

APRIL 1982
ISSUE NUMBER 44

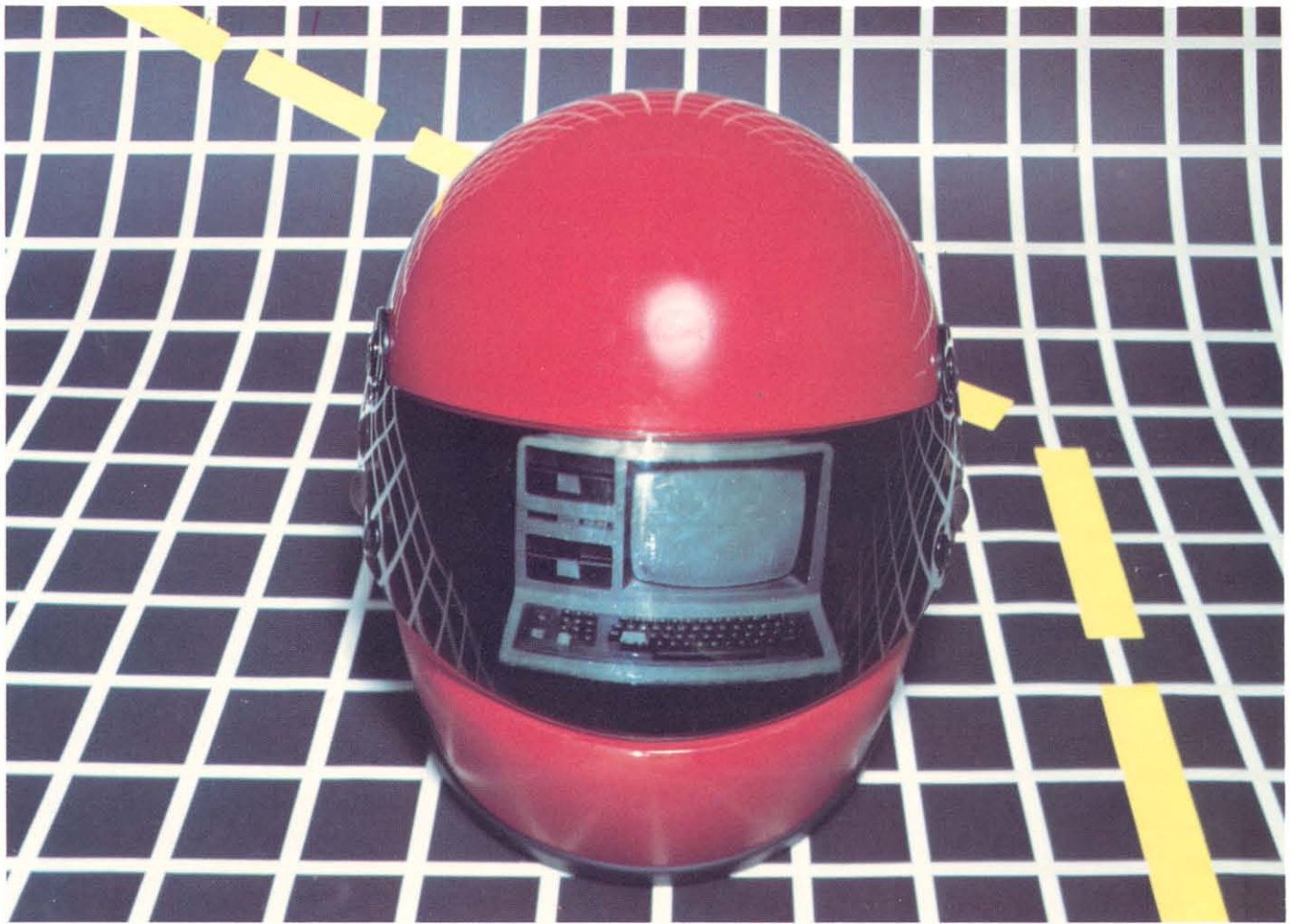
PRICE U.S. \$2.95
£1.50

THE ORIGINAL MAGAZINE FOR
TRS-80™* OWNERS

H & E COMPUTRONICS INC.

*TRS-80™ IS A TRADEMARK OF TANDY CORPORATION





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 \$2995 TAKE YOUR 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
Hollywood, FL 33023

CALL TOLL FREE (Outside of Fla.) 1-800-327-8724 ext. 197
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 inquiries invited

PUBLISHER

Howard Y. Gosman

BUSINESS MANAGER

Steven M. Kahan

EDITOR-IN-CHIEF

Hubert S. Howe, Jr.

BUSINESS EDITOR

Peter Shenkin

MANAGING EDITOR

Martin Leffler

CONTRIBUTING EDITORS

Robert M. Richardson

Joseph Rosenman

Gordon Speer

Sherry M. Taylor

A. A. Wicks

ADVERTISING DIRECTOR

Kevin Rushalko

SALES MANAGER

Stacy Ann Allen

ART DIRECTOR

Edmund Khaleel

QUALITY CONTROL

Harvey Cohen

OFFICE MANAGER

Beatrice Kahn

SOFTWARE MANAGER

Darlene Bell

CUSTOMER SERVICE

Robert Williams

INVENTORY CONTROL

Michael Bernstein

SHIPPING MANAGER

Joan Marchick

PRODUCT DEVELOPMENT

Richard Kaplan

PRODUCTION

Adele Damiano

Louise Ann Kerins

Anna Mistrulli

Sheryl Streim

APRIL 1982

ISSUE NUMBER 44

CONTENTS

FEATURES

- 16 Program Previews..... A. A. Wicks
This month: Refware Thesaurus
- 18 Correction
to Chainer program, published February 1982
- 20 Beginner's Corner..... Sherry M. Taylor
Peripherals and Paraphernalia for the TRS-80 (Part IV)
- 22 Assembly Language for Rank Beginners (Part II) Joseph Rosenman
Decimal-Hexadecimal Conversions and Logical Operations
- 36 Practical Business Programs S. M. Zimmerman and L. M. Conrad
Check Writing on the TRS-80 Model I
- 44 Program Conversion (Part III)..... Richard Kaplan
Print @, Disk Access, and Graphics
- 48 Castle Adventure..... Dave Trapasso
A new Adventure game
- 53 Three BASIC Programs Gordon Speer
National Debt, Box, and Roots
- 55 Two Graphics programs..... Airdrie Ferguson
Graphic Combinations and The Ladder
- 58 The Model III—A Step Back for Mankind? M. Barlow
A personal viewpoint
- 60 April Fool John Warren
A program to drive people crazy!

REGULAR DEPARTMENTS

- 2 Bits and Pieces Howard Y. Gosman
Publisher's Remarks
- 4 The Crystal Ball
New Products from Radio Shack and others
- 10 Letters to the Editor
Readers tell us what's on their minds
- 26 Model III Corner Hubert S. Howe, Jr.
The TRS-80 Model III ROM
- 38 Color Computer Corner..... Joseph Rosenman
This month: Review of Technical Reference Manual
- 62 Questions and Answers Hubert S. Howe, Jr.
Answers to questions from readers
- 68 Advertising Directory

Entire contents copyright © 1982 by H & E Computronics, Inc. All rights reserved. Printed in the United States of America.

All correspondence should be addressed to The Editor, H & E Computronics, Inc., 50 North Pascack Road, Spring Valley, NY 10977. Unaccepted manuscripts will be returned if accompanied by sufficient first class postage. H & E Computronics will not be responsible for the return of unsolicited manuscripts, cassettes, floppy diskettes, program listings, etc. not submitted with a self-addressed, stamped envelope. Opinions expressed by the authors are not necessarily those of H & E Computronics, Inc.

Material appearing in the *H & E COMPUTRONICS MAGAZINE* may be reprinted without permission by school and college publications, personal computing club newsletters, and non-profit publications. Only original material may be reprinted; that is, you may not reprint a reprint. Each reprint must carry the following notice on the first page in 7-point or larger type:

Copyright © 1981 by H & E Computronics, Inc., 50 North Pascack Road, Spring Valley, NY 10977.

Please send us two copies of any publication that carries reprinted material.

ADVERTISING RATES

Contact Advertising Director for rate card. Special discounts available for multiple insertions.

Kevin Rushalko
(603) 547-2970

For information about receiving copies of *COMPUTRONICS* in quantity contact:

Worldwide Media Service, Inc.
386 Park Avenue South
New York, New York 10016
Attention: Sandra A. Joseph
Cable: WORLDMEDIA
Telex: 620430 (WUI)
Tel.: (212) 686-1520

U.S. and Canadian Distributor

H & E Computronics, Inc.
50 North Pascack Road
Spring Valley, New York 10977
Attention: Steven M. Kahan
Tel.: (914) 425-1535

BITS AND PIECES

Howard Y. Gosman

ON THE COVER: THE TRS-80 MEANS BUSINESS

The TRS-80 Means Business is the first book published just for TRS-80 MODEL II owners. The book is outstanding and an excellent introduction to the Model II computer. It is the first book to unscramble the use of the TRS-80 as a BUSINESS COMPUTER. Although written expressly for Model II owners, Model I and Model III owners interested in business applications will also benefit greatly from the book.

The TRS-80 Means Business is the first practical guide to small business computing that helps you and your TRS-80 really get down to business. What follows is a short review of **The TRS-80 Means Business** as described by the publisher:

"Here's the first introduction to computing with the best-selling TRS-80 Model II microcomputer that's geared

specifically for business users. With **The TRS-80 Means Business**, you can turn your **Radio Shack Model II** microcomputer into an efficient business problem-solver. This crystal-clear guide explains what your new computer can and cannot do. And it covers the nuts-and-bolts aspects of business computing—from selecting the right system down to simple programming in easy-to-use Level III BASIC.

You'll discover a wide variety of useful TRS-80 applications you can put to work right away. Case studies show you exactly how programs are implemented in solving everyday business problems. Many ready-to-run subroutines help you transform your TRS-80 into a powerful 'filing cabinet'—for example, to store payroll or customer accounts. You also get outlined examples of business programs that you can develop into fully operational software

continued on page 6

The H & E COMPUTRONICS MONTHLY NEWS MAGAZINE is published by H & E Computronics, Inc., 50 North Pascack Road, Spring Valley, New York 10977. *The H & E COMPUTRONICS MONTHLY NEWS MAGAZINE* is not sponsored, nor in any way officially sanctioned by Radio Shack, a division of Tandy Corporation.

The purpose of the *H & E COMPUTRONICS MONTHLY NEWS MAGAZINE* is to provide and exchange information related to the care, use, and application of the TRS-80™ computer systems. H & E COMPUTRONICS, Inc. does not take any financial responsibility for errors in published materials. Users are advised to check and edit vital programs carefully.

The H & E COMPUTRONICS MONTHLY NEWS MAGAZINE encourages comments, questions, and suggestions. H & E COMPUTRONICS will pay contributors for articles and programs published in the magazine.

The H & E COMPUTRONICS MONTHLY NEWS MAGAZINE is typeset by Photonics, Ltd., 188 Highwood Ave., Tenafly, NJ 07670, and is printed by Kay Offset Printing Service, Inc., 154 Grand Street, New York, NY 10013.

SUBSCRIPTION RATES

\$24 per year	SURFACE MAIL	U.S. Only
\$36 per year	FIRST CLASS MAIL	U.S.
\$36 per year	AIR MAIL	Canada and Mexico
\$48 per year	AIR MAIL	Outside U.S., Canada and Mexico
\$3 per copy	Single Copies	U.S., Canada and Mexico
\$4 per copy	Single Copies	Outside U.S., Canada and Mexico

Foreign subscriptions and sales should be remitted in U. S. funds drawn on a U.S. bank.

YOUR SUBSCRIPTION HAS EXPIRED IF . . . THE NUMBER ABOVE YOUR NAME AFTER THE DASH ON YOUR MAILING LABEL IS 44 (OR LESS). THE NUMBER FOLLOWING THE DASH TELLS YOU THE LAST ISSUE THAT YOU WILL RECEIVE. For example, if your subscription number is 16429-44, your subscription expires with this issue (issue #44).

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.

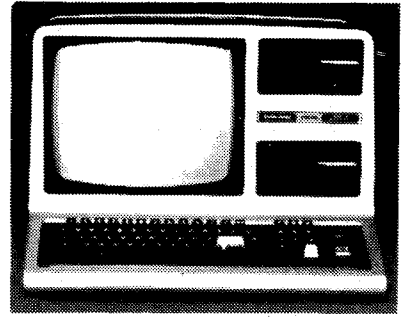
NEW LOWER PRICE \$59.95

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. (5¼" only)

Verbatim Datalife 5¼" 40 track	\$24.95
Apparat's No Name 5¼" 40 track	\$19.95
Verbatim Datalife 8" model II	\$39.95

PAPER

9½"x11" blank white, tractor feed paper, full box 15# or 20#	\$24.95
14½"x11" green bar, tractor feed paper, full box	\$34.95
3½"x15/16" tractor feed mailing labels	\$19.95

OTHER

5¼" plastic library case	\$ 1.95
8" plastic library case	\$ 4.95
5¼" Flip-sort	\$18.95
8" Flip-sort	\$31.95
16K memory kits	\$19.95

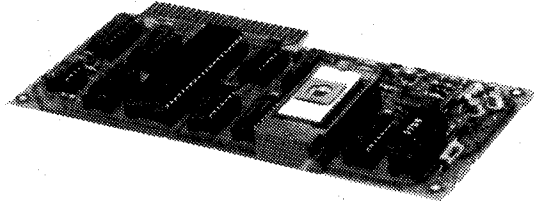
APPARAT'S PROM BLASTER

An eprom programmer for all 25 X X and 27 X X chips. TRS-80®

MOD I & III	\$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 Printers

MX-80 \$499.00

MX-80F/T \$575.00

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

FLEXTEXT/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
- Dual 40 or Single 80 track
- Dual sided 80 track
- **Special - 2 Dual sided 80's**

(ADDS ALMOST 1.5 MEGABYTES OF STORAGE TO A D. D. MOD I OR A MOD III)

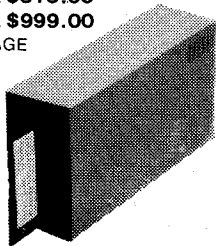
MODEL I DOUBLE DENSITY PACKAGE

Converts a standard TRS-80 Model I to Double Density.

Apparat Doubler & NEWDOS/80V 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
- Pagination 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 type="checkbox"/>
Error Handling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>



Apparat, Inc.

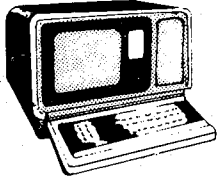
"On-going Support for Microcomputers"

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





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.

THE CRYSTAL BALL

(News and Rumors of Interest to TRS-80™ Owners)

1. **Commodore International**, the manufacturer of the **PET Computer**, may soon be releasing one of the hottest computer items ever. Commodore plans to be the first personal computer manufacturer to come out with a computer that can **emulate** other computers. This is the first attempt by a major manufacturer to create a universal computer. No doubt, it will not be the last.

What is meant by a computer that can emulate other computers? Basically, it means that the computer will function exactly like the machine it is trying to copy. The scheme that is envisioned will be a computer that has a multi-position switch on the outside. One setting will read something like "Commodore Apple". Set the switch to this position and you will have an Apple "work-alike" computer. You will be able to run any software originally developed for the Apple in this position.

Now suppose that you want to run some TRS-80 programs on the computer. Just set the switch to "Commodore Tandy", and you have a TRS-80 "work-alike" computer. An IBM "work-alike" position is also planned for the computer, and no doubt other emulations are under consideration.

The main motivation for the development of such a machine is to allow access to the large software libraries that have been developed for the TRS-80, Apple, and other computers. The Commodore machine would have immediate access to the largest software library of all, because it would include several other machines' programs.

According to the *Wall Street Journal*, Commodore plans to introduce this new computer at a starting price of under \$1,000. There will be two versions, one with a black and white display and one with a color display. Each machine will have an internal memory size of from 128K to 256K bytes. Shipments of this new machine are scheduled to begin in September, with product promotion beginning this Spring.

Is it really possible? Many experts believe that it can be done, but not for under \$1,000 (or any place close to it). When you finish paying for all the options, you may wind up paying more

than for any of the machines being emulated!

Emulation has long been a subject of concern in the large mainframe computer field, but never before with microcomputers. One of the amusing aspects of emulation is that sometimes the emulator is better than the machine it is emulating! In any event, the release of this new machine will certainly be a major event this year.

2. Several floppy disk manufacturers are working on new methods of encoding data that allow many times the storage capacity presently available on 5-inch diskettes. There already exist 40-track drives, 80-track drives, single and double density, and double-sided drives. A single double-sided double-density 80-track drive has storage capacity of over 700K bytes—equal to the entire storage capacity of a Model III TRS-80 with four drives, or almost double the capacity of a Model I.

The new drives will make these figures seem puny. All capacities will be measured in **megabytes**—millions of bytes! One manufacturer's system will allow 1.6 megabytes on a single diskette, and another is said to allow over 5 megabytes! But many problems remain to be worked out. The diskette quality will be critical. Handling and storage of diskettes will have to be done much more carefully than at present. While the diskettes will technically be removable, this will become a painstaking procedure, and diskettes will simply remain in the drives most of the time. Finally, the disk drives themselves must be introduced at a competitive price, because computer owners will also have hard disk drives available at very reasonable prices. Nevertheless, a major manufacturer of TRS-80 compatible disk drives promises to have a drive available by the end of the year with over one megabyte for under \$1,000.

3. Future microcomputer owners may not be using floppy disks, however, because of two other attractive alternatives now being developed. One of these involves the **Sony Beta-max** video cassette recorder being

continued on page 6

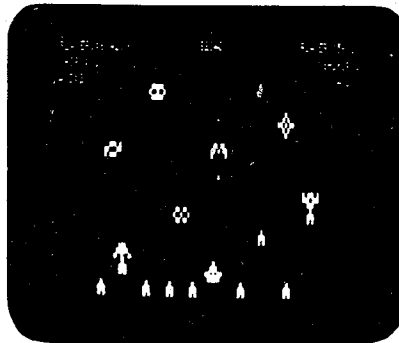
WHY

IS THE ALPHA JOYSTICK SUCH A SUCCESS ?

Because of games like these.

THE LATEST BLAST FROM BIG FIVE...

NEW! **DEFENSE COMMAND**



Actual unretouched photos

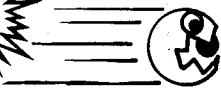
DEFENSE COMMAND



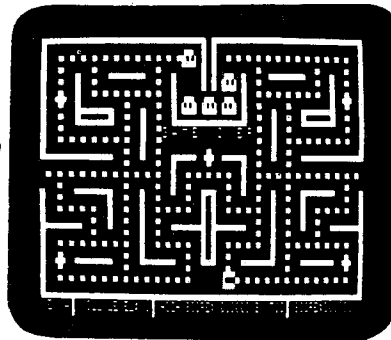
Big Five has done it again! Now the most popular arcade game of all time has a fascinating new twist. The Invaders are back! You are alone, valiantly defending the all important nuclear fuel cannister stockpile from a convoy of thieving aliens who repeatedly break off and attack in precision formations. 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!

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



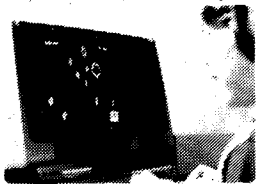
SCARFMAN



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.



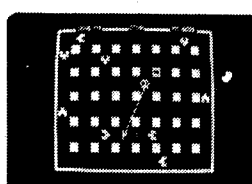
SUPER NOVA

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.



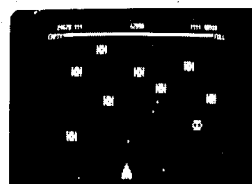
LUNAR LANDER

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.



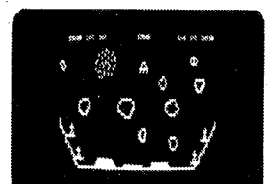
ATTACK FORCE

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)

- ☐ 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)

NEW!

MODEL III JOYSTICK

ONLY \$49.95

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.O.
C.O.D. ADD \$3.00 EXTRA.
QUANTITY DISCOUNTS AVAILABLE.
NY RESIDENTS ADD SALES TAX.
OVERSEAS ORDERS ADD 10%.





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
30 DAY, MONEY BACK
GUARANTEE
†Less 10% restocking charge.

MICRO PROOF Spelling Checker

*A product of Cornucopia Software

- 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 MICRO PROOF to operate from within.

	Was	Now Only
Basic Micro Proof	\$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 for mod 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**

THE AMERICAN EXPRESS®
CARD
The American Express® Card.
Don't leave home without it.™



POCKET COMPUTER OWNERS

At last...**POWERFUL** software for your Radio Shack or Sharp Pocket Computer!

MATH PAC 1 (\$13.95 on cassette)

- Matrix Inv/Det/Sim Eqn (up to 9x9)
- Matrix operations (add, multiply, etc.)
- Polynomial least squares (to 9th order)
- Coordinate transformations
- Triangle solutions

MATH PAC 2 (\$13.95 on cassette)

- Multiple regression (to 9 variables)
- Interpolation (6 different types)
- Simultaneous equations (to 11 eqns)
- Polynomial root finder
- Vector calculator

These programs are the best we've seen. The matrix inverse and sim. eqn. routines use partial pivoting to handle all but singular systems!

ALSO AVAILABLE: Games Pac 1, Statistics Pac 1 and 2, Finance Pac 1, Utility Pac 1.

Complete Documentation. (\$9.95 without cassette). Send for free information. WA residents add 5.5% sales tax.

SOUND SOFTWARE SYSTEMS
PO BOX 1365 RENTON, WA 98057

continued from page 6

PACKARD HP-65 calculator (\$750 at the time for about 1/4 of 1K or 250 bytes of memory). The HP-65 was the first programmable computing device ever available for under \$1,000 (and probably under \$5,000). Since that time, I have had the insatiable urge to

PRINTERS FOR THE 80's

OKIDATA

MICROLINE 80	349.
MICROLINE 82-A	499.
MICROLINE 83-A	749.
MICROLINE 84	1,095.

C. Itoh

STARWRITER 25 CPS/P	1349.
STARWRITER 45 CPS/P	1699.
STARWRITER 25 CPS/S	1439.
STARWRITER 45 CPS/S	1799.

FREE SHIPPING, HANDLING & INSURANCE

(603) 525-6621



BUSINESS COMPUTERS
of Peterborough

766 Middle Hancock Road
Peterborough, NH 03458

purchase every new pocket computing device to come on the market. For those of you who remember the progression, there was the HP-55, HP-67, TI-59 followed by the HP41 (with many lesser devices in between). Next, RADIO SHACK came out with its first POCKET COMPUTER, which is actually the first pocket computing device to use BASIC. Of course, I ran out to get one. Now, RADIO SHACK has announced its new TRS-80 POCKET COMPUTER MODEL PC-2, and, of course, I have to get my hands on it.

Let's give credit where credit is due. In actuality, RADIO SHACK has nothing to do with either POCKET COMPUTER on the market. Both pocket computers are manufactured by SHARP. RADIO SHACK sells the SHARP POCKET COMPUTERS under the RADIO SHACK name. You can also purchase the exact same POCKET COMPUTER under the SHARP name.

I don't want to tell you too much about the new pocket computer since by the time you read this column, many of you will already have seen the ad from RADIO SHACK. I would like to summarize some of the outstanding features here (especially for the 7,500 readers of **COMPUTRONICS** living out of the U.S.A.).

The pocket computer sells for \$279.95. Its enhanced BASIC (compared to the original pocket computer) contains 42 statements, 34 functions and 6 commands. It has many new string functions not previously available including 2-dimensional arrays. The display allows both upper and lower case characters. A built-in quartz clock is accessible from BASIC or from the keyboard and provides month, day, hour, minute and second. It comes with 2,640 Byte Memory. You can plug-in additional RAM or ROM to increase the memory size (up to 16K RAM, ROM or RAM/ROM combination). Additional 4K RAM sells for \$69.95. The POCKET COMPUTER can be outfitted with a variety of peripherals including a printer/cassette interface.

AND EVEN MORE: THE RS-232 INTERFACE will allow users to transfer programs and information from the POCKET COMPUTER to any full size computer. The printer (\$239.95) has outstanding **FOUR COLOR GRAPHICS!**

MIKEEANGELO

MIKEEANGELO (\$340) is the name

of a new product that came across my desk recently. MIKEEANGELO, when installed in your TRS-80 will give you twelve times the normal amount of dots the Model I has and sixteen times the normal amount on the Model III. MIKEEANGELO also comes with complete reverse video. The installation of MIKEEANGELO effectively makes your TRS-80 Model I OR Model III into a high resolution graphics machine. MIKEEANGELO is easy to install. The complete system is built on two circuit boards. MIKEEANGELO comes with installation instructions, instructions on use, a machine language program for quick graphics, a BASIC DEMO PROGRAM, a BASIC driver program and helpful hints for using the system. MIKEEANGELO is not available through H & E COMPUTRONICS, INC. For more information contact MIKE ELECTRONICS CORPORATION, P.O. BOX 3813, Bellevue WA 98009 or call (206) 451-0574. VISA and MASTERCHARGE are accepted.

INCOME TAX TROUBLES

Anyone who ordered our heavily advertised INCOME TAX PAC C is aware that we were unable to supply the product. Here's the full story on the package.

As you know, H & E COMPUTRONICS, INC. has a 30-day money back guarantee on most of the software that we sell. Most of the products that we sell are obtained from a variety of vendors (including PERSONAL SOFTWARE, MICROSOFT, RACET COMPUTES, ETC.). In the case of INCOME TAX PAC C, the vendor that was to supply the package to us did not get it into our hands until January 3, 1982. Upon examining the package, our software committee decided that the package was not suitable enough to put into the hands of our customers. Therefore, we returned all of the packages and decided not to sell it. Fortunately, we were able to provide our customers with an alternative tax package from MICROMATIC PROGRAMMING called TAX/SAVER. This program was well done and did meet the needs of most of our customers.

It seems that this year almost all tax program vendors have dropped out of the market. There appear to be only two tax programs available for TRS-80 owners. The one from CONTRACT

SERVICES sells for about \$1,000 and is high above the price that we are able to market a tax package for (it is an excellent package). The TAX/SAVER from MICROMATIC PROGRAMMING sells for \$119.95, and it was able to meet the needs of most of our customers.

CHEAP SHOTS AT RADIO SHACK

What follows is letter from William B. Herpin, Jr. of Colorado Springs CO.

Dear Mr. Gosman:

I didn't realize that "cheap shots" were necessary in your business. I refer to the comment in your "Bits and Pieces" column in the January 1982 issue of *Computronics*.

Have you ever stopped to think where you and *Computronics* would be if there were no Radio Shack? How many companies now survive on the TRS-80? It seems to me that you should remember the old adage, "Don't bite the hand that feeds you."

It is true that Radio Shack is not perfect. They were caught up in a storm larger than anyone expected. They suffered from the lack of microcomputer talent in the early days. Therefore, a lot of companies sprang up to service the growing TRS-80 market. Most of them prospered and certainly we users benefited.

What other microcomputer manufacturer produces any monthly newsletter? Which one has such a network of dealers and service centers? How many software houses provide continuing support? How many manufacturers and software dealers have toll free HELP lines?

It is easy to sit back and criticize the management policies of RADIO SHACK (sour grapes?), but it is hard to argue with success. I would like to see you concentrate more on the positive aspects of this microcomputer explosion.

PUBLISHER'S REPLY

Mr. Herpin you are exactly correct. Please let me make some comments.

We are certainly grateful for the existence of RADIO SHACK. COMPUTRONICS runs its complete business on five MODEL-II TRS-80'S.

I personally own and have in my house a TRS-80 MODEL-III and COLOR COMPUTER. I have free access to an

ATARI, IBM PERSONAL COMPUTER, PET and APPLE II computers (all available at COMPUTRONICS), but I choose the TRS-80s.

I am an expert in the microcomputer field. If COMPUTRONICS did not exist and I was faced with setting up a computer system for a small company, I would choose a RADIO SHACK computer every time.

Given a budget of \$169 to \$25,000 to buy computers for a small company, I would choose RADIO SHACK every time (the over \$25,000 range is out of my field of expertise).

H & E COMPUTRONICS, INC. exists due to the help of five TRS-80 MODEL IIs, which help monitor our mailing lists, business records, invoices, inventory control and our payroll records.

I sincerely believe that at the current time, RADIO SHACK offers the best value in any computer under \$25,000. I am very familiar with the PET, IBM PERSONAL COMPUTER, APPLE II and ATARI. I would choose the TRS-80 every time.

Any criticism that may appear in our magazine must be taken in the context of the above. Yes, we are sincerely grateful to RADIO SHACK, the services they provide and their spot in the microcomputer explosion. H & E COMPUTRONICS, INC. is one of the companies that grew as RADIO SHACK grew. We always tried to fill the void that RADIO SHACK missed. For example, COMPUTRONICS was able to provide our customers with lower case modification kits and word processors two years before RADIO SHACK came out with similar products. Our criticism at the time was that RADIO SHACK was neglecting the word processing market. RADIO SHACK does listen. Now they have both lower case characters and a word processor. (For those of you who don't remember the beginning, RADIO SHACK's original computer only used upper case characters.) Any criticism or comments that we make about RADIO SHACK or their management policies should be taken with all this in mind. H & E COMPUTRONICS, INC. is part of the microcomputer explosion. We certainly acknowledge that RADIO SHACK has grown and has worked hard to meet the needs of their customers. At COMPUTRONICS, we try to fill the void that RADIO SHACK is currently

continued on page 10

PROOF READER™

The Aspen Software Company Spelling Checker.

+

GRAMMATIK™

Beyond Spelling Checking

THE ONLY COMPLETE PROOFREADING PACKAGE

FOR ALL CP/M, MS-DOS, AND TRS-80 WORD PROCESSORS

We'll match Proofreader with any other spelling checker on the market. It has a big 38,000 word expandable dictionary, and can check even your largest documents in under four minutes. Proofreader looks up every word, and does not use less accurate root word analysis like some others. Full interactive correction is standard on CP/M and TRS-80 Model II systems, and is a low cost option for the TRS-80 Model I/III.

Spelling checking alone is not enough! No one else has anything like Grammatik! It analyzes your document for common typos, punctuation errors, misused phrases, and poor writing style. Grammatik is receiving rave reviews from both critics and users. Bob Loudon in *InfoWorld* (12/7/81): "Grammatik is a surprisingly fast and easy tool for analyzing writing style and punctuation. If you are currently doing original writing on a word processor, you should consider this product." Eric Balkan in *The Computer Consultant*: "I'm impressed with the imagination that went into this product." A user: "Thanks for making my life easier!"

Grammatik and Proofreader are compatible with all CP/M, MS-DOS (including IBM PC), and TRS-80 word processors.

Current CP/M formats:

standard 8", NorthStar, Omikron TRS-80.

Please call or write for details of minimum system sizes, and availability of additional disk and operating system formats. Shipping costs included.

Please specify your system configuration when ordering. Dealer inquiries invited.

MS-DOS versions scheduled for March 1982 release.

	Proofreader	Grammatik
CP/M, MS-DOS	\$129.00	\$149.00
TRS-80 Model II	\$99.00	\$99.00
TRS-80 Mod. I/III	\$54.00	\$59.00
(Model I/III interactive correction option - \$30.00)		

Trademarks: CP/M: Digital Research; TRS-80: Tandy Corp.; Proofreader, Grammatik: Aspen Software Co.

ASPEN SOFTWARE

COMPANY™

P.O. Box 339-H, Tijeras, NM 87059
(505) 281-1634

continued from page 9

missing. After all, if RADIO SHACK had it all, there would be no need for COMPUTRONICS. On the other hand, RADIO SHACK watches companies such as COMPUTRONICS very carefully. They digest all of the information and ideas coming from COMPUTRONICS and similar companies. This helps RADIO SHACK to grow.

So, Mr. Herpin, I thank you for your letter. We won't hesitate to criticize RADIO SHACK in the future if we find something that we feel needs some change, but it all has to be taken in context. We do believe that RADIO SHACK offers the most cost effective computers available for under \$25,000.

COLOR COMPUTER SOFTWARE FROM THE RAINBOW CONNECTION

The RAINBOW CONNECTION has announced the availability of several reasonably priced cassette programs including: BRICKOUT, WORD GUESS, STARFIGHTER-4, TIC-TAC-TOE, B-17 BOMBER, METRIC MAGIC, BIO-RHYTHM, MINEFIELD, BLACKJACK, MATH TUTOR, COMPUTRATION, CHUCK-A-LUCK, LUNAR LANDER, MATH DRILL, COMPUMIND, JACKPOT and a FOOTBALL FORECASTER. For more information, contact the RAINBOW CONNECTION directly, 3514 6th Place N.W., Rochester MN 55901 or call (507) 288-3555. ■

LETTERS TO THE EDITOR

Disagrees with Comments about Radio Shack

Regarding your comments titled "NEW PROBLEMS AT RADIO SHACK?" (January 1982 - issue 41), I disagree. The items you list in no way indicate to me that Radio Shack is running scared. Copyright laws exist to legitimately protect creative efforts. How fair is it for an ex-employee (or anyone else) to use copyrighted material for personal gain? The same holds true for hardware infringements. RS is good enough to publish technical manuals for its machines, but that doesn't mean everyone should manufacture their own, using copyrighted material.

As far as agreements not to compete,

the reported length of one year seems very lenient. Agreements not to compete for five years are quite common in many industries, most notably electronics.

And why do you knock them for wanting to spin off their computer operations? If you had a company that sold flashlight batteries and computers, would you manage both operations the same way? I hope not. Establishing computer centers was the first step, spin off is the next logical step. It's not an indication of running scared, but of steady and continued growth.

No one denies the existence of quality software and peripherals from non-RS sources. But no one supports what they sell better than Tandy. That includes everything from computers to flashlight batteries.

Finally, Radio Shack does indeed deny rumors. Who doesn't? What did your "Crystal Ball" ever report which Radio Shack denied and later produced?

Let's not lose objectivity in reporting. It could very well cause a loss of readership.

Robert P. Graham
2709 N. Sibley St.
Metarie, LA 70003

The publisher has also added some comments about this matter in this month's Bits and Pieces column.

Preventing Model I Crashes

Following up my letter printed in your November-December issue dealing with the Model I crashing, a later improvement was a stainless steel grounding rod just outside the wall of the office. This was plugged directly into a ground hole in the power socket into which the computer was plugged.

I agree with you wholeheartedly in your comments on the brush plating of the board terminals. I have had some discussions with technicians who are involved with this, and it is a general assumption that some sort of clamp that will ground all of the pins at once and serve as one of the terminals in the plating process will be necessary. Just how successful this will be in a ready filled board, working through the port in the case of the TRS-80, is another thing.

It would seem to this writer that RS could perform a well-needed service

to its customers by making such plating available in their service centers, by a trained operator who could clean and plate the terminals properly and eliminate the possibility of an amateur goofing it up.

I should also note in passing that an offer for the Model I came along that I could not turn down, and a new Model III has taken its place. I have had no program crashes in a month's use of it, so apparently RS has solved our problem in the new configuration.

Bob Forman
The Forman Company, Inc.
Box 68
Monmouth, IL 61462-0068

Using a Teletype as a Printer

I hope this letter will help anyone among your readers who wants to try a used teletype as a printer with his or her TRS-80. Earlier this year, some answers you published seemed to be saying that one could have problems doing this. Well, maybe I was just LUCKY, but my only problem was finding a source for the hardware and software after I found a used TTY.

