If you monitor how much memory remains you will know how much text to process for two pages of manuscript.

"As a freelance writer I need a printer that produces high-quality output."

The lesser consequence to writers is the slow printer speed and the TRS-80/ Selectric line-feed problem. The latter involves single spacing the paper when the program requests a double space. Setting the line space lever on the printer to "double" solves this defect as manuscripts are double-spaced anyway.

The program does not automatically underline. To underline disconnect the printer from the computer (a switch on the



printer) and manually key the underline.

The A/J printer, in offline mode, functions as a secretarial model with a variety of print fonts available by changing the type ball. Many word processors do not have this stand-alone capability; the printer cannot be separated from the system and usually has no keyboard of its own. Any printing must take place through the processor.

You can add more memory to the system making the frequent tape saves unnecessary. You can also add disk memory. ■

"I BOUGHT IT"
"My biggest loss
of programming
time using
Snappware's
AUTOMAP and
AUTOFILE is
spent inserting
my diskette."

SCOTT ADAMS - PRES. OF ADVENTURE INTL.



When working with direct files or creating a formatted screen, Autofile and Automap are indispensable aids.

Autofile is designed to automate for the BASIC programmer the task of moving data elements to and from a direct file. Previously, this was a time consuming chore because the FIELDed variables may not be directly referenced by user logic. The FIELD statement was eliminated, thereby relieving you of the guessing game as to where the FIELDed variable is. In addition, the LSET and the CVx functions are performed automatically. The software, when installed, becomes part of your BASIC interpreter providing the enhancements without additional memory.

Automap is designed to automate for the BASIC programmer the task of presenting information on the video display and accepting information from the keyboard operator. The software consists of two main components: the OFF-LINE COMPONENT used to describe to the system the screen formats and the ON-LINE COMPONENT from within your BASIC program to initialize a screen, send data to the video display and receive data from the keyboard operator. This facility when installed, becomes part of your BASIC interpreter.

Both products complement one another and, if used in conjunction, can save a significant amount of programming time.

If you consider your programming time to be worth money, call us and let us show you how to get more of it.

Automap	MODEL II	\$100.00
	MODEL III	\$ 75.00
Autofile	MODEL II	\$ 75.00
	MODEL III	\$ 60.00

SNAPPWARE
 SNAPPWARE
 SNAPPWARE
 SNAPPWARE
 SNAPPWARE

Time saving power
at your fingertips.

CALL TOLL FREE:

1-800-543-4628

OHIO RESIDENTS CALL
COLLECT: (513) 891-4496

3719 Mantell
Cinti., Ohio 45236



MDX-2 PC Board & User Manual
Micro-Design
P.O. Box 748
Manchaca, TX 78652
\$74.95

Complete Kit of Parts
Computex
321 El Dorado
Webster, TX 77598
\$269

by Ronald Cangro

If a direct-connect modem, 4K EPROM, serial port plus all the features of the Radio Shack Expansion Interface sound interesting consider the Micro-Design alternative.

The interface is available either as a kit or assembled. The kit is not intended for inexperienced assemblers. Knowledge about electrical components and their markings are needed as well as experience in soldering techniques. You can purchase only the PC board and manual

the market. However, the advertising is a little misleading on several features. The RS-232 port must be used for modem operation and is unavailable for another use. If you wanted to use the modem and serial interface at the same time, you are out of luck. The dual cassette port is nothing more than an output telling when the cassette drive has been accessed. Additional external circuitry is required for proper operation. Finally, the direct-connect modem requires an off-board coupling transformer and switch to function properly.

The kit goes together fairly well. There are a few minor errors in the instructions and schematic. The errors are nothing a little common sense would not fix. Some of the shipped components have different lead spacings than what the printed circuit board is laid out for. It was difficult to find placement of some components. The printed circuit board is made of a high-quality, double-sided plated through material with a component legend and solder mask. There does not seem to be any rhyme or reason to the component la-

board layout. Neither is provided in the Computex kit. Instead, instructions for building your own are given. No headers are supplied to facilitate the task.

Another inconvenience, is the lack of Radio Shack power packs by Computex. A transformer assembly of the power cord, external diodes and wiring has to be constructed.

*"The kit
 goes together
 fairly well."*

The printed circuit board layout is well designed incorporating several features to make the kit nicer to build and use. The use of DIP switches for programming baud rates is nice. The inclusion of the originate/answer switch on board, along with a DB25 connector is convenient.

To fit the modem on board components have to be stood on end making assembly awkward. There is not enough room on board for the coupling transformer either. It would be nice if the on-board power regulators could provide enough power for at least one disk drive. The whole power supply could have possibly been designed to power the main computer assembly (keyboard) as well as the expansion interface eliminating the need for the extra power pack on the main unit. Perhaps the next generation board will include a double-density floppy-disk controller and 1,200-baud modem capability with auto answer and dial. Even without these features the MDX-2 is impressive.

The manual is severely deficient if the board does not work the first time. A 24-hour hotline is available for technical questions. At this writing an answering machine took messages. Technical assistance was only available after 5 p.m. Texas time. They were helpful when I called.

The line printer, modem and memory all function flawlessly. Your printer has to have an auto line feed on receipt of a carriage return to function properly. This has nothing to do with the expansion interface, but is a result of the Radio Shack software.

The floppy-disk controller has a tendency for read and parity errors on the inner tracks. The circuitry is critical to disk alignment. A better data separator circuit should have been included.

The Micro-Design expansion interface alternative is well worth the money. But, be prepared to spend some time building and troubleshooting the board. ■

PS1 (Power Supply) Provides all power for completed expansion board. Plus or minus 12 volts and plus or minus five volts. The transformer is not board mounted and must be supplied externally.

MEP1 (Memory Expansion) Includes all circuitry to expand system memory to 32K of RAM.

EPM1 (EPROM Expansion) Includes all circuitry to overlay the upper 2 or 4 K words of memory with a 2716 or 2732.

CASS1 (Dual Cassette) Provides all decoding for using two cassettes on your TRS-80. The relay is not board mounted and must be supplied externally.

DCM1 (Direct Connect Modem) Includes circuitry to operate a 300-baud originate or answer modem. The coupling transformer is not provided on board and must be supplied external to the PCB.

LPB1 (Centronics Parallel Line Printer Bus) Circuitry to allow any Centronics parallel type printer to be used at the same address as in the Radio Shack Expansion interface.

RS-232 (RS-232/20 MA Serial Interface) MDX-2 PCB supports both RS-232 and current loop devices without external boards or parts.

RTC1 (Real-Time Clock) Includes circuitry to use Radio Shack equivalent interrupt-driven clock.

FDC1 (Floppy Disk Controller Kit) MDX-2 allows standard five-inch disk drives, single density, to be interfaced to your TRS-80.

Table 1.

from Micro-Design and individually buy the parts. Or buy the parts in module form from Computex and build only particular features.

The PC board can be built at your own pace with a minimum of duplication in components. The different modules available are listed in Table 1.

The interface is completely software compatible with the Radio Shack interface. The added features are not available on any other expansion board currently on

boards silk screened on the board. R1 might be found on one side of the board next to R53. With a little searching all components can be found.

One major deficiency of the printed circuit board is the edge connect fingers are not gold plated. Only time will tell if it will cause a reliability problem in these connections. The edge connectors on the Radio Shack interface are not gold plated either.

Two resistor packs are required in the

Micromouth
Micromint Inc.
 917 Midway
 Woodmere, NY 11598
 \$150 Kit, \$175 assembled (Model I)
 \$200 assembled (Model III)

by Dennis Bathory Kitsz

I M the T R S 80 . . . I M under 1 thousand dollars-ss and I have over 1 hundred 40 2 ss-A . . . I ss-A: "Danger! Danger! Check flow control! It is lesser than the limit. The speed is 2 percent less. Stop it. Try 2 stop it." Ss-o, U R in time 2 have it." This is Digitalker.

Micromouth is certainly a treat to hear. One of the most convincing speech attachments for the home computer, its original speech was done by a human, then digitized. The digitized voice was placed into read-only memory and made part of the Digitalker product set manufactured by National Semiconductor. The first complete TRS-80 (or Apple) attachment using the National electronics is Micromouth.

Micromouth comes in a plastic box with cable and power supply and attaches easily to the TRS-80; an amplifier is built in, but a small speaker is needed to plug into it. Then it's ready to go. Typing OUT 127,0 calls the sign-on phrase (the only one in a female voice), "This is Digitalker." A vocabulary of 143 elements is provided with the unit (31 numbers and number parts, 26 letters, 79 words, five silences and two tones—see Fig. 1); other vocabularies are being developed by National Semiconductor. From the basic word set, many others can be easily constructed. "Endangers" is made with N + dangers + ss, "delimit" is D + limit; even such a word as "extenuate" (X + 10 + U + 8) can be forced. Over 200 words can be created this way, plus all possible number combinations from 0 to 999,999,999. Most words needed for Basic are there (an unfortunate exception is Print), as are many simple words used in bookkeeping or clerical work.

Without the immediate availability of exchangeable vocabularies, though, Micromouth is limited to simple stimulus-response tasks ("2 high, please try again"), use with games ("50 second + ss left. Speed up! Danger!), or just as an all-purpose, amaze-your-friends toy. Upon seeing my Micromouth, programmer and author Jack Decker immediately used it to read the computer's real-time clock in Basic; it was maddening. Nevertheless, a machine-language program can trigger the Micromouth to read the time with virtually no loss of program time.

"I BOUGHT IT"

"My biggest loss of programming time using Snappware's COLLEGE EDUCATED GARBAGE COLLECTOR is spent inserting my diskette."

SCOTT ADAMS - PRES. OF ADVENTURE INTL.



The Snappware College Educated Garbage Collector (SNAPP-VI) is an intelligent processing function which greatly improves performance of typical BASIC applications. And here's why.

Microsoft uses a 'variable length string' in the BASIC interpreter. Each time the string is assigned a new value, it is relocated in a string pool. Periodically the string pool must be reorganized and condensed into a single contiguous area. Performing this string space reclamation is time consuming and inefficient because this approach evaluates and collects each string individually. The time required is roughly proportional to the square of the number of active strings in the resident program. During reclamation the system seems to 'lock-up' and does not respond to the operator until the process is completed.

This time consuming approach requires a better solution. Snappware has developed a solution which takes advantage of the auxiliary memory available. SNAPP-VI requires only four bytes per active string as a work area. When free storage space is available, our system temporarily borrows, uses and returns the space to the free storage pool when completed. If storage is not available, our system will temporarily transfer out to disk enough of the BASIC program to make room for our work area and return the 'paged out' information to its correct location when completed.

Benchmarked times show, in some situations, SNAPP-VI performs one hundred times as fast as the Microsoft approach.

If you consider your programming time to be worth money, call us and let us show you how to get more of it.

MODEL II\$100.00
 MODEL III\$ 75.00

*TRSDOS™ Tandy Corporation



Time saving power at your fingertips.

CALL TOLL FREE:

1-800-543-4628

OHIO RESIDENTS CALL COLLECT: (513) 891-4496

3719 Mantell

Cinti., Ohio 45236



Thirty to ninety (in tens)

Hundred, thousand, million

Letters A to Z (forming words a, be, bee, see, gee, eye, jay, el, am, em, an, en, oh, pea, queue, are, tea, you, ewe, why; prefixes be-, de-, em-, en-, ex-; suffixes -sy, -dy, -y, from E, -gy, -en, -py, -ty, -zy)

again, ampere, and, at

cancel, case, cent, centi-, check, comma, control

danger, degree, dollar, down

equal, error

feet, flow, fuel

gallon, go, gram, great (grate), greater

have (half), high (hi), higher, hour (our)

in, inches, is, it

kilo-

left, less, lesser, limit, low, lower

mark, meter, mile, milli-, minus, minute

near, number

of, off, on, out, over

parenthesis, percent, please, plus, point, pound, pulses

rate, re, ready, right (rite)

-ss-, second, set, space, speed, star, start, stop

than (then), the, time, try

up

volt

weight (wait)

Fig. 1. The Micromouth vocabulary. Words in parentheses can be created from or are variants of the words in Micromouth. All words can be pluralized and some can be created with the -ss- sound.

Micromouth is, in fact, very efficient. It has a self-contained, crystal-timed clock and all latching circuitry necessary for operation. In other words, a quick command produces the entire preprogrammed phrase; a running program can continue as Micromouth speaks. There are no software drivers or other programming baggage beyond commands for the words the user needs. Here's how it works: OUT 127,N triggers a phrase. When INP(127) equals 254, the word is still in progress; when it reads 255, the word is complete. An interrupt-driven program might check port 127 on each sweep through the interrupt service routine (say, part of the real-time clock or keyboard scan), sending the next phrase when it finds Micromouth open—er, ready.

The device is provided with good documentation and full schematics. Detailed information was published in *Byte*, since Micromouth was designed by columnist Steve Ciarcia. The vocabulary ROMs (two

64-kilobit chips) are socketed, so new vocabularies may be inserted at any time.

There is one very amusing feature of Micromouth. Because of the electronic arrangement, any data greater than 143 sent to port 127 produces garbage. Normally, garbage isn't very useful, but spoken garbage is hysterical gibberish. A real treat is OUT 127,171—the sound of my mind after living with Micromouth for six months (sort of a waah-BLEAAAh!-woo-wow-woingggggg). Nothing like it to tell folks they just entered some pretty dumb input (pun intended). Also, Micromouth can be made to stumble and stutter by interrupting the word being spoken at random intervals with the same or another. It starts over until allowed to finish.

In summary, Micromouth is an excellent example of the progress of speech synthesis, excellent for specialized applications, and very easy to use. For prompting, experimenting and game programming it is very attractive. ■

Pocket Computer Printer/Cassette Interface

**Tandy/Radio Shack
Fort Worth, TX
\$149.95**

by Howard Berenbon

The Printer/Cassette Interface is an amazing little printer. It has a 5 by 7 dot-matrix impact printer head that prints 16 columns per line. It uses an inexpensive (\$2.75) replacement ribbon and tiny rolls of paper, 1.78 inches wide (six rolls for \$1.75). The printer, with cassette interface, easily fits into a small briefcase.

Other accessories included with the Printer/Cassette Interface is an ac adapter which is also used to recharge the Ni-Cad battery. When the battery gets low, a low-battery indicator blinks. It takes about 15 hours to charge. One charge prints approximately 8,000 lines. The Printer/Cassette interface weighs only .9 lbs, and comes with three paper rolls, a ribbon cartridge, a cassette connection cable, a charger adapter and instructions.

Operation

Connect your Pocket Computer by removing the connector cover from its side. Make sure both the computer and printer are off. Carefully slide the computer onto the printer/interface until the printer pins are inserted into the computer's connector. Install a roll of paper by turning the printer power switch on and feeding the paper through the mechanism

using the paper advance button.

To print, turn on the printer power and print switches. Then press the computer's on key twice. This sends the computer's output (Print and List) to the printer instead of the display. By entering List the program currently in memory is listed on the printer. If you run a program, it prints the output.

To return the computer to the display mode, turn the print switch on the printer to off and press the computer's on key twice.

When using the cassette interface, the Remote switch on the printer controls the cassette recorder. When the Remote switch is on, starting and stopping of the recorder is controlled by the computer. When the Remote switch is off, the computer will not control this function. The power and cassette cables are connected at the right rear of the Printer/Cassette Interface.

Saving (using CSAVE) and loading (using CLOAD) programs with the Pocket Computer is a little slow, but it works well enough if you use the cassette recorder specified (Realistic Miniset 9), or another of similar quality. Loading can be a problem if you do not have your recorder's volume control up high enough. This level setting depends on the cassette recorder used. I use a Realistic Miniset 10-AM/FM Cassette Recorder with the volume set at 7, and it works well.

The TRS-80 Printer/Cassette Interface is necessary to complete any pocket computer system. It prints clearly and seems to be well made. ■

Call or Write
Your Nearest
Snappware
Distributor

MICRO-80
284 Goodwood Road
Clarence Park
Adelaide South Australia
Ph-(08) 2117224

DIGI-TEK SYSTEMS
65 Thornridge Circle
Kitchener Ontario N2M-4V9
Ph-(519) 742-8205

Strawflower Electronics
50 North Cabrillo
Half Moon Bay
California 94019
Ph-(415) 726-9128

COMPUTER MAGIC
115 Wiltshire Avenue
Louisville, Kentucky 40207
Ph-(502) 893-9334

E-C DATA
Tornevangsvej 88
P.O.B. 116
DK-3460
Birkerød, Denmark
Ph + 45/2/81 81 91

System Soft
49, Dunvegan Drive
Rise Park
Nottingham, England
NG5 5Dx
Ph-(0602) 275559

Programs Unlimited
20 Jericho Tpke.
Jericho, Long Island,
New York 11753
Ph-(516) 333-2266

AEROCOMP
Redbird Airport
Hanger 8
Dallas, Texas 75232
Ph-(214) 339-5104

NOTICE

Snappware Goes On Trial! You Be The Judge!

Snappware knows your programming time is valuable. That's why we are offering a trial package that will cut your programming time up to 75%!

This unprecedented offer allows you to judge for yourself the value of our software using *your* hardware at *your* convenience. Our five best selling products: EXTENDED BASIC, EXTENDED BUILT IN FUNCTIONS, COLLEGE EDUCATED GARBAGE COLLECTOR, AUTOMAP and AUTOFILE, are all available to you on a trial basis for only \$50.00 for the Model II and \$35.00 for the Model III. We're convinced that after you see how well our software helps you perform programming tasks, you will purchase them like thousands of others have.

Our trial package consists of a master diskette which may be used to create one working copy. Your purchase price for the trial package will be credited toward the purchase of any software Snappware sells.

If for any reason you are not satisfied, just return the trial diskette and working copy and we will refund your money, no questions asked. With an unconditional guarantee like this, you can't lose.

Call our toll free number 800-543-4628 to put us on trial. We're sure your verdict will be: Snappware saves you time and money.

MODEL II Trial Package \$50.00
MODEL III Trial Package \$35.00

SNAPPWARE
SNAPPWARE
SNAPPWARE
SNAPPWARE
SNAPPWARE
SNAPPWARE

**Time saving power
at your fingertips.**

CALL TOLL FREE:

1-800-543-4628

**OHIO RESIDENTS CALL
COLLECT: (513) 891-4496
3719 Mantell
Cinti., Ohio 45236**



\$395 BASIC DIVORCE



Announcing the new quick and easy way
to write custom business applications
in hours instead of weeks.

At last, you can get a microcomputer business application development system that is designed for one purpose only . . . fast production of bug-free professional-looking custom business applications.

"Thinks" the Way Business Thinks

Quic-N-Easi is the revolutionary screen-format-oriented application development system that thinks in terms of transactions, records and fields. The same way business thinks. **Quic-N-Easi** expects an application to include custom formatted key entry. It lets you set up the character, field, and record validity checks business wants by merely filling in the blanks. It automatically signals in real time when errors occur and "explains" what is wrong in plain English messages you select for each custom application.

Much Faster than BASIC

Quic-N-Easi programming is much faster than BASIC because the standard business applications (key input, file handling, and output reporting) are handled via pre-programmed parameter driven sub-routines. To produce finished professional looking custom business programs, you merely:

- Draw the business formats directly on the CRT in minutes.
- Fill in the blanks for field attributes, validations, tables, etc.
- Invoke the **Quic-N-Easi** interpreter to check fields against tables, check limits, access data files, and perform business calculations, etc.

- Optionally define file and output formats right on the screen.

Pays for Itself in a Week

By eliminating the coding drudgery of writing screen, field, file, and format programs in BASIC, programmers are free to concentrate on the unique business aspects of each custom application. No professional programmer can afford to develop one more business application without **Quic-N-Easi**. The savings are so significant with **Quic-N-Easi**, it can actually pay for itself in only one week.

Gives You Much More than a Screen Builder . . . the Only Complete Business Development System for Microcomputers

Quic-N-Easi handles the entire application development job from key entry to final output. You get everything you need, including detailed documentation to begin writing professional programs the first day. **You get . . .**

- A singularly capable **Quic-N-Easi** screen builder
- A comprehensive parameter driven **Quic-N-Easi** content editor
- A full **Quic-N-Easi** interpreter language
- A complete **Quic-N-Easi** file management system with Index Sequential, Random, and Sequential File Access Method
- A complete **Quic-N-Easi** print format handler
- A detailed **Quic-N-Easi** reference manual

- A **Quic-N-Easi** self-teaching guide
- A **Quic-N-Easi** quick reference card
- An interface to other program files

ORDER NOW—Don't Waste One More Day Coding BASIC

Your time is too valuable to waste hours on end writing BASIC code. The first week you use **Quic-N-Easi**, your finished business programs will look better, run better, and return more dollars to you. Don't delay. Order **Quic-N-Easi** today. Phone . . . **215 968-0689**

QUIC-N-EASI™

STANDARD MICROSYSTEMS INC.
136 GRANITE HILL COURT, LANGHORNE, PA 19047

Pricing Information

- Complete **Quic-N-Easi** system **\$395**
- Manual only **\$60**
- **Visa** and **Mastercard** accepted
- **Dealer Inquiries Invited**

Minimum System Requirements

Z80 • 48K • Floppy Disc
• CP/M (except TRS80 Mod III)

Disk Formats

8" Single Density • VECTOR
GRAPHICS • MICROPOLIS Mod 2 •
TRS80 Mod II • TRS80 Mod III • APPLE
• OSBORNE • INTERTEC • ZENITH

Apple, CP/M, Intertec, Micropolis, and TRS80 are trademarks of Apple Computer, Digital Research, Intertec Data Systems, Micropolis Corp., and Tandy Corp. ✓ 279

**Computer Programming in Basic
A Self Instruction Course in 4 Volumes**
Ian Willlamson, Rodney Dale & Tim Eiloart
Cambridge Learning Enterprises
Cambridge, MA
Softcover

by Kenneth Delp
and Bruce Eldredge

This series of four magazine-sized books from England is a great place to begin Basic programming.

This course of 60 lessons is designed for the complete rookie. Each booklet contains 15 to 20 lessons arranged sequentially from introductory math functions



through subroutines and For...Next loops. At least one lesson in each booklet is devoted to a broader concept such as computer problem solving, high and low-level languages, and compilers and interpreters.

The first book deals with getting the machine rolling with Read, Data and Print statements. It also introduces the Let statement early in the sequence. The second book places important stress on documentation. Important initial concepts such as flowcharting and REM statements are covered. The third volume moves into loops, arrays and random gen-

"These books are a pleasant surprise."

eration. The fourth, titled *Advanced Basic*, covers subroutines, files and strings among other topics.

The booklets are liberally spiced with examples and immediate answers along with complete explanations. The clarity of these explanations was impressive.

This set of books could easily be used as a text in an introduction to computer class. Since the books can be used without a computer at hand, they are ideal for classroom work where computers may not always be available. Because the

books are not geared to a specific system, they are a suitable introduction to Basic without regard to the quirks of various hardware.

Each book contains the same summary of Basic with statements and commands listed along with math functions and operators. These are referenced with the lessons which deal with those topics. The table of contents and lesson abstracts are complete and useful.

One of the more subtle yet helpful aspects of the series is the format. The lessons are broken into small concepts with clear examples and complete explanations. The authors include extra examples on particularly difficult concepts.

Another useful format characteristic was that the information is divided into four separate booklets. The publishers achieved two goals with this format. First, there is a sense of accomplishment when each book is finished. For the advanced programmer this is unimportant, perhaps even awkward, but for the beginner the task of learning Basic seems much less formidable if he senses accomplishment. Second, the books easily stay open and flat on the table next to a computer. Spines don't have to be broken to get the book to stay in its place.

Most books dealing with beginner's Basic do not show how to test a program for correct output. Yet this one features lessons on debugging and error statements and where and how to start correcting the bugs.

Tanktics
Avalon Hill
4517 Harford Rd.
Baltimore, MD 21214
Models I & III, 16K or 32K
\$24 cassette
\$29 disk

by David G. Bartlett

Avalon Hill's historical simulation board games require hours or even days studying battle manuals, maps and working out intricate strategies. Avalon Hill's new game, *Tanktics*, is better than any previous simulation game. It does not take days to play but does use a map-board, markers and a battle manual.

The board has 768 numbered hexagons superimposed over a countryside map. The object is to defeat the computer's tanks. There are five different scenarios and several different combinations of tanks and antitank guns to choose from.

A couple notes must be made concerning the language of the books. It is British. "Behavior" is spelled "behaviour;" "airplane" is "aeroplane." You can even play naughts and crosses (tic-tac-toe). This is no problem, but we noticed it. More importantly, the language is very straightforward. The authors have accurately anticipated the beginner's questions and answered them honestly.

We found only two minor problems. Some lessons in the first booklets deal with math concepts that may cause some people trouble. The lessons on scientific notation and trigonometric functions in book 2 require some math background and could be confusing. The strength of these books lies in their appeal to the beginner, although these advanced math concepts seem inappropriate.

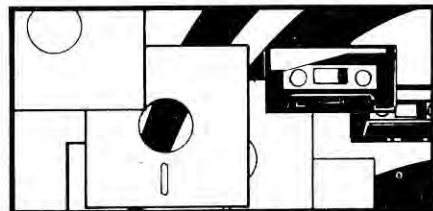
Since the books are written for a worldwide audience, metric units are used. This may be a problem for those unfamiliar with metric conversions. The authors carefully avoid using the British monetary system.

These books are a pleasant surprise. They do not look impressive since they are not typeset or overly illustrated. However, they are durable and practically bound.

After reading the books independently we both remarked that the more we read and used them, the more impressed we became with their completeness, clarity, organization and emphasis. For a beginner they provide instruction in Basic and a useful future reference. ■

Although you have up to eight tanks, the computer gets twice as many.

The computer plans its moves, referees your moves, determines results of combat and tells you when your tanks have sighted the enemy. You never know when the enemy will appear or where they went after an attack. The cassette version loads in two parts. It can be run from disk with a utility such as Twodisk from the



Alternate Source.

Avalon Hill has succeeded in keeping the best part of their board games and letting the computer do the tedious parts for you. ■

HARDWARE BREAKTHROUGH

DESIGN SOLUTION INC. presents the AN-SERIES DEVELOPMENT SYSTEM for TRS-80™, Apple II™, Commodore PET™, Superbrain™*



\$179.95

DSI AN-7000 COMPUTER

True TRS-80™ work-a-like capability is now available in kit form from DSI. The AN-7000 provides a full 16K of dynamic ram, with a complete modulated video interface system for use with standard televisions, Z-80B Micro-processor, cassette interface, membrane keyboard, finished case and power supply module, as well as every component needed for ROM-less assembly. Save hundreds of dollars by assembling the AN-7000 processor yourself with only common hand tools. Step by step in-

structions with clear cut pictorials and schematics create a very straight-forward work environment as you assemble your own system from scratch. Totally flexible, the AN-7000 will interface with all Model I Level II hardware accessories including the DSI AN-760 FDC and AN-1000 Megadrives. The AN-7000 system represents the most significant break-through in user assembled computer equipment available. The AN-7000 kit comes complete with all parts necessary for a full 16K, Z-80 based CPU, less the 12K basic interpreter ROMs.

New DOS 80™ ver 2.0 is available at special package purchase rates for the AN-760 and AN-1000. Contact DSI for complete DOS pricing.

A Registered Microsoft™ TRS-80 Level II work-a-like 3 chip set with manual and complete documentation is available for the AN-7000. The Microsoft-DSI basic package lists at \$89.95.



DSI MEGADRIVE

\$590.00



This single or double density 80 track dual sides 5¼" floppy disk drive is a must for all serious TRS-80 and DSI systems users. With almost 1 million bytes of unformatted data storage capacity in the MFM double density mode the AN-1000 provides the utmost in stability of performance at a very reasonable price. Track to track access time 3 ms, soft error rate 1-10⁹ reads, hard errors 1-10¹² reads, and media life 4x10⁶, clearly represent the AN-1000 technology. Complete with power supply, case, cable and operation manual.

All connections made to AN-SERIES products from your bread-board are simply pushed through the front panel. Custom connectors on the P.C.B. provide super reliable connection for thousands of operations. All AN-SERIES products are warranted for a full 90-DAYS under DSI's limited warranty policy. Complete documen-

tation is provided for each model in an attractive folder, including theory of operation, and special interest projects and applications. All units are supplied with external power supply modules that connect through a mini-jack on the front panel.

DESIGN SOLUTION INC.
BOX 1225, FAYETTEVILLE, AR 72701

C.O.D. add \$5.00 — Other add \$3.00 S/H.
(Exports slightly higher)

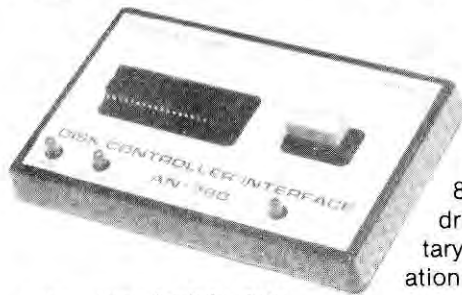
Orders and Information: (501) 521-0281

HARDWARE BREAKTHROUGH

DESIGN SOLUTION INC. presents the AN-SERIES DEVELOPMENT SYSTEM for TRS-80™, Apple II™, Commodore PET™, Superbrain™*

\$99⁹⁵

DISK CONTROLLER

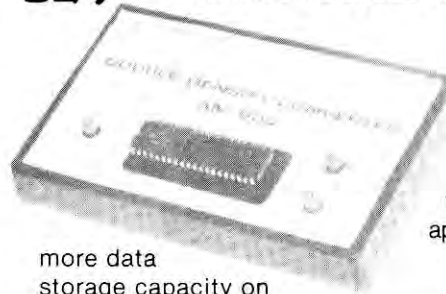


An affordable multidrive floppy disk interface. The AN-760 supports 35, 40, 80 and 160 track drives. Using proprietary Digital Data Separation Techniques, maxi-

mum permissible data transfer integrity is assured. Read, write, and step LED indicators prompt operator during all disk I/O. The AN-760 comes complete with power supply module and operation manual. (Operating system software optional.)

\$129⁹⁵

DOUBLE DENSITY CONVERTER

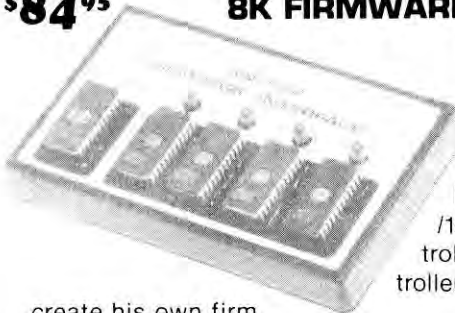


Using DSI Proprietary Data Separation and Write Precompensation Techniques, the AN-920 provides approximately 1.6 times

more data storage capacity on your 5¼ disk drives. The AN-920 can be used in conjunction with the AN-760 FDC or the TRS-80 expansion interface. Double Density System comes complete with power supply module and operation manual. (Required Newdos-80 Ver 2.0 Disk Operation System Optional.)

\$84⁹⁵

8K FIRMWARE INTERFACE



8K Bytes of User Programmable Firmware (4-2716 Eproms) are automatically loaded by system /12345 Command controlled by a 2716 controller chip. The user can

create his own firm operating system to load and execute programs from Eprom or to provide user defined arithmetic functions. Comes complete with power supply, operation manual and controller chip. (The AN-522 requires AN-551 Eprom programmer.)

\$99⁹⁵

MULTI-RANGE DVM INTERFACE

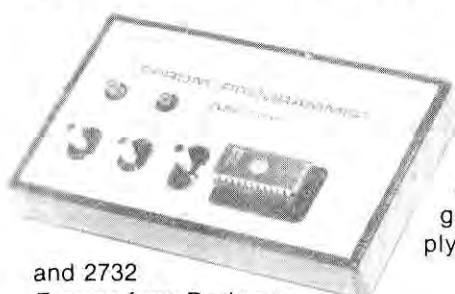


Analog Signal Interface is now as easy as turning a knob. EE-1670 provides DVM functions volts, and milli-amps and 8 ranges, 1-200 millivolts, 0-2, 0-20, 0-200

volts, 0-200 micro amps, 0-2, 0-20, 0-200 milliamps, standard banana jacks and test leads create perfect connection scheme for real time analog data acquisition. EE-1670 system is complete with power supply and manual of operation.

\$99⁹⁵

EPROM PROGRAMMER

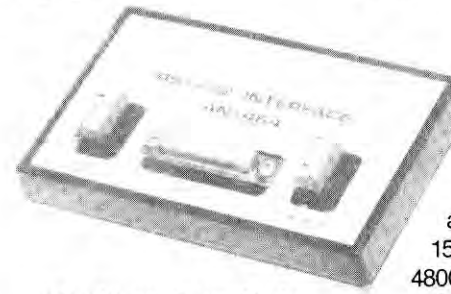


An enhanced version of our original Eprom Programmer, the AN-551 will now program the single supply 2516, 2716, 2532

and 2732 Eproms from Basic or machine language. Software provided will load Eprom from TRS-80 Ram or load TRS-80 Ram from Eprom with complete on-screen verification. The AN-551 comes complete with power supply and operation manual.

\$89⁹⁵

RS-232 INTERFACE



Can be configured to communicate with data communications equipment or data terminal equipment at 110, 150, 300, 600, 1200, 2400, 4800 and 9600 Baud. The

AN-464 provides 20MA loop output and RS-232C through a DB-25P connector. Software selectable odd/even parity, 5-8 bit word lengths and stop bit formats are standard along with power supply module, software driver, and operation manual.

All connections made to AN-SERIES products from your breadboard are simply pushed through the front panel. Custom connectors on the P.C.B. provide super reliable connection for thousands of operations. All AN-SERIES products are warranted for a full 90-DAYS under DSI's limited warranty policy. Complete documen-

tation is provided for each model in an attractive folder, including theory of operation, and special interest projects and applications. All units are supplied with external power supply modules that connect through a mini-jack on the front panel.

DESIGN SOLUTION INC.
BOX 1225, FAYETTEVILLE, AR 72701

C.O.D. add \$5.00 — Other add \$3.00 S/H.
(Exports slightly higher)

Orders and Information: (501) 521-0281

EDUCATION 80

by Earl R. Savage

"The 'meat and potatoes' of the Cheaptalk package is a multi-purpose program permitting you to record. . ."

Warning—

There are left and right-hand edge card connectors. If you or one of your students need to repair or build a ribbon cable connector, be aware that you *can* damage your computer, accessory, or both if you don't take note of the above.

We occasionally use a Y connector (a ribbon that permits connecting two or more accessories to one socket). Somehow a contact in one of them became damaged and needed to be replaced.

I picked up an edge card connector at a local parts store. Since none of us had previously repaired a ribbon cable, we almost mated a left-hand connector with a right-hand connector. The mixture would have *reversed* the wires of each pair in the cable.

The problem is that some connectors attach the outside pin to the top of the card and some attach the outside pin to the bottom of the card (see Fig. 1). Unfortunately, there is no way you can twist the connector or the cable to turn one type into the other if there are an even number of pins.

You know as well as I that school equipment gets changed more frequently than it does in the typical home. Even with the greatest care, one of those sliding connectors is going to get damaged sooner or later. When it happens to you, be sure that

You know. . . that school equipment gets changed more than home equipment."

you watch for the left- and right-hand connectors when making repairs.

Computer Talk

Sure, sound effects and music are possible with your computer. But how can you make it talk without spending the big bucks the administration can't seem to provide? The answer may be easier than you think.

Alan Saville's program, Cheaptalk, (P.O. Box 5190, San Diego, CA 92105) gives you speech synthesis for about \$20. Of course you will need some type of amplifier or speaker connected to the cassette output jack.

You cannot get high fidelity speech from Saville's program, but it is intelligible. Imagine the excitement of an elementary student when the computer actually talks!

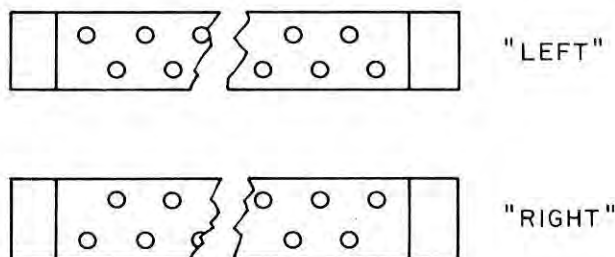
The Cheaptalk package comes with plenty to chew on. A System program loads the memory with the names of the digits (zero through nine) and the words alpha, bravo, charlie, delta, echo, and fox. The second program, in Basic, calls on the previous memory dump to give an audio readout of the hex contents of any selected portion of your computer's memory. Further, the program displays the memory contents so you can check the audio readout.

The "meat and potatoes" of the Cheaptalk package is a multi-purpose program permitting you to record your own words, play them back and rerecord until you are satisfied. You can then save them for later use in the program of your choice.

Recording on the Model III requires only a microphone and a small audio amplifier connected to the printer port. Clear instructions are provided. There is a choice of two methods of recording on the Model I. The first method requires a three-IC accessory on the expansion port. The second method requires a couple of minor wiring changes inside the keyboard unit.

Note that no changes are necessary to *run* talking programs on either a Model I or a Model III. In addition, the Radio Shack RS 227-1008 amplifier/speaker can be used for both recording and running programs.

All things considered, Cheaptalk can be an interesting educational aid. Why not *tell* your students "good" and "very good" and "try harder" instead of simply printing it on the video screen.



VIEWED ON THE RIBBON SIDE

Fig. 1. Two types of edge card connectors.

More for your Dollars!



LDOS PACKAGE SPECIALS.

THE ULTIMATE DISK-OPERATING SYSTEM LDOS™

The new generation of operating system for the TRS-80™. Far superior to any on the market. It is a totally independent device system, capable of device linking, routing, setting, and filtering. LDOS will support 5" and 8" floppies, single/double density, single/double sided, and up to 80 tracks. Excellent documentation in a tab indexed manual (over 280 pages). Call today. Available for Model I or III... only \$129.00. LDOS™ is a product of Logical Systems Inc. Also available: EDAS 3.5 Model I and III... \$79.00

LDOS PACKAGE SPECIALS

		YOU SAVE
LDOS + MAIL/FILE	\$199.00	\$89.00
LDOS + INVENTORY MOD I	\$199.00	\$89.00
LDOS + INVENTORY MOD III	\$299.00	\$89.00
LDOS + STOCK MARKET MON.	\$179.00	\$49.00
LDOS + EDAS	\$179.00	\$29.00
LDOS + FED (FILE EDITOR)	\$149.00	\$20.00
LDOS + LED (LDOS EDITOR)	\$139.00	\$20.00
LDOS + FED & LED	\$169.00	\$30.00
LDOS + FILTER PACKAGE	\$169.00	\$20.00
LDOS + "LC" LANGUAGE	\$229.00	\$50.00
LDOS + MONITOR	\$159.00	\$15.00
LDOS + ULTRA TREK	\$129.00	\$19.95

SUPER LDOS DEVELOPMENT PACKAGE

LDOS + LC + FED + LED + EDAS + FILTER PKG. + MONITOR	\$369.00	\$144.00
---	----------	----------

**Offer good during April & May, 1982

FED - THE LDOS FILE EDITOR

This is the ultimate in file "ZAP" type tools for use with your LDOS system. Full access to files, ASCII and HEX searches, find a load address or where a byte loads. Full HEX or ASCII modify, even to the directory. Two display modes and a built in menu plus unique features that have never been available in this type of system tool. Available now for just... \$40.00

LC - LDOS "C"

This is a very powerful implementation of the "C" programming language. It comes complete with an extensive function library and generates executable code or assembler source that is compatible with either the MAC-80 or EDAS. For efficient creation of both systems and applications code, this is the language. The language of the future now for just... \$150.00.

LED - LDOS TEXT EDITOR

This is the official LDOS text editor designed for writing and maintaining almost any type of text. Handles both line number and unnumbered text files with word processor like functions. Great for all types of pure ASCII source files, even BASIC, and for PATCH and JCL files. Many special features make this editor a "must have" program for the serious user. Finally, a functional text editor for just... \$30.00.

FILTER PACKAGE

This package is a collection of powerful filter for the LDOS "devices" to bring out the true power of the LDOS concept. Included are a HEX-DECIMAL-BINARY-CALCULATE-CONVERT filter for your keyboard, a filter to expand basic code to a formatted structure during listing and a complete translations filter to convert any or all 256 possible characters to other characters even in a by directional mode. Use this package to give your system a DVORACK keyboard or to have your system talk in EBCDIC. Many, many handy additions to your LDOS system for just... \$60.00.

MONITOR - THE LDOS DISK I/O MONITOR

This program brings to LDOS the power of a mini or mainframe error monitor system. When a disk error of any sort occurs, the monitor takes control and allows the operator to select: ABORT, CONTINUE, RETRY or IGNORE. This allows recovery from many problems that before would have caused the loss of data or the interruption of program. Don't let a simple parity error ruin your day again! Get the program that pays for itself the first time it does its job. Be in control of your system for just... \$25.00.

MAILING SYSTEMS - MAIL/FILE-SERIES II

NEW Series II Mail/File has all of the outstanding features of the original Series I Mail/File. PLUS many additional qualities which again will set standards for this type of system. "Word processor" type input editor, fast sorting, and fabulous editing capabilities are a few of its features. Name and ZIP code are under constant sort. A really great Mailing List-Data Base manager. Model I system will handle up to 600 names. Model III system will handle up to 1200 names... \$159.00

BUSINESS SYSTEMS - INVENTORY MASTER SYSTEM

The program to fill your needs. Control up to 2700 items. With today's market, keeping on hand only what your demand calls for is reason enough to let your TRS-80 accurately and effectively take care of your inventory. Always know what to stock and when to stock it. This system has many features which were modeled after a main frame system of large capacity. Model I version just... \$159.00. Model III version just... \$259.00. Also available for the Model I or III Stock Market Monitor: Cassette version... \$89.00. Disk version... \$99.00.

Money orders, credit cards & cod's shipped within 24 hours.

TRS-80™ is a trademark of Tandy Corp.

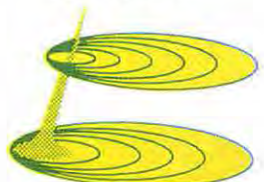


Can't wait? Call

414/241-8030

galactic software ltd.

11520 North Port Washington Road
Mequon, Wisconsin 53092 ✓ 251



A Light Pen?

I hate to admit it but I thought a light pen was just a toy to attach to a computer—an interesting plaything, nothing more. Having now used a light pen, I have completely reversed my thinking about their educational applications.

We selected a light pen from the 3G Company (Rt. 3, Box 28A, Gaston, OR 97119) because it was completely self-contained. It came with a demonstration tape and instruction manual. The pen simply plugged into the cassette jack.

A light pen is a pencil-like device attached to the end of a small cable. Just point it at the screen and a properly-programmed computer can tell where you are pointing.

When the pen arrived, I was prepared to endure a bit of playing until the novelty wore off. Instead, I discovered a valuable adjunct to the computer. Of course, the pen can be used in a wide variety of games but it has plenty of serious uses, too. Let me give you a few examples.

First, how do you get responses from a

“How do you get responses from a young child who does not know the alphabet. . .”

young child who does not know the alphabet or numbers—you guessed it: with a light pen. If you work with young children, you can see a multitude of learning applications for the pen.

Another example of the pen's usefulness is with handicapped children. In addition to those students who lack the coordination to use the keyboard, many are intimidated when confronted with the complexity of the keyboard. With a light pen, the keyboard can be ignored.

The serious use of light pens is not limited to these two groups of children. The light pen has great potential for educational use.

Programming to utilize the light pen is not difficult. 3G's demonstration tape and manual provide all the information you need to create your own programs or to modify existing programs for this purpose.

Try a light pen. It will add another resource to your arsenal of teaching/learning tools ■

The Scott Adams Adventure Series AN OVERVIEW



I stood at the bottom of a deep chasm. Cool air sliding down the sides of the crevasse hit waves of heat rising from a stream of bubbling lava and formed a mist over the sluggish flow. Through the swirling clouds I caught glimpses of two ledges high above me: one was bricked, the other appeared to lead to the throne room I had been seeking.

A blast of fresh air cleared the mist near my feet and like a single gravestone a broken sign appeared momentarily. A dull gleam of gold showed at the base of the sign before being swallowed up by the fog again. From the distance came the angry buzz of the killer bees. Could I avoid their lethal stings as I had managed to escape the wrath of the dragon? Reading the sign might give me a clue to the dangers of this pit.

I approached the sign slowly.

And so it goes, hour after hour, as you guide your microcomputer through the Adventures of Scott Adams in an effort to amass treasures within the worlds of his imagination.

By definition, an adventure is a dangerous or risky undertaking; a novel, exciting, or otherwise remarkable event or experience. On your personal computer, Adventure is that and more.

For the user, playing Adventure is a dangerous or risky undertaking in that you better be prepared to spend many addictive hours at the keyboard. If you like challenges, surprises, humor and being transported to other worlds, these are the games for you. If you dislike being forced to use your common sense and imagination, or you frustrate easily, try them anyway.

In beginning any Adventure, you will find yourself in a specific location: a forest, on board a small spaceship, outside a fun house, in the briefing room of a nuclear plant, in a desert, etc.

By using two-word commands you move from location to location, manipulate objects that you find in the different places, and perform actions as if you were really there. The object of a game is to amass treasure for points or accomplish some other goal. Successfully completing a game, however, is far easier to state than achieve. In many cases you will find a treasure but be unable to take it until you are carrying the right combination of objects you find in the various locations.

How do you know which objects you need? Trial and error, logic and imagination. Each time you try some action, you learn a little more about the game. Which brings us to the term "game" again. While called games, Adventures are actually puzzles because you have to discover which way the pieces (actions, manipulations, use of magic words, etc.) fit together in order to gather your treasures or accomplish the mission. Like a puzzle, there are a number of ways to fit the pieces together; players who have found and stored all the treasures (there are 13) of Adventure #1 may have done so in different ways.

In finding how the pieces fit, you will be forced to deal with unexpected events, apparent dead ends and Scott's humor, which is one of the best parts of the puzzles.

If you run into a barrier like not being able to discover more rooms, don't give up. Play the game with some friends; sometimes they'll think of things you haven't tried.

While I pondered how to reach the throne room — which I was sure contained the treasures of Croesus — the fog grew thicker and the hours passed. I realized I would not be able to outwit Adams today...but maybe tomorrow. I marked my present location on my tattered map and began the long trip to the surface. As I dragged myself off to bed, I thought about other possible Adventures.

But enough for tonight. Tomorrow — another crack at the chasm.
—by Ken Mazur

Reprinted with permission from
PERSONAL COMPUTING MAGAZINE, FEB. 1980
Copyright 1980 PERSONAL COMPUTING MAGAZINE
1050 Commonwealth Ave., Boston, Mass. 02215

The 12 Scott Adams Adventures 19

- Adventureland • Pirate Adventure • Mission Impossible •
- Voodoo Castle • The Count • Strange Odyssey • Mystery
- Fun House • Pyramid of Doom • Ghost Town • Savage
- Island-Part 1 • Savage Island-Part 2 • Golden Voyage

WHO ARE YOU THIS TIME?



Are you the seeker of lost treasures in an enchanted realm of magical beings? Perhaps you're an astronaut, thousands of light years from earth, searching the galaxy's rim for the fabulous treasures and advanced technologies of a long-dead civilization. Maybe you're the plunderer of ancient pyramids in a maddeningly dangerous land of crumbling ruins and trackless desert wastes.

Imagine.

You wish to soar to other worlds, to behold wonders never beheld by mortal eyes, to dream unrestrained to the furthest limits of your imagination.

Imagine now that you can.


The ADVENTURE SERIES by Scott Adams has been reviewed by every major microcomputing magazine, receiving only the highest praise for its mind-puzzling challenge & refreshing originality. Tens of thousands of adults and children have matched wits with the Adventure Master. Now, it's your turn. If you crave the challenge and panorama of the exotic, touched with sparkling humor, then the Adventure Series is for you.

With the incredible Adventure Series by Scott Adams,
**YOU ARE WHOMEVER YOU WANT TO BE,
 WHENEVER YOU WANT TO BE!**

Adventure
 INTERNATIONAL
 A DIVISION OF SCOTT ADAMS, INC.

1982
 BOX 3435, LONGWOOD FL 32750
 (305) 862-6917 (QUESTIONS)

ORDER FROM YOUR FAVORITE DEALER
 or CALL TOLL FREE (800) 327-7172

(ORDERS ONLY PLEASE )

	SINGLE TAPE	12 PACK TAPE	SINGLE DISK	TRIPLE DISK	12 PACK DISK	
APPLE	\$19.95 24K	\$129.95 24K	\$29.95* 48K	\$69.95* 48K	—	Adventure Hint Book (All 12) \$ 7.95
ATARI	\$19.95 24K	\$129.95 24K	—	\$39.95 40K	\$129.95 48K	Adventure Hint Sheet (Single) 1.00
CP/M (2-80)	—	—	—	—	\$129.95	Commodore VIC (Cartridge) 39.95
TRS-80 MOD 1&3	\$19.95 16K	\$129.95 16K	—	\$39.95 32K	\$129.95 32K	T.I. 9914 (Tape or Disk) 29.95
TRS-80 MOD 2	—	—	—	—	\$129.95	Requires Adventure Command Module

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

SHIPPING & HANDLING ARE EXTRA

*Scott Adams' Graphic Adventure Series
 Apple Disks-Full Color Hi-Res Graphics,
 112 Adventure Hint Book Incl.

Another winner from Radio Shack.

Line Printer VIII

Line Printer VIII
Tandy/Radio Shack
Fort Worth, TX
\$799

Richard K. Wallace
3708 B Arizona St.
Los Alamos, NM 87544

Radio Shack's newest printer is certain to become one of the standard accessories for TRS-80 computers. It not only has all the features of the old (now discontinued) Line Printer IV, (including condensed, elongated and proportional characters, subscripts, superscripts and underlining), but also includes bit graphics and sells for \$100 less than the old LP IV.

Printing Modes

The Line Printer VIII operates in three printing modes: Data Processing, Word Processing, and Bit Graphics. The only real difference between the Data Processing and Word Processing modes is how the printer responds to a line-feed command.

In the Data Processing mode any command affecting line feeds, such as reverse line feeds and setting different line spac-

ings, is stored in memory until the printer receives its next line-feed command. In the Word Processing mode line-feed information is acted on immediately, allowing the printing of superscripts, subscripts, equations and other items requiring half line feeds. Word Processing's additional capabilities slow printing speed slightly.

In the Bit Graphics mode, many control codes available in the other two modes are ignored. Alphanumeric character sets are not accessible from the Bit Graphics mode, but the printer can be switched in and out of this mode easily, so graphics and text can be mixed within the same line.

Character Sets

The LP VIII is an impact dot-matrix printer. It prints all 96 ASCII characters, 30 block graphics characters and 32 European and special characters. A 9 by 8 dot matrix (9 by 7 was used in the LP IV) is used to print the 10 character per inch (cpi) ordinary character set at 80 characters per line (cpl), the 5 cpi double-width elongated ordinary set at 40 cpl, the 16.7 cpi condensed set at 132 cpl, and the 8.3 cpi elongated condensed set at 66 cpl.

The proportional spaced character set prints with a 9 by n dot matrix, where the

character width (n) varies from 9 to 23-dot columns. The dot density in the proportional set is the same as in the 16.7 cpi condensed set, 1,600 dots in an eight-inch line. (The proportional characters in the LP IV had a density of only 1,160 dots in the same space.) The length of a proportionally spaced line varies from 69 to 177 cpl. Block graphic characters are printed in a 6 by 12-dot format.

The proportional character set is not as good as an IBM Selectric typewriter, but is certainly adequate for most reports and correspondence. All numbers in the proportional mode are the same width (15-dot columns) and can be easily aligned vertically in tabular output. Samples of the various print modes are shown in Fig. 1.

Program Listing 1 is the program used to obtain the printouts in Fig. 1. Note the difference between the elongated and normal characters.

Hardware

The printer has a parallel interface that connects to the parallel printer port on the Model I (directly to the CPU or through the expansion interface), Model II and Model III. The printer is equipped with easily operated switches to select serial (7 or 8-bit) or parallel interface. It can be used with the Color Computer (or any other computer with an RS-232 port). The serial transmission rate can be set to either 600 or 1,200 baud. Although the Color Computer normally sends data to a printer at 600 baud, the output rate can be increased to 1,200 by executing a POKE 150,41.

The printer is housed in the traditional Tandy black and gold plastic case. It is small: 15.4 inches wide by 11 inches deep by 4.7 inches high and weighs only 16.5 pounds. It accepts standard 9 1/2 by 11-inch fan-fold tractor-feed paper. The printer also has a friction-feed platen for using single sheets with up to two carbons. It is equipped for using roll paper as well.

Printing Speed

Normal printing speed with ordinary (10 cpi) characters is 80 characters per second (cps) and 55 lines per minute (lpm) with a 20-character line and 23 lpm with an 80-character line. Condensed characters print at 100 cps and 18 lpm with 132 character

DEC	SYMBOL	DATA/WORD PROCESSING MODE	GRAPHICS MODE
08 nn	BS	Backspace nn dot columns	Ignored
10	LF	Full Line Feed	5/48 inch LF
13	CR	Carriage Return	Carriage Return
14	SO	End Underline	Ignored
15	SI	Start Underline	Ignored
18	DC2	Select Graphic Mode	Ignored
19	DC3	Ignored/Select DP Mode	Ignored
20	DC4	Select WP Mode/Ignored	Ignored
27 1-9	ESC 1-9	Proportional Spacing	Ignored
27 14	ESC SO	Start Elongation	Start Elongation
27 15	ESC SI	End Elongation	End Elongation
27 16	ESC POS	Positioning,	Positioning,
n1,n2	n1,n2	Dot Column	Dot Column
27 17	ESC DC1	Select Proportional Char.	Ignored
27 19	ESC DC3	Select Ordinary Char.	Ignored
27 20	ESC DC4	Select Condensed Char.	Ignored
27 10	ESC LF	Full Reverse Line Feed	Ignored
27 28	ESC FS	Half Forward Line Feed	Ignored
27 30	ESC RS	Half Reverse Line Feed	Ignored
27 56	ESC 8	3/4 Forward Line Feed	Ignored
28	FS	Repeat Print Data	Repeat Prt. Data
n1,n2	n1,n2	n1 = # repeats, n2 = data	
30	RS	Ignored	End Graphics

Table 1. Printer Central Codes

“Any character or bit graphics image can be printed up to 256 times.”

lines. Elongated ordinary characters print at 40 cps. Bit graphics are printed with a speed of 480 dots per second.

The printer senses when a line contains less than 80 characters, stops the print head at the last character and line feeds to the next line. It will only move toward the left margin as far as necessary to print the first non-blank character in a line. These two features permit fast short line printing.

Graphics

The LP VIII generates graphics in two ways. First, decimal ASCII codes 225-254 print the 30 block graphics designs shown in Fig. 2. The second, much more detailed method is to use the Bit Graphics mode of the printer.

In Bit Graphics mode, you can print any combination of seven dots in a dot column. A line feed moves the paper up approximately 1/10 inch. The small paper advance allows for continuous printing without spaces between lines. The dot density is 960 dots per line with 480 addressable dot-column positions. A Position command allows you to position the print head horizontally at any of the 480 dot-column positions before printing. Absolute column positioning is also available in the text modes, with 800 available dot positions in the condensed and proportional character sets.

Another useful feature of both the text and Bit Graphics modes is the Repeat command. Any character or bit graphics image can be printed up to 256 times, which is particularly useful for plotting points on a line. The Bit Graphics commands are completely compatible with those of the LP VII, except for the LP VIII's lack of a character column addressing command. Since the function of that command can be performed by dot-column addressing in both printers, any program for the LP VII can be written to work without modification on the LP VIII.

Both block graphics and word processing applications benefit from the variable line spacing allowed. In the Data Processing or Word Processing modes, the normal line spacing is six lines per inch. Both eight (3/4 line) and twelve (1/2 line) lines per inch are also available. Forward and reverse line feeds are program selectable when six or twelve lines per inch is set.

Controlling the Printer

All printing capabilities are selected by sending a series of control codes to the printer (Table 1).

In Basic, control codes are sent to the printer using the LPRINT statement. LPRINTing the decimal code for the ASCII control character with CHR\$ causes the printer to respond accordingly. For example, LPRINT CHR\$(15) starts underlining

and LPRINT CHR\$(14) ends underlining. Some commands require two or more codes be sent to the printer. These should be separated by a semicolon to avoid having the carriage return/line feed sent between them.

The sequence LPRINT CHR\$(27); CHR\$(20) sends the ASCII characters ESC (decimal 27) and DC4 (decimal 20) to the printer and causes all subsequent text to be printed in the condensed character set. To return to the ordinary character set just use LPRINT CHR\$(27); CHR\$(19). Different character sets, carriage motions and other options (such as underlining) can easily be mixed within the same line.

Printer Test

Holding the restart switch down while turning on the power causes the printer to print all its characters. There is also a built-in test for carriage movement which does not print any characters.

Instruction Manual

The 49-page instruction manual is comprehensive and detailed. Unfortunately, it is so detailed it reads more like a technical manual than a “how to” manual. The sections on proportional spacing, repeated printing, absolute positioning and bit graphics are difficult to understand without some background in bit/byte addressing. Another irritating aspect of the manual is the preponderance of typographical errors (some rather serious). The booklet does contain some helpful examples, but is not as helpful as it could be. (It is substantially inferior to the Epson MX-80's 107-page manual, for example).

Comparison Summary

One of the most positive features of the LP VIII is the overwhelming similarity between its control codes and those of the LP IV (or its Centronics equivalent). Most programs written for the LP IV such as patches

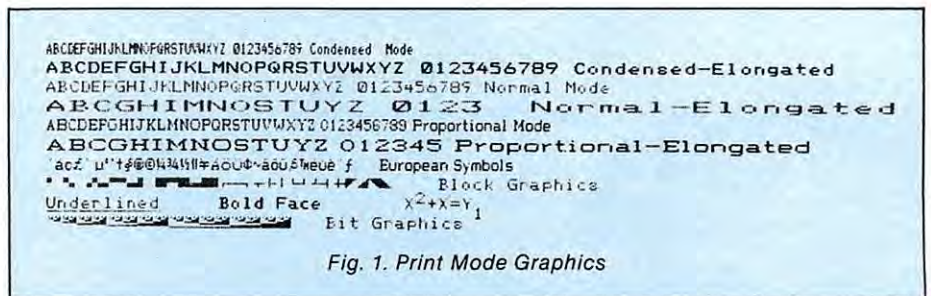


Fig. 1. Print Mode Graphics

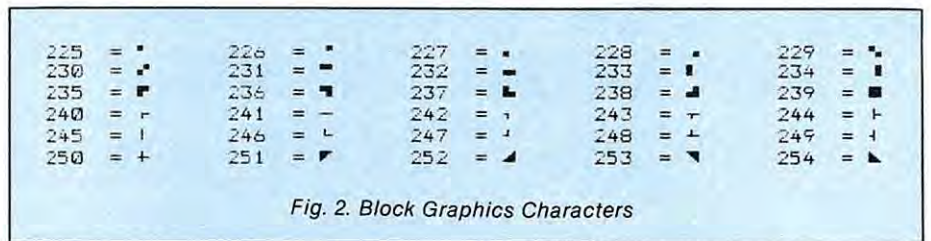


Fig. 2. Block Graphics Characters

```

4 ***** LINEPRINTER VIII PRINT MODES *****
5 LPRINT "LPRINT "
10 LPRINT TAB(5);CHR$(27);CHR$(20);"ABCDEFGHIJKLMNFGIRSTUVWXYZ 0123456789 Condensed Mode";CHR$(27);CHR$(19)
15 LPRINT TAB(5);CHR$(27);CHR$(20);CHR$(27);CHR$(14);"ABCDEFGHIJKLMNFGIRSTUVWXYZ 0123456789 Condensed-Elongated";CHR$(27);CHR$(15);CHR$(27);CHR$(19)
20 LPRINT TAB(5);"ABCDEFGHIJKLMNFGIRSTUVWXYZ 0123456789 Normal Mode"
30 LPRINT TAB(5);CHR$(27);CHR$(14);"ABCDEFGHIJKLMNOSTUYZ 0123 Normal-Elongated";CHR$(27);CHR$(15)
40 LPRINT TAB(5);CHR$(27);CHR$(17);"ABCDEFGHIJKLMNFGIRSTUVWXYZ 0123456789 Proportional Mode";CHR$(27);CHR$(19)
45 LPRINT TAB(5);CHR$(27);CHR$(17);CHR$(27);CHR$(14);"ABCDEFGHIJKLMNOSTUYZ 012345 Proportional-Elongated";CHR$(27);CHR$(15);CHR$(27);CHR$(19)
50 LPRINT TAB(5);CHR$(27);CHR$(17);FOR I=160 TO 191:LPRINT CHR$(I);NEXT I:LPRINT " European Symbols";CHR$(27);CHR$(19)
60 LPRINT TAB(5);FOR I=225 TO 254:LPRINT CHR$(I);NEXT I:LPRINT " Block Graphics"
80 LPRINT TAB(5);CHR$(15);"Underlined";CHR$(14);" "AS="Bold Face";LPRINT A;CHR$(68);CHR$(107);A$;" ";
90 LPRINT CHR$(20);"X";CHR$(27);CHR$(30);"2";CHR$(27);CHR$(28);"X=Y";CHR$(27);CHR$(28);"1";CHR$(27);CHR$(30)
100 LPRINT TAB(5);CHR$(19);FOR I=126 TO 255:LPRINT CHR$(I);NEXT I:LPRINT CHR$(30);" Bit Graphics"
110 LPRINT "LPRINT "

```

Program Listing 1. Normal

"Normal printing speed with ordinary (10 CPI) characters is 80 characters per second. . ."

to Scripsit, should work without modification on the LP VIII.

Programs using some of the additional control codes of the LP VIII (such as the graphics codes), should be easy to convert to that printer. Some programs will be easier to implement on the LP VIII because of its graphics capabilities (adding Greek letters, math symbols and equation capabilities to Scripsit).

Another obvious comparison is between

the LP VIII and the Epson MX-80 (see *80 Microcomputing*, August 1981 for an excellent review of the MX-80). The MX-80 has all of the character spacings available in the LP VIII with the exception of proportional characters. The MX-80 attempts to achieve letter quality by either double-striking characters or striking them with more force. Both of these modes yield very good results and have a significant advantage over proportional spacing.

Model I and III Scripsit does not allow the use of right-justification, hyphenation, horizontal centering, or accurate tab commands with proportional spacing. The MX-80's method of producing good print does not interfere with these functions. The MX-80 does not, however, have such an extensive block graphics set, the European characters, or the Bit Graphics mode.

One final caution: None of the fancy word processing features of the LP VIII (superscripts, subscripts, underlining, backspacing, proportional spacing, European and word processing characters, block graphics and much of the ASCII set) are accessible from Scripsit. The proportional character set can be used by selecting that mode from Basic before loading Scripsit, but it cannot later be changed within Scripsit and many useful Scripsit commands cannot be used with proportional characters.

With the exception of the difficulties dealing with existing word processing software, there is no question the LP VIII is an exceptionally useful printer. It should have no difficulty capturing the large market once filled by the Line Printer IV. ■

```

4 ***** LINEPRINTER VIII PRINT MODE *****
5 LPRINT " "
10 LPRINT TAB(5) CHR$(27);CHR$(28);"ABCDEFGHIJKLMNPQRSTUWXYZ 0123456789 Condensed Mode";CHR$(27);CHR$(19)
15 LPRINT TAB(5) CHR$(27);CHR$(28);CHR$(29);CHR$(30);"ABCDEFGHIJKLMNPQRSTUWXYZ 0123456789 Condensed-Elongated";CHR$(27);CHR$(15);CHR$(27);CHR$(19)
20 LPRINT TAB(5) "ABCDEFGHIJKLMNPQRSTUWXYZ 0123456789 Normal Mode"
30 LPRINT TAB(5) CHR$(27);CHR$(14);"ABCDEFGHIJKLMNPQRSTUWXYZ 0123 Normal-Elongated";CHR$(27);CHR$(15)
40 LPRINT TAB(5) CHR$(27);CHR$(17);"ABCDEFGHIJKLMNPQRSTUWXYZ 0123456789 Proportional Mode";CHR$(27);CHR$(19)
45 LPRINT TAB(5) CHR$(27);CHR$(17);CHR$(18);CHR$(19);"ABCDEFGHIJKLMNPQRSTUWXYZ 012345 Proportional-Elongated";CHR$(27);CHR$(15);CHR$(27);CHR$(19)
50 LPRINT TAB(5) CHR$(27);CHR$(17);FOR I=160 TO 191:LPRINT CHR$(I);NEXT I:LPRINT " European Symbols";CHR$(27);CHR$(19)
60 LPRINT TAB(5);FOR I=225 TO 254:LPRINT CHR$(I);NEXT I:LPRINT " Block Graphics"
80 LPRINT TAB(5) CHR$(15);"Underlined";CHR$(14);" ";;AS="Bold Face":LPRINT AS;CHR$(80);CHR$(187);AS;" "
90 LPRINT CHR$(20);"X";CHR$(27);CHR$(30);"2";CHR$(27);CHR$(28);"x=x";CHR$(27);CHR$(28);"1";CHR$(27);CHR$(30)
100 LPRINT TAB(5) CHR$(18);FOR I=120 TO 255:LPRINT CHR$(I);NEXT I:LPRINT CHR$(30);" Bit Graphics"
110 LPRINT " "
  
```

Program Listing 2. Condensed

FREE EPSON MX-80 PRINTER

With the purchase of a TRS 80, Model III.



For a limited time, Data Services, Inc., will give you a FREE Epson MX-80 Printer (\$645 value), when you buy a TRS 80 Model III, 48k, with 2 PERCOM 40 track drives, at a regular price of \$2,495.

(Optional RS 232. \$90 extra. Radio Shack w/RS 232 - \$170 extra. Printer cable - add \$35.00)

The perfect system, the perfect price!
TRS 80 Model III, 48k - two PERCOM 40 track drives - EPSON MX-80 Printer.

Data Services offers more — APPARAT'S NEWDOS 80, version VER 2.0, regularly \$149.95 — now only \$129.95

Up to 20% savings on TRS computers — accessories — programs. Plus: EPSON / PERCOM / APPARAT / HAYES SMARTMODEM / VERBATIM DISKETTES.

*TRS-80 is a trademark of Tandy Corporation.

- FREE SHIPPING in 48 contiguous states.
- No Sales Tax on out-of-state orders.
- Visa/Master Card welcome.
- Personal checks, allow 3 weeks to clear.
- (International orders, freight F.O.B. Wichita, Kansas)

CALL TOLL FREE: 1-800-835-1129
 or order by mail from:

DATA SERVICES, INC.

COMPUTER SERVICES SINCE 1970

P.O. Box 1157 Wichita, Kansas 67201-1157
 (In Kansas, call 1-316-838-9021)

TRS-CPM*

TRS-80 owners...if you would like to learn more about CP/M, call or write for our free brochure.

OMIKRON proudly presents

The Works

The ultimate CP/M package for your TRS-80* Model I or III

The WORKS includes:
Mapper I & CP/M 2.2, CBASIC II, MBASIC-80
and WordStar

\$399

Mapper I CP/M adapter card designed for simple plug-in installation. Also available in a 64K version for \$199 extra.

CP/M 2.2 is the latest version of CP/M from Digital Research. Our package also includes the MAPPER I CP/M adapter and a sophisticated set of utilities and drivers designed to optimize the CP/M system for the TRS-80.

List price: \$239

WordStar is widely recognized as the most advanced product on the market. It is featured by many computer manufacturers, including Xerox, for wordprocessing applications.

List price: \$495

MBASIC-80 is the CP/M version of Microsoft BASIC. The conversion of TRS-DOS BASIC programs to MBASIC is easy because the syntax is almost identical.

List price: \$349

CBASIC II is the most widely used BASIC for CP/M applications programs. This version of BASIC contains all of the features necessary to develop complex business programs.

List price: \$149

OMIKRON

Products that set Precedents

1127 Hearst Street, Berkeley, CA 94702 (415) 845-8013

ORANGE MICRO JUST TURNED A PAGE IN PRINTER HISTORY.

OUR PRICES, SELECTION & SAME-DAY SHIPPING MAKE US COMPETITIVE...

NEC 8023

Outstanding Graphics, Print
Quality & Performance



144 x 160 dots/inch • Proportional Spacing
• Lower case descenders • Nx9 dot matrix
• 8 character sizes • 5 unique alphabets
• Greek character set • Graphic symbols
• 100 CPS print speed • Bi-directional logic
seeking • Adjustable tractors • Single-sheet
friction feed • Vertical & horizontal tabbing

NEC 8023 List \$795 **\$Call**
Dot Matrix

IDS Paper Tiger 560/Prism 80/132

Affordable Color, Speed



Dot Resolution Graphics • 9-wire staggered
printhead • Lowercase decenders • Over
150 CPS • Bi-directional, logic-seeking
• 8 character sizes • 80-132 columns
• Hi-res dot graphics • Proportional spacing
• Text justifications

Prism 80 List \$899 **\$700**
IDS Paper Tiger 560G List \$1395 **\$1100**
Prism 132 (Color) List \$1995 **\$1895**

NEC Spinwriter 7700 & 3500

Daisy Wheel Quality Leader



High speed, letter quality • 55/33 CPS
• Typewriter quality • Bi-directional plotting
& proportional spacing • Quiet • OCR quality
print • Hi-res plotting/graphing • Quick change
ribbon • Optional cut-sheet feeder, horizontal
or bidirectional tractors • Prints up to 8 copies

NEC Spinwriter RO
Serial Parallel 77xx List \$3055 **\$2575**
35xx List \$2290 **\$1975**

The Epson Series. High-Quality Printers at a Low Price.



Epson MX70

Super low priced dot resolution graphics
• 5 x 7 dot matrix • User replaceable printhead
• Top of form • 80 CPS optional friction feed
• 10" paper width

Epson MX70 List \$450 **\$390**



Epson MX80/MX80FT

9 x 9 dot matrix • Lower case decenders
• 80 CPS • Bi-directional • Logic seeking
• 40, 66, 132, columns per line • 64 special
graphic characters: TRS-80 Compatible
• Forms handling • Multipage printing
• Adjustable tractors

Epson MX80 List \$645 **\$Call**

Epson MX80FT List \$745 **\$Call**



Epson MX100

Same basic features as the MX80 • Plus
friction feed for single sheets • Plus 15" wide
carriage • Dot Resolution Graphics

MX100 List \$995 **\$Call**

Full Line of Epson Accessories

Anadex 9501

High Speed, Commerical Duty
Plus Graphics



Dot graphics • Wide carriage • 11 x 9 dot
matrix • Lower case descender • Dot
resolution graphics • Bi-directional, logic
seeking • Up to 200 CPS • RS 232 Serial &
Parallel • Forms control • X-On/X-Off • Up to
6 part copy

Anadex 9501 List \$1650 **\$1350**

INTERFACE EQUIPMENT

Complete stock of options, cables and accessories.

GRAPPLER APPLE INTERFACE	\$175
CCS APPLE SERIAL Interface & Cable	\$150
ORANGE INTERFACE for Apple II Parallel Interface Board and Cable	\$110
NOVATION D-CAT direct connect modem	\$180
COMPLETE STOCK OF EPSON ACCESSORIES	\$Call
CUSTOM PRINTER CABLES FOR Apple, Atari, IBM, TRS-80 (all models)	\$Call
HAYES MICROMODEM	\$300
PRINTER STANDS: Large	\$99
Small	\$25
PRINTER RIBBONS—Most Types	\$Call

WE'RE NOW



OUR PEOPLE MAKE US EXPERTS.

Malibu 200
Dot Matrix & Letter Quality
in One Printer



200 CPS standard • Letter quality font
• 12 optional fonts • Bi-directional logic
seeking • 19 x 18 dot matrix • Expanded
characters (2x, 4x) Optional • Dot resolution
graphics of 144 x 120 • Underlining

Malibu 200 List \$2995 **\$2600**

Okidata 82A
Hi-Res & TRS-80 Block Graphics



120 CPS • Bi-directional printing • Logic
seeking • Double width & condensed printing
• Friction & tractor feed standard • Font
selection, character pitch & line spacing are
program controllable

Okidata 82A List \$799 **\$Call**

Centronics 739
Crisp Dot-Matrix Characters



Graphics & word processing print quality
• N x 9 dot matrix • suitable for word
processing • Underlining • Proportional
spacing • Right margin justification • Serif
typeface • 80/100 CPS • 9 1/2" pin feed/friction
• Optional 2 Color Kit

Centronics 739-1 List \$695 **\$Call**

Centronics 739-3 List \$795 **\$725**

Our People, Our Product: Both Are Specialized.

Because our salespeople are printer specialists, they know the capabilities of each printer—and how to match one to your exact need. Red Baron's volume stocking assures a low, low price on a wide array of major brands. We're sure you'll like the product and services you get from Red Baron, and we know you'll love our Customer Benefit Package; an exclusive at Red Baron.



Customer Benefit Package

1. Free Expert Consultation. Before you buy, after you buy. **2. Toll-Free Ordering.** There's never a toll charge when you place your order at Red Baron. **3. Free Catalog.** Get your informative catalog with printer comparison chart and character samples today! **4. Warranty.** The manufacturer's warranty applies where applicable. **5. Same-Day Shipping.** Your order is sent the same day when you call before 11:00 a.m. **6. Free/MasterCard & Visa.** Call us toll-free and charge your printer to your credit card. **7. We Stock What We Sell.** No bait and switch, no hassle. We make every effort to keep a large stock of our advertised products.

Televideo CRT's
Price, Performance & Reliability



910C List \$699 **\$600**
920C List \$995 **\$770**
925C List \$995 **\$750**
950 List \$1195 **\$970**

Here's how to order.

Phone orders are welcome; same-day shipment on orders placed before 11:00 a.m. Free use of MasterCard and Visa. CODs accepted. Personal checks require 2 weeks clearance. Manufacturer's warranty included on all equipment. Prices subject to revision.



**CALL FOR
FREE CATALOG**

TOLL FREE

1-800-854-8275 CA, AK, HI (714) 630-3322

Orange Micro Retail Stores
Sherman Oaks: 13604 Ventura Blvd. (213) 501-3486
Anaheim: 3150 La Palma, # 1 (714) 630-3622
Santa Clara: 3216 Scott Blvd. (408) 980-1213



An annotated list of ROM literature.

ROM Bibliography

Paul F. Secord
8341 Winningham Lane
Houston, TX 77055

form but can be read as hexadecimal bytes. With the aid of a disassembler, it can be automatically translated and printed as Z80 assembly language instructions. If you program in assembly language ROM routines will be useful. If you program mainly in Basic, you can call from Basic assembly language routines to accelerate execution speeds.

ROM routines can usually be called from within assembly language programs. A call, similar to a GOSUB in Basic, sends control to the subroutine and returns when the subroutine is completed. Suppose you want to introduce a blinking asterisk in your assembly language program. You would include the instruction CALL 022CH. When control reaches that part of the program, an asterisk blinks in the upper right corner of the screen. Since this routine changes the contents of all registers, save those containing needed data.

ROM is the heart of any computer. If you are fascinated by how computers work, you should learn about ROM and machine language. The books reviewed here will provide new insights into the workings of computers such as the TRS-80.

Radio Shack does not support the use of ROM routines in programming. They want to be free to modify ROM as it becomes advisable. Then programs using ROM might not run on all machines. For example, a few unannounced changes have been made in Model I ROM since the first TRS-80 appeared, so not all Model Is are identical. Their lowercase fix for the CRT screen is a ROM modification. Some programs written for unmodified machines will not run on modified ones. And, of course, Models II and III have different ROMs from Model I.

Radio Shack's concern is well founded, yet this limitation can be exaggerated. Only a few modifications have been made in successive Model I ROMs. Except for the lower-

case modification, the changes do not involve commonly used internal routines. At least one of the books I will discuss specifically details known ROM changes in the Model I, so programmers can avoid them. If you write programs only for your machine, ROM routines that work for you are not a source of trouble.

Radio Shack Basic was written by Microsoft and is protected by copyright. As a result, authors writing about TRS-80 ROM have published listings in incomplete forms. You can fill in the blanks if you have a disassembler for printing ROM contents in Z80 assembly language.

The Books

The following references are listed in order of publication:

Software Technical Manual. Bellaire, TX: Houston Microcomputer Technologies Inc. 1979. 39 pp. \$40.00.

Fuller, Roger. *Supermap: Level II ROM Documentation*. Grand Prairie, TX: Fuller Software. 1979. 36 pp. \$8.95.

Richardson, Robert M. *Disassembled Handbook For The TRS-80*. Vols. 1 and 2. Chautauqua, NY: Richcraft Engineering Ltd. 1980. Vol. 1, 69 pp. \$10.00; Vol. 2, 174 pp. \$15.00.

Daly IV, Raymond E. et. al., *The Book: Accessing the TRS-80 ROM. Vol. 1 Math*. Springfield, VA: Insiders Software Consultants, Inc. 1980. 132 pp. \$16.45.

Blattner, John, and Bryan Mumford. *Inside Level II*. Summerland, CA: Mumford Microsystems. 1980. \$15.95.

Nicholas, Robert F. *Pathways Through The ROM*. Milford, NH: Softside Publications. 1980. \$19.95.

Wilkes, Richard P. and Stephen C. Hill. *The Book: Accessing The TRS-80 ROM. VOL. II: Input/Output*. Springfield, VA: Insiders Software Consultants Inc. 1981. 156 pp. \$16.45.

Articles about ROM (Read Only Memory) abound, and many books claim to reveal ROM's valuable secrets.

About ROM

In the TRS-80 Models I and III, ROM is approximately 12K (over 12,000 bytes). This fixed memory makes it possible for you to communicate with your computer. ROM translates Basic program statements into machine language, checks them, reports errors, contains the routines for communicating with the keyboard and the video screen, and for accessing peripheral equipment (tape recorders, printers and disk drives). Essentially, ROM is an interpreter. If you communicate with your computer only in Basic or other high level languages, a knowledge of how ROM interprets is not necessary.

There are circumstances when it is helpful to know about ROM. ROM is stored in binary

GRAPHICS

THE NEW DIMENSION IN WORD PROCESSING FROM **SIMUTEK**

Word processing will never be the same.

CopyArt™ from Simutek is the first word/graphics processor for TRS-80 Mod. I & III, or PMC-80 and 81. CopyArt gives you unmatched editing flexibility. Change sizes and styles of type in a single line. Insertor delete characters, words and lines. Underline, bold face and make block moves simply. Pagination, headers and footers are a snap. You have complete format control, including justification, centering and flush right copy positioning.

And that's just the beginning.

CopyArt™ is also a graphics generator that can make words and letters in any size, produce graphs, charts, cartoons, logos, borders and illustrations. Business graphs and charts can be intermixed with text to produce reports of exceptional quality. CopyArt's scrolling capability frees you from the bonds of a 64 column screen. CopyArt can simulate a page up to 255 characters wide.

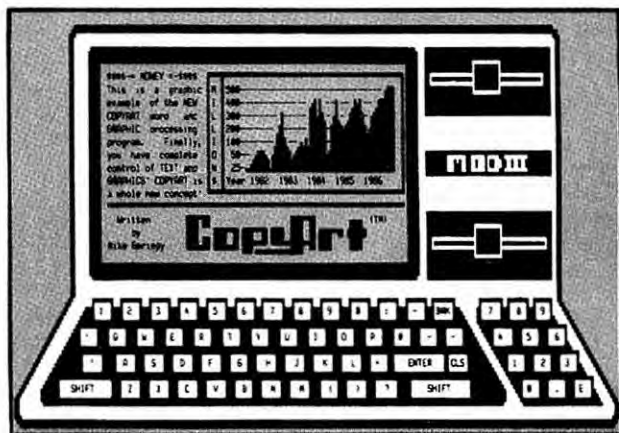
Commands in CopyArt are as simple as 'I' for Insert, 'B' for block move, etc. CopyArt even supports DOS commands like DIRectory, FREE and KILL. A special HELP command gives you instant access to an on-line manual.

CopyArt™ makes word processing more flexible than ever before. It supports the full graphics character sets of Epson and Okidata printers as well as the proportionally spaced justification superscripting, and subscripting capabilities of Centronics' 737 and 739 printer and Radio Shack's Line Printer IV. On non-graphic printers (C-Itoh, Diablo, Radio Shack Daisy Wheel, and others with the ability to turn off linefeeds) CopyArt creates pseudographics by overstriking standard characters. On every printer, especially dot matrix printers, the double printing feature produces unbelievably crisp copies.

(Headline and illustrations produced on CopyArt)

Technical questions? Call (602) 323-9391. Dealer inquiries welcome.

TRS-80 is a TM of Radio Shack, a Tandy Corporation • CopyArt is a TM of Simutek Computer Products Inc.



CopyArt™ WORD/GRAPHICS PROCESSOR FROM SIMUTEK

Diskette and instruction manual ___ \$149.95

Requires TRS-80 MOD I or III, 48K, 1 disk

10 DAY MONEY BACK GUARANTEE

To order call **TOLL FREE 800-528-1149** for VISA
MasterCard American Express COD orders only.

Or mail check or money order to

SIMUTEK

Computer Products Inc.

4877 E. Speedway, Tucson, AZ 85712

"ROM is stored in binary form but can be read as hexadecimal bytes."

Favour, James. *Microsoft Basic Decoded And Other Mysteries*. Upland, CA: IJG Computer Services. 1981. 310 pp. \$29.95.

I will not treat *Pathways Through The ROM* separately. The package includes Volume 1 of the *Disassembled Handbook*, *Supermap*, a Controller Sheet for hardware buffs, two disk maps, and two printed items in the public domain (a disassembler and a Hex-Mem monitor).

The secrecy surrounding ROM in 1978 and 1979 heightened interest in it. According to speculation Radio Shack underestimated the serious programmer's interest in using assembly language. Their early manuals had little information concerning ROM reference points. The Editor/Assembler Manual was also skimpy on this point.

The first published booklet, the *Software Technical Manual*, revealed some of ROM's inner workings for the first time. This achievement came about through a mysterious gentleman named Hildebrand. The manual spells out in a terse and technical fashion how ROM can be used for data handling, logical comparisons, arithmetic functions, data conversions and to adapt Basic routines. It also provides information concerning I/O routines involving the keyboard, tape and disk. It offers a memory map, a tape copy program and ways for the Basic programmer to annex multiple assembly language routines. The manual is mainly of historical interest now. The information has been presented more clearly and in greater detail in other more reasonably priced references.

Supermap selects several hundred key addresses from ROM and documents what they do. Consider the following line from *Supermap*:

```
0060 DELAY LOOP BC IS COUNTER  
14.65 MICROSECONDS EACH LOOP
```

This means you can set BC to a desired value and Call 60H to create a delay which is BC times 14.65 microseconds. You might want to display a graphic for this elapsed time and then move on automatically. The documentation is invaluable. It covers tape I/O routines, system tape format, video driver, cursor control, scrolling, printer driver, arithmetic routines, keyboard scans and input, Editor/Assembler source tape format, entry points for Basic commands, various tables in ROM, Basic tape format, key reserved addresses in RAM and much more. Since most of *Supermap* consists of single phrase documentations of hex addresses in ROM, it is primarily for experienced assembly language programmers. But you do not have to be an expert to use it.

Volumes 1 and 2 of the *Disassembled Hand-*

book also appeared fairly early, explaining the author's wild enthusiasm for ROM routines. He castigates authors for writing articles and books on programming arithmetic routines when supposedly all one need do is call arithmetic routines from ROM. He repeatedly claims the assembly language programmer can save pages of program statements by employing ROM routines and implies that any idiot can see how to do this. This is misleading, to say the least. ROM routines cannot be used without a thorough understanding of what you are doing.

Volume 1 has information about the location of ROM routines ordinarily activated by Basic commands for use by assembly language programmers. Little guidance is given. Their use is far from straightforward. Many do not end in a RET instruction, and merely calling them returns control to Basic instead of your machine language program. They are often inefficient, involving routines necessary to Basic but not machine language.

Space is devoted to explaining arithmetic routines for the three kinds of TRS-80 numbers: integer, single precision and double precision. Useful demonstration programs are provided. They are probably the strongest feature of the book, although I

"Thorough, clear,
meticulous on...
number crunching."

have not tested them. Other sections provide information about keyboard routines, video display and printer output routines. Unfortunately, the suggestions for printer output do not work with my setup. This leads me to wonder about other sections. Many pages list hex bytes in ROM without documentation. It is hard to imagine anyone finding information in that form useful.

In spite of the author's statement that machine code without comments is useless Volume 2 has still more pages of hex bytes. Chapters deal with VARPTR (a Basic function) and its relation to the types of numbers used by the TRS-80, as well as its use with strings; more on single and double precision floating point numbers; an assembly language routine for tape users which prints the current contents of the screen when the JKL keys are pressed simultaneously; a program for a split screen; and exercises for the reader. I only tested the JKL routine and regret to report it does not work without modification.

The author sends each byte in screen memory (3C00H to 3FFFH) directly to the

printer. He must have used a dumb printer that ignored everything but ASCII codes. Most printers today are intelligent, responding to control codes. Some even print graphics. My MX-80 Epson went berserk when it received bytes from this JKL program.

JKL routines must include sorting mechanisms for sending only ASCII codes and for converting control and graphics codes to other numbers. ROM contains some of these routines, but using them requires considerable sophistication. These difficulties emphatically make the point that you need to know exactly what you are doing when using ROM routines. Both volumes of the *Disassembled Handbook* fail in this respect.

Volume I of *The Book* is far superior to the *Handbook*. It is a thorough, clear and meticulous presentation on how to do number-crunching with the TRS-80. The authors begin with a lucid explanation of integer, single and double precision variables, and explain how these are stored in the variable tables at the end of Basic. Reserved RAM forms accumulators for manipulating these number types; these are described along with the register accumulators. Routines for manipulating these different data types are described, including not only appropriate calls to ROM, but also special routines provided by the authors.

A common problem in interfacing ROM routines has been that, if an error occurs, control jumps to Basic. An error-trapping routine is offered to solve this problem. Routines such as data conversion, movement of data, ASCII conversions, geometric functions and obtaining logarithms are explained with precautions. A commented disassembly of all the math routines is also provided. Appendices provide quick references to ROM entry points, I/O areas, storage areas, pointers and three sample math routine programs. This volume is indispensable for complex number processing.

The Book Volume II is an exhaustive treatment of I/O routines in ROM and how to use them. Typically, inexperienced assembly language programmers have their greatest difficulty in this area. The book begins by explaining the Device Control Block, data flow, drivers, flags, register usage and invalid requests. Successive chapters take up keyboard input, video and printer output, and tape I/O. Each chapter is followed by a complete disassembly of all relevant ROM routines, with line-by-line comments. Appendices offer the authors' own lowercase and printer drivers, an alternate System loader and various tables. Like its companion volume, the book is unique in its complete, detailed coverage.

Inside Level II takes a different approach. The book is a gem—a model of clarity, log-

MORE BYTE PER BUCK

**OUR LOW PRICES INCLUDE FREE SHIPPING
SATISFACTION GUARANTEED BY SIMUTEK**

COMPUTERS



Complete MODEL III COMPUTER

Model III with 48K memory, 2 disk drives, 370K storage, and ready to run with TRSDOS 1.3 and manual. 120 day Simutek warranty parts and labor. Compatible with all Radio Shack software. \$1899.99

Model III with 48K, 2 double sided 40 track disk drives with 750K storage. Comes with NEWDOS 80 V.2 and manual. 120 day Simutek warranty parts and labor. Compatible with Radio Shack software. Complete and ready to run. \$2389.99

MODEL III FIVE MEGABYTE HARD DISK

Comes with modified DOSPLUS. No installation required, just plug in 50 pin bus. Complete and ready to run. \$2499.99

MODEL III INTERNAL DISK DRIVE KITS

If you can use a phillips screwdriver, you can easily install Simutek's Model III disk drives and controller in less than an hour. Absolutely NO SOLDERING, TRACE CUTTING OR TECHNICAL KNOWLEDGE REQUIRED! The J & M controller is the best on the market today. We've tried others and found J & M's the finest and easiest to install. We warranty the J & M controller for 120 days against defects in workmanship.

ONE 40 TRACK TANDON DISK DRIVE WITH 185K STORAGE, and J & M controller. Radio Shack DOS, manual. No soldering or trace cutting required. Ready to install with instructions. \$619.99

TWO 40 TRACK TANDON DISK DRIVES 370K STORAGE, with J & M controller Radio Shack DOS, manual. No soldering or trace cutting. Ready to install and run. Instructions. \$889.99

TWO DOUBLE SIDED 40 TRACK DISK DRIVES with 750K storage and J & M controller. NEWDOS 80 V.2. and manual and Model III DOS. No soldering or trace cutting. Ready to install and run. Full instructions. \$1299.99

DISK DRIVES

MODEL I DISK DRIVES

ONE TEC DISK DRIVE 40 TRACK DISK DRIVE with 5ms track to track access time, with power supply chassis, extender cable and shipping for TRS-80. One year warranty on parts and labor. Ten day money back guarantee. Model I or III \$279.00

ONE TEAC 40 TRACK DISK DRIVE, 30 ms track to track, with P/S and chassis, ready to run as drive 0-4. 10 day money guarantee. One year warranty \$279.00

ONE TANDON 40 TRACK DISK DRIVE, 5 ms track to track, with P/S and chassis, ready to run as drive 0-4 or Model III external. 10 day money back warranty \$279.00

ONE 2 DRIVE cable for Model I or III. (Specify) \$25.00

ONE 4 DRIVE cable for Model I only \$35.00

PRINTERS

Letter quality Daisywheel
TEC C-itho 40 CPS Parallel \$1599.99
TEC C-itho 40 CPS Serial \$1649.99
TEC C-itho 45 CPS Parallel \$1799.99
TEC C-itho 45 CPS Serial \$1899.99
TEC C-itho tractor feed \$269.00

High quality dot matrix
TEC C-itho PROWRITER 8510 \$539.99
Epson MX-80 \$479.99
Epson MX-80 F/T \$599.99

Epson MX-100 \$799.99
Epson Graphtrax \$89.99
Malibu 200 dual mode \$2695.99
Okidata microline 80 \$369.99
Okidata microline 82A \$599.99
(Free tractor feed)
Okidata microline 83A \$799.99
(Free tractor feed)
Okidata microline 84 \$1269.99
(Free tractor feed)

Printer Cable for Expansion interface or Model III computer \$29.95

ACCESSORIES/ SOFTWARE, ETC.

16K MEMORY SET SPECIAL

\$17.89 with instructions for MOD I, III Color 4K, Apple, Exidy, one year warranty 200 NS \$17.89

MODEL I, III SOFTWARE

LDOS \$149.95

NEWDOS 80 Ver. 2.0 \$139.00

\$79.95

DOSPLUS...NEW VERSION! \$139.95

DISK HOLDER 5-1/4 \$24.95

PERCOM'S DOUBLER II and DoubleDOS. The best and easiest to install.

Double density mod for Model I. \$159.95



BOOKS

MICROSOFT BASIC DECODED AND OTHER MYSTERIES \$39.95

TRS-80 DISK AND OTHER MYSTERIES \$22.50

BASIC FASTER AND BETTER \$39.95



SUPER MODEM

ESI Lynx smart modem for MOD I or III. Does not require RS-232. Auto answer/dial. Complete with terminal AND host programs. \$279.95

Stop those headaches and eye strain!
ZENITH GREEN SCREEN MONITOR and TRS-80 CABLE \$149.00

SIMUTEK HAS BEEN SATISFYING CUSTOMERS NATIONWIDE FOR THREE YEARS

IF NOT FULLY SATISFIED WITH ANY HARDWARE FOR ANY REASON, RETURN WITHIN TEN DAYS FOR A FULL REFUND OR EXCHANGE. Sorry, no refunds on software.

QUESTIONS? WE KNOW TRS-80S CALL OUR TECHNICAL HOTLINE FOR QUICK AND PROFESSIONAL ANSWERS. (602) 323-9391

ORDERS RECEIVED TODAY ARE SHIPPED TOMORROW. IF AN ITEM IS TEMPORARILY OUT OF STOCK YOU ARE NOT CHARGED UNTIL IT IS SHIPPED.

USE OUR DIME TO ORDER TOLL FREE. (ORDERS ONLY)

(800) 528-1149

FREE SHIPPING ON ALL ORDERS!!

C.O.D.'S OVER \$200 REQUIRE 10% DEPOSIT. ALL C.O.D.'S WILL REQUIRE CASH OR CERTIFIED CHECK FOR PAYMENT.

WE ACCEPT AMERICAN EXPRESS, VISA and MASTERCARD. NO SURCHARGE FOR CREDIT CARD ORDERS!

SORRY, PERSONAL CHECKS REQUIRE 4-5 WEEKS TO CLEAR.



SIMUTEK COMPUTER PRODUCTS INC.

4897 E. SPEEDWAY, TUCSON, ARIZONA 85712
(602) 323-9391 (800) 528-1149

✓ 12

TRS-80 IS A TM OF RADIO SHACK, A TANDY CORP.

"ROM translates Basic program statements into machine language..."

ical organization and thorough documentation. It is even useful for someone who knows only the rudiments of assembly language.

This book makes no attempt to present hundreds of ROM routines. Instead it picks out the most useful and efficient ones and tells you everything you need to know to use them.

Here, as in *The Book*, we gain a clearer understanding of ROM. ROM routines are intertwined with each other. They must serve both disk and tape users. They are written to support Basic, not assembly language programs. They are not always efficient and using them may have disastrous but subtle effects on some other part of your program. Blattner and Mumford are thorough in flagging these pitfalls. I have used most of the routines in their book and every one works perfectly. The book has no flaws; it is a perfect gem. Their knowledge of the TRS-80 so impressed me that I bought their Instant Assembler and their monitors, Micromind and Step-80.

The last entry, *Microsoft Basic Decoded*, is a monumental work, a gargantuan achievement, providing over 7,000 comments on ROM operations.

The first chapter is an overview of the Level II operating and disk systems. The second chapter selects critical ROM routines and details their use. The next two chapters detail cassette and disk operation. Chapter 5 explains how to add an additional sort routine command to Basic. Chapter 6 provides further information on how a separate program can be arranged to be executed by another Basic program. Chapter 7 details the newer ROMs in some TRS-80s. The remaining chapter (about 120 pages) documents ROM in a remarkably thorough manner.

This is a splendid book. If you know the rudiments of assembly language programming, you will get something out of this book, but not as much as from *Inside Level II*.

One shortcoming, shared by all of the books, is the lack of an index. Computer

books are used for reference purposes, so this omission is inexcusable. Future writers take note.

Summing up, *Inside Level II* should be in the library of every programmer. A good complementary work would be either *Supermap* or Volume II of *The Book*. If you plan to do sophisticated number processing in assembly language, Volume I of *The Book* would be a great help. And if you want to add one more reference, certainly *Microsoft Basic Decoded* is the best choice. Finally, I have said nothing about magazine sources on ROM. Perhaps the best for TRS-80 assembly programmers is *The Alternate Source*, a bi-monthly (1806 Ada St., Lansing, MI, 48910). One last caveat. A good monitor/disassembler that single steps through a program (including ROMs), and which displays register and flags contents at each step, should be used in conjunction with any of these books. ■

Paul Secord is Professor of Psychology and Education at the University of Houston.

PLUG INTO...

ACCESS

The Journal of Microcomputer Applications

Numerical analysis, statistics, simulation, information retrieval, engineering design, engineering economics, project planning & management, personal finance, scientific & engineering applications. Subscribe now \$16 for 6 issues. Send check, money order or company purchase order to: ACCESS, P.O. Box 12847, Research Triangle Park, NC 27709

To: ACCESS, P.O. Box 12847
Research Triangle Park, NC 27709
Here's my \$16. Sign me up for 6 issues.

Name _____
Address _____
City _____
State _____ Zip _____

Published by LEDS Publishing Inc.

EXCITING NEWS FOR COLOR COMPUTER USERS

FLEX, OS-9 and the Radio Shack Disk System ALL on the SAME Color Computer

Would you believe that you can run FLEX, OS-9 and Radio Shack disk software on the same Color Computer, and all you have to do is change the disk? That's right, just change the disk. If you have a 32K Color Computer with the Radio Shack disk system, all you need to do is make a trivial modification to access the hidden 32K, as described in the Feb. issue of COLOR COMPUTER NEWS and the March issue of '88' Micro. You can get FLEX from us right now. OS-9 will be ready by summer. Please note that this will only work with the Radio Shack disk system and 32K/64K memory chips that RS calls 32K. Maybe they put 64K's in yours, too. If you don't have a copy of the article, send a SASE and we'll send it to you.

Using this system to run FLEX and OS-9 has many advantages. First, it gives you 48K from zero right up to FLEX. This means that ALL FLEX compatible software will run with NO MODIFICATIONS and NO PATCHES! There are no memory conflicts because we moved the screen up above FLEX which leaves the lower 48K free for user programs.

What you end up with is 48K for user programs, 8K for FLEX and another 8K above FLEX for the screens and stuff. We are working on a multi screen format so you can page backward to see what scrolled by and a Hi-Res screen that will enable us to have 24 lines by 42 character display. That's better than an Apple!

We also implemented a full function keyboard, with a control key and escape key. All ASCII codes can now be generated from the Color Computer keyboard!

We also added some bells and whistles to Radio Shack's Disk system when you're running FLEX or OS-9. We are supporting single or double sided, single or double density, 35, 40 and 80 track drives. If you use double sided drives, the maximum is three drives because we use the drive 3 select for side select. When you are running the Radio Shack disk, it will work with the double sided drives but it will only use one side and only 35 tracks. Using 80 track drives is okay, but will not be compatible with standard Radio Shack software. You can also set each drive's stepping rate and drive type. (SS or DS - SD or DD)

In case you don't understand how this works, I'll give you a brief explanation. The Color Computer was designed so that the roms in the system could be turned off under software control. In a normal Color Computer this would only make it go away. However, if you put a program in memory to do something first (like boot in FLEX or OS-9), when you turn off the roms, you will have a full 64K RAM System with which to run your program (FLEX or OS-9). When the roms are turned off, it is as if you had removed them from the computer. They are gone!

Now, we need the other half of the 64K ram chips to work, and this seems to be the case most of the time, as the article states. Of course, you could also put 64K chips in.

We decided that this was the best way to run FLEX and OS-9 on the Color Computer because it does remove the roms from the memory map and leaves the full 48K for user programs. If you just put in memory for FLEX and use the Basic hooks for I/O, all you have is a little over 30K for user programs. In addition, very few FLEX programs will run without being modified and some won't run very well, if at all (our DATAMAN+ for example). Let me state it again. ALL FLEX COMPATIBLE PROGRAMS WILL RUN WITHOUT MODIFICATION! and the same goes for OS-9!

It is also the ONLY way OS-9 will run because 30K is just not enough.

Some neat utilities are included

MOVROM moves Color Basic from ROM to RAM. Because it's moved to RAM you can not only access it from FLEX, you can run it and even change it!! You can load Color Computer cassette software and save it to FLEX disk. Single Drive Copy, Format and Setup commands are also included.

If you don't have a Color Computer, we can sell you one complete with 64K ram, 24K rom. Single RS disk drive and FLEX for only \$1,490. Set up and ready to go.

FLEX with Edit, Asmb and installation disk is \$199

FRANK HOGG LABORATORY, INC.

130 MIDTOWN PLAZA • SYRACUSE NEW YORK 13210 • (315)474-7856

262

RUN BASIC PROGRAMS AT SUPER SPEED WITH ZBASIC 2.2. THE WORLDS FASTEST TRS-80 BASIC COMPILER from SIMUTEK

BELIEVE IT OR NOT WE'VE ADDED MORE NEW FEATURES to the ONLY INTERACTIVE BASIC COMPILER for the TRS-80!

- Speed increases of 10-100 times are typical after compilation.
- Compiled code can be RELOCATED to run anywhere in memory. Code is even ROMable!
- ZBASIC 2.2 NOW SUPPORTS BOTH RANDOM and SEQUENTIAL DISK I/O.
- ZBASIC 2.2 is now a super tool for business programmers: RANDOM ACCESS FILES, and PRINT USING statements are supported as well as a HIGH PRECISION MATH package (with no rounding problems).
- Special BUILT-IN MACHINE LANGUAGE COMMANDS to increase program operation by as much as 1000 times! Special commands are implemented for fast memory searching (CPDR, CPIR), block memory moves (LDIR, LDDR), inputting and printing HEX numbers, inserting MACHINE LANGUAGE into COMPILED CODE, disabling and enabling interrupts, inverting memory, 16 bit PEEKs and POKEs, and stack control, debug and much more.
- ZBASIC 2.2 compiles the ENTIRE PROGRAM into to Z-80 machine language. (Not 8080 code or a combination of BASIC and machine language like some other compilers.) Clumsy LINKING LOADERS, and RUNTIME MODULES are not needed; ZBASIC 2.2 creates a ready to run MACHINE LANGUAGE program.
- NO ROYALTIES imposed on registered ZBASIC owners.
- Typical COMPILATION TIME is TWO SECONDS for a 4K program.
- Use TRS-80 Basic to write ZBASIC programs!
- Compile many existing programs with only minor changes. (Some BASIC programming experience is required.)
- Fully compatible with both the Model I and the Model III. Mod I compiled programs work on a MODEL III, and visa-versa. ZBASIC works with NEWDOS-80, NEWDOS+, DOSPLUS, LDOS, MULTIDOS, ULTRADOS, TRSDOS etc.
- BUILT-IN and much improved MUSIC and SOUND EFFECTS commands.
- Improved CHAINING for disk users.
- TIME\$ now available on DISK version.
- ZBASIC 2.2 now has an INPUT @ command (similar to PRINT @).
- The TAB function will now tab 255 columns on a printer. (BASIC cannot tab past column 64.)
- NEWDOS 80 2.0 USERS can use the CMD "dos command" function!
- NEW and EASIER to use USR COMMANDS.
- New math functions to calculate XOR and INTEGER REMAINDERS
- Logical STRING COMPARISONS are now supported.
- The disk commands INSTR, MID\$ ASSIGNMENT are now supported on both DISK AND TAPE ZBASIC.
- DEFSTR is now supported.
- Eight disk files may be opened simultaneously; random, sequential or mixed.
- LINE INPUT# is now supported
- Invoke the compiler by simply hitting these two keys: "..."
- NEW 100+ PAGE MANUAL WITH DESCRIPTIONS AND EXAMPLE.
- ZBASIC 2.2 Comes with CMDFILE/CMD program from MISOSYS, to allow appending or merging compiled programs and machine language programs from tape or disk.

ZBASIC 2.2 DOES NOT SUPPORT THESE BASIC COMMANDS:

- ATN, EXP, COS, SIN, LOG, TAN, and exponentiation. (However, subroutines are included in the manual for these functions.)
- ERROR, ON ERROR GOTO, ERL, ERR RESUME.
- No direct commands like AUTO, EDIT, LIST, LLIST ETC, although these commands may be used when writing programs.
- Others NOT supported: CDBL, CINT, CSNG, DEFFN, FIX, FRE.
- Normal CASSETTE I/O. (ZBASIC supports it's own SPECIAL CASSETTE I/O statements.)
- SOME BASIC COMMANDS MAY DIFFER IN ZBASIC. For instance, END jumps to DOS READY, STOP jumps to BASIC READY etc.
- MEMORY REQUIREMENTS: to approximate the largest BASIC program that can be compiled in your machine (at one time), enter BASIC and type: PRINT (MEM-6500)/2. Remember, you can merge compiled programs together to fill memory.

ZBASIC 2.2 SPEED COMPARISON DEMO

To help give you an idea how fast compiled programs are, we have included this demo program:

ZBASIC 2.2 DEMO PROGRAM

Time to compile and run complete program	: 0 MIN. 2 SEC.
BASIC Execution speed MOD 1, LEVEL II	: 7 MIN. 34 SEC.
ZBASIC Execution speed MOD 1, LEVEL II	: 0 MIN. 18 SEC.
BASIC Program size (WITHOUT VARIABLES)	: 895 BYTES
ZBASIC Program size (WITHOUT VARIABLES)	: 2733 BYTES

(Remember that the ZBASIC program includes an 1879 byte sub-routine package.) Program shown exactly as compiled and run in BASIC and ZBASIC.

```

10 '===== ZBASIC 2.2 EXAMPLE PROGRAM AND TIME TEST=====
20 CLS:CLERR:DEFINT A-X:DEFSTR Z:DIM AR(64,24),Z(150):RANDOM
30 AA=100:BB=-1000:CC=3:DD=-3:EE=-9999:ST$="START TIME "+TIME$
40 FOR I=1 TO 127 STEP 2 :FOR J=47 TO 1 STEP -3:XX=POINT(I,J):SET(I,J)
50 XX=(1-J)/CC*(7+I+J):XX=ABS(INT(RND(I*J)-AA)+7):RESET(I,J)
60 XX=PEEK(I+J):POKE15360+I+J,J:OUT255,J AND (3*J):XX=INP(I)
70 AB$=STR$(I+J):BA$=LEFT$(AB$,2):AA(I/2,J/2)=VAL(BA$)+AA*3
80 BA$=BA$+RIGHT$(BA$,RND(3)):XX=INSTR(1,BA$,"9"):XX=SOR(I*J)
90 BA$=MID$(BA$,2,2):MID$(BA$,1,1)=2:IF XX THEN 100 ELSE CLS
100 IF LEN(BA$) > 3 OR SGN(XX)=1 AND ASC(BA$)=32 THEN PRINT"+++"
110 IF POS(0) < 62 THEN TRON:TROFF:PRINT ELSE XX=NOT(RND(99))+100
120 A$=INKEY$:IF A$="Y" OR A$="y" AND I < 120 THEN PRINT"TRUE.."
130 RESTORE:READA,C,Z(J),D:GOSUB170:GOSUB170:GOSUB170:GOTO210
140 NEXT:PRINT"*":NEXTI:CLS:PRINT0512,ST$,"STOP TIME "+TIME$
150 STOP'===== END OF MAIN TEST LOOP =====
160 DATA 12345,-1,"TEST",-9999
170 ON RND(6) GOTO 180,190,200,180,190,200
180 RETURN
190 RETURN
200 RETURN
210 ON RND(9) GOSUB 180,190,200,180,190,200,180,190,200
220 GOTO140
    
```

NOTICE ZBASIC 2.0 OWNERS: you can upgrade your ZBASIC 2.0 for no charge. Just send us your original diskette/cassette and a S.A.S.E with your registered serial number and copy of your invoice. We will send you ZBASIC 2.2 and updates to your manual.

VISA, MASTERCARD, AMERICAN EXPRESS, C.O.D. ORDERS ONLY.

800 528-1149 order line

ZBASIC 2.2 DISK VERSION AND MANUAL	89.95
ZBASIC 2.2 TAPE VERSION AND MANUAL	79.95
ZBASIC 2.2 DISK & TAPE VERSION AND MANUAL	99.99
MANUAL ONLY... (APPLIES TO PURCHASE)	25.00

SIMUTEK COMPUTER PRODUCTS INC.

TECHNICAL QUESTIONS PLEASE CALL (602) 323-9391
4897 E. SPEEDWAY, TUCSON, ARIZONA 85712

TRS-80 is tm of Radio Shack, a Tandy Corp.

✓12

Lots of value for a modest price.

Line Printer VII

Line Printer VII
Tandy/Radio Shack
Fort Worth, TX
\$399

James E. McKenna
 91 Howard Street
 Fredonia, NY 14063

I first saw the Line Printer VII at a computer show in Buffalo, New York. I knew at once it was the printer I wanted.

The two factors which most influenced my choice were size and price. The LP VII requires a level surface measuring at least 16 by 8¼ inches to rest upon. My system (a TRS-80 Model I, Level II, 16K) occupies a key place in my living room. The Line Printer VII intrudes no more on my living room decor

than the rest of the system.

Setting up the LP VII was no problem at all, even for one as mechanically disinclined as myself. The instruction book is short (18 pages), has numerous misspellings and grammatical errors but does give clear information on how to get your printer working. The diagrams are most helpful.

My system requires the Printer Interface Cable (Cat. No. 26-1411 at \$59.95), since I have no expansion interface. The instruction book for this cable is quite clear on how to connect the keyboard to the printer.

The Line Printer VII can be used with the parallel interface or with seven or eight-bit serial interfaces. The LP VII uses any tractor-fed paper 4.5 to 9.5 inches wide. Insert the paper in a slot behind the platen and it

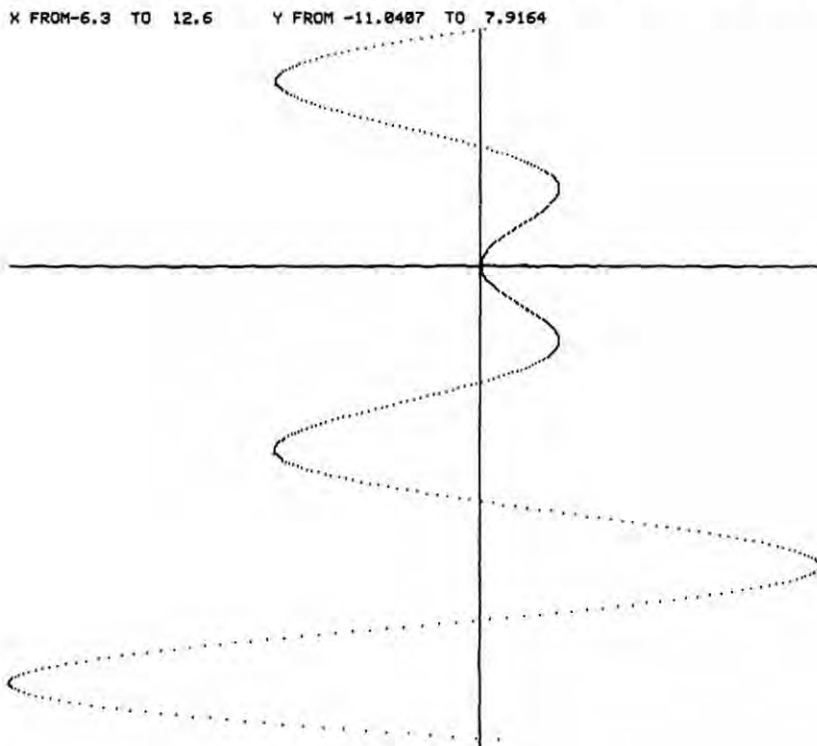
wraps around the platen and reappears in a slot in front. Adjust the tractors to fit the paper by sliding them along the bar where they are fastened. Four large rubber washers keep the paper flat under the print head.

It was all so easy that I was certain something was wrong—especially since the printer was not making any noise. The LED was glowing, so I tried something pleasant like LPRINT "HELLO". In an instant the buzzing noise was over and there was HELLO printed clearly on the paper. The LP VII prints the entire 96-character ASCII character set. I can even print lowercase from my uppercase-only keyboard. If U\$ is an uppercase letter, LPRINT CHR\$(ASC(U\$)+32) sends the corresponding lowercase letter to the printer.

Though I was impressed by the good quality of print the five by seven dot matrix produced, I was a little disappointed that lowercase letters did not have true descenders. The lines are printed at 80 characters per line, 30 characters per second. Though slow, this is fine for me and I would guess for anyone who only needs a printout occasionally. The print fades toward the end of long listings, though not significantly. I would not use the LP VII in an environment where it was printing hours on end.

The Line Printer VII can also print double-width characters at 40 characters per line. You can select this feature dynamically via the LPRINT CHR\$(31) command. The ASCII code 31 does not cause any printing; it instructs the LP VII to convert to the 40-character mode. LPRINT CHR\$(30) returns your printer to the 80-character mode. The LP VII also has a graphics mode which you can select dynamically by the LPRINT CHR\$(18) statement.

Before discussing graphics in more detail, I want to point out that each character printed by LP VII is triggered by an ASCII code sent from the computer. LP VII is memory mapped to address 14312 (in the Model I). POKEing an ASCII code in that address sends that code to the LP VII's 90-character buffer. The character equiva-



Graph of $Y = X \cdot \sin(X)$ Using Line Printer VII.

*"The LP VII. . . comes
at a price low enough
for the hobbyist to consider seriously."*

lents of the ASCII codes in the buffer are printed if the buffer is full or an ASCII code 10 or 13 arrives. ASCII codes which are not printing characters but give instructions to the printer are called control codes.

The Graphics Mode

In order to understand the graphics mode more easily, I will explain more about a dot-matrix character. In the LP VII, a character is printed by a matrix six dots wide by seven dots high. In the character mode only the first five columns of dots are used, the last forming the space between letters. Thus an 80-character line is composed of 480 columns of dots, each column seven dots high. In the graphics mode, the LP VII can darken any seven dots in any of the 480 columns on a line. Once in the graphics mode, only graphics characters can be printed, all ASCII characters except control codes will be ignored.

Imagine that the dots in a graphics column are numbered from top to bottom as 0, 1, 2, 3, 4, 5, 6. Dots to be printed correspond to a 1 bit in a byte sent to the printer. For example, to print only the top dot, numbered 0, use LPRINT CHR\$(129). Remember, this means the binary equivalent of the byte 129 goes to the printer; since 129 is 10000001 in binary, it signals a graphics character (most significant bit of 1) in which dot 0 (least significant bit is 1) is printed. Thus the byte 131 (or 10000011 in binary) prints the top two dots. All seven dots are printed by sending the byte 255 (in binary 11111111). Of course the byte 128 (10000000 in binary) prints no dots in graphics mode. In general, for each dot number *n* to be printed in a given column, add 2^n to 128 to compute the appropriate byte.

Once I realized that each line had 480 columns of seven dots each and that a single $8\frac{1}{2}$ by 11-inch sheet of paper has 66 lines, I saw I was working on a 480 by 482 grid. When I compared this to 128 by 48 for the video monitor, I immediately decided to write a program producing high resolution graphs of mathematical functions. Y values are plotted horizontally by using a tab to the correct dot column. Although the LP VII recognizes a control code for a tab in graphics mode, certain tabs cannot be done via LPRINT because that routine intercepts some control codes (notably 10) and replaces them with others.

In the graphics mode, a tab is signaled by sending two bytes, first 27, then 16. The actual dot column to which the tab goes is presumed to be in the two bytes which follow these control codes. The printer assumes that the dot column has been sent as a two-byte binary integer with the high-order byte first, low-order byte second. Thus tabs to positions from 0 to 255 correspond to a high

byte of 0 a low byte of the tab position. Tabs to columns from 256 to 479 have a high byte of 1 and a low byte of the desired position minus 256. In short, the two bytes required are precisely those used by Basic in the Level II ROM to encode that number, except that these are in the order low, high.

If you tried to do a graphics tab to dot column 10 by a Basic LPRINT command, such as LPRINT CHR\$(27);CHR\$(16);CHR\$(0);CHR\$(10), you would be disappointed because the LPRINT routine will not let the byte 10 through unaffected. The instruction manual points out this difficulty and says you must bypass the LPRINT routine to accomplish some graphics tabs. It does not even hint at how to do that. My solution is to POKE the required bytes into address 14312 (memory-mapped home for the LP VII).

One more problem though—if you POKE a value into address 14312 while the LP VII is busy printing it will not get the byte at all. When the printer is busy, the contents of 14312 is set to a value of 128 or higher. Thus PEEK(14312) > 127 indicates that any value POKEd into address 14312 will be lost. With this in mind, I designed a subroutine to perform a graphics tab to a position whose location (an integer from 0 to 479) is stored in the variable GT%:

```
5000 K = VARPTR(GT%)
5010 LPRINT CHR$(27); CHR$(16);
5020 IF PEEK(14312) > 127 THEN 5020
5030 POKE 14312, PEEK(K + 1)
5040 IF PEEK(14312) > 127 THEN 5040
5050 POKE 14312, PEEK(K) : RETURN
```

This solved the graphics tab problem and gave me full access to the graphic capability of the LP VII. The resulting plotter program produces graphs, though slowly, of excellent resolution.

All things considered, I have been very pleased with my LP VII. So far, it has not needed service or a new ribbon. Two problems have occurred on occasion. When it first starts printing, sometimes the ribbon jams the print head and prevents a return to the left margin. Until the left margin is attained, address 14312 indicates a busy condition and everything hangs up until you jiggle the ribbon a bit to release the jam.

Also, the cable connection at the keyboard sometimes comes loose. Once again the contents of 14312 indicate a busy condition (a value of 255, meaning not connected). I wiggle the connection a little to cure the problem.

The LP VII makes no idling noises at all, prints a readable clean copy, has outstanding graphics capabilities, and comes at a price low enough for the hobbyist to consider seriously. ■

COTTAGE SOFTWARE

PACKER Machine language program that edits all or part of your Basic program to run faster, save memory, or ease editing. The 5 options include UNPACK—unpacks multiple statement lines into single statements maintaining logic, inserts spaces and renumbers lines. SHORT—deletes unnecessary words, spaces, and REM statements. PACK—packs lines into maximum multiple statement lines, including all branches. MOVE—moves line or blocks of lines to any new location on program. On 2 cassettes for 16K, 32K, & 48K.

For TRS-80 Mod I or III Level II or Disk Basic ... \$29.95

SYSTEM TAPE DUPLICATOR Copy your SYSTEM format tapes. Includes verify routines. The Model III version allows use of both 500 and 1500 baud cassettes speeds. For TRS-80 Model I or III Level II ... \$15.95

CASSETTE LABEL MAKER A mini word processor to print cassette labels on a line printer. Includes 50 peel-and-stick labels on tractor feed paper.

For TR-80 Model I of III Level II & Printer ... \$17.95

PRINT TO LPRINT TO PRINT Edits your Basic program in seconds to change all Prints to LPrints (except Print@ or Print#) or LPrints to Prints. Save edited version.

For TR-80 Model I or III Level II ... \$12.95

FAST SORT ROUTINES for use with Radio Shack's Accounts Receivable, Inventory Control I, and Disk Mailing List Systems for Model I Level II Sorts in SECONDS! You'll be amazed at the time they can save. Supplied on data diskette with complete instructions.

FAST SORT for Accounts Receivable ... \$19.95

FAST SORT for Inventory Control I ... \$19.95

FAST SORT for Disk Mailing List (specify data diskette of cassette for 1 drive system) ... \$14.95

ALL THREE ROUTINES ... \$44.95

Prices subject to change without notice. Call or write for a complete catalog. Dealer inquiries invited. VISA and MasterCard accepted. Foreign order in US currency only. Kansas residents add 3% sales tax.

On-line catalog in Wichita FORUM-80: 316-682-2113

Or call our 24 hour phone (316) 683-4811 or write:

COTTAGE SOFTWARE

614 N. HARDING

WICHITA, KANSAS 67208

TRS-80™ is a trademark of Tandy Corporation

EPSON MX-80 COMPLETE PRINTER PACKAGE

SAVE \$270⁰⁰

- EPSON MX-80
 - GRAFTRAX-80
 - EXTRA MX-80 RIBBON
 - 5000 MAILING LABELS
 - 3200/2600 SHEETS (1 Case)
 - TRACTOR FEED PAPER
 - LISTER/CMD (Disk Model I & III Only)
- APPROXIMATE VALUE \$839.⁸⁵

You Pay Only \$569.⁸⁵

Rainbow™

P & P CORPORATION

P.O. BOX 46 • HADDONFIELD, N.J. 08033

TOLL FREE
ORDERS ONLY **800-257-6170**

in New Jersey 609-428-3900

Enclosed is my check for \$569.⁸⁵
plus \$11.90 for shipping and handling

MX-80 Complete Printer Package

Visa Master Card Check
 C.O.D. Wire Transfer (less 2%)

Credit Card No. _____ Exp. Date _____

Name _____

Address _____

State _____ Zip _____

Phone (____) _____

* New Jersey Residents add 5% Sales Tax

PMC Peripherals \$495

QUALITY, DELIVERY AND SERVICE



Price \$495 for 2

Yes, our disk drive has a proven performance and an established reliability record. We specialize in single sided 5 $\frac{1}{4}$ inch single or double density drives featuring 5 ms stepping and 40 tracks with case and power supply. The case is color matched to IBM and PMC personal computers.

Compare printer specifications . . . compare design reliability, repairability or any other parameter! Our DMP-85 is a true "work-alike" to C. Itoh 8510 or NEC 8023 and offers many more features than the MX-80FT at a lower price. You need excellent printers and a professional supplier. Come to PMC.



Price \$495



Price \$495

IBM Selectrics or similar typewriters become 12 cps letter-quality printers at a quarter the cost of "daisy wheel" printers. The ETF-80 coupled with a word processor becomes your personal typist accurately reproducing text at 100 wpm. What a bargain, ETF-80 . . . CALL now for details.

PMC peripherals are designed for PMC, IBM, Apple, Radio Shack or other fine personal computers. We don't advertise our unprintable dealer/distributor prices but if you call or write you'll find we don't meet the competition . . . we make it!

PMC Personal Micro Computers, Inc.
475 Ellis Street, Mountain View, CA 94043 (415) 962-0220



\$ 999 without printer

\$1495 with printer or typewriter interface

WORD PROCESSOR Electric Pencil System (EPS-80)

Lowest priced combination word processor/microcomputer that everyone can afford and so simple that anyone can use! The EPS-80 is a word processor designed to replace typewriters as a personal tool and also to be used as a popular personal computer with thousands of programs available.

Use without a printer

In an office environment, the EPS-80 word processor gives the user editing power which is not available in the latest electronic typewriters. The built-in high speed cassette storage achieves inexpensive and reliable transfer of text from one EPS-80 to another. Therefore, where multiple EPS-80s are used, not every one has to have its own printer. For instance, a single letter quality printer on one EPS-80 can prepare final copies of letters for four to ten non-printer stations. The overall system is efficient, costs less per station than an equal number of electronic typewriters, and provides much higher throughput. There is no need for the usual cycle of dictation, correction and proofreading as the basic composing function can be in the hands of the originator.

Use with a printer

Writers, students and businessmen will find the most intelligent investment is the EPS-80. For high speed printing, we offer our model DMP-85 dot matrix printer and for letter quality printing, our Electric Typing Fingers, Model ETF-80, turns your IBM Selectric or similar typewriter into a printer. When you buy the EPS-80, you get both a word processor and a powerful personal computer that will do many necessary tasks. There are fully proven computer programs for invoicing, billing, financial or engineering analysis, spreadsheet calculations, and many more. Even if you never utilize the computer capability, the EPS-80 word processor can provide filing and retrieval of reference information and mail list handling in addition to fulfilling normal typing needs.

How can we offer a product with so much capability at such a low price? It is due to our highly reliable, low cost cassette storage system that performs as well as many floppy disk systems! We believe the EPS-80 is an immediately important tool in small and large offices and it is also destined to be your personal typing friend at home. If you think word processing and low cost computing power would improve the jobs you do, call or write now for complete information.

PMC is licensed to use Electric Pencil, a copyright of Michael Shrayer.

PMC Personal Micro Computers, Inc. v242
475 Ellis Street, Mountain View, CA 94043 (415) 962-0220



At last a program that tells it like it isn't.

Basic Misinterpreter

Basic Misinterpreter
Kitchen Table, Inc.
Sri Lanka

David D. Busch
515 E. Highland Ave.
Ravenna, OH 44266

Basic Misinterpreter is another in a series of programs developed in the laboratories of Kitchen Table, Inc., and later deemed unworthy of marketing to the general public. Through a special arrangement with the fictitious software and hardware firm, *80 Micro* offers this significant regression in technology to its readers.

In use, the program waits for the unsuspecting victim to enter program lines. Commands entered are acted upon—within certain limits. The user can load an existing program, list it, add new lines and save the resulting file on disk. Syntax is identical to that in *Disk Basic*, and the familiar > prompts for input.

However, the Misinterpreter actually substitutes misspelled words for Basic key words in other programs. For example, Run becomes Ran, Read turns into Reed, GO-

SUB is transformed into GSUNK, and GOTO becomes GOOT. These changes do not become apparent until the user lists the lines, or loads the program from disk some time later.

Should the user spot an error, the line may be edited with most Level II commands. However, the results are worse than before. Some commands are met with a response of "Huh?", while any attempt to put more than one statement on a line is answered with "Sorry, only accepting one statement per line today."

The Misinterpreter's calculator mode offers another twist: When "PRINT 2 + 1" is entered, for example, the micro prints "2 + 1."

KTI thoughtfully included a provision allowing you to add your own preferred bugs and expand the altered key words. To make simple modifications to the Misinterpreter, consider the following program description.

How It Works

Normal key words are stored in a string array, E\$(n), while the equivalent, phoney words are loaded into another array, SP\$(n). Basic Misinterpreter (?BASIC, for short) currently has 18 key word/phoney word pairs. WRDS is defined as 18 in line 30; the arrays are dimensioned using WRDS instead of a constant in line 50. If you wish to add word pairs, change the value of WRDS, and append the pairs onto the end of the Data statements. The phoney word must have the same number of characters as the word it will replace.

The word pairs are read into the arrays in lines 110-160, with a space added to the beginning of each. The actual masquerade begins at line 210, where the > prompt is printed and followed by line 230's "LINE INPUT A\$."

The program then waits for input (a command or a program line). Once Enter has been hit, lines 250-320 check the first few characters of A\$ to see if a command has been entered. These include List, Save, Load, Run, New, Print and Edit.

If a match is found, control branches to a subroutine where the command is carried out. If not, A\$ is an unrecognizable command or a program line.

In this case, ?BASIC looks for a quotation mark (indicating a prompt to be ignored) or a colon (marking a multiple-statement line). For processing speed, ?BASIC refuses more than one statement per line.

If a quote is located, the program looks for the second quotation mark and ignores any characters (including colons) between the two. Only the remainder of A\$ will be examined for keywords.

Next, ?BASIC checks the first few characters of the line until it finds a space. All characters up to the first space are presumed to be the line number (LN). If LN is less than one, the input is an unrecognizable command. The program responds "Huh?" and returns to line 210 for more input.

If the program line number is less than 200 (the largest line number allowed in ?BASIC), a search for the key words begins. (To keep the Load and Save routines of reasonable size, as well as to shorten Lists, ?BASIC is limited to use with program line numbers less than 200. This step also conserves memory space. If you have memory to spare, or end up compiling this program in order to gain speed, you can increase the number of allowable lines by redefining LS in line 40.)

A For . . . Next loop from 1 to WRDS (lines 580-610) compares each good key word with the program line typed in by the user. When a match is found, a check is made to see if the key word is within quotes (and therefore ignored). If not, the phoney word is substituted.

The rest of the program consists of subroutines which carry out commands. If Load "filename" or Save "filename" is entered, that command is parsed to determine the file specification (lines 750-760.) Then the file NE\$ is opened and all LS lines of the program are input or written to disk. Some of these will be null, of course.

The List subroutine is rather complex,

The Key Box

Crayfish-2 Maxiputer
Basically Unlevel
2 Megabytes of RAM
One 5¼ Foot disk

“... striking C, D or I invokes some strange shenanigans.”

because of all the List options. (List shows all lines; List 10 prints only that line. List 10-100 shows those lines, while List 100- lists lines from 100 to the end of the program.) If no hyphen appears in the command, ?BASIC assumes that all lines should be listed (as in the command List) or that only one line is wanted (as in List 10). When a hyphen is included in the command, the program extracts the beginning and ending line numbers specified.

When “Edit linenumber” is invoked, control drops to a routine beginning at line 1330, which closely simulates Level II editing—with a few surprises thrown in. The line number requested is pulled from the user’s command. If no such line exists, an error message is printed. Otherwise, the program prints the line number, and enters an INKEY\$ keyboard strobing loop. Each time the space bar is pressed (as in actual Level II editing), a character of the target line is revealed. Hitting the back arrow blanks up the display. Pressing Enter concludes the editing session, while striking C, D or I invokes some strange shenanigans.

Final Points

This program should also be fairly easy to compile using a compiler which supports disk I/O functions. Just be sure to delete

line 10 and use constants to DIM the arrays in line 50.

You may wish ?BASIC to be more subtle. Instead of always substituting PLINT for PRINT, a random character could be inserted in the key word. Here is a subroutine to get you started:

```
705 E = RND(LEN(SPS(G)))
706 F = RND(26) + 65
707 MIDS(ES(G),E,1) = CHR$(F)
```

That addition chooses a random position (E) in the key word (E) and places a random character from A to Z there. Substitute the real key word for the misspelled ones in the Data lines if you want the phoney words to start out normally. They will get weirder and weirder each time a key word is encountered. PRINT can become PRUNT, then YRUNT, and YRUNG, successively.

Or, store the value of the key word in a DUMMY\$, and return it to its normal value after each replacement. Then, PRINT might appear as PLINT, PLIGT, or TRINT, with only one letter wrong each time.

To add new commands, simply add an appropriate line after line 320 and branch to your subroutine. For example, you might want ?BASIC to recognize CMD“S” and respond “Sorry, DOS is busy at the moment.”

Program Listing

```
1 ' *****
  *
  *          BASIC MISINTERPRETER          *
  *
2 ' *          By: David Busch              *
  * *          515 E. Highland Ave.        *
  * *          Ravenna, Ohio 44266        *
  *
3 ' *****

10 CLEAR 10000
20 DEFINT A-Z
30 WRDS=18
40 LS=200
50 DIM E$(WR),CP$(LS),SP$(WR)
60 Q$=CHR$(34)
70 C$=CHR$(58)
80 SP$=CHR$(32)
90 CLS

100 ' ***** READ WORDS INTO ARRAY *****

110 : FOR N=1 TO WRDS
120 :   READ SPAN$(N)
130 :   READ E$(N)
140 :   E$(N)=SP$+E$(N)
150 :   SPAN$(N)=SP$+SPAN$(N)
160 : NEXT N
170 GOTO 210

180 DATA IF,OF,RUN,RAN,INPUT,IMPUT,LIST,LAST,END,FIN,PRINT,PLINT
,READ,REED,DATA,DADA,THEN,THAN,FOR,FAR,STOP,STEP,NEXT,NXET
```

Program continues

GOOD GRIEF !!
THIS IS UNBELIEVABLE !



TOP-NOTCH PROFESSIONAL SOFTWARE FOR THE TRS-80 MODEL II AT LOW PRICES!

- Power enough for the professional programmer
- Easy for the beginner
- Extremely useful

MENU - Program menu generator. Price: \$24.95

- Great way to organize disks, especially hard drives!
- Like having a directory with descriptions and better!
- Ideal front end for an application package
- Displays menu of programs including descriptions
- User selects program with cursor or by line number
- Can run BASIC or TRSDOS compiled programs
- Up to 200 lines in menu including comment lines
- Submenus (other menu files) can be put in menu
- TRSDOS commands can be menu items
- Each disk or program package can have separate menu
- Complete editing facilities including menu locking
- Can pass information to selected program through file

RESEO - Program line renumberer. Price: \$44.95

- No programmer should be without this utility!
- The ideal solution for inserting lines into crowded code!
- Makes structured programming in BASIC easier
- Renumbers all or part of the lines of a program
- Renumbers up to 30 groups of lines at once
- Can copy groups of lines, leaving originals
- Can combine groups and renumber them together
- Can relocate a group by adding or subtracting a constant from all line numbers
- Can print table showing old and new line numbers
- Can flag or renumberable line number references
- Can have separate input and output files
- Works on compressed format files
- SAVE PROG BAS. A unnecessary
- Fast - up to 240 lines/minute

CREF - Cross reference generator. Price \$34.95

- No more worries about accidental misuse of variables!
- Contains features not found in similar utilities elsewhere!
- Complete cross reference listing of variables, arrays, functions, line number references, and USR routines
- Flags different types of use line numbers, GOTO, GOSUB, ON ERROR, GOTO, RESUME, EAR, FIELD, and regular variables, arrays, use modify, define, functions and USR routines, use define
- Warns when variable may have been used incorrectly
- References listed by effective name and type
- Listing arranged alphabetically or numerically - each type of item in a separate section
- Disk temporary file - no limit on program size
- Works on compressed format files
- Fast - up to 180 lines/minute using Late Printer III

VARLIST - List full names of variables used in program. Price: \$24.95

- When bought with CREF, this is the icing on the cake!
- Lists full names of all variables, arrays, and functions alphabetically. USR routines are listed separately
- Variables having names with same first 2 characters and type are listed together
- Helps find variables with same first 2 characters
- Output listing to CRT, printer, or disk file
- No limit on program size
- Works on compressed format files
- Fast - up to 540 statements/minute on Late Printer III

Introductory offer: Purchase all four packages for only \$99.95!

Note: The above software requires 64K memory to run

For more information: Individual user's guides for above packages are available for \$7.50 each, creditable towards purchase of that package if purchased within 90 days

Add \$2.00 for postage and handling. Iowa residents add 3% sales tax

To order call collect (515) 236-8406



accepted

World Software Resource
Div. Sumner Enterprises
Hwy. 146 N
Grinnell, IA 50112

LOW-LEVEL CENTER

TRS-80 Model I/III

STRETCH SUPERSTEP: New third generation Z80 simulator is the leading element of the Software CPU design base. Animated Z80 Programming Models, Intelligent RAM Window, scrolling disassembler are now extended. New modules are FLTCUR 2-D byte oriented editor with full floating cursor and auto-repeat plus innovative BUFSTF user-defined buffer/window setup for flexible skeleton program views. Use BUFSTF to view large amounts of disassembled code, isolate all instances of selected instructions in several formats, more. Gather instruction frequency counts in straight-line or program-flow order for sophisticated analysis of subject programs and Z80 resource use. Many formatted transparent printer options, including screen pix and instruction-by-instruction tabular listing of all active machine aspects. Pictorial manual gives easy intro to program operation. Nothing newer for byte-entry, debugging and analysis of Z80 machine language programs. \$39.95 + \$2.00 shipping

EMU 020: Detailed instruction-level 6502 simulator with animated before/after 6502 Programming Models (registers, flags and stack) and scrolling instruction stream disassembler active in Single-step and 4-speed TRACE modes, also special high speed interpreter running over 5% actual 1 mhz 6502 processor speed. Have a 6502 without having a 6502, find out why the 6502 brain was picked by Apple, PET, Atari, arcade machines, etc. \$29.95 + \$2.00 shipping

BALCODE 80A: Highly interesting mid-level language for TRS-80 Model I. IBM's BAL (Basic Assembler Language) is an idealized machine instruction set currently in use on the IBM 360/370. BALCODE 80A implements an extended BAL subset via a text editor and macro assembler, you write in BAL with 20 p-registers (16 general purpose, 4 floating point) and powerful addressing modes, then assemble to fast Z80 code. Hands on introduction to BAL, source programs are highly portable to make your TRS-80 an IBM workalike! Includes 106 page IBM reference publication describing BAL. From Balcode Software. \$79.00 + \$3.00 shipping

COMPILER WORKSTATION TRS-80 Model I and III

Your BASIC program development
could go faster...

EDIT: Full-Screen BASIC editor with floating cursor and auto-repeat. More than 30 commands and functions let you variously find, change, insert, delete, replace, replicate, copy, move or position BASIC text at the character, string, line or block level. Developed in Britain by Southern Software. Mod I, III \$40.00 + 1.50 shipping.

PACKER: (Cottage Software) Editing tool will unpack, shorten, repack, renumber all or part of your BASIC text. The UNPACK segment is very useful when preparing BASIC source programs for compilation by ACCEL2. Mod I, III \$29.95 + 1.00 shipping.

Then your BASIC program
could go faster...

ACCEL2: Compiler for TRS-80 Mod I, Mod III Disk BASIC. New functional improvements in place to give more ease-of-use, quicker compilation of large programs, better chaining of compiled and non-compiled programs. Size read-out helps you monitor code growth during compilation. REM NOARRAY option lets you use variable-bound arrays. Professionals note: Comprehensive instructions show how to organize your compiled programs for resale on tape, ES/F water or disk. No royalties! Developed in Britain by Southern Software. Specify Mod I or III. \$88.95 + \$2.00 shipping.

TSAVE: Writes compiler output to independent SYSTEM tape. \$9.95 + \$1.00 shipping.

EXEC: Command-List Processor for TRS-80 Mod I. Prepare, execute, pass as many as nine parameters to lists of TRSDOS or NEWDOS commands and/or BASIC statements. Simplifies repetitive procedures such as power-up sequences, file set-ups, etc. Compatible with ACCEL2 compiler disk output. Developed in Britain by Southern Software. \$22.00 + \$1.00 shipping

M/C, VISA
CA add 6%



ALGORIX

(415) 387-3131

P.O. BOX 11721 SAN FRANCISCO, CA 94101

TRS-80, TRSDOS tm Radio Shack, ES/F tm Exatron

Program continued

```
190 DATA CLS,CSL,GOTO,GOOT,RESTORE,RESTART,GOSUB,GSUNK,RETURN,RE
TRNU,ON,IN
200 '***** INPUT PROGRAM LINE *****

210 PRINT ">";
220 B2=0
230 LINE INPUT A$

240 '***** CHECK FOR 'COMMAND' *****

250 IF LEFT$(A$, 4)="LIST" GOTO 920
260 IF LEFT$(A$, 4)="SAVE" GOTO 730
270 IF LEFT$(A$,4)="LOAD" GOTO 850
280 IF LEFT$(A$,3)="RUN" THEN RUN
290 IF LEFT$(A$,3)="NEW" THEN RUN
300 IF LEFT$(A$,5)="PRINT" GOTO 1290
310 IF LEFT$(A$,4)="EDIT" GOTO 1330
320 IF A$="" :GOTO 210

330 '***** CHECK FOR QUOTES OR COLONS *****

340 A$=A$+CHR$(32)
350 B=INSTR(A$, Q$)
360 C=INSTR(A$, C$)
370 IF C=0 AND B=0 GOTO 480
380 IF B=0 GOTO 460

390 '***** FIND POSITION OF SECOND QUOTATION MARK *****

400 W$=MID$(A$, B+1)
410 B2=INSTR(W$, Q$)+B
420 IF C<B GOTO 460
430 IF C>B2 GOTO 460
440 GOTO 480

450 ' ***** IF COLON OUTSIDE QUOTES - TWO STATEMENTS *****

460 IF C<>0 THEN PRINT"ONLY ACCEPTING ONE STATEMENT PER LINE TOD
AY":GOTO 210

470 '***** CHECK FOR BEGINNING LINE NUMBER *****

480 TST$=""
490 : FOR T=1 TO LEN(A$)
500 : IF MID$(A$, T, 1)=CHR$(32) GOTO 540
510 : TST$=TST$+MID$(A$, T, 1)
520 : NEXT T

530 ' ***** IF LINE NUMBER VALID, ASSIGN TO ARRAY POINTER LN **
***

540 LN=VAL(TST$)
550 IF LN>LS THEN LN=LS-9
560 IF LN<1 PRINT "HUH?":GOTO 210

570 '***** LOOP TO SEARCH FOR ALL KEYWORDS *****

580 : FOR G=1 TO WR
590 : Y=INSTR(A$, SPAN$(G))
600 : IF Y>0 GOTO 660
610 : NEXT G

620 '***** ASSIGN LINE TO FINISHED PROGRAM ARRAYS *****

630 CP$(LN)=A$
640 GOTO 210

650 '***** CHECK TO SEE IF KEYWORD IN QUOTES *****

660 IF Y<B GOTO 690
670 IF Y>B2 GOTO 690
680 GOTO 610
690 L=LEN(E$(G))

700 ' ***** SUBSTITUTE PHONEY KEYWORD *****

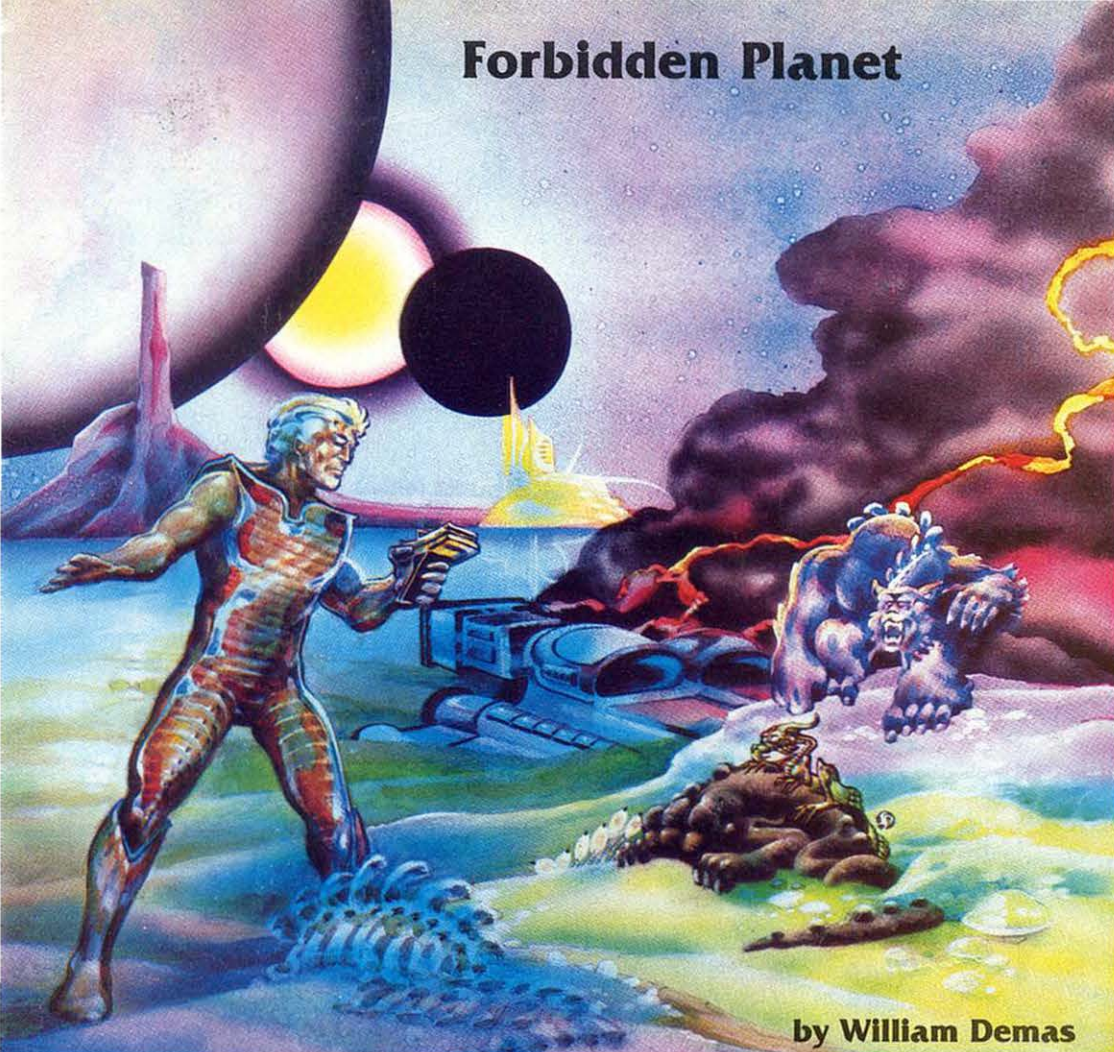
710 MID$(A$, Y, L)=E$(G)
720 GOTO 610

730 '***** SAVE PROGRAM TO DISK *****

740 GOSUB 750:GOTO 780
750 NE$=MID$(A$,INSTR(A$,CHR$(34))+1)
760 IF RIGHT$(NE$,1)=Q$ THEN NE$=LEFT$(NE$, (LEN(NE$)-1))
770 RETURN
780 OPEN "O",1, NE$
```

Program continues

Forbidden Planet



by William Demas

Forbidden Planet The First Talking Adventure

This adventure talks through the cassette port. You no longer need to have a voice synthesizer. This adventure takes you to a desolate planet where only your skill and your talking computer will help you survive. This is Part 1 of a multipart talking adventure. Like no other adventure you have ever played. The first five people to solve Forbidden Planet will get the next adventure FREE.

- ★ Split Screen
- ★ Machine Language
- ★ Talks through Cassette Port
- ★ Supports Lower Case
- ★ Written by William Demas

Price \$39.95
48K Disk Model I & III

Forbidden City A Talking Adventure

This adventure talks through the cassette port. This is a continuation of Forbidden Planet Adventure, but you do not have to have or play it to play Forbidden City.

Once you enter, there is no turning back. Only with the help of your talking computer will you be able to defeat the city's master computer and the robot guards.

- ★ Talks through Cassette Port
- ★ Three Different Voices
- ★ Machine Language

Price \$39.95
48K Disk Model I & III

See Your Local Dealer
— Dealers Inquires Invited—

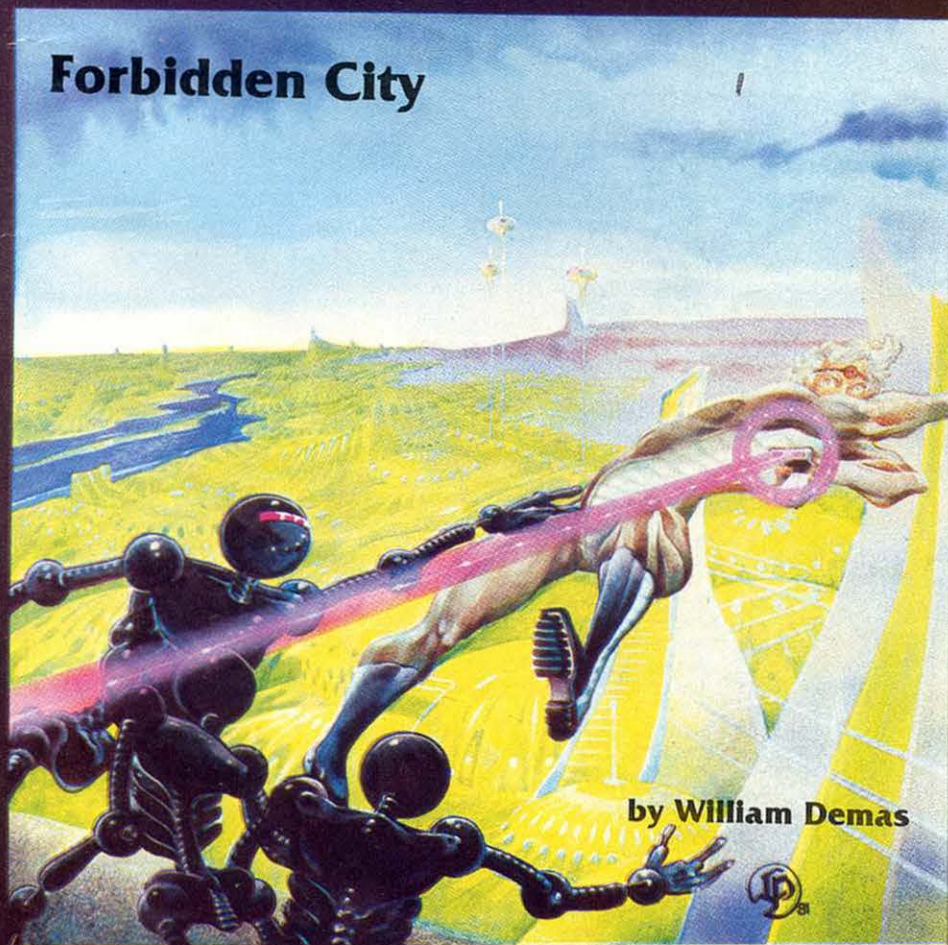
FANTASTIC SOFTWARE

P.O. Box 27734 ^{✓36}
Las Vegas, Nevada 89126

(702) 362-1457



Forbidden City



by William Demas

REMSOFT, INC.

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 45-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 ROM.

Presently available for Model 1 only
REMASSEM-1 (tape) only \$69.95
REMASSEM-1 (disk) only \$74.95

LEARN TRS-80® ASSEMBLY LANGUAGE DISK I/O

Your disk system and you can really step out with REMSOFT'S Educational Module, REMDISK-1, a "short course" revealing the details of DISK I/O PROGRAMMING using assembly language.

Intended for the student with experience in assembly language, using the same format as our extremely popular introduction to assembly language programming, this "ASSEMBLY LANGUAGE DISK I/O PROGRAMMING" course includes:

- Two 45-minute lessons on audio cassette
- 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.
- A booklet of comprehensive, fully-commented program listings illustrating sequential file I/O, random-access file I/O, and track and sector I/O.
- A diskette with machine-readable source codes for all programs discussed, in both Radio Shack EDTASM and Macro formats.
- Routines to convert from one assembler format to the other.

Presently available for Model 1 only
REMDISK-1 only \$29.95

Dealer inquiries invited

These courses were 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. The minimum system required is a Level II, 16K RAM.



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 5 1/2 % SALES TAX

✓129

TRS-80® IS A TRADEMARK OF TANDY CORP.

Program continued

```
790 : FOR N=1 TO LS
800 : PRINT #1, CP$(N); CHR$(13);
810 : NEXT N
820 CLOSE 1
830 GOTO 210

840 '***** LOAD PROGRAM FROM DISK *****

850 GOSUB 750
860 OPEN "I",1, NE$
870 : FOR N=1 TO LS
880 : LINE INPUT #1, CP$(N)
890 : NEXT N
900 CLOSE 1
910 GOTO 210

920 ' ***** LIST SUBROUTINE *****

930 C4=INSTR(A$,"-"):IF C4<1 GOTO 1150
940 C3=INSTR(A$,"LIST")
950 ST$=MID$(A$,C3+4)
960 L1=VAL(ST$)
970 IF L1>LS THEN L1=LS-10
980 C5=INSTR(ST$,"-")
990 ST$=MID$(ST$,C5)
1000 IF LEN(ST$)=1 THEN L2=LS:GOTO 1110
1010 ST$=RIGHT$(ST$, (LEN(ST$)-1))
1020 L2=VAL(ST$)
1030 IF L2>LS THEN L2=LS-5
1040 GOTO 1110
1050 : FOR N=1 TO LS
1060 : IF CP$(N)<>" " PRINT CP$(N)
1070 : NEXT N
1080 PRINT
1090 GOTO 210

1100 ' ***** LIST LINE NUMBER RANGE *****

1110 : FOR N=L1 TO L2
1120 : IF CP$(N)<>" " PRINT CP$(N)
1130 : NEXT N
1140 GOTO 210

1150 ' ***** LIST SPECIFIC LINE OF PROGRAM *****

1160 V=INSTR(A$, SP$)
1170 IF V=0 GOTO 1240
1180 V2$=MID$(A$, V)
1190 V3=VAL(V2$)
1200 IF V3>0 THEN PRINT CP$(V3) ELSE GOTO 1240
1210 PRINT
1220 GOTO 210

1230 ' ***** LIST ALL PROGRAM LINES *****

1240 CLS
1250 : FOR N=1 TO LS
1260 : IF CP$(N)<>" " PRINT CP$(N)
1270 : NEXT N
1280 GOTO 210
1290 S$=MID$(A$,INSTR(A$,"PRINT")+5)
1300 PRINT S$
1310 GOTO 210

1320 ' ***** EDIT LINE *****

1330 LN=VAL(MID$(A$, (INSTR(A$,"EDIT")+4)))
1340 IF CP$(LN)<>" " GOTO 1370
1350 PRINT "UNDEFINED LINE NUMBER"
1360 GOTO 210
1370 PRINT LN;
1380 CU=INSTR(CP$(LN),CHR$(32))
1390 I$=INKEY$:IF I$="" GOTO 1390
1400 IF VAL(I$)>0 THEN NU=VAL(I$)
1410 IF I$="C" GOSUB 1480
1420 IF I$="D" GOSUB 1480
1430 IF I$="I" GOSUB 1480
1440 IF I$=CHR$(8) GOSUB 1540
1450 IF I$=CHR$(32) PRINT MID$(CP$(LN),CU,1);:CU=CU+1
1460 IF I$=CHR$(13) PRINT:GOTO 210
1470 GOTO 1390
1480 R$=INKEY$:IF R$="" GOTO 1480
1490 IF R$=CHR$(27) GOTO 1510
1500 MID$(CP$(LN),CU,1)=R$
1510 PRINT CHR$(8);
1520 CU=CU+1
1530 RETURN
1540 PRINT CHR$(8);:RETURN
```

Now there's a revolutionary new data base manager and operating system with an easy to use conversational business language.

This is the first truly relational system with full conversational JOIN capabilities so that you can interactively establish hierarchical or network structures.

Available on the TRS/80 Model II or DEC 11/23. Data Ace includes its own operating system.

EASY TO USE conversational commands to set up Data Relations and Fields which may be CHANGED without altering application work.

ENGLISH-LIKE LANGUAGE to ADD, CHANGE, DELETE, LIST, or JOIN relations or data on the fly generating analytical or exception reports immediately.

AMAZING PERFORMANCE and response because of the memory resident DATA DICTIONARY which provides rapid access to the Relations you want.

COMPREHENSIVE ERROR TRAPPING with powerful HELP messages

DATA ACE 

The **SMART** Data Base Management System

you may request according to the context of your commands resulting in a system which is virtually self-teaching.

FULL TEXT PROCESSING EDITOR which helps you store, write, and change programs (written in the specially provided Data Manipulation Language), helps you store or change those COMMANDS you may wish to use later or simply store and correct text for letters or memos.

USER VIEWS provided by PROCEDURE with complete control at the FIELD level.

MULTI TERMINAL USE supported on DEC 11/23 with CONCURRENT use of records within a database and full INTERLOCK handling-warm restart with TRANSACTION LOGGING, control of synchronization points and PASSWORDS.

BRING MAINFRAME POWER TO YOUR MICRO-PROCESSOR

This is the first application development tool to be provided on 8 bit and 16 bit computers with a full range of ENGLISH-like conversational power normally only available on large mainframes which demand megabytes of memory.

THE SMART DATA BASE MANAGER

YES! Show me how smart you are.

- Send me a FREE copy of the DATA ACE information leaflet.
- Send me the DATA ACE User Manual covering the Relational Data Base Manager, the Editor, the conversational data retrieval and command facilities and the interactive data definition language. My check for \$75.00 is enclosed. Mail to: **Aregon Systems, Inc. 1911 Wright Circle Anaheim, Ca. 92806, (714) 634-9012**

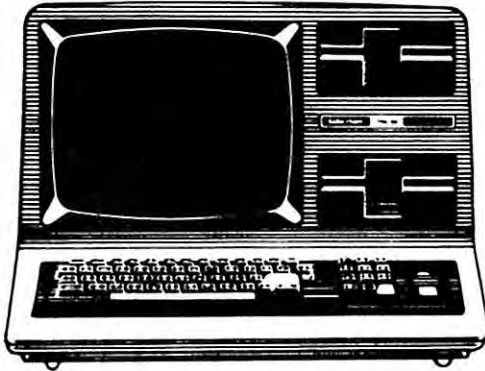
Name _____ Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone _____

AREGON

 325

SOFTWARE

COMPUTER PRODUCTS



GAMES GAMES GAMES

The computer was not meant to be ALL business! We carry a complete stock of Adventure & Arcade style games. Each game has been subjected to extensive testing by one of our less productive staff members. (* denotes rated great!)

For Model I or III

*Adventures by Scott A.		\$19.95
1-12 — order by number		
	Cassette	Disk
Super Nova.....	15.95	19.95
*Galaxy Invasion.....	15.95	19.95
*Cosmic Fighter.....	15.95	19.95
*Robot Attack.....	15.95	19.95
*Attack Force.....	15.95	19.95
*Defense Command.....	15.95	19.95
*Alien Defense.....	19.95	19.95
Star Trek 3.5.....	14.95	19.95
Sky Warrior.....	14.95	19.95
*Eliminator.....	14.95	20.95
*Armor Patrol.....	19.95	24.95
*Valkyrie.....	29.95	39.95
Planetoids.....	19.95	20.95

For Kiddies

Human Adventure.....	—	19.95
*Old McDonald.....	19.95	—
Frog.....	14.95	—
Red Riding Hood.....	14.95	—

Color Computer

	CART	CASS.	DISK
*Beserk.....	—	24.95	—
*Cave Hunter.....	—	24.95	—
Calixto Island.....	—	19.95	—
Black Sanctum.....	—	19.95	—
*Star Blasters.....	39.95	—	—
Color Meteoroids.....	—	21.95	—
Magic Cubes.....	—	19.95	24.95
*Pac Attack.....	—	24.95	29.95
Hangman.....	—	14.95	—
Color Chess.....	37.96	—	—
Football.....	38.95	—	—
Bustout.....	28.45	—	—
*Space Assault.....	28.45	—	—
*Polaris.....	28.45	—	—
Color Scripsit.....	38.95	—	—
*Art Gallery.....	39.95	—	—
*Learning Lab.....	—	49.95	—

SPECIAL DELIVERY

By now you have heard of this
FANTASTIC SOFTWARE.
Now experience it!

- Maintain Your Mail List
- Print Free Format Labels
- Merge with Form Letters
- Fast Fast Fast Machine Language
- Sorts Faster Than A Speeding Bullet
- Enter Name at typist speeds
- Use with Scripsit, Lazywriter, Electric Pencil (We sell them all!)
- Extract Selected Names
- Boldface & Underline (Even on the Daisy Wheel II!)
- Get your Form Letters Past the Secretary's Desk!

XTRA Special Delivery Includes All Of The Above PLUS:

- Disk Sorts
- Multi Label Printer
- Key Definitions

The last mailing list you will ever have to buy!

NOTE TO REGISTERED OWNERS

Registered SPECIAL DELIVERY owners can upgrade to XTRA! by returning their ORIGINAL disk with \$74.00 + \$2.00 shipping and handling.

FOR YOUR MODEL I OR III:

(requires minimum of 32K, single drive)

SPECIAL DELIVERY.....	\$125
XTRA SPECIAL DELIVERY.....	\$199

FOR YOUR MODEL II:

(requires TRSDOS version 2.0 & Scripsit 2.0)

SPECIAL DELIVERY.....	\$199
-----------------------	-------

OTHER FINE SOFTWARE FOR THE MODEL I & III

All New Electric Pencil

**We are through stalling.
It's really here!**

The original PENCIL set a standard for ease of use that no other editors can match. The NEW ELECTRIC PENCIL reaches even greater heights with many exciting new features that make it the most simple to learn text editor available for the TRS-80 Mod I or III! Don't leave home without it.
Electric Pencil version 2..... \$84.95

CONCEPTS

FOR HOME AND BUSINESS

EDAS

This is the assembler from MisoSys which is used for all assemblies of Special Delivery. We had real headaches until this came along. A must for any assembly language programmer.

EDAS MOD I/MOD III.....\$75.00

THE DISASSEMBLER

This is simply the most advanced disassembler we have ever seen. Creates EDAS source code, inserts user-defined labels, disassemble disk or memory, generates ORGS & EQUates.

THE Disassembler - Mod I, III.....\$89.00

RETAIL INVENTORY CONTROL SYSTEM

Maintains Inventory, Tracks Stock Sold, Tracks Backorders, Tracks Reorder Items, Prints Purchase Orders, Prints Listings by Vendors, & MUCH MORE! This is the one we use in our store.

Retail Inventory - Mod I, III.....\$129.00

MAXI MANAGER

A real database manager has finally come to the Model I & III.

Maxi.....\$89.95

MORE

VISICALC MODEL I.....\$94.95

VISICALC MODEL III.....\$189.00

SCRIPSIT.....\$94.95

R.S. General Ledger.....\$94.95

LAZYWRITER I/III.....\$165.00

NEWDOS 80 2.0.....\$145.00

LDOS.....\$125.00

ST80 III.....\$145.00

Super Utility Plus.....\$74.95

Quick Fix.....\$29.95

PRINTERS

EPSON PRINTERS

Epson has become the standard by which other low-cost printers are measured. *Highly recommended!*

MX80.....\$465.00

MX80 F/T.....\$635.00

MX70.....\$299.00

MX100.....\$745.00

Printer Cable.....\$35.00

TRS80 Bus Board/Cable.....\$100.00

GRAPHTAX 80.....\$80.00

MX-80 Ribbons.....\$14.00

Print Heads.....\$38.00

2K Serial Card.....\$145.00

QUME DAISY WHEEL PRINTERS

Sprint 9 KSR 35cps.....\$1995.00

Sprint 9 RO 35cps.....\$1895.00

Sprint 9 LTD 45cps.....\$2195.00

Tractor Feed.....\$195.00

NEC SPINWRITERS

NEC 7730 RO Parallel.....\$2650.00

NEC 7720 KSR.....\$3100.00

DATA SEPARATOR

The lifesaver. If you have a MOD I with disk drives and no data separator you have problems. Order from us or someone else but get a data separator.

Data Separator.....\$27.95

DOUBLER

Another breakthrough. Add double density to your MOD I. Includes built in data separator.

Doubler.....\$165.95

GREEN SCREENS

Not much difference between green screens but everybody should have one. If you don't buy ours, buy theirs.

MOD I/MOD III.....\$17.95

MOD II/LEEDIX 100.....\$22.95

IJG BOOKS

Disk Mysteries.....\$21.50

BASIC Faster & Better.....\$28.95

BASIC Decoded.....\$28.95

DISKETTES

VERBATIM DATALIFE! Re-inforced hub, double density, single sided.

Pkg. of 10 - 5 1/4 inch.....\$25.00

ELEPHANT DISKS. Re-inforced hub, double density, single sided.

Pkg. of 10 - 5 1/4 inch.....\$23.00

MX80 PRINTER STANDS

Smoked plastic printer stand. Hope you buy one of these — gotta bunch of these suckers in stock.....\$21.95

OTHER GOODIES

Flip Sort Boxes 5 1/4".....\$28.95

Flip Sort Boxes 8".....\$39.95

Plastic File Boxes (Holds 10 Disks).....\$3.50

Verbatim Head Cleaner Kit.....\$11.50

Orchestra 90.....\$145.00

Orchestra 85.....\$125.00

Add 3% Shipping & Handling

Texas Residents add 5% Sales Tax on all hardware items

Specify whether MOD I, II, or III when ordering.

SOFTWARE CONCEPTS

(214) 458-0330

(214) 458-0411

visit our new retail store at

**116 Preston Valley
Shopping Center
Dallas, Texas**

Dealer inquiries invited.

Model I owners can have the same clean screen as Model III owners.

Snow Shovel For Your Video

Omniterm
Lindberg Systems
Worcester, MA
Models I & III, 32K
\$95 disk

Ronald H. Bobo
 3246 Gravois
 St. Louis, MO 63118

With the proliferation of computer bulletin boards and the emergence of time-sharing services such as CompuServe and the Source, more and more TRS-80 owners are adding communication capabilities to their computers.

You can accomplish this by installing a Radio Shack RS-232 board in the expansion interface and obtaining a modem.

One other element is necessary. Your TRS-80 must be able to emulate a data terminal.

Terminal programs come in two basic forms. Dumb terminal programs have only the ability to communicate. The program included with Radio Shack's RS-232 is such a program. Smart terminal programs include many additional capabilities.

In the past, the smart terminal program considered to be tops was out of reach of many hobbyists because of its price.

David Lindbergh's Omniterm now offers a serious alternative. It is more affordable, in many ways easier to use, and features enhanced capabilities.

Omniterm is usable on both the Model I and III but before using it on the Model III, the disk must be processed with the

TRSDOS Convert utility. I used the Model I for this evaluation.

On bootup, Omniterm is in a dumb-terminal mode. On the Model I it reads the sense switch settings on the RS-232 and configures the UART accordingly. If a lowercase modification is in the computer, Omniterm activates the lowercase driver. Since the Model III RS-232 has no sense switches, the Model III version uses a standard setting of 300 baud, 7 data bits, 1 stop bit and even parity—the only differences between the two models.

The Command Mode

The power of Omniterm is accessed by pressing the @ key twice. This places the computer into the Command mode. The video screen display is shown in Fig. 1. The information previously on the screen is not lost. It can be retrieved by hitting the Break key.

Although Fig. 1 looks bewildering at first, it is basically a menu and status display.

The current UART settings are shown at the bottom left. On power-up, this is the reading of the sense switches on the RS-232. The bottom right shows the number of errors which have occurred. Directly below this is a display of the I/O buffer status revealing the amount of characters currently stored and the number the buffer is capable of holding.

The top portion of the screen contains two columns of available commands. The commands on the left affect status flags and are invoked by pressing the single letter key listed to the left. It is not necessary to

press Enter except after changing the screen format.

The letter P toggles the printer on and off. If the printer is not fast enough to keep up, Omniterm can buffer up to 2,048 characters. When the buffer fills an error message is printed and the printer is turned off. It continues to print until the buffer is empty, but no new data is forthcoming from the screen.

Screen reformatting lets you set your screen width. This is handy when communicating with, for instance, Apple bulletin boards which are set up for 40 characters across. By typing R and the number of characters, the screen may be set to whatever width you desire. This function also keeps words from being split at the end of a line.

C toggles the carriage return suppression function. In conjunction with reformatting, this enhances the ability to print neat, even lines. This is useful if you are communicating with a computer sending 80 character lines when your screen is formatted for 60. In this situation the TRS-80 prints 60 characters across, line-feeds, then prints the balance of the 80-character line. At this point the other computer sends a line feed leaving you with a short line. CR suppression prevents this.

L controls line-feed suppression. This is needed if you are communicating with another computer which sends only a carriage return at the end of a line rather than the standard carriage return-line feed.

The D command provides software control of half or full duplex. Default is full. If you communicate with a computer which does not echo your transmissions back to

"The buffer extends from the area Omniterm uses, to the end of memory, indicated by the HIMEM Pointer."

your screen and your modem does not have a half-full duplex switch, the setting may be toggled in Omniterm.

E turns on and off the Echo function which is used when you must supply an echo to another computer or terminal. Default is off.

G controls a CR/LF grouping function normally used when the TRS-80 is the host computer for a Teletype or video terminal.

I toggles the input to the buffer, this is used when downloading from a remote computer. The buffer extends from the end of the area Omniterm uses to the end of memory indicated by the HIMEM pointer. Omniterm will not write over any drivers that may be in high memory. If the buffer becomes full, an error message is printed and the buffer automatically closes.

O controls output from the buffer when sending to another computer. Omniterm provides for setting a delay between characters if sending to a slow machine. It also has the ability to provide prompted output. In this mode it sends a line and wait for a prompt from the receiving end before sending the next line.

The Command-mode functions in the right column do not have status flags. They are one-time functions that do their job and then finish. When the X key is pressed from command mode, the screen clears and the sub-menu in Fig. 2 is displayed. These are System functions. To leave the System mode, press Break and return to Command mode.

Q is a quick means of leaving Omniterm and returning to DOS.

C is a cold start. This acts as if one had gone to "DOS Ready" and then rerun Omniterm. All default values are reset.

Once you have Omniterm configured for a particular use, it is not necessary to repeat the process each time the program is used. Using the S key in the System mode allows your settings to be saved in a disk file, these can be loaded along with Omniterm in the future. It is possible to have many different files, each used with a different computer type.

If you are in Omniterm and wish different settings, pressing L while in the System mode brings up a prompt for the filespec desired. Type in the name, press Enter and your new settings are loaded.

Omniterm also provides for sending a string of characters as an auto sign-on, of up to 63 characters.

Using A while in the System mode allows creating or changing a sign-on message. This message can then be saved in the setting file.

Using I from the Command mode to open the input buffer causes the buffer to be cleared of any previous contents. If the buffer contains data and you want to add to it, use the R command. This command, when

used in the system mode, reopens the buffer without clearing the contents.

Powerful Features

One of Omniterm's most powerful features is it allows translation of a byte to or from a device to any other byte. The Omniterm devices consist of the screen, the comm line, the disk file buffer and the printer. Typing T from the Command mode brings up the menu shown in Fig. 3. This function allows you to examine and modify seven byte translation tables, one for each possible device and one for each direction, to or from a device. The control key table and special command tables can also be modified.

The purpose of these tables is to translate any byte to or from a particular device to any other byte. This is useful for code conversions, or when customizing Omniterm for use with additional hardware. For example, if you have a printer built for use with IBM equipment, using EBCDIC code rather than ASCII, the needed conversion can be done while in Omniterm—no external program is needed.

While other terminal programs can support code conversions, Omniterm is the only one I have seen where the operation is self-contained.

An example of one of the tables is shown in Fig. 4.

Omniterm, on start-up, uses whatever parameters the sense switches in the RS-232 are set for. To change these, type U and make your adjustments to the baud rate, parity, number of data bits and number of stop bits.

Your micro interprets the Break key as a value of 1, the same as Control A, and by default uses this value to generate a true break. To send a Control A without generating a break, go into Command mode and type A. The Control A is sent and Omniterm returns to Normal mode.

From the normal mode, pressing the @

key twice causes entry to the Command mode. To transmit an @ character you must type it three times; the first two cause entry to the Command mode and the third transmits @ and returns Omniterm to normal mode.

Unique Functions

A unique function of Omniterm is the ability to scroll back the display. You can accomplish this by typing B while in the Command mode. Holding down the space bar causes the display to scroll. Omniterm holds in memory the last 2,048 bytes received at all times. If something goes by too quickly, just roll back the text and read it again!

Z sets the real-time clock to zero, enabling you to keep track of time on a computer system with time charges, or when paying for a long distance call. The Clock function must be activated from DOS before loading Omniterm so the clock displays on the screen.

To send a file out from the TRS-80, it must first be loaded into the I/O buffer. This is done with the F command.

Saving a received file to disk requires pressing the S key. Once this is done you are prompted for a filespec. This can be any name, so long as it is in standard TRSDOS format. In case of a disk error while saving, Omniterm closes the file so text already written is retrievable. The contents of the buffer are intact, so you can try again.

Omniterm changes all uppercase to lower and vice versa, so Shift must be pressed to get uppercase as on a typewriter.

If using the Model III, a shifted zero reverses this. Some operating systems for the Model I also allow toggling back and forth. If your system does not allow this, the FROM keyboard translation table may be altered so the two cases are no longer reversed. A sample is included on the Omniterm disk under the name UPPER/OMT

```
@ OMNITERM Command Mode—Hit BREAK to quit
P PRINTER is: OFF X SYSTEM COMMANDS
R SCREEN REFORMATING is: 54 T CHANGE/EXAMINE TABLES
C CR SUPPRESSION is: OFF U CHANGE UART SETTINGS
L LFSUPPRESSION is: ON A SEND CONTROL-A & QUIT
D DUPLEX is: FULL @ SEND "AT" SYMBOL & QUIT
E ECHO is: OFF B SCROLL BACK DISPLAY
G CR/LF GROUPING is: OFF Z ZERO REAL TIME CLOCK
I INPUT TO BUFFER is: OFF F FILL BUFFER FROM DISK
O OUTPUT FROM BUFFER is: OFF S SAVE BUFFER TO DISK

Baud Rate = 300 Parity Errors: 0
Data Bits = 7 Framing Errors: 0
Stop Bits = 1 Overrun Errors: 0
Parity = EVEN Buffer: 0 of 25742 used
```

Fig. 1.

"While other terminal programs have the ability to support code conversions, Omniterm is the only one... where the operation is self-contained."

which may be loaded into memory with Omniterm.

Five Utilities

Five additional programs included on the disk are the following utilities:

- BINHEX/CMD converts binary files to ASCII hex files so they may be transmitted in standard format.
- HEXBIN/CMD converts the ASCII hex files back to binary.

● BINERR/CMD converts any type file to a special error-detecting, bit-packed format with checksums at the end of each line and a sum of all checksums at the end of the file. More efficient than BIN-HEX, this will pack 50 percent more data into the same amount of space.

● ERBBIN/CMD re-converts files made by BINERR and detects any errors in the file. If errors are found, the file should be retransmitted until none are found.

● TEXTED/BAS is a line-oriented text editor. This is useful for getting rid of garbage picked up when a buffer is opened too soon or closed too late. Just load the file into TEXTED, delete the lines with garbage and save the file back to disk. It is also useful when you save a Basic file in ASCII format and get a Direct Statement in File error because a line is too long when reloading. TEXTED makes correcting such problems easy. It can also create files to be transmitted by Omniterm.

Five file-setting table files are supplied with Omniterm. If necessary, they may be modified for a particular user's requirement.

The five are:

- UPPER/OMT reverses the keyboard to standard TRS-80 format, shift for lower-case.
- SOURCE/OMT is for using the Model I with the Source. Three changes were made. The Break key sends Control P rather than a true break. The underscore character is translated to a semicolon. (The UPI news service on the Source fre-

Hit BREAK to quit
Table TO Display

00=00	01=01	02=02	03=03	04=04	05=05	06=06	07=07
08=08	09=09	0A=0A	0B=0B	0C=0C	0D=0D	0E=0E	0F=0F
10=10	11=11	12=12	13=13	14=14	15=15	16=16	17=17
18=18	19=19	1A=1A	1B=1B	1C=1C	1D=1D	1E=1E	1F=1F
20=20	21=21	22=22	23=23	24=24	25=25	26=26	27=27
28=28	29=29	2A=2A	2B=2B	2C=2C	2D=2D	2E=2E	2F=2F
30=30	31=31	32=32	33=33	34=34	35=35	36=36	37=37
38=38	39=39	3A=3A	3B=3B	3C=3C	3D=3D	3E=3E	3F=3F

Hit— for previous page, +; for next, ENTER to alter value

Fig. 2.

Keep magazines, catalogues, journals NEAT AND ORGANIZED in home, office, workshop!

End Clutter! Find it fast — the first time with handy, husky, heavy duty fiberboard

SHELF FILES

Eliminate the mess of loose magazines, catalogs and newspapers. Find what you want when you want it by using these handy shelf or desk top files. Adhesive ID labels included.



6 POPULAR SIZES AVAILABLE

From digest size to newspaper size! Popular letter and magazine size (9" x 11½", 3¾" box width) — 8 for \$13.59. 25 for \$31.95 prepaid. Sturdy, heavy-duty fiberboard will last for years! Charge it! Call or mail coupon today.

Professional Aids Co., Suite 8022 ✓ 521

3685 Commercial Ave., Northbrook, IL 60062 312/291-0558

Please rush postpaid Fiberboard Desk and Shelf Files as checked below.

How Many	Qty.	Size	Price	Total Price
8		Letter Size	\$13.59	
25		Letter Size	\$31.95	

Check for Free Catalog
 I enclose \$ _____
 full payment Ship postpaid

Charge it to Visa Mastercharge TOTAL _____

Acct. No. _____ Exp. Date _____

Name _____

Address _____

City/State/Zip _____

Illinois Residents add 6% Sales Tax, please. Other sizes from digest to newspaper available

NEW
40 TRACK
DISK DRIVES
with
POWER SUPPLY & CASE
for
RADIO SHACK
and
OTHER COMPUTERS

\$169

OMNITEK Computers
International, Inc.

1899 Main Street
Tewksbury, MA 01876
(617) 851-4580

Shipping extra FOB Tewksbury
Master Card, Visa, or Bank Checks accepted

✓ 195

"Dumb terminal programs have the Basic ability to communicate, that's all. . . smart terminal programs include many additional programs."

quently sends underscores rather than semicolons.) UPI also sends a decimal; 26 at times, which causes Omniterm to

home the cursor, but not to clear the screen. This has been changed to a null. A sample auto-sign-on message for use

with Tymnet and the Source is included with this file.

● SOURCE3/OMT is identical to the above, but for the Model III.

● MNET/OMT is used with CompuServe and Micronet (a subdivision of CompuServe). Changes refer to screen reformatting, which is turned off, and to the Break key, which now sends a Control C. A sample auto-sign-on message for use with Micronet is included. This table is for the Model I.

● MNET3/OMT as above, but for use with the Model III.

For the user in search of a top-flight terminal program at a reasonable price, Omniterm fills the bill admirably. Everything works as advertised and I've found no bugs.

The documentation is excellent. It consists of 76 pages of explicit directions as well as several appendices full of useful information such as code conversion tables, a glossary and more.

All registered owners are notified of changes and improvements, and upgrades are provided to owners for a \$15 fee. ■

System Commands—Hit BREAK to quit

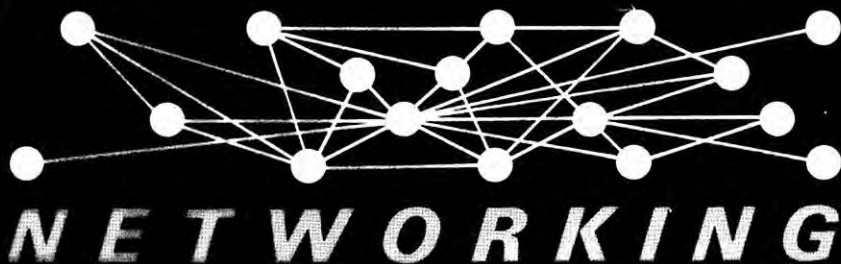
- | | |
|-------------------------------|--------------------------|
| Q Quit Omniterm and go to DOS | C Cold Omniterm Restart |
| L Load Omniterm Settings | S Save Omniterm Settings |
| A Auto Sign-on Message Change | R Reopen Input Buffer |
- Current Auto-Sign-on message:

Fig. 3.

Select a table by number, or hit BREAK to quit

- 1) To Display table
- 2) To Comm Line table
- 3) To Disk Buffer table
- 4) To Printer table
- 5) From Keyboard table
- 6) From Disk Buffer table
- 7) From Comm Line table
- 8) Special Command table
- 9) Control Key table

Fig. 4.



If you like to communicate with others, the CompuServe Information Service is your most effective vehicle. Why? Because we have the largest customer base of any videotex system in North America. And we have hundreds of new subscribers each week.

"Talk" to other CompuServe subscribers via CB simulation (it's the most popular offering on our network). Send E-mail, use the electronic bulletin board and exchange information with computer manufacturers, Special Interest Groups and publishers.

Play a variety of networking games with your own group or complete strangers from New York to Chicago to L.A.

Ask for a demonstration at a Radio Shack® Computer Center. Videotex software is available for various brands of personal computers.

CompuServe Information Service, 5000 Arlington Centre Blvd., Columbus, Ohio 43220. (614) 457-8650.

CompuServe

✓ 235

DAISY WHEEL

By SMITH-CORONA

SAVE \$500⁰⁰

...and more over other popular Daisy Wheel Printers.

- 120 WORDS PER MINUTE
- FRICTION FEED
- CHANGEABLE DAISY WHEEL TYPE FONTS
- CENTRONICS PARALLEL or RS232 INTERFACE

You Pay Only **\$745⁰⁰**

Rainbow™

P & P CORPORATION

P.O. BOX 362 • HADDONFIELD, N.J. 08033

✓ 265

TOLL FREE ORDERS ONLY **800-257-6170**

in New Jersey **609-428-3900**

DAISY WHEEL by SMITH-CORONA

Enclosed is my check for **\$745⁰⁰***

- Visa Master Card Check
 C.O.D. Wire Transfer (less 2%)

Credit Card No. _____ Exp. Date _____

Name _____

Address _____

State _____ Zip _____

Phone (_____) _____

* No charge for shipping
 No charge for Credit Card Orders
 New Jersey Residents add 5% Sales Tax

Programs that correct your spelling errors.

Spelling Chequer

Chextext
Apparat Inc.
 4401 S. Tamarac Parkway
 Denver, CO 80237
\$60

Hexspell
Hexagon Systems
 P.O. Box 397, Station A
 Vancouver, BC V6C 2N2
\$69

Microproof
Cornucopia Software
 P.O. Box 5026
 Walnut Creek, CA 94596
\$185

Miz'Spell
Programs Unlimited
 20A Jericho Turnpike
 Jericho, NY 11753
\$50

Proofreader
Aspen Software
 P.O. Box 339-M
 Tijeras, NM 87059
\$84

Michael M. Finetrock, Ph.D.
The College of Charleston
Charleston, SC 29424

Will proofreading programs turn your flawed, imperfect scribbles into first-rate prose? As contradictory as it may seem, a spelling checker does not know how to spell. The program will remember the words it has been told to learn, but it does not know when to use them, nor does it know any of the grammatical rules involved.

As often as you might want to ask it for the correct spelling of a word, given the limitations of a 48K system, the program is never going to respond with suggestions to use other words. Programs that operate like an electronic thesaurus exist, but this side

of a mainframe there is little likelihood that such a utility will ever be supplied with all the necessary features of a spelling checker.

Proofreading programs should be fast and versatile. On some occasions you might be entirely satisfied if the program does a fast check of your text and lists the unknown words. Under other circumstances you may want to have a video presentation of the suspect words, one by one, with an option to change the spellings in the original document file without having to reload the text with a word processor.

Spelling checkers could save a lot of time if they showed you suspect words in context, so you could verify the nature of the typographical error or misspelling involved before entering a correction. If the program has an interactive correction phase, then a single keystroke should be sufficient to tell it that a word it does not know is indeed

valid, or should be added to its vocabulary or immediately changed.

Spelling checkers should be efficient, smooth to operate and well error trapped, and like any other sequence of computer operations, the ideal spelling checker should be able to perform with 100 percent accuracy. This is possible if the dictionary file is adequate in size and composed *only* of correctly spelled words, the words chosen are appropriate to the user's working vocabulary, and the program itself introduces no extraneous errors.

Which spelling checker measures up to the requirements that I have just specified? Table 1 provides a comparative list of the principal features of each program I have reviewed.

The Testing Process

The initial problem was how to give each program the same advantages or disadvantages.

Name	CHEXTEXT	HEXSPELL	MICROPROOF	MIZ'SPELL	PROOFREADER
Price	\$59.95	\$69	\$184.50*	\$50	\$84#
Model II available?	No	No	Yes(\$149.50)	No	Yes(\$119)
Model III available?	Yes	Yes	Yes	Soon	Yes(\$94#)
Pages of Documentation	8	7	30	5	10
No. of Disks in package	2	2	2	2	4
Comes with DOS?	No	No	No	TRSDOS	File XFER
Comes with LCDVR?	N/A	No	No	LC/CMD	LCDVR/CMD
Total size in grams	77	101	74	88	174
No. Drives, MEM required	2-48K	2-48K	1-32K	1-48K	2-32K
Word processor access?	Yes	No	Yes	No	No
Requires ASCII text?	No	No	No	Yes	No
Max. letters per word	32	17	32	any	40
Dictionary size, words	10,000	20,000	30,000	18,000	38,000
Main dictionary type	Literal	Code	Packed	Code	Hashing
Create alternate?	No	Yes	No	Yes	No
Expand dictionary?	Yes	No	Yes	Yes	Yes
Add to dictionary?	Yes	Yes	Yes	Yes	Yes
Auto add to dictionary?	No	No	No	Yes	No
Delete from dictionary?	Yes	Yes	No	Yes	Yes
Learned word file?	Yes	No	No	No	Yes
Create word file?	No	No	No	No	Yes
Correct source file?	No	Yes	Yes	Yes	Yes
Display context?	No	Yes	Yes	Yes	Yes
Full text scroll?	No	Yes	No	Yes	Yes
Elect to exit program?	Yes	Yes	No	Yes	Yes
Process another?	No	Yes	Yes	No	No

*Total price with Correcting feature and Word Processing Conversion.
 #Total price with Proof.Edit.

Table 1. A Summary Presentation for Proofreading Program Features

THE \$595* SMART TERMINAL

The Heath 19 Smart Video Terminal gives you all the important professional features you want in a terminal, all for under \$600.* You get the flexibility you need for high-speed data entry, editing, inquiry and transaction processing. It's designed to be the backbone of your system with heavy-duty features that withstand the rigors of daily use.

Standard RS-232C interfacing makes the 19 compatible with DEC VT-52 and most computer systems. And with the 19, you get the friendly advice and expert service that makes Heath/Zenith a strong partner for you.

Sold through Heathkit Electronic Centers† nationwide (see your white pages for locations). Stop in today for a demonstration of the Heath 19 Smart Video Terminal. If you can't get to a store, send for the latest Heathkit® Catalog. Write Heath Co., Dept. 035-884, Benton Harbor, MI 49022.

HEATH/ZENITH

Your strong partner

Completely addressable blinking cursor lets you edit anywhere on screen.

Reverse video by character lets you emphasize words, phrases or paragraphs.

High resolution CRT gives you sharp, easy-to-read image, reduces eye-strain.

Z-80 microprocessor-control makes the 19 capable of multitude of high-speed functions. It's the only terminal with ROM source code readily available.

Complete ASCII character set including upper case, lower case with descenders, and special graphic symbols.

80 character by 24 line format, plus 25th line for operator messages and prompts.

Professional quality keyboard, standard typewriter layout, 72 keys, including 12 special function keys.

Insert and delete character or line plus erase to end of line and end of screen make the 19 ideal for sophisticated editors like WORD-STAR.

Cursor and special functions are accessible by keyboard or computer, using either DEC VT-52 or ANSI Standard protocols.

Keypad in calculator format permits fast, easy entry of numeric data.



*In kit form, F.O.B. Benton Harbor, MI. Also available the completely assembled Zenith Z-19 at \$895. Prices and specifications are subject to change without notice.

†Heath Company and Veritechnology Electronics Corporation are wholly-owned subsidiaries of Zenith Radio Corporation. The Heathkit Electronic Centers are operated by Veritechnology Electronics Corporation.

"I sprinkled my text with 15 intentionally misspelled words..."

tages the others enjoyed. First, I had to set up a test that would involve no disk swapping or any unnecessary drive access calls. That part was easy, since I have a 48K double-density system and two drives I can push to 44 tracks each. As a result I was able to put four of the five programs on a single disk along with the test document. Since only two of the spelling checkers I tested could be called from within a word processor, I did not include that function in the timed part of the test.

More complicated was the matter of how to run the programs once I had read and understood the documentation. Two programs will operate with little or no keyboard input, other than the name of the file to be checked. The other programs do not finish until they have gone through an interactive correction phase that could introduce the added factor of my own reaction time. Some of the spelling checkers have been programmed with their functions in the form of an INKEY string, while others require use of the Enter key. Thus the problem was how to time the programs, not my own ability or inability to use them as fast as humanly possible.

In this case the solution appeared in the form of an excellent disk operating system known as NEWDOS80 version 2.0, which can route all program requests for an operator input key to a chain file. This took a lot of experimentation, as I had to custom tailor a chain file for each program, but it proved well worth the time I spent. By using the lowercase drive that NEWDOS80 2.0 automatically loads into memory, I was able to reduce the number of unnecessary variables even further.

Then there was the problem of what to use for a test document. You want to evaluate the performance of the programs on both long and short texts, but the matter of what topic to choose was a very arbitrary decision on my part. I decided to use a letter about proofreading programs, requiring nothing in the way of specialized vocabulary.

Using a pen name to undertake a mythical correspondence with Wayne Green, I sprinkled my text with 15 intentionally misspelled words typical of the typographical errors my alter ego might make. These included: examples of nonstandard usage, *ain't* and *irregardless*; misspelled nouns, *speech*; words run together, *alot*; improper contractions, *already* and *wo'nt*; incorrect prefix, *encorrect*; incorrect suffix, *truely*; incorrect plural form, *dictionarys*; dropped double letter, *irrelevant*, *rightfully*, *referred* and *writen*; and also some simple misspellings, *comparitive* and *abbominations*.

The latter word, which broke at the end of a line, did double duty as it allowed me to find out whether use of a hyphen made any

	Declared Errors	Correct Words Declared Suspect	True Errors Detected	Wrongly Used Words Detected	British Usage Caught	255-Word Test Speed	1650-Word Test Speed
CHEXTEXT	50	31	14	5	2	1:49	2:55
HEXSPELL	34	15	15	4	2	1:41	10:18
MICROPROOF	22	13	8	1	1	1:02	2:25
MIZ'SPELL	26	15	10	2	1	1:39	10:23
PROOFREADER	26	10	14	2	1	4:12*	6:55*

*The combined time of Proofreader and Proof-Edit.

Table 2. Test Results of the Five Proofreading programs for the Model I.

difference to the proofreading programs. The letter also included two English spellings of common words, and eight other correct words that simply were used incorrectly or occurred as typographical errors.

I included one other typographical error in the test document, even though I knew that none of the spelling checkers would be able to catch it, since it involved typing an

incorrect character, s, in place of the article a. The point to be made is that proofreading programs which can check single character words and catch that particular typographical error would not have been able to accept the B.S. abbreviation in the signature.

The 225-word test document is shown in Fig. 1 and the results of the test are given in Table 2, along with additional information

November 1st, 1981

Mr. Wayne Green, Publisher
80 MICROCOMPUTING
80 Pine St.
Peterborough, NH 03458

Dear Mr. Green,

Herewith, at long last, I am inclosing my comparitive review of five proofreading programmes for use on the TRS-80 Model I. As I believe you are already well aware, such programs are not an absolute panacea for the woes of the word processor user--they do not function as electronic dictionarys and wo'nt tell the user when he has chosen an encorrect or irrelevant word for his context, nor will they catch the grammatical errors we all are prone to make alot of. But they are quite rightfully referred to as "spelling checkers," for they do give the righter an opportunity to catch typographical errors and/or faulty usage such as "irregardless" and "ain't," tho such abbominations do seem to crop up ever more frequently in the colloquial speech of Americana.

The principle advantage to having such a peace of software in addition to s word processor is that proofing what one has writen need no longer be a burdensome and time-consuming task, done either in haste or neglected altogether. In fact, I would venture to say that just about anyone using a "spelling checker" will find it all two easy a way to polish one's pros.

Very truely yours,

Will Fullydone, B.S.

Fig. 1

Before you C.ITOH, see us.

When you see us we'll tell you about the line of quality printers available from C.Itoh, one of the largest manufacturers of computer peripherals in the world. C.Itoh has a printer to fit your needs.

C.ITOH STARWRITER

C.Itoh's line of letter-quality Daisy Wheel Printers offers an unmatched combination of price and performance. Since the Starwriter is available in two versions — the 25 cps Starwriter I and the 45 cps Starwriter II — you don't have to buy more printer than you need. If you don't need high print speed, the Starwriter I offers you more for your printer dollar. The Starwriter prints up to 136 columns of sharp letter-quality printing using cloth or film ribbons; its Automatic Bi-Directional printing mode assures the highest possible throughput.

The Starwriter uses industry-standard 96-character print wheels and ribbons, so there are no supply problems to worry about. Plug compatible with all major daisy wheel printers, it requires no changes in software or hardware and is available with a Centronics Parallel or RS 232C Serial interface. Optional Accessories: Bi-Directional tractor, Single Sheet Feeder.

The Starwriter is backed by C.Itoh's one-year warranty (90 days parts and labor, 9 succeeding months parts).

STARWRITER I Parallel 25 cps . . . 1440.00
 STARWRITER I Serial 25 cps . . . 1540.00
 STARWRITER II Parallel 45 cps . . . 1770.00
 STARWRITER II Serial 40 cps . . . 1795.00
 Bi-Directional Tractor 239.00
 Single Sheet Feeder 1395.00

C.ITOH PRO/WRITER

The C.Itoh Pro/Writer offers professional quality at a very low price. Compare the advanced features that are standard on the Pro/Writer with what other printers in its price range offer, and you'll find that none offer so much value for the money; you won't have to buy 'options' to get the performance you want. The Pro/Writer uses the latest in dot-matrix printing technology to provide a productive, cost-effective solution to all your printer needs.

Some of the Pro/Writer's Advanced Features:

N x 9 MATRIX	100 CPS PRINT SPEED
BI-DIRECTIONAL PRINTING	LOGIC SEEKING
PROPORTIONAL SPACING	PICAS (10 PITCH) & ELITE (12 PITCH)
DOT ADDRESSABLE GRAPHICS	5 ALPHABETS
SPECIAL GRAPHICS CHARACTERS	8 TOTAL CHARACTER FONTS
ENHANCED PRINTING	DOUBLE-WIDTH PRINTING
FRICTION & TRACTOR FEED	OPTIONAL RS 232C W/ X-ON & X-OFF

PRO/WRITER Centronics Parallel 549.00
 PRO/WRITER RS 232C Serial 599.00

Alpha Byte

COMPUTER PRODUCTS

We built a reputation on our prices and your satisfaction.

We guarantee everything for 30 days. If anything is wrong, return the item and we'll make it right. And, of course, we'll pay the shipping charges.

We accept Visa and Master Card on all orders; COD orders, up to \$300.00.

Add \$2.00 for standard UPS shipping and handling on orders under 50 lbs. delivered in continental U.S. Call for shipping charges over 50 lbs. Foreign, FPO and APO orders, add 15% for shipping. California add 6% sales tax.

Prices quoted are for stock on hand and are subject to change without notice.

To order, or for information, call:
(213) 706-0333

31245 LA BAYA DRIVE, WESTLAKE VILLAGE, CALIFORNIA 91362

"Apparat's long-heralded text checker was the last of the lot to reach the market."

on the speed at which each of the programs processed a much longer document of 1,650 words.

Chextext 1.0

Pronounced "check text," Apparat's long-heralded text checker was the last of the lot to reach the market. Sold on two formatted data disks, it requires a minimum of 48K RAM and a two-drive, single-density or a one-drive, double-density system. Chextext is largely interactive, and while the documentation supplied does not explain every step of the program, it is quite adequate.

The Chextext package consists of an Assembly-language program and object file, an ASCII character dictionary (65 grams), and a patch to Scripsit which permits the user to activate Chextext and process a document simply by entering the special command "P,CHX." In a two-step operation CHEXTEXT/CMD first compresses the document by casting out all the duplicate words it finds, and then verifies the remaining list against its own vocabulary.

During the suspect word review, the user

may elect either to ignore a word not recognized by the program, add it to the dictionary, or mark it with a # in the source text file.

A separate dictionary maintenance function offers several useful options. You can list any portion of the dictionary to the screen simply by entering the desired parameters. This can be particularly useful when used with Chextext's updating feature, which makes it possible to manually add and delete words from the program vocabulary.

An important part of the Chextext dictionary is its 10-sector update file of user-added words. When this is completely full, the program prompts the user to do a reorder that incorporates his words into the main dictionary in alphabetical order. A notable decrease in the program's speed of operation results. Delete word requests are not effective until you run such a reorder, and if a large number of frequently used words are left to accumulate in the update file, the program's operating speed slows down considerably.

Using Scripsit's hyphenation feature before processing a document with Chex-

text affects the number of suspect words found, as the program ignores any word particle that includes the AD byte put in by Scripsit. During the test, Chextext refused to recognize *abbom-inations* as an error until the pseudo-hyphen had been either removed or replaced by the equivalent 2D ASCII character.

Chextext does not allow you to see the context in which your potential error has occurred, nor does it provide an easy way in which to create an alternate main dictionary. Chextext does not allow you to correct words while processing a document. Instead you can mark suspect words in the source file by changing the last character of each one to a #. This makes it necessary to do an additional series of three-step operations, using the word processor's global search function to locate each bad word in a document so you can correct the error and remove the # sign.

Chextext combines the accuracy of a literal dictionary with considerable operating speed, particularly noticeable on large documents. Although the author's decision to opt for ASCII format over word compres-



MX-80 OWNERS

TIRED OF PRINTING ON THE PERFORATION?

TIRED OF JUMPING TO BASIC JUST TO CHANGE PRINT MODES?

REJOICE! MXPLUS IS HERE

INSTALL **MXPLUS** AND YOUR MX-80 WILL SKIP PERFORATIONS *AUTOMATICALLY*.
(SWITCH SELECTABLE, OF COURSE)

LETS YOU SELECT CONDENSED, EMPHASIZED OR NORMAL PRINTING *INSTANTLY* USING ONLY THE PRINTER PANEL BUTTONS.

MXPLUS IS A PLUG-IN MODULE THAT INSTALLS IN MINUTES. NO SOLDERING REQUIRED.

NO MX-80 SHOULD BE WITHOUT MXPLUS. ONLY

ORDER TODAY \$39.95

CALL: 800-835-2246x441
OR HI,KS,AK, CALL 213-969-2250
WRITE:
DRESSLHAUS COMPUTER PRODUCTS
22713 VENTURA BLVD, SUITE F
WOODLAND HILLS, CA 91364

POSTPAID CALIF. ADD 6%
SAME DAY SHIPPING
WITH MC/VISA




353

GEAP

Can You Create Letters Like The Above In 4 Keystrokes . . .

And Have A Word Processor Print Them Just As A Regular Letter Or File? If Not, It's Time To Explore GEAP.

GEAP Stands For Graphics Editor And Programmer.

Depending On Your Hardware & the GEAP Package You Choose, You Can Create Diagrams, Figures, Flyers, Posters, Letterheads And Artwork With Ease.

Using GEAP Does Not Require Basic Programming Knowledge, However We Have Facilities To Allow Programmers To Create Screen Formats And Program Documentation Within Their Programs With Ease.

We Offer GEAP In Modular Form. You Can Get It All At Once Or Purchase It In Pieces As Your Needs Or Hardware Grows.

Graphics Editor And Programmer

FLEXIBILITY, EASE OF USE, AND EASY FUTURE EXPANSION IS WHAT GEAP IS ALL ABOUT.

GEAP Regular Facilities — 16K-48K Disk, Stringy, or Cassette Supported.

Sample Commands & Facilities In The Basic GEAP Package:

MODULES 2-4 — Letterset Modules. Instant Letters, No Drawing Required. This Is How We Created The "GEAP" Cube Letters In 4 Keystrokes.

MODULE 5 — EPSON Printer Support Module. Now Non-Programers Can Use The EPSON MX-80 To Print Their GEAP Creations — Posters, Flyers, All With Epson Quality.

GEAP 48K DISK — You Get Module 1-5, & Additional Disk Related Features. Expansion Modules Run Via Menu Selections. If You Have The Hardware, This Is The GEAP For You.

NEWSCRIP Support Package — All Of The GEAP 48K DISK Commands, Plus Facilities To Interact With NewScript. Now The Perfect Marriage, Word Processing & Graphics Processing. Requires Current NewScript Update.

Regular GEAP	25.99	Expansion Module 1-4	16.99
GEAP 48K	45.99	NewScript	99.99

California Add Sales Tax

When Ordering, List System & Peripherals

J F CONSULTING

74-355 BUTTWOOD PALM DESERT, CA. 92260
(714) 340-5471

Epson MX-80 is a trademark of Epson America

NewScript is a trademark of ProSoft.

273

“...commonly used words accumulate at the front of the vocabulary where they are found fastest.”

sion may appear to have been misguided, the program must be marketed on 35-track, single-density disks that hold only a very limited 10,000-word dictionary. However, Apparat offers all registered owners of Chertext the opportunity to obtain *free of charge* whatever size dictionaries will suit their own hardware configurations—up to and including a 50,000-word version on a dual 80-track, double-density disk!

Hexspell 1

Hexagon Systems was the first to market a spelling checker for the Model I on an international basis. The seven pages of documentation provided by Bernard Hughes, the creator of Hexspell, are clearly written and walk a first-time user through the entire program. During the test trial Hexspell was the only one of the five programs to prove 100 percent effective in detecting true errors. It has the same minimum system requirements as Chertext, but since its vocabulary is twice as large, Hexspell questioned only half as many correct words.

