

SEPTEMBER, 1981  
ISSUE NUMBER 38  
PRICE \$3.00

THE ORIGINAL MAGAZINE FOR  
TRS-80™\* OWNERS

H & E COMPUTRONICS INC.

\*TRS-80™ IS A TRADEMARK OF TANDY CORPORATION



# 8 USEFUL PRODUCTS

**NEW PRODUCT**  
Photograph not available  
at time of printing.

## 1 PRINTSWITCH

- Printer selector switch module allows two printers to be connected to a single TRS-80 system. Printer to be used is selected by switch.
- THE PROBLEM of plugging and unplugging printer cables in order to select one printer or the other is eliminated by PRINTSWITCH.
- Small, unobtrusive design keeps your system uncluttered. Conveniently located switch allows instant access to either of your printers.
- Will work with any two similar or dissimilar parallel printers or printing systems including: dot matrix, daisy wheel, plotters, TRS-80 converted electrics, etc.
- BUSINESS SYSTEMS benefit from the ability to readily select one of two printers. For example a high speed dot matrix printer can be used for data, program listings and first drafts and a slower correspondence quality

printer utilized to generate letters, reports, etc.

•SIMPLE TO CONNECT. Plugs directly into the parallel printer port of your TRS-80 and provides an edge connector for each of your two printer cables.

•PRINTSWITCH comes completely assembled, tested, and ready to use with connector and instructions. Printswitch A is for model I and III, PRINTSWITCH B is for model II. Please specify when ordering. PRINTSWITCH A or B... ONLY \$59.00

## 2 PRINTER EXTENDER CABLE

- Adds 4 ft. to your existing printer cable. Our extension connects between your Expansion Interface and your present printer cable.
- High quality cable and gold plated contacts ensure reliable connection. ONLY \$27.50

•PLUGS DIRECTLY into the TRS-80 keyboard and gives the "TIMES" function even without an Expansion Interface. In disk systems, it plugs into the Expansion Interface. An optional "Y" connector provides for further expansion.

•TIMEDATE 80's small size keeps the computer table tidy. If you have an Expansion Interface, TIMEDATE 80 literally "DISAPPEARS" by slipping into the empty space in the bottom of the interface.

•Two sets of software, on cassette, come with TIMEDATE 80. "TIME-SET" is a step by step set of simple instructions for setting TIMEDATE 80. "TIMES" is a set of poke routines which patches any Disk Operating System to Level II TIMES to read TIMEDATE 80 and is easily incorporated into any user software. "TIMES" will always print the time and date when LISTING a program—great for keeping track of revisions!

•INVALUABLE for providing accurate date and time information in business applications such as payrolls, receipts, etc.

•FULLY ASSEMBLED and tested, 90 day warranty, complete with instructions and software on cassette, \$95.00, "Y" option, add \$12.00.

## 3 TIMEDATE 80

- Complete, self contained "true" real time clock/calendar, TIME-DATE 80 continues to keep accurate time and date when the computer is turned off or experiences a power failure.
- SET IT ONCE, and it's two replaceable "AAA" batteries (not included) keep TIMEDATE 80 running in excess of 3 years.
- The instant power is applied to the TRS-80, TIMEDATE 80 provides accurate MO/DATE/YR, DAY OF WEEK, HR:MIN:SEC and AM/PM information.
- REPLACES the computer's internal clock. If power fails and then restores, only TIMEDATE 80 will update the system with current TIME and DATE information, an impossibility with the computer's internal clock.
- QUARTZ CRYSTAL based, TIMEDATE 80 is accurate to within a few seconds per month.

**TIMEDATE 80**

ALPHA Product Co.

## 4 EXPANDABUS

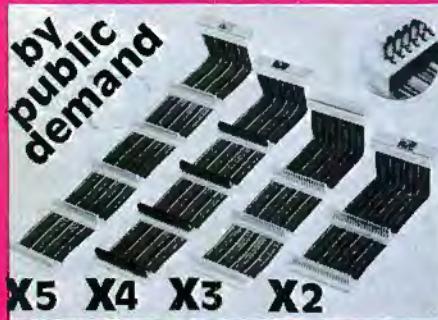
- Connect all of your TRS-80 Model I devices simultaneously on the 40-pin TRS-80 expansion bus. End the hassle of plugging and unplugging your accessories.
- ANY DEVICE that normally plugs into the Model I TRS-80 keyboard edge connector can be plugged into EXPANDABUS.
- For those with an Expansion Interface, EXPANDABUS plugs into the Expansion Port connector (located on the left side panel, to the right of the printer port) or between the keyboard and expansion interface.
- EXPANDABUS is made of the highest quality materials. All gold plated contacts and high grade ribbon cable ensure the most reliable connection possible.
- Protective covers are provided for each connector (as shown on X4 in

photograph) that can be removed and replaced as needed.

•FOUR STANDARD CONFIGURATIONS will fill almost any requirement. We recommend that you order the next greater configuration above that which your application demands so that any future expansion will be provided for.

•Two or more EXPANDABUS cables can be ganged where more than five connections are needed. Custom configurations are also available. Call us.

X2...\$29 X3...\$44 X4...\$59 X5...\$74



## 5 THE ALPHA GREEN SCREEN

- IBM and all other mainframe houses use green screen monitors. The advantages of the green video screen are now widely known. Every TRS-80 user should enjoy the benefits that it provides.
- THE ALPHA GREEN SCREEN is the only CURVED screen MOLDED exactly to the picture tube shape. It is cut precisely to cover the exposed area of the tube.
  - THE FILTER MATERIAL that we use is just the right shade and density. The result is a screen very pleasant to the eye.
  - IMAGE CONTRAST is increased and screen legibility improved.
  - Eye fatigue is reduced by our eye-saving green color and the enhanced readability of text.
  - Your system takes on a distinctively professional look.

•THE ALPHA GREEN SCREEN is the easiest and fastest to install, no lifting, taping, or gluing necessary. Can be removed instantly for cleaning.

•SATISFACTION GUARANTEED—try the ALPHA GREEN SCREEN for 14 days. If, for any reason you are not delighted with it, return it for a full and immediate refund.

•THE ALPHA GREEN SCREEN ONLY \$12.50      Please specify model

## 6 ANALOG-80:

8 DIGITAL MULTIMETERS PLUGGED INTO YOUR TRS-80!! Measure Temperature, Voltage, Current, Light, Pressure, etc. Very easy to use for example, let's read input channel #4 10 OUT 0.4. Selects input #4 and also starts the conversion 20 A = INP(0). Puts the result in variable "A". Voila! Specifications: Input range 0.5V to 0.500V. Each channel can be set to a different scale. Resolution 20mV (on 5V range). Accuracy 8 bits ( 5% ) Port Address jumper selectable. Plugs into keyboard bus or E/I (screen printer port). Assembled and tested. 90 day warranty. Complete with power supply, connector, manual. \$139.

## 7 INTERFACER-80:

INTERFACER-80: the most powerful Sense/Control module

- 8 industrial grade relays, single pole double throw isolated contacts. 2 Amp @ 125 Volts. TTL latched outputs are also accessible to drive external solid state relays
- 8 convenient LEDs constantly display the relay states
- Simple "OUT" commands (in BASIC) control the 8 relays
- 8 optically-isolated inputs for easy direct interfacing to external switches, photocells, keypads, sensors, etc
- Simple "INP" commands read the status of the 8 inputs
- Selectable port address. Clean, compact enclosed design
- Assembled, tested. 90 days warranty. Price includes power supply, cable, connector, superb user's manual. \$159

## 8 CHAIN BREAKER

LET THE "CHAIN BREAKER" FREE YOUR MINI-DRIVES. End the daisy-chain mess once and for all. Fits all minidrives. Percom, Aerocomp, Shugart, Micropolis, MTI, Vista, Periec, Siemens, BASF. Easy to install: just remove the drive cover, plug in the "CHAIN BREAKER", and replace the cover. Voila!!

Now you can change and move your drives around without disassembly. Keep the cover on and keep the dust out. High reliability gold plated contacts. Computer grade 34 conductor cable. Tested and guaranteed. Get one for each drive. only . . . . . \$13.95



# ALPHA PRODUCT

(212) 296-5916  
85 71A, 79th St., Woodhaven, N.Y. 11421

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



**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

A. A. Wicks

**ADVERTISING DIRECTOR**

Kevin Rushalko

**ADVERTISING — SALES**

Elaine Traum

**ART DIRECTOR**

Edmund Khaleel

**QUALITY CONTROL**

Harvey Cohen

**OFFICE MANAGER**

Beatrice Kahn

**SOFTWARE MANAGER**

Darlene Bell

**SALES MANAGER**

Michelle Neumann

**INVENTORY CONTROL**

Alan Friedman

**SHIPPING MANAGER**

Joan Marchick

**PRODUCT DEVELOPMENT**

Richard Kaplan

Dan Schaffer

**PRODUCTION**

Adele Damiano

Eileen Medansky

Anna Mistrulli

Sheryl Streim

**CONTENTS****FEATURES**

- 16 Program Previews ..... A. A. Wicks  
MICROPROOF from Cornucopia Software
- 20 Static Electricity and the Microcomputer..... Dany J. Washington  
What to do about this annoying problem
- 24 EPSON MX-70: A User's Evaluation ..... Brett A. McAlister  
A low cost, high quality printer
- 28 Four BASIC Programs..... Gordon Speer  
Determinant of Any Matrix, Abundant Numbers,  
Perfect Numbers, Road Rally
- 34 NEWDOS80's SYSTEM and PDRIVE Commands... Joseph Rosenman  
How to get the most from these powerful features
- 40 Disassembled Handbook for TRS-80, Vol. 4 ... Robert M. Richardson  
Chapter 6: W4UCH Baudot Radio Teletype Receive Program
- 48 Beginner's Corner..... Sherry M. Taylor  
Elementary Arrays (Part VI)
- 56 The Guarded Bomb..... Chris Jaggi  
A game of skill and strategy

**REGULAR DEPARTMENTS**

- 2 Bits and Pieces..... Howard Y. Gosman  
Publisher's Remarks
- 3 The Crystal Ball  
New Products from Radio Shack and others
- 8 Letters to the Editor  
Readers tell us what's on their minds
- 22 Color Computer Corner ..... Joseph Rosenman  
Information about the TRS-80 Color Computer
- 26 Model III Corner..... Hubert S. Howe, Jr.  
About the TRS-80 Model III Only
- 52 Questions and Answers..... Hubert S. Howe, Jr.  
Answers to questions posed by readers
- 58 Corrections  
Our face is red department
- 64 Advertising Directory

Entire contents copyright © 1981 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 nonprofit 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.

#### EUROPEAN DISTRIBUTOR

##### IN BELGIUM

WSOFT

Centre du demonstration:  
279, Avenue Louise  
1050 Bruxelles (Belgium)  
Telephone (02) 640.57.59

## BITS AND PIECES

### Howard Y. Gosman

#### Full Color

As you can see from the front cover, our magazine is now printed in full color. It is also continuing to grow, in order to bring you more of all the good things that you have come to expect from Computronics. We always enjoy hearing from readers, and we want to know your reactions to all the new features and departments we will be starting.

#### Expanded Color Computer Coverage

This month we begin the first of an expanded Color Computer Corner, which will be conducted by our newest Contributing Editor, Joseph Rosenman. Mr. Rosenman

has written many articles for us in the past, and will continue to do so in the future. He is an expert in many types of computing, and he has written articles about and programs for both the Models 1 and 3 TRS-80's in addition to the Color Computer. He will be glad to try to answer questions that you may have about the Color Computer. Just write "Color Computer Question" on the outside of the envelope, and enclose a self-addressed stamped envelope if you wish an individual reply.

#### New Beginner's Corner

This month we also have a new

*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 38 (OR LESS). THE NUMBER FOLLOWING THE DASH TELLS YOU THE LAST ISSUE THAT YOU WILL RECEIVE.** For example, if your subscription number is 16429-38, your subscription expires with this issue (issue #38).

**H COMPUTRONICS**

## THE CRYSTAL BALL

### (NEW PRODUCTS OF INTEREST TO TRS-80™ OWNERS)

**WARNING:** The information found in our Crystal Ball Department cannot necessarily be verified. What follows are rumors, from what we consider to be reliable sources, concerning new products of interest to TRS-80 owners BEFORE this information is released to the general public.

1. As the Fall of 1981 begins, it is not difficult to see that big changes lie ahead in the personal computing field. On the one side, microcomputer manufacturers led by Tandy Corporation, Apple Computer and others are introducing larger systems, while on the other the giant corporations like IBM, Xerox, and Hewlett-Packard are introducing smaller systems. On the horizon and certain to become a significant factor in the United States market is the Japanese. Significant confrontations will occur as these corporations try to compete in the same marketplace. It's going to be interesting to watch.

While the chief beneficiaries of this competition will be the public and small businesses, the key to success is more likely to be product marketing and distribution rather than quality. Service and support will become as important as sales. IBM on the one hand, and Radio Shack on the other, are most likely to succeed, because their support is already in place while others are just getting started. IBM has always provided total support for its computers. Radio Shack has not only thousands of retail stores, but also many computer and service centers. In a couple of years, though, the picture may be completely different.

2. Lifeboat Associates is developing a board for the TRS-80 Model III that will make the CP/M disk operating system and several other features available. This board remaps the ROM dynamically and adds an additional 16K

RAM to give a total of 64K RAM. A toggle switch will be included so that users can still run TRSDOS. The disk formatting will be different from TRSDOS, probably employing 20 to 24 sectors per track to give over 200K per drive. Double-sided drives will have a capacity of 400K per drive. Hard disk operations will be added in the future. This board plugs into the Z-80 socket of the Model III, and users will have to open the machine and thereby void their warranty.

Another board being planned soon after the CP/M module will give the video monitor the possibility of 24 by 80 character display. With these features, the Model III will not only look like, but have most of the same capabilities of, the TRS-80 Model II.

3. Hewlett-Packard will shortly announce a CP/M-compatible computer comparable to the TRS-80 Model II in the \$7,000 price range.

4. IBM has announced a new computer, its smallest yet, called "System/23 Datamaster". Aimed at small businesses with 10 or fewer employees, it features an 80-character-per-second printer and is priced at \$9,830. The word-processing option costs an additional \$1,100 to \$2,200. The new unit replaces IBM's 5120 "desktop" computer, which was previously the smallest made by the company and sold for \$13,375. It will no longer be made.

In addition, IBM is expected to announce an even smaller unit —

**MD**  
**MICRO-DESIGN**

### ANNOUNCES THE NEW **MDX-3**

#### INTERFACE EXPANSION BOARD INTERFACE EXPANSION BOARD FOR THE TRS-80 MODEL III COMPUTER

##### FEATURES:

- Phone Modem
- RS-232 Port
- Floppy Disk Controller Dual Density Data Separator
- Silk Screen
- Solder Mask
- User Manual

##### Also Available **TheMDS-1**

- Plug in data separator for the MDX-2
- Fully assembled and tested
- User Manual

##### STILL AVAILABLE FOR THE TRS-80 MODEL I

##### MDX-1 and MDX-2 Boards.

##### FEATURES:

- Phone Modem
- 2K-4K E PROM Option
- 32K MEMORY Expansion
- Floppy Disk Controller on MDX-2
- Real Time Clock
- Parallel Port
- RS-232 and 20mA Serial Port
- Dual Cassette Line
- On Board Supply
- Silk Screen
- Solder Mask
- User Manual

### IN STOCK NOW!

PC Board & Manual	
MDX-1	\$64.95
MDX-2	\$74.95
MDX-3	\$74.95
MDS-1	\$21.95

User Manual \$7.95

All Boards Add \$5.00 Shipping  
Assembled Boards Available  
...Call For Prices

FREE PAMPHLET AVAILABLE  
Call or write

**MICRO-DESIGN**

P.O. Box 748  
Manchaca, Texas 78652  
512-282-0225

TRS-80 is a trademark of Tandy Corp.

# PERCOM

a personal computer — soon. It is expected to be in production after the first of next year. By its own admission (which came out in testimony during an IBM/government antitrust case), IBM has been hurt by the proliferation of the microcomputer. A recent research study by the Gartner Group, Inc. of Greenwich, Connecticut (the report sells for \$3,200!) details the decline of IBM's share of the total market from 80% to about 30% or less. There is a market of 25 million computer users, and IBM won't ignore them.

5. **Texas Instruments** has decreased the price of the TI 99/4 home computer to \$649.95. The same unit originally sold for \$950! TI will be redesigning the keyboard into a "bigger key" typewriter keyboard with "standard home row keys". Announcement of this change will be withheld until TI sells out of its current 99/4 stock with its poorly designed calculator-like keyboard. The price of the newer 99/4A will be the same as the current 99/4. TI employees are being given the opportunity to buy a 99/4 at \$299 (below cost).

While the only difference be-

tween the 99/4 and 99/4A is the keyboard, the newer 99/4B will be a completely changed home computer. It will have simpler graphic capability with new "Magnify" commands, a new extended BASIC, and 32K add-on memory expansion modules. Even though the company got off to a rocky start, TI is in the personal computer business to stay.

On another front, TI is now advertising one of the first 5 1/4-inch Winchester-type **hard disk drives**. Each drive can store **6.38 megabytes**. Prices are not being advertised.

6. Atari has dropped the list price of the Atari 400 16K RAM version from \$630 to \$399 and lowered the 8K RAM version by \$100. The 8K Atari 400 will eventually be phased out. The 40-column printer is now \$299.95 (vs. the previous \$449.95). 8K and 16K memory modules were slashed by more than 50% to \$49.95 and \$99.95 respectively.

7. Apple Computer has been having big problems with its **Apple III**. The newspaper **Computerworld** recently reported a rumor that the Apple III was to be scrapped in favor of an Apple IV. New Apple III owners were complaining "about just about every facet of the system." Reported are problems with loose chips, faulty clock/calendar chips, inadequate cooling system, circuit boards, disk problems, and more. Apple has dismissed "most employees involved with the Apple III project, including project director Thomas Whitney". Apple has sold over 4,000 Apple IIIs and had to hold up shipments earlier this year because of "reliability problems."

But the news at Apple is not all bad. Its profit for the six months

Quality Percom products are available from the following authorized Percom retailers. If a retailer is not listed for your area, call Percom toll free at 1-800-527-1592 for the address of a nearby retailer, or to order directly from Percom.

ARKANSAS		
MICROCOMPUTER SYSTEMS, INC.	Hot Springs	(501) 623-5209
<b>ARIZONA</b>		
SIMUTEK	Tucson	(602) 886-5880
<b>CALIFORNIA</b>		
ALPHA BYTE STORES	Calabasas	(213) 883-8594
BERKELEY MICRO COMPUTERS	Berkeley	(415) 848-7122
COMPUTER INFORMATION EXCHANGE		
	San Luis Rey	(714) 757-4849
COMPUTER SERVICE CENTER	Hollywood	(213) 851-3434
DESMAR ELECTRONICS	Santa Clara	(408) 988-2208
HOBBYWORLD	Northridge	(213) 886-9200
WHOLESALE TECHNOLOGY	Santa Ana	(714) 979-1700
<b>COLORADO</b>		
MICROCOMPUTER APPLICATIONS	Denver	(303) 922-6410
<b>DISTRICT OF COLUMBIA</b>		
THE PROGRAM STORE	Washington	(202) 337-4691
<b>FLORIDA</b>		
EN-TRON, INC.	Largo	(813) 586-5012
MICROCOMPUTER CONSULTANTS	Ormond Beach	(904) 673-5787
<b>GEORGIA</b>		
MICROSYSTEMS SOFTWARE, INC.	Hollywood	(305) 983-3390
DAVIS SYSTEMS, INC.	Atlanta	(404) 634-2300
<b>HAWAII</b>		
COMPUTER CENTER	Honolulu	(808) 488-2171
<b>IDAH0</b>		
OFFICE MAGIC COMPUTERS	Boise	(208) 376-4613
<b>ILLINOIS</b>		
GARCIA & ASSOCIATES	Chicago	(312) 782-9750
<b>KANSAS</b>		
BESCO ELECTRONICS	Shawnee	(913) 268-7633
CARDENS, INC.	Hutchinson	(316) 669-8261
<b>MASSACHUSETTS</b>		
OMNITEK	Tewksbury	(617) 851-4580
<b>MARYLAND</b>		
DAMASCUS RADIO SHACK	Damascus	(301) 253-2101
<b>MICHIGAN</b>		
ALTERNATE SOURCE	Lansing	(517) 487-3358
<b>MINNESOTA</b>		
THE CODE ROOM	Eden Prairie	(612) 934-1826
<b>MISSOURI</b>		
LEMBERGER CO.	Vienna	(314) 422-3353
SOFTWARE CENTER	Florissant	(314) 838-7755
<b>NEW HAMPSHIRE</b>		
HARDSIDE	Milford	(800) 258-1790
<b>NEW JERSEY</b>		
CHANNEL 1 RADIO SHACK	Medford	(609) 654-7454
<b>NEW MEXICO</b>		
AUTEL ELECTRONICS	Albuquerque	(505) 255-6451
<b>NEVADA</b>		
PCS COMPUTER	Las Vegas	(702) 870-4138
<b>NEW YORK</b>		
H & E COMPUTRONICS	Spring Valley	(914) 425-1535
80 MICRO COMPUTER SERVICES	Cohoes	(518) 235-9007
MICRO 80 SYSTEMS	Brooklyn	(212) 748-3236
STONY CLOVE	New York City	(212) 391-8337
<b>OHIO</b>		
FELDMAN ENTERPRISES	Akron	(216) 724-5583
JERRY'S COMPUTER	Cleveland	(216) 641-6719
MPS	Wadsworth	(216) 336-2771
<b>PENNSYLVANIA</b>		
ADVANCED MECHANIZATION	Ivylawn	(215) 672-9000
COMPUTER ANALYSTS	New Brighton	(412) 846-9323
<b>TENNESSEE</b>		
COMPUTER WORLD, INC.	Nashville	(615) 255-8330
MARKETING COMMUNICATIONS	Memphis	(901) 794-8677
<b>TEXAS</b>		
ACCESS UNLIMITED	Richardson	(800) 527-3475
COMPUTEX	Webster	(713) 488-8022
QUALITY SOFTWARE	Dallas	(214) 484-2976
TEXAS COMPUTER SYSTEMS	Brady	(915) 577-2931
<b>UTAH</b>		
MICRO MNEMONICS	Sunset	(801) 298-6809
BYTE SHOP MILWAUKEE	Greenfield	(414) 281-7004
<b>FOREIGN DEALERS</b>		
<b>AUSTRALIA</b>		
DICK SMITH ELECTRONICS	P.O. Box 321 North Ryde NSW 2113	
<b>CANADA</b>		
VALERIOTE AND ASSOC.	Guelph Ontario	(519) 824-7041
DVR ELECTRONICS	Surrey B.C.	(604) 576-1045
<b>MEXICO</b>		
CIBERMATIC, S.A.	Mexico	(905) 592-3433
COMPUTADORAS Y ASESORAMIENTO		
<b>DOMINICAN REPUBLIC</b>		
RADIO SHACK	Rio Panuco 14 Mexico 5 D.F.	
	Santo Domingo	(809) 565-9121

**IEEE-488 TO TRS-80\* INTERFACE**  
Everything needed to add powerful BASIC GPIB-488 controller capability to TRS-80 Model 1 or 3, Level 2 or DOS with a minimum of 16K.

488-80B  
For Model 1 Operation

488-80C  
For Model 3 Operation

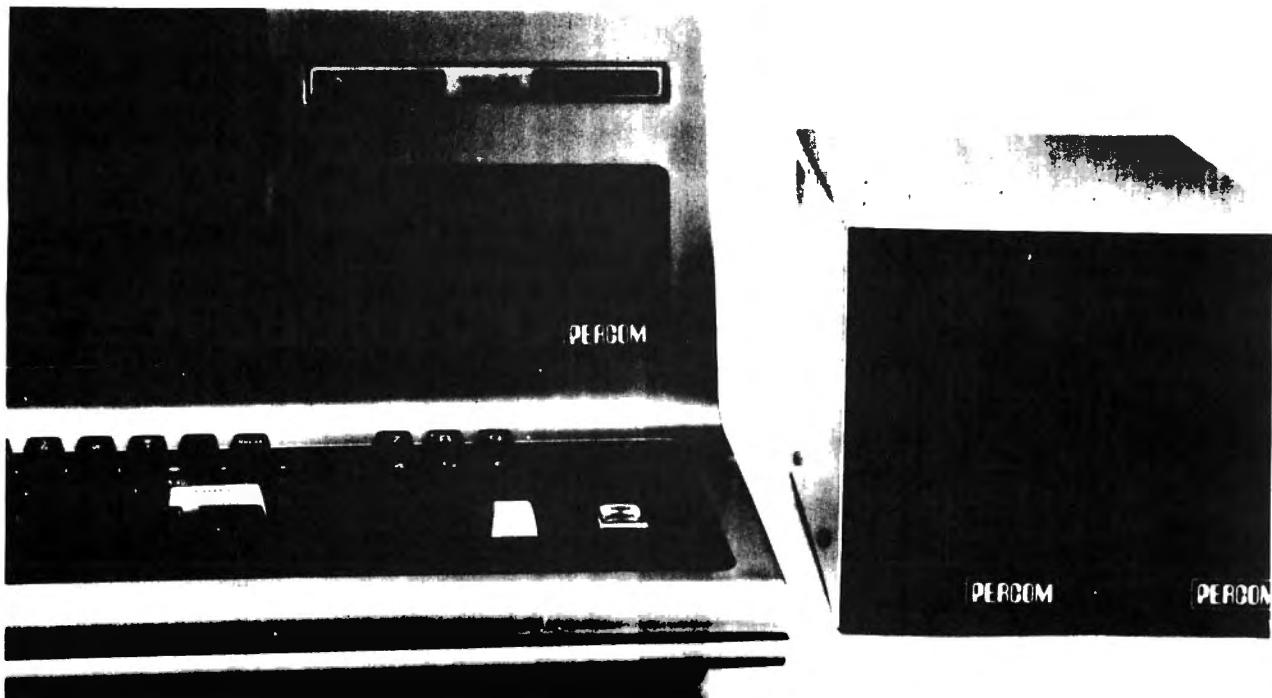
Model 488-80B or 488-80C Price: \$325.  
+ shipping, insurance & tax

WHEN ORDERING SPECIFY DISK OR TAPE

SCIENTIFIC ENGINEERING LABORATORIES  
11 Neil Drive • Old Bethpage, NY 11804  
Telephone: (516) 694-3205

\*Trademark of Tandy Corp.  
There is no affiliation between Scientific Engineering Laboratories and Tandy Corp. or Radio Shack.

COMPUTRONICS



## Disk Storage: It's No Place to Compromise.

A dependable disk system means everything to the high-performance operation of your computer. At Percom, we know this. And we do something about it.

For example, the connectors on our TFD drive systems are gold plated.

Why? Because solder-plated contacts oxidize, forming an insidious insulation that can cause erratic operation. And then total failure.

Gold-plated connectors are just one way we make better drive systems than the competition.

### Now #1 for the Model III

Quality Percom TFD drives provide more features, cost less. Add-on drives start at only \$439.00. Complete First-Drive Systems start at only \$749.95. Features:

**"Flippy" Capability** — Record your

programs and data on either side of a diskette. **Greater Storage Capacity** — Store 180 Kbytes — formatted — on one side of a 40-track TFD drive. Store over twice as much on a TFD 80-track drive.

**Think Megabytes** — Your TFD drive controller will handle up to four drives. You can access almost 1.5 million bytes of on-line program and data files. **Either Add-in or Add-On** — Your TFD First Drive System can be either internal (add-in) or external (add-on). In either case, you get a complete system including the disk controller, drive, power supplies and disk-operating software.

**BASIC-Language DOS** — Included on diskette with each First Drive System is Percom's OS-80/III™. This easy-to-use disk-operating system loads into 7 Kbytes of RAM and then frees the drive for other use. With OS-80™ programs, you can have full, read-write interchangeability between Model I and Model III diskettes. **Or Model III TRSDOS\*** — TFD 40-track drives work with Tandy's Model III TRSDOS, without modification. For 80-track operation, TRSDOS can be easily modified with diskette patches supplied.

And our double-density version of OS-80™ costs just \$49.95.

Of course you don't have to upgrade your Model I for double-density operation to use Percom disk drives. But it's nice to know you can.

Percom TFD drives for the TRS-80\* Model I are available in 40-, 77- and 80-track versions, in 1-, 2- and 3-drive configurations. Prices start at \$399.00.

**System requirements:** Model III TFD drives work with a 16-Kbyte system (min) and Model III BASIC. The initial drive must be a first-drive system. An optional interconnecting cable is available for expanding with external drives #3 and #4. Model I TFD drives work with a 16-Kbyte system (min) equipped with an Expansion Interface. Level II BASIC and DOS software, and an interconnecting cable. Two- and four-drive interconnecting cables are available from Percom.

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

Model I    Model III

Send to  
PERCOM DATA COMPANY, Inc., Dept. 8  
211 N. Kirby St. Garland TX 75042

name \_\_\_\_\_

street \_\_\_\_\_

city \_\_\_\_\_ state \_\_\_\_\_

zip \_\_\_\_\_ phone number \_\_\_\_\_

MAIL TODAY! COI

To order products, or for the name of your authorized Percom retailer, call toll free

1-800-527-1592.

**PERCOM**

PERCOM DATA COMPANY, INC.  
211 N. KIRBY GARLAND, TEXAS 75042  
(214) 272-3421

\*Trademark of Percom Data Company, Inc.  
\*\*Trademark of Radio Shack Corporation which has no relationship to Percom Data Company.

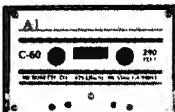
PRICES AND SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

**COMPUTRONICS** INC.

# MICROSETTE CASSETTES



C-10      C-20  
COMPUTER CASSETTES



C-60      C-90  
AUDIO CASSETTES

Microsette, the undisputed industry leader in short cassettes for micro-computer applications also offers equally high grade audio cassettes at budget prices. Credit card buyers may phone (415) 968-1604.

## LOOK AT OUR PRICES

Length	10 Pack	50 Pack
C-10	\$ 7.50	\$32.50
C-20	\$ 9.00	\$39.00
C-60	\$13.50	\$57.50
C-90	\$17.50	\$77.50

UPS shipment in Cont. USA incl.  
We can not ship to P.O. Boxes

Length	Qty.	Price	Total
SUBTOTAL			
Calif. Cust. add Sales Tax			
TOTAL			

Check or money order enclosed   
Charge to: Visa  Master Card   
Account No. \_\_\_\_\_

Expiration Date \_\_\_\_\_

SIGNATURE \_\_\_\_\_

MICROSETTE CO.  
475 Ellis Street  
Mt. View, CA 94043

continued from page 4

ended March 27th has skyrocketed to \$16.5 million, up from last years \$5.4 million — a 229% increase. Not bad for a company founded five years ago by two hobbyists named Steve in their garage!

8. Casio Computer Company has just started selling its \$170 FX-702P hand-held computer, with U. S. sales due later this year. This makes it the second manufacturer after Sharp Corp. to offer a calculator-sized computer capable of running BASIC programs. (The Radio Shack pocket computer is a Sharp.) Casio will soon have a cassette adapter for program and data storage for about \$35, and later it expects to have a miniprinter for hard copy output for about \$70.

## GREMLINS

Go into BASIC and type three spaces followed by an apostrophe and ENTER. What happens? You get a "READY", because you have entered some information followed by the abbreviation for a remark.