My TTY is a model 33KSR. It cost me \$100, and I bought it from an individual after seeing it offered in a classified advertisement in a local newspaper. I had read somewhere that it was fairly easy to use one as a printer, but only after I bought it did I realize I had a problem. About two months after I bought it, I finally got my TRS-232 Interface from Small Systems Software, hooked it up, and have had absolutely no problems. The TRS-232 provides for a 20 MA current loop, and that means that to hook it up to my TRS-80, 2 wires are required and that's it. It will work with an expansion interface, the directions state, but I don't have one. My TRS-80 is 16K Level II and I don't have disk. Small System Software at one time advertised the TRS-232 in your magazine, but that was several years ago. However, they still sell it. The cost is now \$59.95 + \$2.00 for shipping. I got their phone number from the telephone company, but I never could get an answer when I called. So I wrote them, and a month later I received a few sheets of paper listing their products. I ordered a

continued on page 12

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.TM)

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

continued from page 10

"Formatter" package from them in addition to the interface, but have not found a need for it. The TRS-232 includes some software on cassette to drive the printer, and the hardware is deceptively simple. It's about 1"x2"x3". It has 2 female plugs, and you plug the male "aux" from the TRS-80 into either one. It has a female ribbon-cable plug and I bought a male plug and some ribbon cable from Radio Shack. Two of the wires from the ribbon cable go to the TTY. That's all you need, but I also bought 2 male "aux" plugs and connected them so that one goes to the "aux" jack on my cassette, the other to the unused female jack on the TRS-232. This way, you can use the recorder with the TTY hooked up, without having to unplug from the TRS-232 to the recorder.

You load the software, answer a few questions, and then run other programs, since the printer driver is poked into high memory and doesn't require much space.

As a matter of fact, you may have guessed that this letter was written using my TTY and the TRS-232 and your "word processor" or "text editor" program, for which I hereby thank you. It is slow, as your magazine said it would be, but I love the price.

If anyone needs any assistance with the TTY hook-up, they can write me with a stamped, self-addressed envelope. I'll try to help them, but I'm just an amateur.

R. H. Long
2106 Valleywood Drive
Carrollton, TX 75006

Errors in "Determinant Challenge"

My January issue just arrived today. I rekeyed everything in to check the programs in my article, and all seems to be fine!

There are, however, a few typos in the article, none of which really change anything, and all could really go "un-fixed" I guess. But, just for the record, here is what I caught:

1. page 32, 1st column, 5th line up from bottom, end of line, change: "equation." to: "equations."

2. page 32, 2nd column, 2nd line down from top, change: "preceeds" to: "proceeds."

3. page 32, 2nd column, 3rd line down from top, change: "XXsi" to: "Xi."

4. page 32, 2nd column, 4th line down from top, change: "linea" to: "linear."

5. page 36, 1st column, 16th line down from top, change: "equations and does get too big . . ." to: "equations and D does get too big . . ."

6. page 36, 2nd column, 6th line following the end of the program segment at the top of the column, change: ". . . and generate the equation and then . . ." to: ". . . and generate the equations and then . . ."

7. page 37, 2nd column, in the table, 4th row of data, change: "33" to: "133."

Hope the readers like it, have fun with it, find it useful, etc.!

Other random thoughts:

- new covers and layout . . . nice!
- I've written quite a few articles for some of the other journals, etc. including Green's "Encyclopedia", "80-micro . . ." etc. and while they've got you beat by several lengths on pay, I'm not so sure that the extra cash has compensated for the other problems. For example, you quickly learn that for those magazines Green is the only one that can be other than dead serious! Any attempts at anything half-way humorous, are immediately edited out. Also, I have sort of come to the conclusion that they've surrounded themselves with a bunch of young copy editors, at low pay, and put them all into what must be a zoo to work in, and they all seem they HAVE to make massive changes to everything submitted. Now I'm not the world's greatest writer by a long shot, but I do have 9 college texts to my credit, with #10 in the works, and I've dealt with a few publishing folks before. For me, writing books and articles, etc. is fun. Teaching my classes is fun. (Its the &%%\$# meetings, paper grading, and that sort of stuff that I take my salary for doing!) Anyway, the bottom line, is that I think there is a lot to be said for working up an article in a way that you think people will enjoy and profit from, and then seeing it printed in just about the way you wrote it! I sure appreciate that, and I'll bet your other authors do too, even if they've not said so. Just thought you'd like to know!

C. Brian Honess
22 Shaftesbury Lane
Columbia, SAC 29209

Bug in SCRIPSIT

On two occasions while using the Model III SCRIPSIT program with my Model III, I bombed all of the buffer while editing. A careful check to see what I had done to make it bomb disclosed that when the control key and the "T" key are depressed at the same time, the machine goes back to "cass?".

Thinking that something must be wrong with the particular tape that I had, I called Computer Customer Services in Ft. Worth and explained my problem. I stated that I felt that the program should be "idiot proof", so that even I could not bomb it. However, I was told that "the computer knew something that no one else did. It would lock up or do crazy things when these two keys were depressed at the same time, and they could not correct it." The only suggestion they had was to "be very careful".

This, to me, is a rather unsatisfactory answer. Just do not think that this machine is smart enough to fool everyone. Felt that you would have the answer as to what could be done to make this program really "idiot proof".

Thank you for any help you may be able to give me. A self addressed stamped envelope is enclosed.

F. G. Taylor
Rt. 6, 304 Government Street
Gulfport, MS 39503

We don't have a fix for this, but if we print your letter maybe someone who does have one will let us know.

Warning

I have been a subscriber to your fine magazine for over a year and have read avidly all letters to the editor, especially from people who have warned against purchasing products. Unfortunately, I ordered and paid for a printer, "BYTEWRITER-1" from MICROTEK, INC. of 9514 Chesapeake Road., San Diego, CA. 92123 back in September 1981. I have subsequently received an order confirmation and

continued on page 14

Announcing AUTOGRAMMER.

Now you can write the programs your business needs—
even if you have no programming experience!

Until now, you either had to hire an expensive programmer to custom tailor existing software to your business, or else try to adapt your business to someone else's software. The classic dilemma of the square peg in the round hole.

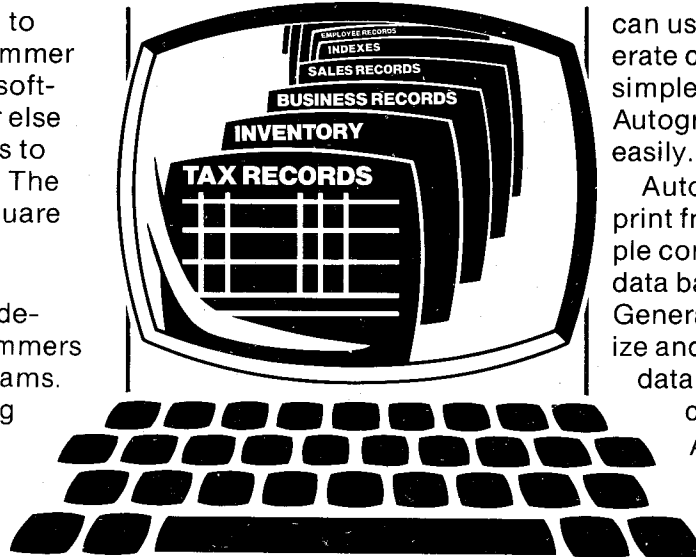
But now there's Autogrammer. Software designed to let non-programmers generate their own programs. No need for programming knowledge. No need to learn any programming language. All you have to know are the needs of your own business.

EASY!

Autogrammer is as easy to use as a typewriter, yet so powerful it puts all the muscle of your computer right at your fingertips. Many applications require only 10 or 15 minutes to complete. What you type on the screen, Autogrammer turns into a machine-language program that's ready to run.

VERSATILE!

Autogrammer has thousands of applications for both business and personal needs. Inventory records, sales and earnings projections, tax calculations, forecasts, employees files, stock market analyses. Using Autogrammer, you can create even complex programs



such as tracking inventories, adding purchases, subtracting sales, crediting accounts, report and adjust for daily sales, add back to inventory, make adjustments for credits, defects, shipping charges, and much more. Having this kind of vital information available can simplify business decisions and save you money.

FLEXIBLE!

As your needs change, Autogrammer-generated applications can easily be revised, updated, expanded, or combined. Autogrammer writes finished, stand-alone programs which do not require Autogrammer for running. They work first time, every time. Everybody in your organization

can use Autogrammer to generate custom programs. It's so simple, anyone can become an Autogrammer quickly and easily.

Autogrammer allows you to print from screen with one simple command or list the entire data base. The optional Report Generator allows you to organize and then report from the data base in the format you choose.

Autogrammer by Roklan costs \$299.95 and is available for Tandy TRS-80* model II and soon for models I, III

and CP/M versions, with other versions soon to come. Optional Report Generator, \$199.00, for in-depth reporting from the data base.

LET'S FACE IT.

Nobody knows your business like you do. With Autogrammer, you can write your own programs and gain control of your own business by generating exactly the information you need.

Autogrammer for TRS-80* model II is available from H&E Computronics Inc. and other major distributors and dealers nationally.

The end of the square peg in the round hole.

*Registered trademark of Tandy Corp.

Roklan
Software

10600 W. Higgins Road, Suite 200, Rosemont, Illinois 60018

**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.

**NEW THROW AWAY THE BOOK! NEW
USE THE CARD!**

*TRS-80 System Reference Card
*TRS-80 is a Registered Trademark of Tandy Corp.
by



P.O. Box 24344
Speedway, IN 46224
(317) 244-4078

Mail orders to the above address, only Checks or Money Orders will be accepted.

MODEL CARD	COST
<input type="checkbox"/> I Basic & Assembler	\$4.95
<input type="checkbox"/> I Basic	2.95
<input type="checkbox"/> III Basic & Assembler	5.95
<input type="checkbox"/> III Basic	3.95

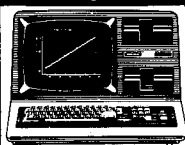
Indiana Residents add 4 percent for Indiana Sales Tax.

Name _____
Address _____
City _____ Zip _____

**SAVE TIME
QUICK REFERENCE
ORDER YOURS TODAY**

Puts a complete summary of both BASIC and ASSEMBLER manuals plus lots of extras at your fingertips.

**You can pay more —
But you can't get more!**



Model III 16K
\$839
Model III 48K
2 disc & RS232C
\$2100



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

BUY DIRECT. These are just a few of our great offers which include Printers, Modems, Computers, Peripherals, Disc Drives, Software and more. **call TOLL FREE 1-800-343-8124**

We have the lowest possible fully warranted prices and a full complement of Radio Shack Software.

computer plus

Write for your free catalog.
245A Great Road
Littleton, MA 01460
617 • 486 • 3193

continued from page 12

written two letters inquiring as to the status of the printer. To date I have not received a reply from MICROTEK. I am stationed overseas, and cannot easily walk down to visit this company. Being somewhat at the mercy of the mail system, I would like to warn potential mail order buyers of this printer that they most likely will face a similar demise.

I would greatly appreciate any action which could lawfully pursue on my behalf. I am enclosing a copy of the order confirmation and my letters to MICROTEK. You may publish this letter if you so desire.

I am currently working on a very realistic Boeing 747 aircraft simulator and very complex Dungeon & Dragons type game. The use of a printer would be unmeasurable in speeding up my progress on both of these programs.

Keep up the fine work, and may my next letter be written using your excellent text writing program.

Geoffrey M. McLean
Comnavsurfgru Westpac
PFO San Francisco, CA 96601

Praise for Computronics

As a newcomer to the world of computers I want to take this opportunity to tell you how much help you have already been. At 70 I do have to learn fast. And I find that people who are really interested are willing to share the things they have learned.

I do not agree with Mr. Greffe (see *Letters to the Editor*, November-December 1981 issue), but then may be he doesn't feel he is getting his money's worth. I do, so enclosed find my check for 2 years of Business Computing.

And in closing let me tell you how I manage keeping tabs on my correspondence. As you can see I'm using Scripsit. I listened to all the advice about keeping 2 copies of everything. So I write protect the Scripsit disk. Then start with two formatted disks. First, I opened a 30 line file filled with blanks (copy enclosed) on both disks. Also another idea that I thought of myself. I set up a header that supports my letter format and save under DIR list as HEAD. When this letter is finished the way I want it I will save it

on both disks then get the list and enter it on both disks.

Hope you can forgive a 70 year young man for being so long-winded.

Seymour E. Long
Flowers for Charity, Inc.
2355 N. W. 30th Street
Ft. Lauderdale, Florida

H & E Computronics welcomes letters on any subject. If you wish a personal reply, please enclose a self-addressed, stamped envelope.

H & E Computronics also welcomes readers to submit programs, articles, or reviews for publication. Please address correspondence to:

The Editor
H & E Computronics
50 North Pascack Road
Spring Valley, New York 10977

Please submit programs on media (cassettes or diskettes). Also, please indicate the system programs were prepared on, and include any necessary instructions.

**Everything
for your TRS-80
Toll-Free
Order Line**

(800) 431-2818

(Outside New York state)

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

PROGRAM PREVIEWS

A. A. Wicks

This Month: REFWARE THESAURUS

Having been associated with computers in some form or another for more years than I care to recall, I feel somewhat blasé regarding their vast capabilities. But with the advent of the microcomputer industry and the applications developed for this equipment in the personal and business world, I am continually and delightfully surprised at some of the unusual programs that are being created for their user's needs.

As a writer and a person interested in lexicography, I was quite intrigued when I received a new program called the REFWARE THESAURUS. This program is produced by the REFWARE Reference Software Division of David C. Whitney Associates, Inc. The program receives credence from the fact that David C. Whitney has been editor-in-chief of the World Book Encyclopedia, Encyclopedian Americana, and the Reader's Digest Almanac. Release information on the program does not state that he actually wrote the program, but that he developed it, which would indicate it has certainly benefitted from his background, in any event.

We all probably know what a thesaurus is, and probably the best-known publication of this nature is the one originally written by the English physician, Peter Roget in 1852. That document was more in the form of a dictionary or encyclopedia, but later editions become more limited in being a large collection, or "treasury" (which we received from the Latin source word "thesaurus"), of synonyms and words associated with one another.

How does all this fit into the program we are about to review, and how may it be useful to you? First of all, it will be of little value to you if you are not using words in your business, trade or profession, where they are extremely important to your documentation. For instance (although this is not restrictive), if you are an Accountant and your work is income tax returns, you may not even have a book copy of a thesaurus on your desk. But if you are a college professor, doctor, executive, journalist, writer, etc., you are undoubtedly interested in producing intelligent and cohesive reports and other writings. And you have also probably wracked your mind for a "better" word than the one that first came to mind. So the needful writers probably far outstrip the casual or disinterested ones. Now that we have disclosed some of the potential users, let's get into the program description and operation.

The REFWARE series comprises three programs on separate disks—"NOUNS," "ADJ" (for adjectives), and "BUILDER." The first two operate similarly, and will be discussed presently. BUILDER, the largest and most extensive of the three (and the most expensive), contains no words within its own file; its prime purpose is to enable the user to create a thesaurus containing specialized words of trades or professions, frequently misspelled words that bother the user, or any words that are associated with one another and which the user may wish to have available for recall at any time.

Commencing with BUILDER, the program dialog is offered

in a series of screen frames that either direct the user to perform certain actions, or provide information. Various subprograms within BUILDER facilitate these functions. For instance, "Prepare" allows you to enter groups of synonyms for your future use, and saves these words in a random access file. In a similar way, "Alphfile" permits the making of alphabetical files of the words you have included. There are many others, allowing complete freedom of access, change, addition and deletion, etc. Choice is by menu selection.

Where do the words come from that you wish to have filed? The choice is yours—perhaps you may wish to use a printed thesaurus as your base source. However, if you are using REFWARE's THESAURUS, you will probably be in a business or profession wherein the words you use are not readily available in a standard thesaurus. Therefore, as a specialist, you will create files for your future needs. As an example in the manual suggests, a medically oriented individual might enter a selection of words such as: blood, leucocyte, granulocyte, lymphocyte, erythrocyte, hemoglobin, plasma, corpuscle, polycythemia, and leucopenia. Upon later recall, entering "blood" will display all of the above associated words, or for that matter, entering any one of the above will cause all of the others to be displayed. Any word group may be changed or added at any time. There will be room on a formatted disk for 620 word groups, for a total of 6200 words (35-track, single density).

Once you have prepared your disk file records of the thesaurus you are building, you may use it at any time as a screen-displayed list, or you may have your words printed. You have a choice here of selecting specific groups of ten words, or all of the words in groups of ten. The program "Alphfile" will also transfer up to 200 words at a time into a new set of alphabetic files, recording, as it does, the location of each word within the random access word file, to enable you to locate a specific word for change or correction.

As previously observed, there are a number of file commands available, permitting some rather unique records of the words in your files. "Addalph" will allow your master record disk to have alphabetical records of up to 5000 words, but after 2500 words have been recorded, it is recommended by the manual that another disk be opened.

When asking for associated words, the program "Find" is called, and you will have two choices to selected from (or you may select both, in turn). These are for a list of words associated with the word you are enquiring about, or, your sentence (which you will then enter), will be displayed up to ten times with the alternate choices of words inserted in the appropriate place—permitting you to view it to see how it "sounds." The latter choice is probably the most useful display, as a word in context is much easier to evaluate.

The other two REFWARE THESAURUS programs mentioned operate essentially the same as BUILDER. However, each already has the nouns or adjectives as the case may be, installed on the program disk, ready for call. These programs

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	\$139.00	\$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. . . \$50.00.

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.

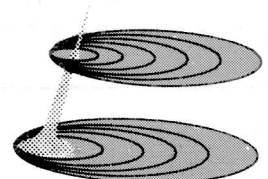
TRS-80™ is a trademark of Tandy Corp.



Can't wait? Call

414/241-8030

galactic software ltd.
11520 North Port Washington Road
Mequon, Wisconsin 53092



commence with a brief refresher in grammar as applied to nouns/adjectives, and then immediately go into the "find" mode, as described for BUILDER, with the choices of screen or printer output available. Unless your needs require the specialization of BUILDER, NOUNS and ADJECTIVES might have a greater usefulness for you as, for instance, in looking for "hard-to-spell" words of similar meaning (e.g. shabby = dilapidated). Also, the hard work of word entry has already been performed. And if there is any question that the word (adjective/noun), you are specifying may not be in the THESAURUS, the odds are good that it will be there, for there are 6200 adjectives, and 6200 nouns. If you are wondering if it might be faster to locate the word association in a printed thesaurus, consider that a word search will take from a minimum of only three seconds to a maximum of 70 seconds, depending on the disk location of the words. Unless you are lucky in your printed copy search, the computer is faster. While searching, by the way, the screen constantly displays how many words have been searched for a matching synonym. But what if that particular word is not included in the disk THESAURUS? The display will then state "The THESAURUS does not have any other alternate nouns (adjectives) for - word -." You then have a choice of searching for more nouns (adjectives), or ending. Of course, you may be misspelling the word, so that the program does not recognize it.

Because of some of the peculiarities of the English language, when a sentence-choice is selected for word or synonym display, some peculiar sentences may result—that sound as if they came from a foreign-source English instruction manual. Unless you are not too familiar with English, you will immediately recognize and reject these sentences.

The manuals accompanying each of the REFWARE programs are well-written, fully explanatory documents. The Introduction to each is the same, but is most interesting from a lexicographic and historical viewpoint. Each page of the text of the manuals simulates a screen display, with explanatory detailed text below each display. The BUILDER manual has 96 pages, NOUNS and ADJECTIVES 32 pages each. Typography is by dot-matrix printer, offset printed. Covers are of flexible plastic material, three-ring type, with the front covers gold-ink stamped. The only typographical or spelling error in all of the documentation is a rather consistent one-letter omission in a number of the simulated displays. Considering the length of the documents, this is a good record. For good, clear and consistent writing, and good manual production, the manual rates a 6.

No problems whatsoever were encountered in loading or running these programs. This does not happen too often—there usually appears to be some little difficulty or misunderstood direction that impedes start up with many of the programs that I review. In the case of THESAURUS, this may have been obviated by the fact that two disk drives were required, an operating system is always present, and there is no need to place the program on a system disk. It was not possible to obtain a disk-read using DOSPLUS—but then the documentation does not suggest that the program will run with any particular DOS. It operated perfectly with TRSDOS 2.3, and a "zap" to DOSPLUS would probably enable it to operate with that system also. Incidentally, absolutely no

programming knowledge whatsoever is required with this program, it is "user-friendly" (a phrase that is about to be done-to-death in the personal computer field, but is nevertheless quite descriptive).

All of the screen and printout information is presented in upper case. I would have liked to have seen the more professional aspect of lower-case capability, particularly as the alternative words are presented.

These are very satisfactory programs if their exclusivity fits your requirements (an obvious criterion for all programs, but of particular importance in this case). The best visualization I have of these programs would be in the reviewing of draft copy, with improvements or changes in mind. Merely check the copy and call up alternate or associated words wherever you feel the need for better text readability or understanding. The other choice would be to have a computer dedicated to storing THESAURUS for rapid access. You will be the judge of these requirements; enough to say that the program works as specified, and is usefully unique.

REFWARE THESAURUS: BUILDER 1.0 - \$149.95
 REFWARE THESAURUS: NOUNS 1.0 - \$39.95
 REFWARE THESAURUS: ADJECTIVES 1.0 - \$39.95

All require Model I or Model III with 48K and two disk drives. From REFWARE, P. O. Box 451, Chappaqua, NY 10514.

A. A. Wicks
 30646 Rigger Road
 Agoura, CA 91301 ■

CORRECTION

Listed below are small corrections to the CHAINER program printed in the February 1982 issue of *Computronics*. These are enhancements to the program. There was one small "bug" in the video listing routine which is also corrected below:

Changes to make:

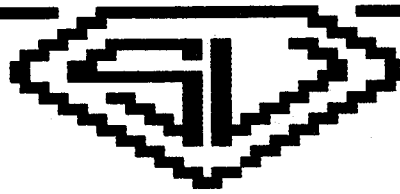
1. Change line 2170 to 'CLS'
2. Change line 2250 to 'IF PEEK(16193) <> 32 THEN 2380'
3. Change line 2380 to 'IF A=LC THEN 2460'
4. Change line 2400 to 'ON INSTR(" CcQq",INKEY\$)
GOTO 2410, 2440, 2440, 180, 180
5. Change line 2410 to 'GOTO 2400'
6. Change line 2730 to 'PRINT FN T\$;'
7. Change line 2660 to 'FOR A=1 TO LC: A\$(A)=" ":
B\$(A)=" ": NEXT'
8. Change line 180 to 'CLS: ON ERROR GOTO 0'

Lines to delete:

1. Delete lines 2180, 2240, 2420, 2430, 2670, 2690, 2700

(Thanks to Jay R. Newirth, 3208 Bonnie Road, Baltimore, MD 21208.)

SUPER UTILITY +



SUPER UTILITY +
(C) (P) 1981 BY
BREEZE/QSD, INC.

By: KIM WATT

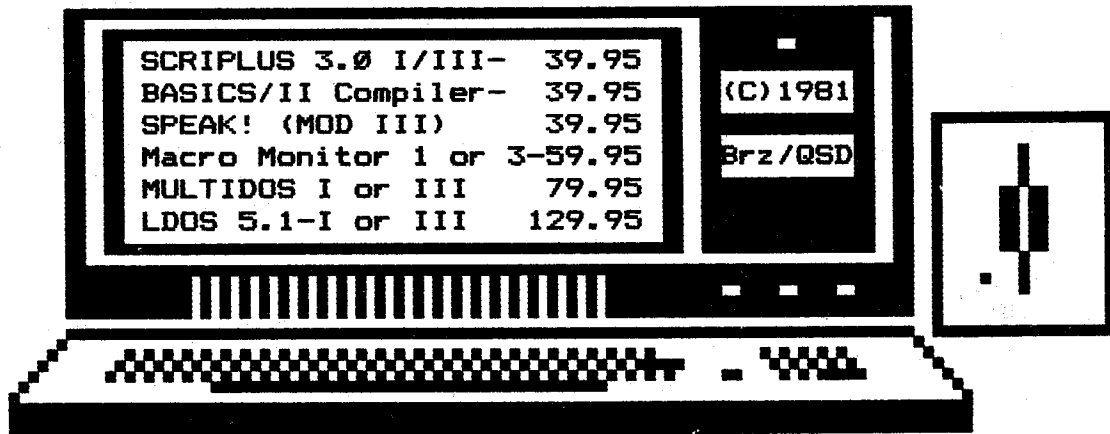
Read Paul Wiener's review on page 366
in the Jan. '82 80-MICROCOMPUTING. (tm)
SU+ has even MORE features now!!

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



SCRIPUS 3.0 I/III- 39.95
BASICS/II Compiler- 39.95
SPEAK! (MOD III) 39.95
Macro Monitor 1 or 3-59.95
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!

BEGINNERS CORNER

Sherry M. Taylor

PERIPHERALS AND PARAPHERNALIA FOR THE TRS-80 (PART IV)

While I sat here reading *Isaac Asimov's Science Fiction Magazine*, I was reminded of his novel *I, ROBOT*. Robotics, a term Asimov coined in the 50's, is now in widespread use and is an expanding field of research. His robots talked. So far, the robots in use today do not have humanoid shape, but some of them ARE talking. The means used for this is "voice-response technology." Voice-response technology is much simpler than the voice-recognition technology we discussed in the last column.

Voice response technology takes on three forms:

- 1) Playing back prerecorded messages.
- 2) Synthesizing messages by piecing together individually prerecorded words.
- 3) Synthesizing messages by first forming words from a set of speech elements, or phonemes, and then piecing the words together into sentences.

One of the first generally available devices that used synthesized speech is the Texas Instruments "Speak and Spell." In the developmental stage, their "toy testers" (children of the employees) were given two versions to try, one with the prerecorded messages and one with the true synthesized speech. The children very much preferred the version with the synthesized speech. Why? No one knows for sure, but some speculate that the children liked their machines to SOUND like machines.

So, what does this have to do with your TRS-80? Well, have you ever had your TRS-80 talk to you? If it did, it was probably in a nightmare after a frustrating evening of debugging a troublesome program, or you have one of those nifty TRS-80 Voice Synthesizers marketed by Radio Shack or some other company.

My Model III has never ever spoken to me. The Voice Synthesizer put out by Radio Shack doesn't work on the Model III as is, but I have had a Model I talk to me. The nice folks at the Gateway Mall Radio Shack in St. Pete, FL let me spend an entire Saturday afternoon playing with their Synthesizer. (I probably drove them all crazy.) Believe me, having the computer talk is a strange experience at first. After a while, though, it becomes quite natural.

For part of my experiments, I used the "Talking Eliza" program. ELIZA is supposed to simulate artificial intelligence in portraying a psychoanalyst. It takes what you have typed into the computer and makes comments based on what you have said. Rather than the response being displayed on the screen, though, the voice synthesizer "speaks" its answers.

As far as the program went, I found ELIZA to be a better comedienne than a psychoanalyst, but the words pronounced by the synthesizer were quite recognizable, although in the stereotypical monotone. There were no inflections of the words to show any emotion, which may be why it seemed so funny!

After getting my psyche analyzed (which proved beyond a shadow of a doubt that I am off my rocker), I tackled

programming the synthesizer myself. Voice synthesis is accomplished by stringing together vocal sounds. Human speech is broken down into phonemes. For example, the word "cat" has three phonemes: k, aah, and t. By typing into a STRING the symbols for those phonemes, the voice synthesizer "speaks" the word.

You are given a dictionary in the manual that will show you the most common of words and their combination of phonemes. For other words, you must sound them out and find the matching symbol for that sound. I found that the English language is quite fascinating when broken down into sounds. My attempts at programming the synthesizer to say "I love you" were rewarded by a very good rendition of the words, and my friend there helping me understood it quite well.

There are a few voice synthesizers on the market. The obvious one to mention is the TRS-80 Voice Synthesizer that was marketed by Radio Shack. I understand that it has been discontinued because it is NOT compatible with the new Model III. But, if you are a Model I owner, you may very well find a few left out there in some of the stores. Ask at your local Shack if they can locate one for you. Also, there are a few of them floating around that are being sold by previous owners.

Progressive Electronics offers a Model I/III voice synthesizer called the "Speak Easy." Their ads boast human quality voice for \$229.95. (I wrote to these folks for further information, but as yet have not heard from them.) The 297 vocabulary is contained in ROM, which means that you don't have to figure out phonemes.

Micro Mint Inc. offers a MICROMOUTH. The Model I version is \$175, and the Model III version is \$200. Their ads say it will say 144 expressions. (I have written to these people for information, too, but have not received any.)

Well, now, let's say you found one of the TRS-80 Voice Synthesizers really cheap somewhere, but you own a Model III computer. All is not lost. Somebody out there heard you crying. Design Solution, Inc., Box 125, Fayetteville, Arizona 72702 may have the answer. They have a Model I/III interface (the AN-587) that allows the TRS-80 Model III owner to connect and interface MOST port based Model I hardware with the Model III. They did not specifically mention the Voice Synthesizer in their literature as a device that could be interfaced, but it is certainly worth checking into. The unit comes complete with external power supply module and a well-written operation manual, all for \$49.95.

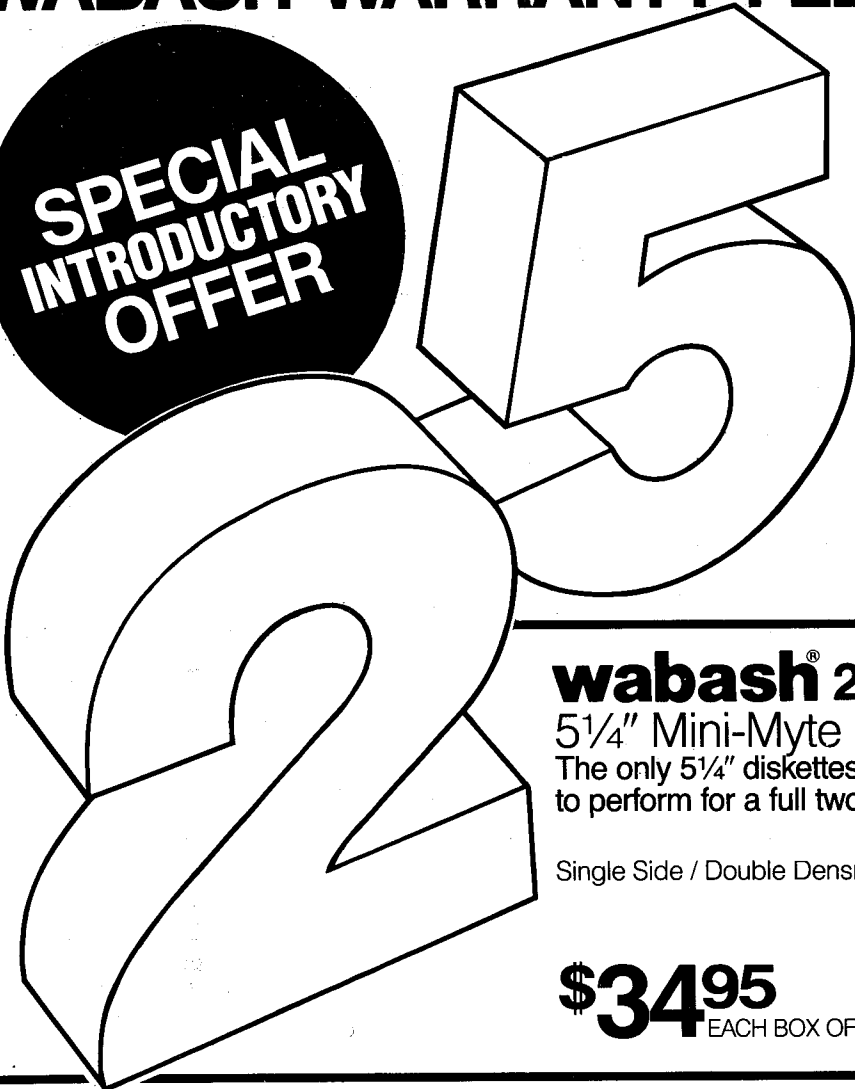
You can also go to Design Solution, Inc. for an Audio Signal Processor which can digitally create sounds as music, speech and sound effects through an built-in amplifier-speaker system. (Sounds like a combination Voice Synthesizer/Vox-Box.) You can get isolated word speech synthesis or phoneme based speech synthesis, voice pattern data

continued on page 33

H & E COMPUTRONICS INC.

WABASH WARRANTY FLEXIBLE DISKS

**SPECIAL
INTRODUCTORY
OFFER**



wabash®
5-YEAR WARRANTY
 8" Maxi-Myte
 Flexible Disks
 The only 8" diskettes guaranteed
 to perform for a full five years.

Single Side / Double Density

\$39.95
 EACH BOX OF 10

wabash®
2-YEAR WARRANTY
 5 1/4" Mini-Myte Flexible Disks
 The only 5 1/4" diskettes guaranteed
 to perform for a full two years.

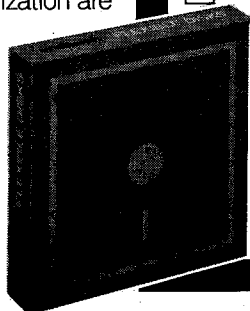
Single Side / Double Density

\$34.95
 EACH BOX OF 10

COATING The Coating process has been recently improved by our revolutionary SR-3000 manufacturing process, resulting in a completely uniform surface, with excellent adherence to the polyester base. The result: consistent signal quality which is crucial to all applications, on all appropriate drives.

PUNCHING State-of-the-Art equipment at the Paoli plant assures precision punching and assembly for every Wabash diskette. Certification and initialization are also care fully supervised at this stage, guaranteeing satisfactory use of Wabash diskettes for years to come.

Ask us about our other in-stock and ready-to-ship products including printer ribbons, pressure sensitive labels, paper, media storage equipment, and more!



CALL TODAY OR SEND COUPON
800-631-2818 24-HOUR HOTLINE **914-425-1535**

COMPUTRONICS 50 N. Pascack Road
 Spring Valley, N.Y. 10977

- Please send me _____ boxes of 8" Maxi-Myte Flexible Disks at **\$39.95** per box. Please add \$3.00 for shipping.
- Please send me _____ boxes of 5 1/4" Mini-Myte Flexible Disks at **\$34.95** per box. Please add \$3.00 for shipping.
- Please send me more information about other Computronics products.

Check enclosed   

Credit Card No. _____ Exp. _____

Name _____

Address _____

City/State/Zip _____

Phone (_____) _____

ASSEMBLY LANGUAGE FOR RANK BEGINNERS (PART II)

Joseph Rosenman

Decimal - Hexadecimal Conversions

Before the serious study of assembly language can be undertaken, it is necessary to become familiar with the base 16 or "hexadecimal" number system. The 16 symbols used in "Hex" are: 0 1 2 3 4 5 6 7 8 9 A B C D E F.