Hexspell is a Compiler Basic written program. Its components are a Microsoft run-

time package BRUN/CMD and SP/CHN, the program files, and a compiled code dictionary (55 grams). Hexspell's initial vocabulary is smaller than the space that has been permanently allocated for the word list because the dictionary is divided into rows of words not necessarily in alphabetical order.

As words are called up during the text checking process they are moved to the head of their row. When the word list is full, a new word added at the front of the list pushes an old one out the back. As a result, commonly used words accumulate at the front of the vocabulary where they are found fastest. There is an almost human quality to Hexspell, for it seems to pick up speed as it becomes more attuned to the user's own vocabulary.

A principal feature of the program is that the source text is scrolled up the screen at a fast reading speed, with each suspect word displayed in full context. This gives the user an opportunity to change or add it to the dictionary on the spot. You must delete words in lowercase.

Hexspell's full text scroll feature means

Hexspell's operating speed is slower than most other spelling checkers'. This becomes more noticeable with longer documents. You can increase the program's speed somewhat by electing not to check words with uppercase letters, such as names and addresses, control codes, and so on. But this means that the first word in every sentence will also not be checked.

The dictionary is small (a maximum of 28,000 words) because it is written in compiler code. Even if you have the available disk space of an 80-track, double-density system, you cannot expand the vocabulary file by so much as a single sector. If you frequently use foreign terms and expressions in your writing you will find Hexspell's word list limiting.

What can be seen as a disadvantage from one point of view may well be one of the program's strongest selling points. The "fast reading speed" video scroll of the full text offers an opportunity to run your own quality control on the document at the same time Hexspell is working. This gives the writer a convenient opportunity to catch any correctly spelled words that have been

SOFTEK SOFTWARE

Quality Software for Your TRS-80 • For TRS-80 Model I & III Disk or Tape

<p>SOFTEK 100 An assortment of 100 programs including Business, Personal, Educational, Animation, Construction, etc. A list of programs is included. \$99.50</p>	<p>SOFTEK PAYROLL Figures all taxes and keeps track of total earnings. Model I & III Disk \$99.50</p> <p>ACCOUNTS PAYABLE Will keep track of total expenses paid out and will print hard copy. Currently used for commissions paid out to broker insurance agents. Model I & III Disk \$89.50</p>	<p>MAIL PROGRAM Keeps a list of over 1,000 names and will display, edit, list, or print mailing labels. Model I & III Disk \$19.95</p>	<p>AIDS SYSTEMS BY METS TECHNOLOGIES MTC AIBS III This easy to use system allows even a novice TRS-80 user to create data files custom configured for many applications, from lists for mailing and cataloging to financial reporting and time scheduling. It requires NO PROGRAMMING and is complete with features for adding, deleting, sorting, updating and printing. MODEL I \$69.95 MODEL II \$99.95</p>
<p>MAIL LETTER Will do the same as mail but you can type up to two letters along with it and the mail letter program will type the letter and put their name and address on the heading and also print "Dear" and their first name. Model I & III Disk \$29.95</p>		<p>THE FLOPPY DOCTOR By Dave Stambaugh FLOPPY DISK/MEMORY DIAGNOSTIC Computer "professionals" have long known the importance of regular use of diagnostic software in verifying the integrity of computer hardware. The TRS-80 is no exception; good diagnostics are a must. The MICRO CLINIC offers two programs designed to thoroughly check out the two most trouble prone sections of the TRS-80, the disk system (controller and drives) and the memory arrays. MODEL I . . \$24.95 MODEL III . . \$29.95</p>	
 <p>SCARFMAN ©1981 Cornsoft Group Model I & III Tape \$15.95 Model I & III Disk \$19.95</p>		<p>MODEL I DOUBLE DENSITY PACKAGE NEWDOS/80 Version 2.0 and Controller Everything you need to convert your TRS-80 Model I to run double density. Complete with software, hardware, and instructions — installs in minutes with NO SOLDERING, WIRING OR CUTTING \$229.95 NEWDOS/80 Version 2.0 for Model I and III \$139.00</p> <p>FLIPSORT File Box Storage for 5 1/4". \$19.95 1 Box Verbatim 5 1/4" Disks with Flipsort. \$43.95</p>	
<p>LIFE INSURANCE QUOTER Good for Life Insurance salesman, included are capabilities for Executive bonus, minimum deposit, Corporate deferred compensation, annuities, term, etc. Model I & III Disk \$350.00</p>	<p>GROUP INSURANCE QUOTER Good for quoting several plans of insurance, primarily health, and printing hard copy. Model I & III Disk \$99.50</p>	<p>VERBATIM DISKETTES 5 1/4" Double Density and 40 Track Datalife. \$26.95</p> <p>SOFTEK SOFTWARE P.O. BOX 702 STERLING, ILLINOIS 61081 815-625-5342</p> <p>MASTERCARD AND VISA WELCOME We Also Accept: • COD • CHECKS • MONEY ORDERS ADD \$2.00 FOR SHIPPING</p> <p>TRS-80® IS A TRADEMARK OF TANDY CORP. AIDS III,® CALCS III,® MERGE III,® ARE TRADEMARKS OF METATECHNOLOGIES</p>	

SOFTWARE
FOR YOUR 16K TRS-80
COLOR, MODEL I, III
ATARI 400/800, APPLE II

NOW YOUR
 COMPUTER
 CAN ACT LIKE
 A COMPUTER
 SHOULD....
 WITH OUR
 MAGNETIC
 MAGAZINES,
 YOUR MICRO
 WILL ENTERTAIN,
 EDUCATE, AND
 CHALLENGE YOU.



On cassette or diskette*, you will receive 6-10 programs every month ranging from games, home entertainment, and personal finance, to more of our unique "teaching" programs.

Our next issue will include:

1. Haunted House Adventure
2. Income Averaging (Schedule G)
3. Hangman with graphics
4. Cryptquote Game
5. Writing Utility Programs
6. More on Graphics

You've already missed Stock Market Analysis, Concentration, Checkers, Go!, Algebra and Geometry Tests and Football. Later issues will include Backgammon, Chess, all Tax Schedules, Baseball, and many more. So don't let another issue pass you by! Remember MAGATARI is for the ATARI 400/800; APPLETREE is for the APPLE II+; and TRC is for the MODEL I, III, and the TRS-80 COLOR, so be sure to order the right one. Subscription price for cassette is \$50 per year, \$30 per 1/2 year, and \$10 for a trial issue; for diskette \$62 per year, \$36 per 1/2 year, and \$11 for a trial issue. (Back issues available on request)

THE COLOR ACCOUNTANT

With our complete home accounting system, keeping track of your finances can be as easy as PI.

Included in this set of programs are:

1. Chart of Accounts Maintenance
2. Complete Checkbook Maintenance
3. Tax Deduction Flags
4. Net Worth Statement
5. Income Less Expense Statement
6. Complete Graph Package (graphs any files)
7. Payments and Appointments Calendar
8. Home Budget Analysis
9. Mailing List

All programs are menu-driven and allow add/change/delete. Also, all files and statements can be listed to screen or printer, and saved to cassette or diskette. The cost of THE COLOR ACCOUNTANT is \$75 for cassette and \$80 for diskette. This package requires 16K for the TRS-80 COLOR, Model I, III, and Apple II+. However the ATARI 400/800 requires 24K for cassette and 32K for diskette. THE COLOR ACCOUNTANT also comes with 40 pages of documentation.

**the
 programmer's
 program**



Do you know all the innovative ways of using BASIC commands? The staff at the Programmer's Institute have designed a set of programs explaining everything the manuals omit.

The Programmer's Program leads you step by step through the fundamentals of programming your computer. Then you explore the finer points... multiple loops, queues, stacks, game programming, sorts, trees, boolean logic, and memory saves. All these methods make your programming tasks easier and more efficient. Difficult (and very useful) programs are created before your eyes, and designed so you learn at your own speed! The Programmer's Program is a must for every owner of a microcomputer (\$50 cassette, \$55 diskette).

Order both The Programmer's Program and 1 year's subscription, and the total cost is only \$75 cassette, \$87 diskette. If you order now, you will receive a Football Program and Computerized Telephone Directory ABSOLUTELY FREE with any \$75 order. So don't wait... order today!

THE PROGRAMMER'S INSTITUTE

A Futurehouse Company
 P.O. Box 3191 Dept. B
 Chapel Hill, N.C. 27514
 (919) 489-2198

✓ 245
 MC & Visa Welcome

Name _____
 Address _____
 City/State _____

Programmer's Program Year Subscription
 Color Accountant 1/2 Year Subscription
 Trial Issue

Type of Computer _____
 Cassette Diskette

ATARI, TRS-80, and APPLE are trademarks of the Atari, Tandy, and Apple Corp. Programmer's Program, TRC, Appletree, and Magatari are trademarks of the Programmer's Institute.

*All software available on cassette for ATARI 400/800, APPLE II+, MODEL I, III, COLOR. On Diskette for the APPLE II+, MODEL III, ATARI 400/800.

"If speed were the sole consideration then Phil Manfield... would be king."

doubled up or used incorrectly (e.g., principle instead of principal) which no proof-reading program would recognize as being in error. And while Hexspell's limited vocabulary size can be a problem, a utility program CLEAR/BAS makes it possible to create as many alternative word lists as you need.

An enhanced version of Hexspell may already be available by the time this review appears. Allegedly it will offer an expandable dictionary, text scroll speed control, an automatic vocabulary add function, and a programmable character set, as well as checking to see if the dictionary is present before prompting for a disk mount. With added features such as these, Hexspell 2 should be a formidable tool at proofreading time.

Microproof

In nearly every respect Cornucopia Software's entry in the spelling checker competition is in a class by itself. It alone will operate on a one-drive, single-density 32K system, and its documentation is at least three times the size provided by the other firms.

In the version tested the full Microproof program had 12 separate elements: a main program and dummy file, three dictionaries (56 grams total), plus PRINTDIC/CMD and ADDTODIC/CMD, programs which allow you to print and to expand the dictionary. Standard Microproof sends the list of suspect words to the screen and also the printer, if turned on.

The text correction feature is available as an option, as is a patch to either Electric Pencil or Scripsit that makes it possible to call the Microproof program, check and correct a document, and then reboot the word processor, all by issuing only a one-letter command. If you elect to see the context in which a suspect word occurs, Microproof displays only a portion of the source text, marking the screen location of the word by putting three question marks after it.

By using sorted word packing and by substituting one-character tokens for root words, Cornucopia was able to compress 30 percent more vocabulary into the Microproof dictionary. Any words added to the dictionary are compressed in the same fashion as the basic word list which comes with the program, and the user can easily learn to use the coding system. This involves no more than entering the root word followed by a space, a v for verb, n for noun, a for adverb, or j for adjective and adverb.

One of the principal criteria by which you judge a proofreading program, or for that matter a human proofreader, is effectiveness in detecting true errors. Where accuracy is concerned, Microproof made an extremely low grade on the test trial, detect-

ing only 53 percent of true errors in the sample document.

A principal cause for the program's poor showing appears to be the root word, prefix, suffix coding system which gives Microproof its speed advantage. Each of the errors that went undetected were compound words: *ain't, comparative, encorrect, irregardless, refered, truely, and writen.*

It seems that the prefix-suffix coding system can create a sizeable number of such artificial words, or at least enough to significantly reduce the 50,000-word equivalency claimed for the Microproof dictionary. This conclusion seems further justified when you compare the performance of Microproof and the other programs with regard to the number of correct words declared suspect when processing the test document.

The text correction module of Microproof should be easier to use. Keys selected for the two principal edit functions require an initial shift to uppercase, and have not been INKEYed. The initial video review of suspect words is done entirely in lowercase. As a result, when processing documents you must resort to the in-context display feature far more frequently than would otherwise seem necessary.

Unlike the other programs tested, Microproof does not offer the option to close files and exit to DOS if and when you desire, nor are you given a convenient means to delete unwanted words from the dictionary.

Cornucopia Software has provided far more program documentation than seems necessary. You find virtually the same explanation of the dictionary coding system in three different places, and a large facsimile of the correction-mode screen display is shown 16 different times in the text. If you want to learn how to use the program in the shortest time possible, check the table of contents to see which of the several appendices to read first.

If speed were the sole consideration then Phil Manfield, author of Microproof, would be king. While the advertising claims made for the program may seem to be a bit excessive, Microproof is very fast. The tests showed that when handling either long or short documents it was the fastest of the spelling checkers I evaluated.

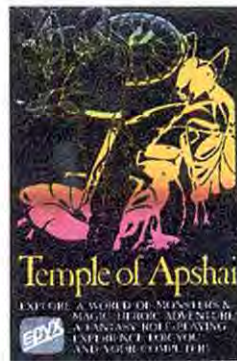
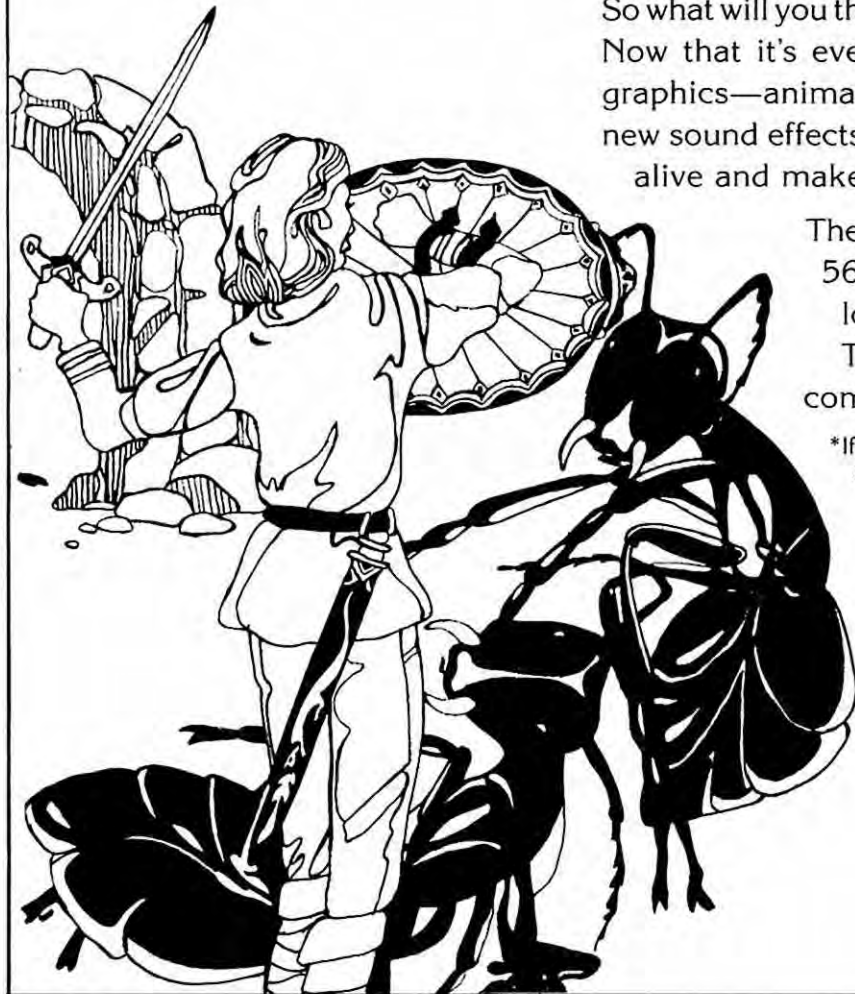
Cornucopia Software has been very responsive to user feedback and already has made a number of improvements in their original version of Microproof. A 20,000 word literal dictionary will soon be available which should greatly improve the program's overall accuracy.

Miz'spell

The author of Miz'spell, Arnold Schaeffer, started college about the same time that Programs Unlimited began to market his

Slaying Monsters Should Be Mostly Fun and Games

An EPYX game from
Automated Simulations



Be one of more than 16 million alter-egos that your computer can generate. Walk into a labyrinth filled with traps, treasures and monsters. There you'll test your strength, constitution, dexterity, intelligence . . . against thousands of monsters in over 200 caverns and chambers—growing in wealth, power and experience as you progress through the four levels of the dungeon.

Your character will do whatever you want him to do. Do battle—in real time—with the likes of giant ants, ghouls, zombies. . . Explore the various levels of the maze and discover the great treasures within.

The Game Manufacturer's Association named The Temple of Apshai the computer game of the year. The Temple is the very first computer game—ever to win the Hobby Industry award for excellence. There can be only one reason for that: it's a great game.

So what will you think of The Temple of Apshai now? Now that it's even better than ever. With better graphics—animated movement—and completely new sound effects that make your computer come alive and make The Temple even more fun.*

The Temple has a superbly illustrated 56-page Book of Lore, and your local dealer has it for the ATARI,** TRS-80,** APPLE,** and IBM** computers.

*If you already have The Temple of Apshai, you can enjoy these great improvements. Just send us your original cassette or disk together with your check for \$5.00 and we'll send you the brand new version—with better-than-ever graphics and sound.

**ATARI, TRS-80, APPLE and IBM are trademarks of Atari, Inc., Tandy Corp., Apple Computer, Inc., and IBM, respectively.

©1981, AUTOMATED SIMULATIONS, INC., P.O. Box 4247, Mountain View, Ca., 94040.



"Miz'spell offers a number of features missing on other spelling checkers."

program. The documentation is very readable. The program comes on two TRSDOS system disks and works with only one disk drive, though it requires 48K RAM to operate.

A streamlined package of only five components, Miz'spell is another Compiler Basic-written program, and like Hexspell includes a Microsoft run-time package. However, it uses a different hashing routine to transform words into three byte values that can be stored in the dictionary.

The program first loads a basic vocabulary of 1,700 words into memory. When checking a word, it first looks through the words that are in memory and then goes to the dictionary file on the disk, which in its virgin state is about 16,000 words.

Upon initialization you can opt to reconfigure the program if necessary. This involves specifying the number of drives, the defaults for source and destination file extensions, a dictionary name default, and the minimum word length in characters for the program to check. The latter figure affects the program's operating speed; I used a

value of 2 during the test.

Unhappily where accuracy is concerned, Miz'spell was true to its name and failed to identify one third of the true errors in the test document. Since these included not only compounds and contractions but also a root word, *speech*. I conclude that the hash codes generated by the program can be shared by more than one word.

Though it zipped along on the short test text, Miz'spell slowed considerably on the longer document. Miz'spell took more time on the long text than the other programs because it must leave room for its in-memory dictionary, and cannot load all of a large sized document at one time.

Those who use Electric Pencil, which writes documents to disk as ASCII files, will have no problem using Miz'spell. However, Scripsit fans must remember to use the "Save,A" option with any text to be proofread.

Miz'spell offers a number of features missing on other spelling checkers. There is an Auto learn command to automatically add all the new words in a document to the dic-

tionary. This is an excellent feature to have if you intend to create alternative dictionaries, though you must take special care to ensure that *all* the words are indeed correct in any document on which you use this feature.

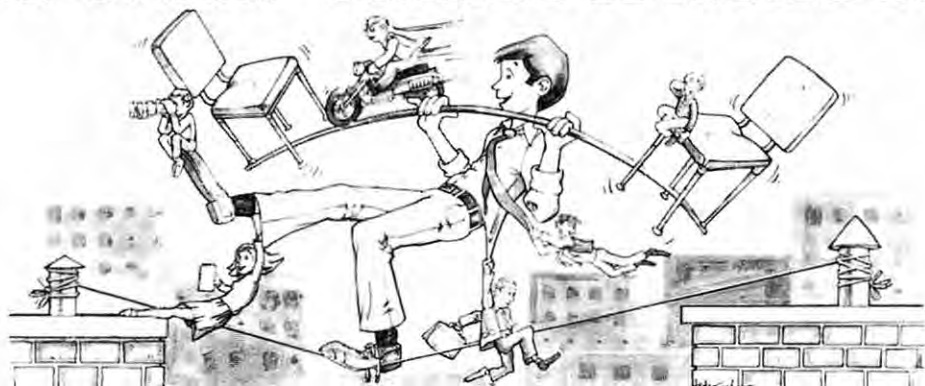
Like Hexspell, Miz'spell offers the advantages of a video scroll of the full text being processed. At the conclusion of the proofreading session Miz'spell displays statistical information on the total number of words checked, the number added to the dictionary, and the percentage of words recognized by the program.

Proofreader

Proofreader is the creation of Aspen Software, and is another component package that you can upgrade with the addition of a correction feature called Proof-Edit. The complete program is available on four disks which require a minimum two-drive, 32K system. Documentation is quite good.

Offering the largest stock dictionary of programs tested (109 grams), the package comes with utilities for editing and

RM/COBOL™¹ MAKES IT ACROSS!



...FROM ONE OPERATING SYSTEM TO ANOTHER! A VITAL WAY TO PROTECT YOUR SOFTWARE INVESTMENT FOR THE FUTURE!!

The **RM/COBOL** language runs on more different Operating Systems and more different-sized computers than any other similar language. For starters, it runs on NCR and TI minicomputers and, in the micro field, on the CP/M², MP/M², CP/M-86², MP/M-86², TRSDOS³, OASIS⁴, MOASIS⁴, and UNIX⁵, (ONYX version) Operating Systems ... to mention only a few.

Until now, serious business software of the scope and flexibility seen in the minicomputer world has not been available on micros. **RM/COBOL** now allows transfer of such software with a minimum of fuss.

We have participated in such a mini-to-micro transfer of a major set of general business soft-

ware ... using **RM/COBOL** as the transfer mechanism, of course. Running on literally thousands of minicomputers, these refined, enhanced, and

RM/COBOL and RT!™⁶ from CYBERNETICS ARE GOING STEADY...



...AND YOU'RE GONNA LOVE 'EM TOO!!

Use your computer to program itself. **RT!** (Cobol Reprogramming Tool!) from cybernetics is a program generator for **RM/COBOL** that produces error-free **RM/COBOL** source programs for data input, file maintenance, and report printing programs.

A full feature interactive program generator, not a subset! Call Now! 714/848-1922.

proven software packages cover A/R, A/P, G/L, P/R, Order Entry (with Invoicing and Inventory Control) as well as Sales Analysis. The Packages define a new level of achievement for features and flexibility in micro applications software and offer top quality at a reasonable price.

For immediate information, call 714/848-1922 for your complete product description.

Trademarks of:

1-Ryan-McFarland Corp.; 2-Digital Research, Inc.; 3-Tandy Corp.; 4-Phase One Systems, Inc.; 5-Bell Telephone Laboratories, Inc.; 6-Cybernetics, Inc.



8041 NEWMAN AVE., SUITE 208
HUNTINGTON BEACH, CA 92647
714/848-1922

A Computer That Writes Programs For You.

What will they think of next..?

Your computer is fantastically fast...once it knows what to do. You probably realize that a computer is really the combination of hardware and software, working together smoothly, to give you what you want. Either one alone is useless. Software is really the key...the "mind" of a computer system. Every project or task you want to do requires a new specific software application to make it behave exactly the way you desire.

Of course, you may be able to "force-fit" an application into some existing canned program you have, but to really get results, you need a separate application program to run on your computer.

Until now, that meant you were forced to pay money for application software off the shelf, or if you could afford it, have it custom written for you, or, if you are qualified, do it yourself...spending endless hours figuring it out and writing it. Now, your computer can write individual application programs for you. These programs are each separate, unique software programs that run in standard Basic on your computer.

A company named FutureSoft has developed this exciting and long awaited remarkable working tool for you. There are two versions called *Quikpro+Plus* and standard *Quikpro*. Both of them create unique separate Basic programs for you...to do exactly, precisely, what you want to do. And listen to this...you create a new program in minutes instead of hours.

You can quickly generate a new program when you want it. You can generate thousands of different unique programs, each one standing alone as a complete program that runs in Basic. Best of all, you do not have to be a programmer to do it. The *Quikpro* software becomes your personal programmer, waiting to do your work for you any time of day or night you choose to use it.

The custom programs you generate from this software provide for: Data Entry, Additions, Changes, Record Locating & Searches, great variety of Computations, and Report Printing (if you have a printer). It lets you decide what data to manipulate and how to manipulate it. It lets you decide the formats you want to appear on your screen and/or to print out in a report. It lets you use differing formats on the same data base. It lets you make calculations from data within records without altering the data base. It lets you report results with or without including the base data from which results were calculated.

All this is included in the ability/power of the program you create. You do it by simply answering questions that appear on your screen. Instantly, the *Quikpro* software instructs the computer to perform complex and



error free instructional sequences. You get the immediate benefits of professionally written software for your application.

The resulting custom program is truly a separate Basic program. You can list it, you can modify it, you can actually see what makes it tick. You can even ask it to print out its own operating instruction manual so others can run it for you. Finally, you can really tap the speed and power of your computer the way you really want. You can create new programs for every use you have in Business, Science, Education, and Hobby areas. And you can start now.

The software is available immediately from the creators. It comes in two versions. If you want to generate separate Basic programs with all the data handling plus Calculations and Report Printing features, you want *Quikpro+Plus*. Specify to run on TRS80 Model I and Model III at only \$149; to run on TRS80 Model II at \$189.

If you do not need Calculation ability or Report Printing in the separate Basic programs you will create from this program generating software, then standard *Quikpro* will do the job for you. Standard *Quikpro* to run on TRS80 Model I or Model III is \$89; to run on TRS80 Model II is \$129. (Later on you can always trade up to the Plus Versions for only the cost difference between the two).

Both programs are available to run on many other computers besides TRS80. Details are available by calling or writing.

You can order right now by phone or mail. If you have Visa/Mastercard, call toll-free from:

All States except CA-AL-HI	1-800-824-7888 OP# 441
From California call	1-800-852-7777 Op# 441
From Alaska/Hawaii call	1-800-824-7919 Op# 441

Operators on duty 24 hours daily. Operators can not answer technical questions. If you need technical information or want to order from Canada or other nations, call 1-904-269-1918 during office hours, Eastern Time, Mon.-Fri.

Send mail orders with check, money order or credit card information to: FutureSoft, P.O. Box 1446-D, Orange Park, Florida 32073. FutureSoft gives you a satisfaction or your money refunded guarantee for 10 days from delivery. You can run the software yourself on your own computer and see with your own eyes what it can do for you. Order now. ✓66

“...the ideal proofreading program has yet to be produced...”

adding to the basic word list. To get around the speed-versus-accuracy problem that has bedeviled their competition, the creators of Proofreader and Proof-Edit chose to employ a hashing algorithm.

Like Chertext, the program does an initial sort of the words in the text and casts out all the duplicates it finds. As a result, Proofreader can handle documents with as many as 1,600 different words, a limit seldom reached on a 48K system.

Proofreader creates a bad-word file with the extension/BWD which Proof-Edit then reads. The program has its own routines for identifying source and output files, but you can easily use two switches to override the defaults.

The program and dictionary together are huge. Nothing less than an 80-track, double-density system will permit the entire program to reside on one disk. Proofreader does not scan for the presence of Proof-Edit before exiting to DOS, nor have the edit functions been INKEYed.

The only true error that Proofreader failed to recognize in the test document was the

word *dictionary*s. This is because the program uses a different technique to handle an s at the end of a word. If the letter before the s is not a vowel or another s, Proofreader assumes the word is a regular plural and drops the s in order to create the singular form. This may or may not be a problem, depending on the user's application.

Proofreader has all the advantages of the full text video scroll and accurate in-context evaluation of suspect words that Hexspell and Miz'spell offer. But the hashing algorithm Aspen Software used significantly reduces the amount of time required to process longer documents. This program is the only one that saves suspect words to a disk file for later reference. Proofreader's creators are also very responsive to user feedback.

Which Is Best?

It all depends on what you are looking for, on what your special application happens to be, on the particular hardware configuration of your system, and on how much time, effort and money you are willing to invest.

If operating speed and ability to call the program from within a word processor are the principal considerations, then either Microproof or Chertext are clear winners. If you demand accuracy combined with the convenience of a document correction feature, then the choice seems to be between Hexspell and Proofreader.

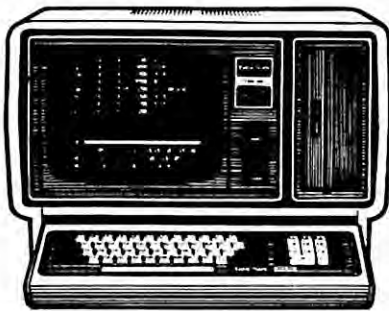
If you have only one disk drive and a single-density system, choose either Microproof or Miz'spell; but if that drive is a double-headed 80, then for the largest available literal dictionary choose Chertext. If you want value for your money, Miz'spell is a "best buy."

In my opinion the ideal proofreading program for the Model I, boasting 100 percent accuracy and lightning speed, has yet to be produced—and probably never will be, though even Radio Shack has plans to take a crack at it.

If you are writing many text files in excess of 10 pages each and can afford it, consider using two of the programs, one for speed and convenience and another for accuracy. ■

THE BIGGEST NAME IN LITTLE COMPUTERS™

TRS-80™ Model II—Your Best Buy
In a Business Microcomputer



UP
TO
15%
OFF!
on

TRS-80™ computers,
software and peripherals

Similar values on all merchandise
CALL COLLECT:

800-351-1580

Texas Residents call: 915-283-2920

Van Horn Office Supply ✓169

701 W. Broadway -- P O Box 1060

Van Horn, Texas 79855

DEALER GO55

Form F48 Provided

Standard Warranty in Effect

THE NATIONWIDE SUPERMARKET OF SOUND®

STOCK MARKET SOFTWARE

By H & H Trading Company for Mod. I, II, & III TRS-80's

STOCK TRACKER™ times trades on individual stocks and options. Uses a technical volume analysis. Completely objective. Gives buy, sell signals.

MARKET TRACKER™ times tops & bottoms on the Dow Industrials; a composite of six technical indicators. Some judgement required.

Gives buy, sell signals.

These two programs are accurate.

Hundreds of satisfied users.

ASK FOR THE EVIDENCE!

FOR MORE INFORMATION OR TO ORDER, CONTACT:

H & H TRADING COMPANY

POST OFFICE BOX 549
CLAYTON, CALIFORNIA 94517
Telephone 415/672-3233

VISA & MASTERCARD

©Regd. T.M. of Radio Shack



AWESOME FIREPOWER!

AND IT'S UNDER YOUR CONTROL

SKY WARRIOR

by Roger Schrag

SKY WARRIOR! Nerves of steel and supreme concentration are your only defenses against an alien strike force poised for the kill! As you pilot your spacecraft over a bizarre alien planetscape, ground-to-air missiles scream skyward without warning. It's up to you to destroy or be destroyed! And adding to your problems, your spacecraft has an ever-diminishing fuel supply (which can be replenished in flight if you're lucky) — if you're not careful, you and your ship will spiral down into a fatal, fiery crash!

SKY WARRIOR! Great fun for one player or double the action with a friend. Features include sound, high score tallies, and a realistic scrolling landscape!

Super
Arcade
Action

TRS-80 TAPE Model 1 & 3 16K
010-0136 \$14.95
TRS-80 DISK Model 1 & 3 32K
012-0136 \$20.95

Adventure
INTERNATIONAL
© 1981 A DIVISION OF SCOTT ADAMS, INC.

BOX 3435, LONGWOOD FL 32750
(305) 862-6917 (QUESTIONS)
ORDER FROM YOUR FAVORITE DEALER
or CALL TOLL FREE (800) 327-7172
(ORDERS ONLY PLEASE)
SHIPPING & HANDLING ARE EXTRA
PRICES SUBJECT TO CHANGE WITHOUT NOTICE

COMBAT

by Bob Shilling

★ War via the RS-232 ★

16K TRS-80's play against other TRS-80's or 24K Atari 400/800's!

Byte Magazine, December 1981:

"The imaginary world of Combat is interesting and intricate, and it really does test one's strategy, tactics, and reflexes ... Combat is a great success."

Combat is a strategic and tactical battle game that allows you to pit your skill and dexterity against that of another player in a real-time graphic battle to the death!

You play against your opponent by direct connection to another computer (up to 300 feet away), by modem communication, or through The Source™. Each player has equal resources. Available weapons include rockets, lasers, shells, mines, decoys, Drone Reconnaissance Aircraft, and one nuclear ICBM. You decide which weapons to carry, load them onto a maximum of eight remote-controlled tanks, and then maneuver your tanks to discover and destroy your enemy's base before he destroys yours.

RS-232 port and either full-duplex modem or direct connection modem eliminator cable required. Works with CONNECTION™ or LYNX™ modems.

TRS-80 16K TAPE, Model 1 & 3
010-0123 \$19.95
TRS-80 32K DISK, Model 1 & 3
012-0123 \$20.95
ATARI 24K TAPE
051-0123 \$19.95
ATARI 24K DISK (Requires DOS 2.0S)
052-0123 \$24.95

Includes a coupon allowing you to purchase a copy for a friend for only \$10.00

ARMORED PATROL

by Wayne Westmoreland & Terry Gilman

See the FANTASTIC Review in **BYTE**-June '82!

Armored Patrol is a realistic arcade battle simulation that puts you into the driver's seat of a massive T-36 tank that's bristling with firepower. Your orders are to discover and destroy the enemy tanks and robots in your sector before they locate your tank and blow it up.

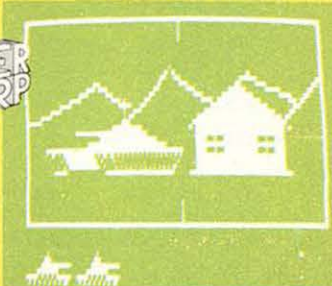
Your perspective is from the inside of your tank, looking out across a bleak landscape. Somewhere out among the deserted blockhouses, enemy tanks and robots are on the prowl. You may find the enemy either by a visual scan of the area or by making use of the radar tracking device displayed at the bottom of the screen.

Armored Patrol is one of the most incredible graphic simulations ever sold for the TRS-80!

TRS-80 16K TAPE, Model 1 & 3
010-0140 \$19.95
TRS-80 32K DISK, model 1 & 3
012-0140 \$24.95
ACTUAL TRS-80 SCREEN

SUPER
SHARP

GRAPHICS



WRITE FOR OUR FREE 150-PROGRAM CATALOG

GREATER VALUES

New Low Prices for Percom Model III Disk Drives!



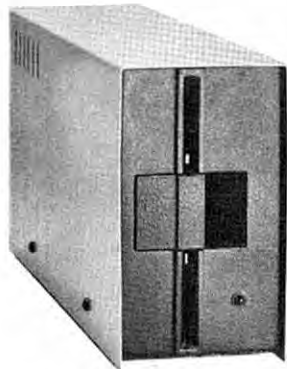
Complete First-Drive Systems

from **\$449**

Internally mounted drives that feature double- or single-density storage, comprehensive pre-delivery testing, 48-hour burn-in and, best of all, Percom's widely acclaimed disk controller. A First-Drive System includes the four-drive disk controller, one or two drives, power supplies, cables and a fully illustrated owners manual. Use Model III TRSDOS*, Percom OS-80+ and all other Model III compatible DOSs.

Note: If you prefer not to make the First-Drive System installation, we'll do it for only \$29.95 plus shipping. This includes a 48-hour operating burn-in of your Model III computer, installation of the drive system and final checkout of the expanded system.

Our Own Fully Tested Drives from only \$275



- Every Access Floppy Disk drive is electrically tested, mechanically tested and burned-in 48 hours under operating conditions. Look for the signed test list in the shipping carton.
- AFD drives are capable of either single- or double-density operation. Store up to 364 Kbytes (formatted) in double density. Store twice the data on a single diskette using AFD "floppy" drives."
- 15-day free trial offer...comprehensive 90-day limited warranty...unbeatable prices...AFD-100 @ \$275.00, -100F @ \$329.00, -200 @ \$429.95, -200F @ \$449.95.

How to order - Order by calling Access Unlimited toll-free on 1-800-527-3475. Or order by mail. Orders may be charged to a VISA or Master Card account, or paid by cashier's check, certified check or money order. COD orders require 25% deposit. Sorry, we cannot accept personal checks. We pay shipping and insurance charges on orders over \$1,000.00. Add approximate insurance and shipping charges for orders under \$1,000.00 if in doubt about these charges, ask when you call in your order. Texas residents include 5% sales tax. Minimum mail order \$20.00. Allow 2 to 4 weeks for delivery.

Technical & Texas (214) 340-5366

Save! VISA and Master Card charges are not deposited until the day your order is shipped.

Everybody's Favorites - for Less!

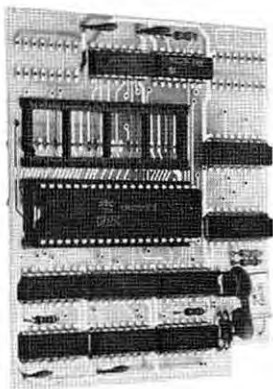
Percom Data Separator	\$23.95
Green Screen I, II, or III	\$18.95
Head Cleaning Kit	\$24.95
Drive Numbering Tabs (pkg 0-3)	\$3.00
5 1/4" Flip-N-File	\$24.95
8" Flip-N-File	\$39.95

PRICES AND SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

— LOWER PRICES

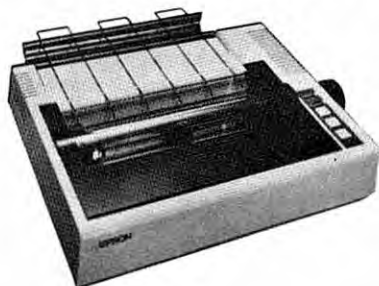
Percom's Proven DOUBLER II†

Upgrade Your Model I to Double Density for only \$159.95



And not with some unproven hacker's kit, either. But with an assembled and fully tested *Percom DOUBLER-II†*. The DOUBLER-II† simply plugs into the disk drive controller socket of your Expansion Interface. Then it lets you store over four times more on one side of a diskette, depending on the drive, than you can store on standard Tandy Model I drives. Other features: • Reads, writes and formats *either* single- or double-density • Includes DBLDOS™, a TRSDOS* compatible disk-operating system • Runs TRSDOS*, NEWDOS††, Percom OS-80† and other single-density software immediately. Change to double-density operation when convenient • Lets Model III software be read on your Model I • Includes on-card high-performance data separation and write precompensation circuitry.

Incredibly Low Prices for Epson and Okidata Printers!



The two most popular printers on the market today. They provide the features you want, the reliability you need, a price you can afford.

MX-80 – Call for latest low price.

Microline 80 only \$399.95

Other models available.



Low Cost System Furniture

Modular design permits custom arrangements • Furniture styling and quality • TRS-80* colors • OK for UPS shipping • Reassemble without tools

System desks from \$115
Printer stands from \$144

Arrick Products Quick-Switch‡

Just flick a switch to connect your TRS-80* printer port from device #1 to device #2. Or, "Quick-Switch" a peripheral between computers. Versions for RS-232 or Centronics interfacing. Includes 5-foot 34-pin cable with card-edge socket, box-mounted 34-pin card-edge plugs. From \$79.95.

‡ trademark of Arrick Products Company.

Save! Make ACCESS your one-call shopping center for TRS-80* hardware and software. Call our toll-free order number for free product literature and latest prices.

**Toll-Free
Order No.**

1-800-527-3475 ◊

(orders & literature only)

ACCESS UNLIMITED

401 N. Central Expressway #600
Richardson, Texas 75080
(214) 340-5366

*Trademark of Access Unlimited
†Trademark of Percom Data Company, Inc.

‡Trademark of Tandy Radio Shack Corporation
††Trademark of Apparat Corporation

Computers and the handicapped—a good combination for business.

BIPED

by Kerry Leichtman
80 Microcomputing Staff

When President Reagan asked the business community to take the initiative providing help and assistance to the disadvantaged, he must have envisioned programs like BIPED. BIPED is an acronym for Business Information Processing Education for the Disabled. The BIPED program may become the prototype for the private sector's new responsibility—realizing the potential of the physically handicapped and actively training them to function as taxpayers rather than tax expenses.

BIPED receives no government financial assistance. Every aspect, from acquiring office furniture (both special and normal) to choosing the curriculum and printing brochures, is funded with corporate dollars.

The connection between this innovative program and its 20 *Fortune* 500 corporate sponsors is obvious in BIPED's rooms at the Easter Seal Rehabilitation Center in Stamford, Connecticut. Two large posters in the main instruction room boast of the affiliations by displaying the familiar logos of

the involved corporations. A refrigerator in the second of the two large rooms had its non-sponsoring corporate nameplate pried off and replaced with a Texaco logo. Texaco, of course, is one of BIPED's sponsors.

The two rooms, an administrative office and a conference room, use approximately 1500 square feet of a new wing in the Easter Seals Rehab Center. BIPED, however, is neither a branch nor a service of Easter Seals; the space is rented.

Walking through the Easter Seals building, past therapists in white uniforms, and patients being wheeled about, eating in the cafeteria or pounding out products at long assembly tables, produces a significant contrast to what the visitor will encounter in BIPED's corner of the building.

There are blackboards, bulletin boards, computer terminals, open books, phones ringing, styrofoam coffee cups, name plates on each desk—not long school-like work-tables, but real desks—drawers, pencil holders, file holders, blotters and the like. The basic difference between BIPED and regular corporate offices is the mode of transportation. There are no quiet shuffling sounds across shag carpeting, seldom the click of heels against linoleum, and

squeaky-sprung office desk chairs are almost non-existent. Most students bring their own chairs. The soft shuffling and sharp clicking have been replaced by the whirr of electrically driven wheelchairs. It should not be misunderstood that the use of wheelchairs constricts the businesslike atmosphere. To the contrary, the wheelchair jockeys are all dressed in business attire: dress shirts, trousers and neckties. These well-dressed people scurry from room to room, in and out of tight corners with the speed of an office go-fer and the accuracy of a professional needle-threader.

Twelve students were chosen for the program: five quadriplegics, one with no use of the left arm, one with flaccid paralysis of the right arm, one with renal failure, two with muscular sclerosis, one with chronic gastrointestinal disorder, the last with cerebral palsy. Rounding out the roster is one course instructor and one general all-around volunteer helper. This unusual group of people refer to themselves as a family.

BIPED as an Idea

IBM, realizing in 1972 that computer programming is an occupation requiring intelligence rather than dexterity, trained a quadriplegic to do the job. The experiment was successful and resulted in the establishment of an ongoing nine-month training program at the Woodrow Wilson Institute in Virginia. IBM's success prompted other experiments; one was started in California, another in Alabama and two more, in Philadelphia and New Haven.

New Haven's program began in 1976 at the city's Easter Seals Rehabilitation Center. Easter Seals' efforts were assisted by Yale University and several leading Connecticut based corporations. Joseph P. La-Maine was with Yale at the time, and supported the program. Later he joined Easter Seals and directed the New Haven program through four sessions. During that time La-Maine taught and graduated 35 students who now work for various Connecticut corporations.

New Haven became one of 12 programs which banded together as an information sharing network to form the Association of Rehabilitative Programs and Data Processing (ARPDP). Some ARPDP programs were



Photo 1. BIPED Classroom Instruction.

FORTRESS

Only the Fast Survive!



SSM SOFT SECTOR MARKETING, INCORPORATED

6250 Middlebelt • Garden City, MI 48135 • 800-521-6504/(313) 425-4020

Written by Larry Ashmun

Copyright © 1982 Soft Sector Marketing, Inc.

Prices per Game: TRS-80 16K Level II Mod I/Mod III Cassette \$15.95
TRS-80 32K Level II Mod I/Mod III Diskette \$19.95

10% discount for 2 items, 15% for 3 or more. Please add \$2.50 per order for postage & handling. Michigan residents add 4% sales tax. Outside USA (except Canada) please add \$10.00 per order for postage & handling.

Sound effects are playable through the cassette AUX plug. High scores are automatically saved after each game on disk versions.

Call or write for our complete catalog.



“ ‘It takes time to work with the handicapped; to find out how can this person become more feasible to society.’ ”

run in a university environment and others came out of rehab centers. All the programs received government support; either federal, state or both. Some received private donations as well.

This partial support through private sector business donations spawned an idea in Joseph LaMaine's head. "One of the reasons BIPED has evolved is because two years ago I thought that if we could run a program that was totally the private sector's contribution, it would release federal

monies for other projects, while at the same time enhancing the future in rehabilitation and bringing more of the private sector into helping the disabled community." With that thought in mind, LaMaine got to work.

The Corporate Role

In 1979 LaMaine presented his ideas to John W. Stanger, president of the General Electric Credit Corporation and Kenneth G. Reside, also of GE Credit Corp. Stanger and Reside were intrigued with the New Haven

project and LaMaine's plan to expand the program to one of total private industry support. "Mr. Stanger and his staff thought it appropriate if I could join General Electric Credit Corporation, to give me the ability to help disabled people, we could be the catalyst to get it going. But we only had one corporation and wanted others to participate equally in the project."

Getting to see and talk with corporate presidents is not easy, unless another corporate president is making the contacts. During the next several months LaMaine and Stanger contacted company presidents and gave demonstrations, seeking the participation of those corporations now with BIPED (see Table 1). They were well received. "The companies were delighted to see a program like this get started, especially when it is going to be managed and directed by them."

Eventually a program was established by the private sector creating a non-profit, non-stock corporation which serves as a private occupational school. Corporate participation is offered through the donation of funds and executives' time and expertise on an advisory committee. "We established that committee over 1980 and '81. The advisory committee is made up of members from the corporate community, data processing executives, public relations personnel and some engineers. Primarily, about 75 percent are data processing executives from corporations and their staffs."

The advisory committee's role is to support the program in the capacities of managing and directing BIPED's functions, the creation of a board of directors and monitoring the financial aspects of the corporation.

The Corporate Atmosphere

As established, BIPED is made up of its corporate officers, board of directors, corporate sponsors, committees and sub-committees. If this all sounds very corporate to you, you're catching on. The reason everything is so businesslike is that it is supposed to be businesslike. The 60 individuals involved are corporate people; it is quite natural for them to divide everything into boards, officers, committees and the like. These kinds of corporate people probably organize family picnics into committees: hot dog committee and relish sub-committee, right on down through potato salad officers and dessert managers. One of the reasons these people are successful is their functional organization.

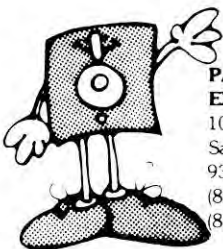
Another reason for the corporate set-up



Photo 2. Joe LaMaine and four students in conference.

**MEMOREX
FLEXIBLE DISCS**

WE WILL NOT BE UNDER-SOLD!! Call Free (800)235-4137 for prices and information. Dealer inquiries invited and C.O.D.'s accepted.



PACIFIC EXCHANGES
100 Foothill Blvd.
San Luis Obispo, CA
93401 In Cal. call
(800)592-5935 or
(805)543-1037

207

**PRIZE WINNING
CHESS**

SFINKS 3.0 (New)

Prize winner in Paris in the 1981 Microcomputer Chess Championship. Sfinks 3.0 is the fastest and strongest chess program ever written!

FEATURES: Book Openings, Chess Clock, Thinking on Opponent's Time, Infinite Levels of Play, and Ruthless Playing Ability!

32K cassette or disk only \$39⁹⁵

SFINKS 1.81

Prize winner in San Jose in the latest (1980) U.S. Microcomputer Chess Championship: Sfinks 1.81 beats Sargon II, Mychess and Gambiet 80. Easy to use with many convenience features.

32K cassette or disk now only \$24⁹⁵

Please specify cassette or disk and Model I or III.
INCLUDE \$2.00 SHIPPING AND HANDLING.

WILLIAM A. FINK

P.O. BOX 5912
LIGHTHOUSE POINT, FL 33074-5912

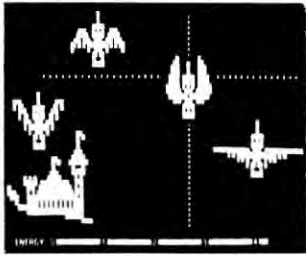
(305) 942-5706

Exceptional Dealer Discounts Available.



212

ARCADE CENTER



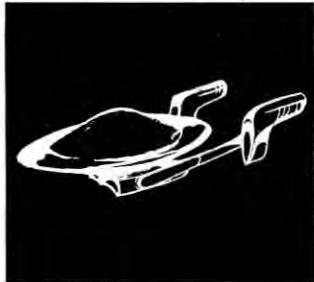
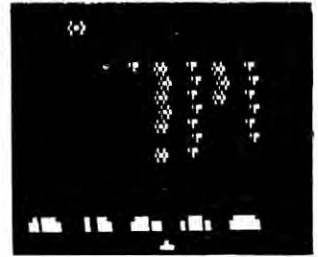
VOYAGE OF VALKYRIE

Mod I & III Tape
\$34.95
 Mod I & III Disk
\$39.95

SUPER VADERS

©1981 Soft Sector Mkt.
 Mod I & III Tape
\$15.95
 Mod I & III Disk
\$19.95

- 2 Player - 10 Levels -

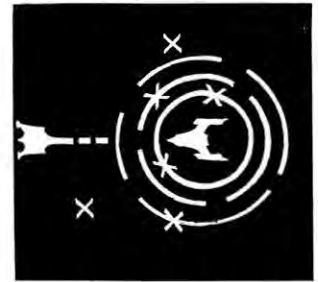


80 SPACE RAIDERS

by Bosen Electronics
 Mod I & III Tape
\$24.95

SPACE CASTLE

Cornsoft Group
 Mod I & III Tape
\$15.95
 Mod I & III Disk
\$19.95



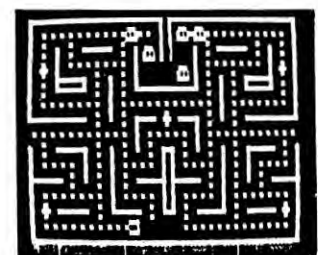
ROBOT ATTACK

by Big 5
 Mod I & III Disk
\$19.95

While Supply Lasts!

SCARFMAN

©1981 Cornsoft Group
 Mod I & III Tape
\$15.95
 Mod I & III Disk
\$19.95



First machine language arcade game written to use all those NEW SPECIAL FEATURES of your MOD III !



ALIEN DEFENSE

Copyright ©1981 Soft Sector Marketing, Inc.
 Written by Larry Ashmun

Cassette, Mod I & III . . . **\$15.95**
 Disk, Mod I & III **\$19.95**

Cassette version doesn't go to disk.
 Only disk version talks
 and saves high scores.

As you fly over a mountainous terrain the aliens are being grabbed from the ground below and are taken to the sky.

C.O.D. - certified check, M.O. or cash only. Most orders shipped next day. All orders must have shipping included. Please add 2% or \$2.50, whichever is higher for shipping. Michigan residents, please add 4% tax. Add extra \$1.50 for C.O.D. Personal checks take 3 weeks to clear. Out of the country orders add \$10.00 extra shipping.
 *TRS-80 is a product of Radio Shack, div. of the Tandy Corp.

SSM SOFT SECTOR MARKETING, INCORPORATED
 6250 Middlebelt • Garden City, Michigan 48135
 Order Line **800-521-6504**
 Michigan Orders & Questions **313-425-4020** 84

The American Express® Card
 Don't leave home without it™



The Quality Continues . . .

“Eventually a program was established by the private sector creating a non-profit, non-stock corporation. . .”

is the students. One aspect where BIPED is very different from other computer programmer courses is that BIPED simulates business and industry. Students have meetings scheduled every morning from 9:00 to 9:30. They divide into individual committees, such as the public relations committee and technical investigations committee. As the course progresses the students will be writing status reports and using calendars to schedule their time.

“They will be learning all the items necessary in business,” said LaMaine, “That includes how to dress appropriately, how to participate in a team environment doing systems analysis work. This gives the student the opportunity to be in the proper business environment and to perform. This is why BIPED uses desks and not just handicapped tables. We feel if the person is going into the business environment he should experience the real environment.”

BIPED Sub-Committees

It is a little difficult to discover BIPED from touring its facilities. It seems BIPED is more what you do not see than what is obvious. What you see has been described earlier: rooms, special equipment, office furniture, and people in wheelchairs whipping about. Even though the program's success depends on how well the students fare in the real non-simulation world, the program's existence depends on the time, money and good will of some of the world's

largest corporations.

Part of that unseen creating force is a group of six sub-committees established to implement the policies of the corporation. These sub-committees are admissions, curriculum, equipment, placement, public relations and accreditations and licensing.

The admissions committee is headed by Walter Johnson of the American Can Company. Johnson is also chairman of BIPED's board of directors. Besides the obvious, this committee also takes into account such special needs as transportation and housing.

The curriculum committee is the charge of Inge Cseh of Reader's Digest. Just as computer hardware and software is constantly changing, so then must a good computer programming curriculum. Approximately 25 percent of BIPED's curriculum is taught by guest lecturers. These lecturers, as well as curriculum supplies and contributions, state-of-the-art course updates and on-site visits are all arranged by the curriculum committee.

Wallace Fletcher, Director of Information Systems for Pitney Bowes, is chairman of the equipment committee. It is the responsibility of this committee to procure all furniture, special equipment, computer equipment and computer time for the students. Assisted by Jonathan Brown of GTE, the committee arranged for 13 computer terminals to be donated from General Telephone and Electronics. GTE has also

promised all the necessary related hardware and a dedicated phone line to Union Carbide's computer in Tarrytown, New York. David Wainwright, Fletcher's Union Carbide counterpart, agreed to provide free computer time for each student for the duration of the program.

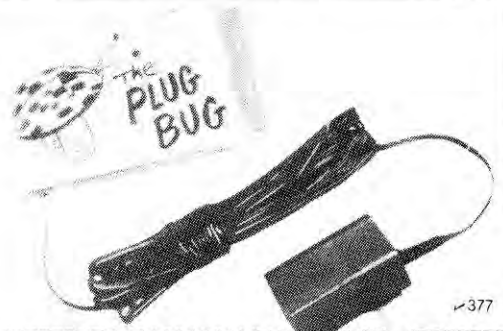
BIPED Corporate Sponsors

- Aetna Life & Casualty
- American Can Company
- Connecticut Bank & Trust Company
- General Electric Credit Corporation
- General Foods
- General Signal
- General Telephone & Electronics Corporation
- GK Technologies
- IBM Corporation
- Lone Star Cement
- Machlett Laboratories, Inc.
- Moore Business Forms, Inc.
- National CSS
- Norden Systems
- Peat, Marwick, Mitchell & Co.
- Perkin-Elmer Corporation
- Pitney Bowes
- Pyramid Consulting, Inc.
- Reader's Digest
- Sherwood & Sherwood
- Smith Thibault
- Texaco
- The Management Services Group Inc.
- Union Carbide
- Xerox Corporation
- Yale University

Table 1. BIPED Corporate Sponsors

PLUG BUG® SYSTEMS
FOR TRS-80™ MODEL I 16K MACHINES

- PLUG BUG PAKS PROVIDE INSTANT EXECUTION OF ANY PROGRAM TO UP 12K.
- NO CASSETTE LOADING - PROGRAMS ARE 'BURNED' IN.
- PLUG BUG I PROVIDES A SMOOTH 6K MONITOR PROGRAM CONTAINING ALL NECESSARY FUNCTIONS TO CREATE AND DEBUG MACHINE LANGUAGE SOFTWARE, PLUS A TRACE MODE TO SINGLE OR MULTI STEP THROUGH ROUTINES AND DISPLAY/LINEPRINT THE PROGRAM COUNTER TRACE.
- PLUG BUG II PROVIDES 6K/12K OF EPROM MEMORY, FOR YOUR FAVORITE PROGRAMS: EDITOR ASSEMBLER OR ANY OTHER OF YOUR FAVORITE PROGRAMS.
- OUR SERVICE PROVIDES PROGRAMMING OF PLUG BUG PAKS, FROM YOUR CASSETTE TAPE SOFTWARE.
- PLUG BUG III PROVIDES 6K OF READ/WRITE RAM FOR YOUR SOFTWARE DEVELOPMENT. A SWITCH PROVIDES READ ONLY OPTION FOR 'BOMB PROOF' OPERATION.
- PLUG BUG BUS FOR USE WITH PLUG BUG I & III OR II & III.
- PLUG BUG BURNER.
- EACH PLUG BUG PAK HAS ITS OWN POWER SUPPLY.
- PLUG INTO WALL AND "GO".
- COMPLETE PLUG BUG SYSTEMS INSTRUCTION MANUAL.
- 10 DAY MONEY BACK WARRANTY IF NOT SATISFIED.



<input type="checkbox"/> PLUG BUG I	\$84.95	NAME _____
<input type="checkbox"/> PLUG BUG II 6K-\$84.95/12K-\$94.95		ADDRESS _____
<input type="checkbox"/> PLUG BUG III	\$94.95	CITY _____ STATE _____ ZIP _____
<input type="checkbox"/> PLUG BUG BURNER	\$99.95	CHECK / MONEY ORDER INCLUDED FOR
<input type="checkbox"/> PLUG BUG BUS	\$24.95	C.O.D. ON REQUEST. \$ _____
<input type="checkbox"/> RE-PROGRAM SERVICE	\$14.95	ADD #3.00 FOR SHIPPING AND HANDLING.
TO ORDER YOUR PLUG BUG PAKS SEND CERTIFIED CHECK OR MONEY ORDER		NEW YORK RESIDENCE ADD 8% TAX.
TO: RFD #3 BOX 300 MT. KISCO, NEW YORK 10549 OR PHONE 914/666-7672		

Utilities

TRS-DOS* COMMENTED

©1982 Soft Sector Marketing, Inc.

Mod III Radio Shack operating system. Comments on every system file, with a chapter on how to use some of the DOS calls.

Fixes for you TRS-DOS users. Helpful reference guide for experienced machine language programmers.

A MUST FOR EVERY MOD III OWNER!

List \$29.95

**Introductory Special
\$19.95**

BUG +

1981 by James Limkemann

A Self-relocating Machine Language Monitor for MOD I & MOD III

©1981 by J. Limkemann. Bug+ is a powerful machine language monitor. The one point most improved over other monitors, is the tape write. Bug+ has the ability to write a "clean" tape (at 500 baud), this tape will read into the TRS-80 under the system command, without the problems previously associated with the volume setting. Regardless what version basic you have or whether or not you have a Radio Shack cassette fix, this monitor will improve the reliability of your cassette by 100%. There is also a verify command that works the same as a "CLOAD?", except when an error is found, the memory address and what is found on the tape is displayed.

Finally a break point that works! When a break point is reached, there is a blinking asterisk in the bottom right hand corner, you are able to see what is on the screen before the monitor takes control. Press the enter key the screen clears and the monitor comes to life. When you continue from a break point, the monitor will restore the screen first then load the CPU registers and return to your program. You do not lose your program or display, and it does work!

Bug+ also has all the commands of T-Bug, they just work better. Bug+ loads into low memory, then relocates itself.

Mod III has all the commands of the Mod I version plus it gives you the ability of reading or writing 1500 baud or 500 baud tapes. You can read at one rate and write at another. MOD I or III, 4K, both on same tape.

Cassette

\$14.95

The
BASIC
OPERATED
SINGLE
STEPPER

BOSS III

©1981 Soft Sector Marketing, Inc.

for Mod III

This Machine Language utility is designed to aid you in creating and debugging programs written in BASIC. The utility allows you to trace the program flow, to single step the BASIC program, to observe the conditions of variables during program execution, and to push your basic program on the stack during program development. The utility is known to operate with Mod III, TRS-DOS or Mod III Rom BASIC.

Cassette (goes to disk) **\$18.95**

TAPE COPY 2

©1981 Soft Sector Marketing, Inc.

This program will load most any TRS-80 500 Baud system tape (standard Mod I speed) and load it into memory and save it at either 500 or 1500 Baud on the Mod III. NO KNOWLEDGE OF MACHINE LANGUAGE NEEDED. Now it gives you a way to back up a machine language program that loads at the lower speed and makes cassette loading into your new Mod III a much faster, more reliable process. Works with Mod I* & Mod III.

Only **\$14.95**

*Mod I loads and saves at 500 Baud only.

Purchase Any Program This
Month and Receive
Tape Copy 2 for \$7.95



ZAPSIT

©1981 by Soft Sector Marketing, Inc. - Written for TRS-DOS & DOSPLUS by Larry Ashmun
Requires 32K Disk - Mod III

Zapsit is a stand alone machine language program that lets you examine, modify, copy disk sectors and much more. It does not use any of the resident DOS routines so that you are not limited to the restrictions of the particular DOS that you normally use. You do not have to have a system disk in DRIVE 0 once Zapsit is running.

Currently there are two versions of Zapsit - one for use with TRSDOS** and one for use with DOSPLUS**. They are the same except in the way that they format a disk and the way that they write DATA ADDRESS MARKS. Because of the differences, they are not interchangeable. Writing to a TRSDOS diskette with the DOSPLUS version (or vice-versa) could make the diskette written too unuseable.

For all disk operations you will be asked a series of questions. Each question can be answered by pressing the ENTER key or by entering a specific value. Pressing the ENTER key will cause the DEFAULT value to be used. All default values are indicated on the screen at the time the question is asked.

When entering a specific numeric value it is assumed to be DECIMAL unless an H is appended to the number. When an H is appended, the number is assumed to be hexadecimal (base 16).

CAPABILITIES

Display/Modify Disk Sectors/Memory. Print to screen. Print sector to printer. Modify in Hex. Modify in ASCII.

Change Track & Sector Limits. Single density read and write. Double density read and write for 1-80 track, from 0-18 sectors. Single and dual sided drives.

Format a Disk. S=Standard Format. W=Format without Erase. If you press ENTER or S you will be asked which drive, what density. After answering these questions Zapsit will format the disk using the parameters specified. As each track is formatted all of the sectors are checked for readability before the next track is formatted. Any unreadable sectors are reported but the operation will not be aborted.

If you type W you will be asked which drive, what density to use and if you want any bad sectors reported to the printer. Before each track is formatted each readable sector on the track is read into a holding area. Unreadable sectors are reported and their holding area is zeroed. After all of the sectors for a track are stored, the track is reformatted and the data in the holding areas written to the appropriate sectors.

Verify a Disk. Verify a disk does just that. It verifies that every sector is readable. Any unreadable sectors are reported. You will be asked if you want the unreadable sectors reported to the printer.

Now you can verify that the format of your diskette is in good shape before you copy your important files to a diskette. This prevents losing your data that you are trying to back up.

Copy Disk Sectors. Copy disk sectors allows you to Copy sectors (Single or Double Density) from a disk to different sectors on the same disk. Copy sectors from a Double Density disk to a different Double Density disk. Copy sectors from a Single Density disk to a different Single Density disk. Copy sectors from a Single Density disk to a Double Density disk. Copy sectors from a Double Density disk to a Single Density disk. All copying to a Different disk must be done on a Two Drive System.

Zero Disk Sectors. Zero disk sectors allow you to write a value of your choice to the sectors specified.

Read a Track. Reading a track allows you to read an entire track into memory, with all of the address marks and information that you don't normally see with a sector read. The output can be to either the screen or printer.

List \$24.95

Introductory Special \$19.95

C.O.D. - certified check, M.O. or cash only. Most orders shipped next day. All orders must have shipping included. Please add 2% or \$2.50, whichever is higher for shipping. Michigan residents, please add 4% tax. Add extra \$1.50 for C.O.D. Personal checks take 3 weeks to clear. Out of the country orders add \$10.00 extra shipping.
*TRS-80 is a product of Radio Shack, div. of the Tandy Corp.

SSM SOFT SECTOR MARKETING,
INCORPORATED

6250 Middlebelt • Garden City, Michigan 48135

Order Line 800-521-6504

Michigan Orders & Questions 313-425-4020 ✓85



The American Express® Card.
Don't leave home without it™



The Quality Continues...

"Part of that unseen creating force is a group of six sub-committees established to implement corporate policies."

The task is just beginning for the placement committee. James Sutter, of Xerox, has taken on the responsibility of teaching interviewing skills and resume writing, as well as teaching the skills necessary for keeping a job after getting one.

BIPED president George Hefferon's public relations committee operates as an outreach promoting general public knowledge of BIPED. Hefferon, who comes to BIPED from Perkin-Elmer Corporation, not only gears BIPED's publicity efforts to the general public, but also attempts to make other handicapped people aware of BIPED's existence.

Accreditations and licensing is an ongoing process. Charles Packer, of the Aetna Corporation, works to keep BIPED licensed as a private occupational school in the state of Connecticut.

Results

From a rehabilitation standpoint, there are many differences between BIPED and other programs. Jim Shearin, director of the Stamford rehabilitation center and a member of BIPED's board of directors, said, "BIPED focuses on training at a high skill

level, while many other programs are clinical and restorative by nature. The severely handicapped are sometimes the most difficult to work with from the standpoint of vocational success and employment."

From a business standpoint, David Kerns, president of Xerox and the U.S. Council of the International Year of the Disabled, explains the business practicality of BIPED. He says business expects the demand for computer programmers to double during the 1980's, "If we don't put disabled people to work, we just aren't going to get the work done."

Kerns is not alone in his opinion. When reached by phone Walter Johnson said, "You can look at it very simply. The timing is absolutely perfect with Reagan's current philosophy on private sector money. This was something that, going into the private sector, couldn't have been done at a better time. Secondly, it's probably the cheapest and most rewarding way you could come up with excellent programmers, who are in short supply. You take people off the tax roles and put them on the payroll."

Joan Gilbert, of Texaco, said, "When you do something as a social service it's one

thing, but when you get an employee who is skilled, and at the same time do something for someone who is disadvantaged, that is satisfying."

"I think one of the key aspects of the BIPED program was best crystallized in a note of thanks we received from a relative of one of the students," said George Hefferon. "It said, '... has a healthy creative mind captured in an imperfectly functioning body.' In the computer programming business, our focus is on that creative mind. The BIPED bottom line is to provide the handicapped person with a means of exploiting that talent in a professional application."

Joe LaMaine also is quick to point out that business can, should and does expect a return from BIPED. "The corporations get qualified people, they don't have to pay agency fees, they get good programmers with the equivalent of two years professional experience. The turnover rate in programming may be quite high in some corporations. The known turnover rate, around the country, for the ARPDP has been approximately seven to eight percent.

"So in the long run, what is in it for the student? We have people who have been institutionalized or have been injured for so long that placement was far off in the future and has been for a long time—for severe quadraplegics maybe forever. I've had students with no outlook toward employment. Computer programming finally offers them the ability, like anyone else, because



Photo 3. One-on-one instruction. Notice regular desk furnishings alongside special adaptive equipment, such as pen holder attached to Mike's hand, paperweight to hold paper still while writing and, above Joe's right hand, a tool to assist drawing the circles, squares, triangles and other shapes necessary to making a flowchart.



Photo 4. Joe LaMaine holding the special paperweight and flowchart tracing tool.



If you are looking for The Finest In Word Processing Systems you can . . .

1. Purchase and examine all other word processing programs on the market, and then purchase **Lazy Writer®** or . . .
2. You can purchase **Lazy Writer®** first. **It's your money!**
Lazy Writer® Mod I or III

\$175.00

*Requires 2 Disk Drives to convert only.

Proportional Spacing Option Now Available for
Daisy Wheel II Printer – **Only \$29.95**

GUARANTEE

If you purchase a Business Program from Soft Sector Marketing, Inc. and for any reason you are not satisfied, you may return (within 30 days of purchase) for a refund (less 10% restocking charge)

ELECTRIC WEBSTER Spelling Checker

*A product of Cornucopia Software

SON OF
MICRO PROOF

- EASY TO USE
- 50,000 WORD VOCABULARY & EXPANDABLE
- RECOGNIZES PREFIXES & SUFFIXES
- REQUIRES ONLY 32K OF MEMORY & 2 DISK DRIVES
- AFFORDABLE & AVAILABLE IN THREE FORMS: fully independent program to identify errors; independent program to identify and correct errors; or with a conversion program that will permit ELECTRIC WEBSTER to operate from within.

	Was	Now Only
Basic Electric Webster	\$125.00	\$89.50
with Correcting Feature		\$149.00
Special LazyWriter® Version	\$189.50	\$149.50
with Correcting Feature		
works from within Lazy Writer®		

Scriptsit Versions Available – Call for Price

THE COMPLEAT IDIOTS BOOKKEEPER – Now Is Tax Season –

Turn your baskets full of receipts
into one super organized group of paper work.

If your income tax is a pain
you don't have The Compleat Idiots Bookkeeper!

Mod I & III – **\$49.95**

FREE Overview Available

MAKE V.C.

Changes files to VISI CALC interchangeable format or V.C. file
into The Compleat Idiots Bookkeeper readable files.

Mod I & III – **Only \$24.95**

C.O.D. – certified check, M.O. or cash only. Most orders shipped next day. All orders must have shipping included. Please add 2% or \$2.50, whichever is higher for shipping. Michigan residents, please add 4% tax. Add extra \$1.50 for C.O.D. Personal checks take 3 weeks to clear. Out of the country orders add \$10.00 extra shipping.
*TRS-80 is a product of Radio Shack, div. of the Tandy Corp.

SSM SOFT SECTOR MARKETING,
INCORPORATED
6250 Middlebelt • Garden City, Michigan 48135
Order Line **800-521-6504**
Michigan Orders & Questions **313-425-4020** ✓ 86

AMERICAN EXPRESS
150-1535
The American Express® Card
Don't leave home without it™



The Quality Continues . . .

“ ‘You can look at it simply: The timing is absolutely perfect with Reagan’s current philosophy.’ ”

you use your mind and tie your hands behind you.

“It offers them a challenge to gain self-respect, dignity and pride to go back and compete in the business world. We may use BIPED as a fictitious corporation, but it functions like any other corporation. BIPED is for business, it is by business and it is of business.” But the nice thing is what it is doing for the handicapped.

Fred Wright, Student

Fred Wright is a 32 year old quadraplegic from Yonkers, New York. His entry into the program, like most of BIPED’s New York contingent, was racked by the kind of frustration that can only be brought about by red tape and bureaucrats. Fifteen months passed between the time Fred first heard of BIPED until he learned of his acceptance into the program.

The hold-up was not with Fred, or any of the other New York students’ qualifications, but politics. Originally the program was being co-produced by the states of New York and Connecticut. The problems probably began when BIPED’s offices became housed not only in Connecticut, but at a rehab center in Connecticut. Apparently there is some restriction against New York sanctioning this type of program if it is located in another state—even if New York residents will benefit from their participation.

Hassles aside, Fred is happy in and with BIPED. He says it is, “One of the best programs to come along.” Fred graduated

from Western College of New York in 1979 with a degree in accounting. “To this day,” says Fred, “it hasn’t done me one bit of good.” Maybe not, but all that classroom experience must have. One day LaMaine was late and Fred ran the class until he got there. From that day on Fred has been called “The President” by his fellow students.

Fred took only one computer course while at Western New York. It was an introductory level course, meant only to explain what computers are about. “I’ve learned more in the first nine days of BIPED than I did in the complete college course.”

Aside from the obvious career opportunities that lie ahead, much of the excitement in the air at BIPED focuses on the participants’ present situation, not the future. At BIPED they are not only learning a career that will make them self-sufficient, but they are treated like business people. The atmosphere is one of learning and collaboration. Fred: “Everyone has their own opinions and expresses their own opinions. . . . You do your work here, you can take it home when you want to. Everyone gets their input in. If someone has a question, there’s no putting it off; together we take care of it right away.”

With BIPED’s emphasis on self-sufficiency the students have to arrange for their own transportation to and from the Stamford offices—just like a regular job. For Fred and the other New York participants that means putting up with the morning and afternoon rush hour traffic on the high-

ways. Most commuters grumble about the twice daily traffic hassle, but not Fred. It may be a lot harder for a quadraplegic to negotiate stop-and-go traffic, pay tolls and switch radio stations but you won’t catch Fred complaining. “I travel over 50 miles a day just to get back and forth. I receive no financial assistance from the state whatsoever. My only means of support is SSI. I’m scratching dirt to get here. But that’s how much I believe in the program. I could give accolades forever about BIPED. I feel like a kid in a candy store.”

George Fitzpatrick, Student

George Fitzpatrick is a 36 year old quadraplegic from Stamford, Connecticut. Being from Stamford, George doesn’t have to fight the traffic as does Fred. As a matter of fact, George lives just over a mile away from the Easter Seals Rehabilitation Center. Being so close to the program’s location is not George’s only advantage. Being from Connecticut, George is able to enjoy his state’s generous active participation in the BIPED program.

George has been a quadraplegic since the spring of 1965. At the time he was a college freshman in North Carolina. He was out walking when a friend pulled alongside and offered George a lift. George accepted and rode with his friend. Two blocks later the truck flipped over, breaking George’s neck.

Since that time George has held various menial jobs; working for a city department of recreation and as a salesman for firms



Photo 5. Fred Wright

BIPED Officers

George J. Hefferon of Perkin-Elmer Corporation
President

Joseph P. LaMaine
Vice President and Director of Instruction
Wallace P. Fletcher of Pitney Bowes
Vice President

Michael P. McLaughlin of Peat, Marwick, Mitchell & Co.
Treasurer

Board of Directors

Walter L. Johnson—American Can Company
Chairman of the Board

Robert A. Frankel—Reader’s Digest
Joan S. Gilbert—Texaco Incorporated
Bernard J. Hayden—Yale University
Charles O. Packer—Aetna Life & Casualty
Kenneth D. Reside—General Electric Credit Corporation
James L. Shearin—Stamford Easter Seals Rehabilitation Center
James F. Sutter—Xerox Corporation
David E. Wainwright—Union Carbide
Alan D’Ammassa—General Electric Company
Everett P. Sherwood—Sherwood & Sherwood

Table 2. BIPED officers and Board of Directors

NOW!

The Ultimate in Mailing Packages **POSTMAN MASS MAILING SYSTEM**

©1982 Alger Software

Distributed exclusively by Soft Sector Marketing, Inc.

For the serious businessman who has as little as 100 name mailing list or 200,000 names, THERE IS ONLY ONE SYSTEM FOR YOU.

Featuring:

- **Menu Driven**
- **All machine language programs**
- **Links all disk drives as one unit**
- **Prints up to 3 across mailing labels**
- **Client listings for great record keeping**
- **Super fast sorts on 1 or All 10 Fields**
- **Form letter generator that works with LAZY WRITER and other fine word processors. (Optional).**
- **Wild Card code selection for your form letters**
- **Versions available for MTI hard disk system.**
- **Many more features - write for overview.**

Standard Version Works On:

- Single density (we recommend double density)
- Mod I TRS DOS
- Mod III TRS DOS
- Mod I and III Newdos-80 version 2.0
- Mod I and III Dosplus 3.4

Hardware Requirements:

- TRS-80 Mod I or III, 48K
- 2 or more disk drives

IDEAL SYSTEM

- Mod III 48K 1 40 Track Drive
- 2 80 Track Dual Headed Drives
- Dosplus or Newdos-80 Operating Systems
- Gives space for over 11,000 names - 5 second average name insertion time
- sorts all 11,000 names in less than 4 minutes

*Special version to work on Dosplus 4.0 Harddisk operating system

Overview available

Standard Version ONLY **\$125.00**

For Dosplus Hard Disk 4.0

Operating System **\$225.00**

POSTWRITER form letter writer . . . **\$50.00** Requires Postman.

Of course POSTMAN Mass Mailing System comes with Data Guard®.

Data Guard® is a special feature only offered by Soft Sector Marketing, Inc. If by chance your machine resets while writing information to the disk, you only lose the information that you were writing. Your files are always protected from the danger of losing all the work that you have put in that day. NO OTHER PROGRAM ON THE MARKET OFFERS THIS PROTECTION. If you reset with ANYBODY'S MAILING PACKAGE DURING WRITING you would destroy your ENTIRE data disk. We can't stop your machine from failing but we can protect your data.

C.O.D. - certified check, M.O. or cash only. Most orders shipped next day. All orders must have shipping included. Please add 2% or \$2.50, whichever is higher for shipping. Michigan residents, please add 4% tax. Add extra \$1.50 for C.O.D. Personal checks take 3 weeks to clear. Out of the country orders add \$10.00 extra shipping. *TRS-80 is a product of Radio Shack, div. of the Tandy Corp.

SSM **SOFT SECTOR MARKETING,**
INCORPORATED
6250 Middlebelt • Garden City, Michigan 48135
Order Line **800-521-6504**
Michigan Orders & Questions **313-425-4020** 88



The American Express® Card
Don't leave home without it™



The Quality Continues . . .

"His entry into the program was wracked by the kind of frustration that can only be caused by red tape and bureaucrats."

such as Amway Distributors. Before BIPED he had some computer training at a private school. He learned Assembly, RPG and Cobol languages but not much else. "The teachers were good, but the atmosphere was not centered around the handicapped. Class turnover was six months so the teachers didn't have the time to give extra help."

George did fairly well, but to keep up he had to work from early in the morning to late at night. It took away from his family life and left him no time for relaxation. "I'd come home from school, eat and get right back to the books and work on problems until 11:30 at night—time to go to bed. I'd get up in the morning to the same routine. It got monotonous to the point where everything was such a rush-rush-rush rat race I'd had enough and decided I didn't need that."

The atmosphere at BIPED is different than that of the computer programmer's school turnstile-like philosophy. "BIPED is a school oriented toward the handicapped." "It understands the problems of the handicapped. It takes time to work with the handicapped; to find out how can this person become more feasible to society, or how can he be more helpful to himself and what way can his learning process be tapped so he might learn more."

"Each one of our problems are different. Our levels are about the same, but we have different needs. Some have a little bit more mobility. It ranges from a wide scope, but the thing about it that's so impressive is,

with the community of these corporations involved, that they take the time to understand that."

Michael Molgano, Student

Twenty-two year old Michael Molgano, also from Stamford, was not overly enthused about BIPED when he first heard of it more than two years ago. Back then the program was slated to be held in New Haven. Michael was about to enter college and, frankly, was not thrilled about the prospect of a daily commute between Stamford and New Haven.

Things changed for Michael when he had to abandon his college plans due to an illness. Later when he heard BIPED (still on the drawing board) was planning to locate in Stamford, Michael called his counselor and then Joe Lamaine. Then came the testing, the talking and the waiting, until finally two years later the program was started. "I'm happy, I'm excited that I was accepted. I know there's nothing out there that will give me the experience and the knowledge that I'll get from this course."

Michael, a quadriplegic as a result of a swimming pool diving accident, had no computer experience prior to BIPED. "There's so much to be offered in this course. In 11 months Joe is going to give us a lot. He has a lot of knowledge. Not only Joe, but all the corporations sponsoring this. Some of the professionals and executives are coming in and giving us some of their knowledge."

The class works together, all the time. "We're a family. We help each other out. We all have different kinds of disabilities. What one can't do, another can, and maybe something he can't do—you know, back and forth."

No consideration is given to those with previous computer experience. They all start together, at the same place—the beginning. *80 Microcomputing* visited BIPED when it was just nine days old. "Right now we're learning the history of data processing," Michael said, "We're learning what data processing is, how it is related in the business world, how it is used."

"He's teaching us the corporate structure. We learned who the corporations involved are and how they got involved. It's nice to know they're concerned; just to come in and give their time. Executives' schedules are very, very tight. Their calendars are set five and six months in advance. So when they're coming for an hour you know somebody's being hung up somewhere. That means a lot.

"In the beginning we needed to get situ-

ated. We all needed special equipment. We've only been here nine days and we've covered a lot of things. We're right on schedule. We went over the curriculum this morning and we're right on schedule. That's good corporate training. Everything is right where it should be."

Looking Ahead

There is a feeling of purposefulness at BIPED. You can sense it by the glimmer you see in the eyes of the students when you talk to them, or maybe by the bustle you wouldn't normally associate with a room filled with physically handicapped people, or it could possibly be in the quickness of everyone's response to the question: What do you see in your future?

George: "I look forward to finishing this course and getting into the business world. My goal is to be self-sufficient. I'm married and I want to help pay the bills. It can be done."

Fred: "The corporations are doing their job; they're putting their support behind us. We have to carry it forward. It's a two-way street: they help finance the program, we do the work. We benefit, they benefit. I think even the communities around will benefit."

Michael: "I'd like to be a programmer and maybe someday get into systems analysis. There are no pressures. We just want to get in here and do our thing. I don't think being the pioneer class will really hit us until after we've graduated and are out in the world. Then we'll say, 'Wow.' "■



Photo 6. George Fitzpatrick.



Photo 7. Michael Molgano.

For Your Color Computer

MASTER CONTROL

Copyright ©1981 Soft Sector Marketing, Inc. - Written by A. Schwartz



Requires 16-32K

1. 50 preprogrammed command keys. Standard and Extended command.
2. Direct control of motor, trace, and audio from keyboard.
3. Automatic line numbering.
4. Programmable Custom Key.
5. Direct Run Button.
6. Keyboard overlay for easy program use.
7. Easy entry of entire commands into computer.

Load Master Control into your machine then either type in a BASIC program or load one in from tape to edit. Cuts programming time by 50% or more **\$24.95**



For The Radio Shack
Color Computer*

COLOR BONANZA

some 4k,
some 16k,
some 32k

**50 PROGRAMS
In One Package**

Distributed by:

SSM SOFT SECTOR MARKETING,
INCORPORATED

*The Color Computer is a product of Radio Shack, division of the Tandy Corporation.



List **\$49.95**
6 Cassettes - Disk version available soon.

MA = Machine language
NE = Non Extended Basic
EXT = Extended Basic

Tape 1		
Keys	4k	NE
Bagels	4k	NE
Find	16k	NE
Darts	4k	NE
Motor	4k	NE
Bomber	4k	NE
Football	16k	EXT
Kapow	4k	NE
Dodge	4k	NE
Tape 2		
Bounce	16k	EXT
Tank	32k	EXT
One Arm	4k	NE
Chute	16k	EXT
Where is it	16k	EXT
Lunar Lander	16k	EXT
Stock Market	4k	NE
Tape 3		
Multiply	16k	EXT
Divide	16k	EXT
Add Sub	16k	EXT
Simple Simon	4k	NE
Hangman	16k	NE
Beast	16k	NE
Count Down	4k	NE
Acey	16k	NE
Genie	16k	NE
Protect	16k	EXT
Tape 4		
Graphics	16k	EXT
Songs	16k	EXT
Joy	16k	EXT
Mortgage	16k	EXT
Checkbook	16k	EXT
Draw 1	16k	EXT
Morris	16k	EXT
Sound	16k	EXT
Tape 5		
Ram	16k	MA
Trace	16k	MA
M/Master	16k	MA
Demo	16k	NE
Disassembler	16k	NE
Basbug	16k	NE
OhmLaw	4k	NE
Convert	4k	NE
Drawer 2	32k	EXT
Degrees	4k	NE
Tape 6		
Hurdler	32k	EXT
Entrap	16k	EXT
Search	16k	NE
Flip Flop*	16k	EXT
Lost Atom	16k	EXT
Attack	16k	EXT
Cartel*	32k	EXT

C.O.D. - certified check, M.O. or cash only. Most orders shipped next day. All orders must have shipping included. Please add 2% or \$2.50, whichever is higher for shipping. Michigan residents, please add 4% tax. Add extra \$1.50 for C.O.D. Personal checks take 3 weeks to clear. Out of the country orders add \$10.00 extra shipping.
*TRS-80 is a product of Radio Shack, div. of the Tandy Corp.

SSM SOFT SECTOR MARKETING,
INCORPORATED
6250 Middlebelt • Garden City, Michigan 48135
Order Line **800-521-6504**
Michigan Orders & Questions **313-425-4020** ✓ 87



The Quality Continues

When your computer needs a change of pace.

A Night on the Town

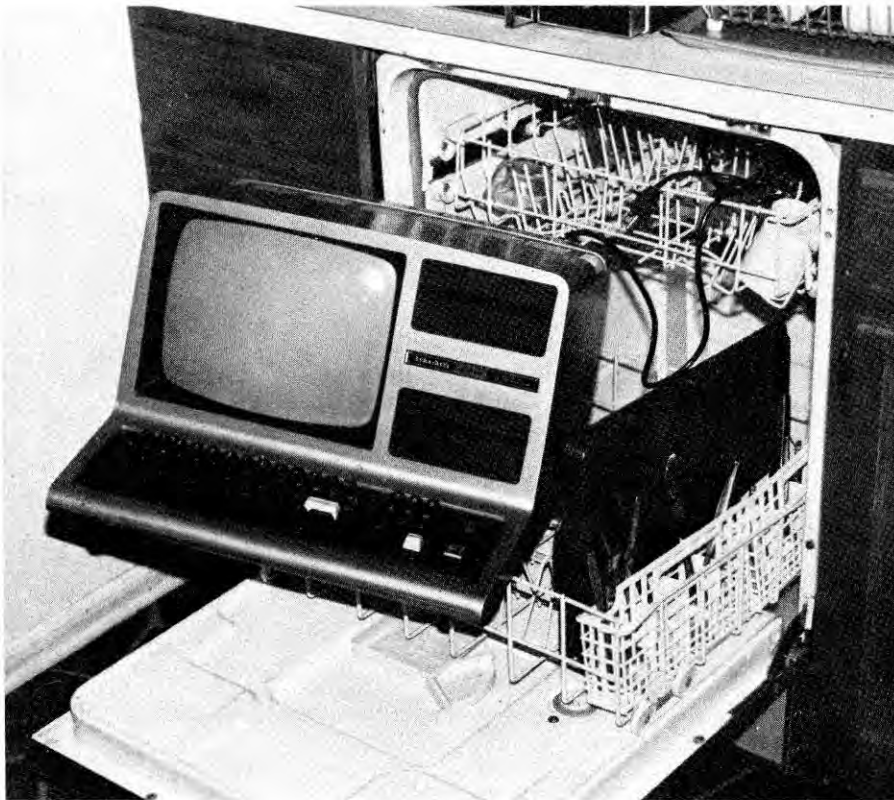


Photo 1. Too cramped

By David Gunn
photos by B. "Snapshot" Hanselman

Your computer is more than just a hunk of electronia... it is your friend! But have you been treating it like one? Well? Uh-huh, I thought so.

When was the last time you took it out to a movie, or even down to the local lunch counter for an egg salad sandwich and coffee—last month? Last year? *Never?*

And what about simple conversation? Are programs the only tete-a-tete communications you have with your electro-brain? Hmm?

I'd say that it is time to give your precious microcomputer a little something in return for all the worldly data it has given you.

Let's focus on two long-overdue basic courtesies:

- Taking your computer out.
- Cleaning and minor maintenance of your computer.

Courtesy #1

Where do you take a computer? Deep sea fishing trips and roller skating can get pretty complicated. Let's start easy: dinner and a movie.

Microcomputers enjoy Chinese food. I

MULTIDOS

Model III Now Available

What Do You Use Your TRS-80® For ?

★★★ Word Processing ?

MULTIDOS will permit you to 'grab' a formatted diskette, shove it into a track compatible drive, and write to it — no matter if it is single density, double density, or DBLDOS™ density. This is possible because of **MULTIDOS'** automatic density, recognition which includes diskettes formatted by DBLDOS™ — similar to NEWDOS/80 2.0.

★★★ Basic Programming ?

"MULTIDOS' BASIC is unequaled, in both features and size, among TRS-80® Disk Basics"
— Paul Wiener, 1982

Included is **B BASIC/CMD** which has all of the "BOSS" single step and trace features. Now you can insert 'break points' to turn on/off the trace and/or single stepping in your **BASIC** program. Now you can save the screen as formatted and look at variable values. Afterward, return the screen as before and continue your **BASIC** program.

★★★ Whatever . . .

MULTIDOS Is Easy To Learn — Easy To Use !

DOS commands may be repeated, even multiple DOS commands. System utilities never require more than 2 keystrokes per query . . .

Now That's Easy! To Make It Easier There Is A 'Help File'!

MULTIDOS
Model I or Model III

Only **\$79⁹⁵**
(Watch The Competition Squirm !)

MULTIDOS Now Available From:

WARLOCK WAREHOUSE
1691 Eason, Pontiac, MI 48054
(313) 673-2224 or (313) 673-8700

— AND —

POWERSOFT
11500 Stemmons Fwy, Suite 125
Dallas, TX 75229
(214) 484-9428

Cosmopolitan Electronics Corporation

P.O. Box 234 • Plymouth, Michigan 48170
(313) 397-3126

— Dealer Inquiries Welcomed —



COD - Cash or Certified Check
Personal Checks - Allow
2 Weeks To Clear.
ADD \$3.00
For Shipping & Handling.
Michigan Residents Include
4% Sales Tax.

58

“Nothing embarrasses a computer more than trying to scoop up food with a pair of chopsticks.”

suppose it relates back to their abacus ancestry. The restaurant I took mine to is nicely decorated in a traditional Chinese checker pattern.

Don't bother trying to impress your computer by attempting to pronounce the Chinese words on the menu. Start with some soup. Won Ton or Egg Drop will be okay, but some microcomputers are finickier than others. If you order egg rolls try to keep the filling away from the keyboard area. The same goes for Chinese tea. The caffeine plays all sorts of havoc with those ICs.

When it comes time for the main course, request some good ol' American silverware. Nothing embarrasses a computer more than trying to scoop up food with a pair of chopsticks.

Finally, there is dessert. No problem? Think again. How do you reasonably explain to a paragon of logic like your TRS-80 that a data printout curled up in a hunk of baked dough can tell its future? Just settle for a dish of litchi fruits.

After dinner I took my computer to the movies. This particular theatre had no reduced children's rates, but if the one you take your computer to does, do not forget to bring your bill of sale—in case you have to prove your computer is under 12 years old.

After the show we window shopped and discussed the sociological implications of the film. Then we went home.

Courtesy #2

Have you ever noticed how much better you feel, how much more efficiently you work, after an invigorating cleansing? The same goes for your microcomputer. The screen is easier to read and the memory seems positively refreshed. So, don't hold out on your little whizbox just because you do not know which shampoo to use. You should not, in fact, use *any* shampoo.

How do you wash it? Sponge baths are okay, but are normally over too quickly. A bathtub bath does not provide nearly enough room for your microcomputer to splash around in and what's worse, the soap is forever disappearing. The dishwasher is too cramped. Like the bathtub, there never seems to be enough room, even if you stack all the glasses on the top rack (Photo 1).

“Where do you take a computer? Deep sea fishing?”

You need to go where there is sufficient space available. I recommend taking it to the car wash. There is plenty of room there and you can get a nice wax if you so desire (Photo 2).

When washing, always use up and down motions over the front and back panels, and side to side strokes on the sides. The brush bristles should be soft and pliant, so as not to irritate the delicate electronic skin.

Always rinse thoroughly. There is nothing as annoying as running a highfalutin' program in front of friends and having telltale suds bubble up out of the console during printout.

There comes a time when simple washing and waxing is not enough—when internal maintenance is necessary. Yes, I am talking about soldering!

Wait! Come back! Soldering is not something to be feared. Heart surgeons perform this simple operation all the time. Of course, many have had umpteen years of cardiovascular training in expensive hospitals, but the point is, if *they* can do it, and

if I can do it then you can do it, too.

Before we get started, you got any whiskey in the house?

Just kidding....

Soldering: What is it? Why do I have to do it?

Suppose you have two wires; Fred and Ethel. Normally, they are a couple of terrific wires who get along beautifully together. Today, though, they have had a little spat and will not speak to each other. Well, that is when you take your solder, Lucy, and get them all together for a nice intimate dinner party. Then, when everyone is relaxed and mellowed out with some wine and cheese... Presto! You melt Lucy all over Fred and Ethel before they have a chance to object. And once again you have a perfectly harmonious metallic union.

Let's just hope that Fred and Ethel don't get too tired of Lucy, because she means to hang around for quite a spell.

Finally, a few words you should be familiar with to facilitate your soldering: *welding*, *riveting* and *flux*.

Welding is soldering that has gotten out of hand (Photo 3).

Riveting is holding someone's attention by means of metal pins or a good story.

Flux is a common expression used when soldering has turned into welding (Photo 3).

Actually, if you can avoid soldering, do so. You will be spared a heck of a lot of grief.

Follow this advice and see if your microcomputer doesn't respond to commands more quickly and compute more accurately. In a future issue, we'll discuss *Selecting A Pet For Your Microcomputer*. Stay tuned. ■

Writer David Gunn and photographer Hanselman run a computer dating service in Vermont. Says Gunn, “Computers are good dancers and, basically, are a cheap date.”



Photo 2. Plenty of room

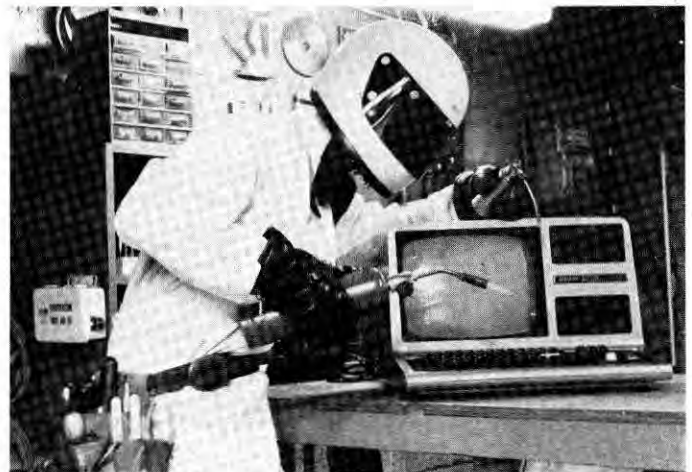


Photo 3. Welding or Flux

Professional/Scientific

WORD PROCESSING

Since introducing QWERTY 3.0 in September, people have been calling to ask if we were making ludicrous claims. The answer is NO! QWERTY 3.0 does all we claim it does and more! No other software of this type can match QWERTY 3.0.

$$T_1^2 = \frac{1}{N} \sum_{i=1}^N \frac{\alpha_i \sigma_i^2 + \mu^2 \pi^2}{\lambda_i \psi_i - \rho^2 \theta^2}$$

It is the best. Period. We guarantee you will agree! If for some reason you find that this program does not meet your needs, return the entire package within 14 days for a prompt and cheerful refund.

(Actual QWERTY text above)

SOME FEATURES OF QWERTY 3.0

1. Automatically prints in proportional print, with a suitable format. Transitions between the three print styles are easy, including all expanded print modes. 2. QWERTY 3.0 adds 75 new symbols, including upper and lower case Greek letters, mathematical symbols such as integrals and summations, arrows, brackets, and probability symbols. 3. Any character can be used as a subscript or superscript, even simultaneously. Carats, bars, and tildes can be placed over any character, with precise position control. 4. Underlining, with or without underlining of spaces, including long ratios and mathematical expressions. 5. FOOTNOTES can be placed on any page so that they remain on the desired page, even if text is inserted later. 6. TABLE commands enable positioning of the print head anywhere on a line. Invaluable in printing neat mathematical layouts, tables, columnar material, etc., in proportional print. 7. PRETTY commands allow printing of repetitions of a chosen character. When combined with TABLE, decorative borders can be produced with ease. 8. FOLIO format produces output in two or three columns per page, in either proportional or 16.7 cpi mode. Ideal for newsletters. 9. Supplies a third output mode, in which only SCRIPSIT commands are obeyed. Allows printing of special QWERTY commands for future reference. 10. PAGE END indicates where pages will end, and the page number, without printing the text. One can prepare an almost error-free document without ever using paper. 11. Correction of SCRIPSIT's errors and inconveniences, extensive documentation, and much more!

QWERTY 3.0 requires a TRS-80 Model I or Model III, at least one disk drive, a copy of SCRIPSIT, and one of the printers specified below. When ordering, *please specify* which model computer, number of drives, and printer you use. For cautious buyers, we offer the manual (over 70 pages) for \$10. When you decide to buy QWERTY, we will credit the full manual price.

QWERTY 3.0

(for Lineprinter IV, Centronics 737, or Centronics 739) complete package . . . \$74.95
DAISY (for Radio Shack Daisy Wheel II) complete package . . . \$74.95
QWERTY 3.0 Manual (specify printer) . . . \$10.00



MED SYSTEMS SOFTWARE
P.O. BOX 3558 CHAPEL HILL, NC 27514
TO ORDER, CALL 1-800-334-5470

Dateline: Sri Lanka

by John P. Mello Jr.
80 Microcomputing staff

If you see a man driving a yellow Pinto station wagon bristling with electronic gadgets, while dictating into a microcassette recorder, there's no need for a double take. It's only David Busch, ever-vigilant watchdog of Kitchen Table Inc., speeding to another significant press event held by the fictitious Sri Lankan-based manufacturer of computer wares.

Busch stands out among computer writers because he is a humorist in a field where sobriety is king. However, the Ravenna, OH, native quickly rapped widespread notions that computers are inherently humorless: "What do they mean computers aren't inherently funny? Haven't they ever used a TRS-80 Model I?"

"Tandy has done many, many good things," he observed. "Yet, they introduced a computer that gave you two letters for every one pressed, left out lowercase in order to save 14 cents and sold a \$300 expansion interface with free disk controller circuitry, but no memory."

The public relations specialist admitted Tandy inspired his creation of KTI: "I was most familiar with Radio Shack. If I had been more familiar with Commodore, I might have thought Commodore."

He added: "I thought, what if there was a

company with the imagination of a Scott Adams, Nolan Bushnell or Bill Gates, but had Tandy's management structure? That was Kitchen Table. Now I can scarcely look at a new product without thinking how KTI would mishandle it."

Busch began his journalistic career in 1960 at the age of 13 as a newsboy for the six-day-a-week *Record-Courier*. Within five years, the whimsical buckeye had risen to reporter, writing mostly sports stories.

Not only did his newsboy job serve as an entree into journalism, but as an introduction to his future wife. "It was on my 16th birthday," he remembered. "One of her girlfriends stopped by and introduced her while I was getting ready to deliver my newspapers.

"She was 13, a little young at the time. I didn't have a driver's license and she wasn't allowed to date, so we just walked around together."

In 1964, her parents moved to California, but the pair corresponded for three years—until Busch saved enough money to fly to California and spend the summer with her. After she graduated from high school in 1968, she moved back to Ohio and the pair tied the knot in 1969.

Meanwhile, Busch began attending Kent State University, where his experience with the Kent and Ravenna county paper made life easier in his college major, journalism:

"When we got assignments to write things, I'd just take a clipping from something I'd already published, hand it in and get an A. We'd learn layout, and I'd bring in a page I'd laid out at the newspaper and get an A. I didn't learn a lot of journalism."

The son of a police officer began to question his newshound instincts—especially after the Kent State killings in May of 1970. "My class let out 15 minutes before the shootings took place," he recalled. "I came out and saw the National Guard and protestors down on a hill. I decided nothing interesting was going to happen so I left. It occurred to me later that I shouldn't go into news journalism because my nose for news was apparently not very highly developed."

At the time of the shootings, Busch managed a camera store on the Kent State campus. "One of the kids that used to come into the camera store and ask me questions about photography won the Pulitzer Prize that year," he said. That student, John Filo, snapped the photo of a woman, her face screaming with grief, crouched beside a slain student. "Maybe his technical skills weren't as good as mine—or maybe they were better, I don't know—but his news sense was a lot more highly developed."

Busch became drawn toward a career in public relations: "There seemed to be more money in it. I had already decided I wasn't the world's greatest reporter. I had already done it. I liked it, but public relations seemed like more fun."

After graduating from Kent State in 1970, he started working in a public relations firm in Rochester, New York. Eighty percent of his work was on Eastman Kodak's account with the firm. Meanwhile, he began collecting jobs. By 1974, he had eight moonlight jobs including photography instructor at the local Barbizon school of modeling; sports information director for St. John Fisher College; and freelance gag writer. "At the time, I was making more money from my part-time things than my main job," he noted.

Despite his exhausting work schedule, Busch still found himself in a money crunch. And he was tiring of icy city life. "They only have two seasons up there," he observed, "cold and colder. My house was burglarized five times, my car broken into a couple of times." So when he had a chance



David Busch

Busch with two of his favorite things: computers and Charlie Chaplin.

“What do they mean computers aren’t inherently funny? Haven’t they ever used a TRS-80 Model I?”

to work in the Ravenna office of Creative Communications Services, a public relations firm with locations in several U.S. cities, he gobbled up the opportunity. “In Ravenna, we haven’t had a murder in a couple of years,” he said. “And nobody locks their doors.”

The public relations agency had Busch

writing about computers and he became interested in them. “But until they invented microcomputers,” he said, “you didn’t have one of your own to play with.”

“When the first kits came out,” he recalled, “I started reading all the magazine articles, but I’m not a hardware person. I never thought I could build one.”

Before buying a Model I Level I, he learned Basic programming from a magazine article and a book he’d bought from Radio Shack. Since then, he’s experimented with Pascal and Assembly, but feels he has a way to go with Basic: “I don’t think I’ve exhausted nearly a tenth of what Basic can do. I’m still surprised at the things you can make Basic do.”

“When I got my Model I,” he said, “I didn’t know what to do with it. It just sounded like a good idea at the time. Then I got into it and I started coming up with ideas.”

Within 48 hours of buying his Model I, he wrote a travel expense report program exceeding the 4K of memory that came with the machine. So he installed some 16K chips—incorrectly—and had to return them to where he’d bought them. Then he tried to reinstall the 4K chips and bent two of the pins. Singlehandedly, he had reduced his Model I to a 1K computer.

When his 16K chips returned, he plugged them in, but still no results. “Finally,” he said, “out of a sense of daring, I plugged in a set of jumpers meant for Level II and they worked. I still don’t know why.”

Busch does a lot of traveling in his trade and he takes computers wherever he goes: “I always take the Pocket Computer. I take the Model I, usually with one or two disk drives. I used to take a Sinclair ZX-81 because it fit in the pocket of my camera bag. Now I’ve got a VIC 20 because it’s got



John Filo photo for Valley News Dispatch, Tarentum, PA. Reprinted with permission.

Busch began to question his instincts for news following the Kent State killings in 1970.

- **TRS - 80⁽¹⁾ Model I or Model III**
48K, 2 disks
TRSDOS⁽¹⁾ or LDOS⁽²⁾
formats available
PRICE \$149.50

- **TRS - 80⁽¹⁾ Model II**
64K, 2 disks
TRSDOS⁽¹⁾ format
expanded version
PRICE \$224.50

GANTT-PACK: AUTOMATED PROJECT CHARTS

This powerful, flexible program will save you time in project planning, scheduling, tracking and reporting. You need no prior Gantt experience; screen prompts guide you all the way. Scratchpad entry lets you keep track of unassigned tasks while structuring your project. Automatic project organization. Fast edit lets you correct errors, modify schedules, explore alternatives. Saves alternative plans from original database. Helps you visualize the project at all stages.

Large capacity allows up to 100 tasks per phase and multiple phases per project, each phase with its own chart. Hard copy to parallel or serial printers. Scroll to any portion of any chart and print selected region. Charts show projected, elapsed and overrun times. Get professional results quickly and easily with Libra Lab’s Gantt-Pack.



Libra Laboratories, Inc.
495 Main Street
Metuchen, N.J. 08840
(201) 494-2224

Gantt-Pack © Libra Laboratories, Inc. 1981
(1) TRS-80 and TRSDOS Trademarks of Tandy Corp.
(2) LDOS Trademark of Logical Systems, Inc.

“... KTI plans to maintain its reputation as an innovative leader with products like no-name software and checkers with sound.”

an RF modulator and you can plug it into the television in the motel.”

80's observer of KTI travels in a Ford Pinto built for comfort. It can receive up to seven electromagnetic bands including CB, radio, AM, FM and television. “I listen to television while I'm driving,” Busch explained. “I have a little thing that flips over the screen so you can't see it. I think it's illegal to watch it while you're driving... also dangerous.”

The car also contains a fuzz buster, gadgets for eating and drinking, and “the usual audio equipment”—power amplifiers, Jensen speakers and from 80 to 100 tapes of recorded music. “The electrical system wasn't built for all that,” he added. “I usually go through a battery every couple of years.”

Traveling as much as he does—eight days a month—can lead to some hairy experiences. “Generally,” Busch observed,

“everywhere I go, tragedy follows. I was at Kent State the day of the shootings. I was in New York the day of the big blizzard. I was in Detroit the day Jimmy Hoffa disappeared. I was at Washington National Airport the day before the plane crashed into the bridge.”

“Last year,” he added, “driving up to Rochester, New York, I drove sideways for about 200 yards on the New York State Thruway on the ice. It's interesting to look out the side window to see where you're going.”

“I frightened all the other drivers. It was a three-lane highway and they all pulled over to the shoulder and watched me drive down the street sideways.”

When Busch goes on long trips, he dictates his Kitchen Table columns into his Norelco microcassette recorder. “I actually get more work done driving than I do some types of work sitting in my office,” he noted.

“My office is a spacious eight by ten

feet,” he added. “Most of it is taken up by counter space and bookcases, and the actual floor space is closer to four by six feet. There are no windows to distract me, and the tight confines keep me from collapsing with fatigue since there's no place to fall down.”

“One major problem is that when I want to move a computer or something, there is such a tangle of wires and extension cords that I usually just snip them with scissors to free the necessary peripherals, and start all over again.”

Another problem is I am seldom more than three feet away from two or three monitors—including one color receiver—so I find that I sometimes glow in the dark.”

The clutter in the silicon comic's office reflects his incurable bent for collecting things. He has all his photography magazines dating back to 1960 and every paperback book he's ever bought. However, while he visited his wife-to-be in 1967, his mother—who had to quit her job of many years as a beautician because she became allergic to hair dye—dumped his comic books and Playboys. “I've always collected everything,” he said. “I don't think I've thrown anything away in my life. It's all out in my garage.”

Busch collects travel guides to Spain published before 1900 and “Seat Occupied” signs from airlines. “I like to do things nobody else does,” he commented.

He's played in a number of jazz, dance, rock and blues bands, including a punk rock garage band called “The Babylonian Disaster Squad.” Currently he's negotiating to play bass with a local New Wave band, BAK Two Square One, “I loaned the band's lead guitarist my bass,” he explained, “and he allowed it to be stolen. Now I'm saving up to buy a new one.”

He likes all kinds of music. His favorite composers are Beethoven, John Lennon and Hank Williams, Jr. He has every Beatles album including bootlegs not officially released by the group. “I listen to Beatles music at least an hour or two a day,” he added.

He also likes films. “I've made humorous home movies,” he noted, “with anyone sitting around with nothing to do.” Charlie Chaplin holds Busch's interest and he has most of the silent era comedian's films on Super 8 and videotape. His favorite movie is “City Lights.”

Other Busch favorites include *The Moon Is a Harsh Mistress* by Robert Heinlein, the video game Galaxians, video pinball, and a pair of utility programs called IRV (a key-

NEW CLASSICS SOFTWARE

239 FOX HILL ROAD-DENVILLE NEW JERSEY-07834-TELEPHONE 201-625-8838

PASCAL 80 by Phelps Gates

“If anyone could devise a good PASCAL system for the TRS-80® it was Phelps Gates. I am happy to report he has done just that.”

BYTE, Dec. 1981, pg. 304

“After trying out...(the competition) I found myself using PASCAL 80 exclusively.” Creative Computing, Nov. 1981, pg. 96

PASCAL 80 is the friendliest PASCAL available anywhere! Monitor, editor, and compiler are in memory at the same time, avoiding time consuming and annoying disk access and disk switching. Yet, it uses standard PASCAL syntax and leaves 23K of work space in 48K (32K at run time).



PASCAL 80 has 14 digit accuracy and requires a 48K

TRS-80® with one disk drive. It comes in a binder with easy and complete user instructions for \$99.

Add \$2 shipping and handling per order and specify Model I or Model III.



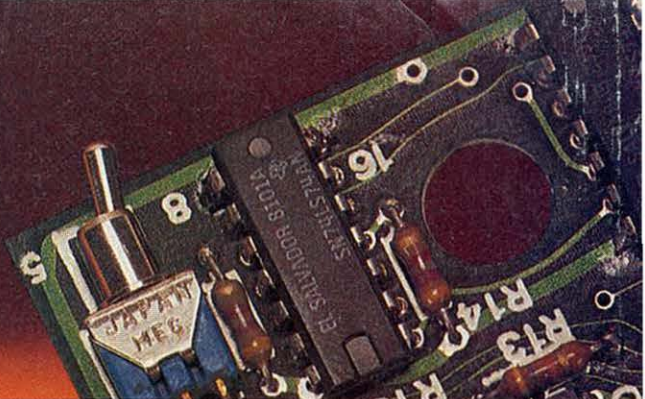
Credit card orders: (201) 625-8838

NEW CLASSICS SOFTWARE
239 Fox Hill Road
Denville, NJ 07834

(PASCAL 80 does not implement variant records, pointer and window variables, or functions and procedures used as parameters.)

255

THE SWITCH



SWITCH TO 5¹/₈" DOUBLE DENSITY

LNDoubler 5/8

FEATURES

- 5- and 8-inch* disk drives
- Single- & double-density
- Any size and density in any mix
- Read Model I, II* and III disks
- 5- or 8-inch* system disk
- Single & double sided disk drives
- DOS+ 3.3.9 included, with Disk BASIC.
- 6 month warranty
- Up to 3.75 megabytes online
- Easy installation - plug-in & run
- Analog phase lock loop data separation
- Precision write precompensation
- Regulated power supply
- Guaranteed operation at 4MHz
- All contacts gold plated
- Solder masked & silk screened
- Runs under DOS+ 3.3.9, TRSDOS 2.3, NEWDOS 2.1, NEWDOS/80 1.0, LDOS, NEWDOS/80 2.0, and ULTRADOS
- Reads 40- and 35-track disks on 80-track drives
- FD1791 controller + your FD1771
- Fits Model I expansion interfaces
- Fits LNW expansion interfaces
- Track configurations to 80-tracks
- 5 inch disk storage increased to:
 - 161,280 bytes - 35-track SS/DD
 - 322,560 bytes - 35-track DS/DD
 - 184,320 bytes - 40-track SS/DD
 - 368,640 bytes - 40-track DS/DD
 - 368,640 bytes - 80-track SS/DD
 - 737,280 bytes - 80-track DS/DD
- 8 inch disk storage increased to:

591,360 bytes - 77-track SS/DD
1,182,720 bytes - 77-track DS/DD
SS: single-sided DS: double-sided
SD: single-density DD: double-density

COMPLETE - The LNDoubler 5/8, switches your Model I or LNW-80 into the most versatile computer you can own. The LNDoubler's switch allows you to boot from 5- or 8-inch system disks, and it's accessible from outside the interface. The LNDoubler 5/8 comes with a double-density disk operating system (DOS+ 3.3.9), complete with BASIC and utility programs . . . ready to run your software NOW!

VERSATILE - Whether you want single-sided, double-sided, single- or double-density, 5- or 8-inch operation, complete versatility is here today! Any combination of 5- and 8-inch disk storage is possible with the LNDoubler 5/8. Each of your present 40-track, single-sided 5-inch drives will store up to 184,320 bytes (formatted storage) - that's an 80% increase in storage capacity for only half the cost of just one disk drive. With three 8-inch double-density, double-sided drives your Model I will have 3.75 Megabytes of online storage - that's more storage than a Model II or Model III!

ADVANCED - The LNDoubler 5/8 is the most technically advanced, tested and reliable double-density

board you can buy. The LNDoubler 5/8 has more features, more options and more software support than any other product of its kind.

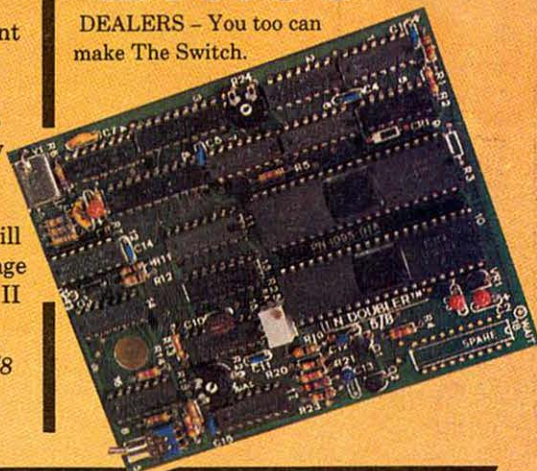
EASY TO INSTALL - The LNDoubler 5/8 is easy to install. There are no traces to cut, no wiring to do, just a screwdriver and a few minutes of your time is all that is required. The instructions are fully illustrated for all interfaces. In minutes you will be 'up-and-running', and enjoying your computer as never before.

COMPARE - Compare features, compare quality, compare value, and make the SWITCH today!

Immediate delivery from stock - at your dealer NOW for only

\$ 219.95

DEALERS - You too can make The Switch.



LNW RESEARCH CORPORATION

2620 WALNUT Tustin, CA. 92680 (714) 544-5744 (714) 641-8850

*8" drive operation requires special cable, 8" double-density requires 3.55MHz CPU speed-up modification or LNW-80 4MHz computer. TRS-80 is a trademark of Tandy Corporation.

“... when I want to move a computer there is such a tangle of wires and extension cords that I usually just snip them with scissors...”

stroke multiplier) and PACKER (which packs and unpacks program statements).

The Busch household also has its complement of pets: goldfish, parakeets and his in-laws' cat, vacationing with the family while its owners reside in warmer climes during the winter. "It feels right at home," he observed. "It comes in and throws up any time it wants."

Busch's cat came to a recent untimely end: "It was one that we found. We thought it was a kitten, but it turned out it was a year and a half old and its growth had been stunted because it had been starving for a year and a half. Then, while walking on some rafters in someone's garage, it slipped and fell between them and hung itself."

Busch has two sons, ages 11 and 12, both interested in computers. His oldest boy, following his father's footsteps, is saving his paper route money to buy an Atari 800.

"My wife can't understand why the computers cost so much money," Busch said. "So I try to explain to her they're free. Like when I bought the Pocket Computer. She said, 'You paid \$200 for that thing?!!' Well, I've already written three articles about it and have gotten twice as much money for the articles as I paid for the computer."

Sometimes Busch tries out his Kitchen Table jokes on his children, but never on his wife. However, he said, "Mostly, I try them on my users' group."

The KTI observer maintained he had no doubts about a humor column being accepted by computerists. "When I first started writing Kitchen Table," he commented, "I said, gee, this is good stuff. I thought people would like it. I tried out the jokes on my user's group and they thought they were hilarious."

Kitchen Table is Busch's handle on the Micronet CB network. "Every time I get on

there," he said, "people recognize it and comment." He also gets funny tongue-in-cheek letters asking questions about KTI wares: "One guy said he had a scratch on TLS-8E's CRT and he wanted to know if the company made a special tape to repair it."

In fact, the demand for KTI products has been so great, Busch is developing some of them: "I'm working on DROSSDOS and the Basic Misinterpreter. DROSSDOS looks like you're actually running a DOS but when you type BASIC, and go into the Basic Misinterpreter, it does funny things. When you type PRINT 1 + 2, it will print one plus two instead of three. If you give it a command it doesn't recognize, it goes: Huh?"

Meanwhile, Busch said, in the coming year, KTI plans to maintain its reputation as an innovative leader with products like no-name software—software with no frills like menus and documentation—and checkers with sound. ■

make connections like you never have before —

Contact CMP for 22 different kinds of CABLE!!!

DISTRIBUTOR & DEALER
INQUIRIES WELCOMED



NOTE: *Printer Parallel accommodates the following printers:
Centronics Anadex
Okidata NEC
Epson Texas Instruments
**All Serial Interface cables are universal kits complete with all parts having 7 wires staked to pins. Pins must be inserted into plugs and sockets and then strain relief (included) added.

CMP INDUSTRIES CABLES		List Price
Cable - Computer Type	Peripheral	\$65.00
11 Altos	Printer Parallel*	35.00
12 Apple	Printer Parallel*	52.00
13 Atari	Printer Parallel*	45.00
14 AVL Eagle	Printer Parallel*	41.00
15 IBM	Printer Parallel*	35.00
16 NEC	Printer Parallel*	35.00
17 Radio Shack TRS-80,*** Mod I or Mod III	Printer Parallel*	35.00
18 Radio Shack TRS-80,*** Mod II	Printer Parallel*	28.00
19 Vector Graphics (Serial)	Okidata Microline (Serial Input)	35.00
20 Vector Graphics (Serial)	NEC Spinwriter (Serial)	23.00
21 Vector Graphics (Serial)	Modem DCE	46.00
22 Vector Graphics (Serial)	Modem DTE	35.00
23 IBM	Houston Plotter	35.00
24 Serial (M) DB 25P	Serial (M) DB 25P**	37.00
25 Serial (F) DB 25S	Serial (F) DB 25S**	37.00
26 Serial (M) DB 25P	Serial (F) DB 25S**	35.00
27 Serial (M) DB 25P	Serial (M) DB 25P**	35.00
28 Serial (M) DB 25P	Serial (M) DB 25P**	35.00
29 Serial (F) DB 25S	Serial (F) DB 25S**	35.00
30 Edge Card Connector, FEN 767-J034-AU/1	Parallel Receptacle (Jumper)	35.00
31 Vector	Houston Plotter Printer Parallel*	37.00
32 Commodore IEEE		

All cables are 5 Ft. except #28 and #29 which are 3 Ft. jumpers and cables #11, #14, #24, #25 and #26 which are 10 Ft. in length.
***TRS-80 is a Trademark of the Tandy Radio Shack Corporation
PRICES SUBJECT TO CHANGE WITHOUT NOTICE

SPECIAL PRICES with this initial offer

CALL TOLL FREE U.S.A. 1-800-521-2764 MICHIGAN 1-800-482-8393

REMEMBER: We are open 8:30 AM to 6:00 PM EST Monday - Friday

YOUR VISA master charge WELCOME HERE No Credit Card Penalty

INDUSTRIES INC. A CAP TECH COMPANY 26514 W. 7 Mile Rd. Redford, MI 48240

We have ways...

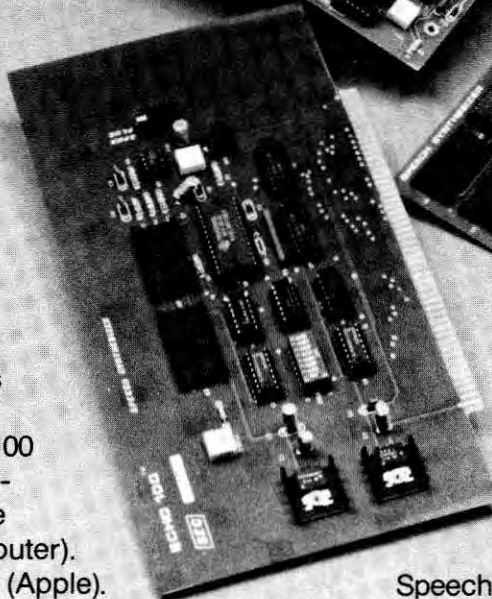
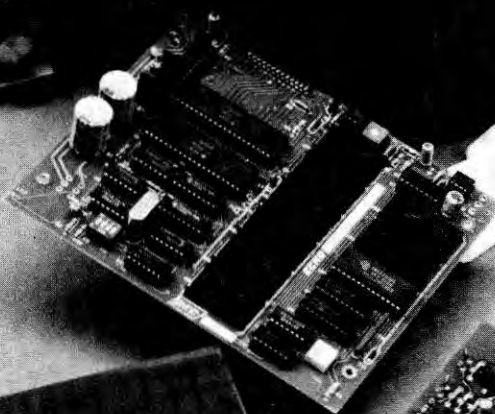
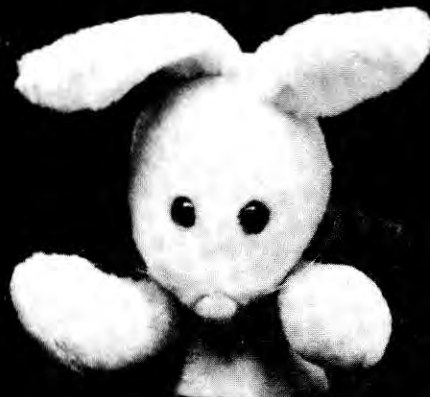
to make it talk!

Give your computer the magic of speech with an ECHO™ Speech Synthesizer!

There are four new models to choose from: the ECHO 80 (TRS-80 models I & III), ECHO 100 (S-100), the ECHO GP (general-purpose, serial/parallel) and the ECHO SBC (single board computer). These join the popular ECHO II (Apple).

ECHO Speech Synthesizers use LPC synthesis pioneered by Texas Instruments, combined with a phoneme-based operating system to provide any vocabulary you desire while using a minimum of your computer's memory.

The TEXTALKER Speech Generator, standard with all ECHOs except the SBC, translates normal English text to speech automatically.



Simple commands allow you to select from:

- 63 different pitch levels
- Words spoken monotonically or with intonation
- Fast or slow speech output
- Entire words pronounced or spelled letter by letter
- Different volumes
- Spoken punctuation if desired

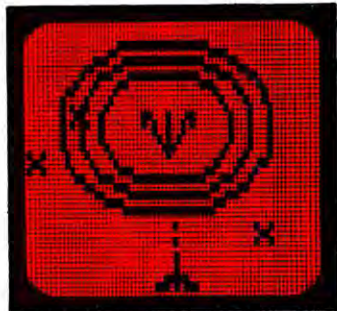
Speech applications are virtually unlimited, ranging from education to games to aiding the handicapped. The flexibility and low price of ECHO Speech Synthesizers make them the logical choice when adding speech to your system.

For more information see your dealer or contact:



STREET ELECTRONICS CORPORATION
3152 E. La Palma Avenue, Suite D
Anaheim, CA 92806 Telephone: 714/632-9950

The Cornsoft Group PRESENTS:
New! SPACE CASTLE
 FOR TRS-80 MODELS I & III

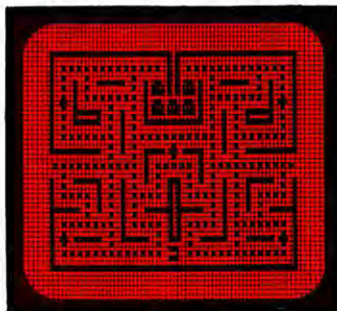


Will you save the Andromeda Galaxy by destroying the Space Castle or will the evil warlord Yugdab continue to rule, uncontested? Locked in battle with Yugdab, your main defense is your ability to skillfully handle your ship and it's projectiles. If you are not careful, Yugdab's intelligent mines will hunt you down and blow you into space dust. Written in machine language, Cornsoft's New Arcade Game, Space Castle, has fast action and exciting sound. Yes, Joystick owner's, the Alpha Joystick really puts you in the cockpit!

16K Model I & III Tape: 15.95 + 1.50 Shipping
 32K Model I & III Disk: 19.95 + 1.50 Shipping

Indiana Residents Add 4% Sales Tax

New! SCARFMAN
 FOR THE TRS-80 COLOR COMPUTER



It's eat or be eaten. That's right!!! Now color computer owners can enjoy the same thrills that lots of Model I & III owners are raving about, like Mrs. David Cullen, Germantown, Maryland, who writes:

"My highest (score) to date is 271,090. I have achieved this on our TRS-80 Model III, without Joysticks. I honestly don't play all day — my three children wouldn't allow it — but I think it's great fun!!

Congratulations on the Third Highest Score to date:
 (Highest: 289,565 by David Leventhal)

Written in machine language, Scarfman has the Excitement, Graphics, Sound and Real Time Action that have become a trademark of the Cornsoft Group. Scarfman is also Alpha Joystick compatible.

TRS-80 Color Computer Tape: 19.95 + 1.50 Shipping
 16K Model I & III Tape: 15.95 + 1.50 Shipping
 32K Model I & III Disk: 19.95 + 1.50 Shipping

Indiana Residents Add 4% Sales Tax

The Cornsoft Group

6008 N. KEYSTONE AVE.
 INDIANAPOLIS, IN 46220
 (317) 257-3227

✓308

MASTER CARD & VISA ORDERS ACCEPTED

CANADIAN OWNERS — Contact:
 RAINBOW SOFTWARE DISTRIBUTORS
 7070B Farrel Road SE, Calgary, Alberta T2H 0T2, (403)-253-6142
 TRS 80* is a registered trade mark of the Tandy Corp.

**ATTENTION UNIVERSITIES AND
 MEDICAL RESEARCH FACILITIES**

**DO YOU NEED DETAILED
 STATISTICAL ANALYSIS?**

StatPac is a new 3-part program written and designed for research, survey and questionnaire processing, data entry, statistical analysis, management and market analysis. StatPac can be easily tailored to fit your needs because you create the data file format. All phases of research analysis can be processed, including:

- frequency analysis
- descriptive statistics
- crosstabs & chi-square
- t-test
- correlation and linear regression
- analysis of variance
- multiple linear regression
- management reports

StatPac eliminates the need for expensive programming or renting time on large mainframe computers because it is the SPSS for the TRS-80's.

Total Package, including an extensive step-by-step user's manual is \$285.00. Manual may be purchased separately for \$30.00 (may be applied to the purchase price of the disks). MasterCard and Visa accepted.

Write or call for a FREE 16 page brochure (612) 866-9022.



Walonick Associates, Inc.
 5624 Girard Ave. So.
 Minneapolis, MN 55419

"Absolutely the best statistical analysis package I've seen for a microcomputer..." Eugene Allred, President of Consolidated Data Services, Minneapolis, MN.

✓147

CHECK OUR LOW PRICES ON

TRS-80*
COMPUTERS & Accessories
Software

NEW--NEW TRS-80* "Model-16"

16/32 Bit Computer. 128K RAM Std. 512K Max. 1 or 2 Built-in 1.25 MB Disk Drives. Multi-user capability. W/1 Drive \$4399.00 W/2 Drives \$5099.00. Call for low prices on other RS equip.

CORVUS**
HARD DISK DRIVES

Call for prices on 5-10-20 MB Hard Disks. We have the new CORDOS operating system which enables you to add a Hard Disk to TRS-80* Mod II with little or no modifications to your software. NEWDOS-80 and OASIS operating systems also available. Full service for CORVUS** and TRS-80's*.

In business 27 years at the same location

Radio Ranch, Inc. ✓140

Cert. Check
 Cashiers Ck.



Route 3, Radio Ranch Airport
 Polo, Illinois 61064

Call Toll Free 800-435-8310

In Ill. Call 815-946-2371

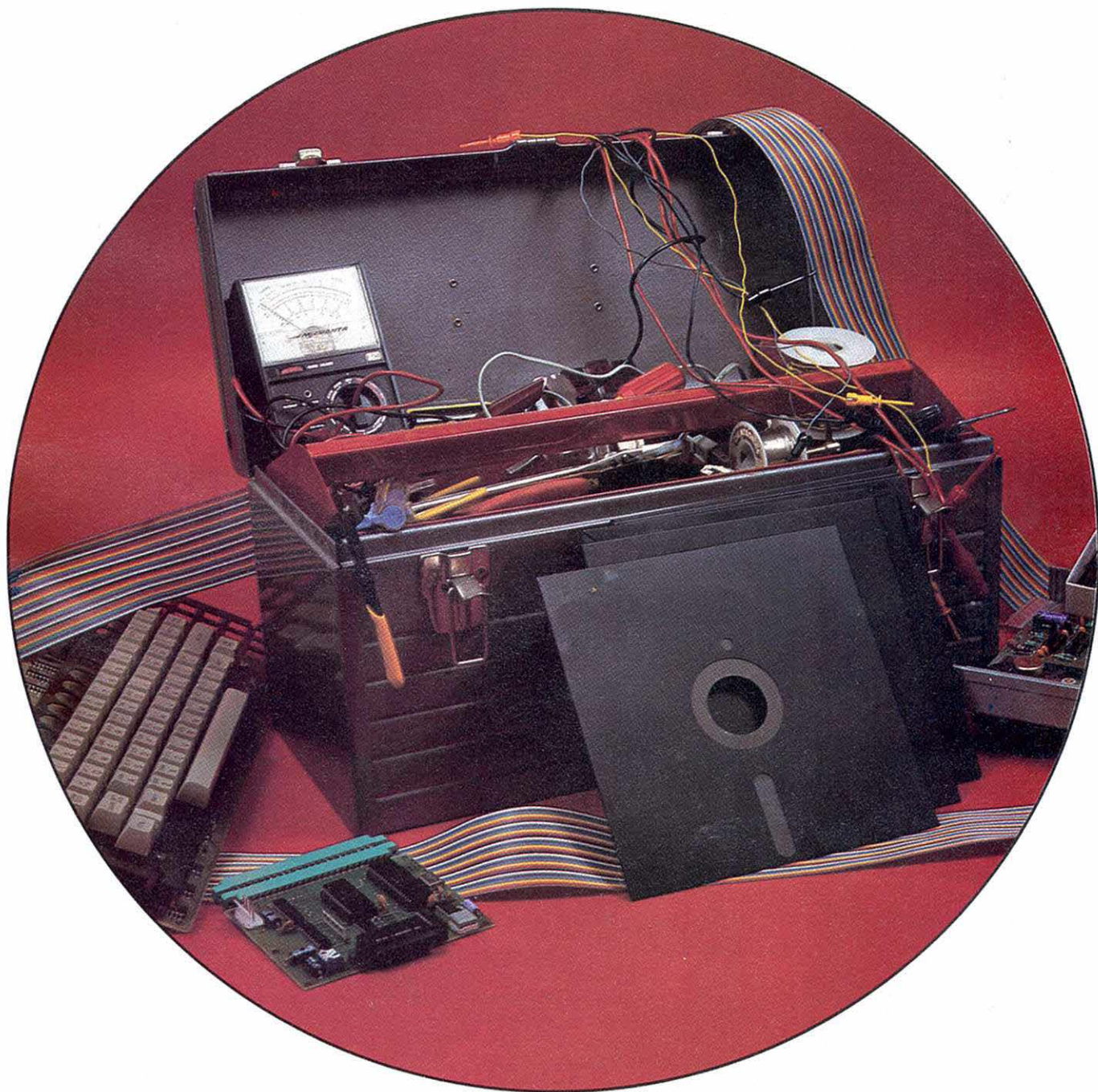
*Trademark Tandy Corp.

Trademark Corvus Systems, Inc.

80

microcomputing^{T.M.}
the magazine for TRS-80 users*

1982 Utilities Buyer's Guide



1982 BUYER'S GUIDE

Assemblers

	Product	Model	Minimum RAM	Tape or Disk System	DOS	Price
Computer Applications	T-ZAL	III	16K	T	NA	\$49.95
Program Innovations	Macro Assembler	II	64K	D	V	\$74.95
InfoSoft	I/SAL	II	32K	D	R	\$225

Editor/ Assemblers

Mumford Micro Systems	Instant Assembler	I,III	16K	T	NA	\$29.95
MISOSYS	EDAS	I,III	32K	D	K,L,V	\$79
MICRO WORKS	SDS80C	Color Comp.	4K	T	NA	\$89.95
RACET Computes, Ltd.	Development Package	II	64K	D	F	\$125
Computer Applications	M-ZAL	I,III	32K	2D	I,K,V	\$149
Spectral Associates	Editor/Assembler	Color Comp.	16K	T	NA	\$34.95

C = inquire
X = unavailable
NA = not applicable

D = disk
T = tape
S = screen

B = NEWDOS 2.1
E = NEWDOS PLUS
F = TRSDOS 2.0

G = NEWDOS
H = NEWDOS40
I = NEWDOS80

UTILITIES

So you have a blown disk, or a tape you would like to duplicate, or a machine language program ready for assembling. What next?

Start by reading Jake Commander's tutorial article about utilities in this issue. He describes each general category of utilities useful to the personal computer owner, and includes tips on what to look for when you purchase a program.

After you decide which utility you need, flip through the pages of the Buyer's Guide. The 20 companies (and approximately 75 products) listed are included because they responded to *80 Micro's* letters of inquiry. (If you don't see your favorite utility here, don't panic. The product is probably still on the market, but the manufacturers did not meet our publication deadlines.)

One notable omission from this Guide is Radio Shack—they chose not to be included. If you're considering Radio Shack software, dust off your catalog and compare their offerings with what is listed here.

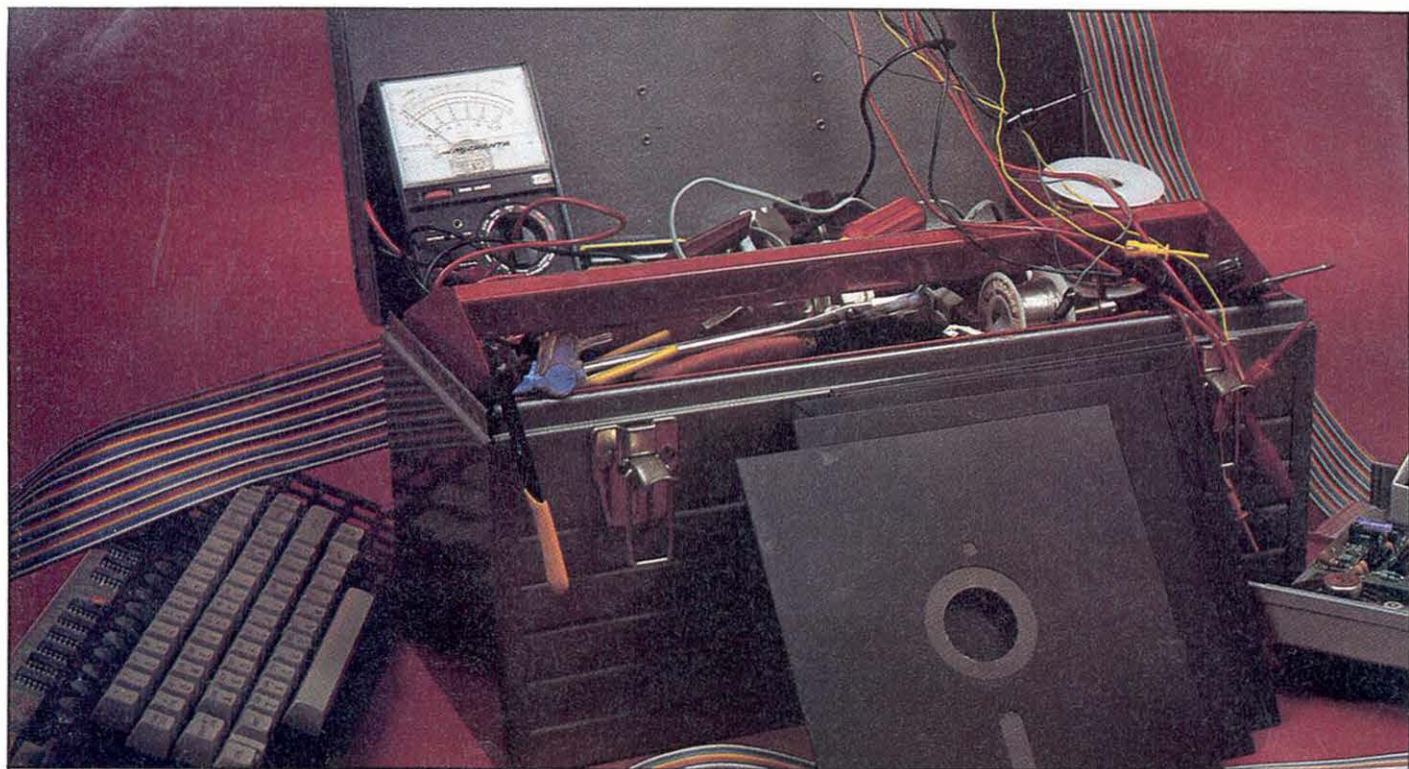
Keep in mind that the purpose of this Guide is not to tell you which product to buy. Rather, it should narrow your field of choices to three or four programs. Eliminate the software which is out of your budget or too simplistic or not written for your system. Then, contact the companies remaining for more specific info about their products.

Obviously, there is no space to comprehensively list the features of each piece of software included. A \$20 product may have virtually the same standard features as a \$120 item. It is up to you to find out about the "extras." ■

Separate documentation	Supports Macros	Conditional Assembly	Other features	
X	N	N	Symbol table cross-ref facility Supports 1500 baud Can upgrade to disk system	
C	Y	Y	Requires EDTASM	
\$15	Y	Y	Linker and debugger alone \$150	

Editor	Supports Macros	Conditional Assembly	Sets Breakpoints	Other features
\$3	Y	N	N	Relocatable code modules Uses compressed format
X	Y	N	Y	Assemble from multiple disk source files
\$10	Y	N	Y	Assigns labels ROMPACK Source listing available
\$12.50	Y	Y	Y	Superzap and disassembler included
NA	Y	Y	Y	Symbol table cross-ref facility Nested source file Relocatable object code
C	Y	Y	Y	

J = NEWDOS80 2.0 K = DOSPLUS L = LDOS	M = VTOS P = MicroDOS R = CP/M	V = TRSDOS W = any non-CP/M DOS
---	--------------------------------------	------------------------------------



Disassemblers	Product	Model	Minimum RAM	Tape or Disk System		Price
				DOS		
Instant Software	The Disassembler	I,III	16K	T	NA	\$9.95
Instant Software	TLDIS	I,III	16K	T	NA	\$14.95
MISOSYS	DISI	I,III	16K	T	NA	\$15
Instant Software	DLDIS	I,III	16K	D	W	\$19.95
MISOSYS	DISII	I,III	16K	D	W	\$20
Program Innovations	Disassembler	II	64K	D	V	\$73.95
The Micro Works	80C	Color Comp.	16K	T	NA	\$49.95

C = inquire
 X = unavailable
 NA = not applicable

D = disk
 T = tape
 S = screen

B = NEWDOS 2.1
 E = NEWDOS PLUS
 F = TRSDOS 2.0

G = NEWDOS
 H = NEWDOS40
 I = NEWDOS80

Companies in Buyer's Guide

Advanced Operating Systems

450 St. John Road
Michigan City, IN 46360
800-348-8558
219-879-4693

ALGORIX/Allen Gelder Software

Box 11721
San Francisco, CA 94101
415-387-3131

The Alternate Source

704 N. Pennsylvania
Lansing, MI 48906
517-482-TAS0
517-482-TAS1

Computer Applications Unlimited

P.O. Box 214
Rye, NY 10580
914-937-6286

Cottage Software

614 N. Harding
Wichita, KS 67208
316-683-4811

Datsoft Inc.

19519 Business Center Drive
Northridge, CA 91324
213-701-5161

Howe Software

14 Lexington Road
New City, NY 10956
914-634-1821

InfoSoft Systems Inc.

25 Sylan Road South
Westport, CT 06880
203-226-8937

Instant Software

Peterborough, NH 03458
800-258-5473
603-924-9471

INTERPRO

P.O. Box 4211
Manchester, NH 03108
603-669-0477

Galactic Software/ Logical Systems Inc.

Mequon, WI 53092
414-241-8030

The Micro Works

P.O. Box 1110
DelMar, CA 92014
714-942-2400

MISOSYS

5904 Edgehill Dr.
Alexandria, VA 22303
703-960-2998

Mumford Micro Systems

Box 400-E
Summerland, CA 93067
805-969-4557

PowerSoft

11500 Stemmons Exp., Suite 125
Dallas, TX 75229
214-484-2976

Program Innovations

Box 1368—400 N. Walnut St.
Lumberton, NC 28358
919-739-3216 ext. 15

PROSOFT

Box 839
North Hollywood, CA 91603
213-764-3131

RACET Computes, Ltd.

1330 N. Glassell Suite M
Orange, CA 92667
714-997-4950

Small Systems Software

P.O. Box 366
Newbury Park, CA 91320
805-497-6657

Spectral Associates

145 Harvard Avenue
Tacoma, WA 98466
206-565-8483

Separate documentation
Relocatable
Labels
Output to Screen, Printer, Tape or Disk
Other features

X	Y	N	P,T	
X	Y	Y	P,T	
X	N	Y	S,P,T	
X	Y	Y	P,D	
X	N	Y	S,P,T	Other programs relocated
C	N	N	D	DO file
X	Y	Y	S,T	Variable output formats

J = NEWDOS80 2.0
K = DOSPLUS
L = LDOS

M = VTOS
P = MicroDOS
R = CP/M

V = TRSDOS
W = any non-CP/M DOS

"If you don't see your favorite utility here, don't panic."

Editors	Product	Model	Minimum RAM	Tape or Disk System	DOS	Price
Instant Software	IRV	I	16K	2D	V	T \$24.95 D \$29.95
Computer Applications	XBE (XEDIT)	I,III	16K	T,D	I,K,L,V	T Model I \$24.95 Model III \$29.95
The Alternate Source	KBE	I,III	32K	D	W	\$39.95
ALGORIX	Edit	I,III	16K	D	W	\$40
Datasoft	S.E.C.S	Color Comp.	16K	T	NA	\$29.95
INTERPRO	ABE	I	32K	D	I,V	\$19.95

Monitors	Product	Model	Minimum RAM	Tape or Disk System	DOS	Price
MISOSYS	DUTIL	I	16K	D	L	\$20
INTERPRO	ULTRA-MON	I,III	16K	T	NA	\$24.95
MISOSYS	TUTIL	I,III	16K	T	NA	\$15
Mumford Micro Systems	STEP80	I,III	16K	T	NA	\$16.95
Computer Applications	X-BUG	I,III	16K	T,D	W	\$19.95

C = inquire
X = unavailable
NA = not applicable

D = disk
T = tape
S = screen

B = NEWDOS 2.1
E = NEWDOS PLUS
F = TRSDOS 2.0

G = NEWDOS
H = NEWDOS40
I = NEWDOS80

Assemblers Editor/Assemblers Disassemblers Editors Monitors Disk Zappers Renumberers/Com

Screen editors are utilities offering distinct advantages over the line-editing process known to TRS-80 users. They allow cursor movement across the video screen without destroying any of the text the cursor passes over.

processors Tape Utilities File Utili

Text editors are used to enter and manipulate text files from a keyboard. Basically, they are stripped-down word processors, and in fact, most word processors will do a better job than a text-editing utility.

ties General Utilities Assemblers Editor/Assemblers

All monitors allow memory to be displayed or printed in various formats, such as hexadecimal, octal, decimal, ASCII or symbolic. Symbolic means symbols are displayed instead of values; these symbols are simply the mnemonics discussed under the heading of disassemblers. Some monitors therefore contain a disassembler as an option. The memory under scrutiny can be altered from the monitor and can influence the results of any resumed execution of the main course.

Disassemblers Editors Monitors

Separate documentation	Full cursor control	Block functions	Global commands	Macro keys	Other features
X	Y	Y	N	Y	
X	Y	Y	Y	Y	
\$2	Y	NA	NA	Y	Editor for Basic, DOS, EDTASM, EDIT-80
X	Y	Y	Y	N	
X	Y	N	N	N	High resolution graphics Character generator Audible error warning
C	Y	Y	Y	Y	

	Disassembler	RAM Editor	Single Step	Set Breakpoints	
X	N	Y	N	Y	Read sectors or tracks
X	Y	Y	N	Y	Relocates memory Trace
X	N	Y	N	Y	
X	Y	Y	Y	Y	Trace
\$9.95	N	Y	Y	Y	Relocatable monitor

Continued

J = NEWDOS80 2.0
K = DOSPLUS
L = LDOS

M = VTOS
P = MicroDOS
R = CP/M

V = TRSDOS
W = any non-CP/M DOS

Monitors Continued	Product	Model	Minimum RAM	Tape or Disk System	DOS	Price
The Alternate Source	TASMON	I,III	8K 16K with no DOS	D	I,K,L,V	\$29.95
Howe	MON-3	I,III	16K	T	NA	\$39.95
ALGORIX	STRETCH SUPERSTEP	I,III	32K	D	W	\$39.95
Howe	MON-4	I,III	16K	D	Model I W Model III V,J,K	T \$49.95 D \$53.95
Datasoft	SIGMON	Color Comp.	16K	T	NA	\$29.95
The Micro Works	CBUG	Color Comp.	4K	T	NA	\$29.95 ROM \$39.95 ROMLESS PAK 1 \$64.90
ALGORIX	COCOBUG	Color Comp.	4K	T	NA	\$19.95
PowerSoft	Super Utility	I	32K	D	G,V	\$49.95
PowerSoft	Super Utility Plus	I,III	48K	D	W	I,III \$74.95 I/III \$124.95
PowerSoft	Quick-Fix	I	32K	T	B,V	\$34.95
Spectral Associates	BUGOUT	Color Comp.	4K	T	NA	\$19.95
Advanced Operating Systems	MACRO-MON	I,III	16K	T,D	W	Model I T \$54.95 D \$59.95 Model III D \$69.95
Small Systems Software	RSM-2	I	16K	T,D	V	T \$26.95 D \$29.95
Small Systems Software	RSMII	II	64K	D	V	\$39.95

C = inquire
X = unavailable
NA = not applicable

D = disk
T = tape
S = screen

B = NEWDOS 2.1
E = NEWDOS PLUS
F = TRSDOS 2.0

G = NEWDOS
H = NEWDOS40
I = NEWDOS80

Price	Disassembler	RAM Editor	Single Step	Set Breakpoints	Other features
\$2	Y	Y	Y	Y	Trace Relocatable monitor
\$2	Y	Y	N	N	Relocate object programs
\$5	Y	Y	Y	N	Trace View code in 8 formats
\$5	Y	Y	N	N	RS-232-C port
X	Y	Y	Y	Y	Mini-assembler Debugger
X	N	Y	N	Y	RS-232 port
X	N	Y	N	Y	Induces screen modes Shows chip and architecture before and after instruction
\$10	N	Y	Y	N	Format disks, configure system Disk or tape copy
\$10	N	Y	Y	N	Format disks, configure system Disk or tape copy
\$10	N	Y	N	N	All features of Super Utility except Special Copy and Tape Copy
C	N	N	Y	Y	
X	Y	Y	Y	Y	Trace Relocate object programs Self-relocatable
X	Y	Y	Y	Y	
X	Y	Y	Y	Y	Modify in hex or ASCII

J = NEWDOS80 2.0
K = DOSPLUS
L = LDOS

M = VTOS
P = MicroDOS
R = CP/M

V = TRSDOS
W = any non-CP/M DOS

Disk Zappers Re numberers/Com pressors Tape Utilities File Utili ties General Utili ties Assemblers Editor/Assemblers Disassemblers Ed

Assemblers come with a wide variety of features and are priced accordingly. The beginner should stay with a simple assembler until the more sophisticated options, such as conditional or macro assembly, are needed. A simple assembler is still worth its weight in gold compared to the time and effort involved in hand assembly.

itors Monitors Disk Zappers Re numberers/Com pressors Tape Utilities File Utili ties General Utili ties Assemblers

As their names suggests, disassemblers do a job exactly opposite of assemblers. Where an assembler takes mnemonic opcodes and assembles them into hexadecimal object code, a disassembler takes the object code and produces mnemonic text.

Editor/Assemblers Disassemblers Ed itors Monitors Disk Zappers Re numberers/Com pressors Tape Utilities File Utili ties General Utili

"The purpose of this Guide is not to tell you which product to buy. Rather, it should narrow your field of choices to three or four programs."

Disk Zappers	Product	Model	Minimum RAM	Tape or Disk System	DOS	Price
The Alternate Source	TRAKCESS	I	48K	D	G,V	\$24.95
Instant Software	Disk Editor	I	16K	D	G,L,M,P,V	\$39.95
Galactic Software	FED	I,III	32K	D	L	\$40

Renumberers/ Compressors	Product	Model	Minimum RAM	Tape or Disk System	DOS	Price
Instant Software	RENUM/COMPRESS	I	16K	T	NA	\$14.95
Instant Software	Compression Utility Pack	I	16K	T	NA	\$19.95
PROSOFT	QUICK COMPRESS	I,III	16K	T,D	G,I,K,L,V	T or D \$19.95
Cottage Software	PACKER	I,III	16K	T,D	G,L,M,V	\$29.95
PROSOFT	FASTER	I,III	16K	T,D	G,I,K,L,V	T or D \$29.95
RACET Computes, Ltd.	REMODEL/PROLOAD	I,III	16K	T,D	G,I,J,K,L,V	T \$35 D \$40

C = inquire
X = unavailable
NA = not applicable

D = disk
T = tape
S = screen

B = NEWDOS 2.1
E = NEWDOS PLUS
F = TRSDOS 2.0

G = NEWDOS
H = NEWDOS40
I = NEWDOS80

ties Assemblers
 Editor/Assemblers
 Disassemblers Ed
 itors Monitors
 Disk Zappers Re
 numberers/Com
 pressors Tape
 Utilities File Utili
 ties General Utili
 ties Assemblers
 Editor/Assemblers

A disk can be blown in numerous ways, and the more ghastly ways will preempt any attempt at data recovery. Many situations exist, however, where a file is intact on a disk but can't be accessed for some reason; this is where a disk zapper can be used to recover hours of work otherwise lost.

Disassemblers Ed
 itors Monitors
 Disk Zappers Re
 numberers/Com

The utility may have functions other than debugging; it may tidy up the final product, or list the program in a more readable fashion than usual.

pressors Tape
 Utilities File Utili
 ties General Utili
 ties Assemblers
 Editor/Assemblers
 Disassemblers Ed
 itors Monitors
 Disk Zappers Re
 numberers Com
 pressors Tape
 Utilities File Utili

Separate documentation	Resident editor	Modify by track	Modify by sector	Modify by file	Other features
X	Y	Y	N	N	
X	Y	N	Y	Y	Transfer command to Debug
\$5	Y	N	N	Y	Edit files on disk

	Renumberer	Remove blanks and Remarks	Produce multi-state-ment lines	Unpack	
X	Y	Y	N	N	
X	Y	Y	Y	N	
X	N	Y	N	N	FASTER & QUICK \$39.95
\$6	Y	Y	Y	Y	Move lines
X	N	N	N	N	Allocates variables to cut running time FASTER & QUICK \$39.95
X	Y	N	N	N	Move or delete lines

J = NEWDOS80 2.0
 K = DOSPLUS
 L = LDOS

M = VTOS
 P = MicroDOS
 R = CP/M

V = TRSDOS
 W = any non-CP/M DOS

Tape Utilities		Product	Model	Minimum RAM	Tape or Disk System	DOS	Price
ALGORIX	TSAVE	I,III (500 baud only)	16K	T	NA	\$9.95	
Cottage Software	System Tape Duplicator	I,III	16K	T	NA	\$15.95	
Mumford Micro Systems	CLONE	I,III	16K	T	NA	T \$16.95 D \$21.95	
Small System Design	Duplicator	I	16K	T	NA	\$8	
Instant Software	Cassette Scope	I	16K	T	NA	\$14.95	

File Utilities		Product	Model	Minimum RAM	Tape or Disk System	DOS	Price
RACET Computes, Ltd.	Cross Reference	II	64K	D	F	\$50	
MISOSYS	PDS (Partition Data Set)	I,III	16K	D	L	\$50	
MISOSYS	CMDFILE	I,III	16K	D	W	\$20	
RACET Computes, Ltd.	BLINK (Basic Linker)	I,III	32K	D	G,I,J,K,L,V	Model I \$25 Model III \$30 Model II \$40	
		II	64K	D	F		
MISOSYS	CONVCP/M	I,III	16K	D	L and R	\$30	
Galactic Software	I/O Monitor	I,III	32K	D	L	\$25	
Instant Software	DISK SCOPE	I	16K	D	V	\$19.95	

C = inquire
X = unavailable
NA = not applicable

D = disk
T = tape
S = screen

B = NEWDOS 2.1
E = NEWDOS PLUS
F = TRSDOS 2.0

G = NEWDOS
H = NEWDOS40
I = NEWDOS80

J = NEWDOS80 2.0
K = DOSPLUS
L = LDOS

Separate documentation	Duplicate tapes	Other features
X	N	Write non-contiguous RAM to System tape
\$3.20	Y	Verify Routines 1500 baud—Model III
X	Y	1500 baud—Model III Screen display of copied material
X	Y	Verify Routines
X	N	Dump tape to screen in binary format Display load addresses of system tapes

Separate documentation	Description
\$5	Listing by variable, string, numeric data, alphanumeric data
X	Generate library files
X	Append, concatenate, offset, copy, create files
\$5	Intercept disk I/O error
Model I \$2.50 Model III \$3 Model II \$4	Program chaining Merge files
X	Transfer file from CP/M to LDOS medium
X	Prints number of file tracks and sectors, amount of memory View tracks or sectors

continues

M = VTOS
P = MicroDOS
R = CP/M
V = TRSDOS
W = any non-CP/M DOS



MONEY MAGIC!

doughflo

DOUGHFLO. The Most Useful Program a Home or Business Manager Can Have!

✓ 112

Designed For The Decision Maker, Doughflo is an interacting system of programs for cash flow analysis, budget planning, and bookkeeping.

In The Home, Doughflo becomes a key tool in solving the puzzle of balancing expenses vs. income. Doughflo shows you where the money goes.

Fire Your Bookkeeper! You, the new bookkeeper, will have easy access to all expense records. Rapidly find and display any number of entries by description, type, amount, date, or number.

Simple To Use, Doughflo is quick and efficient, carefully guiding you from data entry to report generation.

900 Entries In Memory at one time with 48K machines. No time consuming disk access.

Sort 900 Entries In Only 2 Seconds! Sort by check number, description, date, or month.

User Friendly! Detailed instructions. Input screens and single keystroke commands allow quick and easy data entry and computer interaction.

Amazingly Versatile! Indispensable in home or business for:

- Budget Planning
- Tax Preparation
- Bookkeeping
- Financial Analysis

Reports! Compare expenses and income vs. budget, total expenses, percent of total expenses, etc. Up to 24 months can be compared at once.

Gain Valuable Insight. Doughflo is ready to save you time and money. Requires 32K and one or more disk drives, specify Model I or III. \$98.95 postpaid to continental North America. For more information check reader service number.

"A PERFECT CLOAD EVERY TIME"*



tape digitizer

✓ 113

*From a review in September-October 1980 Elementary Electronics. Reprints available.

At last there is a cure for TRS-80 tape cloading blues! For over three years, Alphametics has been selling the TRS-80 Tape Digitizer, a proven hardware solution for your software problems. No longer need you juggle the recorder's volume control endlessly, trying for a perfect cload of a pre-recorded program. Just pop the tape into the cassette recorder, process the signal through our digitizer, and you're ready to RUN a perfect load!

Just check out the Tape Digitizer's features . . .

- **Makes tape program loading virtually independent of volume control setting.**
- **Allows copying system and normal tapes without using computer.**
- **Makes a perfect digital copy of any tape without using computer, removing hum, noise, and cures minor dropouts.**
- **Cassette switch allows manual control of cassette recorder, independent of computer control.**
- **"GOOD DATA" indicator easily enables setting proper volume . . . doubles as a tape monitor.**
- **A.C. powered — no batteries to replace.**
- **Housed in a sturdy, attractive metal case.**
- **Completely compatible with Level I & II, also LOW speed (500 baud) Model III.**

Feed your cassette to the Alphametics Tape Digitizer and feed your computer the exact digital waveform the TRS-80 gave your tape. Get rid of your tape bugs today — \$69.95 postpaid to continental North America, or return within 10 days for a full refund!

alphametics

Box 597 Forestville, Ca. 95436
24 hr. phone (707) 887-7237



File Utilities

Continued

	Product	Model	Minimum RAM	Tape or Disk System	DOS	Price
RACET Computes, Ltd.	DISCAT (Disk directory program)	I,III	32K	D	E,G,I,J,K,L,V	\$50
RACET Computes, Ltd.	Utility Package	II	64K	D	F	\$150

General Utilities

PROSOFT	XTEND40	I	16K	D	H,I,K,L	\$19.95
Instant Software	Dynamic Device Drivers	I	16K	T,D	W	T \$19.95 D \$24.95
RACET Computes, Ltd.	LPSPOOL	I	32K	D	G,I,J,K,L,V	\$75
Cottage Software	Print to LPrint	I,III	16K	T	NA	\$12.95
RACET Computes, Ltd.	COMPROC	I,III	32K	D	G,I,J,K,L,V	T Model I \$20 T Model III \$30 D Model I \$25 D Model III \$35
PROSOFT	DISK RPM	I,III	32K	D	W	\$24.95
Logical Systems Inc.	Filter Package	I,III	32K	D	L	\$60
PowerSoft	Make-80	I,III	16K	D	W	Model I \$14.95 Model III \$24.95
Spectral Associates	Magic Box	Color Comp.	16K	T	NA	\$24.95
PowerSoft	Utility Disk #2	I,III	32K	D	L	\$69.95

C = inquire
X = unavailable
NA = not applicable

D = disk
T = tape
S = screen

B = NEWDOS 2.1
E = NEWDOS PLUS
F = TRSDOS 2.0

G = NEWDOS
H = NEWDOS40
I = NEWDOS80

J = NEWDOS80 2.0
K = DOSPLUS
L = LDOS

Separate
documentation

Description

\$5 Reads and sorts directories

\$15 Ten utilities for rebuilding crashed data files

X Convert 35-track disks into 40-track disks

X Debounce, repeat keys, lowercase mod support, graphics, printer/screen auto switch

\$7.50 Spool data to disk, despool to printer

\$2.60 Change Print to LPrint (except Print@ and Print #)

Model I \$2
Model III \$3
Bring a program to a main menu
Command processor

X Measure and adjust drive rotational speed

\$5 Modify I/O to printer, video, keyboard
Enhancements to LDOS

X Convert 35- or 40- track disks into 80-track disks

C Load Model I or III tapes into Color Computer

\$10 Twelve programs to expand LDOS

M = VTOS
P = MicroDOS
R = CP/M

V = TRSDOS
W = any non-CP/M DOS

MICRO IMAGES

FREE SHIPPING WITHIN CONT. U.S.A.

EPSON CALL **OKIDATA**
FOR OUR LOW PRICES

RS232 Not. Req. **LYNX** Mod I/III **\$259.95**
includes auto dial/answer, cables and terminal software

VERBATIM Datatype 5 1/4 Box **DD/ \$30.00**
MD525-01 of 10 Add \$2.50 - Plast. LIB case

SUPER UTILITY PLUS MOD I or III
by Kim Watt Specify 40 or 80 Track **\$69.95**

SUPERSCRIP BY Acorn - Req. 32K, Scripsit & L/C - Disk **\$44.95**

EDITOR ASSEMBLER PLUS BY Microsoft - 16K Tape **\$27.95**

DOSPLUS Newest Version
3.4S/3.4D/3.4 III ea **\$134.95**

MAXI MANAGER Mod I/III Latest Version 48K Disk **\$84.95**
by Adventure Int'l

UNITERM by Pete Roberts - Mod I/III Works with most modems **\$74.95**

MICROSOFT - FORTRAN 80-\$89.95 - A.L.D.S-\$89.95 - BASIC COMPILER-\$179.95

EDAS by Misosys Sophisticated Editor & Assembler..... **\$75.95**

LDOS Version 5.1 - Mod I or III **\$118.95**

LAZYWRITER LATEST A Best Buy in Word Processors
VERSION - Mod I or III **\$164.95**

Proofreader by Aspen Software Mod I - **49.95** Mod III - **49.95**

Proofedit by Aspen Software..... Mod I **28.50** Mod III - **28.50**

Grammatik by Aspen Software..... Mod I - **55.95** Mod III - **55.95**

MX 80 Ribbon Reloads - **\$3.50 ea/\$38.00dz.** Min. 5 ribbons

We also carry the full line of ADVENTURE INT'L, ACORN, BIG FIVE, BRODERBUND, AVALON HILL, MICROSOFT, DATASOFT, MISOSYS, AUTOMATED SIMULATIONS and most other fine software at discount prices.

SEND FOR YOUR FREE CATALOG

No credit cards at these low prices. Add \$2.00 on all COD orders. Certified Ck/MO/COD shipped immediately. Please allow 2 weeks for personal checks. For extra fast service phone in your COD order. Prices subject to change without notice. New York State residents please add appropriate sales tax.

We Offer Great Values & Prompt Delivery Why Not Try Us?

146-03 25th Road, Flushing, New York 11354

Mon-Fri 10 AM-9 PM (212) 445-7124 ✓157 Sat 10 AM-5 PM

HARDWARE

SPEAK
-- EAZY

*

The HUMAN QUALITY VOICE SYNTHESIZER for your MODEL I or III computer. The complete 297 word vocabulary is contained in ROM. Ready to use HARDWARE and SOFTWARE for ONLY ----- **\$229.95**

DD-80

*

A DOUBLE DENSITY adapter for the MODEL I that allows you to write and read twice as much data on a disk. Plugs into your EXPANSION INTERFACE and is compatible with all existing SINGLE or DOUBLE DENSITY software and hardware. **\$129.95**

TRANS
-- DATA

*

Now an inexpensive means to TRANSMIT-RECEIVE data over the phone lines WITHOUT Expansion Interface, RS232, or software. DIRECT CONNECT to phone lines and your cassette port. **\$59.95**

EAZY
LOADER

*

EAZY LOADER is a signal conditioner for your MODEL I TAPE SYSTEM that CORRECTS the volume sensitivity problems associated with tape loading on the MODEL I.

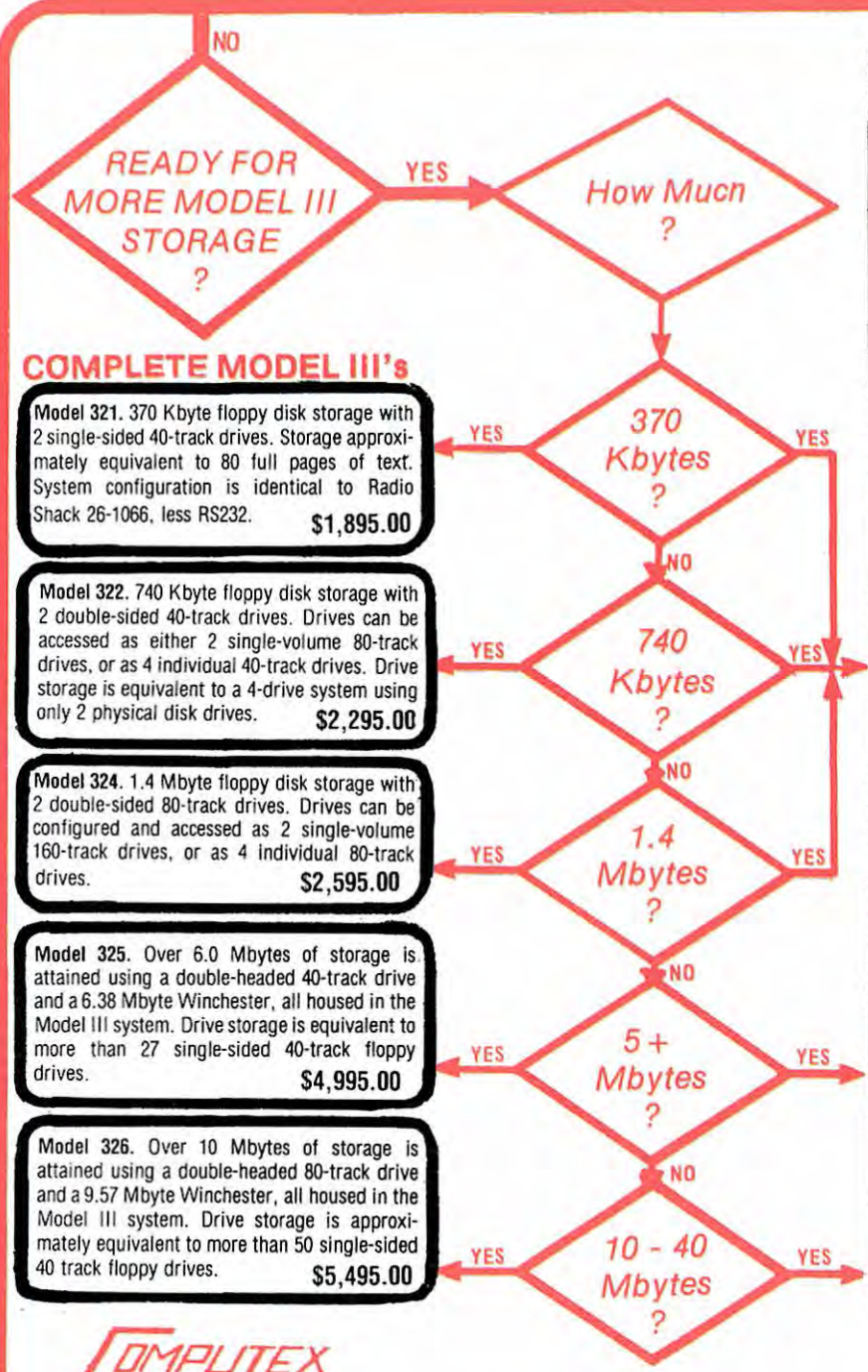
CAN BE USED EXTERNAL or INTERNAL
\$24.95 \$12.50

PROGRESSIVE ELECTRONICS

Hours
9 - 6
Mon - Sat

643 E Chestnut St.
Lancaster, Ohio, 43130
Phone 614-687-1019

✓143



COMPLETE MODEL III's

Model 321. 370 Kbyte floppy disk storage with 2 single-sided 40-track drives. Storage approximately equivalent to 80 full pages of text. System configuration is identical to Radio Shack 26-1066, less RS232. **\$1,895.00**

Model 322. 740 Kbyte floppy disk storage with 2 double-sided 40-track drives. Drives can be accessed as either 2 single-volume 80-track drives, or as 4 individual 40-track drives. Drive storage is equivalent to a 4-drive system using only 2 physical disk drives. **\$2,295.00**

Model 324. 1.4 Mbyte floppy disk storage with 2 double-sided 80-track drives. Drives can be configured and accessed as 2 single-volume 160-track drives, or as 4 individual 80-track drives. **\$2,595.00**

Model 325. Over 6.0 Mbytes of storage is attained using a double-headed 40-track drive and a 6.38 Mbyte Winchester, all housed in the Model III system. Drive storage is equivalent to more than 27 single-sided 40-track floppy drives. **\$4,995.00**

Model 326. Over 10 Mbytes of storage is attained using a double-headed 80-track drive and a 9.57 Mbyte Winchester, all housed in the Model III system. Drive storage is approximately equivalent to more than 50 single-sided 40 track floppy drives. **\$5,495.00**

New! Computex Drive Controller PCB with Winchester Option

We've done it! Computex has developed a new disk drive controller PCB with built-in Winchester Option—and the add-on kits—that make it possible for you to upgrade your Model III to 40 Mbytes one step at a time.

HERE'S HOW.

1) Start with the Computex PCB and manual. 2) Add components—your own, or ours—or select a Computex-assembled board. 3) Install into your Model III with our installation accessories kit. 4) Add one or more Tandon TM100 series disk drives. Your floppy disk system is now operational! At every step, Computex backs you up with | service & maintenance.

M3DC1-1B Computex Disk Drive Controller PCB With Winchester Option. PCB solder-masked and silk-screened • gold-plated edge card connectors • Built-in digital write precomp/data separation • step-by-step detailed assembly /installation manual written for the beginner in kit building, includes complete parts list if you choose to buy your own components, detailed best/trouble-shooting instructions..... **\$49.95**

M3DC1-1M Manual only. Refundable on purchase of any M3DC1 components kit or assembly **\$ 7.95**

Computex Floppy Drive Controller Add-On Kits

Begin enjoying the use of disk drives in your Model III immediately. Computex floppy disk controller kit includes all required components and instructions to complete the floppy disk portion of the PCB. (You can buy the controller assembled.) Add Winchester drives later.

M3DC1-1K-Model III Drive Controller Kit includes PCB and manual, plus all components needed to assemble drive controller board. (Does not include TRSDOS and manual..... **\$129.95**

M3DC1-1KA Assembled Kit, Model III floppy drive controller board. Includes TRSDOS manual. **\$249.95**

M3DC1-AK - Accessories Kit for floppy drive installation. Includes switching power supply and brackets. **\$129.95**

NOTE: A complete floppy disk drive system requires: 1) an assembled disk controller board (M3DC1-1B, M3DC1-1K, or M3DC1-1AKA); 2) a M3DC1-AK accessories kit; and, 3) your choice of Tandon TM100 series floppy disk drives. (The accessories kit is not required if you plan to go directly to a Winchester drive.)

SAVE UP TO \$100.00. With your purchase of a Computex drive controller (assembled or in kit form). We will give you a certificate for a 10% discount on any two Tandon TM100 series bare disk drives.

Computex Winchester Controller Add-On Kits

You can add up to 40 Mbytes of Winchester storage via the Computex disk controller board. You will need a Computex Host Adaptor Kit, an accessories kit, and a western digital WD1000 Winchester Drive Controller (available from Computex), and a Winchester Disk Drive to make the system operational.

M3WHA-1 WINCHESTER HOST ADAPTOR KIT. Includes DOS+ 4.0 Winchester Operating System • Winchester Host Adaptor for M3DC1 • All required data cables • Installation, theory and assembly manual **\$499.95**

M3WAK-1 WINCHESTER ACCESSORIES KIT. Includes mounting brackets hardware for floppy and Winchester drives • Winchester switching power supply • All required power cables..... **\$249.95**

M3WDC-1 DRIVE CONTROLLER. Western Digital WD1000 Winchester Drive Controller..... **\$595.00**

M3WIM-1 MANUAL. Includes drawings, graphs, and schematics (except Host Adaptor schematics which are proprietary and NOT available) • complete technical information on installation, assembly, testing, troubleshooting, operation theory • probably the best manual on Tandon Winchester disk drives available today. • Purchase price fully refundable on purchase of M3WHA -1 **\$99.95**

SAVE UP TO \$260.00! With your purchase of our Host Adaptor Kit, you will receive a 20% discount on the purchase of a 5 or 10 Mbyte Tandon Series TM600 Winchester drive from Computex.



TANDON TM 600 WINCHESTER DRIVES

• Highest storage capacity of any 5¼" high-speed random access drive • Up to 46 Mbytes online storage • Up to four TM600's can be daisy-chained on single bus • S-version compatible - Shugurt SA1000 and Seagate ST506.

TM602S 3-ms access time - 612 tracks - 5 Mbytes/sec data transfer rate - 6.38 Mbyte RPM capacity (unformatted)..... **\$1,195.00****

TM603S 3-ms access time - 918 tracks - Mbytes/sec data transfer rate - 9.57 Mbyte RPM capacity (unformatted)..... **\$1,295.00****

****Save up to \$260! Receive 20% discount with certificate of purchase of Computex Winchester Host Adaptor Kit M3WHA-1.**

TANDON TM100 SERIES FLOPPY DRIVES

• Fast 3-5-ms track-to-track access time • Single or double density operation • Total compatibility with Model I or III • Pre/post testing during 48-hour burn-in • 90-day limited warranty.

TM100-1 - Single-sided 40-track drive - 102 Kbytes single density 180 Kbytes double density..... **\$235.00***
 TM 100-1 with power supply & case. **\$299.95**

TM100-2 - Double-sided 40-track drive - 204 Kbytes single density - 360 Kbytes double density..... **\$335.00***
 TM 100-2 with power supply & case. **\$399.95**

TM100-3 - Single-sided 80-track drive - 204 Kbytes single density - 360 Kbytes double density..... **\$335.00***
 TM 100-3 with power supply & case. **\$399.95**

TM100-4 - Double-sided 80-track drive - 408 Kbytes single density - 735 Kbytes double density..... **\$435.00***
 TM 100-4 with power supply & case. **\$499.95**

*** Save up to \$100. Receive 10% discount with certificate of purchase of any Computex M3DC1.**

Computex Expansion Systems with Disk Drives

Built using the new Computex Model III drive controller board. The full range of drive expansion kits from Computex represent the best design, reliability and expandability of any system currently available. Features include: • Drive Controller with Winchester Host Adaptor expansion option • Switching Power Supply (Don't even think of using an linear supply in your Model III - Heat, Regulation and Reliability) • Double density disk controller • Goldplated Edge Card Connectors • 32K Ram Expansion • All cables and necessary hardware • Installation Manual • Fully tested and burned in • 90 Day parts and labor warranty.

M3DK0 Drive Kit with one Tandon single-sided 40-track drive..... **\$595.00**

M3DK1 Drive Kit with two Tandon single-sided 40-track drives..... **\$799.95**

M3DK2 Drive Kit with two Tandon double-sided 40-track drives..... **\$1049.95**

M3DK4 Drive Kit with two Tandon double-sided 80-track drives..... **\$1249.95**

NEW! MDX-3 Interface Expansion Boards for your Model III from Micro-Design

Phone Modem • RS-232 Port • Floppy Disk Controller Dual Density Data Separator • Silk Screen • Solder Mask • User Manual

COMPLETE KIT \$259.95

- Printed Circuit Board..... **\$74.95**
- Disk Controller Kit..... **89.95**
- Serial Interface Kit..... **79.95**
- Modem Kit..... **29.95**

MDX-2 Interface Expansion Boards for your Model I from Micro-Design

COMPLETE KIT..... \$269.00

- MDX-2 printed circuit board..... **\$74.95**
- Onboard direct connect modem kit..... **39.95**
- 2K/4K Eprom kit..... **17.95**
- RS232 mA serial interface..... **17.95**
- Real-time clock kit..... **17.95**
- Floppy disk controller kit..... **31.95**
- 32K RAM expansion kit (less RAM)..... **11.95**
- Cassette port..... **3.95**
- Analog power supply..... **29.95**
- Hardware and socket kit..... **19.95**
- Centronic line printer port..... **8.95**

COMPUTEX Comprehensive Test Program **\$21.95**

• disk drive speed test • disk drive alignment program (requires alignment disk - Dyan Alignment Disk **\$39.95**) • expansion Interface RAM test • keyboard RAM test • video RAM test • keyboard bounce test • ROM checksum program • full screen RAM display program.

VISA, MASTERCARD, AMERICAN EXPRESS ACCEPTED • Net - 30 terms for D&B rated companies. All products will carry an additional 10 percent handling fee. Prices subject to change without notice. Prices do not include shipping.



a subsidiary of World Wide Data Systems, Inc.

(713) 488-8022

**321 El Dorado
 Webster Texas 77598**

Develop your utility ability.

Make Butterflies—Not Bugs

Utilities: what are they, and how can they help you, the struggling programmer? In this article I'll look at various types of utilities and discuss their use at the hardware and software levels.

According to my dictionary, utilities are "useful things"—a classical dictionary definition if ever I saw one. Although I'd prefer to avoid it, I'm going to have to resort to the overworked term "software tool." That's exactly what utilities are; as tools, they create or alter other programs, but there are other uses for them, as we shall see.

Utilities are broadly divided into two categories—those that help debug software, and those that help debug hardware. Programmers use software utilities in the development stages of a piece of software, when that software is most likely to be going wrong in unpredictable and exasperating ways. Here we're referring to such things as Basic single-step utilities, which allow Basic program execution one instruction at a time. Another example is a variable-dump utility which automatically prints the values of certain variables at predetermined points during the main program flow. These are the tools that allow a programmer a high degree of control over the program under development.

The utility itself is a program which helps create another program, and the utility itself may have been written with the help of other utilities. This is analogous to mechanical tools used to create other tools. The programmer doesn't have to be a Basic programmer to need a utility; he may be writing at a lower level, such as machine code, where similar types of utilities would give important control over the creation and debugging of the final product. The utility may have functions other than debugging; it may tidy up the final product (as a Basic

renumberer would do), or list the program in a more readable fashion than usual. The uses of utilities are many and varied.

Utility programs at the hardware level are more likely to be used in an engineering than a programming situation. For instance, though you may not consider yourself an engineer, you perform an engineering function when you use something like a memory test program. This program wouldn't help write another program, but would diagnose a possible fault in a memory chip or associated hardware. These programs are sometimes called diagnostics because they diagnose and analyze symptoms of hardware problems in the same way a doctor would diagnose a human patient. In common with the experience you would demand from a doctor, the writer of a good diagnostic program must have considerable expertise at the hardware level and familiarity with the specific piece of hardware involved. Many utilities fall into this category, but as a programmer, you won't encounter them as often as the software utilities.

One of the high costs involved in the price of mainframe hardware is the necessary development or diagnostic software that comes with a particular machine. This software takes man-months or years to perfect but ensures that maintenance engineers can keep the equipment functioning at peak efficiency, systems programmers can easily maintain the operating system environment and finally, applications programmers can quickly write and debug the programs which are the *raison d'être* for the computer's existence. In the world of TRS-80 microcomputers we're not as well provided for—we may have to perform any or all these functions ourselves, and we'll need to shop for the correct utilities to help us. With

that task in mind, here is a breakdown, including ten of the various types of utilities and what you can expect them to do.

Assemblers

Assemblers are definitely made for machine code programmers. Though you may think of an assembler as a language program, it's really a utility allowing you to enter a machine code program without having to refer to specific numbers representing required opcodes. Simply reference each opcode by a shortened name (mnemonic), and the assembler will assemble that mnemonic into memory as the appropriate number or numbers. The mnemonics lines fed into the assembler are called the source program, and the resulting pure machine code is the object program. Source code can be typed directly into the assembler from the keyboard or fed in from a tape or disk file. The object code can be directly generated in memory or output to a file on disk or tape to be loaded and executed later.

As an example of an assembler's operation, let's say you decide to start a machine code program by loading the stack pointer register with the number 7000 hex. The Z80 machine code for this procedure consists of the hexadecimal operation code (opcode) 31. The opcode is followed by the address—in this case 7000 hex. To make matters more complicated, some microprocessors (like the Z80) prefer their addresses back to front. The final machine code would appear as: 31 00 70. Imagine doing this process for more than 1000 bytes; you're likely to make a lot of mistakes and cause yourself a severe headache. Using an assembler, just specify a mnemonic followed by an address such as LD SP,7000H, which means "load the stack pointer with 7000 hex." Much simpler than hand assembling

"A simple assembler is still worth its weight in gold compared to the time and effort involved in hand assembly."

the same code.

Assemblers can also keep track of any relative jumps in the machine code. For example, a hand-assembled program may contain a jump forward of ten bytes. If any code is inserted between the jump instruction and the opcode jumped to, the jump has to be adjusted to skip over the inserted bytes. The assembler deals with this by using labels; tell the assembler you want to jump to a label and ascertain the opcode you want to jump to has been labeled. The assembler then inserts the correct number of bytes to jump into your code.

Some assemblers, called conditional assemblers, let you skip over parts of your source code under certain conditions. This feature lets you write portions of code which are assembled only if you specify that code in your final object program. This is normally achieved by setting a label to a value somewhere in the source code, then telling the assembler to test that label and produce code or ignore lines from the source code. This facility allows you to produce two or more versions of the same machine code program with features left in or out according to the way it was assembled, saving you the effort of creating two versions of source code which differ by only a few lines of code.

Finally, macro-assemblers are enhanced versions of the type of assembler we've been discussing. Macro-assemblers let you use macro instructions, which are whole sets of machine code instructions defined within the body of the source program. You define a set of instructions as having a certain name; every time you want to use that sequence of instructions, refer to it by that name. This differs from a subroutine in that the whole routine is spelled out in full within the source code every time you call it by its macro name. Coupled with conditional assembly, macro code allows powerful manipulation of your source code according to preset options.

Assemblers come with a wide variety of features and are priced accordingly. The beginner should stay with a simple assembler until the more sophisticated options, such as conditional or macro assembly, are needed. A simple assembler is still worth its weight in gold compared to the time and effort involved in hand assembly.

Basic Utilities

For our purpose, this heading includes any utility written to help the Basic programmer, and includes all kinds of programming aids. Basic is such a popular lan-

guage it's no wonder so many utilities are available to help create and debug a Basic program.

At the simple end are utilities such as single-steppers (previously mentioned). Single-steppers allow execution of a Basic program one statement at a time, in order to stop a program from running past the point a bug occurs. The program can be stopped with the Break key the moment the bug occurs when a single step causes incorrect operation of the program. It is then easy to list, analyze and correct the bad line; the alternative is to gradually narrow down the portion of code containing the bug until it is found.

Line renumberers are the utility most common to Basic programmers. Renumberers renumber a Basic program (or a portion of it) more logically. Often a line needs to be inserted between two lines with consecutive line numbers while a program is being developed. This small eventuality is the single largest reason to renumber a Basic program. Once a program is renumbered using sensible increments other lines can easily be inserted. Programs can also be renumbered to tidy up the final listing or to logically separate routines from each other.

To improve the appearance of the finished program, a class of utility exists which allows changes in the format of a Basic program. A program which contains so many multi-statement lines it becomes difficult to follow needs its lines unpacked into single statement lines and a new version of the program created with new line numbers. It's possible to bypass such drastic action using a "pretty printer utility," which lists the program in a format structured to make the code flow easy to follow.

The problem may also exist in reverse: The Basic code may be too well laid out, using generous spaces and REM statements, too quickly using up memory. Before long no more room will exist for further code. A compression utility removes spaces, compacts program statements into multi-statement lines, removes REM statements, and even spots and removes unused portions of code within the program text.

Finally there are enhancements to the Basic language itself. These utilities add new features to the dialect of Basic in use by defining new commands or keywords. The commands may provide graphic functions, such as line drawing or shape displays, which may be called by name from the Basic program. A sorting routine might be called to sort a variable array into ascending or descending order. New mathe-

matical functions could be defined, such as matrix manipulation or new transcendental functions. The list goes on; there are as many different variations as there are demands for those variations. Available utilities range from simply utilitarian to outright luxury.

Diagnostics

Diagnostic utilities exist specifically to check the performance of a piece of hardware by subjecting it to a sequence of tests. The hardware involved may be anything from random access memory (RAM) to a disk controller chip to a hard disk unit. These and other devices interface to the microprocessor in some way, and when functioning correctly, will display predictable results. A diagnostic utility works by anticipating these results and comparing them to acceptable parameters. If a piece of hardware can't perform because of a malfunction, it's the diagnostic's job to recognize that malfunction and report the error. A good diagnostic will pinpoint the problem as accurately as possible, suggest possible causes, and even recommend alternate courses of action to fix it.

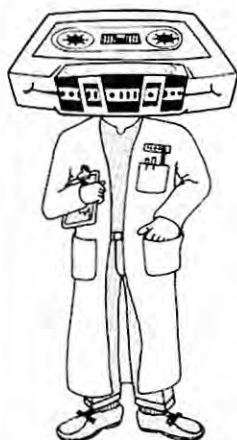
As an example, a memory test diagnostic may not only find the faulty chip, but describe the condition under which the error occurs and the chip's part number for replacement. Memory diagnostics, however, should be used with caution: Certain types of memory fault can be missed during even a thorough workout, and then crash the first program that runs in it. I've witnessed a memory chip pass every combination of bits thrown at it but refuse to accept data written to it from a machine code Push instruction.

Disk diagnostics can be particularly useful because they subject the hardware to physical extremes not encountered in daily use. For instance, the disk can be asked to step from track to track at a faster rate than normal. If this test is passed it's reasonable to expect the disk to behave well at its normal speed. With these techniques, it's even possible to foresee a failure before it actually occurs.

Disassemblers

As their name suggests, disassemblers do a job exactly opposite of assemblers. Where an assembler takes mnemonic opcodes and assembles them into hexadecimal object code, a disassembler takes the object code and produces mnemonic text. The output text can even contain labels automatically generated by the disassembler,

Sick of the same TRS-80 software?



Here's a CHEAP CURE!

The prescription for the Model I and III:
CLOAD Magazine!

A CASSETTE TAPE with 6 to 8 programs a month!

Some past sensational medications

Game — Caterpillar, Suns, CIA Adventure, Reversi.
Practical — Securities, Energy, Tape Directory, Checkbook.
Utility — Variable Dump, Display, Edit, Code It.
Tutorial — Planets, Spell Egg, Atomic Table, Geometry.

At about **75 cents** a program, a subscription to **CLOAD Magazine** is just what the doctor ordered.

The Bottom Line:

1 year (12 issues)	\$42.00
6 months (6 issues)	\$23.00
Single copies	
Back issues	\$ 4.50
Good Games #1	\$12.00
Adventures #1	\$13.00

*Temperature and prices rising July 1, 1982

California residents add 6% to single copies.
North America — First Class Postage Included.
Overseas — add \$10 to subscriptions, and \$1 to single copies. Sent AO rate.

The Fine Print

All issues from Oct '78 on available — ask for list (24 Level I issues also).
Programs are for 16K Level II, 16K Model III, and occasionally for disks.
TRS-80 is a trademark of Tandy Corp.
MasterCard/Visa welcome!

CLOAD Magazine Inc.
P.O. Box 1448, Santa Barbara,
CA 93102 (805) 962-6271

✓ 102

“... a disk zap program can take a blown disk and make it usable.”

enabling reassembly at a later date.

A disassembler makes a machine code easier to follow and understand. The mnemonics produced by a disassembler are easier for a human to read and analyze than the raw opcode bytes used by the microprocessor. It's possible to disassemble a machine code routine and alter it according to your specific needs, a useful capability when changing printer driver routines to enable them to drive off-brand printers, for instance. A less frivolous example is changing tape input/output (I/O) routines to disk, facilitating customized software upgrades to disk operation.

Disk Zappers

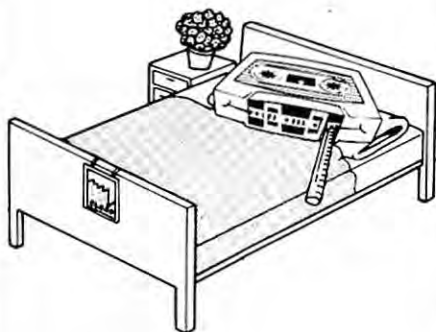
These are a must for disk users. Depending on the sophistication of the particular utility, a disk zap program can take a blown disk and make it usable. A disk can be blown in numerous ways, and the more ghastly ways will preempt any attempt at data recovery. Many situations exist, however, where a file is intact on a disk but can't be accessed for some reason; this is where a disk zapper can be used to recover hours of work otherwise lost.

The subject of disk data recovery can take a whole book—ask Harv Pennington, author of the best-known work on the subject, *TRS-80 Disk and Other Mysteries*. That book gives a fair insight into the problems that may be encountered with disk files. For our purposes, we'll stick to the more typical problems and how a disk zap utility can help.

Imagine this: You save a large program to disk, smoking while you work. You shouldn't be! Smoke particles enter the disk unit and are attracted by static to the disk surface. On the spot your file is to be saved, the particles land under the write head of the disk and cause what's known as a soft error. The next revolution of the disk removes the particles and subsequent writes will be correct, but one sector wasn't written correctly. Unless you're running with automatic write-verification, you won't know your first sector is in trouble until you try to read in the program. When you do try to load it, you'll get a read error. A disk zap utility can find the bad sector and allow a re-write with some dummy information so the program will load, although it will contain garbage from the dummy sector. Rather than retype the entire program, only a small section has to be reentered.

Another example: you save a large program to disk (yes, I know, we just did that, but that's the point, it's much more likely to

For the Extended BASIC **COLOR COMPUTER** **POCKETBOOK SURGERY NOT REQUIRED**



Is your CoCo table-ridden, drinking up electrical juice but not getting any software solids? A prescription of **CHROMASETTE** Magazine will stop the hardening of the ribbon cables.

The doctor explained that **CHROMASETTE** Magazine is a cassette tape with 6 to 8 quality programs on it. A healthy mixture of games, tutorials, utilities, and practical programs to nurture your computer every month. No finger exercises necessary. Just load and run.

Keep CoCo's health costs low. A subscription to **CHROMASETTE** Magazine is good, cheap medication (under 75 cents a program).

The Bottom Line:

1 year (12 issues)	\$45.00
6 months (6 issues)	\$25.00
Single copies	\$ 5.00

Calif. residents add 6% to single copies.
North America — First Class Postage Included.
Overseas — add \$10 to subscriptions, and \$1 to single copies. Sent AO rate.
MasterCard/Visa welcome!

The Fine Print:

All issues from July 81 on available — ask for list. Programs are for the Extended BASIC model only.

MasterCard/Visa welcome!

Chromasette Magazine
P.O. Box 1087 Santa Barbara,
CA 93102 (805) 963-1066

✓ 103

NEWTRIEVE*

Rapid Retrieval of Random Records

is a complete in-memory, recursive, sequential search of an array of 500, 40 character Search String Indexes, replacing the sequential search in BASIC with a machine language program. **NEWTRIEVE uniquely locates KEY words to further access a data base.**

NEWTRIEVE, installed into the BASIC demonstration program, allows the programmer great flexibility in determining the final application. Switches allow for 'EXCLUDING', Divide index, Single Search, in-memory changes, re-write of load module, and selectively browse through the index.

NEWTRIEVE is a concept of program design, and many ideas grow from its use. **Applications** for education, inventory control, research, cataloging, multi-indexing, forms control with alpha-form numbers, data base management, personnel listings, characteristics identification, are just some of the uses that will make **NEWTRIEVE** the basis of program development.

Once an Index has been established, either interactively or from an external data file, a LOAD MODULE may be created to facilitate start-up in less than 10 seconds. **Numerous indexes can be written and successively loaded and searched using the same or an alternate BASIC program.** For example, one index can reference a data base of customer names, another index can reference inventory.

NEWTRIEVE is user oriented. **In commercial applications, speed of access makes it ideal when the working environment requires fast interaction between user and computer.** Although speed is dependent upon variables such as frequency of occurrence and size of array, **a 25,000 character array should be sequentially read in about 1 second.** It is not necessary to utilize a sorted array.

The KEY strings to be matched against the array of Search String Indexes may be entered in any order or in shortened form. Usually, three characters of a word or words are all that is necessary. **NEWTRIEVE** recursively searches each Search String, returning only the index(s) that include all of the elements of the KEY string. **Thus an unskilled operator can retrieve data with sparse knowledge of product description or with a minimum of user input.**

Since final application is up to the programmer, indexes different from the one supplied may be more suitable to your needs. Optional customized indexes are available from the manufacturer.

TRS-80 Model I & III, 1 Drive 48K
\$49.95 Limited time only
N.Y. State residents add 8.25% sales tax
\$3.00 Handling and Postage
Check or Money Order
Allow 4-6 weeks for delivery

UNIQUE
Printing & Stationery Co. Inc.
Since 1929
11 Maiden Lane, New York, N.Y. 10038
(212) 732-2172

© 1982 Unique Printing & Stationery Co. Inc. All Rights Reserved.

*A Trademark of Unique Printing & Stationery Co. Inc.

TRS-80 is a registered trademark of The Tandy Corporation

"Monitors . . . are second only in usefulness to assemblers, and some people would dispute that."

happen during a prolonged disk save). This time there's a glitch on the power lines while your program is being saved. In the short time the power surges, the disk head converts the extra voltage to extra magnetism. We now have a partially erased track on the disk—another scene from the chamber of horrors. The sector no longer exists

so it can't be repaired; to use the disk in the future, it would have to be reformatted, but this would erase every track and sector on it. Fortunately, utilities exist that can reformat a disk without erasing recoverable data. Again, the blown file may be incomplete when salvaged, but many valuable records may be accessible.

The final example is the most common scenario: Accidental file killing. This mishap occurs so often there are utilities that do nothing but find the dead file directory entry and resurrect it. By altering a single bit on the disk with a zap utility and then restoring its entry in the directory hash index table (HIT) this can be done. On many operating systems, the file itself remains intact after being killed, only the directory entry is amended. Some disk zapper utilities can provide the option of restoring killed files.

Editors

Contrary to common belief, these are not people but utilities. Editors come in two main forms: text editors and screen editors.

Text editors are used to enter and manipulate text files from a keyboard. Basically, they are stripped-down word processors, and in fact, most word processors will do a better job than a text-editing utility. The best reason for using a text editor at all is that many computer languages process their source input (the actual program to be compiled or assembled) from a file which has to be typed in initially. Text editors are an integral part of many language development systems and the chief method of preparing input files. In common with word processors, a good editor will move, change, delete, substitute text and so on, and then save it to a file for subsequent input to another program.

Screen editors are utilities offering distinct advantages over the line-editing process known to TRS-80 users. They allow cursor movement across the video screen without destroying any of the text the cursor passes over. Characters may be inserted or deleted or otherwise moved and the line may be entered as if it were typed at the input prompt. Thus, if you type a Run command with a misspelled disk file name, you would move the cursor to the error, correct the typo using the screen editor, and hit the Enter key—much simpler than retyping the whole line and risking a new error. Screen editors can also provide options such as direct entry of graphics characters or other characters not normally available from the keyboard.

Monitors

A monitor is the best debugging tool a machine code programmer has at his disposal. Monitors can be as simple or sophisticated as the pocketbook will allow. They are second only in usefulness to assemblers, and some people would dispute that. They provide an interface between a

What's a SemiDisk?™

The best disk emulator you'll find anywhere. It's a single 512K byte memory board. (1 Megabyte on special order) It operates like a disk, except far faster. Your software is compatible with no modifications.

No strings attached. No need for a special CPU, DMA, I/O, or disk controller. No need to return your operating system disk. No changes to your present hardware.

SemiDisk doesn't interfere with memory space, which is left totally free for the operating system or user programs. If you have an 8080, 8085, or Z80 CPU with CP/M 2.X on S-100, you can use it right now. (Available soon for TRS-80 Model 2 and IBM Personal Computer.)

Unmatched Performance:

- 30 to 300 times faster than 8" floppies
- Much faster than hard disks
- Expandable to 8 Megabytes
- Only 0.6 amps (typ) supply current for 512K (0.9 amps for 1 Megabyte)

SemiDisk is the least expensive disk emulator per byte of storage. At \$1995 for 512K, it's less than a third the cost of the closest competition.

So compare price, performance, hardware requirements, flexibility, storage density, and expandability, and you'll select SemiDisk!

**SemiDisk
Systems**

P.O. Box GG
Beaverton, OR 97075

(503)-
642-3100

TRS-80 trademark of Rad'o Shack — CP/M Trademark of Digital Research

TAKE A TEST DRIVE.

With a reliable
TRAXX™ 100/200/300
series add-on
drive system.



Our drives feature excellent engineering, and all of the advanced performance features you've come to expect from the nation's leading disk drive manufacturers. All systems are completely burned-in and tested. And, you'll see at least five quality assurance stamps on each and every drive, which is how we make sure our drives will run and will continue to run past our optional two year extended warranty.

Our drive packages start at \$250.00 and include a comprehensive operations manual and an attractive static free, dust free cover.

Systems available for Altos,¹ Apple™, Atari, Heath™, North Star™, S-100,² TRS-80™ (Model I, II, III, Color), Zenith™.

If one of our drives fails to meet your highest expectations of how trouble free and reliable a disk drive can be, then return it to us for a complete refund.*

So, before you buy another drive, take a test drive with one of ours. We're sure that you'll find TRAXX to be the finest.

IT'S GUARANTEED!

TRAXX
COMPUTER CORPORATION

Call our toll-free TRAXX LINE: 1-800-621-3102. In Illinois, call: (312) 987-1024. 10AM-6PM CST, Monday thru Friday. *For full refund drives must be returned within 10 days of purchase.

¹Apple is a registered trademark of Apple Computer Inc.

²TRS-80 is a registered trademark of Radio Shack, a Tandy Company.

"No expert craftsman would be without a fine set of tools, and no programmer should be without a good set of utilities."

machine code program and the programmer. Unlike a Basic program (or any other interpreted language, for that matter), a machine code program executes directly on the microprocessor chip at an almost incomprehensible speed. Some method has to be found to prevent a program still in the evolution stages from crashing the system without leaving a trace as to why. This is where the monitor program is a life saver.

As its name suggests, this utility oversees the execution of a program by allowing the machine code programmer a degree of interaction with his code. Probably the most important function of a monitor is to enable the insertion of breakpoints in the body of the code. Whenever such a breakpoint is encountered, the monitor regains control from the program being debugged. At this point the programmer can check the status of registers in the microprocessor or bytes in RAM to ascertain his program is functioning as it should. The monitor will allow subsequent resumption of the target program, ensuring all registers are in the state they held at the time of the breakpoint.

All monitors allow memory to be displayed or printed in various formats, such as hexadecimal, octal, decimal, ASCII or symbolic. Symbolic means symbols are displayed instead of values; these symbols are simply the mnemonics discussed under the heading of disassemblers. Some monitors therefore contain a disassembler as an option. The memory under scrutiny can be altered from the monitor and can influence the results of any resumed execution of the main program.

Other options may include abilities such as single-stepping code, which allows one opcode to be executed at a time. On many computers this is a hardware option, but is not available on micros due to chip architecture. A printer may be used to obtain a trace disassembly similar to the TRON function in Basic. This would show the path taken by a machine code program with registers dumped at strategic points.

Sorts are invaluable utilities which can save you the effort of rewriting your own sort routine every time you need to rearrange data in a program. Many different sorting methods exist, each with their own selling point. Tradeoffs are usually involved; one method may be quicker but take more space, another may run in a small amount of RAM but take longer to sort.

Sorts can operate on data already resident in RAM or be called on to sort data in a disk file. Generally, if a file can fit into

memory, it's quicker to sort it there, losing no time transferring data back and forth between disks. If a file is too large for memory a disk sort has to be performed, an occasion when a well-written, efficient sort routine is required to minimize the input/output overhead.

Depending on the design of the program, a good sort utility will allow you to specify how your records are broken into fields. Once this is done, designate which field is to be used to sort by; this field will be known as the key field and would be a zip code field within a mail-file address record, for instance. Some sorts allow you to specify one or more key fields, allowing sorting within sorting. In this case, you would end up with a file in zip code order, and in name order within each zip code.

It's sometimes necessary to join two files and ascertain that the resultant file is in some kind of order. This calls for a special utility called a sort-merge. There is a conspicuous absence of this in the TRS-80.

Tape Utilities

Tape utilities fall into two types: those that copy tapes one to another, and those that dump tapes in a readable format so the user may view their contents.

Utilities that copy program tapes on the Models I and III must do so by reading the entire tape into memory and then writing a new tape. On many computers this isn't necessary; tape files are structured in blocks which can be read in one at a time and output the same way. Although this is true of data files on the Models I and III, it's not true of Basic or machine code programs, necessitating specialized utilities to copy system tapes. The block format found in other computers allows single blocks to be read and the tape stopped between each to allow that block to be copied to another tape. This isn't possible with TRS-80 program tapes; information would be lost as there are no inter-block gaps. Basic data tapes are saved a block at a time, however.

Some tape utilities let you view the stored data so its layout can be seen as it is encoded. This is especially useful when debugging a piece of software that outputs a tape file, since a bug can intervene and cause output to be different than anticipated. A few of the copy utilities also allow the tape data to be viewed; this allows portions of the data to be changed before dumping a new version.

Terminal Packages

These utilities help with inter-computer

communications. There should be no communication problem since we have what's known as the RS-232 standard. The theory is that an agreed standard should allow anybody and his computer to talk to anybody else's computer by using the same set of interface signals. A computer will know when another computer is ready to talk or ready to listen. That's the theory; in reality, various signals are used in various ways and sometimes one computer may not be giving another the expected signal. The more clever terminal packages can help avoid this problem.

The less clever packages, however, play their part by turning your computer into an appropriately-named "dumb terminal." These packages work by emulating the operation of a dumb terminal without a puff of smoke and quick-change act. Your computer is allowed to simply send and receive data signals. Sending is done from the keyboard only, while receiving involves displaying (sometimes called echoing) the received characters on the video screen. Using such a package permits you to communicate with anyone else if his computer is able to read your signals and you can read his.