Now type four spaces followed by an apostrophe and ENTER. What happens? Does anybody know why?

continued from page 2

author of the Beginner's Corner. Her name is Sherry M. Taylor, and she tells you a bit about herself and why she will be writing the column in this month's installment. Mr. A. Douglas Werbeck, the previous author, has taken a new job with Radio Shack, which created a conflict of interest with his writing for us. We wish Doug well in his new position, from which he will surely continue to help people who are just beginning an interest in microcomputing.

## Authors' Addresses

It is our practice to publish the addresses of authors who write articles and programs published in *Computronics* when their material is published. If you submit something to us and would not like us to publish your address, please state this in your accompanying letter. Otherwise, we will assume that you do not object to having your address appear.

**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%

**ELECTRIC PENCIL™ PATCH**  
for the TRS-80 Model III

Patches the disk version of the Electric Pencil program so that it runs on the TRS-80 Model 3. (You must already have the Model 1 version of the program.) Automatically upper and lower case with no hardware modifications required.

**\$19.95**

**H & E COMPUTRONICS**  
(914) 425-1535  
inside New York State  
(800) 431-2818  
outside New York State

# Throw It Away

(your dictionary, that is)

Now you can proofread and correct ten pages of text in less than one minute, with **MICROPROOF** dictionary software

- **EASY TO USE:** Prepare your text on any Z-80 based microcomputer, using any of a number of popular word processing programs. When you are finished, enter the appropriate command, and MICROPROOF proofreads your document, displaying misspellings and typos on the screen. Then MICROPROOF displays each error separately, requesting you to enter the correct spelling for each. Finally, MICROPROOF corrects your document. All in less than a minute.
- **COMPREHENSIVE:** MICROPROOF comes with a 50,000 word vocabulary. That's equivalent to a Webster's Pocket Dictionary. And MICROPROOF's dictionary is INFINITELY EXPANDABLE. You can add your own technical words and jargon.
- **RECOGNIZES** prefixes, suffixes, hyphenation and comment lines.
- **REQUIRES ONLY** 32K of memory and one single or double density 5½ inch or 8 inch disk drive.
- **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 MICROPROOF to operate from within your own word processing software.

## PRICES

TRS-80® Model I version	\$125.00	Correcting Feature	\$60.00
TRS-80® Model II version	\$200.00	Word Processing Conversion	
CP/M® version	\$200.00	Scripsit® or Electric Pencil®	\$35.00
APPLE® version	available soon	Separate User's Manual	\$5.00

Master Charge and Visa accepted. No COD please. California residents add 6% sales tax. Send for a brochure—specify type of microcomputer and word processing software used. Dealer inquiries welcome.



## CORNUCOPIA SOFTWARE

Post Office Box 5028  
Walnut Creek, California 94596  
(415) 524-8098

**COMPUTRONICS**

# TUNE-UP YOUR TRS-80



Ever wanted to do things to your TRS-80 that Radio Shack said couldn't be done? How about reverse video, high-resolution graphics, a high-speed clock, and audible keystrokes?

Not enough? How about turning an 8-track into a mass storage device, making music, controlling a synthesiser, individual reverse characters, and a real-time clock?

If the thought of using a screwdriver gives you the shivers then you can turn to the software section. Learn how to make BASIC programs auto-execute, reset memory size, pack program lines with machine code, and generate sound effects.

*The Custom TRS-80 and Other Mysteries* is packed with page after page of practical information, and tested software. Get a copy and turn your TRS-80 into a supercomputer! Available from your local IJG dealer for only \$29.95.



1260 West Foothill Blvd.,  
Upland, California 91786  
(714) 946-5805

TRS-80 is a trademark of Tandy

## LETTERS TO THE EDITOR

### Problems with NEWDOS/80

I recently ordered NEWDOS/80 from your organization. When it arrived, the disk was loose in the box, and all of the manual pages were out of the binder. Most of the round holes were bent, torn or mutilated. There were numerous asterisks penned in the margins and some underlining.

As if this weren't enough, after reading the manual I find that there should have been a technical sheet and several ZAP sheets included. All of these were missing.

I am having some problems with NEWDOS/80 and wondered if you could be of assistance. Reading the Apparat manual has not helped much. (Surely this was written by an early Radio Shack manual writer.)

Most of my problems are business-types that build and store data on disk files under TRSDOS. They run fine under NEWDOS/80 until they hit a LOF or EOF command (these are incompatible, you know). Question: how do you make them compatible? Do you have to change the BASIC commands in the programs or rebuild the files with the input routine running under NEWDOS/80?

Any chance of starting a new series of articles on NEWDOS/80 similar to the one on assembly language?

I greatly enjoy your magazine. Keep up the good work.

J. H. Mecom  
RT-1 Box 87A  
Ennis, Texas 75119

We apologize for the condition of your copy. All orders are filled with items exactly as they come from the manufacturers. We have found that the ZAP sheets for NEWDOS/80 are often not included, but they can be obtained from Apparat as long as you are a registered owner.

There is no way to make NEWDOS/80's method of handling the last record in a file compatible with TRSDOS. Programs have to be modified to take the differences into account.

While we do not envision starting an entire series on NEWDOS/80 at this time, we have planned several articles to cover various aspects of it. In this issue we have an article on the SYSTEM and PDRIVE commands.

### A New Utility for the Electric Pencil

In your April 1981 issue (number 33) page 19, Joseph Rosenman, in his review of the MX-80 printer, indicates that the feature of changing the print characteristics during printing would be nearly impos-

**DEMAND THE MOST  
FOR YOUR  
WORD PROCESSING  
DOLLAR?**

**THEN MOVE UP  
TO PROSOFT'S  
NewScript . . .**

- Easy-to-use Full Screen Editing
- Typeahead — never loses keystrokes
- Headings, Page Numbering, Centering
- Form letters, Big Documents
- Global search and change
- Double-Width, Underlining
- Sub-scripts, Super-scripts
- Table of Contents, Indexing
- Proportional font right-margin justification on 737, 739, L.P. IV, D.W. II
- All 12 MX-80 fonts + underlining
- Italics on GRAFTRAX MX-80
- Supports Diablo, Microline, Anadex
- 160 pages of excellent documentation includes "EZEDIT", "EZSCRIPT", self-study tutorial, and hundreds of examples
- Runs under TRSDOS, NEWDOS, NEWDOS/80, LDOS, DOSPLUS.
- Requires 48K TRS-80 with one disk drive.
- Specify: Model I or Model III.

<b>NewScript</b>	<b>\$ 99.95</b>
<b>Mailing Labels Option</b>	<b>\$ 29.95</b>
<b>Special: NewScript + Labels</b>	<b>\$115.00</b>

Order from your local dealer, or from:

**PROSOFT**

✓411

**(213) 764-3131**

**Dept. C, Box 839 • No. Hollywood, CA 91603**

**NOTE:**  
Some features work only if your  
printer has the mechanical  
capability.

**ORDERING INFORMATION:** We accept checks, MasterCard, VISA, Money Orders, C.O.D. (add \$2.00) and even cash. Please, no Purchase Orders. Calif. residents add 6% tax, 10% outside North America.



# MAKE BASIC PERFORM LIKE A CHAMPION



BASIC is not nearly as slow as most programmers think. *BASIC Faster and Better* shows you how to supercharge your BASIC, with 300 pages of fast, functions and subroutines.

You won't find any trivial poorly designed 'check-book-balancing' programs in this book - it's packed with *useful* programs.

Tutorial for the beginner, instructive for the advanced, and invaluable for the professional, this book doesn't just talk... it shows how! All routines are also available on disk, so that you can save hours of keyboarding and debugging.

The #1 disk *BFDEM* contains all the demonstration programs, and #2 *BFBLIB* has all the library functions.

*BASIC Faster & Better* is \$29.95, and the two program disks are \$19.95 each.

Get the book and/or disks direct from *IJG*, or your local *IJG* dealer.



1260 West Foothill Blvd.  
Upland, California 91786

(714) 946-5805

TRS-80 is a trademark of Tandy

sible to implement in Michael Shrayer's *Electric Pencil* program.

This is one of the main reasons why Programma International, Inc., has brought out *POINT*. With Point, you can send any control code, control-A through control-Z, also all escape code sequences, anywhere in the text, including between words, or even within words.

Point has many other features too numerous to list here, but it's very versatile and includes drivers for underlining anywhere in the text, including in centered and justified copy. A driver for centering is also included.

Point works with the disk version of Michael Shrayer's *Electric Pencil* and is available from Programma International or most dealers for only \$49.95. Point also has a high-speed keyboard routine, by the way, and gives your TRS-80 all the power of a \$20,000 dedicated word processor.

Jeff Lasman  
Project Coordinator  
Programma International, Inc.  
2908 North Naomi Street  
Burbank, CA 91504

## Word Processor "War"

For some reason I feel compelled to make some belated comments on your word processor war with Mr. Hinrichs. When I received my issue of *80 Microcomputing* in June of 1980, I immediately keyed in the program. When I brought it up, aside from a few typos, I had no trouble with it. I happened to run across your September 1980 issue and read the article "Problems with the Word Processor". Wow, what a mess! It is hard to believe that you folks had a bone to pick with Mr. Hinrichs....

When I went to 32K, all I had to do was redimension the array. Also, with Dennis Kitsz's speed-up mod, I can type as fast as I want. Even without the speed-up the typing poses no problem.

It seems to me that there could not be too many ways to write a "back bone" program for word processing. Let's face it, BASIC is BASIC. What makes the program is its extensions and embellishments. Hinrichs nailed them and you didn't. It's that simple.

Now for some more bad news. Software piracy is something programmers must live with (look at the music business). I have read so many articles by people who are crying the blues about the problem. Well, the solution is to hit the market hard and heavy, sell as much as you can before the pirates get it, and learn how to code security in. You can cry all years. The pirates, in the meantime, are laughing and selling. I am sure you realize that the mark of a good program is its

*New from*

**BENCHMARK**  
**✓ SOFTWARE**

**RUTTER**

*When sailors first left the European Continent to explore the new world, they sailed into unknown waters with no map or guide. The few who returned home brought with them a priceless record, the Rutter, which told everything they needed to repeat their voyage: which compass heading to follow, where reefs were sighted, where storms were encountered, and where to find gold and trade. You are about to embark on such a voyage with a fleet of five ships. On your voyage you will encounter natural phenomena such as gales, reefs, and St. Elmo's Fire. You will also encounter acts of man such as pirates and enemy ships which sink your ships, and changing economic conditions in Europe which can turn your cargo in your holds into fabulous wealth or excess ballast. When you return with treasure or valuable rutters your fame and fortune will increase. But first you must find your way through 100 locations of uncharted seas, and then return . . .*

*Also from* **BENCHMARK**  
**✓ SOFTWARE**

**ENCHANTED FOREST**

*"You are at the edge of the forest, paths lead to the northwest, south, and west. A weather beaten sign beside the western path says 'Entrance to the Enchanted Forest! Only fools take this path! Consider yourself warned!"*

*The time of decision has come. You know there are only dead ends to the northwest. You were repulsed by the attack of the fire breathing hellhound to the south. You muster your courage, take a deep breath, and plunge westward into the forbidden forest . . .*

*"You fool! You were warned not to come this way! Now you are completely lost! !!"*

*Only those who master the Enchanted Forest can win this provocative 71 room adventure game.\* But mastering the forest is not enough! Can you conquer the nine foot zombie and the other fiends which wait on the other side of the forest? And what are you going to do about that fire breathing hellhound?*

\* 54 location version is available for 16K users.

---

Please specify tape or disk (disk must have 32K), TRS-model and Memory size.

Name \_\_\_\_\_

Street \_\_\_\_\_

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

TRS-80 MODEL    I    III

MEMORY    16K    32K    48K    64+K

\_\_\_\_\_ ENCHANTED FOREST-16K Version    Tape    Disk @ \$19.99 \$\_\_\_\_\_

\_\_\_\_\_ ENCHANTED FOREST-32K Version    Tape    Disk @ \$24.99 \$\_\_\_\_\_

\_\_\_\_\_ RUTTER    Tape    Disk @ \$24.99 \$\_\_\_\_\_

Pennsylvania Residents add 6% sales tax \_\_\_\_\_

TOTAL ENCLOSED \$\_\_\_\_\_

Enclose check or Money order payable to: "Benchmark Software"  
Mail to: 1050 Eve Drive, Suite A, Pittsburgh, PA 15216

# SCIENTIFIC SUBROUTINE LIBRARY FOR ENGINEERS, SCIENTISTS AND MATHEMATICIANS

Now available the most powerful collection of scientific subroutines ever written for microcomputers! Before now these programs were only available for large mainframe computers such as the IBM 370<sup>1</sup>. The SSL is a library of 72 additional run-time subroutines that can be called from Microsoft's<sup>2</sup> FORTRAN-80 and are in the form of relocatable object code. In seconds these programs will perform some of the most difficult and time-consuming problems you face. For example, you can solve Eigenvalue problems, invert matrices, solve differential equations, do multiple linear regressions, and much, much more.

## LIBRARY INCLUDES:

**POLYLIB** — A collection of 8 subroutines designed to handle polynomial operations of a very high order, including polynomial addition, subtraction, division, multiplication, evaluation, differentiation, integration, normalization, and extraction of roots, both real and complex.

**FUNCLIB** — A set of 10 subroutines to compute the value of a series expansion in some special polynomial, the value of a special polynomial or special function, such as the gamma function.

**MATLIB** — A collection of 13 very powerful matrix-handling subroutines which can be used individually or can be linked together to form program modules to perform successive matrix operations. These subroutines all use Variable Array Dimensioning.

**CALCLIB** — A collection of 7 subroutines designed to integrate, differentiate, and solve both single and systems of differential equations. The differential equations programs use the Fourth-Order RUNGE-KUTTA method.

**STATLIB** — A set of 26 different subroutines to calculate many statistical properties of various data sets. While most of the programs can be used individually, several can be called in order to perform very sophisticated analyses, such as multiple linear regressions and polynomial regressions.

**MISCLIB** — A collection of 8 subroutines to calculate various results, including Fourier analysis, Fourier transforms, least squares fits, and the solving of nonlinear equations.

PADD	PSUB	PMPY	PDIV	PVAL	PDER	PINT	POLRT	HEP
HEPS	LEP	LEPS	GMMMA	BESJ	BESY	BESK	IO	INUE
GMADD	GMSUB	GMPRD	GMTRA	SADD	SSUB	SMFY	SDIV	MFUN
SIMQ	MINV	EIGEN	MSTR	DGR3	QTFG	QG2	QG10	RK1
RK2	RKGS	TALLY	BOUND	ABSENT	CORRE	ORDER	MULTR	GDATA
AVDAT	AVCAL	MEANQ	AUTO	CROSS	SMO	EXSMO	CHISO	QTEST
RANK	MOMENT	TTEST	GAUSS	BDTR	CDTR	NDTR	DLGAM	RAND
NDTR	RTNI	FMFP	SE13	APL1	APFS	FORIF	FORIT	FFT

**DOCUMENTATION:** Each diskette comes with 103 pages of documentation containing calling conventions, parameters, notes, examples, appendices and index.

**PROVEN EXPERIENCE:** The SSL is now being used daily in jet propulsion labs, private engineering and consulting firms, major universities and medical schools, government agencies and Fortune 500 corporations.

**MINIMUM SYSTEM REQUIRED:** TRS-80<sup>3</sup> Model I 32K User-RAM, 1 disk drive, FORTRAN

**TO ORDER:** Send check or money order in the amount of \$99.95 per copy made payable to

## AMERICAN COMPUTER DEVELOPMENT, INC.

1735 Briarcrest Dr., Suite 200  
Bryan, Texas 77801  
713/775-1516 713/775-1510

Telephone orders accepted. Dealer inquiries invited. VISA and MASTER CHARGE accepted. Send card number and expiration date. Price includes shipping and handling. Immediate delivery.

<sup>1</sup>A Trademark of the International Business Machines Corporation

<sup>2</sup>A Trademark of Microsoft Consumer Products

<sup>3</sup>A Trademark of the Tandy Corporation

correctness and human engineering. Anything short of that is junk.

Paul E. Erickson  
13 Stalwart Drive  
Newark Delaware 19713

*It's hard to imagine how you could have misunderstood so many of the points we made in our September 1980 issue, so let us restate some of them here. Our complaint was simply that Mr. Hinrichs had published what amounted to a modified version of our program, which we distributed for free, without acknowledging any indebtedness to us. At the time, we were not making a stink about software piracy, but the publisher of 80 Microcomputing was, and the irony seemed to good to pass up.*

*If you will read the article you referred to, you will see that most of the points relate to applications that were not even considered when the program was written, such as not using a Radio Shack printer. Computronics stands behind the programs that it publishes, and not only corrects mistakes, but takes the time to explain them.*

*We don't agree with your attitude about software piracy, which is becoming a more serious problem all the time, but it doesn't matter in this case because we were not even selling the program. The mark of a good program is not just that it is correct and useful, but also that it gets copied.*

## Some Questions from Aruba

I have a 48K Model I with two disk drives, modem and H-14 printer. I also have NEWDOS/80. I have been receiving Computronics for some time and can say that I am very pleased with it (great magazine). As you can see, I live on a very small island off the coast of Venezuela in the Caribbean. Our main problem is support. The local Radio Shack dealer does not give any support in any way, so we are looking around the world for support and hope you will be able to help us. Here are some problems we have:

(1) We would like to have some addresses of schools that give homestudy courses in advanced BASIC (disk version, for the TRS-80).

(2) I am using a parallel to serial interface from Multimedia with my H-14 line printer, and I have some problems. It misses characters when printing, and it also stops printing after six lines. I would be glad for some advice from anyone, thank you.

(3) I would also like to hear from anyone who has or knows about the following programs:

**BASEBALL LEAGUE STATISTICS**

**BASKETBALL LEAGUE STATISTICS**

(4) Is there a better way to get rid of the corrosion

problems on the contacts of the keyboard, expansion interface, and disk drives? I mean a permanent one.

I hooked up to micronet a few times. It's great, but it is a very expensive joke for me. Using Videotex it works fine from overseas. For those who are interested, go right ahead.

R. L. Bromet  
Piedra Plat 135-B  
Aruba, N.A.

Since we can't answer most of your questions, perhaps some of our readers will be able to help you. There is a permanent solution to the edge connector cleaning problem, but we wouldn't recommend it to most users because it is very difficult even for experienced technicians. Roger Fuller sells a Silver Kit which requires you to flow silver solder onto each connector. His address is 630 E. Springdale, Grand Prairie, Texas 75051, telephone (214) 642-0441. The price of the kit varies with the price of silver.

The edge connectors of many other peripherals, including the disk drives, are gold and do not need to be cleaned. The rule is: if it's shiny, leave it alone.

\* \* \* \* \*

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 it was prepared on and include any necessary instructions. ■

5 1/4 INCH 3M DISKETTES ..... \$29.95

5 1/4 INCH WABASH

DISKETTES ..... \$34.95

5 1/4 INCH VERBATIM DATALIFE  
DISKETTES ..... \$34.95

8 INCH WABASH DISKETTES ... \$39.95

—SOLD AS 10 DISKETTES PER BOX—

CALL OUTSIDE N.Y. STATE (800) 431-2818  
TOLL FREE

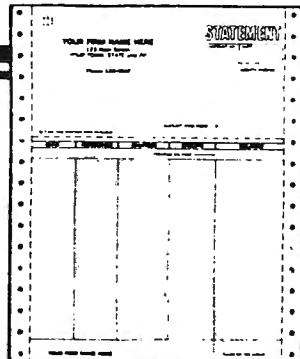
INSIDE N.Y. STATE (914) 425-1535

## TRS-80® Compatible "carbonless" Continuous Statements

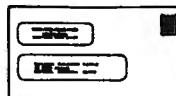
small  
quantities,  
low prices,  
fast delivery

Order as few as 500  
statements imprinted with  
your firm name and address.

Only \$27.95



NEBS 9062 Statements are  
software compatible with  
the TRS-80, Model 1, Level  
II, Accounts Receivable  
package #26-1555.



SPEED COLLECTIONS  
Product 772 DU-O-VUE® Envelope  
(3 1/2" x 6 1/2") eliminates  
envelope addressing.

Product 9062 — Size 6" x 8 1/2" detached. Prices include your firm name, address and phone in top section, plus your name only in lower section. Printed in black ink. Available in single (white) or duplicate (white, canary) continuous sets.

QUANTITY	SINGLE Product 9062-1	DUPLICATE Product 9062-2	Product 772 DU-O-VUE® Envelopes
10,000	\$192.00	\$355.00	\$138.00
6,000	128.00	228.00	92.00
4,000	99.00	169.00	64.50
2,000	59.00	99.00	36.25
1,000	38.75	61.00	20.75
500	27.95	39.95	12.25

ORDER TODAY! MONEY-BACK GUARANTEE.  
FAST SERVICE BY MAIL or PHONE TOLL FREE 1+800-225-9550  
(Mass. residents 1+800-922-8560). It is our policy to ship within  
6 working days following our receipt of your order.

Please ship: Date \_\_\_\_\_ 19 \_\_\_\_\_ CODE 460

9062-1 STATEMENTS (Single)  
 9062-2 STATEMENTS (Duplicate)  
 772 DU-O-VUE® Envelopes  
 Information on continuous checks and other computer forms.

HEADING TO BE PRINTED ON FORMS: (Please type or print)

STREET \_\_\_\_\_  
CITY and STATE \_\_\_\_\_ ZIP \_\_\_\_\_  
PHONE \_\_\_\_\_

AUTHORIZED SIGNATURE \_\_\_\_\_  
If you wish us to BILL and SHIP differently from above please indicate

**Nebs Computer Forms**

78 Hollis Street, Groton, Mass. 01450  
A division of New England Business Service, Inc.

**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
Amdahl	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

**AT LAST!**

Mass production prices for high quality software. Buy direct and save 50%. Also available for CPM and HDOS.

**DATA BASE MANAGER** Mod I & III \$69, \$149 (48K). Mod-II \$199  
Maintain a data base and produce reports, all without user programming. Define file parameters and report formats on-line. Key random access, fast multi-key sort, field arithmetics, audit log, label. No time-consuming overlays. 500 happy users in one year. Mod-II and 48K versions have over 50 enhancements, including 40 fields maximum. "IDM-M2 is great!" - 80-US.

**A/R** Mod-I \$69 Mod-II \$149 Mod-III \$69  
Handles invoices, statements, aging, sales analysis, credit checking, forms input, and order entry. Unlike other accounts receivable programs, ours can be used by doctors, store managers, etc.

**WORD PROCESSOR** \$49  
Centers, justifies, indents, and numbers pages. Mod-I version features upper/lower case without hardware modification! File merge option available.

**MAILING LIST** Mod I & III \$59, \$79 (48K). Mod-II \$99  
The best! Compare and be selective. Includes forms input, 5-digit selection code, zip code extension, sort on any field, and multiple labels. Who else offers a report writer and merges with word processor?

**INVENTORY** Mod I & III \$89, \$109 (48K). Mod-II \$149  
Fast key random access. Reports include order info, performance summary, EOQ and user-specified reports. Many people have converted to our system! "Next to impossible to damage the file."

**GL A/R A/P, PAYROLL** Mod-II \$129 each  
Integrated accounting package. 100+ page manual. As opposed to Osborne's slow binary search and 64 column screen, we use fast ISAM and 80 columns. Dual disk and TRSDOS required.

**L216** \$59  
A cassette package of 10 business programs for Level II 16 K systems. Includes word processor and data base manager. Poker game \$19.  
Most programs are on-line, interactive, random-access, bug-free, documented, and delivered on disks. Mod-I programs require 32K TRSDOS. We're #1 in business software — don't let our low price fool you! Ask for our free 20-page catalog if you're still not convinced. Compiled versions are available.



**MICRO ARCHITECT, INC.**  
96 Dothan St., Arlington, MA 02174

**TM TRS80 color**

From the January 1981 issue of the CSRA Computer Club newsletter:

There was some amusement at the November meeting when the Radio Shack representatives stated that the software in the ROM cartridges could not be copied. This month's 68 Micro Journal reported they had disassembled the programs on ROM by covering some of the connector pins with tape. They promise details next month. Never tell a hobbyist something can't be done! This magazine seems to be the only source so far of technical information on the TRS-80 color computer®. Devoted to SS-50 6800 and 6809 machines up to now, 68 Micro Journal plans to include the TRS-80 6809 unit in future issues.

To get the MOST from your 6809 CPU - This is the BEST SOURCE! The ONLY Magazine for the 6809 Computer. Months Ahead of All Others!

**68 MICRO JOURNAL**

3018 Hamill Road  
HIXSON, TN 37343

USA

1 Yr. - \$18.50 2 Yr. - \$32.50 3 Yr. - \$48.50

\*Foreign Surface Add \$12 Yr. to USA Price

Foreign Air Mail Add \$35 Yr. to USA Price

\*Canada & Mexico Add \$5.50 Yr. to USA Price

# DISK III

## 100% Compatible

### Model III Disks

**Complete Business System includes:**  
**48K TRS-80™ Model III, Disk III™ 2 Drive System, TRSDOS and Manual.**

**\$1882**



<b>DISK III Single drive assy</b>	<b>\$599.00</b>
<b>DISK III Two drive assy</b>	<b>864.00</b>
<b>DISK III Assy w/out drives</b>	<b>435.00</b>
<b>TRSDOS™ &amp; Manual</b>	<b>21.90</b>
<b>External drives (3 &amp; 4)</b>	<b>299.00</b>

#### IMMEDIATE DELIVERY - COMPARE AND SAVE

VR Data's DISK III features:

- Completely compatible with TRSDOS
- State-of-the-art circuitry
- Fully tested, calibrated & burned-in
- Up to 4 drive configuration
- Heavy duty linear power supply
- Warranty 120 days - 100% parts and labor
- Installation with simple hand tools
- Optional 80 tk and 2 sided drives
- **READ 40** - Pgm. to read 40 tk. Diskettes on 80 tk. Drives      \$25.00

DISK III single drive assembly includes: one 40 track 5 1/4" double density drive, power supply,

controller, mounting hardware, and applicable cables.

#### Peripherals

Epson MX80  
Epson MX80FT  
EPSON MX100  
Centronics 739  
Starwriter 25 (P)  
RS-232 Model III  
Lexicon Modem

\$500.00  
625.00  
\$800.00  
750.00  
1395.00  
75.00  
125.00

#### MODEL I/III EXTERNAL DRIVE W/ PS & ENC

Fully Compatible  
120 day warranty  
Easy installation  
80 tk or 2 sided  
80 tk & 2 sided

**\$299**



\$419.00  
549.00

#### OTHER PRODUCTS

SUPERBRAIN 64K      2990.00

PARALLEL PORT —

SUPERBRAIN      99.95

MOTOR MINDER™      149.95

FOR SUPERBRAIN      149.95

DISK & MYSTERIES      22.50

BASIC & MYSTERIES      29.95

#### NEW—

LDOS Operating System      149.00

COMING SOON!!

5 / 10 Meg WINCHESTER for MOD III

Internal MODEM for MOD III

**IF YOU DON'T SEE IT ADVERTISED CALL US AND ASK FOR IT.**

**PUBLISHED PRICES REFLECT CASH DISCOUNT.**

**ALL PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE.**

TRS-80 and TRSDOS are trademarks of Tandy Corp.

DISK III is a trademark of VR Data Corp.

Dealership available. To order call toll free- 800 345-8102 or (215) 461-5300 in PA.



VR Data Corporation  
777 Henderson Boulevard • Folcroft, PA 19032



COMPUTRONICS

# PROGRAM PREVIEWS

A. A. Wicks

## This Month: MICROPROOF

There are few things that provide greater satisfaction in microcomputing than word processing operations. Yes, there will be many who take exception to that statement, especially if their forte is not words and writing in any form. But the fact remains that being able to manipulate, change, add, delete, rewrite any type of documentation by way of a video screen, and have any of these redefined almost instantly, continues to entrance me, no matter how many times it is done.

There are many word processing programs available, and most of these are excellent — a few of the less costly leave much to be desired. But cost is not always indicative of how Valuable the system may be. Personally, I like SCRIPSIT™, and for the most part, it does most of the things that I need (is there an ultimate word processor yet?). One of the things that SCRIPSIT does not do, is to check for spelling and typographical errors in a document — and I really would not expect this within its cost bracket. However, it has been my good fortune to evaluate a program of immense value in this respect — MICROPROOF, produced by Cornucopia Software, and written by Philip Manfield.

Simply stated, MICROPROOF is a "look-up" program, which scans a document (prepared using SCRIPSIT or Electric Pencil™), and compares every word against 50,000 words held in a "dictionary" disk. Any words that do not match are displayed for further processing, that is, of course, if they are in the Dictionary. I have no idea what those 50,000 words are, and did not wish to take the time to find out, but, according to Cornucopia, they are the equivalent of Webster's Pocket Dictionary. I do know that I most certainly would not have enjoyed the task of typing them in as program data. (Think of it — if each word and a space averages 10 characters, and we type 10 characters to the inch, this would be a stream of words 416 feet long!)

MICROPROOF operates with a TRS-80 Model I, II, or III; requires 32K of memory and one disk drive as a minimum. This is a bare minimum — it is much easier to use with 48K of memory and two disk drives (excluding Model II). This review will be based upon an evaluation using SCRIPSIT and two disk drives, but all operations are essentially the same with Electric Pencil, and also with only one disk drive.

There are also two versions of the program itself. One, the Standard version, operates on a word-

processed document and then displays the words that are in conflict with the Dictionary. The user then performs a Global Search and corrects the errors by screen editing. The Correcting version — much to be preferred, operates integrally with the word processor, by displaying the word, allowing several choices of action (see below), and then automatically corrects the word in the file. This is the version to be discussed.

As with most disk-based programs offered today, this one has no Operating System. In most instances, incorporating a Disk Operating System (DOS) with the program is difficult only for one-disk system users. It is a chore, rather than a problem. For MICROPROOF I found that it was a chore, even with two disk drives. Single disk drive users of this program will probably have to gain access to a dual-drive system, or have NEWDOS™ available to copy the necessary files.

The disk for the second version of MICROPROOF, Correcting MICROPROOF, has files stored on both sides of a disk. Users who do not normally use two-sided disks should be cautioned to be careful in noting the cutout slot positions when inserting each side of the disk. The word processing program is "patched" with MICROPROOF. A program on the disk called SPATCH (for SCRIPSIT-Patch), does this. Then this disk, combining the functions of SCRIPSIT and MICROPROOF, has added to it three more programs required for the proper functioning of MICROPROOF. Still another disk is prepared from the original, this one to contain three "dictionary" files, called DICT1, DICT2, and DICT3. The last-named is "your" dictionary, where you may store words, jargon or abbreviations, etc. that you would like to have in the Dictionary. More about this later.

Preparing the second disk was when I found some work was necessary. According to the manual, a formatted disk was required for this one. Adding the three DICT files should not be a problem using the COPY command of TRSDOS, except, in this case, there was no system on the original MICROPROOF disk, and certainly not on the formatted disk. NEWDOS in its wondrous ways probably has a quick solution for this, but rather than work through its ponderous instructions, I opted to transfer the DICTs from the original to a "bare bones" TRSDOS disk, thence to a formatted disk. It only took a few minutes, but was a nuisance.