At this point, take a look at figure 1. This table presents all the numbers from 0 to 52 in Decimal, Binary, and in Hex. Several points should be noticed right from the start. Since Hex is in base 16, there is a new column at every power of 16. The second column is added at 16 (or Hex 10), the third is added at 256 (or Hex 100), the fourth is added at 4096 (or Hex 1000), and the fifth is added at 65536 (or Hex 10000). We will confine ourselves (for the most part) to the first two columns, the "ones" and the "sixteens." Examine the numbers 0 to 16 (10H) in figure 1. For every count of sixteen, the binary numbers (in a set of four) will go through a complete sequence (from 0000 to 1111). If you are beginning to suspect that there is a direct correlation between every Hex column and every four binary columns, you are right! Consider:

0000 0000 = 0H	0001 0000 = 10H
0010 0000 = 20H	0011 0000 = 30H
0100 0000 = 40H	0101 0000 = 50H
0110 0000 = 60H	0111 0000 = 70H
1000 0000 = 80H	1001 0000 = 90H
1010 0000 = A0H	1011 0000 = B0H
1100 0000 = C0H	1101 0000 = D0H
1110 0000 = E0H	1111 0000 = F0H

0001 0000 0000 = 100H
0010 0000 0000 = 200H
0011 0000 0000 = 300H

Let's see how the multiples of 16 correspond to the Hex numbers.

0 = 0H	128 = 80H
16 = 10H	144 = 90H
32 = 20H	160 = A0H
48 = 30H	176 = B0H
64 = 40H	192 = C0H
80 = 50H	208 = D0H
96 = 60H	224 = E0H
112 = 70H	240 = F0H
256 = 100H	

Now, using the techniques presented in the last issue, let's convert numbers from Hex to Decimal. Try the numbers 12H, 30H, 17H, 9H, 2BH, 0DH, 7FH, 5EH, and 12CH. Then, convert the Hex numbers into Binary (you can check all the numbers less than 53 by comparing the results to figure 1). When a Hex number begins with one of the letter symbols (A-F), the number is preceded with a 0 (as in 0DH).

12H:

$$1 * (16 \text{ to the first}) = 1 * 16 = 16,$$

$$2 * (16 \text{ to the zero}) = 2 * 1 = 2,$$

18

30H:

$$3 * (16 \text{ to the first}) = 3 * 16 = 48,$$

$$0 * (16 \text{ to the zero}) = 0 * 1 = 0,$$

48

17H:

$$0 * (16 \text{ to the first}) = 1 * 16 = 16,$$

$$7 * (16 \text{ to the zero}) = 7 * 1 = 7,$$

23

9H:

$$9 * (16 \text{ to the zero}) = 9 * 1 = 9$$

2BH:

$$2 * (16 \text{ to the first}) = 2 * 16 = 32,$$

$$11 * (16 \text{ to the zero}) = 11 * 1 = 11,$$

43

0DH:

$$13 * (16 \text{ to the zero}) = 13 * 1 = 13$$

7FH:

$$7 * (16 \text{ to the first}) = 7 * 16 = 112,$$

$$15 * (16 \text{ to the zero}) = 15 * 1 = 15,$$

Binary = 0111 1111, 127

Decimal-Binary-Hexadecimal

Decimal-Binary-Hexadecimal

0	00 0000	0	27	01 1011	1B
1	00 0001	1	28	01 1100	1C
2	00 0010	2	29	01 1101	1D
3	00 0011	3	30	01 1110	1E
4	00 0100	4	31	01 1111	1F
5	00 0101	5	32	10 0000	20
6	00 0110	6	33	10 0001	21
7	00 0111	7	34	10 0010	22
8	00 1000	8	35	10 0011	23
9	00 1001	9	36	10 0100	24
10	00 1010	A	37	10 0101	25
11	00 1011	B	38	10 0110	26
12	00 1100	C	39	10 0111	27
13	00 1101	D	40	10 1000	28
14	00 1110	E	41	10 1001	29
15	00 1111	F	42	10 1010	2A
16	01 0000	10	43	10 1011	2B
17	01 0001	11	44	10 1100	2C
18	01 0010	12	45	10 1101	2D
19	01 0011	13	46	10 1110	2E
20	01 0100	14	47	10 1111	2F
21	01 0101	15	48	11 0000	30
22	01 0110	16	49	11 0001	31
23	01 0111	17	50	11 0010	32
24	01 1000	18	51	11 0011	33
25	01 1001	19	52	11 0100	34
26	01 1010	1A			

FIGURE 1

Attention

BARGAIN HUNTERS

Receive Hundreds of Classified Ads
Like These Every Month

HARD DISK DRIVE Diablo Mod 31
1.2 MByte std. density. Includes
power supp. and cable, rack mount
slides, amd manual. Excellent
condition. \$450. Call 1601

IMPACT PRINTER 165 CPS Serial
and parallel interfaces-Eight
Selectable character sizes-Single
and double width characters-uses
standard plain paper - same
mechanism as the integral data
system. 1 year old \$589.

HEATHKIT H-11/DEC LSI-11
system, 32K Byte storage, reader 1
punch, video terminal, complete
software. Cost \$4500 assembled,
\$3500 kit. Like new. Sell for \$2250.
305-962-6677. 2058 Griffin Rd., Ft.
Lauderdale, FL 33312.

FOR SALE: Interdata (Perkin-Elmer)
7/16 Mini with 32KB core, front
panel, 50A PWR supply. Includes
HS tape reader, interfaces for LP, 2
(TTY), and RS-232 (Full duplex,
programmable). Includes manuals
and much SW (Basic, Fortran, OS,
etc.). \$800 - After 6 PM 603

COMPUTER AUTOMATION ALPHA
16; 16 k-word core memory, RTC,
PF-R. Modified Mod. ASR-33 TTY.
Manuals, utilities, assemblers and
many option boards - 16 bit I/O
Driver, 16 bit I/O, Asynch modem
contr. 64 bit output, 10 bit A/D -
D/A. Fairly complete documenta-
tion. Up and running in Fortran.
Not much more than TTY at \$1000.
Herb Sauer, 303-494-8724.

FOR SALE: Heath H9 video ter-
minal, excellent condition, \$175 or
best offer. You ship. [214] 962-4484

WANTED: DIGITAL Group 32K
memory board without memory
chips and Phi deck controller board
(kit, assembled or not working).
1510 NW 35th.

PET COMPUTERS moving up to LSI-
11. Pet business system priced to
sell. PET 2001-16N Computer \$800;
2040 Dual Floppy 340K (holds more
data than 6 TRS-80 disks) \$1,100.
Digital cassettes (2) \$60 each.
System complete with Text Editor,
disk sort, database software, real
estate software and more \$2,100.
Call PAUL (313)971-8447

COMPUTER SHOPPER, the new buy, sell, and trade publication, is ready to help you with the latest information on personal, small business and large-system computers, accessories and software.

Each ad-packed issue is full of bargains you are looking for. Included are ads from individuals throughout the United States who are selling their good, pre-owned equipment just so they can trade-up to new equipment coming on the market.

But, COMPUTER SHOPPER'S bargains won't be yours unless you subscribe. This useful, money-saving publication can become your way to communicate with other buyers, sellers, and traders all over the nation.

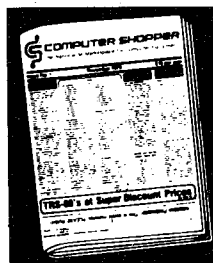
Whether you are a hobbyist or a part-time user, COMPUTER SHOPPER will put you in touch with the nationwide computer marketplace in time for you to take advantage of bargain opportunities.

Have something to sell? A COMPUTER SHOPPER subscriber probably wants to buy it.

Looking for a part, component or even a complete system? A COMPUTER SHOPPER subscriber probably wants to sell it.

COMPUTER SHOPPER is THE marketplace for anything in computers and is read by thousands of people who are ready to buy.

COMPUTER SHOPPER offers a unique format in which classified ads are categorized for fast location of specific items. Combining this with low individual ad rates — 12 cents a word —



makes it the ideal place for buyers and sellers to communicate. And, its mix of individual, dealer, and manufacturer ads enable subscribers to find what they want at the best price possible.

COMPUTER SHOPPER will work for you in other ways, too. If you are just thinking about getting into computers, it can help you learn product availability and prices before you make a decision. And, through the timely ads, COMPUTER SHOPPER will keep you abreast of changes in the market which could create bargain opportunities for you.

BUT COMPUTER SHOPPER cannot work for you unless you subscribe.

Want to look us over first? We'll give you your first issue FREE and then bill you for the next 12. If you are not convinced COMPUTER SHOPPER suits your needs, just write "cancel" on the invoice and return it.

And, to let COMPUTER SHOPPER start working for you right now, with a paid subscription we'll also give you a FREE classified ad to sell your pre-owned equipment or to find equipment you want.

If you don't need to use the free classified ad now, use it anytime during your subscription.

Subscription: \$10/year, 12 issues plus your first free one. Bank cards accepted. Money back guarantee.



The Nationwide Marketplace for Computer Equipment

COMPUTER SHOPPER

P.O. Box 23 • Titusville, Florida 32780

Telephone 305-269-3211

MasterCharge or VISA orders only, call TOLL FREE 800-327-9920.

5EH:

$$5 * (16 \text{ to the first}) = 5 * 16 = 80,$$

$$14 * (16 \text{ to the zero}) \quad 14 * 1 = 14,$$

$$\text{Binary} = 0101 \ 1110, \quad \underline{\quad\quad\quad} \quad 94$$

12CH:

$$1 * (16 \text{ to the second}) = 1 * 256 = 256,$$

$$2 * (16 \text{ to the first}) = 2 * 16 = 32,$$

$$12 * (16 \text{ to the zero}) = 12 * 1 = 12,$$

$$\text{Binary} = 0001 \ 0010 \ 1100, \quad \underline{\quad\quad\quad} \quad 300$$

What about Decimal into Hex? Well, it's not quite as straightforward as Hex into Decimal. Needless to say, there is a way. Recall the powers of 16: 1, 16, 256, 4096, 65536. By selecting the appropriate number to divide by, it is possible to convert the number into Hex. Of course, you must convert the numbers 10-15 into A-F. Let's try reconverting the numbers we just converted into Decimal back to Hex.

$$65536 = 10000H$$

$$4096 = 1000H$$

$$256 = 100H$$

$$16 = 10H$$

$$1 = 1H$$

The method used is to select the Decimal number in the above table that is larger than the "target" number, and begin dividing. So, let's try a large number 115211.

$$(10000H) \ 115211 / 65536 = 1, \ R = 49675$$

$$(1000H) \ 49675 / 4096 = 12, \ R = 523$$

$$(100H) \ 523 / 256 = 1, \ R = 11$$

$$(10H) \ 11 \text{ <is less than 16, so field = 0>}$$

$$(1H) \ 11 / 1 = 11, \ R = 0$$

Now, we multiply the Hex field value by the column value, and add the remainders together. Remember that all numbers between 10 and 15 need to be converted to their respective Hex symbols, A-F.

$$10000H * 01H = 10000H$$

$$1000H * 0CH = 0C000H$$

$$100H * 02H = 200H$$

$$10H * 00H = 00H$$

$$1H * 0BH = 0BH$$

$$\underline{\quad\quad\quad} \quad 1C20BH$$

Ok, they say that practice makes perfect. Here are the numbers to reconvert:

18:

$$18 / 16 = 1, \ R = 2 \quad <10H>$$

$$2 / 1 = 2 \quad <2H>$$

$$\underline{\quad\quad\quad} \quad 12H$$

23:

$$23 / 16 = 1, \ R = 7 \quad <10H>$$

$$7 / 1 = 7 \quad <07H>$$

$$\underline{\quad\quad\quad} \quad 17H$$

48:

$$48 / 16 = 3, \ R = 0 \quad <30H>$$

$$0 / 1 = 0 \quad <0H>$$

$$\underline{\quad\quad\quad} \quad 30H$$

43:

$$43 / 16 = 2, \ R = 11 \quad <20H>$$

$$11 / 1 = 11 \quad <0BH>$$

$$\underline{\quad\quad\quad} \quad 2BH$$

9:

$$9 / 1 = 9 \quad 9H$$

13:

$$13 / 1 = 13 \quad 0DH$$

127:

$$127 / 16 = 7, \ R = 15 \quad <70H>$$

$$15 / 1 = 15 \quad <0FH>$$

$$\underline{\quad\quad\quad} \quad 7FH$$

94:

$$94 / 16 = 5, \ R = 14 \quad <50H>$$

$$14 / 1 = 14 \quad <0EH>$$

$$\underline{\quad\quad\quad} \quad 5EH$$

300:

$$300 / 256 = 1, \ R = 44 \quad <100H>$$

$$44 / 16 = 2, \ R = 12 \quad <20H>$$

$$12 / 1 = 12 \quad <0CH>$$

$$\underline{\quad\quad\quad} \quad 12CH$$

Now, since we have established that practice makes perfect, I will provide a list of numbers to convert. In the next installment of this column, I will provide the answers. Convert into Decimal: 10H, 7BH, 2694H, 3F2, 0ABCH, 309H, 0DADH, 7BE, 162E, 0BACH. Convert into Hex: 467, 22, 4013, 3053, 645, 747, 999, 135, 2000, 3771.

LOGICAL OPERATIONS

In the study of Logical operations, we are going to learn some aspects of different mathematical system, known as "Boolean Algebra." Instead of the familiar arithmetic operations we use (plus, minus, multiplication, division), we will examine ANDing, ORing, XORing (exclusive ORing), and NOTing. We will primarily be concerned with Binary numbers, so make sure you have a pretty good grasp of binary before you attempt this new material.

Recall that a four bit value is also known as a nybble. We will examine logical operations with bytes, nybbles, and with single bits. Logical operations are of two types: Unary (with one bit), and Binary (with two bits). The operation "NOT" is a unary type, while "AND", "OR," and "XOR" are all binary.

Frequently, when working with bits, a 1 is known as "True," and a 0 is known as "False." If you consider that each bit can be used to contain the result of a yes/no question, you will see how logical operations form the basis of "decision making" routines. In fact, you will notice that the numbers respond to ORs and ANDs in much the same way we would use those words in expressing conditional statements in English.

NOT—This operation causes a bit to become the opposite of what it was. What was true becomes false, and what was false becomes true. In other words, a 1 becomes a 0 and a 0 becomes a 1. Let's examine some examples:

$$1001 \text{ becomes } 0110 \ (9 \text{ becomes } 6),$$

$$0000 \text{ becomes } 1111 \ (0 \text{ becomes } F),$$

$$0101 \text{ becomes } 1010 \ (5 \text{ becomes } A), \text{ etc.}$$

$$0000 \ 0000 \text{ becomes } 1111 \ 1111 \ (00 \rightarrow FF)$$

$$0011 \ 0101 \text{ becomes } 1100 \ 1010 \ (35 \rightarrow CA),$$

$$1001 \ 0110 \text{ becomes } 0110 \ 1001 \ (96 \rightarrow 69), \text{ etc.}$$

AND—This operation causes a bit to be true only if both bits are true. Otherwise, the resulting byte is false. There are four possible combinations of bits in any given binary operation. The results of these operations can be easily seen in the table below.

0	0	1	1
0	1	0	1
0	0	0	1

In other words, only when both bits are true will the logical AND also be true.

0000	1111	1010	1110	1001	0110
0000	0000	1111	0100	0011	0111
0000	0000	1010	0100	0001	0110
0000	0111	0000	0111	1111	0000
1010	1010	0011	1100	0110	1001
0000	0010	0000	0100	0110	0000

OR—This operation causes a bit to be true if either bit is true. The result is false only if both bits are also false.

0	0	1	1
0	1	0	1
0	1	1	1

Some examples of the Logical OR:

0000	1111	1010	1110	1001	0110
0000	0000	1111	0100	0011	0111
0000	1111	1111	1110	1011	0111
0000	0111	0000	0111	1111	0000
1010	1010	0011	1100	0110	1001
1010	1111	0011	1111	1111	1001

XOR—This operation causes a bit to be true only if 1 of the two bits are true, and the other is false. The result is false if both bits are false, or if both bits are true. It is known as the "Exclusive OR" because the OR operation is true only if 1 of the two bits (exclusive of the other) is true, not both of the bits.

0	0	1	1
0	1	0	1
0	0	1	1

Some examples of the Logical XOR:

0000	1111	1010	1110	1001	0110
0000	0000	1111	0100	0011	0111
0000	1111	0101	1010	1010	0001
0000	0111	0000	0111	1111	0000
1010	1010	0011	1100	0110	1001
1010	1101	0011	1011	1001	1001

continued on page 47

PONY EXPRESS™

Finally
The most complete mailing program
ever designed, used for many years
by large corporations and organizations

Now Available for the Trs 80*
Models I and III

Following are some of the features of
PONY EXPRESS

- ★ Unlimited amount of files
- ★ 1400 records on a Model III 40 track diskette
- ★ Fast machine code sort
- ★ Records can be sorted by name, zip code, zip and name, zip and address
- ★ Records can be printed on labels one to five across
132 character wide paper
80 character wide paper
or with cheshire format
- ★ Print your own return address labels or any other one to five line message
- ★ Records can be selected by an unlimited amount of selection codes.
- ★ Automatic repeat routines for ease of entering records
- ★ Codes can be used instead of titles for greater efficiency during input
- ★ Unique correction and deletion routines for ease of updating files
- ★ Self-documenting and extensive documentation so that **anyone** can learn how to use **PONY EXPRESS** in less than an hour

Special Introductory Offer
\$99.00

Call or Write to

COMPUTECH

975 Forest Avenue
Lakewood, New Jersey 08701
(201) 364-3005

Master Charge and Visa accepted,
add \$2.50 Shipping and Handling.
N.J. residents add 5% sales tax.

*Trs 80 is a trademark of Tandy Corp.

MODEL III CORNER

Hubert S. Howe, Jr.

This Month: The TRS-80 Model III ROM

A few years ago, back in 1979-80, I authored a series of columns on assembly language programming for the TRS-80 Model I. These were ultimately expanded and published in book form by Prentice-Hall. In the next few columns in this space, I would like to bring some of the materials covered in the previous series up to date concerning the Model III. This material is not just for persons interested in understanding assembly language programming, but for anyone who wants to understand what is really inside the Model III's memory. Because it is so necessary for assembly language programming, I will concentrate on those applications. Persons unfamiliar with some of the technical terms and other details used in this column may find the previous series helpful.

Memory Addressing

All 8-bit microprocessors have the limitation that the maximum address space they can access is 64K bytes. The reason for this is that they allow a single memory location to be specified in just two bytes, and the maximum value that can be contained in two bytes is 65,535 (which is referred to as 64K because "K" equals 1,024 in computer terminology). Extending this to three bytes would increase the address space to over 16 million bytes, but it would mean that an extra byte would have to be accessed for every memory read or write instruction.

The memory addressing space can be filled in a variety of ways by the computer manufacturer, and this is where all microcomputers are different even though they may use the same microprocessors. Looking over all the memory locations in the TRS-80 Model III, we see what is shown in Figure 1: locations 0000 to 37FF (all addresses will be referred to in hexadecimal) contain ROM (read-only memory). From 37FF to 3FFF we find some memory-mapped input/output (I/O) devices, and from 4000 to FFFF is the space reserved for the RAM (random-access memory). You will be familiar with the fourth alternative if you don't have 48K RAM: the address space is empty!

Before you can write an assembly language program for the TRS-80, you must know the organization of its memory and how to use the various parts of it. In this column, we will examine the TRS-80's ROM and dedicated I/O areas in detail, and we will also discuss the functions of the various I/O ports on the Model III. A future column will be devoted to the RAM.

Some of this information is contained in the TRS-80 MODEL III OPERATION AND BASIC LANGUAGE REFERENCE MANUAL, but in fact this book contains only the barest outlines of the system. Other publications give many more details. Most books on this subject provide a disassembly of the ROM together with comments about the what the instructions are doing. The main reason why Radio Shack doesn't give more details is not that it doesn't want you to understand the innards of your computer, but that it will not commit itself to preserving the present organization of the

computer in new versions and releases. By restricting the documentation, it has promised to preserve the published addresses and functions.

The ROM contains the Level II Basic interpreter, as well as the software for accessing the I/O devices, including the keyboard, video display, cassette recorder, line printer and RS-232-C Interface. There is also a "bootstrap loader" program for the mini disk drives, but most of the disk I/O software is read in from the disk when the system is initialized or reset. The main reason for placing software in ROM is so that it cannot be accidentally erased.

The dedicated input/output addresses contain locations where certain devices are interfaced to the TRS-80 through MEMORY MAPPING. Only the keyboard and video display are connected in this way, whereas almost all the peripherals on the TRS-80 Model I were interfaced in this manner. Most peripherals on the Model III are interfaced through I/O ports.

The RAM is where your programs and data must be located, but many addresses at the bottom of RAM are reserved for special purposes. In a non-disk Level II Basic system, 1000 locations are reserved. When you connect a disk drive to the TRS-80, the software needed to operate the disk must be loaded off the system drive into low RAM. This area of RAM then functions as an extension of the ROM, and if you accidentally destroy it, you must reboot the system. The TRSDOS disk operating system reserves over 5K, and Disk Basic requires an additional 5K.

The Model III ROM

The TRS-80 has an unusually large ROM for a microcomputer. Most micros have just some kind of monitor or

Starting Address		Use	Details
Decimal	Hex		
0	0	ROM area	12K Model III BASIC 2K ROM for system use
12288	3000		
14336	3800	Dedicated I/O area	Keyboard Matrix Unused Video display
14465	3881		
15360	3C00		
16384	4000	RAM area	Reserved RAM User memory End of 16K RAM End of 32K RAM End of 48K RAM
17385	43E9		
32767	7FFF		
49151	BFFF		
65535	FFFF		

Figure 1: Basic organization of the TRS-80 Model III's memory.

operating system in ROM, containing only the software for accessing the primary input/output devices. The TRS-80 has all that, but it also has the Level II Basic interpreter, which is huge by comparison. Level II Basic is an extremely complicated assembly-language program, written by Microsoft. Understanding how it works is both beyond the scope of this column and unnecessary. Most of the Level II interpreter is unusable to assembly-language user programs anyway.

The primary reason we need to know about the ROM is to be able to use the input/output software. We may also be interested in knowing the general organization of Level II Basic, and how to find out more about it. When confronted with even an outline of the ROM, most users are bewildered at first. What is all that stuff in there, and why is it organized in the way that it is? These are difficult questions to answer even when you do understand it! Some of the reasons for this organization has to do with the history of the TRS-80 and the relation of the Model III to the Model I. Much of the rest is essentially arbitrary and actually quite haphazard. If you look at a detailed map of the ROM, you will see that there are many unused bytes in it, that many routines jump all around for no apparent reason, and related sections of code are by no means all in the same area.

A general outline of the Level II ROM is shown in Figure 2. This is only a bare outline, and we will go into more detail below. Note that the ROM is divided into five sections: 0 to 0707, 0708 to 1607, 1608 to 1935, 1936 to 2FFF, and 3000 to 37FF. The first of these sections contains system initialization and I/O routines or vectors, the second floating-

point math, the third tables of the BASIC reserved words, functions, and addresses, the fourth most of the Level II BASIC Interpreter, and the fifth additional I/O routines. The fifth section has been added to the Model III, whereas the other sections were adapted from the Model I's ROM, much of them lifted verbatim.

Before we go into these areas in detail, it is necessary to understand some terminology:

A VECTOR is simply a branch or jump to another location. Vectors are used when you want to put all the addresses that relate to carrying out specific functions in one area, but carry out the details elsewhere.

A DRIVER program is the software necessary to communicate with a device. The driver for the video display, for

Addresses	Purpose
0000 - 0707	System initialization, RST and I/O vectors, Graphics routines, Line printer and Video display drivers
0708 - 1607	Floating-point math
1608 - 1935	Tables of Level II Basic reserved words, entry points for Level II commands, RAM initialization and messages
1936 - 2FFF	Level II BASIC interpreter
3000 - 37FF	Keyboard driver, cassette and RS232 I/O routines, misc. tables, initialization and Model III special routines

Figure 2: Outline of the Model III ROM.

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.

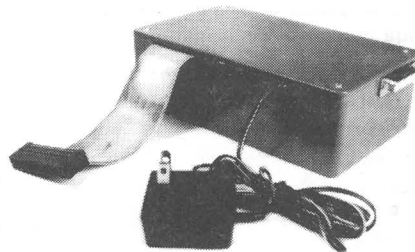
The UPI-3 is completely self contained and ready to use. A 34 conductor edge card connector plugs onto the parallel printer port of the model I Expansion Interface or onto the parallel printer port on the TRS-80 III. A DB25 socket mates with the cable from your serial printer. The UPI-3 converts the parallel output of the TRS-80 printer port into serial data in both the RS232-C and 20 MA. loop formats.



SPEEDWAY ELECTRONICS
Division of Binary Devices
11560 TIMBERLAKE LANE
NOBLESVILLE, IN 46060
(317) 842-5020

TRS 80 is a trademark of Tandy

VISA MasterCard



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	

ST80-III The Ultimate Communications Package:

Price \$150.00

This is our top of the line communication package. Full disk support including DOS commands have been implemented. ST80-III™ has been on the market for over two years and has become the standard in TRS-80™ communication. This package has been used in a wide variety of applications including use with:

Addressomultigraph, Compugraphics, Spectrometers, and a wide range of Time-sharing computers.

IBM	CDC	ITEL	Honeywell
DEC	WANG	Prime	Data General
Amdhal	RCA	XEROX	GE
Apple	Heath	Northstar	Altos
Superbrain	PET	Cromemco	HP 2000

The package includes the ST80-III™ smart terminal program and nine other communication utilities: Fully documented with easy to follow instructions, ST80-III™ is by far the best terminal product on the market today. Features:

- 1) User configurable communication tables
- 2) Auto Logon
- 3) Last line repeat
- 4) Formatted video (Page, Scroll & Formatted)
- 5) Direct cursor addressing
- 6) File transfer from disk or to disk
- 7) Printer support
- 8) Echo, Feedback & Veriprompt™ verifies data transmitted
- 9) 110 to 9600 BAUD support
- 10) Remote control of Memory open & close, Printer on & off, Video on & off & auto logon
- 11) Help display
- 12) User definable function keys

Host Communications: Price \$ 50.00

This program is by far the best HOST program you can buy. It supports the PRINT @ statement for the remote TRS-80™ running any of the ST80™ smart terminal programs. All of the ST80-III™ advanced functions are supported by host allowing easy access via BASIC, Fortran and machine language programs. Host features include:

- 1) User defined RS-232 port addressing
- 2) Definable BAUD rates from 110 to 9600
- 3) Definable break (yes/no)
- 4) Allow line feeds
- 5) Commands:
 - a) Turn on RTS (request to send),
 - b) Turn off RTS,
 - c) Receive data only from terminal,
 - d) Receive data only from host,
 - e) Send data only to host,
 - f) Send data only to terminal,
 - g) Operate in dumb terminal mode,
 - h) Operate in ST80™ mode,
 - i) Check CTS status. (clear to send)

This is a self relocating subroutine that can load anywhere in high memory.

Communications hardware available



SMALL BUSINESS
SYSTEMS GROUP, INC.
6 Carlisle Road
Westford, MA 01886
(617) 692-3800

example, contains all of the instructions necessary to display characters. Driver programs are used to simplify communications: you need simply to CALL the driver with the byte you want to display, which may involve executing hundreds or thousands of additional instructions.

INITIALIZATION code contains information that is moved from the ROM to various areas in the RAM upon system power-on or reset, as well as the code necessary to move the bytes. In order to run the computer under normal conditions, this code is expected to be in various locations.

Addr.	Name	Description
0000		System initialization, RST vectors (discussed in connection with the RAM), I/O subroutine vectors:
0013		General purpose read byte subroutine
001B		General purpose write byte subroutine
0023		General purpose read/write subroutine
002B	KBCHAR	Input from keyboard, return immediately
0033	VDCHAR	Display byte at cursor location
003B	PRCHAR	Line print byte
0040	KBLINE	Input line from keyboard, echo to screen
0049	KBWAIT	Input from keyboard, wait till key pressed
0050	RSRCV	RS232 input byte
0055	RSTX	RS232 output byte
005A	RSINIT	Initialize RS232
0060	DELAY	Delay loop
0066	NMI	Non-maskable interrupt vector
0069	INITIO	Initialize all I/O drivers
006C	ROUTE	Re-route I/O devices
0075		Non-Disk Basic initialization
0132		Graphics routines: SET, RESET, POINT
019D	INKEY\$	Scan keyboard
01C9	VDCLS	Home cursor, clear screen
01D3	RANDOM	Seed random number generator
01D9	PRSCN	Print screen routine
01F8	CSOFF	Turn cassette off
01FB	DELAY	(continued from 60)
021B	VDLINE	Print line of text on video display
0235	CSIN	Read byte from cassette
0264	CSOUT	Output byte to cassette
0287	CSHWR	Write cassette leader and sync byte
028D	KBBRK	Check BREAK key
0296	CSHIN	Read cassette leader and sync
0298	CLKON	Turn on clock
02A1	CLKOFF	Turn off clock
02A9	SYSTEM	Read SYSTEM tape
032A		Basic LIST routine
0358		Single key input
0361		Multiple key input
0384		Wait for key input
038B		Reset LIST device
039C		Basic printer routine
03C2		Line printer driver
0452		Reset I/O drivers
0473		Video display driver
05D9	KBLINE	Input line from keyboard, echo to screen
0674		I/O Dispatcher

Figure 3: Low ROM outline

The term ROUTINE is used to describe a logically independent section of code that performs some function. If the routine can be entered and exited by means of a CALL and RETURN instruction, it is called a SUBROUTINE. Calls to subroutines can be placed into the mainstream area of a program without affecting its operations, provided that the appropriate registers are saved and restored.

Low ROM Outline

As shown above, the low ROM area of the Model III contains system initialization, various vectors and drivers, and some miscellaneous Basic routines. It contains almost all of the documented subroutine addresses, but in fact most of these are vectored elsewhere. Figure 3 contains a detailed listing of all the principal routines in the low ROM area. It shows the starting or entry address (in hexadecimal), the name of the routine if it is referred to by a Basic reserved word or listed as a subroutine in the REFERENCE MANUAL, and a brief description of the function.

Floating-point Mathematics Outline

The floating-point mathematics routines are some of the most complicated in the Level II Basic interpreter. Entire books have been written explaining how to perform these calculations and to access these subroutines from assembly language. Of all the functions performed by the ROM, these are best left to Basic programs. For this reason we will not go into this subject here, but leave it for the specialists.

ROM Tables and Reserved Words Outline

This area of the ROM contains information used by the Level II Basic interpreter to decode and execute statements. Radio Shack was very concerned with upward compatibility from the Model I when it introduced the Model III. While there are many differences between the Model I and Model III ROMs, the one area where complete compatibility exists is in the addresses where Basic statements are executed. This allows assembly-language programs which were written for the Model I to be executed on the Model III without revision. While we cannot go into all these details, we can at least show you how it is organized and to discover more yourself.

Figure 4 is an outline of the tables in this area, and figure 5 summarizes much of what you can get from inspecting the tables.

Address Contents

1608	Function address table
1650	Level II Basic reserved word table
1822	Reserved word address table
189A	Precedence table for mathematical operations
18A1	Mathematical operator index
18C9	Error codes
18F7	RAM initialization code for 4080-40A6 (division support routine)
191D	Messages: "Error", "in", "Break", "Ready"

Figure 4: Outline of tables of Basic reserved words and addresses.

The Model III ROM map shown in Figure 4 does not go into the decoding of Basic statements. If you are interested in this subject, the following information will explain how to find out more about it.

Each of the Level II Basic reserved words is represented internally by a unique byte, called a "token", with a value from 80H to FBH. When you type in a Basic program, only the tokens are stored -- not the complete words you type. The table at locations 1650 to 1820 is a list of all the reserved words, in numerical order of the tokens. The first byte of each word is indicated by having bit 7 set, which is not used in ASCII code. There are two tables of jump addresses, located at 1608 to 164F and 1822 to 1899, plus a third area starting around 24B0, that give the addresses where each command is executed. If you figure all this out, you can construct the table in Figure 5, which is shown by tokens, in alphabetical rather than numerical order.

If you want to know more about the ROM, the best thing to do is to get a disassembler program and look at a disassembled listing of the ROM. A disassembler is the reverse of an assembler, showing the machine instructions corresponding to the program stored in memory. This would enable you to understand better the functions of the Level II Basic interpreter, which are located in the area from 1936 to 2FFF. We will not outline that area in any detail here.


High ROM Outline

It was mentioned above that the high ROM area was added to the Model III, whereas much of the rest of the

SPIKE-SPIKERS™

Protect-Control-Organize Computer & Peripheral Equipment

Helps prevent software "Glitches", unexplained
memory loss, and equipment damage.



Deluxe Power Console
79.95

PROTECTS against power line transients & filters out RFI "Hash". 2 separate filtered circuits.


CONTROLS with 8 individually switched 120 vac grounded outlets. Main on/off switch-fuse & indicator light.

ORGANIZE your computer & peripheral equipment power cords. No more overloaded octopus cube taps.

Also available in 2-socket wall mounted models.

MINI-I
Transient absorber

34.95



MINI-II
Transient absorber plus RFI "Hash" filtering

44.95

KAGLO Electronics Co. Inc.
 Colony Drive Ind. Park
 6584 Ruch Rd., Dept. **hec**
 Bethlehem, PA 18017

Order Factory Direct
215-865-0006
 Out of state order toll free
800-523-9685

Dealers Invited • PA Res. add 6% • For COD, add \$3.00 + Shipping.

ABS	D9	0977	ERL	C2	24DD	MERGE	A8	418B	SGN	D7	098A
AND	D2	25FD	ERR	C3	24CF	MID\$	FA	2A9A	SIN	E2	1547
ASC	F6	2A0F	ERROR	9E	1FF4	MKD\$	EE	4170	SQR	DD	13E7
ATN	E4	15BD	EXP	E0	1439	MKI\$	EC	416A	STEP	CC	2B01
AUTO	B7	2008	FIELD	A3	417C	MKS\$	ED	416D	STOP	94	1DA9
CDBL	F1	0ADB	FIX	F2	0B26	NAME	A9	418E	STR\$	F4	2836
CHR\$	F7	2A1F	FN	BE	4155	NEW	BB	1B49	STRING\$	C4	2A2F
CINT	EF	0A7F	FOR	81	1CA1	NEXT	87	22B6	SYSTEM	AE	02B2
CLEAR	B8	1E7A	FRE	DA	27D4	NOT	CB	25C4	TAB(BC	2137
CLOAD	B9	2C1F	GET	A4	417F	ON	A1	1FC6	TAN	E3	15A8
CLOSE	A6	4185	GOSUB	91	1EB1	OPEN	A2	4179	THEN	CA	---
CLS	84	01C9	GOTO	8D	1EC2	OR	D3	25F7	TIME\$	C7	4176
CMD	85	4173	IF	8F	2039	OUT	A0	2AFB	TO	BD	---
CONT	B3	1DE4	INKEY\$	C9	019D	PEEK	E5	2CAA	TROFF	97	1DF8
COS	E1	1541	INP	DB	2AEF	POINT	C6	0132	TRON	96	1DF7
CSAVE	BA	2BF5	INPUT	89	219A	POKE	B1	2CB1	USING	BF	2CBD
CSNG	F0	0AB1	INSTR	C5	419D	POS	DC	27F5	USR	C1	27FE
CVD	E8	415E	INT	D8	0B37	PRINT	B2	206F	VAL	F5	2AC5
CVI	E6	4152	KILL	AA	4191	PUT	A5	4182	VARPTR	C0	24EB
CVS	E7	4158	LEFT\$	F8	2A61	RANDOM	86	01D3	+	CD	249F
DATA	88	1F05	LEN	F3	2A03	READ	8B	21EF	-	CE	2532
DEF	BD	415B	LET	8C	1F21	REM	93	1F07	*	CF	---
DEFDBL	9B	1E09	LINE	9C	41A3	RESET	82	0138	/	D0	---
DEFINT	99	1E03	LIST	B4	2B2E	RESTORE	90	1D91	↑	D1	---
DEFSNG	9A	1E06	LLIST	B5	2B29	RESUME	9F	1FAF	-	D4	---
DEFSTR	98	1E00	LOAD	A7	4188	RETURN	92	1EDE	=	D5	---
DELETE	B6	2BC6	LOC	EA	4164	RIGHT\$	F9	2A91	+	D6	---
DIM	8A	2608	LOF	EB	4167	RND	DE	14C9	'	FB	---
EDIT	9D	2E60	LOG	DF	0809	RSET	AC	419A	"	22	2866
ELSE	95	1F07	LPRINT	AF	2067	RUN	8E	1EA3	&	26	4194
END	80	1DAE	LSET	AB	4197	SAVE	AD	41A0		2E	0E6C
EOF	E9	4161	MEM	C8	27C9	SET	83	0135			

Figure 5: Summary of Level II Basic reserved words, tokens, and entry points for executing Basic statements.