At the opposite end of the scale we have smart terminal packages. These packages will be smart in proportion to the amount paid for them. There's no real dividing line between smart and dumb; a smart terminal utility may have only a few features which places it just above a dumb one, or it may have many, many features. The attraction of these packages is that they allow such feats as saving incoming messages or data to disk or tape files, or transmission of data from a stored file instead of from the keyboard. It's also possible to simultaneously produce printouts while characters are being received at the terminal. Other goodies offered can include changing the speed of communication (baud rate) without resetting the program and setting specific statuses of RS-232 signals to accommodate a particular dumb terminal.

Each utility described here could have a whole article devoted to it and I've only scratched the surface by taking a quick glance at so many types. In many cases, having the correct utility available saves re-inventing the wheel, something that already occurs too often. Without them, programming would become a drudge instead of the enjoyable experience it should be. No expert craftsman would be without a fine set of tools, and no programmer should be without a good set of utilities. ■

BUSINESS COMPUTING™

THE NEW PUBLICATION
FOR SERIOUS SMALL BUSINESS
COMPUTER USERS

LEARN HOW TO REALLY USE YOUR COMPUTER
THE TRUTH ABOUT SOFTWARE
& NEW COMPUTERS & RELATED PRODUCTS

PUBLISHED BY COMPUTRONICS



Limited Offer

TIRED OF GAMES?... Don't understand your computer?...
Can't understand the difference between RAM and ROM?...
Are Computer Magazines and Manuals over your head?

SUBSCRIBE TO **BUSINESS
COMPUTING™**

Make your computer work for you in your business...Choose
the right computer...Learn the limits of your computer...The
truth about Business Software.

SUBSCRIBE TO **BUSINESS
COMPUTING™** NOW!

And receive the next 12 Issues at less than half our regular
subscription price.

1 YEAR (12 Issues) **\$48.00** (\$120 - Regular Price)

2 YEARS (24 Issues) **\$72.00** (\$240 - Regular Price)

COMPUTRONICS
MAGAZINE PUBLISHERS SINCE 1972

50 N. PASCACK ROAD
SPRING VALLEY, NEW YORK 10977

*** ADD \$12/YEAR ***
(Canada & Mexico)

*** ADD \$24/YEAR ***
(To All Other Countries)

NEW TOLL-FREE
ORDER LINE
(OUTSIDE OF N.Y. STATE)
(800) 431-2818



24 HOUR
ORDER
LINE
(914) 425-1535

*** ALL PRICES AND SPECIFICATIONS SUBJECT TO CHANGE ***

THE ORIGINAL MAGAZINE FOR OWNERS OF THE TRS-80™* MICROCOMPUTER

* TRS-80™ IS A TRADEMARK OF TANDY CORP

SOFTWARE
FOR TRS-80™
OWNERS

COMPUTRONICS INC.

MONTHLY
NEWSMAGAZINE
FOR TRS-80™
OWNERS

MONTHLY NEWSMAGAZINE

Practical Support For Model I, II, III & Color

- PRACTICAL APPLICATIONS
- NEW EXPANDED BUSINESS SECTION
- GAMBLING • GAMES
- EDUCATION
- PERSONAL FINANCE
- BEGINNER'S CORNER
- NEW PRODUCTS
- SOFTWARE EXCHANGE
- MARKET PLACE
- QUESTIONS AND ANSWERS
- PROGRAM PRINTOUTS
- AND MORE

NOW IN OUR 5th YEAR

PROGRAMS AND ARTICLES PUBLISHED IN RECENT ISSUES INCLUDE THE FOLLOWING:

- FINCALC - A COMPLETE FINANCIAL APPLICATIONS PACKAGE
- INFORMATION SYSTEM REVIEW
- STATISTICAL COMBINATIONS
- PASCAL'S TRIANGLE
- ASSEMBLY LANGUAGE FOR BEGINNERS
- DISK FILES
- MOD-III REVIEW
- KEYBOARD THUNDER AND LIGHTING EXPLAINED
- DOS COMMANDS IN LEVEL II
- PROBABILITY CURVE GENERATOR
- CALCULATOR SIMULATIONS
- THE MEGABYTE GAP
- STOCKS AND BONDS
- BUDGET ANALYSIS (FOR BUSINESS AND HOME)
- NEWDOS 80 REVIEW
- DUTCHING THE HORSE SYSTEM THAT CAN'T LOSE
- A SIMULATED GOLF GAME
- CONTINUOUS FORM SOURCES
- TAX SAVER REVIEW
- AND MORE

ALL PRICES AND SPECIFICATIONS SUBJECT TO CHANGE

FREE* WITH
YOUR
SUBSCRIPTION
OR
RENEWAL

FINCALC

A Complete Financial Analysis Package Used To Calculate Markup, Margin, Annuities, Compound Interest, Nominal And Effective Rates, Sinking Funds, Mortgage Calculations, Future Value, Savings and Insurance, Percentage Difference Between Two Numbers, Amortization Schedule and More

SEND FOR OUR NEW 64 PAGE SOFTWARE CATALOG (INCLUDING LISTINGS OF HUNDREDS OF TRS 80™ PROGRAMS AVAILABLE ON CASSETTE AND DISKETTE). \$2.00 OR FREE WITH EACH SUBSCRIPTIONS OR SAMPLE ISSUE

* All programs are supplied on cassette (add \$3 for Diskette Version - add \$5 for modified Mod-II Version).

COMPUTRONICS

50 N. PASCACK ROAD
SPRING VALLEY, NEW YORK 10977

ONE YEAR SUBSCRIPTION \$24
TWO YEAR SUBSCRIPTION \$48
SAMPLE OF LATEST ISSUE \$ 4

START MY SUBSCRIPTION WITH ISSUE.....
(#1 - July 1978 • #12 - June 1979 • #24 - July 1980 • #30 - January 1981)

NEW SUBSCRIPTION..... RENEWAL.....

**NEW TOLL-FREE
ORDER LINE**
(OUTSIDE OF N.Y. STATE)
(800) 431-2818

**NEW!!!
MOD-II NEWSLETTER
\$18/year (or 12 issues)**

**24 HOUR
ORDER
LINE**
(914) 425-1535



CREDIT CARD NUMBER _____ EXP. DATE _____

SIGNATURE _____ NAME _____

ADDRESS _____ CITY _____ STATE _____ ZIP _____

*** ADD \$12/YEAR (CANADA, MEXICO) - ADD \$24 YEAR AIR MAIL - OUTSIDE OF U.S.A., CANADA & MEXICO *** ✓9

H & E COMPUTRONICS INC.

• • EVERYTHING FOR YOUR TRS-80™ • ATARI™ • APPLE™ • PET™ • CP/M™ • XEROX™ • IBM™ • • •

* 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.



BUSINESS PAC 100

100 Ready-To-Run Business Programs

★ All orders processed within 24-Hours
★ 30-Day money back guarantee on all Software

(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 DAYYEAR	Day of year a particular date falls on
5 LEASEINT	Interest rate on lease
6 BREAKEVN	Breakeven analysis
7 DEPRSL	Straightline depreciation
8 DEPRSY	Sum of the digits depreciation
9 DEPRDB	Declining balance depreciation
10 DEPRDDB	Double declining balance depreciation
11 TAXDEP	Cash flow vs. depreciation tables
12 CHECK2	Prints NEBS checks along with daily register
13 CHECKBKI	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 ANNUDEF	Present value of deferred annuities
27 MARKUP	% Markup analysis for items
28 SINKFUND	Sinking fund amortization program
29 BONDDVAL	Value of a bond
30 DEPLETE	Depletion analysis
31 BLACKSH	Black Scholes options analysis
32 STOCVAL1	Expected return on stock via discounts dividends
33 WARVAL	Value of a warrant
34 BONDDVAL2	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 FQIQOQ	Fixed quantity economic order quantity model
53 FQEQOWSH	As above but with shortages permitted
54 FQEQQPB	As above but with quantity price breaks
55 QUEUECB	Cost-benefit waiting line analysis
56 NCFANAL	Net cash-flow analysis for simple investment
57 PROFIND	Profitability index of a project
58 CAPI	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 BUSBUD	HOME business bookkeeping system
77 TIMECLCK	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 TIMUSAN	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 LOANAFDD	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

- CASSETTE VERSION \$99.95
- DISKETTE VERSION \$99.95
- TRS-80* MODEL II VERSION \$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 SERVICE™

50 N. PASCACK ROAD
SPRING VALLEY, NEW YORK 10977

ASK FOR OUR 64-PAGE CATALOG

*** ALL PRICES AND SPECIFICATIONS SUBJECT TO CHANGE***

**NEW TOLL-FREE
ORDER LINE**
(OUTSIDE OF N.Y. STATE)
(800) 431-2818



**24 HOUR
ORDER
LINE**



(914) 425-1535



Tired Of Your GENERAL LEDGER?

VERSA- LEDGER

- ★ THE ULTIMATE PERSONAL CHECK REGISTER
- ★ A PROFESSIONAL ACCOUNTING SYSTEM
- ★ A PERSONAL FINANCIAL MANAGER
- ★ A SMALL BUSINESS ACCOUNTING SYSTEM
- ★ A COMPLETE GENERAL LEDGER

FOR YOUR TRS-80 MODEL I, II, III or COLOR COMPUTER • APPLE II • I.B.M. • XEROX • ATARI
ALL MICROSOFT BASIC COMPUTERS

HOW IT WORKS

VERSALEDGER is a complete accounting system that grows as you or your business grows. To start, your **VERSALEDGER** acts as a simple method of keeping track of your checkbook. Just enter your check number, date and to whom the check is made out to. As you or your business grows, you may add more details to your transactions account number, detailed account explanations, etc.

- **VERSALEDGER** can give you an instant cash balance at anytime. **(IF YOU WANT IT TO)**
- **VERSALEDGER** can be used as a small personal checkbook register. **(IF YOU WANT IT TO)**
- **VERSALEDGER** can be used to run your million dollar corporation. **(IF YOU WANT IT TO)**
- **VERSALEDGER** prints checks. **(IF YOU WANT IT TO)**
- **VERSALEDGER** stores all check information forever. **(IF YOU WANT IT TO)**
- **VERSALEDGER** can handle more than one checkbook. **(IF YOU WANT IT TO)**
- **VERSALEDGER** can be used to replace a general ledger. **(IF YOU WANT IT TO)**
- **VERSALEDGER HAS AN ALMOST UNLIMITED CAPACITY**
(300 checks per month on single density 5 1/4" disk drives such as the TRS-80 Model-I)
(500 checks per month on the Apple II)
(2400 checks per month on the TRS-80 Model III)
(6000 checks per month on the TRS-80 Model II)
(3000 checks per month on single density 8" CP/M)
- **VERSALEDGER** will soon have an add-on payroll package. **(IF YOU NEED IT)**



INTRODUCTORY PRICE
\$99.95

— CAN BE USED WITH 1 or MORE DISK DRIVES —

**VERSALEDGER HAS BEEN CREATED
WITH THE FIRST TIME COMPUTER USER IN MIND**

COMPUTRONICS
MATHEMATICAL APPLICATIONS SYSTEMS

50 N. PASCACK ROAD
SPRING VALLEY, NEW YORK 10977

- ★ 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 U.S., CANADA & MEXICO



24 HOUR
ORDER
LINE

(914) 425-1535



**NEW TOLL-FREE
ORDER LINE**
(OUTSIDE OF N.Y. STATE)

(800) 431-2818

*** ALL PRICES & SPECIFICATIONS SUBJECT TO CHANGE *** ✓9

H & E COMPUTRONICS INC.

● ● EVERYTHING FOR YOUR TRS-80™ MODEL I, II or III ● ●
APPLE AND ALL COMPUTERS USING MICROSOFT BASIC

* TRS-80 is a trademark of Tandy Corp.

- All orders processed within 24 Hours.
- 30-Day money back guarantee
- Add \$3.00 for shipping in UPS Areas
- Add \$4.00 for C.O.D. or NON-UPS Areas
- Add \$5.00 to Canada or Mexico
- Add exact postage to all other countries

BUSINESS/80 presents

NEW **PROFESSIONAL BUSINESS SYSTEMS** **NEW**

PBS
for
TRS-80 MODEL II
or
TRS-80 MODEL III
with 2 Disk Drives
and 48K (64K for Model II)

- ★ Each Module Can Be Operated Individually Or As A Completely Coordinated System.
 - ★ Turn-Key Error Catching Operation For Beginners.
 - ★ Each Module Is Accompanied By More Than 100 Pages Of Step-By-Step Documentation.
 - ★ Manuals Available Separately. (\$50 each) ★ Complete Sample Report Listings (\$10)
- \$195 (Model I Or Model III TRSDOS Version)**
\$250 Apple Version (From Peachtree - Requires CP/M)
\$295 (Model II TRSDOS Version)
\$495 (Model II Peachtree CP/M Version)

BUSINESS/80 * BUSINESS/80 * BUSINESS/80 * BUSINESS/80 * BUSINESS/80 * BUSINESS/80 * BUSINESS/80 * BUSINESS/80 * BUSINESS/80 * BUSINESS/80 * BUSINESS/80

GENERAL LEDGER

Processes

- ★ Flexible design allows system to be easily adapted to both small businesses and also to firms performing client writeup services.
- ★ Add, change or delete records within the Chart of Accounts (Master) File.
- ★ List the Chart of Accounts File.
- ★ Key in transactions into the Transactions (Journal Entries) File.
- ★ List the Transactions File.
- ★ If other Peachtree Software packages are present, pass summary transactions from these packages to the General Ledger at the end of the accounting period.
- ★ At the end of an accounting period, print out the major reports:
 - (1) Trial Balance (Detail Report)
 - (2) Transaction Registers
 - (3) Balance Sheet
 - (4) Prior Year Comparative Balance Sheet
 - (5) Income Statement
 - (6) Prior Year Comparative Income Statement
 - (7) Department Income Statements

File Information

There are two main computer files maintained within the General Ledger System.

- (1) The of Accounts File
 - Account Number
 - Description
 - Account Type
 - Balance Sheet Column Code
 - Current Amount
 - Year-To-Date Amount
 - Budget Amount
 - Prior Year Monthly Amounts
- (2) The Transactions File
 - Account Number
 - Description
 - Source Code
 - Reference
 - Date
 - Amount

ACCOUNTS RECEIVABLE

Processes

- ★ Add, change or delete records within the Customer File.
- ★ List the entire Customer File, or any Customer within the File.
- ★ Enter invoices, payments, credits and adjustments.
- ★ Prepare invoices and statements.
- ★ Produce the following reports:
 - (1) Aged Accounts Receivable
 - (2) Invoice Register
 - (3) Payment, Credit and Adjustment Register
 - (4) Customer Account Status Report
- ★ At the end of a month, post the following items to the General Ledger:
 - (1) Invoiced Sales
 - (2) Freight Charges
 - (3) Sales Tax
 - (4) Service Charge Income
 - (5) Cash Payments
 - (6) Discounts Allowed
 - (7) Returns/Credits
 - (8) Income Adjustments
 - (9) Accounts Receivable

File Information

There are three main computer files maintained within the Accounts Receivable System, the Customer File, the Invoice File, and the Transaction File.

CUSTOMER FILE

Customer Account Number
Customer Name
Address
Phone
Type of Account
Credit Terms
Credit Limit
Tax Rate
Discount Rate
Date of Last Credit
Date of Last Debit
Amount of Last Credit
Amount of Last Debit
Current Balance
High Balance
Year-To-Date Sales
Year-To-Date Payments
Automatic Billing Amount

INVOICE FILE

Invoice Number
Invoice Date
Invoice Amount
Credit Terms

TRANSACTION FILE

Transaction Type
Transaction Date
Transaction Amount

ACCOUNTS PAYABLE

Processes

- ★ Add, change or delete records within the Vendor File
- ★ List the Vendor File.
- ★ Enter vouchers.
- ★ Automatically determine which vouchers to pay
- ★ Print checks and a Check Register.
- ★ Produce the following reports:
 - (1) Open Voucher Report.
 - (2) Accounts Payable Ageing Report.
 - (3) Cash Requirements
- ★ At the end of a month, prepare the General Ledger Transfer File, passing the following information for each debit or credit transaction:
 - (1) Account Number
 - (2) Description
 - (3) Source Code
 - (4) Date
 - (5) Amount

File Information

There are two main computer files maintained within the Accounts Payable System, the Vendor File and the Voucher File.

VENDOR FILE

Vendor Code
Vendor Name
Address
Phone
Year-To-Date Purchases
Year-To-Date Payments
Current Balance
Last Payment
Date of Last Payment
Monthly Entry Flag
Due Date of Month
Debit Account Number
Amount (Debit)
Month Last Paid

This file may also contain information to enable generation of automatic vouchers for those items such as rent or bank payments that are paid every month.

VOUCHER FILE

Voucher Code
Voucher Date
Amount Due
Date Due
Discount Percent
Discount Amount
Discount Date
Invoice Number
Invoice Date
Status

Plus up to six account number-amount fields for General Ledger account numbers to which the amount due is to be distributed.

PAYROLL

Processes

- ★ Add, change or delete records within the Employee File
 - ★ List the Employee File.
 - ★ Modify the Tax Information Files
 - ★ At the end of a pay period -
 - (1) Calculate Pay
 - (2) Print Checks
 - (3) Print Payroll Register
 - ★ At the end of a month -
 - (1) Print the monthly summary
 - (2) Print the Unemployment Tax Report
 - (3) Prepare the General Ledger Transfer File, passing the following information:
 - Net Pay (Cash)
 - Employee FICA Withheld
 - Federal Tax Withheld
 - Insurance Deductions
 - Miscellaneous Deductions
 - State Tax Withheld
 - Local Tax Withheld
- The gross pay for up to twenty payroll departments may also be passed to the General Ledger.
- ★ At the end of a quarter, print the 941A report information.
 - ★ At the end of a year, print the W-2 forms.

File Information

There are two main computer files maintained within the Payroll System, the Employee Master File and the Tax File.

EMPLOYEE MASTER FILE

Name
Address
Local Code
State Code
Marital Status
Exemptions, Federal
Exemptions, State
Social Security Number
Pay Period
Pay Type
Pay Rate
Insurance Deduction
Miscellaneous Deduction
Date Employed
Date Terminated
Last Check Information

Payroll (con't)

And current, month-to-date, quarter-to-date and year-to-date totals for:

Regular Earnings
Overtime Hours/Earnings
Other Hours Rate/Earnings
Commission Earnings
Miscellaneous Income
FICA Deductions
Federal Deductions
State Deductions
Local Deductions
Insurance Deductions
Miscellaneous Deductions

TAX FILE

(for single and married persons)
Federal Tax Information Tables
State Tax Information Tables
Local Withholding Tax Information Tables

An Overview of the Inventory System

Inventory is probably the most speculative of all of a company's assets. A true measure of the effectiveness of management is the ability with which it supervises the inventory control function.

The Peachtree Software™ Inventory Management System is designed to (1) give you better merchandise control, (2) allow you to lower your dollar investment in inventory, and (3) improve customer service and response.

The System maintains detailed information on each inventory item including the part number, description, unit of measure, vendor and reorder data, item activity, and complete information on current item costs, pricing, and sales. Transactions effecting inventory (sales, receipts, adjustments) may be applied at any time to insure the inventory data is always up to date and accurate.

As with all Peachtree products, the system is interactive, simple to operate, and provides reports that are up to date and comprehensive.

Particular features of the Peachtree Software™ Inventory Management System include:

- Interactive, menu-driven programs
- Self-instructing user documentation
- Long item number - up to 15 characters
- Departmentalizing of items
- Multiple pricing levels
- Processes items on reserve (committed but still in stock)
- Online item query at any time
- Comprehensive management reporting
- Automatic month end file backup
- Recovery routines for hardware failures
- Sample data for demonstration and training

How the System is Designed

The Inventory Management System operates with an **Inventory Master File** which allows for the creation of each inventory item and for the recording of transactions (sales, receipts, returns, reserves, and adjustments) to each inventory item.

The **Inventory Master File** contains the item number, description and various other data on item costs, prices, reorder levels, vendor reference, and activity. The items within the Master File are entered, changed, deleted, and queried through the **Inventory Master File Maintenance** program. All data on all items may be listed by using the **Detail Inventory Report** program.

Transactions may be applied at any time to the Master File through the **Enter Inventory Transactions** program. An **Update Report** automatically prints during this entry process to provide an audit trail of all inventory activity.

Several reports are available for the maintaining of stock, analysis, and forecasting. These reports include the **Physical Inventory Worksheet**, **Inventory Price List**, **Departmental Summary Report**, **Inventory Status Report**, the **Reorder Report** and the **Period-to-Date** and **Year-to-Date** reports.

At the end of an accounting period (usually a month), and then again at the end of a year, the **End of Period Processing** program is run to update current balances and clear previous balances.

COMPUTRONICS
SOFTWARE SYSTEMS, INC.

50 N. PASCACK ROAD
SPRING VALLEY, NEW YORK 10977



24 HOUR ORDER LINE



(914) 425-1535

NEW TOLL-FREE ORDER LINE
(OUTSIDE OF N.Y. STATE)

(800) 431-2818

*** ALL PRICES AND SPECIFICATIONS SUBJECT TO CHANGE ***



from **HOWE SOFTWARE**
FOR THE TRS-80 MODEL I AND MODEL III

System Diagnostic

Tests Every Component Of Your TRS-80 and Verifies Proper Operations

For Cassette or Disk

IS YOUR COMPUTER WORKING?

ARE YOU SURE?

\$99.95

- ROM: checksum test
- RAM: four separate tests including every address and data value.
- VIDEO DISPLAY: character generator, video RAM, and video signal.
- KEYBOARD: every key contact tested.
- LINE PRINTER: character test.
- CASSETTE RECORDER: read/write/verify data.
- RS-232-C INTERFACE: connector fault, data transmission, framing, data loop, baud rate generator.
- DISK DRIVES: disk controller, drive select and restore, track seek and verify data, read/write/verify all tracks and sectors with or without erasing, sector formatting, disk drive timer, disk head cleaner.

- Individual tests of each device with operator monitoring and intervention.
- Continuous system tests run continually for hours testing each component, with diagnostic reports optionally written on line printer.
- One program adapts to any system configuration and hardware.
- Complete instructions and documentation.

MON-3 and MON-4

The TRS-80 Monitor Programs #3 and #4 are powerful utility programs enabling you to interact directly with the TRS-80 in Machine Language. They are as useful for beginners as for advanced programmers.

- BEGINNERS can learn to interact directly with the computer in Machine Language.
- 40-PAGE MANUAL provided with each program.
- SIMPLE commands, easy to use.

The Features Of The Monitor Programs Enable You To The Following.....

- DISPLAY memory in different ways.
- DISASSEMBLE memory to see Machine Language commands.
- MOVE and COMPARE memory areas.
- SEARCH through memory to find specific values.
- MODIFY memory in various ways.
- RELOCATE object programs.
- PRINT output on video display or line printer.
- READ and WRITE object tapes in SYSTEM Format.
- UNLOAD programs using low RAM on disk.
- SAVE and READ disk files (MON-4 Only).
- INPUT and OUTPUT of disk sectors (MON-4 Only).
- SEND and RECEIVE data over RS-232-C Interface (MON-4 Only).
- Create SYMBOLIC Tapes (MON-3) or Files (MON-4) of Disassembled output for Editor/Assembler program.

MON-3 (For Cassette Systems) \$39.95
MON-4 (For Disk Systems) \$49.95

SMART TERMINAL

Enables your TRS-80 to be used as a remote terminal to a time sharing computer system. Supports upper/lower case and full range of control keys, including control key mapping into any ASCII character. Automatic transmission of files between TRS-80 and host computer. Files can be read from or written to cassette tape or disk. Incoming data can be printed on line printer or stored in memory for subsequent save to cassette or disk. Disk and tape files are fully compatible with the ELECTRIC PENCIL program. Baud rate and RS-232-C sense switches can be reset without opening Expansion Interface. Requires RS-232-C interface and modem.

Cassette or Disk Version \$69.95

FASTSORT

A series of machine-language subroutines (for 16K, 32K and 48K Systems) to sort data from BASIC programs. Data may be alphabetic (string) or numeric (integer only). Works equally well with Level II or Disk Basic. Complete instructions and examples provided for interfacing with your BASIC programs.

Cassette or Disk Version \$9.95

MAILING LIST

Maintains mailing lists of over 1000 names. Commands allow adding, changing, deleting, and finding names. Sorting is done by machine language according to the information in any field (i.e., name, address, zip code). Labels printed in 1, 2, or 3 columns, in master list on one line, or on video display.

Disk Version Only \$69.95

HOME BUDGET

Combines the maintenance of your checkbook with analysis of your income, expenses, and monthly bills. Handles data including bills, including bills, income, deposits, checks and debits to your checking account, and cash expenses. Computes checkbook balance, list of unpaid bills, monthly and year-to-date summaries of income and expenses showing income tax deductions. All output printed on video display or line printer at user's option. Complete instructions for customizing to suit your own budget.

Disk Version Only \$49.95

SMALL BUSINESS ACCOUNTING

Based on Dome Bookkeeping Record #612, this program keeps track of income, expenditures, and payroll for a small business of up to 16 employees. Income and expenditures can be entered on a daily, weekly, or monthly basis, and the program computes monthly, through last month, and year-to-date summaries. Payroll section keeps record of individual employees and their paychecks with up to six categories of payroll deductions. Employee payroll record and year-to-date payroll totals can be computed. Manual contains complete instructions for customizing to suit your business.

Disk Version \$49.95

Cassette Version \$29.95

(Cassette Version does not contain payroll)

COMPUTRONICS
MATHEMATICAL APPLICATIONS SERVICE

50 N. PASCACK ROAD
 SPRING VALLEY, NEW YORK 10977



24 HOUR ORDER LINE

(914) 425-1535

NEW TOLL-FREE ORDER LINE

(OUTSIDE OF N.Y. STATE)

(800) 431-2818

- All orders processed within 24 Hours
- 30-Day money back guarantee
- Add \$3.00 for shipping in UPS Areas
- Add \$4.00 for C.O.D. or NON-UPS Areas
- Add \$5.00 to Canada or Mexico
- Add exact postage to all other countries

H & E COMPUTRONICS INC.

● ● ● **EVERYTHING FOR YOUR TRS-80™** ● ● ●
And All Microsoft BASIC Computers

* TRS-80 is a trademark of the Radio Shack Division of Tandy Corp.

Announcing!

DOS RANDOM ACCESS & BASIC FILE HANDLING

Written For TRS-80 and All Computers Using MICROSOFT basic

FINALLY IT IS HERE. At last someone wrote a book on disk random access and file handling. A book written for the non-programmer. Written for the businessman and professional who need to solve and write special programs for in house business problems.

Written for the hobbyist who wants to go beyond the cassette recorder and into disk storage and file manipulation.

This book handles a subject of reasonable complexity, so simple and down to earth, that anyone with some Level II experience can cope with the material.

This book is written using a simple program as a starting point. The programs grow in ability and complexity as the book progresses into the various aspects of file handling and record manipulation. Extensive effort has been made to keep the material coherent and every program line is explained in detail.

The programming material presented in this 150 page self-instruction tutorial will provide any non-programmer with the ability to write special programs for inventories, mailing list, work scheduling, record keeping, research project data manipulation, etc. The subjects covered in this edition are as follows

- (A) The writing of a Menu to summarize program functions.
- (B) The writing of a screen format to accept record data.
- (C) The creation of the basic record.
- (D) The Fielding and LSET routines for buffer preparation.
- (E) The writing of the record to disk in a Random Access mode.
- (F) The retrieval of a record from disk in a Random Access mode.
- (G) The ability to change or edit a record.
- (H) The LPRINT capability from disk using three different formats.
- (I) Deleting a record from a Random file.
- (J) Sorting the Random file.
- (K) Searching the Random file by name or other keyfield.
- (L) The ability to search in a "NEXT or PRIOR" fashion.
- (M) The ability to purge a disk file from deleted records.
- (N) The ability to calculate with data from a disk file.
- (O) The provision for future expansion of the data fields.
- (P) The use of flags to prevent program crashes.
- (Q) Date setting, printer on-line, and many other routines that make a program run like a commercial written program.



D.S.C., Publishing, Div. of, DEALERS—CALL D.S.C. PUBLISHING DIRECTLY FOR DEALER PRICING—(203) 748-3231 or write to D.S.C., INCORPORATED. D.S.C. PUBLISHING, P.O. Box 769, Danbury, CT 06810-0769

COMPUTRONICS
MATHEMATICAL APPLICATORS, INC.

50 N. PASCACK ROAD
SPRING VALLEY, NEW YORK 10977

- * 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 U.S., CANADA & MEXICO

*** ALL PRICES & SPECIFICATIONS SUBJECT TO CHANGE ***

**DOS RANDOM ACCESS
& BASIC FILE HANDLING \$24.95**



**24 HOUR
ORDER
LINE**



(914) 425-1535

✓ 9

**NEW TOLL-FREE
ORDER LINE**
(OUTSIDE OF N.Y. STATE)

(800) 431-2818



Be a beginner and advanced at the same time!

BAM!

Jeff Byrkit
 13862 Kimberly Drive
 Largo, FL 33540
 Age: 14

It's 8:30 at night and there is nothing on television worth watching. So you decide to go back to—yes, the *computer room*.

What? You want to try T-BUG again? You haven't used that artifact for a while. Sure, suit yourself. All right, it's loaded. Now a slash. What do you do now? Let's put in a program. Let me see. What command do we use to change memory? Oh well, guess we had better dust off the manual and look it up. Ah! There it is, M. Well, we've put it all in now. How do you get out of the M command? Back to the manual...

So, you just got your new Level II system

back from the store. Good! Let's see how much memory there is on a Level II. Type in P.M. Hmm... SN ERROR?

All right, Captain Joe. Fry the last Klingon and we'll accomplish our mission. Impulse, down, four. God! Now look what we did! We messed up the whole game! Those commands aren't in this game!...

Ever have one of the above diseases? They are very serious. The first disease, forgetfulness, afflicts most of us at one time or another. The second, change-osis, can catch you by surprise. The last disease is a killer. It's called end-of-the-game errosis. It is a complex form of both change-osis and forgetfulness.

Relieve Those Symptoms!

As a victim of all three of these diseases one night, I decided to become my own doctor and make a serum that could relieve the symptoms for a while. I call it

BAM. This serum, taken in gradual doses, can help you learn machine code without having to look up one-letter commands. It can help make the change from Basic to machine code like learning a few words, rather than learning a whole new language, by highlighting the resemblance of machine code commands to Basic commands.

Yes, you have the right magazine. Go ahead and check the cover. I'm doing what you all ask for, you know, the plain English bit. Well, this is plain English from a 14 year old. I'm here to bring you all down to earth and show you what a child can do.

I wrote this program to help those of you who have to look up the one-letter commands for the RSM—1,2,2D, T-BUG, or any other monitor on the market. In BAM, each command is a full *word*, not a single letter, so you can remember what it is supposed to do more easily. In addition, I wrote BAM so that you professors can change it, expand it, and add to it, thus impressing your boss when he comes over for dinner and wants to know about machine code. (You can hide the fact that a kid in ninth grade wrote it by himself.) For example, you could use it to key in a program to tell you how much water it would take to wash a half load of clothes.

Take a Shotgun to that Monitor

Before you begin your quest, I'd like to warn you about something. When the program was still in its design stages, I decided to add a mess of new commands to it. I'd stuffed it so full of junk that the editor/assembler told me, in capital letters, SYMBOL TABLE OVERFLOW. I was so outraged that I wanted to take a shotgun to my screen. But I was in luck. The tape commands and a few others had not been put (or written, for that matter) in yet, so I deleted all the tape subroutines and a few others.

Table 1. Listing of the Subroutines in BAM.

LW This subroutine is not executed by the monitor, but patched into BASIC. If you don't have a lowercase mod installed, you do not need to put it in. But if you ever plan to have lowercase, you should leave it in anyway.

PR This subroutine is an alternative to calling 28A7H. I made this so that I wouldn't have to use up extra lines in the source program. For example:

DEFB	'B'	;This produces an uppercase B when you print ;it using the 28A7H subroutine.
DEFB	'B' + 32	;This produces a lowercase B when printed ;with the 28A7H sub.
DEFB	'L'	;This prints a lowercase L when printed ;with the PR sub.
DEFB	'L' + 32	;Prints an uppercase L when printed by ;the PR sub.
SO....		
DEFB	'C' + 32	
DEFM	'OMMAND?'	

Table continues

*"The first disease, forgetfulness,
afflicts most of us
at one time or another."*

To put the monitor from paper to tape or disk, use the dreaded editor/ assembler to type in the source program. If you don't have the editor/assembler, or only have 4K of memory, use your monitor to key it in by hand. You should change the ORG statement as follows: from 79A7 to 49A7 for 4K, B9A7 for 32K, or F9A7 for 48K systems.

The procedure for loading BAM (Beginners Advanced Monitor) is very simple. First, answer the Memory Size? question with 31142 for 16K, 18854 for 4K, 47526 for 32K, or 63910 for 48K. To get to the Memory Size? question, either turn off the computer or type System (Enter) and /O (Enter). Then type System (Enter) and the name of the monitor (I use BAM). When the monitor has successfully loaded into memory, hit the slash key and Enter. The screen should clear, and BAM Operating System REV 4.1 and Command? should be on the screen. (The Command? will be on the screen if you have a lowercase mod installed.)

With the monitor running, you can now test how well you read and try any of the following commands:

Restart: restarts the monitor. It isn't really necessary, but if you change it, it may come in handy. As written, it clears the screen, enables KBFIX and lowercase, and displays what you see when you type in the slash. The format for entering this command so that the monitor will accept it is Restart (and Enter, because the computer never knows when you are through).

ASCII executes an ASCII dump of memory. If the character to be printed is non-ASCII, a period is printed instead. To temporarily stop execution of the dump, hit the shift @ keys just as you would to stop a Basic listing. To continue, hit any other key. If you want to get back to the monitor, while execution is stopped, hit the Break key. From now on, when the computer is waiting for you to hit Enter or Break, if you hit Break, you are instantly returned to the monitor. Trust me.

Dump executes a hexadecimal dump of memory. The current address is displayed, along with the 16 bytes in memory. After printing a line, the computer waits for you to hit Enter or Break. If you hit Enter, the next address is printed along with the next 16 bytes in memory. The format is: Dump xxxx (Start) xxxx (End).

Modify is similar to T-BUG, and, in fact, the only difference is that you type Modify instead of M. It modifies memory one byte at a time. To display the next byte, hit Enter. To return to the monitor, hit Break. To change the byte, type in the hexadecimal number. Hitting any non-hex number will cause an error message to be displayed. The format is: Modify xxxx (Start).

Search goes through the entire memory

Table continued

will produce 'Command?' if it is printed with the PR sub. But:

DEFB 'C'
 DEFB 'O' + 32
 DEFB 'M' + 32
 DEFB 'M' + 32
 DEFB 'A' + 32
 DEFB 'N' + 32
 DEFB 'D' + 32
 DEFM '?'

will produce 'Command?' if it is printed with the 28A7 subroutine. You can plainly see that it is easier to type in the first example rather than the second, and it conserves valuable buffer space.

KB This is our keyboard debounce routine. It is very crude, but it serves our purpose.

KEY1 This subroutine scans the keyboard. If shift @ is pressed, execution is stopped until you hit another key. If the Break key is pressed, you are returned to the monitor.

KEY Gets a key from the keyboard.

CON This subroutine converts all text in the buffer to uppercase. This is used in case you hit lowercase letters, since the commands are in uppercase.

UN This subroutine moves the HL register to the first non-blank character in the buffer. This is used in case you accidentally type in a space or two before the command.

NEXT This searches through the command table and returns when a 00 hex is found.

INPUT Inputs a line of 65 characters into the buffer. See Wes Thielke's article (ROM routines, #2, p. 106) for the requirements to call the subroutine.

DECIPH This subroutine is the heart of the program. It deciphers the command at the buffer against the commands at the command table. If an exact match is made, the number of the command is returned in the accumulator and at (CO). If no command is found, a zero is returned at (CO).

BLANK This subroutine searches for the first blank (20 hex) in the HL register.

HTOASC This subroutine displays the accumulator on the screen as two ASCII characters. For example, if the A register contained 3C hex, the codes 33 hex and 43 hex would be displayed on the screen.

ASCTOH This subroutine forms a hexadecimal number from two ASCII characters starting at the address pointed to by HL.

ZERO1 This subroutine loads the three workspace words with 0000. Used mainly as a precaution.

EVAL1 This subroutine calls ZERO1, and loads the HL register with the address of the first character (non-blank) of the buffer.

EVAL This subroutine forms a 16 bit integer from the buffer. The number is returned in the DE register.

GET3 Forms three 16 bit numbers from the buffer. (DR),(EN), and (ST) contain the first, second, and third numbers, respectively.

GET2 Forms two 16 bit numbers from the buffer. (EN) and (ST) contain the first and second numbers, respectively.

GET1 Forms one 16 bit number from the buffer. (ST) contains the number.

GETKEY Waits for the user to hit Enter or Break. If the user hits Break, a 01 hex is returned.

CASC Checks to see if the A register contains a valid ASCII code. If it doesn't, the A register is loaded with a period.

DEHL Compares the HL and DE registers. The Z flag is set if they are equal.

DISPHL Displays the HL register on the screen with a colon. Example: If the HL register contains 5610H, if you call DISPHL,
 5610 :
 will be displayed.

NUM Checks to see if the accumulator contains a valid hex number in ASCII. If it does not, an error message is displayed and you are returned to the monitor.

ERROR Prints 'Error at ' along with the HL register. The C register is incremented.

RESTART [Enter] ----- Restarts monitor.

ASCII xxxx xxxx ----- Executes an ASCII dump from start to finish.

DUMP xxxx xxxx ----- Executes a hexadecimal dump from start to finish.

Modify xxxx ----- Modifies memory one byte at a time.

SEARCH xxxx xx or /xx -- Searches memory for two characters or two bytes.

MOVE xxxx xxxx yyyy ---- Moves memory from start to start1 for yyyy number of bytes.

CHECKSUM xxxx xxxx --- Computes and displays checksum from start to finish.

TEST xxxx xxxx ----- Tests memory from start to finish. Bad addresses are displayed.

ZERO xxxx xxxx ----- Zeroes memory from start to finish.

GOTO xxxx ----- Jumps to address given.

BASICM ----- Jumps to 0000H

BASIC1 ----- Jumps to 1A19H

BASIC ----- Jumps to 0072H

----- Does same command again. User must type in information again. Also, the # must be the first character of the input.

ADD xxxx xxxx ----- Adds two numbers. Result is displayed along with the carry.

SUB xxxx xxxx ----- Subtracts two hexadecimal numbers. Displayed like ADD.

INP xx ----- Inputs from a port. Value received is displayed.

OUT xx yy ----- Outputs port xx with value yy.

ENTER xxxx ----- Enters a string of 255 characters at xxxx. Can be stopped at any time with Enter or Break.

Table 2. Summary of commands.

LYNN'S A/R SYSTEM

12 Intergraded Account Receivable Programs

Tested In Service For Over 3 Years

User's Comments: • menu driven • increased cash flow • saved over 50 hours a month in secretarial hours • almost completely eliminated billing errors • phone supported-ask for Ron.

LYNN'S A/R SYSTEM WILL

- print invoices
- tell you your a/r total, number of invoices outstanding, average per invoice
- tell you at any time how many invoices an individual account has open, the total amount owed, the average per invoice, the invoice date, and then invoice amount
- total sales on account for a given month, number of invoices sent, average sale per invoice
- how much an account purchased during month, how many invoices were sent, average invoice for month
- tell you what percent of sales an account is to total sales by month
- tell you what percent of a/r an account is
- print mailing labels for your accounts
- print statements at any time you want them (either individual or all accounts)
- print alphabetical hardcopy of accounts and account numbers
- print all items sold for month
- alphabetical sort of items sold by month
- this set of programs can be custom modified by you or us
- AND MUCH MORE!!

-AGING REPORT FOR LYNN'S A/R SYSTEM-

Aging Report 01/31/82 Page 1

Account	Current	30-60 Days	60-90 Days	90+ Days	Total
ABC Inc.	\$ 249.00	\$ 65.20	\$ 00.00	\$ 00.00	\$ 314.20
Old Co. Inc.	00.00	84.40	165.20	00.00	249.60
New Co. Inc.	97.75	00.00	00.00	00.00	97.75
Deadbeat Inc.	00.00	00.00	00.00	345.00	345.00

Totals \$346.75 \$ 149.60 165.20 345.00 \$ 1,006.55

Aging reports can be compiled on a daily, weekly or monthly bases.

LYNN'S CHECKBOOK LEDGER SYSTEM

•Phone Supported Ask For Ron•

- saves hours of posting to general ledger
- almost completely eliminates mathematical errors
- menu driven
- 200 expense fields
- will handle 1,000 checks a month
- will print checks with option to enter handwritten checks
- will do reconciliation statement with hardcopy
- will print hardcopy of field totals both by month, year to date and end of year
- automatic account numbering
- automatic field entry
- will print hardcopy of checkbook register
- debit and credit memo entry
- alphabetical hardcopy of accounts payable and account numbers (machine language sort, very fast)
- AND MUCH MORE! •

DATA BASE MANAGER BY WELLS

perfect tool for storing and maintaining mailing list, inventories, menus, collection records, article references, important dates, client records • all functions menu driven • easy to interface to word processors and communication programs • sort in ascending or descending order (fast machine language sort) • compact storage with minimum overhead • go from data base to visualc and return • sort and select visualc lines!! • interface to Radio Shack's "advanced statistical package".

LYNN'S

Account Receivable System	\$49 ⁹⁵
Account Receivable Aging Report	\$20 ⁰⁰
Checkbook Ledger System	\$69 ⁹⁵
Well's Data Base Manager	\$39 ⁹⁵

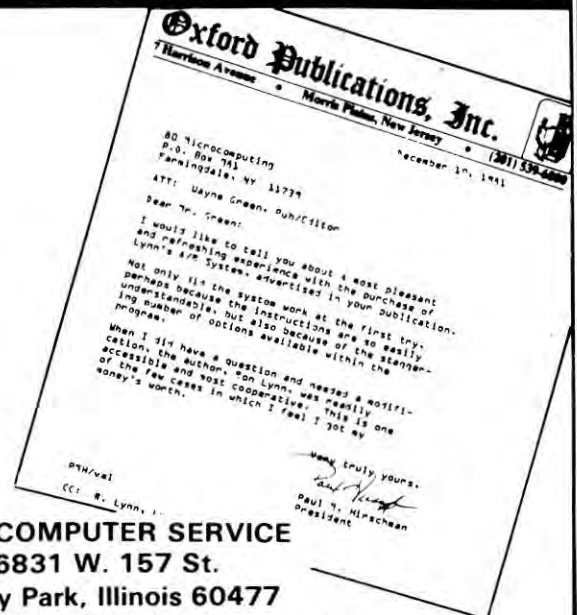
Add \$2.00 Freight and Handling.

Illinois Residents Add 6% Sales Tax.

Send \$10.00 Per System
For Printouts and Documentation.
Credit Given on Order

Equipment Needed: 48K Model I or III,
Lineprinter, 2 Disk Drives.

The above programs will work on TRSDOS 1.2 and 1.3 for the Model III. NEWDOS, NEWDOS80, NEWDOS80 V2.0, LDOS and MULTIDOS for the Model I and III.



LYNN COMPUTER SERVICE
6831 W. 157 St.
Tinley Park, Illinois 60477
(312) 429-1915

TRSDOS and TRSDOS are trademarks of TANDY CORP. NEWDOS and NEWDOS80 are trademarks of APPARAT INC. LDOS is a trademark of LOGICAL SYSTEMS INC

“...I decided to become my own doctor and make a serum.”

looking for either two hex bytes or two ASCII characters. When they are found in succession, they are displayed like this:

MATCH MADE AT 2CA0 : F8 [CD][96] 02__

The address displayed (2CA0) contains the hex byte between the first pair of signs (CD). The monitor then waits for you to hit Enter or Break. If you hit Enter, the computer searches for the next pair of bytes, and returns you to the monitor when it has searched through the entire memory. The format is: Search xxxx (Start) xxxx (Hex

bytes) or /xx (Two ASCII chrs). Here are two examples:

```
SEARCH 0000 CD96 (ENTER) -or-
SEARCH 0000 /ME (ENTER)
```

Move relocates memory from the start to the new address for the number of bytes specified. The formats: Move xxxx [Start] xxxx [New address] xxxx [Number of bytes].

Checksum computes and displays a checksum of memory. The format is: Checksum xxxx [Start] xxxx [End].

Test does what it indicates: tests

memory. No locations are changed. The address with the suspected error is displayed. After the last address has been tested, a total number of errors is printed. If you make a typing error, such as testing the entire ROM, hit the Break key. The format is: Test xxxx [Start] xxxx [End].

Zero is a command that zeroes memory. The format is: zero xxxx [Start] xxxx [End].

GOTO executes a jump to the location given. The format is: GOTO xxxx [Address].

BASICM jumps to 0000H (power-up). The format is: BASICM

BASIC1 jumps to 1A19H (re-entry). The format is: BASIC1

BASIC jumps to 72H (better than 1A19). The format is: BASIC

repeats a command. The user must retype any additional information.

Add is something you learned how to do in first grade. It adds two hexadecimal numbers and displays the result, along with the carry. The format is: Add xxxx [first number] xxxx [second number].

Sub is something you learned in the second grade. It subtracts two hexadecimal numbers and displays the result and the carry. The format is: Sub xxxx [first no.] xxxx [second no.].

INP inputs a value from a port. The received value is displayed. The format is: INP xx [port #].

Out outputs the specified port with the specified value. The format is: out xx [port #] xx [value].

Enter enters a string of ASCII characters. Control characters are accepted also. The format is: Enter xxxx [Address].

When entering any command, any extra information such as addresses, values, and so forth, should have a space included between each item:

```
Dump [space] 44A7 [space] 4500
Search [space] 0000 [space] /ME
Out [space] FF [space] 08
```

When I wrote the monitor, I made it as easy as possible to take out the subroutines and use them in other programs. You can change the name of any command by changing its name at CM, change the error messages E1-E4, and so forth. See Table 1 for the list of subroutines and their functions.

The program, in its present state, occupies only 88 bytes more than T-Bug. Which would you rather have? Think about it. ■

Jeff is a 14 year old. This is his first published article.

Program Listing

```

00100 ;
00110 ; BAM
00120 ; BY JEFF BYRKIT
00130 ; FOR TRS-80 LEVEL II
00140 ;
79A7 00150 ORG 79A7H
79A7 0000 00160 ST DEFW 0
79A9 0000 00170 EN DEFW 0
79AB 0000 00180 DR DEFW 0
0041 00190 BU DEFB 65
79EE 00 00200 CO DEFB 0
79EF 0D 00210 M2 DEFB 13
79F0 63 00220 DEFB 'C'+32
79F1 4F 00230 DEFM 'COMMAND?'
79F8 20 00240 DEFB 32
79F9 0E 00250 DEFB 14
79FA 00 00260 DEFB 0
79FB 6D 00270 M4 DEFB 'M'+32
79FC 41 00280 DEFM 'ATCH MADE AT '
7A09 00 00290 DEFB 0
7A0A 63 00300 M5 DEFB 'C'+32
7A0B 48 00310 DEFM 'CHECKSUM IS '
7A16 00 00320 DEFB 0
7A17 65 00330 M6 DEFB 'B'+32
7A18 52 00340 DEFM 'RROR AT '
7A20 00 00350 DEFB 0
7A21 20 00360 M7 DEFB 32
7A22 74 00370 DEFB 'T'+32
7A23 4F 00380 DEFM 'OTAL ERRORS.'
7A2F 00 00390 DEFB 0
7A30 42 00400 M8 DEFM 'B.A.M. OPERATING SYSTEM REV 4.1
7A4F 0D 00410 DEFB 13
7A50 00 00420 DEFB 0
7A51 52 00430 MC DEFM 'R'+32
7A52 45 00440 DEFM 'ESULT IS '
7A5B 00 00450 DEFB 0
7A5C 20 00460 MD DEFB 32
7A5D 63 00470 DEFB 'C'+32
7A5E 41 00480 DEFM 'ARRY IS '
7A66 00 00490 DEFB 0
7A67 6E 00500 E3 DEFB 'N'+32
7A68 4F 00510 DEFM 'OT ENOUGH INFORMATION.'
7A7E 00 00520 DEFB 0
7A7F 73 00530 E5 DEFB 'S'+32
7A80 59 00540 DEFM 'NYNTAX ERROR.'
7A8C 00 00550 DEFB 0
7A8D 6E 00560 E6 DEFB 'M'+32
7A8E 4F 00570 DEFM 'ON-HEX NUMBER.'
7A9C 00 00580 CM DEFB 0
7A9D 52 00590 DEFM 'RESTART'
7AA4 0D 00600 DEFB 13
7AA5 00 00610 DEFB 0
7AA6 41 00620 DEFM 'ASCII'
7AAB 00 00630 DEFB 0
7AAC 44 00640 DEFM 'DUMP'
7AB0 00 00650 DEFB 0
7AB1 4D 00660 DEFM 'MODIFY'
7AB7 00 00670 DEFB 0
7AB8 53 00680 DEFM 'SEARCH'
7ABE 00 00690 DEFB 0
7ABF 4D 00700 DEFM 'MOVE'
7AC3 00 00710 DEFB 0
7AC4 43 00720 DEFM 'CHECKSUM'
7ACC 00 00730 DEFB 0
7ACD 54 00740 DEFM 'TEST'
7AD1 00 00750 DEFB 0
7AD2 5A 00760 DEFM 'ZERO'
7AD6 00 00770 DEFB 0
7AD7 47 00780 DEFM 'GOTO'
7ADB 00 00790 DEFB 0
7ADC 42 00800 DEFM 'BASICM'
7AE2 0D 00810 DEFB 13
7AE3 00 00820 DEFB 0
7AE4 42 00830 DEFM 'BASIC1'
7AEA 0D 00840 DEFB 13
7AEB 00 00850 DEFB 0
7AEC 42 00860 DEFM 'BASIC'
7AF1 0D 00870 DEFB 13
7AF2 00 00880 DEFB 0
7AF3 49 00890 DEFM 'INP'

```

Program continues

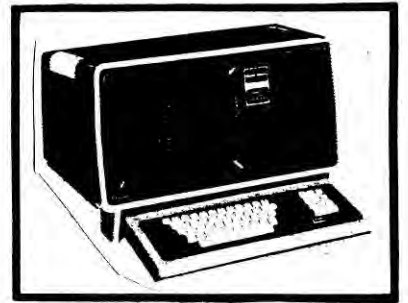
"The program... occupies only 88 bytes more than T-Bug."

Program continued

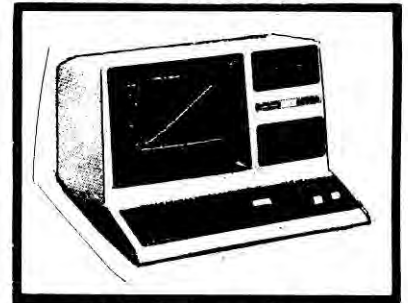
Table with multiple columns containing program details: address, data, operation, label, and other parameters. Includes entries like 7AF6 00 00900 DEFB 0, 7A7F 4F 00910 DEFM 'OUT', etc.

Program continues

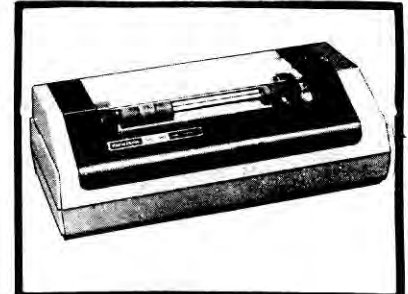
We have THE LOWEST PRICES ON TRS-80™



Model II 64K \$ 3298



Model III 16K \$839



Line Printer VII. \$329

OKIDATA Microline 80 \$394 Microline 82 \$499

EPSON MX-70 \$369

EPSON MX-80 \$479

\$ SAVE \$

MOST ORDERS SHIPPED WITHIN ONE BUSINESS DAY \$

VERBATIM DATALIFETM DISKETTES 5 1/4-inch (box of 10) \$25.95 8-inch Double-Density, \$43.95

* Payment: Money Order, Cashier's Check, Certified Check, Personal Checks require 3 weeks to clear. VISA, MASTERCARD — Add 3%.

WRITE OR CALL FOR OUR COMPLETE PRICE LIST.

CALL (602) 458-2477

All prices are mail order only

RAND'S

2185 E. FRY BLVD.

SIERRA VISTA, AZ 85635

TRS-80 is a trademark of Tandy Corporation.

M-ZAL™

Release Two Is Here!

Our Users asked for it, and we made the best TRS-80 disk assembler even better! Now M-ZAL has:

- Recursive MACROS with full symbolic parameter substitution
- Conditional assembly with unlimited nesting
- Text Editor warm-start/recovery option
- Support for all popular source file formats
- Load Module inspect/superzap using LINKER

and the features that made it famous:

- True multi-pass assembly
- Full Screen Option Menus
- ENTRY/EXTERN symbols, relocation, and object module linking
- 8 character labels with sorted symbol table
- Built-in symbol table cross-reference
- Nested *INCLUDES (source file chaining/nesting)
- Lower case support (Model 3 only)
- Over 175 pages of documentation including Z-80 Technical Manual
- Full Screen Text Editing and much, much more!

M-ZAL provides a modular, structured development environment that makes programming your TRS-80 a truly enjoyable experience. Order yours today. (Requires 32k, 2 disk system)

#1050-10	Mod 1	\$149.00
#1250-10	Mod 3	\$149.00

CAU Development Software— The Professionals Choice:

Full Screen Text Editor for BASIC: we were the first to give the TRS-80 this indispensable ability! A must for every BASIC programmer:

#1010-20	Mod 1	\$24.95
#1210-20	Mod 3	\$29.95

T-ZAL: custom designed for the Model 3, this tape based assembler has many of M-ZAL's most desired features.

#1250-20	Mod 3 only	\$49.95
----------	------------	---------

XBUG: for machine language analysis and debugging—this tiny (2.5k) but powerful program lets you do it all!

#1020-10	Mod 1	\$19.95
#1220-10	Mod 3	\$19.95

FILEXFER: transfer any disk file between two TRS-80s. Use direct cable link or RS modems. Mod 1 and Mod 3 can be mixed. RS-232 and disk reqd.

#1040-10	Mod 1 and 3	\$49.95
----------	-------------	---------

"We've been using M-ZAL heavily for over two months now, and it's been worth its weight in gold."

—Chuck Tesler
PROSOFT

"The documentation is excellent..."

—Jim Klaproth
80-U.S. Journal
BASIC Editor Review

"...well written software that is long overdue."

—Bruce Douglass
80 Microcomputing
BASIC Editor Review

"During the first 3 days of use, M-ZAL saved more money in programmers time than we had paid for the product."

—William Denman
Author of Asylum
MED SYSTEMS

"The editor has at least doubled my productive capacity...Having spent a good deal of money on so called 'utilities' that don't work, it's a delight to find one that not only lives up to its claims but surpasses the advertising."

—BASIC Editor user

Call or write for more information.

All products require level II.

Mail orders specify catalog #.

Send check, money order, or MC/VISA numbers and expiration date to:

Computer Applications Unlimited

P.O. Box 214, Dept. ABM Rye, New York 10580
(914) 937 6286

N.Y. State residents add applicable sales tax.
Outside USA and Canada add \$7.00 shipping.
Dealer Inquiries Invited.



CAU™ **COMPUTER APPLICATIONS UNLIMITED**™
a div. of CAU, Inc.

↗120

TRS-80 is a TM of Tandy Corp. M-ZAL is a TM of CAU, Inc.
Z-80 is a TM of Zilog, Inc.

**CALL TOLL FREE
800 424-2738**



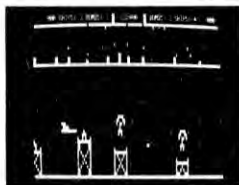
**DEFENSE
COMMAND**



By Hogue & Konyu from Big Five
You are the lone defender of 10 Krotnium fuel cells essential for the survival of the planet. Aliens swoop down from above to steal the fuel; it's your job to destroy them. You can still save the cells after a raid, but you must shoot the alien and simultaneously move under the cell to catch it. If things look bad you can set off one of your 4 antimatter bombs and destroy all enemies on the screen!

16K tape...\$15.95 32K disk...\$19.95

ELIMINATOR



By Westmoreland & Gilman from A.I.
You'll need all your keyboard manipulative skills to keep up with the action in this arcade game. You travel across the planet's low-altitude airspace in an effort to prevent the marauding enemy from capturing your energizer cells. All manner of alien craft await your arrival with destructive forces. For 1 or 2 players, with sound.

32K disk...\$24.95



**ALIEN
DEFENSE**

By Larry Ashmun from Soft Sector
Piloting your ship across the horizontally moving terrain, you must battle the various enemy spacecraft. You are under attack almost constantly, and to make matters worse, your ground patrol people are being picked up by the alien landers. To save them, you must shoot the landers and "catch" the falling man. This fast action game requires skill and rapid reflexes. The model III version uses that model's special graphic features.

Model I, Tape: \$19.95 Disk: \$24.95
Model III, Tape: \$19.95 Disk: \$24.95

Visit our other stores: Seven Corners Center · Falls Church, VA & W. Bell Plaza · 6600 Security Blvd. · Baltimore, MD

the
**PROGRAM
STORE**

SKY WARRIOR

By Roger Schrag from A.I.
Your job is simply(!) to pilot your ship through a tortuous, horizontally scrolling maze, avoid or destroy the many enemy missiles that are constantly being launched against you, then find and destroy the alien fuel dumps. All the while, you must constantly monitor your dwindling fuel supply or risk an untimely end. 1 or 2 players, with sound.

16K tape...\$14.95
32K disk...\$20.95

**Instant Search/Sort
DATABASE**

By G. Hatton from Acorn
An easy-to-use, yet powerful database management tool, ISS alleviates many of the complications usually found in setting up and maintaining information files. Written in machine language, ISS can provide a multitude of sorts, subsorts, searches and categorizations in seconds. Because the processing is done in memory, you can manipulate the data at will without risk to your database on tape or disk. The number of records is limited only by your file format and the amount of RAM in your system.

16K tape or 32K disk...\$49.95



**MONEY
MANAGER**

By Andrew P. Bartorillo from Acorn
A complete management tool for the home budget, it accurately keeps track of your checkbook and provides an easy method of budget allocation. You can store information on up to 100 checkbook entries per month (250 with 48K), specify any automatic withdrawals, keep records of tax-deductibles, and record expenses by category. You can even break up charge account payments into the proper categories.

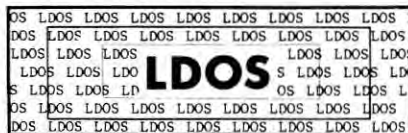
32K disk...\$39.95

**Data File
Programming**

By Finkel & Brown from Wiley & Sons
This self-teaching guidebook, written in clear, non-technical language, leads you at your own pace through the intricacies of data file programming and maintenance. Once learned, data file manipulation is the key to virtually all programming in the business and classroom environment. The book helps you set objectives and self-tests you on your progress toward them.

342 pages...\$9.95

New Low Price!



From Lobo

"...LDOS is by far the best disk operating system for the Model I TRS-80."

Paul Wiener,
June 80-MICROCOMPUTING

"...if you are a serious programmer, you should have LDOS."

George Blank, Editorial Director
September CREATIVE COMPUTING

A totally new and advanced operating system that offers benefits to everyone from novice to advanced system programmers. LDOS comes with one of the most complete and well written documentation books ever, with easy-to-follow instructions to get started plus a wealth of supporting information for when you need it. This, plus a toll-free customer service number means that LDOS supports you as no one has before!

Completely device independent, LDOS provides for routing, linking, setting, and filtering of the input/output of a number of peripherals. Up to eight disk drives are supported in almost any mixture: 5", 8", single/double density, up to 80 tracks, even hard disks.

"Job Control" can end the tedium of repetitive keystrokes needed to call up and manipulate programs. Once you tell LDOS what it needs to do to get you up and running, it executes the series thereafter with a simple command. And LDOS notes the date all files were created or modified -- even flagging files that haven't been backed-up after modification.

We've just scratched the surface of LDOS' capabilities, and we'll gladly send you a pamphlet that goes into more detail. But better yet, order LDOS now and begin enjoying the power that this system will bring to your computer use.

Disk with manual: ~~\$149.95~~ **Now \$129.95**
Specify model I or III

**EDITOR/
ASSEMBLER-
PLUS**

By Chamberlin & Yates from Microsoft
The "PLUS" in assembly language programming has arrived! Get the features of the Radio Shack version, PLUS the debugging features, macros, and more. Clear explanations abound in the 80-page reference/instruction manual. It fully describes all the features, including the macro facility, assembly direct to memory, conditional assembly, added expression evaluators, auto-origin, alphabetic symbol table, and the quash command.

16K tape (model I)...\$29.95
32K disk (model I)...\$49.95



TO ORDER CALL TOLL FREE 800 424-2738

For information
Call (202) 363-9797

THE PROGRAM STORE

4200 Wisconsin Avenue NW, Dept. 8E04 Box 9609
Washington, D.C. 20016

MAIL ORDERS: Send check or M.O. for total purchase price, plus \$1.00 postage & handling. D.C. residents, add 6% tax. Charge card customers: include all embossed information on card.

Get the most from your micro with software and accessories from one of the world's largest selections.

The Program Store

CALL TOLL FREE 800 424-2738



asylum

From Med Systems

Your eyes are bloodshot as you peer into your computer's screen and cry, "I must be CRAZY!" If this has never happened to you, you've never tried ASYLUM, the 3-D graphics adventure! ASYLUM places you on a cot in a small (padded?) room. Periodically the janitor lob a hand-grenade through the window. What you do next could mean escape -- or disaster.

16K tape...\$14.95



Crush, Crumble and Chomp!

From Epyx

It's a monster movie, and you are the monster! You can be The Glob, Kraken, Mantra, Mechismo, Arachnis, or Goshilla -- or even design your own "custom" monster (disk version only). This hilarious action game is loaded with graphics and sound as you practice your villainy.

16K tape or 32K disk...\$29.95

StarFighter



By Sparky Starks from Adventure Int.

As mercenary and galactic police officer, you must maintain the condition and control of all parts of your spacecraft. Suddenly something appears on your screen: is it a Star-pirate or a friendly merchant ship? You can't tell yet, and at this speed you may have only a fraction of a second to make an attack/no attack decision.

Model I & III, 16K tape...\$24.95
Model I disk version...\$29.95

LUNAR LANDER

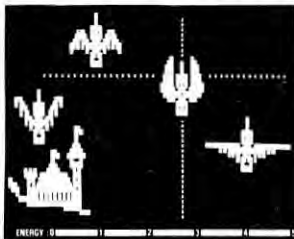


By Wall & Moncrief from Adventure Int.

You get a vast lunar landscape, graphically depicted in both long range and close up, with many choices for landing sites. Choose a more difficult site and get more points -- if you can land successfully. Great graphics and sound add to the realtime challenge and fun.

16K tape...\$14.95

VOYAGE OF THE VALKYRIE



By Leo Christopherson from AOS
Combine the animation and music techniques pioneered by Christopherson with the challenge of his first fast-moving arcade game and you have VOYAGE OF THE VALKYRIE! You speed through a magical maze guarded by ferocious birds that swoop down to attack if you don't get them first. To list all the play and options of this exciting game would take the 16 pages of instruction included.

16K tape...\$34.95
16K disk...\$39.95

ALSO FROM CHRISTOPHERSON:
DUEL-N-DROIDS

Teach your "animated android" how to wield a laser sword in mortal yet comic battle. Entertainment for all ages.

16K protected tape...\$14.95
16K protected disk...\$20.95



By John Allen from Acorn

Once you load ASTROBALL into your TRS-80, the arrow keys become flipper buttons, the screen becomes the play board, and you become the "Pinball Wizard!" A flying saucer, spaceships, meteors, and black holes add to the fun as your ball realistically zings around the board. Five skill levels.

16K protected tape...\$19.95
16K protected disk...\$19.95

ALSO FROM JOHN ALLEN:
PINBALL

Lots of sound and flashing graphics make this fast action game so much like the real thing that you'll have to remind yourself not to "TILT" your TRS-80.

16K protected disk...\$14.95
16K protected disk...\$20.95

Unbelievable Realtime 3-D Graphics!



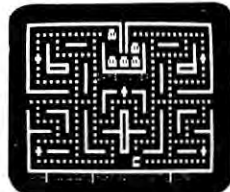
FLIGHT SIMULATION

From Sub-Logic

During FLIGHT SIMULATION, you instantly select instrument flight, radar, or a breathtaking pilot's-eye-view. But be sure to strap yourself in -- you're liable to get dizzy!

NOW FOR MODELS I & III!
16K tape...\$25.00 32K disk...\$33.50

SCARF-MAN

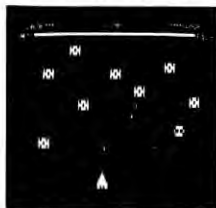


From Cornsoft Group

Race your Scarfman around a maze, gobbling up scoring dots. You are pursued by five monsters: if you eat a "+" they'll lower their eyes and you can eat them, otherwise they'll eat you! SCARFMAN may be played using the keyboard or Alpha Product's Joystick. WARNING: MAY BE HABIT-FORMING!

Tape...16.95

Disk (specify mod. I or III)...\$20.95
Alpha Joystick:
mod. I: \$39.95, mod. III: \$49.95

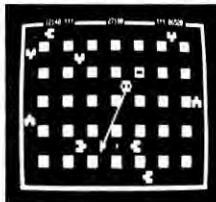


COSMIC FIGHTER

By Hogue & Konyu from Big Five

While fighting off the alien convoys -- each more skillful than the last -- you must keep track of your rocket fuel or risk explosion.

16K tape...\$15.95 32K disk...\$19.95

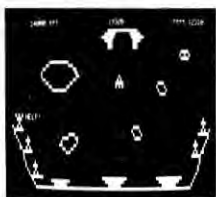


ATTACK FORCE!

By Hogue & Konyu from Big Five

Unlike the usual space "shoot-em-ups," Attack Force lets you control both speed and direction as you maneuver all over the screen in search of the alien Ramships and Flagships.

16K tape...\$15.95 32K disk...\$19.95



METEOR MISSION 2

By Hogue & Konyu from Big Five

Six astronauts are stranded on a desolate planet. You must undock from your command module and maneuver your rescue shuttle through the asteroid field to save them.

16K tape...\$15.95 32K disk...\$19.95

COMING SOON: MYSTERIOUS ADVENTURES

A new series of adventures from Acorn that is bound to keep you asking for more!

THE PROGRAM STORE • Dept 8E04 Box 9606 • 4200 Wisconsin Ave, NW • Washington, D.C. 20016

✓80

Item	Price	Postage \$1.00	name
_____	_____	Total _____	addr _____
_____	_____	<input type="checkbox"/> CHECK <input type="checkbox"/> VISA	city _____ state _____ zip _____
_____	_____	<input type="checkbox"/> MASTERCARD MC Bank # _____	Card # _____ Exp _____

For users of Lifeboat's CP/M.

Model II Terminal Driver

James E. Korenthal
175 West 12th Street
New York, NY 10011

The Key Box

Model II
Microsoft Cobol-80
Lifeboat CP/M

This article shows users of Lifeboat Associates' implementation of CP/M with Microsoft Cobol-80 on the TRS-80 Model II how to implement a terminal driver using the same keyboard codes as Microsoft's TRSDOS driver. The replacement driver takes advantage of all special features found in the TRSDOS driver, and uses an audible alarm in a somewhat unconventional way.

If you use Lifeboat CP/M, but not Micro-

soft Cobol-80, you may be interested in the last two paragraphs in the *Method of Attack* section.

Problems to be Solved

When you received Cobol-80, you probably turned quickly to the User's Guide, Appendix A, *Configuring the CRT*. After noticing no special driver for the TRS-80 Model II, you probably figured that since Lifeboat emulates a Lear-Siegler ADM3-A, it was appropriate to use the CDADM3 driver. So, you installed the driver according to Microsoft's instructions, and compiled, linked, and ran the CRTEST program supplied with the distribution disk. Alas, although the program ran, it did not produce the results you would have liked to see. The problems were:

- The cursor on/off feature was not operational;
- There was no highlighting (reverse video);
- The F1 and F2 keys did not perform as expected;
- The screen scrolled when it was not supposed to; and
- The "Audible Alarm" was inaudible.

The first two problems are because the ADM3-A does not support the cursor on/off and highlighting functions. The third happens because there are no function keys on the ADM3-A. The fourth is more complicated, and will be explained below. The fifth probably did not surprise you, because the TRS-80 does not have a bell.

Method of Attack

We can solve all these problems, (even the fifth, if you have the right type of printer) through the design of a special-purpose terminal driver for the TRS-80 Model II. On page 42 of the Cobol-80 User's Guide (Appendix D) you will see that the new driver supplies the same key codes for all input functions (thus enabling the F1, F2, and arrow keys). Of course, we cannot use the same output functions, because these are meaningless in a CP/M environment. We must, therefore, resort to more devious means of solving the other problems.

Program Listing

```

; When linking programs which use this driver, you must
; explicitly specify the REL file in order to ensure that
; this $outch is used instead of the Microsoft version
; (you'll get a "Mult. Def. Global $OUTCH" error which
; you can ignore). For example:
;
;      A> 180 myprog/n,myprog,cd80m2/e
;
entry   $crln,$scrwid,$setcr,$scuron,$scurof
entry   $curbk,$serase,$alarm
entry   $eol,$hilit,$lolit
entry   $clist,$tlist,$flist

entry   $outch           ;replace $outch in coblib

.z80    ;work in Z-80 mode

0005    bdos equ x'0005'   ;bdos entry point
F800    vidram equ x'f800' ;beginning of video ram
FF80    vidend equ vidram + 24 * 80 ;one past end of video ram

;keyboard code definitions

0000'   $clist:           ;editing key definitions
0000'   15 db x'15'       ;line delete (ctl-U)
0001'   08 db x'08'       ;char delete (backspace)
0002'   1D db x'1d'       ;forward space (right arrow)
0003'   1C db x'1c'       ;back space (left arrow)
0004'   2B db x'2b'       ;plus sign
0005'   2D db x'2d'       ;minus sign
0006'   00 db 0           ;end of list

0007'   $tlist:          ;terminator key definitions
0007'   1E db x'1e'       ;backtab (up arrow)
0008'   1B db x'1b'       ;escape key (ESC)
0009'   09 db x'09'       ;forward tab (TAB or ctl-I)
000A'   0D db x'0d'       ;carriage return (ENTER)
000B'   1F db x'1f'       ;line feed (down arrow)
000C'   00 db 0           ;end of list

000D'   $flist:          ;function key definitions
000D'   01 db x'01'       ;F1 or ctl-A
000E'   02 db x'02'       ;F2 or ctl-B
000F'   00 db 0           ;end of list

```

Program continues

“The fifth problem probably did not surprise you, because you know the TRS-80 does not have a bell.”

The driver implements cursor on/off functions by directly twiddling the appropriate input/output ports of the computer. Refer to the TRS-80 Model II *Technical Reference Handbook* to determine how these functions work; the same information is in a more readable form in the August 1980 issue of *Lifelines*.

Highlighting requires a bit of fancy footwork. The driver maintains an internal flag to indicate whether highlighting is to occur, and supplies a replacement for the Microsoft \$OUTCH routine which checks this flag. It also supplies the high order bit which causes non-control characters to be displayed on the screen in reverse video. Since the new \$OUTCH routine must completely override the one supplied by Microsoft (one entry point in a COBLIB.REL module), remember to specify the driver name on all L80 commands for Cobol-80 programs.

“And now for the coup de grace: the audible alarm.”

The scrolling problem was caused by the lack of an “erase to end of screen” function in the ADM3-A. When this function is invoked, the Microsoft driver sends enough spaces to blank out the screen from the current cursor position. However, the Lifeboat ADM3-A emulator scrolls when any character is written to the last screen position. If the driver sends one less blank the last character on the screen will not be erased. The new driver solves the problem in a much better (and faster) way: Blanks are sent directly to the TRS-80 Model II video RAM from the cursor position to the end of the screen. A similar technique is used for the “erase to end of line” function.

And now for the *coup de grace*: the audible alarm. If you have a printer which will beep (or buzz or chime or holler) when it receives a character sequence, send this sequence when the \$ALARM function is invoked. This driver is set up to send a control-G, but you can easily change it to send whatever characters are required.

There is a better solution to the bell problem: Implement an escape-to-printer sequence on the CP/M BIOS (Basic Input/Output System) level which would ring the bell

```

Program continued

;terminal screen dimensions
$scrLen: db 24d ;24 lines
$scrwid: db 80d ;80 columns

;terminal output codes
escape equ x'1b'
bSpace equ x'08'
bell equ x'07'

0017 eraeol equ x'17' ;erase to end of line
001A clear equ x'1a'

;output functions
;set cursor position: [h] = row, [l] = column

0012 $setcr:
0012 ld a,escape
0014 call $outch ;send esc
0017 ld a,'='
0019 call $outch ;send =
001C ld a,h
001D add a,x'1f' ;adjust row number
001F call $outch ;send row
0022 ld a,l
0023 add a,x'1f' ;adjust column number
0025 jp $outch ;send column

;cursor on/off
$scuron:
0028 ld b,3*32+8 ;slow blink, start at line 8
002A jr curcom ;use common code

$scurof:
002C ld b,l*32+8 ;cursor off (start at line 8)
curcom:
002E ld a,l0 ;tell crt controller that
0030 out (x'fc'),a ;we're referring to register 10
0032 ld a,b ;pick up cursor characteristics
0033 out (x'fd'),a ;and send them to the controller
0035 ret

;highlight video
$hilit:
0036 ld a,x'ff' ;set highlight flag
0038 jr comlit ;use common code

$lolit:
003A xor a ;reset highlight flag
003B comlit:
003B ld (hiflag),a ;save new highlight flag
003E ret

;modified $outch to implement highlighting
003F $outch:
003F push de ;save de & hl
0040 push hl
0041 and 01111111b ;mask off highlight bit
0043 cp x'20' ;control character?
0045 jr c,outch2 ;don't modify if it is
0047 ld hl,hiflag ;hl => highlight flag
004A bit 0,(hl) ;check flag
004C jr z,outch2
004E or 10000000b ;set high bit if it's on
outch2:
0050 ld e,a ;get character in e
0051 ld c,2 ;send character to console
0053 call bdos
0056 pop hl ;restore hl & de
0057 pop de
0058 ret

0059 hlflag: db 0 ;highlight flag

;backspace cursor
005A $curbk: ld a,bSpace ;send backspace
005C jp $outch

;erase to end of screen:
; [hl] = sequential cursor position

005F $erase:
005F ld de,vidram-1 ;de => one before video ram
0062 add hl,de ;hl => cursor position
0063 ld (hl),' ' ;blank out first position
0065 push hl ;save current position
0066 inc hl ;hl => next position

```

Program continues

MORE BYTES FOR YOUR BUCKS

CP/M Compatibility Plus 64K RAM
for your TRS-80

**Freedom Technology
International Inc.**

PRESENTS

Freedom Option

CP/M Compatibility for your TRS-80 model I and III, PMC 80 and 81, and LNW 80 systems.

Freedom Plus

CP/M Compatibility Plus 64K RAM for your TRS-80 model I and III.

TWO SYSTEMS IN ONE
Run CP/M application programs in addition to TRS-DOS

INDUSTRY STANDARD
Enter the world of powerful CP/M application programs; Wordstar, dBase II, etc.

OPEN AND SHUT CASE
EASY to install, plug-in boards; no wires or traces to cut; no soldering.

TECHNICAL BACKGROUND
over 50 years of high technology experience...from Maxi's to Micro's...both Hardware and Software.

FREEDOM OF CHOICE
T8/OS (Our powerful Z-80 code operating system) and CP/M 2.2 if you choose.

- Dealer Inquiries Invited
- Six Month Warranty
- 30 Day Money back Guarantee

Freedom Option \$275.00
Freedom Plus \$490.00
Manual Only \$ 25.00

Call us for information about our large selection of CP/M application programs.

To order Call Toll Free
1-800-523-4067
In Pennsylvania call
(215) 569-2381

TRS-80 is a registered trademark of Tandy Corp.
LNW-80 is a registered trademark of LNW Research Inc.
PMC 80,81 is a registered trademark of Personal Microcomputer Inc.
TRS-DOS is a registered trademark of Tandy Corp.
CP/M is a registered trademark of Digital Research Inc.
Wordstar is a registered trademark of Micro Pro Int. Corp.
dBase II is a registered trademark of Ashton-Tate

**Freedom Technology
International, Inc.**

~240

119 North 18th Street, Philadelphia, PA 19103

"Alas, though the program ran it did not produce the results you would have liked to see."

That way, L80 will produce an error message if you forget to include the driver name. If you stick with the name CD80M2.REL, the proper form of the L80 command is: A>L80 prog/N,prog,subl, sub2,...,subn,CD80M2/E where "prog" is your main program name and "subl" to "subn" are names of your subroutines. For example, the proper sequence to compile, link and run the supplied CRTEST.COB program is:

```
A>COBOL=CRTEST
No Errors or Warnings
A>L80 CRTEST/N,CRTEST,CD80M2/E
Link-80 3.37 08-May-80 Copyright 1979,80 (C) Microsoft
%Mult. Def. Global $OUTCH
Data 0103 50D7
[0209 50D7 80]
A>CRTEST
```

Note that you should ignore the "Mult. Def. Global \$OUTCH" message. In fact, something is seriously wrong if you do not get it! ■

Jim Korenthal is the President of JEKCU, Inc., a software development firm in New York City.

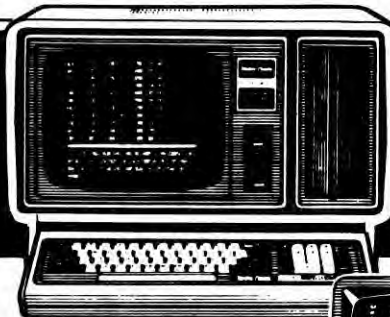
Program continued

```

; a control-W will perform an erase to end of line
; function. This is not documented (and not avail-
; able on the ADM-3A). If it works on your system,
; however, you can substitute the following two
; lines for the above code.
;
; %eol: ld a,eraeol ;send eraeol character
; jp $outch
;
;sound audible tone
;
;Note: Since the TRS-80 Model II has no bell (what an
; oversight!), the normal thing to do here is just
; return, as follows:
;
; $alarm: ret
;
; However, if your printer will respond to a bell,
; you can do the following:
;
$alarm: ld c,5 ;list output function
ld e,bell ;sound printer alarm
jp bdos ;let bdos do the return
;
end
```

```

$ALARM 008DI^ $CLIST 0000I^ $CRLEN 0010I^ $CRWID 0011I^
$CURBK 005AI^ $CUIROF 002CI^ $CUIRON 0028I^ $EOL 0077I^
$ERASE 005FI^ $FLIST 000DI^ $HILIT 0036I^ $LLOLIT 003AI^
$OUTCH 003FI^ $SETCR 0012I^ $TLIST 0007I^ BDOS 0005
BELL 0007 BSPACE 0008 CLEAR 001A COMLIT 003B^
CURCOM 002E^ EOL1 007F^ EOL2 0086^ ERAEOL 0017
ESCAPE 001B HIFLAG 0059^ OUTCH2 0050^ VIDEND FF80
VIDRAM F800
```



TRS-80 MODEL II

64-K **\$3350**

8.4 MEGABYTE HARD DISKS
(PRIMARY UNIT) . . . \$4040.



TRS-80 MODEL III

48-K **\$2100** 16-K **\$850**

2 DISK RS-232 (ALL RADIO SHACK EQUIPMENT)

FREE

OUT-OF-STATE TAXES AND SHIPPING COSTS
WARRANTIES HONORED BY ALL COMPANY OWNED
RADIO SHACK STORES OR COMPUTER CENTERS

WE ALSO CARRY A FULL LINE OF PRINTERS,
COMPUTERS AND ACCESSORIES



TRS-80 COLOR 4-K \$315

16-K **\$495** 32-K **\$595**

COLOR DISK DRIVES
0- **\$509** 1-2-3- **\$339**

— T.M. TANDY CORP.

WE ACCEPT ✓124
CERTIFIED CHECKS,
CASHIERS CHECKS
AND MONEY ORDERS

PERRY OIL & GAS INCORPORATED

137 NORTH MAIN ST., PERRY, MICHIGAN 48872 PHONE (517) 625-4161, MICH.
WE OWN AND OPERATE A RADIO SHACK — DEALERSHIP R162

FOR OUR PRICES, PLEASE CALL TOLL FREE **1-800-248-3823**

Why use their flexible discs:

Athana, BASF, Control Data, Dysan, IBM, Maxell, Nashua, Scotch, Shugart, Syncom, 3M, Verbatim or Wabash

when you could be using

MEMOREX

high quality error free discs?

Product Description	Part #	CE quant. 100 price per disc (\$)
8" SSSD IBM Compatible (128 B/S, 26 Sectors)	3062	2.09
8" SSSD Shugart Compatible, 32 Hard Sector	3015	2.09
8" SSDD IBM Compatible (128 B/S, 26 Sectors)	3090	2.74
8" DSDD Soft Sector (Unformatted)	3102	3.14
8" DSDD Soft Sector (128 B/S, 26 Sectors)	3115	3.34
8" DSDD Soft Sector (1024 B/S, 8 Sectors)	3104	3.34
8" DSDD Burroughs B-80 Comp., 32 Hard Sector	3092	3.34
5 1/4" SSSD Soft Sector (Unformatted)	3401	1.94
5 1/4" SSDD Soft Sector w/Hub Ring	3481	2.34
5 1/4" SSDD 10 Hard Sector w/Hub Ring	3483	2.34
5 1/4" SSDD 16 Hard Sector w/Hub Ring	3485	2.34
5 1/4" DSDD Soft Sector w/Hub Ring	3491	3.09
5 1/4" DSDD 10 Hard Sector w/Hub Ring	3493	3.09
5 1/4" DSDD 16 Hard Sector w/Hub Ring	3495	3.09

SSSD = Single Sided Single Density; SSDD = Single Sided Double Density
DSDD = Double Sided Double Density

Memorex Flexible Discs... The Ultimate in Memory Excellence

Quality

Memorex means quality products that you can depend on. Quality control at Memorex means starting with the best materials available. Continual surveillance throughout the entire manufacturing process. The benefit of Memorex's years of experience in magnetic media production, resulting, for instance, in proprietary coating formulations. The most sophisticated testing procedures you'll find anywhere in the business.

100 Percent Error Free

Each and every Memorex Flexible Disc is certified to be 100 percent error free. Each track of each flexible disc is tested, individually, to Memorex's stringent standards of excellence. They test signal amplitude, resolution, low-pass modulation, overwrite, missing pulse error and extra pulse error. They are torque-tested, and competitively tested on drives available from almost every major drive manufacturer in the industry including drives that Memorex manufactures. Rigid quality audits are built into every step of the manufacturing process and stringent testing result in a standard of excellence that assures you, our customer, of a quality product designed for increased data reliability and consistent top performance.

Customer-Oriented Packaging

Memorex's commitment to excellent does not stop with a quality product. They are proud of their flexible discs and they package them with pride. Both their packaging and their labeling have been designed with your ease of identification and use in mind. The desktop box containing ten discs is convenient for filing and storage. Both box labels and jacket labels provide full information on compatibility, density, sectoring, and record length. Envelopes with multi-language care and handling instructions and color-coded removable labels are included. A write-protect feature is available to provide data security.

Full One Year Warranty—Your Assurance of Quality
Memorex Flexible Discs will be replaced free of charge by Memorex if they are found to be defective in materials or workmanship within one year of the date of purchase. Other than replacement, Memorex will not be responsible for any damages or losses (including consequential damages) caused by the use of Memorex Flexible Discs.

Quantity Discounts Available

Memorex Flexible Discs are packed 10 discs to a carton and 10 cartons to a case. Please order only in increments of 100 units for quantity 100 pricing. We are also willing to accommodate your smaller orders. Quantities less than 100 units are available in increments of 10 units at a 10% surcharge. **Quantity discounts** are also available. Order 500 or more discs at the same time and deduct 1%; 1,000 or more saves you 2%; 2,000 or more saves you 3%; 5,000 or more saves you 4%; 10,000 or more saves you 5%; 25,000 or more saves you 6%; 50,000 or more saves you 7% and 100,000 or more discs earns you an 8% discount off our super low quantity 100 price. Almost all Memorex Flexible Discs are immediately available from CE. Our warehouse facilities are equipped to help us get you the quality product you need, when you need it. If you need further assistance to find the flexible disc that's right for you, call the Memorex compatibility hotline. Dial 800-538-8080 and ask for the *flexible disc hotline* extension 0997. In California dial 800-672-3525 extension 0997. Outside the U.S.A. dial 408-987-0997.

Buy with Confidence

To get the fastest delivery from CE of your Memorex Flexible Discs, send or phone your order directly to our Computer Products Division. Be sure to calculate your price using the CE prices in this ad. Michigan residents please add 4% sales tax. Written purchase orders are accepted from approved government agencies and most well rated firms at a 30% surcharge for net 30 billing. All sales are subject to availability, acceptance and verification. All sales are final. Prices, terms and specifications are subject to change without notice. Out of stock items will be placed on backorder automatically unless CE is instructed differently. Minimum order \$50.00. International orders are invited with a \$20.00 surcharge for special handling in addition to shipping charges. All shipments are F.O.B. Ann Arbor, Michigan. No COD's please. Non-certified and foreign checks require bank clearance.

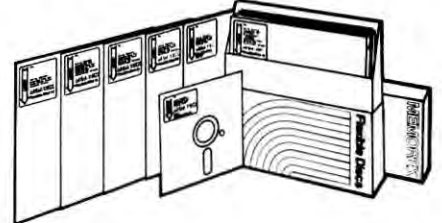
Mail orders to: **Communications Electronics**, Box 1002, Ann Arbor, Michigan 48106 U.S.A. Add \$8.00 per case or partial-case of 100 8-inch discs or \$6.00 per case or partial case of 100 5 1/4-inch mini-discs for U.P.S. ground shipping and handling in the continental U.S.A. If you have a MasterCard or Visa card, you may call anytime and place a credit card order. **Order toll-free** in the U.S. Call anytime 800-521-4414. If you are outside the U.S. or in Michigan, dial 313-994-4444. Order your high quality, error free Memorex discs today.

Copyright ©1982 Communications Electronics™

High Quality Error Free



Order Toll-Free!
(800) 521-4414
In Michigan (313) 994-4444



For Data Reliability—Memorex Flexible Discs

**COMMUNICATIONS
ELECTRONICS™**

Computer Products Division

854 Phoenix □ Box 1002 □ Ann Arbor, Michigan 48106 U.S.A.
Call TOLL-FREE (800) 521-4414 or outside U.S.A. (313) 994-4444

A tweak here, a pinch there, and . . .

Model II Disassembler

Richard L. Faber
Mathematics Department
Boston College
Chestnut Hill, MA 02167

Carl Wuebker's article "TRS-80 Disassembler" (August 1980, *80 Microcomputing*) was a boon to those curious about what goes on inside TRSDOS or the machine language subroutines called from Radio Shack's Basic software. Unfortunately, PEEKs in the program render it not immediately usable on the Model II.

In the June 1980 issue, Tom Yager's article "Model II Q and A" described machine language subroutines, callable from Basic, which implement PEEK and POKE on the Model II. (Bless you, Mr. Yager!) With a surprisingly small effort, I used the PEEK routine (PEEK/REL in Program Listing 3) to adapt the Disassembler for the Model II.

Mr. Wuebker's original program obtains the absolute address L of the first instruction to be disassembled from a LET statement in line 40. (The user changes this statement each time he runs the program.) The starting address must be in decimal, whereas I would prefer to enter the address in hexadecimal.

TRSDOS 2.0 provides two supervisor calls (BINHEX and BINDEC) to convert between binary and hexadecimal and between binary and decimal. These enable the Disassembler to accept input of a starting address in hexadecimal. These calls trans-

late numeric values into hexadecimal strings, performed in Basic in Mr. Wuebker's original program (lines 5000-5060).

Absolute Binary and Address Storage

The relocatable machine language program CONVERT/REL (Program Listing 1) consists of two subroutines which accomplish the above functions. Before the details, consider absolute binary notation and the representation of memory addresses.

Basic stores integers in two's-complement notation; the leading or most significant bit stores the integer's sign (0 = positive, 1 = negative). In this system, the negative of any integer is obtained by changing all zeros to ones and all ones to zeros, and then adding one. Integers take two bytes and lie only in the range minus 32768 to 32767.

A memory address X is a decimal whole number in the range 0 to 65535. This range can be represented in 16 bits, but only if the leading bit is not used as a sign. This is called absolute binary notation. In absolute binary, decimal 65535 is a string of 16 ones, while in two's-complement notation this string represents minus one.

Because Basic always assumes two's-complement is in use, the statement $A\% = X$ results in an overflow error if X exceeds 32767. To avoid this, use the alternative statement:

```
IF X > 32767 THEN A% = X - 65536 ELSE A% = X
```

For $X > 32767$, this takes the 16 bits that are the absolute binary representation of X and allows Basic to store them as if they represented a negative integer (leading bit 1) in two's-complement. For example, the address EF20H (decimal 61216) is 1110111100-

100000 in absolute binary. In two's-complement, this bit sequence represents decimal minus 4320, which is 61216 minus 65536.

The Model II Adaptation

Program Listing 2 shows the changes to Mr. Wuebker's program. (The August issue contains the entire program.) Line 10 protects memory above EF1FH, where the machine language subroutines to be called are located, and loads PEEK/REL. All variables in this program except X are integers rather than floating point. This increases efficiency of the original version. Line 15 loads CONVERT/REL and defines the entry points of its two subroutines, USR2 and USR3. Lines 40-47 request input of the starting address in hexadecimal, check for a valid response, convert this address to decimal floating point, and pack it into a 2-byte integer.

USR2 in line 45 performs the conversion. On entry to this subroutine, the DE register pair points to a 3-byte string descriptor for Y\$. The first byte of this descriptor contains the length of Y\$ (four). The next two bytes contain the address where Y\$ begins in memory (LSB followed by MSB). USR2 moves this address to the HL register pair, sets up the entry conditions for BINHEX, and converts Y\$ to a 16-bit absolute binary address in DE. A call to BINDEC converts this into a 5-byte decimal string whose

The Key Box

Model II Basic
Model II
64K RAM
TRSDOS 2.0
Printer

HAYDEN TAKES CARE OF YOUR TRS-80!



Available at your
local computer store!

For Orders and Inquiries
Call Toll Free

HAYDEN HOTLINE
1-800-631-0856

ORDER TODAY

Hayden Book Company, Inc.
50 Essex St., Rochelle Park, NJ 07662

Please send me the book(s) checked on 15-day FREE examination. At the end of that time, I will send payment, plus postage and handling, or return the book(s) and owe nothing. On all prepaid, Visa or Master Card charge orders, publisher pays postage and handling - same return guarantee.

5182-4 5189-1 5534-X
 5187-5 5496-3

Please send me the software checked. Enclosed is my check, money order, or Visa/Master Card charge account number. **PAYMENT MUST ACCOMPANY ALL SOFTWARE ORDERS.** Hayden Book Co., Inc. warrants that the programs will load and run on the standard manufacturer's configuration of the computer listed.

02403 03416 05203 09903
 03408 03418 05208 10003

Residents of NJ and CA must add sales tax. Offer good in USA only. Prices subject to change without notice.

Visa/Master Card # _____

Expiration Date _____ MC Interbank # _____

Signature _____

Name _____

Address _____

City/State/Zip _____

EOM 4/82-014

Apple is a registered trademark of Apple Computer Co., Inc.; TRS-80 is a registered trademark of Radio Shack, Inc.; PET is a registered trademark of Commodore Business Machines, Inc.; none are affiliated with Hayden Book Co., Inc.

SOFTWARE

MICROTypING (Engel) Features the "touch method" of learning to type for improving your computer typing skills. **02403, TRS-80 Level II tape, \$10.95**

SARGON II (Spracklen) The first great computer chess program! "This program represents a giant step forward in micro-computing Chess... an excellent program which will provide a true challenge for many players... Save your money and buy SARGON II..." '80 Software Critique **03418, TRS-80 Models I & III tape, \$29.95**
03408, TRS-80 Level II Disk, \$34.95
03416, TRS-80 Model III Disk, \$34.95

TRS-80 GALAXY OF GAMES

(Diley, Savolaine, and Wilkerson) A real bargain - and hours of fun, too!
HANGMAN - The most famous word game you'll get hung up on it!
ONE-ARM BANDIT - A home version of the casino slot machine!
SKUNK - An exciting dice game! You get "skunked" when you roll no points!
JACKS - A card game in which small is great. Trade high cards for low ones and win!
09903, TRS-80 Models I & III, \$14.95

DISK CATALOGER (LeBar) Automatically maintains a cross-reference listing of all your programs, their location by disk number, function and use. Catalogs, lists and sorts programs on disk directly from your disks' directories.
05203, TRS-80 Level II tape, \$16.95
05208, TRS-80 Level II disk, \$21.95

BOOKS

THE SOFTSIDE SAMPLER: TRS-80™ ENTERTAINMENT PROGRAMS (ed. Witham) A sampling of SoftSide magazine's more exciting game programs compiled in a single book. 29 stimulating programs in TRS-80 BASIC. Test your nautical skills with *Sound the Horn* and *Battleship*... partake in a nine-man wrestling contest... jump a motorcycle over 10 barrels at a time! **5496-3, \$8.95**

THE BASIC CONVERSIONS HANDBOOK FOR APPLE™, TRS-80™, AND PET™ USERS (Brain Bank) A complete guide to converting Apple II and PET programs to TRS-80, TRS-80 and PET programs to Apple II, and TRS-80 and Apple II programs to PET. Equivalent commands are listed for TRS-80 BASIC (Model I, Level II), Applesoft BASIC, and PET BASIC, as well as variations for the TRS-80 Model III and Apple Integer BASIC. Also describes various graphic capabilities. **5534-X, \$7.95**

MY MICRO SPEAKS BASEX (And Loves It!) (Warne) An in-depth examination of BASEX, a versatile new language for 8080 and Z-80 type microcomputers that combines the best features of BASIC and executable machine language code. The major advantage of BASEX is speed - programs run up to 20 times faster than similar programs in BASIC. **5187-5, \$9.95**
BASEX Compiler/Loader and Sample Programs Available on TRS-80 Tape, #07203, \$34.95
Book and tape, request #5189-1, \$44.90

PROGRAMS FOR BEGINNERS ON THE TRS-80 (Blechman) A valuable book of practical and interesting programs for home use that can be understood and used immediately by the beginner in personal computer programming. Learn step-by-step how 21 sample programs work. Techniques are described line-by-line within the programs, and a unique MatriDex™ matrix index will enable you to locate other programs using the same BASIC commands and statements. A detailed description, complete listing, explanation of what the program does, and instructions for modification accompany each program. **5182-4, \$8.95**
Also Available on TRS-80 Model I & III tape, 10003, \$10.95

Hayden
Book Company, Inc.
50 Essex Street, Rochelle Park, NJ 07662

“...avoid modifying byte 1 of a string descriptor.”

string descriptor is the same three bytes in RAM. The first byte is modified to contain the new length. The new string returns as the value of `USR2(Y$)`.

PEEKing

The next several lines of Listing 2 (containing `GOSUB 65000`) replace statements containing `PEEKs` in Mr. Wuebker's program. In the Model II version of the Disassembler, a given memory location is `PEEKed` using lines 65000-65020.

The address, packed into a 2-byte integer variable `A` is first reinterpreted as a 2-byte location string `A$`, with `MKI$`. Then `A$ = USR1(A$)` invokes `PEEK/REL`. Upon entry to this subroutine, the `DE` register pair points to a string descriptor for `A$`. The first byte of this descriptor contains the length of `A$` (two), and the next two bytes point to `A$` (LSB followed by MSB). `A$` in turn contains the address of the location to be `PEEKed`. `PEEK/REL` follows this chain of pointers to extract the contents of the de-

sired memory location and insert them into the first byte of `A$`. Line 65010 then takes this first byte and puts its ASCII value into `B` as an integer between 0 and 255.

The subroutine calls to 4200 (lines 3320, 3610, and 3810 in Listing 2) replace the statement `C = 256 * I2 + I1`, which could generate a value greater than 32767. Because `C` is an integer variable, we need line 4200 to check for this condition.

Lines 5000-5030 perform conversions from integer values to 4-byte hexadecimal strings. The integer `C` (which contains the contents of one memory location or a packed memory address) converts to a four character hexadecimal string in the range 0000-FFFF by the statements:

```
A$ = MKI$(C) + " " : CS = USR3(A$)
```

Two spaces appended to `MKI$(C)` make the length of `A$` four, the same as the string produced by `USR3`. If we did not do this, we would have to include in `USR3` an instruction to change the first byte of `A$`'s string descriptor from two to four, so Basic would know `USR3(A$)` has length four. This would garble some other string since the extra two bytes derive from an adjacent string in the high-RAM area where Basic stores strings. You should avoid modifying byte 1 of a string descriptor. It was no problem when we applied `USR2` to `Y$` in line 45, because `Y$` was the only variable stored in high-RAM. See the instruction in `EF2E` in Listing 1.

The Model II Disassembler will disassemble instructions at 1.9 per second. Integer

```
*** USR2: Converts from Hexadecimal to Decimal ***
EF20 D5 PUSH DE ;move address of string
EF21 DDE1 POP IX ; descriptor to IX
EF23 DD6E01 LD L,(IX+1) ;store address of string
EF26 DD6602 LD H,(IX+2) ; in HL register pair
EF29 3E18 LD A,24 ;BINHEX is SVC 24
EF2B 0601 LD B,1 ;we'll cvt. hex to bin
EF2D CF RST 8 ;binary result now in DE
EF2E DD3400 INC (IX+0) ;change string lngth to 5
EF31 0600 LD B,0 ;we'll cvt. bin to dec
EF33 3E15 LD A,21 ;BINDEC is SVC 21
EF35 CF RST 8 ;cvt to 5 byte dec. strg
EF36 C9 RET ;Go back to BASIC progr.
```

```
*** USR3: Converts Packed 2-Byte Address to Hex String ***
EF40 D5 PUSH DE ;move address of string
EF41 DDE1 POP IX ; descriptor to IX
EF43 DD6E01 LD L,(IX+1) ;store address of A$
EF46 DD6602 LD H,(IX+2) ; in HL register pair
EF49 5E LD E,(HL) ;move 2-byte bin no. to
EF4A 23 INC HL ; be converted into
EF4B 56 LD D,(HL) ; DE register pair
EF4C 2B DEC HL ;addr of A$ again in HL
EF4D 0600 LD B,0 ;we'll cvt. bin to hex
EF4F 3E18 LD A,24 ;BINHEX is SVC 24
EF51 CF RST 8 ;cvt to 4-byte hex strng
EF52 C9 RET ;Go back to BASIC progr.
```

Program Listing 1. CONVERT/REL

OMNITERM

What is OMNITERM?

OMNITERM is a professional communications package for the TRS-80 that allows you to easily communicate and transfer files or programs with almost any other computer. We've never found a computer that OMNITERM can't work with. It's a complete package because it includes not only the terminal program itself, but also conversion utilities, a text editor, special configuration files, serious documentation and serious support.

Why do I need it?

You need OMNITERM if you need to communicate efficiently with many different computers, or if you want to customize your TRS-80 for use with one particular computer. You need OMNITERM to SOLVE your communications problems once and for all.

What do I get?

The OMNITERM package includes the OMNITERM terminal program, four conversion utilities, a text editor, and setting files for use with popular computers such as CompuServe, the Source, and Dow Jones — just as samples of what you can

The ULTIMATE TRS-80 Terminal Package

do for the computer you want to work with. The package includes six programs, seven data files, and real documentation: a 76-page manual that has been called "the best in the industry." And OMNITERM comes with real user support. We can be reached via CompuServe, Source, phone, or mail to promptly answer your questions about using OMNITERM.

What do I need to use OMNITERM?

A Model I or Model III TRS-80, at least 32K of memory, one disk, and the RS-232 interface, or Microconnection modem. OMNITERM works with all ROMs and DOSes, and will work with your special keyboard drivers.

What will it do?

OMNITERM allows you to translate any character going to any device: printer, screen, disk, keyboard, or communications line, giving you complete control and allowing you to redefine the character sets of all devices. It will let you transfer data, and run your printer while connected for a record of everything that happens. OMNITERM can reformat your screen so that 80, 32, or 40 column lines are easy to read and look neat on your TRS-80 screen. It even lets you get on remote computers with just one keystroke! The program lets you send special characters, echo characters, count UART errors, configure your UART, send True Breaks and use lower case. It accepts VIDEOTEX codes, giving you full cursor control. It will even let you review text that has scrolled off the screen! Best of all, OMNITERM will save a special file with all your changes so you

can quickly use OMNITERM for any one of many different computers by loading the proper file. It's easy to use since it's menu driven, and gives you a full status display so you can examine and change everything.

"OMNITERM has my vote as the top TRS-80 terminal program available today" KiloBaud Microcomputing, June 1981, pages 16-19.

OMNITERM is \$95 (plus shipping if COD) Call for 24 hour shipment. Manual alone \$15, applied toward complete package. Visa, M/C, and COD accepted. MA residents add 5% tax. Dealer inquiries invited.

Contact Lindbergh Systems for your custom programming needs. We are expert at writing software to work with YOUR hardware, in assembler, high-level language, or FortH.

Lindbergh Systems

41 Fairhill Road, Holden, MA 01520 (617) 852-0233

Source: TCA818 CompuServe: 70310.267 TRS-80 is a " of Tandy Corp

"The Model II Disassembler will disassemble instructions at 1.9 per second."

variables rather than floating point, and supervisor calls rather than Basic perform the conversions and improve speed; without them the rate is only 1.3 per second. ■

Professor Richard Faber teaches mathematics and computer science at Boston College and is a consultant in microcomputer applications.

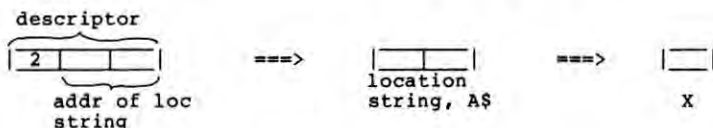
```

1 'DISASSEM/BAS - from Article by Carl Wuebker,
      August 1981 "80-Microcomputing,"
      modified by R. Faber for Model II
10 CLEAR 3000,&HELF:GOSUB60000
      :DEFINT A-W
15 SYSTEM "CONVERT/REL":
      DEFUSR2=&HEF20: DEFUSR3=&HEF40
40 INPUT "STARTING ADDRESS (HEX., 4 CHARACTERS)";Y$
      :IF LEN(Y$)<>4 THEN 40
42 FOR I=1 TO 4:
      IF INSTR(HX$,MID$(Y$,I,1))=0 THEN 40
43 NEXT I 'check for valid hexadecimal digits
45 X=VAL(USR2(Y$))
47 IF X>=32768 THEN L=X-65536
      ELSE L=X 'convert address to integer
      (X is floating pt, L is integer)
1000 A=L:GOSUB65000:I0=B
1050 A=L+1:GOSUB 65000:I1=B:
      A=L+2:GOSUB 65000:I2=B
1200 A=L+1:GOSUB 65000:I0=B+256
1300 A=L+1:GOSUB 65000:I0=B
1330 A=L+2:GOSUB65000:I1=B:
      A=L+3:GOSUB 65000:I2=B
1530 A=L+2:GOSUB 65000:C=B
1560 A=L+1:GOSUB 65000:IPB=203 THEN 1660
1570 A=L+1:GOSUB 65000:I0=B:
      A=L+2:GOSUB 65000:I1=B:
      A=L+3:GOSUB 65000:I2=B
1580 IF I0=54 THEN A=L+3:GOSUB 65000: I1=B:I2=0
1660 A=L+3:GOSUB 65000:I0=B+256
3320 GOSUB 4200
3610 GOSUB 4200
3810 GOSUB 4200
4040 A=L:GOSUB 65000:CT=B AND 127
4070 A=L:GOSUB 65000:C=B
4200 X=256*I2+I1: IF X>=32768 THEN C=X-65536 ELSE C=X:
      RETURN
4990 '
      ***BINARY TO HEX conversion
5000 A$=MKIS(C)+": C$=USR3(A$)
5010 C$=RIGHT$(C$,2): RETURN 'C converted to 1 byte hex
5020 A$=MKIS(C)+": C$=USR3(A$)
5030 RETURN 'C converted to 2 byte hex
59990 '
      *** LOAD PEEK/REL and define starting address
60000 SYSTEM "PEEK/REL":
      DEFUSR1=&HEF60: RETURN
65000 A$=MKIS(A): A$=USR1(A$) 'call PEEK
65010 B=ASC(A$) 'B = contents of address X
65020 RETURN
65300 END
  
```

Program Listing 2. Changes in Disassembler Program

```

*** PEEK/REL: Gets contents of a memory location X ***
EF60 D5 PUSH DE ;move address of string
EF61 E1 POP HL ; descriptor to HL
EF62 23 INC HL ;HL pts to addr of location string
EF63 5E LD E,(HL) ;next, move addr of
EF64 23 INC HL ; location string
EF65 56 LD D,(HL) ; into DE,
EF66 D5 PUSH DE ; and then
EF67 E1 POP HL ; into HL
EF68 5E LD E,(HL) ;then, move the location
EF69 23 INC HL ; string itself
EF6A 56 LD D,(HL) ; into DE
EF6B 2B DEC HL ;addr of location string in HL
EF6C EB EX DE,HL ;exchange register pairs
EF6D 7E LD A,(HL) ;load A with contents of X
EF6E EB EX DE,HL ;exchange back
EF6F 77 LD (HL),A ;move byte from X into loc. string
EF70 C9 RET ;back to BASIC program
  
```



Program Listing 3. PEEK/REL



**If you have
anything to do
with the TRS-80*
System you
should be
reading the
EIGHTY
SYSTEM
NEWSLETTER
every week!**

Don't miss a single issue of the new Eighty System Newsletter... published weekly and mailed every Friday by First Class Mail. This is the only publication designed for personnel in the TRS-80* industry, including manufacturers, distributors, dealers and computer users. The Eighty System Newsletter is compiled and edited by Ken Gordon, producer of the National TRS-80* Show, the Eighty/Apple Show, the NJ Microcomputer Show, and publisher of the Amateur Radio Equipment Directory. Here is valuable information in professionally prepared format about TRS-80* hardware, software, peripherals, trends in the industry, and latest news. In addition, each weekly issue contains brief digests of articles related to the TRS-80* system appearing in over 100 computer related and general interest publications. This bibliography will save you both time and money in keeping up with articles in print on the TRS-80* computer system. The Eighty System Newsletter is a must for all active TRS-80* users, plus anyone involved in any way with the manufacturing, distributing or retailing of TRS-80* products.

Subscribe today! Mail the coupon with your check for \$39 for the next 52 weekly issues (sent First Class Mail that's only 75¢ per week.) If for any reason you are not satisfied with the Eighty System Newsletter — we will refund the undelivered portion of your subscription.

KENGORE CORPORATION
3001 Route 27
Franklin Park, NJ 08823
(201) 297-2526

Enclosed is my check for \$39 for the next 52 issues of The Eighty System Newsletter (sent First Class Mail).

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

*TRS-80 is a Registered Trademark of Tandy Corporation/Radio Shack Division.



TRS 80*

DISK DRIVES 40 & 80 TRACK

as low as **\$299.95**

NEW!

NEW LOW PRICES

Thanks to you our sales volume has allowed us to cut costs and we're passing the savings along. We offer the best disk drive value in the market place. Reliability, features and cost tough to beat. We deliver...and we stand behind our products. AEROCOMP is the only manufacturer to offer FREE TRIAL! Buy Aerocomp drives today. You deserve the best.

BEST FEATURES

- ★ Fast 5 ms. track-track access time.
- ★ Operates single or double density.
- ★ "FLIPPY" feature for lower media cost (40-1 & 80-1).
- ★ Head load solenoid.
- ★ Disk ejector.
- ★ Easy entry door.
- ★ **NEW** EXTERNAL DRIVE CABLE CONNECTION. (no longer need to remove the cover to hook up cable)

EPSON MX80 PRINTERS \$469.00

TRS80 Cable (I & III) \$29.95
 APPLE Cable & Interface . . \$96.00
 RS232 Interface \$69.95
 Ribbon Cartridge, Black . . \$13.95
 Add \$6.00 shipping (Cont. U.S.) does not include cable.

MX80 F/T

All the features of MX80 plus Friction Feed. Shipping & cables as above.

\$579.00

ORDER TODAY!

- ★ 40-Track Drive \$299.95
- ★ 80-Track Drive \$429.95
- ★ 40-Track "FLIPPY" Drive . . . \$329.95
- ★ 80-Track "FLIPPY" Drive . . . \$449.95
- ★ 40-Track Dual-Head Drive . . \$449.95
- ★ 80-Track Dual-Head Drive . . \$579.95

All above drives are complete with silver enclosure, power supply and external drive cable connection. 115 VAC. 50/60 Hz. 230 VAC. 50/60 Hz available on special order.

- ★ 40-Track Bare Drive \$269.95
- ★ 80-Track Bare Drive \$399.95
- ★ 40-Track "FLIPPY" Bare Drive \$299.95
- ★ 80-Track "FLIPPY" Bare Drive \$419.95

★ SPECIAL PACKAGES★

STARTER A \$339.95
 40-Track Drive, 2-drive cable, TRSDOS 2.3 Disk & Manual, Freight & Ins.

STARTER B \$369.95
 40-Track "FLIPPY" Drive, cable, TRSDOS 2.3 Disk & Manual, Freight & Ins.

COMBO C \$465.00
 40-Track "FLIPPY" Drive, 2-drive cable, **LDOS**, Freight & Ins.

COMBO D \$585.00
 80-Track "FLIPPY" Drive, 2-drive cable, **LDOS**, Freight & Ins.

COMBO E \$709.00
 Two 40-Track "FLIPPY" Drives, 4-Drive cable, TRSDOS 2.3 Disk & Manual, Freight & Ins.

COMBO F \$999.00
 Two 80-Track "FLIPPY" Drives, 4-drive **LDOS**, Freight & Ins.

COMBO G \$909.00
 Two 40-Track Dual-Head Drives, cable, TRSDOS 2.3 Disk & Manual, Freight & Ins.

COMBO H \$1299.00
 Two 80-Track Dual-Head Drives, cable, **LDOS**, Freight & INS.

DOSPLUS 3.3 or NEWDOS / 80,2.0 available with any package.

Add \$5.00 per drive for shipping & handling (Cont. US)

FREE TRIAL OFFER

Order your AEROCOMP Disk Drive and use it with your system for up to 14 days. If you are not satisfied for ANY REASON (except misuse or improper handling), return it, packed in the original shipping container, for a full refund. (hardware only. Special packages will be prorated). We have complete confidence in our products and we know you will be satisfied!

ORDER TODAY!!!

WARRANTY

We offer you a 120 day unconditional warranty on parts and labor against any defect in materials and workmanship. In the event service, for any reason, becomes necessary, our service department is fast, friendly and cooperative.

100% TESTED

AEROCOMP Disk Drives are completely assembled at the factory and ready to plug in when you receive them. Each drive is 100% bench tested prior to shipment. We even enclose a copy of the test checklist, signed by the test technician, with every drive. AEROCOMP MEANS RELIABILITY!!

ORDER NOW!!

To order by mail, specify Model Number(S) of Drive, cable, etc. (above), enclose check, money order, VISA or MASTERCHARGE card number and expiration date, or request C.O.D. shipment. Texas residents add 5% sales tax. Add \$5.00 per drive for shipping & handling (Cont. US). Please allow 2 weeks for personal checks to clear our bank. No personal checks will be accepted on C.O.D. shipments-cash, money orders or certified checks only. You will receive a card showing the exact C.O.D. amount before your shipment arrives. Be sure to include your name and shipping address. You will be notified of the scheduled shipping date. Your bank credit card will NOT be charged until the day we ship!!

DRIVE CABLES

- 2-DRIVE \$24.95
- 4-DRIVE \$34.95

WRITE AEROCOMP TODAY FOR MORE VALUES !!!

CALL TOLL FREE FOR FAST SERVICE (800) 824-7888, OPERATOR 24

FOR VISA / MASTERCHARGE / C.O.D. ORDERS

California dial (800) 852-7777, Operator 24, Alaska and Hawaii dial (800) 824-7919, Operator 24.

TOLL FREE LINES WILL ACCEPT ORDERS ONLY!

For Applications and Technical information, call (214) 337-4346 or drop us a card.

Dealers inquiries invited

AEROCOMP

Redbird Airport, Bldg. 8
 P.O. Box 24829
 Dallas, TX 75224

✓ 82



Speed system tape loads with software only.

Rapid System Loader

David C. Hedinger
DCH Electronic Services
206 Chestnut Way
Salisbury, MD 21801

The System command is to machine language as CLOAD is to Basic. Both commands load a program from tape into the RAM of the TRS-80. Both also utilize a data transfer method accepting bits from the tape at 500 baud (bits per second). Since many machine language programs are long, a wait of more than two minutes is common. A case in point is

Radio Shack's Editor/Assembler program. It takes nearly two minutes to load and it is very discouraging to get nearly through the tape and suddenly get a checksum error, forcing you to start all over again. Wouldn't it be nice if there were a way to load those programs two or three times faster without buying a disk drive, modifying your TRS-80, or sacrificing any of the reliability of the tape system?

Breaking the 500 Baud Barrier

Earlier, I wrote a pair of routines for use in "Fastload," a program which loads and saves Basic programs up to four times

faster than CLOAD. The two modules store and retrieve data from tape at 2000 bits per second. These same modules are used here for machine language tapes. With the help of a book called *Pathways Through the ROM*, a disassembled listing of the Level II ROM, the *TRS-80 Technical Reference Handbook*, and several issues of *80 Microcomputing*, I was able to glean enough information to complete this project. I call the program Rapid System Loader (RSL).

Duplicate copies of standard TRS-80 machine language tapes are made by RSL. What's so special about that? The dupli-

cate copies load from two to four times faster than the original copy because they load at 2000 baud. In addition, as soon as the program is successfully loaded, it executes immediately without further help from the human in charge. There is no need to type and enter / to run the program. I call this feature "Auto Start." Not original, but quite useful.

Another feature is a file name display. During loading, all six characters of the file name are displayed, so you know exactly which tape you are running. While creating the RSL backups, up to nine copies in a row can be written without further intervention by the user. RSL will copy any machine language tape not protected. It can even copy itself!

Another nice thing about RSL is it requires no hardware at all. Software alone does the trick. You may have to disable your Radio Shack XRX cassette modification if you have one. With that circuit enabled, RSL will not work.

Program Walks Before It Runs

The TRS-80 has no routines in ROM to load tapes at 2000 baud. Therefore, I have written these routines into a short module tacked automatically to the front of each copy of RSL. When the program is loaded, the pre-load module is encountered first. It loads at 500 baud and

Program Listing

```

*****
00090 ; *****
2.1 * 00100 ;* RAPID SYSTEM LOADER CONVERSION VERS.
* 00110 ;* SEPT 15,1980 BY DAVID C. HEDINGER
*****
00115 ; *****
0072 00120 BASIC EQU 072H ;BASIC RE-ENTRY
0049 00130 KBD EQU 049H ;ROM KEYBOARD ROUTIN
E
28A7 00140 DSP EQU 28A7H ;MESSAGE OUTPUT: ROM
01C9 00150 CLS EQU 1C9H ;ROM: CLS & HOME CUR
SOR
0235 00160 RDBYTE EQU 235H ;ROM RD BYTE FROM TA
PE
01F8 00170 MTOFF EQU 1F8H ;ROM: TAPE MOTOR OFF

42E9 00180 ORG 42E9H ;ORG LOW IN MEMORY
42E9 CDC901 00190 SPEED CALL CLS
42EC 21BB45 00200 LD HL,MENU ;POINT TO MENU STRIN
G
42EF CDA728 00210 CALL DSP ;DISPLAY IT
42F2 CD4900 00220 INP CALL KBD ;GET INPUT
    
```

Program continues

takes about seven seconds. The preloader module starts automatically, loads in the object code program at 2000 baud, and transfers control to the program when it is done.

The advantage to using a preloader is you need to load only one tape. Everything is done automatically once you press Enter. One disadvantage is if the program to be converted by RSL occupies the same area in RAM as the preloader, it will not load properly, since the preloader will be overwritten.

Since the preloader loads at normal speed for seven seconds, the overall decrease in loading time for the object code program depends on its original length. A program must be longer than about 20 seconds to show any decrease in loading time with RSL. Longer programs show greater decreases.

The Inner Workings

The program is divided into three main sections. The first section loads a standard machine language tape and stores it byte for byte in a buffer area in RAM. The second section writes a high speed copy of the program in the buffer preceding it with the preloader program. Remember, the preloader is written at normal speed but the object code program in the buffer is written at 2000 baud. The third section is the preloader module.

Rapid System Loader makes use of two subroutines to create and read 2000 baud tapes. One is W byte, responsible for writing a byte on tape at the 2000 baud rate. The other is R byte, included as a part of the preloader module. R byte is the routine for reading a byte of data from tape. These routines are crucial to the program.

Shifting Into High Gear

As you may know by now, the TRS-80 stores information on tape one byte at a time. Each byte is composed of eight synchronizing pulses separated by two milliseconds each. A data pulse is inserted after a sync pulse to denote a one bit. Otherwise, the space between sync pulses is left blank to represent

a zero bit. All sync and data pulses are identical in duration, being about 263 microseconds long. The total time to store one byte is two milliseconds times eight bits, or 16 milliseconds. About 62 bytes per second can be stored this way, or 3720 bytes per minute. A 16K program takes about 258 seconds (four minutes 18 seconds) to load.

The two subroutines W byte and R byte replace this format with a new one. Each byte is stored as a single sync pulse followed by eight precisely timed intervals of .5 milliseconds each. Each interval will contain either a pulse, representing a one bit, or no pulse, indicating a zero bit. The entire byte occupies 4.5 milliseconds including the sync bit. Each pulse has a width of 140 microseconds. Using this format, we can store about 220 bytes per second, or 13200 bytes per minute. That 16K program that used to take 258 seconds to load can now be loaded in 73 seconds! If we add seven seconds for the time taken to load the preloader, the total is 80 seconds to load 16K, a significant improvement. See Fig. 1 for a graphic

comparison of the two formats.

This change in format is made possible by the fact the cassette input and output circuitry in the TRS-80 is completely under software control and not locked into a single speed or format by hardware. We can create pulses of any width and spacing up to the limits of our clock speed and software. We are limited, however, by the frequency response of the cassette deck used with the computer. I arrived at the 2000 baud data rate as a good compromise between speed and error rate due to frequency response limitations. Using good tape, the RSL copies a load just as reliably as the slower System version. The volume level is still critical, but it is no worse than before.

The Write a Byte Routine

Looking more closely at the W byte routine (lines 2410-2760), we see the first thing done is to save all the Z80 registers for later recovery. On entry to this routine, the A register contains the byte we want to write to tape. The byte is placed in the D register and C is loaded with a

count of nine—eight for the byte and one for the sync bit. The Carry Flag determines whether the Pulse routine outputs a pulse to the cassette port or merely waits for a one time slot.

To output the sync pulse line, 2470 sets the Carry Flag and then calls Pulse which does three things: sets port 255 to .85 volts by an Out instruction and runs a short timing loop; next, sets the port to zero volts and runs another short loop; finally, returns the port to its rest voltage of .46 volts, runs the final timing loop and returns to line 2490.

Lines 2480-2530 form a loop, shifting each bit in the D register to the Carry Flag, and call the Pulse routine. When all eight bits are transmitted, the registers are restored and control is returned to the main program.

Now that we have our byte on the tape, let's see how to read it back into the computer. Lines 3430-3670 contain R byte. When R byte is called from the main program, the first thing done is to save the AF and BC registers on the stack. On exit, the A register will contain the byte read

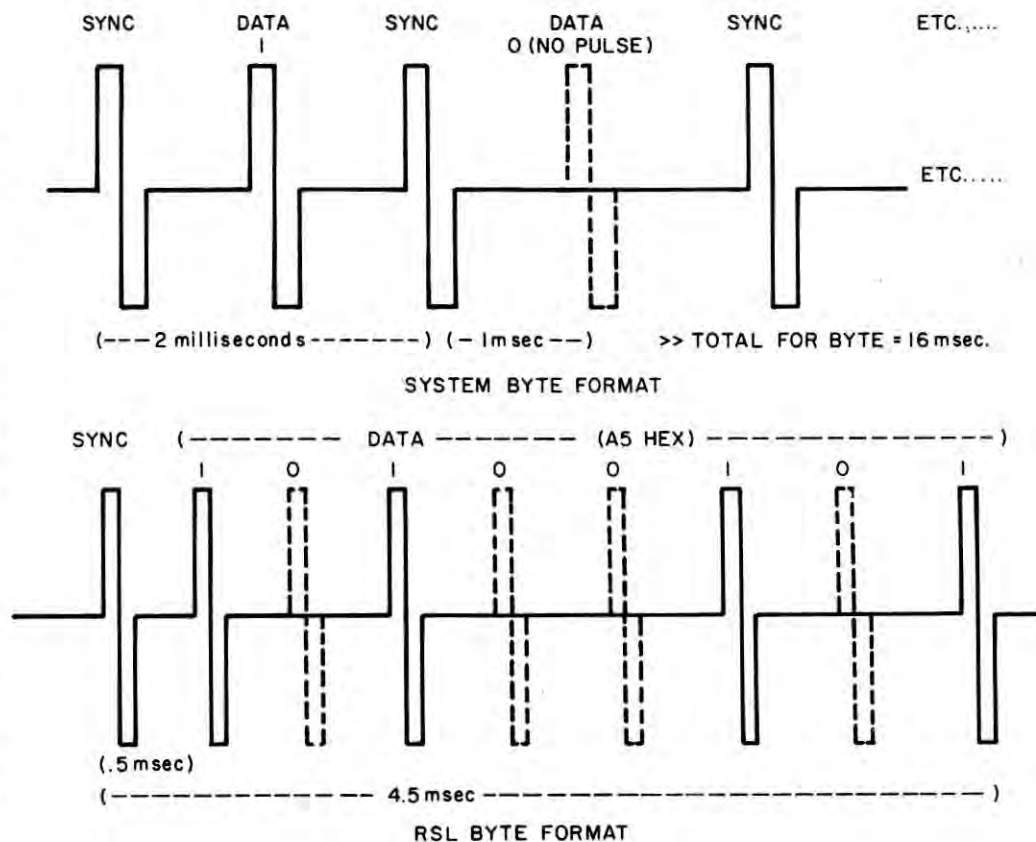


Fig. 1.

Program continued

```
42F5 FE31 00230 CP 31H ;ASCII '1'?
42F7 280C 00240 JR Z,SYSLOD ;YES-LOAD A
TAPE
42F9 FE32 00250 CP 32H ; '2'?
42FB CADA43 00260 JP Z,SYSWRT ;WRITE A FAS
TLOAD TAPE
42FE FE33 00270 CP 33H ;'3'?
4300 CA7200 00280 JP Z,BASIC ;EXIT TO BASIC
4303 18ED 00290 JR INP ;BAD INPUT: TRY AGAI
N
00292 ;
00295 ; *****
*****
00300 ; * THIS SECTION READS A SYSTEM TAPE AND STO
RES IT *
00310 ; * IN A BUFFER WITH ALL CHECKSUMS AND CONTR
OLS *
00314 ; *****
*****
00315 ;
4305 CDC901 00320 SYSLOD CALL CLS ;CLEAR SCREEN
4308 216346 00330 LD HL,MESG1 ;PROMPT USER

430B CDA728 00340 CALL DSP
430E CD4900 00350 CALL KBD ;WAIT FOR INPUT
4311 11803C 00360 LD DE,3C80H ;TO DISPLAY
FILENAME
4314 211347~ 00370 LD HL,BUFFER ;POINT TO BU
FFER
4317 CD9302 00380 CALL 293H ;ROM:MOTOR ON,READ L
EADER & SYNC
431A 3E40 00390 LD A,40H ;'@'
431C 323E3C 00400 LD (3C3EH),A ;DISPLAY '@'
431F CD3502 00410 CALL RDBYTE ;READ NEXT BYTE
4322 FE55 00420 CP 55H ;SYSTEM TAPE?
4324 C2BE43 00430 JP NZ,NOTSYS ;NOT A SYSTE
M TAPE:JUMP
4327 77 00440 LD (HL),A ;PUT 55H INTO BUFFER
```

Program continues

a System program are arranged on the tape in a predefined sequence. In addition to the program itself, the tape contains stuff like sync bytes, loading addresses, checksums, and other assorted control information. These things are necessary to ensure the program loads in the right place in RAM without errors. Here is a brief rundown of the machine language format:

- Leader—256 zero bytes used to allow stabilization of the tape deck and AGC circuits.

- A5 Sync Byte—Reference point to synchronize the input routines with the incoming data.

- 55 System Format Header Byte—Indicates this is a machine language tape and not Basic.

- Filename—Six bytes of ASCII characters padded with spaces.

The next five items may be repeated many times in any one program.

- 3C Data Header Byte—Indicates the start of a block of program data. The block may be up to 256 bytes long.

- XX Length of Data Byte—A number from 0-255 that tells the number of bytes in this block of data.

- Load Address—A two byte address showing where to put the data for this block. Least significant byte (LSB) is first, followed by the most significant byte (MSB).

- Program Data—0-256 bytes of actual program data.

- Checksum—A one byte sum of all the program data bytes and the load address bytes with the overflow ignored. The checksum is used to detect loading errors.

Two items come after the last block of data:

- 78H End of File Marker—Indicates the end of the program.

- Entry Address (LSB/MSB)—Tells where the beginning of the program is.

With this in mind let's see how RSL reads an object code program into the buffer, and how it makes a high speed copy

from the tape, while BC will be unchanged.

Whenever a pulse is received from the tape, the input flip-flop circuit is set at one and remains there until reset by an OUT(255),A instruction. The circuit can be tested with an IN A,(255) instruction. By monitoring this flip-flop, we can detect the pulses coming from the tape and determine their time slot positions in each byte.

Lines 3450 and 3460 clear (Reset) the flip-flop. Next, the C register stores a count of eight for the incoming byte. Then the routine loops until the sync bit is detected. When it is, a short time is spent in a loop and then the flip-flop is reset. The instructions from lines 3530-3650 (labeled BTLOOP) read in a bit once every 500 microseconds and stuff the data into the A register one bit at a time until eight bits (either ones or zeros) are done. Control is then returned to the main program with the entire byte in the A register.

The Machine Language Tape Format

The bytes of data comprising

Attention: European Subscribers

Due to shipping problems in Europe, we are asking our subscribers to send us their most recent mailing label from 80 Microcomputing. If you are unable to provide us with a label, please send us your name and address, and tell us at what point you are presently in in your subscription. This information is very necessary in order to solve a forwarding problem, so we are asking for your co-operation in this matter. Please direct all information to: Attn: Doris Day, 80 Microcomputing, 80 Pine Street, Peterborough, NH 03458.

Your best Model I/III peripheral buy is a modem.

Considering expanding your TRS-80 Model I or III? Then you should know that **only one kind of peripheral** can give you all these **extra capabilities** . . . in a single unit:

- **Computer-to-computer data communications, for better personal or business management.**
- **Access to free "bulletin board" resources.**
- **Access to Source, CompuServe and other time-sharing systems.**
- **Services like electronic mail, instant news and financial reports.**
- **An almost limitless supply of new games and other enthusiast activities.**

Of course, we're talking about a modem. A far more **sensible** first step in expanding than, say, joy-sticks, or a voice box, or a printer. And, therefore, your **best peripheral buy**.

A modem opens up a whole new world to you. A world of **thousands of computers** and computer people just like you, in homes and businesses around the block and across the country. A world you tap through your telephone.

But don't simply settle for any modem. For the most modem satisfaction, you need to make the **best modem buy**.

And that's **LYNX**.



Lynx for Model I/III.

The new LYNX for TRS-80 Model I and Model III. It's the latest innovation from the people who are making data communications affordable. It's the best first step you can take in expanding. It makes your microcomputer a whole new animal.

Your best Model I/III modem buy is LYNX.

The new LYNX is the ideal modem for your Model I or III. That's because it's the **key element of a total direct-connect telephone communications package**.

This package includes all serial and computer bus interfaces, cables and terminal software . . . and comes to you with these remarkable features:

- **SINGLE PRICE: \$299.95!**
- **Compatible with both Model I and III.**
- **No separate purchases required.**
- **One-year warranty.**
- **Auto dial/auto answer.**
- **Works with any software, including ST-80 by Micklus.**
- **Active clear, break, and "control" keys.**
- **Half or full duplex, variable word length, parity and stop bits.**
- **Dial from phone, keyboard, or memory.**
- **Works with or without Model I expansion interface.**
- **Works with or without Model III RS-232 card.**
- **Can be placed on either side of Model III.**
- **No tools needed to install.**

No other modem gives you so much in a **single package**. And when you **compare** the LYNX price with the **total cost** of bringing any other modem on line, it could **save you OVER \$100!**

ESI LYNX

123 LOCUST STREET LANCASTER, PENNSYLVANIA 17602
Phone 717/291-1116

TRS-80 is a trademark of the Radio Shack Division of Tandy Corporation.
FCC Registration Number: A909KE-68171-DM-N

✓ 49



Consult your local microcomputer retailer, or call one of these LYNX handlers today.

THE BOTTOM LINE
Milford, NH
800/228-3900

B. T. ENTERPRISES
Centereach, NY
516/981-8568

BREEZE/QSD
Dallas, TX
214/484-2976

COMPUTER PLUS
Littleton, MA
800/343-8124

THE PROGRAM STORE
Washington, DC
800/424-2738

STEVENS RADIO SHACK
Phoenixville, PA
800/345-6279

SIMUTEK
Tucson, AZ
800/528-1149

PROGRAMS UNLIMITED
Jericho, NY
800/645-6038

Program continued

4328 23	00450	INC	HL	;BUMP POINTER
4329 0606	00460	LD	B,06	;FILENAME BYTE COUNT
ER				
432B CD3502	00470	GTFN CALL	RDBYTE	;GET A BYTE FROM TAP
E				
432E 12	00480	LD	(DE),A	;DISPLAY IT
432F 13	00490	INC	DE	
4330 77	00500	LD	(HL),A	;STORE IN BUFFER
4331 23	00510	INC	HL	;BUMP PNTR
4332 10F7	00520	DJNZ	GTFN	;LOOP 6 TIMES
4334 CD3502	00530	BLOCLP CALL	RDBYTE	;GET MODULE START BY
TE				
4337 FE3C	00540	CP	3CH	;IS IT OK?
4339 202D	00550	JR	NZ,TRANS	;NO:CHECK FO
R EOP				
433B 77	00560	LD	(HL),A	;YES STORE IN BUFFER
433C 23	00570	INC	HL	
433D CD3502	00580	CALL	RDBYTE	;GET BLOCK LEN
4340 47	00590	LD	B,A	;STORE IN B
4341 77	00600	LD	(HL),A	; & IN BUFFER
4342 23	00610	INC	HL	;BUMP PNTR
4343 AF	00620	XOR	A	;CLEAR CHECKSUM
4344 4F	00630	LD	C,A	; IN C REG
4345 CDB343	00640	CALL	INBYTE	;GET BLOC LOAD ADDRE
SS LSB				
4348 CDB343	00650	CALL	INBYTE	;GET BLA MSB
434B CDB343	00660	LDDATA CALL	INBYTE	;GET DATA BYTE, DO C
KSM, ETC.				
434E 3A4038	00670	LD	A,(3840H)	;TEST FOR BR
EAK KEY				
4351 CB57	00680	BIT	2,A	;TEST BIT 2 (BREAK)
4353 2094	00690	JR	NZ,SPEED	;YES: GOTO M
ENU				
4355 10F4	00700	DJNZ	LDDATA	;LOOP TILL BLOCK ENT
ERED				
4357 CD3502	00710	CALL	RDBYTE	;GET CHECKSUM BYTE
435A 77	00720	LD	(HL),A	; INTO BUFFER
435B 23	00730	INC	HL	
435C B9	00740	CP	C	;SAME?

Program continues

with the preloader attached.

The buffer used to store the object code program begins at 4713H and continues to the end of available memory. Every byte read from tape is stored in the buffer verbatim. This includes headers, file names, checksums, and so on. Only the leader and A5 sync byte are not placed in the buffer. Therefore, after the object program is loaded, the buffer contains an exact byte-for-byte image of what was on the tape. Note: The object program will not execute properly at this time; we are only saving it to write on tape at 2000 baud.

Several of the bytes read in are checked to make sure no errors have occurred in the loading process. These include the 55 System Header Byte, the 3C data header byte, the checksum bytes, and the end-of-file byte. If an error occurs in any of these, loading stops and control is sent back to the menu selection routine. Lines 670-690 test the Break key and return to the menu if it is pressed. This gives you a

**DISK DRIVE WOES?
PRINTER INTERACTION?
MEMORY LOSS?
ERRATIC OPERATION?**

**Don't
Blame The
Software!**



Power Line Spikes, Surges & Hash could be the culprit! Pat. #4,259,705
Floppies, printers, memory & processor often interact! Our patented ISOLATORS eliminate equipment interaction AND curb damaging Power Line Spikes, Surges and Hash. Guaranteed!

- ISOLATOR (ISO-1) 3 filter isolated 3-prong sockets; integral Surge/Spike Suppression; 1875 W Maximum load, 1 KW load any socket \$69.95
- ISOLATOR (ISO-2) 2 filter isolated 3-prong socket banks; (6 sockets total); Integral Spike/Surge Suppression; 1875 W Max load, 1 KW either bank \$69.95
- SUPER ISOLATOR (ISO-3) similar to ISO-1 except double Isolation & Suppression \$104.95
- SUPER ISOLATOR (ISO-11) similar to ISO-2 except double Isolation & Suppression \$104.95
- MAGNUM ISOLATOR (ISO-17) 4 Quad Isolated sockets; For ULTRA-SENSITIVE Systems \$181.95
- CIRCUIT BREAKER, any model (Add-CB) Add \$9.00
- CKT BRKR/SWITCH/PILOT (-CBS) Add \$17.00

AT YOUR DEALERS

MasterCard, Visa, American Express
ORDER TOLL FREE 1-800-225-4876
(except AK, HI, PR & Canada)

Electronic Specialists, Inc.

171 South Main Street, Natick, Mass. 01760

Technical & Non 800 1-617-655-1532

159

**ZIP UP YOUR
MODEL I**

SPEED-UP UNIT - an easy to install electronic device that enables programs to run 2 to 3 times faster. It's the fastest and finest quality speed-up unit on the market.

- guaranteed to double processing speed - no additional purchases required.
- programs will run up to 3 times faster (5.3 mhz) by adding a Z80B microprocessor and delay line - not supplied.
- returns automatically to normal speed during disk and cassette operation - no software patches required.
- keyboard power-on light changes color to indicate operating speed.

\$45.00

VIDEO I. Reverses the video display to provide black characters and graphics on an all white screen for a much easier to read presentation. Software controlled. Cures pulling and distortion problems commonly experienced with TRS-80 monitors. For use with TRS-80 monitors only. Assembled.

\$24.00

"SATISFACTION GUARANTEED"

Add \$2.00 postage & handling - California residents add 6% sales tax -Foreign orders add 15%.

ARCHBOLD ELECTRONICS

10708 Segovia Way

Rancho Cordova, CA 95670

(916) 635-5408

Dealer inquiries invited

chance to halt loading at any time, handy if you discover you are loading the wrong program.

When the file name is encountered, lines 470-520 not only store it in the buffer, but also display it on the video on the left side of the screen.

As each byte of data is read from the tape, it is POKED onto the video display in the upper right corner where the flashing asterisk is usually located. It is more informative to see the actual data being loaded instead of a flashing star, although any errors will still be caught by RSL.

After the last block of data is loaded and the end-of-file byte is checked for validity, the entry address is read from tape and stuffed in the DE register. The address is converted to hexadecimal ASCII characters by the HEXASC routine at line 950 and displayed on video. You can write this address down and use it to re-enter your object program if it crashes at some future time.

Now that we have our object code program in the buffer, the

Program continued

```

435D 2073      00750      JR      NZ,CKERR      ;STOP AND DI
SPLAY ERR MESG
435F 3A3E3C    00760      LD      A,(3C3EH)     ;GET LEFT SY
MBOL
4362 3C        00770      INC     A      ;CHANGE IT
4363 323E3C    00780      LD      (3C3EH),A    ;DISPLAY IT
4366 18CC      00790      JR      BLOCLP      ;DO NEXT BLOCK
4368 FE78      00800      CP      78H      ;EOF BYTE?
436A 2061      00810      JR      NZ,TERR     ;NO:DISPLAY ERROR ME
SG
436C 77        00820      LD      (HL),A      ;YES : PUT IN BUFFER
436D 23        00830      INC     HL
436E CD3502    00840      CALL   RDBYTE      ;GET ENTRY PNT. LSB
4371 77        00850      LD      (HL),A
4372 5F        00860      LD      E,A      ;PUT LSB IN E REG
4373 23        00870      INC     HL
4374 CD3502    00880      CALL   RDBYTE      ;MSB
4377 77        00890      LD      (HL),A
4378 57        00900      LD      D,A      ;PUT MSB IN D REG
4379 22D743    00910      LD      (BUFFEN),HL ;STORE END O
F BUFFER PNTR
437C CDF801    00920      CALL   1F8H      ;OFF MOTOR
437F 21CD3C    00930      LD      HL,3CCDH   ;DISPLAY POS
ITION
4382 0602      00940      LD      B,02H     ;# OF BYTES TO CONVE
RT
4384 7A        00950      HEXASC LD      A,D      ;GET MSB
4385 CB3F      00960      SRL     A      ;MOVE HI NYBBLE TO L
OW
4387 CB3F      00970      SRL     A
4389 CB3F      00980      SRL     A
438B CB3F      00990      SRL     A
438D CDA943    01000      CALL   TEST      ;CONVERT TO ASCII
4390 77        01010      LD      (HL),A    ;DISPLAY HEX DIGIT
4391 7A        01020      LD      A,D      ;GET LO NYBBLE
4392 E60F      01030      AND     0FH      ;MASK OFF HI BITS
4394 CDA943    01040      CALL   TEST      ;CNVT TO ASCII

```

Program continues

Gosub International, Inc.

GOSUB'S MX80/70 Friction Feed Kit \$49.95 ppd

- Use Single Sheet Paper
- Use Your Own Letterhead
- Use Inexpensive Roll Paper
- Does Not Affect Pin-feed Use

PRINTERS PRINTERS PRINTERS

EPSON MX80...\$545 ppd. EPSON MX100...\$825 ppd

THE PRINTER STAND.....\$29.95

SAVE MONEY AND SPACE—Holds almost any printer that uses 9½"-size paper or forms. Made from ¼" acrylic, allows 3" of paper or forms to be stacked under printer. Great for use with bottom load printers! Fits MX80/70-Microline 80's BASE 2-850 Bytewriter-1 and many more!

AUTHORIZED DEALERS FOR THE GOSUB FRICTION FEED KIT
 USA—Alpine Computer Center, 2526 S. Alpine Rd., Rockford, Ill. 61108, (815) 229-0200; OMEGA Micros, 3819 West Michigan St., Milwaukee, WI 53208, (414) 933-6088; EXATRON: 181 Commercial St., Sunnyvale, CA 94086, (800) 538-8559/CA, (408) 737-7111.

CANADA—Microwest Dist. Ltd., 1940 Larson Rd., North Vancouver, B.C., Canada V7M 2Z8, (604) 988-9998 or 988-6877.

AUSTRALIA—Computer Campus Pty. Ltd., 11 Rundle Street, Kent Town, South Australia, 5067, ph. 08.424826, telex 88156.

STRATEGY SIMULATIONS FOR THE TRS-80

MERCENARY FORCE

Command a mercenary army. Decide the number of men, type of weapons, armor, air support, medical aid and transports. Battle the enemy in jungles, underwater, on moons and in space. (1-4 players)

TRS-80 L2/16K \$16.95

SPACE MERCHANT

Build an Empire in the stars. Choose your cargo, means of shipping, and security. Risk pirates, ion storms, engine failure and other hazards while you try to become a Space Merchant. (1-6 players)

TRS-80 L2/16K \$9.95

80 SPACE RAIDERS

Starship Simulator and Combat Game

This is the most realistic combat space simulation available for any computer system anywhere! Operator is placed in a rapidly moving ship looking out through a window into the depths of space. Thousands of stars appear in the distance and part toward the screen edges as the ship flashes past. Forward and aft views available at any time. Accurate celestial navigation using both XYZ and spherical coordinates! Comment from Aug. '81 *Microcomputing*: "May be the ultimate Star Trek-type game and, possibly, the most complex microcomputer game ever attempted!" Fast action graphics never stop!

Model 1/Level 2/16K

\$24.95

SOFTWARE

Software for the VIC 20 and Color Computer

SPACE MERCHANT—See Strategy Simulations for the TRS-80

WARRIOR—Head to head combat in a game where you and your opponent are the rulers of warring city-states, each trying to destroy the other. You decide how many of your population will be warriors, farmers, factory workers, and scholars. \$9.95

YAHTZEE! \$10.95

GAME PACK #1 Quarter Horse and Yahtzee.....\$14.95

GAME PACK #3 Warrior and Space Merchant.....\$14.95

Kansas residents add 3% sales tax
 All prices subject to change without notice

FREE CATALOG UPON REQUEST

(TRS-80) is a trademark of Tandy Corp.)

Dealer Inquiries Invited

SEND CHECK OR MONEY ORDER



Gosub Int'l, Inc.
 501 E. Pawnee, Suite 430
 Wichita, KS 67211
 (316) 265-9859

GOSUB International (New England Division)
 P.O. Box 2566
 Framingham, MA 01701
 (add 5% sales tax)

GOSUB
 P.O. Box 275
 Wichita, KS 67201
 (316) 265-9992

Program continued

```

4397 23      01050      INC    HL      ;BUMP DSP PNTR
4398 77      01060      LD     (HL),A ;DISPLAY NEXT DIGIT
4399 23      01070      INC    HL
439A 53      01080      LD     D,E    ;GET LSB
439B 10E7    01090      DJNZ  HEXASC ;DO NEXT BYTE
439D 11C03C  01100      LD     DE,3CC0H ;DSP TEXT LO
C.
43A0 ED532040 01110      LD     (4020H),DE ;CHANGE CURS
. POS
43A4 217E46  01120      LD     HL,HEXDSP ;POINT TO ME
SG
43A7 1818    01130      JR     ERROR ;DISPLAY & RETURN
43A9 F630    01140      OR     30H    ;ASCII CONV. FACTOR
43AB FE3A    01150      CP     3AH    ;0-9?
43AD FAB243  01160      JP     M,TEST1 ;YES RETURN
43B0 C607    01170      ADD   A,7    ;NO CORRECT FOR A-F
43B2 C9      01180      RET
43B3 CD3502  01190      CALL  RDBYTE ;GET BYTE
INBYTE
43B6 77      01200      LD     (HL),A ; INTO BUFFER
43B7 323F3C  01210      LD     (3C3FH),A ; & DISPLAY
IT
43BA 23      01220      INC    HL      ;BUMP BUFFER PNTR
43BB 81      01230      ADD   A,C    ;DO
43BC 4F      01240      LD     C,A    ;
43BD C9      01250      RET         ; CHECKSUM &
43BE 218C46  01260      LD     HL,SYSERR ;PNT TO ERR.
MES.
43C1 CDA728  01270      CALL  DSP     ;DSPLY IT
ERROR
43C4 CDF801  01280      CALL  MTOFF  ;OFF MOTOR
43C7 CD4900  01290      CALL  KBD    ;INPUT KEYBOARD
43CA C3E942  01300      JP     SPEED ;RETURN TO BEGINNING

43CD 21AE46  01310      LD     HL,ERR2 ;PNT TO TRANS. ERR M
SG
43D0 18EF    01320      JR     ERROR ;DISPLAY AND RETURN
43D2 21CC46  01330      LD     HL,ERR3 ;PNT TO CKSUM ERROR
MSG
43D5 18EA    01340      JR     ERROR
43D7 0000    01350      DEFW  0000

```

Program continues

program waits until we press Enter and returns to the menu. Pressing # and 2 sends control to line 1390—the start of routines to record the object code program on a blank tape at 2000 baud. The going starts to get a little rough here, so hang on.

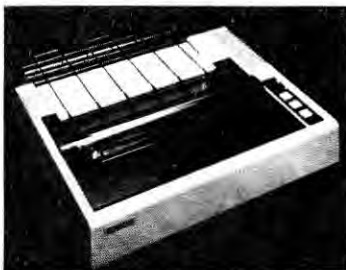
Lines 1390-1480 ask how many copies we wish to make and store our answer in the memory location labeled COPIES. Now comes a pause, so you can prepare the tape machine for recording. So far, so good. Now for the sticky part.

The WRTTAP routine writes the leader and sync byte using the ROM routine at 284H. The 55 System Tape Header Byte and Filename are read from the buffer by OUT7 and written on tape. This is a sneaky way of transferring the file name of the object code program to the preloader module. Having done this, we cause HL to point to the start of the preloader module, LODMOD, so it can be written on the tape.

Notice LODMOD includes the header bytes, block-length bytes

COOSOL DISCOUNTS

PRINTERS



- EPSON MX70 CALL
- EPSON MX80 CALL
- EPSON MX80 F/T CALL
- EPSON MX 100 CALL
- NEC PC-8023A-C \$555
- ANACOM ANC150P OR S \$1195
- ANACOM ANC160P OR S \$1465
- TALLY MT-1602 OR 5 \$1495
- TALLY MT-1802 OR 5 \$1795
- NEC 3510-1, 3515-1, 3530-1 \$1795
- NEC 7710-1, 7715-1, 7730-1 \$2495
- NEC 7720-1, 7725-1 \$2995
- C.ITOH FP 1500 25PU,
H, OR Q \$1350
- C.ITOH FP 1500 25RU \$1450
- C.ITOH FP 1500 45PU OR Q \$1795
- C.ITOH FP 1500 45RU \$1995
- HP-PRINTERS \$ CALL

HEWLETT PACKARD



- HP-125 Microcomputer \$2995
- HP-85A Microcomputer \$2195
- HP-83A Microcomputer \$1595
- HP 85/83 16K Memory Module .. \$169
- HP7225B Graphics Plotter \$1959
- HP-5 1/4" Dual Disk Drive \$1995
- HP-5 1/4" Single Disk Drive \$1249
- HP 8" Dual Disk Drive \$5395
- HP-Other Mass Storage Units .. CALL
- HP-9111A Graphics Tablet \$1595
- HP Firmware CALL
- HP Software Packages CALL
- HP Interfaces CALL

OTHER COMPUTERS

- ALTOS MTU/Floppy/Harddisk . CALL
- ADDS Computer Systems CALL
- ATARI Computer and
Accessories CALL

NEC COMPUTER



- NEC Computer PC-8001A \$795
- NEC I/O Unit PC-8012A \$539
- NEC I/O Port PC-8033A \$152
- NEC Disk Drive PC-8031A \$795
- NEC Disk Drive PC-8032A \$695
- NEC Dot Printer PC-8023A-C ... \$550
- NEC GR Monitor JB-1201 \$199
- NEC COL Monitor JC-1202 \$769
- NEC Accessories & Software ... CALL

TELEVIDEO TERMINALS

- 910C \$595
- 920C \$750
- 912C \$705
- 950C \$959
- ADDS Viewpoint WB2101
or WB2102 \$595

Calif.(714) 545-2216 (800) 854-8498
COOSOL, INC. P.O. BOX 743, ANAHEIM, CALIFORNIA 92805-0743

105

LOAD 80 IS NOW
AVAILABLE ON DISK

Tired of typing in all your programs?

Save time
and money!



ALL THE
MAJOR PROGRAM
LISTINGS FROM
80 MICROCOMPUTING
EACH MONTH

\$9.97

Plus \$1.50 ea. Postage & Handling

SAVE HOURS OF TYPING & AGGRAVATION

Sign up for a subscription to **LOAD 80**. Save up to 30% off the monthly price.
Begin your subscription with the April 1982 cassette or disk.

LOAD 80 disks are TRSDOS 2.3 formatted, single density and floppy-sided. They will not contain an operating system. Single drive users need a single drive copy utility; Model III users need the TRSDOS 1.2/1.3 Convert utility. Source code files may not be useable on the Model III.

"Frankly, after hundreds of hours of frustration, I seldom ever try to keyboard a published program. Inevitably, I mess it up when I keyboard it. Who needs the aggravation?"

"This is why I started a new series of cassettes called **LOAD-80**. Each cassette will have program dumps of the listings in an issue of *80 Microcomputing*. These listings are direct from the authors and tested by the *80 Microcomputing* staff. All but the very short program listings will be on the **LOAD 80** cassettes. Thus, you will be able to save hours of inputting programs and even more of debugging your keyboard errors."

Wayne Green
Publisher, *80 Microcomputing*

The **LOAD 80** cassette is simply the program listings that appear in the articles in *80 Microcomputing*. It was created to save you the time involved in typing the listings yourself. Successful loading of the programs depends on reading the documentation in the articles. If you have your current magazine at hand when you load the cassette or boot up the disk, you should have no difficulty. If you still have problems, please return the tape or disk for replacement.

LOAD 80 began with the April 1981 issue. To order back issues, look for the back issue advertisement in this magazine or ask your local dealer.

To order **LOAD 80**, fill in the attached card and we will send you your **LOAD 80** cassette or disk for the major programs in this issue. If the card is missing, fill in the coupon below (a photocopy is acceptable) and mail to: **LOAD 80**, 80 Pine Street, Peterborough, NH 03458.

Yes, I want April **LOAD 80**.

- YES, I want a cassette of the April 1982 **LOAD 80** for \$9.97 each (plus \$1.50 per tape for postage and handling).
- YES, I'll save 30%. Sign me up for a year of **LOAD 80** beginning with the April 1982 cassette...\$99.97 for 12 issues.
- YES, I want the April 1982 **LOAD 80** on disk for \$19.97 each (plus \$1.50 per disk for postage and handling).
- YES, I want to save money. I'll subscribe to **LOAD 80** on disk beginning with the April 1982 issue... \$199.97
- Visa Am. Ex MasterCard
- Check/Money order

Name: _____
Address: _____
City: _____ State: _____ Zip: _____
Signature: _____ Card# _____ Exp. Date: _____

LOAD 80 is manufactured by Instant Software, a subsidiary of WAYNE GREEN INC., 80 Pine St., Peterborough, NH 03458. There is no warranty expressed or implied that **LOAD 80** will do anything other than save you typing.

Foreign air mail, please inquire.

Program continued

```

43D9 00      01360 COPIES  DEF8  00      ;# OF COPIES TO MAKE
                01365 ;.
                01367 ; *****
*****
F THE *      01370 ; * THIS SECTION WRITES A FASTLOAD VERSION O
LE *         01380 ; *      SYSTEM PROGRAM WITH A PRELOADER MODU
                01384 ; *****
*****
43DA CDC901  01386 ;
43DD 21DB46  01390 SYSWRT  CALL   CLS
43E0 CDA728  01400      LD    HL,MESG3
43E3 CD4900  01410      CALL  DSP
43E6 FE31    01420      CALL  KBD      ;INPUT # OF COPIES
43E8 FADA43  01430      CP    31H     ;LESS THAN 1?
                01440      JP    M,SYSWRT ;YES -TRY AG
AIN
43EB FE3A    01450      CP    3AH     ;LESS THAN OR =9?
43ED F2DA43  01460      JP    P,SYSWRT ;NO-TRY AGAI
N
43F0 E60F    01470      AND   0FH     ;MASK OFF ASCII PART

43F2 32D943  01480      LD    (COPIES),A ;STORE IN ME
M
43F5 21ED46  01490 CONT  LD    HL,MESG5 ;'READY TAPE
FOR RECORD & PRESS ENTER
43F8 CDA728  01500      CALL  DSP
43FB CD4900  01510      CALL  KBD     ;WAIT FOR ENTER
43FE CD8402  01520 WRTTAP CALL  284H    ;MOT. ON,WRITE LEADE
R AND SYNC
4401 211347  01530      LD    HL,BUFFER ;POINT TO 55
H,FILENAME
4404 0607    01540      LD    B,7      ;7 BYTES TO
OUTPUT
4406 7E      01550 OUT7  LD    A,(HL)
4407 23      01560      INC   HL
4408 CD6402  01570      CALL  264H    ;OUTPUT A BYTE

```

Program continues

and load address bytes embedded in it. Only the checksums are not included, since these are calculated by the routines writing the preloader to tape. The preloader is divided into four parts. The first part is a line of text with its origin set to load directly on the video screen. The second part loads into the keyboard buffer area of RAM, a section not used by anything else during the loading of a program. It should be out of the way so it won't upset the loading of the object program. The third part is the R byte routine. Its origin is pegged to load at RAM location 403EH, a 64 byte area not used by most programs I know of. If a program you wish to copy does use this area, simply change line 3420 to place R byte somewhere out of the way. Also change line 2770 (labelled V byte) to the new address.

Note: Nowhere in the preloader is R byte called! Instead, there are numerous calls to V byte. Line 2770 (not a part of the preloader) defines V byte as ad-

Transform your Home into a Computerized Arcade with HORIZONS Software



VENTURE

Journey into the derelict stronghold of an ancient wizard in an effort to destroy monsters and collect treasure in this realtime machine language arcade game. With sound effects, this is the first in a series of outstanding quality arcade-style games for your TRS-80 computer.

Tape \$14.95 / Disk \$19.95

Please specify Model I or Model 3 when ordering.

TRS-STICK Joystick for all Horizons games: Model I or 3: \$39.95

A Division of Case Technology

P.O. Box 4792
Springfield, MO 65802

HORIZONS Software

Dealer inquiries invited.
TRS-80 is a trademark of Tandy Corp.
Please add \$1.00 for handling, MO res. add 6%



(417) 831-5673

✓373

Program continued

```

440B 10F9      01580      DJNZ   OUT7      ;LOOP 7 TIMES
440D 21D544    01590      LD     HL,LODMOD ;POINT TO LO
ADER MODULE
4410 7E        01600      HEADER LD     A,(HL)  ;GET HEADER BYTE
4411 FE3C      01610      CP     3CH      ;OK?
4413 C24344    01620      JP     NZ,QUIT
4416 CD6402    01630      CALL  264H     ;WRITE IT
4419 23        01640      INC   HL
441A 7E        01650      LD     A,(HL)  ;GET LEN
441B 47        01660      LD     B,A     ; IN B REG.
441C CD6402    01670      CALL  264H
441F AF        01680      XOR   A       ;CLR CHKSUM
4420 4F        01690      LD     C,A     ;IN C REG
4421 3E02      01700      LD     A,2
4423 5F        01710      LD     E,A     ;# OF ADDRESS BYTES
4424 23        01720      WRADD INC   HL
4425 7E        01730      LD     A,(HL) ;GET LSB
4426 5F        01740      LD     D,A     ;HOLD IT
4427 81        01750      ADD   A,C     ;CKSM
4428 4F        01760      LD     C,A
4429 7A        01770      LD     A,D     ;RETRIEVE BYTE
442A CD6402    01780      CALL  264H     ;TO TAPE
442D 1D        01790      DEC   E       ;CNT BYTE
442E 20F4      01800      JR    NZ,WRADD
4430 23        01810      DATALP INC  HL
4431 7E        01820      LD     A,(HL) ;GET BYTE
4432 57        01830      LD     D,A
4433 81        01840      ADD   A,C     ;DO CKSM
4434 4F        01850      LD     C,A
4435 7A        01860      LD     A,D     ;GET BYTE
4436 CD6402    01870      CALL  264H     ;TO TAPE
4439 10F5      01880      DJNZ  DATALP
443B 79        01890      LD     A,C     ;OUTPUT CKSM
443C CD6402    01900      CALL  264H
443F 23        01910      INC   HL      ;3CH OR 78H
4440 C31044    01920      JP    HEADER
4443 FE78      01930      QUIT  CP     78H
4445 C2BE43    01940      JP    NZ,NOTSYS ;ERROR IF NO
T
4448 CD6402    01950      CALL  264H
444B 23        01960      INC   HL
444C 7E        01970      LD     A,(HL) ;LSB
444D CD6402    01980      CALL  264H
4450 23        01990      INC   HL      ;MSB
4451 7E        02000      LD     A,(HL)
4452 CD6402    02010      CALL  264H
4455 010030    02020      LD     BC,3000H ;TIMER CNT
4458 CD6000    02030      CALL  0060H   ;ROM TIMER
445B 0640      02070      LD     B,40H  ;64 LEADER BYTES
445D AF        02080      LEADER XOR  A
445E C5        02090      PUSH  BC
445F CD9944    02100      CALL  OUTPUT ;2000 BAUD ROUTINE
4462 C1        02110      POP   BC
4463 10F8      02120      DJNZ  LEADER ;LOOP
4465 211347    02130      LD     HL,BUFFER ;PNT TO BUFI
ER (CONTAINS ALL SYNC AND
CONTROL BYTES
4468 ED5BD743 02140      LD     DE,(BUFFER) ;GET END OF
BUFFER
446C 7E        02150      BUFVRT LD   A,(HL)
446D CD9944    02160      CALL  OUTPUT ;WRITE BYTE AT FASTL
OAD SPEED
4470 7C        02170      LD     A,H     ;SEE IF
4471 BA        02180      CP     D       ; WE ARE
4472 2004      02190      JR    NZ,NEXT ; DONE
4474 7D        02200      LD     A,L     ; YET.
T
4475 BB        02210      CP     E
4476 2803      02220      JR    Z,DONE
4478 23        02230      NEXT  INC  HL      ;MORE: BUMP HL
4479 18F1      02240      JR    BUFVRT  ; & DO NEXT ONE
447B 3AD943    02250      DONE  LD     A,(COPIES) ;GET COPY CN
T
447E 3D        02260      DEC   A
447F 2812      02270      JR    Z,OFFMOT ;DONE :FINIS
H UP & RET
4481 32D943    02280      LD     (COPIES),A ;RESTORE COU
NT
4484 0603      02290      LD     B,03
4486 210000    02300      LD     HL,0000 ;TIMER INNER LOOP
4489 2B        02310      INLOOP DEC  HL
448A 7C        02320      LD     A,H
448B B5        02330      OR    L
448C 20FB      02340      JR    NZ,INLOOP
448E 10F9      02350      DJNZ  INLOOP ;LONG TIMER
4490 C3FE43    02360      JP    WRTTAP  ;DO ANOTHER COPY
4493 CDF801     02370      OFFMOT CALL  1F8H ;OFF MOTOR

```

Program continues

FOR TRS-80 MODEL I OR III AND SOON FOR THE NEW IBM PERSONAL COMPUTER!

- ★ **MORE SPEED**
10-20 times faster than Level II BASIC.
- ★ **MORE ROOM**
Very compact compiled code plus VIRTUAL MEMORY makes your RAM act larger. Variable number of block buffers. 31-char.-unique word-names use only 4 bytes in header!
- ★ **MORE INSTRUCTIONS**
Add YOUR commands to its 79-STANDARD-plus instruction set!
Far more complete than most Forths: single & double precision, arrays, string-handling, clock, more.
- ★ **MORE EASE**
Excellent full-screen Editor, structured & modular programming
Word search utility
THE NOTEPAD letter writer
Optimized for your TRS-80 or IBM with keyboard repeats, upper/lower case display driver, full ASCII, single- & double-width graphics, etc.
- ★ **MORE POWER**
Forth operating system
Interpreter AND compiler
8080 or 8088 Assembler
(Z80 Assembler also available for TRS-80)
Intermix 35- to 80-track disk drives
Model III and IBM can read, write and run each other's Fort and Model I diskettes!
VIRTUAL I/O for video and printer, disk and tape (10-Megabyte hard disk available)

MMS FORTH

THE PROFESSIONAL FORTH FOR TRS-80

(Thousands of systems in use)

MMSFORTH Disk System V2.0 (requires 1 disk drive, 32K RAM) For Radio Shack TRS-80 Model I or III ... \$129.95
For IBM Personal Computer (advance order) ... \$249.95

AND MMS GIVES IT PROFESSIONAL SUPPORT

Source code provided
MMSFORTH Newsletter
Many demo programs aboard
MMSFORTH User Groups
Inexpensive upgrades to latest version
Programming staff can provide advice, modifications and custom programs, to fit YOUR needs.

MMSFORTH UTILITIES DISKETTE: Includes FLOATING POINT MATH (L2 BASIC ROM routines plus Complex numbers, Rectangular-Polar coordinate conversions, Degrees mode, more), plus a full Forth-style Z80 ASSEMBLER, plus a powerful CROSS-REFERENCER to list Forth words by block and line. All on one diskette (requires MMSFORTH V2.0, 1 drive & 32K RAM) ... \$39.95*

FORTHCOM: communications package provides RS-232 driver, dumb terminal mode, transfer of FORTH blocks, and host mode to operate a remote TRS-80 (requires MMSFORTH V2.0, 1 drive & 32K RAM) ... \$39.95*

THE DATAHANDLER V1.2: a very sophisticated database management system operable by non-programmers (requires MMSFORTH V2.0, 1 drive & 32K RAM) ... \$59.95*

MMSFORTH GAMES DISKETTE: real-time graphics & board games w/source code. Includes BREAKFORTH, CRASHFORTH, CRYPTOQUOTE, FREEWAY, OTHELLO & TIC-TAC-FORTH (requires MMSFORTH V2.0, 1 drive & 32K RAM) ... \$39.95*

Other MMSFORTH products under development

FORTH BOOKS AVAILABLE

MMSFORTH USERS MANUAL - without Appendices, for non-owners ... \$17.50*

STARTING FORTH - best companion to our manual ... \$15.95*

THREADED INTERPRETIVE LANGUAGES - advanced, excellent analysis of MMSFORTH-like language ... \$18.95*

PROGRAM DESIGN & CONSTRUCTION - intro. to structured programming, good for Forth ... \$13.95*

FORTH 79 STANDARD MANUAL - official reference to 79-STANDARD word set, etc ... \$13.95*

FORTH SPECIAL ISSUE, BYTE Magazine (Aug. 1980) - we stock this collector's item for Forth users and beginners ... \$4.00*

* ORDERING INFORMATION: Software prices include manuals and require signing of a non-transferable single system, single-user license. Describe your hardware. Add \$2.00 S/H plus \$3.00 per MMSFORTH and \$1.00 per additional book; Mass. orders add 5% tax. Foreign orders add 20% UPS COD, VISA & M/C accepted; no unpaid purchase orders, please.

Send SASE for free MMSFORTH information
Good dealers sought.

Get MMSFORTH products from your
computer dealer or

**MILLER MICROCOMPUTER
SERVICES (MA)** ✓ 137

61 Lake Shore Road, Natick, MA 01780
(617) 653-6136

Program continued

```

4496 C3E942 02380 JP SPEED ;GOTO MENU
4499 0610 02390 OUTPUT LD B,10H
449B 10FE 02400 DJNZ $ ;LOOP FOR A WHILE
      02404 ;
      02405 ;*** WRITE A BYTE IN 2000 BAUD FORMAT ***
      02406 ;
449D E5 02410 WBYTE PUSH HL ;SAVE
449E D5 02420 PUSH DE ; ALL
449F C5 02430 PUSH BC ; REGS
.
44A0 F5 02440 PUSH AF
44A1 0E09 02450 LD C,09 ;# OF BITS +SYNC
44A3 57 02460 LD D,A ;STORE BYTE IN D
44A4 37 02470 SCF ;ADD SYNC
44A5 CDB344 02480 BYTLP CALL PULSE ;OUTPUT A PULSE
44A8 7A 02490 LD A,D ;RETRIEVE BYTE
44A9 07 02500 RLCA ;ROTATE NXT BIT TO C
ARRY
44AA 57 02510 LD D,A ;SAVE IT AGAIN
44AB 0D 02520 DEC C ;COUNT THE BIT
44AC 20F7 02530 JR NZ,BYTLP ;LOOP 9 TIME
S
44AE F1 02540 POP AF ;RESTORE
44AF C1 02550 POP BC ; ALL
44B0 D1 02560 POP DE ; REGS.
44B1 E1 02570 POP HL
44B2 C9 02580 RET ;EXIT PT.
44B3 301B 02590 PULSE JR NC,ZTIME ;BLANK SPACE
FOR 0
44B5 3E05 02600 LD A,05H ;1ST PART OF PULSE
44B7 D3FF 02610 OUT (255),A
44B9 0608 02620 LD B,08H
44BB 10FE 02630 DJNZ $ ;TIMER LOOP
44BD 3E06 02640 LD A,06H ;2ND PART OF PULSE
44BF D3FF 02650 OUT (255),A
44C1 0608 02660 LD B,08H
44C3 10FE 02670 DJNZ $
44C5 3E04 02680 LD A,04 ;3RD PART OF PULSE
44C7 D3FF 02690 OUT (255),A
44C9 062A 02700 → OA LD B,2AH
44CB 10FE 02710 DJNZ $ ;312.37 MICROSECONDS
44CD FD23 02720 INC IY ;ACTS AS NOP FOR TIM
ING
44CF C9 02730 RET
44D0 063F 02740 ZTIME → LD IF B,3FH ;458.97 MICROSECS
44D2 10FE 02750 DJNZ $
44D4 C9 02760 RET
02762 ;
02764 ; *****
02766 ; PRELOADER MODULE FILE
02768 ; *****
403E 02770 VBYTE EQU 403EH ;RBYTE CALL PNT
44D5 3C39 02780 LODMOD DEFW 393CH ;BLOC & LEN
44D7 003C 02790 DEFW 3C00H ;START ADDRESS
44D9 52 02800 DEFW 'RAPID SYSTEM LOADER (C)
1980 BY DAVID C. HEDINGER
4512 3C6E 02810 DEFW 6E3CH ;BLOC START AND LEN
****151DEC
4514 E841 02820 DEFW 41E8H ;LOAD ADDRESS (KBD B
UFFER)
4516 3E04 02830 LD A,04
4518 D3FF 02840 OUT (255),A ;TURN ON MOTOR
451A CD3E40 02850 SYNCIT CALL VBYTE ;LOOK FOR SYNC
451D FE55 02860 CP 055H
451F 20F9 02870 JR NZ,SYNCIT
4521 0606 02880 LD B,06 ;FILENAME COUNT
4523 11403C 02890 LD DE,3C40H ;POINT TO 2N
D LINE
4526 CD3E40 02900 FN CALL VBYTE ;GET FILENAME
4529 12 02910 LD (DE),A ;DISPLAY IT
452A 13 02920 INC DE
452B 10F9 02930 DJNZ FN ;LOOP 6 TIMES
452D CD3E40 02940 BLOOP CALL VBYTE
4530 FE3C 02950 CP 3CH ;BLOC START?
4532 2027 02960 JR NZ,EOF ;NO- CHECK FOR EOF
4534 CD3E40 02970 CALL VBYTE ;OK GET LEN BYTE
4537 47 02980 LD B,A ; INTO B REG
4538 0E00 02990 LD C,00 ;CLEAR CHECKSUM
453A CD3E40 03000 CALL VBYTE ;GET LSB START ADDR
453D 6F 03010 LD L,A
453E 81 03020 ADD A,C ;DO
453F 4F 03030 LD C,A ; CHECKSUM
4540 CD3E40 03040 CALL VBYTE ;MSB
4543 67 03050 LD H,A
4544 81 03060 ADD A,C
4545 4F 03070 LD C,A

```

Program continues

dress 404EH. This means whenever we call V byte, we actually call 403EH.

The reason for this is simple. When the preloader is loaded into its working location at 41E8H, R byte ends up at 403EH, not its original location, 4588H. If we called R byte, we would be calling a nonexistent routine, causing an immediate crash! So we call V byte instead, the program goes to 403EH, and everything works fine.

The final section of the preloader is a single instruction loaded into RAM location 41E2H. The instruction is a jump to 41E8H, the entry point of the preloader. Location 41E2H normally contains a return instruction. It is called by the system command at the end of loading any machine language tape. By putting a jump to our preloader here, control is transferred to it as soon as it is loaded.

Remember: Everything we have put on tape is in standard TRS-80 machine language format. However, as soon as the preloader has been written, the program comes to line 2020 leaving a blank space on the tape. From now on, all bytes are written at the 2000 baud speed.

Making High Speed Copy

Lines 2080-2120 form a loop. It writes 64 zero bytes forming a leader for the 2000 baud tape. When this is completed, HL and DE are pointed to the start and end addresses of the object code program buffer. The routine labelled BUFVRT scans the buffer and sends each byte to the tape. Since all control and checksums are already included in the buffer, no calculating need be done other than checking for the end of the program.

If you asked for more than one copy to be made, lines 2250-2360 will allow a few seconds of blank tape to run and then loop to line 1520 (WRT-TAP) to make another. If all copies have been made, the motor is turned off and the program branches back to the menu for further instructions.

Loading a RSL Format Program

To load a program in the RSL format, use the same procedure



AMERICAN

118 SO. MILL ST
PRYOR, OK 74361
(918) 825-4844

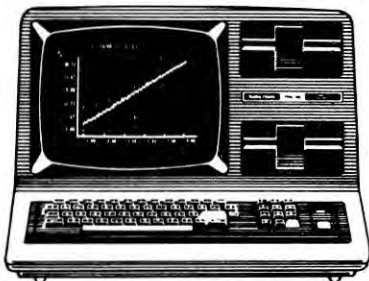
Small Business COMPUTERS

ALL LISTED PRICES ARE CASH DISCOUNTED. WE ACCEPT MC, VISA, AND COD (REQUIRES CERTIFIED CHECK, CASHIER'S CHECK OR CASH). FOR CHARGE ORDERS, PLEASE ADD 3%. FOR COD SERVICE, PLEASE ADD 3%. OKLAHOMA RESIDENTS PLEASE ADD 4% SALES TAX.

*****NEW RETAIL LOCATION — SOUTHWOOD SHOPPING PLAZA, PRYOR, OK*****

DON'T PAY MORE!!

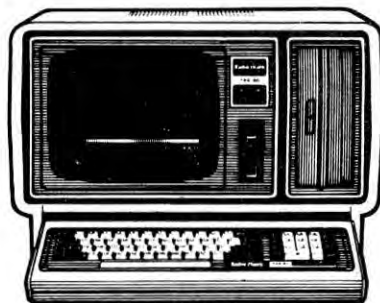
TRS-80 MODEL III



- TRS-80 16K Model III.....\$825.00
- TRS-80 48 K Model III.....\$849.95
- TRS-80 48 K Model III
with one disk drive.....\$1499.95
- TRS-80 48K Model III
with two drives.....\$1749.95

*Model III is also available with dual head and 80 track drives. Drives listed give same performance as standard Radio Shack units.

TRS-80 MODEL II



64K MODEL II
WITH ONE DISK DRIVE

\$3287⁰⁰

CC DISK DRIVE



COLOR
COMPUTER
DISK DRIVE UNIT

\$499⁹⁵

THERE'S NO SECRET

There's no secret as to why we can sell TRS-80 computer equipment for less. Low overhead — that's the reason — pure, simple and straight! As everyone knows, Radio Shack is a huge corporation...with huge expenses. We are able to buy the bare-bones computers from Radio Shack. To these computers, we add our own memory chips, disk drives, cables, etc. The result is a computer system which is equal to, or in many cases, superior to the one you would get from Radio Shack in both price and performance capabilities. There is one thing that you don't get from Radio Shack — their 90 day warranty. What you get in its place is the exclusive 120 days American Small Business Computer's Warranty. So...if you like the Radio Shack computer, but don't like the price...CHECK US OUT!!!

AW...WHAT THE HECK

RAM Memory Chips for the TRS-80 Apple and others

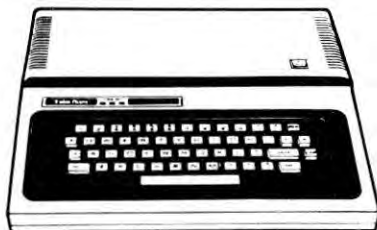
It is the policy of American Business Computers to offer merchandise at the lowest price possible. Several months back, we began selling RAM Memory Chips for the TRS-80 for \$45.00 per set. Someone else sold chips for \$44.00. We sold them for \$38.00. They sold them for \$37.95. So we say "AW...WHAT THE HECK! Let's see if other guys beat this price."

\$17⁹⁵

PER 16K SET

These chips are brand new 4116's. These 200 nano-second chips are fully compatible with all TRS-80 products. Instructions for insertion are included, however, the dip shunt's required for converting a 48K Model II to a 16K Model II are not included at this low price.

COLOR COMPUTER



- COLOR COMPUTER 4K LEVEL I.....\$318.00
- COLOR COMPUTER 16K
EXTENDED BASIC.....\$487.00
- COLOR COMPUTER DISK
DRIVE 1.....\$499.95
- COLOR COMPUTER DISK DRIVE
2, 3 or 4.....\$329.95
- COLOR COMPUTER JOYSTICKS.....\$24.95

* DEALER INQUIRIES INVITED

TRS-80 MODEL III SOFTWARE

DISCOUNT PRICES ON
Model III Software

- Profile.....(26-1562).....\$69.95
- Profile III Plus.....(26-1592).....\$175.00
- VisiCalc.....(26-1566).....\$80.00
- VisiCalc III.....(26-1569).....\$175.00
- Scriptit.....(26-1563).....\$79.95
- Super Scriptit.....(26-1590).....\$175.00
- Scriptit Dictionary.....(26-1591).....\$131.00

CALL 918-825-4844

* TM Tandy Corp. 217

Program continued

```

4546 CD3E40 03080 DLOOP CALL VBYTE ;GET DATA
4549 77 03090 LD (HL),A ;PUT IN MEM
454A 23 03100 INC HL ;BUMP HL
454B 81 03110 ADD A,C ;DO
454C 4F 03120 LD C,A ; CHECKSUM
454D 10F7 03130 DJNZ DLOOP ;LOOP TILL BLOCK ENT
ERED
454F CD3E40 03140 CALL VBYTE ;GET CKSUM
4552 B9 03150 CP C ;SAME?
4553 202A 03160 JR NZ,LDERR ;DISPLAY ERR
OR
4555 3E2A 03170 LD A,2AH ;'*'
4557 12 03180 LD (DE),A ;DSP *
4558 13 03190 INC DE
4559 18D2 03200 JR BLOOP ;GET NXT BLOC
455B FE78 03210 EOF CP 78H ;EOF BYTE?
455D 201C 03220 JR NZ,EOFERR ;DISPLAY ERR
OR
455F CD3E40 03230 CALL VBYTE ;GET ENTRY PNT LSB
4562 6F 03240 LD L,A
4563 CD3E40 03250 CALL VBYTE
4566 67 03260 LD H,A ;MSB TO H
4567 3EC9 03270 LD A,0C9H ;RET
4569 32E241 03280 LD (41E2H),A
456C 22DF40 03290 LD (40DFH),HL ;STR ENTRY P
NT
456F CDF801 03300 CALL 1F8H ;OFF MOTOR
4572 E9 03310 JP (HL) ;AUTO START
4573 00 03320 NOP
4574 CDF801 03330 EXIT CALL 1F8H ;OFF MOTOR
4577 C37200 03340 JP 072H ;RETURN TO BASIC
457A 00 03350 AUTO DEFB 00
457B 3E45 03360 EOFERR LD A,45H ;'E' EOF ERROR
457D 1802 03370 JR XERR
457F 3E43 03380 LDERR LD A,43H ;'C' CHKSUM ERROR
4581 12 03390 XERR LD (DE),A ;DISPLAY ERROR CODE
4582 18F0 03400 JR EXIT ;RETURN TO BASIC
4584 3C29 03410 DEFW 293CH ;BLOC & LEN
4586 3E40 03420 DEFW 403EH ;START ADDRESS

```

Program continues

used to load the original program. In other words, type and enter 'SYSTEM'. Enter the file name of the program as usual. You should see the text load on the screen followed by a few seconds of asterisk blinking. This is the preloader. The whole thing should take about seven seconds. The preloader will auto start and begin loading the object code program. This is indicated by the file name appearing on the second line of video. Every time a block of data is loaded, an additional asterisk will appear after the file name. If an error occurs, a 'C' will replace the last asterisk and loading will stop. Reset and when the memory size question appears on the screen try again. If all goes well, the program will start itself as soon as it is loaded.

Enter RSL

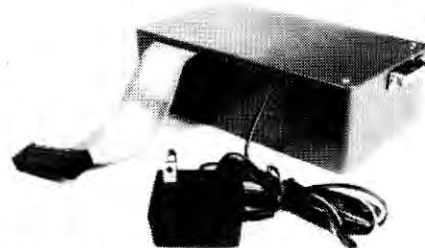
Use the Editor/Assembler and enter the RSL program. If you make any modifications to the preloader (lines 2780-3730) affecting its length, you must alter

CONVERT YOUR SERIAL PRINTER TO PARALLEL

NEW MODEL UPI-3 SERIAL PRINTER INTERFACE MAKES IT POSSIBLE TO CONNECT AN ASCII SERIAL PRINTER TO THE PARALLEL PRINTER PORT ON THE TRS-80.

Software compatibility problems are totally eliminated because the TRS-80 "THINKS" that it has a parallel printer attached. NO MACHINE LANGUAGE DRIVER NEEDS TO BE LOADED INTO HIGH MEMORY BECAUSE THE DRIVER ROUTINE FOR THE UPI-3 IS ALREADY IN THE TRS80 ROM! SCRIPSIT, PENCIL, RSM 2, ST80D, NEWDOS, FORTRAN, BASIC etc. all work as if a parallel printer was in use.

The UPI-3 is completely self contained and ready to use. A 34 conductor edge card connector plugs onto the parallel printer port of the model I Expansion Interface or onto the parallel printer port on the TRS-80 III. A DB25 socket mates with the cable from your serial printer. The UPI-3 converts the parallel output of the TRS-80 printer port into serial data in both the RS232-C and 20 MA. loop formats.



Switch selectable options include:

- Linefeed after Carriage Return
- Handshake polarity (RS232-C)
- Nulls after Carriage Return
- 7 or 8 Data Bits per word
- 1 or 2 Stop Bits per Word
- Parity or No parity
- ODD or EVEN Parity

**NOW
AVAILABLE
FOR
MODEL II**

UPI-2 for TRS80 Model II	\$149.95
UPI-3 for TRS80 Model I or 3	\$149.95
UPI-4 for use with Model 1 and RS Printer	
Interface Cable (no expansion interface required)	\$159.95
Manual only (may be applied to order)	\$ 5.00
Ten day return privilege — 90 day warranty	
Shipping and Handling on all orders	\$ 4.00
Specify BAUD rate 50-9600 BAUD	



SPEEDWAY ELECTRONICS
Division of Binary Devices
11560 TIMBERLAKE LANE
NOBLESVILLE, IN 46060
(317) 842-5020

✓106

TRS 80 is a trademark of Tandy

VISA MasterCard



**Small
Business
COMPUTERS**

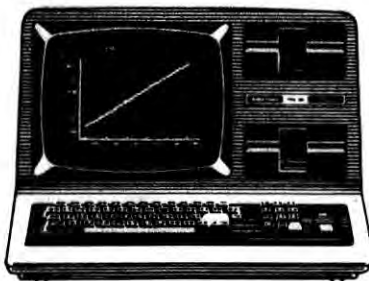
**118 SO. MILL ST • PRYOR, OK 74361
PHONE (918) 825-4844**

ALL LISTED PRICES ARE CASH DISCOUNTED. WE ACCEPT MC, VISA, AND COD (REQUIRES CERTIFIED CHECK, CASHIER'S CHECK OR CASH). FOR CHARGE ORDERS, PLEASE ADD 3%. FOR COD SERVICE, PLEASE ADD 3%. OKLAHOMA RESIDENTS PLEASE ADD 4% SALES TAX.

*****NEW STORE LOCATION — SOUTHWOOD SHOPPING PLAZA, PRYOR, OK*****

TRS-80 MODEL 3 MINI DISK DRIVES

Our Model 3 Mini Disk Drive is based on the famous Tandon mini disk unit. Because of its low cost and high reliability, we thought this Tandon unit the perfect choice for the Model 3. Much testing confirmed our opinion, and we think you'll agree that it's the best mini disk for the money (and the Model 3)!!!



INTERNAL DISK DRIVE KITS FOR THE MODEL III COMPUTER

The kit includes one disk drive of your choice, controller, power supply, cables, mounting hardware, and complete instructions for easy installation.

DRIVE TYPE	DRIVE 0	DRIVE 1	DRIVE 2	DRIVE 3
Single Side 40 Track Stores about 180,000 Bytes/Disk Drive	\$595.00	239.95	265.00	265.00
Dual Head 40 Track Stores about 360,000 Bytes/Disk Drive	\$729.95	379.95	369.95	369.95
Single Side 80 Track Stores about 360,000 Bytes/Disk Drive	\$729.95	379.95	369.95	369.95
Dual Head 80 Track Stores about 720,000 Bytes/Disk Drive	\$829.95	479.95	499.95	499.95

* DEALER INQUIRIES INVITED

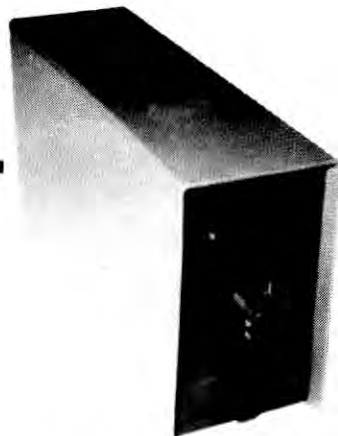
✓218

* Drives 0 and 1 may be installed externally (with controller and power supply mounted internally). Please add \$40.00 for cost of cabinet and cover.

TRS-80* MODEL 1 MINI DISK DRIVES

Our Mini Disk Drives are based on the world famous TEAC Mini Disk Unit. The TEAC Unit features an estimated 8000 power-on-hours mean time between failure (that's 8 hours a day, 5 days a week, for 3.85 years!!). Our drives also feature a lead screw head positioner. This type of positioner insures accurate head positioning over the read-write media while giving a very quiet, noise-free read-write operation. If you have any doubts about our drives, our **one year warranty** should convince you that we know this unit is the **best** drive at the **best** price on the American market. This is one example where you can pay less and get more!!

\$250
~~**\$265**~~



- MODEL 1 40 TRACK FULLY TRS-80 COMPATIBLE DISK DRIVE.....\$265
- MODEL 1 80 TRACK DRIVE (Requires NEWDOS 80 or equivalent software to work).....\$369.95
- NEWDOS 80 (Version 2.0).....\$139.95
- BOX OF 10 VERBATIM DATALIFE DISKETTES.....\$29.95
- 2 DRIVE CABLE.....\$29.95
- 4 DRIVE CABLE.....\$39.95

**COMPLETE DRIVE
WITH POWER SUPPLY**

CALL: 918-825-4844

✓219

* TM Tandy Corp.

the length byte in line 2780, 2810 or 3410. For instance, suppose you change line 2800 to eliminate my name from the text. (Shame on you!) You must subtract the number of characters deleted (18 decimal or 12 hex) from 39 hex and put this new number in line 2780. Line 2780 would then be DEFW 273CH.

Assemble the program and check for errors. When all is well save the source and object code on tape a few times. You are now ready to use the program. Load RSL using the System command. Measure how long it takes to load. Execute the program by typing and entering /. You should see the menu appear on the video.

Now use the program to make a copy of itself in the 2000 baud format. Press 1 to load a machine language tape. Place the RSL object code tape back in the recorder and prepare to load it in. Press Enter when ready. The program will input the tape, display the file name and entry point, then stop. Press Break to return

Program continued

```

03422 ;
03424 ; *****
***
D * 03426 ; * READ A BYTE FROM TAPE AT 2000 BAU
03428 ; *****
***
4588 C5 03430 RBYTE PUSH BC
4589 F5 03440 PUSH AF
458A 3E04 03450 LD A,04
458C D3FF 03460 OUT (255),A ;CLR F.F.
458E 0E08 03470 LD C,08 ;BIT CNTR
4590 DBFF 03480 LKSYNC IN A,(255) ;SYNC?
4592 17 03490 RLA
4593 30FB 03500 JR NC,LKSYNC ;NO, KEEP LOOKING
4595 0625 03510 LD B,25H ;268.39US 1/2BIT
4597 10FE 03520 DJNZ $
4599 3E04 03530 BTLOOP LD A,04
459B D3FF 03540 OUT (255),A
459D 063D 03550 LD B,3DH
459F 10FE 03560 DJNZ $
45A1 FD23 03570 INC IY ;NOP
45A3 DBFF 03580 IN A,(255) ;GET A BIT
45A5 47 03590 LD B,A ;SAVE IT
45A6 F1 03600 POP AF ;GET OTHER BITS
45A7 CB10 03610 RL B ;SHIFT DATA TO CARRY

45A9 17 03620 RLA ;& INTO A REG
45AA F5 03630 PUSH AF ;SAVE IT
45AB 0D 03640 DEC C ;CNT IT
45AC 20EB 03650 JR NZ,BTLOOP ;8 TIMES
45AE F1 03660 POP AF
45AF C1 03670 POP BC
45B0 C9 03680 RET
45B1 3C03 03690 ASTART DEFW 033CH ;MOD & LEN
45B3 E241 03700 DEFW 41E2H ;ORG ADDRESS
45B5 C3E841 03710 JP 41E8H ;INPUT BUFFER AREA
45B8 78 03720 DEFB 78H ;EOF
45B9 E841 03730 DEFW 41E8H ;ENTRY PNT

```

Program continues

THE ALTERNATE SOURCE

Programmer's Journal

We could tell you that it's the best available,

BUT WE'D RATHER PROVE IT.

Supporting TRS-80 Models I and III only...

If you're the type of person whose satisfaction is NOT from loading a computer program, BUT from knowing what makes it tick, what makes it work and how to improve it, then you are invited to accept a guaranteed, no risk, money back offer. The Alternate Source Programmer's Journal would like YOU to critique it's contents. A thinking, creative mind like yours is not content to simply accept things the way they are. Just now we are learning to effectively utilize the power inherent in that little gray box of yours. You're looking for newer, faster, and better ways to utilize this power. Thousands of computerists rely on TAS to provide this information; we GUARANTEE their satisfaction. Consider a NO RISK trial subscription today -- if you're unhappy with the first issue, drop us a note and we'll refund your money. We think you'll like it, though, with our easy-to-understand features and dozens of enlightening articles on programming the computer you love. In over two years of publication, only TWO persons have requested their money back. Discover why -- try an issue of The Alternate Source Programmer's Journal today! Twelve issues are \$24. Published eight times annually.

(Subscription rates for outside USA differ; please inquire. Thanks.)

Special for 80 Micro readers!

DDSD/CMD allows automatic density recognition of both single and double density disks when using NEWDOS/80 Version 2.0, eliminating previous headaches with pcrive parameters. Just execute it when booting the system, and forget it! Regularly \$19.95, just \$10 when subscribing to TAS. Limited offer.

- () I'll try 12 issues of TAS; enclosed is \$24.
- () I'll subscribe and take DDSD; \$34 total.
- () I'll take just DDSD; \$19.95 plus \$3 P&H.

Name: _____
 Address: _____
 City: _____
 State, Zip: _____

The Alternate Source
 704 North Pennsylvania Avenue
 Lansing, Michigan 48906

Ph. 517-482-TAS0

Micronet: 70150.255
 Source: TCH565

69



AMERICAN

SMALL BUSINESS COMPUTERS

118 SO. MILL ST
PRYOR, OK 74361
(918) 825-4844

ALL LISTED PRICES ARE CASH DISCOUNTED. WE ACCEPT MC, VISA, AND COD (REQUIRES CERTIFIED CHECK, CASHIER'S CHECK OR CASH). FOR CHARGE ORDERS, PLEASE ADD 3%. FOR COD SERVICE, PLEASE ADD 3%. OKLAHOMA RESIDENTS PLEASE ADD 4% SALES TAX.

***** NEW RETAIL LOCATION — SOUTHWOOD SHOPPING PLAZA, PRYOR, OK *****

32K EXPANSION INTERFACES

SPECIAL OFFERING ★ NEW LOW, LOW PRICE ★

Due to a very special purchase, American Business Computers is able to offer a limited number of Radio Shack® Expansion Interfaces at the lowest price ever.

American Business Computers guarantees Expansion Interfaces to be Brand New — with original documentation and in perfect working condition.

\$329⁹⁵



✓ 220

CAMEO HARD DISK DRIVES FOR TRS-80 MODEL II

The Cameo Hard Disk offers TRS-80 Model II users 10 million bytes of on-line disk storage. Five million bytes are stored on a standard non-removable disk platter. The second five million bytes are stored on a removable "disk pack". This configuration allows, for example, the accounts receivable to be stored on one disk pack, accounts payable on still another disk pack, mailing list on another, etc., etc.

The Cameo also allows up to four computers to share the same disk drive. This means one person working at one computer can be updating accounts payable, while another person working at another computer can be retrieving records from a data base. So...when your business needs soar beyond a floppy disks limitations, call AMERICAN SMALL BUSINESS COMPUTERS and ask for THE CAMEO CONNECTION.

CALL FOR PRICING INFORMATION

★ Dealers needed for all Cameo Hard Disk Products ★



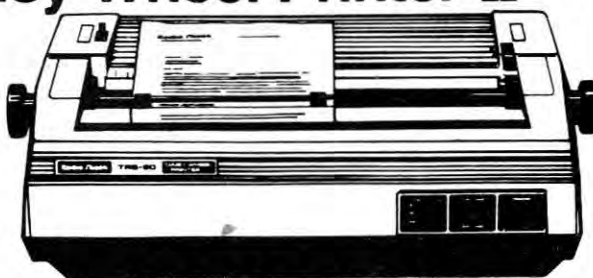
✓ 221

TRS-80™ Daisy Wheel Printer II

By Radio Shack

Yes, this is the same Daisy Wheel sold by Radio Shack for a couple of hundred bucks more. This is just one more reason why it really pays to shop American Small Business Computers.

\$1649⁹⁵



918-825-4844

✓ 222

TRS-80™ LINE PRINTER 7



\$325⁰⁰

✓ 223

Program continued

```

03732 ;
03734 ; *****
03740 ; ***** PROMPT STRINGS *****
03741 ; *****
03742 ;
45BB 52 03750 MENU DEFM 'RAPID SYSTEM LOADER: 2000
BAUD SYSTEM TAPE CONVERSION'
45F1 0D 03760 DEFEB 0DH
45F2 56 03770 DEFEB 'VERSION 2.1 9/15/80 BY DAV
ID C. HEDINGER'
461B 0D 03780 DEFEB 0DH
461C 0D0D 03790 DEFEB 0D0DH
461E 31 03800 DEFEB '1 = LOAD A SYSTEM TAPE'
4634 0D 03810 DEFEB 0DH
4635 32 03820 DEFEB '2 = WRITE A FASTLOAD COPY'
464E 0D 03830 DEFEB 0DH
464F 33 03840 DEFEB '3 = RETURN TO BASIC'
4662 00 03850 DEFEB 00H
4663 52 03860 MESG1 DEFEB 'READY TAPE & PRESS =ENTER='

467D 00 03870 DEFEB 00H
467E 45 03880 HEXDSP DEFEB 'ENTRY POINT ='
468B 00 03890 DEFEB 00H
468C 4E 03900 SYSERR DEFEB 'NOT A SYSTEM TAPE : PRESS =
ENTER='
46AD 00 03910 DEFEB 00
46AE 4D 03920 ERR2 DEFEB 'MISPLACED TRANSFER BYTE ERR
OR'
46CB 00 03930 DEFEB 00
46CC 43 03940 ERR3 DEFEB 'CHECKSUM ERROR'
46DA 00 03950 DEFEB 00
46DB 48 03960 MESG3 DEFEB 'HOW MANY COPIES?'
46EB 0D00 03970 DEFEB 000DH
46ED 52 03980 MESG5 DEFEB 'READY TAPE FOR RECORD & PRE
SS =ENTER='
4712 00 03990 DEFEB 00
4713 00 04000 BUFFER DEFEB 00
42E9 04010 END SPEED
00000 TOTAL ERRORS

```

to the menu. Also press Break if an error occurs.

After readying the recorder for record mode, press 2 to make a copy. Answer the "How many copies?" prompt with a number from one to nine. Press Enter to proceed with the recording. When the menu returns to the screen, press 3 to return to Basic command mode. Rapid System Loader has just copied itself.

Load the high speed copy using the System command as usual. Again, measure the time it takes to load. There should be a significant improvement in speed. Longer programs will show more improvement. (Try EDTASM.)

Some Last Thoughts

This program has greatly increased the amount of work I can do with my computer. I am more likely to use programs that load in one minute instead of three or four. It has also curbed my urge to buy that disk drive I want so much, if only for a while. ■

MONEY BACK GUARANTEE



YORK 10

BASF-DPS

WORLD STANDARD TAPE

- PROFESSIONAL 5-SCREW SHELL
- UNIVERSAL INDUSTRY ACCEPTANCE

DATA TRAC — C-10, C-20

MUSI TRAC — C-45, C-90 ✓156

HERE'S WHAT USERS SAY ABOUT YORK 10 CASSETTES:

"Excellent tape — I haven't had a bad 'CSAVE' and volume level for 'CLOAD' is consistent for all cassettes. Your tape is good enough for me to order more; enclosed is a money order for two dozen more cassettes." Robert W. Bruggemeyer, Long Beach, CA

"The quality to price ratio is very high on these cassettes — had very good luck loading programs back to the computer." Douglas Elkins, Millinocket, ME

"High quality tape in the proper lengths and at the right price. Keep it up." William E. Brown, Jr., Reisterstown, MD

"YOU'VE TRIED THE REST, NOW BUY THE BEST"

Call: 213/710-1430 for IMMEDIATE SHIPMENT on Credit Card Orders.

ORDER NOW... Mail to: YORK 10 Computerware

24573 Kittridge St., #80G, Canoga Park, CA 91307

LENGTH	1 DOZEN	2 DOZEN	TOTAL
C-10	<input type="checkbox"/> 8.00	<input type="checkbox"/> 14.40	
C-20	<input type="checkbox"/> 10.00	<input type="checkbox"/> 18.00	
C-45	<input type="checkbox"/> 13.00	<input type="checkbox"/> 23.00	
C-90	<input type="checkbox"/> 21.75	<input type="checkbox"/> 39.00	
SUB TOTAL			
Calif. residents, add 6% sales tax			
Shipping: 1 doz. \$2.2 doz. \$3.50 add'l. doz., \$1			
TOTAL			

Check or M.O. enclosed Charge to my Credit Card:

VISA MASTER CARD Expires date: _____

account no. _____

name _____

address _____

city _____ state/zip _____

signature _____

WRITE FOR QUANTITY DISCOUNTS
Shipped bulk-pack by UPS to street address in Cont.
U.S.A. only. We cannot ship to P.O. Boxes.

POCKET COMPUTER

NEWSLETTER



A NEWSLETTER FOR POCKET COMPUTER USERS

This timely, compact publication provides up to the minute information on pocket computers, including models such as the Radio Shack TRS-80 PC, Sharp Electronic's PC-1211, the Casio FX-702P, Panasonic's RL-H1000, and others as they are announced. We only cover pocket computers that are capable of executing a high level language such as BASIC.

Up to the Minute News Product & Equipment Reviews

Important Operating Tips Practical Programs More By Subscription Only: for a calendar year period (January — December). You get all issues published to date for the calendar year in which you subscribe, at the time you subscribe.

MC/VISA Phone Subscriptions: (203) 888-1946

1981/82 Charter Subscriber (Issues 1 — 20). \$40.00 in U.S. (U.S. \$48.00 to Canada. U.S. \$60.00 elsewhere.)

1982 Regular Subscriber (Issues 11 — 20). \$30.00 in U.S. (U.S. \$36.00 to Canada. U.S. \$45.00 elsewhere.)

Sample issue. \$3.00 in U.S. (U.S. \$4.00 elsewhere.) *Due to credit card minimum, this item cannot be charged.

Orders must be accompanied by payment in full. We do not issue invoices for the POCKET COMPUTER NEWSLETTER.

Thank you for your remittance.

Name: _____

Addr: _____

City: _____ State: _____ Zip: _____

MC/VISA #: _____ Expires: _____

Signature: _____

POCKET COMPUTER NEWSLETTER

35 Old State Road, Oxford, CT 06483



AMERICAN

SMALL BUSINESS COMPUTERS

118 SO. MILL ST
PRYOR, OK 74361
(918) 825-4844

ALL LISTED PRICES ARE CASH DISCOUNTED. WE ACCEPT MC, VISA, AND COD (REQUIRES CERTIFIED CHECK, CASHIER'S CHECK OR CASH). FOR CHARGE ORDERS, PLEASE ADD 3%. FOR COD SERVICE, PLEASE ADD 3%. OKLAHOMA RESIDENTS PLEASE ADD 4% SALES TAX.