The third disk may be prepared as an option. It holds an example of a letter that is referred to in the text for instructional purposes. Normally, a third disk

# Compare our prices with any in the magazine.

## We win.

### 16 K RAM KITS

NEC 4116 200 ns	1795
DIP SHUNTS (FOR KEYBOARD MEM UPGRADE)	4.00

### TRS-80 MOD I HARDWARE

PERCOM DATA SEPARATOR	27.00
PERCOM DOUBLER	159.00
DOUBLE ZAP II/80 (CONVERTS ND/80 TO D.D.)	45.95
MPI 40 TRACK DISK DRIVE (B-51)	299.00
SHUGART 40 TRACK DISK DRIVE (400L)	299.00
MPI 80 TRACK DISK DRIVE (B-91)	429.00
TANDON 80 TRACK DISK DRIVE	429.00
TANDON 40 TRACK DISK DRIVE	299.00
LNW DOUBLER WITH DOSPLUS 3.3D	159.00
PERCOM SPEAK-2ME-2	64.95

### TRS-80 SOFTWARE

LAZY WRITER MOD I	125.00
PROSOFT MOD I, III	79.00
SPECIAL DELIVERY (MAIL LIST PROG) MOD I, III	119.00
X-TRA SPECIAL DELIVERY (MAIL LIST PROG)	199.00
TRACKCESS MOD I	24.95
OMNITERM SMART TERMINAL PKG MOD I, III	89.95

### PRINTERS

ANADEX DP 9000	1195.00
ANADEX DP 9001	1195.00
ANADEX DP 9500	1295.00
ANADEX DP 9501	1295.00
CENTRONICS 739	765.00
C-ITOH 25 CPS PARALLEL	1440.00
C-ITOH 25 CPS SERIAL	1495.00
C-ITOH 45 CPS PARALLEL	1770.00
C-ITOH 40 CPS SERIAL	1870.00
C-ITOH TRACTOR OPTION	175.00
EPSON MX-80	\$CALL
EPSON MX-80 F/T	\$CALL
EPSON MX-100 F/T	\$CALL
IDS-445G PAPER TIGER	795.00
IDS-460G PAPER TIGER	1149.00
IDS-560G PAPER TIGER	1495.00
INFOSCRIBE 500 9X9. 150 CPS (TI-810 REPLACEMENT)	1495.00
MALIBU 200 DUAL MODE	2995.00
NEC SPINWRITER 5510 SERIAL RO	2595.00
NEC SPINWRITER 5530 PARALLEL RO	2595.00
NEC SPINWRITER 5500 D SELLUM OPTION	2795.00
NEC SPINWRITER 3500 SELLUM OPTION	2195.00
OKIDATA MICROLINE 80	399.00
OKIDATA MICROLINE 82	599.00
OKIDATA MICROLINE 83	795.00

### MODEMS

NOVATION CAT ACOUSTIC MODEM	145.00
NOVATION D-CAT DIRECT CONNECT MODEM	155.00
NOVATION AUTO-CAT AUTO ANSWER MODEM	229.00
UDS 103LP DIRECT CONNECT MODEM	175.00
LEXICON LX-11 MODEM	115.00

### CORVUS

#### TRS-80 MOD I, II

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

5 Megabytes	3095.00
10 Megabytes	4495.00
20 Megabytes	5395.00
MIRROR BACK-UP	700.00

### DISKETTES

MD 525-01,10,16	26.50
MD 550-01,10,16	44.50
MD 577-01,10,16	34.80
MD 557-01,10,16	45.60
FD 32 OR 34 -8000	45.60

### DISKETTE STORAGE

5 1/4" PLASTIC LIBRARY CASE	2.50
8" PLASTIC LIBRARY CASE	3.50
PLASTIC STORAGE BINDER WITH INSERTS	9.95
PROTECTOR 5 1/4"	24.95
PROTECTOR 8"	29.95

### CP/M SOFTWARE

MICROSOFT BASIC-80	299.00
MICROSOFT BASIC COMPILER	319.00
MICROSOFT FORTRAN-80	399.00
PEACHTREE SYSTEMS	CALL
MAGIC WAND (REQUIRES CP/M)	275.00
WORD STAR (REQUIRES CP/M)	310.00
MAILMERGE (REQUIRES WORD STAR)	100.00
SPELLGUARD	239.00
CP/M PICKLES & TROUT FOR TRS-80 MOD II	175.00

### SUPPLIES

#### AVERY TABULABLES

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

#### UARCO PAPER (Prices F.O.B. S.P.)

9-1/2 x 11 18 lb white	29.00
14-7/8 x 11 18 lb white	39.00

We stock a complete line of computer covers, printer ribbons, print wheels & NEC thimbles. Call us for your needs.

### We built a reputation on our prices and your satisfaction.

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

We accept Visa and Master Card on all orders. COD accepted up to \$300.00. We also accept school purchase orders.

Please add \$2.00 for standard UPS shipping and handling on orders under 50 pounds, delivered in the continental U.S. Call us for shipping charges on items that weigh more than 50 pounds. Foreign, FPO and APO orders please add 15% for shipping. California residents add 6% sales tax.

**Alpha Byte<sup>®</sup> STORES**  
**(213) 883-8594**

31245 La Baya Drive, Westlake Village, California 91362

(or more), will be used for storing your documents that are being prepared, rather than storing the EXAMPLE file.

Once the backup composite working disks are prepared, operating with MICROPROOF is easy and rewarding — if you can say that having your mistakes highlighted is rewarding! You start by using the first disk (SCRIPSIT/MICROPROOF) in Drive 0 and the document disk in Drive 1. Of course, if you are working with a document in memory, this is not necessary. The normal SCRIPSIT video display appears at all times that you are word processing. A short command within SCRIPSIT is given and the display clears and states, "Insert Dictionary Disk..." Once this is completed, the document in memory is checked against the Dictionary — very quickly. A ten-page manuscript took about 30 seconds to check, at the end of which the screen displayed a list of words in tandem across the screen. While the check is occurring, one asterisk flashes very rapidly at the top right corner of the screen.

At this point some comment is in order regarding just what kind of words are checked and what words are displayed. The manual emphasizes that the words displayed are potential errors, and this is indeed so. I would rather be permitted, however, to check a suspicious word as it appears to MICROPROOF, than to have it omitted from the displayed list. Words that are truly not errors may be passed over quickly. It is even possible for some misspelled words not to appear. As pointed out in the manual, a word such as "inclosed" will not appear as a misspelling. (The manual uses this word for an example, implying that "inclosed" is misspelled, when actually it is an alternative spelling — but you get the idea.) The reason the word will not appear is that it is treated as two words in evaluation — "in" and "closed." If it was "incloesd" however, it would certainly be treated as an error.

MICROPROOF will also not display single letters, so it is possible that if the letter "s" had been typed where "2" should appear, then you have a non-displayed error — but note — not a misspelling.

Again as previously mentioned, some correctly spelled words may appear on this list. These will be mostly proper names, or abbreviations; for instance, "Maryellen," and "ASCII." If you want these correctly spelled words to be eliminated from future displays, you do have the option of placing them in DICT3.

MICROPROOF accepts hyphenated words too, including end-of-line hyphenations, although there can be exceptions to the latter, depending upon the word division. MICROPROOF considers them as two (or three — see "end-of-line" above), words, but divided words may not end up being Dictionary words.

Following the total display of all of the words that

have been excepted, an "Enter" brings up a new display. This display requests that you choose from one of the following:

- Correct the misspelled word
- Leave the word "as-is"
- Add the word to the Dictionary
- Exit

The word selected as "incorrect" is displayed and your response is awaited. One at a time, these are the words that were previously displayed across the screen. A word selected by the Dictionary as misspelled will appear in each instance that it is encountered within the document. The third choice above allows for a "coding" option. Selecting a code for a word when placing it in the Dictionary will permit suffixes to the word to be recognized when the Dictionary is again scanned.

After completing an entry as in the above, an "Enter" brings up the next word and choices, until the last word has been reviewed. You are then requested to insert your document disk, and your document is corrected in just a few seconds, with SCRIPSIT then displaying the document in its corrected form. You are now ready to print your document.

It is not necessary to wait for a word to appear in a "misspelled" list in order to add to the Dictionary. This may be done at any time the program is in operation. A good time to do this might be immediately before a word-processing session, when you know you will be using a number of abbreviations or proper names, which may be used also in future documents. The disk containing the program ADDTODIC is placed in Drive 0 and a formatted disk in Drive 1. Using the word processing program, a word is entered and coded (if desired), for suffix flagging. Each word is then "ENTERed." At the completion of your list, it is SAVED to the formatted disk in Drive 1. Returning to DOS, ADDTODIC is called, and a short series of commands ultimately results in having your new words included with your Dictionary disk. The statement, "Dictionary Expansion Completed," concludes the action. Although we discussed two-disk drive systems in the foregoing, single-drive users are assured that complete instructions for their guidance are also included in the manual. A not very important point — mostly because added words take so little space on a disk — but there seems to be no way to remove a word from the "personal" Dictionary, once it is created.

Note: The document may be processed with your word processing program without including MICROPROOF until proofing time. For familiarization, I practiced with some months-old SCRIPSIT files and turned up several unexpected typographical errors in a supposedly error-free document.

The manual comprises 25 single-sided pages on

Bond paper 8-1/2 by 11 inches, and is printed from electric typewriter or daisy wheel printer composition. The sheets are stapled, and are not pre-punched or otherwise bound. The manual was written by Richard Bidleman, and is very good indeed — the author is to be complimented on his excellent exposition. Writing style is succinct yet extremely informative, and has not one word that may be considered as computer jargon — thus making it valuable to persons not exposed to computer programming. Composition and layout are excellent, the examples are clear and concise, and significant use has been made of footnotes, which allows the reader to maintain a clear perspective on the item under discussion, without obfuscation.

The Introduction provides an excellent overview of the program and its intent. A very brief Quick Reference Guide can be used to get into operation immediately if desired, and for future reference. I notice that several program producers are commencing to include a section such as this, and think it should be encouraged. There is a great sense of accomplishment to be gained on the part of the purchaser if the program can be run at once, with the details to be looked at later — or never, if that is sufficient.

Yes, the manual is fine — it gets my rating of a 7 on a scale of 1 to 10. It would have been an 8, had it had a light card stock (or better) front and back cover of some sort, and had it been, perhaps, three-hole

punched. The cost of a program should dictate that the manual be a good document in all respects. By the way, there was one spelling error and one typographical error. (Sorry, Cornucopia! I couldn't let that go by.)

I had no problems loading or running this program whatsoever — what a nice change from many that are available! All functions occurred when they should, and as they should, in accordance with the sequences described in the manual.

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. The programs I am finding lately seem to be getting much better, and this is one of them — does this mean the less useful and poorly produced ones are falling away? I hope so.

- MICROPROOF, Cornucopia Software, P. O. Box 5028, Walnut Creek, California 94596.

- TRS-80 Model I/III \$125

- TRS-80 Model II \$200

- Optional Correcting Feature \$60

- Optional WP Conversion for SCRIPSIT  
or Electric Pencil \$35

This program is not inexpensive, but expense is relative when accuracy and speed in proofing lengthy documents is important. ■

## YOU CAN PICK THE WINNERS!

**PRO-FOOTBALL-PIX**, or PRO-PIX, is the culmination of over five years of development and use of a utility program to track the progress of the 28 professional U. S. football teams during the regular 224-game (16 weeks and 14 games per week) season. PRO-PIX made its public debut in 1980 under a slightly different name after extensive testing and was very successful, receiving many plaudits from users, and requests for a 1981 version. PRO-PIX is basically an updated version for 1981, with several subtle changes in presentation format. The prediction data has been modified slightly and information is included herein for updating the program for successive seasons.

PRO-PIX is designed for use on TRS-80 Models 1 & 3, APPLE II PLUS or APPLE II, with APPLESOFT in ROM, or ATARI 400/800 computers with at least 32K of memory. It will operate with data-handling to either Disk or Tape.

Features of PRO-PIX may be summarized as follows:

- List SCHEDULES by team or week of interest.
- List SCORES of all games played, by team or week.
- List current STANDINGS in division
- Show PREDICTIONS for games to be played, by team or week
- PRINT any screen that displays data.
- UPDATE the program by entering weekly scores.
- Set up a new SEASON



### PRO-PIX '81

By Talley-Ho Software  
APPLE conversion by Phillip Case  
ATARI conversion by Russ Wetmore

APPLE DISK (48K)	042-0127	\$24.95
ATARI 400/800 TAPE TO DISK	051-0127	\$19.95
TRS-80 TAPE Model 1 (16K) & 3 (32K)	010-0127	\$19.95
TRS-80 DISK Model 1 (32K) & 3 (32K)	012-0127	\$24.95



Adventure International • Box 3435 • Longwood, FL 32750  
A Division of Scott Adams, Inc.  
IN FLORIDA (305) 882-6917  
TOLL-FREE ORDER NUMBER: (800) 327-7172  
SHIPPING AND HANDLING CHARGES ARE EXTRA  
PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE



# STATIC ELECTRICITY and the MICROCOMPUTER

Dany J. Washington

One of the most annoying problems that programmers encounter when dumping programs onto cassette tapes is static electricity. After endless hours of saving (CSAVE) and verifying (CLOAD?) programs only to be rewarded with an improper (bad) dump, I searched the literature for suggestions on eliminating this electrostatic monster. Alas, the literature is scarce and sparse, and only superficially eludes the topic.

Since necessity is the mother of invention, I decided to tackle this problem actively by devising some strategies (mainly by trial and error) and observing their effects on this electrical phenomenon. In very quiet rooms the static electricity can be heard if you put your ear near the keyboard and video screen. There is a slight popping or crackling sound.

The following is a list of precautionary procedures, one or a combination of which will help eliminate or reduce static electricity:

1. Always verify your programs by using CLOAD? to make sure the program was recorded correctly (bit-by-bit). Static electricity usually affects saving programs, not loading.

2. Use microcomputers in rooms whose floors are bare (wood or tile). Most carpets are producers of static electricity.

3. If it is not practical to remove carpet from the microcomputer area, use rubber or plastic mats in the most widely walked areas.

4. Avoid wearing static-producing clothes near the microcomputer when saving programs, or use a static spray for clothes before programming or saving programs.

5. If it is economically feasible, it is a good idea to get a simple instrument that measures humidity and temperature. Humidity is the best indication of days that are static prone. The ideal humidity is 50% or more. If it is below 40%, beware!

6. Static electricity can affect not only magnetic cassette tapes, but also the computer's memory. It can also cause the computer to "lock up". A simple electroscope brought between the keyboard and the video screen also detects static electricity and can be an inexpensive detective in finding the culprit.

7. In very dry climates or during certain seasons, a

small room humidifier is helpful in reducing static electricity. However, most humidifiers are costly and are not needed continuously.

Although I have given you a list of the most conventional methods used for combatting electrostatic bad dumps, there are still some inexpensive household remedies that I have found to be most effective. The following list contains some practical solutions if the electrostatic monster raises its ugly head:

1. One of the greatest producers of static electricity is the video screen. When saving a program, turn the video off and depend on the cassette light, cassette counter or the cassette clicking sound indicating the dumping is completed. You can turn the video screen back on for verifying (CLOAD?) or depend on your cassette recorder's counter for proof.

2. On low-humidity days always destaticize your clothes before saving a program. Spray your clothes or ground your body by touching a metal object such as a door knob.

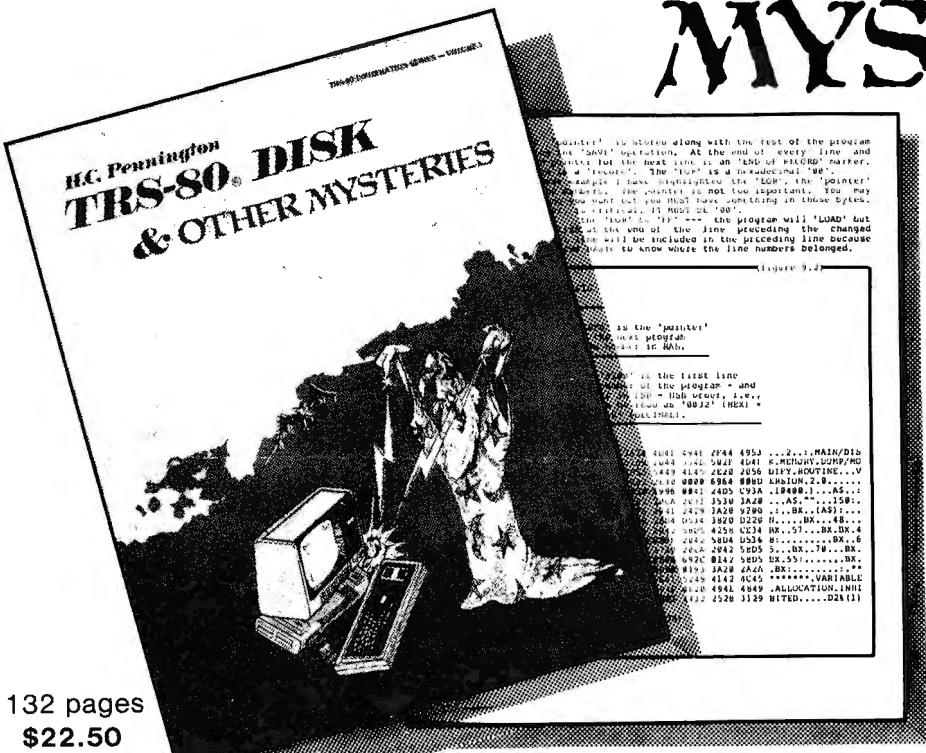
3. Placing the cassette recorder on a sheet of Bounce fabric softener (or some comparable brand) also helps to attract static away from the cassette recorder and tapes.

4. Radio Shack produces a cassette tape called Realistic which is half the price of its Microcomputer tape and performs just as well on microcomputers. However, Realistic tape is affected more by static electricity, so make sure you have low static before using it.

I am sure that the experienced programmer knows all of these tricks of the trade. However, no one has stated them all for the novice. If these precautions and solutions seem too much of a bother, the ultimate solution is to buy a disk system, which is not as sensitive to static electricity.

Dany J. Washington  
Professor of Science Education  
Passaic County Community College  
College Boulevard  
Paterson, NJ 07509 ■

'.. this is not only a worthwhile book but a great book. My advice is to get it and USE it!' - William Barden Jr.



132 pages  
\$22.50

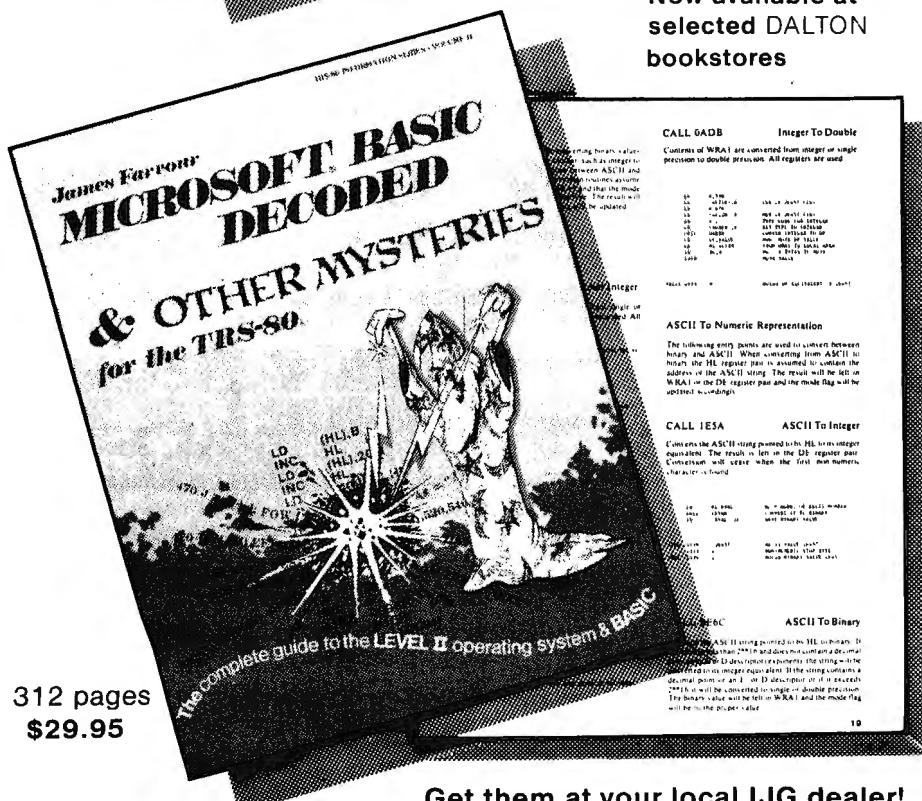
# OTHER MYSTERIES

**TRS-80 Disk and Other Mysteries** is the definitive fixit book for disk users. Written by Harvard Pennington it has more than 130 pages of easy to read, entertaining and immensely useful information - find out how to recover disk files, the layout of information on the disk, memory maps, problem solutions . . . the list goes on!

Many readers have saved days of work by recovering files that had been unreadable. Now in its fourth updated printing, **TRS-80 Disk and Other Mysteries** has been getting rave reviews in several magazines. Yours for only \$22.50 (plus \$1.50 shipping, CA residents please add \$1.35 sales tax).

**Microsoft BASIC Decoded and Other Mysteries** is the complete guide to your Level II ROMs. With over seven thousand lines of comments and 6 additional chapters packed with information, this is easily the biggest, and best, book about the Level II ROMs available.

Exploit the full power of Microsoft BASIC, with the aid of more than 300 pages of tested examples, understandable explanations and detailed comments. Now available in a revised second printing, only \$29.95 (plus \$2.00 shipping, CA residents add \$1.80 sales tax).