ROM was taken from the Model I. If you look at this area in detail, you will see that it has a completely different organization from the rest of the ROM and is really very logical. Almost all of the information here relates to new features of the Model III or to improvements in the Model III over the Model I. A general outline of the routines in this area is shown in Figure 6.

One final word of caution about the ROM is in order: there are different versions of the ROM that are and have been sold by Radio Shack. All of the ROMs are functionally identical, but exactly what the differences are and why different ROMs are being sold is not known at this time.

ROM Subroutines

The ROM contains an enormous number of subroutines, but few of them are useful for assembly-language programs. Those that are useful are summarized below. This list shows the entry point (in hexadecimal), the registers containing parameters for the subroutine, the registers used (destroyed), and the operation of the subroutine. (Subroutines are always entered by a CALL instruction.)

Keyboard Subroutines

002B KBCHAR: scans the keyboard and returns zero in A if no key is depressed, else returns character. Uses AF, DE.

0049 KBWAIT: scans the keyboard and waits for a key to be depressed. Returns character in A. Uses AF, DE.

0040 KBLINE: accepts an entire line of input, terminated by ENTER or BREAK. Displays characters typed, recognizing control functions (backspace, etc.). When called, HL => address of buffer where text is to be put, B = maximum number of characters in line. On exit, B = number of characters typed, including terminator. C set if line ends with BREAK. Uses AF, DE.

028D KBBRK: checks for BREAK key. If pressed, NZ set. Uses AF.

Video Display Subroutines

0033 VDCHAR: prints ASCII character in A at current cursor position on video display. Cursor located at 4020. Uses AF, DE, IY.

01C9 VDCLS: Clears screen and homes cursor. Uses AF.

021B VDLIN: prints all text pointed to by HL up to a carriage return (0DH) or NULL (00) at current cursor position. Uses HL, AF.

Address	Name	Description
3000		Vectors to specific routines
3045		Portion of keyboard driver
3145		Table of characters for printer
31A5		Cassette I/O routines:
31C0	CSOFF	Cassette off
31D1		Cassette on
3203		Slow cassette read byte routine
324		Slow cassette write byte routine
325E		Slow cassette write header routine
3274		Slow cassette read header routine
329B		Fast cassette write header routine
32BA		Fast cassette write byte routine
32CA		Fast cassette read byte routine
32DA		Fast cassette read header routine
338E		Keyboard driver
3455	RESET	System bootstrap (continued from 0)
34AB		Warm bootstrap
35A0	TIME\$	
35BB	DATE\$	
35C2		Maskable interrupt handler
35FB	RSINIT	RS232 initialization subroutine
363A		Disable RS232 routine
365A	RSRCV	RS232 input routine
3680	RSTX	RS232 output routine
36AA		Low RAM initialization (4000-404B)
36F9		RAM initialization (41E5-4224)
3739	ROUTE	I/O device re-router
377B		Part of Basic LIST routine
3779		Basic TIME\$
37AF		Non-disk initialization
37B5	SETCAS	Set cassette baud speed

Figure 6: Outline of high ROM area.

Line Printer Subroutines

- 003B PRCHAR: print byte in A on line printer. Waits till printer ready, can be terminated by pressing BREAK. Uses DE.
- 01D9 PRSCN: print current contents of video display on line printer. Uses all registers.

Cassette Subroutines

- 01F8 CSOFF: Turns cassette off. Uses no registers
- 0287 CSHWR: Write leader and sync byte. Uses AF, C.
- 0264 CSOUT: Write byte in A to cassette.
- 0296 CSHIN: Read leader and sync byte: locates beginning of program and positions for reading next bytes. Motor keeps running. Uses AF.
- 0235 CSIN: Read byte: next byte on cassette returned in A. User must call often enough to keep up with cassette speed.
- 3042 SETCAS: Prompt user to set cassette baud rate. Uses all registers.

G GR GRBASIC

GRAPHICS ENHANCEMENT PACKAGE FOR THE TRS-80 MODEL I AND MODEL III

The TRS-80's Level II BASIC contains no easy to use, fast commands for handling graphics. GRBASIC 3.0 fills this void by adding a set of commands to Level II BASIC that allow line drawing, shape handling, circle generation, and sound generation. Corner to corner lines are drawn in less than 8/100 of a second!

FEATURES OF GRBASIC

LDRAW: Draws or erases lines between sets of coordinates. Coordinates may be chained.

SDRAW, USING...: Draws or erases the designated shape at the designated coordinates, including extended space.

CIRCLE: Draws a circle around a designated center with a designated radius, including drawing in extended space.

TURN: Rotates a shape in 45 degree increments.

SIZE: Sets the scaling factor for shape drawing.

AUDIO: Sends modulated sound to speaker.

All existing Level II programs are upward compatible with GRBASIC 3.0. No existing BASIC commands are altered, and all GRBASIC commands are tokenized. GRBASIC includes versions of GRBASIC for 16K, 32K, and 48K machines, SEDIT, a shape editor program, and MISSILE, a real-time arcade game written entirely in GRBASIC. The manual has been rewritten for clarity and contains more examples.

GRBASIC 3.0 Cassette and Manual . . . \$19.95

GRBASIC 3.0 Diskette and Manual . . . \$24.95

Cassette versions are NOT compatible with Disk BASIC!

If you own an original GRBASIC 1.0, we will upgrade it for \$5.00 if you return the ORIGINAL tape or disk to us.



MED SYSTEMS SOFTWARE
P.O. BOX 2674
CHAPEL HILL, NC 27514
TO ORDER CALL: 1-800-334-5470

RS232 Subroutines

- 0050 RSRCV: receive a character. Uses DE.
 0055 RSTX: transmit character in A.
 005A RSINIT: initialize RS232 interface as indicated in locations 41F8-41FA. Uses DE.

Miscellaneous I/O Subroutines

- 0013 Inputs a byte from an input device. On entry, DE => DCB of device. On exit, Z is set if ready. Uses AF.
 001B Output a byte to a device. On entry, A=output byte, DE => DCB of device. On exit, Z is set if device is ready. Uses AF.
 0023 Output a control byte to an I/O device. On entry, A = control byte, DE => DCB of device. On exit, Z is set if device is ready, A = status. Uses AF.
 0060 Delay loop in 15-microsecond increments. On entry, BC = number of delay pulses. Uses AF, BC.
 0066 NMI reset location: jumps here on non-maskable interrupt. In effect, halt or reset.

Dedicated I/O Addresses: Keyboard

The area from 3000H to 3FFFH is used for direct memory access (DMA) input/output devices. On the Model III it is used only by the keyboard and video display, whereas on the Model I almost all I/O devices were interfaced in this area.

Figure 7 shows how the keys on the keyboard are connected to various locations in the area 3800 to 3880. When a location there is addressed, the computer actually reads the keys of the keyboard. Each key depressed causes a certain bit in a specific location to read "1" rather than "0". For example, if you type the "F" key, bit 6 in location 3801 will be set, causing the value at 3801 to read 40H. A keyboard-reading subroutine must simply check locations

Memory Address	0	1	2	3	4	5	6	7
3801	@	A	B	C	D	E	F	G
3802	H	I	J	K	L	M	N	O
3804	P	Q	R	S	T	U	V	W
3808	X	Y	Z					
	!	"	#	\$	%	&	'	
3810	0	1	2	3	4	5	6	7
	()	*	+	<	=	>	?
3820	8	9	:	;	,	-	.	/
3840	EN	CL	BK	UP	DN	LF	RT	SP
3880	LS	RS						

Figure 7: Mapping of keyboard to memory locations in TRS-80 Model III. Abbreviations used: EN=Enter, CL=Clear, BK=Break, UP=Up arrow, DN=down arrow, LF=left arrow, RT=Right arrow, SP=space bar, LS=left shift key, RS=right shift key.

3801 to 3840 to see if there is any non-zero value, and then decode the bits into the proper letter, checking location 3880 to see if either of the shift keys are pressed. This may seem like much work, but it actually happens so fast that a keyboard-debounce routine had to be incorporated into the Model I to prevent accidental double reading of typed letters. The keyboard debounce does nothing except insert a delay into the key-reading process. (This process was identical on the Model I, the one exception being that both shift keys were mapped to the same bit in location 3880.)

continued on page 40

5,000,000/20,000,000 BYTES

From Micro Mainframe

10 MEGABYTE HARD DISK DRIVES, with REMOVABLE Cartridges, For Models I / II / III (\$5,995/\$8990).

SERIES III H. Model III with 5,000,000 byte hard disk drive(s) (\$6,995/\$9,095) or add to your Model I/III (\$3,795).

SERIES III F. Model III with a controller board (available separately) and operating system which allows you to start with, or move up to, dual-headed or eight-inch floppys.

From AT-80

GL80 — \$149 — Radio Shack General Ledger 1.1 with over 30 added features; including a general ledger, classified balance sheet, check register and options to use an "automatic" account number or re-do an entry or document.

AR80 — \$199 — Radio Shack Accounts Receivable 1.2 with automatic posting of standard monthly amounts.

GL/M1 — \$49 — Convert your General Ledger 1.1 to GL80. Typical user comment: "Takes half as much time."

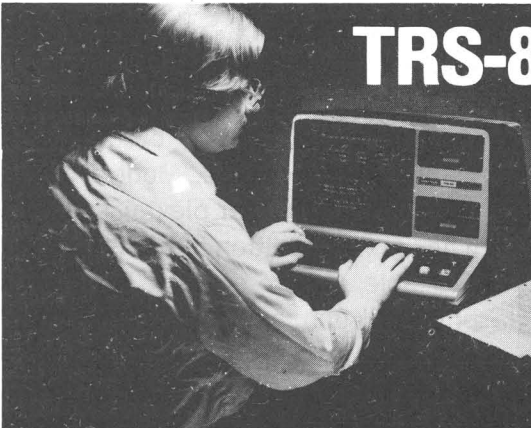
AR/M1 — \$49 — Convert your Accounts Receivable 1.2 to AR80. Typical user comment: "Saves hours."

GL/M1 and AR/M1 require proof of purchase of the original programs, or, send a disk copy of the original programs for conversion at no additional charge. Documentation (apply to purchase) — \$5.00 each.

FTDEM080 — \$12 — Displays and Executes the NEWDOS/80 Appendix A programs/keyboard entries. Requires 32K.

NEWDOS/80 - \$135 LDOS - \$135 EPSON MX-70/80/FT - \$Call FRICTION KIT - \$49

AT-80 3827 Dismount Dallas, Texas 75211 (214) 339-0498



TRS-80 OWNERS REJOICE!

Our professional quality software development tools let you program your TRS-80 with more ease and power than you ever imagined possible. Programming will become a pleasure when you use our full screen editors. These editors are not just patched up word processors. They have been specially designed to enhance the BASIC and ASSEMBLER programming languages. Our assemblers provide full screen option menus to relieve you of the burden of remembering command names. Combine user oriented features like this with the finest and most extensive documentation in the industry and you will see why programming a TRS-80 is now better than ever.

T-ZAL: TAPE BASED ASSEMBLER: Assemble to memory or tape. Create relocatable SYSTEM tapes! Includes relocating LOADER pgm. 8 character symbols with XREF. Upgrades to disk when you do!
Mod 3 Cat # 1250-20 \$ 49.95

FULL SCREEN PROGRAM TEXT EDITORS: All CAU full screen editors support four way cursor motion and scrolling with user selectable auto repeat and scroll speeds. Totally visual character insert, delete, and change. Block move, copy, delete. Global find and change. Editor for BASIC also provides automatic line renumbering and 26 user-definable macro keys.

For Tape and Disk BASIC:
Mod 1 Cat # 1010-20 \$24.95
Mod 3 Cat # 1210-20 \$29.95

For Mod 1 EDTASM source files:
Tape Cat # 1010-30 \$24.95
Disk Cat # 1010-31 \$34.95
(Disk version shipped on tape.)

M-ZAL: DISK EDITOR/ASSEMBLER: Modular Assembler Language development system includes full screen text editor, multi-pass assembler, and object module linker. Allows 8 character symbols and source file chaining/nesting with *INCLUDE cmd. Full support for relocation and global symbols. Symbol table with cross reference. Req. 32K Disk system.

Mod 1 Cat # 1050-10 \$149.00
Mod 3 Cat # 1250-10 \$149.00

XBUG: DEBUGGING TOOL & MONITOR: Display/Modify memory and regs. Set up to 10 invisible and transparent breakpoints. Multi-speed single step. Load/Copy/Create SYSTEM tapes. Uses only 2.5K and can be dynamically relocated to any address.

Mod 1 Cat # 1020-10 \$19.95
Mod 3 Cat # 1220-10 \$19.95

Note: these products are not available for level 1 machines.

When ordering specify Model, RAM size, # of disks.

Send check, money order, or MC/VISA numbers and expiration date to:

Computer Applications Unlimited
P.O. Box 214, Dept. EEW
Rye, New York 10580

N.Y. State residents add applicable sales tax.

Dealer Inquiries Invited.



**COMPUTER
APPLICATIONS
UNLIMITED**™
A Div. of CAU, Inc.

Quality • Reliability • Service

*TRS-80 is a TM of Tandy Corp.

continued from page 20

reductions, music synthesis and more. This device costs \$99.95. (For Model III users, you'll need the Model I/III interface to use this.)

That is how to get your computer to talk back to you. The most obvious use for this technology for me is in teaching a child to read. (Of course, the child will imitate the synthesized speech. Someday, all children will be known by their "computer dialect.") This would especially be a boon to the child who would rather not read. Anything that resembles play is done with great fervor, but not so with something that resembles work! (That sounds like adults, too.)

Dictionary of Computerese

mole-electronics - (TV set for a burrowing animal?): a technique of growing solid-state crystals so as to form transistors, diodes, and resistors in one mass for micro-miniaturization. Also called moletronics.

MUMPS - (a childhood disease characterized by swollen glands in the neck?): a text-oriented language with built-in data base facilities and string matching. Used in HOSPITALS and other large organizations for unified accounting.

touch-up paint (that which is non-existent at Radio Shack repair centers): if you have scratched off the pretty silver paint on your computer, you cannot get touch-up paint from the Shack. (I tried.) I have found that the closest thing to it is Testors Pla Enamel (model airplane paint) #1180, Steel —

NOT the Silver. You might make a closer match if you add a little of the #1146 Silver to the Steel. Try it on an inconspicuous spot first.

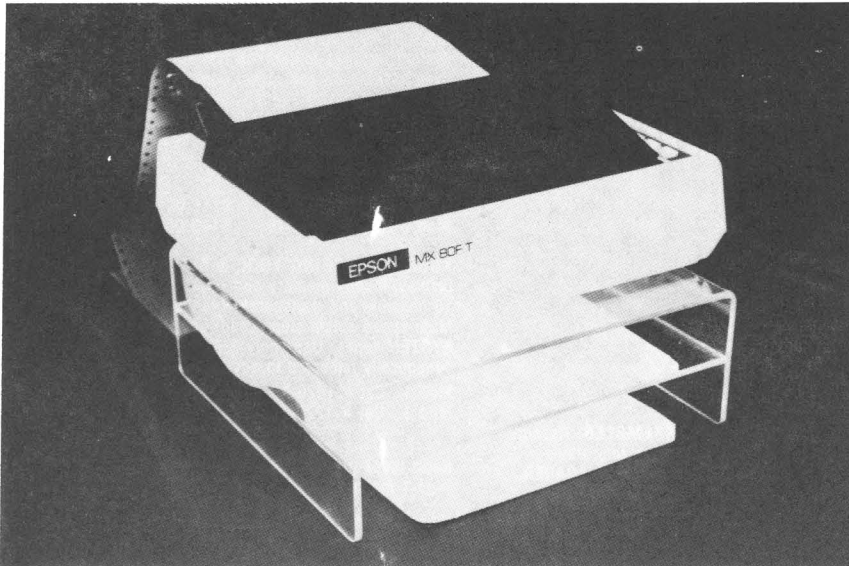
computer tape (the same thing as audio tape): some of the teachers I have been a consultant to have trouble with this one. Radio Shack sells what is known as Certified Computer Cassette tapes. There is NO difference in these tapes and the normal cassette tapes they sell for voice recording except that the magnetic coating on the computer tapes is a little thicker, and they have been tested to make sure the coating is not scratched off in some places.

The computer tape is not magical. The computer transmits an AUDIO signal to the tape recorder. If you pull the EAR plug and play back a program, you can hear the sounds. (No, it's nothing like Barry Manilow.)

Well, that's it. This is also my farewell article. Pressures with my job and at home have built up until I have decided that I am trying to do too much. As much as I hate to let the Beginner's Corner down, I have to start cutting back somewhere.

I hope that your experiences with microcomputing continue to be rewarding, and that you never pass up the opportunity to try something new. Seek out a computer club in your area. The veteran programmers and computerists there just love to pass on what they know.

Sherry M. Taylor
322 South 21st Street
Haines City, FL 33844 ■



PRINTER STANDS

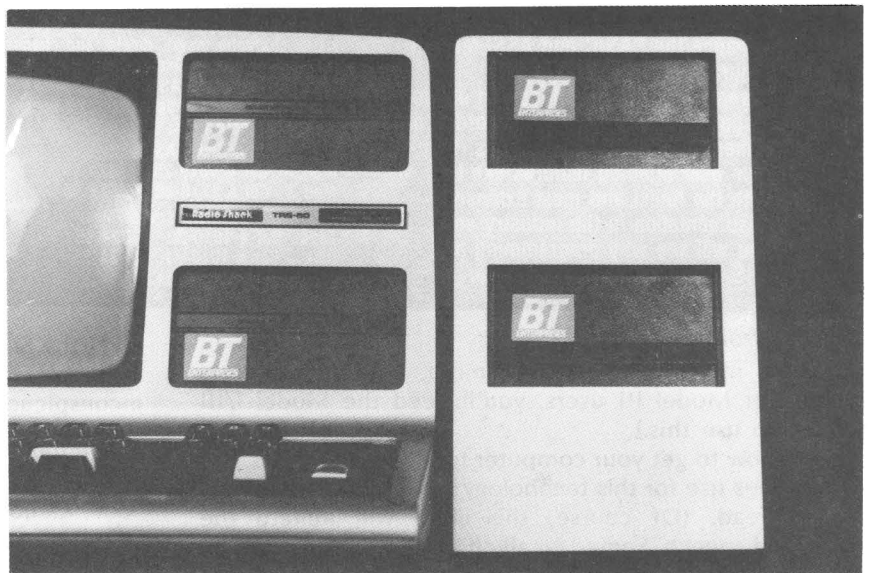
End the mess of paper from your desktop printer. Paper is fed from under the printer and allowed to stack neatly behind your machine. Made from the highest quality clear plexiglass, this is a handsome addition to home or office. Available in two sizes - Regular for printers such as MX-80, Microline80, etc. or Large for printers such as MX-100, DataRoyal, DWII etc. Available with extra shelf for quick and easy forms change.

Regular **\$24.95**
 Large **\$29.95**
 Extra Shelf **\$ 9.95**

MODEL III EXTERNAL DISK DRIVE CASE

When you add disk drives to your Model III TRS-80, put them in the case that was designed for the Model III. This drive case is essential for the office where novice users can become confused with a combination of horizontal and vertical drives. Comes complete with mounting hardware and power supplies for two disk drives and 2 drive cable. Available with and without drives.

Case without drives **\$179.95**
 Case w/1 40 track drive **\$429.95**
 Case w/2 track drives **\$654.95**



MX-80 RIBBON RELOAD

Replace your worn MX-80 Ribbon with a new, fresh high quality black cloth ribbon. Easy to load in your cartridge. You save over \$10.00 compared to purchasing a new cartridge! Complete with easy to follow instructions. Each ribbon individually sealed in plastic bag for long life.

\$3.95 each, 12 for **\$39.95**, 25 for **\$74.95**
 (COMING SOON . . . COLOR RELOADS!!!)

MODEL III DISK UPGRADE

Upgrade your cassette Model III to disks with this easy to use controller kit from Micro Mainframe! Kit is complete with Controller Board, Switching Power Supply (for 2 internal drives), and complete mounting hardware (for 2 internal drives) and instructions. Just add drives! Supports single or double headed drives!

Complete kit **\$279.95**

(CALL FOR LOW, LOW DISK DRIVE AND COMPLETE SYSTEM PRICES!)



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

UNITERM

'The Universal Terminal Program'

The FIRST and ONLY terminal program for both the Model I and Model III TRS-80 computers. Written by Pete Roberts, this program will soon become the standard of terminal software. Unique features includes a Handsome binder with over 75 pages of instructions and examples. Free upgrade policy using local Bulletin Boards and MicroNET. Expanded functions such as 'Type to buffer', 'Display Buffer', Define Auto logon, polling, signon, and connect messages! Requires 32K disk system. Only **\$79.95**

ST80III, OMNITERM, SMART80, SMARTIII owners!!! Upgrade to 'UNITERM'! Send your ORIGINAL program disk and receive 'UNITERM' for only **\$29.95!!**

CONNECTION-80 BBS

Run your own Computer Bulletin Board. This software package when combined with your Model I or Model III TRS-80 and an Auto Answer Modem will convert your computer into a mini-times share system. Functions include message leaving, both public and private, message retrieving, Bulletins, Downloading, merchandise, product ordering, chat, etc. This is a full feature system, and well known for excellence among modem users. Only **\$199.95**

NEWDOS/80 OPERATING SYSTEM

The Hottest Disk Operating System for the TRS-80 Model I and III. Version 2.0 with full single and double density support, allows the use of and combination of disk drives types and densities. Full Double density support when used with a Doubler. On the Model I, you can read and write Model III compatible data disks. On the Model III, you can write Model I single or double density data disks for use on the Model I. Includes: Expanded directories, dynamic basic merge and delete, selective variable clearing, enhanced basic editing, Enhanced chaining functions, Superzap utility, Disk enhanced editor assembler and disassembler, and much more. Special Price, **\$139.95**

M-ZAL

This is the most powerful Editor Assembler for the TRS-80 ever written. Features a full screen editor, a menu driven assembler, and an interactive linker which allows the linking of /CMD and /RLD files. Files can be loaded to Disk or Tape! Assembly Language programs like Dick Balcom, and Pete Robert claim that this is the best Editor Assembler on the market! Special Price, **\$129.95**

THE COPYRIGHT KIT

A self-instruction booklet on copyrighting the computer software you write. Includes step by step instructions, sample forms, as well as discussions of copyrights, patents and trade secrets, your rights secured by copyrights, legal remedies upon infringements, material not copyrightable and MUCH MORE! Written by Attorneys. Published by National Attorneys Publications and distributed exclusively through B.T. Enterprises. IF YOU EVER WROTE A COMPUTER PROGRAM, YOU NEED THIS BOOK! **\$12.95**

COPY III

This Model III Utility, written by Dick Balcom, allows you to load system tapes into your computer at either 500 or 1500 Baud and then copy them onto a new tape at either 500 or 1500 Baud. Includes 10 page instruction manual, **\$9.95**

CASOP

The CASOP utility by Paul Spoltore allows you to copy system tapes, find load locations, check for hidden messages, modify program blocks, relocate program blocks, and merge two tape programs together. A sort of 'SUPERZAP' for tape users, **\$24.95.**

MODEL I DISK DRIVE CASES

Clear Cases for your model I disk drives, complete with power supply for 5-1/4 inch disk drives.

Single Drive Case	\$79.95
Dual Drive Case	\$109.95
Triple Drive Case	\$139.95
Quad Drive Case	\$169.95
Smoked Plexiglass Cases, Add 5.00/per drive	

LYNX MODEMS

The finest Auto Answer/Dial Modem on the market! This is a direct connect modem for your model I or III. Does not require an RS232-C interface in your computer! Season Special, ~~\$299.95~~ **\$249.95**

AMBER EASE

Amber filter for your computer. Amber has been shown to be the easiest on the eyes. Easy to install. (Shown on computer above.) Season Special, All TRS-80 Models, **\$19.95**

TIC-TOC-80 MICROCLOCK

A microclock for your TRS-80 Model I. Gives your computer the correct time and date on powerup. Clock is maintained on a lithium battery for long life. Plugs onto the I/O Buss of the TRS-80 Model I and does not require any modifications for most computers. Complete with extensive documentation and a disk with utilities. SPECIAL NOW AVAILABLE IN KIT FORM!

Complete assembled and tested	\$99.95
Kit with P/C board, parts and instructions	\$59.95
Kit with P/C board, parts list and instructions	\$19.95

OTHER MYSTERIES

We carry the full line of IJG 'Other Mysteries' books at discount prices. These books are a must for computer users.

TRS-80 Disk and Other Mysteries	\$22.50	\$19.95
Basic Decoded and Other Mysteries	\$29.95	\$26.95
Custom TRS-80 and Other Mysteries	\$29.95	\$26.95
Basic Faster & Better	\$29.95	\$26.95

DISK BULK ERASER

Use this handy, portable, non-electric disk bulk eraser anywhere you need it. No need for power, as this unit needs no electricity to function. No user should be without one. Available for the amazing low price of **\$4.95.**

DISK STORAGE BINDER

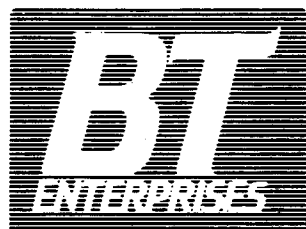
This is a handy 3 ring binder that folds flat for easy use. Complete with 10 plastic pages to store your disks. (Each page holds 2 disks.) Makes transporting your disks as easy as picking up a book!

Binder and Pages (Limited time special)	\$9.95
Extra disk pages alone. (each)	\$.50

MODEL III MEMORY KIT

This kit is all that you need for easy installation of an additional 16K or 32K in your Model III. Complete with 8 page instruction book that has been hailed as '... The best instructions we have ever seen ...'. High quality 150ns memory chips make this the best kit available.

16K ...	\$44.95	32K ...	\$79.95
---------	----------------	---------	----------------



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

PRACTICAL BUSINESS PROGRAMS

S. M. Zimmerman, Ph.D. and L. M. Conrad

Check Writing on the TRS-80 Model I

Copyright© 1981 Zimmerman & Conrad

For the small business person the act of writing monthly checks can be a long and expensive task. One local business concern took four days to write their checks by hand. This program did not solve all their problems relative to check writing, but it has helped reduce the job to manageable size. It still takes a day to complete the task, but that's much better than four days.

There are several interesting programming problems associated with a check writing routine. The conversion of the month's number to the month's name, and the conversion of the symbol of a number to the written word were two similar problems that had to be solved. Another problem not solved completely in this program was the storage and retrieval of data.

In the business under study it was necessary to write a series of two dozen mortgage checks each month. There is no reason to type in this information every month. The program allows for the creation of a disk file or a tape file to be used month after month. This data may be of value in other activities of a business.

The printers now available are both powerful and crammed full of individual abilities. We wrote the program for Radio Shack's old Line Printer I. With a minimum amount of effort we believe the program can be adapted to produce checks on a wide variety of printers. The reader must customize the output to the printer available.

The program is designed to produce either a page of checks for those with alignment problems on friction feed printers or to operate continuously with tractor feed printers.

If you decide to custom design your own checks you should be aware that a check must have the bank's name, the clearing house number, it must say "Pay to the order of" and it must have a signature as well as the account's magnetic number. You will not have a legal check if you leave anything out.

A custom check is fun to produce and use. Take care not to overdo the customization. People like checks to look like checks. When it comes to getting paid many individuals do not like to take fancy custom produced checks.

PROGRAM OUTPUT

Two sets of outputs are required from a check writing program as a minimum. The checks themselves must be produced and a record of the checks must also be maintained. It is also possible to maintain the balance of cash in the check book. However, this function is not included in our program.

The record of checks produced may be either electronic or hard copy. This program produces a check stub at the same time it produces a check. This approach was selected because it duplicated the manual method now being used and minimized the transition from the present system. It was

felt the easier the transition to a computer system could be made, the more readily it would be accepted.

PROGRAM INPUT

The minimum input data was required. In this case the program needs to know the date, amount of the check and name of the person to whom the check is to be made. Debit and credit information is not needed because the data is not used directly for accounting purposes. It is possible to use the data set to produce accounting information. This possibility was left for future development.

RUNNING THE PROGRAM

The program starts with the usual program identification material on the CRT:

```
CHECK WRITER LIMIT $99,999.99
MAXIMUM
STEVEN M. ZIMMERMAN, P.H.D. &
LEO M. CONRAD
1981
```

In this case there is a limit of check size of \$99,999.99. This did not seem to be too great a limit, so only a minimum amount of effort was spent in trying to program around this restriction.

Checks to be of any value must be printed out on a printer. This program assumes that you have a printer and that it is running.

The first question on the screen asks for the type of system you are using:

```
TYPE OF SYSTEM (T)APE OR
(D)ISK?
```

The reason for this question is to control the computer's time clock when necessary to allow for tape input and output while using the disk system. (By the way, the reason we have written the headings skipping every other space is that we are using the 32 character mode for printout on the screen and we wanted to simulate this as close as possible in our explanation.)

We have a disk system and are using disks in our sample run, so we answered D to the above question. Do not try this unless you have a disk system in operation. The question wants to know what you have, not what you wish you had!

The next question is:

```
(R)UN OR (P)AGE?
```

If you have a tractor system you will wish to go into Run

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 UPPERCASE); 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, UPPERCASE lock, normal shift unlocks.

DEBOUNCE

If dirty keys are a problem, this is for you.

BLOCK CURSOR

Easier to locate on a full screen.

SHORT CASSETTE LEADER

For tape based systems.

SWITCHABLE

Disable from key board



"THE PATCH" is a trademark of CECDAT, INC.

"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 RAM (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

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.)

mode. If you have a friction feed system with alignment troubles, you may wish to print out three checks and then either feed an additional three checks or realign after three checks. Both options are available.

We now proceed to the next question:

DATE (YYMMDD) ?

This may seem like a strange way to input a date. The date is written this way because the resulting number allows for the easy sorting of dates. We have not taken advantage of this fact in our current program but plan to do so in some future effort.

The next question asks :

STARTING CHECK NO ?

This question needs no explanation.

There are three optional input procedures built into the program. You may either input from the keyboard, a disk or a tape recorder. Since it is assumed this is the first time you have used the program, the details of the procedure of inputting from the keyboard are given; i.e. your answer was K to the question:

SELECT INPUT KEYS, DISK, TAPE
(K/D/T1/T2) ?

If you answered D for disk it is assumed you have a disk system and wish to open a disk file for the purpose of input

of data. If you answered either T1 or T2, it is assumed the data is stored on tape and will be inputted from tape. If you only have a single tape recorder then you must use T1 for your input.

The next question asks you about your choice of output. You must print a check if you are using this program. The choice is whether you wish to record the input data, and if so, where to record the information.

RECORD NONE, DISK, TAPE
(N/D/T1/T2) ?

If you select none you will have no record of the checks other than the checks and stubs you printed out. If you select tape be sure to set up a tape recorder to record. If you use the tape recorder, you must decide which of the two available tape recorders you want to use. If you only have a single tape recorder you have no choice. You must select T1.

The program is now ready to produce checks and to record the data as instructed above. Be sure to set up the printer as well as the recorder at this stage.

You will be asked several questions over and over again until you tell the computer you are finished. These questions are:

NAME PAYEE (END TO STOP) ?
AMOUNT OF CHECK ?

After you have answered these questions, you will first
continued on page 42

COLOR COMPUTER CORNER

Joseph Rosenman

This Month: Review of Technical Reference Manual

I think I'll start this column with a complaint to Radio Shack. Why has the software support been so skimpy? One might have hoped that Radio Shack would have learned from its experiences with the Model 1. I am referring to the slow release of Model 1 software. Instead, many companies sprang up to fill the void Radio Shack left. Who benefited? Much to the chagrin of Radio Shack (I suspect), we the users. Despite the fact that Radio Shack couldn't provide the software that its users required, new companies stepped in to fill the void.

Why isn't this happening with the Color Computer? Well, of course, to some extent it is. But there are a couple of reasons why this non-Radio Shack software growth is limited. I believe that the primary reason has to do with the Color Computer Disk Drive system.

The Model 1 microcomputer began as a more expensive machine than the Color Computer. By the time most people had heard of it, an Expansion Interface and a Floppy Disk were "standard" peripherals. When you considered purchasing a Model 1, you generally assumed that an Expansion Interface and a Disk Drive would follow. Since "everyone" had a disk, disk software became readily available. Now we come to the darker aspect of this problem. Since all Model 1 users had a cassette recorder, why should a disk drive make such a big difference? The answer lies with the hotly disputed topic of "software piracy." Some users believe that the cost of software can only be justified if they can "share" it with other users, and if they can "share" other users' software in the same fashion. This "trading" is, of course, technically illegal. (I am not equating this type of piracy with that of companies that re-package and re-sell other companies' software. If one is petty larceny, the other is clearly grand theft.) Now I am familiar with both points of view, and I don't intend to advocate any specific position in this column. For whatever it is worth, I believe that the "profit-less" software piracy that individual users have indulged in has probably helped more than it has hurt. I believe this has provided a readily available supply of software, which has in turn encouraged users to purchase both microcomputers and new software. The end result has been a proliferation of both microcomputers and software. Of course, this begs the question of legalities. Clearly companies that develop software and invest both time and money in advertising and distribution deserve compensation for their efforts.

So what has happened with the Color Computer? First of all, the Color Computer is a less expensive machine. I believe that most Color Computer owners don't want to double their investment by buying a disk drive. Frankly, I am forced to agree. If you consider the cost of a 16K Extended Basic Color Computer with disk and a TRS-80 Model 3, I would go for the Model 3. If Radio Shack asked me for my advice, I would say "lower the cost of the disk!" As a result,

very few Color Computer users have a disk. Worse yet, since Radio Shack took so long with the introduction of their disk, a competing company (Exatron) came out with a disk. To make matters worse, the Exatron disk is "data compatible" with the Model 1. And (you guessed it) the two systems are incompatible. In other words, the situation is a real mess.

There are many companies that are producing compatible disk systems for the Model 1 and 3. Why can't these companies do the same thing with the Color Computer? The Model 1 and 3 disks are "software independent." This means that as long as you have a certain "generic" type of disk, you just need to plug it in. All the software is contained on a diskette. The Color Computer system requires a special "plug in" Expansion Interface. This unit plugs into the same place where the cartridge ROMs go. This Interface connects to the disk. It also contains the Disk Operating System on a ROM chip. The disk drives used in the Color Computer are exactly the same as the disk drives used in the Model 1 (Shugart standard, 35 track). While many companies could replicate the Expansion Interface, the ROM Disk Operating System cannot be touched. If any company were to try, Radio Shack would undoubtedly sue the pants off of them. I guess I could say "I told you so." If you look back to issue 39, you will note that I had several reservations about the DOS-ON-ROM approach. Radio Shack tried to insure that only it could provide both the Software and the Hardware for the Color Computer disk, and it looks like we all came up to be the losers.