***** NEW STORE LOCATION - SOUTHWOOD SHOPPING PLAZA, PRYOR, OK *****

DISCOUNT SOFTWARE FOR TRS-80 MODELS ONE, TWO, AND THREE

MICROSOFT SOFTWARE

- Basic Compiler - MOD 1.....159.95
- CPM or TRSDOS - MOD 2.....319.95
- Fortran-80 - MOD 1.....79.95
- CPM Version - MOD 2.....399.95
- COBOL (CPM Version MOD 2).....599.95
- M/SORT (CPM Version MOD 2).....119.95
- **ADVENTURE (MOD 1, Disk Version) ...24.95**
- Olympic Decathlon (Mod 1, Disk Version)....23.00
- Typing Tutor (Cassette Version Only).....14.00
- mu MATH/mu MATH SIMP-80 Symbolic Math Package.....\$ Call Editor/Assembler Plus (Cassette Version Only).....24.00

DISCOUNT PRICES ON OTHER SOFTWARE PRODUCTS FOR THE TRS-80

- NEW DOS 80 (Version 2.0) MOD 3 or MOD 1.....139.00
- CORDOS (An enhancement to the TRS-80 MOD 2 TRSDOS operating system which allows the use of a CORVUS Winchester Disk System)...300.00

Proofreader-Proofreader will check your script*, electric pencil, soft-tex, or other documents for spelling and typographical errors. Proofreader can check every single word of even the longest document in under 5 minutes! The 38,000 word dictionary, one of the largest available, can be easily extended with a user auxiliary dictionary to add any number of new words (only limited by disk file space). **Only...99.95**

Soft-Screen—Soft-Screen is a state of the art full screen text editor. If you have never used a full screen editor before, you will be amazed at the power it gives you. Soft-Screen can literally save you hours of work!! **Only...99.95**

Grammatik—A spelling checker may not be enough to catch all the dumb mistakes made by that less than efficient secretary!! Grammatik checks for capitalization, punctuation, balanced parentheses, and doubled words ("The The"). Grammatik also checks for sexist terms or esoteric jargon, word overuse, and misused phrases. Grammatik also includes utilities for adding your own dictionary of misused words and phrases. **Only...99.95**

COLOR COMPUTER GAMES AT DISCOUNT PRICES "PACKET-MAN" "By GREG ZUMWALT SOFTWARE"

Packet Man—Very similar to the popular arcade game. In this exciting game you must dodge the munchkins who are out to eat you. Very challenging and impossible to beat. Our most played computer game!! **Only...24.95**

- Color Space Invaders.....21.95
- Meteroids.....21.95
- Game of Life.....14.95
- Moon Lander.....14.95

BUY ALL 5 COLOR COMPUTER GAMES AND SAVE EVEN MORE!! All 5 of the above games **Only...89.95**

★ ATTENTION SOFTWARE AUTHORS ★

FARM & RANCH MANAGEMENT PROGRAMS

BEEF PROJECTION—This program simulates feeding situations for beef cattle. \$20.00
BEEF RATION—This program evaluates energy, protein, calcium, and phosphorus content of ration specified by the user. \$15.00
DAIRY COW—This ration evaluator computes the daily requirements for specified cow weight, milk production, and butterfat content. \$15.00
FEED LOG—This pen record tracks each pen of cattle on costs accumulated. \$15.00 (Models I and II), \$100.00 (Model III)
FARM RECORD—This program is a general farm bookkeeping program. It is capable of 52 income and 47 expense categories with inventories, net worth, employee payroll, external accounts payable, receivable, bank accounts, and 5 employees. \$35.00
GOVERNMENT PROGRAM—This program compares participation with non-participation in wheat, feed, grain, cotton programs under various assumptions about yields, production costs, and market prices. \$15.00
GRAIN STORAGE—This program computes the cost per bushel for on-farm storage, interest, shrink, and miscellaneous costs for on-farm or commercial storage for 6 time periods. \$15.00
LOAN—This program computes either interest rate, payment amount, amount of loan, or years of loan when the other three variables and number of payments per year are entered. \$15.00
MACHINE COST—This program calculates the average hourly depreciation, interest, repairs, fuel and labor costs per hour and per acre, for machines or vehicles, for each year of ownership. \$20.00
RECORD MANAGEMENT—This is a general purpose program for entering, correcting, sorting, or searching data files such as cow records, field records for crops, machinery parts lists, mailing lists, etc. \$15.00
ESTATE TAX—This program prints anticipated Oklahoma and Federal taxes for specified estates of individual income. It allows for the leveling of various distribution strategies. \$25.00
FEED FORMULATOR—The Feed Formulator calculates the least cost ration for up to 20 nutritional constraints and up to 30 ingredients. \$25.00
PASTURE PRODUCTION—This program projects game and income expense from pasture for beef cattle. \$20.00

HARDWARE REQUIREMENTS FOR THE ABOVE PROGRAMS: (MINIMUM) TRS-80 Model I or II with 48K and one disk drive. For Model II Versions of the above programs, please add \$5.00 per program (Feed Log Program Add \$65). Buy all the above programs and save even more! Model I and II Versions only \$250.00 (Save \$30). Model II Versions Only \$300.00 (Save \$55).

American Small Business Computers is one of the nation's largest suppliers and distributors of TRS-80 related software. If you have a program which you would like to market, please contact Ms. Jeanie Phillips at American Small Business Computers. She will test and evaluate each program received. If the program meets our high standards, an offer of acceptance, along with our terms, will be returned with the software. All types of games, business and scientific programs will be considered. Highest royalties are now being paid for Color Computer programs.

BIG FIVE SOFTWARE

- Super Nova.....\$12.75
- Force.....\$12.75
- Cosmic Fighter.....\$12.75
- Meteor Mission II.....\$12.75
- ** Defense Command.....\$12.75

Disk Versions of the Above Programs Available for Only \$18.95

GAMES SOFTWARE FOR TRS-80 MODEL I AND III

OLYMPIC DECATHALON* FOR THE TRS-80* MODEL ONE \$23.00

Here's your chance to become an Olympic champion in the greatest of all athletic competitions—the Decathlon! This exciting skill game takes you through all ten events of the total competition from the pole vault to the discus to the 100-meter dash, testing your prowess in three diverse track and field disciplines—running, jumping and throwing. Each event is presented with incredible animated graphics that pull you directly into the action. To meet the challenge of a champion, a difficult, to win the gold medal, you'll need a good sense of timing, fast reflexes and good coordination. For 1-8 players.

ADVENTURE* FOR THE TRS-80* MODEL ONE

\$24.95

You are standing at the end of a road before a small brick building. Around you is a forest. A small stream flows out of the building and down a gully. There is a shiny brass lamp nearby. Get ready to make the first decision that will affect your course through the "Colossal Cave" in the first complete version of Adventure ever implemented on personal computers! As you prove yourself sufficiently skilled in overcoming obstacles, more sections of the cave will become open to you. Proceed, explore the cavern, and collect your treasures. But watch out! Killers, dragons, green snakes, active volcanoes, sulfur lakes, trolls, a live-foot ogre and other hazards abound. Each Microsoft Adventure session is unique, with over 400 messages and descriptions that can be combined in endless ways. Never before has this sophisticated fantasy logic game, written for the DEC PDP-10, been totally implemented on personal computers.

*TM Microsoft Corp
*TM Tandy Corp

DEALER INQUIRIES

INVITED

A program that finds errors for you!

L̄OC-EDITOR

Jon Mark O'Connor
56 Eustis Parkway
Waterville, ME 04901

It is four in the morning. You have been at the keyboard 16 hours. Line 20000 just crashed again. You check the line, run it again and it crashes again. You check every letter of every word

"L̄oc-Editor is a resident program to trap errors."

and discover you spelled Print with an M instead of an N.

Sound familiar? L̄oc-Editor (see the Program Listing) is a resident program to trap errors.

```

0 ONERRORGOTO31000
20000 PRINT:PRINT:PRINT"THIS IS A TEST!":PRINT:PRINT:PRINT:PRIN
T:PRINT:PRINT:PRINT:PRINT:PRINT:PRINT:PRINT:PRINT:PRINT:PRINT:PR
INT:PRINT:PRINT:PRINT:PRINT:PRINT:PRINT:PRINT:PRINT:PRINT:A=A/0:PRINT
30999 GOTO30999
31000 CLEAR2000:DEFINTG-Z:DEFSTRB:DIMB(145):PRINT@960,"READING Y
OUR DATA":
31001 READU$;IFU$<>"****"THEN31001ELSECLS:PRINT@193,CHR$(95):PR
INT@256,"LOC-EDITOR":PRINT"ACTIVATED!":FORGJ=0TO145:READB(GJ):NE
XT:ZW=ERL
31002 PRINT" LINE ..... ":BZ=STR$(ZW):XP=PEEK(16548)+PEEK(
16549)*256
31003 PRINT@402,USING"##### ";YP;:IFYP=ZWTHEN31004ELSEXP=PEEK(XP
)+PEEK(XP+1)*256:YP=PEEK(XP+2)+PEEK(XP+3)*256:GOTO31003
31004 JU=0:XP=XP+4:PRINT@448+LEN(BZ),;:FORL=XPTO(PEEK(16622)+PEE
K(16623)*256)
31005 IFPEEK(L)<128PRINTCHR$(PEEK(L));:JU=JU+1:NEXTELSEPRINTB(PE
EK(L)-128);:JU=JU+LEN(B(PEEK(L)-128)):NEXT
31006 IFPEEK(L)=0THEN31008ELSEIFPEEK(L)<>50ANDPEEK(L)<128PRINTCH
R$(PEEK(L));:KU=KU+1:L=L+1:GOTO31006
31007 IFPEEK(L)<58PRINTB(PEEK(L)-128);:KU=KU+LEN(B(PEEK(L)-128)
):L=L+1:GOTO31006ELSEIFJU<6THENJU=0
31008 PRINT@512+JU+LEN(BZ),STRING$(KU,61):PRINTSTRING$(32-LEN(B
(122+ERR/2+1)/2),32)+B(122+ERR/2+1)
31009 PRINTTAB(20)"HIT "ABS(JU)"/ HIT SPACE BAR":PRINTSTRING$(64
,61);:PRINT@448,;:EDIT.
31010 DATA"****",END,FOR,RESET,SET,CLS,CMD,RANDOM,NEXT,DATA,INPUT
,DIM,READ,LET,GOTO,RUN,IF,RESTORE,GOSUB,RETURN,REM,STOP,ELSE,TRO
N,TROFF,DEFSTR,DEFINT,DEFSNG,DEFDBL,LINE,EDIT,ERROR,RESUME,OUT,O
N,OPEN,FIELD,GET,PUT,CLOSE,LOAD,MERGE,NAME,KILL,LSET,RSET,SAVE,S
YSTEM
31011 DATALPRINT,DEF,POKE,PRINT,CONT,LIST,LLIST,DELETE,AUTO,CLEA
R,CLOAD,CSAVE,NEW,TAB(,TO,FN,USING,VARPTR,USR,ERL,ERR,STRING$,IN
STR,POINT,TIMES,MEM,INKEY$,THEN,NOT,STEP,+,-,*,/,AND,OR,>,<,>,S
GN,INT,ABS,FRE,INP,POS,SQR,RND,LOC,EXP,COS,SIN,TAN,ATN,PEEK,CVI
31012 DATACVS,CVD,EOF,LOC,LOF,MKIS,MKSS,MKDS,CINT,CSNG,CDBL,FIX,
LEN,STR$,VAL,ASC,CHR$,LEFT$,RIGHT$,MID$,NEXT W/OUT FOR","SYNTAX
ERROR","RETURN W/OUT GOSUB","OUT OF DATA","ILLEGAL FUNCTION CAL
L","OVERFLOW","OUT OF MEMORY","UNDEFINED LINE"
31013 DATA"BAD SUBSCRIPT","REDIMENSIONED ARRAY","DIVISION BY ZER
O","ILLEGAL DIRECT","TYPE MISMATCH","OUT OF STRING SPACE","STRIN
G TOO LONG","COMPLEX STRING FORMULA","CAN'T CONTINUE","NO RESUME
","RESUME WITHOUT ERROR"
31014 DATA"UNPRINTABLE ERROR","MISSING OPERAND","BAD DATA FILE",
"L3 OR DISK BASIC ONLY"
31015 END

```

Program Listing

Best of all, L̄oc-Editor displays the entire line up to and including the error. The error is underlined.

L̄oc-Editor displays:

```

SYNTAX ERROR
HIT 144 / HIT SPACE BAR

```

Type 144 and hit the space bar. The cursor stops at the P in PRIMT. The whole word is treated as the error. Change M to N (you are in the Edit mode) and proceed. The process took 10 seconds.

Example

The \$ has been omitted from STRING\$ in the line below:

```
PRINT STRING (29,191)
```

This will be declared as a Bad Subscript. The entire statement will be underlined.

To merge L̄oc-Editor, remove line zero and reinsert it after the merge. ■



AMERICAN

SMALL BUSINESS COMPUTERS

118 SO. MILL ST
PRYOR, OK 74361
(918) 825-4844

ALL LISTED PRICES ARE CASH DISCOUNTED. WE ACCEPT MC, VISA, AND COD (REQUIRES CERTIFIED CHECK, CASHIER'S CHECK OR CASH). FOR CHARGE ORDERS, PLEASE ADD 3%. FOR COD SERVICE, PLEASE ADD 3%. OKLAHOMA RESIDENTS PLEASE ADD 4% SALES TAX.

***** NEW RETAIL LOCATION - SOUTHWOOD SHOPPING PLAZA, PRYOR, OK *****

OH...SHAZZAM

EPSON PRINTERS FOR THE TRS-80, APPLE, ETC.

It is the policy of American Small Business Computers to offer merchandise at the lowest price possible. About a year ago, American Small Business Computers began selling Epson Printers for the TRS-80, Apple, and other computers. The first month we sold them for \$500.00. Someone else sold them for five dollars less. The next month we sold our Epsoms for \$400.00 and someone else sold theirs for three dollars less. So this month our Sales Manager looked at the stack of unsold Epson Printers and said, "Oh...Shazzam, let's stop acting like a bunch of dumb Okies. Lower the price and move 'em out!" So... this month it's Head 'Em Up, Move 'Em Out. Yee Haa Rawhide. Oops! Got carried away...Call for Prices.



CALL
FOR PRICING



918-825-4844

These Epson Printers are brand new and in perfect working order. They are fully compatible with all TRS-80 Computers (when used with the correct cables and interfaces, of course). American Small Business Computers also offers similar savings on the MX-80 FT, MX-70, and MX-100. Attention Foreign Customers: **WE EXPORT!** Please call or write for export prices.

225



TRS-80[®]

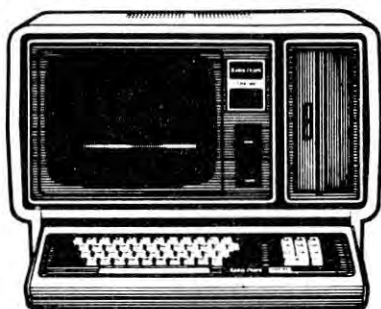


DISCOUNT COMPUTERS

It is the stated goal of **CLEVELAND ELECTRONICS** to sell TRS-80 computers and peripherals at the lowest prices in the **WORLD**. We ask that you call other dealers, check your local Radio Shack store and mail order houses and then call us **LAST (Toll Free, of course)**. We think that you will be pleasantly surprised. Please keep in mind that **CLEVELAND ELECTRONICS** is an authorized Radio Shack dealer.

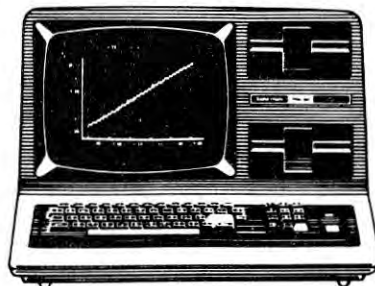
So... give us a call **TODAY!**

WE NOW SELL - EPSON



**FOR TOLL FREE ORDERING
AND PRICE QUOTES, CALL:
1-800-331-3896**
CLEVELAND ELECTRONICS
AUTHORIZED STORE # S-133
**121 BROADWAY
CLEVELAND, OK. 74020
1-800-331-3896**

**TRS-80 MODEL III
IN STOCK**



226



A collection of valuable subroutines.

Zubroutines

*Peter Ashley
10 Clinton Street
Portland, ME 04103*

Since the early days of the TRS-80, there have been many discoveries about the Model I not documented in the original Level II manual. Short routines, valuable PEEK and POKE addresses and other software tricks have slowly made their way to the TRS-80 user.

If you own a disk system and have lots of money to spend on software, tips are available in ready-to-use utility programs. A less expensive option is to build a collection of hints on scraps of paper. Now if you could only remember where you put that one showing how to disable the Break key.

What is really needed is a collection of routines the computer remembers. At the same time, the collection must be easily modified and loaded into the TRS-80 at the beginning of each

computer session. Enter... *Zubroutines.*

Zubroutines

Zubroutines is a collection of about 50 short subroutines to assist you in programming for your TRS-80. Most Zubroutines are only one line long, accessed with the GOSUB command. Zubroutines can assist in writing a program or can be called from within a running program.

Zubroutines uses the concept of structured programming. Instead of rewriting program lines over and over again for formatting the screen or creating graphics, you simply call (via GOSUB) a program already in your program listing. Zubroutines also gives you an instant display of a table, such as the CHR\$ codes, allowing you to stay at the keyboard.

Zubroutines sounds a little silly, doesn't it? Zubroutines is so named because the variables in its routines all contain the letter Z (Z, Z\$, ZD, SZ, and so on). Just avoid the letter Z as a variable in your own main pro-

gramming. This is simple to remember and will eliminate any problems brought about by conflicting variables.

Zubroutines uses about 3.5K of RAM memory. All the routines are written in Basic, although some POKE machine language and others string pack machine language. All routines are in lines 11-99. You can use lines 0-10 in your own programs for remarks and titles. Of course if you increase your collection of routines you must increase the number of lines beyond 99.

It takes less time and memory for the TRS-80 to find line numbers at the beginning of a program. Subroutines with low value line numbers are more efficient. If you use this program in conjunction with one from a magazine, it is very likely the magazine program has line numbers beginning with 10 incremented in intervals of 10. In this case it is better to relocate Zubroutines at higher line numbers. To relocate, call GOSUB 19 and renumber Zubroutines as lines 32011-32099. This renum-

bering process will not correct GOTO or GOSUB. Correct these by hand. If you do not need the routines containing GOTO or GOSUB your renumbering task is simple.

The following line numbers contain GOTO or GOSUB commands: 22, 47, 54, 55, 56, 58, 87, 88. It is easy to make the needed corrections. Edit the line number containing GOTO or GOSUB and prefix any line number 99 or less with 320. For example, line 22 would be edited to read 32022.

The Program

To use this new utility, first type in the program listing and make a copy or two on cassette. Every time you begin a programming session CLOAD and run Zubroutines. At this point you have POKEd 16553,255 (for ma-

The Key Box

**Basic Level II
Model I
Disk System**

chines with touchy ROMs), cleared 500 bytes for string routines, and issued a GOTO to line 100.

Line 100 is where you should begin programming. When you need a particular routine, issue a GOSUB to its line number. Table 1 is a list of the Zubroutines and their line numbers. Some routines require you to assign values before issuing the GOSUB. Line 20 needs a title or message assigned to Z\$. Line 43 requires a value between zero and 47 assigned to ZY. Line 52 requires values for the beginning and ending addresses.

Some routines work more effectively nested in a For... Next loop.

110 Z=9: ZF\$="POP": FOR R=1 TO 9: GOSUB 27: NEXT R

This flashes POP nine times. Others work better combined with additional Zubroutines.

110 GOSUB 28: GOSUB 18: GOSUB 33
This line flashes the error message and awaits an input.

The routines in line 32 and lines 80-82 are sound generating routines. For these connect the Aux cable to an audio ampli-

LINE DESCRIPTION

11	Disable the Break key
12	Enable the Break key
13	Send the video information to the printer
14	Restore the video information to the screen
15	Send the printer information to the screen
16	Restore the printer information to the printer
17	Buzz the cassette relay
18	Jitter the screen and buzz the relay
19	Add 32000 to all the line numbers This does not correct GOTO or GOSUB
20	Print a title (Z\$) at the top of the screen
21	Print a message (Z\$) in the center of the screen
22	Print a message (ZB\$) at the bottom of the screen
23	Print a message in the center of the next line
24	Clear the top line and home the Cursor
25	Start the text on a particular line (ZL)
26	Protect the text above a particular line (ZP)
27	Flash a message (ZF\$) at screen location (Z)
28	Clear the screen and print an Input Error message
29	Convert all Print to LPRINT (for 16K) Do not use END in any program to be converted
30	Save the contents of the video screen in memory Z(ZI)
31	Recall the saved video Z(ZI) from memory to screen
32	Generate a four second audio prompt
33	Stop the program until Enter is pressed
34	Stop the program until any key is pressed
35	Clear the top half of the screen
36	Clear the bottom half of the screen
37	Clear the left half of the screen
38	Clear the right half of the screen
39	Clear a box in the center of the screen
40	White-out the screen
41	Print a line of graphic characters (ZG)
42	Print a line of alphanumeric characters (ZA\$)
43	Print a horizontal line at ZY on the Y-axis
44	Print a moving horizontal line at ZY on the Y-axis
45	Print a vertical line at ZX on the X-axis
46	Print a moving vertical line at ZX on the X-axis
47	Display a chart of the graphic codes (128-191)
48	Display a chart of the PRINT@ locations
49	Delay the program for ZS seconds
50	Print the current memory size
51	Examine the memory (DEC) used by the current program
52	Examine the memory between addresses Z1 and Z2
53	Convert a decimal address into TRS-80 code (LSB,MSB)
54-59	Print a list of the codes for Basic keywords along with a table of their Entry-point addresses
61-62	Time the Input period (Z) Z\$ returns the Input Value using INKEY\$.
65-66	Draw a line from point A (X1,Y1) to point B (X2,Y2) X values must be between 0 and 127 Y values must be between 0 and 47
76-77	LPRINT the contents of the video screen
80-82	Generate sounds, using X=USR(T)
83-88	Draw on the screen from the keyboard
90-96	Print a list of variables and their current values
99	CSAVE three copies of any program in memory

Table 1

QUALITY COMPUTER PRODUCTS

ICHI diskettes \$190.00

for 10 boxes of 10
5 1/4" Double Density, Soft Sector, Single Sided
WITH HUD RINGS,
Individually 100% certified

LNW Research Computers

8" or 5 1/4" Drives
Double or Single Density
Totally TRS-80 Compatible
High Speed Processor
Dealer pricing available
Now available
125K CP/M — Team computer
Compatible with TRS-80 Model 1 and CP/M

Tandon 40 track Double Density Bare drive \$195.00

Minimum Quantity 10

CABLES

	Unit Price Quantity 10	Unit Price Quantity 100
2 drive disc drive cable	\$19.29	\$17.54
3 drive disc drive cable	26.00	23.50
4 drive disc drive cable	28.96	26.33

Custom Cables Available
minimum order 10 - Call for quote

8" Extender Cable (Disc Drive)	\$9.98	\$8.98
6 ft. Printer Cable	\$15.40	\$14.00
10 Ft. Printer Cable	17.79	16.17

CABINETS

1 Drive Cabinet w/power supply	\$51.20	\$42.00
2 Drive Cabinet w/power supply	57.82	48.00
— IBM type Horizontal Design— — Does not require extender cable—		

U.P.S. Shipping
\$5.00 per order shipping and handling
wholesale orders only,
minimum 10 pieces

Syntax Beta
corporation

601 Lipan St.
Denver, CO 80204
[303] 698-1263

**Manufacturers and Wholesale Distributors of
Quality Computer Products**

PREMIUM CASSETTES

COMPUTER GRADE
100% ERROR-FREE
FULLY GUARANTEED

MANUFACTURER PRICES



The Micro-Trac™ Generation

- High Frequency Response • Wide Dynamic Range •
- Used by Software Firms & Computer Hobbyists •
- Choice of School Districts Nationwide •

LENGTH	12-PAK	24-PAK
C-05.....	\$.69	\$.59
C-10.....	\$.79	\$.69
C-20.....	\$.99	\$.89
C-30.....	\$ 1.19	\$ 1.09
C-60.....	\$ 1.49	\$ 1.39
C-90.....	\$ 1.79	\$ 1.69
*CASES.....	\$.21	\$.20

*Cases are highly recommended to protect sensitive cassettes.

—UPS SHIPPING—
(No P.O. Boxes please)
\$2.00 (12-pak) \$3.00 (24-pak)
—Canadian shipping multiply by 2—

**#1 COMPUTER TAPE
IN THE USA!**

—write for volume prices—

TOLL-FREE

(orders only)

1-800-426-4747

ext. 480

In Washington State

1-800-562-4555

ext. 480

MICRO-80™ INC.

E. 2665 Busby Road
Oak Harbor, WA 98277

—Distributors Wanted—

fier. After the sound routine in lines 80-82 has been called, you can delete those lines and still have sound in your program. When you desire sound, use the statement X =USR(T). T represents the tone or frequency value; use any value between one and 255. The tones vary from the lowest frequency with T having a value of one, to the highest frequency with T having a value of 255. If you use other machine language routines in your program remember you have already assigned the USR entry address in line 82 via POKE 16526 and POKE 16527.

The drawing routine beginning in lines 83-88 uses the arrow keys to draw lines up, down, left or right. To erase a line or to move the cursor without drawing, press the space bar and the arrow key at the same time. The

Clear key clears the screen at any time. To end the drawing routine press Enter. To begin drawing at a particular screen location, assign ZX a horizontal value between 0-127 and assign ZY a vertical value between 0-47 before calling this routine.

The following lines contain only the REM abbreviation: 60,63,64,67-75,78,79,89,97,98. Place your own Subroutines in any of these lines, or delete them. Finally, if it becomes important to conserve memory for longer programs, delete the line numbers of any Subroutines not needed in that particular program. ■

Peter Ashley has been using his TRS-80 since 1978. He now has a two disk system. Other interests are photography and camping.

Program Listing

```

10 POKE 16553,255: CLEAR500: GOTO 100
11 POKE 16396,23: RETURN
12 POKE 16396,201: RETURN
13 POKE16414,141:POKE16415,5
14 POKE16414,88: POKE16415,4
15 POKE16422,88: POKE16423,4
16 POKE16422,141:POKE16423,5
17 FORZ=1TO50:OUT255,4:OUT255,0:NEXT:RETURN
18 FORZ=1TO50:OUT255,0:OUT255,15:NEXT:OUT255,PEEK(16445):RETURN
19 Z=17129:FORZ=1TO9000:IFPEEK(Z+1) > THENPOKEZ+3,PEEK(Z+3)+125:
Z=PEEK(Z)+256*PEEK(Z+1):NEXT
20 ZTS=STRING$(62-LEN(ZS))/2,143):PRINT@Z, ZTS; " "; ZS; " "; ZTS:RE
TURN
21 ZCS=CHR$(183)+" "+ZS+" "+CHR$(187):Z=448+(64-LEN(ZCS))/2:PRIN
T@Z,ZCS:RETURN
22 Z=960+(64-LEN(ZBS))/2:PRINT@Z,ZBS:GOSUB26:RETURN
23 Z=(64-LEN(ZNS))/2:PRINT@Z,ZNS:RETURN
24 PRINTCHR$(Z);CHR$(30);CHR$(28):RETURN
25 PRINT@64*(ZL-1),:RETURN
26 PRINT@64*ZP,:FORZ=1TO(14-ZP):PRINTCHR$(255):NEXTZ:PRINT@64
*ZP,:RETURN
27 PRINT@Z,ZFS:FORZ=0TO30:NEXT:PRINT@Z,STRING$(LEN(ZFS)," "):
FORZ=0TO30:NEXT:RETURN
28 CLS:PRINTCHR$(23):PRINT@404,"S O R R Y ,":PRINT@530,"INPUT ER
ROR.":PRINT@780,"PLEASE TRY AGAIN.":RETURN
29 FORZ=17129TO32767:IFPEEK(Z)=128 RETURNELSEIFPEEK(Z)=178THENPO
KEZ,175:NEXTZELSENEXTZ:RETURN
30 DINZ(1024):FORZI=0TO1023:Z(ZI)=PEEK(15360+ZI):NEXT:RETURN
31 FORZI=0TO1023:POKE15360+ZI,Z(ZI):NEXT:RETURN
32 PRINT@-1,""
33 PRINT@4(34)"PRESS <ENTER> TO CONTINUE";
34 Z9$=IMKEYS:IFZ9$="THEN 34 ELSE RETURN
35 FORZ=0TO7:PRINT@Z*64,CHR$(30):NEXT:RETURN
36 FORZ=8TO15:PRINT@Z*64,CHR$(30):NEXT:RETURN
37 FORZ=1TO16:PRINT@0*64*(Z-1),CHR$(223):NEXT:RETURN
38 FORZ=1TO16:PRINT@32*64*(Z-1),CHR$(30):NEXT:RETURN
39 FORZ=6TO8:PRINT@64*Z+16,CHR$(223):NEXT:RETURN
40 FORZ=0TO960STEP64:PRINT@Z,STRING$(64,191):NEXT:RETURN
41 PRINTSTRING$(64,CHR$(ZG)):RETURN
42 PRINTSTRING$(64,ZAS):RETURN
43 FORZX=0TO127:SET(ZX,ZY):NEXT:RETURN
44 FORZX=0TO127:SET(ZX,ZY):NEXT:FORZX=0TO127STEP2:RESET(ZX,ZY):N
EXT:FORZX=0TO127:RESET(ZX,ZY):NEXT:RETURN
45 FORZY=0TO47:SET(ZX,ZY):NEXT:RETURN
46 FORZY=0TO47:SET(ZX,ZY):NEXT:FORZY=0TO47STEP2:RESET(ZX,ZY):NEX
T:FORZY=0TO47:RESET(ZX,ZY):NEXT:RETURN
47 CLS:Z$="GRAPHIC CHARACTER CODES":GOSUB20:PRINT:ZC=127:FORZ=1T
O7:FORZ1=1TO10:ZC=ZC+1:IFZC>191GOTO33ELSE PRINTZC;CHR$(ZC):NEXT
Z1:PRINT:PRINT:NEXTZ
48 CLS:PRINT@0," 'PRINT@' LOCATIONS":FORZ=24TO984STEP8:PRINT@Z,
Z:NEXT:GOSUB33
49 FORZ=0TO345*ZS:NEXT:RETURN
50 PRINT"MEMORY SIZE WAS SET AT";PEEK(16561)+PEEK(16562)*256+Z:R
ETURN
51 FOR Z=17129TOPEEK(16633)+256*PEEK(16634): PRINTZ;PEEK(Z),:NEX
T:RETURN
52 FOR ZA=Z1TOZ2: PRINTZA;PEEK(ZA): NEXT: RETURN
53 INPUT"DECIMAL ADDRESS";ZA:ZN=FIX(ZA/256):ZL=ZA-(ZN*256):PRINT
ZL;"(LSB) ";ZM;"(MSB)":RETURN
54 CLS:Z$="INTERNAL CODES FOR BASIC KEYWORDS":GOSUB20:PRINT"ASCII
I";" KEYWORD",,"DEC ENTRY",,"LSB";" - MSB":PRINT:Z=5712:Z$="E":F
ORZ=1TO124
55 Z=Z+1:IFPEEK(Z) < 128THENZ$=Z$+CHR$(PEEK(Z)):GOTO55
56 PRINTZ+127;" " ;Z$,,;IFZD<612A=6176+2*ZD ELSE IFZD>87ANDZD<
124ZA=5464+2*ZD ELSE 58
57 ZB=PEEK(ZA):ZC=PEEK(ZA+1):PRINT ZB+ZC*256,ZB,ZC;
58 IFZD/10=INT(ZD/10):PRINT:PRINT:GOSUB33:ZP=2:GOSUB26

```

Program continues

Model III DISK SYSTEMS

We have upgraded the TRS80 Model III 16k Computer to 48k with our own high quality memory chips and added our top of the line disk drive systems to make this your best buy of the season. These computers are functionally identical to the Radio Shack units sold at computer centers for \$500 more. Only prime high quality components (described below) are used in the construction of these units. These computers have the same type double density disk drives as the original. They have the same storage capacity, are completely software compatible with TRSDOS, DOSPLUS, NEWDOS/80, LDOS, VTOS and many other disk operating systems, and are compatible with all BASIC applications software available for the Model III.



INSTRUCTIONS - For kit installations we provide complete instructions.

COMPUTER - The Model III computer unit is an original unit which has extended BASIC and upper/lower case. It is packed in original factory packing, and is new and unused. Each computer, after having the drive systems and memory added, must pass a 24 hour burn-in test to assure maximum reliability.

DISK DRIVES - TCS offers standard 5 1/4" disk drives from TANDON, the same people that make the original drives for the Model III. These drives have band head positioning for long life, and have a fast 5 millisecond track to track access time. This means that if LDOS or one of the other fine disk operating systems is used, the track access time may be adjusted to allow faster operation of the entire system. Some brands of drives (Siemens, older Shugart) have access times as slow as 40 milliseconds, which can result in slow system speed especially when a considerable amount of random disk I/O is needed, such as programs manipulating large lists of data. This means that you should check track access capability before deciding on a particular drive. Each of our drives is tested fully for alignment, speed and proper operation before shipment.

MEMORY - The memory used in the TCS Model III is the highest quality Japanese made memory available. In a recent test, Japanese memory was shown to be over twice as reliable as American made memory of the same type. We use only first line (no surplus) chips that are rated 200 nanoseconds or faster. Each set of memory units installed by our technicians is tested using several of the best commercial memory test programs available. These tests last for a period of over 24 hours.

TEXAS COMPUTER SYSTEMS

Offers Lowest Prices on

TRS-80

DISK CONTROLLER - TCS uses a high quality, double sided glass epoxy disk controller board that has GOLD plated edge connectors for reliable data connection. We use a reliable digital data separator design for the utmost in long life reliability. This means that adjustments NEVER need be made to the controller circuit for it to keep separating data correctly. This is the highest quality disk controller board available for the Model III.

POWER SUPPLY - Where many companies cut corners, TCS has chosen the finest switching power supply available. A switching power supply is much more efficient than linear supplies, which means that the TCS supply creates less heat than a linear supply, and it uses less energy. As a result, the internal parts of the Model III can operate cooler (the Model III has no cooling fan) without the need of an expensive internal cooling system. This power supply is the same commercial grade switcher that is used in the original more expensive Model III.

MOUNTING HARDWARE & CABLING - The disk drive mounting hardware is aluminum sheet construction for easy installation and the disk mounting holes are slotted to allow adjustment of the drives for exact alignment. The power and data cables are all included and are plug compatible with each unit. No soldering or tools are needed for installation other than a screwdriver.

KIT 1	Controller, power supply & Mounting Hardware.....	\$379
KIT 2	Kit 1 plus one Tandon Disk Drive.....	\$595
KIT 3	Kit 1 plus two Tandon Disk Drives.....	\$819
KIT 4	One Disk Drive only.....	\$219
KIT 5	16k TCS Memory.....	\$49
KIT 6	32k TCS Memory.....	\$79

For complete assembled and tested Model III Systems using these kits see our other ad in this issue of this magazine.

Introducing The B-TREE SERIES

WHAT IS THE B-TREE?

B-TREE Mailing List Disk.....\$49.95

A mailing list application data base. Allows the maintenance of about 1500 to 2000 names on a single double density DATA disk. Display or print in order by name or by zip code (allows 9 digits). Print mailing labels by zip, name or user selected category. Duplicate names are allowed as well as optional data fields for each record. Also allows two line addresses for long addresses or company names and phone number.

B-TREE Library Program Disk.....\$39.95

A complete library maintenance data base system which allows storage of the book title, author, category, and 2 other user selected fields. Over 2000 books can be maintained on one double density DATA disk. Average search time by author is 2 seconds with 2000 records in file. Complete reports include: 1)Alphabetical listing of file by author, 2)List all books of one author by title or alphabetical by title, 3)List all books in a selected category, etc.

B-TREE Video Program Disk.....\$39.95

A complete data base for your video cassette collection. Allows entry of each program the stars, Video I.D. number, starting counter number, category & length. Over 1000 programs with over 300 cassettes can be stored on one double density DATA disk. Special reports include: 1)Printed Labels, 2)Alphabetical listing by stars, 3)Alpha Listing by Program, 4)Listings by cassette, 5)Time left on each cassette report, etc.

The above Series of programs have many exclusive features. Each application program stores a variety of data in a B-TREE Structured file. The B-TREE file organization method allows fast and efficient access to a large amount of data. With B-TREE, a whole disk of data can be accessed in alphabetic or numeric order without sorting or merging and all in a minimum of time. The user may add, delete, edit, list, print and redisplay the data without any file reorganization necessary. This is one of the BEST ANSWERS to data Storage problems on microprocessors. Fully implements the BINARY SEARCH TREE concepts including insertion, deletion, editing, & traversal. No sorting or long searches for data recovery is needed with B-TREE, yet even larger than memory files can be printed or displayed in sorted order without the necessity of sorts. Varying Key fields possible with duplicates allowed. These are BASIC programs (yet faster than many assembly language programs) with hundreds of REMark statements for easy modification or use of the modules in user programming. Also includes the best INKEY module ever written, allowing the fastest direct screen oriented input you have seen. All programs are non-scrolling with SCREEN oriented design and have all information needed on screen at all times. Single Key stroke command sequences and complete error trapping as well as controlled input of data to any field. Each package comes on a formatted diskette to run on TRSDOS 1.3, LDOS 5.1, NEWDOS80 & DOSPLUS for TRS80 Model III computers and also for Model I using LDOS or DOSPLUS. Watch for new programs in our exclusive B-TREE series in upcoming months. MODEL II versions for TRSDOS and CP/M available soon with expanded capabilities.

For fast, efficient service. **Heart of** we can air freight from Dallas

TEXAS COMPUTER SYSTEMS

P.O. Box 1327 Arlington, Texas 76004-1327

★ Toll Free Number 800 433-5184

Texas Residents 817 274-5625

Dallas Metroplex 265-1524

* Payment: Money order, cashiers check, certified check. Prices above reflect 3% cash discount. Call for VISA/MC prices.

* Prices subject to change any time.
* No tax out-of-state. Texas add 5%.
* Many items shipped FREE. \$Call.

Action Computers

"The Hardware Company"

Centronics Printer Sale

Completely Refurbished, 30 Day Warranty

- Model #**
- 101** 165 c.p.s., 132 print positions, 5x7 dot matrix, areal work horse **\$350. only \$449.00**
- 101A** Same as above with the added features of 9x7 dot matrix and USASCII 95 character **\$500. only \$649.00**
- 101AL** Added Bells and Whistles. All the features of the 101 line plus LSI **\$700. only \$749.00**
- 102A** 330 c.p.s., 125 L.P.M. bi-directional print 9x7 dot matrix **\$900. only \$949.00**
- *306** The best of Centronics line at the best price, compact, 120 characters per second, 5x7, VFU, top of form and more **\$600. only \$689.00**
- Quietizer covers available for this model only only \$89.00**
- 501** 165 c.p.s., 30 L.P.M. at 132 character lines, 150 L.P.M. at 30 character lines, 5x7 dot matrix, sprocket feed, motor control **\$550. only \$689.00**
- 503** 165 c.p.s., sister to the 501 with bi-directional print at twice the speed — self tests **only \$709.00**
- Print stands available for all models only \$70.00 **\$650.**
 - Redactron word/process as is: \$500.
 - Inforex 9" CRT w/power supply and keyboard as is: only \$35.00

Options

- Add lower case to most Centronics Printers only **\$89.00**
 - Foreign character sets available.
 - Add Motor Control to your 779 printer only **\$95.00**
- Our Conversion Kit I gives most Centronics printers the ability to print in upper and lower case - \$89.00
- Our Conversion Kit II turns your motor on and off automatically. Increases the life of your printer \$95.00
- Both kits require **NO** soldering, etch cuts, software mod. or interface. Easy Installation.

Interfaces

- Now use your Centronics Parallel Printer on any Computer with a serial Port. Available in four models all with switchable baud rates.
- Model**
- | | | |
|------------|---------------------|---------------|
| CSP - 100 | No buffer | only \$175.00 |
| CSP - 200 | 256 char. buffer | only \$225.00 |
| CSP - 200X | X on/X off Protocol | only \$340.00 |
| CSP - 2000 | 2048 char. buffer | only \$395.00 |
- PS Models**
parallel to parallel devices \$125.-\$150.
- PPS Models**
Software control serial to parallel or combination, multiple ports \$350-\$395
- MS Model**
Single modem shared by 4 devices \$310
- Many More Interfaces Available

Action Computers

85 Factory Street
Nashua, N.H. 03061

To order: Call 603-883-5369

Inquiries Always Welcome

Shipping and Handling Extra
Yes We Ship C.O.D.



516

Program continued

```

59 Z$=CHR$(PEEK(Z)-128):PRINT:NEXT
60 '
61 FORIZ=0TOZ:Z$=INKEYS:IFZ$=""THENNEXTIZELSE RETURN
62 PRINT"TIME'S UP":RETURN
63 '
64 '
65 ZX=SGN(X2-X1):ZY=SGN(Y2-Y1):IFZX=0THENFORY=Y1TOY2STEPZY:SET(X
1,Y):NEXT:RETURN
66 ZL=(Y2-Y1)/(X2-X1):Y=Y1:FORX=X1TOX2STEPZX:SET(X,Y):Y=Y+ZL*ZX:
NEXT:RETURN
67 '
68 '
69 '
70 '
71 '
72 '
73 '
74 '
75 '
76 CLEAR1500:FOR X=1536TO16359 STEP64: Z$=""
77 FORY=0TO63:Z$=Z$+CHR$(PEEK(X+Y)):NEXT:LPRI NTZ$:NEXTX:RETURN
78 '
79 '
80 DATA 205,127,10,144,140,69,62,1,211,255,16,254,69,62,2,211,25
5,16,254,13,32,239,201
81 FORZ=1TO23:READSZ:SZ$=SZ$+CHR$(SZ):NEXT
82 POKE16526,PEEK(VARPTR(SZ$)+1):POKE16527,PEEK(VARPTR(SZ$)+2):R
ETURN
83 DEFINIZ:Z=PEEK(14400)
84 IFZAND6ZY=ZY-1 ELSE IFZAND16ZY=ZY+1 ELSE IFZAND32ZX=ZX-1 ELSE
IFZAND64ZX=ZX+1
85 IFZX>127ZX=ZX-1 ELSE IFZX<0ZX=ZX+1 ELSE IFZY>47ZY=ZY-1 ELSE I
FZY<0ZY=ZY+1
86 IFZ=2CLS ELSE IFZ=1RETURN
87 IFZ>128SET(ZX,ZY):FORDZ=1TO1:NEXT:RESET(ZX,ZY):GOTO83
88 RESET(ZX,ZY):FORDZ=1TO1:NEXT:SET(ZX,ZY):GOTO83
89 '
90 XZ1=0:XZ2=0:XZ3=0:XZ4=0:XZ5="" :VZ1(3)=VARPTR(XZ$):VZ1(2)=VARPTR(XZ$
):VZ1(4)=VARPTR(XZ1):VZ1(8)=VARPTR(XZ4)
91 FOR NZ1=PEEK(16633)+256*PEEK(16634)TO PEEK(16635)+256*PEEK(16
636)-1:TZ1=PEEK(NZ1)
92 IF PEEK(NZ1+1)=90THEN96 ELSE PRINT CHR$(PEEK(NZ1+2)):CHR$(PEE
K(NZ1+1)):
93 PRINT MID$(".$$1...$",TZ1,1):" ";
94 FOR KZ1=0TOTZ1-1:POKE VZ1(TZ1)+KZ1,PEEK(NZ1+3+KZ1):NEXT
95 IF TZ1=3 PRINTXZ$,ELSE IF TZ1=2 PRINTXZ$,ELSE IF TZ1=4 PRINTX
Z1, ELSE PRINTXZ$,
96 NZ1=NZ1+TZ1+2: NEXT NZ1: PRINT: RETURN
97 '
98 '
99 FORZ=1TO3:PRINT"COPY # ";Z:CSAVE"A":FORZD=0TO2000:OUT255,20:N
EXTZD,Z
100 CLS:Z$="ZUB-ROUTINES ARE READY":GOSUB20

```

TRS-80* Model III

Hardware &
Software
at discount
prices.

COMPUTER HOUSE

RADIO SHACK	List Price	OUR PRICE
26-1066 Mod III, 48 K, 2-Disk	2,495.00	2,100.00
26-1062 Mod III, 16 K	999.00	849.00
26-1906 Invasion Force (T)	14.95	11.95
26-1590 Super Scripset (D)	199.00	155.00
26-1591 Scripset Dictionary (D)	149.00	119.20
26-1589 Mod III Visicalc (D)	199.00	155.00
26-1592 Profile III Plus	199.00	155.00
ADVENTURE INTERNATIONAL		
Star Trek 3.5 (T)	14.95	11.95
Space Intruders (T)	14.95	11.95
Maxi Manager (D)	99.95	79.95
Star Fighter (T)	24.95	19.95
BIG FIVE SOFTWARE		
Robot Attack (T)	15.95	12.75
Cosmic Fighter (T)	15.95	12.75
Attack Force (T)	15.95	12.75
Super Nova (T)	15.95	12.75

(T) = Cassette Tape (D) = Disk

We represent 20+ mfgs with 300+ programs. Write for our FREE catalog for Mod II, Mod III and Color Computer.

COMPUTER HOUSE

P.O. Box 538 Mammoth Lakes, CA 93546

(714) 934-6538

291

Orders less than \$100.00 add \$1.50 for postage and handling. Over \$100.00 shipped free. MC & VISA accepted.

*TRS-80 is a trademark of Tandy Corp.

MICRO MAINFRAME HARD DISKS SETTING THE INDUSTRY STANDARD

Compare MMF's features with those of our competitors. All MMF hard disk systems feature ECC (error correction code). Not all of our competitors can say that. Error correction is an absolute necessity in the hard disk environment, as hard disk media does develop bit pattern sensitivity with time.

Mainframe hard disk suppliers have been using error correction techniques for years, but many of the micro computer hard disk suppliers are selling units with CRC error detection only. This means that as the media ages, disk sectors will become unreadable and valuable data will be lost. This operating is identical to floppy disks and your expen-

sive hard disk becomes only slightly better than the floppy you replaced.

All Micro Mainframe units shipped after February 1982 will operate in conjunction with our Micro Network Multiplexer. Each Micro Network will allow up to four computers to be connected to one of our hard disk systems. Additional networks may be connected for further expansion.

MMF is pleased to announce our new M200-C series hard disk system consisting of a 10 Megabyte Removable cartridge, and a 10 Megabyte fixed hard disk. This unit functions with the Micro Network Multiplexer and features ECC.

SYSTEM PRICING

MICRO NETWORK MULTIPLEXER	\$ 795.00
10 MEGABYTE REMOVABLE CARTRIDGE WINCHESTERS	
M100-R1 Mod-I* or Mod-III* version	\$5350.00
M100-R2 Mod-II*	\$5395.00
5 MEGABYTE FIXED WINCHESTERS	
M50-F1 Mod-I* or Mod-III* version	\$3750.00
M50-F2 Mod-II* version	\$3795.00
120 MEGABYTE FIXED WINCHESTERS	
M1200-F1 Mod-I* or Mod-III* version	\$9950.00
M1200-F2 Mod-II* version	\$9995.00
FIXED AND REMOVABLE SYSTEMS	
M200-C1 Mod-I* or Mod-III* version	\$8750.00
M200-C2 Mod-II* version	\$8795.00

Call for the location of your nearest Micro Mainframe Dealer.
Dealers please inquire on your letterhead.

MICRO MAINFRAME
2227 McGregor Ave.
Rancho Cordova, CA 95670
(916) 635-3997



Get those disk I/O routines right from Basic.

Direct Access

Harold B. Fink
8 North Drive
Great Neck, NY 11021

Many TRS-80 disk routines cannot be accessed directly from Disk Basic—reading from or writing to a particular disk sector, for example, or utilizing the operating system's automatic ability to block and manage records of under 256-byte lengths (without wasting a single sector byte).

Usually, you can access the various disk I/O routines under TRSDOS and NEWDOS et al only through custom machine language programs. How convenient it would be to access them directly from a Basic program, using string variables as input buffers.

I use the following program to do just that. I have used it to read directories directly into string arrays, to set up a sophisticated data base management system, to create a custom disk editor and set up automatic copy or purge routines. Its uses are limited only by your imagination.

To run any of Table 1's routines, you must load the required information into the appropriate register and make a call to the RAM address listed on the left. Below is a list of the abbreviations I used.

Buffer A reserved area of RAM of up to 256 bytes, used to hold the contents of a sector to be read from or

written to the disk.

DCB Device Control Block. For disk this is a 32-byte buffer containing the name of the file to be opened. After the file is opened it contains information to be used in managing the file.

LRL Logical Record Length. Any record length up to 256 bytes can be defined by the user. If LRL=0, then the record length is 256.

UR A reserved area of RAM assigned by the user for records of less than 256 bytes. It is separate from the buffer and must be equal in length to the LRL.

LRN Logical Record Number. The record number used by the disk operating system to determine which record is to be written to or read from. It can be any number from 1 to 65535 and is used only to locate a record.

Let's write a program in Basic to read a particular disk sector into a buffer which we assign to the variable BF\$.

Since we cannot load the registers directly from Basic, we will set up a simple machine routine for doing so. There are several ways of doing this. We can load an object file into high memory, POKE a routine into high or low memory, or use a string variable.

Since the routine we plan to use is only 17 bytes long, we'll

use the string variable approach. It has the advantage of not requiring memory protection. In addition, you can insert into the string easily and quickly.

An Assembly program for loading registers and calling a particular Disk I/O routine is shown in Sample Listing 1.

The following Basic statements will set up the 17-byte routine as a string variable:

```
100 RT$ = ""
110 FOR I = 1 TO 17 : READ A : RT$ = RT$ + CHR$(A) : NEXT I
120 DATA 217, 3, 0, 0, 6, 0, 14, 0, 22, 0, 30, 0, 205, 0, 0, 217, 201
```

Now all that remains is to insert the register values and buffer addresses into the string variable RT. We have initially set all the bytes in the string corresponding to these variables to a value of 00H. The following is a listing of these bytes:

Bytes 3 & 4	Address in RAM of Buffer (BF\$)
Byte 6	Value to be inserted in B register
Byte 8	Value to be inserted in C register
Byte 10	Value to be inserted in D register
Byte 12	Value to be inserted in E register
Bytes 14 & 15	Address of Disk I/O Routine

From Table 1 we note that each disk routine requires different values to be loaded into the various registers. For example, to call the routine for reading a disk sector into a buffer, the HL registers must first be loaded with the address of the buffer area we have set aside; the B register must be

```
217 D9 EXX ;SAVE REGISTERS
33,0,0 21,00,00 LD HL, BUFFER ;LOAD BUFFER ADDR
6,0 06,00 LD B, LRL ;LOAD LOGICAL REC LGTH
14,0 0E,00 LD, C, DRIVE ;LOAD DRIVE #
22,0 16,00 LD D, TRACK ;LOAD TRACK #
30,0 1E,00 LD E, SECTOR ;LOAD SECTOR #
205,0,0 CD,00,00 CALL DISKIO ;CALL DISK ROUTINE
217 D9 EXX ;EXCH REGISTERS
201 C9 RET ;RETURN
```

Sample Listing 1. Assembly Program for Loading Registers.

RAM Address	Description	Entry Information into registers
46DD	Reads a sector from disk	HL>Buffer, C>Drive, D>Track #, E>Sector #
46E6	Writes a sector to disk	Same as above
4424	Opens an existing file	HL>Buffer, DE>DCB, B>LRL
4442	Locates a particular record #	DE>DCB, BC>LRN
4436	Reads a logical record	HL>Buffer, DE>DCB
4439	Writes a logical record	Same as above
4428	Closes a file	DE>DCB
442C	Kills a file & deletes it from dir	DE>DCB

Table 1. TRSDOS Disk I/O Calls.

TRS-80™ DISCOUNT - BUY DIRECT

WE SELL THE FULL LINE OF TRS-80 AT WHOLESALE PRICES
PERSONAL COMPUTERS

MODEL II

26-4002 64K I Drive.....\$3279
Ask About Hard Drives

MODEL III

26-1062 16K.....\$819
26-1066 48K with
2 Drives, RS232.....\$2049

COLOR COMPUTER

26-3001 4K.....\$309
26-3002 16K Ext. Basic.....\$455
26-3003 32K Ext. Basic.....\$569

POCKET COMPUTER

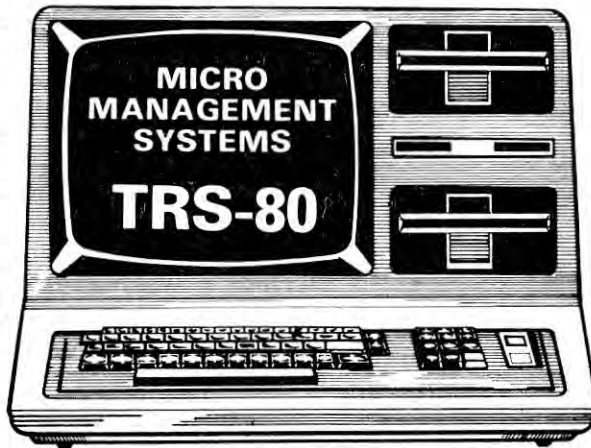
26-3501 Pocket Computer.....\$155

TRS-80 COLOR COMPUTER

DISK DRIVES

26-3022 Disk Drive #1.....\$498
26-3023 Disk Drive #2, 3, 4.....\$338

LEARN TO
"DO IT YOURSELF"
AND SAVE



THOUSANDS OF
SATISFIED
CUSTOMERS

TRS-80™ DISCOUNT SOFTWARE TRS-80™

PERSONAL COMPUTERS SOFTWARE PERSONAL COMPUTERS

WRITE FOR YOUR
FREE CATALOG

ORDER TOLL FREE
1-800-841-0860

- LARGE INVENTORY
- FAST DELIVERY

TM - TANDY CORPORATION
FREE COPY OF WARRANTY UPON REQUEST

**MICRO
MANAGEMENT
SYSTEMS, INC.**

DEPT. NO. 4
115 C. SECOND AVE. S.W.
CAIRO, GA. 31728
GA. 912-377-7120

MODEL III SOFTWARE

26-1563 Scripsit I & III.....\$79.00
26-1566 Visicalc I.....\$83.00
26-1584 Check-Writer 80.....\$90.00
26-1552 General Ledger.....\$90.00
26-1553 Inventory Ctl.....\$90.00
26-1556 Payroll.....\$180.00
26-1555 Accts. Receivable..\$135.00
26-1554 Accts. Payable....\$135.00
26-1558 Bus. Mail List.....\$90.00
26-2201 Fortran III.....\$90.00
26-1562 Profile.....\$72.00
26-1592 Profile III Plus.....\$180.00
26-1565 Microfiles.....\$90.00
26-1569 Visicalc III.....\$180.00
26-1590 Super Scripsit.....\$180.00
26-1591 Scripsit Dictionary..\$135.00
26-1582 Time Manager.....\$90.00
26-1580 Project Manager.....\$90.00
26-1581 Personnel Manager..\$90.00
26-1568 Medical Off. Syst...\$270.00
26-2203 Cobol.....\$180.00

COLOR COMPUTER SOFTWARE



MODEL III



MODEL II



COLOR COMPUTER

MODEL II SOFTWARE

26-4515 Profile Plus.....\$270.00
26-4511 Visicalc II.....\$265.00
26-4512 Profile II.....\$162.00
26-4501 General Ledger....\$180.00
26-4502 Inventory Mgmt....\$180.00
26-4503 Payroll.....\$360.00
26-4504 Accts. Receivable..\$270.00
26-4505 Accts. Payable....\$270.00
26-4507 Mail List II.....\$108.00
26-4701 Fortran.....\$270.00
26-4703 Cobol.....\$270.00
26-4705 Compiler BASIC...\$180.00
26-4540 Statistical Analysis . \$90.00
26-4508 Medical Off. System\$675.00
26-4509 Manuf. Inventory...\$675.00
26-4513 Job Costing.....\$135.00
26-4520 Time Accounting...\$450.00
26-4621 Personnel Search...\$270.00
26-4560 Westlaw.....\$225.00
26-4531 Scripsit 2.0.....\$360.00
26-4534 Scripsit Dictionary..\$180.00

POCKET COMPUTER SOFTWARE



✓96

loaded with the logical record length (LRL)—256 bytes (LRL = 0); and the C, D, and E registers must be loaded with values for the Drive, Track, and Sector numbers respectively.

After this is done, we then call the address of the Sector Read Routine (46DDH). For those NEWDOS owners, use the same addresses with the exception of the sector read and write routines. They are at the following locations:

Routine	TRSDOS	NEWDOS
Read from a disk sector	46DDH	460DH
Write to a disk sector	46E6H	4623H

To facilitate inserting the values, it is more convenient initially to assign input values to an integer array rather than directly into the RT string. We'll create the RT string after we've assigned all values. The following lines assign values to a 17-element array RT(X).

```
160 FOR I = 1 TO 17:READ RT(I):NEXT I
170 DATA 17,33,0,0,6,0,14,0,22,0,30,0,205,0,0,217,201
```

The following will assign 255 bytes of RAM to the variable BF\$ as our buffer and insert the address of buffer into elements three and four.

```
160 BF$ = STRING$(255,32)
```

Line	Comment
100-140	Initializes the program.
150	Assigns 255 bytes of memory to buffer using the string variable BF\$.
160-170	Load our machine routine into the array RT.
500-530	POKE drive number and drive bit into memory locations.
540-630	Read sectors 2-9 and load into array PR\$(X).
5000-5030	Load the various addresses and register values into the RT array.
5050	Creates string variable RT\$ using RT array.
5500-5540	Transfers control to the starting address of string variable RT\$ that now contains our machine-language routine.

Table 2. Listing 1 Structure

```
500 RT(3) = PEEK(VARPTR (BF$) + 1)
      'LOAD LSB
510 RT(4) = PEEK(VARPTR (BF$) + 1)
      'LOAD MSB
```

The VARPTR

For those of you not familiar with the VARPTR, it is used to obtain information regarding variables stored in RAM. VARPTR (A\$) returns the address to RAM where information relating to the string variable A is stored. The first byte at that address is equal to the length of A\$, while bytes 2 and 3 are equal to the address in RAM where A\$ begins.

Byte 2 contains the least significant byte (LSB) of the address and byte 3 the most significant byte (MSB). Line 500 above PEEKs byte 2 (LSB) and loads it into the third element of our array (RT). Line 510 does the same with byte 3 and the fourth element, respectively.

We next load the values to be inserted into registers B, C, D and E, using elements 6, 8, 10 and 12, as called for in Table 1. The value for register B is loaded into RT (6), that for register C into RT(8) and so on. Finally, we insert the address of the Disk I/O routine from Table 1 into RT (14) and RT (15).

There is one other consideration, only applicable to the reading or writing of a disk sector. The bytes located at 4308H and 4309H must be loaded with the drive number and drive bit respectively, prior to calling the disk routine. The drive bit represents the bit corresponding to the drive number.

For Drive 0, the first bit is set; for Drive 1, the second bit and so on. For Drives 0, 1, 2 and 3 the corresponding drive bit values would be 1, 2, 4 and 8. We accomplish this with the following lines:

```
610 DB = 1 : IF DR > 0 THEN DB = 2: DR
      'SET DRIVE BIT (DB)
610 POKE (&H4308),DR : POKE (&H4309),
      DB 'POKE DRIVE # & BIT
```

After loading the address of our buffer BF\$ into RT(3) and RT(4), we then load the drive number into RT(8), the track number into RT(10) and the sector number into RT(12), representing the C, D and E registers.

Now we create the RT string, which contains the routine and all values. We find (through VARPTR) the address of RT\$ and transfer control to it using the USR function.

We are now ready to write our Basic program. Program Listing 1 reads a disk directory into a string array PR\$(X). It assumes that the directory is located on track 17 starting at sector 0 and is 10 sectors in length. If these assumptions do not apply we can add a relatively simple routine to read the directory track number from sector 0, byte

3 and assign the value to TR.

Table 2 explains Listing 1's organization.

Line 5000 assigns the address of the disk sector read routine. TRSDOS uses 46DDH. NEWDOS uses 460DH.

The buffer we set up on line 150 reserves only 255 bytes, the maximum string length allowed under Microsoft Basic. A disk sector, however, contains 256 bytes. Under this arrangement the last byte in the sector will not be read or written to.

While not important to our directory reading program,

```
100 'PROGRAM NAME: DIRECTRD H. FINK 2/81
110 'PROGRAM TO READ A DISK SECTOR
120 CLEAR 5000
130 DEFINT A-Z
140 DIM RT(20),PR$(50)
150 BF$=STRING$(255,32) 'SET UP BUFFER & LOAD WITH BLANKS
160 FOR I=1 TO 17:READ RT(I):NEXT I:LOAD M/L ROUTINE INTO RT ARRAY

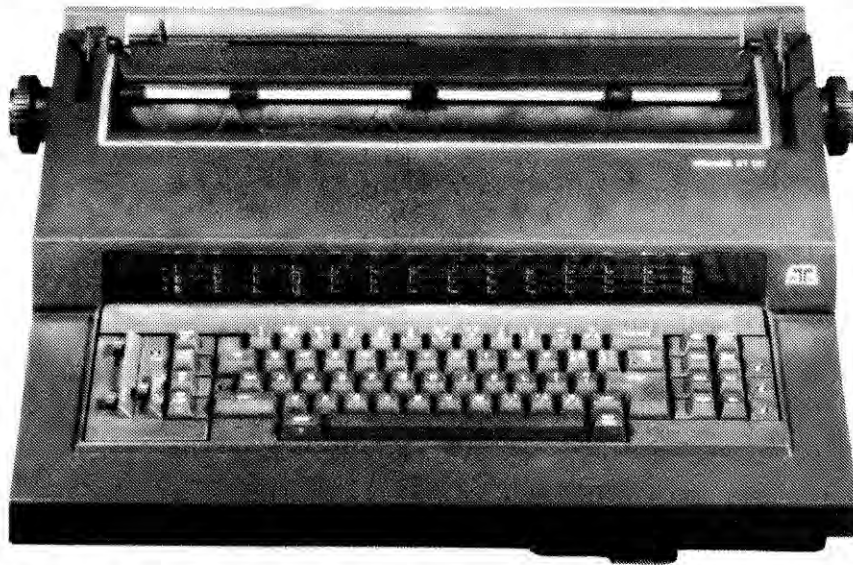
170 DATA 217,33,0,0,6,0,14,0,22,0,30,0,205,0,0,217,201
180 '
190 '
500 CLS:PRINT:INPUT"ENTER DRIVE NO. (0-3) ";DR
510 IF DR<0 OR DR>3 THEN 500
520 IFDR<1THENDB=1:ELSEDB=2(DR 'DRIVE # BIT
530 POKE (&H4308),DR:POKE (&H4309),DB 'POKE DRIVE # & DRIVE BIT
540 K=1:TR=17 'SET UP TRACK & SECTOR VALUES
550 GOSUB5000
560 FOR SC=2 TO 9:MID$(RT$,12,1)=CHR$(SC):GOSUB 5500
570 FOR J=6 TO 240 STEP 32
580 IF ASC(MID$(BF$,J-5,1))=16 THEN PR$(K)=MID$(BF$,J,11)
      ):K=K+1
590 NEXT J
600 NEXT SC
610 FOR I=1 TO K-1 : PRINT PR$(I);" ";:NEXT
620 PRINT:INPUT"PRESS (ENTER) TO CONTINUE ";Z
630 GOTOL00
640 '
5000 RT(14)=221:RT(15)=70: 'SECTOR READ ADDRESS
5005 'FOR NEWDOS RT(14)=13
5010 'LOAD BUFFER ADDRESS (INTO HL REGISTERS)
5020 RT(3)=PEEK(VARPTR(BF$)+1):RT(4)=PEEK(VARPTR(BF$)+2)
5030 RT(8)=DR:RT(10)=TR:RT(12)=SC 'LOAD DRIVE,TRACK,SECTOR
5040 'SET UP ROUTINE IN STRING RT$
5050 RT$="":FOR I=1 TO 17:RT$=RT$+CHR$(RT(I)):NEXTI
5060 RETURN
5500 'FIND ADDRESS OF STRING RT$
5510 M1=PEEK(VARPTR(RT$)+2)*256+PEEK(VARPTR(RT$)+1)
5520 IPM1>32767THENM1=M1-65536
5530 DEFUSR1=M1 :X=USR1(0)
5540 RETURN
```

Program Listing 1. Reads a disk directory into a string array.

Lines	Comment
100-150	Initialize programs.
160	This PEEKs high memory address at 4049H and 404AH, reduces it by 512 bytes, sets the buffer at the top of the new memory, and POKEs the new high memory value.
180	Assigns 32 bytes of memory to DCB using string variable DC\$.
190	Set the logical record length to 50 bytes. LRL can be any number from 1-256 bytes. For 256 bytes, LR = 0.
200	Assigns 50 bytes of RAM to the user record buffer (UR\$). It should be equal in length to LRL.
220-230	Loads the machine-language routine into array RT(X).
500-590	Input drive, filename and function.
1000-1030	Routine to read the record. After the record number is input, the program runs a subroutine at line 4030 for positioning a file and for reading at line 4050.
1100-1200	Routine to write a record to disk. Input fields are combined into one string and inserted into UR\$(user record buffer). Position and write routines (at lines 4030 and 4060) are then invoked.
4000-4070	Values are entered into the RT array required by the open, position, read, write and close routines (Table 1).
4500-4550	Addresses of various buffers are loaded into the RT array.
5000-5050	Create RT\$(containing our DOS I/O routines) and transfer control to the address of our RT\$ via the USR function.

Table 3. Listing 2 Structure

Get a Letter Quality Printer and a Typewriter, At the Price of a Typewriter.



\$1,599.

MTI DOES IT AGAIN. Who but MTI can offer a letter quality printer and an Olivetti electronic typewriter in one unit, at one low price? It's hard to believe.

ITS A LETTER QUALITY PRINTER. At MTI, a low price is not enough unless we can also deliver a superior printing quality. From this interchangeable Daisy Wheel printer. You get clear and crisp print characters and the outstanding features you need. Like:

- *Speed, 17 c.p.s.
- *Print capability in 10 pitch pica, 12 pitch elite, and 15 pitch mikron.
- *100 character set with upper, lower case and underlining.
- *33 different typesyles.

This printer/typewriter has a printing line length of 13.2" and will take paper up to 17" wide. Perfect for business quality reports and documents.

ITS AN ELECTRONIC TYPEWRITER. This Olivetti typewriter makes correspondence and other work simplified. By means of it's logic, it automates those functions that were traditionally done manually by a secretary. Margin Setting, numerical alignment, table formatting and other functions are done rapid and simple operations.

EASY CORRECTION. One-line memory enables words or sentences on the line in process to be automatically cancelled, by the touch of a key.

READY TO GO. You can put this unit to work the minute it's delivered. Everything you need for both functions is included. The unit is complete with parallel interface. It's compatible with TRS-80, Apple, our M.T.I. MOD III computers and nearly all others made. All units are backed by the M.T.I. warranty. The result is outstanding performance, great reliability, and a price you can afford.

OPTIONS. You can add on a RS-232 Serial Interface. Tractor feed is also available. Note: Cable extra.

WANT MORE? For more information, call any of our authorized sales and service centers listed below. If you prefer, you can call or write us and we'll send you the information and a free catalog.

MTI AUTHORIZED SALES AND SERVICE CENTERS

Anchorage, AK (907) 333-8322
 Rodgers, AR (501) 836-9168
 Mesa, AZ (602) 833-8949
 Phoenix, AZ (602) 244-9739
 Sierra Vista, AZ (602) 458-2479
 Tucson, AZ (602) 323-9391
 Anaheim, CA (714) 773-0240
 Covina, CA (213) 332-4088
 Goleta, CA (805) 967-7628
 Huntington Beach, CA (714) 842-1348
 Inglewood, CA (213) 673-3295
 Lancaster, CA (805) 942-5747
 Montclair, CA (714) 626-4813
 Northridge, CA (213) 886-9200
 Orange, CA (714) 771-0880
 Pacheco, CA (415) 689-2260
 Placerville, CA (916) 622-4640
 Port Huememe, CA (805) 985-2329

Redondo Beach, CA (213) 370-5556
 Riverside, CA (714) 781-6361
 San Diego, CA (714) 275-4243
 San Jose, CA (408) 946-1265
 Santa Ana, CA (714) 850-1228
 Santa Monica, CA (213) 393-5785
 Vallejo, CA (707) 554-4933
 Walnut, CA (714) 594-9760
 Westlake Village, CA (213) 706-0333
 Colorado Spring, CO (303) 630-3334
 Grand Junction, CO (303) 434-3616
 Groton, CT (203) 445-5166
 Wilmington, DE (302) 762-0227
 Hollywood, FL (305) 981-1011
 Lynn Haven, FL (904) 265-6452
 Mary Esther, FL (904) 243-5793
 Tampa, FL (813) 247-6023
 Norcross, GA (404) 449-8982

Buckingham, IA (319) 478-2826
 Belleville, IL (618) 277-2354
 Collinsville, IL (618) 345-5068
 Oak Park, IL (312) 386-3323
 Shawnee, KS (913) 631-2029
 Ashland, KY (606) 325-2210
 Shreveport, LA (318) 865-7189
 Anoka, MN (612) 427-5783
 Cameron, MO (816) 632-6528
 Great Falls, MT (406) 737-0901
 Missoula, MT (406) 549-9715
 Raleigh, NC (919) 755-1175
 Grand Forks, ND (701) 772-7848
 West Milford, NJ (201) 728-8080
 Las Vegas, NV (702) 870-4138
 Jericho, NY (516) 333-2266
 New Rochelle, NY (914) 235-4444
 Syracuse, NY (315) 487-5000

Troy, NY (518) 273-8411
 White Plains, NY (914) 761-9283
 Tonkawa, OK (405) 628-2693
 Tulsa, OK (918) 836-9503
 Portland, OR (503) 281-7640
 Dallas, TX (214) 247-6679
 Missour City, TX (713) 499-5241
 San Angelo, TX (915) 658-3781
 Cheyenne, WY (307) 632-9132
 Buenos Aires, ARG 32-1858
 Paris, FRANCE 306-4606
 Holm, GERMANY 4103-4315
 Florence, ITALY 55-45-4319
 Singapore, JAPAN 220-7182
 Cape Town, S.AFRICA 2145-1047
 Tahiti, F.P. 2-54-47
 Taichung, TAIWAN 4228-5523
 Bang Kok, THAILAND 314-1161



MICROCOMPUTER TECHNOLOGY INC.
 3304 W. MACARTHUR, SANTA ANA, CA 92704
 (714) 979-9923 • TWX 910-595-1902 MTISNA

Call or write for free brochure:
 U.S. PRICES, F.O.B. SANTA ANA
 CALIFORNIA AND MAY VARY BY AREA.

✓ 247

some applications require control of all 256 bytes. To control all 256 bytes, we must forego the convenience of buffering directly into a string variable and assign a 256-byte protected area of RAM as our buffer.

I took this approach in Program Listing 2 (lines 160,170 and 4530).

We are now going to use the DOS I/O routines for file and record control. Listing 2 demonstrates the routines to open,

position, read, write and close a file using a record length of up to 256 bytes. DOS will field and block our records for us automatically, and every byte within a disk sector will be used.

Any overflow from one sector will be written to the following sector, and DOS will keep track of each record location. In addition it will field the record directly into a buffer assigned by us.

From Table 1 you know that the disk file routines require a

Program Listing 2. Controls files and records.

```

100 'PROGRAM NAME: DISKRD3                H. PINK 2/81
110 'PROGRAM TO OPEN & CLOSE A FILE & READ & WRITE A RECORD
120 'UTILIZING DOS I/O ROUTINES
130 CLEAR 1000
140 DEFINT A-Z
150 DIM RT(20)
160 M1=PEEK(4096): M2=PEEK(4094): M3=PEEK(4070) ' MEM ?
165 'REDUCE HIGH MEMORY BY 512 BYTES AND SET NEW MEM PROTECT
170 IPM2<M3THENM2=M2-2:POKE(4094),M2:POKE(4070),M2:POKE(
4070),M2:GOTO 100
180 DC$=STRINGS(32,32) 'SET UP DIR CONTROL BLOCK
190 LR=50 'SET LOGICAL RECORD LENGTH TO 50
200 UR$=STRINGS(LR,32) 'SET UP USER RECORD AREA
210 TS=STRINGS(LR,32)
220 FOR I=1 TO 17:READ RT(I):NEXT 'LOAD M/L ROUTINE INTO RT ARR
AY
230 DATA 217,33,0,0,6,0,14,0,22,0,30,0,205,0,0,217,201
240 '
500 CLS :PRINT :PRINT :INPUT"ENTER DRIVE NO. (0-3) ";DR$:DR=VAL(
DR$)
510 IF DR<0 OR DR>3 THEN 500
520 INPUT"ENTER FILE NAME ";FL$:IF FL$="" THEN 520
530 FL$=FL$+";"+DR$+CHR$(13) :MID$(DC$,1,LEN(FL$))=FL$
540 GOSUB 4010:GOSUB 5000

```

```

550 INPUT"1.READ RECORD 2.WRITE RECORD 3.END (CLOSE FILE) ";S
560 ON S GOSUB 1000,1100,1300
570 IFS=1THENPRINT UR$
575 MID$(UR$,1,LR)=TS
580 PRINT :INPUT"PRESS (ENTER) TO CONTINUE ";Z
590 IF S=3 THEN 100:ELSE 560
600 '
1000 'READ RECORD
1010 CLS :PRINT :INPUT"ENTER RECORD NO OR 999 FOR MENU ";RN
1015 IF RN=999 THEN 550
1020 GOSUB 4030 :GOSUB 5000
1030 GOSUB 4050 :GOSUB 5000 :RETURN
1040 '
1100 'WRITE RECORD
1110 CLS :PRINT :INPUT"ENTER RECORD NO OR 999 FOR MENU ";RN
1120 IF RN=999 THEN 550
1130 FOR I=1TO6 :NS(I)="" :NEXT I ' CLEAR INPUT ARRAY NS
1140 INPUT"ENTER NAME ";NS(1)
1150 INPUT"ENTER ADDRESS ";NS(2)
1160 INPUT"ENTER CITY ";NS(3)
1170 INPUT"ENTER STATE ";NS(4)
1180 INPUT"ENTER ZIP ";NS(5)
1190 INPUT"ENTER TELEPHONE NO. ";NS(6)
1200 F2$="" :FOR I=1 TO 6 :F2$=F2$+NS(I)+CHR$(13) :NEXT I
1210 F2$=LEFT$(F2$,LR) :MID$(UR$,1,LEN(F2$))=F2$
1220 GOSUB 4030 :GOSUB 5000
1230 GOSUB 4060 :GOSUB 5000 :RETURN
1240 '
1300 'CLOSE FILE
1310 GOSUB 4070 :GOSUB 5000 :RETURN
1320 '
4000 'DISK I/O ROUTINES - LOAD JUMP VECTORS
4010 RT(6)=LR :RT(8)=DR 'LOAD LRL & DRIVE #
4020 GOSUB 4500 :GOSUB 4520 :RT(14)=36 :RT(15)=68 :RETURN 'OPEN
FILE
4030 RT(6)=INT(RN/256) :RT(8)=RN-RT(6)*256 'LOAD RECORD NUMBER
4040 GOSUB 4500 :RT(14)=66 :RT(15)=68 :RETURN 'POSITION FILE
4050 GOSUB 4500 :GOSUB 4540 :RT(14)=54 :RT(15)=68 :RETURN 'READ
LOGICAL RECORD
4060 GOSUB 4500 :GOSUB 4540 :RT(14)=57 :RT(15)=68 :RETURN 'WRITE
LOGICAL REC
4070 GOSUB 4500 :RT(14)=40 :RT(15)=68 :RETURN 'CLOSE FILE
4080 '
4500 'LOAD DCB ADDRESS (INTO DE REGISTERS)
4510 RT(10)=PEEK(VARPTR(DC$)+2) :RT(12)=PEEK(VARPTR(DC$)+1) :RETUR
N
4520 'LOAD BUFFER ADDRESS (INTO HL REGISTERS)
4530 RT(3)=M1 :RT(4)=M2 :RETURN
4540 'LOAD USER RECORD ADDRESS (HL REGISTERS)
4550 RT(3)=PEEK(VARPTR(UR$)+1) :RT(4)=PEEK(VARPTR(UR$)+2) :RETURN
4560 '
5000 'CALL DISK ROUTINES
5010 RT$="" :FOR I=1 TO 17 :RT$=RT$+CHR$(RT(I)) :NEXT I
5020 M1=PEEK(VARPTR(RT$)+2)*256+PEEK(VARPTR(RT$)+1)
5030 IF M1>32767 THEN M1=M1-65536
5040 DEFUSR1=M1 :X=USR1(0)
5050 RETURN

```

Check Us Out!

Product: Continuous fan-folded checks with dual-windowed envelopes, checkbook binder and software designed especially for computer use in the home. You can't get continuous checks like these anywhere else in the world.

Savings: Special package — including software — to get you started. 200 checks, 100 envelopes and binder—\$49.95. 500 checks, 300 envelopes and binder—\$74.95. Both with our versatile "checkbook-checkwriter" program that will have you printing your checks the day you receive them.

Guarantee: Our checks and accessories are guaranteed to please you and guaranteed compatible with your bank. In fact, if you order a special package and aren't satisfied for any reason, simply return it for a full refund (including postage) and you can keep the "checkbook-checkwriter" program.

Quality: Color co-ordinated imprinting on tamper-proof paper. Your choice of blue, green, grey, or tan color. MICR bank encoding guaranteed compatible with your bank.

Now CHECK WITH US... Order a special package with moneyback guarantee today! Just enclose a voided check for encoding information with your order. Or send today for our free information package. We guarantee you'll be pleased. Visa-Mastercard orders welcome.

EMAIL ADDRESS: SOURCE TON411: MICRONET-GIS 70970 836
SYNERGETIC SOLUTIONS
 DEPT. E22 • 4715 SHEPHERD RD • MULBERRY, FL 33860 • PHONE (813) 646-6557
 234

Just between you and us...
 We think we've got
THE BEST
TRS-80* MODEL III
Disk System around!

WHY? Here's three good reasons.

- 1. VERSATILITY**
 Our own proven, dependable drive controller board will give you the hardware to run almost any drive configuration you can imagine:
 - 5 1/4" and 8" drives in any combination.
 - Internal/external combinations (up to all 4 drives external).
 - Single- and dual-headed drive combinations.
- 2. QUALITY**
 - We chose MPI drives—the long-time leaders in the field.
 - We construct our own disk drive installation kits of heavy gauge steel—no shielding problems!
 - We designed independently regulated linear power supplies—fast and reliable.
- 3. PRICE (including installation & 90-day warranty)**
 - Drive controller board and first drive.....\$679
 - Second (internal) drive.....\$279
 - Third drive (with cable).....\$359
 - Fourth drive.....\$329

If these sound like really good deals but you don't have the Model III yet, we've got the answer.

A TRS-80 Model III, 48K, TRSDOS, 2 MPI drives.....\$1899
 — Fully tested with 90-day warranty —
Dollar-for-dollar, we think this is the BEST TRS-80 system you can buy!!

We also stock for immediate shipment:
MODEL III, 32K.....\$899
EPSON Printers, accessories & interfaces at Low, Low Prices
 We Now Accept Visa & Mastercard

*TRS-80 is a Trademark of Tandy Corp.

NEW LOCATION ➤ 288
PROCESS CONTROL TECHNOLOGY
 8030 Lorraine Ave., Suite 328 • Stockton, California 95210 • (209) 952-6576

32-byte area of memory for the Device Control Block (DCB), which we must initially load with the name of our file. Once we open the file, DOS uses the DCB area to store information necessary to manage the file.

In addition to the DCB, we must also set aside an area of memory at least equal in size to our logical record (LRL) to permit DOS automatically to field our record. You can create both these buffers by using string variables. We will use the variable DC\$ as our DCB and UR\$ as our user record buffer.

Listing 2 works equally well under TRSDOS, NEWDOS and NEWDOS-80 without any change of the DOS addresses. I didn't include routines to open a new file, since it is more convenient to use Disk Basic for this.

Use the following Basic statement:

```
OPEN "R",1,"FILENAME:D":CLOSE
```

Line 190 of our program sets the logical record length to 50,

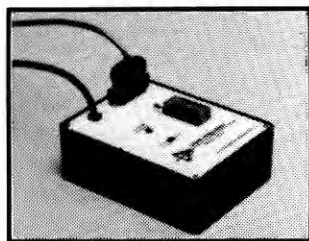
but you can set any value from one-256 bytes (0 = 256 bytes). The program will request drive number and filename. The file should already exist on the drive number requested. You can then read, write or end. You can switch between read and write by entering 999.

When you are finished be sure to End in order to close the file, and write end of file information (EOF) to the directory. You can examine information stored in the DCB buffer DC\$ (see TRSDOS manual for details) at any point by inserting the following subroutine:

```
FOR I = 1 TO 32: PRINT I;" ";ASC(MID$(DC$,I,1));:NEXT I
```

We have just highlighted some of the things you can do by accessing DOS I/O routines directly from Basic. You can insert these Basic subroutines in any program and they will provide you with substantially increased power, flexibility and speed in all your disk operations. ■

Model 953A EPROM PROGRAMMER



- Programs 2508, 2758, 2516, 2716, 2532 and 2732 five volt EPROMS.
- Complete - no personality modules to buy.
- Intelligent - microprocessor based, programs and verifies any or all bytes.
- RS-232 serial interface - use with computer or terminal.
- Verify erasure command - verifies that EPROM is erased.
- Extended diagnostics - error output distinguishes between a bad EPROM and one which needs erasing.
- May be used for extremely reliable data or program storage.
- All power on programming socket under processor control. LED warning light indicates when power is applied.
- Complete with Textool zero insertion force socket.
- High performance/cost ratio.
- Standard DB-25 I/O connector.

PRICE \$289



BAY TECHNICAL ASSOCIATES, inc.

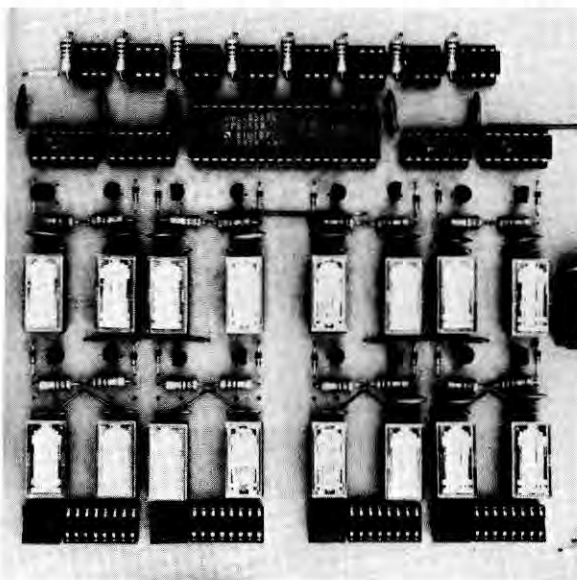
HWY. 603, P.O. BOX 387
BAY ST. LOUIS, MISSISSIPPI 39520
(601) 467-8231

✓243

EXPERIMENTERS HOBBIISTS

TRS-80* MODELS
I or III

"REAL WORLD" I/O CONTROLLER



DEALER INQUIRIES WELCOME

- CONNECTS DIRECTLY TO I/O BUS
- NO EXTERNAL LOGIC REQUIRED
- 24 TTL PROGRAMMABLE PORT BITS
- SOFTWARE CONTROLLED
- 3 MODES OF OPERATION FOR SINGLE OR BI-DIRECTIONAL CONTROL
- HANDSHAKING; INTERRUPTS; FOR ANY INTERFACE APPLICATIONS

**SOFTWARE INSTRUCTIONS INCLUDED
REQUIRES ONLY 5 VOLT POWER SUPPLY**

CARDS ARE STACKABLE TO PROVIDE HUNDREDS OF IN/OUT AUTOMATION FUNCTIONS.

AVAILABLE LOADED ONLY WITH CONTROLLER
AND BUFFERS FOR \$69.95

OR
COMPLETE WITH OPTO-ISOLATED INPUTS AND
HIGH QUALITY DPDT RELAY OUTS FOR \$199.95

ADD \$3.00 FOR SHIPPING/HANDLING.
CALIFORNIA RESIDENTS ADD 6% SALES TAX.



ORDER FACTORY DIRECT FROM:



ADVANCED COMMUNICATIONS SOFTWARE

3540 BALBOA STREET, #2
SAN FRANCISCO, CA 94121
(415) 668-0988

*TRS-80 Registered trademark of Tandy Corp.

✓525

Install the AXX3027 character generator chip.

A New Generation of Characters

Walter C. Park Sr.
4722 Robinwood Drive
Chattanooga, TN 37416

After reading John Burgan's "Lowercase Done Right" (*80 Microcomputing*, September 1981), I sent off to E.B. Garcia and Associates for an AXX3027 character generator chip. Because they no longer carried this item, I bit the bullet and ordered one from Radio Shack.

Here's the Procedure!

I received the AXX3027 character generator chip from the local Radio Shack store about a week after ordering. When I removed the plastic cover from my computer I found all 18 legs of the Z-29 solidly soldered in place on the PC board. Why couldn't it have been plugged in?

If you do not want to salvage this chip remove it by snipping

the IC leads at the body of Z-29 as close as possible.

Use a soldering iron with a small point and needle nose pliers to remove each lead. Then use a round toothpick to re-establish the lead holes by heating the feed-through points where the IC leads were. Push the toothpick through and twist it until it feels stuck. This lets you know the solder has hardened. You may want to sharpen the toothpick for maximum penetration. Use the soldering iron on the trace side of the board and the toothpick on the component side. A bright light under the board lets you see what you are doing.

Install the new character generator chip where the old one was. Touch up the top side with fresh solder where traces meet the pins. Check for trace solder balls and bridges with the same light behind the board.

If you are not experienced with PC board handling and IC removal find someone who is. If you are going to salvage the old chip, use an IC de-soldering iron. Solder wicks leave enough solder to rip up traces if you are

not careful. Support and handle the boards with care. If the strap connector from the keyboard to the main board is pulled loose it will be expensive to repair.

When you are removing the IC, too much iron heat can lift the traces. A 115 V wall plug-in iron can blow several ICs on the board if you are working on a metal desk. Battery irons are my first choice on any PC application for the home computer modifier. Work with a towel under the unit on a wood work table, use a PC board vise if you have one and stand on a rubber mat. Keep a 100 percent cotton rag handy to keep the soldering iron tip clean.

To Switch Or Not To Switch

John Burgan did not install an uppercase/lowercase control switch—I wondered why not.

I installed the Electric Pencil modification several years ago and had left the switch in lowercase on shut-down the night I finished installing the new character generator chip. When I powered-up the next day and was inputting some basic code I noticed I wasn't getting those

wierd hieroglyphics. Changing the switch from lowercase to uppercase and back gave no results.

It seems there are two sets of characters in this chip. If I call a graphic with the U/L switch in lowercase, for example PRINT CHR\$(191) (all pixels on), I get the graphics. I get uppercase without a driver and upper/lowercase with the driver.

I was running a basic coded program and noticed that it did not like lowercase code (the lowercase driver was active) input from the keyboard. My computer gives me uppercase characters, with the shift key. If the lowercase driver is inactive all is normal. This showed me I did not need the external switch with the AX3027 character generator IC.

Now I can edit quicker and scanning text is a pleasure with proper characters. Before, typographical and spelling errors would slip by because of high "a"s and descenders that did not descend. ■

Walter Park is a micro systems analyst and programmer as well as a technical writer.

The Key Box

Basic Level II
Model I

Newly Revised Mail List System. Even better than before!

PROVEN MONEY MAKERS FOR YOUR TRS-80*

*Tandy Corp. Trademark

FORM LETTER (Use alone or with the mail list system below) \$39.95

Create letters and store on disk. Just type in your letter continuously as you would with a typewriter and make corrections with almost unlimited use of the backspace key. What you see on the screen is **exactly** what you get in the printout...Then print the letters using your mailing list. You will be able to select continuous printing or cut sheet, paging, tabing, test printing, and optional printing on envelopes.

MAIL LIST SYSTEM (Model I or III disk only) \$89.95

Our easy-to-use system will accommodate almost any "custom" requirement of even your most demanding clients. A glance below will show that we are far ahead of any other system in speed, variety of features, and sheer volume of names handled...but don't let that fool you. This system can be used just as easily on one disk for a small Christmas card list.

- Maintain virtually an infinite number of disks all in continuous alph. or zip order...essential for large lists.
- Sort **2260** entries (2 full 40 track double density disks) in only 32K or an incredible **4640** entries (2 full 80 track double density disks) in only 48K!...Made possible with our unique date compression techniques on the Model III.
- Super fast sort by alph. or zip order (8 sec. for 1000 entries)...both orders can exist simultaneously on disk.
- High speed recovery of entries from disk...speed of sort is meaningless if retrieval from disk is slow...ours pulls in over 11 per sec!
- Transfers old files over to our system **LOOK!**
- In zip order all entries with same zip code are also arranged alphabetically.
- Four digit zips have a leading "0" appended on labels.
- Backup data disks are easily updated as entries are created, edited, or sorted...extremely useful!!
- Optional reversal of name about comma for that non-computer, personalized look.
- Permits telephone and/or account numbers.
- Master printouts of your list in several formats (not just a rehash of the labels) Optionally continuous or page oriented...Your customers will want this!
- Prints labels 1, 2, or 3 across.
- All 0's in address labels are replaced by easier to read O's.
- All labels optionally support an "Attn" line.
- Many user defined fields with plenty of options for **simultaneous** purging and selecting...even allows for inequalities...powerful and easy to use!!
- Continuous display of numbers of labels/envelopes printed.
- Each disk entry automatically "remembers" how many mailings have been made for that particular entry...Can be tied in with purge/select.
- Primarily written in BASIC for easy modification...embedded machine code for those speed sensitive areas.
- Editing is simple and fast...automatic search.
- Supports the 9 digit zip code.
- Deleted entries have "holes" on disk filled automatically...and alph. order is still maintained!
- Test label printing lets you make horizontal and vertical adjustments with ease.
- Optional "one time" mailing for some selected entries.
- Extensive use of error traps (both operator and machine induced)...even recovers from a power failure during a printout!...recycling on disk errors.
- Patch program allows you to upgrade the system to any DOS.
- Documentation manual available alone for \$4.95.
- Hardware requirements: 32K, printer, and 1 or 2 drives.

Provide your customers with a **CALENDAR \$9.95** printed calendar (along with standard banker's holidays) of any month of any year...Useful in motivating history students. Holds the same fascination for students as a game. Tape only for Model I or III.

Same features as Calendar **SUPER CALENDAR** Additionally prints our large "graphics" type wall calendars (tape only) **\$19.95** with memos under each day. Use as a planning calendar with optional disk storage...requires 16K and printer.

Football Scouting Report (Disk only) \$89.95

Charge local high schools and colleges up to \$1000 per season for these sophisticated reports. Documentation manual available alone for \$3.95.

TRY OUR ONE DAY PC BOARD SERVICE

Fast service and high quality at a reasonable price.

Tic-Tac-Toe For the kids (Tape only) \$9.95

Loan amortization schedules are a must for banks, S & L institutions, and accounting firms. You will be able to charge \$7 plus per schedule. Multiply that times the number of all loans your clients make per day...easiest money we know of!...runs in about 2 minutes and achieves pin point accuracy with a built in calendar...This sophisticated program produces an exceptionally professional looking printout.

Sign (Tape only) \$9.95

Produce large (reduced 50% here) attention getting signs with your printer...supports most keyboard characters...will print multiple lines...use alone or interface to your own BASIC program...requires just over 16K and a printer.

```

SSSSSSSS TTTT TTTT 00000000 PFFFFFFF LL 00000000 00000000 KK KK
SS SS TTTT TTTT 00 00 PP PP LL 00 00 00 00 KK KK
SS TTT 00 00 PP PP LL 00 00 00 00 KK KK
SSSSSSSS TTT 00 00 PFFFFFFF ===== LL 00 00 00 00 XXXX
SSSSSSSS TTT 00 00 PFFFFFFF LL 00 00 00 00 XXXX
SS SS TTT 00 00 PP LL 00 00 00 00 KK KK
SS SS TTT 00 00 PP LL 00 00 00 00 KK KK
SSSSSSSS TTT 00000000 PP LLLLLLLL 00000000 00000000 KK KK

```

FAST SORT

(handles multiple dim. arrays)

and ALPHABETIZER

(disk only) \$29.95

Interfaces to your own basic programs...sort with the speed of machine code but with the convenience of basic. Just use your disk to merge our short basic programs (with embedded machine code) with your own basic program. Follow our simple instructions to poke several values before making the user call from basic. The pokes will set up a sort of string, integer, single, or double precision arrays (also ascending or descending order). Use one of two programs to sort arrays of the form A(1) or A(Q(1)). The disk includes 8 simple basic programs that are ready to merge with the main sort programs. Use them for learning and evaluation. Also included is a ready to use basic program (already merged with the ORDER program). Use it to obtain a printout of alphabetized names. This program alone is worth \$19.95.

Sample Sort Times

8 sec. for 1000 dbl. prec. numbers...50 sec. for 5000 integers. (Ours is one of the only alphabetizers that both ignores non alph. characters and treats upper and lower case alike.)

✓ 63

Precision Prototypes

410 E. Roca
Refugio, Tx. 78377
(512-526-4758)

- Specify Model I or III when ordering
- Add \$2.00 for postage and handling

Visa
Mastercharge
C.O.D.

Test your memory—amaze your friends.

Computer Repeat

Randolph A. Fontenot
734 Choctaw Dr.
Opelousas, LA 70507

Your video flashes a continuous stream of random characters. You anticipate each letter and then a new one is added. A question mark appears and suddenly you are in control. You carefully type in a duplicate of the stream of letters you have just seen. The display clears and you discover you've mastered another level of skillfulness. You're winning Computer-Repeat!

Those of you familiar with a variety of hand-held electronic games will recognize the nature of this one. Computer-Repeat is designed to test your skill and

memory. The hand-held version has been popular with both children and adults for the past couple of years. But, why go out and pay \$20 or more when you can simulate this game on your TRS-80?

The program listing is only 29 lines and merits a little explanation.

Line Description

Lines 90-180 print the instructions for Computer-Repeat. The user is given the choice of seeing the instructions or starting the game.

Lines 190-200 get a skill level from the user and set the length of the winning sequence accordingly.

Line 210 initializes the screen for playing the game.

Line 220 starts the game.

Line 230 gets a random letter and adds it to the computer's sequence of letters.

Lines 240-290 print the computer's sequence one letter at a time. You are allowed sufficient time to see the letter before the next one is shown.

Lines 300-340 prompt the user to repeat the computer's sequence. The letters are accepted through an INKEY\$ routine hiding the letters the user is typing. This prevents the user from making associations between the positions of the letters.

Line 350 decides whether to continue play or to print a losing message.

Line 360 prints a winning message if the game has been

successfully completed.

Line 370 asks the user whether to start a new game or quit.

User Modifications

A few changes may add to your enjoyment of this game.

You can speed up the computer's speed sequence by changing line 260. Change the number 500 to any more suitable value. Increasing the value will increase the time between the appearance of the letters in the sequence.

Or, for a more interesting effect, change line 260 to

```
260 FOR X=1 TO 1000 STEP LEN(MYS):
NEXT X
```

This will begin printing the first few characters slowly, but will increase the speed greatly as the length of the computer's sequence grows.

To print both upper- and

```
10 *****
20 *** **
30 *** COMPUTER-REPEAT FOR LEVEL 2 TRS-80 **
40 *** BY RANDOLPH FONTENOT JAN 1981 **
50 *** 734 CHOCTAW DRIVE **
60 *** OPELOUSAS, LA 70570 **
70 *** **
80 *****
90 CLEAR150:INPUT"DO YOU WANT INSTRUCTIONS, Y/N";AS
100 IF AS<>"Y"THEN190
110 CLS:PRINT@16,"INSTRUCTIONS FOR COMPUTER-REPEAT":PRINT
120 PRINT" COMPUTER-REPEAT IS A GAME OF SKILL AND MEMORY. YOU WILL BE"
130 PRINT"SHOWN A SEQUENCE OF RANDOM LETTERS AT THE CENTER OF THE SCREEN."
140 PRINT"WHEN THE QUESTION MARK APPEARS, CAREFULLY REPEAT THE SEQUENCE"
150 PRINT"OF LETTERS."
160 PRINT" IT IS A REAL CHALLENGE TO WIN AT SKILL LEVEL 5! GOOD LUCK!":PRINT
170 INPUT"ARE YOU READY TO ACCEPT THE CHALLENGE OF COMPUTER-REPEAT, Y/N";AS:IF AS=
180 INPUT "PRESS <ENTER> WHEN READY";AS
190 INPUT"ENTER SKILL LEVEL, 1-5";SL:MY$=""
200 IF SL=1,N=4 ELSEIF SL=2,N=8 ELSEIF SL=3,N=16 ELSEIF SL=4,N=32 ELSEIF SL=5,N=64
210 CLS:PRINTCHR$(23):PRINT@16,"COMPUTER-REPEAT":PRINT@478,"=> <=="
220 FORI=1TON
230 L=RND(25)+65:MY$=MY$+CHR$(L)
240 FOR Z=1TO LEN(MYS)
250 PRINT@478,MID$(MY$,Z,1)
260 FORX=1TO500:NEXTX
270 PRINT@478," "
280 FORX=1TO500:NEXTX
290 NEXTZ
300 PRINT@478,"?":YOUR$=""
310 FORX=1TO LEN(MYS)
320 Y$=INKEY$:IFY$=""THEN320
330 YOUR$=YOUR$+Y$
340 NEXTX
350 IF MY$=YOUR$ THEN NEXTI ELSE CLS:PRINTCHR$(23):PRINT`448,"YOU LOSE AT SKILL LE
360 CLS:PRINTCHR$(23):PRINT@448,"YOU WIN AT SKILL LEVEL ";SL:PRINT"CONGRATULATION$
370 INPUT"PLAY AGAIN, Y/N";AS:IF AS="Y" THENGOTO190ELSE CLS:END
```

Program Listing

I	Counter
L	ASCII code of random letter
N	Length of winning sequence
SL	User's skill level
X	Counter
AS	Multi-purpose string variable
MY\$	Computer's sequence of letters
Y\$	Used to build user's sequence
YOUR\$	User's sequence of letters

Computer-Repeat Variable List

The Key Box

Basic Level II
Model I

For TRS-80 Models I and III

Introducing the Lowest Cost Hard Disk System Ever . . . Laredo's LS525.



\$1995*

5 million low cost bytes of on-line storage.

At \$1995.00 affordable hard disk storage is now within your reach.

The LS525 hard disk system is easier to use than your printer . . . just plug it in switch it on and your disk storage problems are over forever.

The LS525 gives you unheard-of speed and reliability. For starters we built a "mainframe like" controller that can detect disk surface defects and relocate the data to alternate tracks. Talking about speed the LS525 can access files 10 times faster than your floppy.

This coupled with proven "winchester" technology is what we mean by reliability and speed.

We also provide a user-friendly TRSDOS compatible operating system in which all of your existing soft-

ware can run on. It provides features that can make the LS525 look like one big 5M byte drive or four small 1.25M drives or whatever you like.

The LS525 is a compact (less than one half cubic foot) "color-keyed" package that will fit perfectly next to your TRS-80. So if your tired of seeing "Disk Space Full". . . .

. . . there's no excuse.



Call toll free and order yours now.

(800) 538-5137

Inside California call (408) 980-1888.

* Model I or III host adapter \$250 & LDOS \$160 extra, specify when ordering.

laredo systems inc.

. . .mass storage for personal computers.

Laredo Systems Inc. 2264 Calle De Luna, Santa Clara, California 95050

✓53 TRS-80 and TRSDOS are trademarks of Radio Shack a Tandy Co.



Computers & Gambling Products Magazine

SEND FOR FREE CATALOG

Beat Roulette with a Pocket Computer!

This booklet by Dr. Edward O. Thorp describes his little known work on Physical Prediction of Roulette. The man who made Las Vegas change the rules on BlackJack exposes Roulette's susceptibility to computers. **\$ 9.95**



Horse Race Handicapping!

Our biggest seller — Probability Handicapping Device-1 This is a comprehensive horse racing system for spotting overlays in thoroughbred sprint races. Easy entry of data from the racing form. A complete users manual takes you step by step through a sample race and explains overlay betting and money management. The user's manual contains a detailed tab run of a 100 consecutive race system workout showing an amazing \$1.50 returned for each \$1.00 wagered. (Note: this is not the same program as "Winning at the Races"). You may purchase the manual separately for \$7.95 and credit. **PHD-1 is now available for CP/M (Basic-80, M-Basic), PHD-1 User's Manual and cassette for: 16K Apple II Applesoft, 8K Ohio Scientific (specify 1P or 4P), 16K TRS-80 Model I or III \$29.95 Apple or TRS-80 Disk \$34.95 CP/M 8" Single Density Data Disk \$39.95**

DR. QUIRIN'S FAMOUS DISCOVERIES!

Win at the Races. This is the program using the algorithms from Dr. Quirin's book. Highly praised and endorsed by DR. QUIRIN, this program is the best available today. Screen edit data entry makes entering data a breeze. Dr. Quirin's par time adjustment routines are included. We warned you that the price would go up and it did. Order now because this price will go up again. **\$49.95**

Winning at the Races Cassette (32K TRS-80 or Apple) Disk \$49.95

Winning at the Races — the book by William Quirin Ph.D. This is the best computerized study of thoroughbred racing ever published. This 300 page hardbound book shows detailed studies of high impact value factors and includes Dr. Quirin's famous Par Times. **\$21.95**

A Tom Ainsie Winners Circle Book \$21.95

Beating the Races with a Computer by Steve Brecher. A good "How To" book on multiple regression techniques applied to Pari-Mutual handicapping. Some heavy math. **\$14.95**

Make checks payable to JOE COMPUTER — Phone orders and information: (213) 992-0514
Send to JOE COMPUTER, 22713 Ventura Blvd., Suite F, Woodland Hills, CA 91364
California residents add 6% sales tax.



CP/M is a trademark of Digital Research. TRS-80 is a trademark of Tandy Corp.

256

lowercase letters, change line 230 to

```
230 RANDOM:L1 = RND(2):L = RND(26)
:IF L1 = 1 THEN L = L + 64 ELSE L =
L + 96:MY$ = MY$ + CHR$(L)
```

To expand playing beyond the 64 letters of skill level five requires one of two possible changes. Either change the values assigned to the variable N in line 200 or add new skill levels to that line.

To add a new skill level make the following changes:

• Change Line 200 to:

```
200 IF SL = 1, N = 4 ELSE IF ELSE IF
SL = 2, N = 8 ELSE IF SL = 3, N = 16
SL = 4, N = 32 ELSE IF SL = 5, N = 64
ELSE IF SL = 6, N = 28 ELSE GOTO 190
```

Remember to end this line with ELSE GOTO 190. It is an error handling feature.

• Change the value of the bytes to be cleared in line 90. That value should be set slightly higher than twice the largest number set equal to N in line 200. Thus, using the above ex-

ample, you should clear about 275 bytes.

• Change line 190 to show the user the new range of skill levels:

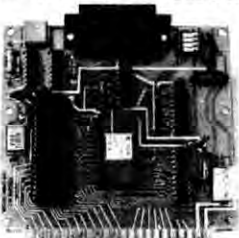
```
190 INPUT "ENTER SKILL LEVEL,
1-6":SL:MY$ = ""
```

Follow this same procedure to add additional skill levels.

My program does not require the user to retype the computer's sequence of letters within a certain time period. That is because the program uses the very efficient INKEY\$ function to get the sequence from the user. It is possible to add a timer within the keyboard scan loop, but I don't recommend it because the extra statements within the loop will cut down its efficiency. I will leave it up to you to find an efficient timer routine for lines 310-340.

Though this is a game, its underlying purpose is important. It will improve your memory skills and make you more familiar with your keyboard. So enjoy Computer-Repeat and have fun. ■

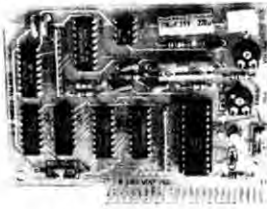
Z8 BASIC COMPUTER/CONTROLLER



As featured in
Byte Magazine, July and August 1981

- On board tiny BASIC Interpreter.
 - 2 on board parallel ports.
 - Serial I/O port
 - 6 interrupts.
 - Just attach a CRT terminal and immediately write control programs in BASIC.
 - BAUD RATES 110-9600 BPS.
 - Data and address buses available for 124K memory and I/O expansion.
 - 4K RAM, 2716 or 2732 EPROM operation.
 - Consumes only 1½ WATTS
- Z8 Basic Microcomputer/Controller Assembled & Tested \$195.00**
Complete Kit \$165.00
Universal Power Supply (+5, +12, & -12v) \$ 35.00
- Z8 is a trademark of Zilog Inc.

SWEET-TALKER. IT GIVES YOUR COMPUTER AN UNLIMITED VOCABULARY.



As Featured in
Byte Magazine, September 1981

- Utilizes VOTRAX SC-01A speech synthesizer chip.
- Unlimited vocabulary.
- Contains 64 different phonemes which are accessed by an 8-bit code.
- Text is automatically translated into electrically synthesized speech.
- Parallel port driven or Plug-in compatible with APPLE II.
- On board audio amplifier.
- Sample Program for APPLE II on cassette

SWEET-TALKER Assembled and Tested Parallel Port Circuit Card \$139
APPLE II Plug-in Card \$149

VOTRAX is a trademark of Federal Screw Works

DISK-80 EXPANSION INTERFACE FOR THE TRS-80 MODEL I



As Featured in
Byte Magazine, March 1981

- Disk controller (4 drives)
- Hardware data separator
- Buffered TRS-bus connector
- Real-time clock
- Printer port (optional)

DISK 80-ASSEMBLED & TESTED with 32K RAM \$329.95
Centronics Printer Port add \$ 50.00
DISK-80 pc board \$ 48.00
Printer/Power Supply pc board \$ 16.00
Complete Kit with 32K RAM and Printer Port \$275.00

TRS-80 is trademark of Tandy Corp.

To Order: Call Toll Free - 1-800-645-3479
(In N.Y. State Call: 1-516-374-6793)
For Information Call: 1-516-374-6793

MICROMINT INC.
917 Midway
Woodmere, N.Y. 11598



117

PROFESSIONAL



INCOME TAX SYSTEM

FOR TRS-80* MODEL I, II or III

For four successive years!

Our system, running on the magnificent line of TRS-80 computers, has prepared thousands of lightning-fast, error-free tax returns a day in accounting offices nationwide.

Now we introduce!

SYSTEM THREE!

SYSTEM THREE is an improved, still more interactive version — Totals W-2's and computes FICA overpayment — Includes "QWIKTAX," a fast tax calculator for tax planning — Has automated Client Billing — More!

And, as always—

1. Full interactive user control, in tax-form language only, line-by-line.
2. Screen display of full 1040 and all schedules, prior to printout.
3. All formats IRS and State approved.
4. Schedule amounts automatically entered on Form 1040.
5. Your Preparer's Information automatically printed at bottom of Page 2, Form 1040.
6. Built-in Validation Check tests entire system, hardware and software.
7. Special printer adjustment routines: Margin Offset, Text Position, etc.
8. Fills in pre-printed forms (we supply) or use overlays. Your choice.
9. AUTOMATICALLY COMPUTES: Tax — Earned Income Credit — Maximum/Minimum Tax — Least Tax Method — All Percentage of Income Limitations — All Fixed Limitations.
DOES INCOME AVERAGING IN EIGHT SECONDS!
10. Full support through the tax season, no charge.
11. Inexpensive yearly updates in accordance with tax-law changes.

SYSTEM THREE comes in four modules. You select the ones you need. There is no system like it, for any computer, and the cost is literally nothing. In one season, our users have paid, out of savings, for the software **and the computer**.

35-page Descriptive Manual - \$7.50

(Refundable on order)

MINIMUM SYSTEM REQUIRED: Model I, 48K, 1 Disk Drive

CONTRACT SERVICES ASSOCIATES ⁶⁸
706 SOUTH EUCLID • ANAHEIM, CA 92802 • TELEPHONE: (714) 635-4055

*TRS-80 is a trademark of Tandy Corp.

Store machine-language routines as string variables in Basic programs.

Memory Size?

Hugo T. Jackson
3446 Nairn Avenue
Vancouver, British Columbia
Canada V5S 4B5

If I discover once more that after having loaded a five-minute tape that I must reload it because I neglected to set the correct memory size, I might easily throw my keyboard at the wall. Deciding that there must be a better way, I discovered how to utilize machine language programs in Basic programs without using two tapes or even worrying about setting memory size.

Storing Machine Language Programs

The secret to this pocket miracle is to store the machine language routine as a string array and then jump to the actual location of the address in the array to execute the program. Thankfully there are only a few points you have to watch in order to avoid all your variables falling over each other.

First, let me explain how to store machine language programs as string arrays. For an example, let's use one of the sound modules (Program Listing 1) that Dennis Kitsz provided in his Babybeep article (April 1980, *80 Microcomputing*). Fig. 1 is the hexadecimal values converted to decimal; this conversion is essential because Level II Basic can utilize decimal numbers only. Program Listing 2 illustrates how the data is formed into a string by defining each

byte of data with the CHR\$() function.

Initially, you may feel that in order to define this string you are committed to a rather substantial memory allotment; remember that Basic stores all its resident commands as a single byte. So although "CHR\$()" uses five screen locations, it is only occupying one byte in memory. Even though an additional two bytes of memory is still required for each machine command (one for the closing parenthesis and one for the plus sign) it is a small price to pay for the convenience.

As the input buffer in the computer's memory can only accommodate 255 characters, in this example it was necessary to use two program lines to fully construct the array. (You can use as many lines as you need as long as you don't exceed the maximum string length, but we will cover that later.) We must add together the string of data we already have formed in line 110 with the remaining data in line 120 by stipulating that A\$ is equal to what A\$ is already, as well as the additional data that follows. You are probably

familiar with how this works from alphabetic string use; if the first line of a program says A\$ = Fish and the next line says A\$ = A\$ + And Chips then A\$ will now equal Fish And Chips.

Ignorance Is Bliss

Try typing in the two lines in Program Listing 2, run it and then type PRINT A\$. Even though the traditional use for strings is the storage of alphanumeric data, the computer cannot tell what is and what isn't. What you see on the screen is the TRS-80's rather futile attempt to display a machine language program.

We use the machine language program via the VARPTR function, which identifies the actual memory location of any variable in a Basic program. Program Listing 3 shows exactly how we extract the required address location information and pass this to the USR function of Level II Basic, which requires that the least and most significant bytes of the routine's location be POKEd into locations 16526 and 16527 respectively.

After that's done it is a simple matter of calling the USR sub-

routine. The program then determines the current location of A\$ (which now holds our complete machine language program) and then it jumps to that location (Program Listing 4). Note that you have to use the Clear function to reserve enough room in memory for your string requirements. Load and run it. To hear the program load you must plug the microphone jack from the computer into an external amplifier or put your tape recorder in the record mode and plug an earphone or speaker into the earphone plug.

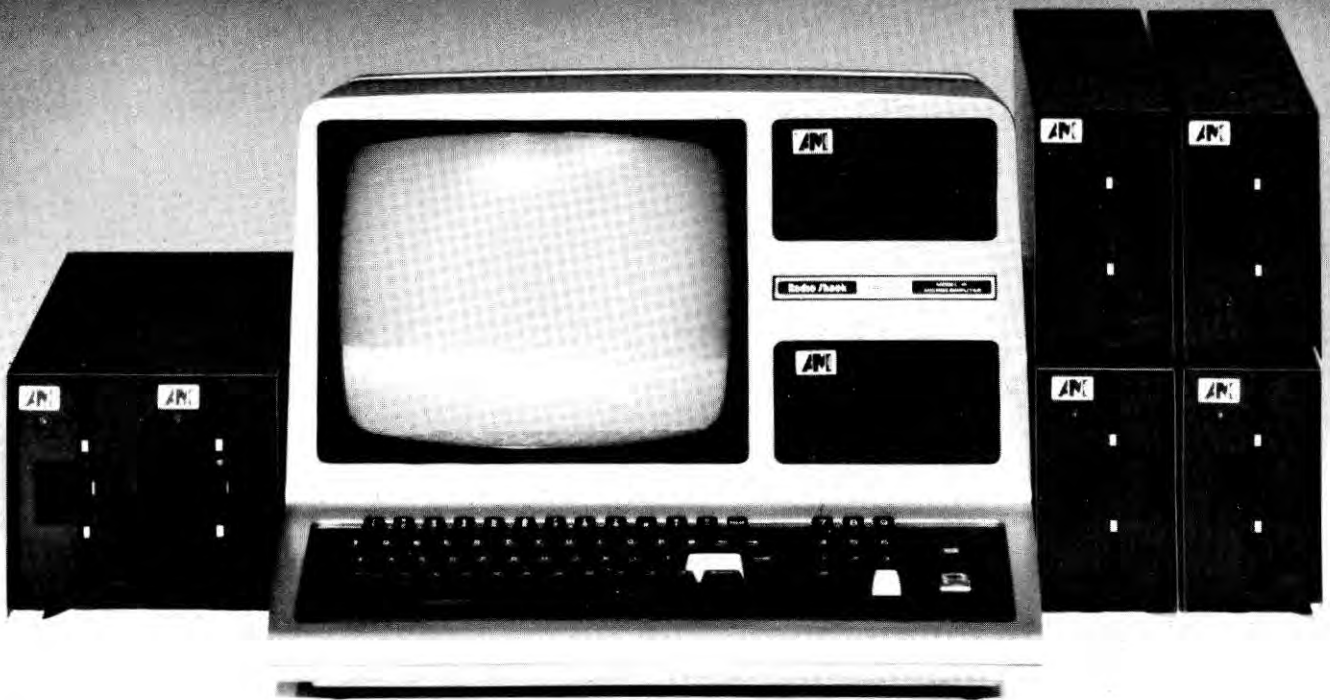
Now that you understand the procedure, I want to underline some important points: Although you needn't dimension the array at the very beginning of your program, you must dimension it before you execute the subroutine it carries.

When transferring the address of the array to the USR function (as in Program Listing 3), you must not dimension any new arrays until after you have returned from execution of the machine language subroutine. That goes for redefinition of existing arrays as well. The reason for this is that the Basic interpreter constantly shifts the location of variables around in memory. Redefining an existing array may well result in the machine language subroutine being relocated in memory. If that happens after you have identified the location of the program and transferred this address to the USR function, invoking the USR call could well put you into a no-man's land of program bugs and crashes. So if

HEX VALUE:	0E	08	06	00	3A	30	40	E6	F0
DECIMAL VALUE:	14	08	06	192	58	61	64	230	253
	05	92	03	FF	D6	02	D3	FF	05
	198	02	011	255	214	02	211	255	197
	10	FE	01	10	F2	00	79	F6	00
	16	234	193	16	242	13	121	246	00
	20	EA	09						
	32	234	201						

Fig. 1. Hexadecimal to Decimal

BORN TO RUN



Get your TRS-80™ up and running with special system and disk drive values like these . . .

Complete TRS-80 Model III microcomputer system with disk drives

A.M. Electronics Model III with 48K RAM, two Tandon 40-track double-density disk drives, A.M. Electronics controller board, DOS & manuals, complete and ready to run! \$1,895.00

Price includes shipping anywhere in Continental U.S.

A.M. Electronics "Multiplier"

Tired of unreliable double density operation? With *Multiplier* you can upgrade from single-density without doubling your problems \$99.95

Memory Chips

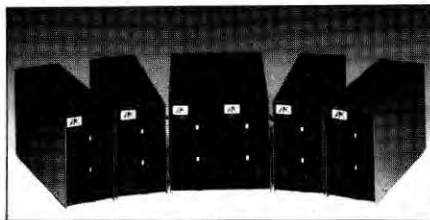
16K 200 nanosecond RAM chips \$2.00 each

New! Teac double-head 40-track disk drive

Complete with power supply, case and extender cables \$340

Teac or Tandon disk drives, complete with power supply, case & extender cables

40-track single side disk drive \$250
80-track single side disk drive \$340



TRS-80 Model III Commented

The definitive guide book to Model III ROM \$15.00

Coming Soon: 8-user work station versatility and hard disk drive for TRS-80 Model II.

A.M. Electronics business software systems put your TRS-80 to work for you

Manufacturing Inventory Control. Six-programs-in-one, for complete control of raw materials from ordering to after-production disbursement \$299.95

Dealer/Service Center Record Package. Includes flexible, modular units for auto dealers, mechanics, TV repair centers, electronic technicians & appliance repair centers \$199.95

A.M. Host. Allows your TRS-80 Model III to be run remotely via telephone \$29.95

Inventory Control System. For complete control over a virtually unlimited amount of inventoried items. Completely menu-driven \$199.95

All software compatible with Model I or Model III. Each package includes comprehensive, easy-to-follow documentation and support materials.



A.M. ELECTRONICS, INC.

New Ann Arbor Address: 3446 Washtenaw Ave. 48104. (313) 973-2312. Open M-F 10-6, Sat. 10-5

Fowlerville*: 111 North Grand, Box 1071. 48836. (517) 223-7281.

Attention Dealers, OEM's & Distributors: Call us for details on our attractive pricing.



*Authorized Radio Shack Dealer. ™TRS-80 trademark Tandy Corp. Prices subject to change without notice.

✓ 38



Model II & Model 16 users:

ANNOUNCING

two/sixteen magazine

You've been ignored long enough! The time has come for a magazine tailored to your special needs as a Model II user. Advent of the Model 16 will increase demand for coverage of matters specific to our very versatile micros. **two/sixteen** will discuss topics of interest to all II/16 owners, from the casual to the advanced user. Articles will be slanted toward the business, professional, and scientific community (but we'll lapse into games and other diversions from time to time). You will see features about networking, CP/M vs. TRSDOS, deciding on hard disk, patching an Epson's power into WordStar, multi-user processing on the 16, and adding the Model 16 enhancement to your Model II. As a non-dealer subscriber, you can place low-cost classified ads. **two/sixteen** is not affiliated with Tandy Corporation.

Charter subscriptions are now available starting with the May-June, 1982 issue. \$30 annually in the U.S. Foreign subscribers inquire for rates. Phone orders accepted at (717) 393-1917 (VISA and MasterCard). Send mail orders to **two/sixteen magazine**, 216 1/2 West James St., Lancaster, PA 17603.

522

FIRST EXECUTABLE BYTE

HEX VALUE:	21	34	23	FA	0E	02	3A	3E	28	02	FE	...
BYTE NO.:	0	1	2	3	4	5	6	7	8	9	10	

Fig. 2. Transfer of Program Execution

	LOCATION OF CALL COMMAND										DUMMY ADDRESS	
	LSB OF DESTINATION ADDRESS					MSB OF DESTINATION ADDRESS					JUMP TO HERE	
HEX VALUE:	3E	0D	00	00	FE	0A	84	...	42	53	21	12
BYTE NO.:	0	1	2	3	4	5	6	...	56	57	58	59

Fig. 3. Non-relative Jumps

Original Code:

HEX VALUE:	3A	40	32	...	48	32	3E	06	4A	AE
BYTE NO.:	0	1	2	...	251	252	253	254	255	256

Separate Code:

HEX VALUE:	3A	40	32	...	48	32	F	03	00	00
BYTE NO.:	0	1	2	...	251	252		253	254	255

add unconditional jump command

HEX VALUE:	3E	06	4A	AE
BYTE NO.:	0	1	2	3

new byte sequence

Figure 4

ACTION GAMES

The fastest growing producer of computer games for your 6809 has the products you have waited for!!

NEW! ARCADE GAMES FOR THE COLOR COMPUTER
CAVE HUNTER COLOR **BERSERK**

Fast paced action • Super Hi-Res Graphics
 Dynamite sound effects • Runs in 16K of memory
 These games will astonish you with their Detail and Quality.
 They set a standard for others to follow.

— ADVENTURES —

Calixto Island • The Black Sanctum

Highly acclaimed by reviewers • Challenging situations
 Fast, efficient machine language • Runs in 16K of memory
 Save game in progress

Adventures on 5 1/4 TSC FLEX disc (specify 6800 or 6809)	ea \$24.95
Both adventures on single disc	\$39.95
Adventures for color computer	ea \$19.95
Color Berserk for color computer	ea \$24.95
Cave Hunter for color computer	ea \$24.95

Shipped prepaid in continental U.S. California residents, please add 6% tax



— MORE COMING SOON —



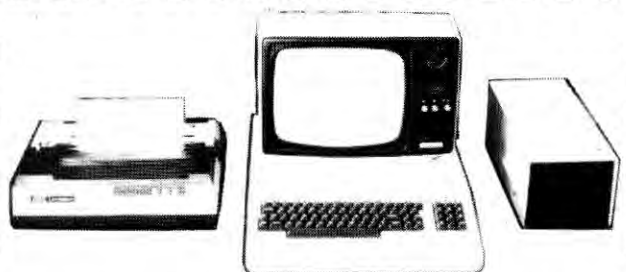
241

MARK DATA PRODUCTS

23802 Barquilla, Mission Viejo, CA 92691 • (714) 768-1551

TRS 80 IS A TRADEMARK OF TANDY CORP.

LNW80 COMPUTERS



• IN STOCK NOW!! CALL FOR SPECIAL PRICES ON LNW80s, NEC PRINTERS, RGB COLOR MONITORS, AND TANDON DISK SYSTEMS.

• ***** NEW LNW SOFTWARE! *****

EXCELLONIX

7180 WOODROW WILSON DR
 LOS ANGELES, CA 90068

• (213) 650-5754 - (714) 973-1939

at all possible, and there will be exceptions, keep the address transfer and the USR call as close together as possible.

Going Further

As mentioned previously, the

Basic interpreter takes care of ensuring enough space for our machine language program through its regular housekeeping chores. It does this by moving our array around in memory to accommodate the changes in

the length of other arrays and variables in other parts of our Basic program. However, this can be the source of many problems if we aren't careful about the type of commands we use in our machine language subroutines. The above method for storing machine programs as strings works only if the proposed machine language subroutine you want to use meets all of the following requirements:

storage of data, i.e., its length will not change.

There are ways, however, of getting around all of the above restrictions, so let's tear down the walls one by one. Things may get a little confusing for those of you without Assembly or machine language programming experience. If you are unfamiliar with machine code it would be wise to stick with programs that meet the above criteria.

First Things First

If for some reason execution of your machine program cannot start with the first byte, you merely have to calculate the offset and add this to the address you will be transferring to the USR

- The first executable instruction is the first character of the array.

- It uses only relative jumps.
- It uses no subroutines.
- It is less than 255 bytes long.
- It has no requirements for

```

00100 *****
00110 ;
00120 ; FIRST MODULE: RISING GLISSANDO
00130 ; FROM "BABYBEEP"
00140 ; BY DENNIS KITSZ
00150 ;
00160 ; FROM 80 MICROCOMPUTING MAGAZINE
00170 ; APRIL 1982
00180 ;
00190 *****
0000 00200 ORG 0000H ;CODE IS RELOCATABLE
0000 0E08 00210 LD C,00H ;NUMBER OF ZIPS
0002 06C8 00220 LD B,00H ;SPEED AND FREQUENCY
0004 3A3D40 00230 LD A,(4000H) ;GET CASSETTE STATUS BYTE
0007 E6FD 00240 AND 0FDH ;SAVE MOTOR STATUS
0009 C602 00250 ADD A,02H ;ADD TONE VALUE
000B D3FF 00260 OUT (0FFH),A ;OUTPUT TO CASSETTE PORT
000D D602 00270 SUB 02H ;ADJUST TONE VALUE
000F D3FF 00280 OUT (0FFH),A ;OUTPUT TO CASSETTE PORT
0011 C5 00290 PUSH BC ;SAVE REGISTER PAIR
0012 10FE 00300 DJNZ #-00H ;COUNT OFF FREQUENCY
0014 C1 00310 POP BC ;RESTORE REGISTER PAIR
0015 10F2 00320 DJNZ #-00H ;REPEAT IF NOT ZERO
0017 0D 00330 DEC C ;DECREMENT ZIP COUNT
0018 79 00340 LD A,C ;TEST FOR ZIP COUNT
0019 F600 00350 OR 00H ;IF IT IS NOT ZERO
001B 20EA 00360 JR NZ,$-14H ;THEN REPEAT SEQUENCE
001D C9 00370 RET ;RETURN TO BASIC
0000 00380 END
00000 TOTAL ERRORS

```

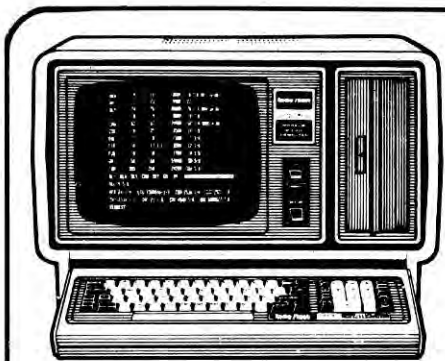
=====
Program Listing 1. Babybeep Sound Module

```

100 CLEAR 80
110 A$=CHR$(14)+CHR$(8)+CHR$(6)+CHR$(192)+CHR$(58)+CHR$(61)+
CHR$(64)+CHR$(230)+CHR$(253)+CHR$(198)+CHR$(2)+
CHR$(211)+CHR$(255)+CHR$(214)+CHR$(2)+CHR$(211)+
CHR$(255)+CHR$(197)+CHR$(16)MK$CHR$(254)
120 A$=A$+CHR$(193)+CHR$(16)+CHR$(242)+CHR$(13)+CHR$(121)+
CHR$(246)+CHR$(0)+CHR$(32)+CHR$(234)+CHR$(201)

```

=====
Program Listing 2. Data Strings



DISCOUNT TRS-80[®] Computers

We have the Largest Inventory in the Central United States. Discount prices on all software and accessories for your TRS-80 computer needs.

Model II
 26-4002
\$3288⁰⁰
 8 Megabyte
Hard Disk
 (Primary)
 26-4150.
\$3994⁰⁰

BUY DIRECT
Toll Free Order:
1-800-835-9056
 Kansas Residents:
 1-800-362-9091

- ★ No out of state Taxes
- ★ Immediate Shipment
- ★ Several Payment Methods
- ★ Direct Buying

Jimscot, Inc. 254

P.O. Box 607 - 1023 N. Kansas
 Liberal, Ks. 67901

**WRITE TODAY FOR YOUR
 FREE CATALOG!**

* TRS-80 is a Registered Trademark of Tandy Corporation

ComSoft

MEANS BUSINESS

Hardware and Software

Products for the TRS 80®
Models I & III

DBM 5

A Data Base For All Seasons
The File Clerk
for the
TRS-80® Models I & III

VERSION 5.5 SPECIFICATIONS:

- A multi-feature file manager
- Plus a simple data base (multi-file data sets)
- Up to 20 user defined fields
- File handling capacity for up to 12000 records
- Files extend across multiple diskettes
- Automatic DISK MOUNT requests
- Assembly language sorts on single and combined data fields
- Multiple search/changed parameters
- Fast (KSAM) record retrieval on sorted keys
- Flexible REPORT GENERATOR
- User titles and pagination
- Computed Fields
- 140-page MANUAL

DBM5 provides three data management features:

- A comprehensive file manager for defining your records, data entry or edit, and general record retrieval
- A flexible report generator for information retrieval
- A simple data base is provided for more advanced applications, where data sets involving file pairs can be defined

PRICES:

#DB-5I \$99 (MOD I)
#DB-5II \$99 (MOD III)

AMS1.0

Apartment Management System

Efficient Property Management
General Ledger Compatibility

PRODUCT BRIEF:

Written by a CAP for his own property management company, this menu driven system provides a practical, proven method for efficiently managing rental property

REPORTS

- LATE RENTS Lists tenants, apt #, amount of rent due, date rent was due, number of days late, payments on account
- VACANT APARTMENTS List apts, description of unit, date vacated, number of days vacant
- SCHEDULE OF RENTS Lists tenants, names (up to 4 per apt), type of unit, amount of rent and other charges, and the last month rent was paid
- SECURITY DEPOSITS held by apartment
- LEASE EXPIRATIONS of all units in order of expiration
- RENT INCREASES lists date of last increase plus current information
- ALPHABETICAL listing of all tenants in building
- MAILING LABELS for all tenants

This apartment management system is a complete package designed to promote ease of management. The reports listed can be run at any time so there is no delay on checking tenants or obtaining any other information desired.

Requires Model III and 132 column printer
Maintains up to 300 UNITS per diskette

PRICES

#AMS-II \$395
Manual Only \$30

VIEW \$29.00

A SCREEN FORMATER FOR DBMS

- Full CURSOR control
- Protected fields
- User form DESIGN
- File data entry, inquiry & edit
- Elegant & professional look
- Flashing messages
- Creates formal and random data files for DBMS
- Includes DBM5 last (KSAM) master key
- View is a compiled basic program
- Basic source code is included

TRS-80 is a Tm of Radio Shack, Tandy Corp.
NEWDOS80 is a Tm of Apparat, Inc.
TRS232 is a Tm of Small System Software Co.



203 Arden Street
Glendale, California 91203
(213) 649-0369

✓104



SERIAL I/O MPR-232

AT LAST! A serial input/output interface designed for connection to the TRS80 Model I with or without an expansion interface

MPR2321 Specifications

- Glitch free operation
- Connects with card edge connector
- Baud rates 75-19,200 are switch selectable
- Integral Power Supply included!
- May be daisy chained with other MPR 232s

The MPR 2321 is compatible with Model I software including TSHARE. Specify Model I or III.

PRICES:

#MPR2321
Assembled and Tested \$129.00 (MOD I)
PC Board Only \$29.00 (MOD I)
#MPR2321II
Assembled and Tested \$139.00 (MOD III)
PC Board Only \$29.00 (MOD III)

CSTOCK \$79.00

- CSTOCK maintains a securities data base
- Maintains data on up to 3 stock market indexes
- Weekly Stock Data (Price, Vol, P/E, and Yield)
- Weekly Stock Option Data (Near, mid, and Far)

- Two years of continuous data per stock
- CSTOCK is a professional technical analysis tool
- Stock and market averages, highs, and lows with respect to any time span
- Linear regression analysis of stock behavior versus any of 3 market indexes
- Short term betas computed (stock volatility in terms of market return)
- Data plotting capabilities for stocks and options

- CSTOCK provides a parametric portfolio selection system as an aid in evaluating investment strategies in relation to risk.

TSHARE 2.0 MULTI-USER

SYSTEM TRS-80®



MODELS I & III

SPECIFICATIONS:

TSHARE is a multi-tasking operating system for two users. It patches itself to your NEWDOS or TRSDOS SYSTEM. TSHARE allows simultaneous and separate operations for two users within a single computer.

AVAILABLE USER MEMORY ABOVE 7F80 HEX

- 32K TRS-80 16K FREE
- 48K TRS-80 32K FREE

TIMESHARING MODES:

- SIMPLEX MODE With TSHARE 1.3 and 2A Only
- STANDARD MODE With All Systems

SUPPORT EQUIPMENT:

- One + Disk Drive
- 32K + Memory
- SIMPLEX MODE
 - A Printer
 - Small System Software 5
 - TRS232 Interface (optional)
- STANDARD MODE
 - A Terminal
 - Radio Shack's RS 232 or Micro Project's MPR-232

EXECUTION SPEED STANDARD MODE:

- (Without Clock Speedup Mods)
- BENCHMARK executed by 2 simultaneous users 37 sec
- BENCHMARK executed once by standard TRS-80 14 sec

FEATURES:

- Type-ahead during Disk I/O (V2 0 Only)
- Communications between users
- Concurrent execution of single program
- Foreground/background task design
- Address up to two printers

PRICES:

#TS-13 for TRSDOS 2.3 \$89 (MOD I)
#TS-13 for NEWDOS 2.1 \$89 (MOD I)
#TS-2A for NEWDOS V1 \$99 (MOD I)
#TS-2B for NEWDOS V2 \$99 (MOD I)
#TS-2BIII for NEWDOS V2 \$99 (MOD III)

function. Fig. 2 shows a hypothetical example of a machine language program that begins execution with the sixth byte. Program Listing 5 shows how to translate this requirement and pass the correct starting address to the USR function. This approach is quite useful for machine language subroutines that have a number of entry points.

If your subroutine has an absolute jump, necessitated by a subroutine call or something of that nature, you must adjust the relevant address bytes in the routine before you execute it. Fig. 3 indicates the offender (an unconditional subroutine call) and the address bytes that follow. You may use any address value here as it serves only as a dummy address that is changed by the Basic program. Fig. 3 also indicates where the program is supposed to branch with the subroutine call in order to effect proper program flow.

Program Listing 6 sorts everything out. Variable C1 is the starting address of the machine language program added to the byte number of the least significant byte in the call instruction.

When calculating byte numbers always start the count at zero. The variable D1 is a calculation of the exact destination address of the subroutine call and is calculated by taking the machine language program's address value and adding to it the byte number of the first byte of the subroutine (in this case 56). This address is broken down into a two-byte composite address (line 140) and POKEd into the locations immediately following the subroutine call, replacing the dummy address we had installed previously.

If your program is 256 bytes long, Fig. 4 is an illustration of a 259-byte program. The first thing that must be done with an over-size program is to break it up into lengths that are no longer than 252 bytes each, because Level II Basic restricts strings to a length of 255 characters and you must put an unconditional jump at the end of each string in order to redirect the program flow to the next string where the remainder of the program is found. As it takes three bytes for an unconditional jump, this brings you to the maximum al-

```
130 POKE 16526,PEEK(UARPTR(A#)+1)
140 POKE 16527,PEEK(UARPTR(A#)+2)
```

Program Listing 3. Transfer the string address to USR

```
100 CLEAR 80
110 A#=(CHR$(14)+CHR$(8)+CHR$(6)+CHR$(192)+CHR$(58)+CHR$(61)+
CHR$(64)+CHR$(238)+CHR$(253)+CHR$(198)+CHR$(2)+
CHR$(211)+CHR$(255)+CHR$(214)+CHR$(2)+CHR$(211)+
CHR$(255)+CHR$(197)+CHR$(16)+CHR$(254)+
CHR$(193)+CHR$(16)+CHR$(242)+CHR$(15)+CHR$(121))
120 A#=(A#+CHR$(193)+CHR$(16)+CHR$(242)+CHR$(13)+CHR$(121)+
CHR$(246)+CHR$(8)+CHR$(32)+CHR$(234)+CHR$(201))
130 POKE 16526,PEEK(UARPTR(A#)+1)
140 POKE 16527,PEEK(UARPTR(A#)+2)
150 A=USR(A)
160 GOTO 150
```

Program Listing 4. Basic Program

```
100 B1=PEEK(UARPTR(A#)+1)
110 B1=B1+(PEEK(UARPTR(A#)+2)+256)
120 B1=B1+6 -- byte number of first executable byte
130 B2=FIX(B1/256)
140 POKE 16526,B1-(B2+256)
150 POKE 16527,B2
```

Program Listing 5

6 ways to give your TRS-80* a

+ PLUS

Exhaustive research and professional standards bring you the best in business software.

EASYTRAK™

KEEP YOUR SALES CURVING UPWARD WITH EASYTRAK™, a powerful, all-purpose activity tracking system. (User-specified options enable you to monitor sales activity by territory, product line, salesman, or by combinations. Can monitor inquiries, sales calls and order booking. Production activity (by shift, by product, by day, by team, etc.), spending or income activity are simple to set up with EASYTRAK™. Extensive video displays make available individual, group or total summaries, relative averages, and percentage data all at the touch of a button. Use of an 80-column printer is optional.



MODEL III \$125
MODEL II \$150

+ ACCOUNTS RECEIVABLE

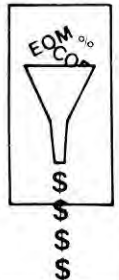
PUT MORE CASH IN YOUR BANK ACCOUNT with +Account Receivable's many collection/credit features, including average payment days, aging schedule and statements. Open-item system records sales activity this year and last, optional automatic discounts and salesman assignment. Cash receipts and A/R adjustments feature extensive on-line validation. And, yes, +Accounts Receivable handles the pesky new 9-digit zip code. Other optional features include service charges to selective customers; partial and "on-account" payments. Posts, at your option, to +General Ledger.



MODEL III \$325
MODEL II \$350

+ ACCOUNTS PAYABLE

FUNNEL THAT STACK OF BILLS into +Accounts Payable system and create an orderly, manageable flow of vendor histories, cash requirements forecasts, check registers and checks, aging schedules, etc. Will accept manual checks, reversals, and adjustments. Pay by selected vendor, invoice, due date, discount dates, and optionally post directly to your +General Ledger. Supports 5-digit vendor numbers.



MODEL III \$325
MODEL II \$350

+ GENERAL LEDGER

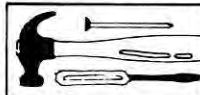
SLICE OUT MORE PROFIT by using +General Ledger to monitor your financial status. Features include fully-flexible financial statements, both budget and last year comparisons, special report options, monthly and quarterly trial balances, manual and/or automatic journal entries all with extensive audit trails. You structure the chart of accounts with up to 5 digit account numbers.



MODEL III \$325
MODEL II \$350

+ FIXED ASSETS

A POWERFUL SET OF TOOLS TO CALCULATE and monitor fixed asset expenditures, book and tax depreciation, investment tax credit, etc. Will even forecast future depreciation for you. (Handy at budget time!) Code structure enables you to classify assets by departments, buildings, groups or other categories. Handles seven depreciation methods. Can post to +General Ledger for you.



MODEL III \$325
MODEL II \$350

+ PAYROLL

KEEP YOUR EMPLOYEES HAPPY and smiling with prompt, accurate and professional payroll records. Will handle weekly, biweekly, semimonthly, monthly payrolls, produce checks, check registers, labor reports, earnings reports, Form 941's, W2's, etc. Can handle fixed, voluntary deductions, hourly/salary employees, bonuses, city and state taxes, etc. Easy to use and update tax tables. Automatic +General Ledger posting.



MODEL III \$325
MODEL II \$350

SPECIAL! All of the above: MODEL III \$1600. MODEL II \$1750.

+PLUS SOFTWARE comes to you feature-packed from on-line validation to machine-language file handling. Extensive documentation and thorough installation guide accompany each order. All systems are furnished on disc. Source code is included. Texas residents add 5% sales tax.



+ PLUS

PLUS COMPUTER TECHNOLOGY, INC.
8900 N. AUSTIN AVENUE
CHICAGO, IL 60648 (312) 647-0988

Dealer inquiries invited

*TRS-80 is a registered trademark of Tandy Corp
EASYTRAK is a trademark of Plus Computer Tech Inc

SCRIPPLUS 3.0

Scriplus is a modification to Scripsit[®] which enables you to take advantage of the special functions, features, and print formats of your printer while your document is being printed. Allows you to:

change expanded print
change no. of characters per inch
or underline in mid-line!

- 1) Send commands to the printer to activate special formats!
- 2) SCRIPPLUS will NOT crash programs protected in hi-mem!
- 3) "END" returns to DOS READY instead of re-booting!
- 4) Initial line feed is changed to a carriage return to empty text buffer!
- 5) The use gets an ALPHABETIZED Directory (with FREE space shown) from within SCRIPPLUS!
- 6) Optionally select line feed after carriage return
- 7) Supports custom printer drivers (NOT included)
- 8) Modifies ALL versions of SCRIPSIT(tm) for Mod I or III. Allows you to use Mod I version on Mod III!
- 9) Printer can be STOPPED for insertion of text or forms alignment!
- 10) Inserted text can be edited prior to resumption of printing!
- 11) Files can be killed, loaded, merged, or chained from the SCRIPPLUS DIRectory!
- 12) Allows Mod III versions to be BACKED UP for your protection!
- 13) Works on ALL current major DOS's (Mod I or III)
- 14) Works with new 3.2 Mod III Scripsit on 1.3 DOS!
- 15) Specifically written for the MX-80, but will work with ANY printer that accepts CHR\$ codes for control!
- 16) Previous owners may send in their disks for upgrade (\$15)

POWERSOFT

GREAT for EPSON's! With or without GRATRAX-80(tm) v61

11500 Stemmons Expressway - Dallas, Texas 75229

M/C-VISA CARDS Accepted	(214)484-2976 -- MicroNet# 70130,203 Join OUR Xtra-80 Sig ON MicroNet! From the "OK" prompt, type: R QSD	Write for our FREE Catalog!
-------------------------------	--	-----------------------------------

DEALER INQUIRIES INVITED

US/CANADA Orders ADD \$5 Shipping/Handling See us at NCC in Dallas! April 21-25! PowerSoft is a division of Breeze/QSD, Inc. SCRIPSIT is a registered TM of TANDY CORP.	FOREIGN add \$10 U.S. FUNDS ONLY for shipping. NO CHECKS!
--	--

lowable (252 + 3 = 255) character string. Be sure, too, that you are breaking up the strings at the completion of valid commands. In other words, you can't insert the required jump after only one byte of what would otherwise be a two-byte instruction.

After you have separated your program into these code sections of no more than 255 bytes, you must add the hex code C3 at the end of each one, followed by two bytes of zero. These dummy address bytes will be completed by the Basic program at run-time. It is also essential to count how many bytes in from the beginning of each section the first zero byte of each dummy address is located. Assign each string a different variable name and define each one separately as was shown in Program Listing 2.

Program Listing 7 makes it work. The first and second strings have been assigned the variables of A\$ and B\$ respectively. Lines 100 and 110 calculate the memory location of B\$, lines 120 and 130 calculate the location of A\$. Line 140 assigns the variable E1 to the address value of the least significant dummy address byte of the unconditional jump instruction at the end of A\$. Line 150 determines the most significant byte value of the B\$ address and lines 160 and 170 POKE this address into the last two locations of the A\$, thereby replacing the existing dummy address bytes.

Subsequent to this procedure it is still necessary to initialize the USR function by transferring the address of A\$ to the USR function as in Fig. 1. (Ensure that no relative jumps result in the program flow leaving the string it is currently executing in; these jumps must be changed to absolute instructions.)

The most complex arrangement that you would encounter is a non-relative jump between portions of your machine language program that are in different strings. The same sort of dynamic relocation that was required in the last example is necessary here. If your machine language program is calling a subroutine resident in another Basic string it will be necessary for you to calculate the location of the string the subroutine is in as well as its relative location within that string. The addition of these two values determines its location at run-time. It is then necessary to break up the address into a two-byte address pair that must be POKEd into the existing address bytes of your machine language subroutine call.

I hope the material presented here allows you to incorporate your machine language routines directly into your Basic programs; and hopefully I'll never have to answer the Memory Size question again. If any of you encounter difficulties, I would be more than happy to answer your questions. ■

```
100 B1=PEEK(USRPTR(A$)+1)
110 B1=B1+(PEEK(USRPTR(A$)+2)*256)
120 C1=B1+2
130 D1=B1+56
140 D2=FIX(D2/256)
150 POKE C1,D1-(D2*256)
160 POKE C1+1,D2
```

Program Listing 6

```
100 D1=PEEK(USRPTR(B$)+1)
110 D1=D1+(PEEK(USRPTR(B$)+2)*256)
120 C1=PEEK(USRPTR(A$)+1)
130 C1=C1+PEEK(USRPTR(A$)+2)*256)
140 E1=C1+254 ---byte number of the LSB of the JUMP command
150 D2=FIX(D1/256)
160 POKE E1,D1-(D2*256)
170 POKE E1+1,D2
```

Program Listing 7

Expensive Expansion



EXPENSIVE – The LNW *System Expansion II* and built-in comes with a full 32K of 200ns RAM, RS232c 20 MA current loop serial interface. That's for starters. Next, consider our heavy gauge steel case, power indicator lamp, gold-plated connectors, FR-2 glass epoxy circuit board with solder mask and silk screen legends. Then there is the parallel printer port, screen printer port, real time clock, and extra heavy duty onboard power supply with over current protection, over voltage protection and thermal shutdown. If that's not enough then there is the floppy disk controller, guaranteed operation at a 4MHz CPU speed and our 6 month warranty. Every one of these features is **STANDARD**. This is true system expansion. You get every 'expensive' feature without spending more.

CHEAP – Our price is \$399.95. Any way you compare, features or price, LNW's *System Expansion II* is the clear winner. The LNW System has been field tested for over two years with thousands of users. It works with any DOS, is 100% TRS-80 Model I compatible and it works 'right out of the box'. If there is any doubt in your mind as to whether you should buy ours or the 'other guys', just ask an LNW owner!

WE ARE #1 – Number one in price, features, reliability, performance and delivery. LNW is committed to 'expensive' features and quality at reasonable prices. LNW is committed to support, thorough documentation, and reliability.

LNW Research Corp.

2620 WALNUT Tustin, CA. 92680
(714) 641-8850 (714) 544-5744

This has made us the number one manufacturer of system expansion units and accessories for the Model I computer. **EXPANSION OPTION** – 8-inch drive capability is as easy as plugging in the *LNDDoubler 5/8* option*. Now you can have any combination of single- or double-density, single- or double-sided, 8" and/or 5" disks on-line! 8-inch disk storage increased to 591,360 bytes – 77-track single-sided, double-density or 1,182,720 bytes – 77-track double-density, double-sided.

The *LNDDoubler's* unique 5/8 switch allows you to boot from 5- or 8-inch system disks and it's accessible from outside the interface. The \$219.95 *LNDDoubler 5/8* comes with a double-density disk operating system (DOS+ 3.3.9), complete with BASIC and utility programs... ready to run your software.

Each of your present 40-track, single-sided 5-inch drives will store up to 184,320 bytes (formatted storage) – that's an 80% increase in storage capacity for only half the cost of just one disk drive. With three 8-inch double-density, double-sided drives your Model I will have 3.75 Megabytes of online storage – that's more storage than a Model II or Model III!



*8" drive operation requires special cable, 8" double-density requires 3.55MHz CPU speed-up modification or LNW-80 4MHz computer.

Save Basic programs in SYSTEM format.

SYSTEMized Basic

Greg Browne
1515 Jefferson
Alamogordo, NM 88310

After reading a review of Dennis Kitsz' KEEPIT program, I really liked the idea of saving my Basic programs in the System format with or without variables. I set out to write a short program that can do some of the things that KEEPIT does. What I wanted to do was save the part of RAM dedicated to Basic and take a few addresses from that part of RAM and save the memory between those addresses. The System tape format is shown in Table 1.

Program Notes

The successful operation of this program (see Program Listing 1) depends on the use of two unpublished ROM routines and knowing the location of dedicated RAM. It may not work on the new ROM and will not work on the Model III. If you have a different ROM chip find your equivalent areas and routines and modify my program to work on your system. The program is

patched to the disk command Save, so if you are already using that for a patch, substitute one of the alternate patches included in Listing 1. The locations of these jump vectors may not be the same in other ROM's.

The program asks for a file name to use and then saves in one 256-byte block the portion of RAM holding the information Basic needs to function. The program then extracts some of those same addresses and saves the memory from the start of Basic to the end of the program, from the start of the simple variables to the end of the array variables, and from the bottom of the assigned string space actually in use to the top of memory. All this is done in the largest blocks possible for the System command to read later. The program ignores the unused space from the end of the array table to the beginning of assigned string space actually in use. This shortens recording time.

Operating Notes

Set the memory size to 32550 before you load the System tape. The Basic version in Program Listing 2 will set its own memory size. If you relocate the routine, be sure to change the values in

the memory sizing line or, if you prefer, you can remove it entirely and set the size on power-up. However, be sure to enter only one command patch. If you enter all the listed patch lines, they will jump you to the program.

After you load the system tape, hit the Break key. The Basic version sets itself up automatically. The program provides a new command (Save, in my case) which is then available for use.

Saving Programs

If you want to save a Basic program, first decide whether you want to save the variables with the program. If you do not want to Save them, issue a Clear command just before you save a program. This will erase Basic's memory of the variable tables and cause Saver to save only the dedicated RAM and the main body of the program. If you want to save your program with variables intact, the program must have a logical breakpoint from which you can use the Continue command, or at least a line you can go to without destroying variables. If this condition is met, you are ready to save the program; once the variables are in place hit the Break key. When Ready appears on the screen,

type Save. The Saver program will request a filename, and then save your program with all existing variables as they were when you hit the Break key.

When you issue the Save command, you will be asked for a filename. At this point, the Break key is still active and will let you abort the process without hurting the program. Hitting the Break key returns you to the Ready message. If you want to save the program, enter the filename that you want to use to load the program later. The filename must start with an alphabetic character and be from one to six characters long. When your tape is ready to record, enter your chosen filename. When recording is complete, you will be returned to the Ready message and you can continue or go to a line.

Loading a Saved Program

Use the System command to load a program you have saved with the Saver program. Answer

The Key Box

Basic Level II
Model I
16K RAM

the first *? prompt with the name you assigned the tape when you saved it. Your program loads like any other System tape and returns you to the second *? prompt character. At this point, hit Break and return to the Ready message. You will now have the option to use or erase the variables you saved. If you do not want to use the previously saved variables, then Run will erase them.

If you forget to hit Break after loading your System tape, the Enter command will get you to Ready, but the Continue command will then produce a ?CN ERROR message. You must then go to the desired point. If you have the Saver program in place, you can then save this program any time.

The Saver program is very useful during the development and testing of a program. At almost

any stage, I can save a copy of a program, and if it blows up later, I can reload the Saver program and continue at an intermediate development point rather than having to start over. I also frequently use the Saver program in conjunction with my Basic text editor. Using Saver is a quicker, easier way to save text files than the normal Input# and Print# statement method. That method uses long leaders and transfers very limited amounts of data with each leader. The extra time taken to save the body of the program is usually less than the time used writing all those leaders. The Saver method doesn't require any special processing to allow storage of strings containing commas and colons. ■

Greg Browne is a 34-year old C.P.A. He is an avid hobby and business micro- and minicomputer user.

Hex Value	Purpose
00	Leader of 256 zeroes
A5	Sync byte
55	System format identifier
XX XX XX XX XX XX	Filename padded with blanks
Repeated	(As necessary to contain all data)
3C	Data header
YY	Data block size byte 0 = 256 bytes
LSB	Least significant byte of load address
MSB	Most significant byte of load address
XX XX XX	Data to be loaded total of YY bytes
CC	Checksum total of load address and data
78	End of data indicator
LSB	Least significant byte of entry address
MSB	Most significant byte of entry address

Table 1. System tape format for TRS-80.

Program Listing 1. Basic version.

```

10 CLS :
   POKE 16561 , 37 : POKE 16562 , 127 :
   CLEAR 50 : DEFINT A-Z

20 REM - Patches to BASIC commands as indicated
   *****

30 POKE 16800 , 195 : POKE 16801 , 39 : POKE 16802 , 127
   REM - SAVE command patch

35 POKE 16782 , 195 : POKE 16783 , 39 : POKE 16784 , 127
   REM - NAME command patch

40 POKE 16803 , 195 : POKE 16804 , 39 : POKE 16805 , 127
   REM - LINE command patch

```

Program Listing 1 Continues

SOFTWARE TRS/PMC ONLY UNBEATABLE PRICES!

BUSINESS	DISK LIST/OUR PRICE	CASS LIST/OUR PRICE
Small Business Systems Group		
Accounts Payable (48)	195.00/155.00	n/a
Accounts Receivable (48)	195.00/155.00	n/a
General Ledger (48)	195.00/155.00	n/a
Inventory Control (48)	195.00/155.00	n/a
Payroll (48)	195.00/155.00	n/a
GAMES		
Adventure International		
Armor Patrol	24.95/19.00	19.95/15.00
Barlog - Maces and Magic #1	29.95/23.00	n/a
Conquest of Chestwood	20.95/16.00	19.95/15.00
Earthquake San Francisco 1906 (I)	20.95/16.00	19.95/15.00
Eliminator	24.95/19.00	19.95/15.00
Lunar Lander	20.95/16.00	14.95/11.00
Missile Attack	20.95/16.00	14.95/11.00
Morton's Fork - Maces and Magic #3 (I)	29.95/23.00	n/a
Planetoids	20.95/16.00	19.95/15.00
Scot Adam's Adventure #1 #2 #3	39.95/31.00	n/a
Scot Adam's Adventure #10 #11 #12	39.95/31.00	n/a
Scot Adam's Adventure #4 #5 #6	39.95/31.00	n/a
Scot Adam's Adventure #7 #8 #9	39.95/31.00	n/a
Sky Warrior	20.95/16.00	14.95/11.00
Space Intruders	20.95/16.00	19.95/15.00
Star Fighter	29.95/23.00	24.95/19.00
Star Trek 3.5	19.95/15.00	14.95/11.00
Stone of Sisyphus - Maces and Magic #2 (I)	29.95/23.00	n/a
Big Five		
Attack Force	19.95/15.00	15.95/12.00
Cosmic Fighter	19.95/15.00	15.95/12.00
Defense Command	19.95/15.00	15.95/12.00
Galaxy Invasion	19.95/15.00	15.95/12.00
Meteor Mission	19.95/15.00	15.95/12.00
Robot Attack	19.95/15.00	15.95/12.00
Super Nova	19.95/15.00	15.95/12.00
Cornsoft		
Scarfman	19.95/15.00	15.95/12.00
Space Castle	19.95/15.00	15.95/12.00
INFORMATION PROCESSING		
Adventure International		
Maxi Manager (48)	99.95/79.00	n/a
OPERATING SYSTEMS		
Micro Systems Software		
Dos Plus V3.3 (I)	100.00/80.00	n/a
UTILITIES		
Howe		
MON3 (I)	n/a	39.95/31.00
MON4 (I)	49.95/39.00	n/a
STERM (I)	n/a	69.95/55.00
System Diagnostic	99.95/79.00	n/a
WORD PROCESSING		
Michael Shrayr Software		
Electric Pencil (I)	n/a	100.00/24.00
Aspen Software		
Grammatik (I)	59.00/46.00	n/a
Proof Edit (I)	30.00/23.00	n/a
Proofreader (I)	54.00/42.00	n/a
Soft-Screen (I) (48)	69.00/54.00	n/a
Soft-Text (I) (48)	69.00/54.00	n/a
MISCELLANEOUS		
Adventure 1 thru 12 - Hints Sheets		1.00
Box of 10 5 1/4-inch Diskettes		25.00
Box of 10 C-10 cassettes		7.50
Box of 10 C-20 cassettes		9.00
Box of 10 C-60 cassettes		11.00
Box of 10 C-90 cassettes		15.00

PGMS will run on Mod I • Mod III, 32 DSK or 16K CAS UNLESS Marked.
(48): 48K DSK • Mod I & III (I): Mod I only (DSK +/- or CAS)

PMCSOFTWARE

✓ 242

475 ELLIS ST., MT. VIEW, CA 94043

Order Only CALL (415) 962-0318
Information CALL (415) 962-0220

Terms: FOR FAST DELIVERY, send certified checks, money orders, Visa or Master Card number and expiration date. Personal checks require 3 weeks. U.S.A. sales only. Prices include U.P.S. continental delivery (do not use P.O. Box). CALIFORNIA customers add 6 1/2% tax. Prices subject to change.

INTERACTIVE CONTROL LANGUAGE

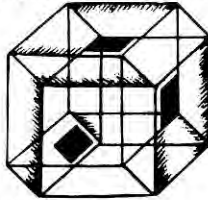
Imagine someone smart standing by, as you work with computer, ready to assist you with advice as well as to take over part of your work! This is what ICL does — perfect "middleman" which stands between user, DOS and application programs.

.....ICL at a glance.....

- ICL monitor — DOS-like command level for execution of Dos commands, /CMD files and /ICL procedures. Fast, efficient and convenient in use.
- Basic functions — automation of work with computer, software enhancement/customization, interfacing of different programs.
- Basic features — intelligent operation, virtual keyboard and display I/O, control interception.
- Language Package — commands, variables, conditionals, literals.
- 32K and 48K versions, lots of examples, 8 ready to use procedures, 57 page manual. Same version works with both models and all operating systems.
- DOS required — TRSDOS[®] — NEWDOS/21[™] — NEWDOS/80[®]
- Min hardware — 32K 1 drive TRS80 Model I or Model III[®]
- Price — \$34.95

The INTERACTIVE CONTROL LANGUAGE is a brand-new software. It gives you unprecedented power to customize and improve your software and make it work the way you want it to work!

ICL is so universal, multifunctional and flexible, it becomes a necessity for every microcomputer user no matter what is the application — business, science, education or just hobby!



Immediate delivery

Order now — only 34.95, manual alone — \$10
Add \$1.50 s/h (check or money order)

XYZT COMPUTER DIMENSIONS Inc.

2 PENN PLAZA, Suite 1500 Write for more information
New York, N. Y. 10121
(212) 244-3100 ✓158 — registered trademarks.

Program Listing 1 Continued

```

50 POKE 16779 , 195 : POKE 16780 , 39 : POKE 16781 , 127
REM - MERGE command patch

60 POKE 16770 , 195 : POKE 16771 , 39 : POKE 16772 , 127
REM - PUT command patch

65 REM - Short loop to READ and POKE machine
language routine from DATA statements
*****

70 FOR ADDRESS = 32551 TO 32766 :
READ BYTE : POKE ADDRESS , BYTE :
NEXT ADDRESS :
NEW

990 REM - DATA statements containing machine
language subroutine for POKE loop
*****

1000 DATA 217,8,42,164,64,237,91,253,64,35,35,223,40,86,43,43,
235,205,164,127,237,83,147,127,205,127,205,201,127,56,71,175,
205,18,2,205,132,2,6,7,33,149,127,205,190,127,33,65,
64,6,0,205,170,127,121,205,100

1010 DATA 2,42,164,64,237,91,147,127,205,227,127,42,214,64,235,
42,177,64,223,40,9,205,164,127,42,214,64,205,227,127,
62,120,205,100,2,62,25,295,100,2,62,26,205,100,2,205,
248,1,8,217,195,25,26,0

1020 DATA 0,85,255,255,255,255,255,13,78,65,77,69,32,62,0,
229,237,82,235,225,201,62,60,205,100,2,120,205,100,2,
125,132,79,125,205,100,2,124,205,100,2,121,134,79,
126,35,205,100,2,16,246,201,33

1030 DATA 156,127,205,167,40,33,150,127,6,6,62,32,119,35,16,
252,33,150,127,175,6,6,195,217,5,122,183,40,12,6,0,
205,170,127,121,205,100,2,21,24,240,123,183,200,67,
205,170,127,121,205,100,2,201
    
```

Program Listing 2. Machine language versions.

```

00100 *****
00110 ;* SAVER *
00120 ;* BY - GREG BROWNE *
00130 ;*
00140 ;* A MACHINE LANGUAGE PROGRAM *
00150 ;* TO SAVE BASIC PROGRAMS *
00160 ;* WITH OR WITHOUT VARIABLES *
00170 ;* IN SYSTEM FORMAT *
00180 *****
00190 ;****
00200 ;****
00210 ;**** BASIC COMMAND PATCH
00220 ;****

41A0 00230 SAVE EQU 41A0H
41B0 00240 NAME EQU 41B0H
41A3 00250 LINE EQU 41A3H
41B8 00260 MERGE EQU 41B8H
41B2 00270 PUT EQU 41B2H
00280 ;****
00290 ORG SAVE ;CHOOSE FROM

LIST ABOVE
41A0 C327FH 00300 JP SAVER ;SET UP JUMP
TO PROGRAM

00310 ;****
00320 ;**** MAIN PROGRAM
00330 ;****

7F27 00340 ORG 32551 ;SET FOR YOU
R SYSTEM
7F27 D9 00350 SAVER EXX ;SAVE REGIST
ERS BY USING
7F28 08 00360 EX AF,AF' ; ALTERNATE
S FOR THIS
7F29 2AA440 00370 LD HL,(BASICP) ;START OF BA
SIC HERE
7F2C ED5BF4D0 00380 LD DE,(PRESPC) ;START OF PR
EE SPACE
7F30 23 00390 INC HL ;MOVE START
OF BASIC UP
7F31 23 00400 INC HL ; AND COMPAR
E WITH FREE
7F32 DF 00410 RST 1BH ; SPACE - Z
= NO PROGRAM
7F33 2857 00420 JR Z,ERROR ;ERROR IF NO
PROGRAM
7F35 2B 00430 DEC HL ;MOVE BACK T
O START OF
7F36 2B 00440 DEC HL ; BASIC IF N
O ERROR
7F37 EB 00450 EX DE,HL ;GET BIGGER
# IN HL
7F38 CDA57F 00460 CALL GETNBR ;GO GET # OF
BYTES IN DE
7F3B ED53947F 00470 LD (PGLN),DE ;SAVE PROGRA
M+VARIABLE
00480 ; TABLE LENG
TH
7F3F CDCA7F 00490 CALL GETNAM ;GET A FILEN
AME
7F42 3848 00500 JR C,ERROR ;IF C = SET,

BREAK PUSHED
7F44 AF 00510 XOR A ;START WITH
A=0
7F45 CD1202 00520 CALL DEFINE ;DEFINE DRIV
E (0) AND
7F48 CD8402 00530 CALL LEADER ; WRITE LEAD
ER AND SYNC
7F4B 0607 00540 LD B,7 ;SET # BYTES
    
```

Program Listing 2 Continues

Tired OF THE LINE-EDIT Game?

Then why not try our Full-Screen Editor?

NOW - Create & Edit BASIC programs quickly and easily with this versatile Full Screen Basic Editor.

FEATURING Eleven commands and thirteen control keys to do any edit function you may require.

- Scroll Forward & BACKWARD through program
- Change many lines at one time
- Insert or delete characters
- Add or delete lines
- Search for strings
- Load the Editor once — it becomes an extension of your Model 3 BASIC
- Call the Editor with one command
- Return to BASIC by pressing BREAK

INSTRUCTION MANUAL ONLY (refundable) \$1.00

Model III Level II Tape..... \$19.95

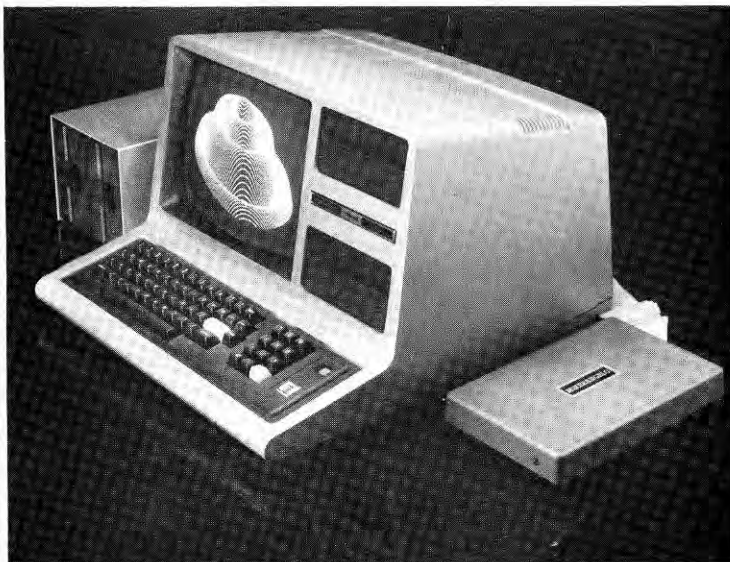
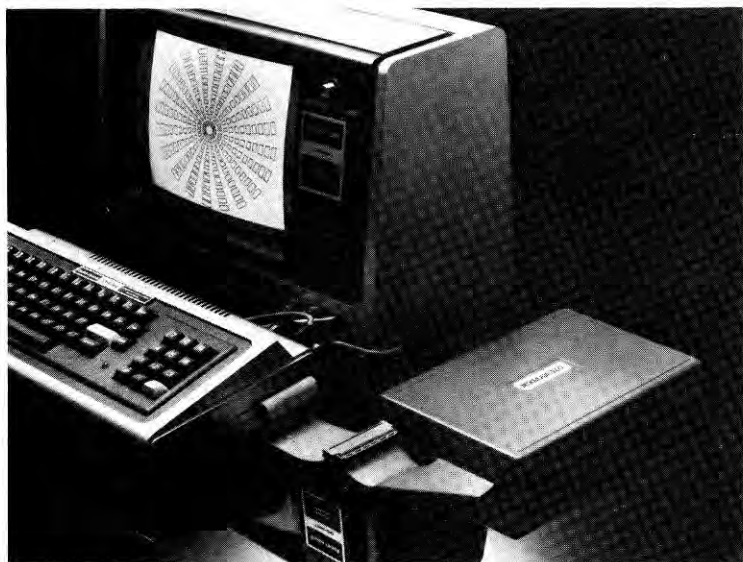
NJ residents add \$1.00 Sales Tax

dcs SOFTWARE

86 Mansel Dr. Landing, N.J., 07850

✓517

TURN YOUR COMPUTER INTO A GRAPHICS MACHINE



WITH THE MIKEEANGELO[®] GRAPHIC SYSTEM!!

MIKEEANGELO[®] is a hardware/software system designed for the TRS-80 model I & III computers. When installed, your 80 will come alive with graphic ability!!

If you've been waiting for a graphic system with the best dots/dollars ratio, take a look at our MIKEEANGELO.[®]

HARDWARE

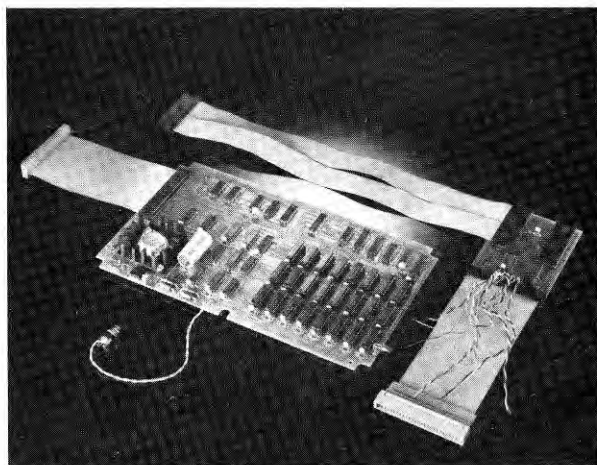
- TOTAL SCREEN INVERSE VIDEO
- TWO MODES OF DENSITY:
 - 384 × 192 or 191 × 192 for Model I
 - 512 × 192 or 256 × 192 for Model III
- EVERY DOT CAN BE SET, RESET or TESTED
- 12288 BYTES OF FAST 200 ns MEMORY
- FUNCTIONS SELECTED BY OUTPUT PORT #254.
- MEMORY MAPPED FOR SPEED
- OCCUPIES LAST 16K BLOCK OF MEMORY
- CAN BE USED AS NORMAL MEMORY (if you have 32K or more of memory)
- COLOR COORDINATED ENCLOSURE
- DOES NOT CONFLICT WITH DISK OR CASSETTE I/O
- SELF SWITCHING POWER SUPPLY (Powers up with Computer)
- COMES WITH IT'S OWN WALL TRANSFORMER
- NOT A CHARACTER GENERATOR!!
- EASY INSTALLATION (Requires only 18 solder connections and one trace/pin cut)

*1 MIKEEANGELO is a trademark for Mikee Electronics Corp

*2 TRS-80 is a trademark for the Tandy Corp

*3 Opening your TRS-80 will void the limited warranty

*4 90 day warranty, full refund or replacement



SOFTWARE

- COMES WITH SAMPLE AND DRIVER SOFTWARE
- USABLE THROUGH BASIC OR MACHINE LANGUAGE
- EXCELLENT INSTALLATION/ OPERATION MANUAL

TOOL KITS AVAILABLE FOR JUST \$15.00

MANUAL AVAILABLE SEPARATELY FOR \$15.00

Full price of manual will be deducted from the Purchase Price of MIKEEANGELO[®] when ordered.

PREPAID, COD, MASTERCARD, VISA, or MASTERCARD ORDERS ACCEPTED. FOB: Bellevue, Wa.

U.S. Currency ONLY. Stock to 30 days delivery.

DEALERS INQUIRIES INVITED.

ORDER NOW FOR ONLY \$369.

Complete with power supply, case software and manual.

WRITE for FREE BROCHURE or call for more information.

MIKEE ELECTRONICS CORPORATION

P.O. Box 3813 Bellevue, Washington 98009
Telephone 206/451-0574

MANUFACTURING INVENTORY SYSTEM

TRS-80 Model 11 — 64K

The system is written in Ansi '74 Cobol and provides the following:

- A. INVENTORY MASTER** — It contains all the indexes by part number.
- B. VENDOR MASTER** — It contains all suppliers' names and corresponding part numbers.
- C. INVENTORY STATUS REPORT** — A listing of the entire master file of items by part number and/or part name with Quantity On Hand, Back Order, Quantity Used, Safety Stock and Total Dollar Value of the entire inventory.

The system is an ON-LINE system with the options to add, change, delete, display the entire item information on the screen by inserting the part number. It is all Menu-driven, performing many functions on a single pass.

We will supply an 8" Floppy Disc with instruction manual.

Delivered Price: \$495.00

ENM DEVELOPMENT CORP.

20 No. Wacker Drive
Chicago, IL 60606

VISA-Master Charge
To order, call TOLL-FREE
800-621-0660
Illinois Resident
800-572-0444

523

We Have The Lowest Price

OKIDATA

Microline 80 \$349 Delivered
82A 5484

EPSON, KESA, ELF II software, Selt Teaching Guides.
Call or write for information!!

MEMORY 16K 200ns CERAMIC DIP
w/instructions for TRS 80
mod I, III
NONE BETTER FOR \$1.65 ea.

VERBATIM MD525-01 single side, soft
sectored
\$24.95/10 w plas lib case \$27.95

SELF TEACHING GUIDES — takes you
step by step through your micro
TRS-80 Basic \$8.95 more TRS-80 Basic \$8.95
8080/280 Assy Lang \$9.95 USING CP/M \$8.95
DATA FILE PROGGMG IN BASIC \$9.95
FLOW CHARTING \$8.95

Terms: Cash, Money
Order, Check (1 wk to
clear); VISA, Master
Card, add 3%
Shipping add \$3.00,
over \$50.00 shipped
free, COD add \$2.00

OKIDATA INC.

P.O. Box 1567 • Wheat Ridge, CO 80034
303-431-4154

Program Listing 2 Continued

```

TO WRITE
7F4D 21967F 00550 LD HL,TITLE-1 ;POINT TO WH
ERE-1
7F50 CDB7F 00560 CALL NOTHER ;WRITE THE F
ILENAME
7F53 214140 00570 LD HL,DDCRAM ;POINT TO DE
DICATED RAM
7F56 0600 00580 LD B,0 ;SET # TO WR
ITE (256)
7F58 CDAB7F 00590 CALL BLKWR ;WRITE THE B
LOCK
7F5B 79 00600 LD A,C ;RETRIEVE TH
E CHECKSUM
7F5C CD6402 00610 CALL BYTOUT ; AND WRITE
IT, TOO.
7F5F 2AA440 00620 LD HL,(BASICP) ;POINT TO PR
OGRAM BODY
7F62 ED5B947F 00630 LD DE,(PGLN) ;RETRIEVE WR
ITE LENGTH
7F66 CDE47F 00640 CALL LOOP1 ;CALL MULTIB
LOCK WRITER
7F69 ED5BD640 00650 LD DE,(STRSPC) ;POINT TO NE
XT AVAILABLE
00660 ; STRING SPA
CE
7F6D 2AB140 00670 LD HL,(MEMTOP) ;POINT TO TO
P OF MEMORY
7F70 DF 00680 RST 1BH ;COMPARE THE
M - IF 2
7F71 280A 00690 JR Z,DONE ; NO STRINGS
TO WRITE
7F73 CDA57F 00700 CALL GETNBR ;IF NZ THEN
GET HOW MANY
7F76 2AD640 00710 LD HL,(STRSPC) ;POINT TO ST
ART OF STRING
7F79 23 00720 INC HL ; SPACE WITH
THIS INC
7F7A CDE47F 00730 CALL LOOP1 ;CALL MULTIB
LOCK WRITER
7F7D 3E78 00740 DONE LD A,78H ;GET END-O-D
ATA INDICATOR
7F7F CD6402 00750 CALL BYTOUT ; AND WRITE
IT
7F82 3E19 00760 LD A,19H ;SET UP ENTR
Y ADDRESS
7F84 CD6402 00770 CALL BYTOUT ; AS THE NOR
MAL
7F87 3E1A 00780 LD A,1AH ; JUMP TO B
ASIC
7F89 CD6402 00790 CALL BYTOUT ; FOR INSU
RANCE
7F8C CDF801 00800 ERROR CALL CASOFF ;TURN OFF TH
E CASSETTE
7F8F 08 00810 EX AF,AF' ;RESTORE THE
ORIGINAL
7F90 D9 00820 EXX ; REGISTER
VALUES
7F91 C3191A 00830 JP 1A19H ;AND BACK TO
WORK
00840 ;****
00850 ;**** A LITTLE STORAGE SPACE
00860 ;**** AND A PROMPT OR SO
00870 ;****
00880 PGLN DEFW 0 ;PROGRAM+VAR
IABLE LENGTH
00890 ; TEMPORARY
STORAGE
7F96 55 00900 DEFB 55H ;SYSTEM HEAD
ER BYTE
0006 00910 TITLE DEFS 6 ;SPACE FOR P
ILENAME
7F9D 0D 00920 MSG DEFB 13 ;PROMPT MESS
AGE
7F9E 4E 00930 DEFM 'NAME >' ; REALLY ORI
GINAL LOOKING
7FA4 00 00940 DEFB 0 ;VIDEO ROUTI
NE NEEDS THIS
00950 ;
00960 ;**** SUBROUTINE TO DETERMINE NUMBER
00970 ;**** OF BYTES TO BE WRITTEN TO TAPE
00980 ;
00990 GETNBR PUSH HL ;SAVE START
LOCATION
7FA6 ED52 01000 SBC HL,DE ;GET DIFFERE
NCE
7FA8 EB 01010 EX DE,HL ;PUT IT INTO
DE
7FA9 E1 01020 POP HL ;RESTORE STA
RT LOCATION
7FAA C9 01030 RET ;BACK TO WOR
K
01040 ;****
01050 ;**** SUBROUTINE TO WRITE A BLOCK
01060 ;**** IN SYSTEM FORMAT AND ACCUMULATE
01070 ;**** A CHECKSUM (TO BE WRITTEN LATER)
01080 ;****
01090 ;**** ENTER WITH B = # OF BYTES TO
WRITE
01100 ;**** HL= POINTER TO ST
ART OF BLOCK
01110 ;****
01120 BLKWR LD A,3CH ;GET DATA HE
ADER
7FAD CD6402 01130 CALL BYTOUT ; WRITE IT
TO TAPE
7FB0 78 01140 LD A,B ;GET # OF BY
TES
7FB1 CD6402 01150 CALL BYTOUT ; WRITE IT
, TOO.
7FB4 7D 01160 LD A,L ;START CHECK
SUM BY
7FB5 84 01170 ADD A,H ; ADDING ADD
RESS BYTES
7FB6 4F 01180 LD C,A ; AND SAVIN
G IN 'C'

```

Program Listing 2 Continues

Program Listing 2 Continued

```

7FB7 7D      01190      LD      A,L      ;SAVE LOAD A
DDRESS NEXT, 01200      CALL   BYTOUT    ; WRITING LS
7FB8 CD6402  01200      CALL   BYTOUT    ; WRITING LS
B FIRST AND
7FB9 7C      01210      LD      A,H      ; THEN WRIT
ING THE MSB
7FBC CD6402  01220      CALL   BYTOUT    ; H=MSB
L=LSB
01230 ;****
01240 ;****
ME          01250 ;**** ALTERNATE ENTRY USED TO WRITE FILENA
01260 ;**** AND SYSTEM FORMAT TAPE HEADER
01270 NOTHER LD      A,C      ;UPDATE CHEC
7FBF 79      01280      ADD    A,(HL)    ; ADDING NEX
KSUM BY     01290      LD      C,A      ; AND SAVIN
7FC0 86      01290      LD      A,(HL)  ;NOW, GET BY
T BYTE
7FC1 4F      01300      LD      A,(HL)  ;POINT TO N
G RESULT
7FC2 7E      01310      INC    HL        ; POINT TO N
TE TO WRITE
7FC3 23      01320      CALL   BYTOUT    ; AND WRITE
7FC4 CD6402  01330      DJNZ   NOTHER    ;DO IT AGAIN
THIS ONE
7FC7 10F6    01340      RET
UNTIL B=0
7FC9 C9      01350 ;****
R THINGS   01360 ;**** THIS SUBROUTINE ISSUES A PROMPT,
01370 ;**** CLEARS OUT THE FILENAME AREA,
01380 ;**** AND ACCEPTS A NEW FILENAME
01390 ;****
7FCA 219D7F  01400 GETNAM LD      HL,MSG    ;POINT TO NA
ME> PROMPT  01410      CALL   MSGOUT    ; AND PRINT
7FCD CDA728  01420      LD      HL,TITLE ;POINT TO FI
IT ON SCREEN
7FD0 21977F  01430      LD      B,6      ;CLEAR OLD N
LENAME BUFFER
7FD3 0606    01440      LD      A,20H    ; FILLING TH
AME BY
7FD5 3E20    01450 BLANK LD      (HL),A   ; WITH SIX
E BUFFER
7FD7 77      01460      INC    HL        ; MOVE UP
BLANKS
7FD8 23      01470      DJNZ   BLANK     ; KEEP DO
TO NEXT BYTE
7FD9 10FC    01480      LD      HL,TITLE ;POINT TO IN
PUT BUFFER
7FDB 21977F  01490      XOR    A        ;CLEAR ACCUM
ULATOR
7FDE AF      01500      LD      B,6      ;SET MAXIMUM
ACCEPT
7FE1 C3D905  01510      JP     5D9H     ;JUMP TO INP
UT (ENDS
01520 ; IN A RET I
NSTRUCTION)
01530 ;****
01540 ;**** SUBROUTINE TO WRITE A SERIES OF
01550 ;**** 256 BYTE BLOCKS UNTIL A SPECIFIC
01560 ;**** LENGTH OF MEMORY HAS BEEN WRITTEN
01570 ;****
01580 ;**** DE = TOTAL BYTES TO WRITE
01590 ;**** HL = POINTER TO WHERE TO STA
RT
01600 ;****
7FE4 7A      01610 LOOP1 LD      A,D      ;D = NUMBER
OF FULL
7FE5 B7      01620      OR     A        ; BLOCKS
TO WRITE
7FE6 280C    01630      JR     2,LAST1  ; 0 = ONLY
PARTIAL LEFT
7FE8 0600    01640      LD      B,0      ;SET BYTES T
O 256
7FEA CDAB7F  01650      CALL   BLKWR    ;WRITE A WHO
LE BLOCK
7FED 79      01660      LD      A,C      ;GET THAT CH
ECKSUM
7FEE CD6402  01670      CALL   BYTOUT    ; AND WRITE
IT, TOO.
7FF1 15      01680      DEC    D        ;DECR FULL B
LOCK COUNT
7FF2 18F0    01690      JR     LOOP1    ; AND SEE I
F WE GO AGAIN
7FF4 7B      01700 LAST1 LD      A,E      ;GET # OF BY
TES LEFT
7FF5 B7      01710      OR     A        ;CHECK IN CA
SE IT IS 0
7FF6 C8      01720      RET     Z       ; AND QUIT I
F IT IS
7FF7 43      01730      LD      B,E      ;OTHERWISE S
ET HOW MANY
7FF8 CDAB7F  01740      CALL   BLKWR    ; AND DO A B
LOCK OF THEM
7FFB 79      01750      LD      A,C      ;GET THE CHE
CKSUM AND
7FFC C36402  01760      JP     BYTOUT    ;JUMP TO WRI
TER (SAVE A
01770 ; BYTE WITH
NO EXTRA RET)
01780 ;****
01790 ;**** ROM MEMORY LOCATION EQUIVALENTS
01800 ;****
40A4      01810 BASICP EQU    40A4H
40FD      01820 PRESFC EQU    40FDH
40D6      01830 STRSFC EQU    40D6H
40E1      01840 MEMTOP EQU    40E1H
4041      01850 DDCRAM EQU    4041H
01F8      01860 CASOFF EQU    1F8H
0212      01870 DEFINE EQU    212H
0264      01880 BYTOUT EQU    264H
0284      01890 LEADER EQU    284H
28A7      01900 MSGOUT EQU    28A7H
1A19      01910 END      1A19H

```

COMPUTER AIDED INVESTMENT

Had you ever missed opportunities to purchase stocks at their low points, and/or had hesitated to sell and resulted in financial losses?

One of the secrets for success in the STOCK-MARKET is timing.

A computed program, STOCKCHART-I™, for usage on the TRS-80* models I & III, APPLE II*, & ATARI-800* computer systems, will time the stocks in your portfolio for BUY & SELL opportunities. The BUY & SELL signals are based on a unique price-trend analysis technique developed by Micro-Investment Software. It only requires the weekly high, weekly low, and the last trading day of the week's close stock prices. With this program, you no longer need to guess or listen to rumors for your investment decisions.

Aside from its ability to assist you on deciding when to BUY & SELL, it also will generate a price-chart from the High, Low, and Close stock prices. The user has the option to select the price-chart to be generated onto the video screen or to the line-printer. And many other useful features...

— STOCKCHART-I™ —

Features:

- generate BUY/SELL signal
- generate price-chart from High, Low, & Close stock prices
- data entry in newspaper format (accept fractions)
- SPLIT mode for price data readjustment on stock split
- EDIT mode for data changes and/or corrections
- STATUS mode display BUY/SELL signal for all stocks on file
- Fully menu driven, user friendly
- LIST mode for price data print out onto video or line printer

Sample Results:

- Tandy Corp.-5/19/80 to 9/07/81
3 BUY/SELL signals
ROI: 163%
- Hewlett Packard-5/25/80 to 8/30/81
4 BUY/SELL signals
ROI: 42%
- Adv. Micro Dev.-5/12/80 to 6/22/81
3 BUY/SELL signals
ROI: 51%
- Nat'l Semi.-5/25/80 to 6/22/81
3 BUY/SELL signals
ROI: 40%
- Storage Tech.-5/18/80 to 6/22/81
3 BUY/SELL signals
ROI: 111%



An Investment Tool for the Serious Investors

System Requirements:

- cassette version - min. 16K RAM
- disk version - min. 32K RAM, 1 disk drive
- printer optional

To order, see your local computer/software dealers or send check, money order, or C.O.D. to:



Micro-Investment Software
9621 Bowie Way
Stockton, CA 95209

cassette version \$79 per copy
disk version \$99 per copy

TM - STOCKCHART-I is a trademark of Micro-Investment Software
*trademare of TANDY CORP., APPLE COMPUTER, & ATARI respectively
ROI - return on investment

Dealer Inquiries Invited

Visa and Mastercard welcome. (209) 952-8833

What the documentation didn't tell you.

Using Test1A

Claude T. Moultrie, Jr.
5105 Sherman Drive
Box 92802
The Colony, TX 75056

One of the best memory tests available for the TRS-80 Model I, TEST1A/CMD, comes as a freebie with Radio Shack's TRSDOS 2.3 operating system. Two problems with this test reduce its usefulness. This article describes some undocumented control commands that are a part of the test and shows how to use the test with operating systems other than TRSDOS.

Hidden Commands

TEST1A/CMD is normally completely automatic. As soon as it loads, it tests the Basic ROM and proceeds to a series of tests of RAM memory. At the beginning of each test, two hex digits are printed on the screen; if all goes well, this happens 32 times. The

series ends with a message to hit Enter. When you do, the system will reboot.

This automatic sequence is fine if there are no memory problems. But if a memory problem is detected, the screen fills with error messages indicating the memory address where the problem was detected, the byte written, and the byte actually read. The memory chips that would produce that error are then listed.

There is, however, a problem with the error messages: They fly by on the screen so fast that it is impossible to read them. The author of the program provided a way to halt the error messages for reading and then to continue them when ready. Unfortunately, Radio Shack neglected to document this feature. Three keys will affect execution of the test, greatly enhancing its usefulness. (See Table 1.)

Using TEST1A with Other Operating Systems

TEST1A will work with NEWDOS 2.1, but not with NEWDOS80 or with LDOS. It interferes with the keyboard debounce routines of these operating systems. Also it will not work if you or your operating system place a keyboard or video driver in high memory. It will test through any high memory

driver and, when it tries to use the keyboard or video, funny things will happen.

The solution to all of these problems is relatively simple. Restore the ROM keyboard and video driver addresses to the vector locations in the keyboard and video DCB's before execution of the test. Most operating systems offer a way to turn off the keyboard debounce and to suppress the loading of special high memory drivers. This is usually done by holding down a key or keys when the system is booted up. Check the documentation for your operating system to determine the exact method. Boot your operating system using the specified method, and you should be able to use TEST1A.

While this method will work, it can be very frustrating. When your computer is acting strangely and you want to do a memory test, you are probably not in the mood to have to remember a special booting sequence.

A better method is to modify the program to take care of the keyboard and video problem before it begins testing. To do this, just add the 15 bytes of code in Program Listing 1 to the end of the program. This appendage will restore the ROM keyboard and video driver addresses to the vector locations in the DCB's, and then jump to the normal start of the program to begin execution. The appended program will now work with TRSDOS as well as with other operating systems.

The Key Box

Model I
TRSDOS 2.3

KEY	FUNCTION
H	Halt text execution. Only recognized during printing to screen (hex digits or error message).
C	Continue test execution. Use after H to resume test or error messages.
E	Exit test. The "Press Enter to Continue" message will appear. Enter will return to DOS. Only recognized during printing to screen (hex digits or error message).

Note: Since H and E are only recognized during printing to screen you must hold the key down until printing occurs for the key to have effect.

Table 1. TEST1A Commands

You can use Debug to add the 15-byte appendage. Be sure to save the modified program under a new name so it is not confused with the original. The procedure for producing the modified program is:

- Load TEST1A/CMD into memory without execution (use the DOS Load command).
- Execute Debug.
- Use Debug's modify memory command (M) to add the appen-

dage.

- Return to DOS at 402DH (G 402D).
- Use the DOS Dump command to save the modified program to disk. The start address for the dump is 63F0H, the end address is 67FFH, and the transfer address (where to begin execution) is 67F0H.

Now you can run the test whenever needed, without using a special booting procedure. ■

```

00100; Listing 1
00110;
00120;
00130; Appendage to Radio Shack's TEST1A/CMD
00140; to restore the Basic ROM keyboard and
00150; video drivers before test execution.
00160;
67F0 00170; ORG 67F0H
00180;
00190 LD HL,03E3H ;ROM KBD driver address
67F3 221640 00200 LD (4016H),HL ; to keyboard DCB.
67F6 215804 00210 LD HL,0458H ;ROM video driver address
67F9 221E40 00220 LD (401EH),HL ; to video DCB.
67FC C3F063 00230 JP 63F0H ;Go to start of TEST1A.
0000 00240 END
00000 Total errors

```

Program Listing 1

[513]
294-3383

THE SOFTCORE SOFTWARE CO.
9 Southmoor Circle, Kettering, OH 45429

"TOO MUCH" FOR RADIO SHACK!

Radio Shack REFUSED to include MISADVENTURE #1 in their SOURCEBOOK due to our description of the game!

- #0201 Misadventure #1 [Madam Rosa's Massage Parlor]
- #0202 Misadventure #2 [Wet T-Shirt Contest]
- #0301 Dohne' Bugg [Adventure-Decoder]

MADAM ROSA'S MASSAGE PARLOR & WET T-SHIRT CONTEST are slightly naughty ribald & risque' games played in the adventure-format.

IN MISADVENTURE #1 the player has to make his way from the sleazy deserted WHARFS, gain admittance to the ancient SPEAKEASY, and attempt to discover the hidden photographs of the politician's beautiful daughter! Brave the deadly alleys, hallways, and traps. Avoid the BOUNCER and the other characters of questionable reputation! Play in the rigged CARD GAME if you dare! Discover why the old man died with a smile on his face! Find out why the WINO prefers cheap booze! Above all, try to escape without needing any injections of penicillin!!!

WET T-SHIRT CONTEST is the second in our series of MISADVENTURES!

DOHNE' BUGG is an ADVENTURE-DECODER. Tired of hearing that a game has many (sometimes over 100) commands that are accepted - but you are not told what the commands are? This machine language program actually displays on the screen all LOCATIONS that are to be found, all VERBS that interact in the game, and all ACTIONS that result! A MUST FOR ALL SERIOUS ADVENTURERS! Very helpful when 'stuck' in a machine-language adventure program!

All programs work on 16k Model I & III \$15.00 EA
Immediate shipment - check or credit cards & phone orders accepted.

379

PRACTICAL • ORIGINAL • SINGULAR • SUPERB • UNUSUAL

REFWARE THESAURUS INNOVATIVE INSTANT WORD-FINDER

WHAT'S THE BEST WORD???

How many times have you racked your brain for just the right word when writing an important letter, report, or article? How many times have your ideas been misunderstood because the words you used didn't express your thoughts clearly and accurately?

Now, by using the remarkable new REFWARE THESAURUS programs, your computer can speedily find those words that are on the tip of your tongue but that you can't quite remember at the moment. And it tells you how to spell them!

Just slip a REFWARE THESAURUS disk into your disk drive. Then type in your sentences or paragraphs. The computer will quickly offer a variety of alternatives, retyping your sentences or paragraphs with substitute possibilities chosen from its multi-thousand word vocabulary. It displays the revised sentences on your monitor or types them on your printer as you choose, so that you can mull them over and choose the one that most accurately expresses what you REALLY mean to say.

The revolutionary REFWARE THESAURUS programs bring the speed and power of the computer to the aid of anyone who wishes to improve his writing or speaking.

In addition to the specific programs capable of substituting suggested alternate words for nouns and adjectives, REFWARE THESAURUS Builder enables engineers, physicians, lawyers, educators, businessmen, authors, and other professionals and specialists to develop their own individually tailored vocabularies of hard-to-remember technical words.

REFWARE THESAURUS Adjectives 1.0

6,200 adjectives assist you in choosing the most accurate modifiers in your ads, letters, reports, and speeches.

REFWARE THESAURUS Nouns 1.0

6,200 nouns suggest alternates for the names of persons, places, things, and ideas that you use in your writing and speaking.

REFWARE THESAURUS Builder 1.0

Series of eight utility programs enables the user to develop specialized computer thesaurus disk programs of hard-to-remember technical words and their alternates for personal use. Functions independently of Adjectives and Nouns programs.

REFWARE THESAURUS User's Manuals: Complete descriptions of use of each of the above programs. Included at no additional charge with each of program disks listed above. If ordered separately, price of manual is deductible from later order of program disk.

MINIMUM System Required:TRS 80* Mod I or Mod III 48K with two disk drives.
*A Trademark of Tandy Corporation

Credit card orders phone (914) 238-8896

Dealer inquiries invited.

REFWARE* Reference software division David C. Whitney Associates, Inc.
P.O. Box 451, Chappaqua, N.Y. 10514

*A trademark of David C. Whitney Associates, Inc.

Specify Mod I () or Mod III ()

Qty.	Order No.	Title	Unit Price	Total
	1001RT	Adjectives 1.0	\$39.95	
	2001RT	Nouns 1.0	\$39.95	
	5001RT	Builder 1.0	\$149.95	
	6001RT	User's Manual Adj	\$9.95	
	6002RT	User's Manual Nouns	\$9.95	
	6003RT	User's Manual Builder	\$14.95	

Sales tax (N.Y. state residents only)

Postage and handling \$ 3.00

Enclosed \$ () Check () Money Order TOTAL \$
Bill: () Visa () MasterCard

Card #

Exp. Date Interbank #

Signature

Name Phone ()

Address

City State Zip

Mailed First Class, but allow 3 to 4 weeks for delivery, no C.O.D. orders.

Maximize the potential of your TRS-80*

Encyclopedia for the TRS-80*

What's the key to getting the most from your TRS-80*? No, it isn't disk drives or printers or joysticks. It's information. Without a continual supply of information and ideas, you cannot realize the full potential of the TRS-80*.

Our response to the clamor for additional information is the *Encyclopedia for the TRS-80**, a ten-volume reference work of programs and articles carefully selected to help you make the most of your microcomputer. You can consider the volumes of the *Encyclopedia* to be an extension of the documentation that came with your TRS-80*. Each book is full of material on programming techniques, business, language, hardware, games, tutorials, education, utilities and interfacing.

Unlike conventional encyclopedias, the *Encyclopedia for the TRS-80** will never become stale or out of date. That's because the volumes of the *Encyclopedia* are being issued one-at-a-time, approximately six weeks apart. This means that each new volume will reflect the latest developments and discoveries, making this a living encyclopedia for TRS-80* users.

The first four volumes are being issued during 1981. The remaining volumes will be issued during the first half of 1982. The deluxe COLLECTOR'S EDITION has a handsome green and black hard cover with a dust jacket.

A soft cover edition is also available.

DEALERS Please request discount information and catalog when ordering. Mail Dealer orders ATT: Wayne Green Books Dealer Sales.

WAYNE GREEN BOOKS
A division of Wayne Green Inc.
Pine Street
Peterborough, NH 03458

Encyclopedia Loader

The editors at Wayne Green Books want to help you use the programs in your *Encyclopedia for the TRS-80**. So to help you maximize the use of your microcomputing time, we created **Encyclopedia Loader™**.

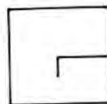
By a special arrangement with Instant Software™, Wayne Green Books can now provide you with selected programs contained in each volume of the *Encyclopedia for the TRS-80** on a special series of cassettes called **Encyclopedia Loader™**. Your encyclopedia provides the essential documentation but now you'll be able to load the programs instantly.

With **Encyclopedia Loader™** you'll save hours of keyboard time and eliminate the aggravating search for typos.

Save money with this introductory offer. **Encyclopedia Loader™** for Volume 1 of *Encyclopedia for the TRS-80** which will normally cost \$14.95 is available for a **limited time only at the introductory price of \$12.95.**

To order specify EL8001 \$12.95.

The Encyclopedia for the TRS-80 is a Wayne Green publication. Encyclopedia Loader is manufactured by Instant Software, a division of Wayne Green Inc. * TRS-80 is a trademark of Radio Shack division of Tandy Corp.

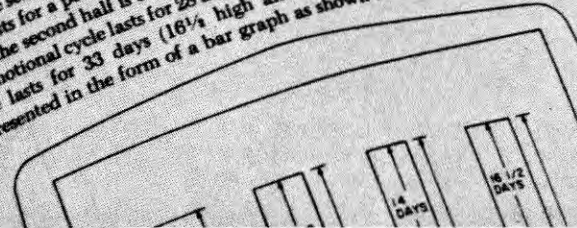


HOME APPLICATIONS

Bio-Bars—Biorhythms in Bar Graph Form

by Ronald J. Thibodeau

Here is a biorhythm program that does not need to be analyzed. If you are unhappy with the usual sine wave display currently being used for biorhythms, this bio-bars program may keep your interest up. By now, almost everyone is familiar with biorhythms and what they mean. In theory, emotional and intellectual condition. Based on the research done by doctors Swoboda and Fliess, the biorhythm theory states that three cycles of 23, 28 and 33 days run concurrently from birth and continue until we die. The first half of each cycle represents an area of strength, while the second half of the cycle represents relative weakness. The physical cycle lasts for a period of 23 days. The first half (11 1/2 days) is a high period while the second half is considered to be a low period of activity. Similarly, the emotional cycle lasts for 28 days (14 high and 14 low) and the intellectual cycle lasts for 33 days (16 1/2 high and 16 1/2 low). These cycles can be represented in the form of a bar graph as shown in Figure 1.

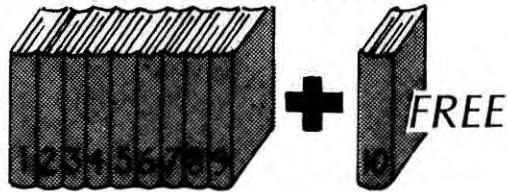


home applications

Program Listing

```
RADIO CAR CONTROL
INSERT COMMAND STRING IN LINE 100 (C254 CBAR)
#*SPRIGT
!-LEFT TURN
?->E80
ADJUST DURATION OF COMMAND IN LINE 160
EM="#####1111#####22222222222200#####1111#####"
```

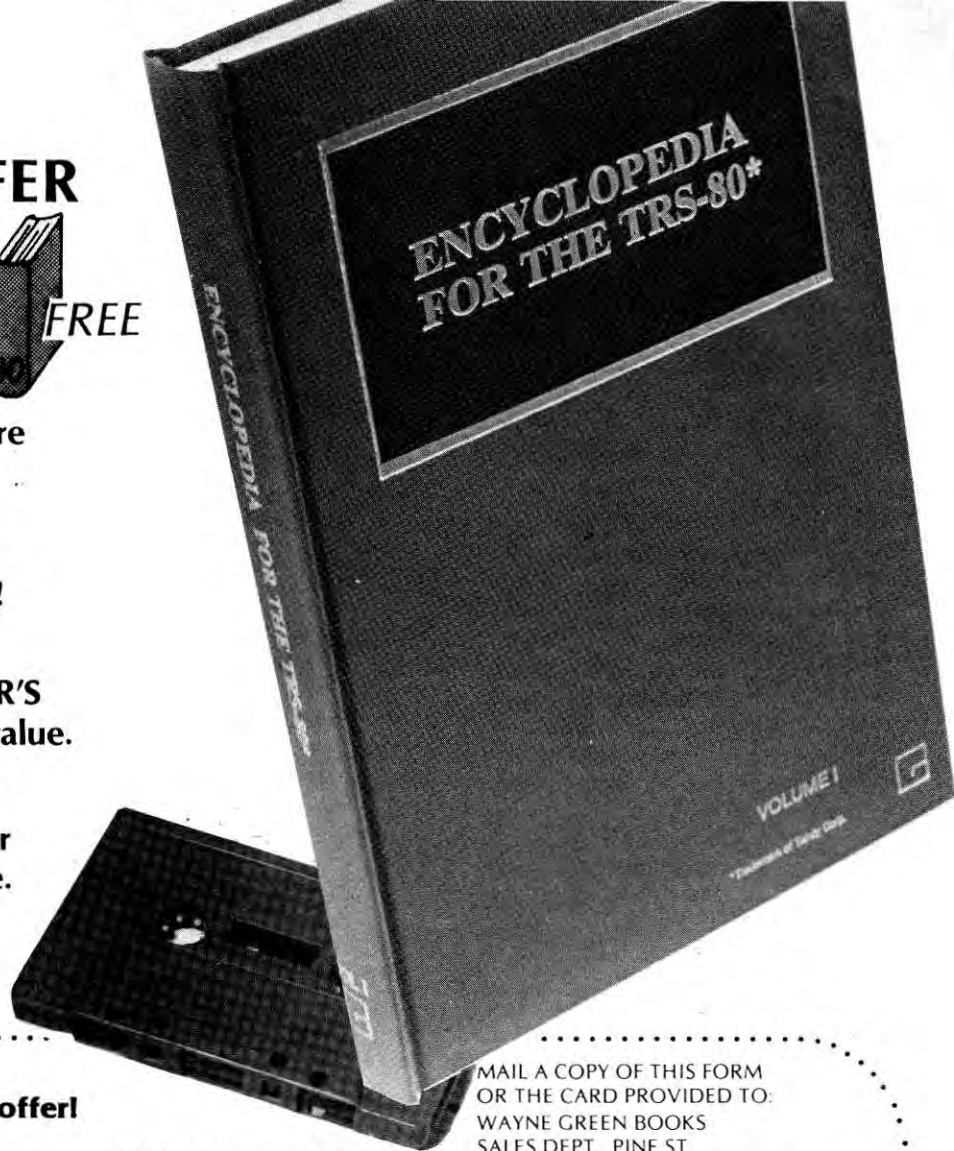
SPECIAL OFFER



If you order the entire ten volume set of the Encyclopedia for the TRS-80*, you'll receive the tenth volume FREE!

10 Volume deluxe hard cover COLLECTOR'S EDITION — a \$199.50 value.
\$164.00 EN8100 postpaid

10 Volume soft cover edition, a \$109.50 value.
\$83.00 EN8080 postpaid



YES, I want your special offer!