312 pages  
\$29.95

Now available at  
selected DALTON  
bookstores

CALL GADB      Integer To Double  
Comments of WRA1 are converted from integer or single precision to double precision. All registers are used.

```
LD    1000    LD    1000
    A=0      A=0
    B=0      B=0
    C=0      C=0
    D=0      D=0
    E=0      E=0
    F=0      F=0
    G=0      G=0
    H=0      H=0
    I=0      I=0
    J=0      J=0
    K=0      K=0
    L=0      L=0
    M=0      M=0
    N=0      N=0
    O=0      O=0
    P=0      P=0
    Q=0      Q=0
    R=0      R=0
    S=0      S=0
    T=0      T=0
    U=0      U=0
    V=0      V=0
    W=0      W=0
    X=0      X=0
    Y=0      Y=0
    Z=0      Z=0
    A1=0     A1=0
    B1=0     B1=0
    C1=0     C1=0
    D1=0     D1=0
    E1=0     E1=0
    F1=0     F1=0
    G1=0     G1=0
    H1=0     H1=0
    I1=0     I1=0
    J1=0     J1=0
    K1=0     K1=0
    L1=0     L1=0
    M1=0     M1=0
    N1=0     N1=0
    O1=0     O1=0
    P1=0     P1=0
    Q1=0     Q1=0
    R1=0     R1=0
    S1=0     S1=0
    T1=0     T1=0
    U1=0     U1=0
    V1=0     V1=0
    W1=0     W1=0
    X1=0     X1=0
    Y1=0     Y1=0
    Z1=0     Z1=0
    A2=0     A2=0
    B2=0     B2=0
    C2=0     C2=0
    D2=0     D2=0
    E2=0     E2=0
    F2=0     F2=0
    G2=0     G2=0
    H2=0     H2=0
    I2=0     I2=0
    J2=0     J2=0
    K2=0     K2=0
    L2=0     L2=0
    M2=0     M2=0
    N2=0     N2=0
    O2=0     O2=0
    P2=0     P2=0
    Q2=0     Q2=0
    R2=0     R2=0
    S2=0     S2=0
    T2=0     T2=0
    U2=0     U2=0
    V2=0     V2=0
    W2=0     W2=0
    X2=0     X2=0
    Y2=0     Y2=0
    Z2=0     Z2=0
    A3=0     A3=0
    B3=0     B3=0
    C3=0     C3=0
    D3=0     D3=0
    E3=0     E3=0
    F3=0     F3=0
    G3=0     G3=0
    H3=0     H3=0
    I3=0     I3=0
    J3=0     J3=0
    K3=0     K3=0
    L3=0     L3=0
    M3=0     M3=0
    N3=0     N3=0
    O3=0     O3=0
    P3=0     P3=0
    Q3=0     Q3=0
    R3=0     R3=0
    S3=0     S3=0
    T3=0     T3=0
    U3=0     U3=0
    V3=0     V3=0
    W3=0     W3=0
    X3=0     X3=0
    Y3=0     Y3=0
    Z3=0     Z3=0
    A4=0     A4=0
    B4=0     B4=0
    C4=0     C4=0
    D4=0     D4=0
    E4=0     E4=0
    F4=0     F4=0
    G4=0     G4=0
    H4=0     H4=0
    I4=0     I4=0
    J4=0     J4=0
    K4=0     K4=0
    L4=0     L4=0
    M4=0     M4=0
    N4=0     N4=0
    O4=0     O4=0
    P4=0     P4=0
    Q4=0     Q4=0
    R4=0     R4=0
    S4=0     S4=0
    T4=0     T4=0
    U4=0     U4=0
    V4=0     V4=0
    W4=0     W4=0
    X4=0     X4=0
    Y4=0     Y4=0
    Z4=0     Z4=0
    A5=0     A5=0
    B5=0     B5=0
    C5=0     C5=0
    D5=0     D5=0
    E5=0     E5=0
    F5=0     F5=0
    G5=0     G5=0
    H5=0     H5=0
    I5=0     I5=0
    J5=0     J5=0
    K5=0     K5=0
    L5=0     L5=0
    M5=0     M5=0
    N5=0     N5=0
    O5=0     O5=0
    P5=0     P5=0
    Q5=0     Q5=0
    R5=0     R5=0
    S5=0     S5=0
    T5=0     T5=0
    U5=0     U5=0
    V5=0     V5=0
    W5=0     W5=0
    X5=0     X5=0
    Y5=0     Y5=0
    Z5=0     Z5=0
    A6=0     A6=0
    B6=0     B6=0
    C6=0     C6=0
    D6=0     D6=0
    E6=0     E6=0
    F6=0     F6=0
    G6=0     G6=0
    H6=0     H6=0
    I6=0     I6=0
    J6=0     J6=0
    K6=0     K6=0
    L6=0     L6=0
    M6=0     M6=0
    N6=0     N6=0
    O6=0     O6=0
    P6=0     P6=0
    Q6=0     Q6=0
    R6=0     R6=0
    S6=0     S6=0
    T6=0     T6=0
    U6=0     U6=0
    V6=0     V6=0
    W6=0     W6=0
    X6=0     X6=0
    Y6=0     Y6=0
    Z6=0     Z6=0
    A7=0     A7=0
    B7=0     B7=0
    C7=0     C7=0
    D7=0     D7=0
    E7=0     E7=0
    F7=0     F7=0
    G7=0     G7=0
    H7=0     H7=0
    I7=0     I7=0
    J7=0     J7=0
    K7=0     K7=0
    L7=0     L7=0
    M7=0     M7=0
    N7=0     N7=0
    O7=0     O7=0
    P7=0     P7=0
    Q7=0     Q7=0
    R7=0     R7=0
    S7=0     S7=0
    T7=0     T7=0
    U7=0     U7=0
    V7=0     V7=0
    W7=0     W7=0
    X7=0     X7=0
    Y7=0     Y7=0
    Z7=0     Z7=0
    A8=0     A8=0
    B8=0     B8=0
    C8=0     C8=0
    D8=0     D8=0
    E8=0     E8=0
    F8=0     F8=0
    G8=0     G8=0
    H8=0     H8=0
    I8=0     I8=0
    J8=0     J8=0
    K8=0     K8=0
    L8=0     L8=0
    M8=0     M8=0
    N8=0     N8=0
    O8=0     O8=0
    P8=0     P8=0
    Q8=0     Q8=0
    R8=0     R8=0
    S8=0     S8=0
    T8=0     T8=0
    U8=0     U8=0
    V8=0     V8=0
    W8=0     W8=0
    X8=0     X8=0
    Y8=0     Y8=0
    Z8=0     Z8=0
    A9=0     A9=0
    B9=0     B9=0
    C9=0     C9=0
    D9=0     D9=0
    E9=0     E9=0
    F9=0     F9=0
    G9=0     G9=0
    H9=0     H9=0
    I9=0     I9=0
    J9=0     J9=0
    K9=0     K9=0
    L9=0     L9=0
    M9=0     M9=0
    N9=0     N9=0
    O9=0     O9=0
    P9=0     P9=0
    Q9=0     Q9=0
    R9=0     R9=0
    S9=0     S9=0
    T9=0     T9=0
    U9=0     U9=0
    V9=0     V9=0
    W9=0     W9=0
    X9=0     X9=0
    Y9=0     Y9=0
    Z9=0     Z9=0
    A10=0    A10=0
    B10=0    B10=0
    C10=0   C10=0
    D10=0   D10=0
    E10=0   E10=0
    F10=0   F10=0
    G10=0   G10=0
    H10=0   H10=0
    I10=0   I10=0
    J10=0   J10=0
    K10=0   K10=0
    L10=0   L10=0
    M10=0  M10=0
    N10=0  N10=0
    O10=0  O10=0
    P10=0  P10=0
    Q10=0  Q10=0
    R10=0  R10=0
    S10=0  S10=0
    T10=0  T10=0
    U10=0  U10=0
    V10=0  V10=0
    W10=0  W10=0
    X10=0  X10=0
    Y10=0  Y10=0
    Z10=0  Z10=0
    A11=0    A11=0
    B11=0    B11=0
    C11=0   C11=0
    D11=0   D11=0
    E11=0   E11=0
    F11=0   F11=0
    G11=0   G11=0
    H11=0   H11=0
    I11=0   I11=0
    J11=0   J11=0
    K11=0   K11=0
    L11=0   L11=0
    M11=0  M11=0
    N11=0  N11=0
    O11=0  O11=0
    P11=0  P11=0
    Q11=0  Q11=0
    R11=0  R11=0
    S11=0  S11=0
    T11=0  T11=0
    U11=0  U11=0
    V11=0  V11=0
    W11=0  W11=0
    X11=0  X11=0
    Y11=0  Y11=0
    Z11=0  Z11=0
    A12=0    A12=0
    B12=0    B12=0
    C12=0   C12=0
    D12=0   D12=0
    E12=0   E12=0
    F12=0   F12=0
    G12=0   G12=0
    H12=0   H12=0
    I12=0   I12=0
    J12=0   J12=0
    K12=0   K12=0
    L12=0   L12=0
    M12=0  M12=0
    N12=0  N12=0
    O12=0  O12=0
    P12=0  P12=0
    Q12=0  Q12=0
    R12=0  R12=0
    S12=0  S12=0
    T12=0  T12=0
    U12=0  U12=0
    V12=0  V12=0
    W12=0  W12=0
    X12=0  X12=0
    Y12=0  Y12=0
    Z12=0  Z12=0
    A13=0    A13=0
    B13=0    B13=0
    C13=0   C13=0
    D13=0   D13=0
    E13=0   E13=0
    F13=0   F13=0
    G13=0   G13=0
    H13=0   H13=0
    I13=0   I13=0
    J13=0   J13=0
    K13=0   K13=0
    L13=0   L13=0
    M13=0  M13=0
    N13=0  N13=0
    O13=0  O13=0
    P13=0  P13=0
    Q13=0  Q13=0
    R13=0  R13=0
    S13=0  S13=0
    T13=0  T13=0
    U13=0  U13=0
    V13=0  V13=0
    W13=0  W13=0
    X13=0  X13=0
    Y13=0  Y13=0
    Z13=0  Z13=0
    A14=0    A14=0
    B14=0    B14=0
    C14=0   C14=0
    D14=0   D14=0
    E14=0   E14=0
    F14=0   F14=0
    G14=0   G14=0
    H14=0   H14=0
    I14=0   I14=0
    J14=0   J14=0
    K14=0   K14=0
    L14=0   L14=0
    M14=0  M14=0
    N14=0  N14=0
    O14=0  O14=0
    P14=0  P14=0
    Q14=0  Q14=0
    R14=0  R14=0
    S14=0  S14=0
    T14=0  T14=0
    U14=0  U14=0
    V14=0  V14=0
    W14=0  W14=0
    X14=0  X14=0
    Y14=0  Y14=0
    Z14=0  Z14=0
    A15=0    A15=0
    B15=0    B15=0
    C15=0   C15=0
    D15=0   D15=0
    E15=0   E15=0
    F15=0   F15=0
    G15=0   G15=0
    H15=0   H15=0
    I15=0   I15=0
    J15=0   J15=0
    K15=0   K15=0
    L15=0   L15=0
    M15=0  M15=0
    N15=0  N15=0
    O15=0  O15=0
    P15=0  P15=0
    Q15=0  Q15=0
    R15=0  R15=0
    S15=0  S15=0
    T15=0  T15=0
    U15=0  U15=0
    V15=0  V15=0
    W15=0  W15=0
    X15=0  X15=0
    Y15=0  Y15=0
    Z15=0  Z15=0
    A16=0    A16=0
    B16=0    B16=0
    C16=0   C16=0
    D16=0   D16=0
    E16=0   E16=0
    F16=0   F16=0
    G16=0   G16=0
    H16=0   H16=0
    I16=0   I16=0
    J16=0   J16=0
    K16=0   K16=0
    L16=0   L16=0
    M16=0  M16=0
    N16=0  N16=0
    O16=0  O16=0
    P16=0  P16=0
    Q16=0  Q16=0
    R16=0  R16=0
    S16=0  S16=0
    T16=0  T16=0
    U16=0  U16=0
    V16=0  V16=0
    W16=0  W16=0
    X16=0  X16=0
    Y16=0  Y16=0
    Z16=0  Z16=0
    A17=0    A17=0
    B17=0    B17=0
    C17=0   C17=0
    D17=0   D17=0
    E17=0   E17=0
    F17=0   F17=0
    G17=0   G17=0
    H17=0   H17=0
    I17=0   I17=0
    J17=0   J17=0
    K17=0   K17=0
    L17=0   L17=0
    M17=0  M17=0
    N17=0  N17=0
    O17=0  O17=0
    P17=0  P17=0
    Q17=0  Q17=0
    R17=0  R17=0
    S17=0  S17=0
    T17=0  T17=0
    U17=0  U17=0
    V17=0  V17=0
    W17=0  W17=0
    X17=0  X17=0
    Y17=0  Y17=0
    Z17=0  Z17=0
    A18=0    A18=0
    B18=0    B18=0
    C18=0   C18=0
    D18=0   D18=0
    E18=0   E18=0
    F18=0   F18=0
    G18=0   G18=0
    H18=0   H18=0
    I18=0   I18=0
    J18=0   J18=0
    K18=0   K18=0
    L18=0   L18=0
    M18=0  M18=0
    N18=0  N18=0
    O18=0  O18=0
    P18=0  P18=0
    Q18=0  Q18=0
    R18=0  R18=0
    S18=0  S18=0
    T18=0  T18=0
    U18=0  U18=0
    V18=0  V18=0
    W18=0  W18=0
    X18=0  X18=0
    Y18=0  Y18=0
    Z18=0  Z18=0
    A19=0    A19=0
    B19=0    B19=0
    C19=0   C19=0
    D19=0   D19=0
    E19=0   E19=0
    F19=0   F19=0
    G19=0   G19=0
    H19=0   H19=0
    I19=0   I19=0
    J19=0   J19=0
    K19=0   K19=0
    L19=0   L19=0
    M19=0  M19=0
    N19=0  N19=0
    O19=0  O19=0
    P19=0  P19=0
    Q19=0  Q19=0
    R19=0  R19=0
    S19=0  S19=0
    T19=0  T19=0
    U19=0  U19=0
    V19=0  V19=0
    W19=0  W19=0
    X19=0  X19=0
    Y19=0  Y19=0
    Z19=0  Z19=0
    A20=0    A20=0
    B20=0    B20=0
    C20=0   C20=0
    D20=0   D20=0
    E20=0   E20=0
    F20=0   F20=0
    G20=0   G20=0
    H20=0   H20=0
    I20=0   I20=0
    J20=0   J20=0
    K20=0   K20=0
    L20=0   L20=0
    M20=0  M20=0
    N20=0  N20=0
    O20=0  O20=0
    P20=0  P20=0
    Q20=0  Q20=0
    R20=0  R20=0
    S20=0  S20=0
    T20=0  T20=0
    U20=0  U20=0
    V20=0  V20=0
    W20=0  W20=0
    X20=0  X20=0
    Y20=0  Y20=0
    Z20=0  Z20=0
    A21=0    A21=0
    B21=0    B21=0
    C21=0   C21=0
    D21=0   D21=0
    E21=0   E21=0
    F21=0   F21=0
    G21=0   G21=0
    H21=0   H21=0
    I21=0   I21=0
    J21=0   J21=0
    K21=0   K21=0
    L21=0   L21=0
    M21=0  M21=0
    N21=0  N21=0
    O21=0  O21=0
    P21=0  P21=0
    Q21=0  Q21=0
    R21=0  R21=0
    S21=0  S21=0
    T21=0  T21=0
    U21=0  U21=0
    V21=0  V21=0
    W21=0  W21=0
    X21=0  X21=0
    Y21=0  Y21=0
    Z21=0  Z21=0
    A22=0    A22=0
    B22=0    B22=0
    C22=0   C22=0
    D22=0   D22=0
    E22=0   E22=0
    F22=0   F22=0
    G22=0   G22=0
    H22=0   H22=0
    I22=0   I22=0
    J22=0   J22=0
    K22=0   K22=0
    L22=0   L22=0
    M22=0  M22=0
    N22=0  N22=0
    O22=0  O22=0
    P22=0  P22=0
    Q22=0  Q22=0
    R22=0  R22=0
    S22=0  S22=0
    T22=0  T22=0
    U22=0  U22=0
    V22=0  V22=0
    W22=0  W22=0
    X22=0  X22=0
    Y22=0  Y22=0
    Z22=0  Z22=0
    A23=0    A23=0
    B23=0    B23=0
    C23=0   C23=0
    D23=0   D23=0
    E23=0   E23=0
    F23=0   F23=0
    G23=0   G23=0
    H23=0   H23=0
    I23=0   I23=0
    J23=0   J23=0
    K23=0   K23=0
    L23=0   L23=0
    M23=0  M23=0
    N23=0  N23=0
    O23=0  O23=0
    P23=0  P23=0
    Q23=0  Q23=0
    R23=0  R23=0
    S23=0  S23=0
    T23=0  T23=0
    U23=0  U23=0
    V23=0  V23=0
    W23=0  W23=0
    X23=0  X23=0
    Y23=0  Y23=0
    Z23=0  Z23=0
    A24=0    A24=0
    B24=0    B24=0
    C24=0   C24=0
    D24=0   D24=0
    E24=0   E24=0
    F24=0   F24=0
    G24=0   G24=0
    H24=0   H24=0
    I24=0   I24=0
    J24=0   J24=0
    K24=0   K24=0
    L24=0   L24=0
    M24=0  M24=0
    N24=0  N24=0
    O24=0  O24=0
    P24=0  P24=0
    Q24=0  Q24=0
    R24=0  R24=0
    S24=0  S24=0
    T24=0  T24=0
    U24=0  U24=0
    V24=0  V24=0
    W24=0  W24=0
    X24=0  X24=0
    Y24=0  Y24=0
    Z24=0  Z24=0
    A25=0    A25=0
    B25=0    B25=0
    C25=0   C25=0
    D25=0   D25=0
    E25=0   E25=0
    F25=0   F25=0
    G25=0   G25=0
    H25=0   H25=0
    I25=0   I25=0
    J25=0   J25=0
    K25=0   K25=0
    L25=0   L25=0
    M25=0  M25=0
    N25=0  N25=0
    O25=0  O25=0
    P25=0  P25=0
    Q25=0  Q25=0
    R25=0  R25=0
    S25=0  S25=0
    T25=0  T25=0
    U25=0  U25=0
    V25=0  V25=0
    W25=0  W25=0
    X25=0  X25=0
    Y25=0  Y25=0
    Z25=0  Z25=0
    A26=0    A26=0
    B26=0    B26=0
    C26=0   C26=0
    D26=0   D26=0
    E26=0   E26=0
    F26=0   F26=0
    G26=0   G26=0
    H26=0   H26=0
    I26=0   I26=0
    J26=0   J26=0
    K26=0   K26=0
    L26=0   L26=0
    M26=0  M26=0
    N26=0  N26=0
    O26=0  O26=0
    P26=0  P26=0
    Q26=0  Q26=0
    R26=0  R26=0
    S26=0  S26=0
    T26=0  T26=0
    U26=0  U26=0
    V26=0  V26=0
    W26=0  W26=0
    X26=0  X26=0
    Y26=0  Y26=0
    Z26=0  Z26=0
    A27=0    A27=0
    B27=0    B27=0
    C27=0   C27=0
    D27=0   D27=0
    E27=0   E27=0
    F27=0   F27=0
    G27=0   G27=0
    H27=0   H27=0
    I27=0   I27=0
    J27=0   J27=0
    K27=0   K27=0
    L27=0   L27=0
    M27=0  M27=0
    N27=0  N27=0
    O27=0  O27=0
    P27=0  P27=0
    Q27=0  Q27=0
    R27=0  R27=0
    S27=0  S27=0
    T27=0  T27=0
    U27=0  U27=0
    V27=0  V27=0
    W27=0  W27=0
    X27=0  X27=0
    Y27=0  Y27=0
    Z27=0  Z27=0
    A28=0    A28=0
    B28=0    B28=0
    C28=0   C28=0
    D28=0   D28=0
    E28=0   E28=0
    F28=0   F28=0
    G28=0   G28=0
    H28=0   H28=0
    I28=0   I28=0
    J28=0   J28=0
    K28=0   K28=0
    L28=0   L28=0
    M28=0  M28=0
    N28=0  N28=0
    O28=0  O28=0
    P28=0  P28=0
    Q28=0  Q28=0
    R28=0  R28=0
    S28=0  S28=0
    T28=0  T28=0
    U28=0  U28=0
    V28=0  V28=0
    W28=0  W28=0
    X28=0  X28=0
    Y28=0  Y28=0
    Z28=0  Z28=0
    A29=0    A29=0
    B29=0    B29=0
    C29=0   C29=0
    D29=0   D29=0
    E29=0   E29=0
    F29=0   F29=0
    G29=0   G29=0
    H29=0   H29=0
    I29=0   I29=0
    J29=0   J29=0
    K29=0   K29=0
    L29=0   L29=0
    M29=0  M29=0
    N29=0  N29=0
    O29=0  O29=0
    P29=0  P29=0
    Q29=0  Q29=0
    R29=0  R29=0
    S29=0  S29=0
    T29=0  T29=0
    U29=0  U29=0
    V29=0  V29=0
    W29=0  W29=0
    X29=0  X29=0
    Y29=0  Y29=0
    Z29=0  Z29=0
    A30=0    A30=0
    B30=0    B30=0
    C30=0   C30=0
    D30=0   D30=0
    E30=0   E30=0
    F30=0   F30=0
    G30=0   G30=0
    H30=0   H30=0
    I30=0   I30=0
    J30=0   J30=0
    K30=0   K30=0
    L30=0   L30=0
    M30=0  M30=0
    N30=0  N30=0
    O30=0  O30=0
    P30=0  P30=0
    Q30=0  Q30=0
    R30=0  R30=0
    S30=0  S30=0
    T30=0  T30=0
    U30=0  U30=0
    V30=0  V30=0
    W30=0  W30=0
    X30=0  X30=0
    Y30=0  Y30=0
    Z30=0  Z30=0
    A31=0    A31=0
    B31=0    B31=0
    C31=0   C31=0
    D31=0   D31=0
    E31=0   E31=0
    F31=0   F31=0
    G31=0   G31=0
    H31=0   H31=0
    I31=0   I31=0
    J31=0   J31=0
    K31=0   K31=0
    L31=0   L31=0
    M31=0  M31=0
    N31=0  N31=0
    O31=0  O31=0
    P31=0  P31=0
    Q31=0  Q31=0
    R31=0  R31=0
    S31=0  S31=0
    T31=0  T31=0
    U31=0  U31=0
    V31=0  V31=0
    W31=0  W31=0
    X31=0  X31=0
    Y31=0  Y31=0
    Z31=0  Z31=0
    A32=0    A32=0
    B32=0    B32=0
    C32=0   C32=0
    D32=0   D32=0
    E32=0   E32=0
    F32=0   F32=0
    G32=0   G32=0
    H32=0   H32=0
    I32=0   I32=0
    J32=0   J32=0
    K32=0   K32=0
    L32=0   L32=0
    M32=0  M32=0
    N32=0  N32=0
    O32=0  O32=0
    P32=0  P32=0
    Q32=0  Q32=0
    R32=0  R32=0
    S32=0  S32=0
    T32=0  T32=0
    U32=0  U32=0
    V32=0  V32=0
    W32=0  W32=0
    X32=0  X32=0
    Y32=0  Y32=0
    Z32=0  Z32=0
    A33=0    A33=0
    B33=0    B33=0
    C33=0   C33=0
    D33=0   D33=0
    E33=0   E33=0
   
```

# COLOR COMPUTER CORNER

Joseph Rosenman

Radio Shack did it again. When the Model I first became available, no one dreamed that it would become as popular as it did. Indeed, I have no doubt that the entire future of home computers would have been quite different if Radio Shack had never entered the field. Once, the Model I was a small (and inexpensive) machine. Remember Level 1, 4K? Radio Shack managed to capitalize on the remarkable success of the Model I, and developed the Expansion Interface, disk, etc. The rest is history.

The newest member of the TRS-80 family is the Color Computer. Unconfirmed rumor has it that the sales of this computer have reached 6 digits — after less than a year! Further (unconfirmed) rumor has it, that a full scale Color Computer Expansion Interface is nearly (or is already) developed, and should be available some time next year. Because of the dramatic success of the Color Computer, **Computronics** has decided to include a section devoted to the Color Computer as a regular feature. In this monthly column, I will write about new developments related to this computer, along with some software reviews and (hopefully) some programs. I will also conduct a Question/Answer section about the Color Computer, so start writing! (Please state "Color Computer Question" on the envelope.)

The best place to begin is with a review of the 4K Color Computer. Like the Model I, the Color Computer comes with a "Level 1" and a "Level 2" configuration. In this case, the "Level 2" is called "Extended Color Basic". Next month, I will write about the Extended Basic. I expect that most of the future articles will focus on the larger Extended Basic configuration (unless there is a large and vocal group of Color Computer users with only regular Color Basic). The upgrade is relatively inexpensive, and significantly adds to the power of the machine. I expect that most users will either quickly purchase it or buy their machines with Extended Basic right from the start (by far the best idea).

## THE 4K COLOR COMPUTER

The Color Computer is a small and attractive unit. The physical cabinet measures only (about) 14 by 14.5 by 4 inches. Like the other TRS-80 microcomputers, this unit is encased in sturdy plastic. The Color Computer includes a cassette port, 2 joystick ports, a serial printer port (RS-232-C), and a ROM cartridge plug in area. There is no obvious Expansion Interface connection. There is also a connection jack for the video signal, and a switch to determine which channel will be used (3 or 4). Believe it or not, the video cable

is simply a standard RCA type audio cable (exactly like the kind you have on your home stereo system). In addition to the actual computer, the necessary documentation and the TV adapter for the computer are included. Considering the cost, not a bad bargain. There is a catch, however. (Isn't there always?) You must supply the TV. A 12 or 13 inch color TV works best. The good news is any standard TV will work. It is a simple switch of a lever to toggle between "computer display" and "normal television". What else is missing? Plenty! If you plan to do any programming, you must have a cassette recorder in order to store and retrieve programs that you write or buy from others. Radio Shack recommends their CTR-80 (of course). Actually, it is a good cassette and has proven itself very reliable with the TRS-80 computers. If you want a printer, you will need to plan for that expense as well. (Remember, it must be a serial printer, or a regular printer with a serial adapter.) The joysticks cost about \$25 for the pair. I believe all the Radio Shack ROM games require them (more on the ROMs later). The keyboard on the Color Computer is a little weird. The keyboard is arranged like a standard QWERTY keyboard but uses square buttons instead of keys. It takes some getting used to, but it does work. I suspect this design helps make the Color Computer dirt resistant. Speaking of cleanliness, don't forget to purchase a dust cover for your Color Computer. Radio Shack sells a good, strong, vinyl cover for only \$4.95 (a genuine bargain). The Color Computer also has lower case — well, sort of. The way lower case appears on the screen is in "reverse video" (usually green on black instead of black on green). If text is stored or printed, the lower case will appear the way it is supposed to.

The documentation that is included is frankly non-technical. For the beginner, this manual will take you from square 0 on up. For a more advanced user, the urge is to skim through it, and likely miss several important points. So, along with this review I will describe what I think are the most important differences from the Model I/III systems. For any readers who are new to the TRS-80's, the manual is the best place to begin.

The 4K machine contains just that: 4K (4096) bytes of memory. The ROM (Read Only Memory) that contains the Color Basic is 8K in size. The microprocessor used in the Color Computer is the Motorola 6809 (a 16 bit microcomputer). Along with the keyboard/computer, there is a TV modulator/interface box and cable. The Color Computer can work on either channel 3 or 4 and does not require a special TV. It is, however, advisable to select a small screen size (Radio

Shack suggests their 13 inch TV) in order to provide good video resolution. The cassette recorder is pretty much a requirement, since it is the only way a program can be saved short of typing it in each time you want to run it. As I describe the features and limitations of the Color Computer, bear in mind that many aspects of this BASIC are enhanced in the Extended Color version.

The video screen is 32 characters across by 16 lines. The Color Computer can produce nine distinct colors:

- |           |             |            |
|-----------|-------------|------------|
| 0) BLACK, | 1) GREEN,   | 2) YELLOW, |
| 3) BLUE,  | 4) RED,     | 5) BUFF,   |
| 6) CYAN,  | 7) MAGENTA, | 8) ORANGE  |

Text will appear black on a green background (or green on black if lower case). To get into lower case mode, type SHIFT-0. A second SHIFT-0 will return you to ALL CAPS mode. The Color Computer also has graphic blocks, where each block has four "quadrants". Any portion of the block can be set or reset, but you can't set different colors in the same block. Since the video screen is 32 by 16, the proper range of SETs and RESETs is 0-61 and 0-31. In addition, there is a color field in the command (0-8). To set a block red in the middle of the screen, type: SET(31,15,4).

A small technical aside: there are 16 different graphic blocks for each of the eight colors. Black is considered "OFF".  $16 \times 8 = 128$ ; it just so happens that all the ASCII codes from 129 to 256 are reserved for graphic blocks (a total of 128 codes). The 16 codes for GREEN are numbered 129-143, for YELLOW they are 144-159, etc. If you try to SET different parts of the same block to different colors, the "SET" portions will all be converted to the most recent color (i.e. the color of the current SET).

Now, what about these ROMS? Are they a new kind of mantra? No, ROM stands for Read Only Memory. A ROM is an Integrated Circuit (IC) containing information that can't be erased or over-written, just read. Within your Color Computer, there are ROMs that give it its personality. Normally, the microprocessor (in this case the 6809) can't do a thing, because it doesn't know what to do. It knows how to do it, but not what to do. The ROM tells it what to do. In the hardware of the computer, there is a special circuit that tells the microprocessor where to begin execution whenever it is turned on. That place (or address) is the beginning of the Level 1 ROM. One of the first things the ROM will do is to clear the screen and announce itself, "Hello, I'm here and alive". It also checks to see whether it is an "Extended Basic" ROM or not. After it has finished starting (initialization), it waits for you to ask it something — that is, it tells the computer to accept input from the keyboard, store it in a buffer, and to "jump to the keyboard input interpreter" when the

enter key is pressed. When enter is pressed, it then looks at what you just typed in to see whether it can make sense of it or not. If it understands what you just typed in, it will execute it, or "Do whatever you asked". If it can't make sense out of what you typed in, it will display an error message and wait for you to type something else. The error message will indicate what it didn't understand in your request. Things you might ask the computer to do include the assignment of values to variables ( $A=23$  or  $B$="HI"$ ), the display of variables (PRINT A), the execution of functions (CLS or POKE), etc.

The Internal ROM makes a "computer system" out of the microprocessor. By adding additional internal ROMs, a system could be expanded. Of course, the original design must include a space for any additional ROMs. What Radio Shack did with the Color Computer was to provide a means for a special ROM to "temporarily" take over the computer's personality. If, upon power up, the internal ROM discovers that there is an external ROM plugged in, it will abandon its own power up procedures and direct the microprocessor to "go to the address of the external ROM, and do whatever it says". The external ROM could contain anything. For the moment, all that is available are games and a memory test utility. What are the advantages of cartridges (over cassette or diskette)? They are very simple to use, they can't be erased, they are permanent (the media doesn't wear out the way cassettes and diskettes do), and they are hard to duplicate. What are the disadvantages? They are expensive, the storage capacity is limited, and (ironically) they are hard to duplicate. Personally, I suspect that one of the reasons that Radio Shack opted for the ROM cartridge was to "strongly discourage" software pirating. Since accidental erasure of the program is nearly impossible, the legitimate reasons for backups have been mostly eliminated. They also are easier to use, and a large number of Color Computer users are novices in the computer field.

The Color Computer Basic includes several new commands, and variants on familiar commands. What follows is a description of some of these new commands. Color Computer Basic supports only single precision or string variables. Both the integer and double precision type are not supported. (There is an INT function, however.) The largest value the computer can handle is  $(ABS(X)>IE38)$ .

**AUDIO:** This command can route the audio output of the cassette to the television speaker. Options are ON and OFF.

**CLEAR:** This command serves two functions. It reserves string space, and sets a high memory limit.

**CLOADM:** This command permits the loading of

continued on page 38

# EPSON MX-70: A USER'S EVALUATION

Brett A. McAlister

It was February when I learned that I was going to have a large enough income tax return to purchase a modest printer. It was going to have to be quite modest though — no more than \$500.00. Since I had a bit of a wait to receive my check, I thought that I might do well to make myself a shopping list and look around. My shopping list was nothing other than a list of features that I wanted on my printer. For instance, a 5X7 dot matrix would be fine for my modest needs, though I insisted on having both upper and lower case letters. I wanted to have good control of the printer via my software, and I felt that the line length must be at least 80 characters. A friction feed and tractor feed would be nice, so that I could use inexpensive roll paper as well as have the ability to print mailing labels for my Christmas cards. I felt that the best interface method was parallel (it's also less expensive than RS-232). The manufacturer would have to be fairly reputable, and repair facilities easily accessible. Above all, the price would have to be less than \$500.00.

With this list in hand I took to the magazines and journals and read hundreds of advertisements. Many printers had all of the qualities that I wanted and then some — EXCEPT THE PRICE! Of those that fit my price range, the Epson MX-70 seemed to fit the best. 5X7 dot matrix: check. Upper and lower case: check. 80 Characters per line: check. Parallel interface: check. Adjustable tractor feed but no friction feed: well, semi-check. Epson is a well known manufacturer of the MX-80, a fairly high quality printer. The ads didn't say much about software control except that it has "programmable line feed and form lengths." The cost is less than \$450.00: SUPER CHECK. But that's not all! This so-called bare bones printer includes a self test function, a low cost easily replaceable print head and a high resolution graphics mode that isn't even available on the MX-80. I knew that this was my printer.

I decided to go down to the local computer store and get a look at this wonder. Guess what? They had never heard of the MX-70! "MX-80? Sure, we carry them. How many would you like?" After I showed them the ads in their magazines, they realized that such a printer did exist. I asked them to check on the availability and price. They said they would. Since I am the impatient type, I didn't look into the mailorder route. About three weeks later I went back to the store and they had MX-70 printers all over the place. It seems as if they couldn't keep enough on hand. I don't think that finding one is going to be a problem for anyone who wants to buy an MX-70.

After a few more weeks (seemed like years) of hovering around the mail box, the check came. Within

hours I had the MX-70 in the back of my car. Since I bought it off the shelf and didn't want to wait for a cable for my TRS-80 Model I without expansion interface (I don't even know if Epson makes a cable to fit this configuration), I stopped by the Radio Shack store and bought their Printer Interface Cable (cat. No. 26-1411). Now I'm set.

Upon getting home, I immediately began unpacking my MX-70. After emptying the box, I found that I had a Printer, an operation manual, a paper separator and a ribbon cartridge. The printer is housed in a brownish-mustard colored high impact plastic case. It has a clear grey smoked cover over the carriage so that you can see what is being printed while the noise is kept down. On the top right front there is a small panel that has a power paper feed button and a small pilot light. There is also a typewriter style manual paper feed knob on the right side. The power switch is well out of the way near the back on the right side. I noticed that the printer could be operated with its left side up against another piece of equipment, since all of the controls are on the right. A nice piece of planning.

The operation manual seemed to be a bit small when compared to other such manuals that I have seen. It measures 6 3/4" by 8" and contains only 35 pages. It is divided into 5 parts: (1) introduction, (2) specifications, (3) installation, (4) operation and (5) maintenance.

The paper separator is used to keep the incoming paper from fouling with the outgoing paper. It is constructed of welded wire with a plastic roller. It mounts easily in holes in the printer housing.

The ribbon cartridge is labelled "long lasting" and installs very easily with no mess. I haven't tried to find a new cartridge as yet so I don't know how much of a problem that might be.

The initial setup is very easy and well explained in the operation manual. The manual has excellent illustrations to help you along the way, and even the least mechanically inclined should have no problems here. When you have completed the setup you are not yet connected to the computer. However, you can perform the print test now. Merely hold down the FEED button while you turn on the power and the printer continuously prints its entire list of characters. To stop the test, you must turn off the power.

Now comes the interface with the TRS-80. I plugged in the Printer Interface Cable (which has a little black box containing the circuitry to drive the printer) into the back of the keyboard assembly. When I tried to plug the other end into the printer, I found that the cable retaining clip on one side of the socket would

not move far enough out of the way. This was easy to solve. I removed the clip. The plug then went right into the socket. Now for power and I'm on my merry way. NOTHING HAPPENS!! After rechecking all connections and reading the operation manual as well as the book that comes with the cable, I find that the little black box needs +5 vdc on pin # 35 of it's edgecard output. I also note that the ribbon cable has only 34 lines. Looking again at the cable book, it says that the printer must supply +5 vdc to the black box. Via a phone call to Epson, I found that if I used the printer to supply the +5 vdc, I would void my warranty. Luckily, I just happen to have a +5 vdc power supply. After hooking it up, it worked.

In the text mode, the MX-70 prints the 96 character ASCII set. Like most printers, the up arrow used for exponentiation is printed as a left bracket. There are two character formats: 80 characters per line and 40 characters per line. In the 80 character format, the characters are printed using a 5X7 dot matrix. In the 40 character format, the characters are printed double width with a 10X7 dot matrix. I didn't need to worry about software control of the printer. You have complete control with the exception of turning the power on and off.

Here is a short summary of the commands:

Carriage return.....CHR\$(13)

Also performs a line feed on TRS-80

Line feed.....CHR\$(10)

Form feed.....CHR\$(12)

Advances paper to top of form. Form length is set by the next command.

Form length.....CHR\$(27);CHR\$(67);CHR\$(n)

n = length of the form in lines

Max n = 127

Normal line is 1/6 inch but can be set at multiples of 1/72 inch.

Line spacing.....CHR\$(27);CHR\$(65);CHR\$(n)  
n = number of 1/72 inch increments

Max n = 85

Return line spacing to 1/6 inch

... CHR\$(27);CHR\$(50)

Print expanded characters.....CHR\$(14)

Stays in expanded character format until a return to standard character format command is received or a carriage return is executed.

Return to standard character format...CHR\$(20)

Also....CHR\$(27);CHR\$(14)

Automatic upon a carriage return. Permits mixing expanded and standard characters on the same line.

The printer will operate properly with every TRS-80 print command except the PRINT "at" command.

The graphics mode is called the "Bit Image Mode" in the manual. While in this mode, every byte sent to the printer defines which dots of a vertical column of eight dots will be printed. The horizontal spacing of the dots is 1/60 inch and the vertical spacing is 1/72 inch. Since the graphics command specifies how many bytes is to be printed in the graphics mode. The opportunity exists for graphics and text to be intermingled. The truth is that it takes quite a bit of practice to perfect the technique. The command to enter the graphics mode is

CHR\$(27);CHR\$(75);CHR\$(n1);CHR\$(n2)

where n1 and n2 define the number of bytes to be printed in the graphics mode. N1 = the low order byte and n2 = the high order byte. You determine these numbers the same way you do the address that you poke into memory prior to a USR call with LEVEL II BASIC (see chapter eight in your LEVEL II manual). The max number of dots per line and the largest number you can define with n1 and n2 is 480. There is one

*continued on page 38*



Unique Software 700 Executive Plaza Bldg. Fort Worth, Texas 76102

## CONVERT<sup>©</sup>

### Basic from Model I to Model II

Radio Shack\* provides a means to transfer programs. Now Unique Software provides a means to CONVERT them. PRINT @,CMD, some PEEK, even SET & RESET, and more are rewritten for execution on a Model II. What CONVERT cannot rewrite, will be listed by type of error and line number. (Available on formatted disk)

Price includes postage & handling Texas residents add 5% sales tax.

Model I disk ... \$19.95 Model II disk . \$24.95

1981 Unique Software

\*Radio Shack is a division of Tandy Corp. & not affiliated with Unique Software

## GRAPHIT

### Don't Settle for Less

With your Daisy Wheel Printer II & your Model I don't settle for distorted hardcopy of graphics on your \$1960 linewriter. Merge "Graphit" with **any** Basic program & GOSUB64000 to reproduce characters **and** graphics in their exact proportions. "Graphit" works with **any** Model I L2 setup and uses only 414 bytes of memory. Instructions for merging cassette to program in memory included. (Send SASE for examples.)

Cassette  
**\$9.95**

Formatted disk  
**\$11.95**

# MODEL III CORNER

## Hubert S. Howe, Jr.

### Some Details about Model III Disks

We have still not verified whether some of the Model IIIs already shipped by Radio Shack actually have double-sided disk drives, but we have spent some time investigating other aspects of the Model III disk system. The Model III's disk controller chip is the Western Digital 1793, which is one of the most powerful disk controllers yet made. It is capable of supporting double-sided drives as well as double density (which is standard). The standard disk drives are made by Tandon, and they have one of the fastest track seek times of any disk drives made. For this reason, Radio Shack employed these superfast seek times in its TRSDOS software, making it impossible to connect most other makes of disk drives to the Model III without employing an altered DOS. The only other original equipment manufacturer making disk drives that can be used on the Model III is MPI, whose drives are used in the Vista V-80 and others. (You might consider these for add-on drives.)

The disk controller is interfaced to the computer through I/O ports F0-F4 hexadecimal (240-244 decimal). These roughly correspond to locations 37E1 and 37EC through 37EF hexadecimal on the Model I. However, the Model III has some other aspects to its operation which we don't completely understand. Before you can output a value to these ports, you must "prepare" the bus by outputting a value to various other ports in the range E0-EC. Apparently some aspects of the Model III disk system are so flakey that the TRSDOS software has to make several attempts before completing an operation. This was also true on the Model I, but the number of times such retries were actually made was much smaller.