TRS-80 Color Computer Technical Reference Manual

Price: \$14.95

Cat No: 26-3193

OK, now that I have raked Radio Shack over the coals, I must give it some credit. The Technical Reference Manual is very expensive for a 69 page manual, but contains a wealth of information. The information included is intended for "advanced" programmers and technicians. Of course, 99% of the Color Computer users will want to skip over the circuit diagrams. Of tremendous value to machine language programmers is the information on how to access and utilize the sophisticated circuitry in the Color Computer.

The Technical Reference Manual has 7 major topics:

- (1) Introduction and Memory Map.
- (2) Disassembly/Assembly of the Color Computer.
- (3) Theory of Operation—a detailed description by topic.
- (4) Trouble shooting.
- (5) Parts List.
- (6) Printed Circuit Board.
- (7) Schematic.



COLOR COMPUTER

COMPUVOICE

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

TRS-80

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

RAMCHARGER 32K UPGRADE

- EXTEND MEMORY FROM 16K to 32K
- 100% Compatible With Extended Basic
- No Soldering Or Modification
- Fits Inside Computer
- \$79.95

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

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
- EPROM 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



SPECTRAL ASSOCIATES

143 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

VISA OR MASTERCARD ACCEPTED

Here is an official "Memory Map" of the Color Computer:

- FFFF End of DMA area.
- FF00 End of Cartridge ROM, start of DMA area.
- C000 End of BASIC ROM, start of Cartridge ROM.
- A000 End of Expansion BASIC ROM, start of BASIC ROM.
- 8000 End of RAM in 32K systems, start of Expansion ROM.
- 4000 End of RAM in 16K systems.
- 1000 End of RAM in 4K systems.
- 0600 End of normal Video, start of Graphics Video.
- 0400 Normal Video Display starts here.
- 0000 All RAM starts here.

"DMA" stands for Direct Memory Access. (More on this later.) Note that there is no "End of Graphics Video." This is because the Graphics Video area is variable. Graphics Video could occupy anything from 0 bytes to 1800H bytes (6K). One astonishing fact about the Color Computer is that it is possible to understand the operations of the Color Computer by examining the five Primary Integrated Circuits.

The "heart" of the Color Computer is contained in only 5 LSI (Large Scale Integration) Integrated Circuit Chips. They are:

- (1) one MC6809E CPU (Central Processor Unit) chip.
- (2) one MC6883L SAM (Dynamic RAM Controller) chip.
- (3) one MC6847 VDG (Video Display Generator) chip.
- (4) two MC6821 PIA (Peripheral Interface Adapter) chips.

In addition to these chips, there is ROM and RAM chips. There are either 1 or 2 8K ROM chips (in Extended BASIC systems, there are 2 ROM chips). In 4K or 16K systems, there are a total of 8 RAM chips. If you are upgrading from a 4K to a 16K system, the old chips would be replaced by the new higher density chips. While it doesn't say so, I'm pretty sure that the 32K upgrade works in the same way. The reason I believe this is that the diagram of the printed circuit board doesn't leave any space for an additional 8 memory chips. This would mean that, in order to expand to a 32K RAM system, one would need to replace the current RAM chips. CAUTION: The upgrade could include more than just chip replacement. It might also require different jumper settings or re-soldering of certain connections.

The CPU is an 8 bit device that performs all of the standard functions expected of a CPU. At some point in the future, I will be writing about 6809 Assembly Language programming. At that time, I will go into the architecture of the 6809 chip in more detail. (Well, it gives you something to look forward to, right?)

The SAM chip controls memory, but that's not all. SAM stands for Synchronous Address Multiplexor. This chip provides the clocks used to control all event timing in the Color Computer, and also generates video address lines. It is possible to set or change parameters of this chip by writing special values to the DMA area (FFC0 to FFD0).

The VDG chip is the "thing" in the color computer that takes the numbers in the RAM and turns them into a video

continued on page 41

continued from page 32

Video Display Memory

The video display memory occupies locations 3C00 to 3FFF. This is a 1K buffer that is mapped directly to the 1024 (decimal) positions of the video display, starting in the upper-left corner and extending 64 characters across each

line for 16 lines. If you store a number in one of these locations, its ASCII equivalent is displayed on the screen. (ASCII tables are in the REFERENCE MANUAL.)

If you store a value in video memory that has bit 7 set, it indicates a graphics character. Graphics divide each cursor position into six PIXELS. Bits 0-5 of the value stored determine which pixels are set. These bits are mapped into the graphics as shown in Figure 8.

- Port Number -				Output bits: Control register
Decimal	Hex	Function		
224	E0	Maskable Interrupt Latch If reset, jumps to: (bit) 0 3365 cassette routines (bit high) 1 3369 cassette routines (bit low) 2 4046 cursor blink and clock 3 403D (presently unused) 4 4206 5 4209 6 4040 7 4043		0 Data terminal ready 1 Request to send 2 Break 3 Parity enable 4 Stop bits 5-6 Word length select 7 Parity
228	E4	Non-Maskable Interrupt Latch Input bits: 5 RESET key pressed 6 Disk drive timeout 7 FDC controller interrupt Output bits: 6 Enable timeout interrupt 7 Enable FDC controller interrupt	234	EB RS232 Data Register Input: Received data Output: Transmit data
232	E8	RS232 Modem Status Register/Master Reset Input bits: 1 UART pin 20 4 Ring indicator 5 Carrier detector 6 Data Set ready 7 Clear to send Output bits: any value resets controller	235	EC Miscellaneous Controls Output bits: 1 Cassette motor (0=off, 1=on) 2 Large size video (0=off, 1=on) 3 Special character set select: 0=Kana, 1=Misc.
233	E9	RS232 Configuration switches Input bits: 0-2 Baud rate select 3 Parity: 0=enable, 1=disable 4 Stop bits: 0=1, 1=2 bits 5-6 Word length select: 00=5, 01=6, 10=7, 11=8 bits 7 Parity: 0=odd, 1=even Output bits: baud rate select 0-3 Receive rate 4-7 Transmit rate	240	F0 FDC Status Register
234	EA	RS232 Status and Control Register Input bits: Status register 0-2 unused 3 Parity error (1=true) 4 Framing error (1=true) 5 Overrun error (1=true) 6 Data sent (1=true) 7 Data ready (1=true)	241	F1 FDC Track Register
			242	F2 FDC Sector Register
			243	F3 FDC Data Register
			244	F4 FDC Interface Control Port Output bits: 0 Drive 0 select 1 Drive 1 select 2 Drive 2 select 3 Drive 3 select 4 Disk side select 5 Write precompensate select 6 Enable wait for data 7 Density select: 0=single, 1=double
			248	F8 Line Printer port Input bits: printer status 0-3 unused 4 Printer fault 5 Device select 6 Out of Paper 7 Printer busy Output bits: data to print
			255	FF Cassette port Input bits: read status 7 Data bit: 0=low, 1=high Output bits: output level 0-1 Level select: 00=0.85V 01=0.46 10=0

Figure 9: Summary of Model III input/output ports and their functions.

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, based on the game Dungeons & Dragons.

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..... \$24.95

ALIEN DEFENDER New version of best arcade game on the market, has new talking sound routine
Tape..... 19.95 / Disk..... \$24.95

CHECKING ACCOUNT..... 48k with disk only..... \$39.00
Excellent check writing program for small business. Prints checks on printer, sorts into 32 categories for bookkeeper and IRS.

BUSINESS PROGRAMS
Billing system..... 48k disc only..... \$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 buy both programs checking and billing..... \$65.00

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..... \$39.00

SUPERMETER



The biggest problem in loading tapes has been the volume control. Prerecorded 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

FAMILY TREE..... tape 32.00/disk..... \$39.00
Excellent Family Genealogy program works on both Model I and III.

SUPER DIRECTORY

This will be the standard of which all other Directories are judged. It will read any normal type of diskette Mod I or III, Multi Dos, Ldos, Dos Plus, Tri Dos, New Dos Model I, Double Density, Single Density, 35, 40 or 80 track drive's.

It 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.

You can even add a line to help tell what the program is about
Example:

TRACEPT/CMD 146U PRINT TRACE OF MACHINE LANGUAGE RUN.

Tracept/cmd is file name on disk ● 146 is disk number ● U is for utility ● PRINT TRACE OF MACHINE LANGUAGE is 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 operating system.

Super Directory..... \$39.90 With 4 Wabash Disks..... \$40.00
With 10 Wabash Disks..... \$59.80

DOS SALE

Multi Dos (the one we recommend)..... \$79.00
L Dos..... \$159.00
New Dos 80 2.0..... \$145.00
Dos Plus 3.4..... \$139.00

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 an operating system that's not as good. Multi Dos is written by Vernon Hestor author of Boss and Ultra Dos.

SPECIALS

MULTI DOS with Aerocomp Doubler..... \$209.00
MULTI DOS with Super Directory..... \$99.00
MULTI DOS with Super D & Doubler..... \$229.00
AEROCOMP DOUBLER..... \$139.00

New Modem Games

Play Checkers, Chess, or Othello over your modem with your friends! Each game features full graphics, sound, and a chat mode permitting you to send messages and sounds (to get the other persons attention). Games are for two players, either one or two computers. Complete documentation included. All three games only: (Includes 2 Tapes or 2 Disks).

2 Tapes..... \$24.95 2 Disks..... \$29.95

Hayes Smart Modem

Auto answer/auto dial complete with two excellent modem programs all for only..... \$259.00
Microcompatible 16K print buffer..... \$279.00
Cable..... \$35.00

ALL PRODUCTS IN STOCK SHIPPED WITHIN 24 HRS.
WE ARE DISTRIBUTORS FOR ALL PROGRAMS EXCEPT
ALIEN DEFENDER

M.C. & VISA OK

PLEASE ADD \$2.00 FOR
SHIPPING IN U.S.A.

COMPUTER SHACK

1691 Eason ● Pontiac, Michigan 48054
(313) 673-2224

Bits: 7 6 5 4 3 2 1 0
Pixel: 1 0 F E D C B A

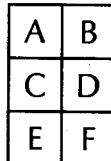


Figure 8: Correspondence between bits and graphics on Model III video display. (The diagram is meant to represent a 3x2 block in one cursor position, which may be divided into six pixels.)

Model III I/O Ports

As we mentioned above, most I/O peripherals on the Model III are interfaced through I/O ports. The Z-80 microprocessor allows up to 256 ports, and only a few of them have been used in the standard design of the computer. There is still much room for expansion.

I/O ports are often used for different functions on input or output, and each of the bits may be used for a different purpose. Figure 9 summarizes the functions of the Model III I/O ports.

We did not discuss the functions of the floppy disk controller (FDC) ports (F0-F4) because they will be discussed in detail in a later column. ■

continued from page 39

image. It is possible to modify or set information in the VDG chip. Some of the DMA inputs to the SAM chip are passed on to the VDG chip. In fact, when you set a PMODE in BASIC,

that is exactly what happens. BASIC will write a specific value to the correct DMA address, and the SAM will change the internal setting of the VDG. In interpreting the video in RAM, this chip generates the character/block, color, and brightness for each fraction of the video image. The different parts of the Video signal are then mixed together in a MC1372 chip, and converted into an RF signal by UM1285-8 chip. (RF stands for Radio Frequency, and refers to the type of signal that a TV antenna can receive).

The PIA chips put together the rest of the Color Computer. One PIA (U8) is used to interpret the keyboard (it also interprets the red "fire" buttons on the joysticks). The second PIA (U4) does quite a bit. It (1) controls a 6 bit DAC (Digital to Analog Converter), (2) drives the RS-232-C port, (3) drives the cassette port, and (4) transfers control from BASIC to a cartridge ROM and controls selection of the VDG chip modes.

Well, that gives you a taste of the Color Computer Technical Reference Manual. Needless to say, there is a great deal more. In future issues, I will explore the use of the DMA address in more detail. Should you purchase this book? Unless you intend to use the Color Computer purely as a "plug in the program and hit GO" type of computer, I would say yes. The information in this book permits a more profound understanding of what makes the Color Computer tick, and can greatly enhance your ability to make use of this machine's features.

Joseph Rosenman
35-91 161st Street
Flushing, NY 11358 ■

continued from page 37

hear the data being recorded, either on the selected tape recorder or on a disk. Then the printer will print a check. When you answer END to the first question, you will hear this data being recorded and the program will end.

PROGRAM NOTES

Lines 420-460 include the name and address, phone number and such of the organization producing the checks. Please replace the name and address of XYZ Management Service Inc. with your own name and address. These lines are noted with REMark statements to help you identify where these changes must be made. Note line 460 is the clearing house number for your bank. It is critical you get it right.

If you have the clearing house number printed by the supplier of your checks then line 460 should simply be removed.

The biggest problem you will run into when using the check writing program is spacing. Unless you wish to use exactly the form selected, you will have to get into this aspect of the program. Line 380 is used to control the spacing at the beginning of the first check on a page and between the remaining checks on the page. Experiment with the value of N in line 380 for the between check spacing. In the case of the first check it is assumed you will line up the top of the first check so that no spacing is required. There is no fast and easy method to work around the task of counting, such as to line up the output as it is needed.

Some of you may not wish to include the print out of a name and address or the information may be on your checks already. The easiest way to get around this problem with minimum reprogramming is to set all of the variables in lines 420-450 equal to blanks (i.e. Z1\$="" , etc.) if the name and address are preprinted on the checks.

```
10 CLEAR 500: CLS : PRINT CHR$(23): REM "CHECK"
20 PRINT "CHECK WRITER LIMIT $99,999.99 MAXIMUM": PRINT
" STEVEN M. ZIMMERMAN PH.D. & LEO M. CONRAD": PRINT " 1981"
30 PRINT : INPUT "TYPE OF SYSTEM (T)APE OR (D)ISK": TS$: NO=0:
INPUT "(R)UN OR (P)AGE": QQ$
40 INPUT "DATE(YMMMDA)": D#: INPUT "STARTING CHECK NUMBER": NX
50 INPUT "INPUT KEYS, DISK, TAPE (K/D/T1/T2)": IO$
60 IF IO$ <> "K" THEN 170
70 INPUT "RECORD NONE, DISK, TAPE (N/D/T1/T2)": RS: IF RS="D"
THEN LINEINPUT "FILE:DISK ": GS: OPEN "O", 1, GS
80 INPUT "NAME PAYEE (END TO STOP)": NS
90 IF NS="END" THEN LET AM#=0.0: GOTO 110
100 INPUT "AMOUNT OF CHECK": AM#
110 IF RS="D" THEN PRINT#1, CHR$(34); NS; CHR$(34), AM#
120 IF TS$="D" THEN CMD"T"
130 IF RS="T1" THEN PRINT#-1, NS, AM#
140 IF RS="T2" THEN PRINT#-2, NS, AM#
150 IF NS="END" THEN END
160 GOTO 280
170 IF IO$ <> "D" THEN 220
180 LINEINPUT "FILE:DISK ": FD$
190 OPEN "I", 1, FD$
200 INPUT#1, NS, AM#
210 GOTO 280
220 IF TS$="D" THEN CMD"T"
```

```
230 IF IO$="T1" THEN INPUT "LOAD TAPE#-1 TO PLAY HIT RETURN": DUS
240 IF IO$="T2" THEN INPUT "LOAD TAPE#-2 TO PLAY HIT RETURN": DUS
250 IF IO$="T1" THEN INPUT#-1, NS, AM#: PRINT NS, AM#
260 IF IO$="T2" THEN INPUT#-2, NS, AM#
270 IF TS$="D" THEN CMD"R"
280 IF NS="END" THEN CLOSE : END
290 NO=NO+1: IF NO=4 THEN IF QQ$ <> "R" THEN INPUT "RELOAD
CHECKS": DUS: NO=1: REM NOTE IF=NUMBER CHECKS PER PAGE +1 ***
300 DY%=D#/10000: DY#=DY%
310 DM#=D#/100. -DY#*100: DM%=DM#: DM#=DM%
320 DD%=D#-DY#*10000-DM#*100
330 FORI=1 TO DM#
340 READ M$
350 NEXT
360 DATA "JANUARY", "FEBRUARY", "MARCH", "APRIL", "MAY", "JUNE",
"JULY", "AUGUST", "SEPTEMBER", "OCTOBER", "NOVEMBER", "DECEMBER"
370 RESTORE
380 N= 9: IF NO<=1 THEN 420
390 FORI= 1 TO N
400 LPRINT " "
410 NEXT
420 Z1$="XYZ MANAGEMENT SERVICES INC.": REM REPLACE WITH YOUR
OWN NAME
430 Z2$="1111 UNDER WATER ROAD": REM REPLACE WITH OWN ADDRESS
440 Z3$="MOBILE, ALABAMA 36605": REM REPLACE WITH OWN CITY
450 Z4$="(111) 111-1111": REM REPLACE WITH OWN PHONE NUMBER
460 CH$="61-142/651": REM REPLACE WITH YOUR BANKS' CLEARING
HOUSE NUMBER
470 C$=" %
%": D$="NUMBER ##### %
% NUMBER #####"
480 LPRINT USING C$: Z1$: LPRINT USING D$: NX, Z2$, NX: LPRINT USING
C$: Z3$: NX=NX+1
490 B$="% % ## , 19## %
%% % ## , 19## "+CH$
500 LPRINT USING B$: M$: DD%; DY%; Z4$: M$: DD%; DY%
510 N=0
520 FOR I= 1 TO N
530 LPRINT " "
540 NEXT
550 A$="% % PAY TO THE ORDER OF:%
% $###,###.##"
560 LPRINT USING A$: NS; NS; AM#
570 EE$=" $###,###.## ": LPRINT USING EE$: AM#;
580 HT%=AM#/100000
590 IF HT%>9 THEN LPRINT "VOID": END
600 IF HT%<=0 THEN 660
610 FOR I=1 TO HT%+12
620 READ N$
630 NEXT
640 RESTORE
650 LPRINT N$: " HUNDRED ";
660 DATA "ONE", "TWO", "THREE", "FOUR", "FIVE", "SIX", "SEVEN",
"EIGHT", "NINE", "TEN", "ELEVEN", "TWELVE", "THIRTEEN",
"FOURTEEN", "FIFTEEN", "SIXTEEN", "SEVENTEEN", "EIGHTEEN",
"NINETEEN", "TWENTY"
670 DATA "THIRTY", "FORTY", "FIFTY", "SIXTY", "SEVENTY",
"EIGHTY", "NINETY"
680 MA=AM#
690 IF HT%>0 THEN LET MA=AM#-HT%*100000
700 T%=MA/1000: IF T%>0 AND T%<20 THEN LET E%=T%+12: GOTO 730
```

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 unequalled, 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. Systems utilities never require more than 2 keystrokes per query . . .

Now That's Easy! To Make It Easier There is a 'Help File'!

MULTIDOS Now Available From:

WARLOCK WAREHOUSE
1691 Eason, Pontiac, MI 48054
(313) 673-2224 or (313) 673-8700

— AND —

POWERSOFT
11500 Stemmmons Fwy, Suite 125
Dallas, Texas 75229
(214) 484-9428

Cosmopolitan Electronics Corporation

P.O. BOX 234 • PLYMOUTH, MI 48170

(313) 397-3126

— Dealer Inquiries Welcomed —

**MULTIDOS
Model I or Model III**

Only \$79⁹⁵

(Watch the Competition Squirm!)



COD - Cash or Certified Check

Allow 2 Weeks For
Personal Checks To Clear.

ADD \$3.00

Shipping & Handling

Michigan Residents
Include 4% Sales Tax

```
710 IF T%=<=0 THEN 760
720 F%=T%/10:D%=T%-F%*10:E%=F%+30
730 FOR I= 1 TO E%: READ N$: NEXT : RESTORE
740 FOR I= 1 TO D%+12: READ M$: NEXT : RESTORE : IF T%=0 THEN
LET N$=" NO "
750 IF D%>0 THEN LPRINTN$;" ";M$;" THOUSAND ";;
ELSE LPRINT N$;" THOUSAND ";
760 MB=AM#
770 IF T%>0 THEN LET MB=AM#-T%*1000
780 IF HT%>0 THEN MB=MB-HT%*100000
790 H%=MB/100
800 IF H%<=0 THEN 860
810 FOR I= 1 TO H%+12
820 READ N$
830 NEXT
840 RESTORE
850 LPRINT N$;" HUNDRED ";
860 MC=AM#
870 IF H%>0 THEN LET MC=AM#-H%*100
880 IF T%>0 THEN LET MC=MC-T%*1000
890 IF HT%>0 THEN LET MC=MC-HT%*100000
900 DX%=MC:IF DX%>0 AND DX%<20 THEN LET E%=DX%+12: GOTO 930
910 IF DX%<0 THEN 960
920 F%=DX%/10:D%=DX%-F%*10:E%=F%+30
930 FOR I= 1 TO E%: READ N$: NEXT : RESTORE
940 FOR I= 1 TO D%+12: READ M$: NEXT : RESTORE : IF DX%=0
THEN LET N$=" NO "
950 IF D%>0 THEN LPRINT N$;" ";M$;" DOLLARS ";; ELSE LPRINT N$;
" DOLLARS";
960 IF HT%>0 THEN LET AM#=AM#-HT%*100000
```

```
970 IF T%>0 THEN LET AM#=AM#-T%*1000
980 A=AM#:X%=A
990 CT#=AM#-X%
1000 IF CT#<0 THEN LET CT#=0.0
1010 CT%=CT#*100: Z#=CT#-CT%/100.: IF Z#>.007 THEN LET CT%=CT%+1
1020 LPRINT" AND ";CT%;" CENTS"
1030 IF IO$="K" THEN 80
1040 IF IO$="D" THEN 200
1050 IF TSS="D" THEN CMD"T"
1060 GOTO 250
```

SUMMARY

A check writing program can be used in all types of business. It is of maximum value when used in combination with other programs. It will be necessary for you to make some adjustments in this program to produce the custom check you require.

In addition to our check writing routine a file handling program has been prepared. This program will be published in next month's issue of this magazine. These file handling routines are designed to handle both the disk and tape files produced by our check writing program. This program is designed for the novice to learn the basics of file handling by tape and disk.

S. M. Zimmerman, Ph.D.
College of Business
University of South Alabama
Mobile, Alabama 36688

Leo M. Conrad
Imagineering Concepts
P.O.Box 9843
Mobile, Alabama 36691 ■

PROGRAM CONVERSION (PART 3)

Richard Kaplan

This month I will discuss several elements of program conversion between the Models 1, 2, and 3. After reading this article, any TRS-80 owner should have a reasonably good idea of what is involved in program conversion for his machine.

PRINT @

Perhaps the most common problem when converting programs is the use of PRINT @ statements. This statement prints something at a specific position on the screen; however, since the Model II has a larger screen than do the Models I and III, PRINT @ coordinates must be converted.

Both the Model I and Model III screens consist of 16 lines of 64 characters, for a total of 1024 screen positions. These print positions have been assigned a value from 0 to 1023. The statement PRINT @ 0, "THIS IS A TEST" would print the text in quotes along the top of the screen. PRINT @ 64 would print starting at the beginning of the second line. PRINT @ 96 would print in the middle of the second line, etc.

The Model II screen consists of 24 lines of 80 columns each, for a total of 1920 print positions. These print positions are numbered from 0 to 1919. As with the Models I and III, PRINT @ 0 would print at the top of the screen. With the Model II, though, PRINT @ 80 would print at the beginning of the second line, NOT PRINT @ 64.

If you are converting a Model I program to run on the Model II, there exists a formula to convert PRINT @ locations. First, insert the following line somewhere at the beginning of your program:

```
DEF FNA(X)=(INT(X/64)*80)+(X-(INT(X/64)*64))+320
```

Whenever you encounter a PRINT @ statement in your Model I program such as PRINT @ X, "THIS IS A TEST" you can now replace it with PRINT @ FNA(X), "THIS IS A TEST".

Converting a Model II program to run on the Model I or III is a bit more difficult. Since the Model II screen is larger than the Model I and III screens, it is simply not possible to duplicate the entire Model II screen.

To give a general idea of where on the Model I or III screen a particular Model II screen location would lie, you can use the formula $(INT(X/80)*64)+(X-INT(X/80)*80)$. Note, however, that this formula will generate some erroneous screen locations. For example, Model II locations 70 and 54 BOTH give the SAME location when plugged into this formula. This is because there are simply more Model II locations than there are Model I or III locations. Using this formula, however, will approximate how to format the Model I or III screen. The only acceptable conversion procedure is really to reduce the amount of information on the screen at one time.

RANDOM DISK ACCESS— VARIABLE LENGTH FILES

Both the Models II and III support a type of file structure

called a variable record length file. This file structure causes some problems when converting a program to the Model I, since Model I TRSDOS does not support variable record length files.

When a random access file is in use, information is stored as "records" on a disk. A "record" usually consists of 256 bytes of information. TRSDOS GET and PUT statements instruct the computer which record to access, and any record can be accessed in any order. Thus, if you are creating a mailing list, each name and address on the list can occupy one record, and you can look at any individual name without first reading in all previous names, as with a sequential file.

It would be rare in a mailing list program, for instance, if your records occupied exactly 256 bytes. Perhaps you have allocated a maximum of 100 characters as the total maximum length for each record. It would be wasteful to consider 100 characters to be a record all by itself. If you did this, TRSDOS would add 156 blank bytes at the end of each record, because standard files have 256 bytes per record. On the other hand, each name on the mailing list MUST have its own record number. If record 1, for instance, consisted of names 1 and 2 (200 bytes) and 56 bytes of name 3, it could get very confusing to keep track of the location of each name.

A variable-length record is a way of telling the computer that your records will only be 100 bytes each. In this way, you do not waste disk space. Unfortunately, this feature is not available on the Model I.

If the OPEN statement on your Model II or III program has a comma and then a number at the end, i.e. OPEN "R",1,"DATA",128 then you have a variable-length file. If you wish to convert this to the Model I, you have two options: ELIMINATE THE VARIABLE-LENGTH FILE STRUCTURE AND WASTE DISK SPACE, OR PURCHASE AN OPERATING SYSTEM WHICH SUPPORTS VARIABLE-LENGTH FILES, SUCH AS DOSPLUS.

If you wish to use TRSDOS with your program and your program uses variable-length file structure, simply delete the comma and the number at the end of every OPEN statement. For example, suppose your Model II or III program reads as follows:

```
10 OPEN "R",1,"DATA",128
```

The preceding program line could be rewritten on the Model I as:

```
10 OPEN "R",1,"DATA"
```

If you eliminate the variable file structure, the disk capacity for your program will be severely diminished. In the preceding example, for instance, EXPANDING 128-BYTE RECORDS TO 256 bytes (standard records) WILL CUT YOUR DISK CAPACITY IN HALF.

DOSPLUS is an operating system which can replace TRSDOS. DOSPLUS enhances the operation of your Model I in many ways. First of all, program loading time is shortened considerably. Second, double-density disk drives will work with DOSPLUS as double density. Many feature are added



MORRIS t' BORIS



Here's a Pair of Games of

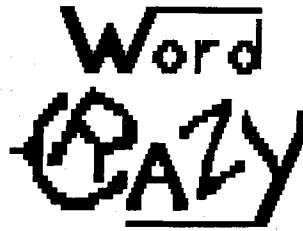
CAT and MOUSE!

NINE MEN'S MORRIS has been around since the reign of Elizabeth I. Here we present the game in its most generally accepted traditional form— according to Hoyle. It's strategies of placement and chase are classic.

BORIS offers a brand new variation. The addition of a center square to the traditional Morris board introduces a three-dimensional element and a whole new game. BORIS will test your power of visualization as well as your nerve.

Available for TRS-80 Models I & III
CASSETTE (16K, LVL II, Min.) \$14.95
DISK (32K Minimum) \$24.95

Logophiles and Lexiphants
BEWARE!



will drive you absolutely
MAD

What's YOUR Turn-On?
•The challenge of a puzzle for one
•A competition in words for up to eight

If you love words and word games, this fascinating puzzlement will give you hour upon hour of fun.

Every Game Is Different!

Available for TRS-80 Models I & III
CASSETTE (16K, LVL II, Min.) \$12.95
DISK (32K Minimum) \$19.95

Lynkana

All the THRILLS, SPILLS, ACTION and EXCITEMENT of a horse show. YOU design your own events by selecting combinations of these *nine* courses:

1. The Big Keyhole
2. The Little Keyhole
3. The Rescue Race
4. The Flag Race
5. The Barrel Race
6. The Slalom
7. The Serpentine
8. Cross Country
9. Take Your Own Line

Up to six players *ride* the courses, compete against the clock and each other for points and the CHAMPIONSHIP! Three levels of play let you progress to expert rider.

Keypad Required

Available for TRS-80 Models I & III
DISK (32K Minimum) \$24.95

COMPASS SYSTEMS, INC.

VILLAGE SQUARE CENTER, BOX 388
EAST HAMPSTEAD, NEW HAMPSHIRE 03826
(603)329-5603

Dealer Inquiries
Invited

VISA & MasterCard
Accepted

into disk BASIC. Model I disks can be written on the Model III which are DIRECTLY compatible. But, as I said earlier, perhaps one of the nicest features of DOSPLUS is that variable record lengths are supported on DOSPLUS. A Model III program which uses this file structure will not have to be converted (or at least the disk access will not).

RANDOM DISK ACCESS—OPEN "D"

The Model II supports two types of OPEN statements for random-access files. OPEN "R" and OPEN "D" both open a random access files, and they have exactly the same parameters. THERE IS ABSOLUTELY NO DIFFERENCE BETWEEN OPEN "R" AND OPEN "D" ON THE Model II.

OPEN "D" is not supported on the Model I or Model III under TRSDOS. If you encounter a Model II program which uses OPEN "D", simply replace every occurrence of OPEN "D" with OPEN "R". The effect of each of these statements is identical.

SEQUENTIAL DISK ACCESS—OPEN "E"

A sequential disk file is a file where data must be read or written in the same order every time. If you have a mailing list, for instance, and you want to look at name number 100, you must first load in ALL 99 records before that one. Sequential files, therefore, are not very efficient and are not used often in good programs, but for a beginning programmer or for an application which requires a very short file (such as simply a date) sequential files are very useful, since

they are easier to use than are random access files.

OPEN "I" and OPEN "O" are two statements which are supported on the Models I, II, and III. OPEN "I" specifies that a file is to be opened as an INPUT file, whereas OPEN "O" specifies that data is to be output into the file. Thus, let's say we wish to open a file called DATE which is to contain the date 04/01/82:

```
10 OPEN "O",1,"DATE"
20 A$="04/01/82"
30 PRINT #1, A$
40 CLOSE
```

Line 10 opens the file as file number one. Line 30 instructs the computer to print the contents of A\$ into the file. Line 40 closes the file.

Let's suppose that you wanted to add another date to your file. Up until now, the procedure has been the same for the Models I, II, and III. The procedure to add to an ALREADY EXISTING file is different on the Model III.

On the Model III, there is a special type of OPEN statement called OPEN "E". This OPEN statement causes the file to be opened as an output file, but the first record printed will be printed AFTER THE LAST RECORD ALREADY INPUTTED INTO THE FILE. To clarify this, let's add a second date into our DATE file.

```
10 OPEN "E",1,"DATE"
20 A$="04/02/82"
30 PRINT #1, A$
40 CLOSE
```

On the Model I and Model II, the OPEN "E" statement does not exist. If the OPEN "O" statement is used, however, the computer will erase all previous contents of your file. Thus, you must first read in all data from your file, then OPEN the file again and save the old data and the new data. Our converted program would read:

```
10 OPEN "I",1,"DATE"
20 INPUT #1,A$
30 CLOSE
40 OPEN "O",1,"DATE"
50 B$="04/02/82"
60 PRINT #1,A$
70 PRINT #1,B$
80 CLOSE
```

One final note for Model I owners: The Model I under DOSPLUS supports the OPEN "E" statement. If you have a Model III program to convert, you may, therefore, wish to purchase DOSPLUS. Exercising this alternative has the added advantage of allowing your Model III disk to be DIRECTLY readable by the Model I. Therefore, you may be spared some unnecessary typing or unnecessary time with an RS-232 interface, depending on the original method of transfer you used (see last month's column).

GRAPHICS

Converting graphics is probably the hardest of all conversions necessary. Before detailing the conversion process, it is necessary to have an understanding of the graphics capabilities of both computers with which you will be working, since each of the Models I, II, and III handles graphics in a substantially different manner.

All three TRS-80's can print special graphics characters. These characters are accessed by means of the CHR\$ function. For example, on the Models I and III character codes 128-191 are special graphics characters. To print any of these characters, you would simply type PRINT CHR\$(X), where X is the appropriate code. For example, PRINT CHR\$(191) would print as a solid block. The complete set of Model I/Model III characters is listed in the Radio Shack Reference Manuals.

The Model I and Model III can also treat the screen as a mathematical coordinate system. The TRS-80 screen is divided into a 128 by 48 array, any block of which may be simply turned on or off. The screen is 128 block wide and 48 blocks high.

The SET statement can be used to turn on any specific point. Executing the command SET (X,Y), where X is the horizontal location and Y is the vertical location will turn on the desired block ("pixel"). To "erase" this point, simply use the RESET statement, which has the same form as the SET statement but a reverse effect.

As an example, the following program will draw a border around the screen and then erase it after pressing the +ENTER- key:

```
10 CLS
20 FOR X=0 TO 127:SET (X,47):SET(X,0):NEXT
30 FOR X=0 TO 47:SET (0,X):SET(127,X)
```

```
40 PRINT @ 544,;:INPUT"PRESS ENTER TO CLEAR
SCREEN";ZZ$
50 FOR X=0 TO 127:RESET (X,47):RESET (X,0):NEXT
60 FOR X=0 TO 47:RESET (0,X):RESET (127,X):NEXT
```

The Model III has a set of 96 additional special characters. 64 of these (CHR\$ codes 192-255) can be printed with the CHR\$ function. However, a special statement must be executed prior to printing any of these characters.

Initially, codes 192-255 represent "space compression" characters. CHR\$(192) would be no spaces, etc., until CHR\$(255), which would be 63 spaces. Typing PRINT CHR\$(21) replaces these space compression characters with the special characters shown in the illustration. Thus, typing PRINT CHR\$(21):PRINT CHR\$(252) would print a question mark in reverse video. CHR\$(21) is what is known as a "toggle switch". This means that every time this statement is executed, the Model III switches from space compression codes to special graphics characters or from graphic characters to space compression codes. CHR\$(21) alternates between these two character sets.

The Model III also has a set of Japanese characters, codes 199-255. These can be selected with the toggle switch CHR\$(22). CHR\$(22) AND CHR\$(21) must be selected in order to print the Japanese characters.

The Model II does not have SET statements available. It does, however, have graphics characters. These graphics characters are codes 128 through 159. To print any of these character, simply type PRINT CHR\$(X), where X is a value from 128 to 159. Consult the chart to see what each character looks like.