___ 10 Volume deluxe hard cover COLLECTOR'S EDITION — a \$199.50 value. EN8100 \$164.00

___ 10 Volume soft cover edition — a \$109.50 value. EN8080 \$83.00

To order single hard cover volumes of the *Encyclopedia* please specify:

To order single soft cover volumes of the *Encyclopedia* please specify:

MAIL A COPY OF THIS FORM OR THE CARD PROVIDED TO:
 WAYNE GREEN BOOKS
 SALES DEPT., PINE ST.
 PETERBOROUGH, NH 03458
 OR CALL TOLL FREE
1-800-258-5473

To order **Encyclopedia Loader™** cassettes please specify:

- ___ Volume 1 EN8101 \$19.95*
- ___ Volume 2 EN8102 \$19.95*
- ___ Volume 3 EN8103 \$19.95*
- ___ Volume 4 EN8104 \$19.95*
- ___ Volume 5 EN8105 \$19.95*
- ___ Volume 6 EN8106 \$19.95*
- ___ Volume 7 EN8107 \$19.95*
- ___ Volume 8 EN8108 \$19.95*
- ___ Volume 9 EN8109 \$19.95*
- ___ Volume 10 EN8110 \$19.95*

- ___ Volume 1 EN8081 \$10.95*
- ___ Volume 2 EN8082 \$10.95*
- ___ Volume 3 EN8083 \$10.95*
- ___ Volume 4 EN8084 \$10.95*
- ___ Volume 5 EN8085 \$10.95*
- ___ Volume 6 EN8086 \$10.95*
- ___ Volume 7 EN8087 \$10.95*
- ___ Volume 8 EN8088 \$10.95*
- ___ Volume 9 EN8089 \$10.95*
- ___ Volume 10 EN8090 \$10.95*

- ___ Volume 1 EL8001 \$12.95*
- ___ Volume 2 EL8002 \$14.95*
- ___ Volume 3 EL8003 \$14.95*
- ___ Volume 4 EL8004 \$14.95*
- ___ Volume 5 EL8005 \$14.95*
- ___ Volume 6 EL8006 \$14.95*
- ___ Volume 7 EL8007 \$14.95*
- ___ Volume 8 EL8008 \$14.95*
- ___ Volume 9 EL8009 \$14.95*
- ___ Volume 10 EL8010 \$14.95*

PAYMENT ENCLOSED _____ PLEASE CHARGE TO MY _____ VISA _____ MASTERCARD _____ AMEX

CARD # _____ INTERBANK # _____ EXPIRES _____

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

SIGNATURE _____

*These prices do not include shipping and handling. Please add \$1.50 per item in the U.S. and Canada. Allow 4-6 weeks after publication date for delivery. (All volumes will be shipped UPS if the complete street address is provided; otherwise shipment will be 4th class book rate.) Foreign orders please add \$10.00 for airmail per item or \$5.00 for surface mail per item. Delivery outside the U.S. varies. Prices are subject to change without notice. No C.O.D.'s.



Get direct access to machine-language routines.

Command Interpreter

Roger C. Alford
2633 Braeburn Circle
Ann Arbor, MI 48104

I recently wrote some assembly routines for my TRS-80 allowing me to use it as a terminal, a device controller, and an interval timer; a small machine language monitor allows me to view and change memory locations. I placed these routines in ROM, but had to keep a small sheet of paper listing the routine entry addresses near my computer. I entered the desired routines using the System command, but found

this method inconvenient and error-prone. I wanted to enter a direct command such as Terminal to enter terminal mode, or Monitor to enter the machine language monitor. By carefully studying the Level II line input routine I created my own commands. These commands allow direct access to any machine language routine.

Line Input Routine

The Level II line input routine begins at location 05D9H. When it is called, the buffer beginning address (the area of memory where the characters are stored as they are entered) must be in the Z80's HL register pair; the maximum number of characters

allowed must be in the B register. The routine immediately pushes the HL pair onto the stack, and pops it back into the HL register pair before returning from the line input routine. The portion of the program that gets a character ends with a jump to the routine whose address is in locations 4016H-4017H. These locations hold the address of the keyboard driver routine (normally 03E3H), generally where the keyboard interception is made for key-debounce routines, including KBFIX.

When the line input routine jumps to the keyboard driver routine, the stack holds the key information for the command interpreter. The top of the stack holds the address of a routine at location 03DDH. This routine restores the DE, IX, HL, and BC register pairs by popping them off the stack and is executed following the return from the keyboard driver routine. When the routine at 03DDH is finished it returns control to the line input routine call point.

The HL register pair holds the address where the next character is to be stored. When a character is retrieved from the keyboard driver routine it is placed at the location pointed to by HL. The C register holds the maximum number of characters allowed in the input line (normally 240). The B register originally holds this same number, but is decremented after each charac-

ter. At the end of the line input routine, the B register contains the total number of characters entered (C minus B).

I call my command interpreter routine Cmdint. The Program Listing is a sample; choose your own commands and your own command service routines. I include a few commands for demonstration. Use your imagination to create commands for your own needs.

How It Works

The initialization sequence, executed only once, stores the keyboard driver routine address from locations 4016H-4017H in an unused area of memory (in non-disk systems), locations 4044H-4045H. It then stores the address of its own intercept routine Rout in locations 4016H-4017H. After these initializations, control returns to the Basic interpreter with the Rout routine ready to intercept and interpret the new commands.

When the line input routine requests a character, Rout is called. Rout then calls the real keyboard driver routine to get a

Program Listing

```

7000      00100      ORG      7000H
01C9      00110 CLEAR EQU      01C9H ;CLEAR SCREEN ROUT.
40A2      00120 CHKBAS EQU     40A2H ;CUR. LINE RUNNING I
N BASIC
4016      00130 INROUT EQU     4016H ;LOC. OF INPUT ROUT.
06CC      00140 BASIC EQU     06CCH ;BASIC ENTRY POINT
4044      00150 STROUT EQU     4044H ;STOR. INPUT ROUT. A
DDR.
4046      00160 SPTMP EQU     4046H ;TEMP STOR FOR SP.
28A7      00170 PRMSG EQU     28A7H ;PRINT MSG ROUT.
40A7      00180 BUFFER EQU     40A7H ;LOC OF INPUT BUFFER
4048      00190 SAVCHR EQU     4048H ;TEMP STOR FOR CHAR
0 (HL)
000D      00200 RETURN EQU     00D
00210 ;
7000 2A1640 00220 CMDINT LD      HL,(INROUT) ;GET CUR. IN
PUT ROUT ADDR
7003 224440 00230      LD      (STROUT),HL ;STOR FOR LA
TER USE
7006 210F70 00240      LD      HL,ROUT ;GET YOUR IN
TCPT ROUT ADDR
7009 221640 00250      LD      (INROUT),HL ;STOR IN INP
ROUT ADDR LOC
700C C3CC06 00260      JP      BASIC ;RETURN TO B
ASIC
00270 ;*****
*****
00280 ;* ROUT INTERCEPTS THE INPUT FROM THE KEYBOA

```

Program continues

The Key Box

Basic Level II
Model I
32K RAM

character from the keyboard. Rout checks the characters for a carriage return and then checks the entered line for a match with its command table. If a Return was not entered, the character returns to the line input routine without further processing.

When Rout gets a Return, it checks that the input line was not requested from a running Basic program. If the line was called from a running program, it is returned without further ado. If the line was not called from a running program, Rout gets the HL value from the stack and returns it to the HL register pair. HL then points to where the next character is to be stored. Rout gets the character currently at this location and stores it for later replacement (necessary because of the Level II Basic line editor). Rout stores the return (ODH) in the location pointed to by HL, then checks for a command match.

At the bottom of the program is a table of commands (TABLE). Each command is followed by a 0 byte; the last command in the table ends with two 0 bytes. A command number counter, the B register, is initially zeroed. The first entry in the command table is compared character by character to the characters in the line input buffer. If there is no match, the command number counter is incremented and the next entry in the command table is checked. This continues until the table is depleted or a match is found.

If the table is depleted, everything returns to the line input routine, where the Level II monitor processes it as a normal input line. If a match was found, the program finds the service routine corresponding to the matched command. This is accomplished with the command number counter and ADRTBL, a table containing the addresses of the command service routines. The addresses must be in ADRTBL in the same order as the corresponding command in TABLE; there must be exactly one entry in ADRTBL for each entry in TABLE.

Since addresses are each two bytes, the command number counter is multiplied by two (ac-

complished by a shift left); the result is the displacement from the beginning of ADRTBL to the command service routine address. This displacement is added to the address of ADRTBL and the result is placed in HL. Finally, a jump gives control to the command service routine.

Caution: If the command service routine intends to return to the Level II monitor without returning the current line in the input buffer, it must end with JP OUT1. OUT1 clears the buffer so the Level II monitor sees a Return entered but no other characters. If the service routine wishes to return the contents of the unchanged input buffer to the Level II monitor, it should end with a JP OUT2.

Modified Buffer Contents

You may change the contents of the input buffer and return the new contents to the Level II monitor. This can be done very easily; see examples in the CMD4 and CMD5 routines in Listing 1. CMD4 changes Lsit to List and returns the modified buffer to the Level II monitor. (I often accidentally enter Lsit when I wish to list a program.) The Level II monitor will interpret both Lsit and List as List.

The CMD5 routine changes the letter L into the word List. List a program by Entering the letter L.

When the line input routine requests a character, Rout is called. Rout then calls the real keyboard driver routine to get a character from the keyboard. Rout checks the characters for a carriage return (Enter) and then match with its command table. If a Return was not entered, the character returns to the line input routine without further processing.

If you use a keyboard debounce routine (KBFIX) enter it in the normal manner, before loading the command interpreter routine. This allows Cmdint to use the keyboard routine, while maintaining proper operation. ■

Mr. Alford studies Computer Engineering at the University of Michigan, Ann Arbor part time. He also works full-time as a system support engineer for ICM Systems, Inc., in Ann Arbor.

Program continued

```

RD. *
*      00290 ;* IF A RETURN IS ENTERED IT FIRST CHECKS TO
*
*      00300 ;* SEE IF THE INPUT IS FROM A RUNNING BASIC
*
*      00310 ;* PROGRAM. IF IT IS, THE LINE IS RETURNED
*
*      00320 ;* WITHOUT FURTHER PROCESSING. IF THE LINE
*
*      00330 ;* IS INPUT IS FROM COMMAND MODE, THE ENTERE
D *
*      00340 ;* COMMAND IS CHECKED TO SEE IF IT MATCHES O
NE *
*      00350 ;* OF THE COMMANDS IN THE COMMAND TABLE. IF
*
*      00360 ;* IT DOES, THE ROUTINE CORRESPONDING TO THE
*
*      00370 ;* COMMAND IS EXECUTED AND CONTROL IS LATER
*
*      00380 ;* RETURNED WITH THE BUFFER CLEARED. IF NO
*
*      00390 ;* MATCHING COMMAND IS ENTERED, THE INPUT
*
*      00400 ;* LINE IS RETURNED IN ITS ORIGINAL CONDITIO
N. *
*      00410 ;*****
*****
700F 211770 00420 ROUT LD HL,NXTINS ;PREP TO CAL
L INPUT ROUT
7012 E5 00430 PUSH HL ;PUT RETN AD
DR ON STACK
7013 2A4440 00440 LD HL,(STROUT) ;GET INPUT R
OUT ADDR
7016 E9 00450 JP (HL) ;CALL ROUTIN
E
7017 FE0D 00460 NXTINS CP RETURN ;RETURN ENTE
RED YET?
7019 C8 00470 RET NZ ;NO, RETURN
TO CALL
701A 3AA240 00480 LD A,(CHKBAS) ;IS LINE PRO
M BASIC PROG?
701D FEFF 00490 CP 0FFH
701F C28B70 00500 JP NZ,OUT2 ;YES, RETURN

7022 3AA340 00510 LD A,(CHKBAS+1)
7025 FEFF 00520 CP 0FFH
7027 C28B70 00530 JP NZ,OUT2 ;YES, RETURN

702A 3E0D 00540 LD A,RETURN ;NOT A BASIC
PROGRM

```

Program continues

LETTERHEADS

Is Your Image worth the Investment

We will Print any Letterhead in any Color for Only \$186.50 for 1000, \$210.50 for 2500.

For under \$100.00 we will attach your existing Letterhead to a Carrier Sheet. In quantities of 500.

Stock Computer Paper & Labels over 50 stock items at the lowest price anywhere.

Send Inquiries or Call: (313) 758-6629

WHITE RIVER PRODUCTS

P.O. BOX 604

MT. CLEMENS, MICHIGAN 48043

✓ 364

Name _____

Street _____ Phone _____

City & State _____ Zip _____

Type of Equipment _____

FREE
SEND FOR
YOURS TODAY

Stock Price List

***** **PRO-DEBUG** *****

For **TRS-80 Model II & III**

SINGLE STEP - Through any area of memory

LOOP - Through subroutines

CALL - Subroutines & programs from keyboard

VIEW -

- Z-80 registers & memory pointed to
- Stack pointer & stack contents
- PC. with it's instructions
- Instructions in both opcode & mnemonics

HUNT - Memory for word

MODIFY - Z-80 registers & any area of memory

DISASSEMBLE - Any area of memory into opcode, mnemonics & ascii

**THIS PLUS 23 ADDITIONAL
COMMANDS FOR \$45.00**

***** **PRO-BASIC** *****

Basic Enhancements For Model II & III

FEATURES INCLUDE

- | | |
|------------------|-------------|
| * PRO-ANGLES | * PRO-DEBUG |
| * PRO-LABELS | * PRO-KEYS |
| * PRO-EXTENSIONS | * PRO-MACH |
| * PRO-WORDS | * PRO-CRT |
| * PRO-EDIT | * PRO-FILES |
| * PRO-SORT | * PRO-VRS |
| * PRO-FUNCTIONS | * PRO-GRAPH |

\$195.00 This includes the right to use Pro-Basic in programs you write for resale

***** **PRO-NC** *****

Numerical Control For Model II

- * Driver for papertape punch & reader
- * Plot tool path
- * Solve print geometry
- * Machine limitation error checking
- * Machine post processors
- * Canned cycles, thread, bolt circle, fastrn plus others on request

TRS-80 is a registered trademark of Tandy Corp.

PRO-80-SYSTEMS

**3206 Center Street
Cedar Falls, IA 50613
319-266-4262 or 319-233-6111**

253

Program continued

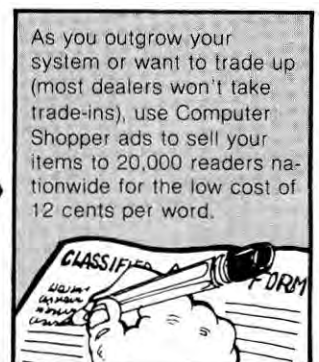
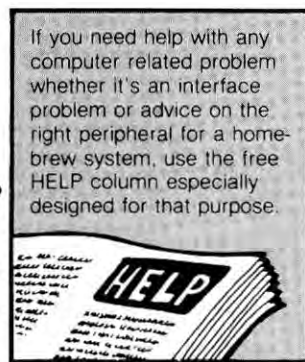
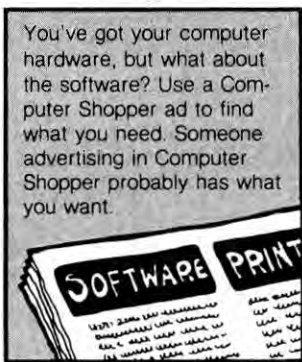
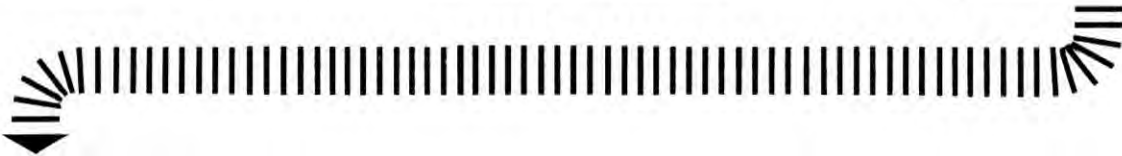
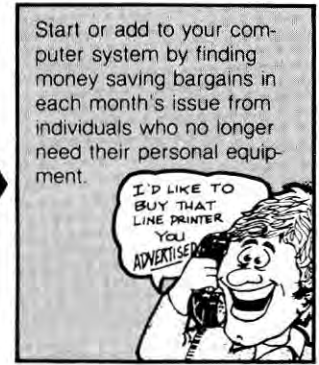
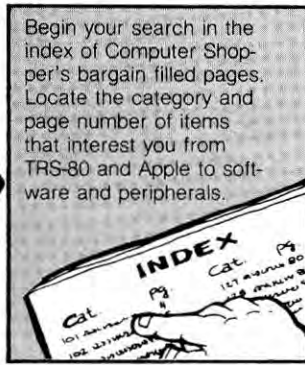
702C ED734640	00550	LD	(SPTEMP),SP	;SAVE STACK
PTR				
7030 DD2A4640	00560	LD	IX,(SPTEMP)	;PREP TO IND
EX FROM SP				
7034 DD6E06	00570	LD	L,(IX+6)	;GET CUR. BU
FFER PTR				
7037 DD6607	00580	LD	H,(IX+7)	
703A 7E	00590	LD	A,(HL)	
703B 324840	00600	LD	(SAVCHR),A	;TEMP. SAVE
CHAR.				
703E 3E0D	00610	LD	A,0DH	
7040 77	00620	LD	(HL),A	;STORE RETN
CHAR IN BUF				
7041 11E570	00630	LD	DE,TABLE	;CHECK CMD T
ABLE FOR CMD				
7044 0600	00640	LD	B,0	;B REG IS CM
D # COUNTER				
7046 2AA740	00650	LOOP1	LD HL,(BUFFER)	;GET ADDR OF
BUFFER				
7049 1A	00660	LOOP	LD A,(DE)	;GET CHAR FR
OM CMD TABLE				
704A BE	00670	CP	(HL)	;EQU TO CHAR
IN BUF?				
704B 2004	00680	JR	NZ,NOPE	;NO, SEE IF
END OF CMD				
704D 13	00690	INC	DE	;YES, CHK NE
XT CHAR				
704E 23	00700	INC	HL	
704F 18F8	00710	JR	LOOP	
	00720			
7051 B7	00730	NOPE	OR A	;IS CHR ZERO
, END OF CMD?				
7052 2013	00740	JR	NZ,DONE	;NO, CHECK N
EXT CMD				
7054 7E	00750	LD	A,(HL)	;IS CHAR IN
BUF A RETN?				
7055 FE0D	00760	CP	RETURN	
7057 200E	00770	JR	NZ,DONE	;NO, CHK NEX
T CMD				
7059 CB20	00780	SLA	B	;MULT. CMD #
CTR BY 2				
705B 48	00790	LD	C,B	;PREP TO FIN
D ROUT ADDR				
705C 0600	00800	LD	B,0	;ADD DISPL T
O ADDR TABLE				
705E 210371	00810	LD	HL,ADRTBL	;GET ADDR OF
ADDR TABLE				
7061 09	00820	ADD	HL,BC	;PT TO ADDR
OF CMD ROUT				
7062 5E	00830	LD	E,(HL)	;PUT ADDR IN
DE				
7063 23	00840	INC	HL	
7064 56	00850	LD	D,(HL)	
7065 EB	00860	EX	DE,HL	;PUT ADDR IN
HL				
7066 E9	00870	JP	(HL)	;GO TO ROUTI
NE				
	00880			
7067 1A	00890	DONE	LD A,(DE)	;FIND BEG OF
NEXT CMD				
7068 B7	00900	OR	A	;ZERO?
7069 2803	00910	JR	Z,NXTZ	;YES, CONT
706B 13	00920	INC	DE	;CHK NXT BYT
E				
706C 18F9	00930	JR	DONE	
706E 13	00940	NXTZ	INC DE	;PT TO NEXT
BYTE				
706F 04	00950	INC	B	;INC CMD # C
COUNTER				
7070 1A	00960	LD	A,(DE)	;ANY MORE CO
MMANDS?				
7071 B7	00970	OR	A	
7072 20D2	00980	JR	NZ,LOOP1	;YES, CHECK
CMD				
7074 1815	00990	JR	OUT2	;NO MOR CMD,
RETRN AS IS				
01000				;*****

01010				;* A JUMP TO OUT1 MUST BE USED AT THE END OF
*				
01020				;* EVERY COMMAND SERVICE ROUTINE. THE OUT1
*				
01030				;* ROUTINE EFFECTIVELY CLEARS THE INPUT BUFF
ER *				
01040				;* SO THAT THE LEVEL II COMMAND INTERPRETER
*				
01050				;* WILL NOT GIVE A SYNTAX ERROR FOR THE
*				
01060				;* COMMAND. ALL OF THE NECESSARY POINTERS
*				
01070				;* ARE CHANGED BY CHANGING THE APPROPRIATE
*				
01080				;* LOCATIONS ON THE STACK.
*				
01090				;*****

7076 DD2A4640	01100	OUT1	LD IX,(SPTEMP)	;GET STACK P
TR ADDR				
707A DD7E08	01110	LD	A,(IX+8)	;SET # OF CH
RS TO ZERO				
707D DD7709	01120	LD	(IX+9),A	
7080 2AA740	01130	LD	HL,(BUFFER)	;GET BUFFER
ADDRESS				
7083 DD7506	01140	LD	(IX+6),L	;PUT CHR PTR
TO BG OF BUF				
7086 DD7407	01150	LD	(IX+7),H	
7089 180E	01160	JR	OUT3	
708B DD2A4640	01170	OUT2	LD IX,(SPTEMP)	;LOAD SP
708F DD6E06	01180	LD	L,(IX+6)	;PREP TO RST
OR SAVED CHAR				
7092 DD6607	01190	LD	H,(IX+7)	
7095 3A4840	01200	LD	A,(SAVCHR)	;GET CHAR
7098 77	01210	LD	(HL),A	;REPLACE
7099 3E0D	01220	OUT3	LD A,RETURN	;RETURN A RE

Program continues

How to Buy or Sell Computer Equipment and Software



Computer Shopper is THE nationwide magazine for buying, selling and trading Micro and Mini-computer equipment and software. Each issue has over 60 pages full of bargains of new and used equipment.

You can save hundreds of dollars by getting the equipment you need from the hundreds of classified ads individuals place in Computer Shopper every month.

Now is the time for you to join over 20,000 other computer users who save time and money with a subscription to Computer Shopper.

Subscribe today and get your first issue and a classified ad absolutely FREE. Type or print your ad on a plain piece of paper and send it along with your subscription.

Just fill in the coupon or MasterCard or VISA holders can phone **TOLL FREE 1-800-327-9920** and start making your computer dollar go further today.

Cut out and mail to: **COMPUTER SHOPPER**
P.O. Box F138 • Titusville, FL 32780

Yes, I'll try Computer Shopper, I understand that if I'm not satisfied with my first issue I can receive a full refund and keep the first issue free.

1 year \$10.00 (\$30.00 in Canada)

I have enclosed my free classified ad.

I want to use my free ad later, send me a coupon.

NAME: _____

ADDRESS: _____

CITY: _____

STATE: _____ ZIP: _____



- * SUPPORTS ALL MX-80 PRINT STYLES
- * WORDPROCESSING TEXT CONTROL MODE
- * MENU MODE FOR GENERAL APPLICATION
- * TRUE PROPORTIONAL JUSTIFICATION

- * UNDERLINES ANYWHERE
- * SUBSCRIPTS
- * DYNAMIC CONTROL OF LINE SPACING IN 1/72 IN. INCREMENTS
- * DYNAMIC CONTROL OF MARGINS
- * WORKS WITH MOST PROGRAMS INCLUDING SCRIPBIT™
- * CENTERS TITLES
- * SUPERSCRIPTS

Maxprint is an extraordinary user oriented printer driver utility program which allows you to select any MX-80 print style or function such as underlining on a character by character basis within word processing text. Maxprint also features proportional right margin justification within a block of standard text to give your printout a truly professional appearance.

Maxprint consists entirely of Z-80 machine language for fastest possible printing performance. Minimum system requirements are a 32K Model I or Model III with one disk drive.

Unleash the true potential of your MX-80. Maxprint is supplied on disk with an extensive 40 page manual and shipping for only:

**** \$27.95 ****

TO ORDER: Call (408) 737-2253 Visa / Mastercard
Send check or money order to:
Peggytronics,
381 First Street, Suite 5147
Los Altos, California 94022

CA residents add 6% sales tax // Scripsit TM of Tandy Corp.

✓ 333

\$ \$ SAVE \$ \$

Internal Disk Drives for the TRS-80® Model III

1st Disk Kit Includes

- 40 TRK disk drive
- Switching power supply
- Floppy disk controller
- All cables & hardware

ONLY **\$489⁰⁰**

2nd 40trk Disk Drive

ONLY **\$239⁰⁰**

MICRO R&D

P.O. Box 746
Rialto, CA 92376 (714) 875-2968

® Registered Trademark of Tandy Corporation

✓ 387

Program continued

```

TURN
709B C9      01230      RET
              01240      ;
              01250      ;*****
              *
              * 01260 ;* THESE ROUTINES, CMD1 THROUGH CMD5, ARE
              * 01270 ;* MERELY TO SHOW SAMPLE USE OF COMMAND
              * 01280 ;* SERVICE ROUTINES. THESE HERE DO NOTHING
              * 01290 ;* MORE THAN MERELY PRINT MESSAGES, EXCEPT C
MD4          * 01300 ;* WHICH CHANGES THE 'LSIT' COMMAND TO 'LIST
              * 01310 ;* IN "REAL LIFE" ANY ROUTINE MAY BE USED IN
              * 01320 ;* PLACE OF THESE TO PERFORM ANY DESIRED FUC
TION.        * 01330 ;* THERE DOES NEED TO BE A ROUTINE FOR EVERY
              * 01340 ;* IN THE COMMAND TABLE, BUT TWO OR MORE COM
COMMAND      * 01350 ;* CAN USE THE SAME ROUTINE. ALL ROUTINES M
MANDS        * 01360 ;* END WITH A 'JP OUT1' IN ORDER TO RETURN T
UST          * 01370 ;* IN THE PROPER WAY, UNLESS THE RETURN IS I
O BASIC     * 01380 ;* TO RETURN THE CONTENTS OF THE INPUT BUFFE
NTENDED     * 01390 ;* CALLING ROUTINE, AS IS THE CASE OF THE CM
R TO THE    * 01400 ;* ROUTINE BELOW - WHICH MUST USE A 'JP OUT2
D4          * 01410 ;*****
              *
              * 01420 ;
              * 01430 CMD1 LD HL,TRMSG ;PRINT TERMI
NAL MESSAGE 01440 CALL PRMSG
709F CDA728 01450 JP OUT1
70A2 C37670 01460 ;
              *
70A5 212C71 01470 CMD2 LD HL,MONMSG ;PRINT MONIT
OR MESSAGE
70A8 CDA728 01480 CALL PRMSG
70AB C37670 01490 JP OUT1
              *
              * 01500 ;
              * 01510 CMD3 LD HL,TSTMSG ;PRINT TEST
MESSAGE
70B1 CDA728 01520 CALL PRMSG
70B4 C37670 01530 JP OUT1
              *
              * 01540 ;
              * 01550 CMD4 LD HL,(BUFFER)
70B7 2AA740 01560 INC HL
70BA 23 01570 LD (HL),'I'
70BB 3649 01580 INC HL
70BD 23 01590 LD (HL),'S'
70BE 3653 01600 LD (HL),'S'
70C0 C38B70 01610 JP OUT2
              *
              * 01610 ;
              * 01620 CMD5 LD HL,(BUFFER)
70C3 2AA740 01630 INC HL
70C6 23 01640 LD (HL),'I'
70C7 3649 01650 INC HL
70C9 23 01660 LD (HL),'S'
70CA 3653 01670 INC HL
70CC 23 01680 LD (HL),'T'
70CD 3654 01690 INC HL
70CF 23 01700 LD IX,(SPTMSG)
70D8 DD2A4640 01710 LD (IX+6),L
70D4 DD7506 01720 LD (IX+7),H
70D7 DD7487 01730 LD A,(IX+8)
70DA DD7E08 01740 SUB 4
70DD D684 01750 LD (IX+9),A
70DF DD7709 01760 JP OUT3
70E2 C39970 01770 ;
              *
70E5 54 01780 TABLE DEFM 'TERMINAL' ;COMMAND 1
70E8 00 01790 DEFM 0
70EE 4D 01800 DEFM 'MONITOR' ;COMMAND 2
70F5 00 01810 DEFM 0
70F6 54 01820 DEFM 'TEST' ;COMMAND 3
70FA 00 01830 DEFM 0
70FB 4C 01840 DEFM 'LSIT' ;COMMAND 4
70FF 00 01850 DEFM 0
7100 4C 01860 DEFM 'L' ;COMMAND 5
7101 00 01870 DEFM 0
7102 00 01880 DEFM 0 ;END OF COMM
ANDS
              *
7103 9C70 01890 ;
1 ROUTE 01900 ADRTBL DEFW CMD1 ;ADDR OF CMD
7105 A570 01910 DEFW CMD2 ;ADDR OF CMD
2 ROUTE
7107 AE70 01920 DEFW CMD3 ;ADDR OF CMD
3 ROUTE
7109 B770 01930 DEFW CMD4 ;ADDR OF CMD
4 ROUTE
710B C370 01940 DEFW CMD5 ;ADDR OF CMD
5 ROUTE
              *
710D 0D 01950 ;
710E 59 01960 TRMSG DEFM 0DH
E** 01970 DEFM 'YOU ARE NOW IN TERMINAL MOD
              *
712B 00 01980 DEFM 0
712C 0D 01990 MONMSG DEFM 0DH
712D 59 02000 DEFM 'YOU ARE NOW IN THE MONITOR'
              *
7147 00 02010 DEFM 0
7148 0D 02020 DEFM 0DH
7149 54 02030 DEFM 'THIS IS A TEST'
7157 00 02040 DEFM 0
7158 0D 02050 HLPMSG DEFM 0DH
7159 54 02060 DEFM 'THIS IS THE HELP ROUTINE'
7171 00 02070 DEFM 0
7000 02080 END CMDINT
00000 TOTAL ERRORS

```


Give Your TRS-80* a Tremendous Boost with RACET COMPUTES Software

**RACET COMPUTES Utility Software makes the TRS faster, more efficient,
and easier to use. Our programming aids improve your productivity.
Our reputation is for products that are professional in design
and work as advertised!!!**

FIELD PROVEN

7½ to 30 MEGABYTES On Line for the TRS-80* Model II

Now you can use RACET's HSDS with the ARM Winchester Disk Drive on the Model II. This cost effective combination provides 15 Megabytes per drive including ECC Error Correction Code and an advanced sequencer to further ensure data integrity. An incremental backup to floppy is provided so that only those sectors that were changed from the last backup are saved. A full monthly service contract is available at \$30 per month per drive.

The Hard/Soft Disk System (HSDS) Software has more than One Year's FIELD Experience. The latest HSDS version adds several enhancements including maintenance of system files on the hard drive, files as large as the disk, the ability to segment the disk as logical drives, definable directory size, and many utilities including bulk copies between floppy and hard drives, multiple purge, Superzap, and Directory Catalog System. Full program compatibility with TRSDOS 2.0a is maintained. Mixed floppy and hard drive operation is supported.

HSDS is available for the Cameo, Cynthia Bull, Corvus, Data Peripherals, and Santa Clara Systems hard disk systems as well as the ARM Winchester Drive.

ARM 15 Megabyte Drive Subsystem \$3895 • HSDS Software \$400 • Cameo 5/5 Cartridge Drive Subsystem \$5995 • Cynthia Bull 10/10 Drive Subsystem \$7995

NEW PRODUCT ★ MODEL II FAST BACKUP UTILITY ★ \$75

5 to 10 times faster backups!!! Full disk backup (including verify) 55 seconds!!! on two drive system — 2:15 on single drive system. In business, time is money, and one BACKUP is worth 1000 tears!!

NEW PRODUCT ★ INTEGRATED BUSINESS SYSTEM ★

ISAM File Structure — Multi-Company Capability, Modular structure. Each module includes complete user documentation which guides the user through installation and allows "practice" using a sample data base. When ready, the user simply names his data base and begins.

The Integrated Business System program set includes General Ledger, Accounts Receivable, Accounts Payable, Payroll, Inventory, General Journal, Asset Management and more.

Features include:

- Multiple data base capability
- ISAM file structure
- 500 multi-purpose forms with order
- Menu driven
- Complete end-of-period processing
- Easy to follow installation procedures
- Multi-company
- Rapid response and fast operation
- No need to have preprinted forms
- User friendly data entry screens
- 80- and 132-column printers
- Automated clerical error detection

Business Programs \$250/module Mod III, \$300/module Mod II, \$795 for all four Mod III, \$995 for all four Mod II. General Ledger and Accounts Receivable available now. Accounts Payable and Payroll 1st Quarter 1982.

RACET COMPUTES UTILITIES and PROGRAMMER AIDS

Renodel + Proload for Mod I and III \$35 Renumber utility with partial renumpers, text moves plus tape merge. A must for tape based systems. **Generalized Subroutine Facilities (GSF) Mod I \$25, Mod III \$30, Mod II \$50** The STANDARD against which all other sorts are compared! And then compare price!!! Multi-key multi-variable and multi-key character string sorts. Includes zero and move arrays and sample programs. **DISCAT Diskette Cataloging System Mod I and Mod III \$50** This comprehensive Diskette Cataloging/Indexing utility allows the user to keep track of thousands of programs in a categorized library. Machine language program works with TRSDOS and NEWDOS versions (please specify). Files include program names and extensions, program length, diskette numbers. **COMPROC Command Processor Mod I and Mod III \$30** Auto your disk to perform any sequence of instructions that you can give from the keyboard!! Ideal for setting up dedicated applications. **Infinite BASIC Mod I \$50, Mod III \$60** Extends Level II BASIC with complete Matrix Functions and 50 more string functions. Includes RACET in-memory sorts!! Select only those functions you want to optimize memory. **Infinite BUSINESS (Requires Infinite BASIC) Mod I and Mod III \$30** Complete printer pagination controls, hash codes, binary array search, and packed decimal arithmetic (127-digit accuracy). **Disk Sort/Merge (DSM) Mod I \$75, Mod III \$90, Mod II \$150** All machine language stand-alone Random file sort package. Establish sort specification in a simple BASIC command file. Sorts multiple-diskette files. Only operator action is to switch diskettes when instructed. Super fast sort times — improved disk I/O makes this the fastest Disk Sort/Merge available. **KFS-80 Keyed File System Mod I and Mod III \$100, Mod II \$175** Machine language BASIC utility provides keyed and sequential access to multiple files. Simple interface to BASIC. Binary tree index system provides rapid access to records. **Utility Package Mod II \$150** Recover blown diskettes. Includes Superzap, bulk copies, and other utilities for repair of blown diskettes. Complete documentation on diskette structure and guidance for repair. Other utilities include Dynamic DEBUG (with single-step, trace, subroutine calling, program looping and more), XCR, DISKID, Directory Catalog System, XPURGE. **Development Package Mod II \$125** Includes RACET Superzap, Apparatus Disassembler and Model II interface to Microsoft's Editor Assembler Plus*. Purchase price includes complete copy of Editor Assembler + documentation for Mod I and uploading service. Assemble directly into memory, MACRO facility, save all or portions of source to disk, extended editor commands. **Basic Cross Reference Utility Mod II \$50** SEEK and FIND functions for variable, line numbers, strings, keywords. 'All' options available for line number and variables. Load from BASIC — call with control 'R'. Output to screen or printer. **Maillist Mod I and Mod III \$75, Mod II \$150** ISAM-based maillist. Four keys — no separate sorting. Supports 9-digit ZIP code and up to 30 attributes.

CHECK, VISA, M/C, C.O.D., PURCHASE ORDER
TELEPHONE ORDERS ACCEPTED (714) 997-4950

CIRCLE READER REQUEST FOR FREE CATALOG
*TRS-80 IS A TRADEMARK OF TANDY CORPORATION

RACET COMPUTES LTD.
1330 N. GLASSSELL, SUITE M, ORANGE, CA 92667

✓41



Try this if you can't buy what you need.

Model III Master Directory

Wilbur A. Muehlig, M.D.
726 N. 91 Plaza, #305
Omaha, NE 68114

My search for a master directory program for my TRS-80 was frustrating. One I found required two disk drives,

but I only had one. Another called for 48K memory but I had only 32K. I sold my Model I and got a Model III. Soon after, I saw an advertisement for a Model III directory program which was also unsatisfactory for my purposes.

Commercial programs use special methods to read disk di-

rectories. Realizing this is needed only once to make a disk file of program names and disk numbers, I decided to write my own program in Basic, using the alphabetic sort supplied with Model III TRSDOS. You must enter a list of your programs, but deleting, correcting or adding programs is easily done.

cludes file entries, alphabetic sorting and reviewing the list.

Print Using statements keep video and hard copy vertically aligned. Only 16 spaces are planned, 12 for the file name, a blank, and three for the disk number (FILENAME/EXT ###). The file name may be as short as you like, but you should fill in the extra spaces with blanks. If the entry does not have 16 spaces, the program will reject it and repeat the same index number. Place the disk number as far to the right as possible; you should place a single number in the 16th position. If you include more information, such as passwords or how many K in each program, change the Print Using statements in lines 570 and 1030, change lines 515 and 516, decrease the number of columns printed on a page (line 1040), and make the numeral in line 1270 equal to the total length of the Print Using format.

Remember to load any previous entries from disk before adding new entries. When you use menu option 1 to review the entries, the scrolling stops after every 15 lines. The sorting has already been done. You can stop the listing while it is moving by pressing S. Enter S when the scrolling has stopped to return to Menu. Enter R to back up the video display to the preceding page.

If you wish to include the amount of free space on each disk make your entries as follows: AAA ####K ###, where the

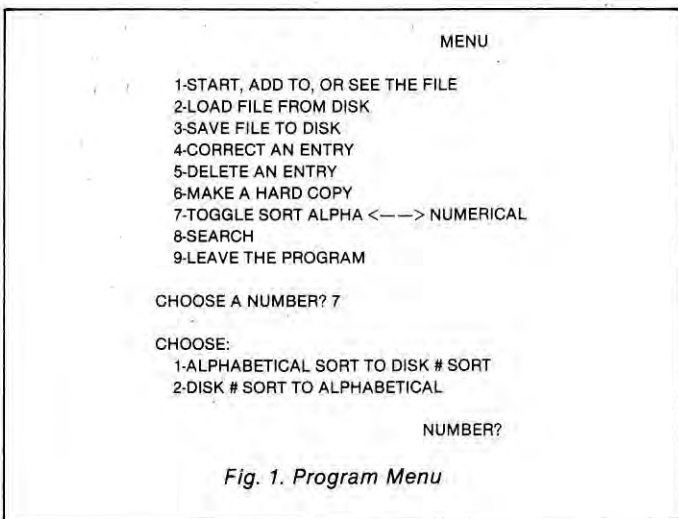


Fig. 1. Program Menu

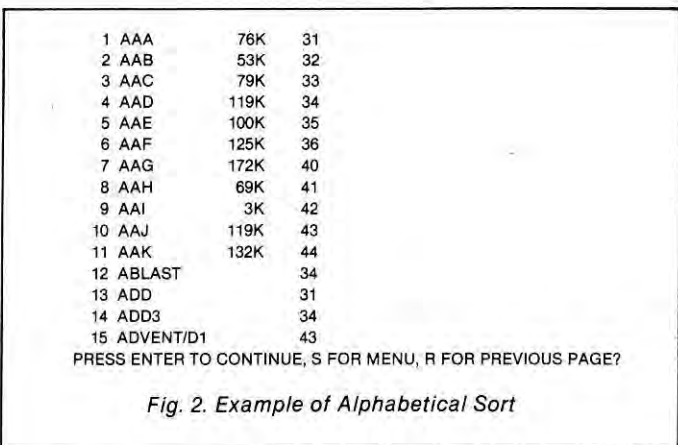


Fig. 2. Example of Alphabetical Sort

The Hardware

The program is written for a 32K Model III with one disk drive. Use TRSDOS with the machine language sort or a DOS with a similar sort for the index program; all other disks may use any DOS. The program runs on a Model I if you insert an alphabetic sorting program at line 550 (with a GOSUB). A printer is not essential but a printed index is a great convenience.

32K should handle at least 600 programs. The program itself is about 6K, 6.5K with remarks, and when running uses an additional 13K.

The Program

Menu item 1 (see Fig. 1) in-



first ### is the number of K on the disk and the second is the disk number. The program sorts these entries to come before the program files. If they all start with AAA, the program arranges them with the lowest number of K first. A better idea is to use AAB, AAC, etc. for increasing disk numbers so they will be sorted by disk number (Fig. 2).

If you prefer, you may list grants. Model III grants are converted to K by multiplying by 768.

The index number, which appears to the left of the file name, is needed to correct an entry (menu option 4) or delete an entry (menu option 5). You can ob-

tain the entry number by using Search (menu option 8). Both the correct and delete functions print the entry for you to see before proceeding. The delete function rearranges the entries so a blank is not left.

Printout (menu option 6) is planned for three columns of 54 lines, a total of 162 programs on a page. If your printer has a better way of setting the margin than Tab, change lines 1000 and 1040.

The sort function (menu option 7) gives two choices. The first places the disk numbers in front of the file names so the sort will be by disks. The programs on each disk will be in al-

phabetical order. You may cut up a printout of this and paste it to your disk jackets. (The Model III sort does not do numerical sorts, but the disk numbers are part of the string.) The second choice restores the entries to their original form.

You can use any part of the file name or disk number and as few as two characters in the search function (menu option 8). Using longer segments yields more accurate program location. Misspelling results in failure. If you do not want the first program found, press Enter to continue searching. Enter M to return to Menu. You can use the search

function to locate programs for correction or deletion; to locate programs with the same extension, such as /CMD; and in place of a printed alphabetical list. If you don't have a printer, this feature is helpful; paging through the video alphabetical list is tedious.

The final menu item reminds you to save the file to disk if you have not done so. It also closes the file in case an error has left it open. ■

Dr. Muehlig is a Retired neurosurgeon. He is also the author of several articles regarding the TRS-80.

Program Listing

```

0 **** A MASTER DIRECTORY PROGRAM ***
1 **** FOR THE TRS-80 MODEL III ***
2 **** WILBUR A. MUEHLIG, M.D. ***
3 **** 726 N. 91 PLAZA, # 305, ***
4 **** OMAHA, NEBR. 68114 ***
50 CLEAR1000:DEFINTX,B:DEFSTRA:DIMA(1000):X=0
60 CLS:PRINT0470,"MASTER DISK INDEX":FORZ=1TO700:NEXT
70 CLS:PRINT:PRINT:PRINT:PRINT:PRINT
80 INPUT"Do you want instructions (Y/N)";I$
90 IF I$="Y" GOTO 1500
100 CLS:PRINT:REM * USE DOWN ARROW TO ALIGN ITEMS WHEN TYPING
    * IN THE NEXT TWO LINES.
110 PRINT"          MENU
    1-START, ADD TO, OR SEE THE FILE
    2-LOAD FILE FROM DISK
    3-SAVE FILE TO DISK
    4-CORRECT AN ENTRY"
120 PRINT"          5-DELETE AN ENTRY
    6-MAKE A HARD COPY
    7-TOGGLE SORT ALPHA <--> NUMERICAL
    8-SEARCH
    9-LEAVE THE PROGRAM"
130 PRINT:INPUT"          CHOOSE A NUMBER";Z
140 ON Z GOTO 500,600,700,800,900,1000,1200,1300,1400
500 X=X+1:CLS:PRINT:PRINT"WHEN FINISHED WITH INPUTS OR TO SEE THE
FILE, PRESS ENTER AN          EXTRA TIME. TO STOP THE FILE PRI
NTING, PRESS 'S'.":PRINT:PRINT"EACH ENTRY MUST BE 16 SPACES LONG."
:PRINT
510 PRINTX;:INPUT"PROGRAM FILE NAME AND DISK #";A(X)
512 IF A(X)=" GOTO 550
515 IF LEN(A(X))<16PRINT"          TO
O SHORT! TRY AGAIN.":GOTO 510
516 IF LEN(A(X))>16PRINT"          TO
O LONG! TRY AGAIN.":GOTO 510
530 X=X+1
540 GOTO 510
545 REM * REMOVE THE X THAT IS NULL AND CALL THE SORT PROGRAM
550 X=X-1:CMD"O",X,A(1)
555 CLS
560 FOR B = 1 TO X
570 PRINTUSING"#### %          ";B;A(B)
575 IF INKEY$="S" GOTO 100:REM * NOT ESSENTIAL!
580 IF B/15 = INT(B/15) INPUT"PRESS ENTER TO CONTINUE, S FOR MENU,
R FOR PREVIOUS PAGE";Z9$:CLS
585 IF Z9$="S":CLS:Z9$="":GOTO100
    REM * IF YOU DON'T 'NULL' Z9$, NEXT TIME THROUGH *
    * PRESSING ENTER WILL SEND YOU TO THE MENU *
586 IF Z9$="R" THEN Z9$="":B=B-30:REM * A NICE TOUCH
590 NEXT
595 INPUT"PRESS ENTER TO CONTINUE";Z9:GOTO100
600 ON ERROR GOTO 1450
605 PRINT:PRINT"LOADING FILE FROM DISK....."
610 OPEN"1",1,"IND/FILE"
620 INPUT1,X:REM * X IS THE TOTAL NUMBER OF ITEMS
630 FOR B = 1 TO X
640 INPUT1,A(B)
650 NEXT:CLOSE
660 GOTO 100
700 IF A(1)=" THEN PRINT"FILE EMPTY":INPUT"PRESS ENTER";Z:GOTO 100
710 PRINT:PRINT"SAVING FILE TO DISK....."
720 OPEN"O",1,"IND/FILE"
730 PRINT1,X
740 FOR B = 1 TO X
750 PRINT1,A(B)
760 NEXT:CLOSE
780 GOTO 100
800 CLS:PRINT:PRINT:PRINT:PRINT:PRINT
820 PRINT:INPUT"WHICH NUMBER DO YOU WISH TO CORRECT";B
840 PRINT:PRINTB;A(B)
860 PRINT:INPUT"TYPE CORRECT ENTRY. IF OK AS IS, PRESS ENTER";A(B)
870 GOTO100
900 CLS:PRINT:PRINT:PRINT:PRINT:PRINT:INPUT"WHICH NUMBER DO YOU WA
NT TO DELETE";B
912 PRINT:PRINTB;A(B)
913 PRINT:INPUT"IS THIS THE NUMBER YOU WANT TO DELETE (Y/N)";Z9$
915 IF Z9$="Y" GOTO 920
917 IF Z9$="N" GOTO 100
920 A(B)= "
930 FOR B = B+1 TO X:A(B-1)=A(B):NEXT
935 A(X)="":X=X-1
950 PRINT:PRINT"ENTRY DELETED":FOR Z=1 TO 300:NEXT:GOTO100
1000 CLS:PRINT:PRINT:PRINT:PRINT:INPUT"IS THE PRINTER ON? WHAT MAR
GIN DO YOU WANT (TRY 6)";T
1010 LPRINTTAB(30+T)"MASTER INDEX"
1015 LPRINTTAB(30+T)"=====":LPRINT" "
1020 FOR B=1 TO X
1030 LPRINTTAB(T)USING"#### %          ";B;A(B)
1040 IF B/54=INT(B/54)PRINT:PRINT"REPOSITION PAPER AND CHANGE MARG
IN TO NEXT COLUMN.":INPUT"          (TRY ADDING 25)";T
1050 NEXT
1060 GOTO100
1200 CLS:PRINT:PRINT:PRINT:PRINT:PRINT"CHOOSE:
    1-ALPHABETICAL SORT TO DISK # SORT
    2-DISK # SORT TO ALPHABETICAL"
1205 PRINT:INPUT"          NUMBER";N
1207 ON N GOTO 1209,1250
1209 PRINT:PRINT"PUTTING DISK # BEFORE FILE NAME....."
1210 FOR B=1 TO X
1220 A(B)=RIGHT$(A(B),3)+" "+A(B):
    REM * A(B) IS STILL INTACT BUT PRINT USING *
    * WILL CUT OFF THE DISK NUMBERS ON THE *
    * RIGHT END.
1230 NEXT
1240 GOTO100
1250 PRINT:PRINT"PUTTING FILE NAME BEFORE DISK #....."
1260 FOR B=1 TO X
1270 A(B)=RIGHT$(A(B),16):REM * GIVING US THE ORIGINAL *
    * A(B) BACK
1280 NEXT
1290 GOTO 100
1300 CLS:PRINT:PRINT:PRINT:PRINT
1310 INPUT"WHAT IS THE FILE NAME OR PART OF FILE NAME
    YOU WISH TO SEARCH FOR";C$:REM * USE DOWN ARROW *
1320 FOR B = 1 TO X
1330 IF INSTR(A(B),C$)>0 PRINT: PRINTB;A(B):PRINT:INPUT"PRESS ENTE
R TO CONTINUE, 'M' FOR MENU";J$
1332 IF J$="M" THEN J$="":GOTO100
1340 NEXT
1345 PRINT:PRINTC$;:INPUT" NOT FOUND. PRESS ENTER";Z:GOTO 100
1350 RETURN
1400 INPUT"DID YOU SAVE FILE TO DISK (Y/N)";Z9$
1410 IF Z9$="Y" GOTO 1430
1420 IF Z9$="N" GOTO 100
1430 PRINT"OK!":CLOSE
1440 END
1450 PRINT:INPUT"ERROR! NO FILE ON DISK OR OTHER. PRESS ENTER FOR
MENU";L:GOTO 100
1500 CLS:PRINT:PRINT26,"INSTRUCTIONS":PRINT
1510 PRINT" Make entries with MENU item #1. They should be limite
d to"
1520 PRINT"16 spaces, 12 for the file name, a blank, and 3 spaces
for the"
1530 PRINT"disk number, e.g., FILENAME/EXT ###. Spaces not used fo
r"
1535 PRINT"characters should be filled with blanks. Place the numb
er"
1540 PRINT"as far to the right as possible in the 16 spaces, i.e.,
a"
1550 PRINT"single number would go in the 16th space. PRINT USING"
1560 PRINT"statements are used in lines 570 and 1030 to give even
print-"
1570 PRINT"outs on video and paper. The length is limited in order
to get"
1580 PRINT"three columns on 8 1/2 x 11 paper. If you need more roo
m for"
1590 PRINT"your file names, the PRINT USING statements can be chan
ged."
1600 PRINT:INPUT"PRESS ENTER";Z:CLS

```

Program continues

MODELS I AND III, 48k, 1 DISK DRIVE

Pay 'um with BILLPAYER

The complete bill paying system for home or office!

FEATURING:

- On-line Accounts data base which helps establish who to pay.
- An interactive session where you decide how much to pay.
- Complete check writing logic that prints checks and stubs including decimal to English conversion.
- Automatic creation of a checks data base with all pertinent data stored in a standard file structure.
- Automatic bank statement reconciliation features turns this task into a simple on-line session.
- Includes complete reporting and searching facilities to help ease year end tax preparation.
- User friendly documentation, as well as order forms for pre-printed continuous checks and window envelopes, are provided.

Only **\$49.95** post paid
 MASTERCARD, VISA
 C.O.D. ACCEPTED
 (VA residents
 add 4% tax)

STULL MICRO PRODUCTS CORPORATION
703/620-2546

12314 Ox Hill Road • Fairfax, Virginia 22033

Program continued

```

1610 PRINT" When additional entries are to be made, always load p
revious"
1620 PRINT"entries from disk first.":PRINT
1640 PRINT" The entries are sorted alphabetically as soon as they
are"
1650 PRINT"complete. They may be reviewed by using MENU item 1. Th
e review"
1660 PRINT"may be stopped while the screen is being printed by pre
ssing"
1670 PRINT"'S'. The previous page may be seen by pressing 'R'. It
is"
1675 PRINT"a good idea to save the file to two different disks as
soon"
1680 PRINT"as your entries are complete."
1685 PRINT
1690 PRINT" The numbers to the left of the file names are index n
umbers"
1700 PRINT"to be used in making corrections or deletions. If you a
re"
1710 PRINT"making several deletions, do them in descending order,
since"
1720 PRINT"the numbers above each deletion will be changed."
1730 PRINT:INPUT"PRESS ENTER";Z:CLS:PRINT:PRINT
1740 PRINT" The hard copy suggestions given in the program are fo
r lines"
1750 PRINT"of 10 CPI and will give three columns of 54 entries eac
h"
1760 PRINT"on 8 1/2 x 11 inch paper.":PRINT
1770 PRINT" TOGGLE SORT ALPHA <-> NUMERICAL gives two choices. T
he first"
1780 PRINT"puts the disk number before the file name and the secon
d"
1790 PRINT"reverses this. The second choice is not essential but i
s fun"
1795 PRINT"to play with and makes a nice demonstration of your com
puter."
1800 PRINT"The sort by disk numbers will make a hard copy that can
be cut"
1805 PRINT"up for disk jacket labels.":PRINT
1807 PRINT:INPUT"PRESS ENTER";Z:CLS:PRINT:PRINT:PRINT
1810 PRINT" The SEARCH choice will find any group of two or more"
1820 PRINT"characters occurring in the list of entries. It prints
out"
1830 PRINT"the entry, then when ENTER is pressed, searches through
the"
1840 PRINT"rest of the entries to find additional occurrences."
1850 PRINT
1860 PRINT" If you press BREAK and leave the program, type GOTO 1
00 to"
1870 PRINT"return to the MENU without losing the data file."
1880 PRINT:INPUT"PRESS ENTER";Z:CLS:GOTO 100
    
```

ALL HARDWARE **Model I Lowercase**

TRS-80 is a Trademark of Tandy Corp

DUALCASE

UPPER/lowercase, full time from power-up; NO software; Standard typewriter keyboard operation (shift to UPPER-CASE); Control characters can be displayed; 128 Total character set plus full graphics.

ELECTRONIC SHIFT-LOCK

No extra keys or switches. Simply tap either shift key, UPPER-CASE lock, normal shift unlocks.

DE-B-B-BOUNCE At no extra cost (At your option)

BLOCK CURSOR If you like (No chg)

SWITCHABLE from key board

"THE PATCH" is compatible with any word processor, any DOS and also other languages which use ROM sub-routines.

"THE PATCH" unit plugs into the ROM sockets (does not replace existing ROM). Lowercase does require installation of the extra video ROM (supplied with "THE PATCH").

Detailed instructions guide even the most inexperienced owner to complete installation in about 30 minutes.

Assembled and tested . . \$127.00

Texas residents add 5% sales tax.

WHEN ORDERING SPECIFY:

"Mem Size" "Memory Size"

To order, send payment plus \$2.00 shipping and handling.

HACKS

P.O. BOX 12963
 Houston, Texas 77017

National Dist. for CECDAT, Inc.

713-455-3276



"THE PATCH" is covered with a one year limited warranty on materials and workmanship. (Does void Radio Shack's 90 day warranty.)

"THE PATCH" is a trademark of CECDAT, INC.

244

Work and play in
**ANOTHER
 DIMENSION!**

**EDIT: Full-screen BASIC editor
 for TRS-80™ Model I/III
 developed in England by
 Southern Software**

\$40+\$1 shipping CA add 6%

ALGORIX
 Allen Gelder Software

(415) 387-3131 ✓ 136
 Box 11721 San Francisco, CA 94101

TRS-80™ is Radio Shack/Tandy Corp.

Poor Man's Floppy

HIGH SPEED CASSETTE SYSTEM



Now the widely acclaimed
JPC Cassette System is available
for your TRS-80* computer.
The price is only \$90.00

TC-8 Cassette System
JPC Products
Albuquerque, NM
Kit: \$90
Assembled: \$120

by Carl A. Kollar

I guess I don't have to tell any TRS-80 owners how frustrating the cassette system that comes with the computer can be. Even with the factory mod that's available, the annoyance of loading and checking programs becomes just barely tolerable.

If you're like me, after you've just plunked down a chunk of money for a Level II 16K machine, "you ain't got nuttin left" for even one disk drive at 500 bucks apiece. So you suffer.

A reasonable alternative is the Exatron Stringy Floppy (ESF). This will cost you about 250 bucks and totally eliminates your loading and saving problems, automatically and fast. I've had one of these for about six months and love it!

But, if the price is still too steep, have I got a device for you!

The Device

The February 1980 issue of *Microcomputing* had an ad that intrigued the hell out of me. It was a high-speed cassette system by JPC Products acclaimed as a "poor man's floppy." It made all sorts of seemingly ridiculous claims such as "loads five times faster," "stores 50,000 bytes on a 10-minute cassette," "less than one bad load in a million bytes with the volume control anywhere between one and eight."

All this for a measly [90] bucks? How could this be? A call to Albuquerque answered a few questions: Yes, it had its own power supply, and, it stored programs five times faster because it utilized higher density data. The computer outputs the information at a higher rate out of the rear keyboard connector.

The ad had even claimed anyone could build it even if you have never soldered before. JPC would make it work, if you couldn't—for free. I was sold. I placed my order, and it arrived about two months later (parts shortage).

I work in electronics, so I found the unit exceptionally easy to build. It took about an hour. The manual is superb. (That's better than great.) It was clear, concise and exact with no

[Reprint of June 1980 Review, *80 Microcomputing*]

ambiguities. Important parts placements are stressed (polarity markings on electrolytics, bands on diodes, etc.).

JPC was right! With these instructions, you couldn't go wrong. The board quality is excellent. It is double-sided and parts locations are clearly marked on the component side of the board. There are no jumper wires to install. JPC utilizes PC traces and plated-through holes for connections to traces on the other side of the board.

Also, there are absolutely no adjustments or settings to bother with.

The documentation is a sheaf of 8 1/2 x 11 papers stapled together. It is written in the nicest format I've seen in a while. Each command and/or subject is covered on its own sheet in large type. All explanations are in easy to read English—not computerese.

Commands and Features

SAVE"filename": Saves your BASIC program on cassette.

LOAD: Reads the next BASIC program from the cassette.

LOAD"filename": Searches for and loads the specified file from cassette.

LOAD? and LOAD?"filename": Reads file from cassette, and compares contents to memory.

LOADN: Prints a list of all the programs on a cassette, until interrupted by the "break" key.

LOADN"filename": Same as above except the tape will stop at the end of the program named.

KILL: Removes the file manager program from memory so that the extra memory can be used by large programs.

RSET: Allows the operator to rewind and position the tape on tape recorders that have these functions tied to the motor control jack.

RUN"filename": TC-8 searches for a specified program and runs it immediately.

PUT"filename": Same as SAVE "filename", except it is for use with system tapes.

GET: Same as LOAD, except it is for use with system tapes.

GET"filename": Same as LOAD "filename", except it is for use with system tapes.

GET? and GET?"filename": Same as LOAD? and LOAD?"filename", except it is for use with system tapes.

GETN and GETN"filename": Same as

FOR TRS-80*

LOADN and LOADN"filename", except it is for use with system tapes.

OPEN: Required before cassette input or output of a data file can be attempted.

CLOSE: Required to end a cassette data file.

PRINT#: Allows numerical or string data to be output to a cassette file.

INPUT#: Allows numerical or string data to be input from a cassette file.

I haven't counted them, so I don't know about the "one load in a million bytes" claim, but my son, Anthony (age 11), loaded about 30 of his programs from his Radio Shack format tape to a new TC-8 format tape. He's run them all and found no bad loads.

Unlike the standard tape system, you can position your tape anywhere before the program you want and not have to look for a blank spot between programs. The TC-8 patiently waits for the program you want and then starts loading without getting confused by the portion of the previous program you just fed it.

Try that on your regular cassette system; you'll wear out the reset button. ■

ORDER NOW

To order your TC-8 kit, send your check or money order for \$90.00 plus \$3.50 postage and handling to JPC PRODUCTS CO., 12021 Paisano Ct., Albuquerque, NM 87112 (New Mexico residents add 4% sales tax). Credit card orders accepted by phone or mail. Personal checks will delay shipment. We will otherwise immediately ship you the TC-8 kit, the cabinet, the ribbon cable, the power adapter, an instruction manual, and a cassette containing the software.



JPC PRODUCTS CO.
Phone (505) 294-4623
12021 Paisano Ct.
Albuquerque, N.M. 87112

Make TRSDOS behave like a turnkey system.

Model I Do Files

Philip F. Jackisch
4218 Rosewold Avenue
Royal Oak, MI 48073

Gordon E. Knapp
27625 Vermont Drive
Southfield, MI 48076

As personal computers become more popular their users have become less technically oriented. Many users have little need or desire to know how they work. Secretaries, salesmen, part-time employees, and family members feel more at ease with computers if they do not have to perform a lot of tasks before getting started on the program they want to use.

Unfortunately, with Model I TRSDOS the operator has to go through many operations before using a typical Basic program. In one particular application it was necessary to: turn on the micro and get TRSDOS; load a machine language program for lowercase characters; load Basic; answer memory and file

questions; then, load and run the Basic program. This can be quite intimidating to a non-technical user.

Programming Out the Fuss

We wrote a short machine-language program called Start to go through most of the steps automatically with a minimum of fuss. When this program is called by the Auto command of TRSDOS, it will load TRSDOS and Basic, answer the memory and file questions, and then run a Basic program called AIDS3. This is just one example. We will show how to modify it for other uses. Figure 1 contains the Start program and explains how to save it to disk.

In Fig. 1 Start loads at hex location 6B00. This can be

changed as you desire. Refer to *TRSDOS & Disk Basic Reference Manual* for more information on using Debug and TapeDisk to enter machine language programs into memory and then save them to disk.

In an appendix, the *TRSDOS & Disk Basic Reference Manual* lists decimal/hexadecimal codes. Use these codes to change the Start program for other purposes. In Fig. 1, starting at location 6B2C, are the codes 42 41 53 49 43 which stand for the letters Basic. The next three codes are 0D 0D 0D which are equivalent to three Enter strokes from the keyboard. These codes load Basic and answer the memory and files questions with the default values. If high memory

has to be protected or if other than three files must be used, these codes can be modified.

Starting in location 6B34 are the codes 52 55 4E 22 41 49 44 53 33 22. These codes stand for the letters RUN“AIDS3”. (AIDS3 is a data management program sold by Meta Technologies. We used it to construct a mailing list file.) Any other Basic program can be entered here by using the appropriate codes.

After you have modified Start to suit your purposes, change the TapeDisk entry (shown in direction 10 of Fig. 1) to show the location of the end of your program. In our example, the first location was 6B00, the last location was 6B3E, and the entry point to the program was 6B00. With changes, the end will

1. From TRSDOS type Debug and hit Enter.

2. Hit the Break key.

3. Type D6B00 and hit Space bar.

4. Type M6B00 and hit Space bar.

5. Enter the machine code as shown, hitting the Space bar after every double digit.

```
6B00=> 21 0F 6B 22 16 40 21 2C 6B 22 2A 6B C3 2D 40 E5
6B10=> 2A 2A 6B 7E FE 0A CA 1F 6B 23 22 2A 6B E1 C9 21
6B20=> E3 03 22 16 40 3E 0D C3 1D 6B 20 20 42 41 53 49
6B30=> 43 0D 0D 0D 52 55 4E 22 41 49 44 53 33 22 0A
```

6. Hit Enter.

7. Type G402D and hit Enter.

8. Type Debug (OFF) and hit Enter.

9. Type TapeDisk and hit Enter.

10. Type F START/CMD:0 6B00 6B3E 6B00 and hit Enter.

11. Type E and hit Enter.

12. Back DOS Ready type in Auto Start and hit Enter.

The Key Box

Basic Level II
Model I
16K RAM
TRSDOS

Figure 1

SAVE / on Software and Hardware for TRS-80[®]

CHEXTEXT[®]

Let your TRS-80[®] do the proofreading on your SCRIPSIT[™] text files!

Features of this program include:

- Complete dictionary maintenance including the addition and deletion of words.
- Menu driven for ease of operation.
- Spelling Checker
- FREE expanded dictionaries available, depending on your drive storage capabilities.

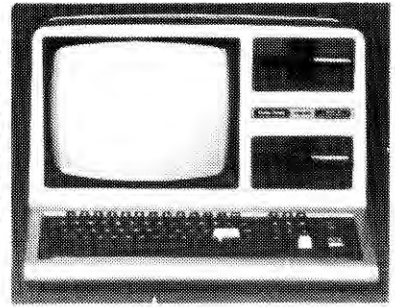
NEW LOWER PRICE \$59.95

MODEL III PRICE LIST

(All 48K with TANDON drives)

1 single sided 40 track drive	\$1695.00
2 single sided 40 track drives	1895.00
1 dual sided 40 track drive	1820.00
2 dual sided 40 track drives	2145.00
1 single sided 80 track drive	1845.00
2 single sided 80 track drives	2175.00
1 dual sided 80 track drive	1995.00
2 dual sided 80 track drives	2395.00
with RS-232 C Add.	115.00

NOTE: These Model III computers contain Apparat installed disk drives and memory. They are warranted by Apparat, Inc. for 90 days.



MISCELLANEOUS SUPPLIES

DISKETTES

Double density-soft sectored-replacement guaranteed. Spindle/Hub protected. (5 1/4" only)

Verbatim Datalife 5 1/4" 40 track	\$24.95
Apparat's No Name 5 1/4" 40 track	\$19.95
Verbatim Datalife 8" model II	\$39.95

PAPER

9 1/2"x11" blank white, tractor feed paper, full box 15# or 20#	\$24.95
14 1/2"x11" green bar, tractor feed paper, full box	\$34.95
3 1/2"x15/16" tractor feed mailing labels	\$19.95

OTHER

5 1/4" plastic library case	\$ 1.95
8" plastic library case	\$ 4.95
5 1/4" Flip-sort	\$18.95
8" Flip-sort	\$31.95
16K memory kits	\$19.95

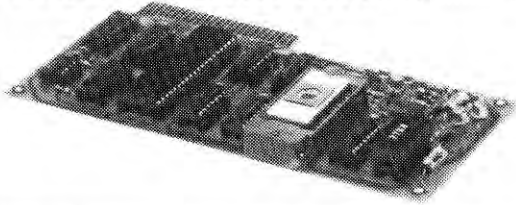
APPARAT'S PROM BLASTER

An eprom programmer for all 25 X X and 27 X X chips. TRS-80[®] MOD I & III

MOD I & III	\$149.00
CABLE	\$ 17.95

BUS EXTENDER

mini version with 2 card slots and no enclosure \$ 69.95



SPECIAL - FREE GRAFTRAX

with EPSON MX-80 & MX-80 F/T Printers

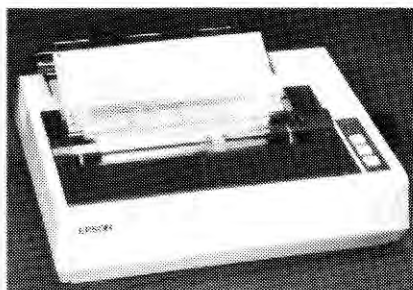
MX-80 \$499.00

MX-80F/T \$599.00

MX-100 \$775.00

Printer Cables \$24.00
(Specify Computer Type)

WE ALSO STOCK OKIDATA & NEC PRINTERS
CALL FOR PRICES



ASSORTED ITEMS OF INTEREST

MICRO CLINIC, Mod I \$24.95, Mod III \$29.95

The ultimate in memory & disk diagnostics

MEAL MASTER, Mod I & III Disk \$24.95

meal planning & grocery shopping aid

FLEXTXT/80 (requires Graftrax) \$34.95

utilize the additional features of the MX-80

printers under model I & III scripsit

MICRO ACCOUNTING SYSTEM, \$479.00

Interactive G/L, A/R, A/P & checkbook manager

UNI-TERM/80, \$89.00

Universal terminal program that takes advantage

of the extended NEWDOS/80 commands

BASIC BETTER & FASTER BOOK, \$23.95

NEW LOWER PRICES ON TANDON DISK DRIVES

Complete with power supply, chassis & configured for TRS-80[®] Model I or III

- Single sided 40 track \$285.00
- Dual 40 or Single 80 track \$415.00
- Dual sided 80 track \$515.00
- Special - 2 Dual sided 80's \$999.00

MODEL I DOUBLE DENSITY PACKAGE

Converts a standard TRS-80 Model I to Double Density.
Apparat Doubler & NEWDOS/80 V.2.0.
\$278.00 value for only \$219.00
Doubler alone \$129.00



NEWDOS 80 Version 2.0

The most sophisticated DOS ever produced for the TRS-80[®] Models I and III. It provides the user with "MAINFRAME" power on a "MICRO".

Some Features available are:

- Jobstream Control Language
- Mod I/Mod III Diskette interchangeability
- Double Density Support on Model I
- Pagenation of BASIC listings on the screen
- Basic program single stepping
- Dynamic variable manipulation
- Multiple array sorts with BASIC CMD
- Complete technical support provided

All this plus much more for only

\$149.00

InfoWorld Software Report Card

NEWDOS/80 Version 2.0

	Poor	Fair	Good	Excellent
Performance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Documentation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Ease of Use	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Error Handling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>



Apparat, Inc.

"On-going Support for Microcomputers"

4401 S. Tamarac Pkwy. • Denver, CO 80237 • (303) 741-1778 • (800) 525-7674

Scrpsit & TRS 80 are a registered trademark of Tandy Corporation

Freight F O B Denver-call for shipping charges Foreign Orders shipped Air Freight

✓40

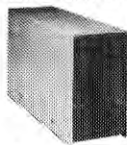


WE WILL NOT BE UNDERSOLD

CP/M® Software	Software/Manual only
Computer Pathways	
Pearl (level 1)	\$ 99/\$25
Pearl (level 2)	\$299/\$40
Pearl (level 3)	\$549/\$50
Digital Research	
PL/I-80	\$459/\$35
BT-80	\$179/\$30
Mac	\$ 85/\$15
Sid	\$ 65/\$15
Z-Sid	\$ 90/\$15
Tex	\$ 90/\$15
DeSpool	\$ 50/\$10
Micropro	
WordStar	\$319/\$60
Customization Notes	\$ 89/\$na
Mail-Merge	\$109/\$25
WordStar/Mail-Merge	\$419/\$85
DataStar	\$249/\$60
WordMaster	\$119/\$40
SuperSort I	\$199/\$40
Spell Star	\$175/\$40
Microsoft	
Basic-80	\$289/\$na
Basic Compiler	\$329/\$na
Fortran-80	\$349/\$na
Cobol-80	\$574/\$na
M-Sort	\$124/\$na
Macro-80	\$144/\$na
Edit-80	\$ 84/\$na
MuSimp/MuMath	\$224/\$na
MuLisp-80	\$174/\$na
Organic Software	
Milestone	\$269/\$30
Supersoft	
Diagnostic I	\$ 49/\$20
Diagnostic II	\$ 84/\$20
Disk Doctor	\$ 84/\$20
Forth (8080 or Z80)	\$149/\$30
Fortran	\$219/\$30
Fortran w/Ratfor	\$289/\$35
Unicorn	
Mince	\$149/\$25
Scribble	\$149/\$25
Both	\$249/\$50
Data Base	
FMS-80	\$649/\$45
dBASE II	\$595/\$50
Access/80	\$699/\$50
Pascal	
Pascal/MT+	\$429/\$30
Pascal/M	\$189/\$20
Miscellaneous	
SpellGuard	\$299/\$25
The Last One	\$549/\$na
SuperCalc	\$269/\$50
CBASIC-2	\$ 98/\$20
MicroStat	\$224/\$25
StatPak	\$449/\$40
Micro B+	\$229/\$20
Apple Software (Business)	
Micropro	
Wordstar	\$269
MailMerge	\$ 99
WordStar/MailMerge	\$349
SuperSort I	\$159
Spellstar	\$129
Personal Software	
Viscalc 3.3	\$229
CCA Data Mgr	\$ 84
Desktop/Plan II	\$229
Visiterm	\$139
Visidex	\$229
Visiplot	\$185



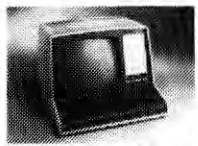
Personal Software (cont.)	
Visitrend/Visiplot	\$ 275
Zork	\$ 34
Miscellaneous	
Micro Courier	\$219
Super-Text II	\$127
ASCII Express	\$ 59
Apple Software (Entertainment)	
Wizard & Princess	\$ 28
Mystery House	\$ 24
Flight Simulator	\$ 29
Raster Blaster	\$ 26
Space Eggs	\$ 26
Sargon II	\$ 29
ABM	\$ 22
Micropainter	\$ 29
Apple Panic	\$ 28
Pool 1.5	\$ 26
Apple Accessories	
Z-80 Softcard by Microsoft	\$299
Keyboard Enhancer	\$119
Apple Joystick	\$ 49
Sup-r Mod	\$ 25
CPS Multifunction Card	\$199
Videoterm by Videx	\$249
16K Card by Microsoft	\$159
Sup-r Fan	\$ 39
ALF9 Voice Board	\$149
CCS Cards	\$Call
CCS Parallel Model 7720	\$Call
CCS Serial Model 7710D	\$Call
CCS Centronics Model 7728	\$Call
Disk Drives	
For TRS-80* Model 1	
CCI-100 5 1/4", 40 Track	\$299
Add-ons for Zenith Z-89	
CCI-189 5 1/4", 40 Track	\$389
Z-87 Dual 5 1/4" system	\$995
Drives for Z-90	\$Call
External card edge and power supply included. 90 day warranty/one year on power supply.	



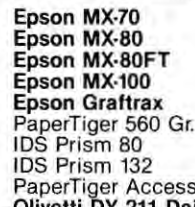
Corvus 5M	\$ 3089
Corvus 10M	\$ 4489
Corvus 20M	\$ 5429
Corvus Mirror	\$ 699
Shugart 8" 801R Raw Drive	\$ 399
TANDON 5 1/4" Raw Drive	\$ Call
Power Supplies	\$ Call
Diskettes—Box of 10	
Maxell 5 1/4"	\$ 40
Maxell 8"	\$ 45
BASF/Verbatim 5 1/4"	\$26.95
BASF/Verbatim 8"	\$ 36
Plastic File Box—Holds 50 5 1/4" dsks.	\$ 19
Plastic Library Case 5 1/4"	\$ 3
Plastic Library Case 8"	\$ 4
Head Cleaning Diskette	\$ 25
Floppy Saver	\$10.95
Floppy Saver Rings	\$ 6.95
16K RAM Kits	
One Kit	\$19.00
Two Kits	\$37.00
200ns for TRS-80*, Apple II, (specify): Jumpers	\$ 2.50
Computer Systems	
Atari 400	\$ 359
Atari 800	\$ 699
Call for other Atari products	
Zenith Z89, 48K	\$ Call
Zenith Z90, 64K	\$ Call
Call for other Zenith products	

For fast delivery, send certified checks, money orders or call to arrange direct bank wire transfers. Personal or company checks require one to three weeks to clear. All prices are mail order only and are subject to change without notice. Call for shipping charges.

Terminals		
ADDS Viewport		\$ Call
Zenith Z-19		\$ 719
Televideo 910		\$ 559
Televideo 920C		\$ 729
Televideo 950		\$ 969
S-100 California Computer Systems		
Mainframe		\$ 349
Z80 CPU		\$ 239
64K RAM		\$ 569
Floppy Disc Cntrl		\$ 339
Integrated Sys. w/int. cables, tstd.		\$1975
2P + 2S I/O		\$ 269
4 Port Serial I/O		\$ 249
4 Port Parallel I/O		\$ 179
Casio Calculators		
Pocket Comp. FX702		\$185.00
Desk Print/Calc. FR100		\$ 79.95
Scientific Calc. FX8100		\$ 49.95
Game Watch CA90 Plastic		\$ 49.95
Game Watch CA901 Steel		\$ 69.95
Calendar Watch AX210		\$ 59.95



Printers		
NEC Spinwriter		
7710 R.O. Ser		\$2395
7710 Ser w/tr.		\$2595
7720 KSR w/tr.		\$2795
7730 R.O. Par		\$2395
7730 R.O. Par w/tr.		\$2595
NEW 3500 Series		\$ Call



Epson MX-70		\$ Call
Epson MX-80		\$ Call
Epson MX-80FT		\$ Call
Epson MX-100		\$ Call
Epson Graftrax		\$ Call
PaperTiger 560 Gr. & 2K		\$ Call
IDS Prism 80		\$ Call
IDS Prism 132		\$ Call
PaperTiger Access.		\$ Call
Olivetti DY 211 Daisy Wheel		\$ Call
Anadex DP-8000		\$ 849
Anadex DP-9500/01		\$1389
Okidata Microline 80 Fric. & pin feed		\$ Call
Okidata Microline 82A Fric. & pin feed		\$ Call
Okidata Microline 83A 120 cps		\$ Call
Okidata 84 200 cps		\$ Call
Centronics 739		\$ 739
Data South 180 cps		\$ Call
Monitors		
Leedex 12" B & W		\$ 119
Leedex 12" Green Screen		\$ 129
Leedex 13" Color		\$ 329
Sanyo 9" B & W		\$ 149
Sanyo 9" Green Screen		\$ 189
Sanyo 12" Green Screen		\$ 249
Sanyo 12" B & W		\$ 239
Sanyo-13" Color		\$ 449
Zenith 13" Color		\$ 349

***** Special of the Month *****
Zenith 12" Green Screen
\$129

Telecommunications		
Prentice Star Modem 1-yr. guar.		\$ 125
Univ. Data System UDS103LP		\$ 149
Univ. Data System UDS103JP		\$ 185
Novation Cat		\$ 139
Novation D-Cat		\$ 149
Novation Auto-Cat		\$ 199
Novation Apple Cat II		\$ 299
Hayes Smart Modem™		\$ 249
Hayes Micro-Modem II™		\$ 295
Hayes Chronograph™		\$ 225
CCI Telnet Com. Package		\$ 135

DEALER (NATIONAL/INTERNATIONAL) INQUIRIES INVITED

Send for FREE Catalogue

The CPU SHOP

TO ORDER CALL TOLL FREE 1-800-343-6522

TWX: 710-348-1796 Massachusetts Residents call 617/242-3361

420-438 Rutherford Ave., Dept. MCO4M
Charlestown; Massachusetts 02129
Hours 9 AM-8PM (EST) Mon.-Fri. (Sat. till 5)

Technical Information call 617/242-3361
Massachusetts Residents add 5% Sales Tax
Tandy Corporation Trademark™ Digital Research



probably be different than 6B3E.

It is not necessary to use Start with the Auto command. If you have several Basic programs on one disk, you could modify and rename Start for each use. Examples might be: GAME1, MATH2, Recipes. Someone who wanted to play GAME1 would then only have to insert the

letters to lowercase when it starts. If it precedes the entry "BASIC", the computer will see "basic" and default back to TRSDOS. We spent many hours trying to work around this problem but could find no easy solution. Since AIDS3 and some other Basic programs can work with lowercase characters, the

*"Unfortunately, with . . .
TRSDOS the operator
has to go through
many operations before
using a typical Basic program."*

proper disk, turn on the computer, and type GAME1 Enter to get going.

If you have a lowercase modification installed in your Model I and use Radio Shack's ULCDVR/CMD program, be careful. This program will defeat the Start program. ULCDVR converts all uppercase let-

easiest thing to do is to have ULCDVR load with the Auto command, then use Shift 0 to get to uppercase, and type in Start and hit Enter.

This example is only suggestive of the many possibilities for using Start. With Start a computer user can quite easily make the machine do what he wants. ■

WHY ARE SMART TERMINAL PROGRAMS SO EXPENSIVE??

Good question. Maybe it's precedence. The first widely known terminal program had a relatively big price tag, like the first word processor, and it was worth it because it was the only one out. But nearly every one that has come along since has maintained an \$80 to \$150 price tag, and it would seem that you are forced to pay it or (admit it) trade it. Some of these programs do a lot, and some don't. But if you are in the market for such a program you should look closely at TELCOM from Mumford Micro Systems. Our price is \$39.95, and it is supplied on disk for Model I or Model III. TELCOM is menu driven, extremely easy to use, and supports the following features:

- Terminal Mode:
 - Save data on disk.
 - Spooled printer output.
 - Upper and lower case support.
 - 8 programmable automatic (log on) messages.
 - 10 programmable character keys for special codes.
- Dump the RAM buffer to a disk file.
- Transmit a disk file in ASCII or binary. No conversion is necessary.
- Receive a file in ASCII or binary.
 - These transmit and receive functions automatically generate and exchange a 16 bit checksum to verify valid data when the person on the other end is also running TELCOM. If the transmission is correct, TELCOM tells you so.
- Define a buffer "open/close" protocol to save only selected data.
- Define a "halt/resume" (Xon/Xoff) protocol for file transfers.
- Easily examine or change baud rate, bits per word, parity, and stop bits.
- Save the entire program as configured on disk.

In addition to the above major features there are many user conveniences. If you want to communicate with large mainframe computers, data banks, personal information services, bulletin boards, another computer across the room or your buddy across town; or if you just want an easier to use smart terminal program, look into TELCOM. If it doesn't do everything you need at a very reasonable price you are welcome to a full refund. And if \$39.95 seems too cheap for a smart terminal program, you can send \$79.95 instead!

TERMS: \$39.95 plus \$1.50 postage. California residents add \$2.40 tax. VISA, MASTERCARD, and COD orders accepted. Specify Model I or Model III.

MUMFORD MICRO SYSTEMS

Box 400-T Summerland, California 93067 (805) 969-4557

Quality software since 1978

IMB

TRS-80* 16 K
COLOR GAME
LIMITED OFFER!

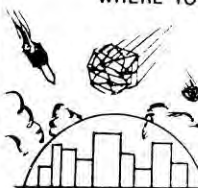
FREE WE'LL SEND YOU OUR BONUS GAME OF THE MONTH
WHEN YOU BUY ANY 2 GAMES

NEW
ARCADE
GAME

16 K COLOR EXTENDED HI-RESOLUTION GAMES**

GATOR ZONE

THE FIRST ANTI-PREPPY COMPUTER GAME \$18.95
WHERE YOU'LL FIGHT OR LOSE YOUR SHIRT!



STARBASE ATTACK \$12.95

METEOR STORM \$12.95

STAR SIEGE \$18.95

HIGH SPEED ARCADE GAME
COSMIC KAMIKAZE \$18.95

IMB GALLOPING GAMBLERS

illustrated memory banks

P.O. BOX 289
WILLIAMSTOWN, MA. 01267-0289

TEL. 413-663-9648

Master Card
and VISA accepted.

*TRS 80 is a TM of
Tandy Corp.

** CASSETTE

CERTIFIED CHECKS OR MONEY ORDERS ONLY
PHONE ORDERS — CALL MON-FRI 9-5 EST

274

Concepts of computer modeling.

Sublime Simulations

James Edward Keogh
121 Gordon Street
Ridgefield Park, NJ 07660

A recent television program showed dramatic full color computer drawings of Saturn. When compared to photographs taken by unmanned spacecraft the untrained eye cannot see any differences. These computer drawings are one of the latest applications of computer simulation.

Corporations are turning to computer simulation models to conduct basic design experiments. Testing a design on a computer is less expensive than testing prototypes. Design engineers draw new cars, planes and a host of other major products on computer terminals.

After programming the basic design, an engineer can simulate production conditions. The computer simulation model illustrates the product's weaknesses.

Simulation models can also be fun to play with. You can fly everything from a single engine two-seater airplane to a spacecraft—

without leaving the ground. Simulation models used by the armed services for training fighter pilots are finding their way into electronic game amuse-

*"Testing
a design
on a computer
is less expensive
than testing
prototypes."*

ment centers. For a quarter you can test your skill flying against the enemy—and really feel like you are flying.

At first, the thought of preparing a computer simulation model frightens many programmers. Although developing such a model takes time and requires a well thought out plan of attack, it can be accomplished with your microcomputer.

No magic is involved. Simulation models convert data into illustrations of resulting situations. If you can work out percentages you can develop a

simple simulation model and put it to work for you.

How a Simulation Model Works

External factors influence almost everything around us. Stress and airflow affect an aircraft's structure. The flow of customers into a retail store affects a business. If the customer flow increases, the operation should be expanded.

The first step in creating a simulation model is to identify all factors influencing the subject. The number of factors included in the model varies with the simulated object's complexity. An aircraft simulator will have many.

You must list each factor, regardless of its importance, if the model is to achieve any degree of accuracy. Large simulation models of complex systems are cumbersome to develop and debug. Most programmers who design models tackle no more than is practical. They break larger systems such as an aircraft into subsystems such as the frame or wing design. The list of factors becomes more manageable.

After you identify the factors you must measure their relation-

ship with the subject. I will apply the modeling steps to a simple but practical problem—should a gas station owner install a third gas pump?

The initial step is to determine factors influencing the subject. In this case, I will develop a model of the business subsystem in the problem.

The factors I must consider are the time of day; the number of cars; the time it takes to service a car; and the number of cars using each pump. When I combine these factors I will have a subsystem of customer flow at the pumps. This is the segment of the business I need to simulate.

The second step is to find the relationship of the factors to the system. I must take measurements to break the relationship down into numbers. For example, a window glass will break if a certain pressure or weight is placed against it. Pressure or weight is a factor in window glass design. The engineer can measure—by trial and error—how much pressure the glass can withstand before it breaks. This information expresses the relationship between a pressure or weight to a

window glass.

Before I can develop a simulation model of the gas station I must measure the flow of cars for each pump at each time of day and for each day of the week. After several weeks of measuring, I will know an average service time, and the number of cars per hour serviced at a particular gas pump.

In my simulation model I use a math relationship involving percentages. Let's say that 30 percent of the time both gas pumps were in operation. Only one pump was in use another 30 percent of the time and 30 percent of the time no pump was in use. Three cars were in the station 10 percent of the time.

I also need to know from my study how frequently customers arrive. Suppose a new customer arrives every 15 minutes on the average. There will be times when a customer may not arrive for over an hour and other times when customers will arrive every five minutes.

In some systems the relationships cannot be easily identified by percentages. More detailed models require regression analysis and other statistical methods.

In the gas station model I assume that customers arrive at random. I will use the random number generator for the range zero to 100.

The next step is to assign a meaning to the random numbers. Numbers 0-29 mean that no cars are in the station. Numbers 30-59 mean one car has arrived. Numbers 60-89 mean two cars have arrived. Numbers 90-100 mean three cars have arrived at the station. The numbers reflect the percentages of occurrences that actually took place.

Traffic flow measurements show that a car arrives every 15 minutes at the gas station. To simulate the arrivals of cars I need a clock to activate the random number generator within the program. In the model 15 minutes do not have to pass before the next car enters the gas station. You can use a few seconds as long as you remember the time represents 15 minutes.

A different clock must time the servicing of each car. For

this example it takes five minutes to service each car. As with timing the arrival of cars, it is not necessary to use five

"More detailed models require . . . other statistical methods."

minutes on the computer clock. However, the times representing the 15 minute arrivals and five minute servicing must be proportional. The clock in the simulation model might have a ratio of one minute equals one second. My model uses 15 seconds and 5 seconds to represent actual times.

Displaying Results

Simulation models allow you to understand and manipulate complex situations easily. Illustrations best communicate this understanding.

The computer pictures of Saturn illustrate this concept. The computer received data measurements from the spacecraft. Raw measurements might have been meaningful to a few scientists, but these numbers have no meaning for most of us. A programmer instructed the computer to make sense out of the numbers. The computer assigned shades of various colors to represent each set of measurements and then displayed the colors for an easy-to-understand image of Saturn.

When you come to the display portion of your simulation model, pretend you're an artist. How can the simulation model graphically display the data? The best approach, although not always practical, is to illustrate the model as close to reality as possible.

The gas station simulation should illustrate cars arriving and stopping at the pump; the gas station attendant servicing the car; and cars leaving the gas station. Do not forget to illustrate the most important item—the gas station!

You can use detailed illustrations or a simple square to

represent the cars, pumps, and so on. The method you use depends on your skills as a programmer and artist. For the gas station model I use rectangles to represent all factors.

I draw the gas station first. The arrival clock begins next and activates the random number generator. After the computer determines the number of cars, it draws the cars and drives them into the gas station. The second clock determines when the computer drives the car out of the station.

One of the major objectives of a simulation model is to permit the user to manipulate the model. How will the situation react if factors change? For example, what happens if an aircraft encounters a head wind of 15 knots? The user inputs this change and the model illustrates the effect.

When you design a simulation model you must consider what factors will vary during a run. Pose these measurements as questions to the user.

In the gas station model the user can change the arrival times of cars and the percentage breakdown of the station's business. Measured data already in the model becomes default measurements if the user does not input a new arrival time or change the volume of cars.

Before the computer draws the gas station, it asks the user to input the variables. Input variables need not come at the beginning of the program: They can come anywhere before the calculation stage. For example, the computer could draw the gas station and then ask for the variables.

Why would a gas station owner need a computer simulation model? He can briefly analyze the raw data to come to a decision.

A computer model permits experimentation. Where it might take several hours to recalculate the performance for each factor changed, the computer simulation model provides results within seconds. ■

Announcing:

LOG

ELECTRONIC NOTEBOOK

LOG Documentation PAGE 7 08 02 81 16 04 00 P

CONTENTS

Cursor positioning commands	pages 3, 4
Page positioning commands	pages 5, 7
Write commands	pages 8, 11
Lineprinter commands	page 12
Special commands	pages 13, 14
Search command	pages 15, 20
New page creation	page 21
Entry options	pages 22, 24
Exit	page 27
Technical information	pages 28, 33
Suggestions for use	pages 34, 37

continue to next page

A totally new concept in small-scale information management for the TRS-80 (R). LOG is an assembly language utility which fills the gap between text editors and data base managers to provide a true free-form information storage and retrieval system with unheard-of ease of operation.

LOG-CMD creates on a formatted diskette a LOG file from 1 to 170 pages long, each page containing 1 full screen of information. Pages are accessed individually or sequentially, as if thumbing through a book. Information is added, updated, or deleted from each page in free form by an integral cursor-oriented text editor. Each diskette becomes a separate organized notebook to use and re-use as you please.

Insert, Delete, Tab, Clear, and full cursor positioning are supported, as well as blinking cursor and auto-repeat. All functions operate with the ease of a single keystroke including Global Search. Output to printer is provided. LOG can even be accessed from BASIC without loss of program.

Why, when you own a computer, do you still keep records by hand? Throw away your pencil and paper! Use your computer as you never dreamed of before!

Model I	32 or 48K	\$44.95	(uppercase only)
Model III	32 or 48K	\$49.95	(uppercase/lowercase)

(minimum system: 32K, 2 disk drives,
DOS 2.3 (I) or 1.3 (III) required)

Write or Call for further information:

KSoft 318 Lakeside Drive Brandon, MS 39042	(601) 992-2239
--	----------------

MasterCard and Visa accepted
MS Residents pay 5% sales tax.
We pay shipping and handling.

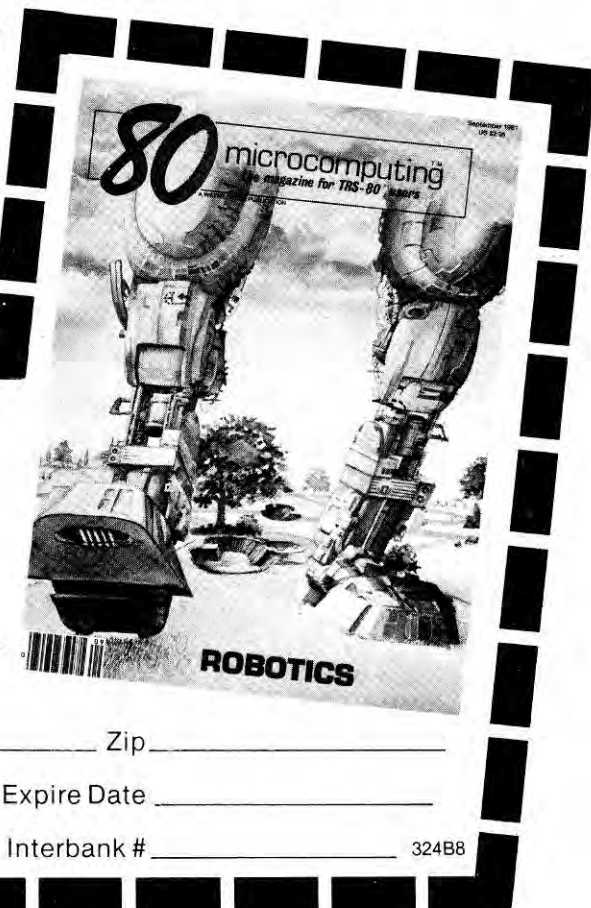
(TRS-80 is a trademark of Tandy Corporation)

331

WHAT DOES 80 MICROCOMPUTING DO FOR YOU?

- IT**
- provides you with more information on your TRS-80* than any other single source
 - gives you 20-30 new programs to use each month
 - reviews equipment and software so you know what or what not to buy
 - gives you the truth about the TRS-80—its good points and its limitations (*80 Microcomputing* is not affiliated with Tandy)
 - lets you save money—lots of it—by comparison shopping within the ad pages
 - clues you in on how other TRS-80 owners are using and updating their systems
 - lets you in on what is really happening in the industry
 - brings you Wayne Green's outspoken and often controversial editorials every month
 - and best of all it gives you a no risk subscription offer—

Subscribe today—if you are not satisfied with the first issue—write "cancel" across your invoice and send it back. The *80 Microcomputing* is yours to keep.



YES I want 80 Microcomputing

- Bill me \$24.97 for a year's subscription
 Bill my AE MC VISA
 Check enclosed

Name _____

Address _____

City _____ State _____ Zip _____

Card # _____ Expire Date _____

Signature _____ Interbank # _____ 324B8

Canadian 1 year only/US funds \$27.97 Foreign Surface 1 year only/US funds \$44.97 (Foreign Air, please inquire.)

80 Microcomputing • PO Box 981 • Farmingdale, N.Y. 11737

*TRS-80 is a trademark of Tandy

MASTER ELECTRONICS, INC.

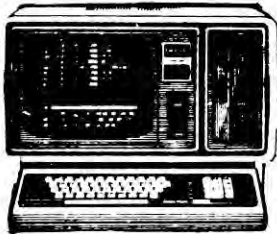
Authorized "TRS-80" Dealers - * F-723

CAN SET YOU UP IN A

TRS-80

STATE-OF-THE-ART-COMPUTER

STARTING AT 15% DISCOUNT!



FULLY STOCKED
IN: Model II's
Model III's
ALL-PRINTERS
AND — MORE!!
* PLUS *
THE ALL NEW:

Model 16 and the 8.5 meg. Hard Drive!

CALL US NOW!!!

Toll FREE: 1-800-

TEXAS CALL COLLECT: 512/689-5536



MASTER ELECTRONICS, INC.
154 NORTH 5th
RAYMONDVILLE, TX 78580



✓ 146

TWENTY FIRST CENTURY SOFTWARE

1607 North Cochran
Hutchinson, Ks. 67501
(316) 663-1047



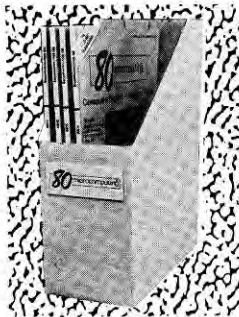
ANNOUNCING

The Twenty-First Century Club

- * A Club for all TRS-80 Computer Owners.
- * Wholesale prices on popular products, saving up to 50% of retail prices.
- * Objective, Unbiased, Tough Reviews of Hardware Software, Systems, Supplies, Critical Analysis of products: revealing what they can and can not do.
- * Newsletters with your stories, Articles, Industry Reviews, Practical Uses for Business, Personal, Professional, Hobby and Entertainment.
- * Programming Support for Compilers, Basic, etc., Beginners and advanced.
- * Comparisons of Product Groups by cost, Capabilities, Etc.
- * A source for selling your own Programs and Inventions. Up to 80% Royalty. Why let others have the lions share?
- * Membership- - - - - \$25.00 per year.
- * WANT MORE INFORMATION? Please send \$1.00 to cover cost of Info.& Postage.

✓ 171

is HARD COPY STORAGE a problem?



Here's the ideal way to keep your growing collection of 80 Microcomputing in order! The 80 Microcomputing Library Shelf Boxes.

...sturdy, corrugated, white, dust-resistant boxes will keep your issues of 80 Microcomputing orderly and available for constant reference. Self-sticking labels are available for the boxes, too, not only for 80 but also for Kilobaud Microcomputing, 73 Magazine, CQ, QST, Ham Radio, Personal Computing, Interface Age, Byte and Radio Electronics. Ask for whichever labels you want with your box order. Each box holds a full year of the above magazines. Your magazine library is your prime reference. Keep it handy and keep it neat with these strong library shelf boxes. One box (BX1000) is \$2.00, 2-7 boxes (BX1001) are \$1.50 each, and 8 or more boxes (BX1002) are \$1.25 each. Be sure to specify which labels we should send. Shipping and handling charges are \$2.00 per order. Call in your credit card orders on our toll free line 800-258-5473, or use the order card in the back of the magazine and mail to:

ATTN: BOOK SALES

80 microcomputing ^{T.M.}

Peterborough,
NH 03458

Please allow 4-6 weeks for delivery. No COD orders accepted.

YOU DON'T NEED AN EXPANSION INTERFACE!

Running out of room?

Increase the memory in your TRS-80® Model I or PMC® up to 48K with no external hardware! The INTERNAL MEMORY™ plugs in inside your keyboard case with NO SOLDERING and can be easily removed at any time. Hundreds of satisfied customers have proven that the INTERNAL MEMORY is reliable, does not cause heat or power supply problems, and is compatible with virtually all hardware and software.

IM-1B INTERNAL MEMORY™ (32K) \$85.50 complete (\$59.50 less RAM)
IM-2 INTERNAL MEMORY™ (48K) \$140.00 complete (\$89.50 less RAM)

SPEED UP your TRS-80/PMC-80 and add a PRINTER!

The SPRINTER™ plugs into the Z-80 socket in your TRS-80/PMC case with NO SOLDERING. The SPRINTER equips your computer with a standard parallel printer port (extending out the case by the expansion connector) with no other hardware or software needed. In addition, the SPRINTER allows software selection of 8 different speeds from 2/3 to 3 times "normal" (no delay line needed). Speed automatically switches to normal during cassette and disk operations.

SPRINTER™ speed-up/printer port (assembled & tested) \$99.50
SPRINTER™ speed-up only; no printer port \$69.50

All products guaranteed for 1 year with a 30-day return privilege. PLEASE INCLUDE \$3.00 SHIPPING IN U.S., \$5.00 for CANADA, 15% for overseas orders.

Send a self addressed stamped envelope for more information.



Holmes Engineering



3555 South 3200 West Salt Lake City, Utah 84119 (801) 967-2324

DEALER INQUIRIES INVITED

Prices valid through end of month on front cover.
Disk, Modem, 80-character display coming soon!

✓ 153

A strange visit to the weird world of the TRX-80.

Vexed by the Void

Randy M. Resnick
17 rue Jean Giraudoux
75116 Paris, France

TO: Fleet Command
FROM: Expedition Leader
Dulo Par

RE: Planet 02, system 1021, Version 21.2

Day 21011201:

Forgive the delay, Commander Xake, but we hit a snag in our exploration of the second large continent. Now that the waters have drained from the southwestern coast, our progress continues. Just as we discovered the purpose of the millions of "automobiles," we will soon have the key to the mystery of the "TRX-80"— devices we have found everywhere. (Note: We do not yet understand the use of the number "80." These beings used at least 10 number bases and somehow knew which was used in a particular case without being told.) I am convinced these devices were important to the beings, because they had to actually get out of their "cars" to visit the TRX-80.

The discovery of a race living inside moving chambers made of metal and rubber, equipped with lights and noisemaking equipment, is indeed one of our greatest accomplishments. Our

understanding of this phenomenon was made easy by the many films and books we found that refer to the "automobile."

Unfortunately, until now we found no documentation whatsoever on the TRX-80 (not even at the numerous places where their owners obtained them). We suspected religious significance. Indeed, the printed references we found showed images of beings seated before the objects, presumably for worship.

Then came a breakthrough! Certain great thinkers did write and distribute secret words of inspiration to the believers. Deep under the surface of the planet we found a collection of these tomes. After carefully analyzing the writings we confidently propose the following theories about this cult:

00. Their main spiritual goal was to communicate with the all-powerful being that controlled their universe, called an "X80." Evidence indicates the X80, or "Holy CPU," was very

just and listened when properly addressed. It, however, never retained what was said from one day to the next.

01. Several stages of enlightenment, or "Levels," were practiced by the believers. They were under constant pressure to "upgrade" or "add peripherals," indicated by many public notices in books for the devout. One of these books (BXTE) consisted almost entirely of these "advertisement" notices.

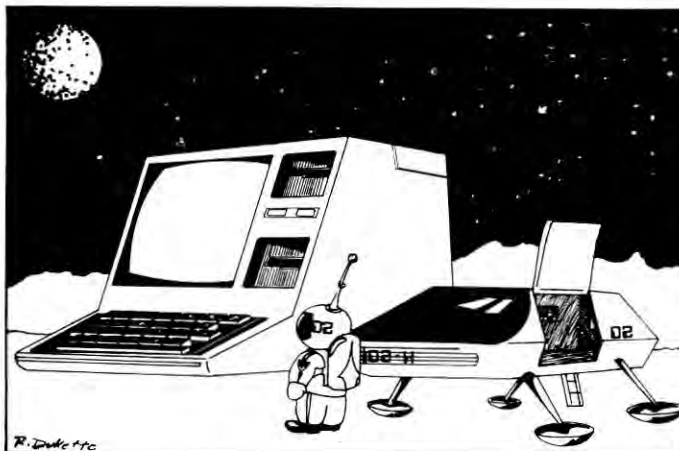
02. Much time was spent studying the works of MICROXOFT, apparently a prophet able to converse fluently in the holy tongue of the X80. While one of the books we found contains a long list of sermons (called "routines") by MICROXOFT, it is in a tongue other than that of the beings themselves; it is not known whether they actually understood what they were studying. A self-proclaimed oracle known as KITXZ devoted his entire life to predicting the actions of the holy CPU.

10. As new devotees joined the ranks, they communicated with the CPU through an interpreter, usually a disciple of MICROXOFT who lived in a "ROM." How the beings themselves understood the vague messages of the interpreter is not known. At the first Level, the interpreter responded with one of 10 different questions, just like our philosophers!

11. The beings sometimes mastered the tongue of the sect called the "Assemblers," the leader of which was named BARDXN. After standing in an assembly line, they were able to address the X80 very precisely. Others invoked a monitor such as the famous T-XUG, but T-XUG performed poorly unless it was "high." If the believer made a slight grammatical error in addressing it, the X80 would disappear or "hang-up," or worse, it would "glitch" or "put out garbage." This last reference perplexes us greatly, for we previously understood that garbage was created just for that purpose—to be put out.

12. In another sect of the original doctrine, the DOX is a central figure. There are many variations on this name, but the only clear reference indicates that "TRXDOX" was their equivalent of our "evil one," and was considered the source of many of their problems. It appears that other DOX figures eventually became powerful enough to overcome the influence of TRXDOX.

20. One enigma is the frequent reference to "XANDY CORP," presumed to be a major force. It



is unclear whether it was good or evil, because while XANDY was often consulted for help, it rarely answered the queries of the faithful hordes, and was seldom mentioned in kindly terms. Also, according to our translations, XANDY is supposed to have put a "hex" in the TRX-80. A "newsletter" was said to have been created by XANDY for the faithful, but the writings of the wise men state this was a myth.

21. Hundreds of wars were fought simultaneously within the cult. Soldiers were beseeched to sign up to fight the enemy. They were promised real-time action and adventure. While none of these wars ever ended or had any effect on the lives of their time, new wars continually started. Our military experts soon will issue their own report.

22. We know magnetism played a considerable role in the practices of these people. They feared magnetism could profane the sacred scrolls. (Scrolling, it seems, was a major activity of the TRX-80.) Legend states that

the evil TRXDOX was once punished by being subjected to a magnetic field. From that time on, he took revenge by cruelly destroying the records every good DOX needed to be useful.

In conclusion, Commander, I hope you are as pleased as I am with the results of this expedition. There is one thing we need to continue our research here, however. Please see the enclosed requisition for a new computer. Ours became unusable, due to a problem that started just after we landed here. It is impossible to enter data because each keystroke creates a double-image on the xideo. We are unable to correct this, even with our best de-key-bounce software.

Respectfully,
Dulo Par ■

Randy is an amateur radio operator, musician, and is currently in Paris at work on laser graphic systems.

Supercharge Your Micro's Performance With



The Professional Operating System with CP/M™ Compatibility

- **Spectacular Performance.** Programs run 3 to 10 times faster compared with TRSDOS or CP/M. Benchmark results up to 20 times faster obtained with some applications by independent firm!
- **Double-Sided Drive Support.** Provides 1.25 Megabytes of storage per 8" double-sided/density disk. Intermix any combination of single- or double-sided drives on-line.
- **Expanded Directories.** Store larger number of files and more information per disk.
- **Automatic Density/Side Recognition.** Detects changes in disk format automatically. Change disks at any time without compromising data or "BDOS/Read-Only" errors.
- **Fast Disk Backups.** Copy a complete 8" SS/DD diskette (610K) in less than 80 seconds. Copy a double-sided/density diskette (1.25 Megabytes) in less than 1 minute 45 seconds!
- **Hard Disk Drive Support.** Supports large hard disks in excess of 1,000 Megabytes without partitioning.
- **Advanced Utilities.** Complete set of disk utilities: system date and time functions, communications channel interface, etc. provided as standard features.
- **Enhanced Automatic Print Spooling.** Run multiple printers simultaneously; support for multiple queues and printers is standard feature on spooling versions.
- **CP/M Compatibility.** Virtually any CP/M (version 2.x) program will run under TURBODOS without modification. Also fully media compatible with standard CP/M-format diskettes.
- **Advanced Mainframe-like features.** Includes read-after-write validation of all disk update operations, type-ahead buffers, incremental disk backup utility, password/log-on security, system date and time functions, accepts string of multiple commands, and numerous other capabilities not available under CP/M or TRSDOS. Multi-user, networking versions also available.

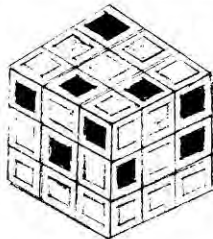
TRS-80 Model II and Xerox 820 versions **\$195** Dealer and OEM inquiries invited
Special Introductory Price
Easily adaptable to any Z80-based computer.
(408) 375-2775 • 686 Lighthouse Avenue • Monterey, 93940
Data-Rx, Inc.

TURBODOS is the registered trademark of Software 2000
CP/M, MP/M, and CP/NET are registered trademarks of Digital Research

✓292

QUICK

TRS-80#
Model
I/III



CUBE

Level II
16 K

Guaranteed to solve any Rubik's Cube (TM) or triple your money back. Enter 54 color faces of cube or let program set up random pattern to be solved. Program run can be interrupted to allow user to enter his/her own moves. Interesting program. Send \$19.95 plus \$1.50 postage & handling to:

**Alpha Queue Systems
Dept. A
P.O. Box 20885
Dallas, TX 75220**

Texas residents add 5% (\$1.00) sales tax. Checks only please.

Trademark of Tandy Corp.
TM Trademark of Ideal Toy Corp.

Auto-dial/Auto-answer Modem



Get connected automatically with the Microconnection™! A quality direct connect modem that dials the phone and answers it too. It transcribes transmissions, decodes busses, runs printers, and eliminates the need for the RS23 board, the expansion interface, and the "obsolete" acoustic coupler. FREE Smart80 terminal software for TRS80* included (\$79.95 value).

Bussdecoding Microconnection for TRS80*	\$249.00
with Auto-dial/Auto-answer	\$328.00
RS232 Microconnection	\$199.00
with Auto-dial/Auto-answer	\$224.94

the microperipheral corporation

2643 151st Pl. N.E., Redmond, WA 98052 (206) 881-7544

*Trademark of Tandy Corp.



✓298

Is there a computer career in your future?

Technological Destiny—Part I

Gary Dillio
1109 Madison Avenue
Prospect Park, PA 19076

At work, does your mind drift to your computer at home, alone and unplugged, helpless without you to guide it? Have you ever rushed home from work anxious to try out a new program? Do you sometimes think a job as a Programmer, Computer Specialist or Computer System Analyst might be interesting?

At the risk of sounding like an advertisement, if you answered yes to any of the questions, maybe the computer field is for you. The pay is good and opportunity abounds. Entry level positions require a knowledge of Basic, Cobol and Fortran languages. A familiarity with Automatic Data Processing (ADP) is also required.

This article is the first of a series. Even if you have no intentions for a computer career, the concepts explained will help

you better understand your computer.

ADP or EDP

Computer professionals define their field as either ADP or EDP. The DP stands for Data Processing. A indicates Automatic and the E is for Electronic. There is no real difference between the two. For the purpose of consistency, I will use EDP.

Computer Components

A computer can be broken down to three types of components: input, process and output.

Computer instructions are called programs. A program tells the computer what to do with the information it is going to receive. This information is called data. The input component accepts programs and data.

The process component operates on the data according to the program's prescribed step-by-step instructions.

Processed data is communicated by the computer to the operator via the output component.

Input or output devices have to be able to convert from the machine's language to human language. Some devices can only be used for input and some are limited to output. Others communicate both input and output. I/O devices, usually separate from the Computer

Processor, are referred to as peripherals.

The TRS-80 Model I keyboard is an input-only peripheral. The video screen is output-only, and the cassette recorder is both an input and output device. The cassette player/recorder is a true I/O device on the Model I.

The processor is usually referred to as a CPU (Central Processing Unit). The CPU is a multifaceted network of electronic devices and integrated circuits that receive input, project output and control the operations of all peripheral equipment. It is the heart of any computer. All the components linking with the CPU would be worthless without it.

Internal Storage: Core vs Memory

The CPU stores a program and data in an area called on-line memory. On-line memory refers to the storage capacity available to the CPU. Memory storage off-line refers to I/O device storage. On-line storage of CPU memory capacity is measured in K, or Kilobytes. A byte is the amount of storage necessary to store one character. A byte is made up of a number of bits (*binary digits*). In the TRS-80, 8 bits equal 1 byte. A kilobyte, or 1K, is equal to 1024 bytes. A TRS-80 4K Model I has 4096 bytes of memory on-line to the CPU.

TRS-80 CPU memory is divided into two sections: ROM (Read Only Memory) and RAM (Random Access Memory). ROM memory cannot be changed as it contains the operating system. The operating system is the master program instructing the CPU for peripheral utilization. This master program is often called the Executive Program.

RAM memory is for program and data storage. The memory associated with the TRS-80 (4K, 16K, or 32K) is RAM memory.

I/O Devices

Obviously, each computer function I mentioned needs further, more detailed explanation to be comprehensively understood. The remainder of this first part of the series will deal with the various devices used for I/O computer operations.

In the late 1880's, Herman Hollerith, a statistician for the Bureau of Census, developed an optically read punched card for data tabulation. Each column has a punch or punches, to represent a character. There are usually 80 columns per card. A card reader converts the punched representation into bytes or characters. By using a card punch, cards can also be used as output. The cards are easily altered and inexpensive. Compared to other I/O devices punched cards are very slow.

Each card has an 80 character limitation. Paper tape is like punched cards. It is a continuous form of punched holes to be read as input or produced as output. Paper tape is less expensive than cards but cannot be altered as easily. Because it is continuous, there is no 80 character limitation. Records cannot get out of sequence as they can on punched card systems. Paper tape is also slow. Its usual transfer rate is less than 800 characters per second; unlike punched cards it is not common in industry today.

Magnetic tape, such as cassette tape, is the most widely used I/O media. Tapes are written and read sequentially and are referred to as Sequential Access Media. Sequential access means the records on tape are read in sequence.

Large computer systems use iron oxide tape on reels measuring 1/2 inch by 2400 feet. Tapes are read and written much faster than cards but slower than disks. Tape is relatively inexpensive and compact. One reel stores millions of characters. The main disadvantages are the difficulty to change and rearrange data and, unlike cards and paper tape, the unreadability by humans.

Disks come in many sizes and varieties. Most common on microcomputers is the 5 1/4 or 8 inch floppy disk. Floppy disks (so called because of their pliability) resemble 45 RPM records. They are protected by a permanent paper cover. Most large data processing installations use a rigid group of disks stacked on top of one another and spaced by a spindle called a disk pack. The disks are coated with an iron oxide material on both the bottom and the top. Data can be recorded on all surfaces of the disk pack except the very top and very bottom. The disk access arm has two read/write heads, one for the top and one for the bottom. A disk records information on circular tracks. Disks are used for input and output.

The major advantages of the disk are speed and its ability to handle Random Access files. A Random Access technique means the ability to select a specific record without reading

through previous records. The major disadvantage of disk is its relatively high cost.

OCR represents Optical Character Recognition. With OCR humans and machines can read the characters. Human readable characters are optically scanned by the computer and interpreted into machine readable code. Obviously, this saves time and money by eliminating data conversion efforts. OCR input is usually typewritten on special forms. The computer uses a photo-electric cell to optically scan each character and convert it into machine-readable code. The major disadvantage of OCR equipment is cost. MICR (Magnetic Ink Character Recognition) is similar to OCR except characters to be read are magnetically coded. MICR is primarily used by the banking industry. Like OCR it is very expensive.

The most common form of output is printed. Printers and plotters print alphabetic, numeric or pictorial information in a variety of fonts and colors. Industrial printers operate from 200 lines per minute to 50,000 lines per minute. Laser printers, now being tested, will double that figure. Printed output is easy to read and convenient. Storage of printouts often becomes a problem: It is cumbersome and expensive.

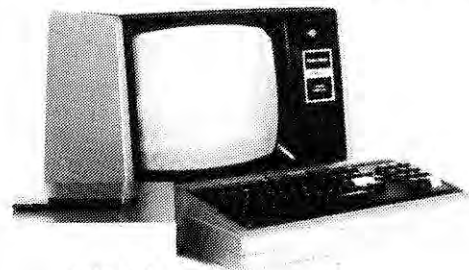
Computer Output Microfiche, COM, solves the problem by microfilming data output. The computer uses a pencil of light to pro-

duce the microfilm at speeds of up to 300 sheets a second. Since each microfiche sheet holds over a hundred pages of computer

DEVICE	INPUT	OUTPUT	SPEED	COMMONALITY	EXPENSE	ACCESS
PUNCHED CARDS	YES	YES	SLOW	LESS COMMON	INEXPENSIVE	SEQUENTIAL
PAPER TAPE	YES	YES	SLOW	RARE	INEXPENSIVE	SEQUENTIAL
MAGNETIC TAPE	YES	YES	MEDIUM	COMMON	INEXPENSIVE	SEQUENTIAL
DISK	YES	YES	FAST	COMMON	COSTLY	RANDOM
OCR	YES	NOT USUALLY	SLOW	RARE	COSTLY	SEQUENTIAL
MICR	YES	NOT USUALLY	SLOW	RARE	COSTLY	SEQUENTIAL
PRINTERS	NO	YES	SLOW	COMMON	COSTLY	-----
COM	NO	YES	FAST	COMMON	COSTLY	-----
CRT	NO	YES	MEDIUM	COMMON	INEXPENSIVE	-----

Table 1

TRS-80* OWNERS



BETA-80

LOW COST ARCHIVE OR DISK BACK-UP TAPE STORAGE SYSTEM

The BETA-80 is a low cost, high speed, direct access digital tape system which provides one megabyte of storage per drive. The dual drive configuration provides two megabytes on line. The BETA-80 has been interfaced to the Model III TRS-80* for use in backing up costly diskettes. It provides direct access at better than 100 inches per second and will store 10 single density 5-1/4" diskettes on a standard C60 cassette.

Write or phone MECA for details.

meca - (714) 365-7686

7350 Acoma Trail, Suite 3 - Yucca Valley, CA 92284

*304
*Manufacturer's Registered Trademark

output and a page of computer output can hold 7,128 characters, one second of COM output creates almost 214 million characters. Microfiche is inex-

pensive to produce, store and maintain.

Another output device is the Cathode Ray Tube or CRT. CRT output is very fast and generally

located at the user's site. The amount of data output is limited to reading speed. The CRT has no printout option. The CRT is a television-like device used extensively by microcomputers like the TRS-80 and by industries where the users are not located in the DP facility.

Table 1 charts the I/O devices according to their advantages and disadvantages.

The Central Processing Unit (CPU)

Internally the CPU is divided into three functional units.

The Arithmetic/Logic Unit performs all arithmetic calculations and any comparisons.

The Control Unit is a combination traffic cop, orchestra conductor and manager. It activates all equipment, controls the input data reads and output data writes, and tells the Arithmetic/Logic Unit when to calculate or compare.

An Internal Memory Unit makes up the third part of the CPU. Memory within the CPU is usually

called Core Storage. Although new advances in computers use non-core storage methodology, the term Core Storage is still widely used. Figure 1 illustrates typical Core Storage. Donut shaped rings, called cores, are strung on wires forming a grid called a Core Plan. Magnetizing a ring in a clockwise direction represents a binary 1, counterclockwise represents 0. Computer size is usually designated in terms of the number of addressable storage locations of internal memory. Operations performed in Core Storage are so fast they are usually measured in millionths or billionths of a second. ■

Gary Dillio is a Computer Systems Analyst for the Department of the Navy. In past roles, as a Senior Programmer and Computer Specialist-Auditor, he has worked on a variety of computer systems throughout the world.

Eds. Note—This article is the first of a five-part series. Next month: Data Processing.

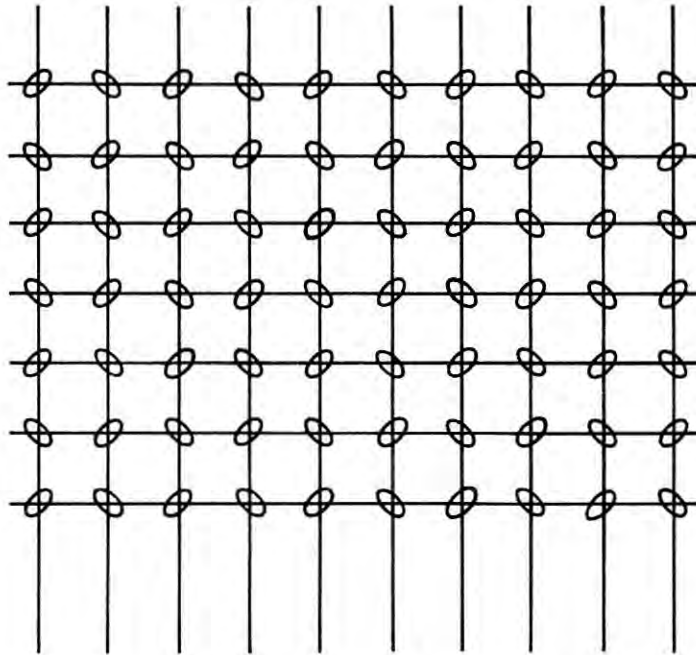
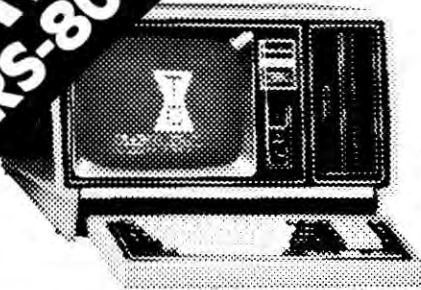


Figure 1

**SAVE
TRS-80's**



TRS-80's and Hewlett-Packards

Best Discounts Possible

WE PAY SHIPPING in the 48 continental states on prepaid orders of \$100.00 or more.

NO TAXES are collected on out-of-state shipments.

WE ACCEPT Visa, MasterCard and American Express, or you can save additional money by paying cash.

Pan American Electronics

TOLL FREE ORDER NUMBER 800/531-7466

1117 Conway • Dept. 36 • Mission, Texas 78572
Phone 512/581-2766 • Telex Number 767339

FORT WORTH BRANCH

2912 N. Main • Dept. 36 • Ft. Worth, Texas 76106
Phone 817/625-6333 • Telex Number 794836



Hewlett-Packard



TM — Trademark of Tandy Corporation

MAKE BASIC PERFORM LIKE A CHAMPION

TRS-80 INFORMATION SERIES - VOLUME IV

Lewis Rosenfelder

BASIC FASTER AND BETTER

& OTHER MYSTERIES



A guided tour of BASIC programming tricks and techniques

BASIC is not nearly as slow as most programmers think it is. *BASIC Faster and Better* shows you how to supercharge your BASIC, with 300 pages of fast, functions and subroutines.

You won't find any trivial 'check-book-balancing' programs in this book - it's packed with *useful* programs.

Tutorial for the beginner, instructive for the advanced, and invaluable

for the professional, this book doesn't just talk . . . it shows how! All of the routines are



1260 W. Foothill Blvd.
Upland, California 91786

(714) 946-5805

also available on disk, so that you can save hours of keyboarding and debugging.

BASIC Faster & Better and *Other Mysteries* is \$29.95, and the two program disks are \$19.95 each. The #1 disk *BFBDEM* contains all the demonstration programs, and #2 *BFBLIB* has all the library functions.

Get the book and/or disks from your local *IJG* dealer and B. Dalton bookstores.

AN OASIS IN A SEA OF TECHNICAL JARGON

Are you on the verge of drowning in the flood of technical information about computers in the marketplace? Wayne Green Inc. can help! **Desktop Computing** is here, and each month will explain all about computers without the "computerese."

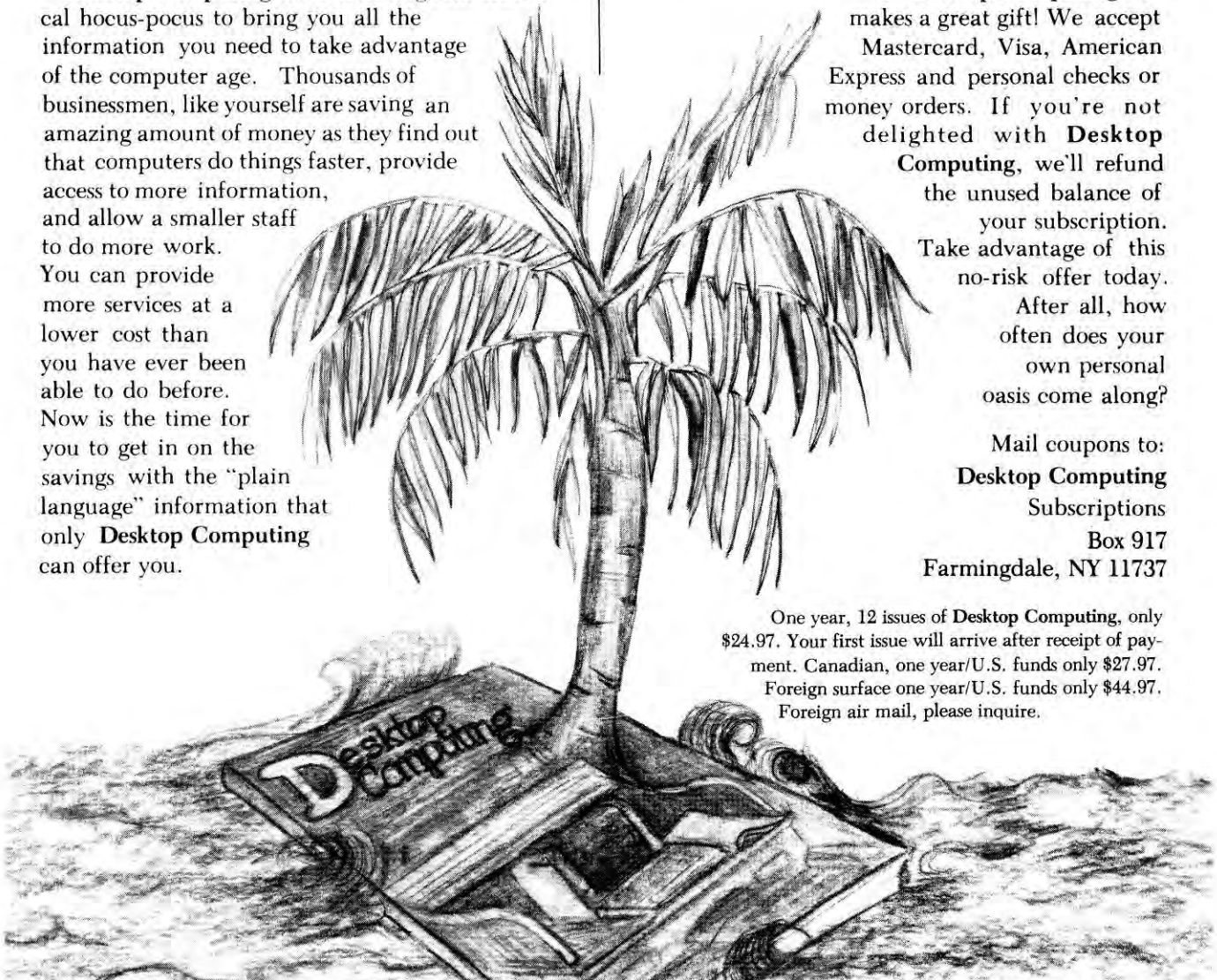
Desktop Computing will cut through the technical hocus-pocus to bring you all the information you need to take advantage of the computer age. Thousands of businessmen, like yourself are saving an amazing amount of money as they find out that computers do things faster, provide access to more information, and allow a smaller staff to do more work. You can provide more services at a lower cost than you have ever been able to do before. Now is the time for you to get in on the savings with the "plain language" information that only **Desktop Computing** can offer you.

The real bargain is that all the "plain language" information you need about computers is available for only \$24.97 for a 12 issue, year subscription that is tax deductible!

To order, fill in the coupon below. A photocopy of the coupon is acceptable. Introduce your friends to **Desktop Computing**—it makes a great gift! We accept Mastercard, Visa, American Express and personal checks or money orders. If you're not delighted with **Desktop Computing**, we'll refund the unused balance of your subscription. Take advantage of this no-risk offer today. After all, how often does your own personal oasis come along?

Mail coupons to:
Desktop Computing
 Subscriptions
 Box 917
 Farmingdale, NY 11737

One year, 12 issues of **Desktop Computing**, only \$24.97. Your first issue will arrive after receipt of payment. Canadian, one year/U.S. funds only \$27.97. Foreign surface one year/U.S. funds only \$44.97. Foreign air mail, please inquire.



Desktop Computing

U.S. \$24.97
 Canada \$27.97 (US funds)
 Foreign \$44.97 (US funds)

For You:

Check/money order Mastercard Visa
 American Express

Name _____

Address _____

City _____ State _____ Zip _____

Signature _____ Exp. Date _____

Card # _____ Interbank # _____

Box 917, Farmingdale, NY 11737

324B8

Desktop Computing

U.S. \$24.97
 Canada \$27.97 (US funds)
 Foreign \$44.97 (US funds)

For a Friend:

Please enter a subscription as my gift to:

Name _____

Address _____

City _____ State _____ Zip _____

I DO DO NOT WANT A GIFT CARD ENCLOSED IN MY NAME.

324B8

PLEASE SEND IN BOTH COUPONS WHEN ORDERING FOR A FRIEND.

COLOR COMPUTER SOFTWARE

**EDITOR ASSEMBLER
DEBUGGER** \$6⁹⁵

CCEAD: This 8K Basic Program supports cassette files, has full cursor control, line insertion/deletion, and much more. Two pass assembler supports full 6809 instruction set & addressing modes, lists to screen or printer. Debugger allows memory examine/modify, program execution. If not delighted return within 2 weeks for a full refund. You get fully commented Basic source & complete instructions. Requires Ext. Basic & 16K. CASSETTE \$6.95

DELUXE TERMINAL PROGRAM

COLORCOM/E: This terminal program has everything! PLUS it's in a convenient plug-in cartridge. LOOK at these features.

- Complete upload & download support
- Selectable baud rate & parity
- Full or half duplex
- Write to any printer or cassette
- Supports ANY serial printer
- Automatic or manual capture
- Selectable Capture characters
- Exchange Basic programs
- Word mode means no split words
- And much, much more

Use with Compuserve, The Source, etc. Talk to other Color Computers. Works with any model Color Computer & full duplex RS232 modem. CARTRIDGE \$49.95

STRIPPER: The Stripper takes off all that excess fat in your Basic Programs. Three valuable commands: (1) Delete Remarks; (2) Pack Lines; (3) Delete Spaces. Fully automatic, is not fooled by GOTO's, GOSUB's, etc. Your programs will run faster and take up much less memory. CASSETTE \$7.95

BOOTSTRAP: This Cartridge automatically loads and executes Basic programs from cassette at power-up. Can't fail. Ignores data files, Machine Language files, or Basic files that have errors. For those programs that have to run! CARTRIDGE \$34.40

RS232 EXPANSION CABLE: With this cable you can connect 2 devices at the same time to the RS232 part of your Color Computer. Great for printer & modem. RS232 Cable \$20.00

CUSTOM CARTRIDGES: Put YOUR Basic program into a convenient ROM Cartridge. It's easy! Runs instantly at power-up, frees up memory. Use for Ad displays, schools, etc. Call or write for info. FROM \$41.65

Send check, money order,
or Visa/MC Number;
Include \$1 for postage and
handling; Visa/MC: Phone
for fast service.



P.O. Box 10234
Austin, Texas 78766
(512) 837-4665

✓ 154

*** **RIBBON SALE** ***
Good This Month **NEW LOW PRICES!**
RADIO SHACK-CENTRONICS-EPSON PRINTERS

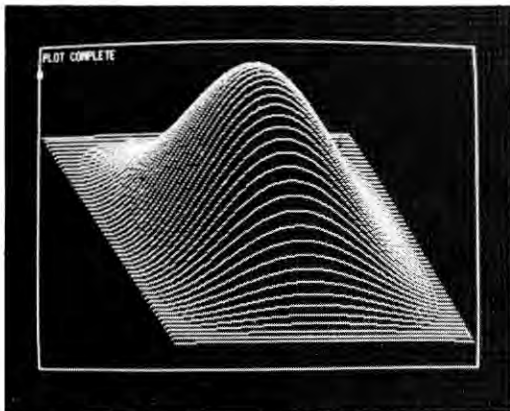
INSERTS	RELOADS	NEW CARTRIDGES (from the manufacturer)
EXACT REPLACEMENTS made in our own shop feature LONG-LIFE and HEAVY INKING. Our instructions make inserts easy to put in.	You SEND your used CARTRIDGES to us. We RELOAD them for you.	
DAISY WHEEL II Carbon Film (26-1419) Red, Green Blue, Brown	26.00/6 50.00/doz	15.00/3 18.00/3
COLORS Long-Life Fabric (1449)	32.00/6 60.00/doz	18.00/3 21.00/3
LP VI-VIII (26-1418)	25.00/3 95.00/doz	9.00 ea 21.00/2
LP III-V (26-1414)	20.00/3 76.00/doz	9.00 ea 22.00/2
LP II-IV 700 Zip-Pack 730/737/779	21.00/3 80.00/doz	9.00 ea 25.00/2
EPSON MX 70-80-100	11.00/3 42.00/doz	9.00 ea 70 25/2 100 46/2
CENTRONICS 7-MEG 702/703/704/753	21.00/3 80.00/doz	10.00 ea 26.00/2

Volume 1 **MODEL II 8" GAME DISCS** Volume 2
Biorhythms, Trap Ugly, Bingo
Rip Cord, Yacht Sea \$25.00 each Towers, Blackjack
Concentration & 4 More Farkle, Pony & 3 More

SEND CHECK, MONEY ORDER or COD(\$2.00 UPS) TO:
BCCOMPCO ✓ 152 ✓ VISA
800 South 17 Box 246 417 932-4196
Summersville MO 65571

WE PAY SHIPPING ON PREPAID ORDERS. NON UPS, MEXICO, CANADA, ALASKA, HAWAII, ADD \$1.00. FOREIGN ADD 10%. US FUNDS ONLY. PLEASE INCLUDE STREET ADDRESS FOR UPS DELIVERY.
WORRIED ABOUT ORDERING BY MAIL? Relax. We've been in business for many years and can please the smallest and largest account. 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. Have you ever received a new fabric ribbon you had to unwind and dump out on the table before you could use it? We have. Or, carbon film inserts that had no end of ribbon sensor? Or, 7-meg cartridges with only HALF enough ribbon at full retail? RIBBON manufacturing and distribution is our only business. We use the latest state of the art production equipment and are blessed with a fine, dedicated staff. We fully guarantee all our products because we make them ourselves. You must be completely satisfied, period. Our ribbons are made fresh daily and are shipped within 24 hours. Write or call for our brochure and newsletter "INK SPOTS". Dealer inquiries welcome. Bob Calk President

**HI-RESOLUTION GRAPHICS
FOR MODEL II \$495**



E/RAM II SCREEN PHOTO

E/RAM II is a hardware/software package which adds a 512 X 240 high-resolution graphics display to the TRS-80™ Model II. An assembly language driver is provided along with a high quality, fully assembled, printed circuit board which plugs directly into the Model II card case.

The software driver provides the user with useful assembly language subroutines which may be called from any high level or assembly language program. Routines include control functions which can either turn the normal TRS-80™ or the E/RAM II display on or off, erase the screen, or invert the video. Plot functions include SET, RESET, or READ a point on the screen. When the LINE function is passed end-point coordinates, an optimized dot raster line is produced at machine language speed.

For more information, or to order, see your dealer or call THE COMPUTER STORE at (918) 747-9333.

Dealers and OEM's contact:
KEYLINE COMPUTER PRODUCTS, INC.
P.O. BOX 35268
TULSA, OKLAHOMA 74135

*TRS-80 is a registered trademark of Radio Shack, a Tandy Corporation.

✓ 163

Micro-Grip™

FRICTION FEED FOR YOUR EPSON

MX-70* or MX-80*

*MX-70 and MX-80 are Trade Marks of EPSON, Inc.

- + Converts your printer for friction feed of SINGLE SHEETS or ROLL PAPER.
- + SIMPLE Installation (all you need is a screwdriver, no soldering)
- + Tractor feed remains undisturbed.
- + Proven reliability.
- + Available NOW!
- + Only \$39.95 (add \$1.50 for postage)

SATISFACTION GUARANTEED OR YOUR MONEY BACK

MICRO-GRIP, Ltd.
P.O. Box 4278
Norton AFB, Ca 92409

VISA & Master Card Accepted

✓ 161



An organized grocery list will do it!

Bringing the Supermarket to its Knees

J. A. Kraynak
5123 Ryan Road Apt. 22
Toledo, OH 43614

items (five pages) are presented the user can input items passed over, forgotten or not listed. The grocery list is printed in the

order products appear on the store's shelves.

Since each store is laid out differently, a trip to the store will

be necessary. List in the Data statements (lines 990-1550), the order (aisle by aisle) the groceries come into view.

It is a common situation: A computer, a wife and a user-husband in the middle. The solution is to get the wife involved or take up a new hobby. The playing games tactic did not work.

One day I observed her begrudgingly making the grocery shopping list. I decided to write a program to minimize the chore. It had to be simple and fast.

The Organized Grocery List

My Shopping List program displays 45 grocery items at a time and permits the items to be selected (for later printout) or passed over. A built in quick exit brings the next page of items into view for selection. Once all

The Key Box

Basic Level II or
Disk Basic
Model I
16K RAM
TRSDOS or NEWDOS80
Disk drive optional
Printer

Program Listing 1

```

10 CLS:
20 CLEAR 200
21 REM ** TITLE PAGE & INSTRUCTIONS
30 PRINTCHR$(23):PRINT:PRINT" **** SHOPPING LIST ****"
40 PRINT" BY J. A. KRAYNAK"
50 PRINT:PRINT:PRINT:PRINT"DO YOU NEED INSTRUCTIONS (Y/N)";
60 A$=INKEY$:IF A$="Y" THEN 70 ELSE IF A$="N" THEN 220 ELSE 60
70 CLS:PRINT:PRINT" FIVE LISTS OF GROCERIES WILL APPEAR ON THE SCREEN,
ONE"
80 PRINT"AT A TIME OF COURSE, WITH A BLINKING CURSOR ( ) NEXT TO THE"
90 PRINT"FIRST ITEM ON THE LIST. IF YOU DESIRE THAT ITEM TO BE ON YOUR"
100 PRINT"PRINTED SHOPPING LIST - PRESS THE 'Y' KEY. IF NOT - PRESS THE"
110 PRINT"'N' KEY & THE CURSOR WILL MOVE ON TO THE NEXT ITEM." :PRINT
120 PRINT" AN '*' WILL APPEAR TO THE LEFT OF THE ITEMS SELECTED. TO"
130 PRINT"MOVE TO THE NEXT 'PAGE' PRESS THE '@' KEY. YOU CANNOT GO"
140 PRINT"BACKWARDS...IF YOU FORGET AN ITEM - DON'T PRET - AFTER"
150 PRINT"RUNNING THE ENTIRE LIST YOU WILL BE ABLE TO ADD ITEMS NOT"
160 PRINT"LISTED OR FORGOTTEN; BEFORE THE PRINT-OUT OCCURS."
170 PRINT@15*64," * PRESS SPACE BAR TO CONTINUE **";
171 REM ** INSTRUCTIONS BLINKING CURSOR ROUTINE
180 KLS=CHR$(143)
190 LK$=" "
200 PRINT@3*64+46,KLS;:FORDD=1TO10:NEXTDD
210 A$=INKEY$:PRINT@3*64+46,LK$;:FORDD=1TO10:NEXTDD:IF A$=" " THEN 220 ELSE 200
220 H=0:K=-1:O=0:P=0:R=0:S=0
230 DIM LT(45),LTS(250),STS(250),LST(45),LSTS(45),NLS(250),AS(50),BS(50),CS(50),
DS(50),ES(50),MSS(20)
240 CLS:PRINTCHR$(23):PRINT:PRINT:PRINT:PRINT:PRINT:PRINT" **** LOADING DATA
****"
241 REM ** LOAD SCREEN WITH 45 ITEMS
250 FOR Y=1 TO 45:READ LT(Y):NEXT Y
260 FOR X=1 TO 45
270 READ LTS(X)
280 IF LTS(X)="" THEN GOTO 380
290 NEXT X
300 X=0:Y=0:H=0
310 CLS
311 REM ** SET UP CURSOR AT PROPER POSITION
320 X=X+1:Y=Y+1
330 IF X=46 THEN 830
340 PRINT@LT(Y),LTS(X);
350 STS(H)=LTS(X)
360 H=H+1
370 GOTO 320
371 REM ** ADD MISC. ITEMS ROUTINE
380 CLS:W=0:PRINT"YOU MAY NOW ADD UP TO 20 ITEMS OF YOUR CHOICE THAT WERE NOT ON
THE LIST. AFTER EACH ITEM IS TYPED, PRESS <ENTER>. WHEN FINISHED...TYPE '
END' FOLLOWED BY PRESSING <ENTER>."
390 PRINT:FOR I=1TO20
400 PRINT"ITEM #";I; " ";
410 INPUT MSS(I)
420 IF MSS(I)="" THEN 460
430 W=W+1
431 REM ** PREVENT INSTRUCTIONS FROM SCROLLING OFF SCREEN
440 IF I=1 THEN PRINT@4*64,CHR$(31);
450 NEXT I
460 CLS:PRINT"READY PRINTER"
470 PRINT"HIT ENTER WHEN READY"
480 A$=INKEY$: IF A$="" THEN 480
481 REM ** PRINT OUT
490 U=PEEK(14312)
500 IF U=63 GOTO 530 ELSE GOTO 510
510 PRINT@7*64,"***** PRINTER NOT READY...CORRECT & PROCEED *****"
520 FOR GG=1 TO 800:NEXT GG:CLS:GOTO460
530 CLS

```

Program continues

The only fancy part of the program is the blinking cursor routine in the instruction and selection portions. This is accomplished in lines 180-210 and 830-890. Exact spacing is important in lines 70-80 of the instructions. The blinking cursor should appear within the (), near the end of line 80.

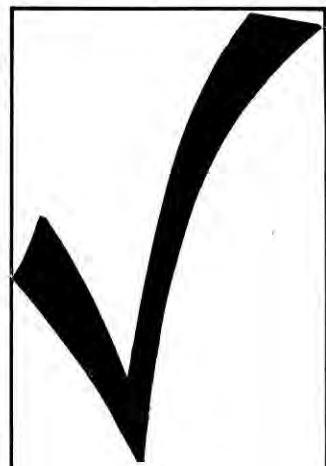
Change the Data statements (lines 990-1550) to suit your particular needs. Change the peri-

ods in line 1540 according to the Remark statement in line 1535 if additions or deletions take place. Swaps will not affect line 1540. As written, 16 additional items can be permanently added to the program by deleting line 1540.

After completing the five page listing, you can add up to 20 other items. Line 440 prevents the top screen instructions from scrolling if more than 11 items are added. Terminate

this section by typing End and hitting Enter. Lines 490-510 check the printer status; alter them for compatibility with your printer or delete them entirely. I use a Line Printer IV (Centronics 737). The subroutine beginning at line 1560 handles the tab print positions.

The program, approximately five grans in length, runs in Level II and Disk Basic. My wife uses the program weekly. ■



Check
our
book pages
for
the
latest books
about
micro —
computers.

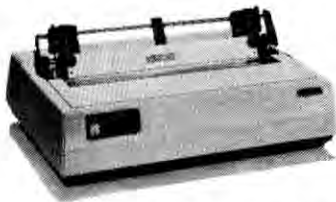
Program continued

```

540 LPRINT " ":LPRINT " ":LPRINT " ***** SHOPPING LIST **
*****";LPRINT " ":LPRINT " ":LPRINT " "
550 NC=-20
560 FOR A=0 TO O-1
570 GOSUB1560
580 LPRINTTAB(NC) AS(A);
590 NEXT A
600 FOR A=0 TO P-1
610 GOSUB1560
620 LPRINTTAB(NC) BS(A);
630 NEXT A
640 FOR A=0 TO Q-1
650 GOSUB1560
660 LPRINTTAB(NC) CS(A);
670 NEXT A
680 FOR A=0 TO R-1
690 GOSUB1560
700 LPRINTTAB(NC) DS(A);
710 NEXT A
720 FOR A=0 TO S-1
730 GOSUB1560
740 LPRINTTAB(NC) ES(A);
750 NEXT A
760 FOR A=1 TO W
770 GOSUB1560
780 LPRINTTAB(NC) MS(A);
790 NEXT A
800 LPRINT " ":LPRINT " ":LPRINT " ***** END OF LIST ***
*****";LPRINT " ":LPRINT " ":LPRINT " "
810 LPRINT " ":LPRINT " ":LPRINT " ":LPRINT " "
820 END
830 REM ** BLINKING CURSOR ROUTINE
840 CS=CHR$(143)
850 JS=" "
855 PRINT@15*64+5,":::.....:PRESS '@' KEY FOR NEXT PAGE:::.....: ";
860 FOR I=1 TO 45
870 PRINT@LT(I)-2,C$;
880 FOR DD=1TO5:NEXTDD
890 JK$=INKEY$:PRINT@LT(I)-2,J$;:FORDD=1TO5:NEXTDD:IFJK$="@ "THEN960ELSEIFJK$="Y "
THENPRINT@LT(I)-2,"*";:K=K+1:GOTO900ELSEIFJK$="N"THENPRINT@LT(I)-2," ";:K=K+1:GO
TO950ELSE870
900 IF F=0 THEN AS(O)=ST$(K):O=O+1
910 IF F=1 THEN BS(P)=ST$(K):P=P+1
920 IF F=2 THEN CS(Q)=ST$(K):Q=Q+1
930 IF F=3 THEN DS(R)=ST$(K):R=R+1
940 IF F=4 THEN ES(S)=ST$(K):S=S+1
950 NEXT I
960 F=F+1:K=-1:GOTO260
961 REM ** SET UP SCREEN PRINT POSITIONS
970 DATA 5,25,44,69,89,108,133,153,172,197,217,236,261,281,300,325,345,364,389,4
09
980 DATA 428,453,473,492,517,537,556,581,601,620,645,665,684,709,729,748,773,793
,812,837,857,876,901,921,940
989 REM ** GROCERY ITEM LISTS . . 45 ITEMS PER 'PAGE'
990 DATA CANTALOUPE,S,MUSHROOMS,APPLES,CELERY
1000 DATA CARROTS,PEARS,LETTUCE,CUCUMBERS
1010 DATA TOMATOES,MARZETTI DRESSING,GREEN PEPPERS
1020 DATA BANANAS,POTATOES,CORN,CABBAGE
1030 DATA ONIONS,GRAPEFRUIT,GRAPES
1040 DATA ORANGE JUICE,DRY YEAST,EGGS,BUTTER
1050 DATA MARGERINE,MILK,CHEESE(SLICES)
1060 DATA CHEESE(PIZZA),MAYONNAISE,SALAD DRESSING
1070 DATA PICKLES(DILL),PICKLES(SLICES),MUSTARD
1080 DATA KETCHUP,PEANUT BUTTER,JELLY
1090 DATA RELISH,HOT SAUCE
1100 DATA SUB BUNS,DINNER ROLLS,FRENCH BREAD
1110 DATA ITALIAN BREAD,PIE,CAKE,DONUTS
1120 DATA POTATOE SALAD,MACARONI SALAD,KIELBASA
1130 DATA LUNCHEON MEAT,BALOGNA,KIELBASA LOAF
1140 DATA PIZZA LOAF,SALAMI
1150 DATA PEPSI,DIET PEPSI,7-UP,GINGERALE
1160 DATA DR PEPPER,R C COLA,POP,ROOTBEER
1170 DATA PEANUTS,WALNUTS,PLAIN CHIPS,RIPPLED CHIPS
1180 DATA PRETZELS,POPCORN,CORN CHIPS
1190 DATA CORN CURLS,DORITOS
1200 DATA MUSHROOMS,SAUERKRAUT,PEAS,CARROTS,GREEN BEANS
1210 DATA CORN,CHILI BEANS,PORK & BEANS,INSTANT COFFEE
1220 DATA REGULAR COFFEE,TEA BAGS,COCOA MIX,TOMATO SAUCE
1230 DATA TOMATO PUREE,TOMATO PASTE,TOMATOES(WHOLE)
1240 DATA FRUIT COCKTAIL,PINEAPPLES,TOMATO JUICE
1250 DATA DOG FOOD,CAT FOOD,BONZ,DOG YUMMIES,FLEA POWDER
1260 DATA FROSTED FLAKES,CHEERIOS,CORN FLAKES,SHREDED WHEAT
1270 DATA BEEF NOODLE SOUP,TOMATO RICE SOUP,CHICKEN SOUP
1280 DATA TOMATO SOUP,VECTABLE SOUP,TUNA FISH,SALMON
1290 DATA RICE-A-RONI,RICE,SPAGETTI SAUCE,PIZZA SAUCE
1300 DATA SPAGETTI NOODLES,ELBO MACARONI,EGG NOODLES
1310 DATA RIGATONI,COOKIES,SALTEEN CRACKERS,RITZ CRACKERS
1320 DATA SOAP(FACE),SOAP(SHOWER),MR BUBBLE
1330 DATA CLEANSER,CHEER,WINDEX,VANISH,SOFT SCRUB
1340 DATA MR CLEAN,AIR FRESHNERS,SHOUT,BLEACH,IVORY LIQUID

```

Program continues



Microline 84 (Parallel)

\$1059⁸⁸

DELIVERED

- 200 cps bidirectional printing
- 50 cps proportional mode
- Enhanced/emphasized print
- Dot-addressable graphics
- Tractor/friction feed up to 16"
- Program-selectable character size

Microline Printers

MICROLINE 80	\$369 ⁸⁸
MICROLINE 82A	\$484 ⁸⁸
MICROLINE 83A	\$749 ⁸⁸
OKIGRAPH ROM—adds Hi-Res capabilities to 82A and 83A Printers	\$89 ⁸⁸

NEC Printers

NEC PC-8023A-C	\$499 ⁸⁸
----------------------	---------------------

Epson Printers

MX-80 w/GRAFTRAX	\$474 ⁸⁸
MX-80/F-T	\$569 ⁸⁸
MX-80/F-T w/GRAFTRAX	\$619 ⁸⁸
MX-100	\$719 ⁸⁸
GRAFTRAX	\$89 ⁸⁸

Centronics Printers

CENTRONICS 739 (Parallel)	\$539 ⁸⁸
CENTRONICS 739 (RS-232-C)	\$644 ⁸⁸
2-Color Adapter	\$69 ⁸⁸

C.Itoh Printers

C.ITOH COMET I	\$284 ⁸⁸
C.ITOH PRO WRITER w/3K buffer (parallel and serial)	\$639 ⁸⁸
C.ITOH F-10 DAISY WHEEL (40cps)	\$1564 ⁸⁸

Cables and interfaces available for the Apple, Atari, CBM/PET, and TRS-80 microcomputers

Orders & Information:

CALL (603)-673-8857

Orders Only: CALL (800)-343-0726

We accept COD's-No surcharge for credit cards-No charge for UPS shipping Stock shipments next day-All equipment factory fresh w/MFG warranty

Prices subject to change

HIGH TECHNOLOGY AT AFFORDABLE PRICES

THE BOTTOM LINE

302

12 Johnson Street, Milford NH 03055

Program continued

```

1350 DATA BOUNCE,AMMONIA,STARCH,TOP JOB
1360 DATA CAKE MIXES, FLOUR,CRISCO,VEGETABLE OIL,LOG CABIN SYRUP
1370 DATA PANCAKE MIX,SPICES,SALT,PEPPER,SUGAR,AU JUS GRAVY
1380 DATA MEAT LOAF MIX,STROGANOFF MIX,MEAT TENDERIZER,CANDY
1390 DATA MARSHMELLOWS,JELLO,CARNATION MILK,FREEZER WRAP
1400 DATA NAPKINS,GLAD WRAP,ALUMINUM FOIL,TRASH BAGS
1410 DATA GARBAGE BAGS,WAX PAPER,KLEENEX,TOILET PAPER,PAPER TOWELS
1420 DATA CAKE,BREAD,HAMBURG BUNS,HOT DOG BUNS,DINNER ROLLS
1430 DATA BREAD CRUMBS,CROUTONS,STUFFING MIX,SHAKE & BAKE
1440 DATA FISH FILETS,FRENCH FRIES,ONION RINGS,GNOCCHI
1450 DATA WAFFLES,LEMONADE,ORANGE JUICE,TANG
1460 DATA PIEROGIES,PIZZA,STEAK-UMMS,CHOPPED ONION
1470 DATA ICE CREAM,POP SICKLES,ICE CREAM TOPPINGS,COOL WHIP
1480 DATA FROZEN CHICKEN,ROAST BEEF DINNER,FROZEN TURKEY
1490 DATA FROZEN STRAWBRY,FROZEN MIXED FRUIT
1500 DATA HOT DOGS,BACON,SAUSAGE,FISH,CHICKEN,TURKEY
1510 DATA PEPPER STEAKS,STEAK,ROAST,CHOPPED SERLOIN
1520 DATA HOT SAUSAGE,HAMBURGER,GROUND CHUCK,HAM,PORK CHOPS
1530 DATA SPARE RIBS,CIGARETTES,PIPE TOBACCO,PIPE FILTERS,T V GUIDE
1535 REM ** DELETE A PERIOD ' ' IN DATA LINE 1540 FOR EACH NEW ITEM ADDED OR
ADD PERIOD ' ' IN DATA LINE 1540 FOR EACH ITEM DELETED.
1540 DATA .....
1550 DATA *END
1560 NC=NC+20
1570 IF NC>60 THEN LPRINTCHR$(13):NC=0
1580 RETURN
1590 'SAVE AS "SHOPPING/JAK"

```

PROFESSIONAL SOFTWARE

TRS-80® MODEL II & 16

NOW AVAILABLE!

BASIC COMPILER

- TRSDOS* 2.0 COMPATIBLE
- UP TO 30 TIMES FASTER

BY MICROSOFT • EASY TO USE

- INCLUDES M-80 & CREF-80
- AUGMENTED WITH OUR DOCUMENTATION

\$339.00*

DISK SORT

- MENU DRIVEN
- EASILY INSERTED INTO JOB STREAM FOR NON-STOP RUNNING

• YOU DON'T HAVE TO BE A PROGRAMMER TO USE IT!

• RANDOM FILES • EASY TO USE • SPEC'S SAVED ON DISK

• FULL DISK CAPACITY

\$69.99*

DOC. ONLY \$10⁰⁰
DEDUCTIBLE
ON PURCHASES

BASIC CROSS REFERENCE

- SEE USED LINE#s/NAMES AT A GLANCE
- PRODUCES NICE PROG. LISTING

• SAVE HOURS!

• INDISPENSABLE

\$59.99*

DOC. ONLY \$10⁰⁰
DED. ON PURCH.

EPSON PAPER

9 1/2x11 18lb WHITE STRIPS TO 8 1/2x11 3,000/BOX

MX-80 \$475⁰⁰ MX-100 \$764⁰⁰ HURRY-LIMITED TIME!

MAILING LIST

- FAST RETRIEVAL-UPDATE
- ESTIMATED AVAILABILITY - MAY 15, 1982

• HIGH CAPACITY • SPANS DISK • NO SORTING

• R/S CONVERSION INCLUDED • LONG/SHORT FORMATS

\$25.00*

DOC. ONLY \$10⁰⁰
DED. ON PURCH.

*PLUS POSTAGE & HANDLING. PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

TRS-80 & TRSDOS ARE REGISTERED TRADEMARKS OF TANDY CORP.

GOOD-LYDDON DATA SYSTEMS
5486 RIVERSIDE DR., CHINO, CA 91710
(714) 980-4583

186

MASTER CARD or VISA accepted.

SOFTWARE YOU CAN BET ON!



OPTION80

If you gamble in the big casino—Wall Street—you need a program to evaluate call options. OPTION80 tells you when it's time to buy and when it's time to sell. Suggests hedges to minimize your risk. Takes only 15 minutes a week to update and run. Comes with data for 25 calls. Easily expanded to include as many as you wish. Sold only on diskette.

Only \$25.00



TOUT3

A vastly improved version of the original TOUT horse race handicapper. Now, thousands of races are simulated in seconds to give you each horse's probability of winning and identify overlays. Horses are screened using factors derived from an operations research study. This handicapper outperforms programs and calculators selling for much more.

Only \$19.00



DRAW5

Jacks or better to open with a joker that can be used as an ace or in straights or flushes (Gardena CA rules). You play against six computer-controlled opponents. This program has true artificial intelligence capabilities. DRAW5 was developed originally by Real World Simulations. After three years of refining, it's now available for the TRS-80. It will provide hours of fun, challenge and education. Now 30% taster.

Only \$15.00

TOUT3 and DRAW5 supplied on 500 baud cassette. Add \$4.00 for Model I or III diskette. All programs available on 8" disk for Model II at \$6.00 additional. PA residents add 6% sales

tax. North Star diskette version of DRAW5 can be obtained from Real World Simulations, Box 4107, Torrance, CA 90510.

WILSON

Software Division • 539 Springhouse Lane • Camp Hill, PA 17011

TRS-80 is a Tandy Corporation trademark

192

VISA/MC Order Line Only (except Mich.) 800-253-4358 ext. 100

FINDISK-II The ultimate in automatic disk indexing with exclusive features Model-I \$20.00

AUTOMATICALLY create INDEX of programs or data from all your disks, print disk LABELS, print alphabetized MASTERLIST, do fast SEARCH, add DESCRIPTIONS. Also automatically: detect DATA or SYS disks, PURGE disks and index of old files, and UPDATE from revised disks only.

SOLAR-I The critical calculations for passive design. Model-I \$30.00 Model-II \$45.00

INPUT: any latitude, orientation, slope, roof overhang, storage type, building loss. OUTPUT: solar angles, shading, time, heat gain/loss, percent solar, fuel use. Print report by hour, month, year in presentation format.

RIA-II Complex Real Estate Investment Analysis Model-I \$30.00 Model-II \$45.00

Analysis for investor or homeowner using Elwood method. INPUT: Project costs, loan and tax data, expenses, depreciation rate. OUTPUT: Cap rate/value, mortgage payments, before/after tax cash flows, return (IRR), profit/gain from sale over any time series.

DEPRECIATE-I Manage a list of depreciable items Model-I \$15.00 Model-II \$20.00

Tracks long list of depreciable items with varying purchase dates, depreciation rates, or per cent business use. Update any time. Print tax form. Used by many CPAs.

STRUCT-I Graphic design of steel/wood beams and moment transfer. Model-I \$15.00

INPUT: span/cantilever, uniform/point loads, beam material. OUTPUT: with screen graphics beam moment & shear diagrams. Print job report with diagram, stresses, and required beam sizes.

Min 32K. On disk (Mod-I one drive order tape). Add \$1.00 postage (Mich. add 4% tax) VISA/MC

193 **DOCUMAN SOFTWARE BOX 387-A KALAMAZOO, MI 49005 (616) 344-0805**

MULTI-USER OASIS HAS THE FEATURES PROS DEMAND. READ WHY.

Computer experts (the pros) usually have big computer experience. That's why when they shop system software for Z80 micros, they look for the big system features they're used to. And that's why they like Multi-User OASIS. You will too.

DATA INTEGRITY: FILE & AUTOMATIC RECORD LOCKING

The biggest challenge for any multi-user system is co-ordinating requests from several users to change the same record at the same time.

Without proper co-ordination, the confusion and problems of inaccurate or even destroyed data can be staggering.

Our File and Automatic Record Locking features solve these problems.

For example: normally all users can view a particular record at the same time. But, if that record is being updated by one user, automatic record locking will deny all other users access to the record until the up-date is completed. So records are always accurate, up-to-date and integrity is assured.

Pros demand file & automatic record locking. OASIS has it.

SYSTEM SECURITY: LOGON, PASSWORD & USER ACCOUNTING

Controlling who gets on your system and what they do once they're on it is the essence of system security.

(THEN COMPARE.)

Without this control, unauthorized users could access your programs and data and do what they like. A frightening prospect isn't it?

And multi-users can multiply the problem.

But with the Logon, Password and Privilege Level features of Multi-User OASIS, a system manager can specify for each user which programs and files may be accessed—and for what purpose.

Security is further enhanced by User Accounting—a feature that lets you keep a history of which user has been logged on, when and for how long.

Pros insist on these security features. OASIS has them.

EFFICIENCY: RE-ENTRANT BASIC

A multi-user system is often not even practical on computers limited to 64K memory.

OASIS Re-entrant BASIC makes it practical.

How?

Because all users use a single run-time BASIC module, to execute their compiled programs, less

memory is needed. Even if you have more than 64K, your pay-off is cost saving and more efficient use of all the memory you have available—because it services more users.

Sound like a pro feature? It is. And OASIS has it.

AND LOTS MORE...

Multi-User OASIS supports as many as 16 terminals and can run in as little as 56K memory. Or, with bank switching, as much as 784K.

Multi-Tasking lets each user run more than one job at the same time.

And there's our BASIC—a compiler, interpreter and debugger all in one. An OASIS exclusive.

Still more: Editor; Hard & Floppy Disk Support; Keyed (ISAM), Direct & Sequential Files; Mail-Box; Scheduler; Spooler; all from OASIS.

Our documentation is recognized as some of the best, most extensive, in the industry. And, of course, there's plenty of application software.

Put it all together and it's easy to see why the real pros like OASIS. Join them. Send your order today.

OASIS IS AVAILABLE FOR SYSTEMS: Altos; CompuCorp; Cromemco; Delta Products; Digital Group; Digital Microsystems; Dynabyte; Godbout; IBC; Index; Intersystems; North Star; Oryx; SD Systems; TRS 80 Mod II; Vector Graphic; Vorimex.

CONTROLLERS: Bell Controls; Cameo; Corvus; Konan; Microtration; Micropolis; Tarbell; Teletek; Thinkertoy; X Comp.

Write for complete, free Application Software Directory.

PLEASE SEND ME:

Product	Price with Manual	Manual Only
OPERATING SYSTEM (Includes: EXEC Language; File Management; User Accounting; Device Drivers; Print Spooler; General Text Editor, etc.) SINGLE-USER MULTI-USER	\$150 350	\$17.50 17.50
BASIC COMPILER/INTERPRETER/DEBUGGER	100	15.00
RE-ENTRANT BASIC COMPILER/INTERPRETER/DEBUGGER	150	15.00
DEVELOPMENT PACKAGE (Macro Assembler; Linkage Editor; Debugger)	150	25.00
TEXT EDITOR & SCRIPT PROCESSOR	150	15.00
DIAGNOSTIC & CONVERSION UTILITIES (Memory Test; Assembly Language; Converters; File Recovery; Disk Test; File Copy from other OS; etc.)	100	15.00
COMMUNICATIONS PACKAGE (Terminal Emulator; File Send & Receive)	100	15.00
PACKAGE PRICE (All of Above) SINGLE-USER MULTI-USER	500 850	60.00 60.00
FILE SORT	100	15.00
COBOL-ANSI '74	750	35.00

Order OASIS from:

Phase One Systems, Inc.
7700 Edgewater Drive, Suite 830
Oakland, CA 94621

Telephone (415) 562-8085
TWX 910-366-7139

NAME _____
STREET (NO BOX #) _____
CITY _____
STATE _____ ZIP _____

AMOUNT \$ _____
(Attach system description; add \$3 for shipping; California residents add sales tax)
 Check enclosed VISA
 UPS C.O.D. Mastercharge
Card Number _____
Expiration Date _____
Signature _____



MAKES MICROS RUN LIKE MINIS

Even if you don't, you'll know what he took.

To Catch a Thief

David G. Kuhn
325 Nancy Drive
Tallahassee, FL 32301

If you are robbed can you quickly and accurately determine what is stolen? The police will need to know; so will your insurance company if you hope to be compensated for your loss.

My wife and I always intended to take an inventory of our household possessions. We were going to place a copy of that inventory in our safe deposit box at the bank for safekeeping. We did not conduct that inventory, however, until I purchased a TRS-80 Model III.

We now have a complete inventory of our household possessions recorded on computer tape. One copy of the program remains at home, another resides in our safe deposit box. Now, if we should be the victims of a burglary, and if the burglar is considerate enough to overlook my computer, we will be

able to determine in a matter of moments exactly what was taken, when it was purchased, and how much we paid for it. In addition, we will be able to give the police an accurate description of the items taken, along with their identifying serial numbers.

Even if my computer is stolen, all is not lost. We will take the tape of the inventory to our friendly Radio Shack store and provide a real-life demonstration of how useful that computer can be.

My home inventory program can be just as useful for establishing the extent of a loss due to a fire or other major or minor catastrophe. In addition, there are times when it is interesting to see exactly just how much you have accumulated over a period of years. You will no doubt be surprised—you may even want to increase the amount of insurance you hold after seeing how much you have spent to obtain all those treasures.

The Program

I wrote the home inventory program (see the Program Listing) before I invested in a printer. I designed it to be used with the bare minimum of equipment. If you have a printer, it is easy to get printouts using the Model III's screen print function, or you can easily modify the inventory program to print what you desire.

When you run the program, it will display a menu of options. You may choose to: list all items included in the inventory; list only those items to be found at a specified location; add items to the inventory; or terminate the program.

Option 2 limits the display of inventoried items to a specified location. You could conduct a room-by-room check for missing items. Program lines 235, 240, and 245 display the appropriate locations and their respective codes. (Substitute locations of your choice for those that I used in the program. Make similar substitutions in lines 310-360, and line 430.)

Adding Items

Add inventory items to the program using Data statements, starting with line 500. Whenever you want to add one or two new items to the inventory select menu Option 3. The program

clears the screen and protects the top seven lines of the display from scrolling (line 425). It then displays on those protected lines a copy of your location codes (line 430) and the appropriate format for the new Data statements (line 440). In addition, line 455 lists items already included in the inventory and clearly indicates where the new Data statements should begin.

Scroll protection is lost if you enter more than two Data statements under Option 3 (somehow memory location 16916 gets set back to zero). This means that you lose the display of the location codes and the format for adding new inventory items. This is usually not a significant problem because you normally add only one or two new items at any one time. However, when you want to add a large number of items to the inventory at one sitting, you may find it helpful to prepare and then refer to a card containing the location codes and format. Also, remember to use the Model III's automatic line numbering function.

Should you desire to remove or modify an item in the inventory, take note of the Data statement line number that is displayed along with the other information on that item. You can now easily remove that line from the program or edit it. The Model III's edit function is very convenient for quickly finding and modifying any of the inventory items. ■

David G. Kuhn is an Associate Professor of Management in the College of Business at Florida State University.

Program Listing

```

100 CLS:PRINT @ 338,*****
105 PRINTTAB(16)** HOME INVENTORY PROGRAM **
110 PRINTTAB(16)** ----- **
115 PRINTTAB(16)** BY **
120 PRINTTAB(16)** DAVID G. KUHN **
125 PRINTTAB(16)**-----**
130 FOR I=0 TO 1000:NEXT I
135 *** PRINT THE MENU OF OPTIONS
140 CLS:PRINT @ 222,"MENU":PRINTTAB(30)"----":
PRINTTAB(21)*1 = LIST ALL ITEMS*:
PRINTTAB(21)*2 = LIST BY LOCATION*:
PRINTTAB(21)*3 = ADD AN ITEM TO INVENTORY*:
PRINTTAB(21)*4 = TERMINATE PROGRAM*
145 PRINT:PRINT:
PRINTTAB(21)"PLEASE CHOOSE BY NUMBER"
150 *** RECORD MENU CHOICE USING INKEY$ AND EXECUTE OPTION
155 K$=INKEY$:IF K$=""THEN 155 ELSE K=VAL(K$)
160 IF K=1 THEN 185
165 IF K=2 THEN 225
170 IF K=3 THEN CLS:GOTO 420
175 IF K=4 THEN CLS:END
180 GOTO 155
185 *** INITIALIZE CUM.VAL., 'T', READ, AND LIST ALL ITEMS

```

Program continues

The Key Box

Basic Level II
Model III
16K RAM
Printer optional

Interested in computers or robotics? Looking for info on hardware, software, theory, and applications?



The Computer Book Club offers you an incredible range of computer books and a huge variety of tapes and disks . . . ALL at low, low member prices!

Select 6 fact-filled books for only \$2.95 (total value up to \$111.70)

1000 List \$10.95: 57 PRACTICAL PROGRAMS & GAMES IN BASIC

1070 List \$14.95: Digital Interfacing With An Analog World

1209 List \$11.95: THE MC6809 COOKBOOK

1053 List \$12.95: Microprocessor Cookbook

1290 List \$15.95: IC TIMER HANDBOOK

1332 List \$16.95: HOW TO DESIGN, BUILD & PROGRAM YOUR OWN ADVANCED WORKING COMPUTER SYSTEM

1050 List \$10.95: THE MOST POPULAR SUBROUTINES IN BASIC

1341 List \$18.95: HOW TO DESIGN & BUILD YOUR OWN CUSTOM ROBOT

1333 List \$16.95: 101 MICROPROCESSOR SOFTWARE & HARDWARE PROJECTS

1187 List \$15.95: The FORTRAN Cookbook

1275 List \$14.95: 33 Challenging Computer Games for TRS-80/Apple/PET

1191 List \$16.95: ROBOT INTELLIGENCE with experiments

1169 List \$15.95: THE GIANT Handbook of Computer Projects

1200 List \$16.95: HOW TO BUILD YOUR OWN WORKING MICROCOMPUTER

1187 List \$15.95: PLAYING THE STOCK & BOND MARKETS WITH YOUR PERSONAL COMPUTER

1277 List \$19.95: MICROCOMPUTERS IN AMATEUR RADIO

1305 List \$15.95: COMPUTER TECHNICIAN'S HANDBOOK

1191 List \$12.95: HOW TO DESIGN/BUILD REMOTE CONTROL DEVICES

1101 List \$15.95: How to Design & Build Your Own Custom TV Games

1250 List \$16.95: DIGITAL ELECTRONICS TROUBLESHOOTING

1028 List \$9.95: How to Repair Video Games

1160 List \$12.95: 1001 THINGS TO DO WITH YOUR PERSONAL COMPUTER

1228 List \$12.95: 34 MORE Tested, Ready-To-Run Game Programs in BASIC

1108 List \$11.95: LASERS, THE LIGHT FANTASTIC

1141 List \$11.95: HOW TO BUILD YOUR OWN WORKING ROBOT PET

1088 List \$13.95: ILLUSTRATED DICTIONARY OF MICROCOMPUTER TERMINOLOGY

1303 List \$14.95: HOW TO SOLVE STATISTICAL PROBLEMS WITH YOUR POCKET CALCULATOR

Join now and get The "Compulator" Book . . . FREE! (List \$7.95)

7 very good reasons to try The Computer Book Club Blue Ridge Summit, PA 17214

- **Reduced Member Prices.** Save up to 75% on books sure to increase your know-how
- **Satisfaction Guaranteed.** All books returnable within 10 days without obligation
- **Club News Bulletins.** All about current selections—mains, alternates, extras—plus bonus offers. Comes 10 times a year with dozens of up-to-the-minute titles you can pick from
- **"Automatic Order"**. Do nothing, and the Main selection will be shipped automatically! But . . . if you want an Alternate—or no books at all—we'll follow the instructions you give on the reply form provided with every News Bulletin
- **Continuing Benefits.** Get a Dividend Certificate with every book purchased after fulfilling membership obligation, and qualify for discounts on many other volumes
- **Extra Bonuses.** Take advantage of added-value promotions, plus special discounts of software, games, and more
- **Exceptional Quality.** All books are first-rate publisher's editions, filled with up-to-the-minute info



THE COMPUTER BOOK CLUB Blue Ridge Summit, PA 17214

Please accept my membership in the Computer Book Club and send the 6 volumes circled below, plus a free copy of The "Compulator" Book. I understand the cost of the books selected is \$2.95 (plus shipping/handling). If not satisfied, I may return the books within ten days without obligation and have my membership cancelled. I agree to purchase 4 or more books at reduced Club prices during the next 12 months, and may resign any time thereafter.

554 1000 1028 1050 1053 1070 1088 1101 1108
1141 1160 1169 1187 1191 1195 1200 1209 1228 1250
1251 1275 1277 1290 1303 1305 1332 1333 1341

Name _____ Phone _____

Address _____

City _____

State _____ Zip _____

(Valid for new members only. Foreign and Canada add 20%. Orders outside U.S. or Canada must be prepaid with international money orders in U.S. dollars.)

EM-482

Program continued

```

190 T=0
195 READ DSN$:IF DSN$="END" THEN 395
200 READ ITEM$,LC,DATES,MAKE$,CST,ID$
205 CLS:PRINT "ITEM:" TAB(20) ITEM$
210 PRINT:PRINT "LOCATION:" TAB(20);:GOSUB 300
215 GOSUB 365
220 GOTO 195
225 *** PRINT LOCATION CODES
230 CLS:PRINTTAB(24)"LOCATION CODES":
PRINTTAB(24)"-----"
235 PRINT " 1 = LIVING ROOM":
PRINT " 2 = DINNING ROOM":
PRINT " 3 = KITCHEN":
PRINT " 4 = FAMILY ROOM"
240 PRINT " 5 = DEN":
PRINT " 6 = CHILDREN'S ROOM":
PRINT " 7 = MASTER BEDROOM":
PRINT " 8 = MASTER BATH"
245 PRINT " 9 = HALL BATH":
PRINT "10 = GARAGE":
PRINT "11 = OTHER LOCATIONS"
250 PRINT:PRINTTAB(15)"SELECT LOCATION CODE AND <ENTER>":
INPUT NUM
255 *** INITIALIZE CUM.VAL.'T', READ, AND LIST BY LOCATION
260 CLS:T=0
265 READ DSN$:IF DSN$="END" THEN 395
270 READ ITEM$,LC,DATES,MAKE$,CST,ID$
275 IF LC<>NUM THEN CLS:PRINT@474,"SEARCHING":GOTO 265
280 CLS:PRINT "ITEM:" TAB(20) ITEM$
285 PRINT:PRINT "LOCATION:" TAB(20);:GOSUB 300
290 GOSUB 365
295 GOTO 265
300 *** THIS SUBROUTINE PRINTS THE LOCATION OF AN ITEM
305 ON LC GOTO 310,315,320,325,330,335,340,345,350,355,360
310 PRINT "LIVING ROOM":RETURN
315 PRINT "DINNING ROOM":RETURN
320 PRINT "KITCHEN":RETURN
325 PRINT "FAMILY ROOM":RETURN
330 PRINT "DEN":RETURN
335 PRINT "CHILDREN'S ROOM":RETURN
340 PRINT "MASTER BEDROOM":RETURN
345 PRINT "MASTER BATH":RETURN
350 PRINT "HALL BATH":RETURN
355 PRINT "GARAGE":RETURN
360 PRINT "OTHER LOCATIONS":RETURN
365 *** THIS SUBROUTINE PRINTS DATES,MAKE$,CST,ID$,DSN$,T
370 PRINT:PRINT "DATE PURCHASED:" TAB(20) DATES:
PRINT:PRINT "MAKE:" TAB(20) MAKE$:
PRINT:PRINT "ORIGINAL COST $:" TAB(19) CST
PRINT:PRINT "IDENTIFICATION:" TAB(20) ID$:
PRINT:PRINT "DATA STATEMENT #:" TAB(20) DSN$:
375 T=T+CST:
380

```

```

PRINTTAB(35) "CUM. VAL. = $":;
PRINT USING "#,#####.##";T
385 PRINT:PRINTTAB(15)*** PRESS <ENTER> TO CONTINUE ** ";:
INPUT ES
390 RETURN
395 *** PRINT END OF DATA MESSAGE AND RETURN TO MENU
400 CLS:PRINT "THAT'S ALL THERE IS!":
PRINT:PRINT:
PRINT "THE TOTAL CUM. VAL. OF ITEMS REVIEWED = $":;
PRINT USING "#,#####.##";T
405 PRINT:PRINT:PRINT:PRINT:PRINT:RESTORE
410 PRINTTAB(14)*** PRESS <ENTER> TO RETURN TO MENU ** ";:
INPUT ES
415 GOTO 135
420 *** THE FOLLOWING POKE PROTECTS THE TOP SEVEN LINES AND
ALLOWS THE LOCATION CODE AND DATA FORMAT TO BE DIS-
PLAYED
425 CLS:POKE 16916,7
430 PRINT"LOCATION CODE: 1=LIVING RM, 2=DINNING RM, 3=KITCHEN,
4=FAMILY RM, 5=DEN, 6=CHILDREN'S RM, 7=MASTER BED RM,
8=MASTER BATH, 9=HALL BATH, 10=GARAGE, 11=OTHER"
435 PRINT
440 PRINT"FORMAT: DATA STATEMENT #, ITEM, LOCATION CODE, DATE,
MAKE, COST, ID"
445 PRINT "-----"
450 *** THE FOLLOWING LISTS THE DATA STATEMENTS AND ALLOWS THE
USER TO IDENTIFY WHERE TO BEGIN ADDING NEW STATEMENTS
455 LIST 460-
460 *** DATA STATEMENTS SHOULD START ON LINE 500 AND INCREMENT
BY 1
465 *****
500 DATA 500,SOFA,1,SEPTEMBER 1981,XYZ COMPANY,395.95,#12345
501 DATA 501,END TABLE,1,9/81,ABC COMPANY,199.95,#54321
502 DATA 502,OVVAL TABLE,2,9-81,ABS COMPANY,399.99,#6789
503 DATA 503,SIX CHAIRS,2,SEPT. 81,ABC COMPANY, 425.00,#9876
504 DATA 504,STOVE,3,SEPT. 81,XYZ COMPANY,350.#121212
505 DATA 505,REFRIGERATOR,3,9/81,XYZ COMPANY,375.#232323
506 DATA 506,25" COLOR TV,4,SEPT. 81,TV INC.,499.95,#1234567
507 DATA 507,RECLINING CHAIR,4,SEPT. 81,EASYCHAIR INC.,199.95,#894
508 DATA 508,COMPUTER,5,SEPT. 81,HINT1-RS,999.#577577
509 DATA 509,CHAIR,5,9-81,?,15,BROWN WOOD
510 DATA 510,BED,6,SEPTEMBER 1981,BETTER BED INC.,0.#92397
511 DATA 511,DESK,6,9/25/81,FRIENDLY DESK COMPANY,100.#543
512 DATA 512,BED,7,SEPT,81,BETTER BED INC.,155.95,#94558
513 DATA 513,CAR,10,SEPT,81,NEW CAR COMPANY,6499.99,#12843
514 DATA 514,CREDIT CARD,11,SEPT. 1981,EASY CREDIT,0.#932993
1000 '
1005 '
1010 *****
1015 ***** THE FOLLOWING DATA STATEMENT MUST BE THE LAST *****
1020 DATA END

```

PRODUCTS FOR YOUR RADIO SHACK

COLOR COMPUTER

MICROTEXT COMMUNICATIONS VIA YOUR MODEM!

NEW!

Now you can use your printer with your modem! Your computer can be an intelligent printing terminal. Talk to timeshare services or to other personal computers; print simultaneously through a second printer port; and re-display text stored in memory. Download text to Basic programs; dump to a cassette tape, or printer, or both. Microtext can be used with any printer or no printer at all. It features user-configurable duplex/parity for special applications, and can send any ASCII character. You'll find many uses for this general purpose module! Available in ROMPACK, ready-to-use, for \$59.95.

SOFTWARE DEVELOPMENT SYSTEM

The Micro Works Software Development System (SDS80C) is a complete 6809 editor, assembler and monitor package contained in one Color Computer program pack! Vastly superior to RAM-based assemblers/editors, the SDS80C is non-volatile, meaning that if your application program bombs, it can't destroy your editor/assembler. Plus it leaves almost all of 16K or 32K RAM free for your program. Since all three programs, editor, assembler and monitor are co-resident, we eliminate tedious program loading when going back and forth from editing to assembly and debugging!

The powerful screen-oriented Editor features finds, changes, moves, copies and much more. All keys have convenient auto repeat (typamatic), and since no line numbers are required, the full width of the screen may be used to generate well commented code.

The Assembler features all of the following: complete 6809 instruction set; complete 6800 set supported for cross-assembly; conditional assembly; local labels; assembly to cassette tape or to memory; listing to screen or printer; and mnemonic error codes instead of numbers.

The versatile ABUG monitor is a compact version of CBUG, tailored for debugging programs generated by the Assembler and Editor. It features examine/change of memory or registers, cassette load and save, breakpoints and more. SDS80C Price: \$89.95

GAMES



- Star Blaster** — Blast your way through an asteroid field in this action-packed Hi-Res graphics game! Available in ROMPACK; requires 16K. Price: \$39.95
- Pac Attack** — Try your hand at this challenging game by Computerware, with fantastic graphics, sound and action! Cassette requires 16K. Price: \$24.95
- Berserk** — Have fun zapping robots with this Hi-Res game by Mark Data Products. Cassette requires 16K. Price: \$24.95
- Adventure** — *Black Sanctum* and *Calixto Island* by Mark Data Products. Each cassette requires 16K. Price: \$19.95 each.

ROMLESS PAK I — is an empty program pack capable of holding two 2716 or 2732 EPROMs, allowing you up to 8K of program! The PC board inside comes with sockets installed, ready to go with the addition of your custom EPROMs. Price: \$24.95

2-PASS DISASSEMBLER — with documentation package. 16K; cassette, 80C Disassembler Price: \$49.95

CBUG — Machine language monitor. CBUG Cassette Price: \$29.95
CBUG ON 2716 EPROM: Can plug into Romless Pak I. CBUG ROM Price: \$39.95

PARALLEL PRINTER INTERFACE — serial to parallel converter allows use of all standard parallel printers. P180C Price: \$69.95

Assembly Language Programming, by Lance Leventhal. Price: \$16.95

MEMORY UPGRADE KITS: 4-16K Kit Price \$39.95. 16-32K (requires soldering experience) Price: \$39.95

PARTS & SERVICES: SAMs, 6809Es, RAMs, PIAs. Call for prices.

THE MICRO WORKS

✓125

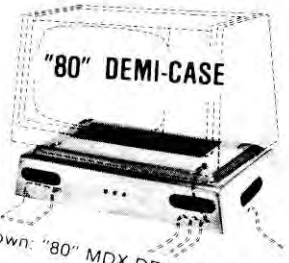


GOOD STUFF!

WE SHIP FROM STOCK!

Master Charge/Visa and COD Accepted

P.O. BOX 1110 DEL MAR, CA 92014 714-942-2400



Shown: "80" MDX DEMI-CASE ✓174

Encloses LNW and MDX P.C. Boards, plus Cabling, A/C Cords, etc. Silver-Gray Fiberglass

\$32.50 plus \$2.50 shipping
N.Y.S. residents add 7% tax

SYRACUSE R&D CENTER
Box 125, Dewitt, N.Y. 13214
"Specializing in Electronic Packaging"

\$275 DISK DRIVES

5 1/4" 40 Track drive with case and power supply.

FLIPPY DRIVES ONLY \$295.00

2 DRIVE CABLE \$14.95

4116 MEMORY CHIPS 8 FOR \$20

CORSAIR COMPUTER CORPORATION ✓200

7952 Highway 80 West
Fort Worth, TX 76116
817-244-8051

SOFTCO Software for TRS80 Model I & III

CHECK REGISTER PLUS™ \$99.95

Ideal for all cash accounting applications including farming

PERS-A-MAIL™ (word processing & mail list)	\$99.95
Basic Word Processor	69.95
Mailing List with QuickSearch™	49.95
Statement/Invoice Writer	29.95
User's Guide for any System (applied to future purchase)	15.00

All Systems are disk based and Require 48K, 1 Disk, Printer & TRS80 Model I or III (please specify)

MAGNUM COMPUTER PRODUCTS
PO Box 3358 Boise, ID 83703 208-342-7304
Dealer Inquiries Invited ✓259

MD EXPANDS

**MICRO-DESIGN PRESENTS THE MDX SERIES
INTERFACE EXPANSION SYSTEMS FOR THE TRS-80* COMPUTERS**

The MDX Series Interface Expansion Boards are designed to provide a wide range of options for the TRS-80* Computers. By using a "modular design" scheme, assembly of the board in sections is possible; thus you build in the options you need, as you may need them! The P.C. Boards are solder-masked and silk-screened for easy assembly, and each board comes with a well illustrated Users Manual.

MODEL I EXPANSION

The MDX-1 and MDX-2 expansion boards are field proven and offer more options than any other board on the market.

Features:

- On-Board Power Supply ✓76
- Floppy Disk Controller
- Phone Modem
 - 300 Baud — Direct-Connect — "Answer" and "Originate" Modes
- Serial Port
 - RS-232 and 20ma Loop Compatible
- EPROM
 - 2K or 4K Capabilities
- Dual Cassette Logic

MDX-1 P.C. Board & Users Manual	\$69.95/ea
MDX-2 P.C. Board & Users Manual	74.95/ea
Fully Assembled MDX-2 & Manual (No Memory)	399.95/ea
Partially Assembled MDX-2 & Manual	299.95/ea
Users Manuals	8.95/ea

Custom Enclosures Available

NOTE: The MDX-1 does not provide FDC circuitry

MODEL III EXPANSION

Micro-Design now introduces the MDX-3 Interface for the TRS-80* Model III Computer. The MDX-3 board mounts inside the computer and uses the existing power supplies.

Features:

- Double-Density Floppy Disk Controller
 - Digital Data Separation
 - Controls Up to 4 Drives
- Serial Port
 - RS-232 and 20ma Loop Compatible
- Phone Modem
 - 300 Baud — Direct Connect — "Answer" and "Originate" Modes

MDX-3 P.C. Board & Users Manual	\$74.95/ea
Fully Assembled MDX-3 & Users Manual	324.95/ea
Partially Assembled MDX-3 & Users Manual	199.95/ea
Users Manual	8.95/ea

THE MDX-4 PHONE MODEM ✓78

The MDX-4 Phone Modem utilizes the same Direct Connect, 300 Baud design as used in the other MDX series boards.

MDX-4 P.C. Board & Users Manual	29.95/ea
Users Manual	8.95/ea

NOW OFFERING ASSEMBLED UNITS

Micro-Design now offers "partially assembled" boards as an added savings to the user. These boards have all discrete components and all sockets soldered in place. All that remains is insertion of the required IC's.

Users Manuals are sold separately for evaluation purposes. The price is deductible upon the order of a board.



ACCEPTED

Texas Residents Add
5% Sales Tax
All Orders Processed In 72 Hours
All Board Orders Add \$5.00 For
Shipping and Handling

*TRS-80 Is A Trademark of Radio Shack

**Dealer Inquiries
Welcomed**

For More Information
And A Free Brochure
Contact:



MICRO-DESIGN
P.O. Box 748
Manchaca, TX. 78652
(512) 282-0225

Five popular, inexpensive printers compared.

Dot Matrix Bargains

Harley Dyk
1644 Grant
Grand Haven, MI 49417

Microcomputers appeared in 1975 and cost three to four times as much then as they cost now, and had fewer features. Many said printer prices would not follow this trend, due to the mechanical nature of printers. However, one can now buy a printer with better quality print and more features for \$200-\$300 less than a comparable printer two years ago. One can now buy a dot matrix printer which produces (for all practical purposes) typewriter quality for well under \$1000.

The dot matrix method has firmly established itself in the inexpensive printer field and, since this method makes many fonts available, is making strides in line printer technology (where whole lines of dots are printed at a time rather than seven or nine single vertical dots).

I have chosen to review five printers, made by Base₂, Centronics, Epson, Integral Data

Systems and Okidata. All five have been introduced in the last year, are dot matrix, have upper and lowercase, accept 8½-inch (or wider) paper, and are in the

\$600-\$1000 price range. These five printers are among the most sought after and best values in small printers for the hobbyist and small businessman.

I have used each printer for several days and have made a comparison chart highlighting features I think would interest prospective buyers. Included

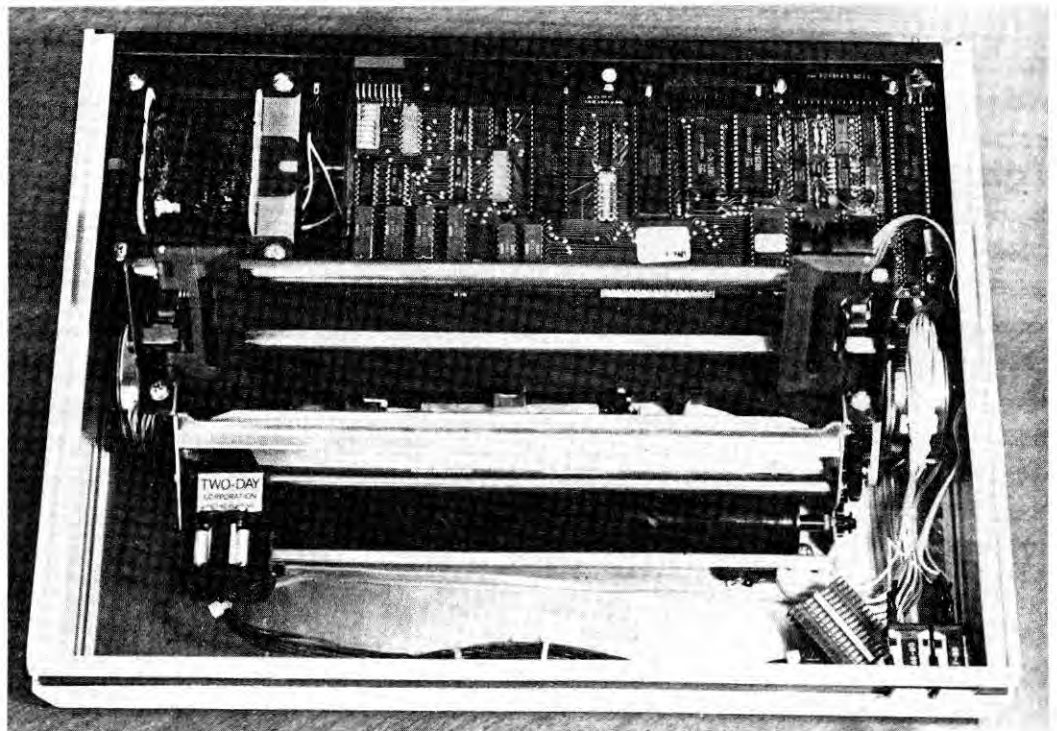


Photo 1. The Base₂ 850

BASE 2 850 DEMONSTRATION:

- 64 Characters per Line
- 72 Characters per Line
- 80 Characters per Line
- 96 Characters per Line
- 120 Characters per Line
- 132 Characters per Line

ELONGATION:

- 32 Characters per Line
- 36 Characters per Line
- 40 Characters per Line
- 48 Characters per Line
- 60 Characters per Line
- 66 Characters per Line

■ can do reverse printing too

Sample 1. Base₂ 850 demonstration.

Normal 10 CPI

Normal 10 CPI Elongated

Normal Proportional

Elongated Proportional

Condensed 16.7 CPI

Condensed 16.7 CPI Elongated

Sample 2. Centronics 737 demonstration.

are photos of each printer and print samples showing the variations of characters each can produce.

Facts such as availability, cost at the time of purchase, location and availability of service, etc., will influence your choice. You may be interested in features that can be tested only when you have the printer at your location. I know a businessman that tested a printer and found it unacceptable because his secretary could not load an 8½ by 11-inch sheet of stationery into the printer in less than five seconds.

The Base₂ 850

The 850 is made by Base₂ Inc., a small California company that has produced some 5000 printers during the past 1½ years. The 850 has been introduced to replace the 800 which had some problems with print head reliability. The new printer has a continuous-duty printer head.

The 850 is unique in that it comes standard with a 2K FIFO buffer, bit graphics, RS-232, 20 ma current loop, IEEE-488, and parallel (Centronics compatible) interfaces. This array of interfaces should match any change in hardware configurations. The 2K FIFO buffer is necessary for graphics, since a full line of data must be sent to the printer before printing begins. The buffer

also allows the use of RS-232 at 600 baud without handshaking, for most applications. Another unique feature of the 850 is that

paper can be fed into it from the bottom, front or rear. I found the 850 to be the most difficult for paper loading, probably due to the close tolerances used for the friction-feed feature.

This printer should be of particular interest to Apple owners, since it can print hi-res Apple graphics (see samples). A special parallel board from Base₂

can copy a high resolution graphics image from screen to paper with a single command. The board also supports Centronics-compatible parallel printers. The color of the 850 matches the Apple color scheme.

The 850 prints an average quality dot matrix character, and offers its best quality in the elongated 132 character per line

Epson MX - 80
Standard

Epson MX - 80
Standard - Emphasized

Epson MX - 80
Standard - Double Strike

Epson MX - 80
Standard - Emphasized - Double Strike

Epson MX - 80
Compressed

Epson MX - 80
Compressed - Double Strike

Epson MX - 80
Compressed - Double Width

Epson MX - 80
Compressed - Double Width - Double Strike

Epson MX - 80
Double Width

Epson MX - 80
Double Width - Emphasized

Epson MX - 80
Double Width - Double Strike

Epson MX - 80
Double Width - Emphasized-Double Strike

Sample 3. Epson MX-80 demonstration.

Tired OF THE LINE-EDIT Game?

Then why not try our Full-Screen Editor?

NOW - Create & Edit BASIC programs quickly and easily with this versatile Full Screen Basic Editor.

FEATURING Eleven commands and thirteen control keys to do any edit function you may require.

- Scroll Forward & BACKWARD through program
- Change many lines at one time
- Insert or delete characters
- Add or delete lines
- Search for strings
- Load the Editor once—it becomes an extension of your Model 3 BASIC
- Call the Editor with one command
- Return to BASIC by pressing BREAK

INSTRUCTION MANUAL ONLY (refundable) \$1.00

Model III Level II Tape..... \$19.95

NJ residents add \$1.00 Sales Tax

dcs SOFTWARE

86 Mansel Dr. Landing, N.J., 07850

✓517

for the TRS-80 from Micro-Mega

The Original GREEN-SCREEN



The eye-pleasing Green-Screen fits over the front of your TRS-80 Video Display and gives you improved contrast with reduced glare. You get bright luminous green characters and graphics like those featured by more expensive CRT units.

Don't confuse the Original Green-Screen with a piece of thin film stuck to the face of your video tube, such as that advertised by others. The Original Green-Screen is mounted in a full frame perfectly matched to the color and texture of the TRS-80 Video Display. It is attached with adhesive strips which do not mar your unit in any way.

The full frame design of the Original Green-Screen "squares off" the face of your video display and greatly improves the overall appearance of your system.

(Specify whether for Model I or Model III)

THE GREEN-SCREEN.....\$13.95
Add \$1.50 for postage and handling.

✓162

Terms: Check or money order, no CODs or credit cards, please. Add amount shown for postage and handling to price of the item. All items shipped within 48 hours by first class or priority mail. Virginia residents, add 4% sales tax

Micro-Mega · P.O. Box 6265 · Arlington, Va 22206

mode, yielding 66 characters per line. The 850 was the only printer I tested capable of inverse printing. The processing time of the Base₂ printer was good, placing it third in this category, but very close to the Epson MX-80. It was not the most quiet in the group, falling behind the Epson, Okidata and Centronics printers. The 850 includes most features as standard and has only one accessory, a roll paper holder (for friction feed) and wire tray combination for \$25.

The Centronics 737

This printer also goes by the name of Lineprinter IV by Radio Shack. The 737 tied with the Epson MX-80 as the lightest printer. It was of average noisiness and has the only gear-driven print head of the five. The print head is massive (comparable to that of the IDS 445) and this, plus its not being bi-directional, accounted for the fact that the

737 was the slowest printer I tested. However, it compensates for the slower processing time with its quality. In the proportional mode it has the most professional looking print I have seen in a dot matrix printer. While most characters take up a given width on a printer, in the proportional mode the 737 uses varying widths for the different characters, along with enhancements—particularly on capital letters such as E, N, and P, as shown in the print samples. The result is essentially a typewriter-quality printout.

The proportional mode uses 1185 dots for the 80 character line. It is ideally suited for right justification since spaces the width of dots can be inserted between words and letters. However, the 737 is reportedly not compatible with Scripsit at this time. In addition to the proportional mode, this is the only printer of the five that can print

IDS - 445 Paper Tiger at 8.3 Characters/Inch

The Enhanced Mode Looks Like This

IDS - 445 Paper Tiger at 10 Characters/Inch

The Enhanced Mode Looks Like This

IDS - 445 Paper Tiger at 12 Characters/Inch

The Enhanced Mode Looks Like This

IDS - 445 Paper Tiger at 16.5 Characters/Inch

The Enhanced Mode Looks Like This

Sample 4. IDS 445 Paper Tiger demonstration.

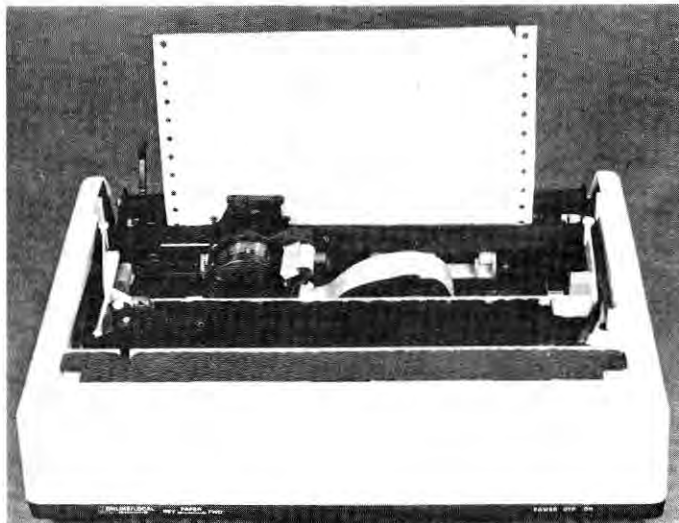


Photo 2. The Centronics 737

QUALITY SOFTWARE FOR TRS-80 COLOR!



ADVENTURES!!!!

For TRS-80, and COLOR-80. These Adventures are written in BASIC, are full featured, fast action, full plotted adventures that take 30-50 hours to play. (Adventures are inter-active fantasies. It's like reading a book except that you are the main character as you give the computer commands like "Look in the Coffin" and "Light the torch.")

Adventures require 16K on COLOR-80 and TRS-80. They sell for \$14.95 each.

ESCAPE FROM MARS

(by Rodger Olsen)

This ADVENTURE takes place on the RED PLANET. You'll have to explore a Martian city and deal with possibly hostile aliens to survive this one. A good first adventure.

PYRAMID (by Rodger Olsen)

This is our most challenging ADVENTURE. It is a treasure hunt in a pyramid full of problems. Exciting and tough!

TREK ADVENTURE (by Bob Retelle)

This one takes place aboard a familiar starship. The crew has left for good reasons - but they forgot to take you, and now you are in deep trouble.

DEATH SHIP (by Rodger Olsen)

Our first and original ADVENTURE, this one takes place aboard a cruise ship - but it ain't the Love Boat.

VAMPIRE CASTLE (by Mike Bassman)

This is a contest between you and old Drac - and it's getting a little dark outside. \$14.95 each.

SPACE SHUTTLE

ONE OR TWO PLAYER HIGH RES GAME -

Your mission is to dock with an orbiting space platform - but you may have to land on the planetary surface for refueling first. A real value in a high res real time game. \$6.95.

KILLERBOT - (Available in 4K) -

Real time action at 20 levels of difficulty as you run, sneak, and dodge your way through a bloody field of Killer Robots. Get across or die! Joysticks or Keyboard controls. TRS-80 COLOR (ANY BASIC 4K or more.). \$9.95.

SLASHBALL (Available in 4K) -

This one is best described as a thinkers arcade game. It rewards fast reflexes and clear thinking - like nothing you have ever seen before. It is one of our best family games for one or two players. \$9.95.

TIMETREK - A REAL TIME, REAL GRAPHICS

STARTRECK. See your torpedoes hit and watch your instruments work in real time. No more unrealistic scrolling displays! \$14.95.

STARFIGHTER - This one man space war game

pits you against spacecruisers, battlewagons, and one man fighters, you have the view from your cockpit window, a real time working instrument panel, and your wits. Another real time goody. \$9.95

BATTLEFLEET - This grown up version of Battleship

is the toughest thinking game available on OSI or 80 computers. There is no luck involved as you seek out the computers hidden fleet. A topographical toughie. \$9.95

LABYRINTH - 16K EXTENDED COLOR

BASIC - With amazing 3D graphics, you fight your way through a maze facing real time monsters. The graphics are real enough to cause claustrophobia. The most realistic game that I have ever seen on either system. \$14.95.