A new version of the DOS, TRSDOS 1.3, has recently been released, and it apparently corrects many errors that were in TRSDOS 1.1 and 1.2. Disk BASIC programmers will be happy to learn that variable files are fully operational now, although you must type, for example, "3V" in response to the question "How many files?" rather than "3,V" when entering BASIC. TRSDOS 1.3 also works correctly with the patched version of Apparat's EDTASM that has been described previously in this column. The August issue of Radio Shack's *TRS-80 Microcomputer News* details a few bugs in the first release of TRSDOS 1.3, but these are minor compared to the bugs in the other versions.

Through personal experience, we can verify that disk errors occur very frequently on the Model III. A Radio Shack repairman claimed that the disk drives

should be aligned every three to four months to insure proper operation. Disk alignment is a complicated procedure that must be carried out by a technician with an oscilloscope. It will cost you about \$50 at a Radio Shack repair center. One of the main reasons for the increased frequency of errors is that double density operations on 5-1/4 inch disks allow far less tolerance than single density. You must employ only the best diskettes and be very careful when handling them. Nevertheless, we suspect that there may also be bugs in the disk operating system, because, for one thing, we don't get as many errors when operating under DOSPLUS. We will continue to investigate these problems and report on them when we have any hard facts to disseminate.

This month our Crystal Ball Department reports on a board being developed by Lifeboat Associates that will enable standard CP/M to run on the Model III. It will also remap the ROM and will probably employ a larger number of sectors on each track of a diskette to provide an even greater storage capacity. We are also informed that this board will incorporate double sided operations if there is any way to achieve this on standard Model IIIs. When we get one of these boards, we will probably be able to investigate the characteristics of the disk system in even more detail, and to understand whether the increased errors are a result of the operating system or of faulty media or other causes.

### Consider a Model III for Business Applications

Another board being developed by Lifeboat will allow the video display to be changed from 16 lines by 64 characters to 24 lines by 80 characters, identical to the Model II. Apparently this is not a complicated modification, and Radio Shack must have considered this option when designing the Model III. We can imagine that there are at least two reasons why RS did not choose it. First, there is already much software developed for the Model I that employs the 16 by 64 screen, and this would immediately become obsolete. Second, it could possibly hurt the sales of the Model II. When you compare a Model III to a Model II, there is an immediate visual reason for preferring the Model II for professional or business applications. You can also run CP/M on the Model II.

When a Model III is enhanced by these boards from Lifeboat, it begins to compare very favorably to the

continued on page 39

# TECHNOLOGY!

## Who says it has to be expensive?

### Character Set

- upper and lower case
- 80 column plus double-wide print

### Ribbon

- long life cartridge ribbon \$9.95
- easy to change; no mess

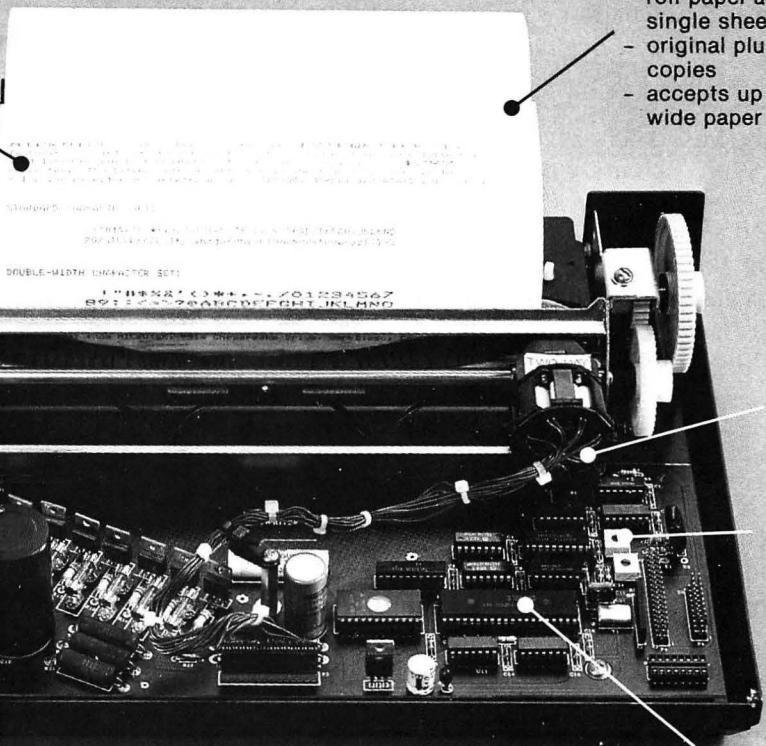
### Transformer

- heavy duty power transformer for longer life

\$299

### Price

- high quality printer for \$299.



### Paper

- roll paper and single sheet
- original plus 3 copies
- accepts up to 9½" wide paper

### Printhead

- 100 million characters \$29.95
- disposable
- 7 wire bi-directional impact matrix

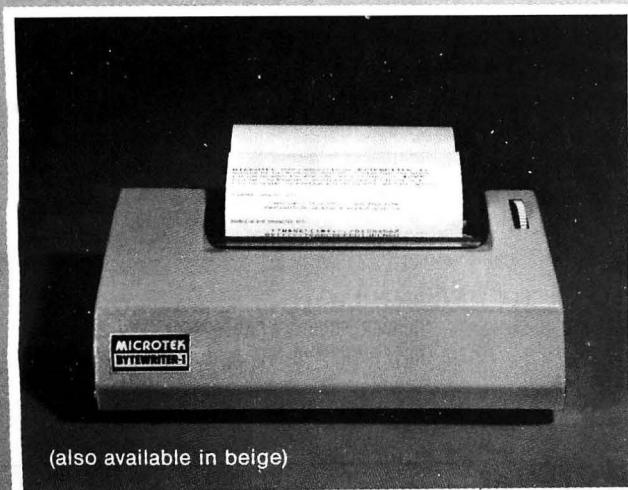
### Trimpot

- for fine adjusting of vertical alignment

### Controller

- state of the art single chip 8039 microprocessor

## BYTEWRITER-1



With a highly engineered circuit board and software program, backed by a rugged mechanism, the Bytewriter-1 makes no compromise with quality.

Call us for more information today — and be sure to ask us about our 30-day money-back guarantee.



Microtek, Inc.  
9514 Chesapeake Drive  
San Diego, CA 92123  
Tel. 714-278-0633  
Outside Calif. call  
toll free: 800-854-1081  
TWX. 910-335-1269

# FOUR BASIC PROGRAMS

Gordon Speer

## DETERMINANT OF ANY MATRIX

A reader in Florida has written a subroutine to find the determinant of any size matrix, which we recommend you add to the end of Chapter 6 in your Level-II BASIC Reference Manual, to go along with the matrix subroutines which are already there.

This is a method of solving a series of equations in a series of unknowns, such as might be involved in logistics, or PERT charts, or various economics applications.

He has added a set of sample data to the subroutine to illustrate the formatting of the equations, and the necessary steps in calling the routine and retrieving the results.

In this example the equations would read:

$$\begin{aligned} 7x + 6y + 3z &= 19 \\ 3x + 2y - z &= 7 \\ x + 4y + 2z &= -2 \end{aligned}$$

and if you solve them correctly you will find that x, y, and z have values of 4, -2, and 1.

As you might expect, as the matrices get larger the routine takes more time, but if you are patient it should be suitable for rather large problems. It was sent to me in compressed form, occupying only 13 lines of programming. I have expanded it to make it a little easier to read.

```
300 DATA 7,6,3,19
310 DATA 3,2,-1,7
320 DATA 1,4,2,-2
330 GOSUB 40100
340 PRINT "B1=B(1), "B2=B(2), "B3=B(3)
999 END
40100 'SUBROUTINE TO FIND THE DETERMINANT OF ANY MATRIX
40110 ' AUTHOR: J. T. CANFIELD, BARRY COLLEGE, MIAMI, FL 33161
40120 INPUT "NUMBER OF ROWS";NR
40130 DIM I(NR,NR+1), Q(NR+1), B(NR)
40140 FOR J=1 TO NR
40150 FOR K=1 TO NR+1 'ONE MORE COLUMN THAN NUMBER OF ROWS
40160 READ I(J,K)
40170 NEXT K
40180 NEXT J
40190 FOR NM=1 TO NR+1
40200 FOR N=1 TO NR
40210 LET Q=1
40220 LET C=N+1
40230 FOR R=1 TO NR
40240 LET C=C+1
40250 IF C > NR THEN LET C=C-NR
40260 IF C=NM-1 THEN LET C=NR+1
40270 LET Q=Q*I(R,C)
```

```
40280 IF C=NR+1 LET C=NM-1
40290 NEXT R
40300 LET Q(NM)=Q(NM)+Q
40310 NEXT N
40320 LET C=0
40330 FOR N=1 TO NR
40340 LET Q=1
40350 LET C=C+1
40360 FOR R=1 TO NR
40370 LET C=C-1
40380 IF C < 1 THEN LET C=C+NR
40390 IF C=NM-1 THEN LET C=NR+1
40400 LET Q=Q*I(R,C)
40410 IF C=NR+1 THEN LET C=NM-1
40420 NEXT R
40430 LET Q(NM)=Q(NM)-Q
40440 NEXT N
40450 NEXT NM
40460 FOR N=1 TO NR
40470 LET B(N)=Q(N+1)/Q(1)      'VALUE OF EACH VARIABLE
40480 NEXT N
40490 'AT THIS POINT THE VALUE OF EACH VARIABLE IS STORED AS B(N)
40500 RETURN
```

## ABUNDANT NUMBERS

In one of his books, Steven Rogowski has a problem for computer solution to find abundant, deficient and perfect numbers. He defines a number as abundant if the sum of all of the factors of the number, including 1, exceeds the number. Some numbers are so abundant their factors total more than twice the number. I expected the best ones to be 24 and 144, my favorites, and was surprised to find they weren't.

I didn't run this very long, but observed that abundant numbers all seem to be even numbers. Does anyone know whether there are any odd ones? We could try running the computer all night and looking for an odd, abundant number by starting with the number 1 and stepping by 2.

```
100 ' ABUNDANT
110 CLS
120 DEFINT N,F
130 PRINT "NUMBER","SUM OF FACTORS","RATIO"
140 LET N=N+1      'GENERATES NUMBERS
150 FOR F=1 TO N/2 'FACTORS
160 IF N/F <> INT(N/F) THEN 180   'EVENLY DIVISIBLE?
170 LET S=S+F      'SUM OF THE FACTORS
180 NEXT F
190 IF S < N THEN 210 'DEFICIENT
200 PRINT N,S/N     'NUMBER, SUM OF FACTORS, RATIO
210 LET S=0          'RESET THE SUM TO ZERO
220 GOTO 140
```

# DYNACOMP

*Quality software for\*:*

ATARI  
PET  
APPLE II Plus

TRS-80 (Level II)\*\*  
NORTH STAR  
CP/M Disks/Diskettes

## CARD GAMES

### BRIDGE 2.0 (Available for all computers)

An all-inclusive version of the most popular of card games. This program both BIDS and PLAYS either contract or duplicate bridge. Depending on the contract, your computer opponent will either play the offense OR defense. If you bid too high, the computer will double your contract! BRIDGE 2.0 provides challenging entertainment for advanced players and is an excellent learning tool for the bridge novice. See the software review in 80 Software Critique.

### HEARTS 1.5 (Available for all computers)

An exciting and entertaining computer version of this popular card game. Hearts is a trick-oriented game in which the purpose is not to take any hearts or the queen of spades. Play against two computer opponents who are armed with hard-to-beat playing strategies. HEARTS 1.5 is an ideal game for introducing the uninitiated (your spouse) to computers. See the software review in 80 Software Critique.

### POKER PARTY (Available for all computers)

POKER PARTY is a draw poker simulation based on the book, POKER, by Oswald Jacoby. This is the most comprehensive version available for microcomputers. The party consists of yourself and up to six other (computer) players. Each of these players (you will get to know them) has a different personality in the form of a varying propensity to bluff or fold under pressure. Practice with POKER PARTY before going to that expensive game tonight! Apple Cassette and diskette versions require a 32 K (or larger) Apple II.

### CRIBBAGE 2.0 (TRS-80 only)

This is simply the best cribbage game available. It is an excellent program for the cribbage player in search of a worthy opponent as well as for the novice wishing to improve his game. The graphics are superb and assembly language routines provide rapid execution. See the software review in 80 Software Critique.

## EDUCATION

### TEACHER'S PET I (Available for all computers)

This is the first of DYNACOMP's educational packages. Primarily intended for pre-school to grade 3, TEACHER'S PET provides the young student with counting practice, letter-word recognition and three levels of math skill exercises.

### MORSE CODE TRAINER (TRS-80 only)

MORSE CODE TRAINER is designed to develop and improve your speed and accuracy in deciphering Morse Code. As such, MCT is an ideal software package for FCC test practice. The code sound is obtained through the earpiece jack of any star cassette recorder. You may choose the pitch of the tones as well as the word rate. Also, various modes of operation are available including number, punctuation and alphabet tests, as well as the keying of your own message. A very effective way to learn code!

## THOUGHT PROVOKERS

### FLIGHT SIMULATOR (Available for all computers)

A realistic and extensive mathematical simulation of take-off, flight and landing. The program utilizes aerodynamic equations and the characteristics of a real aircraft. You can practice instrument approaches and navigation using radials and compass headings. The more advanced flyer can also perform loops, half-tucks and similar aerobatic maneuvers. Although this program does not employ graphics, it is exciting and very addictive. See the software review in COMPUTRONICS.

### VALDEZ (Available for all computers)

VALDEZ is a computer simulation of supertanker navigation in the Prince William Sound/Valdez Narrows region of Alaska. Included in this simulation is a realistic and extensive 236 x 256 element map, portions of which may be viewed using the ship's alphanumeric radar display. The motion of the ship itself is accurately modelled mathematically. The simulation also contains a model for the tidal patterns in the region, as well as other traffic (outgoing tankers and drifting icebergs). Chart your course from the Gulf of Alaska to Valdez Harbor! See the software review in 80 Software Critique.

### NOMINOS JIGSAW (Atari, Apple and TRS-80 only)

A jigsaw puzzle on your computer! Complete the puzzle by selecting your pieces from a table consisting of 60 different shapes. NOMINOS JIGSAW is a virtuous programming effort. The graphics are superlative and the puzzle will challenge you with its three levels of difficulty. Scoring is based upon the number of guesses taken and by the difficulty of the board set-up. The NOMINOS JIGSAW is available for TRS-80 color computer.

### CHESS MASTER (North Star and TRS-80 only)

This complete and very powerful program provides five levels of play. It includes castling, en passant captures and the promotion of pawns. Additionally, the board may be preset before the start of play, permitting the examination of "book" plays. To maximize execution speed, the program is written in assembly language (by SOFTWARE SPECIALISTS of California). Full graphics are employed in the TRS-80 version, and two widths of alphanumeric display are provided to accommodate North Star users.

### STAR TREK 3.2 (Available for all computers)

This is a classic Star Trek simulation, but with several new features: for example, the Klingons now shoot at the Enterprise without warning while also attacking starbases in other quadrants. The Klingons also attack with both light and heavy cruisers and move when shot at! The situation is hectic when the Enterprise is besieged by three heavy cruisers and a starbase S.O.S. is received! The Klingons get even! See the software reviews in A N A L O G, 80 Software Critique and Game Merchandising.

### GAMES PACK I (Available for all computers)

Price: \$10.95 Cassette/ \$14.95 Diskette  
GAMES PACK I contains the classic computer games of BI AY JACK, I UNAR LANDER, CRAPS, HORSE RACE, SWITCH and more. These games have been combined into one large program for ease in loading. They are individually accessed by a convenient menu. This collection is worth the price just for the DYNACOMP version of BI AY JACK.

### GAMES PACK II (Available for all computers)

Price: \$10.95 Cassette/ \$14.95 Diskette  
GAMES PACK II includes the games CRAZY EIGHTS, JOTTO, ACE-Y-DUCEY, LIFE, WUMPUS and others. As with GAMES PACK I, all the games are loaded as one program and are called from a menu. You will particularly enjoy DYNACOMP's version of CRAZY EIGHTS.

Why pay \$7.95 or more per program when you can buy a DYNACOMP collection for just \$10.95?

## STATISTICS and ENGINEERING

### DIGITAL FILTER (Available for all computers)

Price: \$19.95 Cassette/ \$23.95 Diskette  
DIGITAL FILTER is a comprehensive processing program which permits the user to design filter functions or choose from a menu of filter forms. The filter forms are subsequently converted into non-recursive convolution coefficients which permit rapid data processing. In the explicit design mode the shape of the frequency transfer function is specified by directly entering points along the desired filter curve. In the menu mode, ideal low pass, high pass and bandpass filters may be approximated to varying degrees according to the number of points used in the calculation. These filters may optionally also be smoothed. Butterworth and Chebyshev filters may be selected. Features of DIGITAL FILTER include plotting of the data before and after filtering, as well as display of the chosen filter function. Also included are convenient data storage, retrieval and editing procedures.

### FOURIER ANALYZER (Available for all computers)

Price: \$19.95 Cassette/ \$23.95 Diskette  
This is a special software package which may be used to evaluate the transfer functions of systems such as hi-fi amplifiers and filters by examining their response to pulsed inputs. TFA is a major modification of FOURIER ANALYZER and contains an engineering-oriented design versus log-frequency analysis as well as data scaling features. FOURIER ANALYZER is designed for educational and scientific use. TFA is an engineering tool. Available for all computers.

### HARMONIC ANALYZER (Available for all computers)

Price: \$24.95 Cassette/ \$28.95 Diskette  
HARMONIC ANALYZER is a program for the spectrum analysis of repetitive waveform. Features include data generation, adding and subtracting, removal of noise and data spline interpolation. One particularly unique facility is that the input data need not be equally spaced or in order. The original data is sorted and a cubic spline interpolation is used to create the data required by the FFT algorithm.

FOURIER ANALYZER; TFA and HARMONIC ANALYZER may be purchased together for a combined price of \$49.95 (three cassettes) and \$54.95 (three diskettes).

### REGRESSION I (Available for all computers)

Price: \$19.95 Cassette/ \$23.95 Diskette  
REGRESSION I is a unique and exceptionally versatile one-dimensional least squares "polynomial" curve fitting program. Features include very high accuracy, an automatic degree determination option, an extensive internal library of fitting functions, data editing, automatic data and curve plotting, a statistical analysis (eg. standard deviation, correlation coefficient, etc.) and much more. In addition, new fits may be tried without reentering the data. REGRESSION I is certainly the cornerstone of any data analysis software library.

### REGRESSION II (PARAFIT) (Available for all computers)

Price: \$19.95 Cassette/ \$23.95 Diskette  
PARAFIT is designed to handle those cases where the parameters are intended (possibly) to be linear. PARAFIT uses a unique polynomial form including the parameters (A1), (A2), etc. as a sum of m BASIC statement lines. Data and results may be manipulated and plotted as with REGRESSION I. Use REGRESSION I for polynomial fitting, and PARAFIT for those complicated functions.

### MULTILINEAR REGRESSION (MLR) (Available for all computers)

Price: \$24.95 Cassette/ \$28.95 Diskette  
MLR is a professional software package for analyzing data sets containing two or more linearly independent variables. Besides performing the basic regression calculation, the program also provides easy to use data entry, storage, retrieval and editing functions. In addition, the user may interrogate the solution by supplying values for the independent variables. The number of variables and data size is limited only by the available memory.

REGRESSION I, II and MULTILINEAR REGRESSION may be purchased together for \$49.95 (three cassettes) or \$61.95 (three diskettes).

### ANOVA (Available for all computers)

Price: \$19.95 Cassette/ \$23.95 Diskette  
In the past the ANOVA (analysis of variance) procedure has been limited to the large mainframe computers. Now DYNACOMP has brought the power of this technique to the microcomputer. For those conventional users of ANOVA tell them about the power of the TRS-80 and North Star. ANOVA is a program for the TRS-80, a fast and efficient design. For those unfamiliar with ANOVA, do not worry. The accompanying documentation was written in a tutorial fashion for a professor in the subject and serves as an excellent introduction to the subject. Accompanying ANOVA is a support program for building the data base. Included are several convenient features including data editing, deleting and appending.

### BASIC SCIENTIFIC SUBROUTINES, Volume I (Not available for Atari)

Price: \$19.95 Cassette/ \$23.95 Diskette  
DYNACOMP is the exclusive distributor for the software keyed to the popular text BASIC Scientific Subroutines, Volume I by F. Rückdeschel (see the BYTE/McGraw-Hill advertisement in BYTE magazine, January 1981). These subroutines have been assembled according to chapter. Included with each collection is a menu program which selects and demonstrates each subroutine.

Collection #1: Chapters 2 and 3 - Data and function plotting, complex variables

Collection #2: Chapter 4 - Matrix and vector operations

Collection #3: Chapters 5 and 6 - Random number generators, series approximations

Price per collection: \$14.95 Cassette/ \$18.95 Diskette

All three collections are available for \$39.95 (three cassettes) and \$49.95 (three diskettes).

Because the test is a vital part of the documentation, BASIC Scientific Subroutines, Volume I is available from DYNACOMP for \$19.95 plus 75¢ postage and handling.

### ROOTS (Available for all computers)

Price: \$19.95 Cassette/ \$14.95 Diskette  
In the past, ROOTS simultaneously determines all the zeros of a polynomial having real coefficients. Now there is no limit on the degree of the polynomial, and because the procedure is iterative, the accuracy is generally very good. No initial guesses are required as input, and the calculated roots are substituted back into the polynomial and the residuals displayed and save graphics.

### TIDY (TRS-80 only)

Price: \$10.95 Cassette/ \$14.95 Diskette  
TIDY is an assembly language program which allows you to renumber the lines in your BASIC program. TIDY also removes unnecessary spaces and REMark statements. The result is a compacted BASIC program which uses much less memory space and executes significantly faster. Once loaded, TIDY remains in memory, you may load any number of BASIC programs without having to reload TIDY!

## UTILITIES

### GRAFIX (TRS-80 only)

Price: \$14.95 Cassette/ \$18.95 Diskette  
This unique program allows you to easily create graphics directly from the keyboard. You "draw" your figure using the program's extensive cursor controls. Once the figure is made, it is automatically appended to your BASIC program as a string variable. Draw a "happy face", call it HS and then print it from your program using PRINT HS! This is a very easy way to create and save graphics.

### TIDY (TRS-80 only)

Price: \$10.95 Cassette/ \$14.95 Diskette  
TIDY is an assembly language program which allows you to renumber the lines in your BASIC program. TIDY also removes unnecessary spaces and REMark statements. The result is a compacted BASIC program which uses much less memory space and executes significantly faster. Once loaded, TIDY remains in memory, you may load any number of BASIC programs without having to reload TIDY!

## ORDERING INFORMATION

All orders are processed and shipped within 48 hours. Please enclose payment with order and include the appropriate computer information. If paying by VISA or Master Card, include all numbers on card.

### Shipping and Handling Charges

Within North America: Add \$1.50

Outside North America: Add 10% (Air Mail)

### Delivery

All orders (excluding books) are sent First Class.

### Quantity Discounts

Deduct 10% when ordering 3 or more programs. Dealer discount schedules are available upon request.

Ask for DYNACOMP programs at your local software dealer. Write for detailed descriptions of these and other programs from DYNACOMP.

### DYNACOMP, Inc.

1427 Monroe Avenue, Dept. T

Rochester, New York 14618

24 hour mail order phone: (716) 866-7579

Office phone (9AM-5PM EST): (716) 442-8960

New York State residents please add 7% NY sales tax.



\*ATARI, PET, TRS-80, NORTHSTAR, and CPM are registered trademarks and/or trademarks.

\*\*TRS-80 diskettes are not supplied with DOS or BASIC. All DYNACOMP programs for TRS-80 will run on model III with the exception of TIDY, GRAPHICS, CRIBBAGE 2.0.

**COMPUTRONICS**

## PERFECT NUMBERS

In one of his books, Steven Rogowski has a problem for computer solution to find abundant, deficient and perfect numbers. He defines a number as perfect if the sum of all of the factors of the number, including 1, equals the number. In fact there are very few perfect numbers, and you wouldn't want to go hunting for them without your handy-dandy computer doing all the work for you.

This program will find the first three almost instantly, and the fourth after a few minutes, but I can remember about a year ago, just out of curiosity, leaving the computer running all night to look for more of them. (You might want to turn the video display off when you do this. It has nothing to do with the operation of the computer, it just lets you see what it's up to. Then tomorrow morning just push the red Power button on the video display and see what you got.)

```
100 ' PERFECT
110 CLS
120 DEFINT N,F
130 PRINT,"PERFECT NUMBERS"
140 LET N=N+1      'GENERATES NUMBERS
150 FOR F=1 TO N/2 'FACTORS
160 IF N/F <> INT(N/F) THEN 180   'EVENLY DIVISIBLE?
170 LET S=S+F      'SUM OF THE FACTORS
180 NEXT F
190 IF S <> N THEN 210 'NOT PERFECT
200 PRINT N"IS PERFECT!"
210 LET S=0          'RESET THE SUM TO ZERO
220 GOTO 140
```

## ROAD RALLY

We had a great time last spring running a road rally. If you have a group of drivers in need of an activity you really should organize one. Our group was high school students and the occasion was SPRING. (It could just as easily have been a full moon.)

You print up a set of directions to give each navigator such as "turn right at the second road after the bridge", or "turn left 1.1 miles after the house with the windmill and the two wagon wheels".

I found that making up the directions was most easily done using a tape recorder in my car about a week before the rally. (Don't do it too early — some of the landmarks may change.) Record the exact time and mileage for each part of the route using posted speeds. I measured the distances and calculated the times. Where speeds were not posted we used 20 in

```
100 ' RALLY
110 DATA 4.6,675,14.4,1549,18.1,1695
120 FOR L=1 TO 3      'THREE LEGS
130 READ D(L),T(L)    'DISTANCE, TIME
140 FOR N=1 TO 2
150 INPUT "TIME (HHMMSS)":T$(N)
```

```
160 LET H(N)=VAL(LEFT$(T$(N),2))  'HOURS
170 LET M(N)=VAL(MID$(T$(N),3,2))  'MINUTES
180 LET S(N)=VAL(RIGHT$(T$(N),2))  'SECONDS
190 LET SS(N)=3600*H(N) + 60*M(N) + S(N) 'TOTAL SECONDS
200 NEXT N
210 LET I(L)=SS(2)-SS(1)           'INTERVAL IN SECONDS
220 IF I(L) > 0 THEN 240
230 LET I(L)=I(L)+43200           'IN CASE OF 12:00 - 1:00
240 LET TS(L)=I(L)-T(L)           'TIME SCORE FOR EACH LEG
250 IF TS(L) > 0 THEN 270         'ONE POINT PER SECOND LATE
260 LET TS(L)=TS(L)*-2            'DOUBLE PENALTY IF EARLY
270 LET P=P+TS(L)                 'TOTAL POINTS
280 NEXT L
290 INPUT "STARTING ODOMETER":O(0)
300 FOR L=1 TO 3
310 INPUT "ODOMETER (M.T)":O(L)
320 LET ME(L)=O(L)-O(L-1)-D(L) 'MILEAGE ERROR
330 LET DS(L)=ABS(ME(L))*100    'DISTANCE SCORE
340 LET P=P+DS(L)                'TOTAL POINTS
350 NEXT L
360 CLS
370 PRINT
380 PRINT,"A N A L Y S I S"
390 PRINT,,,,"POINTS"
400 FOR L=1 TO 3
410 PRINT,"LEG NUMBER ";L
420 PRINT " TIME ERROR (SECONDS)=",I(L)-T(L),TS(L)
430 PRINT "DISTANCE ERROR (MILES)=",ME(L),DS(L)
440 PRINT
450 NEXT L
460 PRINT,,,"TOTAL POINTS=",P;
470 INPUT "(ENTER)": Q           'HALTS DISPLAY UNTIL (ENTER)
480 RUN
```

residential areas, 35 on gravel, 45 on paved country roads, and 55 on highways. Ten seconds extra were allowed for each stop sign, none for traffic lights.

Include two checkpoints along the course and a third when they return to the starting point. At each you will have an observer record the exact time of arrival and departure as well as the odometer reading on the car.

Scoring is done on the computer. A perfect score is zero. One hundred points are deducted for each mile an odometer is off at a check point, and one point for each second a car is late at a check point. To discourage speeding two points are deducted for each second a car is early at a check point. Cars are started at two-minute intervals, and no more than 20 cars, with two people per car should be allowed, unless you have had some experience with this sort of thing before.

As you can see from our data the total length was about 40 miles and about one hour. This worked very well for us.

Gordon Speer  
3304 Woodlawn Road  
Sterling, IL 61081

# MODEL III FOR \$175.00

**Yes, double density is here!** Two 40 track drives give you 368K of storage. And if that's not enough, four 80 track drives will give you 1.4 megabytes of on line storage. All this with the added speed of double density operation, not to mention 80% more storage per diskette.

**No loss of your software library or conversion of your single density diskettes is necessary.** DOSPLUS 3.3D reacts to the diskette. It will read single or double density with equal ease. It is not JUST a double density operating system, it is a double AND single density system. It is the first of its kind. No one can offer you what we can! To change a disk to double density you need only format a double density disk, and then ONE command (TRANSFER), will bring over all your files. Very simple to use, but not necessary, because DOSPLUS will read them as they are now. Just insert single density diskettes and run (with our operating system). The machine will know what you are doing without having to be told ANYTHING!

If you want your computer to **chain functions**, then you need DOSPLUS 3.3D (for example, from powerup you could have your machine call another computer, scan a data base for appointments, recording any that appear on your printer; and then load in our new BASIC, setting files and mem/size, and start your program so your secretary can go right to work). With our BUILD, DO and AUTO, all of the preceding would be child's play. By the way, you could have also set the time and date, looked at the directory of all your drives as well as checked the free space map (which tells you not only how much space you have on a diskette, but also where it is and what it is used for) DOSPLUS is a truly intelligent, easy to use operating system that gives you all your computer is capable of delivering.

You probably guessed that for \$175.00 what we are doing is turning your Model I into a Model III. It's so easy **anyone can do it in 10 minutes!** Why spend \$2,500.00 for a Model III when you can get the same computing power, with our kit, and **NO SOFTWARE CONVERSION**, for only \$175.00. Don't throw away your Model I, let us expand it! Move up to the world of double density.

You will reap the benefits of our **error-free software**. No miracles, just plain hard work and a lot of testing by experts and novices alike. Test us and judge yourself. We guarantee you will be 100% satisfied. If you are the first to find a legitimate "BUG" in our software you will be rewarded with a brand new \$100 dollar bill.

Your **systems disk will come complete** with an all new single/double density disk editor called DISKZAP, and a BASIC program compressor called CRUNCH. Also included is PURGE, a utility to make the mass removal of unwanted files from a diskette easy, and RESTORE, a program that makes recovering a dead file as easy as typing in a command line. TRANSFER is just as it sounds, a program that moves all files (except systems) from one diskette to another. Single density to double or vice versa. CLEARFILE is used to zero data files on a diskette for a "clean slate". DISKDUMP is a new machine language sector display/modify program that works with filespecs instead of tracks and sectors. Used in conjunction with DISKZAP, you will have more disk editing power than ever before, with less frustration than was ever thought possible.

You will now be able to use all your **DOS commands** from our new **BASIC** with the CMD feature. And how about variable length records that really work, first time, **EVERY** time! This will allow you to use the ISAM programming technique for vastly improved handling of large data bases and lightning speed unheard of in BASIC. (ISAM stands for Indexed Sequential Access Method).

You can create programs that will run on MOD III DOSPLUS, yes, 100% compatibility.

If **inflated computing power without an inflated price tag** is what you're after, contact us at the address below.