GRAPHICS CONVERSION

To convert Model I or Model III SET statements to the Model II, you should PRINT graphics character 153 at the appropriate position on the screen. First, convert the SET statement's X and Y coordinates into an appropriate PRINT @ coordinate. The PRINT @ coordinate for the statement SET (X,Y) would be Y*64+X. This number (Y*64+X) should then be plugged into the previous formula under "PRINT @" conversion to determine the appropriate coordinate. Thus, let's say you have entered in the function described under "PRINT @" and you have the following statement in your program:

```
10 SET (X,Y)
```

This statement could be replaced with:

```
10 PRINT @ FNA(Y*64+X),CHR$(158)
```

Other than the preceding instruction, there really is no set method to convert graphics. The main point to keep in mind is how the original program works. As long as you understand this, the best method is to choose an acceptable character available on the other computer and use that character.

As always, reader correspondence is welcomed. If you have any questions, or if there is a specific topic which you would like to see covered, simply write to Richard Kaplan, c/o H & E Computronics. ■

continued from page 25

Logical operations are very frequently used in assembly language programming. In future columns, I will be showing ways that logical operations are actually used in programming. For the time being, all that YOU (as a beginning programmer) can do is to become familiar with the "language" of programming.

NEGATIVE NUMBERS

Last but not least, is the negative number. Computers usually store negative numbers in a special format known as two's complement. To find the two's complement of a number, get the logical NOT of the number, and add 1 (the logical NOT is also known as the one's complement). In two's complement notation, the left most bit is known as a "sign bit." If it is a zero, the number is positive. If the sign bit is a one, the number is negative. One drawback of the use of two's complement notation, is that the maximum number size that can be represented is reduced. For example, let's take a nybble. Since a nybble is 4 bits long, the maximum number that could be represented would be a 15. In two's complement, the maximum becomes 7. Consider the following table:

0000 = 0	1000 = -8
0001 = 1	1001 = -7
0010 = 2	1010 = -6
0011 = 3	1011 = -5
0100 = 4	1100 = -4
0101 = 5	1101 = -3
0110 = 6	1110 = -2
0111 = 7	1111 = -1

So, now we know how to convert positive numbers into negative. What about negative into positive? Believe it or not, the same way. Get the logical NOT of the number, and add 1. Of course, when working with binary numbers, it is necessary to know whether the numbers being used are two's complement integers or positive integers. With byte values (8 bits) the situation isn't quite as limited as with nybbles. Two's complement representation in bytes permits a number in the range of -128 to +127. Just a few examples to clarify:

1111 1000 = -8H
0011 1011 = 3BH
1011 1100 = -44H
1000 0101 = -7BH
1010 0010 = -5EH

After you have become familiar with the above discussions, you will be ready to examine the idea of "computer architecture" and addressing. In my next column, I will explore those concepts on the Zilog Z-80 microcomputer.

Joseph Rosenman
35-91 161 Street
Flushing, NY 11358 ■

BYTEWRITER DAISY WHEEL PRINTER

NEW / NOT REFURBISHED

LETTER QUALITY PRINTER AND TYPEWRITER
IN ONE PACKAGE

ONLY

\$795

plus shipping

The BYTEWRITER is a new Olivetti Praxis electronic typewriter with a micro-processor controlled driver added internally. No software driver needed.

Maybe we goofed by not charging more for a DAISY WHEEL PRINTER

What's wrong with it?

We guess everyone must be getting used to paying over \$2000 for a new Daisy Wheel Printer and over \$1500 for a refurbished Daisy Wheel Printer. Anything that costs less must be junk. Right?

WRONG!

The BYTEWRITER is not only cheaper it is better!

Following are some of the features of

BYTEWRITER

- ★ 10, 12, or 15 characters per inch switch selectable
- ★ Interchangeable daisy wheel - many different typstyles readily available
- ★ Correctable Electronic Typewriter operation with nothing to disconnect
- ★ Correctable film or nylon cartridge ribbon
- ★ Self test program built in
- ★ Only 14 internal moving parts for incredible reliability, ease, efficiency and accuracy
- Two keyboard positions for standard American type or special characters for foreign languages

Centronics compatible parallel input operates with TRS-80, APPLE, IBM and many others

Call or Write to

COMPUTECH

975 Forest Avenue
Lakewood, New Jersey 08701
(201) 364-3005

Master Charge and Visa accepted,
N.J. residents add 5% sales tax.

CASTLE ADVENTURE

Dave Trapasso

After playing the original adventure game by Crowthers and Woods, I got bitten by the "Adventure" bug. This made up my mind to finally purchase a TRS-80 Model III, and play these games at home into the hours of the night when most people are having dream fantasies.

I spent the better part of the first month that I owned the computer solving adventures by Scott Adams and other honorable mentions. This turned my wife into an instant computer widow who patiently waited for me to get CRT burns in my face.

Well, it never happened, and I never lost interest in playing them. That's when my wife decided to help me come up with an idea for writing one. (If you can't beat them, join them!)

For those of you who are not familiar with adventure games, they are a kind of computer simulated fantasy. They transport you through time and space, to another place where anything is possible, whether it be a pyramid or a ghost town.

At any rate, the adventure game is only an assistant to your imagination, and it works by painting a description of where you are and the objects around you. The game presents you with obstacles which you must first overcome before you obtain your goal, which in this game is to rescue the maiden and get her out of the castle.

Your response to the computer should be in the general form: (verb) (noun) such as: TAKE TORCH. The computer's response might be: TORCH TAKEN, YOU'RE ALREADY CARRYING IT, or YOU CAN'T DO THAT YET, depending on the circumstances. All objects presented to you in the game have some function in the game. For example, you must be carrying the mace before you can ring the bell. I won't give you any more hints, because that would ruin the fun.

Some authors like to put in objects or clues to throw you off the track, but these mostly occur in games written for the experienced adventurer. I rate this game for the novice adventurer. You will find out how well you did at the end of the game anyway.

To move about the game, you only need to enter a single letter for a direction, such as E (for east), etc., with the exception of obstacles like water or stairs. The key to playing the game is to watch all portions of the screen after you give a command. If you don't watch carefully you may miss a clue. In general the top portion of your screen will display what you see and where you are. The bottom portion of the screen will give clues and commands.

If, at any time, you want to know what you're carrying, type "INVENTORY". If you want a description

your surroundings or a closer look for hidden clue — type "LOOK".

Since this is the first time I've tried to write a program that is longer than about 10 lines, I encountered several difficulties. First of all, you have to find a decent theme and stick to a logical flow of thought. Next, from my experience of playing adventure games written in BASIC, I found them to be too slow in responding, and I would find myself getting impatient for the result. To rectify this problem, I structured this program to respond in most cases within a couple of seconds' time.

This was accomplished by searching the verb data list within the program and jumping directly to the verb handling subroutine for that verb as soon as the verb is found in the list. You will notice that, if you type in a verb that the program doesn't recognize, it will take longer to respond. Some of the verbs don't need to know what the noun is, so the program will not bother to search the noun data list, such as for a direction. Also, the verbs used the most were put at the front of the list so that the program would find them faster. The end result is a relatively fast adventure program written in BASIC.

Many things pop up which logically have to be taken into account. For example, in real life situations you have to open a door before you walk through it, whereas in playing or writing an adventure game this could be very easily forgotten.

Another example would be that, in real life you can only carry so many objects at once. This is true in many versions of adventure games. It's a pain in the keyboard having to drop items and go back to pick them up as you need them. This serves no useful purpose as I can see, so I let you carry as many objects at once as you wish.

Many of the things you do can be dangerous, such as fooling around with the crocodiles. Most adventure games would decide to kill you at that point and make you start over again. Out of the goodness of my heart I let you live in this game.

Some of the verbs the game recognizes are: TAKE, PULL, DROP, HIT, SAY, KILL, UNLOCK, CATCH, THROW, BREAK, RING, and SWIM. Some of the nouns it will recognize are: SAW, DUCKS, GUNPOWDER, MACE, DAGGER, TORCH, BUCKET, ROPE, WATER, and ARMOR. There are more, but if I told you them all it would ruin the fun. If you have to know more, you can always look at the data list, but that's cheating. This is another good reason to write adventures in machine language.

This program requires 16K of memory, so if you have

any problems with room, remove the comment statements from the first few lines of the program. This program was written in upper case only to make it more compatible with most of the Model I's. Happy adventuring.

```

1 'WRITTEN BY DAVE TRAPASSO
2 'JULY,1981
3 ' COPYRIGHT D. TRAPASSO, JULY 1981
4 '29 BOULEVARD PARKWAY, ROCHESTER, N.Y. 14612, (716) 663-3925
5 CLS : PRINT @ 18,"WELCOME TO CASTLE ADVENTURE, " : PRINT
"THE OBJECT OF THE GAME IS TO ENTER THE CASTLE AND RESCUE THE
FAIR MAIDEN FROM THE CLUTCHES OF THE BLACK KNIGHT AND RETURN
  WITH HER TO THE FRONT ";
10 PRINT "OF THE CASTLE. I RECOGNIZE SIMPLE TWO WORD
COMMANDS LIKE TAKE BUCKET, AND ONLY NEED ONE LETTER TO MOVE IN A
DIRECTION SUCH AS N (NORTH), S (SOUTH) ETC. SOME OF THE"
12 PRINT "OTHER WORDS THAT I KNOW ARE LOOK AND INV
(INVENTORY)--GOOD LUCK!"
17 CLEAR 400
20 DIM V$(33),P$(26,5),N$(35,1),M$(12)
25 FOR N=0 TO 33 : READ V$(N) : NEXT
30 FOR N=0 TO 26 : FOR X=0 TO 5 : READ P$(N,X) : NEXT X : NEXT N
35 FOR N=0 TO 35 : FOR X=0 TO 1 : READ N$(N,X) : NEXT X : NEXT N
40 FOR N=0 TO 12 : READ M$(N) : NEXT N
44 INPUT "BEFORE WE CAN PLAY PLEASE TELL ME YOUR NAME";Z$
45 P=0 : N2=0 : N3=0 : N11=0 : N12=0 : N8=0 : F=0
46 G=5
47 CLS
48 GOTO 2050
49 GOTO 55
50 PRINT @ 0,STRING$(255," ")
55 GOSUB 2000
60 RANDOM : B=RND(20) : IF B=6 THEN PRINT @ 512,"A HEART
STOPPING FEMALE SCREAM IS HEARD FROM SOMEWHERE"
62 F=F+1
65 PRINT @ 896,STRING$(63," ") : PRINT @ 896,"---NOW WHAT " ; :
INPUT QM$
70 X1=LEN(QM$) : IF X1<3 THEN 100
71 X3=0 : FOR X2=1 TO X1 : M$=MID$(QM$,X2,1) : IF M$=" "X3=X2
74 NEXT X2
80 IF X3=0 THEN 90
85 X5=X1-X3 : R$=RIGHT$(QM$,X5) : R1$=LEFT$(R$,3)
90 L$=LEFT$(QM$,3) : GOTO 112
100 L$=LEFT$(QM$,1)
112 FOR I=0 TO 33
113 IF L$=V$(I) THEN 180
114 NEXT I : G=2 : GOTO 2050
116 GOSUB 2100
117 IF JJ<0 THEN 130
120 ON S GOTO 3000, 3010, 3020, 3030, 3100, 3200, 3300, 6700,
7000, 3500, 3700, 3800, 3900, 4000, 4100, 4200, 4300, 4400,
4500, 4600, 4700, 4800, 4900, 3400, 9700, 8100, 8200, 8500,
3300, 4300, 8550, 8550, 8550, 8550
130 G=2 : GOTO 2050
180 S=S+1 : IF S<8 OR S=22 OR S=19 OR S=27 OR S=14 OR S=29
THEN 120 ELSE 116
2000 IF P=6 THEN 9000

```

```

2001 PRINT @ 0,STRING$(255," ") : PRINT @ 0,"YOU SEE :
";P$(P,0)
2004 R=0
2005 PRINT @ 64,""; : FOR N=0 TO 35 : IF P=VAL(N$(N,1)) THEN
2007
2006 NEXT : GOTO 2040
2007 PRINT "*" ;N$(N,0) ; : R=R+1
2010 IFR=3 THEN 2060
2015 IFR=6 THEN 2065
2020 NEXT
2040 PRINT @ 256,STRING$(63,"*") : RETURN
2050 GOSUB 6850 : PRINT @ 384,M$(G) : GOTO 55
2060 PRINT @ 128,""; : GOTO 2020
2065 PRINT @ 192,""; : GOTO 2020
2100 JJ=-1 : FOR J=0 TO 34
2110 L1$=LEFT$(N$(J,0),3)
2111 IF L1$=R1$ THEN 2120
2112 NEXT J : RETURN
2120 JJ=J : RETURN
3000 P1$=P$(P,1) : GOTO 3040
3010 P1$=P$(P,2) : GOTO 3040
3020 P1$=P$(P,3) : GOTO 3040
3030 P1$=P$(P,4)
3040 IF VAL(P1$)<0 THEN 3600
3045 IF VAL(P1$)=40 THEN 3070
3050 P=VAL(P1$) : GOTO 46
3060 G=0 : GOTO 2050
3070 G=3 : GOTO 2050
3100 IF P=7 THEN 3110
3105 G=4 : GOTO 2050
3110 IF R1$="NOR" OR R1$="BAN" OR R1$="CAS" THEN 3130
3120 IF R1$="SOU" OR R1$="MOA" THEN 3140
3125 G=4 : GOTO 2050
3130 P=8 : GOTO 46
3140 P=6 : GOTO 46
3200 IF P=8 OR P=9 OR P=11 OR P=24 THEN 3210
3205 G=1 : GOTO 2050
3210 IF P<10 THEN 3270
3220 IF P<22 THEN 3230
3222 GOTO 3290
3225 G=4 : GOTO 2050
3230 IF P=11 THEN 3232
3231 GOTO 3205
3232 IF R$="UP" THEN 3235
3233 IF R$="DOWN" THEN 3240
3234 GOSUB 6850 : PRINT @ 384,"YOU CAN ONLY GO UP OR DOWN ON
STAIRS" : GOTO 60
3235 P=10 : GOTO 46
3240 P=12 : GOTO 46
3250 IF JJ=28 THEN 3270 ELSE G=9
3260 GOTO 2050
3270 IF P=8 THEN 3280
3271 IF P=9 THEN 3275
3272 G=0 : GOTO 2050
3275 P=8 : GOTO 46
3280 IF N8=0 THEN 3285
3282 P=9 : GOTO 46
3285 GOSUB 6850 : PRINT @ 384,"THE VINES ONLY REACH ABOUT HALF
WAY UP THE WALL" : GOTO 60

```

```

3290 IF P<24 THEN 3293
3291 IF R$="DOWN" THEN 3294
3292 IF R$="UP" THEN 3295
3293 GOTO 3234
3294 P=23 : GOTO 46
3295 P=25 : GOTO 46
3300 GOSUB 2000 : IF JJ=34 AND P=9 AND VAL(P$(9,5))=1 THEN 3330
3303 IF P$(15,5)="1" AND P=15 AND R1$="PIC" THEN 3340
3305 IF VAL(P$(P,5))=0 THEN 3320
3310 G=8 : GOTO 2050
3320 G=7 : GOTO 2050
3330 P$(9,5)="0" : N$(6,1)="9" : GOTO 3310
3340 P$(15,5)="0" : N$(9,1)="15" : GOTO 3310
3400 GOSUB 8000 : IF N4=0 THEN 60
3410 IF JJ=15 THEN 3420
3415 G=1 : GOTO 2050
3420 IF N$(0,1)="30" AND P=19 THEN 3440
3430 G=0 : GOTO 2050
3440 IF N$(14,1)="6" AND N$(25,1)="22" THEN 3460
3450 GOSUB 6850 : PRINT @ 384,"DING,...NOTHING HAPPENS" :
GOTO 60
3460 N$(13,1)="40" : N$(14,1)="40" : P$(19,3)="23"
3470 GOSUB 6850 : PRINT @ 384,"DING,...THE WHITE KNIGHT COMES
CHARGING OVER THE DRAWBRIDGE AND ENGAGES IN A FIERCE BATTLE WITH
THE BLACK KNIGHT, WHERE UPON THEY BOTH DISAPPEAR IN A PUFF OF
SMOKE"
3480 GOTO 50
3500 IF JJ=18 THEN 3540
3502 GOSUB 8000 : IF N4=0 THEN 60
3503 IF JJ=3 THEN 3525
3505 IF JJ=18 OR JJ=19 THEN 3550
3515 G=12 : GOTO 2050
3525 GOSUB 6850 : IF VAL(N$(2,1))=30 THEN 3535
3530 PRINT @ 384,"THE DUCKS TRY TO BITE YOUR FINGERS" : GOTO 50
3535 PRINT @ 384,"THE DUCKS EAT YOUR GRAIN AND BECOME FRIENDLY"
: N2=1 : N$(2,1)="40" : GOTO 50
3540 IF N$(18,1)="-6" THEN JJ=19
3543 GOTO 3502
3550 GOSUB 6850 : IF VAL(N$(3,1))=30 THEN 3560
3555 PRINT @ 384,"OK, THE CROC'S RUN AFTER YOU TRYING TO EAT
YOU, BUT YOU'RE TOO FAST SO THEY GIVE UP" : GOTO 50
3560 N$(18,1)="-6" : N$(19,1)="6" : P$(6,4)="7" : PRINT @
384,"THE CROCS TAKE YOUR DUCKS AND DESPITE THEIR QUACKING AND
COMPLAINTS GET EATEN FEATHERS AND ALL" : N$(3,1)="-5"
3565 GOTO 50
3600 PRINT @ 768,STRING$(64," ") : G=0 : IF P=6 AND L$="W" THEN
PRINT @ 768,"THE CROCS ATTEMPT TO BITE YOU AS YOU APPROACH THE
MOAT SO YOU RETREAT" : GOTO 50
3605 IF P=16 THEN PRINT @ 768,"THE ARMOR WON'T LET YOU BY" :
GOTO 50
3610 IF P=7 THEN PRINT @ 768,"I DON'T THINK YOU CAN WALK ON
WATER" : GOTO 50
3615 IF P=8 AND L$="N" THEN PRINT @ 768,"YOU JUST WALKED INTO A
CASTLE WALL" : GOTO 50
3617 IF P=12 AND L$="S" THEN PRINT @ 768,"YOU JUST BUMPED INTO A
WALL BUT IT SOUNDS HOLLOW" : GOTO 50
3620 IF P=9 THEN PRINT @ 768,"IT'S A LONG WAY DOWN TO THE BANK,
BUT THE VINES OVER THE EDGE LOOK PRETTY STURDY" : GOTO 50

```

```

3625 IF P=11 OR P=12 THEN PRINT @ 768,"DON'T YOU KNOW THAT YOU
HAVE TO LIFT YOUR FEET UP WHEN YOU CLIMBSTAIRS?" : GOTO 50
3635 IF P=17 THEN PRINT @ 768,"THE STONE WALLS LOOK SOLID BUT
YOU FEEL A DRAFT COMING FROM ONE OF THEM" : GOTO 50
3640 IF P=19 THEN PRINT @ 768,"THE BLACK KNIGHT WON'T LET YOU
BY" : GOTO 50
3645 IF P=20 THEN PRINT @ 768,"THE GATE SEEMS TO BE LOCKED" :
GOTO 50
3650 IF P=22 THEN PRINT @ 768,"YOU HAVE TO LET DOWN THE
DRAWBRIDGE BEFORE YOU CAN WALK ACROSS IT" : GOTO 50
3655 IF P=23 THEN PRINT @ 768,"DIDN'T YOU EVER LEARN TO OPEN A
DOOR BEFORE YOU WALK THROUGH IT" : GOTO 50
3660 IF P=24 THEN PRINT @ 768,"DON'T YOU EVER LEARN, YOU HAVE TO
LIFT YOUR FEET WHEN YOU CLIMB STAIRS!" : GOTO 50
3665 IF P=6 THEN PRINT @ 768,"THE DRAWBRIDGE IS RAISED SO YOU
CAN'T CROSS THE MOAT ON IT" : GOTO 50
3670 G=3 : GOTO 2050
3700 IF JJ=11 THEN 3725
3705 IF JJ=26 THEN 3735
3715 GOSUB 6850 : PRINT @ 384,"YOU CAN'T BE SERIOUS" : GOTO 60
3725 GOSUB 8050 : IF N4=1 AND P=26 AND N$(10,1)="-26" THEN 3750
3726 IF N4=1 THEN 3790
3727 JJ=31 : GOSUB 8050 : IF N4=1 THEN 3790 ELSE 6720
3735 GOSUB 8050 : IF N4=1 AND P=22 AND N$(24,1)="22" THEN 3780
3736 IF N4=1 THEN 3790
3737 JJ=17 : GOSUB 8050 : IF N4=1 THEN 3790 ELSE 6720
3750 N11=1 : N$(16,1)="26" : G=5 : GOTO 47
3780 P$(22,2)="6" : P$(6,1)="22" : N$(32,1)="-6" :
N$(33,1)="6" : P$(22,3)="7" : P$(22,4)="7"
3785 P$(22,5)="0" : N$(24,1)="-22" : N$(25,1)="22" :
GOSUB 6850 : PRINT @ 384,"YOU HEAR THE SOUND OF MACHINERY" :
GOTO 50
3790 G=4 : GOTO 2050
3800 IF JJ=11 AND P=25 THEN 3805
3801 GOSUB 8000 : IF N4=0 THEN 60
3802 IF JJ=11 THEN 3810
3803 GOTO 3850
3805 IF VAL(N$(6,1))=30 AND VAL(N$(31,1))=25 THEN 3860
3810 G=0 : GOTO 2050
3820 G=5 : N$(31,1)="-25" : N$(5,1)="25" : GOTO 55
3850 G=12 : GOTO 2050
3860 GOSUB 6850 : PRINT @ 384,"THE BLADE SEEMS TO BE TOO DULL" :
GOTO 60
3900 GOSUB 8000 : IF N4=0 THEN 50
3905 IF JJ=3 THEN GOTO 6700
3910 IF JJ=18 OR JJ=19 THEN GOTO 3550
3915 IF JJ=13 OR JJ=14 OR JJ=15 OR JJ=17 THEN GOTO 3930
3920 G=4 : GOTO 2050
3930 GOSUB 6850 : PRINT @ 384,"I WOULDN'T DO THAT IF I WERE YOU
HE'S LIABLE TO CHOP YOUR HEAD OFF" : GOTO 50
4000 IF R1$="CHA"4003
4001 IF P=20 AND N$(9,1)="30" THEN 4050
4002 GOSUB 8000 : IF N4=0 THEN 60
4003 IF P=17 THEN 4010
4005 G=1 : GOTO 2050
4010 IF N$(17,1)="17" AND N$(9,1)="30" AND R1$="CHA" THEN 4020
4015 G=0 : GOTO 2050
4020 P$(17,5)="0" : N$(17,1)="40" : P$(17,2)="18" : GOSUB 6850 :
N$(35,1)="17"

```

```

4025 PRINT @ 384,"THE SKELETON SAYS 'THANKS, NOW I'LL SHOW YOU
THE WAY OUT'..... PUSHES A STONE IN THE WALL AND DISAPPEARS
CHAINS AND ALL"
4030 GOTO 50
4050 GOSUB 6850 : PRINT @ 384,"THE GATE IS SO HARD IT WEARS THE
TEETH OFF THE SAW" : GOTO 60
4100 GOSUB 8000 : IF N4=0 THEN 60
4103 IF JJ=34 THEN 4110
4105 G=1 : GOTO 2050
4110 IF VAL(N$(8,1))<0 THEN 4120
4115 GOSUB 6850 : PRINT @ 384,"IT'S NOT LOADED" : GOTO 60
4120 IF N$(7,1)="30" AND N$(6,1)<"-9" THEN 4130
4125 G=0 : GOTO 2050
4130 IF N$(14,1)="-6" THEN 4140
4135 GOSUB 6850 : PRINT @ 384,"YOU CAN'T, YOU DON'T HAVE ANY
MORE GUNPOWDER" : GOTO 60
4140 N$(14,1)="6" : GOSUB 6850 : PRINT @ 384,"THE CANNON
EXPLODES WITH A FLASH AND A BOOM, AND YOU HEAR THE SOUND OF
HOOF BEATS FROM SOMEWHERE NEAR THE MOAT" : GOTO 50
4200 GOSUB 8000 : IF N4=0 THEN 60
4203 IF JJ=34 THEN 4210
4205 G=1 : GOTO 2050
4210 IF VAL(N$(8,1))>0 THEN 4220
4215 GOSUB 6850 : PRINT @ 384,"THE CANNON IS ALREADY LOADED" :
GOTO 60
4220 IF N$(8,1)="30" AND P=9 THEN 4230
4225 G=0 : GOTO 2050
4230 N$(8,1)="-14" : G=5 : GOTO 2050
4300 IF P=13 OR P=16 THEN 4305
4302 IF P=23 AND JJ=29 THEN 4330
4303 IF P=20 THEN 4360
4304 GOTO 4306
4305 IF JJ=29 THEN 4335
4306 G=4 : GOTO 2050
4310 IF JJ=22 THEN 4360
4320 IF JJ=24 THEN 4350
4330 IF P$(23,3)="-24" THEN 4340
4335 GOSUB 6850 : PRINT @ 384,"IT'S ALREADY OPEN" : GOTO 60
4340 P$(23,3)="24" : G=5 : GOTO 2050
4350 G=0 : GOTO 2050
4360 IF N$(4,1)="30" THEN 4380
4370 GOSUB 6850 : PRINT @ 384,"YOU CAN'T IT'S LOCKED" : GOTO 60
4380 IF P$(20,2)="21" THEN 4335
4383 IF P<20 THEN 4350
4385 P$(20,2)="21" : N$(22,1)="-20" : N$(23,1)="20" : GOTO 46
4400 IF JJ=12 AND P=26 AND N$(16,1)="26" THEN 4460
4401 IF JJ=12 AND P=26 AND N$(16,1)="-26" THEN 4480
4403 IF JJ>12 THEN 4485
4405 IF JJ=3 OR JJ=4 OR JJ=5 THEN 4470
4406 GOSUB 8000 : IF N4=0 THEN 60
4410 IF JJ=12 THEN 4430
4420 N3=1 : GOTO 7000
4430 GOSUB 6850 : PRINT "AT WHAT " : INPUTAZ$
4440 IF AZ$="ARMOR" THEN 4447
4445 IF AZ$="VINES" THEN 8100
4447 IF P=16 THEN 4450
4448 GOTO 4720
4450 N$(12,1)="7" : N$(20,1)="-16" : N$(21,1)="16" :
P$(16,4)="17" : GOTO 46

```

```

4460 P$(26,5)="0" : N$(16,1)="-26" : N$(10,1)="26" :
N$(4,1)="26" : GOSUB 6850 : PRINT @ 384,"THE WATER GETS ADSORBED
INTO THE GROUND" : P$(26,5)="0" : GOTO 50
4470 G=1 : GOTO 2050
4480 GOSUB 6850 : PRINT @ 384,"THE BUCKET IS EMPTY" : GOTO 60
4485 G=9 : GOTO 2050
4500 PRINT @ 640,"YOU ARE CARRYING THE FOLLOWING : "
4510 PRINT @ 704,"" : V1=0 : FOR H=0 TO 12 : V=VAL(N$(H,1)) :
IF V=30 THEN 4540
4520 NEXT H : IF V1<30 THEN PRINT "NOTHING AT ALL"
4530 GOTO 60
4540 V1=V : PRINT N$(H,0);"* " : GOTO 4520
4600 GOTO 4650
4602 GOSUB 8000 : IF N4=0 THEN 60
4610 IF JJ=11 OR JJ=26 OR JJ=28 OR JJ=1 THEN 4620
4614 G=1 : GOTO 2050
4620 GOSUB 6850 : PRINT @ 384,"WITH WHAT YOUR BEAR HANDS " :
INPUTGN$
4622 IF GN$="YES" THEN 4630
4625 GOTO 60
4630 IF N$(31,1)="25" AND P=25 THEN 4660 ELSE PRINT
"SORRY...YOU'RE TOO PUNY!" : GOTO 60
4650 IF P=17 AND JJ=26 AND N$(17,1)="17" THEN 4620
4652 IF P=25 AND N$(31,1)="25" THEN 4620
4655 GOTO 4602
4660 GOSUB 6850 : PRINT @ 384,"I DON'T BELIEVE IT BUT YOU JUST
BROKE THAT ROPE WITH YOUR BEAR HANDS-I GUESS YOU'RE NOT SO PUNY
AFTER ALL" : GOTO 3820
4700 '
4702 IF JJ=5 OR JJ=10 OR JJ=11 OR JJ=13 OR JJ=18 OR JJ=19 OR
JJ=20 OR JJ=22 OR JJ=24 OR JJ=26 OR JJ=29 THEN 4720
4705 GOSUB 8000 : IF N4=0 THEN 60
4710 IF JJ=15 THEN 3400
4720 B=JJ+1 : GOSUB 6850
4730 ON B GOTO 4750, 4620, 4750, 3530, 4750, 4805,
4750, 4750, 4760, 4750, 4815, 4825, 4750, 4835, 3930, 3400,
4750, 3930, 4845, 3555, 4855, 3930, 4865,4750,4875, 4750, 4755,
4750, 4755, 4885, 4755, 4750, 4755, 4750, 4760, 4750
4750 G=12 : GOTO 2050
4755 G=4 : GOTO 2050
4760 PRINT @ 384,"I WOULDN'T DO THAT IF I WERE YOU, IT MIGHT
EXPLODE" : GOTO 60
4800 G=6 : GOTO 2050
4805 GOSUB 8050 : IF N4=1 THEN 4750
4807 JJ=31 : GOSUB 8050 : IF N4=0 THEN 6720
4810 GOTO 4750
4815 GOSUB 8050 : IF N4=1 THEN 4750
4817 JJ=16 : GOSUB 8050 : IF N4=0 THEN 6720
4820 GOTO 4750
4825 GOSUB 8050 : IF N4=1 THEN 4750
4827 JJ=31 : GOSUB 8050 : IF N4=0 THEN 6720
4830 GOTO 4750
4835 GOSUB 8050 : IF N4=1 THEN 3930
4837 JJ=14 : GOSUB 8050 : IF N4=0 THEN 6720
4840 GOTO 3930
4845 GOSUB 8050 : IF N4=1 THEN 3555
4847 JJ=19 : GOSUB 8050 : IF N4=0 THEN 6720
4850 GOTO 3555
4855 GOSUB 8050 : IF N4=1 THEN 3930

```



```

4857 JJ=21 : GOSUB 8050 : IF N4=0 THEN 6720
4860 GOTO 3930
4865 GOSUB 8050 : IF N4=1 THEN 4755
4867 JJ=25 : GOSUB 8050 : IF N4=0 THEN 6720
4870 GOTO 4755
4875 GOSUB 8050 : IF N4=1 THEN 4755
4877 JJ=25 : IF N4=1 THEN 4755
4880 JJ=32 : GOSUB 8050 : IF N4=1 THEN 4755
4882 JJ=33 : GOSUB 8050 : IF N4=1 THEN 4755
4884 GOTO 6720
4885 GOSUB 8050 : IF N4=1 THEN 4755
4887 JJ=30 : GOSUB 8050 : IF N4=1 THEN 4755
4890 IF P=13 THEN 4755
4892 GOTO 6720
4900 IF JJ=1 AND N$(1,1)="30" THEN 4910
4905 G=0 : GOTO 2050
4910 IF VAL(N$(2,1))=P THEN JJ=12
4915 IF P=7 THEN JJ=12
4920 IF JJ<12 OR JJ<2 THEN 4940
4925 GOSUB 6850 : PRINT @ 384,N$(JJ,0);" TAKEN"
4930 N$(JJ,1)="30" : GOTO 50
4940 INPUT "WITH WHAT ";Z$
4945 JJ=40 : IF Z$="GRAIN" THEN 4970
4950 IF Z$="WATER"4980
4965 GOSUB 6850 : PRINT @ 384,"SORRY ";Z$;" WON'T FIT IN THE
JAR" : GOTO 60
4970 JJ=2 : GOSUB 8000 : IF N4=0 THEN 60
4975 GOTO 4925
4980 JJ=12 : GOSUB 8000 : IF N4=0 THEN 60
4985 GOTO 4925
5000 DATA N, S, E, W, SWI, CLI, LOO, TAK, DRO, FEE, PUL, CUT,
CAT, SAW, FIR, LOA, OPE, THR, INV, BRE, HIT, SAY, FIL, RIN, KIL,
POU, FUC, CLO, EXA, UNL, TOU, FEE, SME, TAS
5010 DATA FOREST ,0,2,1,0,0,FOREST ,1,3,1,0,0,FOREST &
BUSHES,0,4,3,5,1,FOREST ,1,3,3,2,0,BUSHES ,2,4,4,4,0,FOREST
,5,5,2,6,0,CASTLE ENCIRCLED BY MOAT , -22,6,5, -2,0,MOAT
, -8, -6, -7, -7,0
5020 DATA BANK & CASTLE, -9,7,8,8,0,GUARDS
WALK,9, -8,10,9,1,GUARDS WALK NEAR TOP OF SOME STEPS
,11,10,10,9,0,STAIRS ,40, -11,40, -11,0,HALLWAY NEAR FOOT OF
SOME STEPS ,40, -13,11,15,1,SECRET DOOR,12,14,40,40,0,
ARMORY,13,40,40,40,0
5030 DATA HALLWAY WITH PICTURES OF FIERCE LOOKING BEARDED
KNIGHTS,40,40,12,16,1,HALLWAY ,40,40,15, -17,0,DUNGEON
,40, -18,16,40,1,SECRET PASSAGEWAY,17,40,19,40,0,COURT YARD &
WELL,26,20, -23,18,0, ,19, -21,19,19,0
5035 DATA TUNNEL ,20,22,40,40,0,21, -6, -7, -7,1
5040 DATA DOOR NEAR FOOT OF SOME STEPS ,40,40, -24,19,0,STAIRS
, -24, -24, -24,0,WATCH TOWER ,40,40,24,40,0,WELL
,40,19,40,40,1,MACE ,17,JAR ,4,GRAIN ,1,DUCKS ,5,KEY , -26,MAIDEN
, -25,DAGGER , -9,TORCH ,15
5045 DATA GUNPOWDER ,14,SAW , -15,BUCKET , -26,ROPE ,26,WATER ,7
5050 DATA KNIGHT DRESSED IN BLACK ARMOR ,19,KNIGHT DRESSED IN
WHITE ARMOR , -6,BELL ,19,BUCKET OF WATER , -26,SKELETON CHAINED
TO WALL ,17,CROCS WITH EMPTY BELLYS ,6,CROCS WITH FULL BELLYS
, -6,ARMOR ,16,RUSTY SUIT OF ARMOR , -16,GATE ,20
5055 DATA OPEN GATE , -20
5060 DATA DRAWBRIDGE ,22,LOWERED DRAWBRIDGE , -22,CHAIN
,22, ,40,VINES ,8,DOOR ,16,DOOR ,19,MAIDEN TIED UP WITH ROPE

```

```

,25,DRAWBRIDGE ,6,LOWERED DRAWBRIDGE , -6,CANNON ,9,SECRET
PASSAGE , -17
5070 DATA SORRY-BUT YOU CAN'T DO THAT...YET!! ,I DON'T KNOW WHAT
YOU MEAN,WHAT?,SORRY YOU CAN'T GO THERE,NOTHING HAPPENS,OK,SORRY
SIR LANCELOT...WRONG GAME, YOU SEE NOTHING SPECIAL,THERE'S
SOMETHING THERE ALL RIGHT
5075 DATA IT'S BEYOND YOUR POWER!,TAKEN
5080 DATA DROPPED, YOU MUST BE WEIRD
6010 IF VAL(N$(12,1))=P THEN N$(12,1)="30"
6015 IF VAL(N$(2,1))=P THEN N$(2,1)="30"
6020 GOTO 6740
6025 P$(2,5)="0" : GOTO 6010
6100 IF VAL(N$(1,1))=30 THEN 6740
6110 PRINT @ 384,"THE GRAIN SLIPS THROUGH YOUR FINGERS AS
YOU TRY TO TAKE IT" : GOTO 50
6200 IF N2=1GOTO 6740
6210 PRINT @ 384,"THE DUCKS FLY AWAY FROM YOU AS YOU APPROACH
THEM" : GOTO 50
6300 P$(12,2)="13" : P$(12,5)="0" : PRINT @ 384,"YOU HEAR THE
SOUNDS OF GEARS AND CHAINS CLANKING COMING FROM SOMEWHERE DOWN
THE HALLWAY" : N$(JJ,1)="30" : GOTO 50
6400 IF VAL(N$(1,1))=30 THEN 6430
6410 PRINT @ 384,"YOU'VE NOTHING TO CARRY IT IN" : GOTO 50
6430 G=10 : GOTO 6740
6500 IF N11=0 THEN 6520
6510 GOTO 6740
6520 PRINT @ 384,"YOU CAN'T TAKE THE ROPE YET IT SEEMS TO BE
ATTACHED TO SOMETHING" : GOTO 50
6700 GOSUB 6850 : C=JJ+1 : IF C>13 THEN 6770
6705 G=10 : IF VAL(N$(JJ,1))=30 THEN 6750
6707 IF JJ=10 THEN 6900
6708 IF JJ=5 THEN
6709 IF JJ=5 THEN 8300
6710 IF VAL(N$(JJ,1))=ABS(P) THEN 6730
6720 G=0 : PRINT @ 384,"I DON'T SEE IT HERE" : GOTO 60
6730 IF VAL(N$(JJ,1))=P THEN 6760
6735 G=0
6740 IF G=0 THEN 2050
6743 N$(JJ,1)="30" : PRINT @ 384,"TAKEN" : GOTO 50
6750 GOSUB 6850 : PRINT @ 384,"YOU'RE ALREADY CARRYING IT!" :
GOTO 60
6760 ON C GOTO 6740, 6025, 6100, 6200, 6740, 6740, 6740, 6300,
6740, 6740, 6900, 6500, 6400
6770 G=9 : GOTO 2050
6850 PRINT @ 384,STRING$(255," ") : PRINT @ 640,STRING$(255," ")
: : RETURN
6900 IF N$(16,1)="-26" AND N$(10,1)="-26" AND P=26 THEN 6940
6910 IF VAL(N$(10,1))>0 AND VAL(N$(10,1))<30 THEN 6740
6920 IF VAL(N$(10,1))>0 AND VAL(N$(16,1))<0 THEN 6720
6930 G=0 : GOTO 2050
6940 GOSUB 6850 : PRINT @ 384,"THE BUCKET'S TOO HEAVY" : GOTO 60
7000 IF VAL(N$(JJ,1))=30 THEN 7020
7005 GOSUB 6850 : PRINT @ 384,"YOU'RE NOT CARRYING THE ";
N$(JJ,0) : GOTO 60
7020 IF JJ=12 THEN 7050
7021 IF JJ=1 THEN 7060
7022 IF N3=0 THEN 7024

```

continued on page 58

THREE BASIC PROGRAMS

Gordon Speer

NATIONAL DEBT

Eighteen-percent interest, or even twelve percent is almost impossible to explain in terms the average person relates to. There was a story about a modern-day Rip Van Winkle who, upon waking after 40 years of sleep, called his stock broker to find out how his shares were doing. He was rejoicing at the news that they were over a million dollars a share when the telephone operator interrupted to ask for another hundred-thousand dollars for the next three minutes.