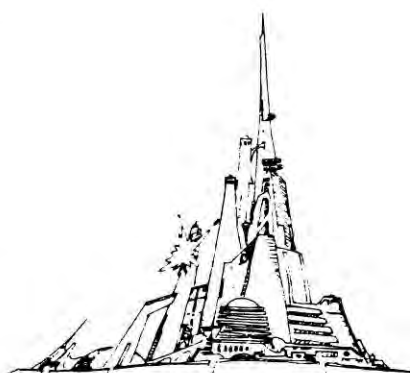
QUEST - A NEW IDEA IN ADVENTURE GAMES!

Different from all the others, Quest is played on a computer generated map of Alesia. Your job is to gather men and supplies by combat, bargaining, exploration of ruins and temples and outright banditry. When your force is strong enough, you attack the Citadel of Moorlock in a life or death battle to the finish. Playable in 2 to 5 hours, this one is different every time. 16K COLOR-80 OR TRS-80 ONLY \$14.95.



SPACE ZAPPER -

Protect your central Star Base from ships that attack from all four sides. Fast reflexes are required as the action speeds up. Great for kids or Dads. This game has high speed high resolution graphics and looks as if it just stepped out of the arcades. - 16K extended or 32K disk. BASIC TRS-80 Color only. \$14.95.



Please specify system on all orders

This is only a partial listing of what we have to offer. We have arcade and thinking games, utilities and business programs for the OS1 and TRS-80 Color. We add new programs every week. Send \$1.00 for our complete catalog.



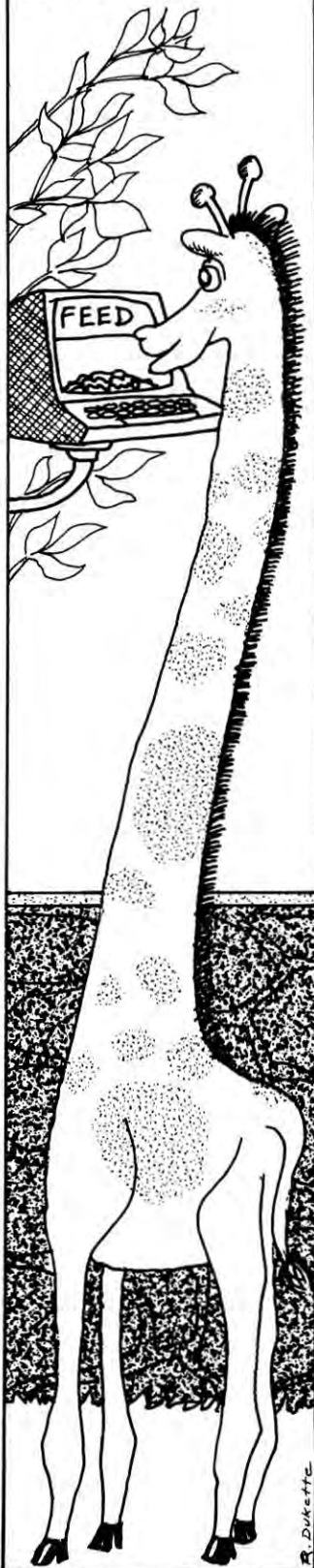
TRS 80

AARDVARK - 80
2352 S. Commerce, Walled Lake, MI 48088
(313) 669-3110

TRS 80 COLOR

✓107

101 USES FOR A DEAD MICRO- COMPUTER no.4



subscripts and superscripts, and do true underlining.

The 737 has friction feed and handles only 9½-inch pinfeed paper. The paper carriage is at

the rear of the printer, making the inclusion of tractors impractical. The 737 does not have a paper-out indicator and is missing a hardware top-of-form ad-

vance—features I would expect to find on a printer of this price. The 737 is the only printer of the five that offers no form of graphics.

Printer Comparison Chart

	BASE, 850	CENTRONICS 737
Weight	15 lbs	12 lbs
Size (H x W x D) in.	3 x 15 x 11	5 x 14.5 x 11
List Price	\$799, wire tray & paper roller-\$25	\$995
Standard Interface (if parallel, is Centronics compatible)	Parallel, series (20mA & RS-232), IEEE-488	Parallel
Speed	100 cps at all character densities	50 cps @ 10 cpi
Time to list typical 5.6K Basic program @ 10 cpi	2 min. 20 sec.	4 min. 5 sec.
Bi-directional	Yes (can select uni-directional)	No
Print head life expectancy (characters)	100 million	150 million
Print head drive	Roller Cam	Gear
Descenders	No	Yes
Number of wires in print head	7	9
Number of possible print variations of characters	12 plus inverse printing	6
Print head replacement cost	\$50	\$172
Densities (characters/line)	64, 72, 80, 96, 120, 132 plus elongated for each	40, 66, 80, 132 monospaced 8.2 to 24.6 cpi in proportional mode depending on text
Graphics	Dot resolution control, 5 densities, 99 dots/in. max. hor. 72 dots/in. max. vert.	None
Slash zeroes	Yes	No
Line spacing	6 lines/in. default. Programmable in half dot increments	6 lines/in.
Maximum paper width	9½ in. fanfold, 8½ in. cut	9½ in. fanfold, 8½ in. cut
Tractors	Yes, to 9½ in.	No, pinfeed 9½ in. paper only
Friction feed	Yes	Yes
Paper loading	Rear, bottom, or front	Rear
Paper tray	Available	No, separator used to divide paper in & out
Paper roll holder	Available	Yes
Copies	Up to 3 part	Up to 3 part
Paper out indicator	No	No
Top of form control	Yes (hardware & software)	Yes (software only)
External controls	Power, on line/off line, form/line feed	Power, on line/off line, Paper FWD/REV
Ribbon	½ in. width, cartridge, 5 million character expectancy	15 yd. zip-pack mobius loop
Noise (on a scale from 1-5 with 1 being most quiet)	4	3
Company address & phone	Base, Inc. P.O. Box 3548 Fullerton, CA 92631 800-854-7360	Centronics Data Computer Corp. 1 Wall Street Hudson, NH 03051 603-883-0111

The Epson MX-80

The MX-80 is designed to be compatible with the TRS-80 and supports the Model I and III

block graphics. The MX-80 can print some graphics that can't be produced on the screen, since it has programmable line spacing. It is the first printer

advertised as having a disposable print head which can be replaced for under \$30 (well under other print head prices).

The MX-80 tied for being the

lightest in the group, came in second for quietness and speed (on a typical 5.6K Basic program), has descenders, is bi-directional, is the least expen-

Printer chart continues

	EPSON MX-80	INTEGRAL DATA SYSTEMS 445	OKIDATA MICROLINE 80
Weight	12 lbs	20 lbs	14 lbs
Size (H x W x D) in.	4.2 x 14.7 x 12	12.5 x 15.75 x 12.5	4.25 x 13.5 x 9.75
List Price	\$645; bit graphics, serial interface addl.	\$795; add \$99 for graphics, paper tray addl.	\$800, tractors \$140, buffered RS-232, addl.
Standard Interface (if parallel, is Centronics compatible)	Parallel	Parallel & Series	Parallel
Speed	80 cps @ 10 cpi	120 cps @ 10 cpi	80 cps @ 10 cpi
Time to list typical 5.6K Basic program @ 10 CPI	2 min. 19 sec.	2 min. 12 sec.	3 min. 6 sec.
Bi-directional	Yes (logic seeking)	No	No
Print head life expectancy (characters)	50-100 million	300 million	200 million (guaranteed)
Print head drive	Belt	Belt	Belt
Descenders	Yes	No	No
Number of wires in print head	9	7	9
Number of possible print variations of characters	12	8	3
Print head replacement cost	Under \$30	\$150	\$115
Densities (characters/line)	40, 66, 80, 132	66, 80, 96, 132 plus enhanced (elongated) for each	40, 80, 132
Graphics	64 block characters TRS-80 compatible	Optional, Maximum density 72 dots/in. vertical, 64.2 dots/in. horizontal	64 block characters TRS-80 compatible
Slash zeroes	No	No	Yes
Line spacing	6 or 8 lines plus n lines/in. programmable	6 or 8 lines/in.	6 or 8 lines/in.
Maximum paper width	10 in. fanfold	9½ in. fanfold	9½ in. fanfold, 8½ in. cut
Tractors	Yes to 10 in.	Yes to 9½ in.	Optional, to 9 in.; 9½ in. pinfeed standard
Friction feed	No	No	Yes
Paper loading	Rear	Bottom or rear	Rear
Paper tray	No, separator used to divide paper in & out	Available	No
Paper roll holder	Does not apply	Available	Yes
Copies	Up to 3 part	Up to 4 part, more with adjust.	Up to 3 part
Paper out indicator	Yes	Yes	Yes
Top of form control	Yes (hardware & software)	Yes (hardware & software)	Yes (software only)
External controls	Power, LF, FF, On/Off line	Power, On/Off line, Line/form feed, form set	Power, On/Off line
Ribbon	Cartridge, 3 million character expectancy	½ in. cartridge, mobius loop, 6 million character expectancy	Standard ½ in. wide, 2 in. typewriter type
Noise (on a scale from 1-5 with 1 being most quiet)	2	5	1
Company address & phone	Epson America, Inc. 2384 Hawthorne Blvd. Torrance, CA 90505 213-378-2220	Integral Data Systems Milford, NH 03055 603-673-9100	Okidata Corporation 111 Gaither Drive Mt. Laurel, NJ 08057 609-235-2600

```

10 PRINT"1 - 16.5 Characters/Inch
20 PRINT"2 - 10 Characters/Inch
30 PRINT"3 - 5 Characters/Inch
35 INPUT C
40 IF C(1 OR D)3 THEN 35
50 LPRINTCHR$(27);CHR$(28+C)
60 PRINT"0 - 6 Lines per Inch
70 PRINT"1 - 8 Lines per Inch
80 INPUT L
90 IF L(0 OR 1) THEN 80
100 LPRINTCHR$(27);CHR$(54+2*L)

```

```

10 PRINT"1 - 16.5 Characters/Inch
20 PRINT"2 - 10 Characters/Inch
30 PRINT"3 - 5 Characters/Inch
35 INPUT C
40 IF C(1 OR D)3 THEN 35
50 LPRINTCHR$(27);CHR$(28+C)
60 PRINT"0 - 6 Lines per Inch
70 PRINT"1 - 8 Lines per Inch
80 INPUT L
90 IF L(0 OR 1) THEN 80
100 LPRINTCHR$(27);CHR$(54+2*L)

```

```

10 PRINT"1 - 16.5 Characters/Inch
20 PRINT"2 - 10 Characters/Inch
30 PRINT"3 - 5 Characters/Inch
35 INPUT C
40 IF C(1 OR D)3 THEN 35
50 LPRINTCHR$(27);CHR$(28+C)
60 PRINT"0 - 6 Lines per Inch
70 PRINT"1 - 8 Lines per Inch
80 INPUT L
90 IF L(0 OR 1) THEN 80
100 LPRINTCHR$(27);CHR$(54+2*L)

```

Sample 5. Okidata Microline 80 demonstration.

sive and offers the boldest print option. The MX-80 also has the best documentation, if you get the manual by David Lien rather than the standard manual. Lien's manual does a nice job of presenting the operation of the printer to the beginner.

Up to twelve character variations can be produced under software control. Standard width, compressed width and double-width characters can be obtained, and most of these can be spiced up with double strike, emphasized mode or both. In the double strike mode, the line is printed once, then the paper is advanced 1/216th of an inch and the line is printed again in the same direction. This fills in some of the holes in the dot matrix character. However, I

think the emphasized mode offers better quality. In this mode each dot is double printed (with a slight shift to the right between strikes) in a single pass so the printer can maintain its bi-directional mode. This offers an excellent print, very close to typewriter quality. In addition to the variations on standard American letters, the MX-80 offers some special Japanese, German, French, English and American characters.

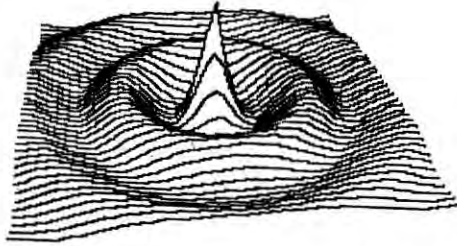
The line feed of the MX-80 is fairly slow and in some applications may slow processing time. I timed the MX-80 on one-inch wide mailing labels (which require many line feeds while being printed) and found it to be 10 percent slower than my Heath H-14, which is not bi-directional.

I have two criticisms of the MX-80. The first is that it is missing the friction feed feature making use of letterhead impossible. However, considering the printer's overall quality and excellent value, a company should be able to get their letterhead printed on fanfold paper (with removable holes). Better yet, the letterhead could be printed with graphics and double-width emphasized print on the paper.

The second criticism is that I have observed characters not being placed exactly vertical from each other on both the MX-80's I have tested. This hap-



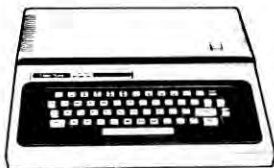
72 dots per inch



54 dots per inch

Sample 6. Base, 850 graphics.

AUTHORIZED TRS 80® DEALER #R491

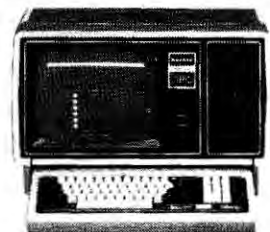


TRS-80® Color Computer With
Extended Color BASIC



26 - 1062
Model III 16K RAM
Model III, BASIC

\$825.00



26 - 4002
Model II, 64K

WE ACCEPT CHECK, MONEY ORDER, OR PHONE ORDERS WITH VISA OR MASTERCARD. SHIPPING COSTS WILL BE ADDED TO CHARGE ORDERS. DISK DRIVES, PRINTERS, PERIPHERALS, AND SOFTWARE—YOU NAME IT, WE'VE GOT IT. WRITE OR CALL FOR OUR COMPLETE PRICE LIST.

C & S ELECTRONICS, LTD. 32 EAST MAIN ST. MILAN, MICH. 48160

(313) 439-1508 (313) 439-1400

138

C & S ELECTRONICS MART IS AN AUTHORIZED TRS 80® SALES CENTER STORE #R491

Now my accounting systems run on CP/M as well as TRSDOS.

So they'll work with your micro, no matter which it uses.

I'm Irwin Taranto, and I originally designed my Model II systems to work with TRSDOS, the operating software Radio Shack supplies with the TRS-80.

I designed them extremely carefully, with features other microcomputer accounting systems don't have. Mine all integrate with the general ledger, and, where it helps, they integrate with each other.

My general ledger system gives year-to-year comparisons, in dollars and percentages. It figures budgets and it even has a report generator.

My accounts receivable systems can do sales analysis by product code and figure in salesmen's commissions. They generate mailing lists by customer code or zip code for up to 2000 customers. You can choose either an open item system or a balance forward system which works on a cash or an accrual basis.

My payroll system can handle up to 600 employees in multiple departments, with any state tax routine (we provide them all). It can make any miscellaneous deductions you ask it to — it even does tips and meals.



TRSDOS and TRS-80 are trademarks of the Tandy Corporation.
CP/M is a trademark of Digital Research Corporation.

My inventory control system stores up to 5000 items. It can report by vendor, tell you when you're out of stock or when you need to reorder. It can update price or cost automatically, and integrates fully with my invoicing system.

There's a lot more, too. Over the years, I've had thousands of phone conversations with my customers, working out the bugs and kinks and adding desirable features. Everybody talks about "user-oriented" systems, but because of all these phone calls, it really means something when I say it. These may well be the most thoroughly researched small business accounting programs in the world.

They're also the best supported, at least as far as microcomputer systems go. If you have a problem, just call. If your problem is tough enough, I'll get on the phone myself. There's no charge for phone assistance, ever.

All these calls keep me upgrading my systems constantly. If you own one, you're eligible for a standing offer I've made all along: send me your diskette, and I'll send you the latest upgrade for only \$25.

Now I've taken another step. More and more owners are switching over to CP/M software these days. It seems to be where the whole microcomputer industry is heading.

That's fine with me, because I've just converted all these accounting systems, and can sell them for the prices I've listed:

General Ledger/Cash Journal	\$ 299
Accounts Payable/Purchase Order	349
Open Items Accounts Receivable/Invoicing	349
Balance Forward Accounts Receivable	399
Payroll	299
with Job Costing Option	399
Inventory Control	399

For mail-order programs, these prices may seem high. But for serious accounting programs, nothing can touch them.

Michael Tannenbaum, the "80 Accountant" in *80 Microcomputing*, just called them "a very impressive product at a very reasonable price."

Our TRS-80 Model I and Model III systems aren't quite as sophisticated. But they're tremendous buys at \$99 each (\$149 for general ledger).

So call me and take your choice — CP/M or TRSDOS. Same price, same support. My systems are ready and waiting.

Taranto
& ASSOCIATES, INC.

✓ 70

121 Paul Drive, San Rafael CA 94903
Outside California, toll free (800) 227-2868. In California, (415) 472-2670.

EXCITING NEWS FOR COLOR COMPUTER USERS

FLEX, OS-9 and the Radio Shack Disk System ALL on the SAME Color Computer

Would you believe that you can run FLEX, OS-9 and Radio Shack disk software on the same Color Computer, and all you have to do is change the disk? That's right, just change the disk. If you have a 32K Color Computer with the Radio Shack disk system, all you need to do is make a trivial modification to access the hidden 32K, as described in the Feb. issue of COLOR COMPUTER NEWS and the March issue of '68' Micro. You can get FLEX from us right now. OS-9 will be ready by summer. Please note that this will only work with the Radio Shack disk system and 32K/64K memory chips that RS calls 32K. Maybe they put 64K's in yours, too. If you don't have a copy of the article, send a SASE and we'll send it to you.

Using this system to run FLEX and OS-9 has many advantages. First, it gives you 48K from zero right up to FLEX. This means that ALL FLEX compatible software will run with NO MODIFICATIONS and NO PATCHES! There are no memory conflicts because we moved the screen up above FLEX which leaves the lower 48K free for user programs.

What you end up with is 48K for user programs, 8K for FLEX and another 8K above FLEX for the screens and stuff. We are working on a multi screen format so you can page backward to see what scrolled by and a Hi-Res screen that will enable us to have 24 lines by 42 character display. That's better than an Apple!

We also implemented a full function keyboard, with a control key and escape key. All ASCII codes can now be generated from the Color Computer keyboard!

We also added some bells and whistles to Radio Shack's Disk system when you're running FLEX or OS-9. We are supporting single or double sided, single or double density, 35, 40 and 80 track drives. If you use double sided drives, the maximum is three drives because we use the drive 3 select for side select. When you are running the Radio Shack disk, it will work with the double sided drives but it will only use one side and only 35 tracks. Using 80 track drives is okay, but will not be compatible with standard Radio Shack software. You can also set each drive's stepping rate and drive type. (SS or DS -SD or DD)

In case you don't understand how this works, I'll give you a brief explanation. The Color Computer was designed so that the roms in the system could be turned off under software control. In a normal Color Computer this would only make it go away. However, if you put a program in memory to do something first (like boot in FLEX or OS-9), when you turn off the roms, you will have a full 64K RAM System with which to run your program (FLEX or OS-9). When the roms are turned off, it is as if you had removed them from the computer. They are gone!

Now, we need the other half of the 64K ram chips to work, and this seems to be the case most of the time, as the article states. Of course, you could also put 64K chips in.

We decided that this was the best way to run FLEX and OS-9 on the Color Computer because it does remove the roms from the memory map and leaves the full 48K for user programs. If you just put in memory for FLEX and use the Basic hooks for I/O, all you have is a little over 30K for user programs. In addition, very few FLEX programs will run without being modified and some won't run very well, if at all (our DATAMAN + for example). Let me state it again, ALL FLEX COMPATIBLE PROGRAMS WILL RUN WITHOUT MODIFICATION!!! and the same goes for OS-9!

It is also the ONLY way OS-9 will run because 30K is just not enough.

Some neat utilities are included.

MOVROM moves Color Basic from ROM to RAM. Because it's moved to RAM you can not only access it from FLEX, you can run it and even change it!! You can load Color Computer cassette software and save it to FLEX disk. Single Drive Copy, Format and Setup commands are also included.

If you don't have a Color Computer, we can sell you one complete with 64K ram, 24K rom, Single RS disk drive and FLEX for only \$1,499, set up and ready to go.

FLEX with Edit, Asmb and installation disk is \$199.

FRANK HOGG LABORATORY, INC.

130 MIDTOWN PLAZA • SYRACUSE NEW YORK 13210 • (315)474-7856

✓ 262

!!NOW AVAILABLE!!

NEW!
CPM-MBASIC

I N D E X S E Q U E N T I A L A C C E S S M E T H O D

- ★ Get and Put Records to Disk File by "KEY"
- ★ Read File in Key Sequence Without Sorting
- ★ Delete Records Without Recopying File
- ★ Add Records to Disk Files in Any Sequence
- ★ Variable Key Length From 1 to 50 Characters
- ★ Machine Language or Basic Subroutines.

BUSINESS APPLICATION ADVANTAGES

- Improved Disk Utilization
- Easier Program Development
- Improved Operating Characteristics
- Reduce or Eliminate Sorting
- Improved Performance

ISAM SUBROUTINES
ISAM UTILITIES

Documentation
On Diskette \$90.00

NEW! MACHINE LANGUAGE + BASIC SUBS — \$140

— PLUS — Free Mailing List Sample Application
Add 6% Sales Tax for California Orders

TRS-80 MODEL I, II, & III and CPM SOFTWARE FROM:

Johnson Associates - or - Telephone Order Line
P.O. Box 1402 For Bank Card Sales
Redding, CA 96001 (916) 221-0740

WRITE FOR FREE CATALOG

✓ 150

pens in the bi-directional mode and probably could be adjusted.

New options for the MX-80 include bit graphics (high resolution), serial interface and an IEEE 488 interface.

The Integral Data Systems 445

The IDS 445 Paper Tiger is a replacement for the 440. It receives the prize for the largest, heaviest, noisiest and fastest printer of the group. It has an instantaneous print speed of 198 characters per second in compressed mode, so in spite of being uni-directional, it has a short processing time.

The 445 comes standard with a 256-byte buffer, but if one selects the graphics option, a 2K-byte buffer is included. The graphics option is similar to that of the Base, 850 and offers up to 72 dots per inch vertical and 64.2 dots per inch horizontal.

DIP switches can be used to select a serial interface (up to 1200 baud) or a parallel (Centronics compatible) interface. Character densities are software and hardware selectable, and form length control as well as one-inch perforation skip

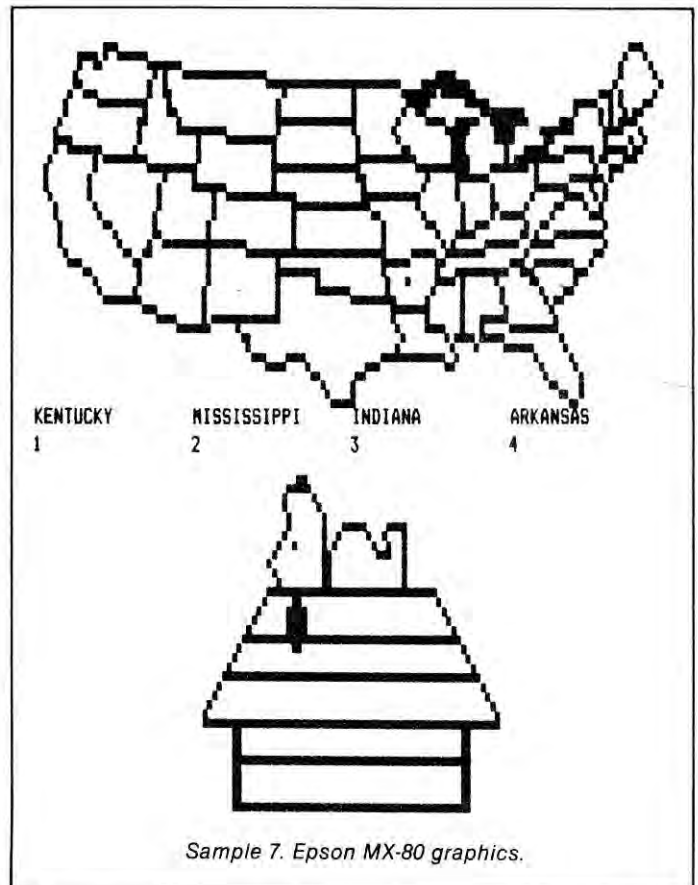
features are included.

The 445 prints a good, standard dot matrix quality and gives the densest print in the 132-character per line double-width mode. It will handle up to four-part forms with no adjustment and more than four by turning an adjustment knob. The 445 has a very fast line feed and, in operation, seems to be a very beefy commercial quality printer. It has internal room for a 4½-inch roll of paper, assuming one can find tractor feed roll paper.

The Okidata Microline 80

My wife was very impressed with the Microline 80. She did not consider the print quality or other features, but liked the printer because it was so inconspicuous. It is the smallest and quietest of the five printers and, therefore, her favorite.

The Microline 80 prints TRS-80 graphics (block) and seems to do a slightly more uniform job than the Epson MX-80. It has a pinfeed roller fixed at the 9½-inch paper width. A tractor option is available which can be snapped on or off very easily, so



Sample 7. Epson MX-80 graphics.

one can use friction feed roll paper for keeping paper costs down, switching to fanfold paper for the more important jobs. When the Microline 80 is in the 80 character per line mode, it can be set to 64 characters (still at 10 cpi) to give a convenient

left and right margin.

The Microline 80 prints 80 cps in the 10 cpi mode as does the Epson MX-80, but the Microline 80 is uni-directional. This means it will take about 34 percent longer to print a typical Basic program.

The ribbon in the Microline 80 is probably the cheapest to replace, since it is the standard two-inch spool, 1/2-inch wide typewriter ribbon available universally.

Wrapping It Up

Each printer comes with a standard 90-day company warranty, although some dealers are doubling this. Each printer

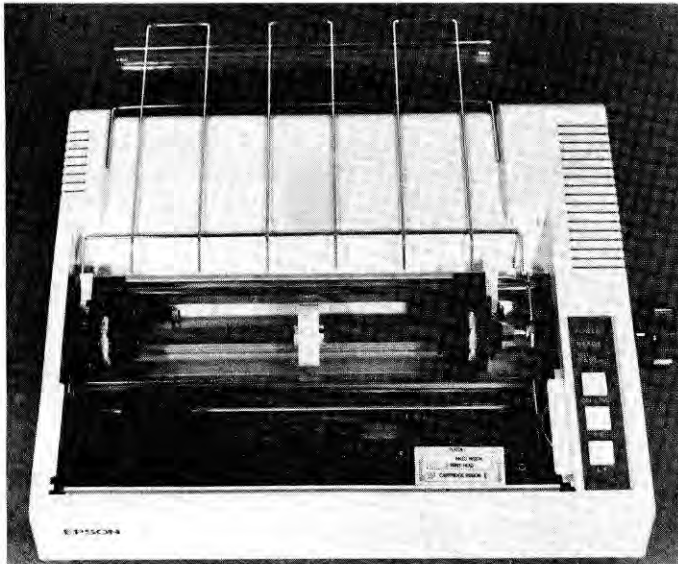
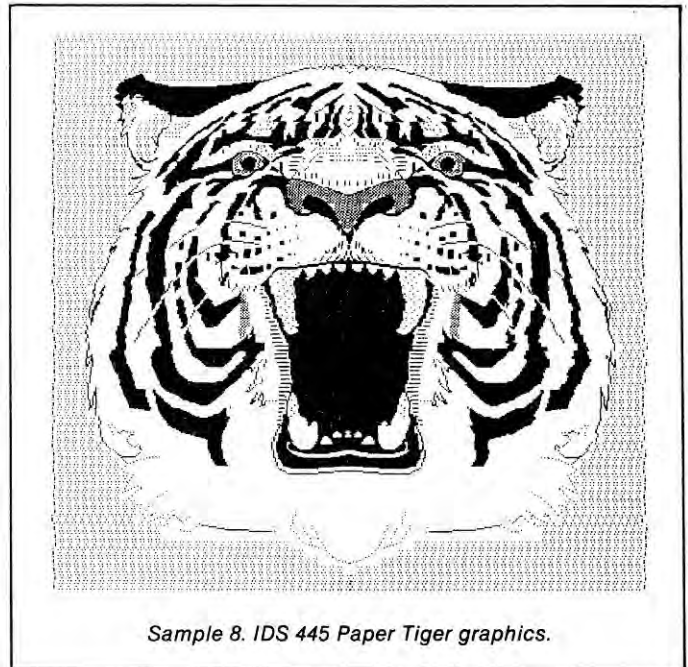
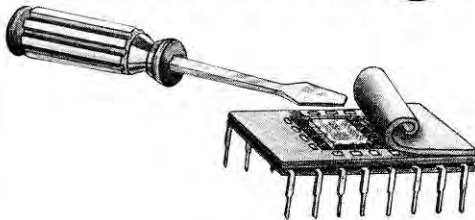


Photo 3. The Epson MX-80



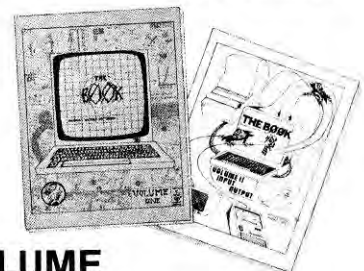
Sample 8. IDS 445 Paper Tiger graphics.

Accessing the TRS-80* ROM...



← or →

It's your choice:
do it the hard way, or
get the information you need from



THE BOOK VOLUME I & II

Comprehensive Guide to TRS-80* Assembly Language Routines

Each Volume Priced At \$14.95 Plus \$1.50 Shipping/Handling

VA residents add 4% tax • Foreign: send U.S. funds, add \$4 ea. for overseas delivery

✓ 126

*Trademark of Tandy Corp.

VOLUME I

The most complete book yet on the math routines of the BASIC ROM, Models I & III. Contains a wealth of detail about integer, single and double precision formats, advanced math, data manipulation, and assembly language interfacing, with examples. Includes commented listing (0708H-1607H), plus a highly detailed map of the ROM and reserved RAM.

INSIDERS SOFTWARE CONSULTANTS, INC.

P.O. Box 7086, Dept. SUM3 • Alexandria, VA 22307

Please send THE BOOK: Volume I Volume II

Name _____

Address _____

City _____ State _____ Zip _____

Enclosed is check M.O. for \$ _____

Charge to my VISA MasterCard Bank Code _____

Exp. date: _____ Card No. _____

Signature _____

VOLUME II

Packed full of useful information on the model I input/output routines, with detailed listings to illustrate the commented source code. Learn to control and manipulate the keyboard, video, printer port, and cassette port. Essential for assembly language programmers, you can write your own routines or use the many programming examples included.



PERTEC FLIPPY
ONE YEAR WARRANTY \$205

M III FDC KITS
J & M SYSTEMS \$350
A. M. ELECTRONICS \$350

M III SYSTEMS Model III RS232 \$75

48K 2 DISK DRIVE (No RS232) \$1895

48K 2 DISK DRIVE with RS232 \$1973

DISK DRIVES BARE

40 TK TANDON \$230

40TK TEAC \$230

40TK PERTEC \$205

Add \$45.00 to Bare Price for Complete Models.

PRINTERS

OKIDATA 82A \$525 120 CPS Bidirectional with RS232 & Parallel.

OKIDATA 83A \$725 120 CPS Bidirectional with RS232 & Parallel.

OKIDATA 84 \$1100 200 CPS Bidirectional with RS232 & Parallel.

DOSPLUS 4.0
and 5 MEG.
WINCHESTER
FOR MODEL III \$2895

This is complete and ready to plug into data bus for use as drive No. 4.

MODEL III 16K \$850



638 S. Dillard St.
West Orange Shopping Cntr.
Winter Garden, FL 32787-0915
Store: 305-877-2830
DATA: 305-877-2829



THE COMPUTER STOCK MARKET BOOK
THE PROFESSIONALS BUY

Purchased by over 160 Financial Institutions, 75 Market Advisory Services, 50 Colleges and Universities, and 150 Computer and Software Firms.

Has been sold in every state and over 30 other nations. It is a study of market timing based on cycles and seasonal factors, as they affect stock and commodity prices. It gives solid tools for measuring and profiting from them. Author has more than 20 years experience as a stock broker, and conducted 8 years of computer research developing the 34 programs in the book which contains ideas and programs never before published. Programs are written in TRS-80 BASIC.

Do you have the great stock and commodity trading advantages given by the home computer to the few who properly use it?

To order "New Uses For The Home Computer In The Stock Market" send your name and address with your check for \$19.95 (overseas; U.S.A. Dollar International Money Order or a Draft payable on a U.S.A. Bank) to:

Thomas V. Lenz, Dept. M
596 W. Karval Ct. - Spring Creek
Elko, Nevada 89801

144

requires a cable which will cost from \$25-\$50. Each seems reliable and solid. Of course, only extensive field testing will determine a printer's reliability. ■

Thanks to: Remarkable Soft-

ware, Muskegon, MI for providing the Epson MX-80 and Okidata Microline 80; Warren White, Pentwater, MI for providing the Centronics 737; Base, Inc., for providing the 850; Integral Data Systems for providing the 445.

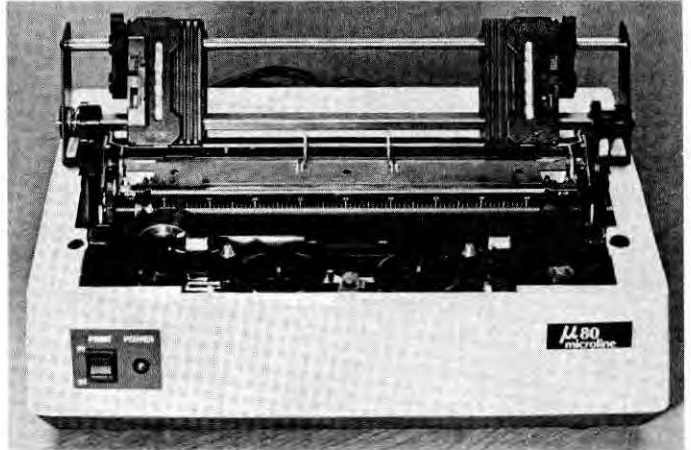


Photo 4. The Okidata Microline 80

RADIO SHACK
PRESENTS

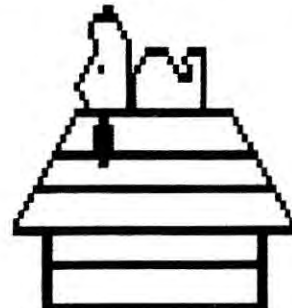
THE
DANCING
DEMON



PROGRAM BY LEO CHRISTOPHERSON
(C) 1979 88-NW PUBLISHING CO.



SALT LAKE CITY 1 HONOLULU 2 BOISE 3 SALEN 4



Sample 9. Okidata Microline 80 graphics.

LDOS

VERSION 5.1
THE TRS-80™ OPERATING SYSTEM
MODEL I AND III

WE ARE NOW NUMBER 1
OUR MASSIVE VOLUME HAS ALLOWED US TO REDUCE OUR
PRICE TO JUST

\$129⁰⁰
REDUCED FROM 169⁰⁰

*New
Low
Price*

FOR THE POWERFUL
LDOS 5.1 OPERATING SYSTEM.

The Ultimate In
Operating Systems
For Model I & III

* Model I LDOS provided on 35 track single density media.
* Model III LDOS provided on 40 track double density media.
* LDOS can be provided on special media configurations at an additional charge.
* Prices & Specifications are subject to change without notice.
† Although not required, LSI recommends two or more drives when using LDOS.

For Further Information Contact The Distributor Or Dealer Nearest You:

(West)
LOBO DRIVES INT'L
354 S. Fairview Ave.
Goleta, CA 93117
(805) 683-1576

(Central)
GALACTIC SOFTWARE LTD.
11520 N. Port Washington Rd.
Mequon, WI 53092
(414) 241-8030

(East)
MISOSYS
5904 Edgehill Dr.
Alexandria, VA 22303
(703) 960-2998

(The Common Market)
MOLIMERX LTD.
1 Buckhurst Rd., Bexhill
Sussex, England
(0424)-220391

DEALER INQUIRIES WELCOME. LDOS is a product of LSI. TRS-80 & Radio Shack are trademarks.

**LOGICAL
SYSTEMS
INC.**

Mequon, WI 53092
(414) 241-3066

Battling bugs, slugs and chugs.

Worm Pills for Basic

Dan Keen and Dave Dischert
RD 1 Box 432
State Highway 03
Cape May Court House, NJ
08210

tion with PRINTUSING cause a tremendous speed bog down. Two statements are faster even though they use a few extra bytes of memory. It may seem like a tiny difference in the program, but what an increase in speed!

The short program in Listing 1 demonstrates this difference. Lines 10-50 open five files and dump 30 random numbers into each record (for a total of 150 numbers). Then the program retrieves those numbers and prints them on the screen (line 80):

```
FOR X= 1 TO 30: PRINTUSINGM$;CVD
(FI$(X)): NEXT X
```

Notice how slowly it progresses. Now watch as execution proceeds to line 120:

```
FOR X= 1 TO 30: A=CVD(FI$(X)):PRINT-
USINGM$;A: NEXT X
```

The CVD of the field variable is assigned to variable A *before* the PRINTUSING statement. Look how fast those numbers are pulled now!

Line 80 takes about 15 seconds (Model I) to print the 30 numbers from just one record, while line 120 pulls *all* five files in about the same amount of time!

The program contains another trick. Notice how all 30 subrecords are fielded in one line (line 30) by using a For...Next loop and a calculation (8*X) within the loop. PH\$ represents a counterfeit string. As long as FI\$(X) has a consistent length across the field, use a loop.

To avoid a type mismatch error use parentheses around 8*X. Apparently the machine has trouble doing calculations within a field statement.

The Timing Loop Syndrome

Many games fill the screen with directions which either stay on the display too long and keep you waiting or do not stay on long enough for you to figure out what you are supposed to do.

Sometimes operators have to study the results of calculations or reread some lines of instructions. Finding a timing loop of optimum duration for all people is difficult.

The best technique is to display a prompting message and wait for the operator to indicate when ready.

You can use a single Input statement, but this prints a question mark on the screen. LINEINPUT suppresses the question mark; in both cases you must hit Enter to continue execution.

```
100 INPUT "HIT<ENTER> TO
CONTINUE";A$
```

Another approach would be to use INKEY\$.

```
200 PRINT "HIT ANY KEY TO CONTINUE
210 IK$ = INKEY$: IF IK$ = "" THEN 210
```

If you can use this technique several times in your program, put the lines in a subroutine to keep your program shorter and neater.

Dummy Up Your INKEY\$

It is a good idea to put a dummy INKEY\$ just before the INKEY\$ input you want to pick up any stray keystrokes that are still held in the keyboard memory. For example, you could use

```
10 DUMMY$ = INKEY$
20 PRINT "SELECT A, B, OR C"
30 IK$ = INKEY$: IF IK$ = "" THEN
GOTO 30
```

Children's programs are good candidates for this technique, since kids often lean on the keyboard.

We wrote a program where after the operator entered a three digit number, a new menu was to be displayed and another character selected. We did this

Learning the words and syntax of any computer language will not make you a programmer. It takes many hours of working with the machine as you discover how to put all those words to efficient use. Here are a few of our ideas and discoveries.

Combined Statements

Articles on techniques to speed up your programs using DEFINT, multiple statement lines, and so on appear regularly. There is a major exception to the rule. Many times combining program statements makes for faster execution, but we found a time when the reverse is true!

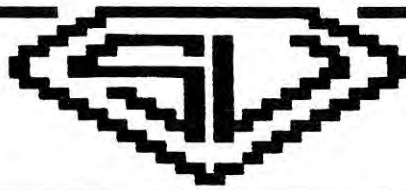
Numerical field conversions (such as CVI, CVD) in conjunc-

```
10 CLEAR 1000: DIM FI$(30): M$ = "$$####,###.##"
20 OPEN "R", 1, "TEST/FIL"
30 FOR X=1 TO 30: FIELD 1, (8*X) AS PH$, 8 AS FI$(X): NEXT
40 REM
50 FOR R%=1 TO 5: FOR X=1 TO 30: Z=RND(32000): LSETFI$(X)=
MKD$(Z): NEXT: PUT 1, R%: NEXT
60 REM SLOW RETRIEVE
70 FOR RE%=1 TO LOF(1): GET 1, RE%
80 FOR X=1 TO 30: PRINTUSINGM$;CVD(FI$(X)): NEXT
90 NEXT RE%
100 REM FAST RETRIEVE
110 FOR RE%=1 TO LOF(1): GET 1, RE%
120 FOR X=1 TO 30: A=CVD(FI$(X)): PRINTUSINGM$;A: NEXT
130 NEXT RE%
```

Program Listing 1

The Key Box
Basic Level II

SUPER UTILITY +



SUPER UTILITY +
(C) (P) 1981 BY
BREEZE/QSD, INC.

By: KIM WATT

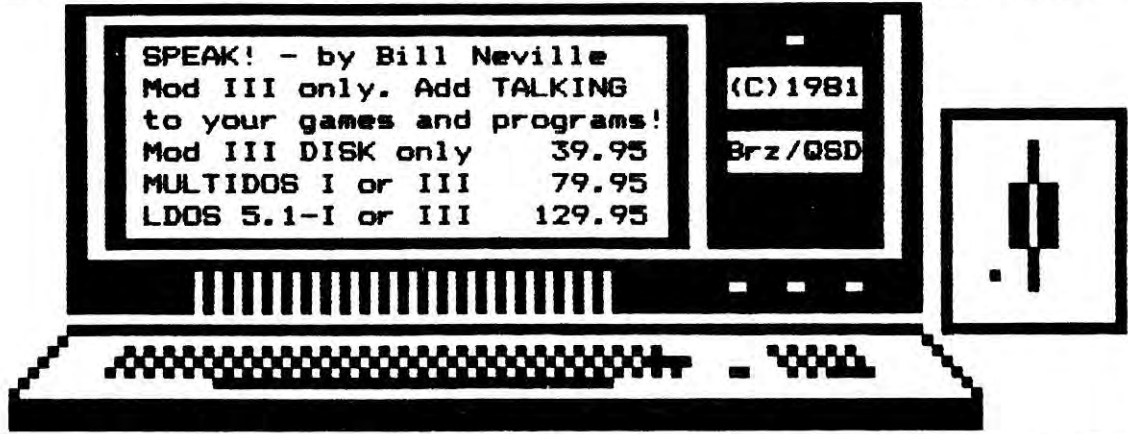
Read Paul Wiener's review on page 366
in the Jan. '82 80-MICROCOMPUTING. (tm)
SU+ has even MORE features now!!

Mod I or III
\$74.95
(specify)

SPECIAL Mod I/III
\$124.95
Boots on EITHER machine!

80 Track versions
AVAILABLE ON
REQUEST

NEW BOOK by KIM WATT- "SUPER UTILITY+ TECH MANUAL" - \$14.95



SPEAK! - by Bill Neville
Mod III only. Add TALKING
to your games and programs!
Mod III DISK only 39.95
MULTIDOS I or III 79.95
LDOS 5.1-I or III 129.95

(C) 1981

Brz/QSD

POWERDRAW

A SCREEN GRAPHICS UTILITY FOR MOD I or III
SAVE SCREENS IN 6 DIFFERENT FORMATS!

By: KIM WATT

only

3995

YOU CAN NOW EASILY CREATE, SAVE,
OR PRINT GRAPHIC SCREEN DISPLAYS!!

POWERSOFT

GREAT for EPSON's! With or without GRATRAX-80(tm)

11500 Stemmons Expressway - Dallas, Texas 75229

M/C-VISA
CARDS
Accepted

(214)484-2976 -- MicroNet# 70130,203
Join OUR Xtra-80 Sig ON MicroNet!
From the "OK" prompt, type: R QSD

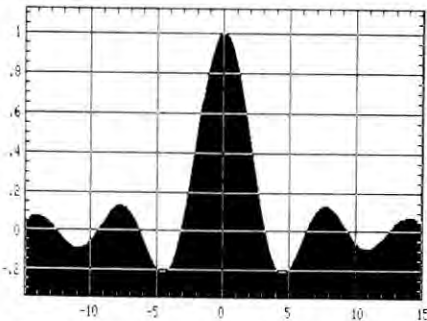
Write for
our FREE
Catalog!

DEALER INQUIRIES INVITED

US/CANADA Orders ADD \$5 Shipping/Handling
(This ENTIRE AD was created using PowerDraw!)
PowerSoft is a division of Breeze/QSD, Inc.
Radio Shack is a TM of the TANDY CORP.
See US at NCC in Dallas! April 21-25!

FOREIGN add \$10
U.S. FUNDS ONLY
for shipping.
NO personal
checks PLEASE!

EPSON GRAPHICS



How much is a picture worth? You can turn your **EPSON MX-80, MX-80 F/T or MX-100** printer with **GRAFTRAX** into an exquisite curve plotting instrument with a graphics resolution of 480 x 192. You only write a small BASIC subroutine and **AUTO PLOT** plots your functions or tabulated data automatically—yes, even VISICALC or SCRIPSIT files. By pressing a few extra keys you can select from many options as explained in the clear and lucid 46-page manual. Our customers are enthusiastic: "SUPER PROGRAM! BEST WRITTEN AND EASIEST TO USE OF ANY I HAVE PURCHASED" — N.S. Cody, WY."

AUTO PLOT for TRS-80 I/III
(48k, 1 disk drive) \$ 79.50
AUTO PLOT for LNW-80
(+Hi-Res Video Graphics) \$ 99.50
Ca. residents add 6% sales tax
24-hour order line for VISA and MASTERCARD

MENLO SYSTEMS ✓524
3790 El Camino Real, Suite 221
Palo Alto, CA. 94306, Tel. (415) 327-7424

TRS-80: TM of Tandy Corp. MX-80, GRAFTRAX: TM of EPSON Inc.

Houston's Software Store • Micro Solutions, Inc. Color Computer Software • Model I • Model III • Model II & CP/M

Communications Programs •

Color Computer Model I or III • Rompack that allows your printer to be used with your modem. Allows downloading to tape. \$59.95
• Intelligent terminal program easy to use. Allows downloading and uploading (Disk) \$149.95

Games •

Color Computer Model I or III • Rompack "Star Blaster" action packed machine language high res. graphics (Requires 16k) \$39.95
• Arcade games Meteor Mission 2, Galaxy Invasion, Robot Attack, Cosmic Fighter. (Tape/Disk) and more. Send for list. \$16.95/20.95

Accounting Programs •

Model III
• General Ledger 400 accts, 1000 transactions/month, allows for departmental income statement \$199.95
• Accounts Payable 400 accts, 1000 transactions/month, and 99 department codes \$199.95
• Accounts Receivable 400 accts, 1000 transactions/month, and 99 department codes \$199.95
• Payroll 400 employees weekly, bi-weekly, monthly, salaried, hourly, 2 misc. ded. \$199.95
Model II
• Available for floppy or hard disk. Capacities below are for 2 floppy drive systems.
• General Ledger 5000 accts, 2000 transactions/month, allows for departmental income statements \$499.00
• Accounts Payable 2000 accts, 5000 transactions/month, and 99 department codes \$499.00
• Accounts Receivable 2000 accts, 5000 transactions/month, and 99 department codes \$499.00
• Payroll 2000 employees weekly, bi-weekly, monthly, salaried, hourly, 2 misc. ded. \$499.00

In Houston
9949 E. Harwin
Houston, Tx. 77036
(713)-789-5443

VISA/M/C Accepted
Prices include handling and shipping

In Florida
P.O. Box 271793
Tampa, Fl. 33688

✓ 362

COLOR COMPUTER USERS . . . YOUR EXCLUSIVE MONTHLY MAGAZINE



the RAINBOW

HAS A POT OF GOLD FULL OF

- Programs
- Hints and Tips
- Helpful Utilities
- Honest Reviews
- New User Tutorials
- Software Discounts

The RAINBOW is devoted only to the TRS-80* COLOR COMPUTER! It is the magazine that will help you get the most out of your Color Computer . . . whether you're interested in fun and games, business applications or education.

"The RAINBOW is a pot of gold full of fabulous information" — P.M., Detroit

"I wouldn't be without the RAINBOW. Its the best!" — R.P., Seattle

the RAINBOW

5803 Timber Ridge Dr • Prospect, KY 40059
Subscribe to the RAINBOW today.
A 12-month subscription is only \$12.

Canadian points please add \$2.50

All subscriptions start with current issue (limited back issues available for \$2. plus \$2.50 postage and handling)

*Trademark of Tandy Corp.

✓ 296

Make Money Selling

80 microcomputing™



the only major journal for the users of the TRS-80*, a sure bet for getting the computer enthusiast into your store. Once through the door you can sell him anything.

We know 80 will make you money. . . it's the only magazine for the TRS-80* users and you know how many of those there are. So call today and join the dealers who make money with 80.

For information on selling **80 Microcomputing**, call 603-924-9471 and speak with Ginnie Boudrieau, our Bulk Sales Manager. Or write to her at **80 Microcomputing**, Pine Street, Peterborough, NH 03458.

*TRS-80 is a trademark of Tandy Corp.

with INKEY\$ rather than INPUT statements. The dummy INKEY\$ line, just after the first three numbers, guarded against someone entering a four digit number. The fourth digit was not taken by the program to be the operator's response to the next menu selection.

Printing Reports

Making neat columns of printed information can be a problem if you try to use a semicolon or comma as print tab positions. Assume A\$ = "PAPER CLIPS" and B\$ = "100 PER BOX". The following program creates a well centered printout.

```
10 PRINT"ITEM","PACKAGED"
20 PRINTA$,B$
```

result:

```
Item Packaged
Paper clips 100 per box
```

But a problem arises if A\$ is long enough to push B\$ past its anticipated tab position into the next tab stop. If A\$ = "RINGS-HIGH IMPACT TEFLON", the printout would look like this:

```
Item Packaged
Rings-High impact teflon 100 per box
```

PRINTUSING can set up a printout format for numbers and prices and hold spaces for strings. It automatically trun-

cates letters exceeding the desired field. The revised program looks like this:

```
10 PRINT"ITEM","PACKAGED"
20 X$ = "% %"
30 PRINTUSINGX$,A$;PRINTB$
```

Now the result is:

```
Item Packaged
Rings- 100 per box
```

Note that the percent signs count as spaces, too. For example, A\$ = "% %" holds three spaces available.

Once a PRINTUSING is encountered, a colon must precede any other statements on a multiple statement line. This is legal:

```
10 PRINT" ";USING"% %";A$
```

This will produce an error:

```
10 LPRINT USING"% %";A$;USING;"% %";B$
```

In another approach you can combine string and numeric values in one PRINTUSING string, using extreme care. For example:

```
10 A$ = "% % $$$$ ## % % $$$$ ##"
20 PRINT"STOCK # COST LOCATION
RETAIL"
30 FOR X = 1 TO T:REM (T = NUMBER OF
ITEMS IN FILE)
40 PRINTUSINGA$;STOCK$;COST$;LO-
CATION$;RETAIL
50 NEXT
```

Consistency is the Best Policy

Recently we had to modify a program for a local business. We wrote it many programs ago, and it was hard to pick up our original train of thought.

Unlike languages such as Cobol, Basic is unstructured and not self-documentary. Without remarks, clear documentation, and other aids it is not always easy to figure out what is going on.

One big help was our practice of using the same variables for certain functions in all of our programs. For example, we assign IK\$ to all INKEYs, and DE (representing DELay) for For... Next loops used as timing delays. In keeping with Radio Shack's DOS manual, we use R% for record number and SR% for subrecord. These symbolic characters help you associate a variable with its function. This also decreases the chance of using an important variable twice in the same program.

We do not recommend using full words, although the TRS-80 allows it. For example:

```
FOR DELAY = 1 to 100: NEXT
```

Since only the first two characters are checked, when a program gets long it is easy to accidentally pick another word that may start with the same two characters. Leave the wordy programming to Cobol.

Fortran has a start in the right direction by automatically assigning variables I-N as integers.

Presetting Variables

It is always a good policy when writing a program to require as little input from the operator as possible. This reduces both time and the chance for human error.

In an Input statement, the value of the numeric variable assigned to the input is not destroyed if the Input question is responded to with Enter.

For example, you are writing a carpentry program. The computer must ask how many inches on center the joists are to be set. The answer is usually 16 inches, but we want to be able to change it if necessary. By presetting the variable OC (for On Center) equal to 16, the user need only press Enter for the standard figure.

```
10 OC = 16
20 INPUT"HOW MANY INCHES ON
CENTER (JUST HIT <ENTER> TO DE-
FAULT 16";OC
30 PRINT OC
```

Dave Dischert manages a computer repair center for a large computer manufacturer. Dan Keen is employed in the field of electronics. He is a computer instructor at two schools. Together they operate Soft Horizons creating software for local businesses.

Simput
UTILITY PROGRAM FROM HIKARI GROUP

SIMPOT:

- Easy to use
- Almost limitless record length
- Access subrecords with numbers
- Get exact subrecords you put in, no more, no less
- Compatible
- No knowledge of disk basic required

SIMPOT is a flexible random access program for the TRS 80 Model I* that lets you manage extremely complex data with great simplicity. It allows you to create records from one byte to more than 85,000 bytes long, with as many subrecords as you need, and it can be used with Microsoft's Basic Compiler. It eliminates many disk access statements and saves disk space.

SIMPOT is simple. The package includes a comprehensive instruction book and easy to follow sample program. Once you've tried SIMPOT, you'll never go back to normal random access method. SIMPOT has been tested to be compatible with any TRSDOS* compatible languages.

For more information write: Hikari Group, 3032 Fourth Avenue West, Seattle, Washington 98119. Available on disk for \$29.95. If you have only one disk drive, a tape is available. (206) 382-6632.

*Trademarks, Tandy Corporation.

508



Match a word with a definition.

Vocabulary Test

Paul Kalkstein
Phillips Academy
Andover, MA 01810

ularies. I am convinced cramming raises college board scores, too.

Testing

We often draw up our own tests. Most teachers know that making useful, easy to grade tests is tedious work.

Of all of the types we tried, the most satisfactory is the matching test. Requiring less time to administer and correct than others, this type of test also approximates the kinds of word judgements students must make on large-scale standardized tests.

But even a matching test takes time to write, and it is a repetitive task. With the active encouragement of my colleagues, among whom computer literacy is not rampant, I set to work to create a test-making program. I produced a program to alphabetize our vocabulary entries and make a ditto stencil.

The Program

Making multiple copies and cutting stencils on a dot matrix printer is a chancy operation. Some printers do not pack the wallop needed to do the job. My Epson, however allows emphatic (double force) and double-strike (twice over, with a tiny incremental feed) printing at once. Program line 50 selects the emphatic and double strike modes; delete the line to use another printer. The Centronics 737/739 and the Radio Shack LP IV and LP VIII will also make a strong

impact, as will a daisy wheel or Selectric printer.

Lines 10-100 format and print the quiz heading and directions. Our quizzes are usually cumulative, and line 40 asks for the scope of the quiz. Line 60 selects double-width letters for the heading; change the control code or delete the line for other printers. Lines 110-130 clear string space, dimension strings and set flags.

Entry of key words and appropriate synonyms occurs at line 150. After the combination

(word, comma, synonym) is entered, line 160 gives a running count of the number of entries. Pressing Enter closes the file and begins the sort.

The alphabetization routine that begins at line 210 was suggested by Howard Y. Gosman in the August/September, 1978, *TRS-80 Monthly Newsletter*. It alphabetizes without revising the file in memory. The routine prints the words on the left and the synonyms on the right alphabetically by changing each word to ZZ as it is printed. This

As a high school English teacher I see many students with inadequate vocabularies. Students are frustrated; they often know more than they can write.

A significant part of our school's required course in English competence is vocabulary drill. Over the years the method has remained the same: learning by cramming. Learning psychologists claim people learn vocabulary better through natural contextual exposure: reading. We find our students do not read much outside of assigned texts. So we use the cramming approach—and, judging by written work, we have been successful in building their working vocab-

The Key Box

Basic Level II
Model I
4K RAM
Epson MX 80

```

10 CLS
20 PRINT"VOCABULARY TEST MAKER"
30 PRINT:PRINT
40 INPUT "LESSON 1 - ?";L
50 LPRINTCHR$(27)"E":LPRINTCHR$(27)"G"
60 LPRINTCHR$(27)CHR$(14)" VOCABULARY QUIZ, UNITS 1 -";L
70 LPRINT:LPRINT
80 LPRINT"This is a matching quiz. To the left of each number, write
90 LPRINT"the letter of the closest synonym."
100 LPRINT:LPRINT
110 CLEAR5000
120 DIMA$(500):DIMB$(500):DIMN$(500):DIMM$(500)
130 I=1:H=1
140 CLS
150 INPUT"WORD, SYNONYM";N$(I),S$(H)
160 PRINTI;N$(I),S$(H)
170 IFN$(I)="ANDS$(H)"GOTO210
180 I=I+1:H=H+1
190 N=N+1:M=M+1
200 GOTO150
210 FORI=1TON
220 AS(I)=N$(I)
230 NEXT
240 FORH=1TOM
250 BS(H)=S$(H)
260 NEXT
270 CLS:K=0:X=0
280 I=1
290 FORJ=2TON
300 IFA$(I)<A$(J)GOTO310ELSEI=J
310 NEXT
320 H=1
330 FORQ=2TOM
340 IFB$(I)<B$(Q)GOTO350ELSEH=Q
350 NEXT
360 IFN$(I)="ANDS$(H)"GOTO380
370 LPRINTTAB(8);K+1;" " ;N$(I);:READL$:LPRINTTAB(35);L$;" " ;S$(H)
380 AS(I)="ZZZ"
390 BS(H)="ZZZ"
400 K=K+1:X=X+1
410 IFK=NANDX=MGOTO420ELSEGOTO280
420 LPRINT
430 DATA a,b,c,d,e,f,g,h,i,j,k,l,m,n,o
    
```

Program Listing

COMPUTER SHACK

New!
Greymoon



Greymoon is the medieval land in which this simulation of conquest and economic development takes place. As creator of Greymoon, you can buy, sell, plant, feed, hire, build, raid, invade, and consult various advisers. Objectives? Gain land become wealthy, develop your initial small village into a city state and increase your rank from master to King. Obstacles? Every year brings one of over a dozen random events, which, until the end of year, are unknown to you except through hints by your advisors. Can you compete with the many neighboring nations of Greymoon?

Even has sound routines. It will keep you interested for hours on end. Each game is different. The game is very fast but you can play at your own speed. All ages will like it and it takes no special skills but a sharp mind. This is better than an adventure game in the fact that each game is different and is more realistic.

TRS-80 Model I or III \$15.95
16K Tape \$15.95 Disk 18.95

Modem Games

Play CHESS, CHECKERS, and OHELLO over your modem with your friends! Each game features full graphics, sound, and a chat mode permitting you to send messages and sounds. Games are for two players and can be played on one computer or over the modem on two computers. All three games are on each program, comes with 2 disks or 2 tapes. You must each have a Modem Game program to play over the modem. Share the cost with a friend. The same version of Modem Games will work on both the Model I or the Model III disk or tape. Modem games will work on only the Lynx modem or modems using a 232 board.

2 Tapes or 2 Disks **\$29.95**

Hayes Smart Modem

We at Computer Shack think this is the best modem on the market. We include a file transfer and communications program at no charge with each purchase of the Smart Modem.

Programs and modem only **\$259.00**

Print Buffer

The New Super Spooler from Compulink only **\$329.00**

SUPERMETER

The biggest problem in loading tapes has been the volume control. Pre-recorded tapes are produced at differing volume levels. Now finally, a device to let you set the correct volume levels for loading any tape. You will now load any tape the FIRST time. **SUPERMETER** plugs in (no cutting or soldering) between your tape recorder and the computer and lets you set the volume to the level that your computer wants.

SUPERMETER \$29.00

THE TWO YEAR DISK'S

All Wabash Disks are certified 100% error free for two years by the manufacturer. If you have any problems return them to us for new ones.

5 1/4 single density \$25.95
Double Density 40 or 80 tracks \$32.99
Double Density two sides \$35.99
8" Disks \$35.99

MULTI DOS

We sell them all --- We recommend and use **MULTI DOS** --- Don't let its low price fool you. It'll do everything the others will and quite a few things they can't.

MULTIDOS has the BEST BASIC --- it's the EASIEST to use and its the FASTEST system around. For more details see Cos. Electronics full page ad in this magazine. Why pay twice as much for a operating system that's complicated and hard to use.

SPECIALS

MULTI DOS with Aerocomp Doubler \$209.00
MULTI DOS with Super Directory \$99.00
MULTI DOS with Super D & Doubler \$219.00
AEROCOMP DOUBLER \$139.00

The operating systems that are given out free with the doublers for \$149 and \$159 dollars are not comparable with all of the features of Multi Dos.

Multi Dos is sold by us with a money back guarantee. If you don't like it, send it back for a refund.

Look what you get with Multido's Basic!
A file handling utility sold separately for **\$19.00** A graphics program sold separately for **\$19.00** A Gobal editor sold separately for **\$29.00** Boss debugger single stepper sold separately for **\$19.00**

Total value if purchased separately \$86.00
you get all this plus the best basic for only **\$79.00**

New!
Baja



Take your dune buggy and enter it in the famous Baja Desert race. The race has straightaways, curves, S's, and obstacles. We feel that this is the best car race game made for the TRS-80.

The game has 10 different action packed skill levels. The program is all machine language for fast graphics and excellent sound. 1 to 6 players.

TRS-80 Model I or III \$15.95
16K Tape \$15.95 Disk \$18.95

SUPER DIRECTORY

This will be the standard which all other Directories are judged. It will read any normal type of diskette Mod I or III, Multi Dos, Ldos, Dos Plus, and Trs Dos. Double Density, Single Density, 35, 40 or 80 track drives.

A machine language program that is easy to use, but at the same time has all the features you will ever need. Display to screen or to printer. Displays by program, or disk, or subject. Super fast sort. Scrolling displays ect.

You can even add a line to help tell what the program is about. Example:

SARGON/CMD 146G GREAT CHESS GAME
SARGON/CMD is name of program read off of disk. 146 is you reference number for this disk G is added later designating game. "GREAT CHESS GAME" is added later as a descriptor file.

Special Introductory offer with each directory ordered before June 1st we will include 4 blank Wabash double density Disks for a dime or you can get a box of ten disks for only \$19.90. Please specify the operating system you use and if a Model II or

Please specify the operating system you use and if a model II if you have a doubler.

Super Directory **\$39.00**
Super Directory with 4 Wabash Disks **\$40.00**
Super Directory with 10 Wabash Disks **\$59.80**
Super Directory \$39.00 With 4 Wabash Disks \$40.00
With 10 Wabash Disks \$59.80



Dungeon Escape

At last!! An adventure which takes quick thinking and strategy!
Different from fixed adventures

★ Super graphics ★ Interactive Sound ★
★ Uses latest programming techniques ★

★ Fast Paced -
The creator's ghost has sensed an intruder, and he is determined to hunt you down. (His intelligence in tracking was set by you) This feature makes this simulation unlike others for you're always "on the go."

★ Written by an experienced gamer in fantasy role-playing.
Objective: Your character begins on the first of a three level dungeon, searching for magical "stones" which permit you to descend to the next lower level.

The Adventure: There are numerous traps, and over a dozen hostile monsters that come in various sizes, shapes and degrees of nastiness. It has various treasures and magic items (weapons, elixirs, cloaks, scrolls, etc.) You can become a fighter, a thief or a magic-user. Each time you play you get a totally different and exciting game.

This short description only begins to tell you of the many adventures and some of the features of this exciting game. This will be your favorite adventure game!

Complete documentation included
You must specify Model I or Model III. Available on:
Tape. 16K. **\$19.95** Diskette. 32K. **\$19.95**

Small Business Programs

CHECKING ACCOUNT Mod. I or III, 48k disk \$39.00
Excellent check writing program for small business. Prints checks on printer, sorts into 32 categories for bookkeeper and IRS.

BILLING SYSTEM Mod. I or III, 48k disk \$39.00
Excellent system for the small business man. It is fast and easy to use. Prints out invoice and monthly bills. Adds interest etc.

SPECIAL BOTH PROGRAMS **\$65.00**

EP-SET

If you have a EPSON Printer you need EP-Set. A series of programs that help you use all the features of the Epson printer. One merges with a basic program to help drive the printer. One is a machine language subroutine to give you keyboard access to the printer. (example type control c to get the compressed mode. Control E to get emphasised characters). Use EP-SET to set the line spacing, character modes, strike modes etc. Throw your manual away. Happiness is here with EP-SET.

Disk or Tape **\$18.95**

WARZONE

A new game that pits you against the computer. Trying to isolate the computer before he stops your conquest. Exciting sound routines and great graphics. This is a fast paced game that is excellent for young and old. It has three skill levels.

Tape \$14.95 Disk **\$18.95**

FAMILY TREE

Excellent family genealogy program works on both the model I and III. Written especially for the person just getting into genealogy. It has over 250 pages of instructions on how to research your family tree, how to get information, and how to put it into the program. The computer program is easy to follow and gives both printouts and screen listings of your family tree. It will even give you a listing of all your living relatives birthdays.

Disk or Tape **\$29.00**

ORDERING INSTRUCTIONS:

MC and VISA OK please add \$2.00 for Shipping in U.S.A. Also to help us send you the best possible version include the type of computer you have, your operating system if disk and if you have a doubler in the model I.

DEALERS ... We are distributors for all items in this ad except for the games Scarfman, Laser Defense, Fortress, and Alien Defense. Write for our catalog and price list.

COMPUTER SHACK

1691 Eason • Pontiac, Michigan 48054 (313) 673-2224

(313)673-8700

✓ 109

Subscribe
to CCN

Color Computer News



Are you tired of searching the latest magazine for articles about your new Color Computer? When was the last time you saw a great sounding program listing only to discover that it's for the Model I and it's too complex to translate? Do you feel that you are all alone in a sea of Z-80's? On finding an ad for a Color Computer program did you mail your hard earned cash only to receive a turkey because the magazine the ad appeared in doesn't review Color Computer Software? If you have any of these symptoms you're suffering from Color Computer Blues!

But take heart there is a cure!

It's COLOR COMPUTER NEWS.

The monthly magazine for Color Computer owners and only Color Computer owners. CCN contains the full range of essential elements for relief of CC Blues. Ingredients include: comments to the ROMS, games, program listings, product reviews, and general interest articles on such goodies as games, personal finances, a Kid's page and other subjects.

The price for 12 monthly treatments is only \$21.00 and is available from:



Mail
Today!

REMarkable Software

P.O. Box 1192
Muskegon, MI 49443 ✓ 145

NAME _____

ADDRESS _____

CITY _____ State _____ Zip _____

Allow 8-10 weeks for 1st issue.

80 M

Vocabulary Quiz, Units 1-9

This is a matching quiz. To the left of each number, write the letter of the closest synonym.

- | | |
|-----------------|------------------------|
| 1. Calumny | a. Deceit |
| 2. Dearth | b. Deception |
| 3. Disparity | c. Excuse |
| 4. Dross | d. Fraud |
| 5. Dupe | e. Glove |
| 6. Gauntlet | f. Inequality |
| 7. Guile | g. Punishment |
| 8. Humbug | h. Rate |
| 9. Incidence | i. Refuse |
| 10. Meed | j. Reimbursement |
| 11. Pretext | k. Reward |
| 12. Restitution | l. Scarcity |
| 13. Retribution | m. Slander |
| 14. Subterfuge | n. Trace |
| 15. Vestige | o. Victim Of Deception |

Sample test

method is faster for a long test than a sort with replacement. We sort alphabetically for ease of cross reference when compiling later cumulative quizzes.

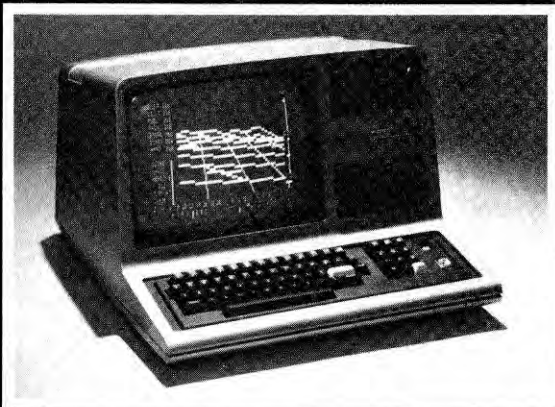
Line 370 formats the printout into two columns. Line 430 supplies, as data, the letters for the synonyms in the right column.

This program will help allevi-

ate tedium from what is otherwise an exciting and rewarding profession. ■

Paul Kalkstein, author of several books on the teaching of writing, teaches English and coaches lacrosse at Phillips Academy in Andover, MA. He is also an active ham (N1PL).

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
Telex: 206995

MP-X

Text Entry/Edit and Photocomposition

For TRS-80 Model I or III with 48K RAM and 2 Disk Drives. (3 Disk for Model I) "Native code" driver (parallel and RS-232) for Autologic APS-5* & Micro-5 Phototypesetters. Full screen editing and 100, FDP compatible markup codes, allowing 200 User Defined, disk resident, Formats. Algorithmic Hyphenation with 500 word expandable exception dictionary and maintenance program assures correct word breaks. Optional line printer proofing for context, line-breaks, and hyphenation. This low cost, high quality system is now available for immediate delivery in a predefined configuration of 8 Font Families, for Service Center Use. A complete *Telecommunication and Mail Order* APS-5* Typesetting Service, for your MP-X job, is now offered by Watson Directory Corp. in St. Louis MO, with rates as low as \$4.95/ft. and measures up to 70 pica. Software & User Documentation.. \$495. (User Documentation Only)..... \$ 25. Complete Hw/Sw TRS-80 Model III 48K System with User Documentation \$2895. Quotes on Custom Turn-Key System for "your" APS-5* available on request.

MICRO PRINT-X INC

P.O. BOX 581 Ballinger, Texas 76821
(915) 365-2343

*Trademark Radio Shack, Div. Tandy Corp.
*Product of Autologic Inc.

363

ARE YOU TIRED OF

- Fighting protected disks
- Paying \$5.00 more for your programs
- Wasting a whole disk for 1 program
- Or a program that won't run when you put it to disk? Well, finally

VECTOR FIX IS HERE!

- Identifies machine language programs on cassette & loads them into high memory.
- Adds an appendage to patch the keyboard vectors enabling the program to run from disk regardless of the type of DOS.
- Dumps the program to disk or
- Allows you to scan in ASCII or HEX - reveals hidden text in upper or lower case. Dump either to printer.
- High speed string search.
- Call 'Debug' & return.
- Also patches relocated Disk versions above 8100 H, thus eliminating special loading procedures.

32K MODEL I TRS-80 DISK \$19.95

Personal checks take 15 banking days to clear. Send check or money order to:

MICRO-MEDIA

P.O. Box 538, Linden, MI 48451

PORTFOLIO Management System

- Stores multiple portfolios of stocks, puts, calls, warrants, mutual funds, and bonds.
- Retrieves market quotes from your Dow Jones News Service Account*
- Prints analysis by Portfolio-High • Low • Last • Close • Volume Current Value • Gain or Loss Value Change • Price Change Dow Averages
- Creates Tax Record

MODEL I/III	MODEL II
\$149.95	\$495.00

Send Check or Money Order to:

Snowden E. Bunch, Ph. D.
(c/o Ehlen Enterprises
6319 Briarwood Road
Columbia, SC. 29206
(803)787-7256

* Account established separately with Dow Jones, Inc.

338

NEW PROGRAMS FOR THE TRS-80

INCOPROP

Income Property Analysis for the TRS-80

INCOPROP: Based upon standardized methods of property analysis used throughout the real estate industry. Generates a 3 page report containing an annual property operating statement and a comprehensive 10 year cash flow analysis. Contains I.R.S. tax table to project after-tax income stream and investor's I.R.R.

- Handles 5 different methods of tax depreciation.
 - Handles up to 3 loans & 3 different type loans.
 - Highly interactive format permits "Sensitivity Analysis".
 - Disk files created for permanent storage of data.
- Minimum system requirements: 32K RAM, 1 drive and printer. Sold with informative 78 page user's manual covering basic aspects of income property investment & 50 data worksheets.
- | | |
|---|----------|
| Model I & III on cassette for easy transfer to disk | \$120.00 |
| Model II on 8-inch diskette | \$145.00 |
| Model II Version available in MBASIC running under CP/M | \$165.00 |

New!
MAINDEX: An easy-to-use program to aid you in the indexing of your files on disk. Can't find that program you wrote last month? Put your computer to work! Find any program or data file in your system in seconds.

- A Main Index of all your other disk's directories.
 - Alphabetizes list of files and gives you names, grams used, dates written, tracks and file descriptions.
 - Sorts Files by name, disk, and categories.
 - File descriptions can be searched for key words.
 - Prints disk labels with disk name and file names.
 - Uses all the advanced and extremely fast file manipulation capabilities of Apparat, Inc.'s NEWDOS/80.
- Requires Level II 48K, 1 disk drive and NEWDOS/80 on cassette for easy transfer to disk. \$20.95

177
VISA MasterCard



DEPT EM, PO BOX 591, NOVATO, CA 94947

MODEL I or III Disk

PILOT

* only \$29.95 *

- * Debug Package displays all flags and commands before they execute.
- * Break Key Enable/Disable.
- * One Command invocation. May be an AUTO command.
- * File Chaining. A complete system from AUTO to exit.
- * LAST RESPONSE always available for Jump Use, File, etc. commands.
- * Uses UPPER or lower case for all commands.
- * Command/Modifier order not important.
- * All extra spaces ignored.
- * F A S T - All Z80 Machine code.
- * Less powerful than the SHACK's Pilot but a lot more friendly to the author and the user (and a little cheaper!).

TINY PASCAL® Disk Mod.

• \$19.95 •
- requires TINY PASCAL.

- * DISK storage of PROGRAMS and PCODE
- * DISK I/O from programs
- * LINE PRINTER commands
- * COMPILER can use alternate TABLES or compiler PCODE.

- Georgia residents add 4% sales tax.
- Add \$10.00 for complete SOURCE CODE, - either system.

Personal checks Ok. Pilot includes many sample programs.
Barker Software
P. O. Box 5313
Athens, Georgia 30604

378

STARK SOFTWARE

introduces

TIME-TABLE

A NEW CONCEPT IN MICRO-COMPUTER SOFTWARE

TIME-TABLE is a tested, interactive time management program developed for the TRS-80 Models I/III by a leading designer of decision aiding software.

TIME-TABLE provides the busy manager, professional, project planner, personal user, among others, with a versatile tool for maintaining files of time-related activities. **TIME-TABLE** includes features traditionally associated with computer mainframes, such as:

- Simplistic user customization - requires no programming
- Conversant menu-driven displays & controls
- Extensive data entry, edit & updating capabilities
- Convenient data review, search & documenting controls
- Automatic on-line time sorting
- Extensive error trapping & user prompting functions
- Efficient data storage & file management operations

TIME-TABLE versatility can be illustrated by the following list of "designed-for" applications:

- Business & personal calendar maintenance
- Project planning & control
- Construction planning & control
- Transportation scheduling
- Production planning & control
- Professional appointments management

TIME-TABLE was exhaustively tested and certified and includes a comprehensive user's manual. Requires (Min): TRS-80 Model III; Tape Ver-16K RAM, Level II (Md III ROM, TPE RCDR).

TIME-TABLE pricing (includes 51 pg user's manual): -16K Tape-\$29.95; 32K/48K Tape-\$49.95; 48K Disk-\$79.97 (Md III disk)/\$74.95 (Md I/III CASS).

To place an order, mail to the below address or use the order phone.



STARK SOFTWARE
P.O. BOX 695
RICHBORO, PA 18954

ORDER PHONE: (215) 493-5111

Orders can be placed using bank check, money order, personal check (Allow 2 wks. to clear) or C.O.D. Include \$1.50 Postage & Handling.

*PA Residents include 6% Sales Tax
*TRS-80 is a trademark of Tandy Corp.

503

Amortize a loan to show the monthly damage.

One Twelfth of a Misery

James K. Krapf, CPA
16160 SW 108 Avenue
Miami, FL 33157

ing the Rule of 78's method (see *80 Microcomputing*, July 1981).

I tested the program with my auto loan from General Motors Acceptance Corporation. My GMAC coupon payment book shows the interest deduction allowed for income taxes for each year of my loan. I ran my program using the information from the Regulation Z Disclosure Statement for my loan. The total interest over the life of the loan was the same for both my schedule and GMAC but my results for each year's interest deduction varied by a few pennies.

For the five months in 1980, my calculation for interest expense was \$441.56; GMAC calculated \$441.60, a difference of four cents. For 1981, the difference was 12 cents! I attributed the differences to rounding errors on the part of the GMAC computer (which apparently uses only four decimal places in one of its calculations).

Using my calculator, I computed the sum of the digits for the five payments I made in 1980 as $230(48 + 47 + 46 + 45 + 44)$. The sum over the 48 month life of the loan $(48 + 47 \dots 2 + 1)$ is 1176. On a 48 month loan the lenders claim 48/1176 of the total interest the first month (or portion thereof), 47/1176 the second month and so on to the last month (1/1176 of the total interest charges). On a 36 month loan, the sum of the digits is 666

and the first month's interest would be 36/666 of the total finance charge. Line 140 in my program contains the algebraic

formula for computing the sum of the months digits, with N being the total number of months in the contract. The correct calcul-

With my TRS-80 I computed the interest expense on my installment loan and learned my output was more accurate than that of the General Motors Acceptance Corporation. Taxpayers often come to me at income tax time without their annual interest statement from the bank for their installment loans. I decided to write a program to amortize an installment loan, us-

The Key Box

Basic Level II
Model I
16K RAM
TRSDOS 2.3
Daisy Wheel II

```

10 'PROGRAM TO AMORTIZE INSTALLMENT LOAN
50 POKE 16425,1
60 CLEAR 500:DEFDBL O,P,S,I,U,M:DEFSTR W,A
80 CLS:INPUT "WHAT IS THE TAXPAYER'S NAME";JS
90 INPUT "WHAT IS THE NAME OF THE LENDER";Z$
120 INPUT "ENTER ORIGINAL FINANCE CHARGES";FC
130 INPUT "ENTER TOTAL NUMBER OF MONTHS IN CONTRACT";N
133 INPUT "ENTER ORIGINAL AMOUNT FINANCED";OB
134 INPUT "HOW MUCH IS THE MONTHLY PAYMENT";MP
135 INPUT "FIRST MONTH OF PAYMENT";FM
136 INPUT "OF WHAT YEAR";YR
137 INPUT "WHAT IS THE MONTH OF YOUR FISCAL YEAR END ";YE
140 SYD=N*(N+1)/2
143 UI=FC:FY=YE+1
145 LPRINT CHR$(138)
146 LPRINT "TAXPAYER NAME: "JS;TAB(42)"LENDER: "Z$
147 LPRINT STRING$(77,204)
148 LPRINT CHR$(138)
150 LPRINT "TOTAL FINANCE CHARGE IS $ ";
151 LPRINTTAB(35) USING "#####.###";FC
160 LPRINT "TOTAL MONTHS IN CONTRACT ARE ";TAB(41) N
162 LPRINT "THE MONTHLY PAYMENT IS $ ";
163 LPRINTTAB(35) USING "#####.###";MP
166 LPRINT "THE AMOUNT FINANCED IS $ ";
168 LPRINTTAB(35) USING "#####.###";OB:LPRINT CHR$(10)
172 LPRINTTAB(1) "MO";TAB(6) "YR";TAB(14) "PAYM";
173 LPRINTTAB(27) "INT";TAB(35) "PRINC";TAB(46) "BAL";
175 LPRINTTAB(55) "PAYOFF";TAB(71) "REBATE"
550 SI=0
600 I=FC*N/SYD:SI=SI+I:PRI=MP-I:OB=OB-PRI:LC=LC+1
632 IF N=1 GOTO 4400
633 OB=OB:POB=OB+MP:UI=UI-I
690 LPRINTTAB(1) USING "###";FM;
700 LPRINTTAB(4) YR;
705 LPRINTTAB(11) USING"#####.###";MP;
710 LPRINTTAB(22) USING"#####.###";I;
720 LPRINTTAB(31) USING"#####.###";PRI;
725 LPRINTTAB(42) USING"#####.###";OB;
735 LPRINTTAB(53) USING"#####.###";POB;
740 LPRINTTAB(68) USING"#####.###";UI:FM=FM+1
810 IF FM=PY GOTO 3000 ELSE 850
842 LPRINTTAB(1) "MO";TAB(6) "YR";TAB(14) "PAYM";
843 LPRINTTAB(27) "INT";TAB(35) "PRINC";TAB(46) "BAL";
845 LPRINT TAB(55) "PAYOFF";TAB(71) "REBATE"
850 N=N-1
855 IF FM=13 THEN FM=1:YR=YR+1
870 IF N=0 GOTO 3000 ELSE 600
3000 LPRINT TAB(5) "INTEREST CHARGES FOR THE FISCAL YEAR ENDED";
3002 LPRINT YE/"YR"ARE ";
3020 LPRINT USING "#####.###";SI
3100 SI=0
3195 LPRINT STRING$(77,192)
3200 LPRINT CHR$(10)
3350 IF LC>25 THEN LPRINT CHR$(12):LPRINT "TAXPAYER NAME: "JS;
3352 IF LC>25 THEN LPRINTTAB(42) "LENDER: "Z$:LPRINT STRING$(77,168);LC=1
3390 IF N=0 GOTO 5000 ELSE 842
4400 OB=0:GOTO 633
5000 LPRINT CHR$(12)
5010 END

```

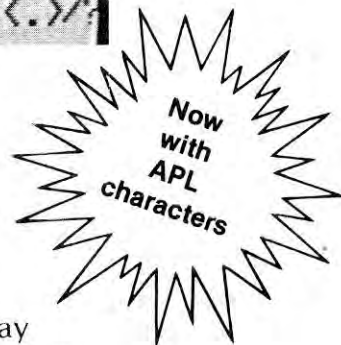
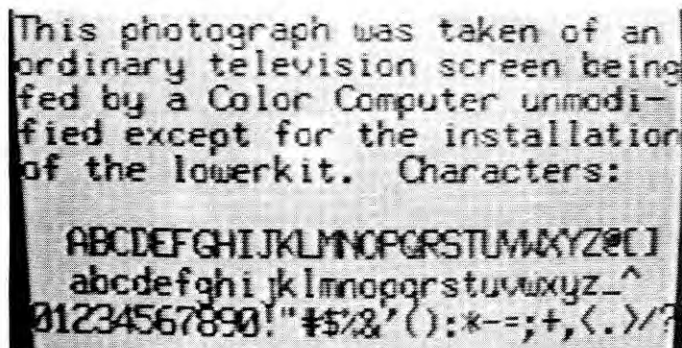
Program Listing



then your TRS-80 COLOR COMPUTER needs the

Word Processing Lowerkit

It converts your screen from an illegible checkerboard to this:



- Complete and ready to install—no software needed
- Nothing to solder—fully assembled, tested, guaranteed
- Compatible with all Color Computer software
- Absolutely no loss of hi-resolution graphics modes
- Optional cut-off switch restores original reverse-caps display
- European, Kata Kana (Japanese) and Greek characters optional
- Designed by 80 Microcomputing's Dennis Bathory Kitz

\$79.95 (U.S.) complete

MSB Electronics ³²⁸

Drawer 766, Barre, Vermont 05641
(802) 476-7311

Bare board and kits available. Call or write for information.
Dealer inquiries invited. *TRS-80 is a trademark of Tandy Corporation

COD—Visa—Mastercard Dealer Inquiries Invited

Add \$2.50 for shipping and handling
in continental U.S.

electronic mail

A perfect trio—The Hayes Stack Smartmodem, TRS-80, and the Automated Communication Exchange software. Now you can have access to other computers over the telephone line, as well as, time sharing systems and information utilities nationwide.

The Hayes Stack Smartmodem features auto answer & auto dial, RS232C compatibility, seven LED indicators, an audio monitor, accepts over 30 different commands, and is programmable in any language.

The unique A.C.E. software package allows you to receive & transmit ASCII files from your completely unattended TRS-80!

For a sophisticated, high performance, data communication system select A.C.E. and the Hayes Stack Smartmodem.



Hayes Stack Smartmodem \$249
A.C.E. disk software for 48K Model I/III \$79

***** Special—Limited time only! *****
A.C.E. Disk software \$39 w/Smartmodem purchase



ACE COMPUTER PRODUCTS OF FLORIDA, INC.
1640 N.W. 3rd Street
Deerfield Beach, FL 33441

Data (305) 427-6300/Voice (305) 427-1257
MC/VISA accepted FL res. add 4% sales tax
Freight incl. (UPS ground—Cont. USA)

197

ation of my 1980 interest deduction is 1980 digits/total digits times total finance charges; or 230/1176 times \$2257.69; or .19557823129 times \$2257.69; or 441.56 as computed by my TRuSty 80.

Enhancements

To put some pizzazz into my program I added a Payoff column and the ability to compute interest expense on a fiscal year (any financial year end other than December). If you are a calendar year taxpayer, just tell the computer your year end is month 12.

I added a line counter into the program to prevent splitting the year between pages.

My string decorations (lines 147, 3195 and 3352) were developed using the decimal code in my Daisy Wheel II printer manual. Modify these lines for your printer or use LPRINT STRING\$(77," ") with the character of your choice between the quotes.

If you are considering paying

an installment loan early, the Payoff column will tell you within a few pennies what your payoff would be in lieu of your next monthly payment, on or before the payment due date. If you make payments on your loan between your payment dates, the amount may vary based on the policy of your lender. Some lenders pro-rate the payoff month's interest on a daily basis, while other lenders keep the full interest even if you are only one day into the month.

The next time you shop for an installment loan, ask the loan officer if they compute the rebate on a daily or monthly basis. If you find two willing lenders with identical terms, choose the one who computes the rebate on a daily basis. It will save you a few dollars if you pay off early. ■

James Krapf, a 1970 graduate of the University of Delaware, has been practicing accounting in the Miami area since 1970.

CONVERT YOUR TRS-80 MODEL-I OR III 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 DEVELPMATE 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 DEVELPMATE 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 DEVELPMATE 81, for Model I, with software, power supply, emulation cable, TRS-80 cable, and "universal" personality module \$329
DEVELPMATE 83, Model III version, same as above \$329
PM2 PERSONALITY MODULE for 2732A EPROM \$15
PM3 PERSONALITY MODULE for 2764 EPROM \$15

ORION INSTRUMENTS

172 Otis Avenue, Dept. M, Woodside, CA 94062

(415) 851-1172 ✓ 151

Master Charge and Visa phone orders accepted
California residents please add 6% sales tax



**INTRODUCING THE MEMORY BOX
MEMORY THAT NEVER NEEDS PROTECTION**

Plugs directly into the CPU or expansion interface. Includes its own regulated power supply and ribbon cable. 1024 bytes of ram in an unused area on the memory map (3000-33FF HEX). Solves memory allocation problems when using monitor programs and utility support routines. Programs stay in the memory box even when the CPU is turned off.

For Model I Level II and all DOS systems (4, 16, 32, 48K)
Price \$49.95

Two utility software programs written for the Memory Box are:

1. Microm-A powerful machine language monitor (available at a keystroke without disturbing main programs).
Price \$19.95
2. U3000-A utility including cassette level meter program, adjustable keyboard debounce, screen print driver, page numbering, smart line termination, and more (all available at a keystroke).
Price \$12.95
Special offer complete package..... \$69.95

**DISPLAYED VIDEO IS DRIVING
DOWN PRICES ON DISKS**

DISPLAYED VIDEO is now offering TRS-80* MODEL III with disk drives, one of the most reliable disk drive systems on the market, for incredibly low prices!!

MODEL III with 48K ram, dual 80 track double-density disk drives, complete systems with Newdos 80 and one box of diskettes
PLUG IT IN AND GO \$2,250

MODEL III with 48K ram, dual 40 track double-density disk drives, complete systems with TRSDOS and one box of diskettes
PLUG IT IN AND GO \$1,850

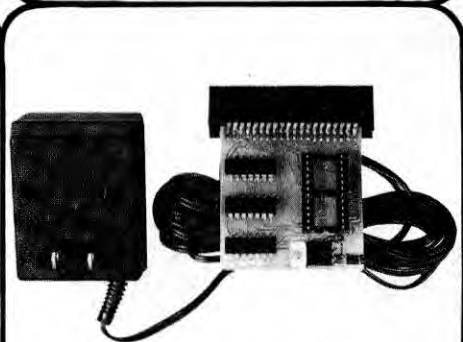
Disk Drives: Includes case and power supply
40 track disk drive \$269
80 track disk drive \$385
80/80 track disk drive \$510

Disk Drives: Not including case and power supply
40 track (bare) disk drive \$230
80 track (bare) disk drive \$335
80/80 track (bare) disk drive..... \$440

Drive Cases and Power Supplies:
5 1/2 inch single drive unit and power supply \$ 70
5 1/2 inch dual drive unit and power supply \$100
8 inch single drive unit and power supply \$139
16K RAM Memory Chip (200 NS) \$1.95 each
TRS-80* MODEL III 16K \$849

MODEL III Internal Drive Kit: Includes controller board, dual drive mounting bracket, dual power supply, all hardware, cables and connectors \$399

We carry a full line of Epson printers



THE 2K HIDEAWAY EPROM BOARD

Accepts 2716 compatible memory chips (not included). Includes its own power supply and connector. Install a pre-programmed eprom or use a ram chip in combination with the powerful monitor and utility programs sold above "Microm" or "U3000" (not included) for Model I, Level II and all DOS systems (for 16, 32, 48K) 2K Hideaway \$49.95

THE EASYGRAMER EPROM PROGRAMER

Attaches to cassette interface on Model I or III. Programs 5 volt 1K, 2K, and 4K eproms. Includes driver program, instructions, cable, and power supply. Programmer \$69.95

U.V. Eprom Eraser Lamp \$49.95
2716 Eprom Chip..... \$ 8.95
2K Ram Chip \$29.95
Z.I.F. (Zero Insertion Force Socket) \$14.95



IMMEDIATE DELIVERY
90 Days Parts and Labor Warranty
One Year Limited Warranty on Disk Drives
Dealer inquiries invited

**DISPLAYED
VIDEO**

Free Shipping in U.S.
48 Contiguous States



Displayed Video
7538 Jackson Road
Ann Arbor, Michigan 48103
(313) 426-5086

MasterCard & VISA add 3%
Michigan Residents add 4% Sales Tax

To Order: Call (313) 426-5086 or (313) 482-4424 or write DISPLAYED VIDEO,
7538 Jackson Road, Ann Arbor, Michigan 48103

*TRS-80 is a trademark of the Tandy Corporation

Prices subject to change without notice.



DISPLAYED VIDEO'S CERTIFIED DATA CASSETTES

Made of top grade tape formulated by Agfa-Gevaert of Germany.

Cases are of superior grade five-screw construction. Guaranteed 100% error-free or your money back.
Length C-1088 ea.
C-2078 ea.
12 pack .68
24 pack .58

Norelco style hard plastic cassette cases .21 ea. Special offer with every order of 24 cassettes: a Pilot Razor Point pen will be included.

DISKETTES (BOX OF 10)
Verbatim certified diskettes
Guaranteed 100% error-free or your money back.
5 1/4 inch MD525-01
1 box of 10 \$26.90
10 boxes of 10 \$25.90

Add \$2.00 for shipping & handling. To Order: Send check or money order or call (313) 426-5086 or (313) 482-4424.



In this classroom, a TRS-80 is the ruler.

King Komputer

Dana B. Allison
Box 172
Newton, NH 03858

As a high school math teacher, I have heard other teachers complain for years that some students cannot read a ruler. The program presented here has ended most complaints.

The program draws a ruler on the screen; the student measures a line of random length using the ruler. The enlarged ruler will measure up to 2-5/8 inches. The large size is easy

to read and enables measurements to a sixteenth of an inch. Photo 1 shows what the screen looks like.

The student gets three tries to answer each question, although after the first incorrect response the question is counted as incorrect in the final grade. The program also counts as incorrect any improperly reduced fractional answer. The program generates twenty questions; at the end the user can try the test again.

The test uses an eighth grade reading level, but you can easily change this to the elementary level. The test starts with a sample question which instructs the user how to type in answers. During the test itself the program shows the question number, draws the line to be measured, and then draws the ruler under the line.

The computer then asks how

long is the line in whole inches. After a correct response or after three wrong answers, the computer asks what fraction of an inch is left. At this point the user types in the answer in fractional form (i.e. 3/16, or zero if the line is a multiple of a whole inch). After a correct response to this question, or after three incorrect answers, the computer prints the full correct answer. The user then presses Enter to continue. At the end of the twenty questions the computer gives the percentage correct.

the ruler; each 1/16 of an inch equals three sets. A subroutine at line 9050 draws the ruler. From there the program branches to other subroutines to print the ruler on the screen. Table 1 lists the variables used in the program.

This program is the second of two which were developed to help students who have difficulty reading a ruler. The program presented here is the test portion of the first. The first program is a much longer (15K) remedial program on how to read a ruler. You can obtain it from me for \$10. ■

Dana Allison teaches math and programming languages at Pentucket Regional High School, West Newbury, MA.

The Key Box

Basic Level II
Model I or III
16K RAM

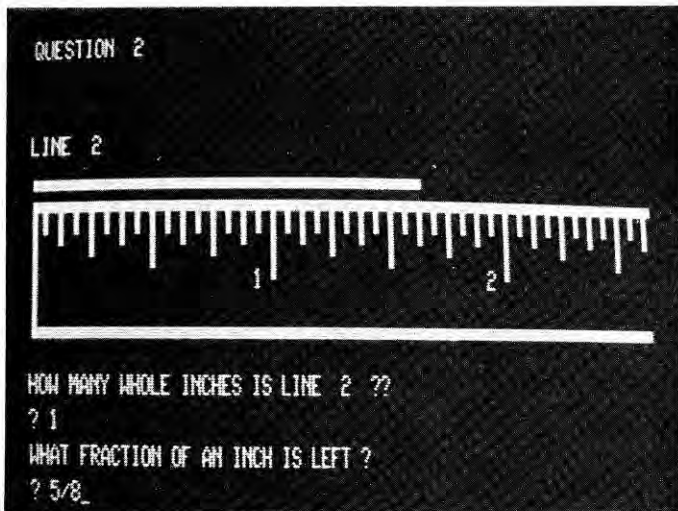


Photo 1

Program Graphics

The graphics are the most important part of this program. A subroutine starting at line 5500 generates the line to be measured. Set statements generate

N\$	User's name	B\$	Answer denominator
K	Set statement length	A3	Answer numerator
K1	Number of sixteenths in the line	A4	Answer denominator
Q	Question number	Z	Reduce answer counter
B	Line length in whole inches	C1	Denominator
C	Line length after deducting B	A1	Answer
T	Number of tries on a question	GH	Counter
V	Number of tries on a question	F	Delay
A	Used for answers and set increments	AV	Average
I	Delay	NR	Number correct
A\$	Used for answers	F	Beginning of set
L1	Input answer length	G	End of set
R	Fraction denominator length	X	Used for sets
L	Fraction numerator length	Y	Used for sets
T\$	Answer numerator		

Table 1. Variable list.

Program Listing.

```
10 REM THIS PROGRAM WAS WRITTEN BY DANA B. ALLISON
15 RANDOM
20 CLS:PRINT@192,"THIS PROGRAM WILL TEST YOUR ABILITY TO READ A
RULER."
25 PRINT "THE RULER THAT WE WILL BE USING IS LARGER THAN NORMAL
THIS":PRINT"WILL MAKE READING IT A LOT EASIER.":PRINT:INPUT"TYPE
```

Program continues

The only complete document proofreading system:

GRAMMATIK™

Beyond Spelling Checking

+

PROOFREADER™

The Aspen Software Company Spelling Checker

= NO ERRORS

For CP/M®, TRS-80®, and 8086/8088 Word Processors

Don't settle for a partial proofreading program. There are other spelling checkers available, but only Aspen Software offers a complete document proofreading system.

The Aspen Software Company spelling checker is Proofreader. We've been improving Proofreader since it was first released in early 1981. The newest version is fully menu driven, and so simple to use that you probably won't even need the comprehensive user's manual that's included. It has a large 38,000 word fully expandable dictionary, and can check even your largest documents in under four minutes (even faster on most systems). Proofreader's dictionary is almost twice as large as some, so you won't have to spend so much time adding new words. And Proofreader is totally accurate. Proofreader looks up every word in its dictionary, and does not artificially extend its dictionary size with less accurate prefix and suffix analysis like some others. (Beware: Most checkers with "vocabularies" of 50,000 or more words use this method and can miss some misspelled words!) The entire 38,000 word dictionary takes only 100,000 bytes of disk space.

Proofreader does not simply mark the errors in your document like some checkers, but allows you to make corrections interactively, with the full context of each unknown word displayed. You can correct mistakes, leave unknown words alone, or add words to the dictionary. Unlike most spelling checkers, you also have complete interactive access to the dictionary while correcting, so you won't need to keep a separate dictionary to look up words manually. Each correction is automatically double checked in the dictionary, and with a single command, Proofreader can almost always show you the correct spelling of a word. (Interactive correction optional on TRS-80 Model I/III, included on all other versions. TRS-80 versions do not support interactive dictionary look up.)

Spelling checking alone is not enough! Aspen Software's Grammatik goes beyond simple spelling checking. No one else has anything like it. First, Grammatik will check your document

for common typos (such as doubled words: "the the"), and punctuation and capitalization errors (e.g., "STicky shift key"). It also checks for poor writing style using a dictionary of over 500 misused phrases as defined in many writer's style manuals. Grammatik classifies each error it finds, marks the errors for easy correction with your word processor, and provides suggestions for correcting the problem. The phrase dictionary can easily be expanded to include checking for esoteric jargon or your own personal pet peeves. Grammatik also collects other information that can help you judge the style of the document, and can produce a profile of word usage.

Grammatik is receiving rave reviews from both critics and users. Bob Loudon in InfoWorld (12/7/81): "If you use a word processor and a spelling checker, then you should investigate the unique capabilities of this program. Grammatik is a surprisingly fast and easy tool for analyzing writing style and punctuation." Eric Balkan in The Computer Consultant: "I'm impressed with the imagination that went into this product." Many users call or write to tell us how much they like Grammatik. Some typical remarks: "Great!", "Thanks for making my life easier.", "I'm not just happy, I'm ecstatic!". Grammatik has also been selected as an officially approved Osborne Computer software package and will soon be appearing at Osborne dealers.

Only Proofreader and Grammatik can provide you with complete document proofreading, and together cost less than some spelling checkers alone. Proofreader and Grammatik have been designed to work with almost any CP/M, TRS-80, or 8086/8088 based word processor. While they have been designed to work together, they are available separately.

Aspen Software also has its own full featured word processor called Writer's Companion for all these systems. One of the best implementations of Ratfor (Rational Fortran) is available, too, along with an automatic Ratfor pretty printer. Please call or write for more details about these products.

--CP/M versions require CP/M version 2 or later and at least 48K of RAM. Standard 8" single density, Northstar, Osborne-I, Omikron, and Apple formats available directly from Aspen Software. These and most other formats also available from Digital Marketing. Some CP/M systems with limited disk capacity supplied with 28,000 word, 65,000 byte dictionary. Proofreader-\$129.00. Grammatik - \$150.00. Both - \$250.00.

-Manuals only - \$8.00 each, \$15.00 for both.

--TRS-80 Model I/III versions require only one disk drive and 32K of RAM, and are compatible with all TRS-80 word processors and operating systems. Model II version requires 64K and 1 drive. TRS-80 Model I/III: Proofreader - \$59.00, Interactive correction option - \$30.00, Grammatik - \$59.00. All - \$139.00. TRS-80 Model II: Proofreader - \$99.00, Grammatik - \$99.00, Both - \$179.00.

--The 8086/8088 version will run under MS/DOS or equivalent (including the IBM Personal Computer DOS). MS/DOS formats available include standard single density 8" and IBM PC 5.25". CP/M-86 versions scheduled for Summer 1982 availability. Proofreader - \$129.00, Grammatik-\$150.00. Both - \$250.00.

IMPORTANT ORDERING INFORMATION: You MUST specify computer model, operating system, memory size, and format and number of disk drives when ordering either software or manuals alone. Please include your phone number. All U.S., Canada, and Mexico orders include first class shipping in price. Overseas please add \$5.00. We accept cash, check, money order, VISA and Master Card. Sorry, no UPS or COD service available. Purchase orders accepted from educational institutions and nationally recognized corporations only. Cost of manual only orders can be credited to final purchase. NM residents add 4% sales tax.

Aspen Software products distributed exclusively by Aspen Software Company and Digital Marketing. Dealer and OEM inquiries welcome.

Trademarks: CP/M: Digital Research; TRS-80: Tandy Corp.; MS-DOS: Microsoft; Proofreader, Grammatik: Aspen Software Co.



ASPEN SOFTWARE COMPANY™

P.O. Box 339-M Tijeras, NM 87059 (505) 281-1634

↗85

Program continued

```
IN YOUR NAME THEN HIT THE WHITE <ENTER> KEY";NS:PRINT
26 PRINT "OK "NS", DO YOU WANT TO SEE AN EXAMPLE OF A TEST QUEST
ION?";PRINT "TYPE Y OR N"
27 PRINT "AFTER YOU TYPE IN THE ANSWER TO THE QUESTION HIT THE WH
ITE <ENTER> KEY.":INPUT AS: IF AS="N" GOTO 99
30 K=60:K1=20:Q=0:GOTO 110
99 CLS:PRINT@192, "LETS START THE TEST.":FOR I=1 TO 600:NEXT I
100 NR=0:FOR Q=1 TO 20:B=9:AS=NS:K=3*RND(42):K1=K/3
110 CLS:PRINT"QUESTION "Q:PRINT@192, "LINE "Q:GOSUB5500:GOSUB9050

115 GH=0
120 B=INT(K1/16):C=K1-(B*16):T=0:V=0
125 IF Q=0 GOTO 300
130 PRINT@640, "HOW MANY WHOLE INCHES IS LINE "Q" ??":INPUTA:IFA=
BTHEN PRINT@768, "CORRECT "NS" "A":FOR F=1 TO 800:N
EXT: GOTO150
132 PRINT@704, "WRONG, TRY AGAIN":FOR I=1 TO 600:NEXT
140 T=T+1:IFT=3 THEN GOTO145 ELSE GOTO 130
145 PRINT@704, "THE CORRECT ANSWER IS "B
150 PRINT@768, "WHAT FRACTION OF AN INCH IS LEFT ?":INPUTAS:IFVAL
(A$)=0 THEN A=0:GOTO157
152 L1=LEN(A$):IF L1<3 OR L1>5 THEN GOTO 157 ELSE IF L1=3 THEN L
=1:R1=GOTO155
153 IF L1=4 THEN L=1:R=2:GOTO155
154 IF L1=5 THEN L=2:R=2
155 TS=LEFT$(A$,L):BS=RIGHT$(A$,R):A3=VAL(T$):A4=VAL(B$):IF A4=0
THEN A=3 ELSE A=A3/A4:IF A4>16 THEN A=3
156 IF MID$(A$,L+1,1)<>"/" THEN A=3
157 IF GH=1 GOTO 182
170 FOR Z=4 TO 1 STEP -1:IF C/2<>INT(C/2)GOTO 178
175 C=C/2:NEXTZ
178 IFZ=0 AND A=0 GOTO 230
180 C1=2|Z:A1=C/C1
182 IFA1=A AND C1=A4 THEN GOTO200
185 PRINT@832, "WRONG, TRY AGAIN":V=V+1:GH=1:FORF=1TO700:NEXT
190 IF V=3 THEN GOTO 210 ELSE GOTO 150
200 IF B=0 THEN GOTO 220 ELSE PRINT@832, "YOU ARE CORRECT "NS"
":PRINT@896, "LINE"Q"IS "B" AND "C"/"C1" INCH
E LONG":GOSUB20000:GOTO 250
210 PRINT@896, "THE CORRECT ANSWER IS "B"AND "C"/"C1:GOSUB20000:G
OTO250
220 PRINT@832, "YOU ARE CORRECT "NS"
":PRINT@896, "LINE"Q"IS "C"/"C1" OF AN INCH LONG":GOSUB200
00:GOTO250
230 PRINT@832, "YOU ARE CORRECT "NS"
":IF B=1 THEN PRINT@896, "LINE"Q"IS ONE INCH LONG" ELSE PRI
NT@896, "LINE"Q"IS "B" INCHES LONG"
235 GOSUB20000
250 IF V=0 AND T=0 THEN NR=NR+1
255 NEXT Q
260 CLS:AV=NR/20:AV=INT(AV*100+.5):PRINT@320, CHR$(23) "YOU GOT
"NR"CORRECT OUT:PRINT"OF 20 QUESTIONS FOR A":PRINT"SCORE OF"AV
```

```
PERCENT."
270 PRINT:INPUT"DO YOU WANT TO TRY ANOTHER 20 QUESTIONS, TYPE
Y OR N";AS:IFA$="Y"GOTO 100
280 PRINT:PRINT "THANKS FOR USING THIS PROGRAM":PRINT"I HOPE YOU
DID WELL."
299 END
300 PRINT@128, "EACH QUESTION WILL LOOK LIKE THIS":PRINT@640, "HO
W MANY WHOLE INCHES IS LINE 0 ??":PRINT@704, "? "CHR$(95):PRINT
@710, "AT THE QUESTION MARK YOU WILL ENTER THE ANSWER.":FOR I=1 T
O 1500:NEXT
310 PRINT@774, "IN THIS PROBLEM THE ANSWER IS 1":PRINT@832, "ARE Y
OU READY IF SO TYPE 1 THEN HIT THE WHITE <ENTER> KEY":INPUTB:PR
INT@784, "? 1
"
320 PRINT@768, "WHAT FRACTION OF AN INCH IS LEFT ":PRINT@832, "? "
CHR$(95)
325 PRINT@840, "AT THE QUESTION MARK ENTER THE ANSWER IN REDUCED
FRACTION FORM. ":INPUT"REMEMBER BOTH 2/8 AND 4/16
ARE NOT REDUCED SO THE CORRECT ANSWER IS 1/4, SO TYPE IN 1/4.";
A$
330 PRINT@768, "? 1/4
":FORI=1TO 300:NEXT:PRINT@768, "YOU ARE CORRECT "NS:PRI
NT@832, "LINE 0 IS 1 AND 1/4 INCHES LONG":GOSUB20000
340 CLS:PRINT@320, "IF YOU GIVE AN INCORRECT ANSWER THE COMPUTER
WILL PRINT WRONG. YOU WILL HAVE 3 CHANCES TO GET THE QUESTION R
IGHT. AFTER THE THIRD MISS YOU WILL BE GIVEN THE CORRECT
ANSWER."
350 PRINT:INPUT "IF YOU WANT TO SEE THE EXAMPLE AGAIN, TYPE IN Y
OR N.":AS:IF AS="Y" GOTO 300
360 PRINT:PRINT:INPUT "LETS START THE TEST BY HITTING THE <ENTER
> KEY":AS:GOTO100
399 END
4000 REM MARKERS
4005 FORY=16TO16+A:SET(X,Y):NEXTY:RETURN
5000 REM RULER TOP AND BOTTOM AND NUMBERS INCH AND 1/2 IN."
5010 PRINT@469, 1:PRINT@493, 2:Y=15:GOSUB9000:Y=26:GOSUB9000:X=1:F
ORY=16TO25:SET(X,Y):NEXTY:FORX=48TO127STEP48:A=5:GOSUB4000:NEXTX
:FORX=24TO127STEP48:A=4:GOSUB4000:NEXTX:RETURN
5500 FORX=10K:SET(X,13):NEXTX:RETURN
6000 REM 1/4 INCH MARKERS
6010 FORX=12TO127STEP24:A=3:GOSUB4000:NEXTX:RETURN
7000 REM 1/8 INCH MARKERS
7010 FORX=6TO127STEP12:A=2:GOSUB4000:NEXTX:RETURN
8000 REM 1/16 INCH MARKERS
8010 FORX=3TO127STEP6:A=1:GOSUB4000:NEXTX:RETURN
9000 REM HORIZONTAL LINE
9010 FOR=-1TO127:SET(X,Y):NEXTX:RETURN
9050 REM SUB TO GOSUB
9060 GOSUB5000:GOSUB6000:GOSUB7000:GOSUB8000:RETURN
20000 PRINT@968, "IF YOU ARE READY TO CONTINUE HIT THE <ENTER> KE
Y":INPUTK$:RETURN
```

SOFTWARE THAT FITS.

PROPERTY MANAGEMENT

- Tenant Histories
- Late Rent Report
- Vacancy Report
- Income Report
- Automatic Late Charge
- Returned Check Report
- Integral General Ledger
- Ownership Files
- Utilities Report
- Tax Expense Report
- Owners' Statements
- Late Notice Letters
- 900 Properties Per Disk

\$795

All programs come with COMPLETE SOURCE CODE AND VARIABLE DEFINITIONS. Programs utilize fast, convenient keyed file access and are written in Microsoft Basic. Easy to understand documentation. Money back guaranteed to be error free. License agreement and Source Code allows local programmers to modify for unusual applications and for resale profits. All on TRS 2.0. Other programs also available.

INVENTORY MANAGEMENT

- Inventory Performance Report
- Up To 15 Digit Stock Number
- Sales Input From CRT Or Disk
- Period & Year-End Performance
- Profits By Salesperson
- Sales Input From Radio Shack's Accounts Receivable Also
- Suggested Reorder List
- Conversion Of Files From Radio Shack's Inventory With No Re-Keying
- Price List
- Over 2000 Items Per Disk

\$175



PATIENT DATA MANAGEMENT

- Maintains AMA CPT Codes With Fees & Descriptions
- Up To 10 Doctors At 3 Locations
- Forms For Blue Cross/Blue Shield; Campus; Medicaid; Medicare
- Patient & 3rd Party Billing
- Full Patient History (1000 Per Disk) Or Balances Only (3000 Per Disk)
- Patient, Doctor & Service Code Files Maintained Separately For Easy Access
- Reports By Doctor Or Location

\$895

MICRO-COMPUTER SALES CORPORATION OF FAYETTEVILLE, NC

Phone 919-483-2003
Post Office Box 53376
Fayetteville, NC 28305



246

NEW PRINTERS. NEW PERIPHERALS. SAME OLD RELIABLE QUALITY AND VALUE.

1982 will find more OEM's, businesses, dealers and personal computer users turning to MICROTEK than ever before.

TekWriter-1



80 Column Dot Matrix Printer (Formerly BYTEWRITER-1)

The Tekwriter-1 printer is, dollar for dollar, the finest value in the industry. And we've proved it by comparing the Tekwriter-1 to the Epson MX-80. Our print speed is 14 lines per minute faster, our life expectancy is longer, the character sets are the same, and the interface, warranty and printhead replacement cost are all identical.* But the biggest difference is the price. The Tekwriter-1 is about \$300 less.

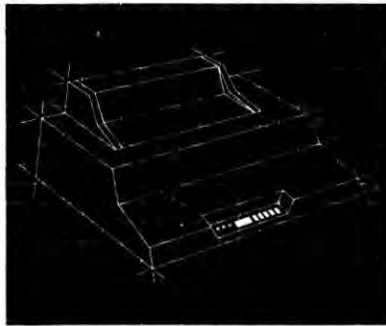
Our extensive testing has proved that the Tekwriter-1 interfaces problem-free to most parallel Centronics and serial (RS-232) computers.

The Tekwriter-1 is tough to beat for performance and quality.

*Data Source: Epson MX-80 Operation Manual

Parallel \$349
Serial \$389

TekWriter-2



NEW! 80/132 Column Dot Matrix Printer

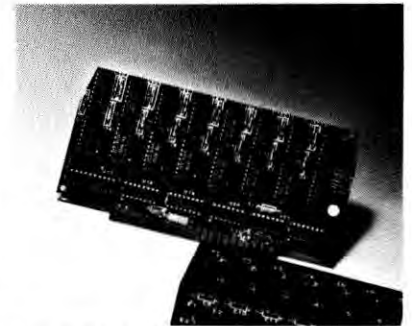
The Tekwriter-2 is perfectly suited to personal, business or OEM applications. Tekwriter-2 is designed to accept single sheet, roll or pin feed paper. It has a 9-wire dot matrix impact print head which produces crisp characters and has underlining capability. The printer is manufactured to run extremely quietly even while operating at peak output levels.

Tekwriter-2 is especially well suited to handle word processing applications because of its data buffer expansion capabilities to 25K. This ability makes it an efficient graphics generator.

Parallel interface (Centronics type). Interfaces all models of TRS-80, Apple, and Atari 400/800, and most computers with Centronics printer interface.

\$695

Peripherals



Parallel/Serial Data Buffer Converter

Interfaces with most computers and printers on the market today. Switch selectable parallel or serial input/parallel or serial output. Ideal for word processing and data communications. Data buffer 2K standard — expandable to 62K. Serial I/O BAUD rates switch independently selectable.

16K Apple Memory Board

Apple Parallel Interface Card

16K-32K Atari Memory Boards

Atari Parallel or Serial Printer Cables

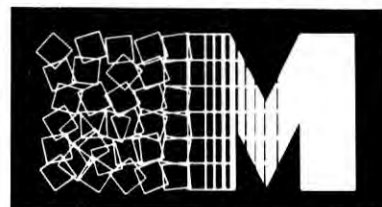
8K-16K VIC-20 Memory Boards

64K to 256K IBM Memory Board

Quantity and OEM discounts available.

Continuing our quest for excellence.

TRS-80 is a trademark of Radio Shack, Inc.
Apple II is a trademark of Apple Computer, Inc.
Atari 400/800 are trademarks of Atari, Inc.
Microsoft is a trademark of Microsoft Consumer Products, Inc.
Z-80 is a trademark of Zilog, Inc.
Visical is a trademark of Personal Software, Inc.



MICROTEK inc.

MICROTEK
9514 Chesapeake Drive
San Diego, CA 92123
(714) 278-0633
Outside CA call
Toll Free (800) 854-1081
TWX. 910-335-1269



An IBM-like monitor for your 80.

CP80

Brian Cameron
284 Albert Street
Waterloo, Ontario
Canada N2L 3T8

With all the monitor programs on the market you might ask why write your own.

Surely one of those popular programs could satisfy me. But after long searching I concluded that none of them fit my needs completely.

Other Monitors

Zedbug, by Northern Technology, is part of an editor/assembler that uses 8080 mnemonics.

I became familiar with it while testing the beginnings of a communications program. The input and output commands are useful and only a few monitors feature this. It sends a byte of data to a port. Testing the hardware for Compac this way reduced debugging time dramatically. The drawback with Zedbug is the

command format which terminates all commands with a period. I got the feeling I was entering sentences not commands. The format is rigid in that it prohibits a multi-number of blanks within the command line.

The first monitor I bought was T-Bug by Radio Shack. Its memory location was awkward. The programs I wanted to test fell in the 4380-4980 hexadecimal memory location. I found it incredible that in order to modify a register, I had to look up its display command location and use the memory modify command. This was a little cheap on bytes and the breakpoint command was also awkward.

MON3 showed promise with its ability to move itself around in memory via the relocate command, but it lacked a register display command and a breakpoint command. It was rather large for a monitor (approximately 4K) but this was the fault of the rigid format of the disassembler. You had to enter the punch command without a blank between the command and the start address. The same was true for the relocate com-

DISPLAY

D R - displays all registers
D G - displays general purpose registers
D P - displays the program counter
D S - displays the stack pointer
D X - displays IX index reg (can use IX)
D Y - displays IY index reg (can use IY)
D mmmm - displays one line of memory
D mmmm. - displays full screens of memory. Break to quit or enter to continue display.

STORE

S Gr xx - where r is A,B,C,D,E,H, or L and xx is byte
S PC xxxx - stores xxxx into PC (c is optional)
S SP xxxx - stores xxxx into SP (p is optional)
S IX xxxx - stores xxxx into IX (I is optional)
S IY xxxx - stores xxxx into IY (I is optional)
S mmmm xxxxxxxx...(cr) - stores up to 255 bytes in hex
S mmmm xxxxxxxx...(cr) - stores ascii into memory at mmmm

BEGIN

B - returns to adstop address.

ADSTOP

A xxxx - sets an adstop and clears the old one.
A - clears adstop.

EXCHANGE

EX - exchanges AF with AF'
EXX - exchanges BC,DE,HL with BC',DE',HL'

Table 1. CP80 Command Table

The Key Box

Model I
32K RAM
One disk drive

THE ULTIMATE IN COLOR COMPUTING

WORD PROCESSING

THE SUPER "COLOR" WRITER II

The Word Processor that re-wrote the book on Word Processing

The Super "Color" Writer is a FAST, machine code, full featured, character (screen) oriented word processing system for the TRS-80(TM) Color Computer and ANY printer. The video display is styled after a professional phosphor (green characters on black background) display for hours of use without eye fatigue (optional orange on black). The unique print WINDOW frees you from 32, 51 or 64 character lines FOREVER! This window can be moved anywhere in the text file, up, down, left or right to display the text as it will be printed without wasting paper. You can create or edit Super "Color" Terminal files, ASCII files, BASIC programs or Editor/Assembler source listings. It's simple enough for beginners with 4K and... for the professional writer with a 32K disk system and a lot to say, there's plenty of room to say it!

COMPARISON CHART	SUPER COLOR WRITER			THE COMPETITION		
	4K	16K	32K	4K	16K	32K
System Size	4K	16K	32K	4K	16K	32K
TAPE Text space	N/A	8K	24K	N/A	2K	18K
ROMPAK Text space	2.5K	15K	31K	N/A	N/A	N/A
DISK Text space	N/A	6.5K	22.5K	N/A	0.5K	16.5K
Right Justify		YES			NO	
Video Window		YES			NO	
Edit any ASCII File		YES			NO	

The figures speak for themselves and with professional features like PROGRAMMABLE function string commands to perform up to 28 commands automatically, PROGRAMMABLE text file chaining, PROGRAMMABLE column insert & delete, and right hand JUSTIFICATION with punctuation precedence, the choice is clear but there's still more!

The Super "Color" Writer takes full advantage of the new breed of "smart printers" with Control codes 1-31, 20 Programmable control codes 0-255 for special needs and built in Epson MX-80, Centronics 737, 739 and R.S. Line Printer IV, VII, VIII drivers.

CHECK THESE FEATURES!!

HIGH SPEED & normal operations • 32K Compatible • Window • Key beep • HELP table • 128 character ASCII & graphics • Memory left • Lower case • Full cursor control • Quick paging • Scrolling • Word wrap around • Tabs • Repeat all functions • Repeat last command • Insert character & line • Delete character, delete to end of line, line to cursor, line & block • Block move, copy & delete • Global Search, Exchange & Delete • Merge or Append files • Imbed Control Codes in text • Underline • Superscripts • Subscripts • Headers, Footers & 2 Auxiliary footnotes on odd, even or all pages definable position • Flush right • Non-breakable space • 4 centering modes: 5, 8, 3, 10 & 16 7 (CPI) • Full page & print formatting in text • Single sheet pause • Set Page length • Line length, Line spacing, Margins, page numbers • Title pages • Printer baud: 110, 300, 600, 1200, 2400 • Linefeeds after CR • Soft & hard formfeed • Works with 8 bit printer fix • and more!

SUPER "COLOR" WRITER DISK

The Disk version of the Super "Color" Writer works with the TRS-80C Disk System and has all the features listed above plus many more! Use with up to four Disk Drives, Includes an extended HELP table you can access at any time. Call a directory, print FREE space, Kill disk files and SAVE and LOAD text files you've created all from the Super "Color" Writer. Print, merge or append any Super "Color" Terminal file, ASCII file, BASIC program or Editor/Assembler source listing stored on the Disk or tape. The Super "Color" Writer Disk version has additional formatting and print features for more control over your printer and PROGRAMMABLE chaining of disk files for "hands off" operation. Print an entire BOOK without ever touching a thing!

Includes comprehensive operators manual.

TAPE \$49.95 ROM PAK \$74.95 DISK \$99.95

Manual only, \$7.00 Refundable with purchase.

Allow 2 extra weeks for personal checks. C.O.D. orders add \$2.00. When ordering specify computer type and add \$2.00 for S/H. Minn. residents add 5% sales tax. VISA/Master Chg

DEALER INQUIRES ARE INVITED.

TRS-80 is a registered trademark of the Tandy Corp.

COMMUNICATIONS

THE SUPER "COLOR" TERMINAL

Time Share, Smart Terminal, High-speed Data X'fer & Videotex

The Super "Color" Terminal turns the Color Computer into a Super-smart terminal with all the features of VIDEOTEX(TM) plus much more. COMMUNICATE with Dow Jones & Compuserve and with computers like the TRS-80(TM) MODEL I, II, III, APPLE etc., via modem or RS-232 direct! Save the data to tape or print it! Reduces ON-LINE cost to a minimum!

FEATURES

10 buffer size settings from 2-30K • Buffer full indicator • Lprints buffer contents • Full 128 ASCII keyboard • Compatible with Super "Color" Writer files • UPLOAD & DOWNLOAD ASCII files, Machine Language & Basic programs • Set RS-232 parameters • Duplex: Half/Full • Baud Rate: 110, 300, 600, 1200, 2400, 4800 • Word Lengths: 5, 6, 7 or 8 • Parity: Odd, Even or None • Stop Bits: 1-9 • Local linefeeds to screen • Tape save & load for ASCII files, Machine code & Basic programs • Unique clone feature for copying any tape.

Super "Color" Terminal Disk

The Disk version offers all the features listed above plus Host ability in full duplex • Lower case masking • 10 Keystroke Multiplier (MACRO) buffers on disk to perform repetitive log-on tasks and send short messages (up to 255 bytes) • Programmable prompts for send next line • Selectable character trapping • Set printer line length • Pagination • Linefeed with CR option • Printer Baud: 110, 300, 600, 1200 & 2400 • Documentation.

TAPE \$39.95 ROM PAK \$49.95 DISK \$69.95

Documentation only, \$4.00 Refundable with purchase.

16K RAM KIT \$15.99

PREMIUM 16K 200 Ns Ram for TRS-80 Color Computer. Includes ram test instructions and a ONE YEAR GUARANTEE. 32K upgrade instructions FREE! (32K requires soldering)

ROMPAK KITS

Put your programs in a ROMPAK or execute tape based programs in a RAMPACK at \$COOO. Kit includes 1 socketed P.C. board that holds up to 4, 2716 EPROMs or 4, 2K Static Ram Chips for a total of 8K and a plastic housing to fit the rom port. \$24.95

2716 2K 5v EPROM \$5.95 ea.

2K Static RAM \$19.95 ea.

COLOR GAMES!!

FEATURING GREAT GRAPHICS & SOUND!

ADVENTURE 3-PAK Requires 16K Extended Basic **TAPE \$24.95**

This TRILOGY OF 3-D FANTASY GAMES takes you to the **WORLD UNDER THE CIMEEON MOON**. Engage in ritual combat with Tooamoath Narthokc Monsters and skilled warriors. Advance in rank with play experience. Then adventure through **DAZMAR'S UNDERWORLD OF DOOM** to the forbidden ruins of Castle Argana. Search for the Eye of Dazmar while avoiding the sorcerer's intricate traps. Survivors must then negotiate the perilous peaks of the Ugrek Mountains to the **FORSAKEN GULTCH** where the wicked idol awaits restoration.

VEGAS 5-PAK Requires 16K Extended Basic **TAPE \$19.95**

The **THRILLS OF A VEGAS CASINO** at home. Five action packed Vegas games for up to four players: **CASINO CRAPS** • **21** • **ONE ARMED BANDIT** • **UP & DOWN THE RIVER** • **KENO**. Bank tracks players' winnings from game to game • realistic cards • regulation tables • boards • authentic sounds • lively graphics • official rules in each game.

COMBAT 3-PAK Requires 16K Extended Basic **TAPE \$24.95**

Three action packed two player games featuring lifelike graphics and sound of **LASER FIRE**, **CANNONS** and **PHOTON TORPEDOES**.

2-1-0 TANK COMBAT five terrains • the experienced arcade player can design combat scenario. **STELLAR BATTLE** pilot a Flex-Wing Fighter at incredible speeds in enemy space taking out Dorian Tye Fighters defending the Imperial Star Fortress. **GALACTIC BLOCKADE** maneuver your craft in a course that boxes your opponent but avoid cosmic debris and hostile space probes!



**NELSON
SOFTWARE
SYSTEMS**



128

P.O. Box 19096 Minneapolis, MN 55419 612/827-4703

mand. Also, it rejects the lower-case modification when issued a punch command.

RSM was like MON3 except that it was not relocatable. Each of these products was more of a tape utility package than a monitor program.

Microsoft's EDTASM PLUS and Z-Bug monitor magazine advertisements promised breakpoints, the ability to single-step through memory, register display and modify commands. I was sold until I saw the user's manual at a TRS-80 club meeting. My hopes were dashed at this classic example of command overkill. Commands set the display to byte form, word form, ASCII, or mnemonic form. (Another case of the mnemonic plague.) I had to enter a shift up arrow for the commands. It was like typing things in backwards since each command line ended with the command itself. FFFF LLLL\$, where FFFF is the first address and LLLL is the last address, the dollar sign is the shift up arrow and the T is the display command. A command marathon!

After this let-down I decided to write my own monitor. I would own the source and could always debug or add new features without patching a monitor with only the object code. The program could grow at its own pace. I based CP80 on the debugging aids of IBM's Control Program (CP). I use them every day, so I used familiar command names. It feels good to go from one system to another and use the same debug commands on both machines. Such ties bridge the gap between large systems and microcomputers.

So, You Need a Monitor?

I did not set out to please *everyone* when I wrote this program as did each of the other monitor authors. In each case they failed. Owning the source means you can pick the parts you want, rework them, add commands, and create your personal version.

- A monitor should be relatively small so it can stay out of the program you are testing.

- A monitor should load anywhere in memory to avoid conflict with the program you are testing.

```

* LETS DISPLAY OUR GENERAL REGISTER SET
D G
A B C D E H L
00 00 00 00 00 00 00
* LETS DISPLAY AN AREA OF MEMORY
D 00F0.
00F0 CEFF22B1 401922A0 40CD4D1B 211101CD *....@...@.M.....*
0100 A728C319 1A4D454D 4F525920 53495A45 *....MEMORY SIZE*
0110 00524144 494F2053 4841434B 204C4556 *.RADIO SHACK LEV*
0120 454C2049 49204241 5349430D 001E2CC3 *EL II BASIC.....*
0130 A219D7AF 013E8001 3E01F5CF 28CD1C2B *.....>.>.....*
0140 FE80D24A 1EF5CF2C CD1C2BFE 30D24A1E *...J.....0.J.*
0150 16FF14D6 0330FBC6 034FF187 5F06027A *.....0...O.....*
0160 1F577B1F 5F10F879 8F3C47AF 378F10FD *.W.....<G.7...*
0170 4F7AF63C 571AB7FA 7C013E80 47F1B778 *.O.<W.....>.G...*
0180 281012FA 8F01792F 4F1AA112 CF29C9B1 *.....O.....*
0190 18F9A1C6 FF9FE5CD 8D09E118 EFD7E53A *.....:.*
01A0 9940B720 06CD5803 B72811F5 AF329940 *.e. .X.....2.@*
01B0 3CCD5728 F12AD440 77C38428 21281922 *<W.....@.....*
01C0 21413E03 32AF40E1 C93E1CCD 3A033E1F *.A>.2.@.>...>.*
01D0 C33A03ED 5F32AB40 C92101FC CD210206 *...2.e.....*

* LETS START OFF THIS EXAMPLE BY SETTING AN ADSTOP IN MEMORY
* DISPLAY THE ADDRESS BEFORE THE ADSTOP IS SET
D 7FF0
7FF0 00000000 00000000 00000000 00000000 *.....*
* NOW LETS SET THE ADSTOP
A 7FF0
* AND DISPLAY IT
D 7FF0
7FF0 F7000000 00000000 00000000 00000000 *.....*
* WE NOW SET AN F7 IS STORED THERE
* LETS SET OUR STACK POINTER TO SOME ADDRESS
S SP 6000
* AND DISPLAY IT
D S
6000
* NOW LETS POINT OUR PC AT OUR ADSTOP
S PC 7FF0
D P
7FF0
* NOW WE WILL JUMP OFF TO OUR ADSTOP WITH THE BEGIN COMMAND
B
ADSTOP AT 7FF0
* AND WE FIND OURSELVES BACK IN CP80.
* NOW LETS SEE HOW THE STORE COMMAND WORKS ON MEMORY.
* WE WILL WORK WITH THE SAME ADDRESS AS WE DID FOR THE ADSTOP
D 7FF0
7FF0 F7000000 00000000 00000000 00000000 *.....*
S 7FF0 1122334455
STORE COMPLETE
D 7FF0
7FF0 11223344 55000000 00000000 00000000 *..3DU.....*
* LETS NOW STORE WITH TRANSLATION INTO THE SAME LOCATION
S T7FF0 THIS IS A TEST TO SEE RESULT OF STORE
STORE COMPLETE
D 7FF0
7FF0 54484953 20495320 41205445 53542054 *THIS IS A TEST T*

```

Table 2. CP80 Terminal Session

- A monitor is a debug tool. It *should* display and modify memory and the CPU registers. It *should not* have tape I/O features such as copy tape or save system tape commands which add to the program and complicate the command language. It is better to reassemble the source with changes than to zap and save the object. Otherwise, when you change and reassemble the source, your zaps will be cancelled and the original pro-

blem or bug will reappear.

- The commands should be brief and simple. Display, Store, Breakpoint, and Go are all you really need to debug a program.

- The command line should allow freedom to enter multi-blanks.

- Single step, memory move, byte and word search, should be an extension program that can connect with the main program only as needed

- The display of memory is the window into the machine

and should please the eye as well as transmit information. Memory display should offer the option to see a little or a lot, **but** always allow you more than one byte. It is better to fill a line with data than to waste space on the screen. Usually one line is sufficient but sometimes it is nice to fill the display so you can browse without restrictions. Both the ASCII and hexadecimal versions should display so you need not reset the display

M.T.I.[®] PERFORMANCE. RELIABILITY. LOW PRICE.

CP/M

Winchester Hard Disk

80 x 24 Display

4Mhz Operation

MTI gives you the things you are looking for when you are looking for a personal computer.

MOD III PLUS/140. We have taken the basic Model III, expanded the memory to 48K and added our MTI Double Density Dual Disk Drive System. System is fully compatible with Radio Shack DOS and peripherals.

MOD III PLUS C/140. Similar to the MOD III 140 but has CP/M and 80x24 display added, along with 4 mhz speed-up enhancement, cooling system and anti-glare screen. The perfect low-cost business system.

MOD III/240. Same as the MOD III PLUS/140 but has double storage capacity, and dual headed 40 track drives.

MOD III/280. Has 1.5 megabytes storage and 2 dual headed 80 trk. double density disk drives with DOS plus 3.3.

MOD III/WINCHESTER. Our largest business computer system. 5.7 megabytes of storage. Includes a 5 megabyte WINCHESTER hard disk and 80 track dual head disk head used as back-up and for conventional floppy disk operation.

WANT MORE? For more information call your local dealer listed below. If you prefer, you can call or write us, and we'll send you the information.



- 90 Day Warranty
- One Year Extended Warranty Available
- Local Dealer Service

MTI AUTHORIZED SALES AND SERVICE CENTERS

Anchorage, AK	(907) 333-8322	Redondo Beach, CA	(213) 370-5556	Buckingham, IA	(319) 478-2826	Troy, NY	(518) 273-8411
Rodgers, AR	(501) 636-9168	Riverside, CA	(714) 781-6361	Belleville, IL	(618) 277-2354	White Plains, NY	(914) 761-9283
Mesa, AZ	(602) 833-8949	San Diego, CA	(714) 275-4243	Collinsville, IL	(618) 345-5068	Tonkawa, OK	(405) 628-2693
Phoenix, AZ	(602) 244-9739	San Jose, CA	(408) 946-1265	Oak Park, IL	(312) 386-3323	Tulsa, OK	(918) 836-9503
Sierra Vista, AZ	(602) 458-2479	Santa Ana, CA	(714) 850-1228	Shawnee, KS	(913) 631-2029	Portland, OR	(503) 281-7640
Tucson, AZ	(602) 323-9391	Santa Monica, CA	(213) 393-5785	Ashland, KY	(606) 325-2210	Dallas, TX	(214) 247-6679
Anaheim, CA	(714) 773-0240	Vallejo, CA	(707) 554-4933	Shreveport, LA	(318) 865-7189	San Angelo, TX	(713) 499-5241
Covina, CA	(213) 332-4088	Walnut, CA	(714) 594-9760	Anoka, MN	(612) 427-5783	San Angelo, TX	(915) 658-3781
Goleta, CA	(805) 967-7628	Westlake Village, CA	(213) 706-0333	Cameron, MO	(816) 632-6528	Cheyenne, WY	(307) 632-9132
Huntington Beach, CA	(714) 842-1348	Colorado Spring, CO	(303) 630-3334	Great Falls, MT	(406) 737-0901	Buenos Aires, ARG	32-1858
Inglewood, CA	(213) 673-3295	Grand Junction, CO	(303) 434-3616	Missoula, MT	(406) 549-9715	Pans, FRANCE	306-4606
Lancaster, CA	(805) 942-5747	Groton, CT	(203) 445-5166	Raleigh, NC	(919) 755-1175	Holm, GERMANY	4103-4315
Montclair, CA	(714) 626-4813	Wilmington, DE	(302) 762-0227	Grand Forks, ND	(701) 772-7848	Florence, ITALY	55-45-4319
Northridge, CA	(213) 886-9200	Hollywood, FL	(305) 981-1011	West Millford, NJ	(201) 728-8080	Singapore, JAPAN	220-7182
Orange, CA	(714) 771-0880	Lynn Haven, FL	(904) 265-6452	Las Vegas, NV	(702) 870-4138	Cape Town, S.AFRICA	2145-1047
Pacheco, CA	(415) 689-2260	Mary Esther, FL	(904) 243-5793	Jericho, NY	(516) 333-2266	Tahiti, F.P.	2-54-47
Placerville, CA	(916) 622-4640	Tampa, FL	(813) 247-6023	New Rochelle, NY	(914) 235-4444	Taichung, TAIWAN	4228-5523
Port Huememe, CA	(805) 985-2329	Norcross, GA	(404) 449-8982	Syracuse, NY	(315) 487-5000	Bang Kok, THAILAND	314-1161



MICROCOMPUTER TECHNOLOGY INC.
3304 W. MACARTHUR, SANTA ANA, CA 92704
(714) 979-9923 • TWX 910-595-1902 MTISNA

Call or write for free brochure.
U.S. PRICES F.O.B. SANTA ANA
CALIFORNIA AND MAY VARY BY AREA.
CP/M is a registered trademark of Digital Research, Inc.

mode and re-issue the display command to see the data in the required format.

• A monitor should never contain a disassembler. It wastes space and should be a separate program.

DISPLAY

The Display command can display both memory and CPU registers. Memory display will show sixteen data bytes starting at the nearest zero address specified. For example, the command D 4032 would start at

location 4030. The display consists of the address followed by four groups of four hexadecimal data bytes and by the same sixteen data bytes in ASCII, whenever possible. A period signals unprintable characters. Round down to the last zero address and calculate the address on the screen, since each group of four hex bytes starts on address zero, four, eight, or twelve (hex C). If you prefer the display to start at the actual address entered, and avoid the round down process, store NOP instructions

In memory locations 7205 and 7206. This eliminates the AND 0F0H instruction, keeping the address as entered from the keyboard. More than one byte should be displayed since you will probably want to see the next byte. An extension to the display of memory will show fifteen lines of memory data on the screen. This will scroll when you hit Enter, or terminate when you press the Break key. To use this display append the address with a decimal point (e.g. D 403F.). For an example of this

display see both the CP80 and IBM sample sessions.

The register display reduces several areas. As with the IBM display command, subsets of the registers can be displayed. Infrequently you may want to see all registers. If you have only one command and it displays every register in the system, you get a screen-full of numbers. (A case of not seeing the trees for the forest.) I have broken the registers down into a set called the general purpose registers. They consist of A, B, C, D, E, H, and L. I deleted the alternate set of registers since you do not manipulate them anyway. Several other options allow the display of the remaining registers. D P will show you the PC, and D S will display the stack pointer. D IX or D IY will show the index registers (the I is optional). These are like the IBM D P, D Y, D X register display instructions. If you insist on all of the registers, simultaneously use a D R command. This command also will display the alternate registers.

STORE

Store is like the Display command. With it you can store hex values directly into memory for a length of 255 bytes and none of the bytes are stored until you press Enter. Before that, if the memory location is invalid, or for any other reason, you Break and terminate the entire store into memory. No other monitor allows this. It stores ASCII values directly into memory in the same way by preceding the memory address with a T translating the command before storing. Basic ROM defines the buffer that stores the 255 bytes. Calling location 40H activates this buffer. The routine will recognize control functions such as backspace. The C register will be set if Break terminates the line. Location 40A7H contains the address used by Level II Basic for its input buffer. Disk-basing changes the contents of this location. You can store directly into the general registers by specifying Gx where x is the general register. An example of this is S GB 4F. This will store

```
* LETS DISPLAY OUR GENERAL REGISTER SET
D G
GPR 0 = 00001218 003C2D30 000007A0 00000003
GPR 4 = 00000848 C4404040 00000040 00003EB0
GPR 8 = 000007A0 00000848 003C2A48 00000000
GPR 12 = 003C2A48 FFFFFFFD 403C2BBA 00000000
* LETS DISPLAY AN AREA OF MEMORY
D T02A0.
0002A0 C4404040 40404040 C4404040 40404040 *D D *
0002B0 D5C5E340 40404040 D5C5E340 40404040 *NET NET *
0002C0 40404040 40404040 C1C3C3C5 E2E24040 * ACCESS *
0002D0 F0F261F1 F661F8F1 9186E34B 2D400000 *02/16/81jft.. *
0002E0 00000000 00000000 00000000 00000000 *.....*
0002F0 TO 000300 SUPPRESSED LINE(S) SAME AS ABOVE .....
000300 C3D4E2D3 C9C24040 C3F3F7F0 40404040 *CMSLIB C370 *
000310 FFFFFFFF FFFFFFFF FFFFFFFF FFFFFFFF *.....*
000320 TO 000340 SUPPRESSED LINE(S) SAME AS ABOVE .....
000340 FFFFFFFF FFFFFFFF 0000510C 00000600 *.....*
000350 0000570C 00000000 D7D3C9D3 C9C24040 *.....PLILIB *
000360 D7D3C9E4 D6E64040 C3D4E2D3 C9C24040 *PLIUOW CMSLIB *
000370 E6C1E3D3 C9C24040 C3F3F7F0 40404040 *WATLIB C370 *
000380 D7D3C9D6 D7D3C9C2 FFFFFFFF FFFFFFFF *PLIOPLIB.....*
000390 FFFFFFFF FFFFFFFF FFFFFFFF FFFFFFFF *.....*
0003A0 00000180 000000C0 00000000 00000000 *.....*
0003B0 00000160 000003BC FFFFFFFF 40404040 *.....*
0003C0 40404040 40404040 40404040 40404040 *.....*
0003D0 TO 000440 SUPPRESSED LINE(S) SAME AS ABOVE .....
000440 00000000 00000ACA 003EB23E 07FE0000 *.....*
000450 00000000 00000000 00000000 00000000 *.....*
* NOTICE THAT THE T FOR TRANSLATION IS REQUIRED FOR IBM DISPLAY.
* THIS IS THE DEFAULT WITH CP80.
* LETS LOOK AT THE MEMORY LOCATION BEFORE THE ADSTOP IS SET
D T20000
020000 47F0F00C D7E2E6C4 40404040 58F0F030 E0 *.00.PSWD .00.*
* NOW LETS SET AN ADSTOP
ADSTOP 20000
* LETS DISPLAY THE ADDRESS NOW
D T20000
020000 0AB3F00C D7E2E6C4 40404040 58F0F030 E0 *..0.PSWD .00.*
* LETS CONTINUE THE PROGRAM AND ENCOUNTER THE ADSTOP
BEGIN
ADSTOP AT 020000
* NOW LETS SEE HOW STORE INTO MEMORY WORKS
d t20000
020000 00000000 00000000 00000000 00000000 E0 *.....*
* LETS STORE A VALUE AT THIS ADDRESS
STORE 20000 11223344
STORE COMPLETE
D T20000
020000 11223344 00000000 00000000 00000000 E0 *.....*
* NOW LETS STORE WITH TRANSLATION ON.
STORE T20000 TEST
STORE COMPLETE
D T20000
020000 E3C5E2E3 00000000 00000000 00000000 E0 *TEST.....*
```

Table 3. IBM CP Terminal Session

Sams unlocks the secrets of your TRS-80® microcomputer with eight great books that show you how to process data, enhance your programming skills and control and receive information from a number of external devices.

INTERMEDIATE PROGRAMMING FOR THE TRS-80® (MODEL I), No. 21809, \$9.95, leads you smoothly from standard BASIC to machine- and assembly-language programming.

TRS-80® ASSEMBLY LANGUAGE MADE SIMPLE, No. 21851, \$12.95, shows you how to effectively utilize the existing Level II BASIC ROM assembly language subroutines.

TRS-80® MORE THAN BASIC, No. 21813, \$10.95, takes you beyond higher-language programming to the efficient and powerful realm of assembly-language programming, where you can use the Z-80 instruction code to perform functions not practical or possible under BASIC.

MOSTLY BASIC: APPLICATIONS FOR YOUR TRS-80®, BOOK 1 (No. 21788, \$12.95) and BOOK 2 (No. 21865, \$12.95) together contain more than 50 BASIC programs for use in your home or office. These programs can help you save money on investments, entertain, and educate yourself and your family.

The heart of your TRS-80® microcomputer is its Z-80 microprocessor. With THE Z-80 MICROCOMPUTER HANDBOOK, No. 21500, \$11.95, from Sams, you will learn about the internal architecture and numerous interfacing signals of this popular device.

With TRS-80® INTERFACING BOOK 1 (No. 21633, \$10.95) and BOOK 2 (No. 21739, \$11.95) you will learn to use your microcomputer's internal signals to control and monitor external circuitry via BASIC-language programs.

Once you understand how your TRS-80® operates, your applications are limited only by your own imagination. Sams holds the key to freeing your creativity.

To order these Sams Books or to get the name of your local Sams retailer, call 800-428-3696 toll-free, or 317-298-5566 and reference AD161.

VISIT SAM'S AT NCC. BOOTH #8223.



SAMS BOOKS

Howard W. Sams & Co., Inc.
4300 West 62nd Street, P.O. Box 7092
Indianapolis, IN 46206

299

SAMS HOLDS THE KEY TO YOUR TRS-80®



Offer good in USA only and expires 7/31/82. Prices subject to change without notice.

4FH into the B register.

ADSTOP

IBM calls the interrupt breakpoint ADSTOP. ADSTOP pops you into the interrupt handler where a one-byte instruction is stored. The contents of that byte address are stored in CP80 until another ADSTOP is entered or until an ADSTOP clear is issued. When the system tries to execute the instruction (a hexadecimal F7H), a call is made to location 30H in ROM where a jump instruction is found which gets you to RAM address 400F. Normally this address contains a return instruction, but replacing it with the address of the ADSTOP handler gives you the RST facility. CP80 does this store for you at start up time.

BEGIN

This command loads the registers with the values stored when the last ADSTOP interrupt occurred, or with new values if registers were updated via the STORE command. It then jumps off to the address stored in the new program counter.

Some Frills

First are two Exchange commands. I am often frustrated when the alternate set of registers are unavailable to the program I am running. When an error in a subroutine call clobbers a register it would be nice to be able to switch register banks, set ADSTOP before exiting the routine, and continue with the program. With ADSTOP you can switch the register banks and carry on. The Z-80 instruction set allows this by supplying an EX and an EXX instruction. I provided an EX and an EXX command. The EX command swaps the AF register with the AF' register. The EXX command swaps the BC, DE, HI registers with the BC', DE', HL' bank.

To get a printout of my debugging session I had to modify CP80 to provide the examples. I left the extra instructions and control keys in. The modification allowed me to send what was displayed on the screen down the RS-232 line where an editor on the IBM system caught

it. Change port address and status bits to send the output to the standard Radio Shack RS-232 port or even to the printer port since I am using my own interface. The location of the port address is 7696 and the location of the status test is 768F. By changing the port address and status bits you can perform an I/O test on any port. A printout of a session is often handy when reviewing changes but you only need this occasionally. To provide an ON/OFF switch, I set the up and down arrows to start and end the printout. Another feature when using the printer is the comment ability. If a line of text starts with a *, the entire line will go to the printer port without any other action. You can read your debugging session as you go. Along with the special functions of up and down arrow keys I enabled the Break and Clear keys

throughout CP80. Any time Clear will clear the screen and Break will terminate your command line.

User Hooks

Several locations on CP80 contain NOP instructions which allows writing overlay programs to load only when CP80 will provide incomplete debugging assistance. Unless you plan to add overlays you can eliminate NOP instructions. I plan an extension program that will tie into CP80 called CPX80, a single-step feature, byte search, memory move, and several other features which are standard in some monitor programs. CPU80 will be a utility program linking into CP80. It will feature system tape read and write, copy ability, and other I/O functions. With CP80, CPX80 and CPU80 I can bypass most monitor programs. I need only load the parts I re-

quire thus saving on memory.

The first user hook occurs in the command table at location 707BH. Before falling through to the invalid command message, you can insert a call to your command handler. If the command entered is not found just return and the invalid message will be displayed.

The second user hook is in the display register command at location 73B4H where additional display information can be inserted such as a description of the flag bits, or a display of the DCBs.

The third user hook is in the keyboard input routine at location 7564H. It scans for flag settings for additional commands. ■

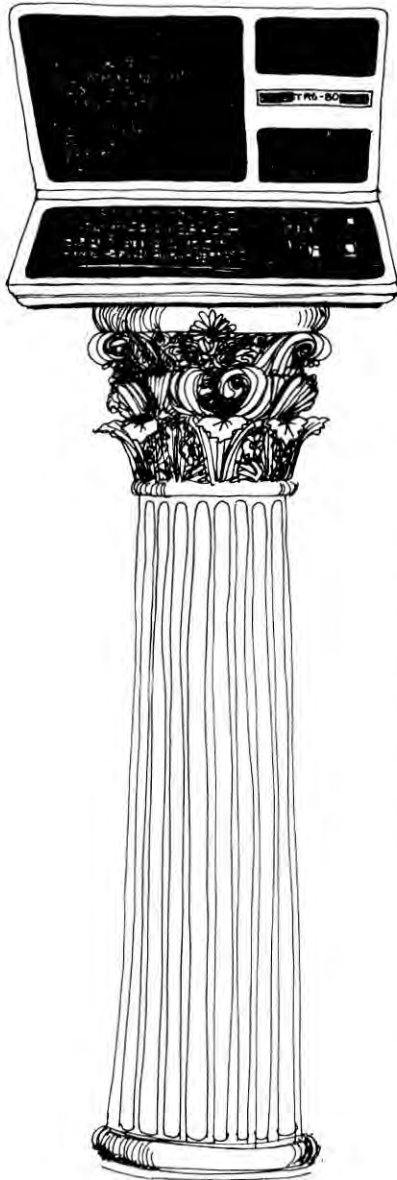
For more information, refer to the Command table (Table 1) and two sample sessions comparing IBM CP monitor commands and CP80 (see Tables 2 and 3).

Program Listing

```
01000
01010
0060 01020 DELAY EQU 0060H
0040 01030 GSTRNG EQU 40H
40A7 01040 BBUFF EQU 40A7H
400F 01050 DEBUG EQU 400FH
0000 01060 CR EQU 0DH
0000 01070 EOM EQU 00H
01C9 01080 CLEAR EQU 01C9H
002B 01090 KBD EQU 2BH ;KEYBOARD ROUTINE
0033 01100 RSDSP EQU 33H
00F0 01110 DATA EQU 0F0H
00F1 01120 CTRL EQU 0F1H
28A7 01130 MSGDSP EQU 28A7H
01140 ;*****
01150 ; INIT ROUTINE
01160 ;*****
01170 ORG 7000H
7000 315077 CP80: LD SP,STACK
7003 21B076 LD HL,LOGO
7006 CDA728 CALL MSGDSP
7009 3EC3 LD A,0C3H ;LOAD A JUMP
700B 320F40 LD (DEBUG),A ;LOAD THE JUMP
700E 218B74 LD HL,ADINT
7011 221040 LD (DEBUG+1),HL
7014 CD9770 CALL OURKBD
7017 CDC901 CALL CLEAR
01270 ;*****
01280 ; COMMAND HANDLER ;
01290 ;*****
01300 CMDHND EQU $
01310 XOR A ;CLEAR A REG
01320 LD (CMDFLG),A ;RESET FLAGS
01330 CALL OURKBD ;SCAN FOR COMMAND
01340 CP 1FH ;IS IT A CLEAR
01350 JR NZ,NOTCL ;NO
01360 CALL CLEAR ;JUST CLEAR SCREEN
01370 JR CMDHND ;CONTINUE
01380 EQU $
01390 CP 0DH ;IT IT CR
01400 JR NZ,NOCR ;NO - BYPASS
01410 CP80M EQU $
01420 CALL OURMSG
01430 DEFB 0EH ;INSURE CURSOR ON
01440 DEFM 'CP80 '
01450 ; AN EXTRA BLANK FOR CPX80 AND CPU80 ZAP
01460 DEFB CR
01470 DEFB EOM
01480 JR CMDHND ;RETURN
01490 ;
01500 NOCR EQU $
01510 CP 20H ;IS IT A BLANK?
01520 JR Z,CMDHND ;YES RETURN
```

Program continues

FORUM-80



Introducing **FORUM-80™**, the hottest new communications product from **SBSG COMMUNICATIONS**. With **FORUM-80™** you and your **TRS-80™** Model I or III can become part of one of the fastest growing communications networks in the country. With **FORUM-80™**, your computer becomes an on-line bulletin board system. Local users can leave messages, get messages, swap information, and get more out of their personal computers.

Written by noted author **Bill Abney**, **FORUM-80™** will expand your computing horizons. Besides the bulletin board features, as a **FORUM** operator, you can get your message across to all callers through the unique 'System Bulletin' feature. In the local option mode, there is even space for your own newsletter.

SBSG COMMUNICATIONS offers many other superior communications products – like our **ST80-III™** terminal software. With **ST80-III™**, your **TRS-80** becomes your link to communicating with mainframe computers including **IBM**, **HEWLETT PACKARD**, and **PRIME**. Or, you can use it to call the **SOURCE** or **MICRONET**. Of course, you can use **ST80-III™** to access the **FORUM-80™** network.

Using our new **TELSET-80™** system, **SBSG COMMUNICATIONS** offers remote typesetting capabilities to **TRS-80™** users. Your **Scpsit** files can now be typeset--without requiring you or your staff to leave your office and make a trip to the printer. Plus, you will achieve cost reductions since your printer will not have to rekey all of the text.

All in all, **SBSG COMMUNICATIONS** is making it easy for **TRS-80™** users to 'talk' the same language. For more information, please call us at (617) 692-3800. We have some good ideas to share with you.

Available for the **TRS-80™** models I and III, requires 3 drives on the model I; 2 drive on the model III. Minimum 48K, **RS232** interface, and auto answer modem are also required. **FORUM-80™** is \$350.00 and comes with complete documentation. **Corvus** hard disk versions also available.

Convince yourself this is a good idea – if your **TRS-80™** has communications capability feel free to call any of the **FORUM-80™** systems listed below. We think you will agree.

TELSET-80 is a trade mark of **SBSG**
TRS-80 is a trade mark of **Tandy Corp.**
FORUM-80 is a trade mark of **Bill Abney**

Westford, MA (617) 692-3973 • Albany, NY (518) 355-1826 • Augusta, GA (803) 279-5392 • Boston, MA (617) 431-1699 • Charleston, SC (803) 552-1612 • Cleveland, OH (216) 486-4176 • Denver, CO (SYS 1) (303) 341-0636 • Denver, CO (SYS 2) (303) 399-8858 • Fairfax, VA (703) 978-7561 • FT Lauderdale, FL (305) 772-4444 • Hull, England 011-44-482-859169 • Kansas City, MO (H.Q. SYS) (816) 861-7040 • Kansas City, MO (816) 931-9316 • Las Vegas, NV (702) 362-3609 • Leavenworth, KS (913) 651-3744 • Medford, OR (503) 779-6800 • Monmouth County, NJ (210) 528-6623 • Montgomery, AL (205) 272-5069 • MT Clemens, MI (313) 465-9531 • Nashua, NH (603) 882-5041 • Orange County, CA (714) 952-2110 • Pontiac, MI (313) 335-8456 • Prince Wm Cty, VA (703) 670-5881 • Seattle, WA (206) 723-3282 • Shreveport, LA (318) 631-7107 • Tampa, FL (813) • Tulsa, OK (918) 747-1310 • Union, NJ (201) 688-7117 • Wichita, KS (316) 682-2113 • Wichita Falls, TX (817) 855-3916

SMALL BUSINESS SYSTEMS GROUP • 6 CARLISLE ROAD • WESTFORD, MA 01886 • (617) 692-3800

✓512

NEW PROGRAMS FOR THE TRS-80 INCOPROP

Income Property Analysis for the TRS-80

INCOPROP: Based upon standardized methods of property analysis used throughout the real estate industry. Generates a 3 page report containing an annual property operating statement and a comprehensive 10 year cash flow analysis. Contains I.R.S. tax table to project after tax income stream and investor's I.R.R.

- Handles 5 different methods of tax depreciation
- Handles up to 3 loans & 3 different type loans
- Highly interactive format permits: Sensitivity Analysis
- Disk files created for permanent storage of data

Minimum system requirements: 32k RAM, 1 drive and printer. Sold with informative 78 page user's manual covering basic aspects of income property investment & 50 data worksheets.

Model I & III	on cassette for easy transfer to disk	\$120.00
Model II	on 8 inch diskette	\$145.00
Model II	Version available in MBASIC running under CP/M	\$165.00

New!

MAINDEX: An easy-to-use program to aid you in the indexing of your files on disk. Can't find that program you wrote last month? Put your computer to work! Find any program or data file in your system in seconds.

- A Main Index of all your other disk's directories
- Alphabetizes list of files and gives you names, dates, sizes, dates written, tracks and file descriptions
- Sorts Files by name, disk, and categories
- File descriptions can be searched for key words
- Prints disk labels with disk name and file names
- Uses all the advanced and extremely fast file manipulation capabilities of Apparat, Inc.'s NEWDOS/80 Hercules Level II disk, 1 disk drive and NEWDOS/80 on cassette for easy transfer to disk. \$20.95



DEPT EM, PO BOX 591, NOVATO, CA 94947

TRS-80 Model III/I

WOBOS I

Basic Operating System

Who needs it? Everyone who writes or uses programs in BASIC. For Tape systems it's like having a DOS without the hardware! For Disk systems it provides the structure that DOS doesn't! When you CLoad this magnificent System you get over 30 powerful programs, routines and subroutines at your direct command or from a 9 choice Menu that can vary easily be down and customized to your needs. Designed to be used as 'stock' for ALL BASIC programs.

PROGRAM	MENU	UTILITIES
1	Your Program A	11 - Data List
2	B	22 - Sort
3	C	33 - Renumber
4	D	44 - Append
5	E	55 - Memory Dump
6	Graphics Synthesis	66 - Map
7	Special characters 0-31	77 - Size
8	91-127	88 - New Data Entry
9	192-255	99 - Device I/O

- It will add multifrequency SOUND to your TRS-80
- It will standardize your writing and save you many hours of debugging and rewriting utility functions.
- It will help you structure YOUR OWN programs.

"Once you've used it, you'll never write another program without it!"

Model I		Model III	
LEVEL II	DISK	MODEL III	DISK
CC1022A	CD1032A	CC1021B	CD1031A

ON QUALITY CASSETTE & MANUAL

ORDER PHONE (503) 649-4526 ONLY \$35

SEND CHECK, MONEY ORDER OR NUMBER AND EXPIRATION DATE OF YOUR CREDIT CARD TO:

W O B O S I

6640 SW 173 AVENUE, BEAVERTON, OREGON 97007

Dedicated to Excellence since 1978

TRS-80 is a TM of TANDY CORP.

Program continued

```

703F FE0A 01530 CP 0AH ;DOWN ARROW?
7041 2006 01540 JR NZ,NOTD ;NO
7043 AF 01550 XOR A ;CLEAR FOR NOP
7044 328876 01560 LD (POUT),A ;STORE IT
7047 18D1 01570 JR CMDHND
01580 ;
7049 01590 NOTD EQU $
70AC 02200 WCR EQU $
70AC CD9770 02210 CALL OURKBD
70AF FE20 02220 CP 20H ;BLANK?
70B1 28F9 02230 JR Z,WCR ;YES RETRY
70B3 FE0D 02240 CP 0DH ;IS IT CR
70B5 20F2 02250 JR NZ,NOTBL ;NOPE
70B7 C9 02260 RET
02270 ;
-02280 ;*****
02290 ; HERE TO SWAP REGISTER WHEN USER ISSUES
02300 ; EX (SWAP AF WITH AF')
02310 ; EXX (SWAP BC DE HL WITH BC' DE' HL')
02320 ;*****
70B8 02330 ECMD EQU $
70B8 CD9770 02340 CALL OURKBD
70BB FE58 02350 CP 58H ;IS IT X?
70BD 20BF 02360 JR NZ,ICMD ;NO ERROR
70BF CD9770 02370 CALL OURKBD
70C2 FE0D 02380 CP 0DH ;IS IT EX CMD?
70C4 2015 02390 JR NZ,NOTEX ;NO CHECK EXX
70C6 2AFA76 02400 LD HL,(AFSV)
70C9 221277 02410 LD (TEMPR),HL
70CC 2A0277 02420 LD HL,(AFPSV)
70CF 22FA76 02430 LD (AFSV),HL
70D2 2A1277 02440 LD HL,(TEMPR)
70D5 220277 02450 LD (AFPSV),HL
70D8 C31A70 02460 JP CMDHND
70DB 02470 NOTEX EQU $
70DB FE58 02480 CP 58H ;IS IT X?
70DD C2E770 02490 JR NZ,ICMD
70E0 CD9770 02500 CALL OURKBD
70E3 FE0D 02510 CP 0DH
70E5 C2E770 02520 JP NZ,ICMD
70E8 21FC76 02530 LD HL,BCSV
70EB 111277 02540 LD DE,TEMPR
70EE 010600 02550 LD BC,6
70F1 EDB0 02560 LDIR
70F3 210477 02570 LD HL,BCPSV
70F6 11FC76 02580 LD DE,BCSV
70F9 010600 02590 LD BC,6
70FC EDB0 02600 LDIR
70FE 211277 02610 LD HL,TEMPR
7101 110477 02620 LD DE,BCPSV
7104 010600 02630 LD BC,6
7107 EDB0 02640 LDIR
7109 C31A70 02650 JP CMDHND
02660 ;
02670 ;*****
02680 ;ENTER HERE AFTER STORE IS VALIDATED
02690 ;1.WAIT FOR A BLANK
02700 ;2.GET ADDRESS TO STORE DATA
02710 ;3.WAIT FOR A BLANK
02720 ;4.KEEP RECEIVING BYTES AND STORE UNTIL CR
02730 ;5.REPLY - STORE COMPLETE
02740 ;
02750 ;*****
710C 02760 STCMD EQU $
710C 21F976 02770 LD HL,TRNPLG
710F CB8E 02780 RES TRANS,(HL) ;TURN TRANSLATE OFF
7111 21F876 02790 LD HL,CMDPLG
7114 CBD6 02800 SET STORE,(HL) ;SET FLAG BIT
7116 CDA170 02810 CALL WBLK ;GET A BLANK
7119 02820 STTM EQU $
7119 CD3C75 02830 CALL GETADD ;GET AN ADDRESS
711C CDA170 02840 CALL WBLK ;GET ANOTHER BLANK
711F 02850 STMEM EQU $
711F E5 02860 PUSH HL ;SAVE DEST ADDR
7120 2AA740 02870 LD HL,(BBUFF) ;GET BUFFER ADDRESS
7123 06FF 02880 LD B,255 ;SHOW LENGTH
7125 CD4000 02890 CALL GSTRNG ;GET OUR STRING
7128 DA5476 02900 JP C,CJMP ;BREAK - TERMINATE
712B 21F976 02910 LD HL,TRNPLG ;GET FLAG
712E CB4E 02920 BIT TRANS,(HL) ;IS TRANS ON?
7130 203A 02930 JR NZ,NOTTR ;NO BYPASS
7132 2AA740 02940 LD HL,(BBUFF) ;POINT TO SOURCE
7135 FDE1 02950 POP IY ;POINT TO DESTINATION
7137 02960 TRANM EQU $
7137 CD5071 02970 CALL TRANA
713A 23 02980 INC HL ;POINT TO NEXT BYTE
713B CB27 02990 SLA A
713D CB27 03000 SLA A
713F CB27 03010 SLA A
7141 CB27 03020 SLA A
7143 47 03030 LD B,A
7144 CD5071 03040 CALL TRANA
7147 80 03050 ADD A,B
7148 FD7700 03060 LD (IY+0),A ;STORE IT
714B FD23 03070 INC IY
714D 23 03080 INC HL
714E 18E7 03090 JR TRANM
03100 ;
7150 03110 TRANA EQU $
7150 7E 03120 LD A,(HL) ;GET A CHAR
7151 FE0D 03130 CP 0DH ;END?
7153 2003 03140 JR NZ,TRANC ;NO - CONTINUE

```

Program continues

Program continued

```

7155 F1      03150      POP AF          ;KILL STACK ENTRY
7156 181D    03160      JR STCMM       ;LINK UP
7158          03170      EQU $
7158 D630    03180      SUB 30H        ;REMOVE SPECIAL CODES
715A FA6871  03190      JP M,TRANIV   ;INVALID
715D FE0A    03200      CP 0AH        ;0-9?
715F F8      03210      RET M         ;YES
7160 D607    03220      SUB 7         ;FLIP BIT
7162 FA6871  03230      JP M,TRANIV   ;ERROR
7165 FE10    03240      CP 10H        ;A-F?
7167 F8      03250      RET M         ;YES
7168          03260      EQU $
7168 D1      03270      POP DE        ;KILL STACK ENTRY
7169 C35476  03280      JP CJMP
              03290      ;
716C          03300      NOTTR EQU $
716C 48      03310      LD C,B
716D AF      03320      XOR A         ;CLEAR A REG
716E 47      03330      LD B,A
716F D1      03340      POP DE        ;RESTORE DEST
7170 2AA740  03350      LD HL,(BBUFF) ;SOURCE AGAIN
7173 EDB0    03360      LDIR         ;MOVE IT
7175          03370      STCMM EQU $
7175 CD7B76  03380      CALL OURMSG
7178 0D      03390      DEFB CR
7179 53      03400      DEFB 'STORE COMPLETE'
7187 0D      03410      DEFB CR
7188 00      03420      DEFB EOM
7189 C31A70  03430      JP CMDHND
              03440      ;
              03450      ;*****
              03460      ;ENTER HERE IF AN I WAS ENCOUNTERED
              03470      ;FROM HERE WE DETERMINE IF IT
              03480      ;IS AN X OR Y
              03490      ;*****
718C          03500      STIND EQU $
718C CD9770  03510      CALL OURKBD
718F FE59    03520      CP 59H        ;IS IT A Y
7191 2814    03530      JR Z,STY     ;YES
7193 FE58    03540      CP 58H        ;IS IT AN X
7195 C2A970  03550      JP NZ,NOTBL  ;NO - ERROR
7198          03560      STX EQU $
7198 CDA170  03570      CALL WBLK
719B CD3C75  03580      CALL GETADD  ;GET NEW IX
719E CDAC70  03590      CALL WCR     ;WAIT FOR A CR
71A1 220A77  03600      LD (IXSV),HL ;STORE NEW IX
71A4 C31A70  03610      JP CMDHND   ;RETURN
              03620      ;
71A7          03630      STY EQU $
71A7 CDA170  03640      CALL WBLK
71AA CD3C75  03650      CALL GETADD  ;GET NEW IY
71AD CDAC70  03660      CALL WCR     ;WAIT FOR A CR
71B0 220C77  03670      LD (IYSV),HL ;STORE NEW IY
71B3 C31A70  03680      JP CMDHND   ;RETURN
              03690      ;
              03700      ;*****
              03710      ;ENTER AFTER A STORE
              03720      ;A B C D E H L
              03730      ;THE HL IS POINTING TO
              03740      ;CORRECT AREA TO STORE INTO
              03750      ;*****
71B6          03760      STG EQU $
71B6 CDA170  03770      CALL WBLK   ;WAIT FOR A BLANK
71B9 CD4575  03780      CALL GETNUM ;GET THE VALUE
71BC 77      03790      LD (HL),A   ;STORE IT
71BD CDAC70  03800      CALL WCR    ;WAIT FOR A CR
71C0 C31A70  03810      JP CMDHND   ;RETURN
              03820      ;*****
              03830      ;ENTER HERE FROM THE GETADD
              03840      ;CODE FOR STORE
              03850      ;FIRST BYTE OF ADDR WAS THE
              03860      ;CHAR P TELLING US TO STORE
              03870      ;A NEW PC
              03880      ;*****
71C3          03890      STOREP EQU $
71C3 CD9770  03900      CALL OURKBD ;GET A CHAR
71C6 FE20    03910      CP 20H      ;BLANK?
71C8 2808    03920      JR Z,DOPC   ;YES
71CA FE43    03930      CP 43H      ;IS IT C?
71CC C2A970  03940      JP NZ,NOTBL ;NO - ERROR
71CF CDA170  03950      CALL WBLK   ;WAIT FOR BLANK
71D2          03960      DOPC EQU $
71D2 CD3C75  03970      CALL GETADD ;GET THE NEW PC
71D5 CDAC70  03980      CALL WCR    ;WAIT FOR A CR
71D8 221077  03990      LD (PCSV),HL ;STORE IT
71DB C31A70  04000      JP CMDHND   ;AND RETURN
              04010      ;*****
              04020      ;FIRST BYTE WAS A S
              04030      ;SO WE SHOULD STORE NEW SP
              04040      ;*****
71DE          04050      WST3 EQU $
71DE CD9770  04060      CALL OURKBD ;GET A CHAR
71E1 FE20    04070      CP 20H      ;BLANK?
71E3 2808    04080      JR Z,SPNOB  ;YES
71E5 FE50    04090      CP 50H      ;UPPER CASE P?
71E7 C2A970  04100      JP NZ,NOTBL ;NO INVALID FORMAT
71EA CDA170  04110      CALL WBLK   ;WAIT FOR A BLANK
71ED          04120      SPNOB EQU $
71ED CD3C75  04130      CALL GETADD ;GET NEW SP
71F0 CDAC70  04140      CALL WCR    ;WAIT FOR A CR
71F3 220E77  04150      LD (SPSV),HL ;SAVE IT
71F6 C31A70  04160      JP CMDHND   ;RETURN
              04170      ;

```

Program continues

more . . .

SPECTACULAR OFFERS



BASF



WABASH



MAXELL



OPUS

We stock the complete line of BASF diskettes, reel-to-reel tapes, mag cards, disk packs and cartridges. We also carry MAXELL, OPUS and WABASH products. All are 100% certified and fully guaranteed.

Box of 10 diskettes:	5 1/4"	8"
OPUS ss/sd	\$20	\$21
BASF ss/sd	23	24
WABASH ss/sd	23	24
MAXELL	TOO LOW TO QUOTE	CALL

5 1/4" - 10 sector-now available
Sectoring must be specified.

5 1/4" or 8" Vinyl Storage Pages 10/\$5

LIBRARY CASES

8" Kas-sette/10 \$2.99
5 1/4" Mini Kas-sette/10 . . . \$2.49



HARDHOLE DISK PROTECTORS
Reinforcing rings of tough mylar protect disk hole edge from damage.

Applicators	5 1/4"	8"
Hardhole Rings (50)	\$3	\$4
	\$6	\$8

DISK DRIVE HEAD CLEANING KITS

Prevent head crashes and ensure error-free operation.
5 1/4" or 8" \$19.50



SFD C-10 CASSETTES 10/\$7
(All cassettes include box and labels.)



Get 8 cassettes, C-10 Sonic, and Cassette/8 Library-Album, as illustrated, for only \$8

SNAP-IT POWER CENTER

Turns 1 outlet into 6. Wall mount or portable. Circuit breaker, lighted switch and UL approved.
4"x3"x2" \$19.95



We also offer printer ribbons, printwheels, type elements, equipment covers, power consoles, paper supplies, storage and filing equipment, furniture and many other accessories for word and data processing systems. Write for our free catalog.

VISA • MASTERCARD • MONEY ORDERS • CERTIFIED CHECK • FOR PERSONAL CHECKS ALLOW TWO WEEKS • C.O.D. REQUIRES A 10% DEPOSIT • CAL. RES. ADD 6% SALES TAX • MIN \$2 SHIPPING & HANDLING • MINIMUM ORDER \$10 • SATISFACTION GUARANTEED OR FULL REFUND

286

ABM PRODUCTS

8868 CLAIREMONT MESA BLVD.
SAN DIEGO, CALIFORNIA 92123

Toll Free 800-854-1555 Order Only
For Information or California Orders
(714) 268-3537

CANADIANS

NOW IN STOCK

**ACORN SOFTWARE
BIG FIVE
INSTANT SOFTWARE
CREATIVE COMPUTING
ADVENTURE
INTERNATIONAL
APPARAT INC.
EPSON PRINTERS
MANY MORE**

MOD I • MOD III • COLOR

Excellent 5 1/4" Diskettes
S. Den. or D. Den.
Fully Guaranteed

Lower Case Mod - Mod I
One IC \$29.95

IBM Selectric Printer
Conversion Kit \$825.00

VISA

Phone or Write for Info.
(403) 423-3919

CMD MICRO ✓181
10546 - 106 Street
Edmonton, Alberta
T5H 2X6

Program continued

```

04180 ;*****
04190 ; ENTER HERE WHEN DISPLAY HAS BEEN
04200 ;VALIDATED. IT IS NOW OUR JOB TO
04210 ;FIN OUT WHAT KIND OF DISPLAY IS
04220 ;REQUIRED.
04230 ;*****
04240 DICMD EQU $
04250 CALL WBLK ;WAIT FOR A BLANK
04260 LD HL,CMDPLG
04270 SET DISPLY,(HL) ;SET FLAG BIT
04280 CALL GETADD
04290 LD A,L ;GET LOW BYTE
04300 AND 0F0H ;ROUND OFF
04310 LD L,A ;SAVE IT BACK
04320 CALL OURKBD ;GET A CHAR
04330 CP CR
04340 JR NZ,CKDOT ;NOT CR
04350 LD IY,CMDPLG ;LOAD FLAGS
04360 RES DOT,(IY+0) ;TURN DOT OFF
04370 JR PREN ;LINK UP
04380 CKDOT EQU $
04390 CP 2EH ;IS IT A DOT
04400 JP NZ,ICMD ;NO - ERROR
04410 CALL WCR ;WAIT FOR CR
04420 LD IY,CMDPLG ;LOAD FLAGS
04430 SET DOT,(IY+0) ;TURN DOT ON
04440 PREN EQU $
04450 NULN EQU $
04460 CALL KBD ;SCAN KEYS
04470 OR A ;ANYTHING?
04480 JR Z,KDSP ;NO
04490 CP 1 ;BREAK?
04500 JR NZ,KDSP ;YES - END
04510 JP CMDHND ;RETURN
04520 KDSP EQU $
04530 XOR A ;CLEAR A REG
04540 LD (CNT),A ;CLEAR COUNT
04550 LD (BLKN),A ;CLEAR BLOCK NUMBER
04560 PUSH HL ;SAVE START ADDR
04570 CALL DSPADD ;DISPLAY THE ADDRESS
04580 CALL DSPC ;FIRE IT OFF
04590 DDMP EQU $
04600 LD A,(HL) ;GET CHAR
04610 CALL DSPCAR ;SHOW IT IN HEX
04620 INC HL ;POINT TO NEXT
04630 LD A,(CNT) ;GET COUNT
04640 INC A ;ADD 1
04650 LD (CNT),A ;STORE BACK
04660 CP 4 ;LIMIT?
04670 JR Z,BLNK ;YES
04680 JR DDMP
04690 ;
04700 BLNK EQU $
04710 LD A,20H ;LOAD A BLANK
04720 CALL DSP ;FIRE IT
04730 XOR A ;CLEAR REG
04740 LD (CNT),A ;CLEAR COUNT
04750 LD A,(BLKN) ;GET BLOK NUM
04760 INC A ;ADD 1
04770 LD (BLKN),A ;STORE BACK
04780 CP 4
04790 JR Z,ASCDP ;DONE PART 1
04800 JR DDMP ;CONTINUE
04810 ;
04820 ASCDP EQU $
04830 XOR A ;CLEAR A REG
04840 LD (CNT),A ;RESET COUNT
04850 LD (BLKN),A ;RESET BLOCK
04860 LD A,20H ;LOAD A BLANK
04870 CALL DSP ;FIRE IT OFF
04880 LD A,'*'
04890 CALL DSP
04900 POP HL ;GET BACK START ADDR
04910 MOREA EQU $
04920 LD A,(HL) ;GET A CHAR
04930 CP 20H ;IS IT BLANK?
04940 JR Z,CKEND ;YES - DISPLAY
04950 CP 30H ;LOW WATER?
04960 JP M,DODOT ;NO
04970 CP 5BH ;HIGH WATER MARK?
04980 JP P,DODOT ;NO
04990 JR CKEND ;SEE IF DONE
05000 DODOT EQU $
05010 LD A,'.' ;BEST JUST ..
05020 CKEND EQU $
05030 CALL DSP ;SHOW IT
05040 LD A,(CNT) ;GET COUNT
05050 INC A
05060 LD (CNT),A ;STORE IT BACK
05070 INC HL ;POINT TO NEXT
05080 CP 16 ;LIMIT?
05090 JR NZ,MOREA ;NO
05100 LD A,'*'
05110 CALL DSP ;SHOW IT
05120 LD A,CR
05130 CALL DSP
05140 LD IY,CMDPLG ;FIRE IT OFF
05150 BIT DOT,(IY+0) ;GET FLAG
05160 JP Z,CMDHND ;IS DOT ON?
05170 LD A,(SCNT) ;NO - DONE
05180 INC A ;GET SCREEN COUNT
05190 LD (SCNT),A ;ADD 1
05200 CP 15 ;SAVE IT BACK
05210 JP NZ,NULN ;LIMIT?
;NO - DO MORE

```

Program continues

TECO MONITORS

**RATED BEST BUY BY
THE COMPUTER SHOPPER**

NOW AN EVEN BETTER BUY

B & W MONITOR HIRES 119.95
GREEN PHOSPHOR HIRES 129.95
GREEN PHOSPHOR ULTRARES 144.95
TRS-80 CABLE 5.00
5 1/4" DISK DRIVES WITH PS & CASE 289.95

FROM

**THE MAINE SOFTWARE LIBRARY
P.O. BOX 197
STANDISH, ME 04084**

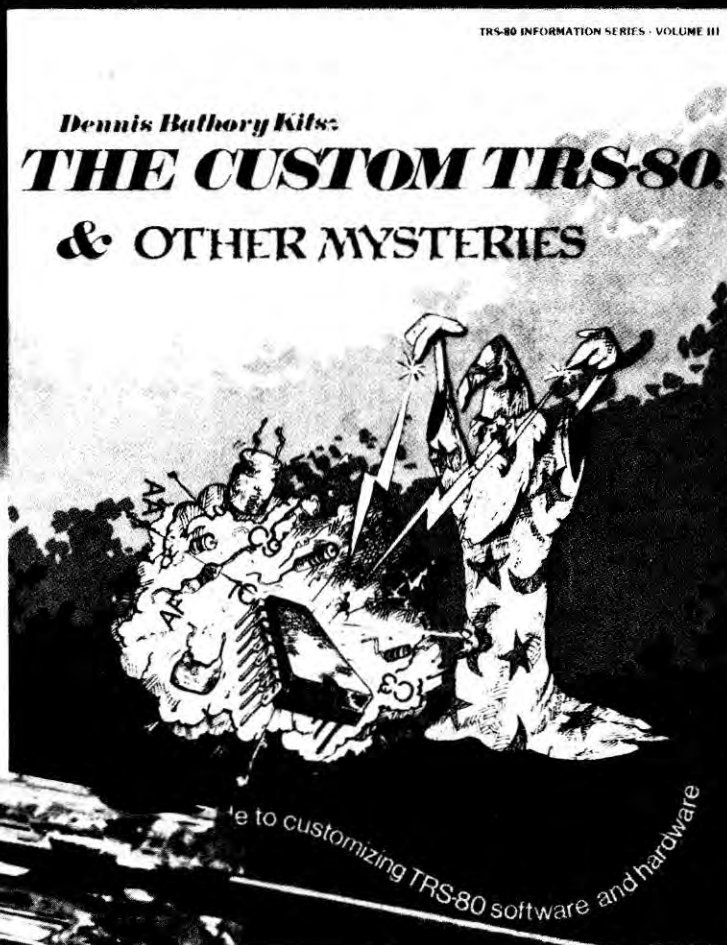
CHECK, MO, COD (20% DEPOSIT ON COD)
ADD \$10 SHIPPING FOR MONITOR \$6 FOR
DRIVES

LNW-80-OWNERS

WE HAVE SOME TERRIFIC IDEAS
AND PRODUCTS TO MAKE THIS
GREAT COMPUTER EVEN BET-
TER. WRITE TO US FOR PACK-
AGE BEFORE YOU BUILD.

✓ 196

TUNE-UP YOUR TRS-80



Ever wanted to do things to your TRS-80 that Radio Shack said couldn't be done?

How about upper/lower case, reverse video, high-resolution graphics, a high-speed clock, audible keystrokes, an extra keyboard, and a real-time clock?

Still not enough?

How about using an 8-track as a mass storage device, making music, controlling a synthesiser, monitoring your data bus, and individual reverse characters? All these hardware modifications, plus lots more, are in *The Custom TRS-80 and Other Mysteries* by Dennis Bathory Kitz - the latest book from IJG Computer Services.

If the thought of using a screwdriver gives you the shivers then you can turn to the software section. In this you learn



1260 West
Foothill Bl.
Upland, CA
91786 (714)
946-5805

ON SALE NOW!

how to make BASIC programs auto-execute, reset the memory size, patch into the interpreter, test memory with machine-language, pack program lines with machine code, and generate sound effects.

The Custom TRS-80 and Other Mysteries is more than 300 pages of practical information, and tested software, for \$29.95. Order your copy now, and start turning your TRS-80 into a five-hundred-dollar supercomputer! Pick one up at your local IJG dealer and B. Dalton bookstores.

TRS-80 is a Trade Mark of the Tandy Corporation



TEACH YOUR CHILDREN

ALPHA—Our best seller. Enhanced with larger letters and three exercises. Alphabet recognition for pre-schoolers.

ALPHA II—More alphabet exercises. Find the duplicate letters; letters before and after; put in alphabetical order.

SIGMA—Addition problems for grades 1-3.

SIGMA-EX—Addition problems for the younger or slower learner.

SIGMA-82—Addition, subtraction, multiplication and division. Nine speed levels. Time left and total time constantly displayed.

SPE-L—Spelling practice for grades 2-4.

Learning to Count Money—A THREE PROGRAM SYSTEM THAT TEACHES THE IMPORTANT SKILL OF COUNTING MONEY. SUPERIOR GRAPHICS. (SOLD BY THE SET ONLY.)

Available on cassette only for TRS-80 Models I and III \$6.95 each, two for \$12.00, four for \$21.00 Learning to Count Money—\$19.95

Add \$1.00 to total order for first class shipment.



✓188
Mercer Systems Inc.
87 Scooter Lane
Hicksville, N.Y. 11801

TRS-80*

SAVE A BUNDLE

When you buy your TRS-80™ equipment! Use our toll free number to check our price before you buy a TRS-80™ . . . anywhere!

TRS-80 is a trademark of the Radio Shack Division of Tandy Corporation.

Don't delay . . . CALL TODAY



SALES COMPANY

704 West Michigan

P.O. BOX 8098 PENSACOLA FL 32505

904/438-6507

nationwide 1-800-874-1551

Program continued

```

72C1 AF 05220 XOR A ;CLEAR A REG
72C2 321C77 05230 LD (SCNT),A ;CLEAR THE COUNT
72C5 CD9770 05240 CALL OURKBD ;GET A CHAR
72C8 FE01 05250 CP 1 ;IS IT BREAK?
72CA CA2E70 05260 JP Z,CP80M ;YES - DONE
72CD FE0D 05270 CP 0DH ;JUST RETURN?
72CF C27E70 05280 JP NZ,ICMD ;NO - ERROR
72D2 C32972 05290 JP NULN
;
72D5 05310 ;
72D5 E5 05320 DSPADD EQU $
72D6 7C 05330 PUSH HL ;GET ADDR
72D7 C5 05340 LD A,H ;LOAD FIRST BYTE
72D8 CDE272 05350 PUSH BC ;SAVE REGS
72DB 7D 05360 CALL DSPCAR ;SHOW CHAR
72DC CDE272 05370 LD A,L ;LOAD SECOND BYTE
72DF C1 05380 CALL DSPCAR ;SHOW IT
72E0 E1 05390 POP BC ;RESTORE REG
72E1 C9 05400 POP HL ;RESTORE ADDR
;
72E2 05420 ;
72E2 4F 05430 DSPCAR EQU $
72E3 CB3F 05440 LD C,A
72E5 CB3F 05450 SRL A
72E7 CB3F 05460 SRL A
72E9 CB3F 05470 SRL A
72EB CDF572 05480 CALL CKIT
72EE 79 05490 LD A,C
72EF E60F 05500 AND 0FH
72F1 CDF572 05510 CALL CKIT
72F4 C9 05520 RET
72F5 05530 CKIT EQU $
72F5 C630 05540 ADD A,30H
72F7 FE3A 05550 CP 3AH
72F9 FAFE72 05560 JP M,CK1
72FC C607 05570 ADD A,7
72FE 05580 CK1 EQU $
72FE CD8176 05590 CALL DSP
7301 C9 05600 RET
;
7302 05610 ;
7302 3E20 05620 DSPC EQU $
7304 CD8176 05630 LD A,20H
7307 CD8176 05640 CALL DSP
730A C9 05650 CALL DSP
05660 RET
05670 ;
05680 ;*****
05690 ;ENTER HERE TO DISPLAY ALL
05700 ;THE CPU REGISTERS. THIS
05710 ;HAS BEEN ADDED FOR ALL
05720 ;THE PEOPLE WHO DON'T WANT
05730 ;TO MISS OUT ON ANYTHING
05740 ;*****
730B 05750 DRS EQU $
730B CDAC70 05760 CALL WCR ;WAIT FOR CR
730E CD7B76 05770 CALL OURMSG
7311 20 05780 DEFM ' AF BC DE HL AF'
732E 27 05790 DEFB 27H
732F 20 05800 DEFM ' BC'
7334 27 05810 DEFB 27H
7335 20 05820 DEFM ' DE'
733A 27 05830 DEFB 27H
733B 20 05840 DEFM ' HL'
7340 27 05850 DEFB 27H
7341 0D 05860 DEFB CR
7342 00 05870 DEFB EOM
7343 21FA76 05880 LD HL,APSV ;POINT TO START
7346 AF 05890 XOR A ;CLEAR ...
7347 321B77 05900 LD (CNT),A ;OUR COUNTER
734A 05910 DOMOR EQU $
734A CDBA73 05920 CALL DDSP ;DO A DOUBLE DISPLAY
734D CD0273 05930 CALL DSPC ;DOUBLE SPACE
7350 3A1B77 05940 LD A,(CNT) ;GET COUNT
7353 3C 05950 INC A ;ADD 1
7354 321B77 05960 LD (CNT),A ;SAVE BACK
7357 FE04 05970 CP 4 ;DONE?
7359 20EF 05980 JR NZ,DOMOR ;NOT YET
735B CD0273 05990 CALL DSPC ;DOUBLE SPACE
735E AF 06000 XOR A ;RESET
735F 321B77 06010 LD (CNT),A ;..COUNTER
7362 06020 DOPRM EQU $
7362 CDBA73 06030 CALL DDSP ;DOUBLE DISPLAY
7365 CD0273 06040 CALL DSPC ;DOUBLE SPACE
7368 3A1B77 06050 LD A,(CNT)
736B 3C 06060 INC A
736C 321B77 06070 LD (CNT),A
736F FE04 06080 CP 4 ;DONE?
7371 20EF 06090 JR NZ,DOPRM ;NOT YET
7373 CD7B76 06100 CALL OURMSG
7376 0D 06110 DEFB CR
7377 20 06120 DEFM ' IX IY'
7380 0D 06130 DEFB CR
7381 00 06140 DEFB EOM
7382 210A77 06150 LD HL,IXSV
7385 CDC773 06160 CALL D16
7388 CD0273 06170 CALL DSPC
738B 210C77 06180 LD HL,IYSV
738E CDC773 06190 CALL D16
7391 CD7B76 06200 CALL OURMSG
7394 0D 06210 DEFB CR
7395 20 06220 DEFM ' SP PC'
739E 0D 06230 DEFB CR
739F 00 06240 DEFB EOM
73A0 210E77 06250 LD HL,SPSV

```

Program continues

Subscribe
to CCN

Color Computer News



Are you tired of searching the latest magazine for articles about your new Color Computer? When was the last time you saw a great sounding program listing only to discover that it's for the Model I and it's too complex to translate? Do you feel that you are all alone in a sea of Z-80's? On finding an ad for a Color Computer program did you mail your hard earned cash only to receive a turkey because the magazine the ad appeared in doesn't review Color Computer Software? If you have any of these symptoms you're suffering from Color Computer Blues!

But take heart there is a cure!

It's COLOR COMPUTER NEWS.

The monthly magazine for Color Computer owners and only Color Computer owners. CCN contains the full range of essential elements for relief of CC Blues. Ingredients include: comments to the ROMS, games, program listings, product reviews, and general interest articles on such goodies as games, personal finances, a Kid's page and other subjects.

The price for 12 monthly treatments is only \$21.00 and is available from:



Mail
Today!

REMarkable Software

P.O. Box 1192
Muskegon, MI 49443 ✓ 145

NAME _____

ADDRESS _____

CITY _____ State _____ Zip _____

Allow 8-10 weeks for 1st issue. 80 M



AUTO-WRITER

NEW!

YOU ALREADY OWN THE BEST DATA BASE MANAGER AVAILABLE . . .



It's Your Word Processor . .

Use your word processor to create and maintain a **FREE-FORMAT** data base. There is **NO NEED TO ABBREVIATE** because of fixed-length fields.

Sort your data base by any field.

Print form letters and reports, automatically selecting and extracting information from your data base.

Use format codes to control the printing of form letters and reports.

Create subsets of your data base with the powerful **SELECT-IF** software.

Requires 48K, 2 disk drives, and lower case Model I or III. Available for most Disk Operating Systems.

NOW AT THE SPECIAL INTRODUCTORY PRICE OF \$72.83
(Manual available separately for \$20.00)

AUTO-WRITER . . . IN A CLASS BY ITSELF
WRITE OR CALL NOW FOR A FREE BROCHURE

MIDWEST DATA SYSTEMS

a division of Walonick Associates, Inc. ✓ 148
5624 Girard Ave. So., Minneapolis, MN 55419
(612) 866-9022

■■■■■■■■■■ MORE STRAIGHT TALK ABOUT DISK DRIVES ■■■■■■■■■■

- DON'T BE CONFUSED BY ALL THE BRAND NAMES YOU SEE IN THE MARKET PLACE, THERE ARE VERY FEW MANUFACTURERS OF THE BASIC DRIVE CHASSIS, ALL THE OTHER NAMES ARE THOSE OF THE ASSEMBLERS OR THE RETAILERS.
- AS MANUFACTURED, THE DRIVE WILL NOT RUN ON A TRS-80*, IT MUST BE MODIFIED BY THE ASSEMBLER.
- THE QUALITY OF THE DRIVE DELIVERED TO YOU IS DEPENDENT ON BOTH THE MANUFACTURER AND THE ASSEMBLER, THE BEST CAN TURN TO JUNK IF THE ASSEMBLY IS IMPROPERLY DONE.
- THE POWER SUPPLY AND CASE ARE VERY IMPORTANT COMPONENTS OF THE COMPLETE DRIVE, THE CASE MUST ALLOW PROPER COOLING AIR FLOW, AND THE POWER SUPPLY MUST MAINTAIN TWO CONSTANT VOLTAGES.
- YOU MUST DEPEND ON THE COMPANY SELLING YOU THE DRIVE TO SERVICE IT AT REASONABLE COST WHEN IT FAILS YOU, THE MANUFACTURER IS NOT EQUIPPED TO DO THIS!
- THE BEST MEASURE OF QUALITY IN A DRIVE IS IT'S SPECIFICATIONS, WILL IT HANDLE DOUBLE DENSITY, WHAT IS THE TRACK TO TRACK ACCESS TIME, THE ANSWERS TO THESE TWO QUESTIONS INDICATE THE PRECISION OF IT'S COMPONENTS.
- WHAT KIND OF DRIVE SHOULD YOU BUY? LEVEL IV HAS CHOSEN TO DISTRIBUTE EXCLUSIVELY, THE MPI LINE, ALL MODELS OF MPI ARE DOUBLE DENSITY RATED AND REQUIRE ONLY A FIVE MILLI-SECOND TRACK TO TRACK ACCESS TIME.
- WHAT DO ALL THE MODEL NUMBERS MEAN?
B-51= 40 TRACKS SINGLE HEAD SINGLE SIDE B-52= 40/40 TRACKS DOUBLE HEAD DOUBLE SIDE
B-91= 80 TRACKS SINGLE HEAD SINGLE SIDE B-92= 80/80 TRACKS DOUBLE HEAD DOUBLE SIDE
(DOUBLE HEADS)-READ BOTH SIDES OF DISK (DUALS)-TWO DRIVES IN ONE CASE (RAW)-NO POWER SUPPLY OR CASE
- WHERE SHOULD YOU BUY YOUR DRIVE, LEVEL IV IS ONE OF THE OLDEST AND LARGEST DISTRIBUTORS OF TRS-80* EQUIPMENT, LOOK AT THE ADS IN YOUR OLD MAGAZINES, MANY OF THE ADVERTISERS ARE NO LONGER IN BUSINESS, LEVEL IV HAS BEEN A LEADER SINCE THE BEGINNING, WE STAND BEHIND OUR PRODUCTS, AND WE'LL BE HERE WHEN YOU NEED HELP.
- WHERE DO THE NATIONALLY KNOWN AUTHORS BUY THEIR DRIVES? LEVEL IV CAN SHOW COPIES OF SALES RECEIPTS FOR DRIVES TO MOST OF THEM, LEVEL IV ALSO PROVIDES SERVICE FOR THEIR DRIVES AND COMPUTER SYSTEMS IN OUR FULLY EQUIPPED TECH CENTER.
- CALL FOR OUR LOW PRICES ON NEW AND USED DRIVES, AND REMEMBER, WE ALSO TAKE TRADES!

LEVEL IV PRODUCTS INC. 32461 SCHOOLCRAFT, LIVONIA, MI 48150
PHONES: MI (313) 525-6200 OTHERS 800-521-3305 (TOLL FREE)
* a trademark of the RADIO SHACK DIV. of TANDY CORP.

The Lawyer's Microcomputer™

A Newsletter for Lawyers Using the TRS-80*

- Articles for Lawyers
- Law Office Applications
- Lawyer Information Exchange
- Software Reviews
- Hardware Reviews
- Advertisements Directed to Lawyer Users
- Technical Tips
- Letters and Suggestions
- And Much More

A New Monthly Newsletter For Lawyers

Send \$28 For A One Year Subscription

The Lawyer's Microcomputer™
Post Office Box 1046A
Lexington, S.C. 29072

✓191 *TM Tandy Corp.

IS YOUR MICRO TOO small?

THEN ENLARGE IT



WITH S-100!

Why the S-100 (IEEE 696-1) Bus Standard?

- It will turn your MICRO into a computer with the capability of a MINI.
- You add as much MEMORY as needed (add 1, 2 or more 64K RAM boards).
- Add a board to give you as much HARD or floppy disc CAPACITY as you need.
- Add a high density COLOR GRAPHICS board and much MORE!
- These boards just PLUG INTO your system provided you have an S-100 mainframe and an interface adapter from COMPUTER WIT.

• For TRS-80 Pet & others

• From \$95 mainframes from \$310. Catalog \$1 (refunded with order)

Dealer Inquiry Welcome

COMPUTER WIT
INCORPORATED

5620 176th Street S.W.
Lynnwood Washington 98036
(206) 743-4336
formerly HUH

Program continued

```

73A3 CDC773 06260 CALL D16
73A6 CD0273 06270 CALL DSPC
73A9 211077 06280 LD HL,PCSV
73AC CDC773 06290 CALL D16
73AF 3E0D 06300 LD A,0DH
73B1 CD8176 06310 CALL DSP
06320 ; ALLOW A HOOK INTO DISPLAY
73B4 00 06330 NOP
73B5 00 06340 NOP
73B6 00 06350 NOP
73B7 C31A70 06360 JP CMDHND
06370 ;
73BA 06380 DDSP EQU $
73BA CDC173 06390 CALL SDSP
73BD CDC173 06400 CALL SDSP
73C0 C9 06410 RET
06420 ;
73C1 06430 SDSP EQU $
73C1 7E 06440 LD A,(HL)
73C2 CDE272 06450 CALL DSPCAR
73C5 23 06460 INC HL
73C6 C9 06470 RET
06480 ;
73C7 06490 D16 EQU $
73C7 23 06500 INC HL
73C8 7E 06510 LD A,(HL)
73C9 CDE272 06520 CALL DSPCAR
73CC 2B 06530 DEC HL
73CD CDC173 06540 CALL SDSP
73D0 C9 06550 RET
06560 ;
06570 ;*****
06580 ;HERE FOR DISPLAY OF GENERAL
06590 ;REGISTERS A,B,C,D,E,H,L
06600 ;
06610 ;*****
73D1 06620 DG EQU $
73D1 CDAC70 06630 CALL WCR ;WAIT FOR CR
73D4 CD7B76 06640 CALL OURMSG
73D7 41 06650 DEFB 'A B C D E H L'
73F0 0D 06660 DEFB CR
73F1 00 06670 DEFB EOM
73F2 3AFA76 06680 LD A,(AFSV) ;GET USER A REG
73F5 CDE272 06690 CALL DSPCAR ;SHOW IT
73F8 CD0273 06700 CALL DSPC ;DOUBLE SPACE
73FB 21FC76 06710 LD HL,BCSV ;POINT TO B REG
73FE AF 06720 XOR A ;CLEAR A
73FF 321B77 06730 LD (CNT),A ;CLEAR COUNT
7402 06740 DGM EQU $
7402 CDC173 06750 CALL SDSP ;SHOW IT
7405 CD0273 06760 CALL DSPC ;DOUBLE SPACE
7408 3A1B77 06770 LD A,(CNT) ;GET COUNT
740B 3C 06780 INC A ;ADD 1
740C 321B77 06790 LD (CNT),A ;SAVE BACK
740F FE06 06800 CP 6 ;LIMIT?
7411 20EF 06810 JR NZ,DGM ;KEEP DSPING
7413 3E0D 06820 LD A,CR ;LOAD A CR
7415 CD8176 06830 CALL DSP
7418 C31A70 06840 JP CMDHND
06850 ;
06860 ;*****
06870 ;THE DISPLAY TYPE JUMPS HERE WHEN IT
06880 ;DECIDES WHAT 16 BIT REGISTER SHOULD
06890 ;BE DISPLAYED. THE ADDRESS WILL
06900 ;BE POINTED TO BY THE HL REGISTER
06910 ;BIT8R SHOULD BE JUMPED TO IF
06920 ;AN 8 BIT REGISTER IS TO BE
06930 ;DISPLAYED.
06940 ;*****
741B 06950 BIT16 EQU $
741B CDAC70 06960 CALL WCR ;WAIT FOR CR
741E 23 06970 INC HL ;POINT TO LOW
741F 7E 06980 LD A,(HL) ;GET THE CHAR
7420 CDE272 06990 CALL DSPCAR ;SHOW IT
7423 2B 07000 DEC HL ;POINT TO 2ND PART
7424 07010 BIT8R EQU $
7424 7E 07020 LD A,(HL) ;GET 2ND PART
7425 CDE272 07030 CALL DSPCAR ;SHOW IT
7428 3E0D 07040 LD A,CR ;LOAD A CR
742A CD8176 07050 CALL DSP
742D C31A70 07060 JP CMDHND
07070 ;
07080 ;*****
07090 ;WE ENTER HERE AFTER A VALID BEGIN IS FOUND
07100 ;ALL REGISTERS ARE RESTORED
07110 ;FROM THE SAVE AREA AND
07120 ;A JUMP TO THE PC IS MADE
07130 ;*****
7430 07140 BCMD EQU $
7430 CDAC70 07150 CALL WCR ;WAIT FOR A CR
7433 ED7B0E77 07160 LD SP,(SPSV) ;USE USERS STACK
7437 C1 07170 POP BC ;GET OLD PC
7438 ED4B1077 07180 LD BC,(PCSV) ;SAVE USERS PC
743C C5 07190 PUSH BC ;SAVE PC ON STACK
743D 315077 07200 LD SP,STACK ;REINIT OUR STACK
;RESTORE AF
7440 ED5B0277 07220 LD DE,(AFPSV)
7444 43 07230 LD B,E
7445 4A 07240 LD C,D
7446 C5 07250 PUSH BC
7447 F1 07260 POP AF
07270 ;RESTORE HL
7448 ED5B0877 07280 LD DE,(HLPVS)

```

Program continues

SAVE YOUR CLOAD WITH THE



"DATA CONDITIONER"

Exclusively From Communications Systems Labs

TIRED of CLOAD troubles with prerecorded tapes? Are CSAVEs a headache? USE THE DATA CONDITIONER TO:

- Copy system and data tapes without your computer.
- Eliminate noise and minor dropouts.
- Signal condition in both directions—loading & saving.
- Operates at ALL TRS-80 baud rates (Mod III high speed too!).