**MICRO SYSTEMS  
SOFTWARE INC**  
Specializing in the Tandy Line



(305) 983-3390



5846 Funston Street  
Hollywood, FL 33023

CALL TOLL FREE FOR FAST SERVICE  
(800) 824-7888, OPERATOR 193  
FOR VISA/MASTERCHARGE/C.O.D. ORDERS  
California dial (800) 852-7777, Operator 193  
Alaska and Hawaii dial (800) 824-7919, Operator 193  
**TOLL FREE LINES WILL ACCEPT ORDERS ONLY!**  
For Applications and Technical information, call  
(305) 983-3390 or drop us a card

Dealers inquiries invited



**COMPUTRONICS**

# AMBER EAZE™

**EYE FATIGUE**— Much discussion has taken place regarding screen Color and contrast. Extensive research has produced a breakthrough in the prevention of Operator Eye Fatigue.



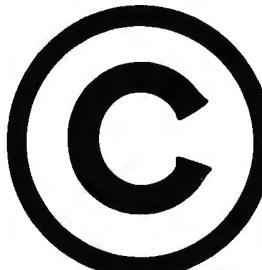
Amber has been found to be much more effective in preventing eye

fatigue than any other color. Put an Amber Eaze Filter on your TRS-80™ or any other computer monitor. Contact one of the dealers below.  
Model I ..... \$19.95  
Model II & III... \$24.95  
Other Computers Call

## The Copyright Kit

"How to Copyright your Computer Software"

A self-instruction booklet on copyrighting the computer programs 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 Inc. and distributed exclusively through B.T. Enterprises and available from the dealers below. IF YOU EVER WROTE A COMPUTER PROGRAM, YOU NEED THIS BOOK!!

## Available At

Breeze Computing  
P.O. Box 1013  
Berkley, MI 48072  
313-288-9422

Programs Unlimited  
20 Jericho Tpke.  
Jericho, NY 11753  
800-645-6038

Contemporary Comm Corp.  
5582 Coral Way  
Haslett, MI 48840  
517-339-1028

Computer Magic Inc.  
115 Weltshire Ave.  
Louisville, KY 40207  
502-893-9334

Son John Enterprises  
P.O. Box 1671  
Freemont, CA 94538  
415-651-4147

Stevens Radio Shack  
562 Nutt Road  
Phoenixville, PA 19460  
800-345-6279

All Systems Go  
105 W. Plant St.  
Winter Garden, FL 32781  
305-877-2830

Bob's T.V.  
93-15 86th Drive  
Woodhaven, NY 11421  
212-441-2807

Soft Sector Marketing  
6250 Middle Belt Rd.  
Garden City, MI 48135  
313-425-4020

CPU Computer Corp.  
175 Main Street  
Charleston, MA 02129

Computer Serv. of Danbury  
P.O. Box 993  
Danbury, Ct. 06810  
203-744-5516

Omni Systems Associates  
P.O. Box 632  
W. Caldwell, NJ 07006  
201-226-9185



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



COMPUTRONICS

# TIC-TOC 80™

## Micro-Clock

Put a wrist watch on your Computer. Gives Time, Date, and Day of week, without the need of operator input. Runs on Batteries, so it never needs to be reset. Gives you the ability to enter data with the knowledge that the Date and time are correct. Includes complete documentation, and sample routines.

Mod I Version.....	\$99.00
Mod III Version .....	\$109.00
NEW DOS PLUS SUPPORTED!!	

## LIGHT PEN

Model I & II Light Pen. Needs only a 9 Volt Battery. Attaches through the cassette recorder for ease of operation. Easy to use and program. Comes complete with hardware and extensive documentation and sample routines. All this power for only ..... \$19.95

## LYNX MODEMS

Expand your horizons, allow yourself to communicate with other computers, and for others to communicate with your computer!! Now this is easy to do with the NEW Model I & III LYNX Modem with Auto Answer/Dial features. Needs no RS232-C Board installed in the TRS-80™. Full 1 year warranty. All this for only ..... \$299.95

## MODEL III MEMORY KIT

Upgrade your Model III to 32 or 48 K with the RIGHT Memory Chips. These are Prime 150ns (Fast!!) chips. Beware of slower chips, as future Mod III upgrades may not work with them!

16K set .....	\$45.00
32K set .....	\$80.00

## COPY III by Dick Balcom

Load in the 500 Baud system tapes in 1/3 the time with Copy III. This utility will read in your 500 baud system tapes, and then write them out at 1500 baud. This gives you backup protection as well as speeding up your tapes. A must for all Model III Cassette users!

SPECIAL .....	\$9.95
---------------	--------

## CASOP

The CASOP Utility will allow you to copy systems tapes, find load locations, check for hidden messages, modify program blocks, relocate program blocks and merge two tape programs together. CASOP is a must if you write or load SYSTEM tapes .....



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

## UNI-TERM

### UNIVERSAL TERMINAL PROGRAM

by Pete Roberts

The first and only fully intelligent terminal program for BOTH Mod I and Mod III users! Includes all features found in Terminal programs costing MUCH more, plus many not found anywhere else. Includes extensive Documentation and handsome binder.

Price .....	\$79.95
-------------	---------

## RUN YOUR OWN COMPUTER BULLETIN BOARD

Become a CONNECTION-80 SYSOP (System Operator) with a LYNX Modem, and CONNECTION-80 BBS Program by Tom Vande-Stouwe & Rich Taylor. All for only \$399 (\$100 off regular price).

CONNECTION-80 BBS Alone .....	\$199.95
LYNX Auto Modem Alone .....	\$299.95

## DOS PLUS

This is the BEST Operating System currently available for the TRS-80™. It offers you all the features you could ever use, speed, reliability and much more. Available for the Model I and III. Single and double density systems available. Only 99.95 either system.

## UTILITY PACK

by Mike Friedman

FOR THE SERIOUS TRS-80™ USER  
CONTAINS:

Spooler: Very fast. Allows page parameters & Perf Skip. This spooler allows you to switch Dos's without interrupting printing!!

Erase: Super program, purge utility with many modes of operation. You will never use KILL again!!

Map: Places a sector map of your disk on the screen. Shows free, used and locked out qrans.

All for only ..... \$49.95

## MODEL III DISK DIRECTORY PROGRAM by Bill Maxey

Catalogue your Diskettes with this easy to use Catalogue program for Model III Disk systems. Can run on as little as a 32K 1 Disk system. Helps you keep track of ALL of your programs.

ONLY ..... \$19.95

COMPUTRONICS

# THE SYSTEM AND PDRIVE COMMANDS OF NEWDOS80

## Joseph Rosenman

When Radio Shack released its TRSDOS Disk Operating System, it was possible for the TRS-80 to access a disk (after a fashion), but that's about all. The only "configuration" choice the microcomputer users had is in how many disk drives they will purchase (1 to 4). This "bare bones" operating system permitted no customization of parameters or resources (i.e., other computer peripherals). Many Computronics readers are familiar with the NEWDOS80 operating system distributed by Apparat. NEWDOS80 corrects many errors that TRSDOS has and adds many powerful features. Of special note are the utilities included (such as SUPERZAP and DIRCHECK). Unfortunately, the commands that permit system configuration are somewhat esoteric. In this article, I will describe how to set up the various options, and (where appropriate) explain what the options mean.

The TRS-80 uses a standard disk configuration, in which each diskette contains a number of tracks and each track contains 10 sectors. In TRSDOS, there could only be 35 tracks. NEWDOS80 allows the "track count" to be specified (more on this later). The sectors are organized into groups of five called "granules". The first granule of drive 0 track 0 must contain a special program called BOOT. BOOT contains the information the computer needs to tell it how to bring in and run the DOS. In point of fact, all the necessary information is contained in the first sector. This leaves 4 unused sectors. The original author of TRSDOS (Randy Cook) filled these sectors with a cleverly encoded "ownership" message. If you type "BOOT/SYS.WHO" and then hold down in the numbers 2 and 6 together, the screen fills with a message declaring that he owned the rights to the DOS. (Radio Shack didn't correct this until release 2.3, when it substituted TANDY CORP for RANDY COOK.) NEWDOS80 made somewhat better use of this diskette space. Sector 3 contains tables which store configuration parameters. Whenever the system is "booted up", these values are assigned to the appropriate DOS locations.

### The SYSTEM Command

The SYSTEM command has 19 options (more may be added in future releases). The format of the system command is:

**SYSTEM,:0**

To display options.

**SYSTEM,:1**

To display whatever options are stored on drive 1

(they would only be used if that diskette was in drive 0 when the system was booted up).

**SYSTEM,password,:0**

To display options (where passwords are enabled).

**SYSTEM,:0,XX=ZZ,YY=QQ**

To set options on the diskette on drive 0 (option XX gets the value ZZ, YY gets the value QQ, etc.).

**SYSTEM,password,:2,XX=ZZ**

To set option XX to ZZ on drive 2 when passwords are enabled.

The actual option codes and their purposes are as follows:

AA: Enables or Disables passwords.

AB: Selects a "Normal" or a "Run-Only" mode.

AC: Selects the NEWDOS80 keyboard debounce.

AD: Enables or Disables the "JKL" screen print option.

AE: Enables or Disables the "123" debug entry option.

AF: Enables or Disables the "DFG" Mini-Dos option.

AG: Determines whether BREAK will produce a 01 or a 00.

AH: Determines the interrupt disable timing.

AI: Lower Case option.

AJ: Option to have keyboard spot "JKL", "123", & "DFG".

AK: Option to determine whether "JKL" will dump graphics.

AL: Number of drives connected to the computer.

AM: Number of tries permitted in correcting disk I/O errors.

AN: Default drive for the DIR command.

AO: Default drive for file save.

AP: HIMEM address.

AQ: Enables or Disables the CLEAR key.

AR: Password checking during disk copy.

AS: Allows or Prevents Lower Case in BASIC.

AT: Undefined.

AA: If "Y", passwords are enabled, and if "N", they are disabled. This means that when passwords are enabled, the DOS will check whether or not there is a password, and if so, that it is used properly. When this option is "N", the DOS doesn't check for or care about passwords. Passwords still can be set or changed, however.

AB: If "Y", the computer will operate in "RUN-ONLY" mode. If "N", the computer is in normal mode. Essentially, Run-Only means that no "user" intervention is permitted (i.e., you can't type anything into the

keyboard from DOS READY, or issue any DIRECT commands from BASIC (a direct command would be RUN, LOAD, SAVE, etc.). If the situation arises where control passes to the user, the system "crashes" — an error message is displayed and the system waits for reset.) Don't plan to use this option on a DRIVE 0 diskette when you intend to update that diskette. This would be used where certain "authorized" individuals had permission to "use" but not to examine programs on the diskette. Obviously, placing this diskette on any drive other than drive 0 would defeat the purpose of this option.

AC: This option selects the NEWDOS80 keyboard debounce routine. In order for this option to be available, option AJ must also be set to "Y". If AC="Y" the debounce is on. If AC="N" the debounce is not used. (Key Debounce is a method of delaying the acceptance of a keystroke until a certain period has passed, in order to "filter out" spurious or unclear keystrokes. If the delay is too long (and the typist is fast) input values may disappear, and if it is too short garbage may appear.)

AD: If "Y" then "JKL" is enabled, and if "N" then "JKL" is disabled. "JKL" is the special NEWDOS80 code for dumping the contents of the video display to the line printer. If the line printer is off (or non-existent) the system will hang. By saying "JKL", what is meant is the simultaneous typing of those three keys. Warning: in some cases, some (or all) of those letters may appear as input to whatever program was executing at the time.

AE: If "Y" DEBUG mode is entered by typing "123", if "N" then DEBUG is entered via the "old" method (using the break key). As with option AD, the "123" means the simultaneous typing of those three keys.

AF: If "Y" then "DFG" is enabled, and if "N" then "DFG" is disabled. "DFG" is the special NEWDOS80 code for entering Mini-Dos. (Mini-Dos is a special "small" DOS that can be entered and exited during the execution of most programs on the TRS-80. This means that one could, while executing certain machine language and BASIC programs, execute most of the NEWDOS80 LIB commands, abort the current job, and even perform limited disk copies. The criterion for determining whether a machine language program can be interrupted is whether or not it uses its own keyboard routine; if so, it can't jump to Mini-Dos.)

AG: This option determines the nature of the BREAK key. If "Y", break is treated like any other input key and has the value of ASCII 01. If "N", then the BREAK key is treated as a special input (with an ASCII value of 00).

AH: This option determines when interrupts will be disabled during disk I/O operations. According to the NEWDOS80 manual, normal I/O requires 70ms, when AH="N". If AH="Y", this number is reduced to 12ms (it waits until the first byte of data is transferred). The

cost of this option is in the significantly higher "lost data" errors that will occur. If the real-time clock is being used (as in displaying the time), this time savings may be appreciable. It is my judgement, however, that it is better to keep I/O interrupts disabled at the time of the I/O request (as in the "normal" situation).

AI: If "Y", lower case has been installed; if "N", there is no lower case. At least DEBUG and SUPERZAP use this parameter to determine whether to display information in lower case.

AJ: If "Y" NEWDOS80 will intercept keyboard input into its own special internal routines, where such things as Key Debounce and special input ("JKL", "123", or "DFG") can be detected. If "N", then NEWDOS80 can't work its magic on the keyboard. Generally, you will get many more keyboard errors — without any appreciable advantages.

AK: This option determines whether the "JKL" option should alter certain ASCII codes before being dumped to the printer. If "Y", everything will be sent to the printer as it appears on the display (thus in video memory). This option should be "Y" if your printer can print TRS-80 Graphic Blocks. If "N", everything from ASCII 80H to FFH will be changed to a period, indicating that something unprintable was there. Set this to "N" if you can't print the Graphic Blocks. If you have no printer, make sure that option AD = "N".

AL: This option should be set to the actual number of disk drives available (1 to 4). If you set a number too high, NEWDOS80 will attempt to use it. If the number is too low, drives that really do exist will be ignored. Remember to change this option when you add a drive to your system. It just might save you the frustration of believing that your new (expensive) disk drive doesn't work when it really does.

AM: This option determines the number of tries that NEWDOS80 will make in performing disk I/O before it quits with an error message. The default value is 10. On my system, I have set this value to 4. I have found that if it doesn't work after 4 tries, it probably isn't going to. You could set this option to as many as 256 tries! (But don't, since each try will reload the read/write head; you could be waiting a very long time.)

AN: This option determines the default drive for directory listings. This means that by typing DIR with no numerical argument, the directory of whatever drive option AN is set too will be displayed. The default is for drive 0.

AO: This option determines what drive will be searched first for FDE entry space while creating a NEW file. The search proceeds in sequence (no drive number less than the value of option AO will be searched). The default is for drive 0.

AP: This option (if non-zero) will set the High Memory limit upon system BOOT.

AQ: If "Y", the CLEAR key is enabled; if "N", then it is disabled.

AR: If "Y", then passwords are not checked during diskette copies — even if passwords are enabled. If "N" then passwords are checked during copies (if passwords are enabled via option AA).

AS: If "Y", BASIC will convert any lower case input into upper case. If "N", BASIC will not perform any conversion to upper case (this option does not affect input data). If you don't have lower case, make sure that this option is "Y". If you have lower case, and plan to use it in BASIC, set this option to "N" and make sure that you load a lower case driver before entering BASIC — many nasty mistakes could occur since you would be able to perform text compares using a lower case character without being able to see it.

## PDRIVE

The PDRIVE command is somewhat easier to use — since it only has 5 options. Because this command requires the specification of 2 drives, it is a little confusing. The proper format for the PDRIVE command is:

**PDRIVE,:0,:0**

To see the options on drive 0, for drive 0

**PDRIVE,:0,:1**

To see the options on drive 0, for drive 1

**PDRIVE,:0,:2**

To see the options on drive 0, for drive 2

**PDRIVE,:1,:0**

To see the options on drive 1, for drive 0

**PDRIVE,:1,:3**

To see the options on drive 1, for drive 3

**PDRIVE,password,:0,:0**

To see options when passwords are enabled.

**PDRIVE,:0,:0,DTC=40**

To set an option on drive 0 for drive 0 to: track count equals 40.

The available options are:

TI: Type of disk interface used.

TD: Type of disk drive being used.

DTC: Number of tracks on disk drive.

DDST: Disk Directory Starting Track.

DDGA: Disk Directory Granule Allocation.

TI: There are only 2 possible codes available at the present time. If TI=A, there is a standard TRS-80 interface in use. If TI=B, there is an OMIKRON 8 inch drive. (If TD=A then you must also set TI=A). Apparat also defined (but didn't implement) TI=C, which is for the LOBO expansion interface.

TD: Here also, there are only 2 possible codes available at the present time. If TD=A the disk is 5 inch, single density, single side. If TD=B the disk is 8 inch, single density, single side. Apparat also defined (but didn't implement) 6 additional disk types. They are:

C = 5 inch, single density, double sided.

D = 8 inch, single density, double sided.

E = 5 inch, double density, single side.

F = 8 inch, double density, single side.

G = 5 inch, double density, double sided.

H = 8 inch, double density, double sided.

DTC: This value determines the number of tracks on the disk. The number could range anywhere from 1 to 96. This value is used throughout NEWDOS80 (except for DIR and FREE), and it is important that it be set properly.

DDST: This is the track that will contain (or start) the DIRECTORY. Usually, it is track 17. Not all DOSs can support a directory that appears on some track other than 17, so if you decide to locate the directory elsewhere, it is "at your own risk".

DDGA: This determines the number of granules to be allocated to a diskette directory (between 2 to 6). If additional granules are allocated, they will appear on the tracks immediately following the track specified in DDST. The usual number of granules is 2. If you had many single granule files, you might want to add a granule to the directory (you should only do this to a "clean" diskette, in order to make sure that the track following the directory has not already been allocated). 80-track diskettes will often have a 4 granule directory.

## EXAMPLES

Now for some examples. We have been living with a one drive system and just won a lottery! We decided to expand our system by adding a 40 track drive and an 80 track drive. Furthermore, we will always use drive 0 as a "SYSTEM" drive, and use drives 1 and 2 as "DATA" drives. We would need to update both the system command and the PDRIVE command to reflect this change. So, with a NEWDOS80 diskette in drive 0 we would type:

SYSTEM,:0,AL=3 <Now we have 3 drives>  
PDRIVE,:0,:1,DTC=40 <Drive 1 is 40 tracks>  
PDRIVE,:0,:2,DTC=80, <Drive 2 is 80 tracks, and has  
DDGA=4 a 2 track DIRECTORY>

For users with only one standard 35 track Radio Shack drive:

PDRIVE,:0,:0,DTC=35 <Drive 0 is 35 tracks>  
SYSTEM,:0,AL=1 <Only 1 drive available>

An innovative word processing system for TRS-80\* MOD I & MOD III

# Lazy Writer®

It is time to put your word processing program away and use a Word Processing System

©1980 by David Welsh

MOD I - \$125  
MOD III - \$175

\*Requires 2 drives for conversion only

\*Lazy Writer is the product of ABC Sales

## LAZY WRITER Takes on Scripsit® by Radio Shack® and Electric Pencil®

Has all the things that other word processing programs should have. Easy to use, written all in machine code / It permits the inserting and deleting by characters, words, sentences, and paragraphs / Page scrolling up and down / Search ahead of the cursor or behind the cursor for any character / The cursor can be moved up, down, left and right / You can seek top of file and bottom of file / Block move of text, block delete of text / Search and replace or search delete / Unlimited insert (to the limit of your machines memory) / Permits use with lower case /

Has things that other programs should have, but don't. Upper and lower case output to your printer (if your printer accepts lower case) without having your computer modified. ON UPPER CASE ONLY MACHINES This program marks the capital letters so you can see which letters are CAPITALS and which are not / Will change all upper characters text to lower case or all lower case to upper. A SINGLE COMMAND / Will capitalize the first letter of all sentences and all proper noun's. WITH A SINGLE COMMAND / LOADS ANY ELECTRIC PENCIL FILE / ASCII SAVED FILES. EDTASM FILES or BASIC PROGRAMS SAVED ASCII / Permits installing special control characters in your text for your printers special features, like double wide or condensed print / Definable screen length and definable print length to 255 characters wide / Screen editing that is not final till your command. This means that you can edit your file on the screen and if you don't like how it reads you can cancel and leave it the way it was / You can append files (which means that you can put one file to the end of another file) / No lost characters at the end of the line, even for the fastest typist / A directory of all your files is available to the user without leaving the program / Saving programs to disk easy enough for the non-computer user / To save memory, not all the program modules are in memory at one time but are called from the disk as needed / You can set tab positions like on a typewriter / 10 CUSTOM COMMAND KEYS for the experienced user there is a command file that permits many special functions that are all user defined (not enough space for better explanation in ad, send for complete overview) / Program has HELP file that is a short review of the commands that are available /

**Standard Printer Module.** This printer module is provided for the user as a standard feature. Optional special printer routines for custom printer will be available in the near future. In this original release, it has the following printer drivers and will support the following printing devices: RS232, IRS232 and PARALLEL printer ports. You have the following format commands: Justifies Text, Centers Text, Centers Title, Line Spacing, Line Length from 3-255 characters and Set Margins / Also send any ASCII code to any printer from the text / Save formatted text to the disk for spooling later / Information for customer to load his own special printer driver / Printing can be stopped and started by the user at any time and then restarted where you left off / You can print entire file or just print to bottom of the page /

**Communication Package.** RS232 COMMUNICATION TERMINAL PROGRAM permits you to communicate with other computers. Transfer files from one machine to another. Permits dumping memory across the phone lines. Receive files from other TRS-80's and "Shake Hands" with larger computers. This is the complete system called LAZY WRITER. There is no package written for the TRS-80\* that is as comprehensive. This package is available for the TRS-80\* MOD I, 32K or larger with at least a single disk drive. List price is from

**\$125.00**

**SSM** SOFT SECTOR MARKETING, INC. COMPUTERIZED

Phone Orders  
**800-521-6504**



Questions & Michigan Orders  
**(313) 425-4020**

## NEW FEATURES in Lazy Writer "The People Request, and David Welsh Delivers"

The system permits embedding ASCII commands into the text of the program. Now you can do SUPERSCRIPT and SUBSCRIPT (if your printer can handle it). Underlining and boldface, printing of a single word in a paragraph, is now possible, at no extra cost.

A key that remembers the cursor position.

User definable special character. For use with printers that have printable characters that the TRS-80 keyboard does not normally support.

Margin control from within text. This means that you can change the margins of your printed text without stopping the printer routine and changing it.

Page offset with odd/even headers & footers. This means that you can print one page offset to the left of center and the next page offset to the right. This is very nice when you are writing a book.

Printing chaining feature. This permits having more than one file on disk and create one printed letter, contract, or book without having to reset the printer commands.

Mandatory space command. This is necessary when you are writing letters or papers that have certain words that are not to be broken-up, eg. John P. Andhouse. This name can be made to be unbreakable to justify routines in the program.

Disk catalog. Now you can load your disk directory into memory and create a file of this information.

Reverse Indents or known as Hanging Indents

**COMPUTRONICS**

If the configuration has lower case, then type:

SYSTEM,:0,AL=1,AI=N <1 drive and lower case available>

For users with 2 drives (0=35 tracks,1=40 tracks), lower case, and an EPSON MX-80 printer (which can print screen graphic blocks):

PDRIVE,:0,:0,DTC=35 <Drive 0 is 35 tracks>  
PDRIVE,:0,:1,DTC=40  
<Drive 1 is 40 tracks>  
SYSTEM,:0,AL=2,AK=Y,  
AI=Y <2 drives, graphics,  
lower case>

For users with 4 Radio Shack Drives and a Radio Shack line printer (no graphics):

PDRIVE,:0,:0,DTC=35 <Drive 0 is 35 tracks>  
PDRIVE,:0,:1,DTC=35 <Drive 1 is 35 tracks>  
PDRIVE,:0,:2,DTC=35 <Drive 2 is 35 tracks>  
PDRIVE,:0,:3,DTC=35 <Drive 3 is 35 tracks>  
SYSTEM,:0,AL=4,AK=N <4 drives, no graphic print>

For our last example:

4 40-track drives  
lower case  
graphic blocks on the printer  
no passwords required  
use NEWDOS80's keyboard debounce  
enable "JKL", "123", and "DFG",  
have keyboard spot "JKL", "123", and "DFG",  
permit only 4 I/O tries before command aborts,  
change the DIRectory search default from drive  
0 to 1,  
bypass password checking during disk copy,  
permit lower case in BASIC programs.

PDRIVE,:0,:0,DTC=40 <Drive 0 is 40 tracks>  
PDRIVE,:0,:1,DTC=40 <Drive 1 is 40 tracks>  
PDRIVE,:0,:2,DTC=40 <Drive 2 is 40 tracks>  
PDRIVE,:0,:3,DTC=40 <Drive 3 is 40 tracks>  
SYSTEM,:0,AL=4,AI=Y,AK=Y,AA=N,AC=Y,AD=Y,  
AE=Y,AF=Y,AJ=Y,AM=4, AN=1,AR=Y,AS=N

In all cases, the directories begin on track 17. After we re-BOOT the system, these new options will be in effect. One final word: both SYSTEM and PDRIVE will list all of their options when the commands are executed. If any changes have been made, they will be reflected in the list displayed. If no changes were made, then the list will just display the current defaults.

Joseph Rosenman  
35-91 161 Street, Apt. 4J  
Flushing, NY 11358

continued from page 23

machine language programs from cassette.

**CLOSE:** This command "closes" a "device path" created by OPEN (see OPEN for more details).

**CLS:** This command can be followed by a number between 0-8, and will clear the screen to the color represented by that number. The number can be a variable within parentheses: CLS(I).

**EOF:** This is a function that determines whether or not the End Of File has been reached.

**EXEC:** This command transfers execution to the machine language program that begins at the address specified in the EXEC command. If no address is specified, the address set by the last CLOADM is used.

**JOYSTK:** This function will return the value of the horizontal and vertical positions of the joysticks. There are 4 subscripts (0-3). Both the right and left joysticks are accessed through this function.

**MOTOR:** You can turn the cassette motor ON or OFF with this command (Why?).

**OPEN:** This command creates an explicit pathway for I/O operations. For instance, "O";#1,"TEXT" would set up output to the cassette (device # 1), and the file would be named "TEXT".

**SET:** This command allows the "Setting" of a portion of a graphic block (each block has 4 quarters). There is an X,Y specification required, and an optional third specification for color.

**SKIPF:** This command causes the cassette to skip ahead to the end of the current program, or to the end of a program you specify.

In the next issue of **Computronics**, I will review the Extended Basic version of the Color Computer, and in the November issue, I will review several programs (from both Radio Shack and others) for the Color Computer. ■

continued from page 25

problem that arises at this time: YOU CANNOT USE CHR\$(0) WITH THE TRS-80. This is a null and the computer will not do anything with it. This applies to the text mode as well as the graphics mode. If you need to use this character, you must poke a zero into memory location 14312 (for LEVEL II 16K systems).

Now for the only really serious deficiency (in my opinion) that I found. The operation manual is very poor in explaining the graphics mode. It provides a barely adequate explanation of the makeup of the code. It does not explain about the possible problem in using a null. The pictures are nice in that they show what can be done; but there are no examples to help you to understand how to apply the graphics mode.

continued on page 39

*continued from page 38*

In general though, if you can get the graphics figured out, you will have a lot of fun with some very nice high resolution graphics. You can make some nice pictures and great graphs. Two things that you will have to remember is to set your line spacing at 8/72 inch and to poke your zeros rather than use CHR\$(0).

A few other specifications that may be of interest are:

80 characters per second printing speed,  
unidirectional printing,  
tractor feed is adjustable from 4 inches to 10 inches,  
capable of printing an original and two carbons,  
prints 10 characters per inch,  
quieter operation than Centronics printers,  
all motors are stepper motors that only run when needed.

After getting to know my MX-70, I find it hard to understand how Epson can sell such a package of features at such a low price. This printer would be a bargain at \$550.00. It meets so many of the home computerist's printing needs so well that I can hardly believe it. The problems I encountered were not insurmountable: the need for an extra +5 vdc, the inability to use CHR\$(0), and the poor documentation for the graphics. This little printer is truly a versatile

printing tool with plotter quality graphics on the side — a fine basic-PLUS printer for home and limited business use. ■

Brett A. McAlister  
1332-C Talbott Rd.  
Rantoul, IL, 61866

*continued from page 26*

Model II. The Model II still employs up to four 8-inch disks, which have a storage capacity of about 500K bytes each; but a double-sided double-density Model III disk will store about 400K. The next major difference between the two machines is likely to be that Radio Shack will introduce a hard disk for the Model II, but if RS doesn't make it available for the Model III, we are sure that someone else will, perhaps Lifeboat again. The Model III certainly ought to be considered seriously for small business applications. ■

---

#### **TOLL-FREE ORDER LINE** (outside of New York State)

**(800) 431-2818**

---

# **A small business needs a word processing system with a small price tag.**

Owning a small office computer can make sense by saving time. But its software system should make sense too—it should be inexpensive, easy to use, perform routine office chores. It should be Kwikrite.

Kwikrite consists of an instruction manual and 5½" floppy disk, programmed for TRS-80 Model I and Model III, but it is adaptable to most small computers. It will write form letters with customized inside addresses and salutations; print out continuous labels; write standardized report pages (manuals, manuscripts, etc.); and create title pages for those reports, properly centered and spaced.

Kwikrite is so easy to use that you can begin operation immediately. And it is so inexpensive, it will quickly pay for itself.

So send today for Kwikrite, the system that makes sense.

The Kwikrite program requires 16K (1) disk, written in BASIC, source code is easily modified for tape. It costs \$37.50 plus \$2.00 for shipping. MasterCard or VISA accepted. Catalogue of other software available free. Send order to: **M. B. Rowe & Associates**; Suite 1, Southgate Office Building; 716 Fourth Street S.W.; Hickory, North Carolina 28601; 704-328-2386. **kwikrite**  
**\$37.50**

# VOL. 4 - DISASSEMBLED HANDBOOK FOR TRS-80

Robert M. Richardson

## CHAPTER 6

### W4UCH BAUDOT RADIO TELETYPE RECEIVE PROGRAM

#### 60, 66, 75 AND 100 WORDS PER MINUTE SPEED

#### INTRODUCTION

Receiving Baudot radio teletype with a stable amateur single sideband receiver, converting the 2125 cycle MARK tones and 2295 cycle SPACE tones to TTL logic levels with a Flesher TU-170 terminal unit, and then applying them to the TRS-80's I/O bus with a Telesis VAR/80 interface unit is certainly just as easy, if not more so, than generating a Baudot radio teletype signal which was covered in the last Chapter.

Since we will not be generating prepared messages as we did in Chapter 5, the total Baudot receive program is only about 1/2 the length of the Baudot transmit program.

Same as the last Chapter, the RS-232C adaptor will NOT be required as the program creates its own software UART for converting the incoming serial data stream to parallel. The program as written will work "fine business" on both the Model I and Model III TRS-80s. Again, see APPENDIX 2 for wiring up the necessary Model III to Model I adaptor for the I/O bus, though there should be numerous low cost ready-made adaptors on the market by the time this is published.

#### SPACE AND FREQUENCY DIVERSITY RECEIVING SYSTEMS

Except for line of sight and forward scatter communications, most long distance radio communications utilize the F2 layer in the upper ionosphere to propagate the radio signal from one point to another by bending it around the earth's curvature. The level of ionization and the resulting MUF (maximum useable frequency) that ?????????? the highest frequency that will be reflected at a given time is determined primarily by radiation from the sun; i.e., the MUF decreases significantly at night and increases during daylight hours, usually peaking around local noon time. On a short term basis (micro/milli-seconds), scintillation, a brief variation in the ionizing level often occurs, causing momentary fading.