I wondered how much money George Washington would have had to invest, upon taking office in 1789, to accumulate enough interest to pay off the trillion dollar national debt of today. The program uses 12% interest. You won't believe the answer. If you'd like a real shock, try replacing the .12's with .18's, (the interest rate your VISA card used to charge, before it was raised). The program also compounds the interest only annually. Monthly compounding would be even more incredible.

```
100 ' NATLDEBT
110 CLS
120 PRINT " WASHINGTON PAYS OFF THE NATIONAL DEBT!":PRINT
130 DEFDBL D 'DOUBLE PRECISION VARIABLE
140 REM HOW MUCH WOULD GEORGE WASHINGTON HAVE NEEDED TO
150 REM INVEST IN 1789 AT 12%, TO COVER THE TRILLION DOLLAR
160 REM NATIONAL DEBT OF TODAY?
170 LET D=1D12 'ONE TRILLION, DOUBLE PRECISION
180 FOR Y=1789 TO 1982 STEP -1
190 PRINT @ 320,Y
200 LET D=D/1.12 'COMPOUNDED ANNUALLY, BACKWARDS
210 NEXT Y
220 PRINT USING "$####.## INVESTED AT 12% BY GEORGE WOULD BE
WORTH";D
230 FOR Y=1789 TO 1982
240 PRINT @ 640,Y
250 LET D=D*1.12 'COMPOUNDED ANNUALLY
260 NEXT Y
270 PRINT "$"D"TODAY"
```

BOX

The CALCULETTER column in Popular Science Magazine recently posed this problem: what is the smallest square of sheet metal that can be folded into an open-top box which will contain 13 gallons? There are actually two questions here. The first is, what are the relative dimensions of a box which has the maximum volume from a given sheet size. (The sheet dimension becomes two heights plus one side of the base.) The second is easier: given the relative dimensions, what actual dimensions will produce a volume of 13 gallons, each of which is 231 cubic inches. The second part is a proportion question, volumes are proportional to the cubes of linear dimensions ($V/v = S \text{ cubed}/s \text{ cubed}$).

Now let's get to the tough part. Finding the relative

dimensions of a box with a maximum volume is a calculus problem, unless you have a computer. But we all have computers so we'll use the BRUTE FORCE method instead of calculus. We'll change the dimension of the little square you cut out of each corner of the sheet to make the box, and figure the volume the box would have, again and again until the volume starts to decrease. Then we'll use steps half as big in the opposite direction until the volume once again reaches a peak and starts to decrease, then again, and again. It's like tuning a radio—you tune past a station until it starts to fade, then go the other direction a little slower until it fades again, etc.

The answer I came up with has 3 3 3 4 5 and a decimal, but not in that order. See what you can do with it.

Here is another problem which is similar. What is the longest I-beam, six inches wide, which can be wheeled around a right angle corner where a ten foot wide hallway meets an eight foot wide hallway. I'll answer that in a future issue. Send me your solution if you want a prize.

```
100 'BOX
110 ' FIND THE PROPORTIONS OF A MAXIMUM VOLUME OPEN-TOP BOX
120 ' FORMED FROM A GIVEN SQUARE OF MATERIAL BY CUTTING
130 ' SQUARES OUT OF THE CORNERS AND FOLDING UP SIDES
140 CLS 'CLEAR THE SCREEN
150 GOSUB 380 'DRAW THE PATTERN
160 DEFDBL A-Z 'EXTRA PRECISION
170 PRINT:PRINT:PRINT
180 PRINT " MAXIMUM VOLUME BOX FORMED FROM A 10 X 10 SHEET:"
190 PRINT
200 PRINT @ 661,"VOLUME (CUBIC UNITS)";
210 PRINT @ 384,"CORNER NOTCH (UNITS)";
220 S=10 'LENGTH OF A SIDE OF MATERIAL
230 LET I=1 'INCREMENT
240 LET D=1 'DIRECTION OF STEP
250 LET N=L+I*D 'NOTCH=LAST SIZE +/- INCREMENT
260 LET V=(S-2*N)*(S-2*N)*N 'VOLUME OF BOX
270 PRINT @ 725,V; 'CURRENT VOLUME AND NOTCH SIZES
280 PRINT @ 454,USING"#.#####";L; 'CURRENT NOTCH SIZE
290 IF V < SV THEN 330 'PAST MAXIMUM-GETTING SMALLER
300 LET SV=V 'SAVE VOLUME FOR COMPARING
310 LET L=N 'SAVE LAST NOTCH SIZE
320 GOTO 250
330 ' VOLUME GETTING SMALLER - CHANGE THE DIRECTION
340 LET D=-D 'CHANGE DIRECTION OF STEP
350 LET I=I/2 'CHANGE SIZE OF INCREMENT
360 GOTO 250
370 ' DRAW THE PATTERN
380 DATA 20,40,80,80,20,25,25,80,92,92,25,40
390 DATA 40,80,92,80,40,45,45,40,80,40,40,45
400 DATA 40,28,40,28,25,40,25,28,40,40,20,25
410 FOR A=1 TO 6
420 READ Y,FH,TH 'FROM AND TO HORIZONTALLY
430 FOR X=FH TO TH
440 SET(X,Y)
450 NEXT X
```

```

460 READ X,FV,TV
470 FOR Y=FV TO TV
480 SET(X,Y):SET(X+1,Y) 'MAKE VERTICALS DOUBLE WIDE
490 NEXT Y,A
500 FOR DELAY=1 TO 1000:NEXT
510 RETURN

```

ROOTS

Everyone, at one time or another, gets interested in genealogy. Sometimes it's just to show the kids who their ancestors were, or how they are related to their cousins. Sometimes it becomes a detailed search through volumes of lineage records. The microcomputer is certainly suited to this kind of work, but would generally be used with disk drives and a printer to list all the descendants. Working backwards, however, we all have two parents, four grandparents, eight great-grandparents, etc., and all of those will fit on your video display very nicely. The question becomes, how do you teach the computer to decide who is related to whom? Here is where the programmer has at least three choices. First, he can study up on genealogy and try to teach the computer to code people by some accepted method (education). Second, he can read computer books until he finds out how some other programmer has done it and do it similarly (plagiarism). Third, he can program it any way he pleases, whether it's acceptable, or not, as long as it works (invention). In writing programs you will always have these three choices, and will probably use all of them at one time or another.

The method used in ROOTS was to assign each person a unique birthdate and to list the name, birthdate, father's birthdate, and mother's birthdate of each family member in a sequential file. (DATA statements in a BASIC program constitute a single sequential file. Using DISK BASIC you may access more than one sequential file, as well as random files, but writing the files requires a little more work than DATA statements.)

When the program is run you are asked to enter the birthdate of the person whose roots you want to trace. The computer then looks for the person with that birthdate, prints his name at the right of the screen, notes the birthdates of his parents, looks them up, prints their names, notes the dates of their parents, etc. Unknown dates and duplicate dates must be supplied with unique suffixes to avoid confusion. The example supplied shows how these might be handled. Try the program with your own ROOTS and see how it works.

```

100 ' Roots
110 CLEAR 10000
120 INPUT"Enter the birthday of the descendant (1-30-1882)";D$
130 CLS
140 PRINT,,"R O O T S"
150 PRINT @ 128,"- - - - -";
160 PRINT @ 256,STRING$(27,"-");
170 PRINT @ 384,"- - - - -";
180 PRINT @ 512,STRING$(37,"=");
190 PRINT @ 640,"- - - - -";
200 PRINT @ 768,STRING$(27,"-");
210 PRINT @ 896,"- - - - -";

```

```

220 LET S$=D$: GOSUB 800
230 IF N$="" THEN 280
240 LET F1$=F$:M1$=M$
250 PRINT @ 550,N$;
260 PRINT @ 624,B$;
270 ' parents
280 LET S$=F1$: GOSUB 800
290 IF N$="" THEN 320
300 LET F2$=F$:M2$=M$
310 PRINT @ 284,N$;B$;
320 LET S$=M1$:GOSUB 800
330 IF N$="" THEN 370
340 LET F3$=F$:M3$=M$
350 PRINT @ 796,N$;B$;
360 ' grandparents
370 LET S$=F2$:GOSUB 800
380 IF N$="" THEN 410
390 LET F4$=F$:M4$=M$
400 PRINT @ 142,N$;B$;
410 LET S$=M2$: GOSUB 800
420 IF N$="" THEN 450
430 LET F5$=F$:M5$=M$
440 PRINT @ 398,N$;B$;
450 LET S$=F3$: GOSUB 800
460 IF N$="" THEN 490
470 LET F6$=F$:M6$=M$
480 PRINT @ 654,N$;B$;
490 LET S$=M3$: GOSUB 800
500 IF N$="" THEN 540
510 LET F7$=F$:M7$=M$
520 PRINT @ 910,N$;B$;
530 ' great grandparents
540 LET S$=F4$: GOSUB 800
550 IF N$="" THEN 570
560 PRINT @ 64,N$;B$;
570 LET S$=M4$: GOSUB 800
580 IF N$="" THEN 600
590 PRINT @ 192,N$;B$;
600 LET S$=F5$: GOSUB 800
610 IF N$="" THEN 630
620 PRINT @ 320,N$;B$;
630 LET S$=M5$: GOSUB 800
640 IF N$="" THEN 660
650 PRINT @ 448,N$;B$;
660 LET S$=F6$: GOSUB 800
670 IF N$="" THEN 690
680 PRINT @ 576,N$;B$;
690 LET S$=M6$: GOSUB 800
700 IF N$="" THEN 720
710 PRINT @ 704,N$;B$;
720 LET S$=F7$: GOSUB 800
730 IF N$="" THEN 750
740 PRINT @ 832,N$;B$;
750 LET S$=M7$: GOSUB 800
760 IF N$="" THEN 780
770 PRINT @ 960,N$;B$;
780 GOTO 780
790 '
800 'subroutine to search for ancestors by birthday
810 RESTORE

```

```

'search birthday
'no data on file
'father and mother birthdays

```

```
'lock the display
```

continued on page 64

TWO GRAPHICS PROGRAMS

Airdrie Ferguson

GRAPHIC COMBINATIONS

Anyone designing graphic material (borders, frames, etc.) need only to run this program to get some ideas for pattern makeup. I have used this extensively over the last two years—it saves a lot of spade work. Running is self-explanatory, and the program requires well under 4K in Level II.

```
10 RANDOM : CLS : PRINT CHR$(23) : PRINT @ 266, "GRAPHICS
COMBINATIONS" : FOR T=1 TO 1000 : NEXT : CLS : PRINT @ 271,
"PRESS SPACE BAR TO CONTINUE DISPLAY"
15 PRINT @ 404, "PRESS 'BREAK' KEY TO STOP" : PRINT @ 528,
"SELECT MAGNITUDE OF COMBINATIONS"
20 PRINT @ 649, " BY PRESSING 2, 3, 4 OR 5 .....NOW"
30 I$=INKEY$ : IF I$ < "2" OR I$ > "5" THEN 30 ELSE I=VAL(I$) :
ON I GOTO 30,70,90,140,380
40 GOTO 30
50 ***** GRAPHICS DISPLAY OF LINES USING COMBINATIONS OF UP TO
FIVE GRAPHICS CODES AT RANDOM AND DISPLAYING IDENTIFICATION *****
60 ***** AIRDRIE FERGUSON,BOX 40206 CASUARINA,
N.T. 5792,AUSTRALIA *****
70 L=0 : CLS : FOR K=1 TO 8 : A=RND(62)+128 : B=RND(62)+128 :
FOR N=L TO L+62 STEP 2 : PRINT @ N, CHR$(A); : NEXT
75 FOR M=L+1 TO L+63 STEP 2 : PRINT @ M, CHR$(B); : NEXT :
PRINT @ L+64, "A="; A; "B="; B; : L=L+128 : NEXT
80 A$=INKEY$ : IF A$ = " " THEN 70 ELSE 80
90 L=0 : CLS : FOR K=1 TO 7 : A=RND(62)+128 : B=RND(62)+128 :
C=RND(62)+128 : FOR N=L TO L+60 STEP 3 : PRINT @ N, CHR$(A); :
NEXT : FOR M=L+1 TO L+61 STEP 3
95 PRINT @ M, CHR$(B); : NEXT : FOR O=L+2 TO L+62 STEP 3 :
PRINT @ O, CHR$(C); : NEXT : PRINT @ L+64, "A="; A; " B="; B;
" C="; C;
100 L=L+128
110 NEXT
120 A$=INKEY$
130 IF A$=" " THEN 90 ELSE 120
140 L=0
150 CLS
160 FOR K=1 TO 7
170 A=RND(62)+128
180 B=RND(62)+128
190 C=RND(62)+128
200 D=RND(62)+128
210 FOR N=L TO L+60 STEP 4
220 PRINT @ N, CHR$(A);
230 NEXT
240 FOR M=L+1 TO L+61 STEP 4
250 PRINT @ M, CHR$(B);
260 NEXT
270 FOR O=L+2 TO L+62 STEP 4
280 PRINT @ O, CHR$(C);
290 NEXT
300 FOR Q=L+3 TO L+63 STEP 4
```

```
310 PRINT @ Q, CHR$(D);
320 NEXT
330 PRINT @ L+64, "A="; A; " B="; B; " C="; C; " D="; D
340 L=L+128
350 NEXT
360 A$=INKEY$
370 IF A$=" " THEN 140 ELSE 360
380 L=0
390 CLS
400 FOR K=1 TO 7
410 A=RND(62)+128
420 B=RND(62)+128
430 C=RND(62)+128
440 D=RND(62)+128
450 E=RND(62)+128
460 FOR N=L TO L+59 STEP 5
470 PRINT @ N, CHR$(A);
480 NEXT
490 FOR M=L+1 TO L+60 STEP 5
500 PRINT @ M, CHR$(B);
510 NEXT
520 FOR O=L+2 TO L+61 STEP 5
530 PRINT @ O, CHR$(C);
540 NEXT
```

HOW ABOUT YOUR OWN PERSONAL RUBIC CUBE COACH?
16K LEVEL II OR 32K DISK **** ONLY \$14.95 !!!
THE 'RUBIC CUBE COACH' WILL TURN YOUR TRS-80 INTO A
POWERFUL TOOL TO HELP DEVELOP YOUR SKILLS IN SOLVING THE
POPULAR PUZZLE. YOU CAN DESCRIBE YOUR OWN CUBE TO THE
COMPUTER AND THEN EITHER RACE AGAINST THE COMPUTER OR HAVE
IT SOLVE YOUR CUBE FOR YOU - SHOWING YOU EACH TURN EVERY
STEP OF THE WAY! IT EVEN ALLOWS YOU TO USE ITS OWN TECH-
NIQUES OR ENTER YOUR OWN TO EXPERIMENT WITH! AND MORE!

(714) 621-7747

H&S COMPUTER CO.--1024 ALAMOSA DR.--CLAREMONT,CA 91711

DOSPLUS OWNERS



Our brand-new, *expanded* user's manual
will provide you with greater in-depth
information on *all* versions of DOSPLUS.
Over 160 pages of documentation, yours for
only \$29.95. To order, call 1-800-348-8558.
MasterCard and VISA accepted.

ADVANCED OPERATING SYSTEMS
450 St. John Rd. • Michigan City, Indiana 46360

```

550 FOR Q=L+3 TO L+62 STEP 5
560 PRINT @ Q, CHR$(D);
570 NEXT
580 FOR R=L+4 TO L+63 STEP 5
590 PRINT @ R, CHR$(E);
600 NEXT
610 PRINT @ L+64, "A="; A; " B="; B; " C="; C; " D="; D;
" E="; E;
620 L=L+128
630 NEXT
640 A$=INKEY$
650 IF A$=" " THEN 380 ELSE 640
660 END

```

THE LADDER

The object is to climb the ladder, one "rung" at a time, to the top of the wall. The "rungs" are blocks which light up (in order as required) but with random delays in lighting up and staying on for random lengths of time. Each move up the ladder must be made while the rung is "on", but before it goes "off". A reward display is there for success.

```

10 RANDOM : CLEAR 2500 : CLS
20 ' *** THE LADDER *** AIRDRIE FERGUSON BASIC II 3808 8/80
30 GOTO 50
40 GOTO 300
50 CLS : FOR N=256 TO 318 STEP 2 : PRINT @ N, CHR$(135); :
NEXT : FOR M=257 TO 319 STEP 2 : PRINT @ M, CHR$(133); : NEXT :
FOR A1=22 TO 982 STEP 64 : PRINT @ A1, CHR$(170); : NEXT
55 FOR A2=28 TO 988 STEP 64 : PRINT @ A2, CHR$(149); : NEXT :
FOR Y=38 TO 41 STEP 3 : SET(44,Y) : NEXT : FOR Y=35 TO 41 STEP
3 : SET(57,Y)
60 NEXT : IF SS = 0 THEN 40
70 A=663 : B=664 : C=665 : D=0 : E=667 : F=727 : G=728 : H=729 :
J=731 : K=791 : L=792 : O=795 : P=855 : Q=856 : S=858 : T=859 :
U=922 : V=920 : W=923 : X=44
75 FOR Y=5 TO 35 STEP 3 : RESET(X,Y) : NEXT : X=57 : FOR Y=5 TO
32 STEP 3 : RESET(X,Y) : NEXT : X1=15447 : X2=15451 : FOR XX=1
TO 11 : FOR YY=X1 TO X2 : POKE YY,128
80 NEXT : X1=X1+64 : X2=X2+64 : NEXT : RR=32 : LL=35 : M=0
90 PRINT @ G, CHR$(168); : PRINT @ H, CHR$(188); CHR$(148);
CHR$(176); : PRINT @ K, CHR$(184); CHR$(172); CHR$(191);
CHR$(156); CHR$(133);
95 PRINT @ P, CHR$(176); CHR$(190); CHR$(143); CHR$(189);
CHR$(128); : PRINT @ V-1, CHR$(128); CHR$(128); : PRINT @ U,
CHR$(170); CHR$(176);
100 IF D < 0 THEN 120 ELSE PRINT @ P, CHR$(176); : PRINT @ V-1,
CHR$(128); CHR$(128);
110 M=M+1 : GOSUB 260
120 PRINT @ K, CHR$(138); : PRINT @ F, CHR$(176); : IF
POINT(44,LL) AND POINT(46,LL) THEN 130 ELSE 70
130 M=M+1 : LL=LL-3
140 M=2 : GOSUB 260 : PRINT @ U, CHR$(128); CHR$(128); : PRINT @
T, CHR$(176); : FOR J1=1 TO 50 : NEXT : PRINT @ B, CHR$(160);
CHR$(176); CHR$(144);
145 PRINT @ F, CHR$(176); CHR$(178); CHR$(191); CHR$(177);
CHR$(176); : PRINT @ K, CHR$(130); CHR$(186); CHR$(191);
CHR$(181); CHR$(129);
150 PRINT @ P, CHR$(176); CHR$(149); CHR$(128); CHR$(170);
CHR$(176); : GOTO 160
160 FOR J1=1 TO 50 : NEXT : PRINT @ A, CHR$(176); CHR$(168);
CHR$(188); CHR$(148); : PRINT @ F, CHR$(138); CHR$(172);
CHR$(191); CHR$(156); CHR$(180);
165 PRINT @ K, CHR$(128); CHR$(190); CHR$(143); CHR$(189);
CHR$(128); : IF POINT(47,2) THEN 350
170 IF POINT(44,LL) AND POINT(46,LL) THEN 180 ELSE 70
180 M=M+1 : LL=LL-3
190 M=1 : GOSUB 280 : PRINT @ S, CHR$(128); CHR$(128); :
PRINT @ O, CHR$(176); : FOR J1=1 TO 50 : NEXT
195 PRINT @ J, CHR$(133); : PRINT @ E, CHR$(176); : IF
POINT(55,RR) AND POINT(57,RR) THEN 200 ELSE 70
200 M=M+1 : RR=RR-3
210 M=2 : GOSUB 280 : PRINT @ P, CHR$(128); CHR$(128); : PRINT @
K, CHR$(176); : FOR J1=1 TO 50 : NEXT : PRINT @ B-64, CHR$(160);
CHR$(176); CHR$(144);
215 PRINT @ B, CHR$(178); CHR$(191); CHR$(177); : PRINT @ F,
CHR$(130); CHR$(186); CHR$(191); CHR$(181); CHR$(129);
220 PRINT @ L, CHR$(149); CHR$(128); CHR$(170); : FOR J1=1 TO 50
: NEXT : PRINT @ B-64, CHR$(168); CHR$(188); CHR$(148);
CHR$(176);
225 PRINT @ A, CHR$(184); CHR$(172); CHR$(191); CHR$(156);
CHR$(133); : PRINT @ F, CHR$(128); CHR$(190); CHR$(143);
CHR$(189); CHR$(128);
230 IF POINT(55,RR) AND POINT(57,RR) THEN 240 ELSE 70
240 M=M+1 : RR=RR-3
250 M=3 : GOSUB 260 : V=V-128 : A=A-128 : B=B-128 : C=C-128 :
E=E-128 : F=F-128 : G=G-128 : H=H-128 : J=J-128 : K=K-128 :
L=L-128 : O=O-128 : P=P-128 : Q=Q-128 : S=S-128 : T=T-128 :
U=U-128 : W=W-128 : D=1 : GOTO 90
260 N=RND(3) : FOR I=1 TO N*500 : IF INKEY$="0" THEN RETURN ELSE
NEXT : SET(44,LL) : N=RND(ZZZ)+2 : FOR I=1 TO N*20 : IF INKEY$
="0" THEN RETURN ELSE NEXT : RESET(44,LL) : ON M GOTO
110,140,250,270
270 M=0 : GOTO 110
280 N=RND(3) : FOR I=1 TO N*500 : IF INKEY$="0" THEN RETURN ELSE
NEXT : SET(57,RR) : N=RND(ZZZ)+2 : FOR I=1 TO N*20 : IF INKEY$ =
"0" THEN RETURN ELSE NEXT : RESET(57,RR) : ON M GOTO 190,210,290
290 M=0 : GOTO 190
300 PRINT @ 392, "THE"; : PRINT @ 519, "LADDER"; : PRINT @ 642,
"EASY...PRESS '4'"; : PRINT @ 770, "HARD...PRESS '1'"; : PRINT
@ 896, "IMPOSSIBLE...PRESS '0'";
305 C$=INKEY$ : IF C$ = "4" THEN ZZZ=4 ELSE IF C$ = "1" THEN
ZZZ=1 ELSE IF C$ = "0" THEN ZZZ=0 ELSE 300 : GOTO 340
310 GOSUB 340 : PRINT @ 350, "YOU CAN REACH FOR THE NEXT RUNG ";
: PRINT @ 482, "AS SOON AS IT APPEARS"; : PRINT @ 609, "BY
PRESSING THE '0' KEY";
315 PRINT @ 737, "IF YOU MISS YOU FALL DOWN"; : PRINT @ 865,
"PRESS SPACE BAR TO START"; : A$=INKEY$
320 IF A$ = " " THEN 330 ELSE 310
330 FOR PP=350 TO 862 STEP 128 : PRINT @ PP, CHR$(30); : NEXT :
GOTO 70
340 FOR J5=640 TO 896 STEP 128 : PRINT @ J5, STRING$(22,32); :
NEXT : RETURN
350 CLEAR 1000 : I=22 : K=128
360 A$=" "+CHR$(K)+CHR$(168)+CHR$(188)+CHR$(148)+CHR$(K)+STRING$(
6,CHR$(24))+CHR$(26)+" "+CHR$(K)+CHR$(K)+CHR$(189)+CHR$(
K)+CHR$(K)

```

continued on page 64

IBM TRS-80⁺ 16K
COLOR GAME LIMITED OFFER!
FREE WE'LL SEND YOU OUR BONUS GAME OF THE MONTH
WHEN YOU BUY ANY 2 GAMES

NEW 16K COLOR EXTENDED HI-RESOLUTION GAMES**
ARCADE GAME **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 \$12.95

HIGH SPEED ARCADE GAME
KOSMIC KAMIKAZE \$18.95

IBM GALLOPING GAMBLERS EACH
 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

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

GOBBLER  **ALIEN INVADERS** 

SBI's new additions to the GAME market.

Turn the tables on monsters set on consuming the gobbler. Skill levels from beginner to expert. Written in machine language, advanced graphics, with motivational sound to add to the excitement of gobbling up the monsters. Let the gobbling begin !!

MODEL 1 & 3 TAPE-\$16.95
 DISK-\$19.95

Both come with exciting sound

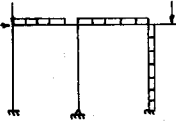
An exciting new addition to the space war family of programs. SBI's new ALIEN INVADERS space war game offers fast arcade action. It has a large selection of level of play so the player can start at beginner and advance to expert.

Models I & III 16K Tape \$19.95
 Disk \$24.95

STRUMAP 3.0 w/ Data File Editor
 Now the structural program that brought main frame computing power to the micro has an editor and a choice of units-kips, lbs, in, ft & metric. Write data files and then save them to disk, load from disk, delete, insert or change lines of data. Several loads can be put into the file and combinations of loads w/ load factors can be used.

Analysis plane frames or continuous beams and find moments, shears and axial forces in each member. Also, get joint displacements-vertical, horizontal, and rotational.

MODEL I 48K 1-DiskDisk \$349.95



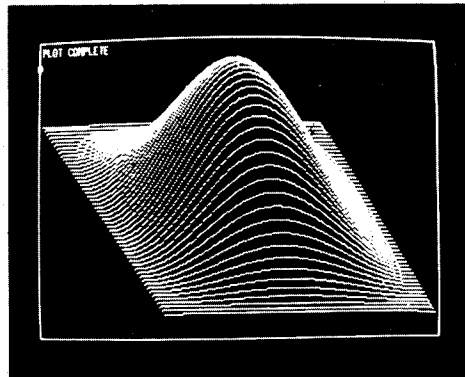
Send for a complete listing of our programs.
 Engineering
 Education
 Business
 Games

MISSOURI RESIDENTS
 PLEASE ADD
 4 1/2% STATE SALES TAX

SUPERIOR SOFTWARE INC.
 P.O. BOX 11676
 KANSAS CITY, MO 64138

Write SSI for information about marketing your programs: P.O. Box 11676 Kansas City, MO 64138

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.

THE MODEL III—A STEP BACK FOR MANKIND?

M. Barlow

An axiom of the Better Mousetrap Building business is that to sell in any quantity, the new product must be an order of magnitude better or cheaper than the competition. With the Model I TRS-80, Radio Shack had the edge, partly because of a good choice of compromises in the basic TRS-80 design, but mainly because their marketing and back-up arrangements were right. In places where this was not so, e.g. Europe, the TRS-80 is nowhere near as popular. It is also noticeable that where Tandy was not so all encompassing, e.g. in software and specialized peripherals, a whole secondary industry arose to supply the needs of the 250,000 TRS-80 owners.

With the introduction of the Model III, I suggest that Radio Shack has not made an order of magnitude improvement, so that there is no clear advantage for those 250,000 buyers to go out and get the new model. At the same time, enough minor changes have been made to ruin the work of those other suppliers, who in most cases must now redo their work and supply separate items for Model I and Model III. This is bound to increase the cost of these items, and some companies will go out of business as a result. The TRS-80, therefore, is now a losing proposition, and no longer shows such pronounced advantages over the PET, Sinclair and Apple.

What are the incompatibilities, and can they be worked around? First, in the hardware, let us agree that the new packaging and its lack of RF interference are great. The necessity of breaking the warranty seals to install non-Radio Shack disk drives may put a crimp in the sales of such drives, which were selling like hot cakes for the Model I. The use of double density disks does not worry me, but the change in connector types for the modem and cassette are ridiculous decisions. The latter problem can be fixed by simply breaking off the end cylinder of the cassette plug, but why on earth was it made different? Printer cables with the same connectors on each end can be used on the Model I, but the hole in the Model III case won't accept the longer plug.

The software problems are more serious. The changes are slight, but the result is that every software program has to be checked, and often modified, to make it run on the Model III. The improvements obtained by giving up the extra 280 or so bytes of RAM are just not worth the extra work now involved. Having gone that far, Radio Shack might as well have changed the video format to 24 rows of 80 characters, as we all expected them to do. The problem is made worse by the deficiencies in the first version of Model III TRSDOS, which must be at least as bad as the early Model I TRSDOS. The writers of the DOS seem to have learnt nothing from the popularity of other DOS programs: the Model III TRSDOS, and conversion to and from Model I is extremely crude and time-consuming.

What then, can we do about it? First, we can use NEWDOS or DOSPLUS to solve the software problems. Second, we could buy an LNW80 or PMC-80 instead of the Model III. Third, we could ask Radio Shack to provide the necessary chips to make a Model III an exact replacement of a Model I. Fourth, we could upgrade the existing Model I

chips to emulate a Model III with single density.

One can imagine the Radio Shack committee trying to decide which way to go with some of these decisions. No doubt they were much influenced by the need to increase sales, for all of the points above seem to be in the direction "buy R.S. or be inconvenienced". I question the wisdom of their choices. To me, the situation is similar to that of Kodak when they cut off their 250,000 users of regular 8 mm movies by introducing Super 8. I doubt if 1% of the previous users changed over—most took up another hobby. I fear Radio Shack may just have done the same thing for us.

M. Barlow
5052 Chestnut Avenue
Pierrefonds, Quebec
Canada H8Z 2A8 ■

continued from page 52

```
7023 G=5 : N3=0 : GOTO 7025
7024 G=11
7025 N$(JJ,1)=STR$(P) : GOTO 2050
7050 N$(12,1)="7" : GOSUB 6850 : PRINT @ 384,"THE WATER SPLASHES
OUT AND GETS ABSORBED INTO THE GROUND" : GOTO 50
7060 IF VAL(N$(2,1))=30 THEN N$(2,1)=STR$(P)
7061 IF N3=0 THEN 7064
7062 N3=0 : G=5 : GOTO 7065
7064 G=11
7065 N$(JJ,1)=STR$(P) : IF VAL(N$(12,1))=30 THEN 7050
7070 GOTO 7025
7450 P$(15,5)="0" : GOTO 7040
8000 N4=1 : IF VAL(N$(JJ,1))=30 OR VAL(N$(JJ,1))=P THEN RETURN
8010 GOSUB 6850 : PRINT @ 384,"YOU CAN'T DO THAT YET BECAUSE
IT'S NOT HERE"
8020 N4=0 : RETURN
8050 N4=1 : IF VAL(N$(JJ,1))=30 OR VAL(N$(JJ,1))=P THEN RETURN
8051 N4=0 : RETURN
8100 IF P=8 AND N$(12,1)="30" AND JJ=12 AND N8=0 THEN 8120
8103 IF P=26 AND R1$="WAT"4400
8105 GOTO 7000
8120 GOSUB 6850 : PRINT @ 384,"THE GROUND RUMBLES AROUND YOU AND
THE VINE NOW SPROUTS ALL THE WAY UP THE CASTLE WALL" : N8=1 :
N$(12,1)="7" : GOTO 50
8200 GOSUB 6850 : PRINT @ 384,"HEY, WATCH YOUR LANGUAGE" :
GOTO 60
8300 IF P=25 AND N$(31,1)="25" THEN 8340
8305 IF N$(5,1)="30" OR VAL(N$(5,1))=P THEN 8350
8310 GOSUB 6850 : PRINT @ 384,"SHE'S NOT HERE" : GOTO 60
8340 GOSUB 6850 : PRINT @ 384,"SHE'S NOT READY TO GO YET, SHE'S
TIED UP AT THE MOMENT" : GOTO 60
8350 GOTO 6740
8500 G=9 : GOTO 2050
8550 GOSUB 6850 : PRINT @ 384,"STOP THAT YOU WEIRDO" : GOTO 60
9000 IF VAL(N$(5,1))=30 THEN 9050
9010 GOTO 2001
9050 CLS : PRINT @ 340, "CONGRATULATIONS YOU WON!" "
```

continued on page 60

™ 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 informations 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!