RUGGED CONSTRUCTION-AC POWERED-DESIGNED & MADE IN THE USA
Introductory Price \$59.95 (post paid) through April 30, 1982 **ORDER TODAY!**
Phone Order? ... Use your VISA, MASTERCARD or AMERICAN EXPRESS

write call
COMMUNICATIONS SYSTEMS LABORATORIES (808)-677-3380 ✓ 361
94-165 Leokane Street, Waipahu, HI 96797

THE BOOKKEEPERS

FOR INFO CALL (603)-447-2745

- Intermediate Bookkeeper—48K, 2 Drive & Printer.....\$109.95
- Ann Rose, our Accounts Receivable Clerk—
48K, 2 Drive & Printer. \$150.00
- The Count—A variety of utilities such as weight, area and capacity conversions;
loan amortization; hex code conversion, etc.
- 48K disk. \$49.95

All programs are for TRS-80™ Model I or III

STURDIVANT & DUNN, INC. ✓ 180

BOX 277, 124 WASHINGTON ST., CONWAY, N.H. 03818

(TRS-80 is a trademark of the Tandy Corp.)

CASM Z80* EDITOR/ASSEMBLER

TRS-80* Model I or Model III

- SOURCE FILES CREATED AND EDITED IN RAM
- SOURCE FILES ASSEMBLED FROM DISK
- CHAINING OF SOURCE FILES PERMITTED
- MACHINE LANGUAGE OBJECT CODE STORED IN RAM OR TO DISK

* TRS-80 is a trademark of Tandy Corp
Z80 is a trademark of Zilog Corp

POWERFUL DISK ASSEMBLER

MINIMUM REQUIREMENTS:
32K OF RAM
ONE DISK DRIVE

COMPREHENSIVE INSTRUCTION MANUAL
CASM W/MANUAL \$49
CASM MANUAL ONLY \$20

CROWN MicroProducts ✓ 337

P. O. Box 892 • Marysville, WA 98270 • (206) 659-4279 DEALER INQUIRIES INVITED

SOFTWARE YOU CAN BET ON!



If you gamble in the big casino—Wall Street—you need a program to evaluate call options. **OPTION80** tells you when it's time to buy and when it's time to sell. Suggests hedges to minimize your risk. Takes only 15 minutes a week to update and run. Comes with data for 25 calls. Easily expanded to include as many as you wish. Sold only on diskette.

Only \$25.00



A vastly improved version of the original TOUT horse race handicapper. Now, thousands of races are simulated in seconds to give you each horse's probability of winning and identify overlays. Horses are screened using factors derived from an operations research study. This handicapper outperforms programs and calculators selling for much more.

Only \$19.00



Jacks or better to open with a joker that can be used as an ace or in straights or flushes (Gardena CA rules). You play against six computer-controlled opponents. This program has true artificial intelligence capabilities. DRAW5 was developed originally by Real World Simulations. After three years of refining, it's now available for the TRS-80. It will provide hours of fun, challenge and education. Now 30% faster.

Only \$15.00

TOUT3 and DRAW5 supplied on 500 baud cassette. Add \$4.00 for Model I or III diskette. All programs available on 8" disk for Model II at \$6.00 additional. PA residents add 6% sales tax.

North Star diskette version of DRAW5 can be obtained from Real World Simulations. Box 4107, Torrance, CA 90510.

WILSON
Software Division • 539 Springhouse Lane • Camp Hill, PA 17011

TRS-80 is a Tandy Corporation trademark.

✓ 192



First in
Its Class
and
Looking
for
Work.

TRS-80 Model I, II, III

Five multiple regression procedures (including stepwise, backward elimination, all subset, and ridge), 24 transformations, comprehensive data base manager (with search and sort), descriptive statistics, hypothesis testing (7 tests), time series analysis (7 models), random variate generation, discrete probability distributions, sampling distributions, nonparametrics (5 tests), and complete documentation.

Complete package with manual — \$125

To order, send payment plus \$2.00 shipping and handling to:

Quant Systems

P.O. Box 628
Charleston, S.C. 29402 ✓ 194
803-571-2825

S.C. residents add 4% sales tax
Overseas orders add \$7 for shipping

OMNITEK COMPUTERS INTERNATIONAL, INC. ✓ 195

1899 MAIN STREET
TEWKSBURY, MASS
617-851-4580

- Scotch S.S./S.D 5.25" Diskettes. 25.00
- Elephant Memory 5.25" Diskettes. 23.00
- 16K RAM KITS. 14.00
- TECO 12" B&G Monitor. 119.00
- Okidata Microline 80. 329.00
- Okidata Microline 82A. 449.00
- Okidata Microline 83A. 699.00
- Epson Mx-80. 479.00
- Radio Shack Mill w/48K. 879.00
- Radio Shack Mill w/48K and 2 40T dr
..... 1699.00
- 40 track 5.25" Tandon TM-100-1. 284.00
- 80 track 5.25" Tandon Dual Head 484.00
- 5.25" Power Supply and case. 49.00
- 8" Power Supply and case. 109.00
- Apple II plus w/48K, 1 drive, RF mod
..... 1690.00
- Comet 125 CPS printer. 299.00

TRS-80 is a registered trademark of Tandy Corp.

Prices are for mail order only.
TERMS: Check, money order, Mastercard and Visa accepted. F.O.B. Tewksbury-freight extra. Mass residents add 5% sales tax. Write for FREE CATALOG.

F.C. 9.3096130 E 05 TIME 47.45
 SHEDOS 6.3157340 E 02 FORWARD VIEW P.I. 312.15

X= 6.7996812 E 04 Y= +6.8725465 E 04 Z= 1.2255484 E 04
 TX= 3.1846217 E 05 TY= -3.0733159 E 06 TZ= 4.3288297 E 06

-80 SPACE RAIDERS
Starship Simulator
and Combat Game

This is the most realistic combat space simulation available for any computer system anywhere! Operator is placed in a rapidly moving ship looking out through a window into the depths of space. Thousands of stars appear in the distance and part toward the screen edges as the ship flashes past. Forward and aft views available at any time. Accurate celestial navigation using both XYZ and spherical Coordinates! Comment from Aug '81 *80 Microcomputing*: "May be the ultimate Star Trek type game and, possibly, the most complex micro-computer game ever attempted!" Fast action graphics never stop!

Now available for Model III!

\$24.95 (MasterCard, VISA, check, etc.)
 includes shipping. COD OK

Specify Model I or III, Level 2 16K

Bosen Electronics
445 E. 800 N.
Spanish Fork, UT 84660
(801)-798-9553 ✓ 294

Dos helper

- The features your dos doesn't have
- Fast ram spooler
- Type ahead
- Route to disk
- Compare files
- File format conversions
 - Add and drop line numbers
 - Word processor to EDTASM
 - Unpack Basic programs
- Append object files
- Model III TRSDOS directory
- Neat listing of packed Basic programs
- Designed for Newdos80.
Works with any dos
- Only \$19.95

Tatum Labs
 P.O. Box 722
 Hawleyville, CT 06440
 (203) 426-2184

✓ 335

Program continued

```

744C 43      07290      LD      B,E
744D 4A      07300      LD      C,D
744E C5      07310      PUSH   BC
                07320      ;RESTORE DE
744F ED5B0677 07330      LD      DE,(DEPSV)
7453 43      07340      LD      B,E
7454 4A      07350      LD      C,D
7455 C5      07360      PUSH   BC
                07370      ;RESTORE BC
7456 ED5B0477 07380      LD      DE,(BCPSV)
745A 43      07390      LD      B,E
745B 4A      07400      LD      C,D
                07410      ;
745C D1      07420      POP    DE
745D E1      07430      POP    HL
745E DD2A0A77 07440      LD      IX,(IXSV)
7462 FD2A0C77 07450      LD      IY,(IYSV)
                07460      ;
7466 D9      07470      EXX
7467 08      07480      EX     AF,AF'
                07490      ;RESTORE AF
7468 ED5BFA76 07500      LD      DE,(AFSV)
746C 43      07510      LD      B,E
746D 4A      07520      LD      C,D
746E C5      07530      PUSH   BC
                07540      ;RESTORE DE
746F ED5BFE76 07550      LD      DE,(DESV)
7473 43      07560      LD      B,E
7474 4A      07570      LD      C,D
7475 C5      07580      PUSH   BC
                07590      ;RESTORE HL
7476 ED5B0077 07600      LD      DE,(HLSV)
747A 43      07610      LD      B,E
747B 4A      07620      LD      C,D
747C C5      07630      PUSH   BC
                07640      ;RESTORE BC
747D ED5BFC76 07650      LD      DE,(BCSV)
7481 43      07660      LD      B,E
7482 4A      07670      LD      C,D
                07680      ;
7483 E1      07690      POP    HL
7484 D1      07700      POP    DE
7485 F1      07710      POP    AF
                07720      ;
7486 ED7B0E77 07730      LD      SP,(SPSV)
                07740      ;
748A C9      07750      RET
                07760      ;
                07770      ;*****
                07780      ;      ADSTOP INTERRUPT CODE
                07790      ;
                07800      ;THIS SECTION IS ENTERED WHEN AN
                07810      ;ADSTOP HAS BEEN SET VIA THE ADSTOP
                07820      ;COMMAND OR BY THE USER STORING A HEX
                07830      ;F7 IN THE PROGRAM. ALL REGISTERS
                07840      ;ARE SAVED.
                07850      ;*****
748B          07860      ADINT EQU $
748B ED43FC76 07870      LD      (BCSV),BC ;FREE BC FOR WORK
748F C1      07880      POP    BC ;GET OLD PC
7490 0B      07890      DEC    BC ;POINT TO REAL ADDRESS
7491 C5      07900      PUSH   BC ;SAVE NEW PC
7492 ED431077 07910      LD      (PCSV),BC ;SAVE IT
7496 ED730E77 07920      LD      (SPSV),SP ;SAVE STACK PTR
749A 315077 07930      LD      SP,STACK ;USE OUR STACK
                07940      ;SAVE DE
749D F5      07950      PUSH   AF
749E 43      07960      LD      B,E
749F 4A      07970      LD      C,D
74A0 ED43PE76 07980      LD      (DESV),BC
                07990      ;SAVE HL
74A4 45      08000      LD      B,L
74A5 4C      08010      LD      C,H
74A6 ED430077 08020      LD      (HLSV),BC
                08030      ;SAVE AF
74AA D1      08040      POP    DE
74AB 43      08050      LD      B,E
74AC 4A      08060      LD      C,D
74AD ED43FA76 08070      LD      (AFSV),BC
                08080      ;SAVE BC
74B1 ED5BFC76 08090      LD      DE,(BCSV)
74B5 43      08100      LD      B,E
74B6 4A      08110      LD      C,D
74B7 ED43PC76 08120      LD      (BCSV),BC
                08130      ;SAVE INDEX
74BB DD220A77 08140      LD      (IXSV),IX
74BF FD220C77 08150      LD      (IYSV),IY
                08160      ;GET NEXT SET
74C3 D9      08170      EXX
74C4 08      08180      EX     AF,AF'
74C5 ED430477 08190      LD      (BCPSV),BC ;SAVE FOR WORK
                08200      ;SAVE DE
74C9 F5      08210      PUSH   AF
74CA 43      08220      LD      B,E
74CB 4A      08230      LD      C,D
74CC ED430677 08240      LD      (DEPSV),BC
                08250      ;SAVE HL
74D0 45      08260      LD      B,L
74D1 4C      08270      LD      C,H
74D2 ED430877 08280      LD      (HLPVS),BC
                08290      ;SAVE AF
74D6 D1      08300      POP    DE
74D7 43      08310      LD      B,E
74D8 4A      08320      LD      C,D
  
```

Program continues

Program continued

```

74D9 ED430277 08330 LD (AFPSV),BC
08340 ;SAVE BC
74DD ED5B0477 08350 LD DE,(BCPSV)
74E1 43 08360 LD B,E
74E2 4A 08370 LD C,D
74E3 ED430477 08380 LD (BCPSV),BC
74E7 CD7B76 08390 CALL OURMSG
74EA 0E 08400 DEFB 0EH ;CURSOR ON
74EB 0D 08410 DEFB CR
74EC 41 08420 DEFM 'ADSTOP AT '
74F6 00 08430 DEFB EOM
74F7 2A1077 08440 LD HL,(PCSV) ;GET THE PSW
74FA CDD572 08450 CALL DSPADD ;SHOW IT
74FD 3E0D 08460 LD A,CR ;RETURN CURSOR
74FF CD8176 08470 CALL DSP ;SHOW IT
7502 C31A70 08480 JP CMDHND
08490 ;
08500 ;*****
08510 ;ENTER HERE AFTER VALID FORM OF ADSTOP
08520 ;IS ENTERED. IF NO ADDRESS IS ENTERED
08530 ;WE CLEAR THE ADSTOP. IF AN ADDRESS
08540 ;IS ENTERED WE RESET THE OLD CODE
08550 ;AND ZAP THE NEW ADDRESS AFTER
08560 ;DOING A SAVE ON THE BYTE WE ARE
08570 ;GOING TO ADSTOP ON.
08580 ;*****
7505 08590 ADSTP EQU $
7505 CD9770 08600 CALL OURKBD
7508 FE20 08610 CP 20H ;BLANK?
750A 280B 08620 JR Z,DOADD ;YES
750C FE0D 08630 CP CR ;CR?
750E C2A970 08640 JP NZ,NOTBL ;NO - ERROR
7511 CD2E75 08650 CALL SWAPAD ;CLEAR OLD PART
7514 C31A70 08660 JP CMDHND ;WE ARE DONE
7517 08670 DOADD EQU $
7517 CD3C75 08680 CALL GETADD ;GET THE ADDRESS IN HL
751A CDAC70 08690 CALL WCR ;WAIT FOR A CR
751D E5 08700 PUSH HL ;SAVE ADDRESS
751E CD2E75 08710 CALL SWAPAD
7521 E1 08720 POP HL ;RESTORE ADDRESS
7522 7E 08730 LD A,(HL) ;GET NEW CHAR
7523 321A77 08740 LD (ADSINS),A ;SAVE NEW CHAR
7526 221877 08750 LD (ADSADR),HL ;SAVE NEW ADDR
7529 36F7 08760 LD (HL),0F7H ;LOAD A RST
752B C31A70 08770 JP CMDHND
08780 ;
752E 08790 SWAPAD EQU $
752E 2A1877 08800 LD HL,(ADSADR) ;GET OLD ADDRESS
7531 3A1A77 08810 LD A,(ADSINS) ;GET OLD INST
7534 77 08820 LD (HL),A ;RESTORE IT
7535 210000 08830 LD HL,0 ;CLEAR HL
7538 221877 08840 LD (ADSADR),HL ;CLEAR OLD AREA
753B C9 08850 RET
08860 ;
08870 ;*****
08880 ; THIS ROUTINE RETURNS AN ADDRESS OR A BYTE
08890 ; DEPENDING ON FLAG SETTINGS FOR CERTAIN
08900 ; COMMANDS.
08910 ;*****
753C 08920 GETADD EQU $
753C CD4575 08930 CALL GETNUM ;GET 1ST PART OF ADDR
753F 67 08940 LD H,A ;SAVE IT IN HIGH
7540 CD4575 08950 CALL GETNUM ;GET LAST PART OF ADDR
7543 6F 08960 LD L,A ;SAVE IT IN LOW
7544 C9 08970 RET
7545 08980 GETNUM EQU $
7545 C5 08990 PUSH BC ;SAVE REGS
7546 CD5875 09000 CALL GETDIG ;GET FIRST DIGIT
7549 CB27 09010 SLA A
754B CB27 09020 SLA A
754D CB27 09030 SLA A
754F CB27 09040 SLA A
7551 47 09050 LD B,A ;SAVE IT FOR ADD
7552 CD5875 09060 CALL GETDIG ;GET SECOND DIGIT
7555 80 09070 ADD A,B ;PUT TOGETHER
7556 C1 09080 POP BC ;RESTORE REGS
7557 C9 09090 RET
09100 ;
7558 09110 GETDIG EQU $
7558 CD9770 09120 CALL OURKBD ;GET BYTE FROM KEYBOARD
755B FE01 09130 CP 1 ;IS IT BREAK
755D CA5476 09140 JP Z,CJMP
7560 FE20 09150 CP 20H ;BLANK?
7562 28F4 09160 JR Z,GETDIG ;YES TRY AGAIN
09170 ; HOOK FOR USER TO GET AT INPUT
7564 00 09180 NOP
7565 00 09190 NOP
7566 00 09200 NOP
7567 D9 09210 EXX
7568 21F876 09220 LD HL,CMDFLG ;GET THE FLAG
756B CB56 09230 BIT STORE,(HL) ;IS IT STORE CMD
756D CAE575 09240 JP Z,NOTSTR ;NO - BYPASS
7570 FE47 09250 CP 47H ;IS IT G?
7572 2030 09260 JR NZ,NOTSG ;NO - BYPASS
7574 CD7076 09270 CALL POPRES ;POP AND RESET
7577 09280 GETGC EQU $
7577 CD9770 09290 CALL OURKBD ;GET A CHAR
757A FE20 09300 CP 20H ;IS IT BLANK?
757C 28F9 09310 JR Z,GETGC ;YES - TRY AGAIN
757E FD21E176 09320 LD IY,GTAB ;POINT TO TABLE
7582 09330 TGC EQU $
7582 FDBE00 09340 CP (IY+0) ;SAME?

```

Program continues

***SPECIAL ** SPECIAL
TRS-80 TANDON ADD ON
IMMEDIATE DELIVERY**

**SINGLE SIDED \$215.00
DOUBLE SIDED \$335.00**

**COMPLETE SYSTEMS
SINGLE SIDED \$345.00
DOUBLE SIDED \$465.00
INCLUDES:
MINI DISK DRIVE
FUSED POWER SUPPLY
VENTED CABINET
CABLE
90 DAY WARRANTY
FACTORY ASSEMBLED
FACTORY TESTED**

THESE ARE NEW 5" FD's

**I 2 INTERFACE, INC
20932 CANTARA ST
CANOGA PARK, CA 91304
(213) 341-7914 ✓ 182
VISA AND MASTER CHARGE ACCEPTED**

**BIS Bayesian
Investment
Services**

Send \$1.00 for
instructive catalog
with sample output
of TRS-80*
investor programs
written by economist
Dr. Richard Harriff
of BIS.

**Stock Timer™
Commodity Timer™
Option Valuator™
Convertible
Valuator™
Portfolio Valuator™**

Write or call:

BIS
757 Santa Rosita
Solana Beach, CA 92075
(714) 755-6225

*TRS-80 is a trademark of Tandy Corp.

✓ 183

The Captain 80 Book of
BASIC ADVENTURES

EIGHTEEN ADVENTURES:

- Atlantean Odyssey
- Dog Star
- Thunder Road
- Deadly Dungeon
- Revenge of Balrog
- The Fortress at Times-End
- Temple of the Sun
- Lost Ship
- Spider Mountain
- Lost Dutchman's Gold
- Journey to the Center of the Earth
- King Tut's Tomb
- Voyage to Atlantis
- House of Seven Gables
- Sorcerer's Castle
- CIA Adventure
- Arctic Adventure
- Adventureland

All these program listings plus an Adventure Generator not available from any other source!

\$19.95*

Although all programs are written for TRS-80 Model I & III, these programs will easily convert to any other machine using Microsoft® BASIC.



Send to :

80 Northwest Publishing
3838 South Warner St.
Tacoma, WA 98409
(206) 475-2219

Name _____
Address _____
City _____
State, Zip _____
Visa/MC _____
Exp. Date _____

*Please add \$2.05 for Shipping and Handling.

Program continued

7585 2812	09350	JR	Z,PGC	;YES
7587 08	09360	EX	AF,AF'	;SAVE REGS
7588 PD7E00	09370	LD	A,(IY+0)	
758B FEFF	09380	CP	0FFH	;END OF TAB?
758D CA7E70	09390	JP	Z,ICMD	;YES - ERROR
7590 08	09400	EX	AF,AF'	;RESTORE
7591 PD23	09410	INC	IY	;POINT
7593 PD23	09420	INC	IY	;TO NEXT
7595 PD23	09430	INC	IY	;CHAR
7597 18E9	09440	JR	TGC	;AND TRY AGAIN
7599	09450	EQU	\$	
7599 PD23	09460	INC	IY	;POINT TO ADDR
759B PD6601	09470	LD	H,(IY+1)	;LOAD IT UP
759E PD6E00	09480	LD	L,(IY+0)	;LOAD IT UP
75A1 C3B671	09490	JP	STG	;LINK COMMON CODE
75A4	09500	EQU	\$	
75A4 FE54	09510	CP	54H	;IS IT T?
75A6 200B	09520	JR	NZ,NOTT	
75A8 CD7076	09530	CALL	POPRES	;KILL STACK
75AB 21F976	09540	LD	HL,TRNPLG	;GET FLAG
75AE CBCE	09550	SET	TRANS,(HL)	;SET IT
75B0 C31971	09560	JP	STTM	;LINK UP
75B3	09570	EQU	\$	
75B3 FE50	09580	CP	50H	;IS IT P
75B5 2006	09590	JR	NZ,NOTSP	;NO - BYPASS
75B7 CD7076	09600	CALL	POPRES	;POP AND RESET
75BA C3C371	09610	JP	STOREP	;LINK UP WITH P CODE
75BD	09620	EQU	\$	
75BD FE53	09630	CP	53H	;IS IT S
75BF 2006	09640	JR	NZ,NOTSS	;NO - BYPASS
75C1 CD7076	09650	CALL	POPRES	;POP AND RESET
75C4 C3DE71	09660	JP	WST3	;RETURN
75C7	09670	EQU	\$	
75C7 FE49	09680	CP	49H	;IS IT I
75C9 2006	09690	JR	NZ,NOTSI	;NO - BYPASS
75CB CD7076	09700	CALL	POPRES	;POP AND RESET
75CE C38C71	09710	JP	STIND	;RETURN
75D1	09720	EQU	\$	
75D1 FE50	09730	CP	58H	;IS IT X
75D3 2006	09740	JR	NZ,NOTSX	;NO - BYPASS
75D5 CD7076	09750	CALL	POPRES	;POP AND RESET
75D8 C39071	09760	JP	STX	;GO DO X
75DB	09770	EQU	\$	
75DB FE59	09780	CP	59H	;IS IT Y
75DD 2006	09790	JR	NZ,NOTSY	;NO - BYPASS
75DF CD7076	09800	CALL	POPRES	;POP AND RESET
75E2 C3A771	09810	JP	STY	;GO DO Y
75E5	09820	EQU	\$	
75E5	09830	EQU	\$	
75E5 CB4E	09840	BIT	DISPLY,(HL)	;TEST IT
75E7 CA3876	09850	JP	Z,NOTDSP	;BYPASS
75EA FE47	09860	CP	47H	;GEN REGS?
75EC 2007	09870	JR	NZ,NOTG	;NO - BYPASS
75EE F1	09880	POP	AF	;GET RID OF RETURN
75EF F1	09890	POP	AF	;GET RID OF RETURN
75F0 F1	09900	POP	AF	;GET RID OF RETURN
75F1 F1	09910	POP	AF	;GET RID OF RETURN
75F2 C3D173	09920	JP	DG	;DISPLAY IT
75F5	09930	EQU	\$	
75F5 FE52	09940	CP	52H	;IS IT R?
75F7 2007	09950	JR	NZ,NOTR	;NO
75F9 F1	09960	POP	AF	
75FA F1	09970	POP	AF	
75FB F1	09980	POP	AF	
75FC F1	09990	POP	AF	
75FD C30B73	10000	JP	DRS	
7600	10010	EQU	\$	
7600 FE50	10020	CP	50H	;PC?
7602 2006	10030	JR	NZ,NOTP	;NO - BYPASS
7604 211077	10040	LD	HL,PCSV	;POINT TO IT
7607 C34D76	10050	JP	JBIT16	;SHOW IT OFF
760A	10060	EQU	\$	
760A FE53	10070	CP	53H	;SP?
760C 2006	10080	JR	NZ,NOTS	;NO - BYPASS
760E 210E77	10090	LD	HL,SPSV	;POINT TO IT
7611 C34D76	10100	JP	JBIT16	;SHOW IT OFF
7614	10110	EQU	\$	
7614 FE49	10120	CP	49H	;INDEX?
7616 200E	10130	JR	NZ,NOTI	;NO
7618 CD9770	10140	CALL	OURKBD	
761B FE58	10150	CP	58H	;X INDEX?
761D 200B	10160	JR	Z,HOOKX	;YES
761F FE59	10170	CP	59H	;Y INDEX?
7621 2810	10180	JR	Z,HOOKY	;YES
7623 C35476	10190	JP	CJMP	
	10200			
7626	10210	EQU	\$	
7626 FE58	10220	CP	58H	;X INDEX?
7628 2005	10230	JR	NZ,NOTX	;NO
762A	10240	EQU	\$	
762A 210A77	10250	LD	HL,IXSV	;POINT TO IX
762D 181E	10260	JR	JBIT16	
762F	10270	EQU	\$	
762F FE59	10280	CP	59H	;Y INDEX?
7631 2005	10290	JR	NZ,NOTY	;NO
7633	10300	EQU	\$	
7633 210C77	10310	LD	HL,IYSV	
7636 1815	10320	JR	JBIT16	
7638	10330	EQU	\$	
7638	10340	EQU	\$	
7638 D9	10350	EXX		
7639 D630	10360	SUB	30H	;STRIP SPECIAL CHAR

ESTATE PLANNING MODEL SAVE TIME AND MONEY

by using your TRS-80* Model II, 64 K computer for professional estate analysis.

- ☆ **Marital Deduction Formula Analysis Reports** analyze six formula bequests for both husband and wife for both orders of death.
- ☆ **Estate Tax Return Report** computerizes estate tax planning for decedents' estates.
- ☆ **Client-Ready Reports** printed.
- ☆ **State (Ohio) and Federal Taxes** computed.
- ☆ **Free Updates** to reflect legislative changes for one year.
- ☆ **Sold and maintained by author:** an attorney and estate planning professional.
- ☆ **ALREADY REVISED** to comply with 1981 TAX REDUCTION ACT.

YES, please send me more information on the Estate Planning Model.

Name _____
 Name of Firm _____
 Street _____
 City _____ State _____ Zip _____

Mail to: Beard Software Development Co.
 59 Skyline Avenue
 Canfield, Ohio 44406

*TRS-80 is a trademark of Tandy Radio Shack. ✓134

COGNIVOX VIO-332. The affordable voice I/O peripheral for the TRS-80



See Review in December 81 issue of 80 MICROCOMPUTING

If you have a TRS-80 model I, level II with at least 16K of RAM, COGNIVOX VIO-332 will add a whole new dimension to your computer.

Imagine being able to use your voice for entry of commands and data and then listen to the computer talk back to you! This exciting possibility has now become a reality at a very affordable price.

COGNIVOX can be trained to recognize words or short phrases from a vocabulary of up to 32 entries of your choice. To train COGNIVOX to recognize a word, you simply repeat the word three times under the prompting of the system. The voice output vocabulary can have up to 32 entries chosen by the user.

COGNIVOX comes complete with microphone, power supply, built-in speaker/amplifier, cassette with software and extensive user manual. It plugs into the expansion port of the keyboard or in the expansion interface via a standard 40-pin flat cable with connectors on both ends (not included - \$19 extra).

Software provided with the unit includes demonstration programs, two voice operated games and programs that play music. It is also very easy to add voice I/O to your own programs. A simple statement in BASIC is all that is needed to either recognize or say a word.

Use COGNIVOX for data entry when hands or eyes are busy, as an educational tool, a sound effects generator, an aid to the handicapped, or as a super toy. Use it with the Radio Shack power controller (#26-1182) to control by voice appliances and lights in your home. The list is endless.

COGNIVOX costs only \$149 (plus \$4.50 shipping in the US, foreign add \$15 for air shipment, CA add 6% tax.) The 40-pin flat cable jumper is \$19 extra. To order send a check by mail or call us at (805) 685-1854, 9AM to 5PM M-F and charge it to your VISA or MASTERCARD. COGNIVOX is backed by a 120-day warranty against manufacturing defects.

VOICETEK P.O. Box 388, Goleta, CA 93116



RAMCHARGER 32K UPGRADE

Color Invaders Space War

- The Best Games Available
- High Resolution Graphics
- Fast, Machine Language
- Ext. Basic Not Required
- \$21.95 each, cassette
- \$25.95 each, disk

EXTENDED BASIC GAMES

- **LOTHAR'S LABYRINTH**
Word Search Puzzle
- **BATTLEFLEET**
Battleship Search Game (one or two players)
- **SPACE TRADERS**
Galactic trading game

\$14.95/ea.



COLOR COMPUTER

COMPUVOICE TRS-80

Give your computer a voice of its own - build speech into your BASIC programs. This machine language program is a must for your library - no hardware modification needed. \$44.95

- EXTEND MEMORY FROM 16K to 32K
- 100% Compatible With Extended Basic
- No Soldering Or Modification
- Fits Inside Computer
- \$79.95

THE FACTS

At last, a complete description of the "guts" of the Color Computer Specs on all the ICs, complete schematics, theory of operation and programming examples.

\$14.95

NEW MACHINE LANGUAGE GAMES

- **COSMIC SUPER BOWL** \$14.95
Similar to hand held football games.
- **PACKET MAN** \$21.95
Gobble your way through the maze while avoiding the munchkins.
- **CROID** \$12.95
Eliza type artificial intelligence game.

SOUNDSOURCE

Store music or voice from a cassette tape in the computer and display it on the TV screen. Shorten it, lengthen it, modify it and replay it through the TV's sound system. Build and test your own sounds for games. No hardware mods needed.

\$24.95

UTILITIES

- **EDITOR/ASSEMBLER** \$34.95
- **SUPER MONITOR** 19.95
- **EPRM PROGRAMMER** 89.95
(Program your own ROMs for the ROM-PAC port)
- **MAGIC BOX** 24.95
Load MOD I/III Tapes into the color computer
- **DISASSEMBLER** by Korenthal ... 14.95
Written in BASIC - generate source and object code for the FACTS.

DEALER INQUIRIES INVITED

MADNESS & THE MINOTAUR

The best adventure game available for the color computer. Over 200 rooms, 6 creatures, 8 magic spells, loads of treasures. Written in machine language, extended Basic not required. \$19.95



SPECTRAL ASSOCIATES

145 HARVARD AVE.
Tacoma, Washington 98466

WRITE FOR COMPLETE CATALOG
ADD 3% FOR SHIPPING \$1.00 minimum

Allow 2-3 wks. for delivery

(206) 565-8483 ✓119

VISA OR MASTERCARD ACCEPTED

MODEL I/III

SUPER SKETCHER MODEL I/III

Have you ever wanted to add graphics to BASIC programs as BASIC subroutines in minutes rather than hours... or draw schematics, charts, graphs, maps, cartoons or logos such as ours using graphics & alphanumerics... save graphics as pages and animate them or print them with your EPSON MX-80? SUPER SKETCHER's the answer. It works like a text editor with graphics. It's easy to use and Features • Full Cursor control • Help table • on screen editing • Circle, Square, Sine Wave & point to point commands • Edit & animate 10 Graphics screens at one time • Save Graphics files, BASIC subroutines & programs on disk or tape • 128x45 or 64x15 display • Built in Epson MX-80 driver • and much more.

SUPER SKETCHER Mod I/III DISK \$29.95

CODES II for the ELECTRIC PENCIL

CODES II for the Model I and the ELECTRIC PENCIL is an easy to use software package that lets you imbed printer control codes into your PENCIL textfiles, with NO hardware additions. Shift your printer into Double Wide, Condensed, Elongated character fonts and send any special control codes to your smart printer to get it to do what you bought it for. Codes II loads into the Electric Pencil and includes codes for Epson MX-80 & 100, R.S. LP IV, VII & VIII, Centronics 737/739, MPI 88 series, Okidata Microlines and one that you can customize.

TAPE \$19.95 (Requires lower case) DISK \$24.95

DISK INVENTORY SYSTEM MODEL III

DISK INVENTORY for the Model III allows you to keep track of your disks permanently! This Menu Driven indexed utility lets you search through up to 99 disks (4752 diskfiles) in 1 second and display or print them alphabetically by name, extension or disk number. Printer driver has built in page numbers & spacing in all modes and a unique Disk Jacket labeling feature.

MODEL III DISK \$29.95

AUTOMATIC MENU SYSTEM MOD III

AUTOMENU for the Model III is more than just an automatic menu system. Just power up and AUTOMENU takes over with a complete menu to Execute, Load or List Programs & Command files or enter Debug, Basic or System with a single keystroke. Ideally suited for office use.

MODEL III DISK \$15.95

16K RAM \$15.99

Premium 16K 200 Ns RAM for TRS-80 Model III/I computers. Includes ram test & instructions. **ONE YEAR GUARANTEE** (Model 1 owners add \$2 for dip shunts)

DEALER INQUIRIES INVITED

Allow 2 extra weeks for personal checks. C. O. D. orders add \$2.00. When ordering specify computer type and add \$2.00 for S/H Minn. residents add 5% sales tax. VISA/Master Chg.

VISA/MASTER CHG. ACCEPTED



✓ 128

**NELSON
SOFTWARE
SYSTEMS**



P.O. Box 19096 - Minneapolis, MN 55419 - 612/827-4703

TRS-80 is registered trademark of Tandy Corp.

Program continued

```

763B FA4976 10370 JP M,INVT ;INVALID
763E FE0A 10380 CP 0AH ;0-9?
7640 F8 10390 RET M ;YES
7641 D607 10400 SUB 7 ;FLIP BIT
7643 FA4976 10410 JP M,INVT ;INVALID
7646 FEL0 10420 CP 10H ;A-F?
7648 F8 10430 RET M ;YES
7649 EQU $
7649 D1 10450 INVT EQU $
764A D1 10460 POP DE
764B 1807 10470 JR CJMP
764D EQU $ JBIT16 EQU $
764D F1 10490 POP AF
764E F1 10500 POP AF ;GET RID OF RETURN
764F F1 10510 POP AF
7650 F1 10520 POP AF
7651 C31B74 10530 JP BIT16
10540 ;
7654 EQU $ CJMP EQU $
7654 CD7B76 10560 CALL OURMSG
7657 0E 10570 DEF8 0EH ;CURSOR ON
7658 0D 10580 DEF8 CR
7659 43 10590 DEF8 'COMMAND TERMINATED'
766B 0D 10600 DEF8 CR
766C 00 10610 DEF8 EOM
10620 ;
766D C31A70 10630 JP CMDHND ;RETURN TO NORM CODE
10640 ;
10650 ;
7670 EQU $ POPRES EQU $
7670 C1 10670 POP BC ;SAVE OUR RETURN
7671 F1 10680 POP AF ;GET RID OF RETURN
7672 F1 10690 POP AF
7673 F1 10700 POP AF
7674 F1 10710 POP AF
7675 AF 10720 XOR A
7676 32F876 10730 LD (CMDFLG),A
7679 C5 10740 PUSH BC ;RESTORE RETURN ADDR
767A C9 10750 RET
10760 ;
767B C9 10770 OURMSG EQU $
767B E1 10780 POP HL ;GET MSG ADDR
767C CDA728 10790 CALL MSGDSP ;SHOW IT
767F C5 10800 PUSH BC ;SAVE IT AS OUR RETURN
7680 C9 10810 RET
10820 ;
7681 10830 DSP EQU $
7681 CD3300 10840 CALL RSDSP
7684 CD8876 10850 CALL POUT
7687 C9 10860 RET
10870 ;
7688 10880 POUT EQU $
7688 C9 10890 RET
7689 FE0D 10900 CP 0DH ;IS IT CR?
768B 2816 10910 JR Z,SHIPB ;YES FILL
768D 08 10920 EX AF,AF'
768E EQU $ POUT2 EQU $
768E DBF1 10940 IN A,(CTRL) ;GET STATUS
7690 CB47 10950 BIT 0,A ;ANYTHING?
7692 28FA 10960 JR Z,POUT2 ;NO KEEP LOOKING
7694 08 10970 EX AF,AF' ;RESTORE
7695 D3F0 10980 OUT (DATA),A ;SEND IT
7697 FE0D 10990 CP 0DH ;WAS IT A CR
7699 C0 11000 RET NZ
769A 01FFFF 11010 LD BC,0FFFFH ;SET RECOVER TIME
769D CD6000 11020 CALL DELAY ;LET LINE TURN AROUND
76A0 3E0D 11030 LD A,CR
76A2 C9 11040 RET
76A3 EQU $ SHIPB EQU $
76A3 08 11060 EX AF,AF' ;SAVE
76A4 EQU $ POUT3 EQU $
76A4 DBF1 11080 IN A,(CTRL) ;STATUS
76A6 CB47 11090 BIT 0,A
76A8 28FA 11100 JR Z,POUT3
76AA 3E20 11110 LD A,20H
76AC D3F0 11120 OUT (DATA),A
76AE 18DE 11130 JR POUT2
11140 ;
76B0 11150 LOGO EQU $
76B0 0E 11160 DEF8 0EH
76B1 1C 11170 DEF8 1CH
76B2 1F 11180 DEF8 1FH
76B3 17 11190 DEF8 17H
76B4 0D 11200 DEF8 CR
76B5 0D 11210 DEF8 CR
76B6 0D 11220 DEF8 CR
76B7 0D 11230 DEF8 CR
76B8 0D 11240 DEF8 CR
76B9 0D 11250 DEF8 CR
76BA 0D 11260 DEF8 CR
76BB 20 11270 DEF8 '
76C9 0D 11280 DEF8 CR CP80'
76CA 0D 11290 DEF8 CR
76CB 20 11300 DEF8 ' BY BRIAN CAMERON'
76E0 00 11310 DEF8 EOM
76E1 11320 GTAB EQU $
76E1 41 11330 DEF8 41H
76E2 FA76 11340 DEF8 AFSV
76E4 42 11350 DEF8 42H
76E5 FC76 11360 DEF8 BCSV
76E7 43 11370 DEF8 43H

```

Program continues

Program continued

76E8	PD76	11380	DEFW	CSV
76EA	44	11390	DEFB	44H
76EB	PE76	11400	DEFW	DESV
76ED	45	11410	DEFB	45H
76EE	FF76	11420	DEFW	ESV
76F0	48	11430	DEFB	48H
76F1	0077	11440	DEFW	HLSV
76F3	4C	11450	DEFB	4CH
76F4	0177	11460	DEFW	LSV
76F6	FFFF	11470	DEFW	0FFFFH
76F8	00	11480	DEFB	00H
76F9	00	11490	DEFB	00H
0001		11500	EQU	1
0002		11510	EQU	2
0004		11520	EQU	4
0008		11530	EQU	8
0001		11540	EQU	1
76FA	00	11550	DEFB	00H
76FB	00	11560	DEFB	00H
76FC	00	11570	DEFB	00H
76FD	00	11580	DEFB	00H
76FE	00	11590	DEFB	00H
76FF	00	11600	DEFB	00H
7700	00	11610	DEFB	00H
7701	00	11620	DEFB	00H
7702	0000	11630	DEFW	0000H
7704	0000	11640	DEFW	0000H
7706	0000	11650	DEFW	0000H
7708	0000	11660	DEFW	0000H
770A	0000	11670	DEFW	0000H
770C	0000	11680	DEFW	0000H
770E	0000	11690	DEFW	0000H
7710	0000	11700	DEFW	0000H
0006		11710	DEFS	6
7718	0000	11720	DEFW	0000H
771A	00	11730	DEFB	00H
771B	00	11740	DEFB	00H
771C	00	11750	DEFB	00H
771D	00	11760	DEFB	00H
0032		11770	DEFS	50
7750		11780	EQU	5
7000		11790	END	CP00

FREE business software directory

- Radio Shack's Model I, II, III.
- Heath's MBASIC and HDOS
- CPM: Xerox, Alto...
- IBM Personal Computer

"IDM2 is GREAT!" -publisher of 80-US

"(GL) superior to either the Osborne (SBSG & Taranto) or Radio Shack... MAIL-X has a greater capacity... more flexible than (R.S.)"

-columnist of 80-microcomputing

"imperceptively fast...(DBMS) is a good and reliable workhorse"

-publisher of Interface Age

Data base manager, integrated accounting package (AR, AP, GL & Payroll), inventory, word processing, and mailing list. Compare and be selective!



Micro Architect, Inc.
96 Dothan St., Arlington, MA 02174

149

FREE...

VERBATIM DATA-LIFE DISKETTES

We'll send you a plastic box of 10 Verbatim Data-Life Diskettes, ABSOLUTELY FREE ... when you purchase any one of the following three items:

APPARATS NEWDOS/80[®], 2.0 \$149.95
HAYES SMARTMODEM 279.00
ST80 III 149.95

COPY MODEL III SCRIPSIT/VISICALC[®] \$20.00

Works with all model III Visicalc/scrpsit and allows unlimited backups of master disks. Works even if you're already backed up twice. Simple 17 line program.

TRS 80 AIR NAVIGATIONAL PROGRAM... \$39.95

For FBO'S - Charter - Business - Personal. Plan trips anywhere in the contiguous U.S. Program produces pilot-oriented, flyable, printout of locations in memory, or that you input. Shows trip data leg-by-leg, with mileage between points, MC, Wind correction, MH & GS, fuel per leg, ETE, ETA. Total mileage, time, fuel, average GS, plus fuel management.

Program requires 48K disk and printer

(Specify model I or III). Disk has over 200 locations, expandable to 500. Send \$5.00 for sample printout and instructions.

VERBATIM[®] DATA-LIFE DISKETTES

5"... \$29.90 box
8"... \$39.90 box

5" Diskettes come in reusable plastic storage box.

LAYMAN'S GUIDE TO NEWDOS/80, 2.0- \$7.50

An easy-to-understand, plain-English guide to the most commonly used features of NEWDOS/80, 2.0.

ST80 III... \$149.95

Smart terminal communications package. Allows file uploading/downloading. Emulates many different terminals. Total oper-

ator control. (Written by Lance Micklus.) - Includes FREE Diskettes. -

HAYES SMARTMODEM... \$279.00

Talk with other computers over regular Telephone lines. SMARTMODEM can auto dial - auto answer - repeat - allows for audio monitoring - programmable - is FCC approved direct-connect - Full or half duplex capability, 0 - 300 baud - RS-232C interface - seven status LED's. - (Includes FREE Diskettes) -

VISA - Mastercard - Money Orders - COD. Allow 2 weeks for personal checks. Kansas residents add 3.5% sales tax.



526 E. 4th Hutchinson, Kansas 67501
316/665-3611

142

Build a desk for your computer.

A Handy, Dandy, Tandy Table

R. Gene Langston
10755 Liscard Rd. S.
Jacksonville, FL 32216

What is a plywood project doing in a computer magazine? (Get ready to put that old card table back into the attic.)

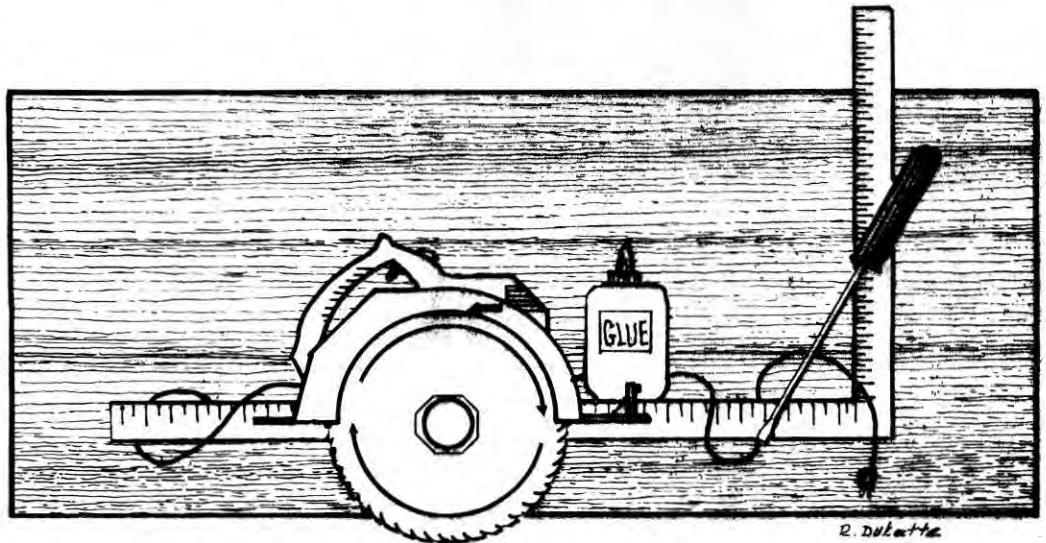
Make a Computer Table

You can purchase plywood, or (if you're on a tighter budget) you can get particle board instead. Particle board is tough, durable, and more than suitable for this job. Your wood should be at least 5/8-inch thick for strength.

A power saw will make the necessary cuts an easy job (see Fig. 1). If you buy the wood at a do-it-yourself supply center, the management will cut the board to your specifications for a nominal charge.

Assembly

After your pieces are cut, you



have the option to design your own side pieces. The design in Fig. 2 is just one of many that can be used. The strength of the table will not be compromised because of the cuts. Experiment on paper with various designs and utilize the one you like best.

But the 40-inch table back piece up against the leg stands, flush with the top. Secure with glue and screws. Lay the 40-inch wide table top over your as-

sembly, flush with the back. Again, secure with glue and screws.

Your computer table can be finished in any number of ways. For example, you can sand and stain; varnish top and sides; use formica-type covering for the

top and paint the sides; or leave it unfinished, for that "natural" look.

You can add a shelf (made from the left-over pieces) under the table, or on either side. You can also change the dimensions to suit your purposes. ■

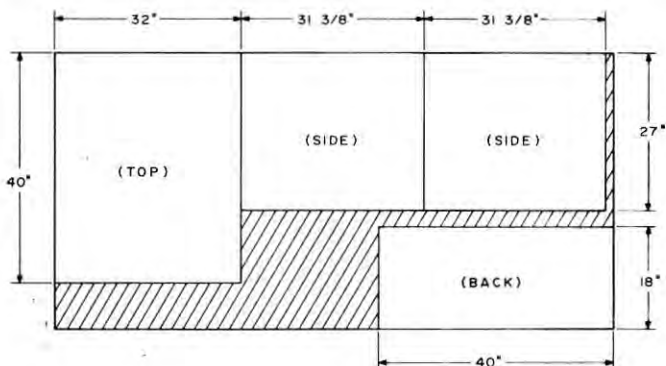


Figure 1

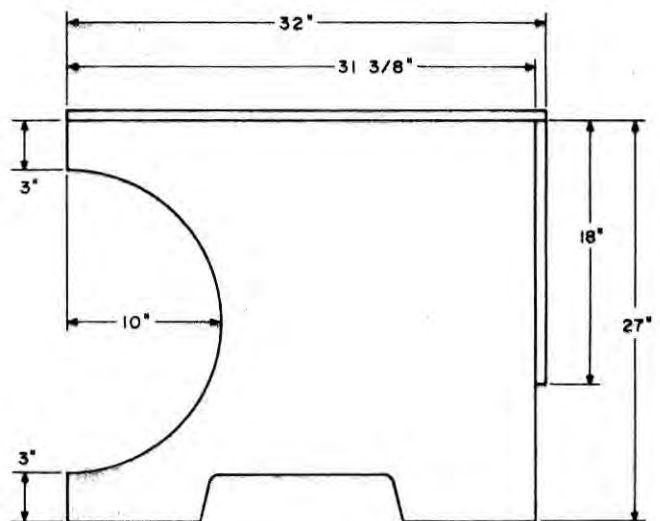


Figure 2

Make the most of your TRS-80™ with Wiley's popular guides

Whether you're a novice programmer or an adept computer user, our inexpensive paperback guides let you exploit the full potential of your TRS-80™ micro— for work, for pleasure, and everything in-between.

TRS-80™ BASIC

Bob Albrecht, Don Inman, & Ramon Zamora

"OUTSTANDING...the best thing to happen to Level II owners"

—**Computronics Monthly News**

"If you're a rank beginner... your novice status won't last long. TRS-80 BASIC leads you by the hand through the maze of programming the computer to perform both entertaining and useful tasks."—**Interface Age**

"Anyone with access to the proper home computer will be able to write programs within a few days."

—**Science Books and Films**

(0 471 06466-1) 1980

351 pp. \$8.95

THE TRS-80™ MEANS BUSINESS

Ted G. Lewis

Written specifically for business computer users, this hands-on manual is the first guide to the best-selling Radio Shack Model II Computer. You'll discover a wide variety of applications that will turn your system into a powerful "filing cabinet"—while making your business a lot more manageable. Many ready-to-run programs are included and the most difficult aspects of file structure programming are simplified.

(0 471 08239-2) 1982

194 pp. \$12.95

accompanying program disk

(0 471 86798-5) \$19.95

PROBLEM-SOLVING ON THE TRS-80™ POCKET COMPUTER

Don Inman & Jim Conlan

This step-by-step manual shows you how to use your TRS-80 pocket computer to solve virtually any educational or practical problem. Easy-to-follow demonstration problems familiarize you with the machine's own BASIC dialect, its keyboard, and its special operating, editing, and programming features.

(0 471 09270-3) 1982

255 pp. \$8.95

MORE TRS-80™ BASIC

Don Inman, Ramon Zamora, & Bob Albrecht

This exciting new interactive guide teaches scores of practical, recreational, and educational applications—including supergraphics, file techniques, animation, games, and versatile programming tools.

(0 471 08010-1) 1981

280 pp. \$9.95

TRS-80™ COLOR BASIC

Bob Albrecht

This self-paced manual lets you get maximum use from your TRS-80 Color Computer while it teaches you the fundamentals of BASIC programming. Abundant games, experiments, and programming problems and solutions help you explore the recreational, educational, and home applications of this fun and friendly machine.

(0 471 09644-X) April 1982

approx. 192 pp. \$9.95

8080/Z80 ASSEMBLY LANGUAGE Techniques for Improved Programming

Alan R. Miller

A step-by-step, top-down approach to assembly language programming. Over 100 pages of programs let you develop, write, and test your own routines. "This book is for intermediate and advanced programmers, but its clarity and organization can provide even a beginning programmer with an avenue to advanced techniques."—**Interface Age**

"An extremely useful book... gives plenty of examples to follow."

—**Computing Reviews**

(0 471 08124-8) 1981

318 pp. \$10.95

DATA FILE PROGRAMMING IN BASIC

Leroy Finkel & Jerald R. Brown

"A comprehensive guide to the mysterious world of data files... It will open up a whole new world of computing—a greatly extended repertoire of functional uses for one's microcomputer."

—**Interface Age**

"If you've been wanting to learn data base programming... or if you just need a good reference manual, this book is the one."—**REMarkable Software**

(0 471 08333-X) 1981

338 pp. \$12.95

FAST BASIC Beyond TRS-80™ BASIC

George Gratzner with Thomas G. Gratzner

You can vastly increase your computer's speed and efficiency by programming it in FAST BASIC—exciting new techniques developed to make your programs more powerful. You'll master 20 assembly language instructions and the names of 60 memory functions, then you'll apply these concepts to your knowledge of BASIC to improve your programming speed up to 1,000 times.

(0 471 09293-2) April 1982

288 pp. \$9.95



JOHN WILEY & SONS, Inc.

605 Third Avenue
New York, N.Y. 10158

2-1692

More than a million people have learned to program, use and enjoy microcomputers with Wiley paperback guides.
Look for them all in your favorite bookshop or computer store!

TRS-80™ is a trademark of Tandy Corp.

Data Acquisition and Control for the TRS-80* \$180 ppd.

The STARBUCK-8882 is a complete eight channel data acquisition and control system, plug compatible with the Model I Level II TRS-80. It includes 8 protected analog inputs (0-5 Vdc with 8 ± 1 bit accuracy), 8 protected digital inputs, 8 optoisolated digital outputs, and two joystick ports. Interrupt-driven software package allows simultaneous data acquisition and storage while using the TRS-80 for any other purpose!

Application manual covers home security, energy monitoring, weather station use, appliance control, graphics and games. Price includes case, power supply, extra expansion card edge, connector cable, complete software package and detailed applications manual. Manuals only are available for \$4.00 ppd. Model III version also available. To order, write:

STARBUCK DATA CO.
P.O. Box 24, Newton, MA 02162

Massachusetts residents add 5% sales tax ✓205
*TRS-80 is a trademark of Tandy Corp

A WIN AT "21"



PROFESSIONAL "21" TUTOR

Drills & exercises for learning & practicing basic playing strategy, card counting, & money management. Full casino simulation for play evaluation & practice with the benefit of excellent graphics!

TRS80 Model III

ATLANTIC CITY "21"
Game Only \$19.95
Game & Basic Strategy \$29.95
Full System \$95.00

(16K/cassette or DISK, specify when ordering)

NEVADA SYSTEM AVAILABLE IN APRIL '82. Order full system now & receive NEVADA SYSTEM FREE when available. Order by phone or mail. Pay by check, C.O.D., VISA or MASTERCARD. Add \$1.50 for shipping in U.S. \$3./Canada. \$5./Overseas. Add \$1.50 for C.O.D. or Blue Label.

Technical Software Systems

Box 55, Shrewsbury, N.J. 07701
(201) 780-4004 (24 Hrs.)
N.J. residents add 5% sales tax ✓204



HIGH SPEED CASSETTE DUPLICATION

If You've Written A Program And Need Copies (1 to 1,000,000) Give Us A Call!

Penner Bros., Inc.

305-287-0588 ✓387

210 Seville St. Stuart, FL 33494



TOTAL DISKETTE BACKUP

INCLUDING UNLIMITED BACKUP OF MOST PROTECTED DISKS

If your diskette software library is not completely backed up, or, if you are wasting diskettes by making backup copies of all your diskettes, your problem is solved! Using DUMLOAD, the total contents of your diskettes can be safely dumped to tape. The hi-speed tape option allows six 35 or 40 track diskettes to fit on one C60 cassette.

- TRS-80 Model I 16K - 48K
- TRSDOS or NEWDOS80 Compatible
- May be used to back-up TRSDOS, VTOS 4.0, NEWDOS, MICRODOS, or data disks. (Single Density)

— \$16.95 on Cassette — \$19.95 on Diskette
Plus \$1.00 handling (Indiana Res. add 4% tax)
TOLL FREE 24 HR. ORDERING SERVICE
1-800-525-9391 (Ext. 509) (Except Colo.)
1-800-332-9259 (Ext. 509) (Colo. Residents)
or Mail Check or Money Order To:

COMPLETE COMPUTER SERVICES ✓210
8188 HEATHER DRIVE
NEWBURGH, INDIANA 47630



EDUCATIONAL SOFTWARE

For TRS-80* Color Computer, PET, Apple II.

ELEMENTARY	MATH
SCIENCE	HISTORY
GEOGRAPHY	ACCOUNTING
ECONOMICS	BUSINESS ED.
FOREIGN LANG.	FARM RECORDS
GRAMMAR	COIN INVENTORY

Write for FREE Catalogue:

MICRO LEARNINGWARE ✓209

BOX 2134, N. MANKATO MN 56001
507-625-2205

VISA & MASTER CHARGE ACCEPTED

We pay 15% royalty for Educational Programs listed with us

Apple is a trademark of Apple Computer Co.
TRS-80 is a registered trademark of TANDY CORP.
Pet is a trademark of Commodore Bus. Machines.

\$275 DISK DRIVES

5 1/4" 40 Track drive with case and power supply.

FLIPPY DRIVES ONLY \$295.00
2 DRIVE CABLE \$14.95
4116 MEMORY CHIPS 8 FOR \$20

CORSAIR COMPUTER CORPORATION ✓200

7952 Highway 80 West
Fort Worth, TX 76116
817-244-8051

TRS80 MODEL II SOFTWARE

by **SOFTCO**

THE BUSINESS WATCHER™ System including

INVENTORY CONTROL SYSTEM	\$395.00
ACCOUNTS RECEIVABLE SYSTEM	295.00
ACCOUNTS PAYABLE SYSTEM	295.00
PAYROLL SYSTEM	295.00
GENERAL LEDGER SYSTEM	295.00

BUSINESS WATCHER™

Total System \$1495.00

PICOS™
(Parts Inventory Control System) \$1400.00

The most comprehensive software packages for TRS80 MODEL II users available.

MAGNUM COMPUTER PRODUCTS
PO Box 3358 Boise, ID 83703 208-342-7304
Dealer Inquiries Invited ✓261

GET YOUR TRS-80 DIRECT FROM

AUTHORIZED SALES CENTER

FORT WORTH **COMPUTERS** AND VIDEO

377 PLAZA, HWY 377 GRANBURY
FORT WORTH, TX 76048 ✓214

AND SAVE \$

FREE! Zenith Color T.V. NEW 1982 Model. with every MOD II or equivalent.

Get our quote "before" you buy.
Full manufacturers' warranty.
Texas residents add 4% sales tax.



817-573-4111

COST OF CALL REFUNDED FOR ORDERS BY TELEPHONE

Subscription Problem?

80 Microcomputing 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:

80 Microcomputing
Subscription Dept.
PO Box 981
Farmingdale, NY 11737

Thank you and enjoy your subscription.

— Professional —

REAL ESTATE SOFTWARE

for APPLE, TRS-80 + PET

- **PROPERTY MANAGEMENT SYSTEM:** \$325
 - Tenant History
 - Late Rent Report
 - Vacancy Report
 - Income Report
 - Auto Late Charge
 - Returned Checks
 - Ownership Files
 - Building Reports
 - Utilities Report
 - Tax Expense Report
 - Prints Checks
 - Prints Receipts
- **PROPERTY LISTINGS/COMPARABLES:** \$325

— SCREEN BY —

 - 22 Items/Listing
 - 1000 Listing/Disk
 - Listing Memo Field
 - Max/Min Price
 - Units/Zone/City
 - Max Price/Income
 - Max Price/Sq Foot
 - Min Cashflow
- **REAL ESTATE ANALYSIS MODULES:** \$40/Module
 - Home Purchase
 - Income Prop Analysis
 - Property Sales
 - Construction Cost/Profit
 - Tax Deferred Exchange
 - APR Loan Analysis
 - Loan Amortization
 - Depreciation Analysis
- **WORD PROCESSOR — MAGIC WAND:** \$285



AI Computer Stores Everywhere
or Order CDD Direct
Cal Residents add 6% Sales Tax
(213) 372-9419

Suite F, Dept. M, 1116-8th Street, Manhattan Beach, CA 90266

IEEE-488 TO TRS-80* INTERFACE

Everything needed to add **powerful BASIC GPIB-488 controller capability** to TRS-80 Model 1 or 3, Level 2 or DOS with a minimum of 16K.

488-80B
For Model 1
Operation





488-80C
For Model 3
Operation

Model 488-80B or 488-80C Price: \$375.
+ shipping, insurance & tax

WHEN ORDERING SPECIFY DISK OR TAPE

SCIENTIFIC ENGINEERING LABORATORIES

11 Neil Drive • Old Bethpage, NY 11804
Telephone: (516) 694-3370

*Trademark of Tandy Corp. ✓203

There is no affiliation between Scientific Engineering Laboratories and Tandy Corp. or Radio Shack.

MODELS I & III DISK BASIC PROGRAMS

RANDOM ACCESS PAYROLL VER. 1.1

- No complicated initialization
- EDIT & LIST
- NO SPECIAL CHECKS
- USES NEB 9020 checks
- PAY any employee anytime
- SALARIED or hourly
- SPECIAL PAY—special hours
- TWO SAVINGS—including RIA
- CLASSIFIED by occupation or dept.
- PAYSTUB shows Year-to-Date
- STATE—FICA—FED. TAXES—SAVINGS

SEND YOUR STATE TAX SCHEDULE—FREE—customized to your state tax

Documentation \$10.00
Disk & Documentation \$95.00

RANDOM ACCESS DEPRECIATION

- LISTS any one year's depreciation
- OR complete list of all property
- PRINTOUT shows—L.D. Number—description—Yr. purchased—life—method—1st yr. additional depreciation—
- Reg. deprec.—deprec. prior yrs.—balance
- SUMMARY—total value prop.—additional 1st yr.
- REGULAR deprec.—deprec. prior yrs.
- PERMANENT records for your taxes

Documentation \$15.00
Disk & Documentation \$195.00

MIN. 32K—1 DISK—PRINTER/132 CPI

TERMS: Personal checks require 3 weeks to clear.
USE—VISA—MASTER CHARGE—MONEY ORDERS
TEL 7 PM-9:30 PM EASTERN—(617) 359-2364/6370
SEND: SASE for additional information



MEDFIELD COMPUTER SOFTWARE

39 GREEN ST., MEDFIELD, MA 02052 ✓215

TRS-80 MODEL I T.M.* GOLDPLUG - 80

Eliminate disk re-boots and data loss due to poor contact problems at card edge connectors. The GOLD PLUG - 80 solders to the board card edge. Use your existing cables.

CPU/keyboard to expansion interface \$18.95
Expansion interface to disk, printer, RS232, screen printer (specify) \$9.95 ea
Full set, six connectors. . . \$54.95

EAP COMPANY
P.O. Box 14, Keller, TX 76248
(817) 498-4242

*TRS-80 is a trademark of Tandy Corp.

✓216

4 MHz

FOR THE

MOD 3

PC BOARD & DOC. ONLY \$19.95

THIS EASY TO INSTALL KIT WILL DOUBLE THE SPEED OF YOUR MOD-EL III COMPUTER.

COMPLETE KIT **\$59.95**
ASSEMBLED & TESTED **\$99.95**

CALL OR WRITE
J.E.S. GRAPHICS
P.O. BOX 2752
TULSA, OK. 74101
PHONE (918) 742-7104 ✓202

Verbatim

flexible disks

Call Free (800) 235-4137 for prices and information. Dealer inquiries invited. C.O.D. and charge cards accepted.




PACIFIC EXCHANGES
100 Foothill Blvd.
San Luis Obispo, CA 93401. In Cal. call (800) 592-5935 or (805) 543-1037.

✓207

TRS-80* MAGIC

MOD. 1 (IMPROVES LOW SPEED III TOO)
— THE AMAZING —



ONLY \$12.99

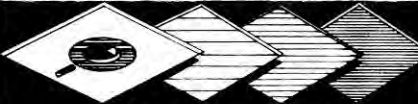
POSTPAID

TAKE THE LOAD OFF YOUR MIND!

- Say Goodbye to Tape Load Woes
- Reliably Loads "Impossible" Tapes
- Ends Tricky Volume Settings
- Invaluable for Regular CLOAD & SYSTEM Loads
- Great for High Speed KWICOS** Too!
- Use with CTR-80, 80A & Other Recorders
- Install in Seconds Simply Plug Between Cassette and Computer
- Money Back Guarantee

order LEMONAID LOADER FROM:
LEMONS TECH SERVICES
325 NORTH HIGHWAY 65
P.O. DRAWER 429 PH.: 417/345-7643
BUFFALO, MISSOURI 65622

*TRS-80 is a trademark Tandy Corp.
**KWICOS is a trademark KVM Software ✓358



FILE FORCE

A Disk File Program Designed for the Small Businessman

File Force is designed to readily keep track of all your business files and programs by utilizing all the power of your TRS-80 and Disc Basic. This program is specially designed to combine the power of a disk utility, the speed of random access, and the ease of use of a general database manager.

File Force will automatically read the information on your disks and allow you to search the masterfile by

- the name of the disk
- the name of a program
- the name of a business file
- any extension, such as a date. CMD

Other special features include easy updating. Where some software houses have protected their disks to make them unreadable, File Force will let you assign a disk name and enter those program names. It will also create a master printout of all business files and records on your disks, for safe keeping and better management of your resources.

System Requirements: TRS-80 Model 1, 48K. One Disk Drive. TRS-DOS Version 2.3 \$19.95. Please add \$2 for handling and postage: \$5 overseas; for your convenience you may phone in VISA or M/C orders.

SOFTWAREHOUSE INTERNATIONAL
We've Moved! P.O. Box 1383 Tandy Corp.
Clovis, CA 93613; (209) 251-7877
In Australia: Computer Campus; Kent Town, S.A. 5067
Phone: 08.42.4826

™ TRS80 color

From the January 1981 issue of the CSRA Computer Club newsletter:

There was some amusement at the November meeting when the Radio Shack representatives stated that the software in the ROM cartridges could not be copied. This month's 68 Micro Journal reported they had disassembled the programs on ROM by covering some of the connector pins with tape. They promise details next month. Never tell a hobbyist something can't be done! This magazine seems to be the only source so far of technical information on the TRS-80 color computer. Devoted to SS-50 6800 and 6809 machines up to now, 68 Micro Journal plans to include the TRS-80 6809 unit in future issues.

To get the MOST from your 6809 CPU - This is the BEST SOURCE! THE ONLY Magazine for the 6809 Computer Months Ahead of All Others!

68 MICRO JOURNAL

5900 Cassandra Smith Rd.
Hixson, TN 37343

USA
1 Yr.—\$24.50 2 Yr.—\$42.50 3 Yr.—\$64.50
*Foreign Surface Add \$12 Yr. to USA Price
Foreign Air Mail Add \$35 Yr. to USA Price.
*Canada & Mexico Add \$5.50 Yr. to USA Price. ✓213

Direct access to all memory with Fortran.

Total Recall

J. Gary Bender
P.O. Box 773
Los Alamos, NM 87544

I am about to demonstrate one of the most powerful tricks you can pull on the Fortran compiler and runtime system: direct access to anything in memory. By "direct access" I don't mean

PEEK and Call POKE; I mean doing things like Screen(I) = MSG(J). As part of the demonstration, you'll have two Fortran routines that will be similar to Basic's CLS and Print @ statements.

This old trick is based on the same idea as having based arrays which are available in some high level languages, i.e., you define an array to the compiler

but set the base (the memory location of subscript (1)) at runtime. In this example we will define an array and then overlay it onto the display RAM at locations X'3C00' to X'3FFF'. The array can be a vector of 1024 INTEGER*1 characters, or a matrix of 64 columns by 16 rows (or both). The same technique can be used to directly reference the keyboard, device control blocks, or whatever you want (and know the memory address of).

You need two things for this to work. You must define an array and you must know exactly where the loader is going to store the array in the runtime module. The first part is easy and the second is standard in Radio Shack's Fortran. The loader will tell you the location (see Fig. 1). The variables associated with the \$MAIN program will always be loaded at X'5200' unless you tell the loader to put data somewhere else. To be sure you know where things are, it is a good idea to put the array into a named common block and always make it the first thing you define. I generally make my

\$MAIN program a simple call to the real program, which becomes a subroutine that never returns.

So, we have a \$MAIN with an array in named common:

```
INTEGER*1 X$5200(1)
COMMON /BASECM/ X$5200
```

This will do the job nicely. We just told the compiler that we have an array. We already know where the loader will put it. The array size does not matter, but we need to know where it starts. It is the programmer's responsibility to watch array boundaries in most Fortrans, including this one. When the manual says dimensions *must* match it means "they better, for your own good." However, we are going to break a couple of standard Fortran rules, but the compiler is too dumb to catch us and the runtime system will let us.

To make the technique more general, let's do this in two steps. First we will offset all the way to memory location X'0001'. From there we can offset again to any place we want by simply using the known absolute memory address. If ABSMEM is an INTEGER*1 array with ABSMEM(1) located at X'0001' then ABSMEM(15360) is the first position in the TRS-80's memory mapped screen (15360 decimal

```
OK Gary: F80 DEMODMA,DEMOMDMA = DEMODMA-N
DEMOMDMA
SETBAS
SCNDEM
CLS
PRINT$
OK Gary: L80 DEMODMA,DEMOMDMA-N-M
LINK-80 3.4 28-NOV-80 COPYRIGHT 1979,80 (C) MICROSOFT
DATA 5200 55E7 < 999>
/BASECM/ 5200 < 3>
CLS 5571 DEMOMDMA 5206 PRINT$ 55A6
SCNDEM 532D SETBAS 5230
FORLIB RQUEST
-$IO 53E7 -$INIT 520A -$ND 53EA
-$ST 5220 -$W2 53DC -$POKE 547D
6 UNDEFINED GLOBAL(S)
32474 BYTES FREE
*
-E
DATA 5200 6EC4 < 7364>
24955 BYTES FREE
(5206 6EC4)
OK Gary: . The following load is with the WRITE and FORMAT statements removed.
(No FORTRAN I/O in this.)
OK Gary: L80 DEMO, -E
LINK-80 3.4 28-NOV-80 COPYRIGHT 1979,80 (C) MICROSOFT
DATA 5200 5980 < 1920>
30890 BYTES FREE
(5206 5980)
OK Gary:
Note that /BASECM/ is located at X'5200' and that the second load, without WRITE
or FORMAT in the program, is quite a bit smaller. (The "OK Gary:" is really "LDOS
Ready" except I personalized SYS1/SYS.)
```

Fig. 1. Compile and Load of the DEMODMA/FOR Program.

The Key Box

Radio Shack Fortran
Model I
32K RAM

Centronics 730

Same as Radio Shack
Line Printer II

Once \$995

Brand New

Now

\$399

While they last

Plus \$10 for shipping & insurance



5 1/4 Disc Drives

For TRS-80 Mod. 1 35 or 40 track capability

\$279

Single or double density (with proper interface)
Choice of MPI or Tandom drives

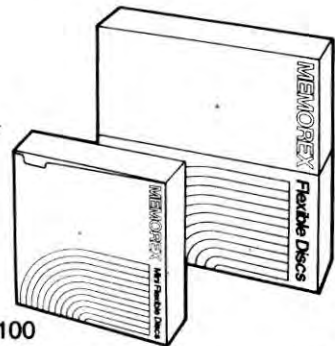
Add \$7.50 for shipping

5 1/4 Discs for TRS-80 and Apple

Prime First Quality

MEMOREX Discs as low as **\$1.89 per disc** In lots of 100

Limited time only
Subject to availability



Part No.	10 or More	50 or More	100 or More
3401	\$2.09	\$1.99	\$1.89
3431 with Hubring	\$2.35	\$2.25	\$2.15

All prices, F.O.B. shipping point, subject to change. All offers subject to withdrawal without notice. Advertised prices reflect a 2% cash discount (order pre-paid prior to shipment). C.O.D.'s and credit cards are 2% higher.

MiniMicroMart, Inc



943 W. Genesee St. Syracuse, N.Y. 13204 (315)422-4467



= 3C00 hex). It turns out that the magic number is -20990. That is, the location of X\$5200(1) at X'5200', element X\$5200 (-20990) is the absolute memory address X'0001'. (Ah, but negative subscripts are illegal, you say?) Since the subscript is a variable, Fortran does not know it is negative. Actually, 20990 is X'51FE', which when subtracted from X'5200' leaves us pointing at X'0001'.

The main program sets one location based on another known location and passes that on to the Setbas subroutine. Setbas then offsets again to define Screen at X'3C00'. Remember that arguments in subroutine and function calls are not values, but are the addresses of where the values are stored. So, when we pass the argument X\$5200 (-20990) to Setbas, we are passing the address X'0001'. Whatever we decide to call the receiving array in the subroutine, it will be located at that address. I have called the new array ABSMEM and it is also dimensioned one.

Screen will be based by a call with the subscript X'3C00'. The array at the other end will then have element Screen(1) at that location. The screen is now a regular Fortran array. We can assign values, get values, do arithmetic (may look strange) just like any other Fortran variable. You should be able to follow the DEMDMA program pretty easily from here on.

In case you are a new Fortran user, to compile, load and run the program just create it with Edit or Scripsit and name it DEMODMA/FOR. Then,

```
F80 DEMODMA = DEMODMA
and
L80 DEMODMA, DEMODMA-N,-E
```

To run it, just Enter DEMODMA. The results are a demonstration of putting characters on the screen.

You will notice a phenomenal improvement from Write to Call POKE and a very noticeable change from POKE to the direct array access. If you only need to put a few special characters here and there on the screen, POKE will do fine and you can avoid the

two dummy routines to set up the array. On the other hand, POKE only moves one byte at a time while the array is much more flexible (and faster) and you can move array elements easily with Do loops. Here is another surprise: check the run module size of the example (that's the number in < > displayed at the end of the load), comment out all the Writes and Formats, and compile and load it again. You can save over 5K by avoiding Fortran's I/O modules. For some applications that is practical. I have a 1200 baud Fortran terminal program that emulates the Visual 200 and Videotex protocols and has no Fortran I/O at all, yet it is written entirely in Fortran.

One Limitation

The technique has one important limitation. In order for the basing to be effective, the arrays must be passed as arguments. You cannot locate the Screen array in common. This is not too serious a limitation as long as you remember it. Any time you break a rule, be very careful. This is a powerful technique when you do it on purpose. Do it by accident or do it wrong, and you will have a very nasty bug.

The demonstration program illustrates how to directly access the lower 32K of memory. In order to access the high 32K it is necessary to use an additional offset. The reason for this requirement is that the integer subscripts become negative if you attempt to exceed 32767. The most direct way to setup the high memory addresses is to establish an array at X'8001'. Do that by using X\$5200(11777) as an argument to Setbas and then call it something like HIMEM(1) in Setbas. To access locations in the top 32K, just subtract X'8000' from the absolute address and refer to HIMEM() with that value for the subscript.

Experimentation

When I was experimenting with this technique, there were many times that I could have used an LOC function. LOC is available in some Fortrans to discover the memory address of its argument. LOC is similar to VARPTR in Basic.

Radio Shack's Fortran has the capability of telling you the absolute address of a variable. The trick is only a minor infraction of the rules; you just use a do-nothing subroutine as the integer function. For example, in the demonstration program you would have:

```
BASOFF = -LOC(X$5200) + 2
```

instead of the constant. All that is needed for this to work is the following subroutine:

```
SUBROUTINE LOC
RETURN
END
```

You must make LOC a subroutine, even though you use it as a function. That is what makes it work. When arguments are passed to subroutines the first argument's address is placed in the HL register. BASOFF = -LOC(X\$5200) puts the address X'5200' in HL. Since subroutine LOC is not expecting any arguments and doesn't do anything

but return, the HL register pair is left containing the address of the argument. The calling program, however, expects an integer value to be returned by the function. By standard calling convention for this compiler, a function returns an integer value (note that is value, not address) in the HL register pair. So there you have it. The calling program looks at HL for the function value and gets back the address it just put there.

By using LOC in place of the magic number you no longer care exactly where the reference array is loaded, as long as it is in the lower 32K of memory. In fact, the X\$5200 array is not really needed. It's only purpose was to give the programmer a known memory location to start from. Any array in the program can be the reference point by finding its LOC.

Notice that plus two is added to the LOC of the reference array. You must increase the negative subscript by one to point at X'0001' rather than zero, and you must count element X\$5200(0). ■

Program Listing

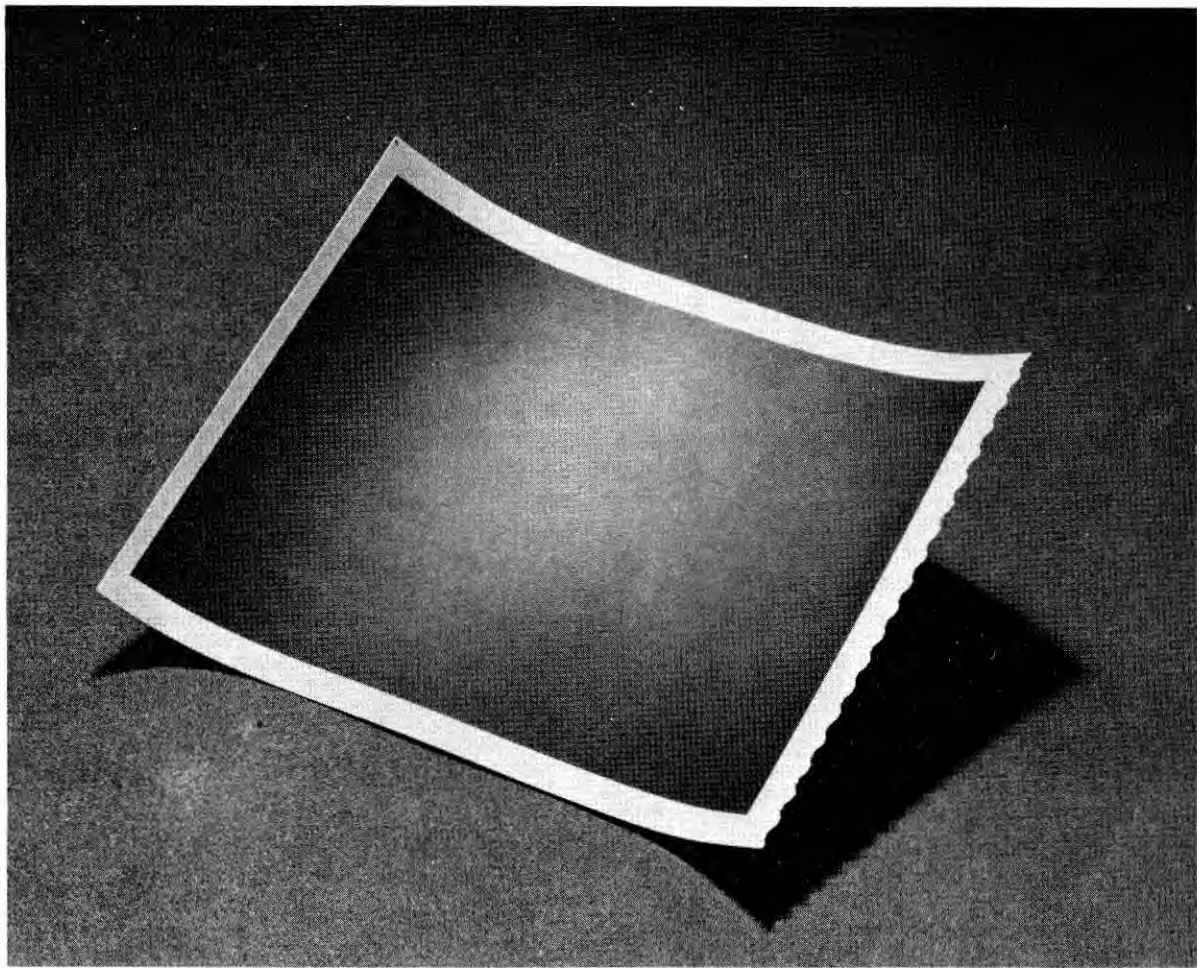
```
C DEMDMA -- Demonstrate FORTRAN Direct Memory Access
C
C JG Bender, N5BFM
C Los Alamos, NM 87544
C
C Version 810716-2130
C
C The purpose of this $MAIN program is to establish the locatio
n
C of Common /BASECM/ and the X$5200() array at X'5200'.
C
PROGRAM DEMDMA
Integer*1 X$5200(1)
Integer*2 BASOFF
Common /BASECM/ X$5200, BASOFF
BASOFF = -20990
Call SETBAS(X$5200(BASOFF))
Stop **end
End

C
C Subroutine SETBAS(ABSMEM)
C
C Set the location for base of memory and point to the screen.
C It is a good idea to also pass ABSMEM(1) as an argument so yo
u
C can make
C make absolute memory calls at any time.
C
Integer*1 ABSMEM(1)
Integer*2 LOCSCR
Data LOCSCR/X'3C00'/

C
C It is not necessary to put positive subscripts into variables
,
C but it
C will make it easier to adjust the offset values for other mac
hines.
C
Call SCNDEM(ABSMEM(LOCSCR),ABSMEM)
Return
End

C
C
C Demonstrate the speed of direct screen access.
C
C First ... "flash" the screen 20 times with WRITES
C Then ... use "Call POKES"
C Then ... direct access thru an offset array
C
Subroutine SCNDEM(SCREEN,ABSMEM)
C
Integer*1 SCREEN(1), ABSMEM(1), I1, J1, K1
```

Program continues



This is a picture
of all the printers in the world
that outsell the MX-80.

Epson.

The one thing you can't beat in the marketplace is value. And there simply isn't a better combination of reliability, print quality, features and price in an 80-column printer than the Epson MX-80. Anywhere on earth.

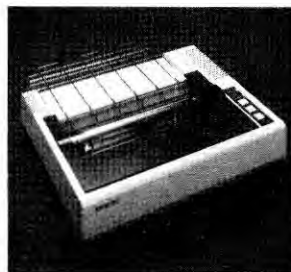
But while we're pleased to make the best-selling 80-column printer in the world, we're hardly surprised. Because we decided a long time ago that the way to succeed in this business is to build a good product, sell it at a fair price, and stand behind it.

So we built our MX-80 with features like a choice of 24 different type faces, graphics that rival plotters, logical seeking, bidirectional printing and the world's first disposable print head. We priced it at under \$650. And if it breaks, we'll be here to fix it.

That seems like a straightforward enough policy. But when we first introduced the MX-80, the competition

laughed. Now they're cutting prices, introducing "new" models, and running splashy color ads, all in an effort to catch up. And they're not laughing.

But you don't have to take our word for it. You've got a choice: you can buy the printer that's been embraced by several hundred thousand computer fanatics all over the world. Or you can buy something else. And take your chances.



✓97

EPSON
EPSON AMERICA, INC.

3415 Kashiwa Street, Torrance, CA 90505 • (213) 539-9140

**Computer
Case
Company**



• RS204

**Comp
Case**
NOW TOLL FREE
800-848-7548

Attaché style cases for carrying and protecting a complete computer set-up. Constructed of the highest quality luggage material with saddle stitching. Will accommodate equipment in a fully operational configuration along with manuals, working papers and disks. Never a need to remove equipment from case. Simply remove lid, connect power and operate.

• RS201	TRS-80 Model I, Expansion Unit & Drives ..	\$109
• RS202	TRS-80 Monitor or TV set	84
• RS204	TRS-80 Model III	129
• RS205	Radio Shack Color Computer	89
• P401	Paper Tiger 440/445/460	99
• P402	Line Printer II/IV	89
• P403	Epson MX70 or MX80	89
• P404	Epson MX100	99
• CC80	Matching Attaché Case (5")	85
• CC90	Matching Attaché Case (3")	75
• CC91	Matching Accessory Case	95

Computer Case Company ✓ 139

5650 INDIAN MOUND CT. COLUMBUS, OHIO 43213 (614) 868-9464



Then Parallel Process!

CUE is a programmable processor which rapidly accepts from your computer data to be printed and then goes off-line to drive the printer— independent of your computer, which is now free. CUE is better than software spooling since none of your computer's memory, processing power, or disk drives are tied up. CUE is available in parallel, serial, or with both in 2- and 4-port models (connect several printers or computers) with from 16K to 32 K memory. Use as an interface

MicroCompatible

Prices begin at \$299.

P.O. Box 7624, Atlanta, GA 30357 (404) 874-8366 ✓ 287

Program continued

```

Integer*2  SOLID(31), BLANKS(31)
Data      SOLID/31*X'BFBF'/, BLANKS/31*X'2020'/
C
  Call CLS(SCREEN)
  Call PRINT$(SCREEN(86),'This is using WRITBs',20)
C
C Following code sets the system's cursor position in the Device Control
C Block to the beginning of the screen.
C
  ABSMEM(X'4020') = X'00'
  ABSMEM(X'4021') = X'3C'
C
  Do 5 I=1,32767
  Continue
C
  Do 21 J1=1,20
  Do 10 I1=1,16
  Write (1,1010) SOLID
  Continue
10
C
  ABSMEM(X'4020') = X'00'
  ABSMEM(X'4021') = X'3C'
C
  Do 20 I1=1,16
  Write(1,1010) BLANKS
20
  Continue
C
  ABSMEM(X'4020') = X'00'
  ABSMEM(X'4021') = X'3C'
C
21
  Continue
C
1010
  Format (1X,31A2)
C
C
  Call CLS(SCREEN)
  Call PRINT$(SCREEN(86),'This is using POKEs',19)
  Do 25 I=1,32767
  Continue
25
C
  Do 40 J1=1,20
  Do 30 I=X'3C00',X'3FFF'
  Call POKE(I,X'BF')
30
C
  Do 40 I=X'3C00',X'3FFF'
  Call POKE(I,X'20')
40
C
C
  Call CLS(SCREEN)
  Call PRINT$(SCREEN(80),'This is with direct array access',
32)
  Do 50 I=1,32767
  Continue
50
C
  Do 70 J1=1,20
  Do 60 I=1,1024
  SCREEN(I) = X'BF'
60
C
  Do 70 I=1,1024
  SCREEN(I) = X'20'
70
C
C
  Call CLS(SCREEN)
  Call PRINT$(SCREEN(541),'D o n e',7)
  Do 80 I=1,32767
  Continue
  Return
  End
80
C
C
C CLS -- Clear Screen subroutine
C << this routine does not maintain the system cursor location
  pointer>>
C
  Subroutine  CLS(SCREEN)
C
  Integer*1  SCREEN(1024)
  Integer*2  I
C
  Move blanks (character X'20') to the entire screen.
C
  Do 10 I=1,1024
  SCREEN(I) = X'20'
10
C
  Return
  End
C
C
C PRINT$ -- Subroutine similar to BASIC's PRINT@
C Call with WHERE() array based at screen position (1-1024)
C STRING() array is the string to display.
C LEN is the length of STRING() (note this version is limited
  to 127 characters because of the use of Integer*1 for its typ
  e)
C << system cursor pointer at X'4020' is not maintained by this
  version.
C A mix of FORTRAN I/O and PRINT$ will not be consistent in
  screen
  placement. >>
C
  Subroutine  PRINT$(WHERE,STRING,LEN)
C
  Integer*1  WHERE(1), STRING(1), LEN, ILOOP
C
C (this routine cannot check that WHERE is actually on the scre
  en, it
  is really a general MOVE subroutine usable anywhere.)
C
  Do 10 ILOOP=1,LEN
  WHERE(ILOOP) = STRING(ILOOP)
10
C
  Return
  END

```


READER SERVICE

This card is valid until May 31, 1982

Please help us to bring you a better magazine—
by answering these questions.

A. What is your occupation?

- 1 Professional
- 2 Engineer
- 3 Data Processing
- 4 Business
- 5 Education
- 6 Technician
- 7 Government
- 8 Student
- 9 Other

H. From what companies have you purchased software?

- 1 Hayden
- 2 Hewlett-Packard
- 3 Instant Software
- 4 Microsoft
- 5 Personal Software
- 6 SAMS
- 7 Other

B. What are your primary interests in applications of your TRS-80? Rate all that apply on a scale of 1 (least) to 5 (most).

- 1 Business
- 2 Hobby
- 3 Home Management/Finance
- 4 Education
- 5 Science or Technical
- 6 Other

I. How many people read your copy of 80 Microcomputing?

- 1 1
- 2 2
- 3 3
- 4 4 or more

C. Is your computer use:

- 1 Connected with your occupation
- 2 Not connected with your occupation
- 3 Both of the above apply

J. Where did you obtain this copy of 80 Microcomputing?

- 1 Subscription copy
- 2 Newsstand
- 3 Computer store
- 4 Friend
- 5 Other

D. What type of TRS-80 do you own?

- 1 Model I Level I
- 2 Model I Level II
- 3 Model II
- 4 Model III Level I
- 5 Model III Level II
- 6 Color
- 7 Pocket Computer

K. Please enter the month and page number of your favorite 80 Microcomputing article published during the last 12 months.

Month _____ Page Number _____

E. On average, how many of each issue's program listings do you actually type into your microcomputer?

- 1 0-2
- 2 3-5
- 3 6-8
- 4 9 or more

L. On a scale of 0 (no interest) to 5 (great interest) please rate your interest in the following columns:

- 1 Remarks
- 2 Inside 80
- 3 80 Applications
- 4 Education 80
- 5 News
- 6 Exclusive 80
- 7 80 Accountant
- 8 Kitchen Table Software
- 9 The Assembly Line
- 10 Input
- 11 New Products
- 12 Reviews

F. Are you currently a member of a network?

- 1 Yes Which one?
- 2 No

M. If you are not a subscriber please circle 500.

G. To what type of software users groups do you belong?

- 1 Hardware Exclusive
- 2 General Club
- 3 College Organization
- 4 Other

Reader Service: To receive more information from any of the advertisers in this issue of 80 Microcomputing, circle the number on the postage-paid Reader Service Card that corresponds with the Reader Service number on the ad in which you are interested. You will find numbers, preceded by a circle, near the logo of each advertiser. Complete the entire card, drop into a mailbox and in 4-6 weeks you will hear from the advertiser directly.

1	6	11	16	21	151	156	161	166	171	301	306	311	316	321	451	456	461	466	471
2	7	12	17	22	152	157	162	167	172	302	307	312	317	322	452	457	462	467	472
3	8	13	18	23	153	158	163	168	173	303	308	313	318	323	453	458	463	468	473
4	9	14	19	24	154	159	164	169	174	304	309	314	319	324	454	459	464	469	474
5	10	15	20	25	155	160	165	170	175	305	310	315	320	325	455	460	465	470	475
26	31	36	41	46	176	181	186	191	196	326	331	336	341	346	476	481	486	491	496
27	32	37	42	47	177	182	187	192	197	327	332	337	342	347	477	482	487	492	497
28	33	38	43	48	178	183	188	193	198	328	333	338	343	348	478	483	488	493	498
29	34	39	44	49	179	184	189	194	199	329	334	339	344	349	479	484	489	494	499
30	35	40	45	50	180	185	190	195	200	330	335	340	345	350	480	485	490	495	500
51	56	61	66	71	201	206	211	216	221	351	356	361	366	371	501	506	511	516	521
52	57	62	67	72	202	207	212	217	222	352	357	362	367	372	502	507	512	517	522
53	58	63	68	73	203	208	213	218	223	353	358	363	368	373	503	508	513	518	523
54	59	64	69	74	204	209	214	219	224	354	359	364	369	374	504	509	514	519	524
55	60	65	70	75	205	210	215	220	225	355	360	365	370	375	505	510	515	520	525
76	81	86	91	96	226	231	236	241	246	376	381	386	391	396	526	531	536	541	546
77	82	87	92	97	227	232	237	242	247	377	382	387	392	397	527	532	537	542	547
78	83	88	93	98	228	233	238	243	248	378	383	388	393	398	528	533	538	543	548
79	84	89	94	99	229	234	239	244	249	379	384	389	394	399	529	534	539	544	549
80	85	90	95	100	230	235	240	245	250	380	385	390	395	400	530	535	540	545	550
101	106	111	116	121	251	256	261	266	271	401	406	411	416	421	551	556	561	566	571
102	107	112	117	122	252	257	262	267	272	402	407	412	417	422	552	557	562	567	572
103	108	113	118	123	253	258	263	268	273	403	408	413	418	423	553	558	563	568	573
104	109	114	119	124	254	259	264	269	274	404	409	414	419	424	554	559	564	569	574
105	110	115	120	125	255	260	265	270	275	405	410	415	420	425	555	560	565	570	575
126	131	136	141	146	276	281	286	291	296	426	431	436	441	446	576	581	586	591	596
127	132	137	142	147	277	282	287	292	297	427	432	437	442	447	577	582	587	592	597
128	133	138	143	148	278	283	288	293	298	428	433	438	443	448	578	583	588	593	598
129	134	139	144	149	279	284	289	294	299	429	434	439	444	449	579	584	589	594	599
130	135	140	145	150	280	285	290	295	300	430	435	440	445	450	580	585	590	595	600

Name _____
 Address _____
 City _____ State _____ Zip _____

80 Microcomputing • April 1982

BOOKS

80 Microcomputing
Peterborough NH 03458

Please send me the following 80
Microcomputing products:

Qty.	Catalog #	Title	Unit Price	Total

Shipping and handling charges:
\$1.50 1st book, \$1.00 each additional book
(UPS, use street address)
\$10.00 each book overseas airmail

Shipping/handling _____

Total _____

Enclosed \$ _____ Check M.O.

Bill: AE MC VISA

Card # _____

Exp date _____ Interbank # _____

Signature _____

Name _____

Address _____

City _____ State _____ Zip _____

Please allow 4-6 weeks for delivery

No C.O.D. orders accepted.

SUBSCRIPTION

80 microcomputing

subscribers save \$10
off the
newsstand price.

New subscription Renewal

1 year—\$24.97

Enclosed \$ _____ Check M.O.

Bill: MC Visa AE me

Card # _____ Exp. date _____

Signature _____ Interbank # _____

Name _____

Address _____

City _____ State _____ Zip _____

Canada—\$27.97, 1 year only, US funds.

Foreign Surface—\$44.97 1 year only, US funds.

Foreign Air—Please inquire.

324889



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY CARD

FIRST CLASS PERMIT NO. 80 PETERBOROUGH NH 03458

POSTAGE WILL BE PAID BY ADDRESSEE



Subscription Dept.
POB 981
Farmingdale NY 11737



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY CARD

FIRST CLASS PERMIT NO. 80 PETERBOROUGH NH 03458

POSTAGE WILL BE PAID BY ADDRESSEE



Att. Mail Order
Peterborough NH 03458



P. O. BOX 306
DALTON, MA 01226

BUSINESS REPLY MAIL

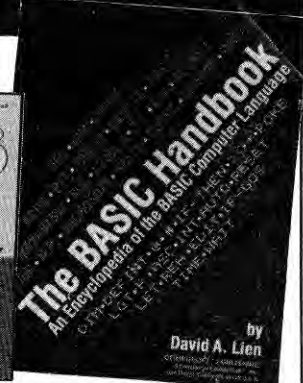
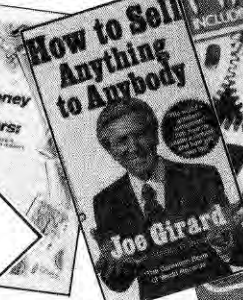
FIRST CLASS PERMIT NO. 30 DALTON MA 01226

POSTAGE WILL BE PAID BY ADDRESSEE



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BASIC & PASCAL



new

new

ANNOTATED BASIC—A NEW TECHNIQUE FOR NEOPHYTES.—BASIC programming was supposed to be simple—a beginner's programming language which was so near to English that it could be easily understood. But, in recent years, BASIC has become much more powerful and therefore much more difficult to read and understand. BASIC simply isn't basic anymore. *Annotated BASIC* explains the complexities of modern BASIC. It includes complete TRS-80* Level II

BASIC programs that you can use. Each program is annotated to explain in step-by-step fashion the workings of the program. Programs are flowcharted to assist you in following the operational sequence. And—each chapter includes a description of the new concepts which have been introduced. *Annotated BASIC* deals with the hows and whys of TRS-80 BASIC programming. *How* is a program put together? *Why* is it written that way? By observing the programs and following the annotation, you can develop new techniques to use in your own programs—or modify commercial programs for your specific use. *Annotated BASIC Volume 1* BK7384 \$10.95 *Annotated BASIC Volume 2* BK7385 \$10.95 *Order Both Volumes and Save!* BK7384/2 \$18.95

THEORY Z—How American Business Can Meet the Japanese Challenge—by William Ouchi. Why are the Japanese catching up and surpassing American industrial productivity? What allows Japanese industrialists to offer guaranteed lifetime employment to their workforce? This book will help you understand the Theory Z managerial philosophy and its implications for the American corporate future. Examples are given of the American industrial giants already operating under Z-style management, and the impact of this style on the quality of their executives and workers is explored. A must for the alert businessman, large or small. BK1226 \$12.95*

SO YOU ARE THINKING ABOUT A SMALL BUSINESS COMPUTER—by Richard G. Canning and Nancy C. Leeper. For a well-organized manual on the process of selecting the right computer system for your small business, this text can't be excelled. Designed to introduce the novice in data and word processing to the real benefits of computerization, the book is filled with money- and time-saving tips, photos of equipment, lists of suppliers, prices, explanations of computer terminology, and helpful references to additional sources of information. Everyone contemplating a first computer installation should have this book. BK1222 \$14.00*

PAYROLL WITH COST ACCOUNTING—IN BASIC—by L. Poole & M. Borchers, includes program listings with remarks, descriptions, discussions of the principle behind each program, file layouts, and a complete user's manual with step-by-step instructions, flowcharts, and simple reports and CRT displays. Payroll and cost accounting features include separate payrolls for up to 10 companies, time-tested interactive data entry, easy correction of data entry errors, job costing (labor of distribution), check printing with full deduction and pay detail, and 16 different printed reports, including W-2 and 941 (in CBASIC). BK1001 \$20.00.*

SOME COMMON BASIC PROGRAMS—Published by Adam Osborne & Associates, Inc. Perfect for non-technical computerists requiring ready-to-use programs. Business programs, plus miscellaneous programs. Invaluable for the user who is not an experienced programmer. All will operate in the stand-alone mode. BK1053 \$14.99 paperback.

PIMS: PERSONAL INFORMATION MANAGEMENT SYSTEM—Learn how to unleash the power of a personal computer for your own benefit in this ready-to-use data-base management program. BK1009 \$11.95.*

INTRODUCTION TO TRS-80 LEVEL II BASIC AND COMPUTER PROGRAMMING—by Michael P. Zabinski. Written by an experienced educator, this is the book for those beginners who want to learn about computers without having to become an expert. It has practical programs, useful line-by-line comments, excellent flowcharts accompanied by line numbers and over 200 exercises which help the reader assess progress, reinforce comprehension, and provide valuable practical experience. BK1219 \$10.95.*

50 BASIC EXERCISES—by J. P. Lamotier. This book is structured around the idea that the best way to learn a language is through actual practice. It contains 50 completely explained exercises: statement and analysis of the problem, flowcharts, programs and actual runs. Program subjects include mathematics, business, games, and operations research, and are presented in varying levels of difficulty. This format enables anyone to learn BASIC rapidly, checking their progress at each step. BK1192 \$12.95.*

THE BASIC HANDBOOK—SECOND EDITION—by David Lien. This book is unique. It is a virtual ENCYCLOPEDIA of BASIC. While not favoring one computer over another, it explains over 250 BASIC words, how to use them and alternate strategies. If a computer does not possess the capabilities of a needed or specified word, there are often ways to accomplish the same function by using another word or combination of words. That's where the HANDBOOK comes in. It helps you get the most from your computer, be it a "bottom-of-the-line" micro or an oversized monster. BK1174 \$19.95.*

LEARNING LEVEL II—by David Lien. Written especially for the TRS-80, this book concentrates on Level II BASIC. It explores every important BASIC language capability. Updates are included for those who have studied the Level I User's Manual. Sections include: how to use the Editor, dual cassette operation, printers and peripheral devices, and the conversion of Level I programs to Level II. BK1175 \$15.95.*

BASIC BASIC (2ND EDITION)—by James S. Coan. This is a textbook which incorporates the learning of computer programming using the BASIC language with the teaching of mathematics. Over 100 sample programs illustrate the techniques of the BASIC language and every section is followed by practical problems. This second edition covers character string handling and the use of data files. BK1026 \$10.50.*

ADVANCED BASIC—Applications including strings and files, coordinate geometry, area, sequences and series, simulation and graphing and games. BK1000 \$10.75.*

INTRODUCTION TO PASCAL—by Rodney Zaks. A step-by-step introduction for anyone wanting to learn the language quickly and completely. Each concept is explained simply and in a logical order. All features of the language are presented in a clear, easy-to-understand format with exercises to test the reader at the end of each chapter. It describes both standard PASCAL and UCSD PASCAL—the most widely used dialect for small computers. No computer or programming experience is necessary. BK1189 \$14.95.*

PROGRAMMING IN PASCAL—by Peter Grogono. The computer programming language PASCAL was the first language to embody in a coherent way the concepts of structured programming, which has been defined by Edsger Dijkstra and C.A.R. Hoare. As such, it is a landmark in the development of programming languages. PASCAL was developed by Niklaus Wirth in Zurich; it is derived from the language ALGOL 60 but is more powerful and easier to use. PASCAL is now widely accepted as a useful language that can be efficiently implemented, and as an excellent teaching tool. It does not assume knowledge of any other programming language and therefore suitable for an introductory course. BK1140 \$12.95.*

—GAMES—

40 COMPUTER GAMES FROM KILOBAUD MICROCOMPUTING—Forty games in all in nine different categories. Games for large and small systems, and even a section on calculator games. Many versions of BASIC used and a wide variety of systems represented. A must for the serious computer gamesman. BK7381 \$7.95.*

BASIC COMPUTER GAMES—Okay, so once you get your computer and are running in BASIC, then what? Then you need some programs in BASIC, that's what. This book has 101 games for you from very simple to real buggers. You get the games, a description of the games, the listing to put in your computer and a sample run to show you how they work. Fun. Any one game will be worth more than the price of the book for the fun you and your family will have with it. BK1074 \$7.50.*

MORE BASIC COMPUTER GAMES—Edited by David H. Ahl. More fun in BASIC! 84 new games from the people who brought you *BASIC Computer Games*. Includes such favorites as Minotaur (battle the mythical beast) and Eliza (unload your troubles on the doctor at bargain rates). Complete with game description, listing and sample run. BK1182 \$7.50.*

WHAT TO DO AFTER YOU HIT RETURN—PCG's first book of computer games... 48 different computer games you can play in BASIC... programs, descriptions and many illustrations. Lunar Landing, Hamurabi, King, Civel 2, Qubic 5, Taxman, Star Trek, Crash, Market, etc. BK1071 \$16.50.*

—MONEYMAKING—

HOW TO MAKE MONEY WITH COMPUTERS—In 10 information-packed chapters, Jerry Felsen describes more than 30 computer-related, money-making, high profit, low capital investment opportunities. BK1003 \$15.00.*

HOW TO SELL ANYTHING TO ANYBODY—According to *The Guinness Book of World Records*, the author, Joe Girard, is "the world's greatest salesman." This book reveals how he made a fortune—and how you can, too. BK7306 \$2.25.*

THE INCREDIBLE SECRET MONEY MACHINE—by Don Lancaster. A different kind of "cookbook" from Don Lancaster. Want to slash taxes? Get free vacations? Win at investments? Make money from something that you like to do? You'll find this book essential to give you the key insider details of what is really involved in starting up your own money machine. BK1071 \$5.95.*

*No C.O.D. orders accepted. All orders add \$1.50 for the first book, \$1.00 each additional book, \$10.00 per book foreign airmail. Please allow 4-6 weeks for delivery. Questions regarding your order? Please write to Customer Service at the following address. Use the order card in this magazine or itemize your order on a separate piece of paper and mail to 80 Microcomputing Book Department • Peterborough NH 03458. Be sure to include check or detailed credit card information.

FOR TOLL FREE ORDERING CALL 1-800-258-5473

80 microcomputing bookshelf

MICROCOMPUTING CODING SHEETS *Microcomputing's* dozen or so programmers wouldn't try to work without these handy scratch pads, which help prevent the little errors that can cost hours and hours of programming time. Available for programming in Assembly/Machine Language (PD1001), which has columns for address, instruction (3 bytes), source code (label, op code, operand) and comments; and for BASIC (PD1002) which is 72 columns wide, 50 sheets to a pad. \$2.39.*

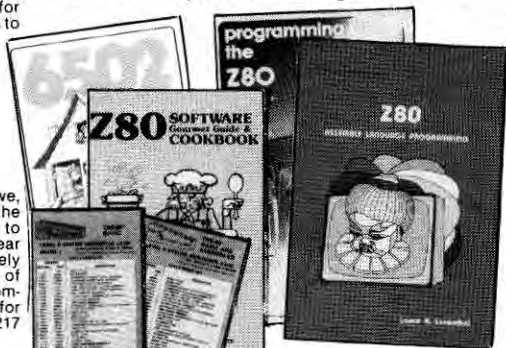
—Z-80—

TRS-80 ASSEMBLY LANGUAGE—by Hubert S. Howe, Jr. This book incorporates into a single volume all the pertinent facts and information you need to know to program and enjoy the TRS-80. Included are clear presentations of all introductory concepts, completely tested practical programs and subroutines, details of ROM and RAM and disk operating systems, plus comprehensive tables, charts and appendices. Suitable for the first time user or more experienced users. BK1217 \$9.95.*

PROGRAMMING THE Z-80—by Rodney Zaks. Here is assembly language programming for the Z-80 presented as a progressive, step-by-step course. This book is both an educational text and a self-contained reference book, useful to both the beginning and the experienced programmer who wish to learn about the Z-80. Exercises to test the reader are included. BK1122 \$15.95.*

INSIDE LEVEL II—For machine language programmers. This is a comprehensive reference guide to the Level II ROMs, allowing easy utilization of the sophisticated routines they contain. It concisely explains set-ups, calling sequences, variable passage and I/O routines. Part II presents an entirely new composite program structure which unloads under the SYSTEM command and executes in both BASIC and machine code with the speed and efficiency of a compiler. Special consideration is given to disk systems. BK1183 \$15.95.*

Z-80 SOFTWARE GOURMET GUIDE AND COOKBOOK—by Nat Wadsworth. Scelbi's newest cookbook! This book contains a complete description of the powerful Z-80 instruction set and a wide variety of programming information. Use the author's ingredients including routines, subroutines and short programs, choose a time-tested recipe and start cooking! BK1045 \$16.99.*



6809 ASSEMBLY LANGUAGE PROGRAMMING—BK1177—by Lance A. Leventhal. This book thoroughly covers the Z-80 instruction set, abounding in simple programming examples which illustrate software development concepts and actual assembly language usage. Features include Z-80 I/O devices and interfacing methods, assembler conventions, and comparisons with 8080A/8085 instruction sets and interrupt structure. \$16.99.*

6809

6809 MICROCOMPUTER PROGRAMMING AND INTERFACING—by Andrew C. Staugaard, Jr. Getting involved with Tandy's new Color Computer? If so, this new book from the Blacksburg Group will allow you to exploit the awesome power of the machine's 6809 microprocessor. Detailed information on processor architecture, addressing modes, register operation, data movement, arithmetic logic operations, I/O and interfacing is provided, as well as a review section at the end of each chapter. Four appendices are included covering the 6809 instruction set, specification sheets of the 6809 family of processors, other 6800 series equipment and the 6809/6821 Peripheral Interface Adapter. This book is a must for the serious Color Computer owner. BK1215 \$13.95.*

NANOS SYSTEM REFERENCE CARDS

for Model I and Model III

At last! No more flipping through the pages of the Basic manual! No more working through the maze of machine language instructions! These cards completely summarize the Basic and Assembler manuals! **FEATURES INCLUDE:** memory map, eyeball graphics, math instructions, basic commands, store instructions, basic functions, load instructions, basic statements, move instructions, special keys, exchange instructions, print using examples, shift instructions, basic special characters,

compare instructions, basic and assembler messages and codes, branch instructions, basic facts, data alteration instructions, reserved words, I/O instructions, ROM routines, complete character chart with graphics and space-compression codes, hex-dec chart, control code cross-reference, assembler instructions commands and operators, screen line layout, editor commands & subcommands, condition code easy access

Plus—"magic graphics number—a mystery until you learn how to use it!

Designed as a fold-up, accordion-style card, fits in your pocket. Panels organized for optimum speed for reference.

Model I: Basic only FC1001 \$2.95, Basic and Assembler FC1002 \$4.95

Model III: Basic only FC1004 \$3.95, Basic and Assembler FC1003 \$5.95

ALL NEW—FOR 80 OWNERS ENCYCLOPEDIA FOR THE TRS-80*

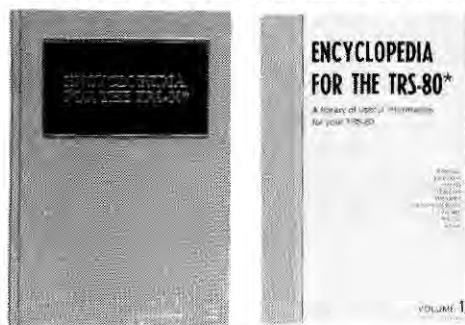
ENCYCLOPEDIA FOR THE TRS-80** is the newest peripheral for your micro-computer. This ten-volume reference series contains programs and articles especially selected to extend the documentation that comes with the TRS-80. Volumes of the **Encyclopedia** are being issued one-at-a-time, approximately six weeks apart. This means that each new volume will reflect the latest developments in TRS-80 microcomputing. **Encyclopedia for the TRS-80** is available in two editions. The deluxe **COLLECTOR'S EDITION** has a handsome green and black hard cover with a dust jacket. A soft cover edition is also available.

To order single hard cover volumes of the **Encyclopedia** please specify:

Volume 1	EN8101	\$19.95*
Volume 2	EN8102	\$19.95*
Volume 3	EN8103	\$19.95*
Volume 4	EN8104	\$19.95*
Volume 5	EN8105	\$19.95*

To order single softcover volumes of the **Encyclopedia** please specify:

Volume 1	EN8081	\$10.95*
Volume 2	EN8082	\$10.95*
Volume 3	EN8083	\$10.95*
Volume 4	EN8084	\$10.95*
Volume 5	EN8085	\$10.95*
Volume 6	EN8086	\$10.95*
Volume 7	EN8087	\$10.95*



SPECIAL INTRODUCTORY OFFER
Order the entire set (the first ten volumes) of the **Encyclopedia for the TRS-80** and receive the tenth volume **FREE!**

10 Volume deluxe hard cover **COLLECTOR'S EDITION** — a \$199.50 value.

EN8100 \$164.00 postpaid

10 Volume soft cover edition, a \$109.50 value.

EN8080 \$83.00 postpaid

ENCYCLOPEDIA LOADER is the software companion to the **Encyclopedia for the TRS-80**. This special series of cassettes will allow you to load selected programs from the **Encyclopedia** instantly. Hours of keyboarding time and the aggravating search for typos is eliminated by using the **Encyclopedia Loader**.

Encyclopedia Loader for Volume 1 of the **Encyclopedia** of the TRS-80 is available at a **Special Introductory Price** of \$12.95 (a \$14.95 value). To take advantage of this offer specify:

EL800111 \$12.95*

Additional **Encyclopedia Loaders** will be available as each volume of the **Encyclopedia** for the TRS-80 is issued. To order specify **Encyclopedia Loader**:

Volume 2	EL8002	\$14.95*
Volume 3	EL8003	\$14.95*
Volume 4	EL8004	\$14.95*
Volume 5	EL8005	\$14.95*
Volume 6	EL8006	\$14.95*
Volume 7	EL8007	\$14.95*

*No C.O.D. orders accepted. All orders add \$1.50 for the first book, \$1.00 each additional book, \$10.00 per book foreign airmail. Please allow 4-6 weeks for delivery. Questions regarding your order? Please write to Customer Service at the following address:

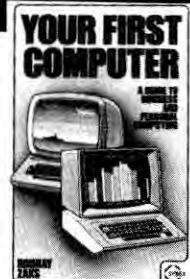
Use the order card in this magazine or itemize your order on a separate piece of paper and mail to 80 *Microcomputing* Book Department • Peterborough NH 03458. Be sure to include check or detailed credit card information.

FOR TOLL FREE ORDERING CALL 1-800-258-5473

80

microcomputing™

bookshelf



HOBBY COMPUTERS ARE HERE!! If you want to come up to speed on how computers work—hardware and software—this is an excellent book. It starts with fundamentals and explains the circuits and the basics of programming, along with a couple of TVT construction projects, ASCII, Baudot, etc. This book has the highest recommendations as a teaching aid. \$4.95.* BK7322

THE NEW HOBBY COMPUTERS—This book takes it from where Hobby Computers Are Here! leaves off, with chapters on Large-Scale Integration, how to choose a microprocessor chip, an introduction to programming, low-cost I/O for a computer, computer arithmetic, checking memory boards... and much, much more! Don't miss this tremendous value! Only \$4.95.* BK7340

AN INTRODUCTION TO MICROCOMPUTERS, VOL. 0 —The Beginner's Book—Written for readers who know nothing about computers—for those who have an interest in how to use computers—and for everyone else who must live with computers and should know a little about them. The first in a series of 4 volumes, this book will explain how computers work and what they can do. Computers have become an integral part of life and society. During any given day you are affected by computers, so start learning more about them with Volume 0. BK1130 \$7.95.*

VOL. I—2nd Edition completely revised. Dedicated to the basic concepts of microcomputers and hardware theory. The purpose of Volume I is to give you a thorough understanding of what microcomputers are. From basic concepts (which are covered in detail), Volume I builds the necessary components of a microcomputer system. This book highlights the difference between minicomputers and microcomputers. BK1030 \$12.99.

• UNDERSTANDING AND PROGRAMMING MICROCOMPUTERS—BK7382—A valuable addition to your computing library. This two-part text includes the best articles that have appeared in 73 and KiloBaud Microcomputing magazines on the hardware and software aspects of microcomputing. Well-known authors and well-structured text helps the reader get involved. \$10.95*

• SOME OF THE BEST FROM KILOBAUD MICROCOMPUTING—BK7311—A collection of the best articles that have appeared in KiloBaud MICROCOMPUTING. Included is material on the TRS-80 and PET systems, CP/M, the 8080/8085/Z-80 chips, the ASR-33 terminal. Data base management, word processing, text editors and file structures are covered too. Programming techniques and hard-core hardware construction projects for modems, high speed cassette interfaces and TVTs are also included in this large format, 200 plus page edition. \$10.95.*

DON'T (or How to Care for Your Computer)—by Rodney Zaks. In plain language, with numerous illustrations, this book tells all the do's and don't's of the care, preservation and correct operation of the small computer system. Specific chapters cover each piece of hardware and software, as well as safety and security precautions and help for problem situations. Have your computer work right the first time and keep it working. No technical background required. For all computer users. BK1237 \$11.95.

YOUR FIRST COMPUTER—by Rodney Zaks. Whether you are using a computer, thinking about using one or considering purchasing one, this book is indispensable. It explains what a computer system is, what it can do, how it works and how to select various components and peripheral units. It is written in everyday language and contains invaluable information for the novice and the experienced programmer. (The first edition of this book was published under the title "An Introduction to Personal and Business Computing".) BK1191 \$8.95*

MICROPROCESSOR INTERFACING TECHNIQUES—by Austin Lesea & Rodney Zaks—will teach you how to interconnect a complete system and interface it to all the usual peripherals. It covers hardware and software skills and techniques, including the use and design of model buses such as the IEEE 488 or S-100. BK1037 \$17.95.*



SPECIAL INTERESTS

MOD III ROM COMMENTED—Soft-Sector marketing, 1981. This book is not an instruction course on machine language, but rather an information source that you can use time and time again for writing your own program or patching old Mod I machine language programs. It contains an explanation of ROMs in the latest machine from Tandy, with most every location of the 14K ROMs listed, with comments. BK1235 \$22.50.

THE CUSTOM TRS-80 AND OTHER MYSTERIES—by Dennis Kitz. More than 300 pages of TRS-80 customizing information. With this book you'll be able to explore your computer like never before. Want to turn an 8 track into a mass storage unit? Individual reverse characters? Replace the BASIC ROMs? Make Music? High speed, reverse video, Level I and Level II? Fix it if it breaks down? All this and much, much more. Even if you have never used a soldering iron or read a circuit diagram, this book will teach you how! This is the definitive guide to customizing your 80! BK1218 \$29.95.*

BASIC FASTER AND BETTER AND OTHER MYSTERIES—by Lewis Rosentelder. You don't have to learn assembly language to make your programs run fast. With the dozens of programming tricks and techniques in this book you can sort at high speed, swap screens in the twinkling of an eye, write INKEY routines that people think are in assembly language and add your own commands to BASIC. Find out how to write elegant code that makes your BASIC really hum, and explore the power of USR calls. BK1221 \$29.95.*

THE CP/M HANDBOOK (with MP/M)—by Rodney Zaks. A complete guide and reference handbook for CP/M—the industry standard in operating systems. Step-by-step instruction for everything from turning on the system and inserting the diskette to correct user discipline and remedial action for problem situations. This also includes a complete discussion of all versions of CP/M up to and including 2.2, MP/M and CDOS. BK1187 \$14.95.*

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

KILOBAUD CLASSROOM—by George Young and Peter Stark. Learning electronics theory without practice isn't easy. And it's no fun to build an electronics project that you can't use. *KiloBaud Classroom*, the popular series first published in *KiloBaud Microcomputing*, combines theory with practice. This is a *practical* course in digital electronics. It starts out with very simple electronics projects, and by the end of the course you'll construct your own working microcomputer!

Authors Young and Stark are experienced teachers, and their approach is simple and direct. Whether you're learning at home or in the classroom, this book provides you with a solid background in electronics—and you'll own a computer that you built yourself! BK7386 \$14.95

TOOLS & TECHNIQUES FOR ELECTRONICS—by A. A. Wicks is an easy-to-understand book written for the beginning kit-builder as well as the experienced hobbyist. It has numerous pictures and descriptions of the safe and correct ways to use basic and specialized tools for electronic projects, as well as specialized metal-working tools and the chemical aids which are used in repair shops. \$4.95.* BK7348

HOW TO BUILD A MICROCOMPUTER—AND REALLY UNDERSTAND IT—by Sam Creason. The electronics hobbyist who wants to build his own microcomputer system now has a practical "How-To" guidebook. This book is a combination technical manual and programming guide that takes the hobbyist step-by-step through the design, construction, testing, and debugging of a complete microcomputer system. Must reading for anyone desiring a true understanding of small computer systems. \$9.95.* BK7325



TRS-80 DISK AND OTHER MYSTERIES—by Harvard C. Pennington. This is the definitive work on the TRS-80 disk system. It is full of detailed "How to use," information with examples, samples and in-depth explanations suitable for beginners and professionals alike. The recovery of one lost file is worth the price alone. BK1181 \$22.50.*

MICROSOFT BASIC DECODED AND OTHER MYSTERIES—by James Farvour. From the company that brought you *TRS-80 DISK AND OTHER MYSTERIES*. Contains more than 6500 lines of comments for the disassembled Level II ROMs and six additional chapters describing every BASIC subroutine, with assembly language routines showing how to use them. Flowcharts for all major routines give the reader a real insight into how the interpreter works. BK1186 \$29.50.*

*No C.O.D. orders accepted. All orders add \$1.50 for the first book, \$1.00 each additional book, \$10.00 per book foreign airmail. Please allow 4-6 weeks for delivery. Questions regarding your order? Please write to Customer Service at the following address.

Use the order card in this magazine or itemize your order on a separate piece of paper and mail to 80 Microcomputing Book Department • Peterborough NH 03458. Be sure to include check or detailed credit card information.

FOR TOLL FREE ORDERING CALL 1-800-258-5473

80 CALENDAR

April

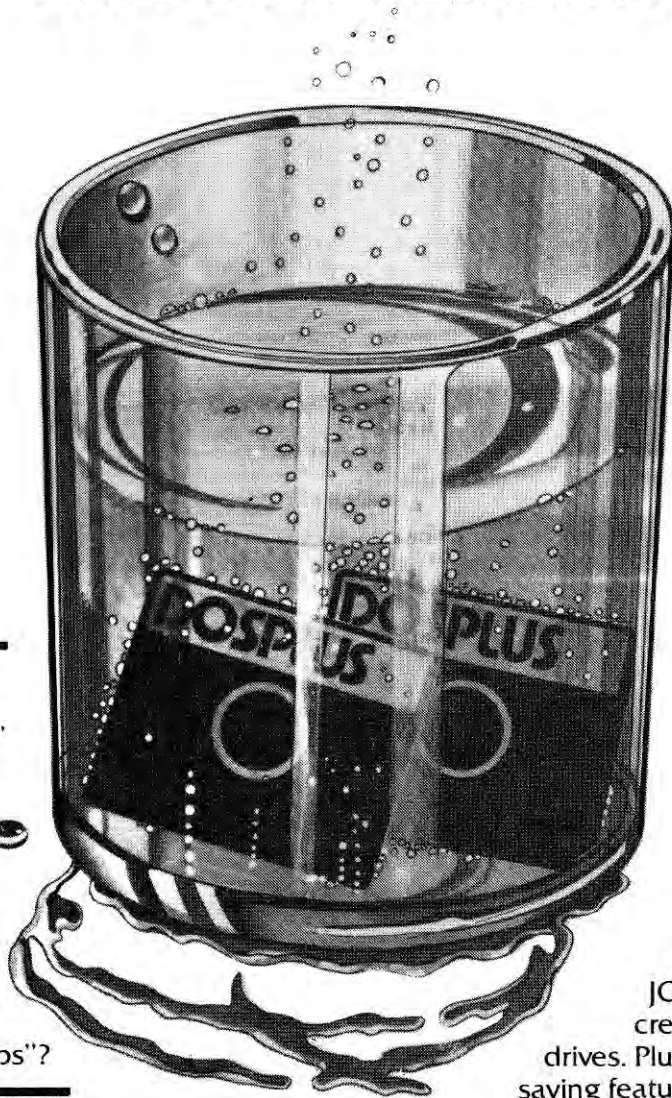
- 1-3 Alaska Association for Computers in Education, Anchorage, AK. **Educational Computing—The Future is Now Conference**, Anchorage, AK.
- 2-3 Montana Council of Teachers of Mathematics and Montana Office of Public Instruction. **Rocky Mountain Computer Conference for Educators**, Ramada Inn, Billings, MT.
- 2-4 Kengore Corp., Franklin Park, NJ. **Eighty/Apple Computer Show—An Exposition for Products and Services for Apple and TRS-80 Computers**, NY Statler Hotel, New York, NY.
- 2-4 Kengore Corporation, Franklin Park, NJ. **Eighty/Apple Computer Show**, New York City, NY.
- 5-7 American Federation of Information Processing Societies Inc., Arlington, VA. **1982 Office Automation Conference**, Moscone Center, San Francisco, CA.
- 6-9 Ken Orr and Associates Inc., Topeka, KS. **Course on Structured Systems Design**, Sacramento, CA.
- 7-9 Ken Orr and Associates Inc., Topeka, KS. **Course on Structured Systems Planning**, Chicago, IL.
- 12-14 American Management Associations, New York, NY. **Course on Paperwork Management**, Chicago, IL.
- 12-16 Ken Orr and Associates Inc., Topeka, KS. **Course on Structured Systems Design/Structured Program Design**, Raleigh, NC.
- 13-16 Ken Orr and Associates Inc., Topeka, KS. **Course on Structured Data Base Design**, Washington, DC.
- 13-16 Ken Orr and Associates Inc., Topeka, KS. **Course on Structured Requirements Definition**, St. Paul, MN.
- 15-17 The Interface Group, Framingham, MA. **Showcase Expo for Small Business Proprietors, Independent Neighborhood Professionals and Mid-Level Corporate Managers**, A. J. Cervantes Hall, St. Louis.
- 15-18 National Computer Shows, Chestnut Hill, MA. **Southwest Computer Show and Office Equipment Exposition**, Market Hall, Dallas Market Center, Dallas, TX.
- 16-18 Virginia Computer User's Conference, Association for Computing Machinery, and Virginia Polytechnic Institute and State University. **2th Annual Conference with topics on artificial intelligence, office automation and data-base management**, Marriot Hotel, Blacksburg, VA.
- 16-18 Technical Education Research Centers, Cambridge, MA. **Microcomputers in Education Workshops**, Jersey City State College, Jersey City, NJ.
- 19 Ken Orr and Associates Inc., Topeka, KS. **Course on Management Overview of Data Structured Systems Development**, Boston, MA.
- 19-23 Ken Orr and Associates Inc., Topeka, KS. **Course on Structured Systems Design/Structured Requirements Definition**, Lake Tahoe, NV.
- 20 Ken Orr and Associates Inc., Topeka, KS. **Course on Management Overview of Data Structured Systems Development**, Washington, DC.
- 20-23 Ken Orr and Associates Inc., Topeka, KS. **Course on Structured Systems Design**, Dallas, TX.
- 22-23 Data Processing Management Association, Mile High Chapter, Denver, CO. **Exposition and Conference of Computer Technology**, Rocky Mountain Data Processing Expo, Curigan Hall, Denver.
- 22-25 The National Computer Shows, Chestnut Hill, MA. **New York Computer Show and Office Equipment Exposition**, Nassau Coliseum, Uniondale, Long Island, NY.
- 23-25 The Interface Group, Framingham, MA. **Showcase Expo for Small Business Proprietors, Independent Neighborhood Professionals and Mid-Level Corporate Managers**, Miami Expo Center, Miami, FL.
- 24 John Craig's Computer Swap, Palo Alto, CA. **Flea Market for Computer Enthusiasts**, Santa Clara County Fairgrounds, San Jose, CA.
- 26-30 Ken Orr and Associates Inc., Topeka, KS. **Course on Structured Systems Design/Structured Program Design**, Omaha, NE.
- 4 University of New Hampshire, Computer Science Department. **Microcomputer Fair**, Memorial Union Building, UNH, Durham, NH.
- 4-7 Integrated Computer Systems, Santa Monica, CA. **Hands-On Pascal Workshop**, San Francisco, CA.
- 4-7 Ken Orr and Associates Inc., Topeka, KS. **Course on Structured Requirements Definition**, Seattle, WA.
- 4-8 University of California Extension, Berkeley. **16-Bit Microprocessor Workshop**, (6 week evening course), Mountain View, CA.
- 6-9 The National Computer Shows, Chestnut Hill, MA. **Southern California Computer Show and Office Equipment Exposition**, L.A. Convention Center, Los Angeles.
- 7-9 The Interface Group, Framingham, MA. **Showcase Expo for Small Business Proprietors, Independent Neighborhood Professionals and Mid-Level Corporate Managers**, Anaheim Convention Center, Anaheim, CA.
- 10-14 Ken Orr and Associates Inc., Topeka, KS. **Course on Structured Systems Design/Structured Program Design**, Portland, OR.
- 11-12 The Yankee Group, Cambridge, MA. **The Next Generation of Consumer Electronics Seminar**, New York City, NY.
- 11-13 Ken Orr and Associates Inc., Topeka, KS. **Course on Structured Systems Planning**, Washington, DC.
- 11-14 Integrated Computer Systems, Santa Monica, CA. **Distributed Processing, Mini and Microcomputer Implementations**, San Francisco, CA.
- 17-19 Software Design Associates, New York City. **20th User Conference: Productivity in the 80s**, Hyatt Regency Crystal City, Arlington, VA.
- 18-19 The Yankee Group, Cambridge, MA. **The Next Generation of Consumer Electronics seminar**, Palo Alto, CA.
- 18-20 Technical Education Research Centers, Cambridge, MA. **Microcomputers in Education Workshops**, Gutman Library, Cambridge, MA.
- 18-21 Ken Orr and Associates Inc., Topeka, KS. **Course on Structured Requirements Definition**, Kansas City, MO.

May

- 3-7 Ken Orr and Associates Inc., To-

FOR FAST RELIEF

Take DOSPLUS 3.4



Do you have that tired dragged out feeling known as "DOS Drag" from an operating system that is just **too** slow? Do you have "Computis Interruptous" because you spend more time with your DOS manual than you do at your computer? Has an undependable DOS got you down with the inadvertent "Dumps"?

Then you need DOSPLUS 3.4. DOSPLUS 3.4 contains all the active ingredients for a quick recovery. Dependable fast action features like instant boot-up, BASIC array sort (multi-key, multi-array), Tape/Disk-Disk/Tape utility (with program relocater), Input@ (controlled screen input from BASIC), and complete disk editing features including random access file editing and ASCII modification on sector dump utility.

And who wouldn't feel better with proven features like the ability to use a "DO" (command chaining) file from within a BASIC program, and more reliable BACKUP and FORMAT utilities.

In addition, you have the convenience of repeating the last DOS command with "/" <ENTER>, a single file convert from Model III TRSDOS, file directory supported for Model III TRSDOS disks, complete device routing supported with FORCE and JOIN, and the ability to read or create 40 track disks in 80 track drives. Plus many other time and effort saving features.

Of course, in order for a prescription to work, you've got to follow instructions — in this case the instructions are contained in the new easy to use easy to follow 240 page DOSPLUS users guide with system technical reference section. So, if you're experiencing any DOS related discomfort, get instant relief. **\$149⁹⁵**
Get DOSPLUS 3.4

DOSPLUS

First in the Industry backed by a lifetime warranty.



**MICRO SYSTEMS
SOFTWARE, INC.**

5846 Funston Street • Hollywood, FL 33023

(Outside of Fla.)
CALL TOLL FREE
1-800-327-8724

FOR VISA/MASTERCHARGE/C.O.D. ORDERS
TOLL FREE LINES WILL ACCEPT ORDERS ONLY!
For Applications and Technical information
call (305) 983-3390 or drop us a card
Dealers inquires invited

Wayne Green Books

NEW
ARRIVALS



Annotated BASIC—A New Technique for Neophytes.

BASIC programming was supposed to be simple—a beginner's programming language which was so near to English that it could be easily understood. But, in recent years, BASIC has become much more powerful and therefore much more difficult to read and understand. BASIC simply isn't basic anymore.

Annotated BASIC explains the complexities of modern BASIC. It includes complete TRS-80* Level II BASIC programs that you can use. Each program is annotated to explain in step-by-step fashion the workings of the program. Programs are flowcharted to assist you in following the operational sequence. And—each chapter includes a description of the new concepts which have been introduced.

Annotated BASIC deals with the hows and whys of TRS-80 BASIC programming. How is a program put together? Why is it written that way? By observing the programs and following the annotation, you can develop new techniques to use in your own programs—or modify commercial programs for your specific use.

Annotated BASIC Volume 1 contains Projecting Profits, Surveyor, Things to Do, Tax Shelter, Introduction to Digital Logic, Camelot, The Soundex Code, Deduction, Op Amp, Contractor Cost Estimating. **BK7384 \$10.95** ISBN 0-88006-028-X

Annotated BASIC Volume 2 contains Rough Lumber List, Trip Mileage, Flight Plan, OSCAR Data, SWR/Antenna Design, Supermaze, Petals Around the Rose, Numeric Analysis, Demons, Air Raid, Geography Test, Plumbing System Design. **BK7385 \$10.95** ISBN 0-88006-037-9

Order Both Volumes and Save! BK738402 \$18.95

Kilobaud Classroom—

A practical course in digital electronics

by George Young and Peter Stark

Learning electronics theory without practice isn't easy. And it's no fun to build an electronics project that you can't use. *Kilobaud Classroom*, the popular series first published in *Kilobaud Microcomputing*, combines theory with practice. This is a *practical* course in digital electronics. It starts out with very simple electronics projects, and by the end of the course, you'll construct your own working microcomputer!

Authors Young and Stark are experienced teachers, and their approach is simple and direct. Whether you're learning at home or in the classroom, this book provides you with a solid background in electronics—and you'll own a computer that you built yourself!

Kilobaud Classroom contains Getting the Ball Rolling, Gates and Flip-Flops Explained, J.K. Flip-Flops and Clocked Logic, PC Boards and Power Supplies, Hardware Logical Functions, Voltage, Current and Power Supplies, Transistors, Diodes and OP Amps, Pulses and More Pulses, Counters and Registers, Bus Traffic Control, ROM and RAM Memories, I/O Circuitry, Parallel and Serial I/O Ports, Computer I/O III, Computer I/O IV, Computer I/O V, Processor Connections, Finally—The Kilobaud Crescendo, Eproms and Troubleshooting, Expansions and Programming, Machine-Language Programming, Assembly-Language Programming, Connecting to the Outside World.

ISBN 0-88006-027-1 **BK7386 \$14.95**

The New Weather Satellite Handbook

By Dr. Ralph E. Taggart WB8DQT

Here is the completely updated and revised edition of the best-selling *Weather Satellite Handbook*—containing all the information on the most sophisticated spacecraft now in orbit. Dr. Taggart has written this book to serve both the experienced amateur satellite enthusiast and the newcomer. The book is an introduction to satellite watching that tells you how to construct a complete and highly effective ground station. Not just ideas, but solid hardware designs and all the instructions necessary to operate the equipment are included. An entire chapter is devoted to microcomputers and the Weather Satellite Station. And for the thousands of experimenters who are operating stations, *The New Weather Satellite Handbook* details all the procedures necessary to follow the current spacecraft.

Weather Satellite contains Operational Satellite Systems, Antenna Systems, Weather Satellite Receivers, A Cathode Ray Tube (CRT) Monitor for Satellite Picture Display, A Direct-Printing Facsimile System for Weather Satellite Display, How to Find the Satellite, Test Equipment, Microcomputers and the Weather Satellite Station, Station Operations.

ISBN 0-88006-015-8 **available now! BK7383 \$8.95**

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

FOR TOLL-FREE ORDERING CALL 1-800-258-5473
WAYNE GREEN BOOKS • PETERBOROUGH NH 03458

Use the order card or itemize your order on a separate piece of paper and mail to Wayne Green Books Attn: Sales • Peterborough NH 03458. Be sure to include check or detailed credit card information. (Visa, Master Charge or American Express accepted.) No C.O.D. orders accepted. All orders add \$1.50 for the first book, postage and handling; \$1.00 each additional book; \$10.00 per book foreign air mail. Please allow 4-6 weeks after publication for delivery. Questions regarding your order? Please write to Customer Service at the above address.

LYNX
TRS-80
MODEM



\$239⁸⁸

DELIVERED

- Compatibility with both Model I and III
- No separate purchases required
- One-year warranty
- Auto dial/Auto answer
- Works with any software, including ST-80 by Micklus
- Active CLEAR, BREAK, and "CONTROL" keys
- Half or full duplex, variable word length, parity, and stop bits
- Dial from phone, keyboard, or memory
- Works with or without Model III RS-232 card
- Can be placed on either side of Model III
- No tools needed to install

HIGH TECHNOLOGY AT AFFORDABLE PRICES


THE BOTTOM LINE

Orders & Information
(603)-673-8857

Orders Only
(800)-343-0726

12 Johnson Street, Milford NH 03055

306



THE ULTIMATE CHECKBOOK

The Ultimate Checkbook is designed to help the individual keep track of checks, tax deductions, and deposits as well as provide for fast and easy checkbook balancing and bank reconciliation. However, its versatility is such that it can be used effectively as a "Mini-Ledger" for many small businesses.

FEATURES:

- Menu driven for easy use
- Checks can be entered, edited, and deleted quickly
- In-memory check capacity of approximately 400 checks
- Check listings on screen or your printer
- Running balance displayed when posting checks
- Defaults for check numbers and date to speed data entry
- Check-by-check balance displayed or printed
- Search routine finds checks quickly and easily
- Fast MACHINE LANGUAGE, multi-key sort
- Totals checks and deposits by deduction, budget, or deposit categories

System Requirements: TRS-80 Models I & III with 48K, DOS & Printer (Optional). Please indicate model when ordering. \$39.95. Please add \$2 for handling and postage; \$5 overseas; for your convenience you may phone in VISA or M/C orders.

SOFTWAREHOUSE INTERNATIONAL
We've Moved! P.O. Box 1383 Tandy Corp.
Clovis, CA 93613; (209) 251-7877
In Australia: Computer Campus; Kent Town, S.A. 5067
Phone: 08.42 4826

for **POCKET COMPUTERS**

Game Pac 1: OLD FAVORITES
Five proven games, updated with exciting new features. Fun for all! PLANET-Land on any planet. ZILCH-Bagles, 1-9 digit numbers. HILO-Nifty version of Stars. COINS-Computer "learns" to win. WINNER-You Lose! Includes complete notes and listings \$9.
with cassette \$14.

BEGINNERS GUIDE TO PROGRAMMING the Sharp/Radio Shack Pocket Computer
It's fast, fun and easy. You'll understand every word and be amazed how easily you progress. No other method brings positive results so quickly \$19.

YOU AND YOUR DOLLARS: ALL ABOUT INTEREST
99 basic questions answered with 17 dynamite programs. Includes variable and fixed rate home loans. Also annuities, present and future value, notes and contracts, cash flow analysis and much more. \$19.
with cassette \$33.
(Remit in U.S. funds. Add \$2 for first class delivery Add \$3 if outside U.S. Calif. add 6% sales tax.)

AND WE HAVE OTHERS! For a copy of our catalog, circle our number on your bingo card or write directly.

HANCO Software (formerly XCEL)
P.O. Box 4772H, Sylmar, CA 91342
(213) 367-4366

370

FICTION

FUTURISTIC CAREER OPPORTUNITY IN SPACE

Aliens, Androids, and Earthlings of sound body and mind. We need you!

The Hypergate Centurion Guild is in dire need of recruits for the Solan Centurion Base.

Applicants must own a TRS-80 Model I or III.

Send resume to our earth based agency:

SYNERGISTIC SOLAR INC.
P. O. Box 560595
Miami, FL 33156

NONFICTION

Hypergate Centurion and Hypergate Patrol Are Coming Soon!!!

B17 TAPE OPERATING SYSTEM will let you

- Save & Load programs 6X faster than Model-1.
- Save & Load Data Arrays over 800X faster.
- Backup standard System tapes that load-n-go.
- Certify cassette tapes for B17 use.

\$24.95 Specify Model 1/3 16K/32K/48K RAM. Inexpensive Upgrades available. 3rd year of sales.

B17 DISK/BAS is a Disk version. Lets you save any disk file to cassette at 3000 baud. Inexpensive way to backup your files. Works with any DOS. Includes tape certifier. Requires 32K RAM-up.
\$19.95 Specify Model 1/3.

WORDSMITH Word-processing program in BASIC. A "Trainer" for more complex W/P programs. Easy-to-use. Specify Tape/Disk version. Tape version requires B17 Tape Operating System (above). Disk version requires 32K RAM-up. Uses MX-80 Printer.
\$19.95 Specify Model 1/3.

Add \$1.00 postage/handling per item.
Write for additional Products info.

ABS Suppliers
3352 Chelsea Circle
Ann Arbor, MI 48104
(313) 971-1404

173

— NEW —

WORD PROCESSING STATIONERY

CLEAN-EDGE CONTINUOUS TRACTOR FEED LETTERHEAD

NO PIN HOLE EDGES
CUT SHEET APPEARANCE

REASONABLE COST

BLACK OR COLOR PRINTING
VARIETY OF PAPERS
OFF THE SHELF DELIVERY
PRICE & SAMPLES

RABCO ENTERPRISES
806 FREEDOM CIRCLE
HARLEYSVILLE, PA 19438

366

OPTIONS-80, NOW FOR
APPLE* & TRS-80*

OPTION INVESTING

PROGRAM ANALYSES
RETURN FROM LISTED
STOCK OPTION
INVESTING

HANDLES CALLS, PUTS, SPREADS, IN AND OUT; COMMISSIONS, RISK, COST OF MONEY, DIVIDENDS. TABLES AND GRAPHS. PRINTS, STORES TO DISK. INDEXED MANUAL A COMPLETE GUIDE TO OPTION INVESTING. M/C & VISA. \$125. SEND FOR FREE BROCHURE.

OPTIONS-80, BOX 471 E
CONCORD, MASS 01742

*TRADEMARK TANDY CORP *TRADEMARK APPLE COMPUTER, INC

206

MEMOREX FLEXIBLE DISCS

WE WILL NOT BE UNDER-SOLD!! Call Free (800)235-4137 for prices and information. Dealer inquiries invited and C.O.D.'s accepted.



VISA

PACIFIC EXCHANGES
100 Foothill Blvd.
San Luis Obispo, CA
93401 In Cal. call
(800)592-5935 or
(805)543-1037

207

SOFTCo for TRS80
Software Model II

FILEMASTER™ \$149.95
Data Base Management System
File Creation and Handling
Interact up to 5 files
User Friendly Menu Utility
Full File Editing
Sort/Merge Functions
Accumulate Any Field
Report Generator with Multiple Access Files

coming: **DECISIONMASTER™** Module
Full Electronic Spreadsheet Calculations
Conditional Analysis Processor
File Changer and Reformatter

MAGNUM COMPUTER PRODUCTS
PO Box 3358 Boise, ID 83703 208-342-7304
Dealer Inquiries Invited

260

SOFT BITS

a basic/assembly column

by Roger Fuller

This month I will examine Radio Shack's Editor/Assembler (EDTASM). Radio Shack provides only thirteen pages of documentation on its operation, probably one of the reasons users have such trouble with it. The manual accompanying EDTASM also assumes the user already knows about assemblers and how they work.

In General

An assembler produces object code from a source code or assembly listing. Object code is machine code, the actual instructions executed by the computer. Object code must reside in memory when it is executed because the Z80 fetches its instructions from read/write memory, not disk or tape. You can use EDTASM's editor to generate a source listing, or load one from media.

The editor is very similar to the editor in Level II. It is line oriented (you must specify the line number to be edited, just like in Basic). Line numbers can range from 00000 to 65529 and include the leading zeros. The maximum length of a line is 128 bytes (not counting the line number or its trailing space).

Commands

Unlike Level II, you cannot enter line numbers in EDTASM's command mode; You must use the I command. This command follows the same format and operation as Level II's Auto command. (To get the feel of using it to enter text, try using only Auto to write a Basic program.) The I command retains the increment you used to determine line spacing; it will not overwrite an existing line.

Lines can only be deleted with the D command. Just specify the line number after the D. The editor has three abbreviations. As in Disk Basic the period indicates the last line entered, printed or edited. The pound sign (#) indicates the first line in the source program, and the asterisk stands for the last line. The item delimiter is a colon. There is no New command; D#:* performs the same function.

The R command works like a combination of D and I commands. It replaces a current line in your program by inserting a

new line as you type code. The R command does not continue unless the next line number generated does not exist.

The N command rennumbers the entire text or source program. (There is no provision for renumbering only parts of the text.) The increment you specify becomes the new default value. For example, N 20,110 rennumbers all lines by 110 starting with line 20. If you enter N 30 after the above, the renumbered program will still have an increment of 110, but will start at line 30.

The E command is almost identical to Level II's Edit mode. The D subcommand does not display deleted characters between exclamation points.

When you are entering text using either the I or E commands, the right arrow key tabs to the next print zone. This tab is CHR\$(9), and is not converted to spaces. (This saves memory because the actual spaces are not stored.) Backing up over a tab sends the cursor the full distance of the tab instead of just a single space.

The P command replaces Basic's List command. Parameters are optional: If you specify no parameters the assembler scrolls 15 lines on the screen. If these lines are one screen width, they will all be displayed. If some lines are longer than the screen width, the top line of the scrolled page will be pushed off the top. To see the entire program enter P#:. P100 displays only line 100. The H command behaves like LLIST.

The T command is the same as the H command except it does not print the line numbers. The assembler does not use line numbers; they are there only to help you edit text.

The manual says the up and down arrows scroll up or down and display the previous and following source line. They display the lines, but as implemented this is not scrolling.

The F command is handy. It searches from the line following the current one to the end of text for a string of 16 characters or less. The Find command does not recognize tabs in this string but it does recognize leading and trailing spaces. A common mistake is forgetting to reset the current line pointer before conducting an

F (Find). Just type P# to accomplish this.

The B command transfers control to address 0000H.

The A command assembles an object program from the source listing. Because EDTASM is an in-memory assembler, the source listing must be resident in the text buffer. You can type in the text or load a program from tape with the L command (similar to Basic's System loader). If you do not specify a file name (six characters, maximum), the editor will load the next source file.

Unlike Basic, EDTASM does not automatically erase the resident text file in memory. If you do not want to concatenate files, perform a D#:* before loading. The W command acts as the reverse of the L command. If you do not specify a file name you will get the default value of NONAME. Remember the W (Write) command writes a source file, not the object file. Both the L and W command require a single space between the command and the file name.

Assembly

There are five assembly options: no listing, no output, no symbols, line printed, and wait on error. Assembly switches (/NL, /NO, /NS, /LP and /WE) activate the options. Placing a switch after the A command activates the corresponding option. The slash mark helps the assembler distinguish a switch from a file name.

How does the assembler produce an object program? A legitimate line of source code will contain as many as four fields. For example:

```
Label Opcode Operand(s) Comment
00100 START ORG 7F00H ;TOP OF 16K
```

As in Basic, you can specify numbers as a constant or an expression. Constants can be expressed in one of three numeration systems. The default numeration system (or *radix*) is decimal. Each number, regardless of radix, must begin with a numeral 0-9 to be classified as a number. As the assembler examines the characters on each line, it must decide if the characters are numbers; only numbers can start with a numeral.

Level IV Products, Inc. Is Expanding Again! 3 Locations To Serve You...

<p>HEADQUARTERS DIVISION 32429 Schoolcraft Road Livonia, Michigan 48150 313 / 525-6200</p>	<p>LEVEL IV COMPUTER CENTER 182 North 20th Street Battle Creek, Michigan 49015 616 / 963-2212</p>	<p>RADIO SHACK* DEALER STORE #P-130 134 South Front Dowagiac, Michigan 49047 616 / 782-6600</p>
---	--	--

Our Purchasing Power, (\$5 Million plus Gross Sales) allows us to offer the best of **RADIO SHACK***, as well as other popular Hardware and Software at the **LOWEST DISCOUNT PRICES AVAILABLE!**

OUR POLICY IS THAT IF WE SELL IT...WE ALSO SERVICE IT!
CALL US TOLL FREE IF YOU DON'T SEE THE ITEM YOU'RE LOOKING FOR.

TYPICAL PRICES (PARTIAL LISTING)

TRS 80* Color Computer, 32K w/ext. Bas.	499.00
TRS 80* Mod III, 48K w/1-40 TR Drive.	1589.00
TRS 80* MOD II, 64K w/1-8" Drive	3375.00
TRS 80* MOD 16, 128K w/1-Double 8" Drive	CALL
TRS 80* MOD III, 6.4MEG Winchester Drive	2795.00
5¼" Add on Drives for MOD I, III, Color, etc.	from 228.00
8" Add on Drives for MOD II, MOD 16	from 540.00
Printers, Radio Shack*, Epson, Citoh, etc.	CALL
Technical Service (7 technicians on staff)	24.00/hour
UPGRADE YOUR PRESENT COMPUTER	CALL FOR A QUOTE!

WARRANTY POLICY:

The Radio Shack* 90 Day Warranty requires construction from Radio Shack* Supplied components, at slightly higher prices.

Equipment containing non-R/S components is covered by our 6 month parts and labor warranty.

Inquire when ordering to ascertain your coverage.

TERMS OF SALE:

We allow a 2% discount for cash pre-paid orders, personal checks require 2 weeks for bank clearance.

VISA, Master Charge and C.O.D. orders accepted, deposits are required for all special order and assembly items

SHIPPING:

Foreign orders and large items shipped best-way freight collect, most others are shipped promptly from stock via U.P.S. add 1.5% or \$2.50 minimum, and \$1.50 if C.O.D.

DEALER'S NOTE: Some key areas are still available for both re-sale and servicing dealerships, contact our Headquarters Division for Details.

TOLL FREE ORDER HOT LINE
800-521-3305
HARDWARE/SOFTWARE
Service Line
313 / 525-6200

Your One Stop Computer Shopping Center

*TRADE MARK OF TANDY CORPORATION



SOFT BITS

Once the assembler has determined that a group of characters is a number it examines the last character of the group to determine the radix. (Remember, numbers are evaluated right to left.) EDTASM determines the end of the number by a delimiter. The delimiters are space, tab, semicolon or one of four operation symbols I will cover later.

If the last character is the letter O, the assembler evaluates the group as an octal number. If the last character is H the assembler evaluates the group as a hexadecimal number. If the last character is not O or H (or if it is D), the assembler treats the group as a decimal number. The suffix D is optional for decimal notation. (I wish Microsoft had left out octal and included binary notation. It would be handy when setting up masks for bit manipulation.)

An illegal numeral in a number generates an error. Using the digit 9 in octal is illegal. The letters A-F are illegal in decimal and octal notation. Whatever radix you use, the result cannot exceed 65535, as this is the maximum word the Z80 can ac-

cept. But what about negative numbers?

The Editor/Assembler allows two unary operations (operations executed on only one operand). A +21 uses the operator + on a single operand, the 21. The result of such an operation is the value of the operand, or 21. The other unary operator is mi-

nus. A -21 produces the two's complement of 21. This result (and all numbers) are two-byte words. A -21 would be 0FFDFH. This allows the assembler's math section to handle only words, not bytes.

Z80 instructions that specify a single

Addr	Obj Code	Line#	Labels	Op-code	Operands	Memory Contents
7F00		00008		ORG	7F00H	0800 0A .ORG,7F00H
		00016	VIDEO	DEFL	0033H	1000 10 VIDEO,DEFL,0033H
		00024				1800 00
7F00	CD2B00	00032	TYPFR	CALL	KEYBD	2000 0F TYPFR,CALL,KEYBD
		00040		OR	A	2800 05 .OR,A
7F04	28FA	00048		JR	C,\$-4	3000 09 .JR,Z\$-4
7F06	CD3300	00056		CALL	VIDEO	3800 0B .CALL,VIDEO
7F09	18F5	00064		JR	TYPFR	4000 08 .JR,TYPFR
		00072				4800 01 ;
002B		00080	KEYBD	EQU	002BH	5000 0F KEYBD,EQU,002BH
0000		00088		END		5800 04 .END
00000 TOTAL ERRORS						FFFF End of text marker
KEYBD 002B						85 KEYBD 2B00
TYPFR 7F00						85 TYPFR 007F
VIDEO 0033						AF VIDEO 3300
						00 End of table marker

Figure 1

COLOR COMPUTER SOFTWARE

**EDITOR ASSEMBLER
DEBUGGER** \$6.95

CCEAD: This 8K Basic Program supports cassette files, has full cursor control, line insertion/deletion, and much more. Two pass assembler supports full 6809 instruction set & addressing modes, lists to screen or printer. Debugger allows memory examine/modify, program execution, if not delighted return within 2 weeks for a full refund. You get fully commented Basic source & complete instructions. Requires Ext. Basic & 16K. CASSETTE \$6.95

DELUXE TERMINAL PROGRAM

COLORCOM/E: This terminal program has everything! PLUS it's in a convenient plug-in cartridge. LOOK at these features:

- Complete upload & download support
- Selectable baud rate & parity
- Full or half duplex
- Write to any printer or cassette
- Supports ANY serial printer
- Automatic or manual capture
- Selectable Capture characters
- Exchange Basic programs
- Word mode means no spill words
- And much, much more

Use with Compuserve, The Source, etc. Talk to other Color Computers. Works with any model Color Computer & full duplex RS232 modem CARTRIDGE \$49.95

STRIPPER: The Stripper takes off all that excess fat in your Basic Programs. Three valuable commands: (1) Delete Remarks; (2) Pack Lines; (3) Delete Spaces. Fully automatic, is not fooled by GOTO's, GOSUB's, etc. Your programs will run faster and take up much less memory. CASSETTE \$7.95

BOOTSTRAP: This Cartridge automatically loads and executes Basic programs from cassette at power-up. Can't fail. Ignores data files, Machine Language files, or Basic files that have errors. For those programs that have to run! CARTRIDGE \$34.40

RS232 EXPANSION CABLE: With this cable you can connect 2 devices at the same time to the RS232 part of your Color Computer. Great for printer & modem. RS232 Cable \$20.00

CUSTOM CARTRIDGES: Put YOUR Basic program into a convenient ROM Cartridge. It's easy! Runs instantly at power-up. Frees up memory. Use for Ad displays, schools, etc. Call or write for info. FROM \$41.65

Send check, money order,
or Visa/MC Number;
Include \$1 for postage and
handling; Visa/MC. Phone
for fast service.

**Eigen
Systems**

P.O. Box 10234
Austin, Texas 78766
(512) 837-4665

✓ 154

electronic mail

A perfect trio—The Hayes Stack Smartmodem, TRS-80, and the Automated Communication Exchange software. Now you can have access to other computers over the telephone line, as well as, time sharing systems and information utilities nationwide.

The Hayes Stack Smartmodem features auto answer & auto dial, RS232C compatibility, seven LED indicators, an audio monitor, accepts over 30 different commands, and is programmable in any language.

The unique A.C.E. software package allows you to receive & transmit ASCII files from your completely unattended TRS-80!

For a sophisticated, high performance, data communication system select A.C.E. and the Hayes Stack Smartmodem.



Hayes Stack Smartmodem \$249
A.C.E. disk software for 48K Model I/III \$79

***** Special—Limited time only! *****
A.C.E. Disk software \$39 w/Smartmodem purchase



ACE COMPUTER PRODUCTS OF FLORIDA, INC.
1640 N.W. 3rd Street
Deerfield Beach, FL 33441
Data (305) 427-6300/Voice (305) 427-1257
MC/VISA accepted FL res. add 4% sales tax
Freight incl. (UPS ground—Cont. USA)

✓ 197



Rose®

You've Got TOTAL ACCESS

(Specializing in TRS80 *)

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

The complete line of Radio Shack products is available through TA with standard RS limited warranty. Call me for price and delivery. Just cause you don't see it don't mean we ain't got it!
ROSE

iv'e got

*** DISK DRIVES**

TA400 (40-T).....	\$289
TA800 (80-T).....	\$419
TA400 Flippy.....	\$319
TA800 Flippy.....	\$439
TA400-2 Dual Head.....	\$439
TA800-2 Dual Head.....	\$549

Complete with silver enclosure & power supply. All TA Drives are MPI.

*** CABLES**

2-Drive.....	\$23.95
4-Drive.....	\$33.95
Extender Cable.....	\$14.95

*** BARE DRIVES**

TA400B.....	\$259
TA800B.....	\$389
TA400B Flippy.....	\$289
TA800B Flippy.....	\$409

*** EPSON PRINTERS**

MX80.....	\$469.00
MX80 F/T.....	\$579.00
MX100.....	\$799.00
Parallel Cables.....	\$29.95
MX 70-80 Ribbons.....	\$12.95

*** OPERATING SYSTEMS**

TRSDOS 2.3 Disk & Manual....	\$19.95
LDOS.....	\$119.95
NEWDOS/80.....	\$129.95
DOSPLUS 3.3,3.3D.....	\$89.95

*** IRON**

Disk Drive Power Supply, Single.....	\$37
Disk Drive Case (silver)and Base	\$19
Memorex Diskettes (bx of 10) ..	\$25

90 day warranty on **DRIVES**. Add \$5.00 freight per drive in Cont. U.S. UPS COD charge \$1.50. There is also a 15 day FREE TRIAL on TA drives. If not completely satisfied I'll refund your money (less shipping). I'll take exception to improper use or mishandling.

*** RADIO SHACK COMPUTERS**

26-1061 MIII, LI, 4K.....	\$595
26-1062 MIII, LII, 16K.....	\$835
26-1065 MIII, 48K, 1 Drive.....	\$1695
26-1066 MIII, 48K-2 Dr-RS232..	\$2099
26-3001 4K Color Computer....	\$315
26-3002 16K w/ext. Basic.....	\$485
26-3003 32K w/ext. Basic.....	\$566
26-3501 Pocket Computer.....	\$185
26-4002 MII, 64K, 1-dr.....	\$3288

*** PERIPHERALS - Model I, II, III**

26-1140 OK Exp. Interface.....	\$249
26-1140 With 16K Mem. Tstd/Guar	\$299
26-1140 With 32K Mem. Tstd/Guar	\$349
26-1145 MI RS232 w/cable.....	\$85
26-1148 MIII RS232 w/cable.....	\$89
26-1172 D.C. Modem I.....	\$135
26-1173 D.C. Modem II.....	\$169
26-1206 CTR-80 Recorder.....	\$51
26-3008 CC Joysticks, pr.....	\$21
26-3010 13" Color Video.....	\$353
26-4150 MII 8.4MB Disk.....	\$3820
26-4151 MII Hard Disk No.2....	\$2970
16K 200nsec Memory Guar 1yr.	\$29

*** OTHER PRINTERS & ACCESSORIES**

26-1158 Daisy Wheel II.....	\$1694
26-1455 Acoustic Cover.....	\$339
26-1447 Tractor Assy.....	\$208
26-1448 Sheet Feeder.....	\$1111
26-1165 Line Printer V.....	\$1581
26-1166 Line Printer VI.....	\$986
26-1167 Line Printer VII.....	\$339
26-1168 Line Printer VIII.....	\$679
26-1191 Flat Bed Plotter.....	\$1695
26-1195 Digitizer.....	\$379
ANADEX DP-9500, 9501.....	\$1295
NEC 7730 Spinwriter, 55cps.....	\$2484
Daisy Wheel Printer, 45cps....	\$1779
Tractor for above.....	\$237
Sheet Feeder for above.....	\$1250
26-1308 Printer Stand.....	\$88
26-4302 Printer Stand.....	\$129
26-1401 or 4401 Printer Cable..	\$32

*** NEC COMPUTERS**

PC-8001A Keyboard & Processor...	\$1099
PC8011A Expansion Unit.....	\$699
PC-8031A 2-drive Expansion Unit.....	\$1099
PC-8041A Green Phos. Video.....	\$225
PC-8043A HighRes Color Mon.....	\$925

ZENITH MONITORS

12" Screen * Green Phosphor
This is the one you have been waiting for. Well built. Works great with the model I. Also has 40/80 column switch so the Apple folks can use it. 90 day warranty good Nationwide. Sell your old Model I monitor and be the first on your block to have a "real" green screen.
12" Zenith Green Phos. Mon..... \$135
Cable for Model I..... \$7

*** RADIO SHACK SOFTWARE**

I have most all R/S software instock and it can be yours at 15% off the R/S retail price. Call me for the latest availability.

DOUBLE DENSITY DATA SEPARATOR FROM AEROCOMP \$49.95

If you own a PERCOM DOUBLER A*, "DOUBLER II" or LNDoubler ** upgrade it with the "DDS". Plugs right in. No more lock-out! You deserve one of these.

ORDER NOW! TOLL FREE 800-527-3582

Write or call ROSE TOLL FREE at 1-800-527-3582. Texas residents call 214-234-1770. Please use the toll free lines for orders and literature requests only. Technical help or service use the Texas line. Prices are mail order only. You pay by VISA or MASTERCARD, you can send check or money order (allow a couple of weeks for personal checks to clear) or order COD (we ship COD'S cash, certified check or money order only). 25% deposit required on all COD orders. Rose will take American money in just about any form. Add freight (UPS where possible) on all orders. Texas residents cough up 5% sales tax. Allow 2-4 weeks for delivery. Order today - I need the money!

TOTAL ACCESS® P.O. BOX 3002 RICHARDSON, TX 75080

214-234-1770 ✓ 81

ROSE'S SPECIAL OF THE MONTH

★ AEROCOMP'S ★ ALL NEW DOUBLE DENSITY CONTROLLER "DDC" \$149.95

Here's a Double Density Controller for Mod. 1 that does away with all those data separation problems that seem to keep cropping up! Rose wouldn't fun ya now, would she? Don't be scared of Double Density any more. AEROCOMP has designed some advanced circuitry that even I don't understand - but I do know it works. Better order now. Quantities are going to be a bit short.

\$189.95 complete with Dosplus 3.3D. How many do you want? 12?

* Trademark of PERCOM DATA CO., ** Trademark of LNW * TRS80 & Radio Shack are trademarks of Tandy Corp. Copyright 1981 TOTAL ACCESS

byte such as LD A, -21 generate an error, but LD A,21 does not. The assembler checks the value needed against the maximum allowed, so 21 (0015H) can be expressed as a single byte while -21 (0FFDFH) cannot. This means you cannot express a byte as a negative number directly.

The binary operator & will perform an arithmetic AND on the two operands it separates. A -21 & 0FFH produces a 00DFH which can be expressed as a single byte. To use a negative number as a byte just AND it with 3370 or 255 or 0FFH (all represent a byte with all eight bits set).

Remember both the plus (+) and minus (-) operators perform their normal functions. The fourth binary operator (<) performs a bit shift on the first operand for the direction and amount of the second operand. A 40H < 1 shifts the bits in 40H left one position, resulting in 80H. A 40H < -1 shifts the bits in 40H right one position, producing 20H. Since this is a bit shift you can duplicate the results by multiplications or divisions by two. See Table 1 for a comparison to Basic.

The Editor/Assembler performs multiple binary operations on a first-come first-served basis. No parentheses are allowed. A 10H < 1+1 equals 21H, not 40H, because < is the left-most operation.

Labels can define numbers. Labels are limited to six alphanumeric characters; the first character must be alphabetic. You cannot use the name of a Z80 register, a status flag, or the words ON or OFF for a label. Labels are similar to variables in Basic but, except in two cases, they cannot change the values assigned to

them. Values are assigned to labels only by placing the label in the first column of a source code line.

This action assigns them the current address the assembler contains when it assembles that line unless the pseudo-ops DEFL or EQU are used. They are called pseudo-ops because they are not actually Z80 operations. A DEFL (pronounced define label) assigns the label the value of the following operand. For example:

```
00100 START DEFL 8000H
00200 START DEFL 13H
00300 START LD A,1
```

Line 100 makes the value of the label (START) 8000H. You can redefine a label by using another DEFL on it only if you first defined it by a DEFL pseudo-op. You

“Labels are similar to variables in Basic.”

can change the value of START in line 200 to 0013H because you originally defined it by a DEFL and you are now redefining it by a DEFL. The last line is illegal because START was already defined in line 200 as 13H; you cannot redefine it except by another DEFL. EQU does not allow redefinition. Any value assigned to a label by EQU (Equate) cannot be changed.

You can only create a label by starting the label in column one. At any time the remaining length of the source line may be devoted to comments by inserting a semicolon, equivalent to Basic's REM.

There are six more pseudo-ops in the Editor/Assembler. ORG (Origin) initializes the current address counter to the value assigned it. This value can be a number, an expression or another label. If you do not use an ORG statement the assembler uses the default address 0000H. The ORG statement is usually the first statement in an assembly or source listing. Although you can use as many ORGs as you like, I recommend you use only one per program.

The ORG statement is open-ended; it does not specify how much memory the object code will use. The END statement terminates an assembly program; you can specify an execution address by placing an address after it. This is not automatically the ORG address. The execution address is the address the assembler uses after you load a System tape and enter a

slash (/). You can omit an ORG statement (it will default to zero), but the absence of an END statement produces an error.

The remaining four pseudo-ops (DEFB, DEFW, DEFS and DEFM) are used mostly in producing tables. DEFB places a byte at the current assembler address. This byte can be a number, a label, an expression or a one-byte string. An apostrophe instead of a quotation mark delimits strings in the Editor/Assembler. This allows you to include quotation marks within strings. If the string is longer than one byte, you must precede it by the DEFM (Define memory) pseudo-op. DEFB and DEFM can specify a single byte string.

To specify a two-byte word use DEFW (Define word). This installs the value in LSB/MSB format starting at the current assembler address. You cannot use DEFW with strings.

DEFS reserves space for buffers and work areas. The assembler fills these spaces with zeroes when it assembles the object code.

There are also two assembler commands (in contrast to twelve editor commands). *LIST OFF and *LIST ON turn the listing of the combined assembly and object code off and on. When debugging this is useful (along with the /NL and /NO switches) to cut down on wait time.

The program in Fig. 1 shows the source listing and its format in memory. The line numbers are stored as binary numbers followed by the length of the line as a single byte. The periods represent the 09H tabs in the text buffer. The end of text is marked by a 0FFFFH word (remember, you cannot enter this as a legitimate line number).

The symbol table (in the top of available memory) stores all labels the program will use. The format is a status bytes followed by the label and its value. This explains

Editor/Assembler	Basic
.	.
.	.
<-4	/16
<-3	/8
<-2	/4
<-1	/2
<0	/1
.	*1
<1	*2
<2	*4
<3	*8
<4	*16
.	.
.	.
.	.

Table 1

TAKE A BYTE OUT OF YOUR SOFTWARE COST!

Save 20-40% on all major Brands of micro-software

90 day guarantee-when you're happy, we're happy!

Gigantic inventory of old and new releases.

Overnight shipment by UPS-no per item handling fee.

We credit orders \$1.00 when you call from out of 213 area.


Eligible for free Visicalc if order within 60 days.

385

SOFTWARE GALORE

For free catalog/orders call 213-827-1851 (8 am - 5 pm only) New National Direct Phone Number 1-800-423-6326

GRAPHICS! NEWSOFT PROSOFT



If you have a MICROLINE or EPSON MX-80/100 printer, you can print graphics like the ones above! GEAP (the Graphics Editor and Programmer) offers three Letter-sets, Selective Reverse-Image, Shrink, Magnify, Rotate and Draw, all in one easy to use package. It can Save and Restore images on disk, or Print them directly on your EPSON or MICROLINE. GEAP can be selected from the NEWSOFT menu, and when finished, pass its eye-catching results back to NEWSOFT for merging of text and Word Processing formatting.

PANEL JOINER connects several screen images together. It normally costs \$14.95, but if you order both GEAP and NEWSOFT, or are a registered owner of NEWSOFT and order GEAP now, JOINER will be included free. So, order today by mail or Toll-Free telephone, and enter the world of Word Processing Graphics! (48K TRS-80 disk system needed. Specify Model I or III.)

GEAP plus Letter Sets: \$45.95

NEWSOFT 7.0: \$124.95

AMAZING PROGRAM SPEEDS UP BASIC



Your time is valuable, so why waste it on slow-running BASIC programs? PROSOFT's "FASTER" will analyze those programs while they run, then show you a simple change (usually one new line) that can reduce run-times by up to 50%.

Accounting systems, financial models, engineering and scientific programs all run faster; so do games. Large, complex programs improve the most, and "FASTER" is easy to use.

THIS ISN'T A COMPILER! Your BASIC programs remain readable and can be changed later on. While your programs run, "FASTER" counts how often each "variable" is used, then shows you the correct sequence for these variables. Afterwards, the computer finds them sooner, so your programs run faster.

Does it really work? Yes! *Personal Computing* said so in their May, 1981 issue (p. 116); we've received many letters from customers who've gotten 20-50% improvements; and we will make you this offer:

Order "FASTER" now. Try it on your bread-and-butter programs. If you don't get an overall run-time reduction of at least 20%, return it within 30 days for a prompt and cheerful refund.

"FASTER" runs on TRS-80 Models I and III, 16-48K, tape or disk

\$29.95

QUICK COMPRESS

Small (276 bytes), fast (processes 800 lines in under 3 seconds) utility removes blanks and remarks from your BASIC programs. Produces smaller, faster programs, and doesn't alter the original logic.

16-48K Model I or III, tape or disk.

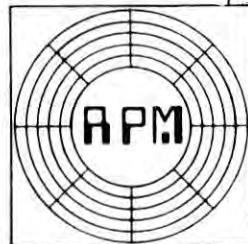
\$19.95

SPECIAL FASTER + QUICK Compress:

\$39.95

ERRATIC DISK DRIVES

RPM measures the rotational speed and variation of your disk drives, and reveals a common cause of unexplained errors. Simple one-key operation, runs under any DOS, interchangeable between Models I and III. Shows current and average speeds, plus fluctuation history. Recovers from severe errors. Documentation explains how to adjust drives. Use RPM monthly for best results. 32-48K Model I or III disk **\$24.95**



TO ORDER, CALL NOW, TOLL FREE

(800) 824-7888, Operator 422

CALIF: (800) 852-7777, Oper. 422

ALASKA/HAWAII: (800) 824-7919

FOR TECHNICAL INFORMATION CALL:

(213) 764-3131, or write to us.

PROSOFT™

Dept. G Box 560
North Hollywood, CA 91603

TERMS: We accept VISA, Mastercard, checks, Money Orders, C.O.D. and even cash. We pay shipping via surface UPS inside U.S.A. Please add \$3.00 for Blue Label, 6% tax in California, and 15% outside North America (air shipment).

SOFT BITS

why all labels are stored as two-byte words. An 00H byte marks the end of the table.

When you request an assembly of the source code residing in the text buffer, the assembler makes a first pass through the text. On this pass it places any label it encounters in the symbol table. If the label is defined as the assembler encounters it, the assembler sets bit seven of the status byte. Thereafter, any attempt to define this label again produces an error. The assembler must search the table each time it adds a label to prevent duplicates. The low nibble stands for the number of characters in the label.

acters in the label.

On the first pass the assembler also increments the program counter. The special label \$ accesses the program counter or the current assembler address. I used it in line 48 to loop back if no key was pressed. The assembler updates the counter by determining the number of bytes in the instruction. The assembler determines this number by accessing a table of op-codes within itself. The table contains the mnemonic along with the first byte of its object code, the length of the mnemonic, and an offset byte for parsing the operands.

After the first pass is complete the second pass begins and all labels are defined. As the assembler proceeds it lists the combined codes on the appropriate output device. If the assembler is producing an object code tape the output fills a 128-byte buffer. When the buffer is full or assembly ends the assembler writes a record to tape. (This is why you hear pauses in an EDTASM object tape, and why the load records are never more than 128 bytes long.)

In conclusion, I am including a table of significant addresses in EDTASM 1.1 (see Table 2). ■

Addresses	Function		
4100	Length of string in Find buffer	41C0	Assembler pass counter
4101-4110	Find buffer	41C1,41C2	Value of an expression
4111,4112	Pointer to current line # ()	41C3,41C4	Pointer to symbol table
4113,4114	Last byte of usable memory. Protect hi-mem here.	41C5	Strip line number flag 1 = T 0 = H
4115,4116	Pointer to first byte of unused text buffer	41C6-42FE	Stack work area
4117,4118	Line increment	4300-4317	DCB
4119,411A	Pointer to start of text line	4318-	Make a pip
411B,411C	Pointer to address of current line	435D-	Read a byte
411D,411E	Pointer to address of next line	4389-	Write a byte
4121,4122	I/O buffer pointer to next byte	43CE-	Driver entry
4123	Temporary checksum during assembly	43EF-	Keyboard driver
4124	Current length of buffer contents during assembly	4460-	Video driver
4125,4126	Address for byte at start of I/O buffer	45AA-45F5	Printer driver
4127-41A7	I/O buffer (128 bytes)	4673-4989	Assembler option table
41A8,41A9	Pointer to byte in I/O buffer	468A	Main entry point to EDTASM
41AA	Length of contents of I/O buffer in use	4696-	Top of memory testing
41AB,41AC	Pointer to Filename for tape	46A2	Reentry point to EDTASM keeps text intact
41AD	Length of Filename	476B-4904	Message table has bit seven set of last character
4AE,41AF	Start address of assembled instruction	4905-4931	Command table; change B jump
41b0	0 for single-byte op-codes; DD,ED,FD for multiple-byte op-codes	4941-49BA	Parser for input
41B1	Initial hex code from op-code tables	4E06-	A-gain
41B2,41B3	Pointer to I/O buffer during assembly	4E11-	L-list
41B4,41B5	Length of assembled instruction	4E22-	Space
41B6,41B7	Internal program counter, current assembler address	4E31-	Carriage return
41B8,41B9	Error counter	4E48-	E-xit
41BA	I/O flag 1 = cassette 0 = no	4E4C-	C-hange
41BB	Byte counter of I/O buffer	4E67-	D-elete
41BC	Display type flag 0 = video 1 = printer	4E74-	Q-uit
41BE	Block flag 0 = new FF = old	4E79-	I-nsert
41BF	Error flag 1 = error	4E7D-	X-tra
		4E81-	H-ack

Table 2

—ATTENTION ALL TRS-80® OWNERS—

No matter how your Model I, II or III is used, whether it be business or pleasure, this product can benefit you.

The **FATIGUE FIGHTER™** reduces the operator fatigue (irritated, watery eyes and headaches) caused by the harsh white video display thereby making computer use more efficient and/or enjoyable. The graph at the right will help explain how it works. Superimposed on the standard eye sensitivity curve is the band pass curve of the **FATIGUE FIGHTER™** as recorded by a spectrophotometer. A marker is also on the graph at the ideal psychological tolerance color. As you can see, the green color of the **FATIGUE FIGHTER™** takes advantage of both eye sensitivity and psychological tolerance to make the display less irritating.

The **FATIGUE FIGHTER™** is made of tough 1/8 inch thick acrylic sheet which adds absolutely no distortion or fuzziness to the display and is industry proven to be an excellent material for optical filtering (e.g. lenses for laser safety goggles). It installs easily on all three TRS-80™ models with a pressure sensitive adhesive which will not let the filter fall off yet allows easy removal if necessary. Finally, the black and silver border design makes it a perfect match for the computer styling.

If you want a **FATIGUE FIGHTER™** of your own but prefer not to order by mail, check with your local computer stores to see if they have them in stock. Otherwise follow the ordering instructions below.

TRS-80 IS A TANDY CORP. TRADEMARK.

TO ORDER:

Send Name & Address Typed or Clearly Printed with Check or Money Order (U.S. FUNDS) for \$14.95 Each, Including Shipping. Canadian Orders add \$1.00 Each. All Other Foreign Orders Add \$2.00 Each for Shipping. NO CREDIT CARD ORDERS. COD's (U.S. ORDERS ONLY) are \$2.50 Additional Per Order & are Accepted by Mail or by Calling 904-378-2494 9-5 M-F. Florida Residents Add 4% Sales Tax. MAIL ORDERS MUST BE SENT TO THE U.S. ADDRESS.

—DEALER INQUIRIES INVITED—

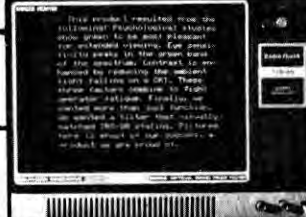
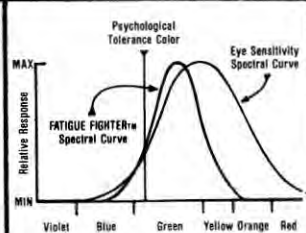
SID

SOUTHERN INNOVATIVE DESIGN
1520 NORTHEAST 12TH STREET
GAINESVILLE, FLORIDA 32601

—CANADIAN DEALERS ONLY—

For pricing and ordering information contact:

MICRO-COMP ENTERPRISES INC., 955 Brock Rd. S., Unit 3
Pickering, Ontario L1W 2X9 Phone: 416-839-4561





1236 E. Colonial Drive
Orlando, Florida 32803 USA
Voice (305) 894-4744
BBS 24 Hour Electronic Mail
Order (305) 277-0473
Micronet 71555,520

Write For Free Catalog

Over 400 items in Diskettes, Business Software, Games, Utilities, Paper, Labels, Ribbons, Checks, Storage Boxes, Furniture, Binders and Hardware.



**We ship daily - Anywhere in the World
Stop by or write for complete price list!**

Quantity Discounts

\$1.40 for COD

*Free Freight (except labels) + \$4 for overseas
We Accept Master Card/VISA/American Express*

RELOADS

- 4 pak for 18.95 — R.S. LP 1/2 & 4
- 3 pak for 12.95 — R.S. LP 3 & 5
- 3 pak for 11.95 — R.S. LP 6 & 8
- 10 pak for 24.95 — R.S. Daisy II - black
- 6 pak for 24.95 — above in red, blue, brown
- 3 pak for 16.95 — Epson MX-80 / 80FT
- 3 pak for 16.95 — Epson MX-100

RIBBONS

CARTRIDGES

- N/A
- 3 for 24.95
- N/A
- 4 for 24.95
- N/A
- 1 for 18.95
- 1 for 28.95

✓ 190

Coming Next Month

Our May issue features Computers in the arts—who is using them and some of their unique applications and limitations.

Commercial producer Jay Rose gives us an in-depth view of micros being used in commercial production while Mike Nadeau broadens our horizons with their uses in theatre, tv, and broadcasting.

Read about computer-designed sculpture, and the history and applications of computer-synthesized music.

And last but not least be sure to catch Jake Commander's smashing new Color Computer graphics.

Attention: European Subscribers

Due to shipping problems in Europe, we are asking our subscribers to send us their most recent mailing label from *80 Microcomputing*. If you are unable to provide us with a label, please send us your name and address, and tell us at what point you are presently in in your subscription. This information is very necessary in order to solve a forwarding problem, so we are asking for your co-operation in this matter. Please direct all information to: Attn: Doris Day, *80 Microcomputing*, 80 Pine Street, Peterborough, NH 03458.

MOVING?

Let us know 8 weeks in advance so that you won't miss a single issue of *80 Microcomputing*.

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.

- Address change only
 - Extend subscription
 - Enter new subscription
 - 1 year \$24.97
 - Payment enclosed (1 extra BONUS issue)
 - Bill me later
- Canadian \$27.97 US funds, Foreign surface \$44.97 US funds, Foreign air mail please inquire

If you have no label handy, print OLD address here.

AFFIX LABEL

Name _____ Call _____

Address _____

City _____ State _____ Zip _____

print NEW address here:

Name _____ Call _____

Address _____

City _____ State _____ Zip _____

80 MICROCOMPUTING P O Box 981 • Farmingdale NY 11737 •

Micro joins war against crime This super cop has neither cape nor mask

by Kerry Leichtman
80 Micro Staff

With Superman busy making motion pictures again, America's crime fighters have had to seek alternative methods for keeping us safe from crime. One such alternative is the TRS-80. It would be difficult to say who was first to incorporate TRS-80s in police work, but certainly one of the more elaborate systems must be the one used by the police in Hanover Park, IL.

Police Chief Robert Sauer has put together a system of five Level II TRS-80 Model Is, each with one disk drive and 48K of RAM; a Corvus 20-megabyte hard disk; an IBM 34 minicomputer; auto answer and acoustical modems; a Line Printer I, Line Printer VI and an Epson MX-80; and a Model II is on the way.

Chief Sauer bought a Model I when they were first available. He put the Level I 4K machine to work figuring manpower allocations, beat planning and some "what if" scenario situations. When he started doing graphic work to make charts, he began to realize the potential of a TRS-80 on the police force. And so the chief applied for federal funding:

"We kind of nickel and dined it. The first grant got us a few more machines, expanded our operation from tape to disk, got us expansion interfaces and all the related things needed to bring up disk systems. It also bought machines for two other towns giving us the ability to 'talk' to each other. We bought modems.

"A few grants later, we bought our first hard disk. We got a 10 megabyte disk and a multiplexer and that let us hook up for

the first time more than one machine to time-share that disk. That worked like a champ opening up all kinds of new horizons. Then we got the three printers."

The federal grants were obtained for the purpose of using micros for crime analysis. One of the first computer applications used by the Hanover Park police was pattern analysis. "We used it to draw maps of the town," said Sauer. "We spotted, on the maps, incidents of particular crimes, or any kind of call for police service. Using these maps, we could determine if we were having problems with a particular area. It was like a spot mapper, a pin map kind of thing. We automated that process and got rid of all our pin maps."

continued

Hanover Park Police Chief Robert Sauer works with graphs on his Model I. Sauer's acknowledgement of the Model I's potential led to computerization of his department's operation.



EPSON

PRINTERS & ACCESSORIES

Common Features of the MX80, MX80FT & MX100 Printers

- 80 characters per second
- Replaceable print head by user
- User programmable from BASIC
- Bi-directional logic seeking printhead
- 96 ASCII characters
- Programmable tabs (vert./horz.)
- Cartridge ribbons
- Self-test mode
- Tractor/pin feed paper flow
- Extreme reliability
- 12 type fonts under software control
- 9x9 & 9x18 matrix
- Programmable form feeds
- Compressed/expanded letters
- Parallel interface standard
- Double strike & emphasized modes

MX80....The Printer that started it all. All of the above features plus extreme ease of use. Complete TRS80 block graphics set as well as user selectable international symbols. Gives correspondence quality printing in several user selectable modes. Dip switch pins may be set for dedicated applications. Complete forms programability from BASIC software.

MX80FT....All the features of the MX80 but with FRICTION feed as well for the use of single sheets of paper or roll paper. An exceptional buy for the user needing the single sheet capability. In the compressed mode 132 characters can be printed across the width of a page which means it can be used for any printouts that normally need a 15 inch wide printer.

MX100.... An exceptional printer with a extra quiet printhead and extra heavy duty construction for the intense use of a business environment. Does not have the TRS80 graphic blocks but comes standard with Bit-Image graphics which allow the user control of individual dots for designing specialized graphs, symbols, etc. A best buy for business use.

MX70....For the budget minded a excellent entry level printer. It has most all of the features mentioned above including Bit-Image graphics in place of the TRS80 graphic blocks set. The Printer is unidirectional only. Expandable text can be printed but not compressed. Only single density printings is supported on the MX70. An inexpensive heavy duty printer.

CALL for BEST prices on Epson Printers All Printers & accessories in STOCK now!!!

If you buy your EPSON somewhere else you'll probably pay too much!

EPSON ACCESSORIES, INTERFACES & CABLES

- GRAFTRAX 80 option (bit-image & italics).....\$79
- CABLE Model I interface & Model III.....\$35*
- * \$25 if purchased with printer
- CABLE & INTERFACE to Model I Keyboard.....\$85
- APPLE interface & cable.....\$89
- PET IEEE interface & cable (Pet).....\$79
- SERIAL RS232C unbuffered int.cable.....\$65
- SERIAL RS232C 2k buffered int.cable.....\$149
- Epson to Color Computer card/cable.....\$59

All RIBBONS and CARTRIDGES in Stock

\$CALL

800-433-5184

Radio Shack LINE PRINTERS	Line Printer VI.....	\$988
Daisy Wheel II.....	Line Printer VII.....	\$325
Line Printer V.....	Line Printer VIII.....	\$699

CUSTOM SOFTWARE FROM TCS

Completely Integrated **BINARY SEARCH TREE** programs now available. This series of programs fully implements the B-TREE structures including INSERTION, DELETION, EDITING & TRAVERSAL. No more sorting or long data file searches and yet files can be larger than memory. Duplicate keys are fully supported. Files can be retrieved in sorted order via B-TREE Traversal. Each of the programs come with fully commented source code so that you can use the modules in your own programming. A Screen oriented Input routine is also included in each module. The following B-TREE programs are now available and each includes all of the mentioned modules and full documentation:

- B-TREE Library (organize your home library keyed by author).....\$39.95
- B-TREE Video (organize your video cassette library, prints labels, etc).....\$39.95
- B-TREE Mailing List (keyed by name or zip,label printing,etc).....\$49.95

EPSON PACK A Utility Software package for MX80 & 80FT.

MX80/CMD will send all printer commands from DOS. BIGLETT/BAS prints large Graphic Letters. EPSON/SUB merges with BASIC programs allowing 2 letter mnemonic commands to be sent to printer. JKL Patches allow JKL in NEWDOS 80 1.0 & NEWDOS 2.1 to send graphics properly. DEMO/BAS tutorial program of use of printer. LABEL/BAS custom label making program with graphics. DEFSTATE/SUB allows one word BASIC commands for centered titles, titles with borders, etc. A great program package for EPSON fans. SPECIAL DEAL: \$24.95 with printer \$34.95 separately. Specify Model 1 or III. disk only

EPSON PACK 2 - GRAFTRAX

version for MX80, 80FT & MX100. This package includes updated versions of modules in original Epson Pack. A screen oriented BIT IMAGE GRAPHICS generator utility is provided. Create your special characters, symbols, etc. directly on your monitor and then send to printer. Printout includes code to generate graphics and will save needed code as BASIC program line to disk. Then MERGE these into your BASIC program. Also demo programs showing use of Bit-Image graphics. Full documentation. **INTRO SPECIAL: \$24.95 with printer or GRAFTRAX. \$34.95 separately. \$7.50 for update of old Epson Pack**

ZAP3 - Direct read/write access to any TRSDOS 1.2 or 1.3 sector. Disable Passwords & access levels. Self prompting. Modify any sector in HEX or ASCII. Includes many patches to TRSDOS 1.2 & 1.3. Also COPYIT to allow backups of SCRIPSIT, VISICALC, etc. Just...\$24.95

SDIR - Super directory manipulation for TRSDOS 1.2 or 1.3. Alpha 4 column directory & free space. Display a range of programs by extension. Change name and date. Generate report of location of any program on diskette. Just...\$14.95

SPECIAL DEAL: Buy ZAP3 & SDIR together for \$29.95

CASIO ELECTRONIC ORGANS have arrived!!!

The fantastic CASIO Electronic Organs are here in force. Fully equal to any \$2000 traditional Organ with dozens of exciting NEW features not seen on other musical instruments:

- CASITONE CT-403 (25 instruments, 18 rhythms, chord memory, etc.).....\$519
- CASITONE CT-701 (programmable, barcode reader, 51 keys, etc., etc.).....\$835

TEXAS COMPUTER SYSTEMS

Offers Lowest Prices on

TRS-80

Model II 64K



The best buy for small business needs and yet completely expandable as your business grows. Easy to use for the beginning operator. We have in STOCK all accessories and disk expansions as well as printers and software. **IMPORTANT:** We also have CP/M for the Model II plus a large amount of support software. All of these items at our fabulous DISCOUNT prices. We ship from DFW by air and fully insured for FAST safe delivery.

HARD DISK SUPPORT FOR THE MODEL II...NOW!

5, 10 or 20 Megabytes (up to 80 Megabytes) for the Model II. Full CP/M support. Also full support for TRSDOS and all TRSDOS software. Multiple computers (multi-user) can be connected to these hard disk systems and can share and access common data bases under both CP/M and TRSDOS. The same common data base can even be accessed simultaneously by several users. We use top of the line CORVUS Hard Disk Drives which have a proven track record and have outsold all of their competitors combined in the microcomputer market. Model I and III are also supported by these Hard Disk Systems. \$Call for our LOW prices.

COLOR COMPUTERS

Original mfg.warranty on these items: TCS 180 day Limited warranty on TCS items:

4K Level 1.....	\$308;	16K Level 1.....	\$369
16K Level 1.....	\$439;	16K Extended Basic.....	\$439
16K Extended Basic.....	\$459;	32K Extended Basic.....	\$499
32K Extended Basic.....	\$569;	32K Upgrade Kit (TCS).....	\$79
Color Disk 0...\$495	Disk 1...\$349	EPSON/COLOR Int.& cable	\$59

TRS80 MODEL III COMPUTER SYSTEMS

The following with Radio Shack Warranty:

Model III 16k.....	\$818	The following with quality TCS memory & our own 180 day limited warranty:	
Model III 32k.....	\$979	Model III 32k.....	\$909
Model III 48k.....	\$1089	Model III 48k.....	\$969
Model III 48k 2 Drives RS232C2049			

MODEL III DISK EXPANSION KITS

We use the highest quality fiberglass **CONTROLLER BOARDS** with double sided glass epoxy board and gold plated contacts in our TCS systems. The finest switching **POWER SUPPLY** available is also provided. The aluminum **MOUNTING HARDWARE** has slotted holes for easy installation of the drives and includes all the power and data cables necessary to install the controller, drives and power supply.

Our **DISK DRIVES** are made by Tandon the same company that makes the drives used by Radio Shack. These drives are 40 track, double density, 5 millisecond stepping rate and are fully burned in for 48 hours. These drives have the same specifications as the drives used by Radio Shack. No soldering or modifications to existing circuitry is necessary. The following kits are available:

KIT 1 Controller, Power Supply & Mounting Hardware.....	\$379
KIT 2 Controller, Power Supply, Hardware & 1 Disk Drive.....	\$595
KIT 3 Controller, Power Supply, Hardware & 2 Disk Drives.....	\$819
KIT 4 One Tandon Disk Drive (bare drive only).....	\$219
KIT 5 16K of High Quality TCS Memory chips.....	\$49.95
KIT 6 32k of High Quality TCS Memory chips.....	\$79.95

MODEL III 48k 2 DISK DRIVES ... \$1795

Above KIT fully assembled, with 48 hour burn-in test & 180 day TCS Limited Warranty!!!

SAVE \$200

This month order 2 Mod III
48K Two Disk Systems at
\$1,695. each

DEALER INQUIRIES ARE INVITED ON THE ABOVE TCS KITS

For fast, efficient service. **Heart of** we can air freight from Dallas

TEXAS COMPUTER SYSTEMS

P.O. Box 1327 Arlington, Texas 76004-1327



Toll Free Number 800 433-5184

Texas Residents 817 274-5625

Payment: Money order, cashiers or certified check. Prices above reflect 3% cash Discount. Call for Visa/MC card prices.

Prices subject to change at any time. No Tax out-of-state. Texans add 5%. Many items shipped FREE. Call for quote.

POLICE_{continued}

The personnel evaluation process was automated next. Putting the TRS-80s onto this task accomplished another of the chief's goals: "Getting the supervisors to use the machines. They had to do their personnel evaluations in it and in the process they also got comfortable with the machines."

With Scripsit as their word processing program, daily bulletins, file maintenance and ordinance writing were put into the growing TRS-80 system.

The advent of micros to the Hanover Park police made life easier for the department and saved the town money. Sauer said: "We have an IBM Systems 34 mini-computer in the village. It's a super machine. It does the budgeting and all that stuff, but one of the things that's very costly to do with the 34 is try out ideas. It costs a lot of money to play around on the 34." To figure the police department's budget Sauer and his supervisors tried out different ideas and methods on the Model I. Once it was formed to everyone's satisfaction, it was put into the 34.

Hanover Park will be saving even more money when its Model II arrives. The terminal it leases now to plug into the state's sophisticated central computer system for criminology and police management

information costs \$600 a month.

"What we plan to do is work up an interface to a large CPU that could in turn talk to the state computer and give us the state access without the large cost. We wanted to use our Model I to do it. But we had format problems with screen size and protocol problems with modems. We could have pulled it off, but software-wise it would have been expensive. So we're going to buy a Model II and do three things with it."

First, they plan to dedicate half of their 20 megabyte disk and use a different operating system on the Model II to enable them to do some high speed computing in-house.

Next, they will hook up to the state and the country's criminal justice data base.

They also will use the Model II as a dumb terminal interface to the IBM 34 to make the IBM accessible to the clerk's office. "We figured out a way to do that." Sauer said. "They have backup problems. So what they will be able to do is dump down to our disk."

Sauer was so pleased with how his system was developing that, in October 1979, he wrote an article for *Police Chief* magazine about it. The response was staggering. "A whole bunch of departments called and wanted to know what we were doing, Sauer said." I found out there were a whole lot of TRS-80s [in police departments] around the country, but they were somewhat limited in their uses. We had done some things that I guess was kind of unusual."

The chief not only aroused the interest of his fellow officers, but also that of a California company called Search Inc. They are a clearinghouse, of sorts, specializing in automated criminal justice systems. They were also monitoring, for the federal government, several large criminal justice grants. Next thing he knew, Chief Sauer was traveling the country making demonstrations and holding seminars on the use of microcomputers.

"It really took off," he said, "There was a lot of action, particularly on the federal level, a redirection of interest in getting away from funding big machines and getting into distributive process systems and things like this." Sauer gave advice and even helped some departments obtain software and set their systems up.

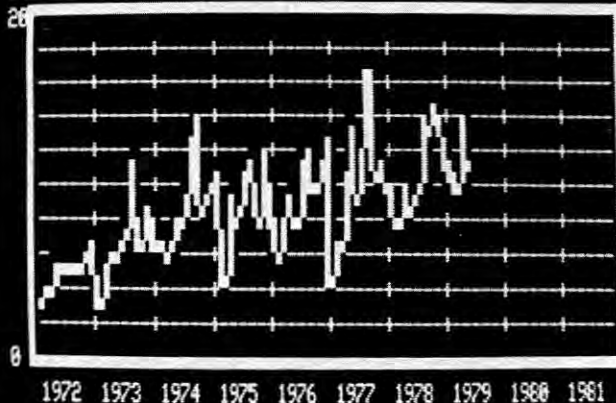
For conventional software the Hanover Park police make use of Scripsit, Visicalc, NEWDOS80 and the AIDS III DBM. Most of their special software was written for them by two Illinois men Dennis Gillig of Schaumburg and Mike Schussert of Elmhurst.

Sauer feels the results of Hanover Park's conversion to TRS-80 computerization has been extremely successful. As the system continues to be used, Sauer and his staff continue to find new uses for it. The chief knew he was on to something when he first introduced the Model I to the department. The potential of that one 4K machine led to the development of the department's present system. Said Sauer, "It just doesn't feel like a small inexpensive computer." ■

ENTER 1)INPUT 2)MODIFY 3)DATA 4)12MVA 5)PRESSURE
6)GRAPH 7)PRINT 8)MENU? _

X 18 CRIMEI

ORIGINAL SERIES



Photos courtesy of Hanover Park Police

LINE	CASE NO.	CODE	ST	DA	REC.	ARR.	DE	SUB	OF	HRS
	DISPLACE	METH	ITEM	PROP	RECIVAL	STOLEN	VAL	RECIVAL	DEST	
LINE	CODE	STAT	OFF	HRS	<p style="text-align: center;">HANOVER PARK POLICE DEPARTMENT</p> <p style="text-align: right;">ENTRY # 1</p>					
LINE	CODE	STAT	OFF	HRS						
LINE	CODE	STAT	OFF	HRS						
LINE	CODE	STAT	OFF	HRS						
LINE	CODE	STAT	OFF	HRS						
UNIT ASSGD		UNITS ASSIST								

Model I display (left) shows crimes in Hanover Park from 1972 to 1981. The department's Model I's are used for generating crime reports (right).

Tax bill woes cured by micro

G. Bert Latamore
Contributing Editor

For generations officials of small, rural towns have kept their tax records by hand. Year after year they have patiently written out annual property tax lists; year after year they have spent hours in repetitive tax bill computations. Many small towns today still use the methods employed by colonial officials 300 years ago.

Canterbury, NH, selectman James Ashworth discovered that fact the hard way. During his first year in the post, he and two other selectmen spent four hours trying to find a four cent mistake in the tax records.

Ashworth found the selectmen were spending one or two months preparing tax bills for a town where "ninety per cent of the properties remain the same year after year."

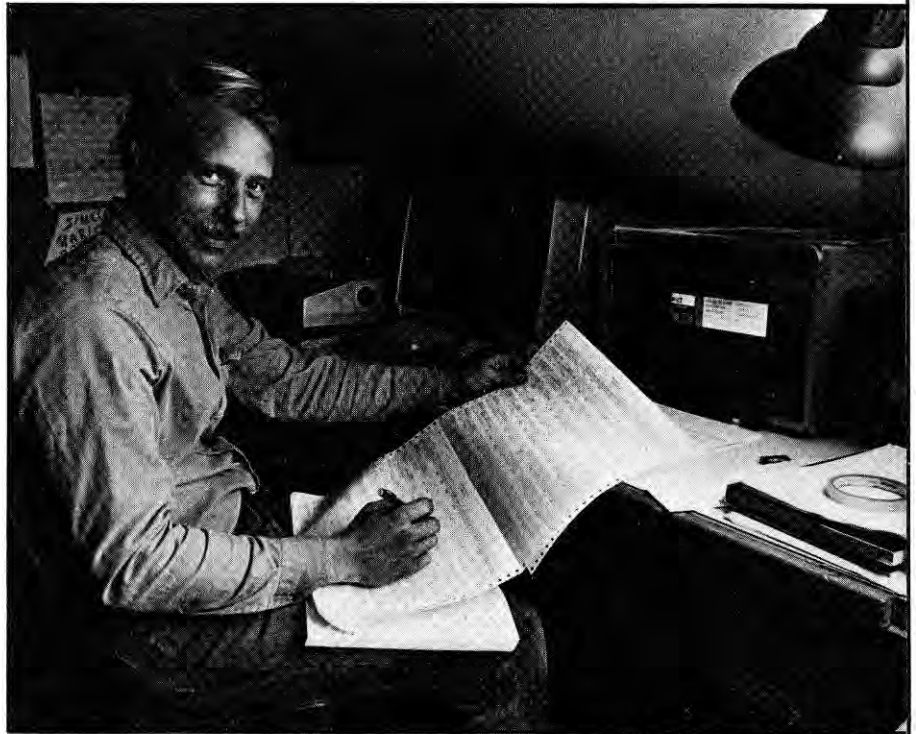
"It was so frustrating to see the same things hand written year after year," he commented. "There had to be a better way."

Ashworth saw computers as that better way. But towns the size of Canterbury do not have the money for computers even in this day of comparatively cheap desktop machines.

Ashworth, who is independently wealthy, decided that if Canterbury couldn't afford a computer, he would buy it himself. The New Hampshire native and former teacher bought a TRS-80 Model II in October 1980 and launched a service providing computerized tax records for small New Hampshire towns. The response has been very favorable.

So far this year, Ashworth said, six small towns have put articles on their town meeting warrants authorizing selectmen to contract with his Municipal Computer Services. He confidently expects all the towns to approve the plans, and he has reason to. Not only will it save town officials a great deal of time, making it possible in many cases for qualified but busy individuals to serve in town offices, it will save them money from the start.

Ashworth charges 40 cents per parcel for entering property tax information into the system and 25 cents per bill for each bill generated, so it costs the town 65 cents per property bill the first year. This is a 20 cent saving per parcel over the average cost of hand preparation of those same bills. Since the information for the vast majority of parcels will not be modified each year, the cost of Ashworth's service will drop to 32 cents a parcel on



Ken Williams/Concord Monitor

Ashworth: After spending four hours trying to find a four-cent error, he found Model II was for him.

the second year.

The service also saves the town money because of its speed in figuring and printing tax bills. Once the state sets the town's tax rate, it takes at least two weeks under traditional methods to figure the bills and have them printed. Ashworth can do it all in a day. He says the average small town loses about \$100 a day in interest during those two weeks of delay in getting their tax money in. The service pays for itself just by saving that interest.

Ashworth bought a TRS-80 Model II mainly for reliability and the service Radio Shack offers in New Hampshire. He has been very pleased. His machine has broken down twice and both times Radio Shack got it back to him within 24 hours. When he bought the machine, the store in Manchester, NH, promised that if it was down for a long time he could use one of their demonstration models. So far, he hasn't had to do that.

Ashworth depends on a database manager called The Formula from Microprocessor Associates in New York for his processing, and he says he can "highly recommend that program to anyone who is working in data management." It can handle all his needs and allows him to create his own tax forms to meet New

Hampshire law using a form generator included in the program. And, he explained, it does these things directly, without requiring him to come up with tricks to circumvent program limitations.

Ashworth's personal motivations for getting into the tax computing business are complex. He says the business will make him "a small amount of money," but he has no particular need for money. He and his wife, Carol, bought their 114 acre farm six years ago after receiving a generous inheritance. They have gone back to the land, enjoying raising sheep and pigs and, recently, building themselves a new home by hand.

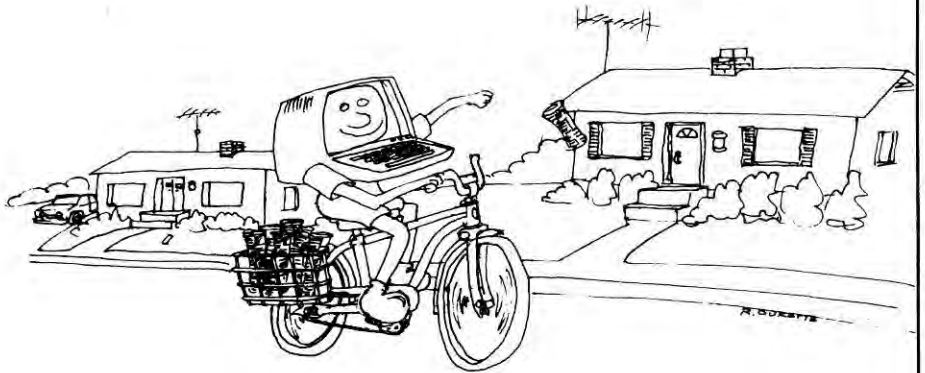
Ashworth admits the computer has become something of a hobby with him. "I enjoy working with the computer," he explained. "It's the most challenging thing I've ever done."

Like many people, however, Ashworth and his wife are concerned with the quality of life in their town and the area around it. That was his motivation in running for selectman in the first place. The tax service is a way for him to help small towns who are being squeezed by many financial pressures.

"The towns need it," he said. "I think I can be a service to them." ■

Newsboy's micro runs paper route

Kerry Leichtman
80 Micro Staff



A newspaper carrier used to have three essential pieces of hardware: a bicycle, a canvas carrying bag and a dog-eared customer record book. The bicycle and canvas carrying bag may still be essential, but the customer record book may be on the way out. Sixteen-year-old Rock Hill *Evening Herald* paperboy Bob Berry has replaced his with a micro.