Experts are asked to take this simplistic explanation with a grain of salt, but for all intents this is what happens.

A number of long distance commercial (and military) radio communication systems utilize both space and frequency diversity to eliminate short term fading due

to temporary fluctuations in the F2 layer. Space diversity is accomplished by spacing a number of antennas 10 to 20 or more wave lengths apart. Frequency diversity is accomplished by transmitting exactly the SAME information on another frequency channel to minimize short term fading.

Here is an interesting aspect regarding the frequency diversity reception of amateur FSK (frequency shift keyed) radio teletype signals, as most amateurs DO NOT have the capability or real estate to set up the space diversity approach to minimize short term fading:

1. The majority of radio teletype terminal units utilize ONLY the mark OR the space tone to determine whether a mark or space was received; i.e., if the audio 2125 cycle tone is present, it is a mark. IF the audio 2125 cycle tone is NOT present, it is a space. Or the following (not both):

2. Conversely, if a 2295 cycle is present it is a space. If it is absent, it is a mark.

Now, here is the concept of using either hardware (or software) to create a frequency diversity radio teletype receiving system THAT WILL AUTOMATICALLY select either #1 or #2 above, WHICHEVER WAS VALID AT THE TIME OF THE OTHER FREQUENCY'S SHORT TERM FADE. IT IS NOT PERFECT, BUT A GIANT IMPROVEMENT OVER DECODING "ONLY" MARK OR SPACE, ALONE.

This unique concept was developed by John Loughmiller-KB9AT, and first published in "Ham Radio" magazine in the October '78 issue, pages 74-77. We highly recommend any serious radio teletype buff's reading it as it is one of the best and most fascinating approaches to solving the F2 layer scintillation problem when space diversity is not possible.

Please understand that there is a great deal more to a radio teletype (TU) terminal unit than just a simple mark or space decoder and that some other important factors include:

1. Limiter dynamic range, IF a limiter is used.
2. Dynamic range, IF a limiter is NOT used.
3. Passband shape factor - NOT decoding undesired signals.
4. Stability - will the audio tone decoder drift due to temperature or voltage fluctuations.

APPENDIX 3 details the author's modification to

KB9AT's excellent circuit using National Semiconductor TTL chips since a number of the TTL chips that John Loughmiller specified are no longer available from Fairchild Semiconductor.

#### EDITOR'S NOTE

We recommend you "NEVER USE" use Fairchild Semiconductor TTL devices as they APPEAR and DISAPPEAR with greater regularity than the "Witch of the North." Here today, gone tomorrow. Not even a "broomstick" remains to let you know they ever existed.

### BAUDOT RECEIVE PROGRAM LOGIC AND FLOW

In essence, the program is little more than a software UART (universal asynchronous receiver-transmitter) that converts the serial Baudot data stream into a parallel word whose decimal value is equal to the Baudot character received. MEM is used to recall whether the character is from LETTERS or FIGURES. A compare table then matches the decimal value of the Baudot character received up with its appropriate alphanumeric/punctuation counterpart and jumps off to load it with its ASCII value which is then displayed on video, AND if you have a line printer turned "on" also printed out.

IT SURE SOUNDS SIMPLE TO ME, BUT I'M GONNA FASTEN MY SEATBELT!

Gridley, you have got to be the world's most suspicious student. Whatever made you like that?

EXPERIENCE AND 4 VOLUMES FROM YOU ! ! !

Very well Gridley, even though the comments are largely self-explanatory, let's run through most of the program's lines to make sure we have not inadvertently obscured some important point for you.

Lines 160-310: Initialize the program and remind us we are in the RECEIVE MODE.

WHY DOESN'T THIS LINE TELL US WHAT OUR TELETYPE SPEED IS ? ? ?

Good question, Gridley. We could have used the same routine as we did in the last Chapter; i.e., TRANSMIT MODE - WPM = 60 or whatever speed you selected, BUT we figured you had the intelligence to remember since it is announced EVERY TIME you switch to TRANSMIT MODE. Seriously, you WOULD NOT want to see the transmit speed repeated since we have included the feature of allowing you to select a DIFFERENT receive speed, if desired. Anytime a signal is BEING RECEIVED and printed out on video, the program lines 3700 - 3720 check to see if the BREAK key is pressed. IF SO, the program asks YOU to input TIME1 and TIME2, thus allowing YOU to set the receive speed. As such, in the next Chapter you may transmit at one speed and receive at another, if you wish.

Lines 320-360: First introduce a 1/2 second time delay to keep the program from jumping back to the

transmit mode (next Chapter) since the CLEAR key is used to switch back and forth between both transmit and receive modes (lines 340-360). In line 360 we have substituted JP Z,SPEED for JP Z,XMIT in the next Chapter.

Lines 370-440: Are a sort of "synchronize" GO scheme. What they are looking for in essence is 2+ mark periods in a row before continuing on to START. Though not perfect, they work quite well when coming to receive mode from transmit mode.

```

00100 ; - W4UCH BAUDOT TELETYPE RECEIVE PROGRAM -
00110 ;
00120 ; 60, 66, 75, AND 100 WORDS PER MINUTE EQUIVALENT SPEED
00130 ;
00140 ; COPYRIGHT 1981 (C) OBJECT = BAUDOT3 & SOURCE = BAUDOT4
00150 ;
00160 W4UCH EQU 31000 ;=7918H FOR YOU PURISTS
00170 ORG W4UCH ;LET'S START HERE
00180 EX AF,AF' ;SWAP ALTERNATE REGISTERS
00190 EXX ;SWAP ALTERNATE REGISTERS
00200 PUSH IX ;SAVE IN STACK
00210 PUSH IY ;SAVE IN STACK
00220 DI ;DISABLE INTERRUPTS
00230 CALL CLS ;COMPATABILITY MOD 1 & 3
00240 MODE CALL CARRET ;VIDEO CARRIAGE RETURN
00250 LD HL,RECV ;RECEIVE MESSAGE ADDRESS
00260 CALL 28A7H ;DISPLAY STRING ROUTINE
00270 ;LATER USE NEXT CHAPTER
00280 CALL CARRET ;VIDEO CARRIAGE RETURN
00290 JP RGO ;JUMP AROUND MESSAGE
00300 RECV DEFM 'RECEIVE MODE'
00310 DEF3 0 ;MESSAGE DELIMITER
00320 RGO LD BC,32000 ;1/2 SECOND TIME DELAY
00330 CALL 060H ;DO IT
00340 LD A,(14400) ;CLEAR KEY ROW IN MEM
00350 CP 2 ;CLEAR KEY PRESSED ?
00360 JP Z,SPEED ;GOTO XMIT - NEXT CHAPTER
00370 IN A,(0) ;127 = SPACE & 255 = MARK
00380 CP 127 ;SPACE SIGNAL PRESENT ?
00390 JP Z,RGO ;IF SO, GO LOOK AGAIN
00400 LD BC,(TIME3) ;BIT LENGTH + 100
00410 CALL 060H ;ROM TIME DELAY ROUTINE
00420 IN A,(0) ;LOAD 'A' PORT ZERO
00430 CP 127 ;SPACE SIGNAL THERE ?
00440 JP Z,RGO ;IF SO, GO LOOK AGAIN
00450 START LD A,(14400) ;CLEAR KEY ROW IN MEM
00460 CP 2 ;CLEAR KEY PRESSED ?
00470 JP Z,SPEED ;GOTO XMIT - NEXT CHAPTER
00480 IN A,(0) ;LOAD 'A' PORT ZERO
00490 CP 127 ;IS THE START BIT THERE ?
00500 JP NZ,START ;IF NOT, GO LOOK AGAIN
00510 LD D,0 ;ZERO OUT CHAR COUNTER
00520 LD BC,(TIME2) ;1/2 BIT LENGTH VALUE
00530 CALL 060H ;TIME DELAY SUBROUTINE
00540 BIT0 LD BC,(TIME1) ;FULL BIT LENGTH VALUE
00550 CALL 060H ;TIME DELAY SUBROUTINE
00560 IN A,(0) ;LOAD 'A' PORT ZERO
00570 CP 127 ;127 = SPACE BIT
00580 JP NZ,SET0 ;IF MARK, GO SET BIT 0
00590 SET 0,A ;EQUALIZING -

```

00600	JP	BIT1	;TIME DELAY	01220	DEFB	Ø	;MESSAGE DELIMITER
00610	LD	BC,(TIME1)	;FULL BIT LENGTH VALUE	01230	SPD4A	CALL 1BB3H	;KYBD/VIDEO INPUT ROUTINE
00620	CALL	Ø60H	;TIME DELAY SUBROUTINE	01240	RST	10H	;SCAN STRING SET 'C' FLAG
00630	IN	A,(Ø)	;LOAD 'A' PORT ZERO	01250	CALL	ØE6CH	;ASCII \$ TO ACUM RET MIN
00640	CP	127	;127 = SPACE BIT	01260	CALL	ØA7FH	;CONVERT ACCUM TO INTEGER
00650	JP	NZ,SET1	;IF MARK, GO SET BIT 1	01270	LD	(TIME2),HL	;STASH IT AWAY IN TIME 2
00660	SET	Ø,A	;EQUALIZING -	01280	JP	RGO	;START ALL OVER AGAIN
00670	JP	BIT2	;TIME DELAY	01290	LTRS	LD A,(SHIFT)	;LTRS = Ø & FIGS = 1
00680	BIT2	LD BC,(TIME1)	;FULL BIT LENGTH VAULE	01300	CP	Ø	;SUBTRACT Ø SET 'Z' FLAG
00690	CALL	Ø60H	;TIME DELAY SUBROUTINE	01310	JP	NZ,FIGS2A	;IF NOT ZERO, GOTO FIGS2
00700	IN	A,(Ø)	;LOAD 'A' PORT ZERO	01320	POP	AF	;LOAD 'A' FORMER 'D'
00710	CP	127	;127 = SPACE BIT	01330	CP	1	;LETTERS 1 = E
00720	JP	NZ,SET2	;IF MARK, GO SET BIT 2	01340	JP	Z,EE	;IF SO, GOTO EE
00730	SET	Ø,A	;EQUALIZING -	01350	CP	2	;LETTERS 2 = LINE FEED
00740	JP	BIT3	;TIME DELAY	01360	JP	Z,START	;IF SO, IGNORE IT
00750	BIT3	LD BC,(TIME1)	;FULL BIT LENGTH VALUE	01370	CP	3	;LETTERS 3 = A
00760	CALL	Ø60H	;TIME DELAY SUBROUTINE	01380	JP	Z,AA	;IF SO, GOTO AA
00770	IN	A,(Ø)	;LOAD 'A' PORT ZERO	01390	CP	4	;LETTERS 4 = SPACE
00780	CP	127	;127 = SPACE BIT	01400	JP	Z,SPACEA	;IF SO, GOTO SPACE
00790	JP	NZ,SET3	;IF MARK, GOT SET BIT 3	01410	CP	5	;LETTERS 5 = S
00800	SET	Ø,A	;EQUALIZING -	01420	JP	Z,SS	;IF SO, GOTO SS
00810	JP	BIT4	;TIME DELAY	01430	CP	6	;LETTERS 6 = I
00820	BIT4	LD BC,(TIME1)	;FULL BIT LENGTH VALUE	01440	JP	Z,II	;IF SO, GOTO II
00830	CALL	Ø60H	;TIME DELAY SUBROUTINE	01450	CP	7	;LETTERS 7 = U
00840	IN	A,(Ø)	;LOAD 'A' PORT ZERO	01460	JP	Z,UU	;IF SO, GOTO UU
00850	CP	127	;127 = SPACE BIT	01470	CP	8	;LETTERS 8=CARRIAGE RETN
00860	JP	NZ,SET4	;IF MARK, GO SET BIT 4	01480	JP	Z,CARRTN	;PRINTER CARRIAGE RETURN
00870	SET	Ø,A	;EQUALIZING -	01490	CP	9	;LETTERS 9 = D
00880	JP	LOAD	;TIME DELAY	01500	JP	Z,DD	;IF SO, GOTO DD
00890	LOAD	LD BC,(TIME1)	;FULL BIT LENGTH VALUE	01510	CP	1Ø	;LETTERS 1Ø = R
00900	CALL	Ø60H	;TIME DELAY SUBROUTINE	01520	JP	Z,RR	;IF SO, GOTO RR
00910	PUSH	DE	;DE REG ON TOP OF STACK	01530	CP	11	;LETTERS 11 = J
00920	JP	LTRS	;GOTO LTRS	01540	JP	Z,JJ	;IF SO, GOTO JJ
00930	SETØ	SET Ø,D	;SET BIT ZERO TO ONE	01550	CP	12	;LETTERS 12 = N
00940	JP	BIT1	;GOTO BIT 1	01560	JP	Z,NN	;IF SO, GOTO NN
00950	SET1	SET 1,D	;SET BIT ONE TO ONE	01570	CP	13	;LETTERS 13 = F
00960	JP	BIT2	;GOTO BIT 2	01580	JP	Z,FF	;IF SO, GOTO FF
00970	SET2	SET 2,D	;SET BIT TWO TO ONE	01590	CP	14	;LETTERS 14 = C
00980	JP	BIT3	;GOTO BIT 3	01600	JP	Z,CC	;IF SO, GOTO CC
00990	SET3	SET 3,D	;SET BIT THREE TO ONE	01610	CP	15	;LETTERS 15 = K
01000	JP	BIT4	;GOTO BIT 4	01620	JP	Z,KK	;IF SO, GOTO KK
01010	SET4	SET 4,D	;SET BIT 4 TO ONE	01630	CP	16	;LETTERS 16 = T
01020	JP	LOAD	;GOTO LOAD	01640	JP	Z,TT	;IF SO, GOTO TT
01030	SPEED	LD HL,SPD1A	;MESSAGE ADDRESS TO HL	01650	CP	17	;LETTERS 17 = Z
01040	CALL	28A7H	;DISPLAY MESSAGE ROUTINE	01660	JP	Z,ZZ	;IF SO, GOTO ZZ
01050	LD	BC,6550Ø	;APPROXIMATELY 1 SECOND -	01670	CP	18	;LETTERS 18 = L
01060	CALL	Ø60H	;TIME DELAY	01680	JP	Z,LL	;IF SO, GOTO LL
01070	JP	SPD2A	;JUMP AROUND MESSAGE -	01690	CP	19	;LETTERS 19 = W
01080	SPD1A	DEFM 'INPUT TIME 1'	;IS GOOD PRACTICE	01700	JP	Z,WW	;IF SO, GOTO WW
01090	DEFB	Ø	;MESSAGE DELIMITER	01710	CP	2Ø	;LETTERS 2Ø = H
01100	SPD2A	CALL 1BB3H	;KYBD/VIDEO INPUT ROUTINE	01720	JP	Z,HH	;IF SO, GOTO HH
01110	RST	10H	;SCAN \$ SET 'C' FLAG	01730	CP	21	;LETTERS 21 = Y
01120	CALL	ØE6CH	;ASCII\$ TO ACCUM RET MIN	01740	JP	Z,YY	;IF SO, GOTO YY
01130	CALL	ØA7FH	;CONV ACCUM TO INTEGER	01750	CP	22	;LETTERS 22 = P
01140	LD	(TIME1),HL	;STASH IT AWAY IN TIME 1	01760	JP	Z,PP	;IF SO, GOTO PP
01150	LD	DE,1ØØ	;1ØØ DECIMAL TO DE	01770	CP	23	;LETTERS 23 = Q
01160	ADD	HL,DE	;ADD 1ØØ TO TIME 1	01780	JP	Z,QQ	;IF SO, GOTO QQ
01170	LD	(TIME3),HL	;STASH IT AWAY IN TIME 3	01790	CP	24	;LETTERS 24 = O
01180	LD	HL,SPD3A	;TIME 2 MESSAGE ADDRESS	01800	JP	Z,OO	;IF SO, GOTO OO
01190	CALL	28A7H	;DISPLAY MESSAGE ROUTINE	01810	CP	25	;LETTERS 25 = B
01200	JP	SPD4A	;JUMP AROUND MESSAGE -	01820	JP	Z,BB	;IF SO, GOTO BB
01210	SPD3A	DEFM 'INPUT TIME 2'	;FOR SAFETY'S SAKE				

01830	CP	26	;LETTERS 26 = G	02440	CP	25	;FIGURES 25 = ?
01840	JP	Z,GG	;IF SO, GOTO GG	02450	JP	Z,QUEST	;IF SO, GOTO QUEST
01850	CP	27	;LETTERS 27 = FIGURES	02460	CP	26	;FIGURES 26 = AMPERSAND
01860	JP	Z,FIGS1A	;IF SO, GOTO FIGS 1	02470	JP	Z,AND	;IF SO, GOTO AND
01870	CP	28	;LETTERS 28 = M	02480	CP	27	;FIGURES 27 = FIGURES
01880	JP	Z,MM	;IF SO, GOTO MM	02490	JP	Z,START	;IGNORE, AS ALREADY THERE
01890	CP	29	;LETTERS 29 = X	02500	CP	28	;FIGURES 28 = PERIOD
01900	JP	Z,XX	;IF SO, GOTO XX	02510	JP	Z,PERIOD	;IF SO, GOTO PERIOD
01910	CP	30	;LETTERS 30 = V	02520	CP	29	;FIGURES 29 = /
01920	JP	Z,VV	;IF SO, GOTO VV	02530	JP	Z,SLASH	;IF SO, GOTO SLASH
01930	JP	START	;IF ERROR, GOTO START	02540	CP	30	;FIGURES 30 = ;
01940	FIGS1A	LD	A,1	02550	JP	Z,SEMIC	;IF SO, GOTO SEMIC
01950	LD	(SHIFT),A	;STASH IT AWAY IN SHIFT	02560	CP	31	;FIGURES 31 = LETTERS
01960	JP	START	;START ALL OVER AGAIN	02570	JP	Z,UNSHIF	;IF SO, GOTO UNSHIFT
01970	FIGS2A	POP	AF	02580	JP	START	;IF ERROR, GOTO START
01980	CP	1	;FIGURES 1 = 3	02590	SPACEA	LD	A,Ø
01990	JP	Z,THREE	;IF SO, GOTO THREE	02600	LD	(SHIFT),A	;AUTOMATIC 'UNSHIFT' -
02000	CP	2	;FIGURES 2 = LINE FEED	02610	LD	A,' '	;ON SPACE: Ø = LETTERS
02010	JP	Z,START	;IF SO, IGNORE IT	02620	JP	SHOW	;SPACE
02020	CP	3	;FIGURES 3 = -	02630	AA	LD	A,'A'
02030	JP	Z,DASH	;IF SO, GOTO DASH	02640	JP	SHOW	;GOTO SHOW
02040	CP	4	;FIGURES 4 = SPACE	02650	BB	LD	A,'B'
02050	JP	Z,SPACEA	;IF SO, GOTO SPACE	02660	JP	SHOW	;GOTO SHOW
02060	CP	6	;FIGURES 6 = 8	02670	CC	LD	A,'C'
02070	JP	Z,EIGHT	;IF SO, GOTO EIGHT	02680	JP	SHOW	;GOTO SHOW
02080	CP	7	;FIGURES 7 = 7	02690	DD	LD	A,'D'
02090	JP	Z,SEVEN	;IF SO, GOTO SEVEN	02700	JP	SHOW	;GOTO SHOW
02100	CP	8	;FIGURES 8 = CARR. RETURN	02710	EE	LD	A,'E'
02110	JP	Z,CARRTN	;PRINTER CARRIAGE RETURN	02720	JP	SHOW	;GOTO SHOW
02120	CP	9	;FIGURES 9 = \$	02730	FF	LD	A,'F'
02130	JP	Z,DOLLAR	;IF SO, GOTO DOLLAR	02740	JP	SHOW	;GOTO SHOW
02140	CP	1Ø	;FIGURE 1Ø = 4	02750	GG	LD	A,'G'
02150	JP	Z,FOUR	;IF SO, GOTO FOUR	02760	JP	SHOW	;GOTO SHOW
02160	CP	11	;FIGURES 11 = APOSTROPHE	02770	HH	LD	A,'H'
02170	JP	Z,APOST	;IF SO, GOTO APOST	02780	JP	SHOW	;GOTO SHOW
02180	CP	12	;FIGURES 12 = COMMA	02790	II	LD	A,'I'
02190	JP	Z,COMMA	;IF SO, GOTO COMMA	02800	JP	SHOW	;GOTO SHOW
02200	CP	13	;FIGURES 13 = !	02810	JJ	LD	A,'J'
02210	JP	Z,EXCLAM	;IF SO, GOTO EXCLAM	02820	JP	SHOW	;GOTO SHOW
02220	CP	14	;FIGURES 14 = :	02830	KK	LD	A,'K'
02230	JP	Z,COLON	;IF SO, GOTO COLON	02840	JP	SHOW	;GOTO SHOW
02240	CP	15	;FIGURES 15 = (	02850	LL	LD	A,'L'
02250	JP	Z,CLOSE	;IF SO, GOTO CLOSE	02860	JP	SHOW	;GOTO SHOW
02260	CP	16	;FIGURES 16 = 5	02870	MM	LD	A,'M'
02270	JP	Z,FIVE	;IF SO, GOTO FIVE	02880	JP	SHOW	;GOTO SHOW
02280	CP	17	;FIGURES 17 = "	02890	NN	LD	A,'N'
02290	JP	Z,QUOTE	;IF SO, GOTO QUOTE	02900	JP	SHOW	;GOTO SHOW
02300	CP	18	;FIGURES 18 = )	02910	OO	LD	A,'O'
02310	JP	Z,OPEN	;IF SO, GOTO OPEN	02920	JP	SHOW	;GOTO SHOW
02320	CP	19	;FIGURES 19 = 2	02930	PP	LD	A,'P'
02330	JP	Z,TWO	;IF SO, GOTO TWO	02940	JP	SHOW	;GOTO SHOW
02340	CP	2Ø	;FIGURES 2Ø = #	02950	QQ	LD	A,'Q'
02350	JP	Z,NUMBER	;IF SO, GOTO NUMBER	02960	JP	SHOW	;GOTO SHOW
02360	CP	21	;FIGURES 21 = 6	02970	RR	LD	A,'R'
02370	JP	Z,SIX	;IF SO, GOTO SIX	02980	JP	SHOW	;GOTO SHOW
02380	CP	22	;FIGURES 22 = ZERO	02990	SS	LD	A,'S'
02390	JP	Z,ZERO	;IF SO, GOTO ZERO	03000	JP	SHOW	;GOTO SHOW
02400	CP	23	;FIGURES 23 = 1	03010	TT	LD	A,'T'
02410	JP	Z,ONE	;IF SO, GOTO ONE	03020	JP	SHOW	;GOTO SHOW
02420	CP	24	;FIGURE 24 = 9	03030	UU	LD	A,'U'
02430	JP	Z,NINE	;IF SO, GOTO NINE	03040	JP	SHOW	;GOTO SHOW

03050 VV	LD	A,'V'		03670	JP	START	;GOTO START
03060	JP	SHOW	;GOTO SHOW	03680	SHOW	LD (37E8H),A	;SEND TO LINE PRINTER
03070 WW	LD	A,'W'		03690	CALL	033H	;DISPLAY 'A' ON VIDEO
03080	JP	SHOW	;GOTO SHOW	03700	LD	A,(14400)	;CLR/BREAK KEY ROW IN MEM
03090 XX	LD	A,'X'		03710	CP	4	;BREAK KEY PRESSED ?
03100	JP	SHOW	;GOTO SHOW	03720	JP	Z,SPEED	;IF SO, GOTO SPEED CHANGE
03110 YY	LD	A,'Y'		03730	JP	START	;GOTO START
03120	JP	SHOW	;GOTO SHOW	03740	TIME1	DEFW 1530	;SAVE 2 BYTES FOR TIME 1
03130 ZZ	LD	A,'Z'		03750	TIME2	DEFW 765	;SAVE 2 BYTES FOR TIME 2
03140	JP	SHOW	;GOTO SHOW	03760	TIME3	DEFW 865	;SAVE 2 BYTES FOR TIME 3
03150 ONE	LD	A,'1'		03770	SHIFT	DEFB 0	;SAVE A BYTE-SHIFT STATUS
03160	JP	SHOW	;GOTO SHOW	03780	CARRET	LD A,0DH	;0DH = CARRIAGE RETURN
03170 TWO	LD	A,'2'		03790	CALL	033H	;DO IT ON VIDEO
03180	JP	SHOW	;GOTO SHOW	03800	RET		;RETURN WHENCE U CAME + 1
03190 THREE	LD	A,'3'		03810	CARRTN	LD A,0DH	;CARRIAGE RETURN
03200	JP	SHOW	;GOTO SHOW	03820	LD	(37E8H),A	;DO IT ON LINE PRINTER
03210 FOUR	LD	A,'4'		03830	JP	START	;GOTO START
03220	JP	SHOW	;GOTO SHOW	03840	CLS	CALL 01C9H	;STANDARD ROM CLS ROUTINE
03230 FIVE	LD	A,'5'		03850	LD	A,0	;MODEL 3 COMPATABILITY
03240	JP	SHOW	;GOTO SHOW	03860	OUT	(224),A	; " " "
03250 SIX	LD	A,'6'		03870	LD	A,48	; " " "
03260	JP	SHOW	;GOTO SHOW	03880	OUT	(236),A	; " " "
03270 SEVEN	LD	A,'7'		03890	RET		;RETURN WHENCE U CAME + 1
03280	JP	SHOW	;GOTO SHOW	03900	END	W4UCH	;EL FIN = EL BEGUINE
03290 EIGHT	LD	A,'8'					
03300	JP	SHOW	;GOTO SHOW				
03310 NINE	LD	A,'9'					
03320	JP	SHOW	;GOTO SHOW				
03330 ZERO	LD	A,'0'					
03340	JP	SHOW	;GOTO SHOW				
03350 DASH	LD	A,'-'					
03360	JP	SHOW	;GOTO SHOW				
03370 DOLLAR	LD	A,'\$'					
03380	JP	SHOW	;GOTO SHOW				
03390 APOST	LD	A,'"'					
03400	JP	SHOW	;GOTO SHOW				
03410 COMMA	LD	A,'.'					
03420	JP	SHOW	;GOTO SHOW				
03430 EXCLAM	LD	A,'!'					
03440	JP	SHOW	;GOTO SHOW				
03450 COLON	LD	A,':'					
03460	JP	SHOW	;GOTO SHOW				
03470 OPEN	LD	A,'('					
03480	JP	SHOW	;GOTO SHOW	TIME1	1530	1390	1222
03490 QUOTE	LD	A,'"'		TIME2	765	695	611
03500	JP	SHOW	;GOTO SHOW				468
03510 CLOSE	LD	A,')'					
03520	JP	SHOW	;GOTO SHOW				
03530 NUMBER	LD	A,'#'					
03540	JP	SHOW	;GOTO SHOW				
03550 QUEST	LD	A,'?'					
03560	JP	SHOW	;GOTO SHOW				
03570 AND	LD	A,'&'					
03580	JP	SHOW	;GOTO SHOW				
03590 PERIOD	LD	A,'.'					
03600	JP	SHOW	;GOTO SHOW				
03610 SLASH	LD	A,'/'					
03620	JP	SHOW	;GOTO SHOW				
03630 SEMIC	LD	A,';'					
03640	JP	SHOW	;GOTO SHOW				
03650 UNSHIF	LD	A,0	;0 = LTRS				
03660	LD	(SHIFT),A	;STASH IT AWAY IN SHIFT				

Lines 450-530: The program is initialized with TIME1, TIME2, and TIME3 set at 1530, 765, and 1630 respectively, for 60 words per minute speed. Use the following constants for speeds noted on the Model I. For the Model III you may add 15% due to the faster clock, though the Model I constants will work quite well as the program allows considerable leeway. TIME3 is calculated by the program. TIME2 could ALSO have been calculated, but we like to make Gridley feel "he is contributing" to the program. In the next Chapter, TIMES 1, 2, & 3 are set when the transmit mode is initialized, though YOU may input them later if you wish for differing transmit and receive speed operation.

60 SPEED	66 SPEED	75 SPEED	100 SPEED
----------	----------	----------	-----------

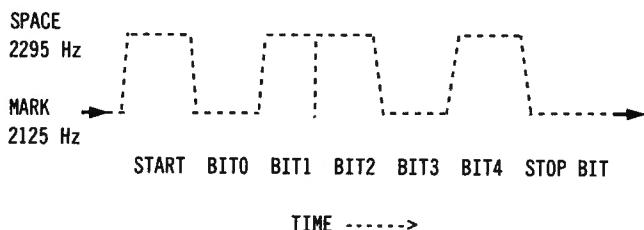
TIME1	1530	1390	1222
-------	------	------	------

TIME2	765	695	611
-------	-----	-----	-----

TIME1 = the bit length, TIME2 = 1/2 bit length, and TIME3 = TIME1 + 100, for any given speed.

Lines 450-470 are testing the CLEAR key again, and in the next Chapter will send the program off to the TRANSMIT MODE. Lines 480-500 are waiting for a START bit, and loop to line 450 till one is received. WHEN a START bit is received, the program falls through to line 510 which zeroes out the "D" register and then delays for one-half bit length in lines 520 and 530.

The drawing below illustrates a typical Baudot character. In this case, the letter D = 9 decimal. LSB is sent FIRST.



Bit zero is the least significant bit and Bit 4 the most significant bit. What we are trying to accomplish in lines 520 and 530 via the 1/2 bit length time delay is to CENTER our software UART's timing exactly in the MIDDLE of each bit when we test each bit for a mark or space. After lines 520 and 530 the program should be "dead center" in the middle of the start bit, with respect to time.

Lines 540-880: First delay 1 bit length in lines 540 & 550. This places the program "dead center" in the middle of bit zero. Lines 560 to 580 test bit zero for a mark or space and IF a mark, go off to SET zero and set bit zero of the D register to a one. IF not a mark, bit zero of the D register is left at value zero and lines 590 & 600 do ABSOLUTELY NOTHING except create an equalizing time delay EXACTLY the same as if bit zero had been a mark instead of space. Actually, four NOPs would have been within a microsecond or two of lines 590 & 600, but why not be EXACT instead of sloppy. Lines 610 to 880 repeat the process for the rest of the Baudot word (we really mean character).

Lines 890-920: First delay for one bit length which takes the program into about the first third of the STOP bit, saves the DE register in the stack since D has the Baudot character number in it, and then jumps off to LETTERS in line 1290.

Lines 930-1280: Contain both the SET and speed change instructions.

Lines 1290-1320: First test the MEM location of SHIFT to see whether the previous Baudot character was LETTERS or FIGURES. If letters, it falls through to line 1320 where the stack (previous DE register) is popped into the AF register. If the previous character was FIGURES, then line 1310 sends the program off to FIGS2A in line 1970. The contents of the SHIFT MEM location do much the same thing as the SHIFT key on your typewriter.

Lines 1330-1930: Match up the Baudot decimal value with its appropriate character and send it off to be loaded with its ASCII equivalent. Lines 1850 & 1860 send the program off to set SHIFT in lines 1940-1960 if it was the Baudot FIGURES value.

Lines 1970-2580: Do virtually exactly the same thing for the FIGURES characters as lines 1330-1930 do for the LETTERS characters.

Lines 2590-2620: Do the job of UNSHIFT ON SPACE. Anytime we are receiving Baudot characters in

the FIGURES mode, IF a space occurs these lines force the program back into the LETTERS mode. Depending upon what you are using your radio teletype for (bookkeeping), you may change this feature, though highly unlikely.

Lines 2630-3640: Simply load A register with the ASCII value of the received Baudot character and then jump off to SHOW in line 3680.