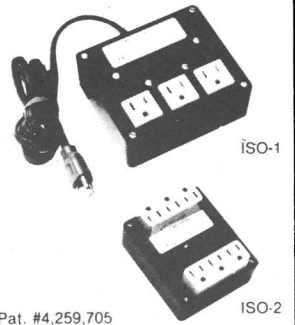
68 MICRO JOURNAL

5900 Cassandra Smith
HIXSON, TN 37343

USA
1 Yr. - \$24.50 2 Yr. - \$42.50 3 Yr. - \$64.50
*Foreign Surface Add \$12.00 Yr. to USA Price
**Foreign Airmail Add \$36.00 Yr. to USA Price
*Canada & Mexico Add \$5.50 Yr. to USA Price

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

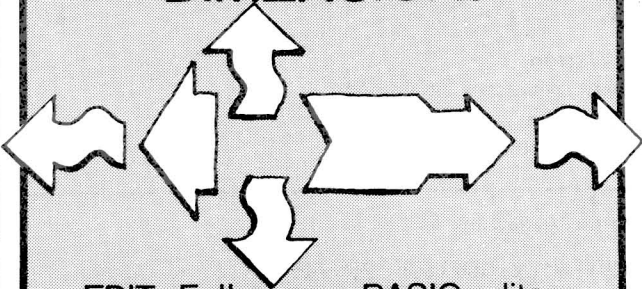
MasterCard, Visa, American Express
ORDER TOLL FREE 1-800-225-4876
(except AK, HI, PR & Canada)

Electronic Specialists, Inc.

171 South Main Street, Natick, Mass. 01760

Technical & Non-800: 1-617-655-1532

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

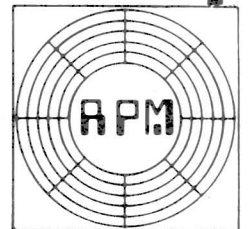
(415) 387-3131

Box 11721 San Francisco, CA 94101

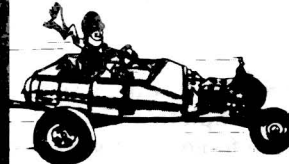
TRS-80™ Radio Shack/Tandy Corp

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



AMAZING PROGRAM SPEEDS UP BASIC



Your time is valuable, so why waste it on slow-running BASIC programs? PRO-SOFT'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%. TRS-80 Models I and III **\$29.95**

CALL NOW TOLL-FREE FOR ORDERS ONLY:

(800) 824-7888, Oper. 422

Callt: (800) 852-7777, Oper. 422

Alaska/Hawaii: (800) 824-7919, Oper. 422

For technical information, write or call us directly:

PROSOFT

P.B. 839 / No. Hollywood, Ca. 91603 / (213) 764-3131

Check, M/C, VISA ok. Add \$2.00 for COD, 6% sales tax in California, and \$5.00 for shipment outside North America.

APRIL FOOL

John Warren

One program may process information; another might provide amusement. This one simply drives people crazy!

When the victim runs "April Fool," the program clears the screen, displays Level II error message number 8, "Unidentified Line," and identifies the error location as "Line 70." Control is then transferred to a subroutine that displays what looks like a program-is-ended prompt. INKEY\$ is used instead of INPUT because of the in-program prompt (?) produced by the INPUT command.

The victim's response is accepted one character at a time. As long as the inputs have an ASCII value greater than 13 (carriage return), they are concatenated to reconstitute the message. A carriage return breaks the INKEY\$-concatenation loop and transfers control to a logical sieve.

Here the reconstituted command is matched against three possibilities; LIST, RUN, and EDIT. LEFT\$ is used to discard any attached line numbers. If the command does not make a match, "Syntax Error" is displayed, and control is returned to the pseudo-prompt subroutine.

The command LIST provides what, on first glance, seems to be a program listing. String assignment, concatenation, Peeking and Remarks are all visible. On closer examination, things become curiouser and curiouser. The PEEK statement has two arguments and informs the victim "PEEK AB,U" (peekaboo?). The string concatenation tells him that he is a "turkey," and the line with the undefined GOTO reads "GOTO HADES."

The tricky part of this segment is to get realistic double quotes in the pseudo-listing, since a quote is a nonprinted delimiter. Since CHR\$ converts its argument from decimal to the equivalent ASCII character, CHR\$(34) yields quotes which can be added to the display at the appropriate points.

The command RUN elicits the rather snotty reminder from the computer that it had located an error in line 70, and, after a pause, the injunction "Fix it!" is displayed.

Requesting that the computer Edit 70 results in "70 GOTO HECK" and the return to the pseudo-prompt.

A problem in debugging this routine is the difficulty in discriminating between a real program-end prompt and the pseudo-prompt. After several embarrassing cases of mistaken identity, I replaced the "READY" with a series of asterisks until the debugging was complete.

When a program starts fooling the fooler, that's going too far!

```
10 CLS
20 PRINT "UNDEFINED LINE IN 70"
30 GOSUB 340
40 PRINT
50 IF LEFT$(Z$,4)="LIST" THEN 110
60 IF LEFT$(Z$,3)="RUN" THEN 220
70 IF LEFT$(Z$,4)="EDIT" THEN 290
80 PRINT "SYNTAX ERROR"
90 GOSUB 340
100 GOTO 40
110 'PHONY LIST
120 PRINT "10 CLS"
```

```
130 PRINT "20 A$=";CHR$(34);"PROGRAMMER";CHR$(34)
140 PRINT "30 B$=";CHR$(34);"TURKEY";CHR$(34);":UR$=B$+A$"
150 PRINT "40 PEEK AB,U"
160 PRINT "50 I=CU"
170 PRINT "60 REM BEGIN 4/1/80"
180 PRINT "70 PRINT GOTO HADES"
190 PRINT "80 CHANCES=10E6+2+1"
200 GOSUB 340
210 GOTO 40
220 'PHONY RUN
230 PRINT "I TOLD YOU--THERE IS AN UNDEFINED LINE IN 70"
240 FOR X=1 TO 300: NEXT X
250 PRINT "FIX IT"
260 FOR Y=1 TO 500: NEXT Y
270 CLS
280 GOTO 10
290 'PHONY EDIT
300 PRINT "70 GOTO HECK"
310 GOSUB 340
320 GOTO 40
330 END
340 PRINT "READY"
350 Z$="": PRINT ">";CHR$(95);
360 Z$=INKEY$: IF Z$="" THEN 360
370 PRINT CHR$(24)
380 PRINT Z$;
390 Y$=INKEY$: IF Y$="" THEN 390
400 IF Y$>CHR$(13) THEN PRINT Y$;
410 IF Y$<CHR$(14) THEN 440
420 Z$=Z$+Y$
430 GOTO 390
440 RETURN
450 STOP
```

John Warren
Assistant Professor of English
East Carolina University
Greenville, NC 27834 ■

continued from page 58

```
9055 PRINT @ 470,"YOU USED ";F;" TURNS"
9056 IF F>350 THEN 9080
9057 IF F>175 THEN 9090
9060 PRINT @ 589,"EXCELLENT-I HEREBY KNIGHT YOU SIR ";Z$
9070 GOTO 9070
9080 PRINT @ 585,"POOR-";Z$;" SHOULD HAVE EATEN THE DUCKS
INSTEAD"
9081 GOTO 9070
9090 PRINT @ 585,"FAIR-BUT ";Z$;" DOESN'T GET TO KEEP THE
MAIDEN"
9091 GOTO 9070
9700 G=9 : GOTO 2050
```

Dave Trapasso
29-Blvd. Parkway
Rochester, NY 14612 ■



TRS-80 Software
All programs on disk

WOW!
CHECK THESE PRICES!

Box 525 Dept S
Setuaket NY 11743
516-751-2535
Send For Free Price List #376

	OUR LIST PRICE
MOD I ONLY	
DUEL-N-DROIDS.....	\$20.95 \$16.76
INVADERS FROM SPACE	20.95-16.76
CRUSH, CRUMBLE & CHOMP.....	29.95-23.96
TEN PINS.....	20.95-16.76
OLYMPIC DECATHLON	29.95-23.96
MOD I/III	
DEFENSE COMMAND.....	19.95-15.96
ATTACK FORCE	19.95-15.96
COSMIC FIGHTER	19.95-15.96
GALAXY INVASION	19.95-15.96
METEOR MISSION II.....	19.95-15.96
ROBOT ATTACK	19.95-15.96
SUPER NOVA	19.95-15.96
ABOVE 7 ON CASSETTE	15.96-12.76
SCARFMAN	19.95-15.96
SUPERSCRIPT	50.00-39.96
MISSILE ATTACK	20.95-16.76
MORTON'S FORK	29.95-23.96
3 ADAMS' ADVENTURES	
Specify #1-3,4-6,7-9,10-12 -each.....	39.95-31.96
CASSETTE	
ASTRO BALL (I)	19.95-15.96
TYPING TUTOR (I)	19.95-15.96
TIGERS IN THE SNOW (I).....	24.95-19.96
SCARFMAN (I/III)	15.95-12.76
C.O.D. • Money Orders • Certified Checks For Personal Check Allow Two Weeks N.Y.S. Res. Add 7.25% Sales Tax • All Orders Under \$100 Add \$2.00 Postage and Handling	



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.
5624 Girard Ave. So., Minneapolis, MN 55419
(612) 866-9022

POTIONS

24 Exciting Programs for only \$2.50 each.

Subscribe now to **SOFTWARE POTIONS** and you can look forward to receiving a cassette with 4 superb fast action machine code programs every other month for the next year.

Subscription (6 issues)..... US \$59.95
Sample issue..... US \$18.95

Requires Level II, 16K RAM min. Payment by cheque or money order.
Allow 4-6 weeks for delivery.



SOFTWARE MAGIC

Box 2184, Bramalea Postal Stn.
Bramalea, ONTARIO, Canada L6T 3S4.

Tel. (416) 451-9452.



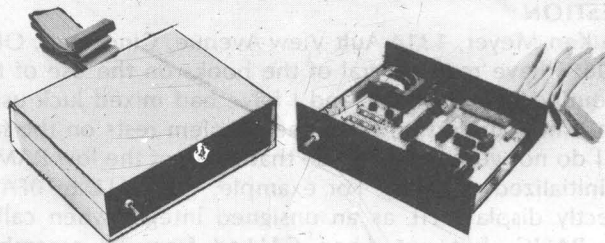
TRS-80/RS-232 ADAPTER: Connect RS-232 printer to line printer port on Mod 3 or Mod 1 Expansion Interface. No software driver required. Leaves TRS-80 RS-232 port free for modem use. Set at 1200 baud, or specify rate (300-9600). TU8014, \$69.95.

MX-80 FRICTION FEED: Upgrade to use single sheet, tractor, or roll paper with MX-80. Install in 15 minutes, using only screwdriver and pliers. No drilling or cutting. FFU/80, only \$69.95

Virginia Micro Systems, 14415 Jeff Davis Hwy
Woodbridge VA 22191, (703)491-6502

Add \$2 P&H. Mail order only. VA Residents add 4%

TELETYPE INTERFACE



- PARALLEL PORT TO SERIAL DATA
- INTERFACE ASR & KSR 33 TELETYPES
- MODEL I, II, & III COMPATIBLE
- NO SOFTWARE OR MEMORY REQUIRED
- 20 MA. CURRENT LOOP FORMAT
- SIMPLE LLIST, LPRINT COMMANDS
- LINEFEED AFTER CARRIAGE RETURN
- 110 BAUD RATE STANDARD
- PA RESIDENTS ADD 6% SALES TAX

\$139.95

GTI ELECTRONICS CO.

RD 2, BOX 234B, LEHIGHTON, PA 18235
717-386-4032

QUESTIONS AND ANSWERS

Hubert S. Howe, Jr.

QUESTION

from Bill Rawls, Bill's TV Service, P.O. Box 114, Plymouth, FL 32768: Can you tell me where I can buy a BR1941M I.C. for the RS-232 board of my Model I TRS-80? I get vertical lines instead of a cursor in the upper left corner of the screen when I run the terminal program. Radio Shack won't sell me parts, and it's too far to the repair center. I checked the contacts. I get 5 volts on terminal 2 of the DC-DC converter on the RS-232 board, but no voltages on terminals 3 and 5. I tried replacing the DC-DC converter, but it didn't help. I get less leakage with an ohmmeter on 3 or 5 when I unplug the I. C. above, so I thought that might be pulling the voltages down. Can you help me or tell me where I can get help? Don't tell me to call Radio Shack in Texas. All they can ever say is, "take it to the repair center." They are never any help. They act like they don't have time for you. I think they are scared of competition.

ANSWER

Before you try replacing the I. C., get an RS-232 Connector Brace from Gunn Industries, 704 Franklin Blvd., Austin TX 78751. It costs only \$5.00, and since installing them we have had no trouble with our RS-232 boards, which were nothing but trouble before then. In spite of the fact that you tried the connector test, it is probably the contacts that are bad. That may not be all, however, but you will need the brace even if the RS-232 board is good.

If the board itself is bad, I would suggest that you take it or send it to the repair center, as that may be the only practical solution to getting it fixed.

QUESTION

from Ken Meyer, 1314 Ault View Avenue, Cincinnati, Ohio 45208: I have read several of the books on the use of the subroutine calls in ROM, and I have had mixed luck using them. I now understand that the problem rests on the fact that I do not go into BASIC, so that some of the low RAM is not initialized correctly. For example, the CALL to 0FAFH correctly displays HL as an unsigned integer when called from BASIC, but not when CALLED from an assembler program. I have copied the division support routine found at 18F7H to 4080H, and this helps some. Now where I used to reboot, only an error message is displayed, and I get a warm return to TRSDOS. My question is simply, what else do I have to initialize, so that the various useful subroutines will work without BASIC. Since I am just learning assembler, I don't want to have to return to BASIC after each reboot. I'm sure all assembler programmers remember how often they had to reboot during the learning stage! I have a Model III with TRSDOS 1.3

ANSWER

There is no single answer that can cover all of the subroutines in ROM. You do not need to initialize RAM in order to use the input/output subroutines (which are documented this month in the Model 3 Corner), but you may need to initialize it to use the calls that are meant for BASIC programs. Most books will tell you what needs to be done for each specific

subroutine. For example, James Favour's *Microsoft Basic Decoded and Other Mysteries* specifically states that the subroutine you mentioned, 0FAFH ("HL to ASCII"), "can only be used after Disk BASIC has been initialized." When using the ROM subroutines, the best advice I can give is to follow the documentation very carefully, and even then some things will be wrong!

QUESTION

from Danny Cuzzart, 2427 Chatterworth Lane, Louisville, KY 40222: My hobbies are computers and printing, and I am using the TRS-80 Daisy Wheel Printer II as a typesetter.

Tandy has only five print wheels available, with two more coming out soon. Where can I get print wheels that are compatible with the TRS-80 Printer II and disk Scripsit? I would like to obtain several dozen different type faces if possible.

ANSWER

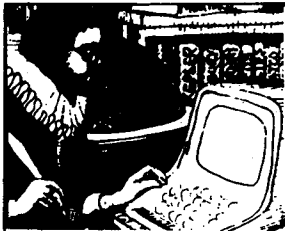
The Radio Shack Daisy Wheel printer is compatible with the Qume printers, and you should be able to use any of the typewheels for the Qume. These are advertised in many places, and many varieties are available. I doubt whether you will be able to obtain typewheels that will look good with the proportional spacing that you used in printing your letter, however. Most of them use the standard 10 or 12 characters to the inch.

QUESTION

from Warren Franz, 2623 Bermuda Dunes, Missouri City, TX 77459: I have a Model I 48K Level II machine, for which I plan to develop a fairly large interactive system for a particular application. However, the application will require considerable disk storage. To retain future compatibility with different systems, I would like to develop this system in Fortran. Radio Shack has a nice Fortran, I hear, for the Model I. However, because of the storage requirements of my application, I would like to have the flexibility of a double density system or even the ability to use 8-inch disks along with my 5-inch disks. Can Radio Shack's Fortran be run under NEWDOS/80 or some other DOS with double density and/or 8-inch disk drives? Also, will Radio Shack have a Fortran for its Model III? If not, I would have to transfer my application to some other machine, if I eventually wanted to replace it.

ANSWER

You have many questions here, so let's try to sort them out. Radio Shack's Fortran was developed by Microsoft, and while I have no particular knowledge and may be quite wrong, it will probably be made available for the Model III eventually. I would not recommend that you develop your application in Fortran, however, especially if you are concerned about transporting it to another machine. Fortran is a language of the past, developed for maxicomputers and only rarely implemented on microcomputers. It has all but been replaced by Basic, and the two languages are so alike that there is little reason for using them both. If you are



The Electronic Astrologers™

cast an accurate birth chart for any date, time and place from 1880 to 2000, then tell you what it means! They give personalized astrological consultations of 1500 words or more, based not just on your Sun sign, but on the unique relation of ALL the planets at your birth moment.

ASTRO-SCOPE™

delineates your character, its strengths and weaknesses, and touches on many areas of life such as relationships, finances, career and life goals. Text is by Steve Blake, psychology-oriented astrologer and popular lecturer, and Robert Hand, pioneer in astrological microcomputing and author of four bestselling astrology books..... \$30

Sex-O-Scope™

tells you things your astrologer would blush to reveal! John Townley, author of *Planets in Love*, an editor of *Sexology Today*, and a student of all forms of sexual behavior, uncovers your tastes and turn-ons..... \$30

for
TRS-80* Model I or III, with TRSDOS, 32K RAM, 2 drives
Apple II+ with Applesoft, 32K RAM, 1 drive

†TM of Apple, Inc.

*TM of Tandy Corp.

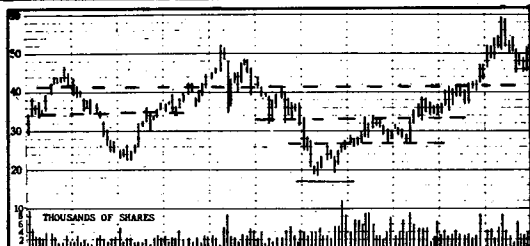
WE TAKE MASTERCARD AND VISA



AGS Software

Box 28, Orleans, Ma. 02653
Telephone 617/255-0510

Outside USA please add \$2.50 shipping charge



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. T
596 W. Karval Ct. - Spring Creek
Elko, Nevada 89801

MANUFACTURING CONTROL SYSTEMS

MICS module - Manufacturing Inventory Control
15 reports for inventory, purchasing, and stock-room 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 ELTEC business modules

ELTECH Associates

Specialists in manufacturing business systems
2466 Moreno Drive, Los Angeles, Ca 90039
(213) 663-0347



INCOME TAX...

PERSONAL INCOME TAX INTERVIEW PROGRAM written in BASIC by a tax attorney as he would conduct a personal interview to organize taxpayer's data into Federal income tax categories for 1981 tax returns. Program leads the user through an extensive checklist of personal events which can have income tax consequences, giving numerous examples and explanation of tax law for each YES answer.

Covers events such as marriage, divorce, birth, death, employment, lay-offs, retirement, travel, change of residence, accidents, illness or injuries, business ventures, self-employment, education, investments of money or time, prizes, scholarships, insurance recoveries, tax-exempt income, bad debts, etc., as well as the commonly known income items and deductible expenses.

Program also carries out computations for depreciation schedules, joint vs. separate returns, itemized vs. standard deductions, depreciation vs. tax credits, etc., in order to help make important tax decisions. Includes 1981 Tax law changes, references to related areas such as gift and inheritance taxes, trusts, estates, partnerships, corporations, pension and retirement plans, tax-exempt organizations, etc. Includes booklet of useful IRS tax forms, other tax publications, and toll-free phone number of tax attorney. Available on cassette or diskettes for most popular micros. Price \$49.95

OTHER POS PRODUCTS . . .

- POS-100 NRZ1 Tape Drive Controller/Formatter . . . \$795.00
- POS 800/1600 Universal Tape Drive Controller . . . \$1495.00
(4K/16K buffer, RS-232 or Parallel Ports to CPU)
- POS I/O Conversion Kit for IBM Office Selectric . . . \$150.00
- POS ASCII Printer Interface for IBM I/O Selectric . . . \$249.95
- POS IBM ASCII Selectric Printer (Parallel Interface) . . . \$895.00
- GTE IS Model 560 ASCII Selectric I/O Terminal . . . \$995.00
- POS Daisy-Wheel Printer Interface for TRS-80 Model I . . . \$249.95
- Variable Width FORMS TRACTOR for 15" Selectrics . . . \$95.00

PACIFIC OFFICE SYSTEMS

2265 Old Middlefield Way • Mt. View, CA 94043 • (415) 493-7455

concerned about future compatibility, I would recommend that you use either Basic or a structured language like Pascal or "C".

Storage requirements are certainly a problem for applications that need more than what you can get on 5-inch single density drives. I would not recommend that you get 8-inch disk drives, however. Instead, you can get more capacity by investigating double density, double-sided, and 80-track drives on 5-inch diskettes. For really a lot of storage, the best solution is a hard disk drive, and many of these are now appearing on the market at reasonable prices.

QUESTION

from Richard L. Davis, 3926 Bledsoe Avenue, Los Angeles CA 90066: I tried to use the Disk Drive Timing program listed in the June 1981 issue and didn't have much luck. First, the program bombed almost immediately with an "Out of Data in 8010" message. After some reflection, I decided it was easier to change the upper limit in line 8010 than to think up some additional data numbers, and I found that something like &H9022 "worked". I was then able to select a drive, but the system reboots shortly after the drives start.

For the record, I have a Model I Level II machine with 48K RAM, two Micropolis 77-track drives, Dataroyal 5000 printer, and I use TRSDOS 2.3 mostly. Two interesting tips:

I have modified FORMAT and BACKUP for 80-track operation. The Micropolis 77-track drives work just fine: all 80 tracks format and are usable.

I have been using Dr. Howe's "old" Word Processor for over two years now, with a few additional commands on the menu, and after compiling it with the Microsoft compiler, it's dynamite!

ANSWER

There were some errors in the Disk Drive Timing program, corrections for which were given in the July 1981 issue. Here they are again. Change lines 170, 180, and 200 as follows:

```
170 CT=PEEK(&H9092)+256*PEEK(&H9093)
180 RPM=60*1.774E6/(CT*35+112)
200 SBAR=SBAR*.9+RPM*.1
```

The program does run properly with these corrections, and although I have not tried the Micropolis drives, I see no reason why they would not work. I am sure other readers will be glad to read your information about the Micropolis drives.

* * * * *

Got a question about the TRS-80? Send it to **Questions, H & E Computronics, 50 North Pascack Road, Spring Valley NY 10977**. If you wish a personal reply, please enclose a self-addressed, stamped envelope. ■

continued from page 54

```
820 READ N$,B$,F$,M$ 'name, birthday, father's, mother's
830 IF N$="OUT" THEN N$="":B$="":F$="":M$="":GOTO 860
840 IF B$ <> S$ THEN 820 'not the right one yet
850 LET B$=" (+B$+)"
860 RETURN
870 REM Data are: Name, birthday, father's bday, mother's bday
880 DATA James Roosevelt,1760, ,
```

```
890 DATA Mary Eliza Walton,1769, ,
900 DATA Isaac Roosevelt,1790,1760,1769
910 DATA Rebecca Aspinwall,1809-1, ,
920 DATA James Roosevelt,4-16-1828,1790,1809-1
930 DATA Warren Delano,1779, ,
940 DATA Deborah Church,?-1, ,
950 DATA Warren Delano,1809-2,1779,?-1
960 DATA Joseph Lyman,?-2, ,
970 DATA Catherine Robbins Lyman,?-3,?-2,
980 DATA Sara Delano,9-21-1854,1809-2,?-3
990 DATA Franklin Delano Roosevelt,1-30-1882,4-16-1828,9-21-1854
1000 DATA OUT,OF,DA,TA
```

Gordon Speer
3304 Woodlawn Road
Sterling, IL 61081 ■

continued from page 56

```
370 B$=" "+CHR$(K)+CHR$(130)+CHR$(191)+CHR$(129)+CHR$(K)+STRING$(
(5,CHR$(24))+CHR$(26)+" "+CHR$(135)+CHR$(181)+CHR$(144)+CHR$(K)
: GOTO 460
380 A$=" "+CHR$(128)+CHR$(168)+CHR$(188)+CHR$(148)+CHR$(128)
+STRING$(6,CHR$(24))+CHR$(26)+" "+CHR$(128)+CHR$(152)+CHR$(189)
+CHR$(164)+CHR$(128)
390 B$=" "+CHR$(128)+CHR$(131)+CHR$(191)+CHR$(178)+CHR$(129)
+STRING$(6,CHR$(24))+CHR$(26)+" "+CHR$(128)+CHR$(128)+CHR$(181)
+CHR$(144)+CHR$(141) : GOTO 460
400 A$=" "+CHR$(128)+CHR$(168)+CHR$(188)+CHR$(148)+CHR$(128)
+STRING$(6,CHR$(24))+CHR$(26)+" "+CHR$(128)+CHR$(152)+CHR$(189)
+CHR$(164)+CHR$(128)
410 B$=" "+CHR$(131)+CHR$(128)+CHR$(159)+CHR$(144)+CHR$(131)
+STRING$(6,CHR$(24))+CHR$(26)+" "+CHR$(160)+CHR$(182)+CHR$(128)
+CHR$(138)+CHR$(132) : GOTO 460
420 A$=" "+CHR$(128)+CHR$(168)+CHR$(188)+CHR$(148)+CHR$(128)
+STRING$(6,CHR$(24))+CHR$(26)+" "+CHR$(128)+CHR$(152)+CHR$(189)
+CHR$(164)+CHR$(128)
430 B$=" "+CHR$(131)+CHR$(128)+CHR$(159)+CHR$(144)+CHR$(131)
+STRING$(6,CHR$(24))+CHR$(26)+" "+CHR$(128)+CHR$(140)+CHR$(129)
+CHR$(181)+CHR$(128) : GOTO 460
440 A$=" "+CHR$(128)+CHR$(168)+CHR$(188)+CHR$(148)+CHR$(128)
+STRING$(6,CHR$(24))+CHR$(26)+" "+CHR$(128)+CHR$(160)+CHR$(189)
+CHR$(144)+CHR$(128)
450 B$=" "+CHR$(128)+CHR$(133)+CHR$(191)+CHR$(146)+CHR$(129)
+STRING$(6,CHR$(24))+CHR$(26)+" "+CHR$(128)+CHR$(140)+CHR$(129)
+CHR$(181)+CHR$(128) : GOTO 460
460 FOR L=1 TO 10 : NEXT : I=I+1 : PRINT @ I, A$; :
PRINT @ I+128, B$; : GOSUB 480 : J=J+1 : ON J GOTO
380,400,420,440,470
470 J=0 : GOTO 360
480 IF POINT(124,6) THEN 490 ELSE RETURN
490 PRINT @ 50, "GOODBYE"; : FOR J=1 TO 1000 : NEXT : CLS :
SS=1 : PRINT @ 340, "PRESS 'C' TO CONTINUE" : PRINT @ 405,
"PRESS 'F' TO FINISH"
500 QS=INKEY$: IF QS="C" THEN SS=0 : GOTO 50 ELSE IF QS
< "F" THEN 500 ELSE CLS : FOR J=1 TO 2000 : NEXT : END
```

Airdrie Ferguson
Box 40206
Casuarina, NT 5792
Australia ■

Tired Of Your GENERAL LEDGER?

VERSA- LEDGER

FOR YOUR TRS-80 MODEL I, II, III or COLOR COMPUTER • APPLE II • I.B.M. • XEROX • ATARI
ALL MICROSOFT BASIC COMPUTERS

- ★ THE ULTIMATE PERSONAL CHECK REGISTER
- ★ A PROFESSIONAL ACCOUNTING SYSTEM
- ★ A PERSONAL FINANCIAL MANAGER
- ★ A SMALL BUSINESS ACCOUNTING SYSTEM
- ★ A COMPLETE GENERAL LEDGER

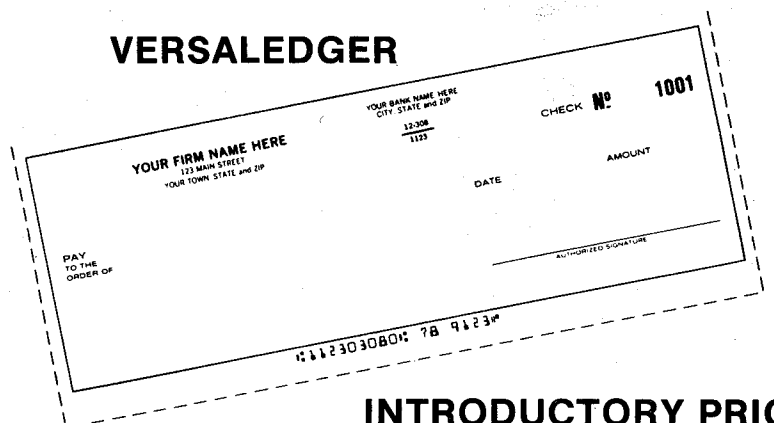
HOW IT WORKS

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 5¼" 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)**

— CAN BE USED WITH 1 or MORE DISK DRIVES —

**VERSALEDGER HAS BEEN CREATED
WITH THE FIRST TIME COMPUTER USER IN MIND**



**INTRODUCTORY PRICE
\$99.95**

COMPUTRONICS
MATHEMATICAL APPLICATIONS SERVICE

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 ***

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
MATHEMATICAL ANALYTICAL SYSTEMS

50 N. PASCACK ROAD
SPRING VALLEY, NEW YORK 10977



**24 HOUR
ORDER
LINE**



**NEW TOLL-FREE
ORDER LINE**

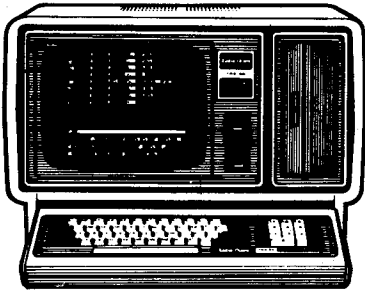
(OUTSIDE OF N.Y. STATE)

(914) 425-1535

(800) 431-2818

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:

915-283-2920

Van Horn Office Supply

701 W. Broadway -- P O Box 1060

Van Horn, Texas 79855



DEALER GO55

Form F48 Provided

Standard Warranty in Effect

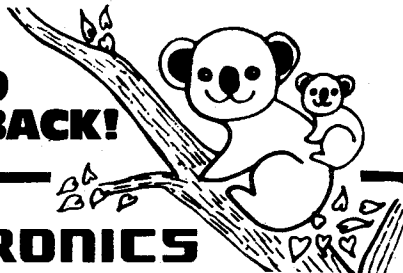
THE NATIONWIDE SUPERMARKET OF SOUND®



ADVERTISING DIRECTORY

Advanced Operating Systems	55
Adventure International	Cover 4
AGS Software	63
Alpha Products	5
Apparat, Inc.	3
Aspen Software Company	9
AT-80	32
Business Computers of Peterborough	8
BT Enterprises	34-35
Bytes and Pieces	61
Compass Systems, Inc.	45
Computech	25, 47
Computer Applications Unlimited	33
Computer Plus	14
Computer Shack	41
Computer Shopper	23
Cornucopia Software	11
Cosmopolitan Electronics Corporation	43
Digital Systems Engineering	68
EAP Co.	14
Electronic Specialists	59
Eltech Associates	63
ETS Center	6
Galactic Software Ltd.	17
Allen Gelder Software	59
GTI Electronics Co.	61
Hacks	37
H & E Computronics	Cover 3
H & E Computronics	21, 65-67
H & S Computer Co.	55
Illustrated Memory Banks/IMB	57
Kalglo Electronics	29
Kengore Corporation	4
Keyline Corp.	57
Thomas V. Lenz	63
Logical Systems, Inc.	15
Med Systems Software	31
Micro Architect	57
Micro Systems Software	Cover 2
Midwest Data Systems	61
Nanos Systems Corp.	14
Pacific Office Systems	63
Powersoft	19
Prosoft	59
Roklan Software	13
68 Micro Journal	59
Small Business Systems Group	28
Soft Sector Marketing	7
Software Magic	61
Sound Software Systems	8
Spectral Associates	39
Speedway Electronics	27
Superior Software	57
Van Horn Office Supply	68
Virginia Micro Systems	61

**GO
PIGGYBACK!**



CENTRONICS

**ADD lowercase with our
PLUG-IN piggyback board!**

9WX7H Dot Matrix \$135

5WX7H Dot Matrix \$ 95

TWO complete character sets on board:

96 character ASCII **PLUS** choice of
128 character APL, TRS-80/H-19 Graphics or
Scientific. (Customer defined: add \$50/set).

Most printers convertible: specify logic board #



SYDNEY SEZ:
Shop Comparatively!

DSE Digital Systems Engineering

12503 King's Lake Drive, Reston VA 22091 (703) 620-2994

ALSO AVAILABLE: New Centronics and Integral Data Systems printers at
15-20% below list; also, used printers of several makes. **Call for information!**

MasterCard, VISA, Check, MO, PO

All products warranted 90 days

The Original Magazine for Owners of the TRS-80™ MicroComputer

MODEL I • MODEL II • MODEL III • POCKET COMPUTER • COLOR COMPUTER

Software
for TRS-80
Owners

H & E COMPUTRONICS INC.

Monthly
Newsmagazine
for TRS-80
Owners

MONTHLY NEWS MAGAZINE



- PRACTICAL APPLICATIONS
- NEW EXPANDED BUSINESS SECTIONS
- GAMBLING
- GAMES
- EDUCATION
- PERSONAL FINANCE

- BEGINNER'S CORNER
- NEW PRODUCTS
- SOFTWARE EXCHANGE
- MARKET PLACE
- QUESTIONS & ANSWERS
- PROGRAM PRINT OUTS
- ...and MORE!

YOUR CHOICE

FREE

with your Subscription or Renewal

A.

NANOS SYSTEMS CORP.

TRS-80 At Your Fingertips

Complete quick reference guide to basic, assembly language* and graphic codes — all at your fingertips for all TRS-80 computers (specify computer).

Assembly Language Section N/A for Color Computer

B.

A Word Processor, Data Management System and Cleanup

(A maze game) All on cassette. (Add \$3 for diskette, add \$5 for modified MOD-II diskette version — N/A on color computer or pocket computer.)

OR

H & E COMPUTRONICS INC.

50 North Pascack Road
Spring Valley, New York 10977

CALL TOLL FREE
800-431-2818

(Outside of New York State)

24 HOUR ORDER LINE
914-425-1535



- One Year Magazine Subscription \$24 New Renewal
 Two Year Magazine Subscription \$48.00 New Renewal
 Sample Issue \$4. Mod II Newsletter Subscription \$18
 Your Choice: TRS-80™ at Your Fingertips or Word Processor/ Data Management
 Model I Model II Model III Color Computer Pocket Computer

NEW!
NEW!

MOD-II
NEWSLETTER
18/Year (or 12 issues)

Name _____ Address _____ City _____

State _____ Zip _____ Signature _____

Credit Card Number _____ Expiration Date _____

Add \$12/Year (Canada, Mexico) — Add \$24/Year Air Mail outside of U.S.A., Canada, and Mexico
All Prices and Specifications Subject to Change

* TRS-80 is a trademark of the Radio Shack Division of Tandy Corp.

FORWARDING POSTAGE GUARANTEED
RETURN POSTAGE GUARANTEED



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



WRITE FOR OUR FREE 150-PROGRAM CATALOG