Berry uses his micro to keep the books for his 90-house South Carolina paper route. The program, written by his father, has nine functions including add and delete customers, printout monthly billings and enter payments and credits.

Berry, who has delivered the *Herald* for almost four years, said if he didn't have the computer to take care of the organization and the math, he would have dropped the route long ago.

Rock Hill circulation manager Jack Einreinhof said "It's great that Bob is using something modern to do something as old as deliver newspapers." Customer reaction has been mixed, according to Einreinhof. "I hear that it works fine and yet we have had calls from customers saying they do occasionally get billed at a wrong rate."

Berry also has received complaints he believes are directed more towards computers in general than the odd billing mistake: "I have had several customers that when they have a question with a bill, they say please check your computer. I don't know what kind of effect it's having on my customers' attitudes. Perhaps they're getting a little carried away with the computer-error syndrome."

Despite the intermittent complaints, Einreinhof is amused at Berry's use of the micro, "We are now just getting software for our circulation department's billing, and this little crapper has had it for the last few years. I guess that's just keeping up with the times." ■

Info utility gives raisers edge

By G. Bert Latamore
Contributing Editor

How a farmer approaches the commodities market can mean success or failure for his business. Until recently, most plowmen were unable to keep tabs on this vital exchange but today, farmers need no longer be blind about it.

The Professional Farmers of America provides electronic commodity information to major farmers using Tandy's videotext system.

The Cedar Falls, IA, organization's service, called Instant Update, provides a rundown, updated every 10 minutes, of prices at the Chicago commodities market and at major U.S. ports. It also provides advisory services including morning, noon, and afternoon news and feature reports offering items likely to influence commodities' prices.

It offers an "alert page" which carries stories of special impact or interest; a weather page; a world weather survey, giving farmers some idea of what is happening to their overseas competition; and Washington Watch, containing stories from Professional Farmers' staffers covering the federal government. After the market closes each afternoon, the service provides its "hog and pig report" covering events and trends affecting that market.

Beyond news, Instant Update provides Market Predictions based on fundamental (supply and demand) and technical (special indicator based) standpoints. Marketing Manager Tom McCafferty explained many farmers use the fundamental analysis to get general trends and the

technical analysis to look for day-to-day clues in the markets to help them determine the best time to sell their goods.

McCafferty said the service has been successful from the start. Although intended mainly for the midwestern farm belt, it has attracted subscribers from across the continent and as far away as Hawaii, even though users must call the database over normal telephone lines and pay the long distance charges themselves.

McCafferty said they have been continually adding to their service since starting it last summer. Many of the additions have been at the request of groups of subscribers who have wanted, for instance, the prices at Norfolk, VA, or gold and silver prices, a general indicator of the health of the economy.

They are also in the process of adding to the service from the technical standpoint. Until recently, farmers had to have either a Tandy videotext terminal or a TRS-80 microcomputer and Radio Shack's special videotext adaptor package to access the database. However, Professional Farmers is now making the technical changes to allow farmers with Apple microcomputers to use the service also.

Instant Update is one of very few videotext services anywhere in the world that does not have the backing of either a national government or major international firm. And it is one of the few designed to be self-supporting virtually from the start. By its survival and success, it is demonstrating the electronic information age has indeed taken the step into the home and small business in a very real way. ■

PROGRAMMING TOOLS FOR YOUR TRS-80™ MODEL I AND MODEL III

INSIDE LEVEL II

The Programmers Guide to the TRS-80 ROMS

INSIDE LEVEL II is a comprehensive reference guide to the Model I and Model III ROMS which allows the machine language or Basic 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. Part II presents an entirely new composite program structure which loads under the SYSTEM command and executes in both Basic and machine code with the speed and efficiency of a compiler. In addition, the 18 chapters include a large body of other information useful to the programmer including tape formats, RAM usage, relocation of Basic programs, USR call expansion, creating SYSTEM tapes of your own programs, interfacing of Basic variables directly with machine code, and special precautions for disk systems. **INSIDE LEVEL II** is a clearly organized reference manual. 80 Microcomputing calls it "a volume of valuable information...immensely thoughtful, literate, and cleanly designed." Byte Magazine says: "I recommend this book to serious machine language programmers."

Includes updates for Model III. INSIDE LEVEL II.....\$15.95

SINGLE STEP THROUGH RAM OR ROM

STEP80 allows you to step through any Basic or machine language program one instruction at a time, and see the address, hexadecimal value, Zilog mnemonic, register contents, and step count for each instruction. The top 14 lines of the video screen are left unaltered so that the 'target program' may perform its display functions unobstructed. **STEP80** will follow program flow right into the ROMs, and is an invaluable aid in learning how the ROM routines function. Commands include step (trace), disassemble, run in step mode at variable step rate, display or alter memory or CPU registers, jump to memory location, execute a CALL, set breakpoints in RAM or ROM, write SYSTEM tapes, and relocate to any page in RAM. The display may also be routed to your line printer through the device control block so custom print drivers are automatically supported.

Specify Model I or Model III. STEP80.....\$16.95

SMART TERMINAL PROGRAM

This machine language program may be used as a smart terminal with time share systems or for high speed file transfers between two disk-based micros over modems or direct wire. It is menu driven and extremely simple to use. Functions include real-time terminal mode, save RAM buffer on disk, transmit disk file, receive binary files, examine and modify UART parameters, program 8 custom log-on messages, automatic 16-bit checksum verification of accurate transmission and reception, and many more user conveniences. Supports line printers and lowercase characters. With this program you will no longer need to convert machine language programs to ASCII for transmission, and you will know immediately if the transmission was accurate. This program comes on a formatted disk.

Specify Model I or Model III. TELCOM.....\$39.95

PROGRAM INDEX VERSION 2.0

Assemble an alphabetized index of your entire program library from disk directories. Program names and free space are read automatically (need not be typed in) and may be alphabetized by disk or program. The list may also be searched for any disk, program, or extension; disks or programs added or deleted; and the whole list or any part sent to the printer. Printer output may be requested in three different formats including labels. The list itself may also be stored on disk for future access and update. It also includes a PURGE mode for quickly killing unwanted files. Directory reads and alphabetizing is done in machine code for speed. 1,000 programs may be sorted in less than 10 seconds. 80 Microcomputing called it "The best thing since sliced bread." It works with TRSDOS, OS-80, NEWDOS, and NEWDOS/80 single or double density. One drive and 32K required.

Specify Model I or Model III. INDEX.....\$24.95

4 SPEED OPTIONS FOR YOUR TRS-80

The SK-2 clock modification allows CPU speeds to be switched between normal, an increase of 50%, or a 50% reduction; selectable at any time without interrupting execution or crashing the program. Instructions are also given for a 100% increase to 3.54 MHz. The SK-2 may be configured by the user to change speed with a toggle switch or on software command. It will automatically return to normal speed any time a disk is active, requires no change to the operating system, and has provisions for adding an LED to indicate when the computer is not at normal speed. It mounts inside the keyboard unit with only 4 necessary connections for the switch option (switch not included), and is easily removed if the computer ever needs service. The SK-2 comes fully assembled with socketed IC's and illustrated instructions.

Model I only. SK-2.....\$24.95

INSTANT ASSEMBLER NOW ON DISK!

The **INSTANT ASSEMBLER** is a powerful disk or tape-based assembler and debugger for the TRS-80. Now you can assemble directly to memory and immediately debug your program 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 assembly language programming.

INSTANT ASSEMBLER is absolutely unique among tape based assemblers in that it produces relocatable code modules that can be linked with the separate **LINKING LOADER**, which is supplied in two versions for loading programs into either high or low RAM. This lets you build long programs with small modules. **INSTANT ASSEMBLER** also features immediate detection of errors as the source code is entered, a compactly coded source format that uses 1/3 as much memory as standard source, and many operational features including single stroke entry of DEFB and DEFW, pinpoint control of listings, alphabetic listing of symbol table, separate commands for listing error lines or the symbol table, block move function, and verification of source tapes.

INSTANT ASSEMBLER's debugger provides single stepping with full register displays, decimal or hex entry of addresses, forward or backward memory displays, disassembly of object code in memory, memory display in ASCII format, and hex-to-decimal or decimal-to-hex conversion. The single-stepper will step one instruction at a time or at a fast rate to any defined address.

INSTANT ASSEMBLER occupies less than 8400 bytes of memory. In a 16K machine this will leave you enough memory to write assembly language programs of around 2000 bytes. This and its module-linking feature make **INSTANT ASSEMBLER** ideal for users with only 16K machines. The instruction manual may be purchased separately for \$3, which will apply towards the purchase of the **INSTANT ASSEMBLER**. In addition to disk I/O, the disk version includes a stand-alone version of the debugger.

Specify Model I or Model III. TAPE INTASM.....\$29.95

Specify Model I or Model III. DISK INTASM.....\$35.95

RESTORE DAMAGED TAPES WITH RESQ2

Cassette recordings are subject to several types of damage. Thin spots in the oxide, dirt, voltage fluctuations while recording, or stray magnetic fields can all contribute to lost or added bits. **RESQ2** was written to provide a method of restoring tapes that can no longer be loaded for these reasons. It can restore BASIC, SYSTEM, ASSEMBLER, and DATA tapes. **RESQ2** compares two copies of the damaged tape to attempt a restoration, though restoration can often be accomplished with only one copy. After the damaged data is corrected in memory, a new tape may be recorded and verified which does not contain the errors. The success rate of **RESQ2** will depend on the severity and quantity of errors. **RESQ2** comes with a comprehensive user manual and examples of two types of 'crashed' programs to practice on.

Specify Model I or Model III. RESQ2.....\$19.95

RAM SPOOLER AND PRINT FORMATTER

This program is a full feature print formatting package featuring user definable line and page length (with line feeds inserted between words or after punctuation), screen dump, printer pause control, and baud rate selection. In addition, printing is done from a 4K expandable buffer area so that the LPRINT or LLIST command returns control to the user while printing is being done. Works with cassette or disk systems. Ideal for Selectric or other slow printers. Allows printing and processing to run concurrently. Output may be directed to either the parallel port, serial port, or the video screen. 80 Microcomputing said "I can only give my highest recommendation of Spooler and Mumford Micro Systems."

Specify Model I or Model III. SPOOLER.....\$16.95

DUPLICATE SYSTEM TAPES WITH CLONE

Make duplicate copies of almost any tape including Basic, SYSTEM, data lists, assembler source, or 'custom loaders'. The file name, load address, entry point, and every byte (in ASCII format) are displayed on the video screen. Model III version allows changing tape speed so you can load in a tape at 500 baud and write it out at 1500.

Specify Model I or Model III. CLONE.....\$16.95

MACHINE CODE FAST FOURIER TRANSFORM

Written by Dr. A.H. Gray, Jr., co-author (with J.D. Markel) of the classic text 'Linear Prediction of Speech', this complete package includes 3 versions of the machine language FFTASM routine assembled for 16, 32, and 48K machines, a short sample Basic program to access them, a 10K Basic program which includes sophisticated interactive graphing and data manipulation, and a manual of instructions and examples. The machine language subroutines use variables defined by a supporting Basic program to make data entry and retrieval automatic, without PEEKs and POKEs. They perform 20 to 40 times faster than their Basic equivalent (256 points in 12.5 seconds), and handle up to a 1024 point complex FFT. The FFT is useful in analyzing stock market and commodity trends as well as for signal analysis.

Specify Model I or Model III. FFTASM.....\$49.95

FFTASM on disk with source code.....\$69.95

MUMFORD MICRO SYSTEMS

ORDERING: Complete satisfaction is guaranteed or a full refund will be made. All programs except TELCOM and DISK INTASM are shipped on cassette unless \$5 is included for a formatted (no system) disk. Include \$1.50 for postage and handling. California residents add 6% sales tax. Visa, Mastercharge and COD orders accepted. **SPECIFY MODEL I OR MODEL III.** Dealer inquiries invited.

Box 400-E Summerland, California 93067 (805) 969-4557

VIEWPOINT

Let your digits do the crunching

by Chuck Kraemer

This being the age of information, I shuffled recently into my new neighborhood computer store, with its still-fresh aroma of carpet compound, and its Apples and Ataris blinking everywhere, and greatly impressed the clerk, I believe, by announcing that I wanted to crunch a few numbers.

Programmer lingo, you know.

Dot matrix or impact? he wanted to know. Basic or Pascal? What peripherals exactly? Did I want a modem? Acoustic coupler OK? What resolution on the CRT? Something about algorithms, mainframes, ICs, CPUs, buffers, and a binary chops. And how about a word processor? Block move? Word wrap? Search and replace?

Fine, I said, and throw in a floppy chip and an integrated disk or whatever and a can of debugger for the input.

And, if the program was too tough, I wondered, was it OK sometimes to count on my fingers?

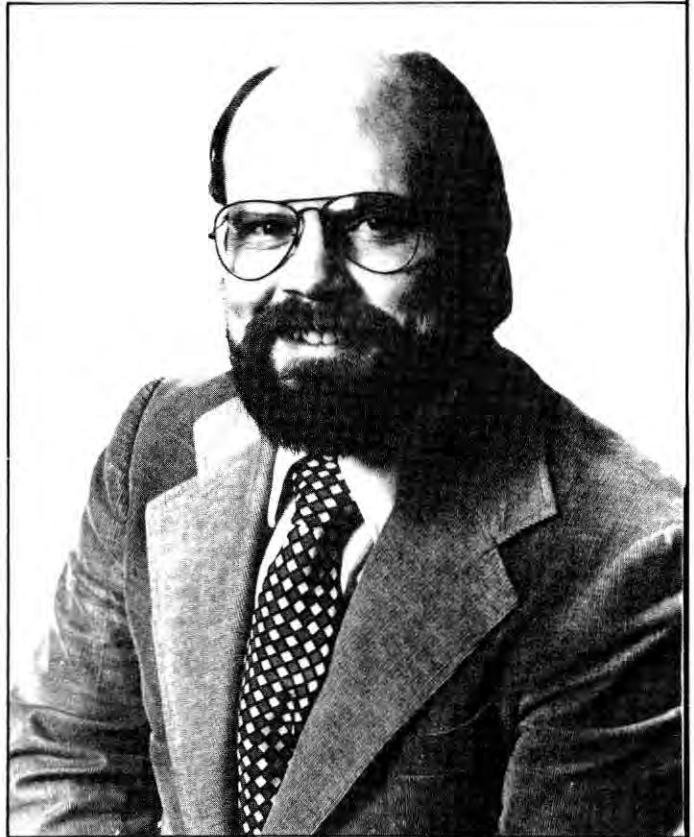
Suddenly the guy steps sideways in front of his Apple, as if to protect it from a worm, and inquires suspiciously just what experience did I have, anyway, with computers.

I said, well, I have an electric typewriter and was learning to make it backspace.

Whereupon he steered me into the electronic game department and tried to sell me one of their starter-models. I think he called it Inter-galactic majong.

Whereupon a slight blush spread across my interface and I realized this was the wrong kind of hardware store for me.

So I backed out the door and went home to crunch my numbers on the same old integrated



Kraemer: Not ready to byte the Apple.

circuits I've used since 1945.

Except for that dismal semester in 1961, in algebra, they have always worked just peachy, thank you, so you'll forgive me if I don't byte the Apple just yet. Maybe later, after I figure out how to backspace.

Till then, if this is the age of information, I don't want to know.

Chuck Kraemer is a reporter and commentator for WCVB-TV, Channel 5, in Boston, where this essay was aired Jan. 18.

TELEWRITER

the Color Computer Word Processor

the only one with all these features for your TRS-80 Color:

51 column x 24 line screen display ■ Sophisticated full-screen editor

Real lower case characters ■ Powerful text formatter

Works with any printer ■ Special MX-80 driver

Runs in 16K or 32K ■ Disk & cassette I/O

requires absolutely no hardware modifications

TELEWRITER

Telewriter is the powerful word processor designed specifically for the Color Computer. It can handle almost any serious writing job and it is extremely easy to use. It has all the advanced features you need to create, edit, store, format and print any kind of text. With Telewriter you can quickly produce perfect, finished copy for letters, reports, term papers, articles, technical documentation, stories, novels, screenplays, newsletters. It is also a flexible and efficient way to take notes or organize ideas and plans.

51 x 24 DISPLAY

The Color Computer is an incredibly powerful and versatile computer, but for text editing it has some major drawbacks. The small 32 character by 16 line screen format shows you too little of the text and, combined with its lack of lower case letters, bears little resemblance to the way text really looks on the page. Reverse video in place of lower case just adds confusion.

Telewriter eliminates these shortcomings with **no hardware modifications required**. By using software alone, Telewriter creates a new character set that has **real lower case letters**, and puts 24 lines of 51 characters on the screen. That's more on-screen characters than Apple II, Atari or TRS-80 Model III. That's more than double the Color Computer's standard display.

FULL SCREEN EDITOR

The Telewriter editor is designed for maximum ease of use. The commands are single key (or single key plus control key), fast, and easy to remember. There is no need to switch between insert modes and delete modes and cursor movement modes. You simply type. What you type is inserted into the text at the cursor, on the screen. What you see on the screen is always the current state of your text. You

can move quickly through the text with one key cursor movement in all 4 directions, or press the shift key simultaneously for fast, auto-repeat. You can jump to the top or bottom of the text, the beginning or end of a line, move forward or backward a page at a time, or scroll quickly up or down. When you type past the end of the line, the wordwrap feature moves you cleanly to the next.

... one of the best programs for the Color Computer I have seen . . .

— Color Computer News, Jan. 1982

You can copy, move or delete any size block of text, search repeatedly for any pattern of characters, then instantly delete it or replace it with another. Telewriter gives you a tab key, tells you how much space you have left in memory, and warns you when the buffer is full.

FORMAT FEATURES

When it comes time to print out the finished manuscript, Telewriter lets you specify: left, right, top, and bottom margins; line spacing and lines per page. These parameters can be set before printing or they can be dynamically modified during printing with simple format codes in the text.

... truly a state of the art word processor . . . outstanding in every respect.

— The RAINBOW, Jan. 1982

Telewriter will automatically number pages (if you want) and automatically center lines. It can chain print any number of text files from cassette or disk without user intervention. You can tell it to start a new page anywhere in the text, pause at the bottom of the page, and set the Baud rate to any value (so you can run your printer at top speed).

You can print all or any part of the text buffer, abort the printing at any point, and there is a "Typewriter" feature which allows you to type straight to your printer. Because Telewriter lets you output numeric control codes directly (either from the menu or during printing), it works with any printer. There's even a special driver for the Epson MX-80 that lets you simply select any of its 12 fonts and do underlining with a single underline character.

CASSETTE AND DISK I/O

Because Telewriter makes using cassette almost painless, you can still have a powerful word processor without the major additional cost of a disk. The advanced cassette handler will search in the forward direction till it finds the first valid file, so there's no need to keep retying a load command when you are lost in your tape. The Verify command checks your cassette saves to make sure they're good. You can save all or any part of the text buffer to disk or cassette and you can append pre-existing files from either medium to what you have in the buffer already.

AVAILABLE NOW

Telewriter turns your Color Computer into the lowest cost hi-power word processor in the world today. It runs in 16K or 32K (32K recommended) and is so simple you can be writing with it almost immediately. It comes with 63 pages of documentation and is fully supported by Cognitec. Telewriter costs \$49.95 including shipping (California residents add 6% tax). To order, specify disk or cassette and send check or money order to:

Cognitec
704 Nob Ave.
Del Mar, Ca. 92014

Or call (714) 755-1258 weekdays 7 AM-4PM PST. We will gladly answer your questions.

PULSE TRAIN

CBS-ATT videotext test to start Sept. 15

On Sept. 15, two communications giants—the American Telephone and Telegraph Co. and the Columbia Broadcasting System—will start a major test of home computer information technology.

The test (see *80 Micro* news, December 1981), called Venture I, will involve 200 households in New Jersey and run seven months, James Bauer told *80 Micro*.

The director of business development for the project said it will include information from CBS sources. In addition to its world-wide broadcast holdings, CBS owns 60 newsstand magazines and six book lines.

"But we're not going to take material that's appeared in a printed magazine and spit it out," Bauer observed. "We're putting together a fairly large editorial staff that will essentially create unique products for the videotext service."

"I can't tell you the specifics of the information," he added, "but it will be fairly broad, general consumer information—a lot of things that other services up to now have: news, sports, weather, local information, local entertainment."

And the network will have some "unique" things on the system, he said, that are "proprietary."

He explained households will participate in the experiment free of charge. "They're going to be chosen by a market research firm," he observed, "that is going to set up the demographics of people likely to be the initial mass market purchasers of the service."

Two kinds of interactive terminals will be used in the test. One unit can be connected to the back of a tv set; the other is stand-alone and looks like a Hazeltine 1510 terminal.

Bauer explained two devices will be used because one research objective of AT&T is to find out what kind of terminals people prefer for videotext service.

"We're also interested in how much time videotext will take away from normal television viewing," he added.



Commodore's VIC-20 lineup: Printer comes up short.

Commodore short-sheets VIC-20 printer

Computer novices eyeing Commodore International's new printer for its VIC-20 microcomputer should consider carefully the printer's paper size, cautioned Christopher Plumley of Brattleboro, VT, in a letter to Wayne Green Inc.

He explained the VIC-1515 printer uses eight-inch wide paper. Standard-size paper is 8.5-inches wide.

If the 15-pound paper is bought from Commodore, Plumley said, it costs \$15 for 1,000 sheets. He maintained it costs him \$6.37 per 1,000 for standard-size paper.

Commodore's vice president of marketing, Kit Spencer, admitted eight-inch paper is "not the most common size." But there are other printers using that size paper, he said, such as the Seikosha printer.

Asked if there were other suppliers of the non-standard paper, Spencer replied: "There are other people. I do know that. We checked that out."

"Paper is very much an open market," he added. "We have advised our dealers

of both external supplies of paper and ours."

Asked about the \$15 per 1,000 price, he responded, "I think you'll find that's a reasonable price to pay."

Data processing hot career for 1982

If your career specialty is data processing, you will be in good shape in 1982, predicted Paul R. Ray & Company Inc. of Fort Worth, TX.

The executive search firm also noted another "hot" career right now is computer program design.

Senior vice president Joseph A. Zant said in a statement, people with data processing experience who move into another discipline have a better shot at top corporate jobs than people without that kind of experience.

He added that a manager with 10 years of electronic data processing combined with good communication skills is now worth \$75,000.

continued

THE BEST NEW PROGRAM OF THE SEASON ISN'T EVEN ON TV.

The smash hit program is E/Z-SCREEN. You can see it live, in action, right on your computer.

E/Z-SCREEN is the revolutionary new system that makes designing of professional quality screens a snap by letting you design them right on your TRS-80* screen.

Once in place, the E/Z-SCREEN system starts the show by "talking" to you. It automatically produces "user friendly" disk BASIC code, giving you access to a host of screen processing functions.

This and many other E/Z-SCREEN features can save you untold time, effort and can actually make screen design kind of enjoyable! Here's how:

E/Z-SCREEN DESIGN

By using your keyboard, E/Z-SCREEN's formatting commands let you format and modify your screen. Like changing channels, you can keep changing your layout until you're perfectly happy with it. And since what you see onscreen is what you get, you never get a layout or write a program you're not completely satisfied with.

Want to center a line? Maybe a few? Just give the command and watch it happen—automagically! You can even repeat information, horizontally or vertically. Best of all, if you still don't like what you see, you can totally rearrange the screen design—even after you've written your program.

E/Z-SCREEN lets you move any and all fields of



information, re-sequence lines, plus much more. And you see it all happen. When you're finally satisfied, save your screen on disk and go on to design another. But after design completion, E/Z-SCREEN really goes to work for you.

THE GRAND FINALE

E/Z-SCREEN automatically generates the screen process code, making your screen work and look like those written for larger industrial computers. The code controls the displaying and reading of data and the printing of text on the screen—for up to 12 screens per program!

What's more, the keyboard operator is truly the program director, in total control of data being entered. Data changes, corrections, and erasures are all made easily by using the various cursor control keys.

A MATTER OF RECORD

E/Z-SCREEN even makes documentation of your program easy by automatically cross-referencing and printing it on paper (if printer is connected to system).

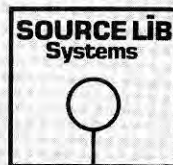
EASY ON THE BUDGET

E/Z-SCREEN costs about the same as an average black and white TV. Only \$149.95.

So to order, call toll free 800-223-1087.

In N.Y. State call 212-751-8891.

For more information, write SOURCE LIB Systems, Inc., 1670 Pershing St., Valley Stream, N.Y. 11580.



*Compatible with TRS-80 Models I and III, dual disk 48K memory, TRS-80 trademark of Tandy Corp.

All major credit cards accepted. N.Y. State residents add appropriate sales tax.

PULSE TRAIN *continued*

Networking arrives in N.Y. Times newsroom

Networking has arrived in the New York Times newsroom.

Using the split-screen capability in the newsroom terminals, reporters can write their stories on one side of the screen while calling up information on the other side.

The formation—accessed by reporters through an in-house network called "Copynet"—is from the newspaper's information bank. It includes the full text of the newspaper for the last 18 months and abstracts and digests of articles from the *Times* and 70 other newspapers, magazines and journals published in the United States and abroad.

Micro Winchester Market exploding

From ground zero in 1980, the micro Winchester drive market rocketed to \$81 million in 1981 and it's expected to break the billion dollar threshold by 1985, according to a report in the New York *Times*.

Since last January, 30 companies have announced entries into the market, but manufacturers may be facing their first real test this year. After a flurry of orders during the first nine months of 1981, the *Times* said, business has tapered off, as computer makers study the market and begin designing their choices into their machines. This could take another six months, long enough to severely tax upstarts in the industry.

Several other factors have retarded market growth, 3M Data Records Product Division Vice President Alfred E. Smith said in a statement. But those factors—lack of product availability, lack of common interfacing and the need for a realistic back-up solution—are being overcome.

The *Times* identified the following as leading makers of the drives: Seagate Technology Corporation, which has a contract with Apple Corporation, has licensed its technology to Texas Instruments, and is rumored to be close

to closing a deal with Digital Equipment Corporation; Tandon Corporation, which has contracts with Tandy and Commodore; and Shugart, now owned by Xerox and will be sole supplier to that concern's "office of the future."

Long term success, however, is not guaranteed for the current crop of successful companies, the *Times* added. If the market develops as the calculator and digital watch markets did, continued innovation is the only guarantee of long term existence. Consequently,



3M's Smith: Barriers down.

companies are working on cartridge rigid disks, semiconductor "thin film" heads, and some floppy disk makers on multiple floppy disk cartridges.

And of course, there's the Japanese. Sony has announced it's working on a 3½-inch rigid disk.

Freelancer of future may be electronic

It may be an inkling to what writing for magazines will be like in the near future.

When editor Stan Miastkowski of *Popular Computing* told Harris Brotman he liked the author's idea for an article on electronic barter, the pair decided to set up an electronic exchange of their own.

Using *The Source*, an information utility in McLean, VA, Brotman com-

posed his 2,000 word story on his data terminal in Vermont. Then he used *The Source's* electronic mail feature to send the manuscript to Miastkowski in New Hampshire, where the editor received it on a TRS-80 Model II in four minutes and 20 seconds.

Miastkowski told *80 Micro* Brotman could have transmitted his story directly to *Popular Computing* but there was an advantage to using *The Source*. Brotman could leave the story in the magazine's electronic mail box to be retrieved later.

Another advantage, noted *Source* spokesman Mike Rawl, is *The Source* allows microcomputers from different manufacturers to communicate with each other.

Miastkowski said his magazine uses electronic communication infrequently because many of its authors are inequipped to do it. "Another major problem," he added, "is that many of our authors that get *The Source* don't know our user number, TCG847."

While writers and editors have been linked electronically within newsrooms for several years, only recently have independent writers, located many miles from their publishers, begun to compose and transmit manuscripts via computers.

"Many writers and publishers," Rawl observed, "are beginning to create informal networks among themselves for the purpose of communicating, discussing ideas, queries, assignments, copy transmission and copy editing."

Brotman envisions a day when "networks of writers and publishers will exist nationwide, proposing story ideas, composing, submitting copy and having editing done."

So does Rawl: "I really believe that in five years probably about half the writers that are out there will be composing and transmitting copy electronically."

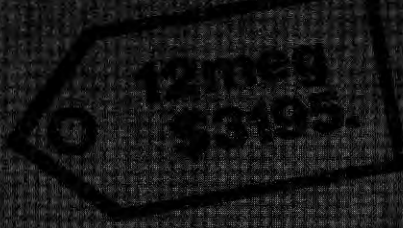
Fighting the arcade menace

A one person war against electronic arcade games is being waged by Mrs. Ronnie Lamm of Centereach, NY.

According to a report in the *Boston Herald American* Lamm's crusade against the games has included circulating petitions, making speeches, sending out mass mailings, talking with state officials about legislation to control the games and calling the local fire department to check on overcrowded conditions at popular amusement centers.

Quality Computer Services presents..

Hard Disk Systems



For TRS®, Apple®, Heath®, S-100, IBM.....
6,12,20,40 and 80 Megabyte systems

Completely assembled and tested subsystem including:

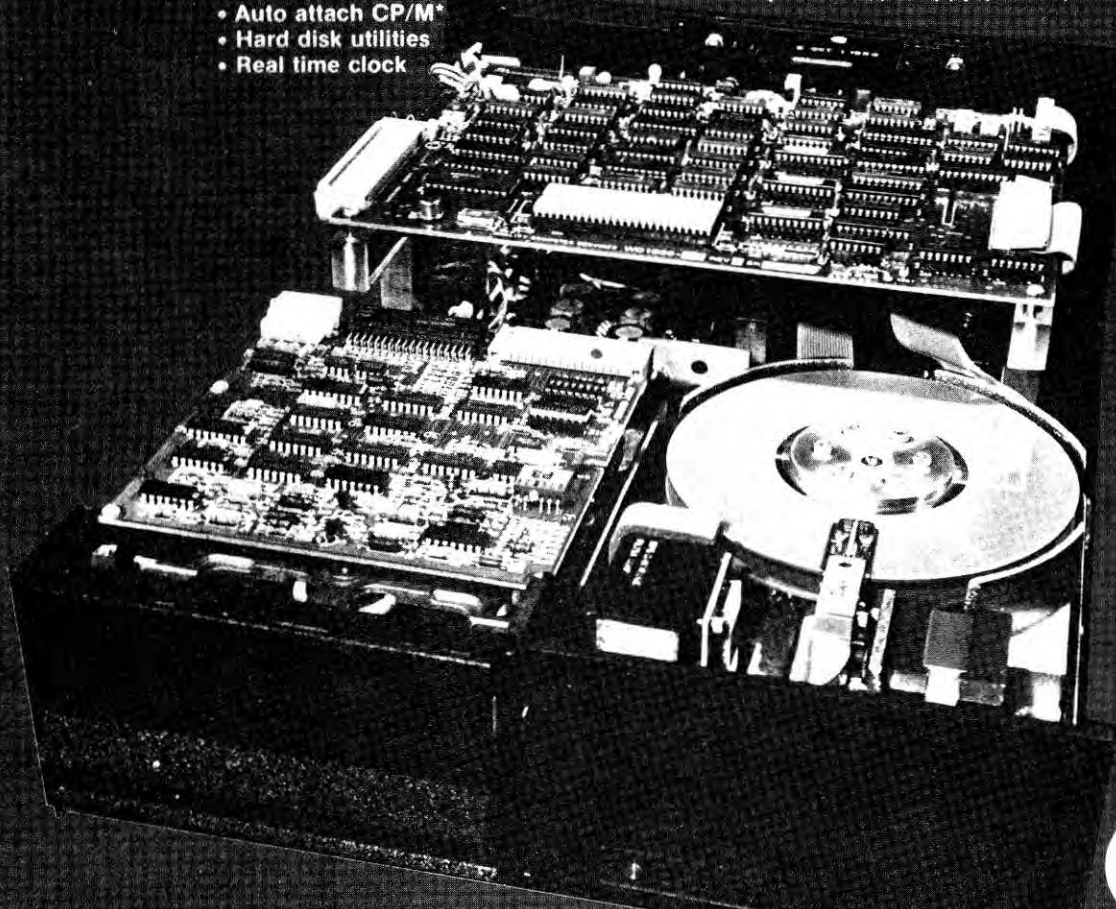
- Switching power supply
- Winchester drive
- Host adapter card
- Sealed case
- Expansion

The enclosure, controller and power supply have been designed to allow for future backup hardware or increased storage

- Software
- Auto attach CP/M*
- Hard disk utilities
- Real time clock

- Formatting program
Assigns alternate sectors for any weak sectors detected during formatting assuring the lowest possible error rate

- Warranty: The system has a full one year warranty on all parts and workmanship
- Also available: attach for TRSDOS, OASIS*, Apple DOS
- Optional 5¼" floppy (shown)



See local dealer
or call:
Quality Computer
Services
178 Main Street
Metuchen, New Jersey
201-548-2135

• Quantity discounts available. Distributor, Dealer and OEM inquiries invited.

*OASIS is a trademark of Phase One Systems. CP/M is trademark of Digital Research

QCS
u e inc

Toll free number: 800 631 5944

PULSE TRAIN *continued*

When Lamm started speaking out on the issue, there were 17 applications to open video parlors along a three-mile strip in her community. Twelve applications were denied by local officials; the other five were dropped. Lamm also joined other concerned parents to persuade a neighboring town, Brookfield, to approve a six-month moratorium on arcade permits.

A case that may determine how far a community may go to control the games is presently before the U.S. Supreme Court (see *80 Micro News*, January 1982).

The *Herald American* report noted games opponents in other communities have called Lamm to compare notes, and through parent-teacher association conventions and other gatherings, a loose-knit army to oppose the amusements is developing throughout the state and nation.

Lamm maintained there is unacceptable language and antisocial behavior exhibited in the arcades. The games, she added, corrupt youngsters, teaching them gambling, aggressive behavior and theft (see *80 Micro News*, February 1982).

French laws keep Interpol from computer age

There are 3.5 million files at the International Criminal Police Organization—a good target for computerization—if the group were not headquartered in France.

Interpol acts as a massive center for transferring information on crime. Its files contain the gritty details of international skulduggery: offenses and places where they were committed; modus operandi of criminals; documents; fingerprints; photographs; and more than one million names. But according to a report by the Associated Press, French laws regulating computer files are discouraging Interpol from modernizing its record keeping.

The laws require any organization maintaining computer records on people to make them public and have empowered a National Committee on Information and Freedom to inspect the files; correct them; and even destroy them. Information submitted to Interpol, it maintains, is meant to be shared with law enforcement agencies in its 133 member countries, not with the French public.

Other international organizations operating on French soil have been granted immunity from the laws. Interpol is currently negotiating with France for

such immunity, but until an agreement can be reached, the organization's general assembly has frozen its program to computerize its records.

The AP report quoted Interpol's secretary general, Andre Bossard, as saying that although the negotiations were going well, moving the organization's headquarters "is always a possibility."

\$50 terminals by 2000 A.D.

By 2000 A.D., videotext terminals will cost as little as \$50, according to a study by the Institute for the Future, a California research and consulting group.

The concern also predicted 10 percent of the homes in the United States will have terminals by 1990—when the devices will sell for \$200—and 40 percent by the end of the century.

According to the computer newspaper *Infoworld*, figures on videotext compiled at the end of 1981 reveal 42,000 U.S. and Canadian terminals were subscribing to Dow Jones, The Source and CompuServe; 150,000 U.K. terminals were receiving one-way CEEfax and Oracle teletext; and 10,500 terminals were interactive with 500 electronic publishers and 500 users in seven countries over Prestel's international service. ■



NEW CENTER IN SPOKANE. Timothy F. Preece (far right), Kaiser Aluminum's corporate vice president for planning and control, explains the operation of the company's new Northwest Regional Data Center in Spokane, Washington, during a recent open house tour. The center is the first of several the company will set up to coordinate information systems, time-sharing and telecommunications for plants and facilities in the United States and abroad.

YOUR Family Tree

By Chuck Actee



NEW!

A comprehensive genealogical program that lets you avoid the rigidities of paper-based family trees. It quickly and easily sets up a data base to hold pertinent information about each ancestor, including name, date and place of birth, marriage and death information, plus a comment line.

YOUR FAMILY TREE will display and print a complete "pedigree" for any selected family member; or a 3-generation ancestral chart may be generated for display or printer, showing the number of known ancestors beyond each branch of the tree. As a novelty feature, the program will display a U.S. outline map showing migration across the country. Access to information in YOUR FAMILY TREE is virtually unlimited, with full search capabilities on any key field—using full or partial information.

16K RAM has space for 45-55 ancestors with brief comments. A 32K cassette-based system will hold about 175 records; a 48K, about 300. In all cases, a disk-based system will hold about 75 less due to DOS overhead.

Available for TRS-80* models I and III on tape or disk, YOUR FAMILY TREE requires a minimum of 16K RAM. Enjoy the benefits of this powerful and flexible charting system now for just \$29.95.

ACORN PROGRAMS ARE AVAILABLE AT FINE COMPUTER STORES EVERYWHERE

MONEY MANAGER



By Andrew P. Bartorillo

A complete management tool for the home budget, it accurately keeps track of your checkbook and provides an easy method of budget allocation.

You can store information on up to 100 checkbook entries per month (250 with 48K), specify any automatic withdrawals, keep records of tax-deductibles, and record expenses by category. You can even break up charge account payments into the proper categories.

Requires TRS-80* model I or III with a minimum of 32K and one disk drive. Order now for only \$39.95.

LOST COLONY



By David Feitelberg

It's the world's first deep space colony and you are the economic manager. A remarkable simulation, LOST COLONY arms you with maps and charts as tools for resource management. You assign human and robotic labor, explore new land, and set production quotas. At the same time you must determine equitable pay scales and taxes.

Communicate through your Model I or III using full sentences or short commands. A challenging game, it might give you insight into real life management as well. Available on 16K tape or 32K disk for only \$19.95 each.



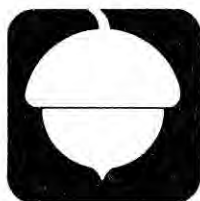
SPACE ROCKS

By Steven Kearns

Huge antimatter rocks appear on the Tactical Display Screen of your spacecraft. You blast away but they just explode into smaller chunks for you to destroy. To add to your woes, alien ships and time bombs appear periodically. If the ships hit you or the timers reach zero—BOOM! Maneuver, fire lasers, jump to hyperspace—anything to avoid the onslaught. For one or two players, with nine skill levels.

A realtime arcade game with sound, for TRS-80* model I or III. Versions for 16K tape or 32K disk are \$19.95 each.

*Trademark of Tandy Corp.



(202) 544-4259

Acorn
Software Products, Inc.

634 North Carolina Avenue, S.E., Washington, D.C. 20003

ALL ACORN ENTERTAINMENT SOFTWARE SUPPLIED FOR TRS-80* MODELS I & III

MAIL ORDERS: Include \$2.00 shipping & handling (D.C. residents add 6% sales tax).
CHARGE CARD CUSTOMERS: Call (202) 544-4259 for fastest service.

79

COMPUTER GAMES
TRS-80 MODEL 1/3 16K LEVEL II
TRS-80 16K COLOR AND 8K PET

DEMONSTRATION PROGRAM "FROG RACE" COMES ON CASSETTE WITH A FULL REFUND COUPON TO USE ON YOUR NEXT ORDER. FROG RACE CASSETTE \$3. WITH CATALOG

DUO-PAK'S ARE \$10 DOLLARS EACH.

NO.	PGM SIDE 1	PGM SIDE 2
1	GONE FISHING	CONCENTRATION
2	CRAPS	SLOT-MACHINE
3	STARSHIP	SHERLOCK HOLMES
4	TANK ATTACK	ASSOCIATION
5	NUMBER GUESS	DICE ROLL
6	IN-BETWEEN	SHELL GAME
7	SAFARI	STARSHIP-2
8	MORTAR BATTLE	PUZZLE
9	TEASER	MOUSE
10	PT BOAT	TURTLE RACE
11	CHEK-CHES	STARSHIP-3
12	THINK	LUCK & LOGIC
13	TREASURE ISLAND	RESCUE

SHIPPED 1ST CLASS MAIL PPD. - NO COD'S. SPECIFY WHAT COMPUTER YOU HAVE.
B. ERICKSON P.O. BOX 11099
CHICAGO, IL 60611 ✓371

SMILE WHEN YOU SAY TAPE!

KWICOS



The reasonable alternative to Model I DISK. Software only, no mods or add-ons. The KWIK Cassette Operating System gives you a new tape storage format with these advantages:

- Selectable SAVE/LOAD speeds, 2x through 6x.
- Visual loading guide for easy volume setting.
- Write, read, verify, search, test-read, and catalog of BASIC and machine-code programs.
- Merge [chain-load] of BASIC programs from tape.
- Up to 32 character program titles including password protection and in-title comments.
- No lock-ups or garbage from a busted load.
- Display of program filespecs, including length.
- Adjustable debounce and control of LIST, Trace, and BASIC program execution speed.
- Won't LOAD/MERGE if unprotected RAM is too small.
- Motor on/off from keyboard, plus automatic gaps.
- Partial kill of KWICOS if more memory needed.
- Built-in BACKUP feature lets you copy KWICOS.
- Full compatibility with the LemonAid Loader**

Cassette for Model I, Level II
4k - 48k ...
PPd U.S. **\$24.00**

✓359
KWIK Software
P.O. Box 328
Bolivar, MO. 65613

** Trademark of Lemon Tech Services

WILD CAT

REMARKABLE TRS-80 DISK DIRECTORY CATALOGUE SYSTEM

Catalogue contains Filespec, FIRST LINE REMARK, disk ID, disk name, disk date and free grants

Model I using TRSDOS 2.3 or any Version NEWDOS Uses fast machine code for reading and sorting.
\$39.95 + \$2.00/S/H Req. 48K. Two 5" Drives
Satisfaction guaranteed or return within 10 days.

DONALD M. FIELDING
2207 N.W. 61st PLACE • MARGATE, FL 33063
(305) 972-6744

Dealer Inquiries Invited
TRS-80 and TRSDOS - Trademark of Tandy Corp.
NEWDOS - Trademark Apparat Inc.

✓357

TRS-80™ BUSINESS SOLUTION

Tired of switching printer cables between printer #1 and printer #2? Here is the solution. The Model SW17-A Printer Switcher is your answer. The SW17-A Switcher is a solid-state (no relays) printer switcher designed with your office efficiency in mind—simple to operate, with the single remote switch, yet positive in operation. Absolutely no data dropout. Available for TRS-80™ Model I, II, III, cables, remote switch, and power supply are included. 1 year limited warranty.

\$249.95

Please specify computer and printer models, sorry, no C.O.D.

Wizard Electronics, Inc.

P.O.B. 47842 • Doraville, GA. 30362
404-261-2653



✓381

TRS-80™ is a registered trademark of Tandy Corporation

TRSDOS ↔ CP/M with REFORMATTER™

Model II users! Convert files between TRSDOS and CP/M!

- REFORMATTER runs under TRSDOS
- Operates on single drive system
- Converts in both directions
- CP/M operating system not needed
- All TRSDOS record lengths supported
- Initializes blank CP/M diskette
- Displays or dumps CP/M files
- Manipulates CP/M directory under TRSDOS

\$249.00 from stock. CP/M ↔ IBM and CP/M ↔ DEC versions of REFORMATTER also available at \$249.00 from MicroTech Exports, Inc., 467 Hamilton Ave., Palo Alto, CA 94301 □ Tel: 415/324-9114 □ TWX: 910-370-7457 MUH-ALTOS □ Dealer & OEM discounts available. ✓380

OH NO!

We've run out of several issues of 1980's 80 Microcomputing. Therefore, we can no longer offer the entire year of 1980 issues for \$25.00. If there is a certain month that you need, please contact us through our back-issue ad in this magazine. We may be able to help you with your particular request.

TRS-80 MODEL I T.M.* GOLDPLUG - 80

Eliminate disk re-boots and data loss due to poor contact problems at card edge connectors. The GOLD PLUG - 80 solders to the board card edge. Use your existing cables.

CPU/keyboard to expansion interface \$18.95
Expansion interface to disk, printer, RS232, screen printer (specify) \$9.95 ea
Full set, six connectors. . . \$54.95



EAP COMPANY
P.O. Box 14, Keller, TX 76248
(817) 498-4242

*TRS-80 is a trademark of Tandy Corp.

✓216

"COMPUTER ACCESSORIES OF ARIZONA PRESENTS" PRODUCTS FOR THE "TRS-80* COLOR COMPUTER"

1248-EP EPROM PROGRAMMER \$94.95

- | | | |
|--|---|---|
| <ul style="list-style-type: none"> • Software driver in EPROM • Totally menu driven • Validate EPROM erasure • Program memory blocks/bytes • Verify programs • Includes onboard 25 volt programming supply | <p>PROGRAMS:</p> <ul style="list-style-type: none"> • 2908 • 2758-0/1 • 2516 • 2716 • 2532 • 68732-0/1 • 68764 | <ul style="list-style-type: none"> • Quality ZIF socket • Address decoding option supports efficient use of ROM port memory space • Makes professional software development system when used with Micro Works SDS80C** editor/ assembler |
|--|---|---|

CK4 PROM/RAM CARD \$29.95

- ROM pack space decoded into 2K blocks
- Switches to write protected RAM's
- Use 4 2716's or 4016's
- Use 4 4K ROM's or 2 8K ROM's

MEDK80 MORSE EN/DECODER KIT \$39.95

- Use any KMTR or RCVR
- Speeds - 50 WPM
- RCVR auto-speed adapts
- Includes schematic, PCB components, instructions and software on tape

"COMPARE PRICE!" "COMPARE VALUE!"
YOU'LL BUY FROM:

COMPUTER ACCESSORIES OF ARIZONA
5801 E. VOLTAIRE DR
SCOTTSDALE, AZ 85254

MAKE CHECKS OR MONEY ORDERS PAYABLE TO THE ABOVE ADDRESS
ARIZONA RESIDENTS ADD 5% SALES TAX
*TRS-80 IS A TRADEMARK OF TANDY CORP.
**SDS80C IS A TRADEMARK OF THE MICRO WORKS

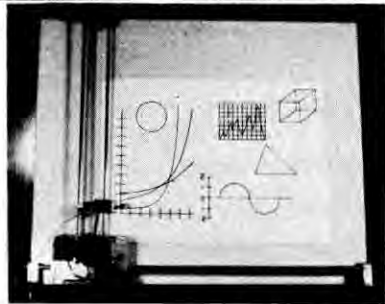
✓382

EFFECTIVE IMMEDIATELY:

Canadian subscriptions, \$27.97
1 year only, U.S. funds
Foreign surface, \$44.97
1 year only, U.S. funds
Foreign air mail, please inquire.

[All previous subscription offers void as of February 1, 1982.]

**BUILD THIS DIGITAL PLOTTER
AT HOME FOR UNDER \$200.00**



FOR \$19.95 YOU GET PRO QUALITY BLUE-PRINTS, SCHEMATIC, PARTS LIST, ASSY. INSTRUCTIONS AND NECESSARY SOFTWARE FOR MODEL I OR III. ACCOMMODATES PAPER UP TO 18 X 24. ADD \$9.95 FOR 10 PROGRAMS INCLUDES PLOTTING GRAPHS, RADII NUMBERS A 3-D CUBE AND MORE.
SEND CHECK OR MONEY ORDER TO: ✓352
P.M.W. 7741 ALABAMA AVE. #8
CANOGA PARK, CA. 91304

☆☆ **SUPER™** ☆☆
ISA's DATABASE

The only DBMS with all these features:

- ★ PROVEN in one year of test marketing
- ★ TOUGH, reliable file structure
- ★ MENU driven for simplicity and easy use
- ★ ARITHMETIC with stored calculations
- ★ FAST set-up and report formatting
- ★ CLEAR user-oriented documentation
- ★ PRINTS totals & subtotals - mail labels
- ★ REFORMATS and merges data files
- ★ MULTI-DISK files: Up to 128K records
- ★ SORTS full disks on up to 40 fields
- ★ PRODUCTION input of repetitive data
- ★ COUPLES to word processor & statistics
- ★ POSTS transactions to master file
- ★ SEARCH by strings, ranges, comparisons
- ★ DATA COMPRESSION: Over twice as many labels as the other system

For TRS-80® Models I, II, & III - 250.00

Ask your Dealer or Write:

Institute for Scientific Analysis, Inc.
P. O. Box 7186, Dept. M-1
Wilmington, DE 19803 (215) 358-3735

*T.M. Tandy Corp.

✓351

MANUFACTURING CONTROL SYSTEMS

MICS module - Manufacturing Inventory Control 15 reports for inventory, purchasing, and stockroom control. "Reserved" parts feature.

BOMP module - Bill of Materials Processor for "complex product" control of inventory.

SHOC module - Manufacturing Shop Order Control Order scheduling and backlog/shipment reporting.

LABP module - Labor Collection/Performance Reptg Daily, weekly, and monthly labor reporting by employee, job and overhead accounts, and department and operation. Actual job costing reports.

JCST module - Manufacturing job cost reporting Job status and completion reporting with performance to standards. Variance reporting. Overhead determination monthly and year-to-date.

All modules for Models I and III, 32K minimum systems. Master menu driven - full operator prompted. Expandable to fit your growth needs.

Model I modules from \$295, Model III from \$345

Send for catalog of ELTECH business modules

ELTECH Associates

Specialists in manufacturing business systems
2466 Moreno Drive, Los Angeles, Ca 90039
(213) 663-0347 ✓344

80 microcomputing™

Back Issues



January 1980.....\$5.00
February to June 1980.....3.00
Single back issue
July 1980 on.....3.50
Single back issue

Add \$1.00 per magazine for shipping.

10 or more back issues
add \$7.50 per order for shipping.

Back Issues • Attn. Pauline Johnstone
80 Pine St. • Peterborough, NH 03458

**DOTPLOT-80
HI RESOLUTION
GRAPHICS SOFTWARE**

USE YOUR LINE PRINTER VII OR
LINE PRINTER VIII TO DRAW:

- ★ COMPUTER ART
- ★ LINE DRAWINGS
- ★ GRAPHS WITH FULL LABELING

RESOLUTION:

- ★ 60 DOTS/INCH HORIZONTAL
- ★ 63 DOTS/INCH VERTICAL

SAMPLE PROGRAMS INCLUDED.

MODEL I OR III, LEVEL II BASIC
CASSETTE \$19.95

PLEASE SPECIFY 16K, 32K, OR 48K
OHIO RESIDENTS ADD 6% SALES TAX

WORKBENCH SOFTWARE
P.O. BOX 24497
DAYTON, OHIO 45424 ✓356

**LARGE CAPACITY
ACCOUNTS RECEIVABLE
FOR MODEL I/III**

5000+CUSTOMERS
15000+TRANSACTIONS

30-60-90-120 AGEING ON ALL REPORTS.
PRINT 1/ALL STATEMENTS OR LABELS.
DATE/INV#/DESCR/AMT DETAIL SHOWN.
SELECTIVE FINANCE CHARGES & RATES.
FAST POSTING & ENTRY ERROR CHECKING.
LAST PAYMENT DATE & % OF CREDIT LMT.
SALES ANALYSIS BY TRANSACTION TYPE.
MANUAL & SAMPLE DATA.
RETAIL & PROFESSIONALLY USED 2 YRS.

\$100.00 32K 2 DISK REQ.

HOLMAN D-P SERVICE ✓355
2059 WEST LINCOLN TERMS: VISA
OROVILLE, CA. 95965 MC OR COD
916-533-5992 3PM-9PM 3.00 S & H

PRESERVE

80 microcomputing™

**BINDERS
& FILE
CASES**



Keep your issues of 80 Microcomputing together, handy and protected in handsome and durable library files or binders. Both styles bound in dark green leatherette with the magazine logo stamped in gold.

Files: Each file holds 6 issues, spines visible for easy reference. \$5.95 each, 3 for \$17.00, 6 for \$30.00

Binders: Each binder holds 6 issues and opens flat for easy reading. \$7.50 each, 3 for \$21.75, 6 for \$42.00 (Postage paid in USA. Foreign orders include \$2.50 per item)

Please state years: 1980 to 1983

Send check or money order to:

JESSE JONES BOX CORP.

P.O. Box 5120

Philadelphia, PA 19141

Allow 4 to 6 weeks for delivery

Scotch® Diskettes

Rely on Scotch® diskettes to keep your valuable data safe. Dependable Scotch diskettes are tested and guaranteed error-free. The low abrasivity saves your read/write heads. They're compatible with most diskette drives.



(800)235-4137



Dealer Inquiries
Invited



PACIFIC EXCHANGES
1100 Euclid Blvd
San Luis Obispo, CA
93401 In Cal call
(805)542-5905
(805)543-1117

✓207

ANNOUNCING!
SOFTWARE
ANNOUNCING!
SYNTHESIZER!

K AND K INTRODUCES A SOFTWARE
BREAKTHROUGH FOR TRS-80'S* IN
SYNTHESIZED MUSIC PRODUCTION.
AT THE AFFORDABLE PRICE OF \$4.95
YOU CAN LEARN ABOUT AND CREATE
YOUR OWN ELECTRONIC MUSIC.

YOU CAN SELECT FROM MANY SOUND
TYPES AND CONTROL MANY PARAMETERS.
COMBINED WITH THE UNDERSTANDABLE
MANUAL AND MANY EXAMPLES THIS
PACKAGE IS A MUST.

K AND K COMPUTER PERIPHERALS
PO BOX 88203 DEPT 1111
KENTWOOD MI 49508-9203
PLEASE ADD 1.00 FOR SHIPPING

*TRS 80 IS A TRADEMARK OF TANDY CORP

✓354

80 Medical Opinion

by Philip R. Mills, M.D.

"Although apprehensive, another physician and I installed the unit in an hour."

Our clinic uses both the Model I and the Model II for business. (Recently we have been considering the purchase of KTI's TLS-8E fictitious Model II as a throw-away backup system. I am told that the folks at Sri Lanka have just launched a major campaign aimed at the physician market. Apparently they believe that a doctor a day keeps the Apple away!)

In our office the TRS-80 Model I has proven to be a good computer and given us excellent service.

However, it does have several disadvantages for a medical clinic. First, without a hardware card it is not compatible with the excellent business programs designed for CP/M. Second, without an additional hardware card it does not support eight-inch disk drives which are almost mandatory for handling the volume in patient accounts receivable. Third, it has a 64-character line, 18-line video screen. The Model II, of course, has none of these limitations.

Although the CP/M disk operating system is the standard Z80 in business operating systems, surprisingly few Model I or III users are acquainted with it. For the evening hobbyist, lack of CP/M compatibility poses only a minor handicap since several excellent disk operating systems (such as NEWDOS/80 and LDOS) are available with good software support. I am no CP/M fanatic and for most applications find NEWDOS/80 a far more convenient operating system; however, the most sophisticated word processing, accounting, and medical office software is written for CP/M. Now that IBM and Xerox have introduced their CP/M-compatible computer line, CP/M is almost certain to remain the operating system of choice for business applications.

Originally, Tandy considered making the Model I computer CP/M-compatible, and even purchased the rights to market the operating system. For reasons best known in Fort Worth this plan was abandoned.

In their Models I and III, Radio Shack placed RAM at the very beginning of memory. CP/M requires ROM at this beginning location. This is why it is impossible to modify Models I and III with software alone and have it truly CP/M compatible.

To remedy this problem several companies are marketing CP/M cards to install in the Model I and III, making them compatible with conventional CP/M. For the Model III an 80-character line and 24-line screen is even available.

We originally purchased the Model I computer for its word processing capabilities. Within a month we realized we needed CP/M. At that time Lazy Writer was not marketed, and the newly introduced Scripsit was the most sophisticated TRSDOS word processor available. It was simply not sufficient for our needs. The Magic Wand word processing software (now marketed by Peachtree) was superior for our purposes, but was available only for CP/M. At this point we decided to make our Model I CP/M compatible.

We discovered a second advantage to CP/M upon purchasing the Model II. Only a few of our Model I TRSDOS programs were transferable to the better machine. All of our Model I CP/M software programs were compatible with a few modifications. This resulted in a substantial reduction in the cost of new software.

We learned of a CP/M card, manufactured by Omikron, from our local TRS-80 user's group. I ordered the Mapper Card by phone for faster service, but it still took more than two months to arrive. Manufactured by a perfectionist, George Gardiner, its arrival could not be hurried!

Mapper I

Omikron
1127 Hearst Street
Berkeley, Ca 94702
\$239

The Mapper I CP/M card is the oldest of the CP/M converters for the Model I. Now three years old and thoroughly debugged, it has a reputation for dependability. Our unit was installed one year ago and has functioned flawlessly since its installation.

And installation is simple. The only tool needed is a Phillips screwdriver to disassemble the CPU. Although apprehensive, another physician and I installed the unit in an hour. The complete directions are well illustrated with photos. The CPU cover is unscrewed and the Z80 microprocessor chip removed. This chip is then in-

serted in the socket provided on the Mapper Card. The Mapper I Card is then inserted in the old Z80 socket on the CPU. The CPU cover is reassembled with the screwdriver and the installation is complete. No soldering is required (except for five percent of older units manufactured with a marginal power supply requiring a very simple soldering modification to improve its power output). Removal of the unit is just as simple as installation, and when the Model I requires service from a local repair center, the Mapper can be removed without a trace.

The owner's manual is excellent. My version is printed in all caps and dot matrix making it less readable than regular type. This has since been improved.

With the Mapper installed there is a pleasant surprise when you turn the machine on—no screen garbage. Instead, the choice of T = TRS-80 and C = CPM appears. If you press "T" the Mapper is bypassed and the Model I functions normally. If you enter "C" the Mapper bypasses the Model I ROM and the computer behaves as a 48K CP/M machine. The Model I can never be a perfect CP/M computer, however, since its screen size is limited to 64 characters. Also its internal interrupts are different from standard CP/M. Under CP/M the Model I emulates the Soroc "IQ120" terminal.

CP/M is not a perfect system. Simple programs have little incompatibility among various CP/M based computers. Complicated programs with sophisticated video routines require significant modifications among machines. These modifications may be elementary for the experienced, but they seem impossible to the beginner. Do not expect to effortlessly exchange all programs with your Model II or trade with friends who are using CP/M on non-Radio Shack computers.

Two major versions of CP/M are in common use. Version 1.4 is archaic and based on a non-video terminal. It is upward compatible with its replacement version 2.2. Omikron supports both versions but I recommend version 2.2.

Each company marketing CP/M has added its own enhancements. These various CP/M systems are similar, but vary a great deal in detail. Omikron's version of CP/M has several such enhancements

If you liked MICROPROOF, then you'll love SON OF MICROPROOF:

ELECTRIC WEBSTER ^{T.M.}

The ultimate spelling checker.

IMPROVED:

- One-step proofing and correcting.
- Lists errors to screen or printer.
- Can display errors in context.
- Can display dictionary to locate correct spellings.
- New precise symbolic dictionary will not miss an error.
- Remarkably compact (50,000 word dictionary will fit on one 5 inch disk).
- Even FASTER than MICROPROOF (formerly the fastest available).
- Simple Grammatical Checking (Optional Feature).
- Hyphenates automatically (Optional Feature available for some Word Processing programs).

SELECT APPROPRIATE RESPONSE:

CORRECT MISPELLED WORD:	ENTER CORRECT WORD
LEAVE WORD "AS IS":	HIT <ENTER> KEY
DISPLAY WORD IN CONTEXT:	?
DISPLAY DICTIONARY:	@
ADD WORD TO DICTIONARY:	+
EXIT:	!
WORD:	(Your error)
RESPONSE:	

EASY TO USE: Prepare your text on any Z-80 based micro-computer, using any of a number of popular word processing programs. When you are finished, enter the appropriate command, and ELECTRIC WEBSTER proofreads your document, displaying misspellings and typos on the screen. Then correcting ELECTRIC WEBSTER can display each error separately, requesting you to enter the correct spelling for each. You are also given the option of displaying errors in context or adding words to ELECTRIC WEBSTER's 50,000 word vocabulary. If you do not know the correct spelling you may also ask ELECTRIC WEBSTER to look it up for you and display the dictionary. Finally, ELECTRIC WEBSTER corrects your document. All in less than a minute.

LOW PRICES: Standard MICROPROOF is available for \$69.50 (TRS-80). Standard ELECTRIC WEBSTER is available for either \$89.50 (TRS-80[®] Model I or III, Apple[®]) or \$149.50 (CP/M[®], TRS-80 Model II and all others). The optional correcting feature can be added at any time for an additional \$60. Correction feature can be ordered with patch to integrate with your word processing software. For each patch, optional Grammatical Checking feature, or optional Hyphenation feature, add \$35. (Integration patch not necessary for Wordstar.[™])

SPEED is the single most important factor in a dictionary program. All dictionary programs will find your potential errors but if the program is too slow, you are not likely to use it. ELECTRIC WEBSTER's speed is outstanding. It can proofread a several page letter in 20 seconds.

ELECTRIC WEBSTER's FULL 50,000 WORD VOCABULARY saves you time and allows you greater confidence in the lists of potential errors that ELECTRIC WEBSTER identifies. The mini-dictionary programs, with their 10,000 and 20,000 word vocabularies, have many correctly spelled words omitted from their vocabularies. Consequently, they identify as potential "errors" many words that are actually spelled correctly; five to ten times as many such words as does ELECTRIC WEBSTER. So, when you use ELECTRIC WEBSTER, you will have far fewer extra words to evaluate, a major time savings. There will be less need to look up words in order to verify that they are in fact spelled correctly. The extra 30,000 words in ELECTRIC WEBSTER's vocabulary assures you confidence in the error lists that Electric Webster generates.

HERE'S WHAT THE REVIEWERS HAVE TO SAY ABOUT MICROPROOF:

"I have already found that the use of (MICROPROOF) has greatly enhanced the quality of my letters and reports. This is a very useful product and should be obtained by anyone who uses a word processor."

Michael Tannenbaum, CPA
80 Microcomputing, August 1981

"The summary review of this program? One word — Excellent. I highly recommend it for anyone using a word processor for any need — articles, manuals, reports, and even letters of substantial length."

A. A. Wicks - Program Previews
Computronics, September 1981

In a comparative review of proofreading programs (with smaller dictionaries), MICROPROOF was found to be considerably faster than all the others, when tested against a 400 word sample document.

Phillip Lemmons
BYTE Magazine, November 1981

"(MICROPROOF) operates with good speed and efficiency. A 1500 word document took 26 seconds to load, process, and proof when the program was run on a TRS-80 Model II under CP/M."[®]

"Once the program is integrated, it is very friendly and any person able to use a word processing program can master it in moments."

Frank Derfler
Info-World, January 1982

See your local microcomputer dealer or write to:

NOW
AVAILABLE
FOR APPLE!



CORNUCOPIA SOFTWARE

Post Office Box 5028, Walnut Creek, California 94596 • (415) 524-8098

and utilities. In standard CP/M, disk drives are labelled A:,B:,C:,D:. Each drive may contain a minimal operating system which is installed with the command SYSGEN.COM (the ".COM" is identical to TRSDOS "/CMD"). Since the Mapper supports both five and eight-inch disk drives, the SYSGEN command is modified to LSYSGEN.COM for the larger drives and MSYSGEN.COM for the smaller drives. LFORMAT.COM and MFORMAT.COM are similar modifications to support both size drives.

CP/M makes no distinctions between upper or lowercase keyboard commands. "DIR" or "dir" brings up the directory equally well. This could pose a problem for those few Model I owners who still do not have a lowercase modification. For this reason Omikron has included a software uppercase conversion to enable the operator to read files with lowercase characters.

Other enhancements include OMCOPY.COM. Standard CP/M copy is performed by PIP.COM, which is a slow but versatile file-by-file transfer utility. OMCOPY however, copies by track and sector and is much faster. OMCOPY ALL provides a rapid and complete backup of the entire disk. OMCOPY DATA copies only the data portion of the disk, while OMCOPY SYSTEM copies only the portion of the disk containing the operating system.

XDIR.COM provides a three-column directory listing which is far superior to the one-column listing without pauses standard CP/M 1.4 provides. We renamed this utility D.COM and get the directory by simply typing "D."

The debug utility DDT.COM is not standard CP/M due to the Model I's interrupts as well as the screen size.

Other non-standard utilities include features to customize the system for software with special video and printer applications. Other utilities thoroughly examine the computer's memory and proper functioning of the five and eight-inch disk drives.

For word-processing uses, a buffer, repeat-character routine, and blinking cursor are provided. This changes the Model I from a horse and buggy system to a Volkswagen. It is too slow, has too few special characters, and too small a screen to ever be a Cadillac, though.

All in all, the system is well designed and Omikron should be commended for its excellent job in making CP/M available for the Model I user. I recommend it without hesitation.

One disappointment with CP/M is the absence of a Basic program included as a standard feature. MBasic is available, but

must be purchased separately. To decrease the cost of this and other CP/M programs, Omikron has developed a software club called Cougar. The latest edition of Word Star (which is the finest word processing program I have ever used to date) is available for \$149 (it lists for \$495). Many other standard programs are available at a very low cost. CBasic for example, lists for \$150; from Cougar it is available for only \$39.

Although the best known, Omikron is not the only company providing CP/M hardware. Several other companies are marketing CP/M cards to install in the Model I or III and make them compatible with conventional CP/M. Some offer double density and 64K options. For the Model III even the 64-character-line screen limitation has been removed. If any of you have had experience using other systems I would be happy to hear from you.

Mapper II

The Mapper II is another card from Omikron. It solves the problem of the Model I or III's limited five-inch disk storage. This installs in the Expansion Interface. It is even more simple to install than the Mapper I. (We installed both units at the same session.) Mapper II costs \$149.

With the Mapper II installed, the Model I or III addresses eight-inch disk drives. This feature is supported by NEWDOS80 and other major DOS systems. It is not supported by TRSDOS. Of course, the Mapper I CP/M supports eight-inch drives. Eight-inch drives make a surprising difference in the power of the Model I. Faster disk access time speeds program execution. It is amazing how much information an eight-inch, single-density disk holds when compared to a five-inch drive.

We use 80-track drives in the clinic, but have found alignment to be very critical. For heavy business use our experience has been negative. Eight-inch drives, on the other hand, are extremely reliable, and not much more expensive than the 80-track drives.

For simple word processing without a dictionary, eight-inch drives may be unnecessary. For dictionary programs, however, eight-inch drives are very helpful. For accounts receivable they are mandatory.

Prior to installation of the Mapper II card, we had trouble with track errors due to Radio Shack's inadequate data separator. The Mapper II contains a high-quality data separator and our errors have vanished.

Although we have tested many complicated programs, we have found only one incompatibility. With the Mappers in-

stalled, early editions of Super Utility Plus hang while loading. The author of Super Utility Plus, Kim Watt, has fixed this bug. Regular Super Utility has always worked perfectly with our Mappers.

**Mayday Power Supply
Sun Research Inc.
Box 210
New Durham, NH 03855
\$650**

Recently a local hospital purchased an IBM computer to facilitate x-ray filing. After a month of inputting data there was a momentary power failure. With the power failure went the entire month's work.

When our office manager heard about this computer disaster, she urged us to take precautions to prevent a similar occurrence at our clinic. We decided to purchase the Mayday 60 + 2S. This provides a very steady voltage, protects against line surges, and has a battery backup, so that during power failure an orderly shutdown can take place.

The unit itself took two months to arrive. It is an excellently made piece of equipment. The documentation was confusing and difficult for us to understand at first, but it became clear after the second reading. We misunderstood the instructions and blew fuses three times before we finally turned it on correctly.

It arrives with a 12-volt battery. The battery is shipped without acid for obvious reasons, but the acid is shipped in a container with a spout that makes pouring safe and simple. It took us about 30 minutes to have the unit up and going.

For operation, a grounded three-prong outlet is necessary. We discovered some of our outlets were *ungrounded* three-prong sockets. The unit refused to work until the correct electrical outlet was available.

When used with the Model I, the familiar and distracting screen waves vanished. The Model II has a better internal power-supply filter, and we can detect no difference in its operation with the Mayday installed.

It has provided a large advantage for the Model II in another way. Since our eight-inch disk drives are Qume double-sided drives, and have an independent power supply, the Mayday provides a one-switch power source protecting us from accidentally operating the Model II computer without the accessory drives operating.

The unit has one distracting feature; it makes a steady, irritating hum, even when turned off. Since it cannot be unplugged without blowing an internal fuse, we simply leave it humming. ■

Looking for a SPELLING CHECKER?

PRESS: (L) LEARN WORD (R) REPLACE WORD (S) SKIP WORD
WORD IN ERROR: mistake

This is an example of a text being checked by HEXSPELL. The text scrolls up the screen as it is checked. When an error is detected, you have three choices.

1) REPLACE the incorrect word. The replacement word is INSTANTLY RE-CHECKED for correctness, then inserted in the text.

2) The word is correct, leave it as it is.

3) Tell HEXSPELL to LEARN this word for future reference, with just one keystroke.

Hexspell requires just one step to check and correct a text, and learn new words. Your document is ready to print as soon as Hexspell is finished. A word that is in error e.g. mistake, is highlighted in the text for easy correction.

HEXCON - HEXAGON CONTROL FILE EDITOR

SET HEXSPELL OPTIONS

A) Work File Name = DQCD:1
B) Input File Name = TEST
C) Next Program Name = NONE
D) Alternate Char. Set = 0
E) Extended Word List = N
F) Auto Learn On = N
G) Wait For SPELL disk = N
Press appropriate key to change an option.
Press (X) to exit edit.

Get more than just a spelling checker —

HEXSPELL 2™

the EVERYTHING checker.

HEXSPELL CHECKS:

Product codes • zip codes • French words • engineering formulae • typesetting commands • German words • numbers • addresses • chemical formulae • Greek words • names • amounts • printer commands • Japanese words • acronyms • dimensions • mathematical formulae • values . . . and of course plain old English words.

Hexagon Systems is proud to announce another first in text checking — an everything checker. Hexspell 2 checks not only dictionary words, but learns and checks codes, formulae and numbers which are so essential in many commercial and technical documents. With Hexspell 2 you define which characters make up a "word", then teach Hexspell the new "words" it needs to check your text. This advanced system builds on the unique features of the original Hexspell (the first TRS-80 spelling checker).

When we introduced Hexspell over a year ago, it was the world's first adaptive learning spelling checker. Hexspell constantly adapts its wordlist to your usage. No complicated editing of the wordlist.

Hexspell remembers words as long as you use them. If you never use a word again Hexspell will eventually forget it to make room for new words. Extending this feature in Hexspell 2 gives you a text checker that can learn to check everything that you write.

Hexspell 2 is the product of nearly three years research and experience. Unlike other microcomputer spelling checkers Hexagon Systems didn't simply rewrite the multi-step batch process found on large computers, we invented a simple one-step process that capitalizes on the interactive strengths of the personal computer. Hexspell's simple one-step process makes it practical for daily use on all your letters and documents.

HEXSPELL VERSION 1 USERS — GET THESE HEXSPELL 2 ENHANCEMENTS:

Programmable character set • Disk error trapping • Extendable word list, up to 50,000 words • Speed control • Longer words, up to 40 characters • Auto learn function • User settable system options • Control file editor • Built in lower case driver.

Hexspell 2 upgrade for registered owners of Hexspell Vers. 1
— \$35 from Hexagon Systems or your nearest dealer.

Hexspell requires a TRS-80 Mod I or Mod III with 2 drives and 48K. Works with most word processors.
TRS-80 is a trademark of Tandy Corp.

US \$99.
Manual \$12



HEXAGON SYSTEMS

P.O. Box 397, Station A
Vancouver, B.C. Canada V6C 2N2
Telephone (604) 682-7646
Electronic Mail-Micronet 70235,1376

A NOTE ON CANADIAN MAIL: please allow 5 to 10 days in each direction for mail delivery. For faster service leave your orders or enquiries on our 24 hours answering machine.

RELOAD 80

This month's RELOAD 80 will deal briefly with assembly language source code—code generated by an editor/assembler. We will not consider opcodes or the like, but merely loading problems.

Unlike Basic, Assembly language source code must be assembled into machine language before it can be executed. To write the code and then to assemble it requires an editor/assembler. The most obvious is Radio Shack's EDTASM.

Owners without disk drives who wish to buy LOAD 80 obviously have no choice. They must buy the cassette LOAD 80 and

must own a cassette-based editor/assembler. Disk drive owners, however, encounter compatibility problems when deciding to buy tape or disk. Your editor/assembler may be limited only to reading disk source code. It may also be particular about which editor/assembler created the source code.

Disk Drive Users

Apparat markets one of the most popular disk-based editor/assemblers on their NEW-DOS Plus operating system for either the Model I or Model III. It consists of a series of patches

to the old Radio Shack tape-based EDTASM, which enables it to read and write files to disk.

There is, however, a compatibility problem between the Apparat and Radio Shack versions of EDTASM. The Radio Shack version will not read source code generated by the Apparat version; the reverse is also true. Apparat's format was designed as an extension of the tape protocol and had been around for three years when Radio Shack came out with their version. We can only guess at the reason behind Radio Shack's decision to lock out the reading of files generated by Apparat's assembler. In any case, the Apparat format has become the standard, and is the one we use in LOAD 80 disk files. *This means disk users must have an Apparat-compatible editor/assembler to read LOAD 80's source code files.*

You may ask why we don't assemble the source code and save you all the hassle. We deliberately don't do this so machine-language programmers can customize programs for their own use. We do, however, attempt to substitute a Basic version whenever possible.

To sum up: To load a source code file, you need an editor/assembler. If you have disks and wish to buy LOAD 80 on cassette, you must have an editor/assembler which can read cassettes. If you wish to purchase LOAD 80 on disk, you need an Apparat-compatible ed-

itor/assembler.

A Patch

There simply isn't time here at *80 Micro* to patch, repair or modify the programs we print. But occasionally, on our own, we get interested enough to work on a submitted program.

This short patch makes the program Neatlist from the January 1982 issue compatible with Level II, Disk Basic and with the Model III all at the same time.

The program was compatible with only one exception. In line 65504 I is initialized to 17127, two bytes below the start of a Level II Basic program. Neatlist begins examining the Basic code at this address. It therefore bombs when the Basic program is moved higher, as happens under Disk Basic or on the Model III.

Fortunately, existing ROMs and operating systems use the two bytes at 16548 and 16549 to point to the beginning of a Basic program. Since the format of these two bytes is the same as the format of I (a least significant and most significant byte making up a two-byte integer), we can set I equal to the start of the Basic program by POKEing the values on top of I. Subtracting two from I will then initialize I correctly. Listing 1 is the patched version of line 65504 of Neatlist.

Please note that the best way to ascertain program compatibility is to read the documentation in the magazine. ■

```
65504 CLS: CLEAR600: DEFINT A-Z: DIM K1(125): LM=5: RM=72: S=1: T1=5: I=1:
POKE VARPTR(I), PEEK(16548): POKE VARPTR(I)+1, PEEK(16549): I=I-2: GO
SUB65510: PRINT@520, " "; INPUT "TITLE"; AS: GOSUB65524
```

Program Listing 1

April LOAD 80 Directory

Program	Title	Page	Comments
1	BASICK	86	NONE
2	BAM	167	Needs EDTASM
3	RSL	188	Needs EDTASM
4	ZUBRTNES	208	NONE
5	DIRECTRD	214	NONE
6	DISKRD3	214	NONE
7	COMMAND	244	Needs EDTASM
8	MASDIR3	250	NONE
9	SHOPPING	270	NONE
10	RULER	302	NONE
11	CP80	306	Needs EDTASM

ALCOR PASCAL

AT LAST

A COMPLETE PROFESSIONAL QUALITY PASCAL FOR THE TRS80

Pascal Features

1. A complete Jensen and Wirth Standard Pascal
2. Produces compact efficient code that executes 10-20 times faster than interpreted BASIC
3. Generates reentrant Romable code
4. Can compile large programs (4000 lines +)
5. Fast one pass compiler
6. Simple commands for compiling and running programs
7. Supports separate compilation of procedures and functions
8. Compiler switch options, including conditional compilation
9. Full heap support including NEW and DISPOSE procedures that perform true heap allocation
10. Complete implementation of sets with up to 256 members. All standard set operators
11. Variant records are fully supported
12. Supports single and double precision REAL
13. Files are compatible with TRSDOS

Extensions

14. OTHERWISE clause on case statements
15. Identifiers may contain '\$' and '-' characters
16. Automatic type conversion in arithmetic expressions and assignment statements
17. Constants may be expressed in decimal or hexadecimal
18. Characters within strings may be specified by ascii code. Allows non-printable characters in strings.
19. Type transfer operator to override type matching requirements
20. ESCAPE allows exit from anywhere in a procedure
21. LOCATION function returns the address of a variable
22. SIZE function returns the amount of memory required for a variable

TRS-80 Library

23. Graphics routines (setpoint, cleargraphics)
24. Interface to assembly language routines with parameter passing
 - Can call operating system and ROM routines
 - Memory may be protected from Pascal for use by assembly language routines.
25. Read keyboard (scan or wait for character)
26. Write to CRT screen with cursor addressing
27. Direct access to memory with PEEK and POKE
28. Input and output to IO ports from pascal
29. Programs may perform their own recovery from file and device errors
30. File or device names for Pascal files are determined from the keyboard when a program is executed. Alternatively a program may internally specify file names.

Full Screen Text Editor

31. Included with Pascal or available separately
32. No limit on file size (except disk capacity)
33. Full cursor movement and scrolling
34. Insert and delete characters
35. Insert, delete, duplicate, split, merge lines
36. Find string, replace string
37. Typewriter style tabs and autoindent
38. Show file, Insert file
39. Horizontal scrolling allows editing of files containing lines wider than the screen
40. Key and command mode access to commands
41. On-line documentation with HELP command
42. Files are compatible with TRSDOS
43. Can also edit text and BASIC programs
44. Many additional features

The Best of Both Worlds

45. Pseudocode (Pcode) for compactness
 - Allows large programs in small memory space (8500 line + programs can execute in 48k)
46. Native code for speed
 - Optional code generator produces Z80 instructions
 - Z80 code can be mixed with Pcode

TRS-80 is a trademark of Tandy Corporation
CP/M is a trademark of Digital Research, Inc.
Z80 is a trademark of Zilog, Inc.
IBM is a trademark of International Business Machines
Z89 is a trademark of Zenith data systems

Linking Loader

47. Links separately compiled routines
48. Supports procedure and function libraries
49. Can create command files that are callable as commands from TRSDOS top level

250 Page Documentation Package

50. Beginner's guide
51. Pascal Tutorial with 500 line Data Base program. (source supplied on diskette)
52. Pascal Reference Manual
53. System Implementation Manual
54. Text Editor Manual
55. Handy System Reference Card
56. Cross reference index for documentation package

Optional Advanced Development Package

57. Pcode optimizer
 - Reduces the size of a program by 25-30%
 - Increases execution speed
58. Z80 native code generator
 - Produces relocatable, reentrant native code for the Z80
 - Native code executes 3-5 times faster than Pcode.
 - Native code can be mixed with Pcode to provide speed where required and still benefit from the compactness of Pcode

Hardware Required

TRS-80 model I; TRS-80 model III; or CP/M system (with Z80)
48k of memory
One disk drive (two recommended)

TRS-80 version compatible with TRSDOS and most other operating systems.

Available directly or through authorized dealers.

COMING SOON

Alcor Pascal for:
Zenith Z89, IBM Personal Computer, 8086 and 68000 based systems

Yes, I'm interested in Pascal for:

- TRS-80 Model I
- TRS-80 Model III
- CP/M (available March 1, 1982)
- Send More Information
- Alcor Pascal System
- Text Editor only
- Advanced Development Package
- Manuals only



free
\$199
\$ 60
\$125
\$ 30

Name _____

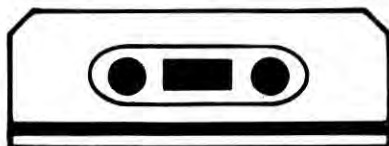
Address _____

City _____ State _____ Zip _____

Send to: **ALCOR SYSTEMS**
13534 Preston Road
Suite 365
Dallas, Texas 75240
For immediate service call:
(214) 226-4476



**LOAD
80
LOADS
EASY**



LOAD 80

**ELIMINATE HOURS OF
TYPING AND
AGGRAVATION**

**LOAD 80 cassettes for BACK ISSUES
of 80 Microcomputing now available**

In the April, 1981 issue of 80 Microcomputing we introduced LOAD 80 to save you the time and trouble of typing our programs yourself. LOAD 80 cassette tapes contain dumps of the major program listings in 80 Microcomputing.

If you have not yet ordered any LOAD 80 tapes and wish you had, don't worry. We are now offering a "back issue" cassette program. You can order any LOAD 80 cassette from April, 1981 to date for \$9.97. Back issues of 80 Microcomputing are also available with the LOAD 80 cassettes for \$3.50. With the complete documentation found in the companion magazine issue, you should have no difficulty loading any of 80's major programs.

Please send me the following:

month year month year
Tapes _____ Magazines _____

ITEM	COST	QTY.	TOTAL
LOAD 80 Tapes add \$1.50 per tape for postage and handling	\$9.97		
80 Microcomputing add \$1.00 per magazine for postage and handling	\$3.50		
TOTAL			

Check Enclosed Bill my: MC AE VISA

NAME _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____
CARD # _____ EXP. DATE _____
SIGNATURE _____ INTERBANK # _____

Please allow 4-6 weeks for delivery
LOAD 80 • 80 Pine Street • Peterborough NH 03458
Attn: Debra Boudrieau

80 microcomputing™

bookshelf

**Nanos System
REFERENCE CARDS**

(for Model I and Model III)



At last! No more flipping through the pages of the Basic manual! No more working through the maze of machine language instructions! These cards completely summarize the Basic and Assembler manuals! FEATURES (on most cards):

memory map, eyeball graphics, math instructions, basic commands, store instructions, basic functions, load instructions, basic statements, move instructions, special keys, exchange instructions, print using examples, shift instructions, basic special characters, compare instructions, basic and assembler messages and codes, branch instructions, basic facts, data alteration instructions, reserved words, I/O instructions, ROM routines, complete character chart with graphics and space-compression codes, hex-dec chart, control code cross-reference, assembler instructions commands and operators, screen line layout, editor commands & subcommands, condition code easy access

Plus—"magic graphics number—a mystery until you learn how to use it!

Designed as a fold-up, accordion-style card, fits in your pocket. Panels organized for optimum speed for reference.

Model I: BASIC only FC1001 \$2.95

Model I: BASIC and Assembler FC1002 \$4.95

NEW!



DOS RANDOM ACCESS & BASIC FILE HANDLING—By H.J. Muller. This book was written for the nonprogrammer. It is ideal for the businessman or professional who needs to solve and write special programs for in-house business problems, or the hobbyist who wants to go beyond the cassette recorder and into disk storage and file manipulation. It is written as a self-instruction tutorial and will provide anyone with some Level II experience with the ability to write special programs for inventories, mailing list, work scheduling, record keeping, research project data manipulation, etc. 150 pages. BK1236 \$24.50

**NEW!
FOR THE MODEL III**

MOD III ROM COMMENTED —Soft-Sector marketing, 1981. This book is not an instruction course on machine language, but rather an information source that you can use time and time again for writing your own program or patching old Mod I machine language programs. It contains an explanation of ROMs in the latest machine from Tandy, with must every location of the 14K ROMs listed, with comments. BK1235 \$22.50.



NOW AVAILABLE FOR THE MODEL III

Nanos System Reference Card
(as described above)

Model III: BASIC FC1004 \$3.95

Model III: BASIC and Assembler FC1003 \$5.95

Prices do not include shipping and handling charges. Please include \$1.50 for first book, \$1.00 each additional book and \$10.00 per book foreign airmail. Sorry no COD orders. Use the order card in this magazine to order. Allow 4-6 for delivery. Shipping and handling for cards only \$1.00 per order.

80 Microcomputing Bookshelf • Peterborough, NH 03458



1-800-258-5473



MONEY DOS

an operating system for financial survival

by J.M. Keynes

*"For every winner
there is an equal and opposite loser. . ."*

Every day thousands of speculators bet millions of dollars that they can pick a stock which will increase in price dramatically within a short time. How would you like to bet \$200 that a stock currently selling for \$50 will rise in price to \$72.25 within 45 days? That is a 45 percent increase!

Recently, speculators bet millions that this stock would go to at least 72.25 in which case they would break even. That's right, just break even. You see they bought an option to buy 100 shares of this stock (the name is Amax...symbol AMX) for \$70 per share anytime before the option expired, in this case 45 days. The price for the option was 2 or \$200 for an option on 100 shares. If the stock remains below 70, the option will expire worthless and the speculator will lose everything. There have been takeover rumors about Amax and the speculator hopes that the stock will rise quickly if the rumors are true. At \$72.25 per share he breaks even after commissions (which are very high relative to the money involved). Should Amax be taken over within 45 days at 90 the speculator can sell his option for about 20 (\$2000) and turn a huge profit.

One of my friends recently invested \$675 in ten Dean Witter options. He guessed right because when the Sears

takeover was announced, his \$675 was worth \$15,000. Such windfalls keep the speculator eager to catch lightning in a bottle one more time. Old "Crap Shootin' Charlie" will likely blow it all back feeding his gambling propensities; he reminds me of "Sure Thing Sam."

Sam is a barber. One day, when the shop was closed, he told his wife that he was going to the races. "What will you use for money?" queried his wife. "Ah, I got enough to get in and make one \$2 bet," said Sam.

Sam arrived at the track just before the first race. He looked over the racing form and spotted a two year old gelding that was 20 to one and had a chance. He bet the \$2 to win. The horse won!

Now Sam had \$40. A 30 to one shot in the second race caught his eye. He bet \$40 to win. The damn thing won easily! The \$2 bankroll had swelled to \$1200. Sam had the golden touch. He picked the winner in the next seven races and bet the bankroll to win on each race. The kitty mounted to \$500,000 and Sam was going home when he heard the horn sound announcing the entry of the horses for the last race. Sam downed his fifth vodka gimlet while he went over the form. The race was six furlongs and a horse named Black Beauty could go the distance in 1:09 flat

which was at least two seconds better than any of the others. An absolute cinch! The other betters agreed. Black Beauty was even money. "Why not?" thought Sam. "I'll be a millionaire." As Sam walked to the ticket seller a tingling feeling swept over his body. "\$500,000 to win on number two," said Sam, showing none of his inner anxiety.

Black Beauty broke in front and was five lengths ahead at the 1/16 pole. Only 330 feet to go and Sam would be a millionaire. . . that is if Ding Dong, a 15 to one longshot, who must have grown wings didn't catch him. It was a photo finish. Sam waited. . . and waited. The pictures came down. Ding Dong won by a whisker. Sam went home. As he entered the back door his wife said, "Well Sam, how did you do at the track today?" In a monotone Sam said, "I lost \$2." Sam may be fictional but his behavior is typical of the compulsive gambler.

Stock Option Speculation

When the speculators bid up the price of stock options to an outrageous level it may be tempting to "book" their action and sell to them. This is called option writing and can be dangerous. When you write an option (agree to sell someone a stock you don't own) your profit is limited by the amount you realize from the sale. Your risk is unlimited. When my friend made the \$14,335 profit on the Dean Witter options, someone lost it. The game of buying and selling "naked" (you don't own the stock) options is a zero sum situation. For every winner there is an equal and opposite loser minus commissions.

I discourage naked option writing. The risks are too great. But there is a way to take advantage of the gambler's irrational behavior and incur little risk. It is called covered option writing. You buy the stock and simultaneously sell someone an option to buy it from you, usually at a higher price. This is not a strategy to employ every day—to wit: the poor performance of the covered option writing mutual funds. Unlike them, you don't have to be in action all the time. If you exercise patience you can find situations which stack the odds heavily in your favor. If you watch

Computer study of a covered option write with the following parameters: Buy Howard Johnson sell July 15 calls.

500 shares at \$14.50 per share.
Write option for \$3 with a striking price of 15

75 days to expiration. Margin rate at 14%

Return on cash investment of \$5871.29

	ACTUAL %	ANNUALIZED %	BREAK EVEN
UNCHANGED	23.4822	114.28	
EXERCISED	24.0248	116.92	11.7426
MARGIN RETURNS			
UNCHANGED	56.7348	276.11	
EXERCISED	60.0341	292.166	11.9511

MARGIN DEPOSIT \$2246 \$10,000. Invested for 5 years at 292.166 % will grow to \$9.27574E + 06

Figure 1

the options market closely, you can spot potential takeover candidates long before the news is out. When you see the price of an option rise dramatically within one or two days while the common stock price remains unchanged, you know that someone thinks they have inside information. When I spot such action I run the Program Listing and determine what action to take.

A classic example occurred in early May 1980. Howard Johnson common stock had been hovering close to \$15 per share and the July 15 options had been selling from 1 1/4 to 2. Within two days the July 15 options increased to 3 while the common stock declined slightly to 14 1/2. I ran the option program and when I saw the printout I began to buy the stock and sell the July 15 options (all options expire on the third Friday of the month). I liked the soundness of the stock (it was "A" rated) and felt it unlikely that the stock would decline to under my break even point of 11 3/4 within 75 days. As it turned out, the speculators did "know" something as Howard Johnson's was taken over for over \$25 per share. The speculator got rich and I managed a tidy profit for my clients.

A few months later they were wrong about American Cyanamid. The stock was at 28 and the October 30 options sold for 5. The stock was still at 28 by October so the speculator lost. This is a good example of the only investment I know where if the price of what you bought remains unchanged, you profit handsomely. You made nothing on the stock you bought at 28, but the option premium of 5 all winds up in your pocket, save the commission. We bought American Cyanamid (ACY) for \$28/share and sold the October 30 options for \$5. The options had 90 days to expiration. Run these figures in the program and see how we came out. If you are too lazy to do it, I'll tell you. The annual return was 80 percent. Had the stock moved up to 30 or more, our return would have been higher.

The Other Side

The above are successes. Now let us deal with what all investors should consider the day they put up their money. What if something goes wrong? How much risk should you take? What if the worst happens? The most serious and costly problem investors have is their inability to deal with failure rationally. The day we invest we delight in thinking about winning and "counting our chickens" with scarcely a thought about disaster and what we will do if it happens. "I'll watch things closely and make a decision if something goes wrong," you say. With

this outlook you are courting trouble. In fact, you are guaranteeing it sooner or later! I call it the "I'll watch it another day" syndrome. Thousands have been watching General Motors "another day" for several years. Some have watched it closely all the way from 113 down to under 40. All are thinking the same thing: "I don't want the cheese; just let me out of the trap!"

If you are in such a situation and don't know what to do, examine this reasoning:

You bought 1,000 shares of XYZ at \$40 and now it is at \$25. Do you sell? Picture yourself out on the street with \$25,000 cash in a sack, and pretend you own no XYZ. Would you take that sack of cash to your broker and tell him to buy 1,000 shares of XYZ? If your answer is "Hell no!" then you are a seller, because someone will put you on the street with \$25,000 in cash in return for your XYZ stock. You need never face such a problem if you come to grips with reality the day you invest your money.

Program Listing

```

10 CLEAR: CLEAR1000: CLS
20 US="#.#": TS="####.#": S$="###.##": V$="###.#": X$="#####.##": Z$="###
###"
30 PRINT"YOU HAVE TWO OPTIONS..."
40 PRINT: PRINT"2. INSTANT COMMISSION SCHEDULE ON STOCKS OR OPTIONS.
50 PRINT: PRINT"3. DETERMINE PROFITABILITY OF A COVERED OPTION WRITE.
60 PRINT"EXAMPLE: BUY 200 SHARES OF TANDY AT 33 AND SELL SOME "
70 PRINT"SPECULATOR AN OPTION TO BUY THE 200 SHARES FROM YOU AT $35
80 PRINT"FOR $4.00 PER SHARE.
90 PRINT: INPUT"CHOOSE YOUR NUMBER & PRESS 'ENTER'.": MU: IF MU=2THEN1200
100 CLS: PRINT"COVERED OPTION WRITING ANALYSIS.": PRINT: PRINT:
  INPUT"NO. OF SHARES 100,200,300,500, OR 1000.": N: IFN<100 THEN N=100
110 INPUT"STOCK PRICE (EXPRESSED AS IN DECIMAL).": S: E=S*N
120 INPUT"OPTION STRIKING PRICE": SP
130 INPUT"OPTION PRICE EG. 2 3/8 = 2.375.": O: F=O*N
140 INPUT"DAYS TO EXPIRATION": D
150 INPUT"CURRENT MARGIN RATE": IR: IR=IR/100
160 INPUT"COMMISSION DISCOUNT": C: C=1-(C/100)
170 GOSUB 1150
180 INPUT"DIVIDENDS PER SHARE TO EXPIRATION": DD: DD=DD*N
190 CLS: PRINT: INPUT"FOR PRINTOUT=2": A4
200 IFA4=2THENLPRINT"COMPUTER STUDY OF A COVERED OPTION WRITE":
  LPRINT"WITH THE FOLLOWING PARAMETERS: ": LPRINT "
210 IFA4=2THENINPUT"ENTER STOCK SYMBOL AND OPTION DATA": W$:
  LPRINT " ": LPRINTWS
220 IFA4=2THENLPRINTN," SHARES AT $": S," PER SHARE.":
  LPRINT"WRITE OPTION FOR $": O," WITH A STRIKING PRICE OF ": SP: LPRINT "
230 PRINTN," SHARES AT $": S," PER SHARE.":
  PRINT "WRITE OPTION FOR $": O," WITH STRIKING PRICE OF ": SP
240 IFA4=2THENLPRINTD," DAYS TO EXPIRATION.": " MARGIN RATE AT ": IR,"%": LPR
INT "
250 PRINTD," DAYS TO EXPIRATION.": " MARGIN RATE AT ": IR,"%
260 PRINT
270 GOSUB 510
280 CM=Z+OC
290 G=CM*C
300 I=E-F+G-DD
310 IFS<SPTHEN330ELSEIFA4=2THENLPRINT"THE MAXIMUM RETURN WILL
  BE REALIZED PROVIDED THE STOCK": LPRINT"REMAINS ABOVE ": SP;
  ".": " CASH INVESTMENT $": I: LPRINT"CASH RETURN","ACTUAL",
  "ANNUALIZED", "BREAK EVEN"
320 IFS>SPTHENPRINT"THE MAXIMUM RETURN WILL BE REALIZED PROVIDED THE STOCK"
  : PRINT"REMAINS ABOVE ": SP;" CASH INVESTMENT $": I:
  PRINT"CASH RETURN","ACTUAL", "ANNUALIZED", "BREAK EVEN": PP=1: GOTO 400
330 GR=E-I
340 J=GR/I*100
350 K=J/D*365
360 IFA4=2THENLPRINT"RETURN ON CASH INVESTMENT OF $": I: LPRINT", "ACTUAL %"
  , "ANNUALIZED %", "BREAK EVEN": LPRINT"UNCHANGED", J, K
370 PRINT"RETURNS ON CASH INVESTMENT OF $": I
380 PRINT", "ACTUAL %", "ANNUALIZED %", "BREAK EVEN"
390 PRINT"UNCHANGED", J, K
400 S=SP: GOSUB 510
410 SO=SP*N
420 ER=SO-I-Z
430 II=I+Z
440 AA=ER/II*100
450 AB=AA/D*365
460 BE=I/N
470 IFA4=2THENLPRINT"EXERCISED", AA, AB, BE
480 PRINT"EXERCISED", AA, AB, BE
490 GOTO 800
500 REM CALCULATE STOCK COMMISSIONS
510 IFS<10THEN Z=33.92: GOTO 830
520 IFS<11THEN Z=34: GOTO 830
530 IFS<12 THEN Z=36.25: GOTO 830

```

Program continues

Color computer owners, 32K PLUS DISKS* \$298.00

Yes, that's right - for as little as \$298.00 you can add 32K of dynamic RAM, and a disk interface, to your TRS-80 Color Computer! If you just want the extra memory it's only \$199.00, and you can add the disk interface later for \$99.00.

Just plug the *Color Computer Interface (CCI)*, from Exatron, into your expansion socket and "Hey Presto!" - an extra 32K of memory. No modifications are needed to your computer, so you don't void your Radio Shack warranty, and Exatron give both a 30 day money-back guarantee and full 1 year repair warranty on their interface.

The *CCI* also contains a 2K machine-language monitor, with which you can examine (and change) memory, set break-points, set memory to a constant and block-move memory.

So what about the *CCI Disk Card*? Well as we said it's only an extra \$99.00, but you'll probably want Exatron's *CCDOS* which is only \$29.95 - unless you want to write your own operating system. The *CCI Disk*

Card uses normal TRS-80 Model I type disk drives, and *CCDOS* will even load Model I TRSDOS disks into your color computer - so you can adapt existing TRS-80 BASIC programs.

As a further plus, with the optional *ROM Backup* adaptor, you can dump game cartridges to cassette or disk. Once the ROM cartridge is on cassette, or disk, you can reload, examine and modify the software. The *ROM Backup* adaptor is only \$19.95.

For more information, or to place an order, phone Exatron on their Hot Line 800-538 8559 (inside California 408-737 7111), or clip the coupon.



excellence in electronics

exatron

DEALER ENQUIRIES INVITED

Exatron, ✓ 94
181 Commercial Street,
Sunnyvale, CA 94086



- Please send a 32K Color Computer Interface for \$199.00
- Please send a CCI Disk Card for \$99.00
- Please include CCDOS and manual for \$29.95
- Also include a ROM Backup adaptor for \$19.95

Please add \$5.00 for shipping to all orders, and 6 percent sales tax in California.

Name

Address

City

State Zip

Charge my:

MasterCard Interbank Code

Visa Expiration Date

Card

Check enclosed for

Ship COD (\$2.00 extra)

Signature

Copernica Mathematica

by Bruce Douglass

"I am primarily concerned with how neurons within a ganglion talk to each other."

As a neuroscientist, I am primarily concerned with how neurons within a ganglion talk to each other. How do they communicate with each other, and as a network modify and transmit information among themselves?

Only very recently was an optical technique developed allowing neuroscientists to gather data about these questions (see the references). Many other properties of ganglia are fairly well known and understood.

This column is a simple ganglion simulation of the effect of several neurons on a single neuron. It also rather accurately models how a single neuron behaves.

The Single Neuron

Well, how does a neuron behave? A neuron (see Fig. 1) is made up of several parts; axons, dendrites, hillocks, among others. The center of the neuron is called the cell body or *perikaryon*. It receives impulses from other neurons via *synapses* onto either the perikaryon or *dendrites* (projections extending out from the perikaryon). A synapse is a connection be-

tween two neurons. Almost all synapses are unidirectional chemical-mediated junctions. That is, information only travels in one direction (towards the dendrite to the perikaryon); the message is sent by releasing a chemical substance called a *transmitter*. This transmitter diffuses across the synaptic junction and "knocks on the door" of the other neuron. If it "knocks" loudly enough, the neuron being talked to will send out a message of its own. This message is sent down its *axon*, which is a long projection from the perikaryon that begins at the *hillock* of the neuron. The axon then *innervates*, or talks to, other neurons or organs.

A brief explanation of the message is in order. Special proteins in the cell membranes pump sodium (Na^+) out in exchange for potassium (K^+). The ratio of two sodiums for three potassiums generates a charge across the membrane, which now acts like a capacitor.

Sodium leaks constantly; these proteins keep pumping it out. Channel proteins allow sodium to enter as if the membrane weren't even there, but most of the time these are kept tightly shut. When an excitatory transmitter chemical reaches the membrane of the dendrite or perikaryon, it opens these channels (apparently by removing calcium). When a little more sodium gets in, it affects the membrane potential charge slightly. If, however, enough sodium can get in, all hell breaks loose, and all the channels open, allowing sodium to rush in.

These chemical channels have a kind of time lock. They close after a short period of time. The sodium pumps get their act together to expell the sodium from the cell. When the channels open, the membrane potential changes from a normal negative 70 millivolts (outside with respect to inside) to positive 30 mV. Before

the channels open, there is only a slight change in potential. If the change is great enough, the neuron fires an action potential (which I will explain in a moment). This is called an "all or none" phenomenon, since it occurs at full strength or not at all.

Small changes in membrane potential are called subliminal potentials, since they are below the threshold necessary to elicit a neuronal response.

Most neurons talk to other neurons in a subliminal manner. But there are several ways subliminal potentials can add or *summate* to reach the threshold potential necessary to elicit a response. These are spatial and temporal summation.

Spatial summation occurs if two or more neurons innervate a given neuron close enough for the chemical transmitters to add their effects. Temporal summation occurs when two or more innervations (they may all be from the same neuron) come close enough together in time for their effects to summate. Since the sodium pumps expel the sodium influx causing the subliminal potential, the local potential returns to normal after a brief period of time. If another or several more potentials are received quickly enough, they may add their effects. Spatial and temporal summation may both occur at the same time.

Innervations are not all excitatory. Many substances make the membrane potential more negative rather than more positive. These make it more difficult to elicit a response from the neuron, and are called *inhibitors*.

The wide change in membrane potential from negative 70 mV to positive 30 mV is called *depolarization*. The sodium pumps returning the membrane potential to normal is called *repolarization*. Figures 2 & 3 show how a membrane potential travels down an axon, away from the

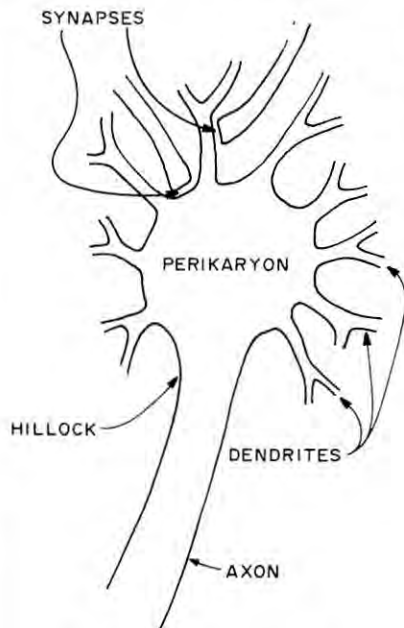


Fig. 1. A typical neuron cell

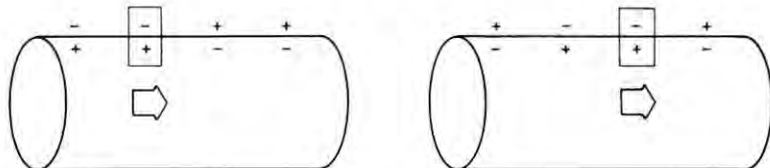


Fig. 2. Action Potential moving down the axonal membrane

MX-80/100 OWNERS



PRINTER STANDS

End the mess of paper from your desktop printer. Paper is fed from under the printer and allowed to stack neatly behind your machine. Made from the highest quality clear plexiglass, this is a handsome addition to home or office. Available in two sizes - Regular for printers such as MX-80, Microline80, etc. or Large for printers such as MX-100, DataRoyal, DWII etc. Available with extra shelf for quick and easy forms change.

Regular (300010)	29.95
Regular w/shelf (300011)	44.95
Large (300020)	34.95
Large w/shelf (300021)	49.95

MX-80 RELOADS

Reload your own MX-80 & MX-100 Ribbon Cartridges, and save money. These endless loop Silver Dollar Ribbon packs load into your worn cartridge easily, saving you money. Now available in **Blue** and **Red**.

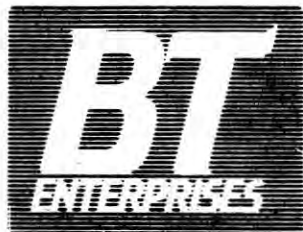
Black (500000)	\$3.95 ea.	Black (500001)	\$39.50 doz.
Red (500010)	4.95 ea.	Red (500011)	49.95 doz.
Blue (500020)	4.95 ea.	Blue (500021)	49.95 doz.

MX-80 RIBBON CARTRIDGE

Same as original cartridge, with the additional feature of "Mobis" loop which turns the ribbon 180° after each run through the cartridge extending ribbon life. As you know MX-80 cartridges cost \$15.00 from most sources, but these are only \$10.95 each or save even more by buying 3 at \$29.95.

1 cartridge (500050)	\$10.95	2 pack (500051)	\$29.95
----------------------------	----------------	-----------------------	----------------

NEW — We now carry the **DIGIAC MULTIUSER COMPUTER**. Call for details on **MULTIUSER Processing!!**



171 Hawkins Road
Centereach, New York 11720

(516) 981-8568 (Voice)
(516) 588-5836 (Data)
MNET-70331, 105



Dealer Inquiries Welcome

Add \$2.00 S & H
NYS res. add appr. tax

✓300

Program Listing

```

10 REM ***** GANGLION SIMULATOR *****
20 REM ***** BY BRUCE P. DOUGLASS *****
30 REM ***** DEPT. OF PHYSIOLOGY *****
40 REM ***** SCHOOL OF MEDICINE *****
50 REM ***** UNIV. OF S. D. *****
60 REM ***** VERMILLION, S. D. *****
70 CLEAR 200:DEFINT I-N:DEFSTRA:IS=15360:ID=16320:AM="PRESS <ENT
ER> TO BEGIN":A1=CHR$(176)+CHR$(142)+CHR$(143)+CHR$(141)+CHR$(17
6):A2=CHR$(131)+CHR$(172)+CHR$(188)+CHR$(156)+CHR$(131)
80 RANDOM:AT=STRING$(7,32):AS=STRING$(11,32):K(1,0)=32:K(2,0)=42
:K(3,0)=62:K(4,0)=72:K(5,0)=32:K(6,0)=42:K(7,0)=62:K(8,0)=72
90 J1(1)=7:J1(2)=29:J1(3)=116:J1(4)=208:J1(5)=11:J1(6)=46:J1(7)=
184:J1(8)=224
100 K(1,1)=13:K(2,1)=11:K(3,1)=11:K(4,1)=13:K(5,1)=27:K(6,1)=29:
K(7,1)=29:K(8,1)=27
110 REM J1() IS THE POSITION ID'S FOR BIT-ANDING FOR LATER DETER
MINATION OF SPATIAL SUMMATION
120 CLS:PRINT @78,CHR$(23);"GANGLION SIMULATOR"
130 PRINT@206,"BY BRUCE DOUGLASS";
140 FOR I=IS TO IS+63:POKEI,191:POKEI+960,191:NEXT I
150 FOR I=IS+62 TO ID STEP 64:POKE I,191:POKEI+2,191:NEXT I
155 PRINT@904,"PRESS <ENTER> TO CONTINUE";
160 PRINT@532,A1;:PRINT@596,A2;:FOR I=1 TO 60:SET(57+I,26):SET(5
7+I,27):NEXT I
170 FOR I=1 TO 60:RESET(57+I,26):RESET(57+I,27):NEXT I
180 IF INKEY$=""THEN160
190 CLS:PRINT"THIS PROGRAM SIMULATES THE ACTIONS OF IMPINGING
NEURONS ONTO ANOTHER NEURON IN A GANLION. TO ACTIVATE A
NEURON, PRESS THE NUMBER CORRESPONDING TO THAT NEURON"
200 PRINT:PRINT"IF THE NEURON IS ABLE TO FIRE, IT WILL. IF
IMPINGING NEURONS CAUSE THE DEPENDENT NEURON TO REACH
THRESHOLD, IT WILL ALSO FIRE."
210 PRINT:PRINT"FOR THE IMPINGING NEURONS' EFFECTS TO SUMMATE,
THEY MUST BE CLOSE TOGETHER, EITHER IN TIME, LOCATION
OR BOTH. IF THE SUM OF THE SUBLIMINAL EFFECTS IS SUFFICIENT,
THEN THE DEPENDENT NEURON WILL FIRE."
220 PRINT:PRINT TAB(16);AM;
230 IF INKEY$=""THEN230
240 REM START OF SIMULATION - DRAW FIGURES
250 CLS:FOR I=1 TO 4:IT=RND(3):IF IT=1 THEN A(I)="I":L(I)=-1 ELSE
A(I)="E":L(I)=1
260 PRINT A;I;A(I);AT;:NEXT I:PRINT@64,"";:FOR I=1 TO 4:IT=RND(
2):IF IT=1 THEN A(I+4)="I":L(I+4)=-1 ELSE A(I+4)="E":L(I+4)=1
270 PRINT A2;AS;:NEXT I
280 PRINT@768,"";:FOR I=1 TO 4:PRINTAL;AS;:NEXT
290 FOR I=1 TO 4:PRINTA2;AS;:NEXT
300 FORI=1 TO 4:PRINT I+4;A(I+4);AS;STRING$(I,32);:NEXT I
310 FOR I=0 TO 3:IP=16*I+130:I(I+1)=IP:J(I+1,1)=INT(IP/64)*3:J(I
+1,0)=(IP-INT(J(I+1,1)*64)/3)*2:NEXT I
320 FOR I=0 TO 3:IP=770+16*I:I(I+5)=IP:J(I+5,1)=INT(IP/64)*3:J(I
+5,0)=(IP-INT(J(I+5,1)*64)/3)*2:NEXT I
330 REM J(I,0)=X(I),J(I,1)=Y(I) FOR DRAWING LINES TO NEURON
340 E=26.6667:FOR T=0 TO 6.3 STEP .035
350 X=E*COS(T)+52.5:Y=10*SIN(T)+20.5:SET(X,Y)
360 NEXT T 'K(,) CONTAINS POINTS ON NEURON TO DRAW LINES
370 PRINT@965,"I' MEANS INHIBITORY, 'E' MEANS EXCITATORY";
380 FOR I=1 TO 8:X1=J(I,0):Y1=J(I,1):X2=K(I,0):Y2=K(I,1)
390 GOSUB 580:NEXT I 'DRAW IN LINES
400 X1=79:Y1=20:X2=127:Y2=20:GOSUB580
410 REM NOW THAT FIGURE IS DRAWN, RUN THE SUCKER!
415 KU=-70
420 A=INKEY$:IF A<>"" THEN B=VAL(A) ELSE B=0
430 PRINT@472,KU " ";
440 FORI=1TO8:IFP(I)>0THENP(I)=P(I)-1
450 NEXT
460 POKE 16442,0:POKE16443,0:IF B>8 THEN B=0
470 IF B=0 THEN IF KU>-70THENKU=KU-1:GOTO420 ELSE IF KU<-70THENK
U=KU+1:GOTO420
480 IF B=0 THEN 420
490 REM DETERMINE IF NEURON CAN FIRE
500 IF P(B)<2 THEN K1(B)=1:GOSUB570:GOSUB580:GOSUB650:GOTO 520
'FIRE ACTION POTENTIAL
510 IF P(B)<5 AND P(B)=>2 THEN IF RND(P(B))>P(B)/2 THEN K1(B)=1:
GOSUB570:GOSUB580:GOSUB650: ELSE K1(B)=0:GOTO530 'FIRE IF PROBA
BILITIES ARE GOOD
520 P(B)=5

```

Program continues

perikaryon.

The change in membrane potential affects the potential of the membrane around the area initially affected. This causes it to depolarize. This area depolarizes the area adjacent to it, and so on. Meanwhile, the initial area cannot be depolarized again until a certain amount of the original membrane potential is regained; during this time it is said to be *refractory*. The refractory period is usually broken into two parts, absolute and relative. During the absolute refractory period, it is impossible for the neuron to fire. During the relative refractory period, a neuron can fire only if it receives a stronger-than-normal stimulus. The *action potential*, as this moving wave of depolarization is called, can only move in one direction, since the membrane that came before it is refractory. That is why the information transfer in neurons is unidirectional.

How Do you Model Neurons in a Computer?

The simple simulation here models many of the characteristics of real neurons. To indicate action potentials traversing down the axon, I have used two routines. The connection between the large neuron and the smaller ones is shown by a line between them. An action potential is depicted by blanking out the line and then redrawing it. If the large neuron is sufficiently excited, the line extending to the right (its axon) will be blanked out and redrawn.

You may excite the small neurons by pressing the number associated with that neuron (1-8). The neuron fires if it can, determined by its refractive period (how long it has been since it fired last). This is a repeating function if the key is held down. But remember, once it fires, it has an absolute refractory period during which it cannot fire. When this absolute refractory period is over, it has a relative refractory period, during which it may or may not fire.

The small neurons may excite or inhibit the large neuron. This property, determined randomly at the onset of the simulation, is indicated by I or E next to the neuron. If it inhibits the large neuron, it will be more difficult to make the neuron fire. If it excites the larger neuron, it makes it easier to fire an action potential.

The Program

A simple variable list in Fig. 4 will aid you in understanding how these properties are modelled.

The simulation starts at line 420 with the INKEY\$ loop. The method for determining spatial summation assigns numbers to each small neuron representing the area of innervation on the large

neuron. These numbers are chosen so, when ANDed together, the result is non-zero only if the areas are adjacent.

The AND does a bit-wise comparison of numbers and returns a 1 in a bit position only if both of the numbers contain a 1 in that bit position. Therefore, it wasn't too hard to choose numbers such that they allowed to test for adjacent areas. Further, not all neurons innervate equally. Generally, neurons that innervate closer to the hillock of the axon innervate the neuron more strongly. The numbers are arranged so those closest to the axon have the largest AND. This can be demonstrated graphically quite simply:

```
00000111  00011001  01110100  11010000
(1)        (3)        (5)        (7)
00001011  00011110  10111000  11100000
(2)        (4)        (6)        (8)
```

In this figure, you can see the binary numbers in each box. The number in

"A model's purpose is to simulate only the characteristics essential to what you are considering at the moment."

parentheses is the bit position (1-8) corresponding to the box location. All bits from adjacent boxes are set in a given box. Thus, two adjacent boxes share two bit positions on. If they are not adjacent, they will have no shared positions on. For example, boxes 1 and 2 share bit positions 1 and 2. Boxes 3 and 5 share bit positions 3 and 5. Boxes 2 and 3, adjacent in a kitty-

corner fashion, also have two bit positions in common. This is because they are both adjacent to boxes 1 and 4. Boxes 2 and 5 have no bit positions in common. Note that the ANDs of adjacent boxes increase in value as you go from left to right. Thus, we can weigh the boxes at the right more than those at the left.

This is exactly the strategy used in the simulation. Look at the last few lines of the program. The bit positions are ANDed together and multiplied by the state of the neuron (K1(I)). If it is not on, the state variable is zero; if it is on, the state is a one. The numbers used for the boxes in the above figure do not exactly correspond with those in the simulation: I rearranged the boxes. Looking at the video display of the ganglion, 1 is adjacent to 5 and 4 is adjacent to 8. The bit-ANDing numbers are the same as those used in our figure above, however.

The refractory state of the small neurons are kept in the array P(I). When a neuron is excited to fire, it is set to 5. This low value produces a short refractory period. You may change the command P(B) = 5 to 10 or 15, or whatever suits your fancy. The neuron cannot fire when P(I) is greater than two. This corresponds to the absolute refractory period. If P(I) is between zero and two, line 510 calculates the probability that the neuron will fire. If P(I) equals zero, the neuron will fire every time.

Simulation Limitations

Not all the ganglion's characteristics are modelled here. In fact, that is the definition of a model. If all characteristics were modelled, then you would have a copy. A model's purpose is to simulate only the characteristics essential to what you are considering at the moment. This simplifies very complex phenomena. Of

Program continued

```
530 REM OK, NOW DOES THE DEPENDENT NEURON FIRE???
```

```
540 IF KU>-70 THEN KU=KU-1 ELSE IF KU<-70 THEN KU=KU+1
```

```
550 IF KU>-30 THEN X1=79:Y1=20:X2=127:Y2=20:GOSUB 610:GOSUB580:K
```

```
U=-30
```

```
560 GOTO 420
```

```
570 X1=J(B,0):Y1=J(B,1):X2=K(B,0):Y2=K(B,1):GOTO620
```

```
580 REM DRAW LINE ROUTINE
```

```
590 SG=SGN(X2-X1):S=(Y1-Y2)/(X1-X2):T=Y1+.5:FOR J=X1 TO X2 STEP
```

```
SG
```

```
600 SET(J,T+S*(J-X1)):NEXT J:RETURN
```

```
610 REM BLANK OUT LINE ROUTINE
```

```
620 SG=SGN(X2-X1):S=(Y1-Y2)/(X1-X2):T=Y1+.5:FOR J=X1 TO X2 STEP
```

```
SG
```

```
630 RESET(J,T+S*(J-X1)):NEXT J:RETURN
```

```
640 GOTO 640
```

```
650 REM ANDING IN THE STATE IN REAL TIME
```

```
660 FOR K1=1 TO 8:KN=INT((J1(B)ANDJ1(K1))*K1(K1)*J1(B)*L(B)/300)
```

```
+4*L(B):KU=KU+KN:NEXT:IF KU>20 THEN KU=20
```

```
670 RETURN
```

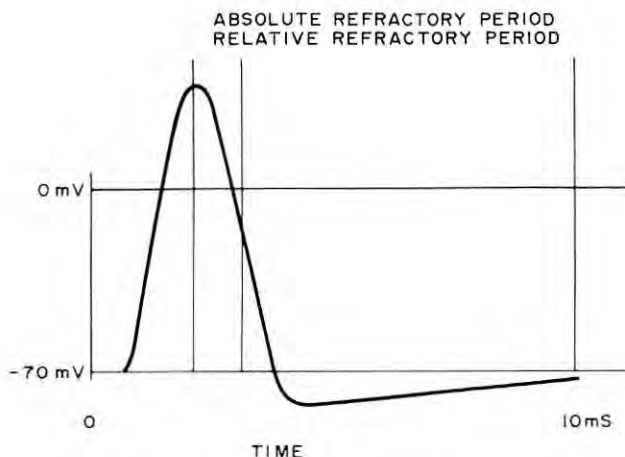


Fig. 3. Change in membrane potential during an action potential

A1-A3	Graphics Strings
J1(I)	Position codes for spatial summation
A(I)	I or E states for the neuron
L(I)	Numerical equivalent of excitation or inhibition
J(I,0), J(I,1)	(X,Y) coordinates for the small neurons
K(I,0), K(I,1)	(X,Y) coordinates on the large neuron
KU	Sum or state membrane potential of the large neuron
P(I)	Refractory states of the neurons
K1(I)	States of the neurons (1 = on, 0 = off)
POKEs	Reset the key buffer
Lines 500-510	Determine if the small neuron in question can fire

Fig. 4. Program variables

FREE

with software purchase—
One CPM Handbook

DISCOUNT SOFTWARE

Ad #24 ULTIMATE SOFTWARE PLAN

We'll match any advertised price on any item that we carry. And if you find a lower price on what you bought within 30 days of buying it, just show us the ad and we'll refund the difference. It's that simple.

Combine our price protection with the availability of full professional support and our automatic update service and you have the Ultimate Software Plan.

It's a convenient, uncomplicated, logical way to get your software.

✓ (New items or new prices)

CP/M users: specify disk systems and formats. Most formats available.

CP/M® DISK WITH / MANUAL ONLY

ARTIFICIAL INTELLIGENCE*	
Medical (PAS-3)	\$849/\$40
Dental (PAS-3)	\$849/\$40
ASYST DESIGN*	
Prof Time Accounting	\$549/\$40
General Subroutine	\$289/\$40
Application Utilities	\$439/\$40

COMPLETE BUS. SYSTEMS*	
Creator	\$269/\$25
Reporter	\$169/\$20
Both	\$399/\$45

COMPUTER CONTROL*	
Fabs (B-free)	\$159/\$20
UltraSort II	\$159/\$25

COMPUTER PATHWAYS*	
Pearl (level 1)	\$ 99/\$25
Pearl (level 2)	\$299/\$40
Pearl (level 3)	\$549/\$50

DIGITAL RESEARCH*	
CP/M 2.2	
NorthStar	\$149/\$25
TRS-80 Model II (P+T)	

PL/I-80	\$459/\$35
BT-80	\$179/\$30
Mac	\$ 85/\$15
Sid	\$ 65/\$15
Z-Sid	\$ 90/\$15
Tex	\$ 90/\$15
DeSpool	\$ 50/\$10
CB-80	\$459/\$35
CBasic-2	\$ 98/\$20

D.M.A.	
Ascorm	\$149/\$15
Formula	\$539/\$45

GRAHAM-DORIAN*	
General Ledger	\$729/\$40
Acct Receivable	\$729/\$40
Acct Payable	\$729/\$40
Job Costing	\$729/\$40
Payroll II	\$729/\$40
Inventory II	\$729/\$40
Payroll	\$493/\$40
Inventory	\$493/\$40
Cash Register	\$493/\$40
Apartment Mgt.	\$493/\$40

MICRO-AP*	
S-Basic	\$269/\$25
Selector IV	\$295/\$35
Selector V	\$495/\$50

MICRO DATA BASE SYSTEMS*	
HOBS	\$269/\$35
MDBS	\$795/\$40
DRS or QRS or RTL	\$269/\$10
MDBS PKG	\$1295/\$60

MICROPRO*	
WordStar	\$319/\$60
Customization Notes	\$429/\$na
Mail-Merge	\$109/\$25
WordStar/Mail-Merge	\$419/\$85
DataStar	\$249/\$60
WordMaster	\$119/\$40
SuperSort I	\$199/\$40
Spell Star	\$175/\$40
CalcStar	\$259/\$na

MICROSOFT*	
Basic-80	\$298
Basic Compiler	\$329
Fortran-80	\$349
Cobol-80	\$629
M-Sort	\$124
Macro-80	\$175
Macro-86	\$259
Edit-80	\$ 84
MuSimp/MuMath	\$224
MuLisp-80	\$174
Multi Plan	Call
Manager Series	Call

DON'T SAY 'UNCLE'!	
SAY "MICROTAX" TODAY!	
Individual	\$ 250/\$na
Professional	\$1000/\$na
Partnership	\$ 750/\$na
Package	\$1500/\$na
ACRS, depreciation, batch computing/printing of over 30 forms/schedules, and much more.	

ORGANIC SOFTWARE*	
TextWriter III	\$111/\$25
DateBook II	\$269/\$25
Milestone	\$269/\$30

OSBORNE*	
General Ledger	\$ 59/\$20
Acct Rec/Acct Pay	\$ 59/\$20
Payroll w/Cost	\$ 59/\$20
All 3	\$129/\$60
All 3 + CBASIC-2	\$199/\$75
Enhanced Osborne	\$269/\$60

PEACHTREE*	
General Ledger	\$399/\$40
Acct Receivable	\$399/\$40
Acct Payable	\$399/\$40
Payroll	\$399/\$40
Inventory	\$399/\$40
Surveyor	\$399/\$40
Property Mgt	\$799/\$40
CPA Client Write-up	\$799/\$40
P5 Version	Add \$129
MagiCalc	\$269/\$25
Other	less 10%

SOFTWARE WORKS*	
Adapt (CDOS to CP/M)	\$ 69/\$na
Ratfor	\$ 86/\$na

SOHO GROUP*	
MatchMaker	\$ 97/\$20
WorkSheet	\$177/\$20

STRUCTURED SYSTEMS*	
Business Packages, Call for Price	

SORCIM*	
SuperCalc	\$269/\$na
Trans 86	\$115
Act	\$157

TCS*	
GL or AR or AP or Pay	\$ 79/\$25
All 4	\$269/\$99
Compiled each	\$ 99/\$25
Inventory	\$ 99/\$25

SUPERSOFT*	
Diagnostic I	\$ 49/\$20
Diagnostic II	\$ 84/\$20
Disk Doctor	\$ 84/\$20
Fort (8080 or Z80)	\$149/\$30
Fortran	\$219/\$30
Fortran w/Ratfor	\$289/\$35
C Compiler	\$174/\$20
Star Edit	\$189/\$30
Other	less 10%

UNICORN*	
Mince	\$149/\$25
Scribble	\$149/\$25
Both	\$249/\$50

WHITESMITHS*	
"C" Compiler	\$600/\$30
Pascal (incl "C")	\$850/\$45

"PASCAL"	
Pascal/MT+ Pkg	\$429/\$30
Compiler	\$315
Sp Prog	\$175
Pascal/Z	\$349/\$30
Pascal/UCSD 4.0	\$670/\$50
Pascal/M	\$355/\$20

"DATA BASE"	
FMS-80	\$649/\$45
dBASE II	\$595/\$50
Condor II	\$899/\$50
Access 80 Level 1	\$249
Access 80 Level 2	\$429
Access 80 Level 3	\$679

"WORD PROCESSING"	
WordSearch	\$179/\$50
SpellGuard	\$229/\$25
VTS/80	\$259/\$65
Magic Wand	\$289/\$45
Magic Spell	\$269/\$25
Spell Binder	\$349/\$45
Select	\$495/\$na
The Word	\$ 65/\$na

"OTHER GOODIES"	
Micro Plan	\$419/\$na
Plan 80	\$269/\$30
Target	\$189/\$30
BSTAM	\$149/\$na
BSTMS	\$149/\$na
Tiny "C"	\$ 89/\$50
Tiny "C" Compiler	\$229/\$50
Nevada Cobol	\$179/\$25
MicroStat	\$224/\$25
Vedit	\$130/\$15
MiniModel	\$449/\$50
StatPak	\$449/\$40
Micro B+	\$229/\$20
Raid	\$224/\$35
String/80	\$ 84/\$20
String/80 (source)	\$279/\$na
ISIS CP/M Utility	\$199/\$50
Lymx	\$199/\$20
Supervyz	\$ 95/\$na

APPLE II®	
INFO UNLIMITED*	
EasyWriter	\$199
Datadex	\$249
EasyMailer	\$128
Other	less 15%

MICROSOFT*	
Softcard (Z-80 CP/M)	\$298
Fortran	\$179
Cobol	\$499
Tasc	\$139

MICROPRO*	
WordStar	\$269
MailMerge	\$ 99
WordStar/MailMerge	\$349
SuperSort I	\$159
SpellStar	\$129

PERSONAL SOFTWARE/ VISICORP*	
Visualc 3.3	\$225
Desktop/Plan II	\$225
Visiterm	\$ 90
Visidex	\$225
Visiplot	\$180
Visitrend/Visiplot	\$300
Visifile	\$225

PEACHTREE*	
G/L, A/R, A/P, Pay or Inventory (each)	\$224/\$40

"OTHER GOODIES"	
VU #3R (usew/Visualc)	\$ 79
Context Connector (usew/Visualc)	\$129
Micro Courier	\$219
Super-Text II	\$127
Data Factory	\$134
DB Master	\$184

IBM PC SOFTWARE	
Business/Med/WP	Call for Price

Copernica Mathematica

course, you must determine what is essential and what is not. This requires a firm understanding of exactly what you want to look at in your model.

In the present simulation, I left out many characteristics that you may consider essential, depending on exactly what aspects of neural ganglionic behavior you wish to view. For example, the connectivity map depicted is extremely simplified. A ganglion with only nine neurons would still have perhaps hundreds of interconnections, including:

- Multiple innervations of the large neuron by each small neuron.
- Multiple innervations of neurons by other small neurons.
- Recurrent innervations of a neuron by itself.

A single neuron may make as many as 10,000 synaptic connections. I simplified this into only one. A given neuron synapses with many other neurons in the ganglion. I have eliminated all of those. Think about the effect this has on the model: If small neuron one innervates

"This interconnectivity is one of the things that make neural behavior so difficult and interesting to study."

small neuron two, it alters the probability of neuron two firing to innervate the large neuron. This interconnectivity is one of the things that make neural behavior so difficult and interesting to study.

I also omitted recurrent innervation, in which a given neuron innervates itself. Usually, this type of connection is inhibitory. You might think of it as extending the refractory period.

Even with the omissions, the simulation is informative and may be useful as a CAI tool for instruction in neural behavior in simple ganglionic networks. ■

Douglass, B. and Hasting, D. Spectrophotometric Methods For Mapping Neural Networks 1981 Proceedings from the Lawrence Symposium (to appear)

Grinvald, A., Cohen, L., Leshner, S., and Boyle, M. Simultaneous Optical Monitoring of Activity of Many Neurons in Invertebrate Ganglia Using a 124-Element Photodiode Array May 1981 Journal of Neurophysiology pp. 829

ORDERS ONLY—CALL TOLL FREE VISA • MASTERCARD

1-800-854-2003 ext. 823 • Calif. 1-800-522-1500 ext. 823

Outside Continental U.S.—add \$10 plus Air Parcel Post • Add \$3.50 postage and handling per each item • California residents add 6% sales tax • Allow 2 weeks on checks, C.O.D. \$3.00 extra • Prices subject to change without notice. All items subject to availability • ®—Mfgs. Trademark. Blue Label \$3.00 additional per item.

THE DISCOUNT SOFTWARE GROUP

6520 Selma Ave. Suite 309 • Los Angeles, Ca. 90028 • (213) 837-5141

Int'l TELEX 499-0446 DISCSOFT LSA • USA TELEX 194-634 (Attn: 499-0446)

TWX 910-321-3597 (Attn: 499-0446)

101

STEVENS' (Bleep)

An Authorized (Bleep) Dealer

We didn't fool you, did we? We can't use certain names in our advertising, but the fact is that as a result of our authorized dealership we are able to offer a full line of TRS-80 (tm) products with a full warranty. Of course the fact that we are not a company-owned store allows us to offer a full line of accessories when we feel they may better suit your needs, so you'll find we carry printers by Epson and C. ITOH, modems by Lynx, operating systems by Logical Systems and Apparat, and disk drives by Tandon (cheaper without the "Bleep" label). If you like, we'll help you pick the combination most suited to your needs. We even have custom programming available if you need that kind of help. And if all that is not enough to interest you, check below and you'll find that our prices are outstanding.

HARD DISK DRIVES

10 megabyte removable cartridge Winchester drive for the TRS-80 Model I, II, or III - includes host adapter and all cables.

Model I or III (includes LDOS driver)	\$5395.
Model II (requires DOS)	\$5295.
Model I & III Operating Systems	
LDOS 5.1	\$116.
NEWDOS80	\$139.
Model II Operating Systems	
Racet HDOS (TRSDOS)	\$400.
Single User Oasis	\$500.
Multi-User Oasis	\$850.
CP/M	\$195.

MODEL III SYSTEMS

We take a 16K Model III, add 32K of prime 200 NS memory, a high quality disk controller with a switching (not linear) power supply, and two double density 40 track tandon disk drives (the same one Tandy uses). Since we can assemble this system for less, you pay only **\$1895.**

With 2 double sided 40 track drives*	\$2095.
With 2 single sided 80 track drives*	\$2195.
With 2 double sided 80 track drives*	\$2295.

*Requires LDOS or other alternate Model III operating system. We will provide LDOS 5.1 for **\$80.** with the purchase of any of the systems listed above.

HARDWARE

Mod III 48K 2 Disk	\$2150.	32K Extended Color	\$634.
16K Model III	865.	CTR80 Cassette Recorder	52.
64K Model II	3385.	Lynx A/A Modem	249.
64K Color Computer	339.	C. Itoh Prowriter Printer	550.
16K Extended Color	499.	Starwriter Daisy 25cps	1495.

CHEKBOOK

AT LAST . . . A system to handle both your income and expense ledger AND your checkbook! Presenting CHEKBOOK (c) by Ronald Schulman. CHEKBOOK has these advanced features:

MENU DRIVE
 FLEXIBLE HARDWARE CONFIGURATION
 SIMPLE STATEMENT RECONCILIATION
 LEDGER ACCOUNTING
 ITEMIZED DEDUCTION REPORT
 INCOME STATEMENT
 PERMANENT YEARLY ACCOUNTING
 ERROR RECOVERY
 FAST COMPILED CODE
 FULL DOCUMENTATION

SPECIFY OPERATING SYSTEM
\$99.95

WARRANTY INFORMATION

All Radio Shack products are covered by the standard Tandy 90 day warranty, which will be honored at any company-owned store or computer center. Other hardware is warranted for 120 days by Stevens' Electronics.

DEALER B094

STEVENS' ELECTRONICS

562 Nutt Road, Phoenixville, PA 19460
 Call Toll Free (800) 345-6279
 In Pennsylvania (215) 933-3441

Add shipping to prices listed.
 Add 3% for Visa and Master Card.
 PA. residents add 6% sales tax.



NEW PRODUCTS

Edited by Janet Fiderio

Featuring—
The Radio Shack Model 16



The Model 16

The Model 16

The TRS-80 Model 16's dual processor design features an MC68000 microprocessor—a 16/32 bit central processing unit. The Model 16 comes with 128K of RAM and is expandable to a total of 512K RAM and 2-1/2 megabytes of disk memory storage.

The Model's second microprocessor, a Z-80A handles all input/output functions. The Z-80 also enables you to use all existing Model II software. The 16's operating system is Library Command compatible with the Model II. An editor/assembler is provided and includes an editor, macro-assembler, linking

loader, cross reference and debugger.

The Model comes with one or two built-in 1.25 million character eight-inch disk drives. A high resolution 12-inch video screen with 24 by 80 characters each is standard. The detachable typewriter-style keyboard features a numeric keyboard and two special function keys.

Two RS-232C serial ports and a parallel printer interface allow expansion with a wide variety of peripherals. A hard disk port can be added to use from one to four 8.4 megabyte hard disk drives.

The one-disk Model 16 (#26-6001) is priced at \$4999. For more detailed information contact your local Radio Shack store.

Reader Service ✓583

Commodity Price Data

Test your trading strategy before investing with this disk data base for those interested in commodity researching and trading. Over 400 years of historical

commodity futures price data is offered.

This data base features computer-edited daily high, low, and settlement prices for the 16 most actively traded commodities from 1976 to the present. The original data has been collected from exchange statistical annuals, daily statistical bulle-

tins, daily quote services, and the *Wall Street Journal*.

In addition to files of daily statistics, a summary form of weekly high, low, and Friday settlement is also available. Printed listings and maintenance software may be purchased as well.

The entire data base (initial release) is available for \$1000. Minimum purchase is \$50. For more detailed information contact D B Management Inc., 16407 Evans Ave., South Holland, IL 60473, (312) 596-5755.

Reader Service ✓590

16-Bit Processing For the Model II

A Model 16 Enhancement Option is available for Model II owners.

The Model II Enhancement Option (#26-6010) provides you with the MC68000 CPU and 128K RAM of internal memory. (It is expandable to 256K.) Your present disk drives are retained and all Model II software remains compatible.

The package sells for \$1499 and is available from Radio Shack.

Reader Service ✓ 584

Audit Software

Stat/Pak is a program designed to aid the auditor in applying statistical sampling techniques to the compliance testing of virtually any facet of the accounting system.

Stat/Pak determines required sample size, selects the items to be examined, provides clients with a list of documents to be pulled for examination, and provides the auditor with a worksheet to be used in the test. It also generates workpaper documentation of the statistical parameters employed, and evaluates the test results by generating a report ready for inclusion in the workpapers.

This package is available for the Model I, II and III, in cassette and disk versions

COMPUTER BOOKS FOR BEGINNERS

Everything you need to know to get started programming your own computer. These handy program sourcebooks, each jam-packed with easy-to-understand info for beginners, are crammed with hundreds of tips, tricks, secrets, hints, shortcuts, and techniques, plus hundreds of tested ready-to-run programs. TRS-80 Color Computer. TRS-80 Pocket Computer. Sharp PC-1211 Pocket Computer. Casio FX-702P Pocket Computer. Four of the most popular computers for beginners.

Color Computer

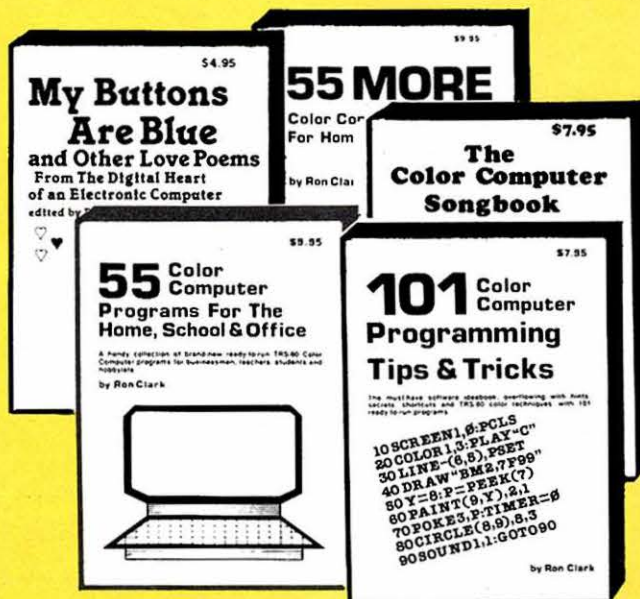
101 Color Computer Programming Tips & Tricks, learn-by-doing instructions, hints, secrets, techniques, shortcuts, insights, for TRS-80 Color Computer, 128 pages **\$7.95**

55 Color Computer Programs for the Home, School & Office, practical ready-to-run software with colorful graphics, 128 pages **\$9.95**

55 MORE Color Computer Programs for Home, School & Office, sourcebook of useful, plug-in-and-run software with colorful graphics, for TRS-80 Color Computer, 112 pages **\$9.95**

The Color Computer Songbook, 40 favorite pop, classical, folk & seasonal songs arranged for the TRS-80 Color Computer, ready-to-run music programs, 96 pages **\$7.95**

My Buttons Are Blue And Other Love Poems From The Digital Heart Of An Electronic Computer, for poetry lovers, computer lovers, just-plain lovers, a high-tech classic, 66 heartwarming poems written by a TRS-80 Color Computer, great gift for someone close to you, includes the exclusive ARCsoft Poetrywriter™ program, 96 pages **\$4.95**



Pocket Computer

50 Programs in BASIC for the Home, School & Office, useful plug-in-and-run software for TRS-80/Sharp PC-1211 pocket computers, 96 pages **\$9.95**

50 MORE Programs in BASIC for Home, School & Office, sourcebook of tested ready-to-run software for TRS-80/Sharp PC-1211 pocket computers, 96 pages **\$9.95**

101 Pocket Computer Programming Tips & Tricks, secrets, hints, shortcuts, techniques from a master programmer, for TRS-80/Sharp PC-1211 pocket computers, 128 pages **\$7.95**

Murder In The Mansion and Other Computer Adventures, murder mystery, space, adventures, loads of fun, 24 game programs for TRS-80/Sharp PC-1211 pocket computers, 96 pages **\$6.95**

35 Practical Programs for the Casio Pocket Computer, useful plug-in-and-run software for the FX-702P, 96 pages **\$8.95**

Pocket Computer Programming Made Easy, new fast and easy way to make the world's smallest computer work for you, 128 pages **\$8.95**

Order direct from this ad. Send check or money order. Include \$1 shipping for each item ordered up to a maximum of \$3. Or write for our free catalog. Mail orders to:

ARCsoft Publishers

Post Office Box 132Q
Woodsboro, Maryland 21798

(301) 663-4444

Program Worksheets

Handy printed forms make writing BASIC software easy and fun. Customized for your own computer system, or use the universal form good for any BASIC computer. 40-sheet tablelets:

Color Computer Coding Form	\$2.95
Pocket Computer Coding Form	\$2.95
APPLE Computer Coding Form	\$2.95
IBM Personal Computer Form	\$2.95
Universal Coding Form	\$2.95

Electronics Projects

25 Easy-To-Build One-Night & Weekend Electronics Projects, useful gadgets, readily-available parts, 96 pages **\$4.95**

Customers outside North America wanting airmail send \$6 per book. Foreign customers pay in U.S. dollars. For first-class mail delivery in North America include \$2 per book. Maryland residents add 5% sales tax. Sorry, no COD. TRS-80 is a trademark of Tandy Corp./Radio Shack.

priced from \$150 to \$250. For information contact Joseph T. Ney, Certified Public Accountant, 1656 Upland Road, Huntington, WV 25701.

Reader Service ✓564

Portable Communications System

The Omni System is a fully portable communication aid for the non-vocal or vocally impaired, severely handicapped individual, as well as a computer keyboard substitute for the dexterity impaired.

The system includes a display board, LCD readout, printer, 16K programmable memory, remote environmental control, audible alarm, voice synthesizer, typewriter interface and computer access.

The display board (\$1000) provides the capacity for direct communications of selected messages in word, phrase, symbol or picture form. Environmental control enables the user to turn on or off electrical equipment or dim or brighten lights. An audible alarm enables the user to summon an attendant and an emergency alarm sounds should the switching device be held in an open position.

The reader/printer attachment (\$1500) provides alphabetic interpretation of symbols or pictures while the LCD readout enables the user to proof and correct script before sending it to the printer.

The system can be interfaced with the TRS-80 through the RS-232 port. Additional vocabularies or technical languages may be added to the system through the CRC programming service.

For more information contact the Communications Research Corporation, 1720-130th Avenue North East, Bellevue, WA 98005, (206) 881-9550.

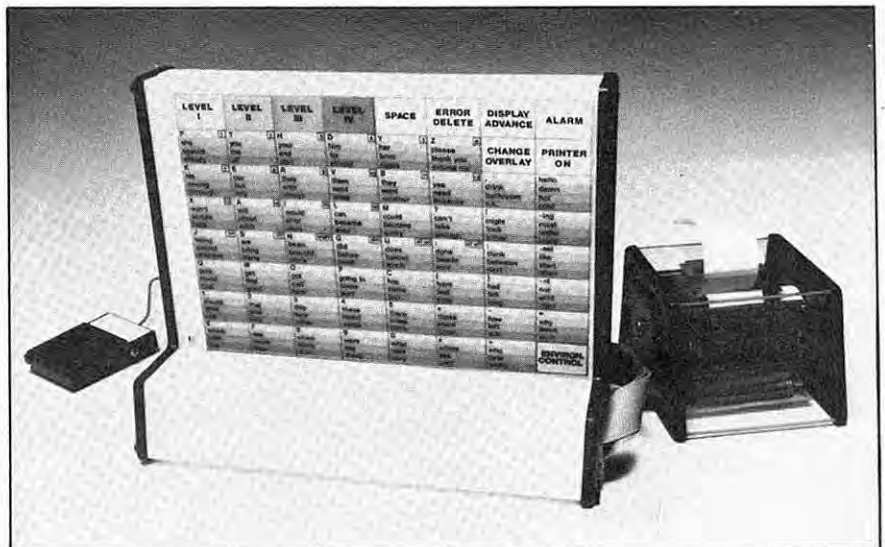
Reader Service ✓561

Scientific Decision Making

Decision Aide 1.1 is a self-prompting program that takes the user step-by-step through a rigorous thought process culminating in the application of dimensional analysis, a useful decision algorithm. Detailed written instructions are provided with the program.

Decision Aide 1.1 is written in Level II Basic for the Model I with a minimum of 16K. It is priced at \$10. Address inquiries to M. Spatz, 2617 Village Lane, Silver Spring, MD 20906.

Reader Service ✓ 579



The Omni System

A Database Alternative

If you are tired of database retrieval, you can now access disabase with the PABAB (Pick A Base, Any Base) software package. Simply boot up PABAB and answer the question WHICHABASE? with Disabase or Database. If you answer Disabase, you're sent to the disk's disabase; if you answer Database, you're sent to the disk's database. To jump back and forth between the two, type Doseabases, thereby accessing a little bit of disa and a little bit of data. The manufacturer says that even the least computer-minded business executive can master

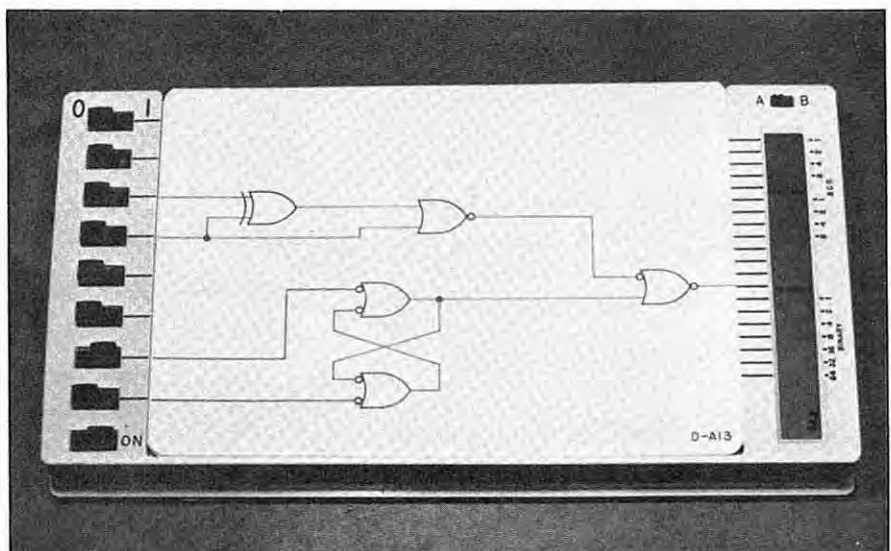
PABAB in a matter of months.

PABAB costs \$199.95 and proof-of-purchase seals from any two Sugar Pops packages, and is available from Mismanagement Systems, 6809 Lotsaluck Road, Palo Alto, CA 94303.

Logic Trainer

The Broder Logic Trainer (Model 100) reduces the time it takes to learn the circuit function of gates and flip-flops.

The training package includes lessons in logic, diodes, bipolar transistors, and FET (non-linear). The student must solve



The Broder Logic Trainer

NEW PRODUCTS

the trainer problems by correctly manipulating eight switches.

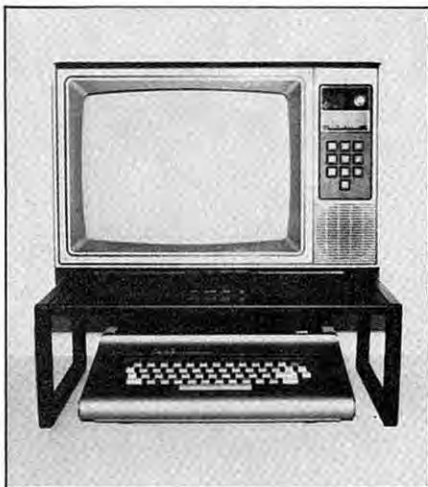
This product is available from L.J. Broder Enterprises Inc., 11105 Shady Trail, Suite 115, Dallas, TX 75229, (215) 241-3727.
Reader Service ✓569

Granny's Old-Fashioned Word Processing System

Granny's Old-Fashioned Word Processing system instantly turns your TRS-80 into an ordinary typewriter. The package, for the writer who wants to go electronic but doesn't want to give up old ways, includes no editing capabilities; the user must print all copy and edit it by hand. GROLFWORP also permits no permanent files; the user must produce a printout or lose whatever he's typed.

Other features include: no delete, no scrolling, no justification, no insertion capabilities, no bold or underscore functions, and tabs that work only occasionally. Special I/O routines randomly jam the paper in the printer, smudge the pages and print lines one on top of the other.

Granny's Old-Fashioned Word Processing System costs \$1495, and is available from Granny, Little White Cottage Lane, Picket Fence, NH 03458.



The Desktop Video/Printer Stand

Video/Printer Stand

The Desk Top Video/Printer Stand converts the micro users' present desk or table into a specialized computer work station.

When used as a video stand the Color Computer or Videotex monitor is raised to eye level. The stand's metal construction easily supports any portable color television.

If used as a printer stand, the users'

disk drives, tape recorder, or fan-fold paper fit under the printer.

Priced at \$39.95, the stand is available from E.S. Advanced Effort Saver Products Inc., 6501 Cow Pen Road, Building D-207, Miami Lakes, FL 33014, (305) 821-9961.

Reader Service ✓ 557

Word Processing Enhancement Program

Auto-Writer turns your word processing system into a data base management system. This five program word processing enhancement program allows you to create a mailing list, or any data base, then use all the features of your word processor to maintain and edit that list.

Some of the features include: joining a mailing list to a form letter with a wide variety of options, sorting name and address files by any key (even when the name or zip is buried in a line), and personalizing form letters as you run them by inserting key words or phrases.

For information on additional Auto-writer features contact Walonick Associates, 5624 Girard Avenue South, Minneapolis, MN 55419, (612) 866-9022. The Autowriter is available for the Model I and III with two disk drives and 48K for \$72.83.
Reader Service ✓571

Word Processing With the EPS-80

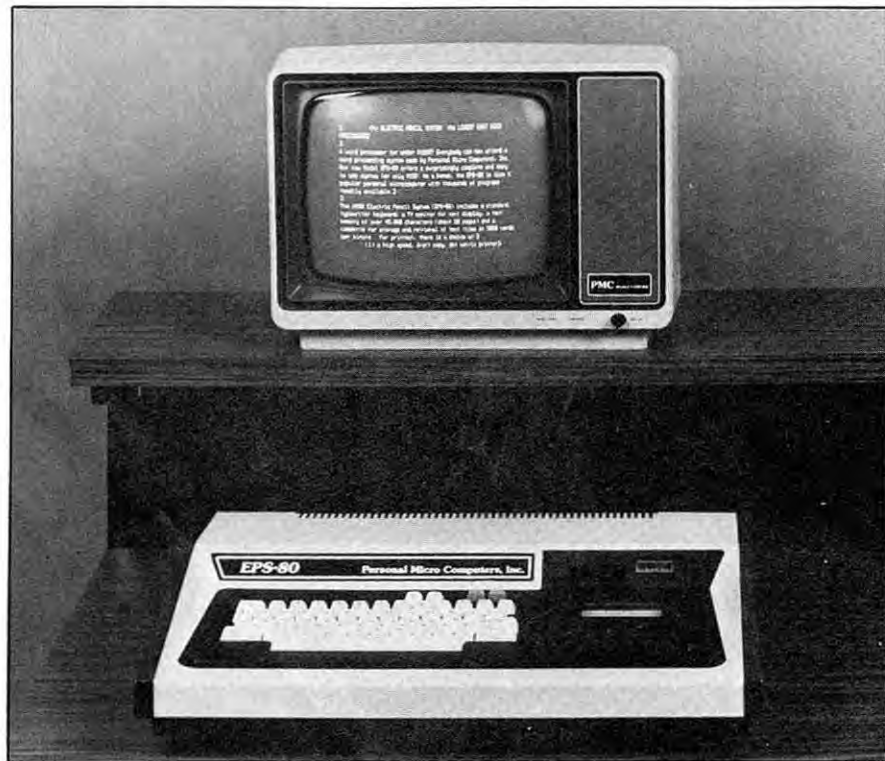
The Electric Pencil Word Processing System, the EPS-80, contains a PMC-80 computer with standard keyboard, green phosphor television monitor, a text memory of over 45,000 characters (about 20 pages), and a built-in high speed cassette deck for storage and retrieval of text files at 5000 words per minute. Two printers (the ETF-80 and the DMP-85) are available for an additional price of \$600.

The PMC-80 is software-compatible with the TRS-80 Model I, Level II. For more detailed information on this system contact Personal Micro Computers Inc., 475 Ellis St., Mountain View, CA 94043, (415) 962-0220.

Reader Service ✓591

Diascriptive Reading

Diascriptive Reading is a seven-disk, diagnostic, prescriptive, tutorial reading program. It is designed to aid the read-



The EPS-80

ing teacher, eliminate paper work and provide individualized instruction for each student.

The program covers six skill areas: vocabulary, sequence, main idea, fact/opinion, details and inference.

The program is available for the Model I, Level II or the Model III, Level II on cassette or disk for \$245. Contact Educational Activities Inc., Microcomputer Dept., Box 392, Freeport, NY 11520, (800) 645-3739, for additional information.

Reader Service ✓552

Radio Shack's New Pocket Computer And Peripherals

The PC-2 Pocket Computer (B 279,95 # 26-3601) is now available and can be outfitted with a variety of peripherals.

It features a Basic interpreter with 42 statements, 34 functions, and six commands; full string handling ability with 80-character string length and two-dimension arrays; 26-alphanumeric liquid crystal display with upper and lowercase characters; fully addressable seven by 156 dot matrix LCD graphics; 2640 byte expandable memory with plug-in RAM or ROM Memory Modules (4K, \$69.95); built-in real time quartz clock; and a 60 pin input/output interface connector.

The PC-2 Printer/Plotter and Dual Cassette Interface (\$239.95) provides four color graphics (red, blue, green and black) and stores and loads programs and data using one or two cassette recorders. The Printer Plotter adds 25 commands and statements to Pocket Computer Basic. The Dual Cassette Interface allows automatic program overlay, chaining and data storage without having to change tapes.

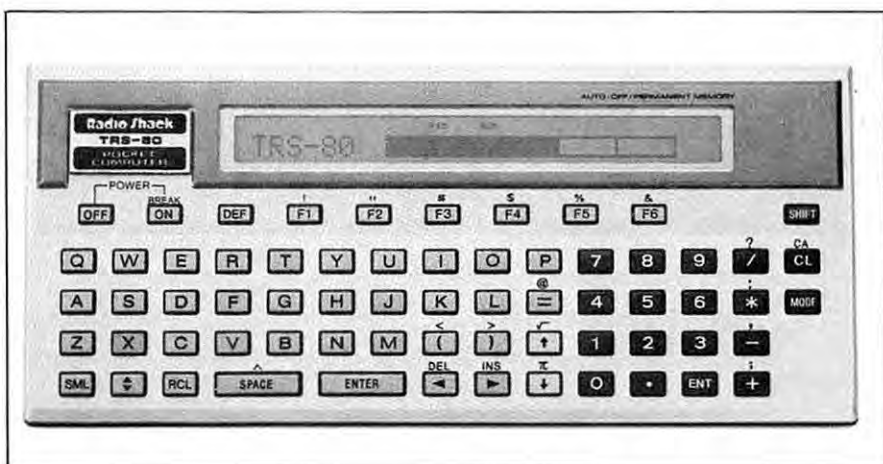
For more detailed information on the Pocket Computer and its peripherals contact your Radio Shack dealer.

Reader Service ✓587

The TRS-80 DT-1

The TRS-80 DT-1 is a video terminal suited for communication with the Model 16 Multi-Use Office System or with other host computers.

The DT-1 offers a non-volatile memory retaining the terminal configuration even with no power and no battery backup. It is completely code-compatible with four standard terminal protocols. It can emulate a Televideo 910, a Lear Siegler ADM-5, an ADDS 25 or a Hazeltine 1410



The PC-2 Pocket Computer

terminal. The 12-inch diagonal CRT displays 24 lines of 80 upper and lowercase characters per line. The terminal also offers dual-speed repeat, two printer ports, and special features.

Priced at \$699, the terminal is available from your Radio Shack dealer.

Reader Service ✓588

SORTOF

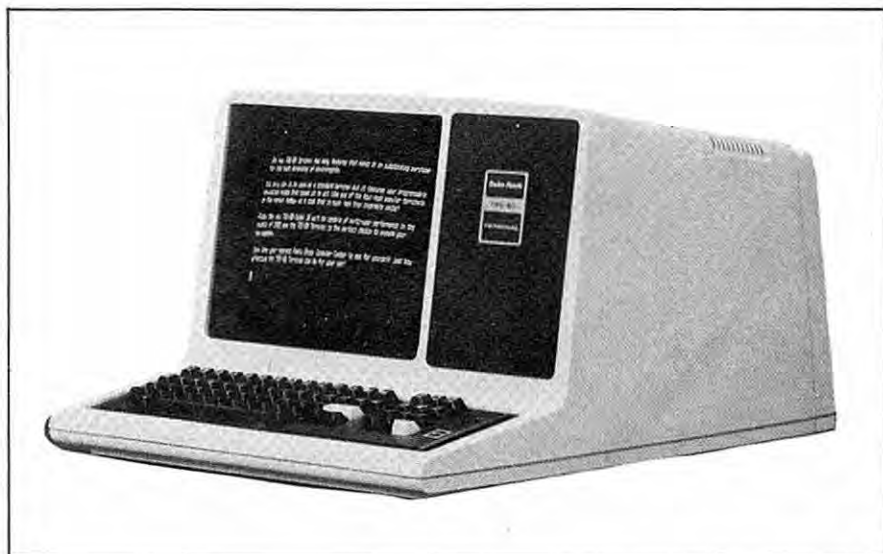
SORTOF is a program that sorts any list by the third letter of each item. For instance, the list "treat, dog, person, pocket, block" is sorted "pocket, treat, dog, block, person." An option allows you to print the list with the third letter first. The above list, for example, would be printed as "cketpo, eattr, gdo, ockbl,

rsonep." You can then do a second-level sort of this list: "cketpo, ockbl, gdo, rsonpe, eattr" (or "etpock, kbloc, ogd, onpers, ttrea"). Eventually, if you go through enough levels of sorts, you end up with the original list. The program lets you sort backwards, forwards, or both ways at the same time.

SORTOF is available on cassette only for 99 cents from Yet Another Software House, 9900 Crankemout Circle, Club Foot, MI 49035.

Simplify Business Modeling

Bisplan is designed to simplify business modeling. Its uses include: planning a new business endeavor, projecting the direction of an existing business, generat-



The TRS-80 DT-1

NEW PRODUCTS

ing depreciation schedules, providing proposal information for loan applications, and classroom use.

Once data is entered it may be reviewed, changed or ultimately used to produce four measures of the proposed business venture. The measures are: a cash flow analysis, a profit and loss statement, a balance sheet, and the initial investment required.

For additional information contact Mariah Computing, Box 513, Columbia, MO 65205. Bisplan costs \$20 and is available for the Model I and III with at least 32K. Reader Service ✓568

Check Register Accounting System

Maxi Cras, a personal accounting system for individual, family or small business use, is designed to eliminate costly data entry mistakes.

This disk-based system handles an unlimited number of checks and deposits each month. Up to 233 income and expense accounts are supported. Checks can either be written by hand or automatically.

Maxi Cras also organizes data from the check register and provides printed re-

ports and statements including: account distribution data, a printed check register, and account activity analyses. Maxi Cras interfaces easily with Visicalc and operates with the Model I or III with two disk drives and a printer.

Contact Adventure International, Box 3435, Longwood, FL 32750, (800) 327-7172. The System is priced at \$99.95.

Reader Service ✓ 563

Games for the Color Computer

Two new games are available for the Color Computer.

Mazerace is a board-type game involving both chance and strategy. The playing field is an 18 by 18 hexagon matrix, partially filled with obstacles. Mazerace, \$22.95 on disk and \$17.95 on cassette, uses high resolution graphics and requires joysticks and extended Basic.

Storm, a graphics arcade style game, features 135 levels of play, fast action and sound. It costs \$24.95 on cassette or \$29.95 on disk.

Both games are available from Computeware, 1472 Encinitas Blvd., Box 668, Encinitas, CA 92024, (714) 436-3512.

Reader Service ✓ 555

Pascal Compiler for CP/M

Alcor Pascal is a complete implementation of Jensen and Wirth standard Pascal, with over 20 language extensions. It generates reentrant ROMable code and can compile large programs (over 4000 lines) with limited memory (48K).

A full screen text editor is included with the compiler. Programs may be compiled into native code, interpreted P-code, or consist of mixtures of native code and interpreted code.

The linking loader supports separate compilation of modules and can create TRSDOS and CP/M command files. A runtime library of more than 20 routines provides access to the hardware.

The Compiler package retails for \$199 and the Advanced Development Package containing the p-code optimizer and native code generator is \$125. Contact Alcor Systems, 13534 Preston Rd., Suite 365, Dallas, TX 75240, 214-226-4476, for additional information.

Reader Service ✓ 580

GAGDOS

GAGDOS (Giggle and Guffaw Disk Operating System) is the perfect April Fools' gift for your TRS-80-owning friend. Just pop it into his disk drive when he's not looking, and watch the fun as it wipes out any other disk he happens to put in.

This DOS makes mincemeat out of most word processing programs, and takes accounting packages apart bit by bit. Guaranteed to turn him into a frenzied maniac as you roll on the floor with laughter. GAGDOS comes with fake labels for several popular disk operating systems.

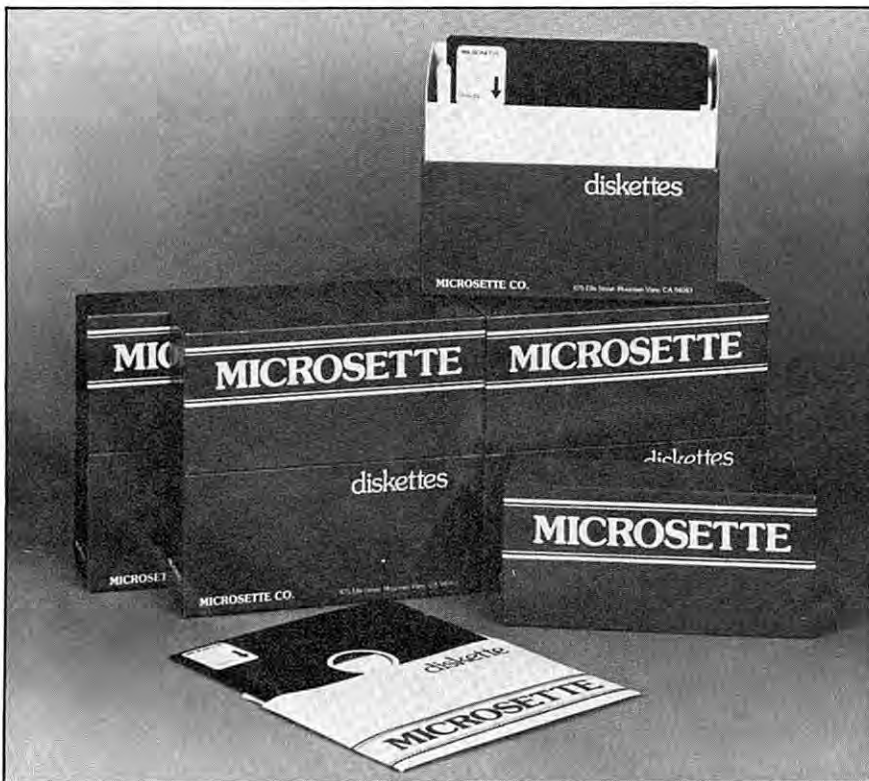
GAGDOS costs \$599 and is available from Slap-Happy Sam's Snickering Software Emporium, 1802 Naynay Way, Salt Lake City, UT 84101.

Microsette Mini-Disks

Microsette MD-5, 5¼-inch disks are certified error-free on one side. They are for all soft-sectored, single or double density applications. The burnished disk surface ensures longer head life and durability. The disks feature a reinforced hub.

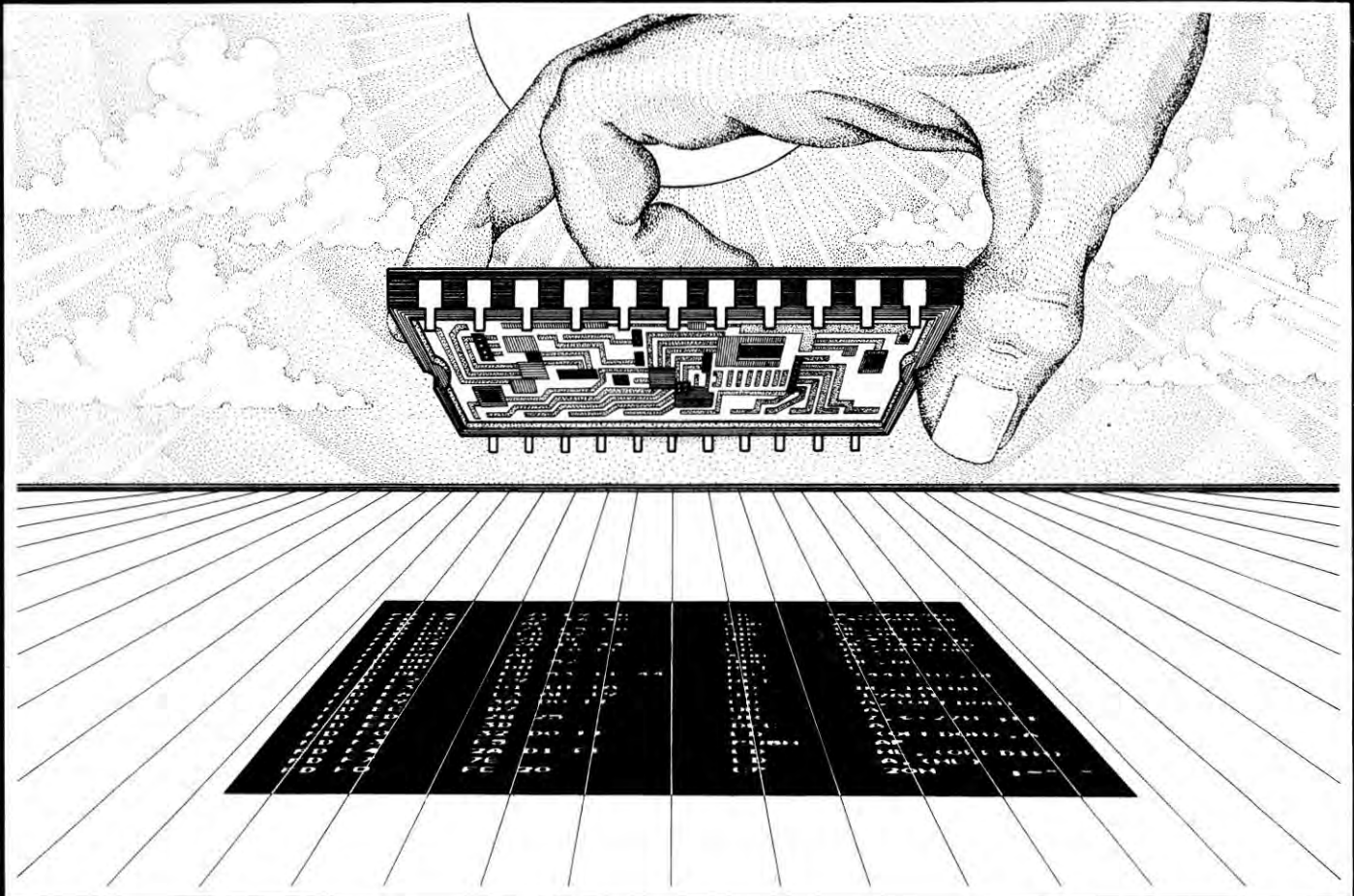
The MD-5 disks are sold in units of 10 (\$2.50 apiece) or 50 (\$2.20 apiece). For further information contact Microsette Company, 475 Ellis St., Mountain View, CA 94043, (415) 968-1604.

Reader Service ✓ 560



Microsette Mini-Disks

MACRO-MONITOR ...THE SHADOW



What secrets lurk deep within the heart of your microprocessor? Only THE SHADOW knows. Advanced Operating Systems shines the light on the intricate workings of your *TRS-80 Model I or Model III microcomputer. MACRO-MONITOR, THE SHADOW, is a machine language program by Jake Commander which allows you to disassemble and examine program instructions from any part of your computer's memory. THE SHADOW even enables you to single-step through your computer's ROM.

With THE SHADOW, you can load a machine language program from disk or tape and

begin execution at a user-specified breakpoint, one instruction at a time, with a user-defined time delay between instructions. It will disassemble each instruction as it is being executed and route it along with all current register values to your video screen or printer. The user may also search through memory for a specific character string (ASCII or Hex) up to 16 bytes in length.

THE SHADOW permits machine language programs to be relocated within memory with all internal calls and jumps changed to execute in the new location. The program also provides a visual display of tape LOADS and SAVES.

THE SHADOW is completely user-relocatable in RAM making it an extremely valuable tool for all programmers.

Now available at your local software retailer, or call (800) 348-8558 to order. (Indiana residents, call (219) 879-4693) MasterCard and VISA accepted.

MODEL I TAPE	\$54.95
MODEL I DISK	\$59.95
MODEL III DISK	\$69.95

**ADVANCED
OPERATING
SYSTEMS**

450 St. John Road
Michigan City, IN 46360

280

**“You Don't Have to be
to Give Your TRS-80
Just Pick Up**



**WINCHESTER
TRS**

ADD 6.3 MEG TO 38

Integral Winchester Business
System includes: 48K MODEL III,
DOSPLUS DISK III™

6.3 MEG HARD DISK (internal). **\$4995**

6.3 MEGABYTE WINCHESTER
(external) HARD DISK SUBSYSTEM
With Chassis, PS, DOSPLUS **\$3195**

9.5 MEG **\$3695**

19.0 MEG **\$4295**



Warren G. Rosenkranz
President VR Data Corporation
since 1972



VR data

777 Henderson Boulevard N-6
Folcroft, PA 19032 (215) 461-5300

**Call Toll-Free
800-345-8102
in PA 215-461-5300**

**ALL VR DATA PRODUCTS CARRY A 120-DAY
WARRANTY INCLUDING PARTS & LABOR**

Published prices reflect cash discount. All prices are subject to
change without notice. TRS-80 and TRSDOS are trademarks of
Tandy Corp. DISK III is a trademark of VR Data Corp.

8:30AM-7PM E.S.T. Mon.-Fri., Sat. 10AM-3PM
CABLE "VRDATA" TELEX 845-124

Phone or write to order direct, or for name of your
nearest dealer.

If you don't see it advertised call us and ask for it.

a Genius, or Croesus, Additional Capabilities, the Phone."

WARREN ROSENKRANZ,
PRESIDENT OF VR DATA

HARD DISK FOR -80™

MEG TO YOUR TRS-80

VR DATA WINCHESTER HD SUBSYSTEM FEATURES:

- TRSDOS Compatible Operating System
- State-of-the-Art Circuitry
- Full Calibration, Test and Burn-in
- Up to 4 drive configuration
- Heavy duty Power supplies
- Warranty—120 days—parts & labor
- 115/230 VAC, 50/60 Hz.

Optional Mod III Configurations:

9.5 Meg HD (internal)	add \$500.00
19.0 Meg HD (internal)	add \$1100.00
80 tk 1 side floppy	add \$120.00
80 tk 2 side floppy	add \$240.00

Optional Winchester Subsystem Configurations:

2 x 6.3 meg drives	\$4695
2 x 9.5 meg drives	\$5395
2 x 19.0 meg drives	\$6795

MODEL III COMMUNICATIONS

HERE NOW:

VR-RS232C \$90.00
Direct Replacement For
R.S. RS232, Fully Tested
& Burned-In, Easy
Installation, 120 Day
Warranty, Programmable
Pincut, Prototype Area

COMING SOON:

D-CON \$299
Integral Modem,
NEEDS NO RS232—Direct
Connect, Programmable
Dialing, AUTO
ANSWER/ORIGINATE,
Easy Installation

DISK III 100% Compatible Model III Disks

Complete Business System includes:
48K TRS-80™ Model III, Disk III™-2
Drive System, TRSDOS
and Manual

\$1882

DISK III Single drive assy. ¹	\$599
DISK III Two drive assy.	\$864.00
DISK III Assy. w/out drives	\$435.00
TRSDOS™ & Manual	\$21.90
DOSPLUS	\$149.00
LDOS	\$129.00
External drives (3&4)	\$275.00 ea.

¹DISK III single drive assembly includes: one 40 track 5¼" double density drive, power supply, controller, mounting hardware, applicable cables, and manual.

IMMEDIATE DELIVERY COMPARE AND SAVE VR Data's DISK III features:

- Completely compatible with TRSDOS
- State-of-the-art circuitry
- Fully tested, calibrated & burned-in
- Up to 4 drive configuration
- Warranty 120 days—100% parts and labor
- Installation with simple hand tools
- Optional 80 tk and 2 sided drives
- READ 40—Pgm. to read 40 tk. Diskettes on 80 tk. Drives \$25.00

MODEL 1/111

**External Drive
w/PS & ENC \$275**

Fully Compatible, 120 day warranty,
Easy installation.
80 tk or 2 sided **\$419.00**
80 tk & 2 sided **\$549.00**

Other Products

DISK & MYSTERIES BOOK	\$22.50
BASIC & MYSTERIES BOOK	29.95
NEC Ribbons (min. 6)	5.95
C Itoh Ribbons	5.95
Epson Ribbons—MX-80	12.50
LDOS Operating System	129.00
DOSPLUS Operating System	149.00

Peripherals

Epson MX-80 w/GRAPHTRAX	\$595.00
Epson MX-80FT	615.00
Epson MX-100	800.00
Centronics 739	700.00
CENTRONICS 704	1749.00
C ITOH F-10 40 cps	1695.00
Tractor	200.00
Printer cables	25.00
LEXICON MODEM	125.00

Forth for the Color Computer

ColorForth is a version of fig-Forth for use on the Color Computer.

ColorForth does not require Extended Basic but does require 16K. This software includes an editor and CSAVEM command, useful for those who do not have Extended Basic. (Note: Extended Basic is required for the disk version.)

A cassette and disk version are supplied for \$49.95. Contact Armadillo Int'l Software, Box 7661, Austin, TX 78712, (512) 459-7325, for more information.

Reader Service ✓ 565

Add I/O Capability To the Color Computer

The Color Port plug-in cartridge adds I/O capability to the Color Computer.

The unit adds two fully programmable eight-bit bidirectional ports with full handshaking. The unit can be configured by the user for interfacing to peripherals. Full interrupt capability is supported, and important computer voltage and logic control lines are brought out to the standard edge connector.

A socket in the cartridge allows either 2K bytes of RAM or of EPROM, allowing software for the control of I/O operations to be stored separately from the main user memory space. Provision is also made for selection of both autostart of the memory in the cartridge and of synchronous reset of the cartridge and the computer.

The Color Port Cartridge sells without memory for \$129.95. 2K RAM chips are available for \$19.95 each. 2K EPROMs are available for \$12.95. For additional information contact Maple Leaf Systems, Box 2190, Station C, Downsview, Ontario, Canada M2N-2S9.

Reader Service ✓ 553

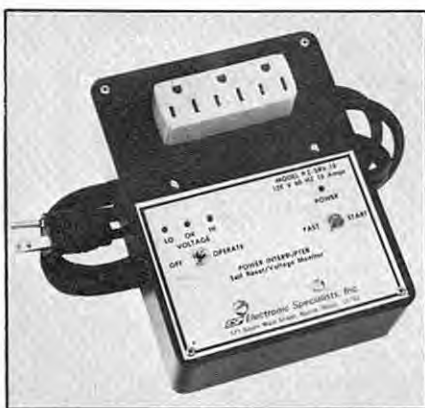
The Gobbler Challenge

The Gobbler is a fast moving, arcade-style game designed for one or two players.

The game features beginner-to-expert skill levels and is written in machine language for fast execution. Sound is also provided.

The Gobbler is available for the Model I and III for \$16.95 cassette and \$19.95 disk from Superior Software Inc., Box 11676, Kansas City, MI 64138.

Reader Service ✓ 566



Power Line Interrupter

Self-Reset Power Line Interrupter

The Power Interrupter disconnects ac power from controlled apparatus. A four-minute time delay, followed by automatic self-reset, helps avoid wide voltage fluctuations associated with power line malfunctions. An optional line voltage monitor is available.

Connected to the ac line with a standard three-prong plug, the Self-Reset Power Interrupter can accommodate a 15 amp resistive load or a 10 amp inductive load.

The Model PI-SR-15 Self-Reset Interrupter is priced at \$185.95 and the Model PI-SRV-15 Self-Reset and Voltage Monitor Interrupter at \$205.95.

Both are available from Electronic Specialists Inc., 171 South Main Street, Box 389, Natick, MA. 01760, (617) 655-1532.

Reader Service ✓ 575



Desk Console for the Pocket Computer

Logo for the Dead

Logo for the Dead lets you continue your computing activities from the Other Side.

The package includes a unique telecommunications feature which lets you turn your TRS-80 into an electronic Ouija board. Then, using Logo's graphics capabilities, you can work with a friend or relative on this side of the Great Beyond to write programs. The software requires that your body be hardwired to an analog-to-digital converter, which is then interfaced to your computer. A special Terminal (very terminal) program lets you talk with the users through Deadnet, an EBBS (Ectoplasmic Bulletin Board System).

Logo for the Dead is available for 10 percent of your estate from NecroSoft Inc., 6502 Charnelhouse Blvd., Cleveland, OH 44101.

Desk Console

A Desk Console is now available for the Pocket Computer and SHARP PC-1211 with printer.

Made of black plastic, the console measures 8.5-inches by 16-inches by 2.75-inches. It has room for three cassette boxes, a full set of 3 by 5 cards, two paper rolls, a spare printer ribbon and the interface cable.

The Desk Console sells for \$19.95. Interested persons should contact Fox/Walker, 4650 Arrow Highway Building G-17, Montclair, CA 91763, (714) 621-3400.

Reader Service ✓ 573

Color Computer Smart Terminal Software

Colorterm uses the Color Computer's high resolution graphics to provide a 51 or 64 column by 21 line display, and lower-case with descenders.

It operates as a terminal at 300 or 110 baud, has on-line scrolling, user-programmable keys, a type-a-matic feature and four-way cursor control. It stores host input in a buffer that can be examined and saved to tape, on or off line. The buffer can also be printed out. Any data format may be used; macro buffers provide easy sending of often-used messages with Colorterm. Data can be encoded; user files can be uploaded to the host; and a window of any size can be preserved while new material scrolls through the remainder of the screen. The program can even rewrite some of its own subroutines to operate independently in programs that run above 9168.

Cassette and manual cost \$34.95 from Martin Consulting, 94 Macalester Bay, Winnipeg, Manitoba R3T 2X5, Canada.

Reader Service ✓ 572

Improved Graphics Resolution

The Grafyx Solution is an add-on circuit board containing 12,288 bytes of additional read/write memory that does not conflict with the TRS-80 address space. Upgrading requires no soldering.

The Solution gives the Model III a screen resolution of 512 by 192 — 98,304

individually accessible points. Alternate resolutions (256 by 192, 128 by 192 or 128 by 96) are also possible.

The included graphics package allows you to set and reset points, lines, rectangles, and to complement or clear the screen with simple Basic commands. In addition to a number of demonstration programs, an 80-character display for business forms and word processing is possible with the supplied Column80 program. The board comes with software to save or load a graphics screen and to send a high resolution graphics screen to a printer with graphics capabilities.

For additional information contact Micro-Labs Inc., 902 Pinecrest, Richardson, TX 75080, (214) 235-0915. The Grafyx Solution is priced at \$299.95.

Reader Service ✓ 559

The LemonAid Loader

The LemonAid Loader, for the Model I, compresses, peaks and shapes cassette output to reduce loading errors due to noise or tape variations, without critical CTR volume settings.

The loader plugs between the cassette recorder and the computer, and works on both self-saved, and prerecorded tapes. It was especially developed for use with the Radio Shack CTR-80 and 80A tape recorders and like recorders. A speaker or earphone can be plugged in for audio monitoring of saves and loads also.

Priced at \$12.99, the loader is available from Lemons Tech Services, 325 North Highway 65, Buffalo, MO 65622.

Reader Service ✓ 574

Extra Cash With Your TRS-80

VisiCrook is a general accounting package that automatically rakes five percent off your company's gross sales and then juggles the books for you. It includes a special business planning program that gives you a variety of possible scenarios based on factors you control—kick-back schemes, blackmail income, bribery expenses and payoffs to government officials. An option for those subscribing to electronic banking services lets you launder money through selected banks in Mexico, Argentina and Switzerland. Special access codes make this package ideal for accountants in large corporations.

VisiCrook, tested by a panel of former IRS agents, is guaranteed to be foolproof. It can be used by a variety of businesses, from pharmacies to construction firms to porn shops, and will be delivered in a brown paper sack on the street corner of your choice.

VisiCrook costs \$4.95 and is available from Covert Software, 8085 E. Lightfinger Drive, Jersey City, NJ 07303.

Silly Syntax A Game with a Twist

Silly Syntax is written for the Color Computer with 16K and Extended Basic.

This menu-driven game, depending upon which cassette is loaded, can be an educational family game or a unique adult entertainment game. Topics currently available are Fairy tales, Science Fiction and Adventure, Current Events, Sing-Along, X-Rated and Gothic Romance.

For information contact Sugar Software, 2153 Leah Lane, Reynoldsburg, OH 43068, (614) 861-0565.

Reader Service ✓ 567

Waterbill

Waterbill is a complete billing/accounts receivable program designed especially for small to medium sized water companies.

The program generates bills based on meter-reading entries for each account, in any of ten different rate schedules for different types of water, sewer and special uses. Also included are routines to print late statements, account listings (alphabetically or numerically), summaries of water and sewer usage by rate types, delinquent cut-off lists, and a complete



The Grafyx Solution

NEW PRODUCTS

audit trail of all transactions.

The system requires a Model II and a line printer capable of condensed print. Up to 4000 accounts can be stored on four disk drives. Prices start at \$1500.

For further information contact Computer Sales and Service Co., Radio Shack Dealer F-410, 211 W. Main St., Dillon, SC 29536, (803) 774-6903.

Reader Service ✓ 577

Tips and Tricks For the Programmer

101 Color Computer Programming Tips and Tricks is a collection of useful, practical and efficient programming techniques and shortcuts.

Each of the 101 tips and tricks features a complete ready-to-run program. Functions and statements in both Color Basic and Extended Color Basic are included.

This 128-page paperback book is available from ARCsoft Publishers, Box 132, Woodsboro, MD 21798, (301) 845-8856. It is priced at \$7.95.

Reader Service ✓ 570

Dual-Headed Drives

The Dual Sided Disk Kit allows dual-headed drives to be used on the Model I with no drive modifications.

A single directory is used for both sides of a disk, and files can overflow from one side to the other. Single and dual-headed drives of any track size can be mixed.

The kit consists of a special three-drive disk cable plus a patched version of TRSDOS 2.3 or NEWDOS 2.1. Disks created on the modified system are fully compatible with TRSDOS and NEWDOS.

The kit costs \$79.95 and is available from Computer Design Labs, Box 219, Garden Grove, CA 92642.

Reader Service ✓ 582

Disk Doubler II

The Disk Doubler II kit converts eight-inch single-sided disks for both two-sided and double-sided use.

Using the tools of the kit, you can quickly measure, mark and punch new openings in the right places.

The Doubler II is available for \$12.95 from Jim Quinn Computer Division, 9120 Clearlake Way, Lakeside, CA 92040, (714) 561-2540.

Reader Service ✓ 558

Plug-Compatible Serial Interface

The VR-RS232C is a plug-compatible serial interface for the Model III.

It features: a programmable baud rate generator from 50-19200 baud; fully interrupt driven; programmable pin out to eliminate special cables (modem output standard); reverse polarity protection; programmable UART; and user prototyping area for special applications (such as 20ma current loop, relays or lamp drivers).

The VR-RS232C is compatible physical-

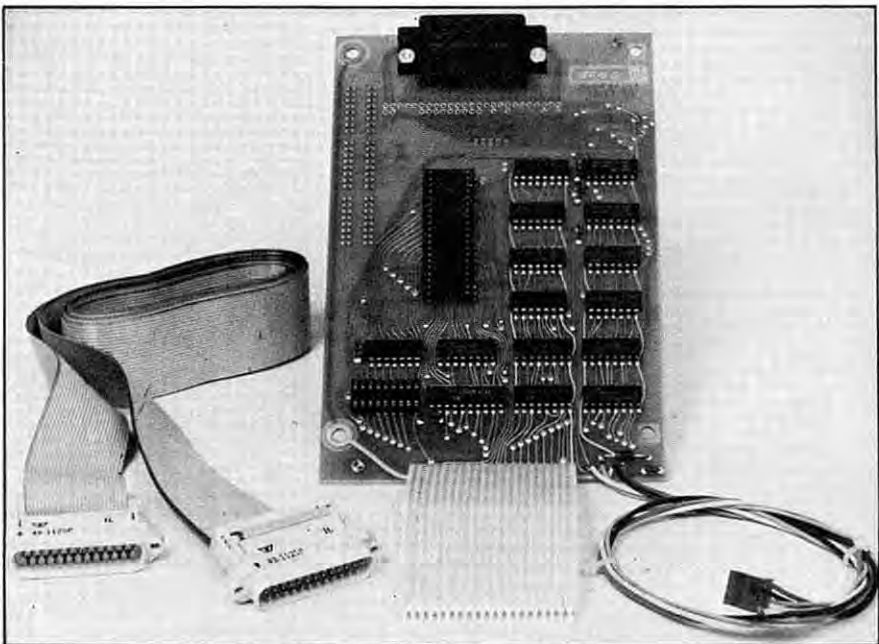
and help, the computer helps you solve the cube.

This program is priced at \$14.95 and is available from H & S Computer Company, 1024 Alamosa Drive, Claremont, CA 91711, (714) 621-7747.

Reader Service ✓ 554

Marking Labels

LABELMAKR provides a useful utility for the home or office by turning mailing labels into marking labels.



The VR-RS232C Serial Interface

ly and electrically and comes standard with a five foot modem cable. Internal installation can be made with simple hand tools.

Priced at \$75, the interface is available from the VR Data Corporation, 777 Henderson Blvd. N-6, Folcroft, PA 19032, (215) 461-5300.

Reader Service ✓ 576

Coaches You on Rubic's Cube

The Rubic Cube Coach Program solves the cube and helps you do the same.

The program has four modes of operation: competition, try to beat the computer in solving the cube; experiment, practice your techniques in solving the cube; timing, watch the computer solve the cube;

This easily-used program prints professional looking labels quickly. The instruction manual's start-up procedure includes a simple method of calibrating the MX-80 printer for precise loading of label forms. During this time (less than a minute) the program boots, loads, and is ready for operator entry. The program offers 16 different label formats.

LABELMAKR, priced at \$19.50, is available from the Electronic Time Service Center, Box 651, 35026-A, Turtle Trail A, Willoughby, OH 44094, (216) 946-8479.

Reader Service ✓ 551

Draw Objects in Three Dimensions

The 3D Drawing Board is a tool for education, entertainment and various pro-

DUNZHIN

by Randall Don Masteller

Dunzhin is Med Systems' first adventure/role playing game. Written by Randall Masteller, author of several non-computer D&D-type games, it is the first adventure/role playing game to combine fast, "from above" graphics, FAST response time, and COMPLETE computer implementation. There are no "rule books" to consult, and no waiting for the computer to "think".

Dunzhin places you in a huge dungeon of many levels. There are many treasures, but only one, deep in a hidden chamber, will win the game for you. Every game is different, but you can save a game in progress. You can also save the character you become as you gain experience in battling the goblins and demons waiting around every corner.



TRS-80 MODEL I 48K DISKETTE: \$29.95

TRS-80 MODEL III 48K DISKETTE: \$29.95

MED SYSTEMS SOFTWARE • P.O. BOX 3558 • CHAPEL HILL, NC 27514
TO ORDER, CALL: 1-800-334-5470

83

jects which require three-dimensional drawings.

The program helps you draw objects, rotate them, and change their size, elevation, and distance. The drawings can be saved to tape or disk for future use.

The drawing board is priced at \$24.95 for cassette and \$29.95 for disk and can be purchased from Computerware, 1472 Encinitas Blvd., Box 668, Encinitas, CA 92024, (714) 436-3512.

Reader Service ✓ 556

Stationary for Micros

Clean Edge is letterhead, tractor-feed stationary in continuous form style. The easily removed tractor edges leave no unsightly pin holes.

The paper is available in several standard sizes and styles, with printing ranging from black to multi-color. Special papers, embossing, and other non-standards are also available.

For additional information contact Rabco Enterprises, 806 Freedom Circle, Harleysville, PA 19438, (215) 368-4866.

Reader Service ✓ 562

Signing Tutor

Learn to communicate with the hearing-impaired with this program for the Model I and III.

This learning aid teaches the one hand

sign-language alphabet (finger spelling) using graphic pictures for each letter. This program allows you to type in any phrase up to 255 characters long. The letter being signed will be highlighted and repeated as many times as you wish.

This Signing Tutorial is available on cassette only for \$19.95 from En-Joy Computer Programs, Box 1535, Goleta, CA 93116.

Reader Service ✓ 585

TCOM Plus

TCOM Plus is an enhanced version of the Ten Commandments data base. You can modify any of the original ten and add up to 200 of your own, customizing the Commandments to your own needs. Easy-to-use functions offer versatility not possible with stone tablets.

TCOM Plus is written in Sinai Basic and runs with GODDOS version II:17. Contact Moses' Micro Warehouse, 68000 Main St., Egypt, PA 18032.

Protect Sensitive Electronic Equipment

The LF2 and LF6 Line Filters protect electronic equipment from power line transient damage and audio frequency interference.

Both filters offer common mode and dif-

ferential mode surge suppression for power line spikes. RF interference is suppressed using both inductive and capacitive components. The LF2 (\$39.95) has a single duplex outlet while the LF6 (\$59.95) has three duplex outlets, a switch and indicator lamp.

The filters are available from R.L. Drake Company, 540 Richard Street, Miamisburg, OH 45342, (513) 866-2421.

Reader Service ✓ 550

Circuit Analysis Program

AC Analysis analyzes ac analog circuits and it performs a full nodal analysis of ac linear circuits, including frequency response and all internal voltages. It is intended to provide an alternative to breadboarding and extensive measurements, for the electronic engineer.

This program can analyze circuits of up to 64 nodes and 127 branches in 48K systems. It is written in machine language and runs in 16K memory with reduced circuit size (31 nodes).

Larger circuits can be broken up into stages that are later linked together. Using this method, circuits of infinite size can be analyzed and compared by the computer. The program automatically performs a full worst-case analysis. Both phase and amplitude are tested and the worst case flags are saved for later use.

The program requires a Model I or III with at least 16K RAM. Available in disk or cassette for \$75 from Tatum Labs, Box 722, Hawleyville, CT 06440, (203) 426-2184.

Reader Service ✓ 581

Farming Software

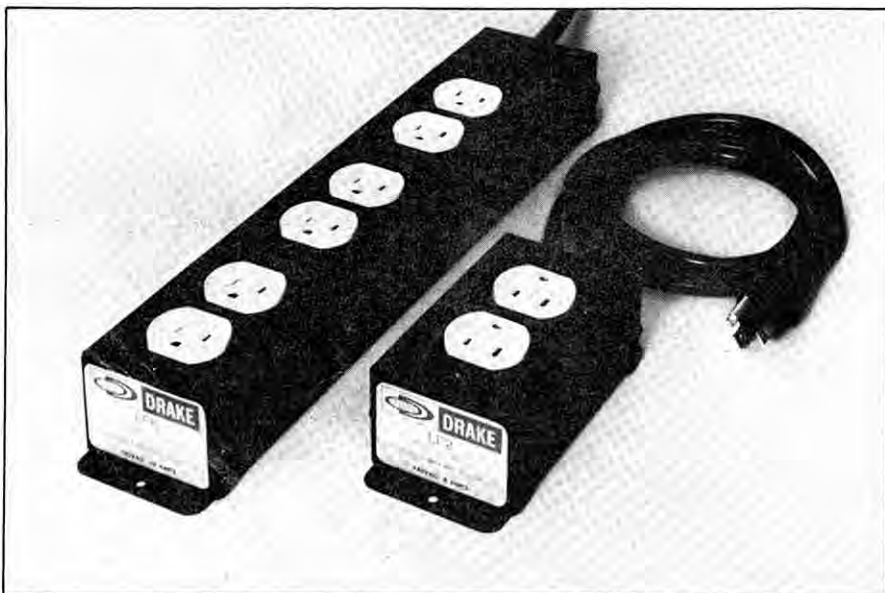
Farmkeep is a multi-purpose farm record-keeping software system.

Following the simple entry of the information contained on check stubs or invoices, Farmkeep automatically keeps track of all the pertinent records a typical farm requires, including fuel, animals, labor, resale items, capital items, patronage records and bank account balances.

Among the reports generated by Farmkeep are: 1040F, 4797, Income and Expense Summary, Check-Writing, Account Audits.

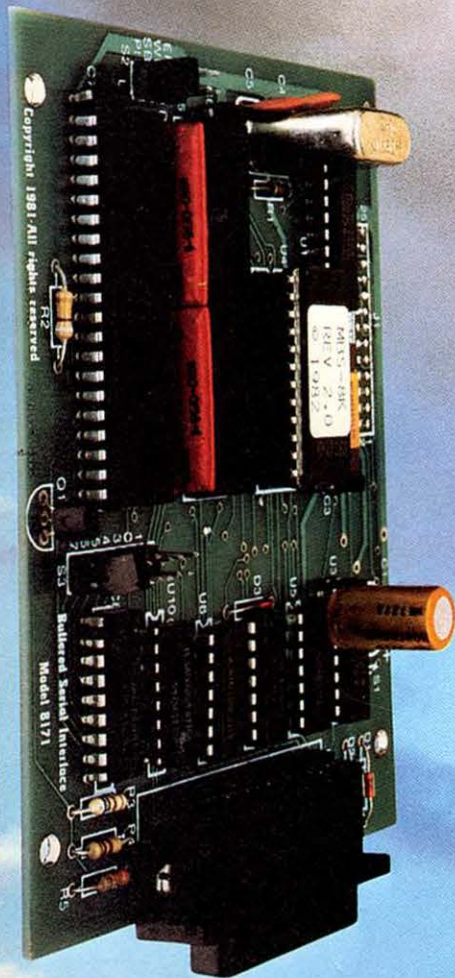
Farmkeep requires a 64K computer with 500K of disk storage. For more information contact: Specialized Business Systems Company, 10-11 North Galena, Freeport, IL 61032, (815) 235-1945.

Reader Service ✓ 578



The LF2 and LF6 Line Filters

HOW TO USE YOUR EPSON WITHOUT WASTING COMPUTER TIME:



Your computer is capable of sending data at thousands of characters per second but the Epson can only print 80 characters per second.

This means your computer is forced to wait for the printer to finish one line before it can send the next. A waste of valuable time.

THE NEW MICROBUFFER™ ACCEPTS DATA AS FAST AS YOUR COMPUTER CAN SEND IT.

Microbuffer stores the data in its own memory buffer and then takes control of the printer. This frees your computer for more productive functions.

PARALLEL OR SERIAL.

Microbuffer model MBP-16K is a Centronics-compatible parallel interface with 16,384 bytes of on-board RAM for data buffering.

The MBS-8K is a full-featured RS-232C serial interface with both hardware and software (X-On/X-Off) handshaking, baud rates from 300 to 19,000 and an 8,192 byte RAM buffer.

SIMPLY PLUG IT IN.

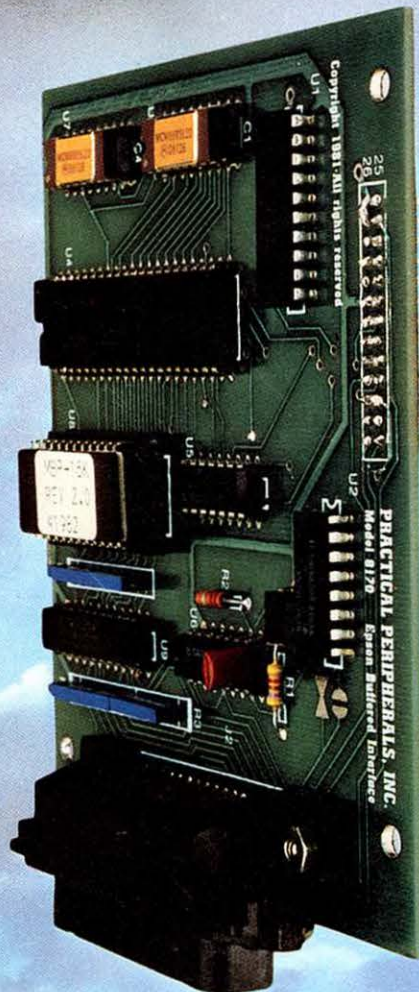
Either model fits the existing auxiliary interface connector inside the Epson MX-80, MX-80 F/T or MX-100 without modification, and is compatible with standard Epson cables and printer control software, including GRAFTRAX-80.

JUST \$159.00*

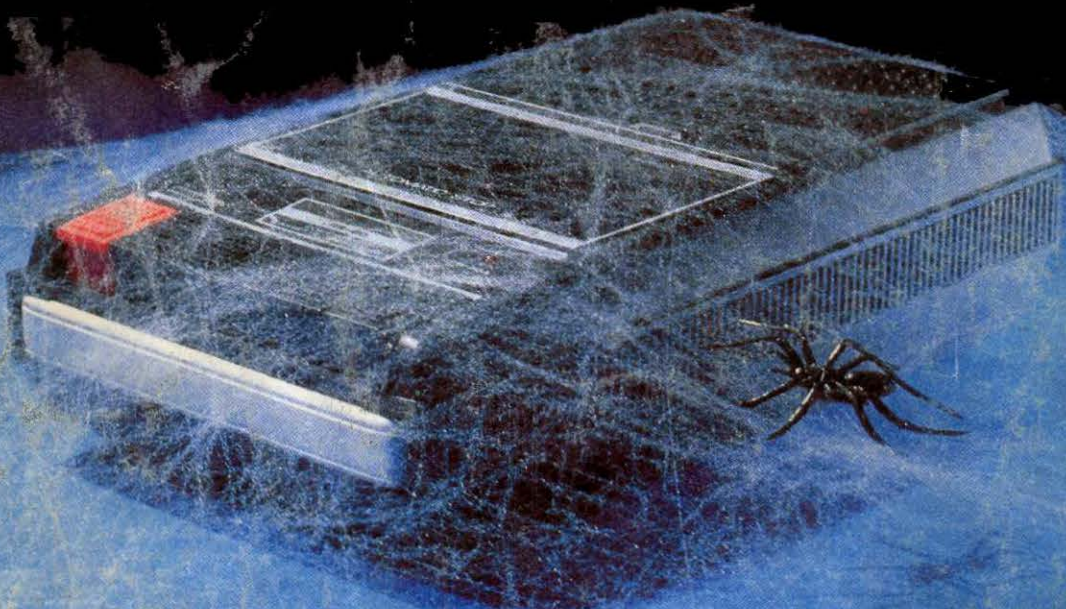
When you think how much time Microbuffer will save, can you afford *not* to have one? Call us for your nearest dealer.

PRACTICAL PERIPHERALS, INC.

31245 LA BAYA DRIVE, WESTLAKE VILLAGE, CA 91362 • (213) 991-8200



TIRED OF WAITING?



Frustrating isn't it! No matter how much you speed up your program it still seems to take forever to save data onto a cassette. Wouldn't it be great if someone could design a mass storage system with the speed of a disk, but at half the cost? Exatron did, the *Exatron Stringy Floppy (ESF)*.

Totally self-contained, the ESF is an extremely fast, reliable, and economical alternative to cassette or disk storage of programs or data. All of the ESF's operations are under the computer's control, with no buttons, switches, knobs or levers to adjust or forget.

The ESF uses a miniature tape cartridge, about the size of a business card, called a wafer. The transport mechanism uses a direct drive motor with only one moving part. Designed to read and write

digital data only, the ESF suffers from none of the drawbacks of cassettes - without the expense of disks.

Several versions of the ESF are available, for the *TRS-80*, *Apple*, *PET*, *OSI* and an *RS 232* unit. Even the slowest of the units is 15 times faster than a cassette, and all are as reliable as disk drives - in fact a lot of users say they are *more* reliable!



excellence in electronics

exatron

To get further information about the ESF give Exatron a call on their Hot Line 800-538 8559 (inside California 408-737 7111).

If you can't wait any longer then take advantage of their 30 day money-back guarantee, you've nothing to lose but time!

181 Commercial Street
Sunnyvale, CA 94086