Lines 3650-3670: Set the LETTERS/FIGURES MEM location of SHIFT back to LETTERS if the Baudot decimal 31 = LETTERS was received while in the FIGURES mode.

#### WHAT DID HE SAY ? ? ?

A real mouthful, Gridley. What we meant was that if you are in FIGURES you have GOT TO HAVE SOME WAY TO GET BACK TO LETTERS. This is how it is done.

Line 3680: This line sends "A," the decoded ASCII character to MEM location 37E8H which is both the Model I and Model III memory mapped location for line printer output. IF you have a line printer attached and "TURNED ON" it may print out the character that was received (see the following "LIVE" printout) from ARRL Headquarters via their amateur radio station W1AW that was transmitted as an RTTY bulletin during April 1981. Since we are RECEIVING an RTTY signal of anywhere from 60 to 100 words per minute equivalent speed, it is solely UP TO YOUR PRINTER as to whether or not it can follow the incoming signal's speed. Our Western I/O (IBM) Selectric can printout both 60 and 66 WPM RTTY, but cannot follow the higher speeds. As in MOST good things, you have a choice between quality and speed; i.e., most any dot matrix printer will run up to ten times faster ... but the print quality is not exactly to TEXTBOOK standards. Give a little, take a little.

Lines 3690-3730: Display the received character on the video display and then test MEM for whether the BREAK key is pressed. If so, off to speed change ONLY for the RECEIVE MODE program.

Lines 3740-3830: Reserve MEM locations for TIMES 1, 2, 3, & SHIFT. CARRET and CARRTN provide carriage returns for the video display and line printer, respectively.

Lines 3840-3890: Allow program compatibility between the Model I and Model III.

## USING THE PROGRAM - ARRL DAILY RADIO TELETYPE BULLETINS

The Flesher TU-170 terminal unit provides 10 volt RMS outputs from both mark and space for an oscilloscope to aid in tuning the RTTY signal. A scope is really unnecessary with the panel tuning meter that is provided. After a few minutes practice, you should have little difficulty tuning in most any RTTY signal that you can hear.

There is one pitfall to avoid. When starting out, do not try tuning in a station transmitting at 66, 75, or 100 words per minute equivalent speed with the receive program set at 60 WPM as it obviously will not work. The American Radio Relay League station, W1AW transmits daily RTTY bulletins at 60 WPM at 0200, 0500, and 2300 UTC daily, plus Monday through Friday at 1600 UTC DURING NON-DAYLIGHT SAVING TIME. During daylight saving time, these RTTY bulletins are transmitted ONE HOUR EARLIER.

Frequencies that would be of interest for these transmissions are: 7.095, 14.095, 21.095, and 28.095 MHz.

The following is a small segment of the W1AW bulletin received at this location on 14.095 MHz on April 9, 1981 USING THIS PROGRAM TO PRINT IT OUT ON OUR WESTERN I/O SELECTRIC PRINTER. The only changes that have been made to it are to change the 72 characters per line to a justified 62 characters per line so it would fit on this page.

QST DE W1AW  
HR ARRL BULLETIN NR 40 FROM ARRL HEADQUARTERS  
NEWINGTON CT APRIL 9, 1981  
TO ALL RADIO AMATEURS BT

THE U.S. COAST GUARD HAS REQUESTED INFORMATION CONCERNING A DISTRESS BEACON THAT WAS TRANSMITTED ON OCTOBER 26, 1980 AT 0400 UTC ON 123.5 AND 243.0 MHZ. THIS TRANSMISSION WOULD HAVE BEEN FOUR TO SIX DASHES OF FOUR SECONDS DURATION EACH. ANY INDIVIDUAL WHO MIGHT HAVE HEARD THIS DISTRESS SIGNAL IS ASKED TO CONTACT THE COAST GUARD OFFICE OF MARINE INVESTIGATION, COMMANDANT G MMI 1, U.S. COAST GUARD HEADQUARTERS, WASHINGTON, D.C. 20593, TELEPHONE 202 426 1455 AR

TELETYPE/ASCII BULLETINS ARE SENT DAILY AT 0200, 0500, AND 2300 UTC AND MONDAY THROUGH FRIDAY AT 1600 UTC. \*\*\*

\*\*\* NOTE: during non-daylight saving time.  
\*\*\* NOTE: during non-daylight saving time.

THE BULLETINS WILL NOW BE REPEATED ON 110 BAUD ASCII

The American Radio Relay League's W1AW daily RTTY bulletins are primarily of interest to active ARRL members and cover many ham radio topics. The Friday bulletins are fun to copy and of special interest to that breed of radio amateur interested in working every imaginable RARE COUNTRY, coral reef, atoll, sand-spit, or what-have-you.

## CONCLUSION OF CHAPTER 6

We have tried to present as logical and straight forward a Baudot radio teletype receive program as can be written for the TRS-80 Model I and Model III. It is possible to shorten the program somewhat, but NOT without sacrificing the clarity and simplicity that was our primary goal.

For those readers who are not familiar with the functions of many of the CALLs the program uses to Level II ROM, we suggest you read Volumes 1, 2, and 3 of the **Disassembled Handbook for TRS-80**. They are available for \$10, \$15, and \$18 respectively from your local dealer, H & E Computronics, or:

Richcraft Engineering Ltd.  
Drawer 1065, Wahmeda Industrial Park  
Chautauqua, New York 14722 USA

For those readers who prefer the German language editions, Volumes 1, 2, & 3 (Vol. 4 fall '81) are available from:

Ingenierburo fur Datentechnik  
Unter Oelbach 1  
5090 Leverkusen 3  
WEST GERMANY

For those readers who prefer the French language editions, Volumes 1, 2, & 3 (Vol. 4 fall '81) are available from:

GRAPHIE - M. P. Douy  
16, Bd. Aristide-Briand  
93100 Montreuil  
FRANCE

For those readers in the U.K., English language editions of Volumes 1, 2, & 3 (Vol. 4 fall '81) are available from:

General Northern Microcomputers (GNOMIC)  
46 Middle Street, Blackhall  
Hartlepool, Cleveland  
ENGLAND

## IN THE NEXT CHAPTER

We will put it all together, Chapters 5 & 6, into a single unified Baudot radio teletype transmit and receive program.

WILL "RECEIVE MODE" TELL ME THE WORDS PER MINUTE SPEED ? ? ?

We give up, Gridley. You win. Yes, the RECEIVE MODE reminder will include the equivalent words per minute speed just in case you have forgotten what it was. The CLEAR KEY will be your transmit/receive switch and if you wish, you may use bit zero or bit one output to PORT ZERO to control your transmitter, receiver, and antenna relay.

continued on page 54

Spelling Errors? Does your TRS-80\* wordprocessor need help?

# PROOF READER<sup>T.M.</sup>

CAN SPELL rendezvous AND mnemonic AND OVER 38,000 OTHER WORDS

Now let your TRS-80 and Proofreader by Soft-Tools check your Scripsit\*, Electric Pencil, or other documents for spelling and typographical errors. It has all the features needed to meet your proofreading requirements.

- Checks every single word of even your biggest document in under 5 minutes.
- The 38,000 word dictionary is one of the largest available.
- Dictionary can be easily extended to add more words such as technical terms or names.
- All unknown words are listed on the screen and can be saved on a file for printing.
- Works with almost any TRS-80 wordprocessor including Scripsit and Electric Pencil.
- Comes with complete and easy to understand User's Manual.

• Proof-Edit™, optional interactive corrections feature for Model I/III

# GRAMMATIK<sup>T.M.</sup>

## BEYOND SPELLING CHECKING

A spelling checker may not be enough! This paragraph contains a number of common errors (indicated by underlining) that will be discovered by Grammatik that would seldom ever be caught by a spelling checker. For example, Grammatik checks for improper word usage as identified by a number of writing style manuals (such as "seldom ever"). Grammatik will check for the presence of certain words such as jargon or sexist terms. It also checks for consistant punctuation, cap-

italization, balanced quotation marks and parentheses, and and repeated words. In addition, it will produce a list of all unique words found in your document with the number of times each was used. Grammatik comes with a dictionary of commonly misused phrases and a dictionary of sexist terms. It also includes a complete set of utilities to build, sort, and merge phrase and jargon dictionaries of your own. Works with Scripsit, Electric Pencil, and other standard TRSDOS text files.

	Proofreader	Grammatik	Proof-Edit
MODEL I Requires 32K RAM, 1 disk drive, TRSDOS or NEWDOS..	\$54.00	\$49.00	\$30.00
MODEL II Requires 64K RAM, 1 disk drive, TRSDOS 2.0 (can check 1.2 files using XFERSYS).....	\$109.00	\$99.00	N/A
MODEL III Requires 32K RAM, 1 disk drive, TRSDOS..... Manual only, specify model (refundable) .....	\$64.00 \$3.00	\$59.00 \$5.00	\$30.00 \$5.00

Soft-Tools are professional quality software tools developed for the TRS-80 by a Ph.D. in Computer Science. Other tools include:

— SOFT-SCREEN™, a powerful, state of the art full screen text editor. Over a year in development, Soft-Screen is compatible with all TRS-80 programming languages, including BASIC, FORTRAN, MACRO, Ratfor, and COBOL. Easy to use, comes with tutorial and full documentation.

— RATFOR, a structured language preprocessor for Fortran developed at Bell Labs. Soft-Tools Ratfor provides a number of extensions, including "case" and

"string". Includes complete manual with all the information needed to learn and write Ratfor programs. Requires FORTRAN.

— PP-RATFOR, a pretty printer for use with Soft-Tools Ratfor. Automatically formats and indents Ratfor source programs.

	Ratfor	PP-Ratfor	Both	Soft-Screen
MODEL I	\$49.00	\$30.00	\$74.00	\$69.00
MODEL II	\$99.00	\$49.00	\$139.00	\$99.00
MODEL III	\$59.00	\$34.00	\$84.00	\$75.00
Manual only(refundable)			\$12.00	\$15.00

MODEL I, III require 48K, 2 drives, TRSDOS  
MODEL II requires 64K, 1 drive, TRSDOS 2.0

Please call or write for more details.

# SOFT-TOOLS<sup>T.M.</sup>

Orders sent postpaid by first class mail.  
Terms: Cash, check, money order, VISA, or  
Master Card. NM residents add 4% tax.  
When ordering, specify model, memory size,  
number of drives, and operating system.



Dealer inquiries invited

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

\* Trademark of Tandy Corporation

Proofreader, Soft-Tools, and Soft-Screen are trademarks of Soft-Tools.

# BEGINNER'S CORNER

Sherry M. Taylor

## ELEMENTARY ARRAYS (PART VI)

Here it is Septmeber and our 13th gathering. Beautiful September! I can hardly believe that I made it through the summer. Oh, no, it wasn't the heat that got me down. It was my school-aged son picking fights with his little sister every day for two and a half months. He's back to school now and peace reigns in the castle for 7 hours a day. Hallelujah !!

As you can see by the name above, I am **not** A. Douglas Werbeck. (No, he did not get a sex change operation! Even if he did, he wouldn't tell you.) Due to a slight conflict of interest, Doug can no longer continue writing the BEGINNER'S CORNER. Not wanting to leave you hanging in mid-air, he has asked me to continue for him, and as he and I agree on most views, I think it should work out well.

I began microcomputing two and a half years ago on a Model I Level II 4 K system. Since then, I have upgraded to a Model III 32K system. However, I am still cassette bound, so I am probably on the same level, equipment-wise, as most beginners. But, my claim to fame is that I have been programming for 2 1/2 years, and I read everthing I can get my hands on that deals with microcomputing, TRS-80 style. I am hooked. Also, I am teaching a Beginner's Class to several teachers who are trying to get ready for the new computers just recently bought for their school. So, any questions that are troubling them, I can safely assume are probably troubling you. But, if I don't touch on something that you need help with, please write me. If you would like a personal answer, include a SASE. I'll get back to you as soon as possible.

Okay, on with the show. Let's refresh our memory here so we'll know where we are, and hopefully, know where we are going.

In columns 11 and 12, Doug provided programs that illustrated two of the three possible ways of loading numbers into an array. In column #11, we used the line input by the operator method. In #12, we used the data statement. This time, we are going to have a little fun with our trusty cassette recorder and have the numbers read in from tape.

If you have the last program we used on tape, please load it now. We will have a short musical interlude while you do that.

Okay, I assume you are ready. Our first order of business will be to create a "data tape." A data tape is like a DATA line, except that the numbers are stored on magnetic tape (or disk) rather than within the program.

If you will take a look at the DATA line in the

program, line 100, you will see that there is a line of numbers, each one separated by a comma. Only those numbers will be put on the tape.

To get you prepared for modifying the program, I will have to introduce two new terms: PRINT #-1 and INPUT #-1.

The statement/command PRINT #-1 (pronounced "print number minus one"), turns the recorder motor on, does a CSAVE of the values you listed, and then turns the recorder motor off. The -1 refers to cassette recorder #1. That is because the Model I TRS-80, with the expansion interface, has the ability to use 2 tape recorders. Sorry, Model III folks, only 1 recorder connection for you. (Just as a point of interest: if you had 2 recorders, there is also a PRINT #-2 statement.)

This is the format for PRINT #-1:

PRINT #-1, 3, 7, 9, 1, 2, 8

It is used normally within a program but can be used as a command outside a program if it is done immediately when you press ENTER.

INPUT #-1 is the opposite of PRINT #-1. This statement turns the recorder motor on, CLOADs the data, then turns the recorder motor off; and, unlike PRINT #-1, INPUT #-1 cannot be used as a command. It must be used inside a program.

Now that we have that background stuff out of the way, let's modify the program that you have already loaded into your electronic marvel.

\* Change line 10's REM statement to REM INPUT PROGRAM FOR SEPT. COMPUTRONICS

\* Delete lines 30, 80, and 100.

\* Replace line 20 with the following line:

20 INPUT #-1, P(Ø,Ø,), P(1,Ø), P(2,Ø), P(Ø,1),  
P(1,1), P(2,1)

\* Add these lines to the program:

```
11 PRINT "PREPARE THE RECORDER BY INSERTING A BLANK  
TAPE AND SET TO RECORD."  
12 INPUT "PRESS ENTER WHEN READY"; Z$  
13 PRINT #-1, 3, 7, 9, 1, 2, 8  
14 PRINT "THE NUMBERS ARE NOW ON TAPE. REWIND THE  
TAPE AND SET TO PLAY."  
15 INPUT "PRESS ENTER WHEN READY"; Z$
```

Now your program should look like this:

# Color computer owners, 32K PLUS DISKS<sup>\*</sup> **\$298.00**

Yes, that's right - for as little as \$298.00 you can add 32K of dynamic RAM, and a disk interface, to your TRS-80 Color Computer! If you just want the extra memory it's only \$199.00, and you can add the disk interface later for \$99.00.

Just plug the *Color Computer Interface (CCI)*, from Exatron, into your expansion socket and "Hey Presto!" - an extra 32K of memory. No modifications are needed to your computer, so you don't void your Radio Shack warranty, and Exatron give both a 30 day money-back guarantee and full 1 year repair warranty on their interface.

The *CCI* also contains a 2K machine-language monitor, with which you can examine (and change) memory, set break-points, set memory to a constant and block-move memory.

So what about the *CCI Disk Card*? Well as we said it's only an extra \$99.00, but you'll probably want Exatron's *CCDOS* which is only \$29.95 - unless you want to write your own operating system. The *CCI Disk*

*Card* uses normal TRS-80 Model I type disk drives, and *CCDOS* will even load Model I TRSDOS disks into your color computer - so you can adapt existing TRS-80 BASIC programs.

As a further plus, with the optional *ROM Backup* adaptor, you can dump game cartridges to cassette or disk. Once the ROM cartridge is on cassette, or disk, you can reload, examine and modify the software. The *ROM Backup* adaptor is only \$19.95.

For more information, or to place an order, phone Exatron on their Hot Line 800-538 8559 (inside California 408-737 7111), or clip the coupon.

## DEALER ENQUIRIES INVITED

Exatron,  
181 Commercial Street,  
Sunnyvale, CA 94086



- Please send a 32K Color Computer Interface for \$199.00
- Please send a CCI Disk Card for \$99.00
- Please include *CCDOS* and manual for \$29.95
- Also include a *ROM Backup* adaptor for \$19.95

Please add \$5.00 for shipping to all orders, and 6 percent sales tax in California.

Name .....

Address .....

City .....

State ..... Zip .....

Charge my:

MasterCard Interbank Code .....

Visa      Expiration Date .....

Card.....

Check enclosed for .....

Ship COD (\$2.00 extra)

Signature .....



excellence in electronics

# exatron

```

10 CLS: DIM P(2,1) : REM - INPUT PROGRAM FOR
SEPT. COMPUTRONICS
11 PRINT "PREPARE THE RECORDER BY INSERTING A BLANK
TAPE AND SET TO RECORD."
12 INPUT "PRESS ENTER WHEN READY"; Z$
13 PRINT #1, 3, 7, 9, 1, 2, 8
14 PRINT "THE NUMBERS ARE NOW ON TAPE. REWIND THE
TAPE AND SET TO PLAY."
15 INPUT "PRESS ENTER WHEN READY"; Z$
20 INPUT #1, P(0,0), P(1,0), P(2,0), P(0,1),
P(1,1), P(2,1)
40 PRINT " 0 1 2"
50 PRINT " - - -"
60 PRINT "0 ) ";P(0,0);"; "P(1,0);"; "P(2,0)
70 PRINT "1 ) ";P(0,1);"; "P(1,1);"; "P(2,1) : PRINT
90 PRINT "ALL 6 POSITIONS HAVE BEEN FILLED - END OF PROGRAM"

```

Next, after you are sure everything is right, RUN the program. Obey the prompts, and you should have a nice array printed out on your screen with all positions filled — all by the magic of PRINT #-1 and INPUT #-1. I am sure that you can see the usefulness of this. So you thought that the tape recorder was only for storing programs! Shame on you!

Let's look at an application of this principle: Let's say you are in charge of a hydroelectric plant. It is your job to keep track of how much coal you use during the year so that you can intelligently order coal for the coming months. This would be based on the amount of coal you used for the same months last year. Your foreman measures the coal pile every week. You take his figures and calculate how much coal was used since the last measurement. Each week you enter this figure into the computer to be saved on tape. By the end of the year, you would have 52 totals. Depending on how you add the totals, you could tell how much coal was used in each of the months, how much you used during the quarter, or how much you used all year.

There are a couple of rules you need to be aware of when using the PRINT #-1 and INPUT #-1 statements:

- 1) Always save the same number of elements as you intend to load back in. If you don't, you will get an OUT OF DATA error.

- 2) Make sure the variable names match the type of data you are reading (numeric or string). If the computer encounters a number where there should be a STRING, you will get a BAD FILE DATA error.

Since we mentioned the word STRING, let's take a moment to find out what it is. Defined, a STRING is a sequence of alphanumeric characters. "Alphanumeric characters" is computerese for letters and numbers. On the trusty TRS-80, the dollar sign (\$) is used to indicate a STRING variable. (A\$ is pronounced A-string.) For example, A\$="John L. Doe" is a string. So is B\$="123 Sesame Street". In this format, the entire string is enclosed by quotation marks. In DATA

statements and PRINT #-1 and INPUT #-1 statements, they don't have to have the quotes around them unless they contain a comma or other punctuation marks, or include numbers, such as an address.

You may also use DEFSTR to indicate a string variable. DEFSTR Q will cause any variable that begins with Q to be a string. That also means that you cannot use Q (or any other variable defined as a string) as a number. If you do, you will get the old TM ERROR, (type mismatch).

There is a thing called the STRING ARRAY. It is the same thing as a numeric array except that the array positions contain a STRING. For instance, let's say ROOM\$(2)="BRIGHT, SUNNY KITCHEN." As you see, we could have the makings of an adventure. (The green, slimy monster is probably under the sink in the bright, sunny kitchen rather than in the dark, dank, musty dungeon, huh?)

These STRINGS can also be loaded into your array by the same three methods we have covered. For example:

```
100 DATA "DARK, DANK, MUSTY DUNGEON", "BRIGHT, SUNNY
KITCHEN"
```

or

```
100 INPUT #1, "DARK, DANK DUNGEON", ROOM$(2), ROOM$(3)
```

We have now discovered 3 methods of loading values into arrays: 1) line input by the operator, 2) READing the values from a DATA line within the program, and 3) CLOADing the values from a data tape using INPUT #-1.

We have also discovered how to make a data tape to CLOAD from using the PRINT #-1 statement. And, we have seen that working with STRING arrays is no more difficult than working with numeric arrays.

Now a piece of advice. Do you remember I said we were going to have fun with our "trusty" cassette recorders? Well, how do you keep a tape recorder "trusty"? Invest in a tape head demagnetizer and head cleaner. Use it at least every other week, more often if you are a heavy user. I've had many hard-to-load programs load easily after one pass of the head cleaner. If you want to save yourself a lot of frustration, get one.

I guess that about covers it for arrays. The subject for the next gathering of the BEGINNER'S CORNER will be a surprise. I would tell you, but I will need time to evaluate where we are and which direction we *should* go. If you have any ideas on the subject, contact me and let me know what you think. I'm open to suggestions. Send your comments, favorable or unfavorable, to me at the address indicated below.

Until next time, may all your discoveries be good ones!

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

## *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 ~~Carson~~ 1601  
Riverside Dr. CPS Serial 113

**IMPACT PRINTER** 165 CPS  
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 P.M. (319) 2035

**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 documen-  
tation. Up and running in Fortran.  
Not much more than TTY at \$1000.  
**Herb Sauer, 303-494-8724.**

**FOR SALE:** Heath H9 video terminal, 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).  
W/ ~~RE~~ 1510 NW 72nd

**PET COMPUTERS** moving up to LS-1  
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

ads are categorized for fast location of specific items. Combining this with low individual ad rates — 10 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

**COMPUTER SHOPPER**  
The Nationwide Marketplace for Computer Equipment  
P O Box 23 • Titusville, Florida 32780  
Telephone 325-2211

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

# COMPUTRONICS

# QUESTIONS AND ANSWERS

## Conducted by Hubert S. Howe, Jr.

### QUESTION

from Dr. Robert Richardson, Drawer 1065, Chautauqua, NY 14722: I had (wisely or stupidly) the NEW video chip with lower-case descenders (g, j, p, q, y) installed in my ole' trusty Model I when it was out for repair. VERY KINDLY, the repairman did NOT foul-up its use with Electric Pencil, leaving the Pencil switch, et al, alone. The PROBLEM is this: rather than printing "left arrows" after each ENTER, it prints capital Ms. This is really no big problem, but I would like to cure it if you have any suggestions.

### ANSWER

There is NO cure; the capital Ms are part of the new video chip that you had installed. It's interesting to note some aspects of this situation that many users aren't aware of.

The video display chip, complete with lower case, is part of every TRS-80 Model I manufactured. Early models used the chip without descenders but with the left arrows, while later models incorporated the descenders with the Ms. "Installing lower case" in a Model I actually involves adding a one-bit RAM chip in the video display section; lower case letters don't display because bit 6 in the video RAM doesn't exist. (The main problem with the Electric Pencil modification was the extra Control key.)

The characters that are printed by the Electric Pencil program to represent carriage returns and line feeds are equivalent to what you get by POKING the ASCII values of these functions (CR=13, LF=10) into the video RAM. If you PRINT these characters, they will produce carriage returns and line feeds rather than Ms or left arrows. On the Model III, which uses an even more sophisticated character generator, certain characters are available ONLY through being POKED into video RAM.

It's difficult to get used to something new, especially when one has been thinking that the left arrows were intended to represent carriage returns when actually it was just a fortuitous happenstance. We sympathize with the problem, but we have gotten used to both systems here at Computronics since we have both types of Model I's.

### QUESTION

from R. M. Sanford, 12787 139th Street N., Largo, FL 33540: I purchased a Radio Shack Expansion Interface with zero memory, intending to do my own addition of 16K memory and later 16K more to make 32K total. The first 16K of added memory was ordered from Hobby World Electronics of Northridge, California as their catalog no. 1156B. They advertised no. 1156 for the keyboard, no. 1156A for Expansion Interfaces manufactured before 1979, and no. 1156B for those manufactured since 1979.

The first 16K was installed and has worked perfectly to date. I then ordered a second 16K from the same source, specifying no. 1156B 200 nanosecond type to match the first 16K exactly. Chips received came with an invoice identifying them as no. 1156 for the keyboard unit. A telephone call to Hobby World gave me the information that the chips were all the same and would be ok. A subsequent letter trying to go further into this matter remains unanswered. I have not installed these chips to date.

Hobby World continues to advertise the three separate items no. 1156, 1156A and 1156B. There is no way for me to find out if the chips will work but install them. The second lot of chips are marked 7-684316 8028FJ Japan M5K4116P. Can you tell me their speed rating?

As a second question, memory expansion chips are now advertised from 150 to 300 nanosecond speed. What is best? What is not advisable? A Radio Shack repairman advises me that their chips are 350 nanosecond and that keyboard chips and interface chips are not interchangeable, which is why I have not installed the second group of 16K. I am sure that your readers would appreciate answers to these questions.

### ANSWER

The person who told you that "they're all the same" may be closest to the truth. The TRS-80's system clock has a speed of 563 nanoseconds (nS) and therefore should be able to work with chips rated as slow as 500 nS. Since there is a bit of overhead with the processor, memory chips with an access time of 450 nS are usually specified for the TRS-80, to be safe.

When an Expansion Interface is added to the system, there are additional complications due to various design flaws in the interface itself and in the process of sending the signals back and forth across the buffered cable. Memory with an access time of 350 nS is usually specified for the Interface.

All of this changes considerably if you consider adding one of the various speedup modifications to your system. In this case memory chips with access times of at least 300 nS would be specified, and 200 nS would be preferred.

There is no difference in the manufacturing process between 200 and 500 nS memory chips. Each one is tested under stringent conditions and thrown into bins in 50 nS increments from 150 to 500 nS. The fastest ones can cost considerably more than the slower ones, because there are fewer of them. Since the TRS-80 has been introduced, many manufacturers have brought out copies of these RAM chips bearing different numbers and ratings. As a result, they have dropped significantly

## It's Not Your Printer, It's Your Software

in price and are easily available. They are also used in numerous products besides the TRS-80, some with more demanding requirements and others with less, which is why there are so many different ratings.

The only way you can discover whether the chips you purchased will work is to try them out. If you are careful, you will not damage the Expansion Interface if you install them even if they don't work. We have found that you can mix many different kinds of chips in the Interface with no ill effects. Also, and very important, we have noted that many problems that show up as memory errors are not due to bad chips but to corrosion on the Expansion Interface cable or other problems. This can be corrected simply by cleaning the edge connectors with an eraser.

If you would like to understand more about the Model I's problems and possible fixes, there is an excellent article called "When Kicking It Won't Help" by Dennis Bathory Kitsz in issue number 10 of *The Alternate Source* (address: 1806 Ada Street, Lansing, MI 48910).

\* \* \* \* \*

As we conclude this month's questions, I would like to discuss some limitations that we must place on answering your questions. We are open to any kind of question at all on the TRS-80 computers, and if we can't help you we won't be afraid to say so. If you have a question about a program published in *Computronics*, unless it relates to a typographical error in the published copy, we will usually just forward it to the author of the program. Since we almost always publish the names and addresses of the authors in the magazine, you may prefer to write them yourself. They are not under any obligation to reply, but most of them are interested in your questions and want to know how others are making use of their programs. If you think there is an error in the published copy, check the next couple of issues for corrections, for we usually catch simple errors and inform our readers quickly.

If you have a question about a piece of software that you have purchased either from *Computronics* or from another vendor, we probably cannot answer it unless we have had extensive experience with the program. We have had experience with many programs, and we try out everything that we sell before we accept it, but you will probably get better results by writing directly to the authors of the program.

Finally, don't send us a listing of a program and say, "You find the error!" If you do want to send us a copy of a program, send it on media rather than on paper. Be sure to describe the nature of your problems in detail, and tell us the computer and configuration you are using, including peripherals.

\* \* \* \* \*

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. ■

Do you own a Centronics 737? 739? Lineprinter IV? Tired of the limitations of SCRIPSIT? QWERTY 3.0 will let you produce Greek letters, mathematical symbols, simultaneous subscripts and superscripts, controlled underlining, footnotes, 2 and 3 column folio formats, TABLES in proportional mode, page ends, plus much more. See our ad in '80 Microcomputing for a better description.

**Qwerty 3.0** is more than "fully tested." It has seen thousands of hours of use in a university environment. A masters thesis and a statistical doctoral dissertation were produced using this package.

**Qwerty 3.0** is the finest SCRIPSIT addition available for the Centronics 737, 739 and Lineprinter IV. You must own one of these printers, a copy of SCRIPSIT, and a disk drive to use it. It is the best. Period. WE GUARANTEE YOU WILL AGREE! If for some reason, you find that this program doesn't meet your needs, return the entire package within 14 days for a prompt and cheerful refund.

**Qwerty 3.0 Disk, Manual, Reference Card, and Printer Table Rule** \$49.95

**Qwerty 3.0 Manual Alone** \$10.00

**MED SYSTEMS SOFTWARE**  
P.O. BOX 2674-C  
CHAPEL HILL, N.C. 27514  
(919)933-1990

## microfusion\*



## CHROME

- CHROME is the perfect back-up for disk — low cost, very low error rate
- Twice as secure during EMPs, power failures, & other malfunctions
- MICROFUSION\* CHROME runs like a champ on high baud rate formats like JPC
- Needs no special modification on good cassette decks
- CHROME saves lots of money & time — saves lots of program & data

C-10s — 10 for only \$12.00!

C-20s — 10 for only \$15.00!

Add \$2 per order for P&H; in CT add 7.5% tax. M.O., check, MasterCard, Visa. If paying by card, give card number, expiration date, sign order. Prompt shipment.

Nine CHROME are in black, 5-screw shells; the 10th CHROME (in white) carries a half dozen of Emory Cook's fast-running business-oriented subroutines with documentation. They're in R/S Level II Basic, some very sneaky.

True digital transfer plus premium tape makes us the acknowledged prime duplicator of software for T.I., OSI, and all the Tandy, Apple, Pet, Atari, & fast formats. Write for further information, or call 203-853-3641.

\* TM Reg      **COOK LABORATORIES, INC.**  
**375 Ely Avenue      Norwalk, CT 06854**  
*Oldest in DIGDUP, newest in SOAP*  
(If you don't know what SOAP stands for, place an order!)

continued from page 46

## CHAPTER 6 ADDENDUM

CASSETTE TEST TAPE 60-66-75-100 WPM BAUDOT & 110 BAUD ASCII:

Richcraft is NOT in the teletype cassette tape business, but does offer a standard cassette tape that may be played through the TRS-80's cassette player/recorder to test the Baudot and ASCII receive programs in Chapters 6 and 9.

The audio frequency shift keying accuracy is better than plus or minus 1/2 Hertz for both the 2125 cycle Mark tone and 2295 cycle Space tone at 60, 66, 75, and 100 words per minute equivalent speed in Baudot and also at 110 Baud ASCII, if your cassette is operating properly.

The reason for the high cost is that each tape is custom made when an order is received as we expect (and hope for) VERY FEW orders. Also, each tape is individually tested at ALL speeds.

The reasons for offering the teletype test tape are threefold:

1. A number of users do not have a calibrated lab standard source for testing TRS-80 based TTY receiving systems.

2. It is difficult to find 66, 75, and 100 speed Baudot RTTY stations on the ham bands when one needs them. And, when one finds them their absolute and frequency shift accuracy is often somewhat less than lab standard.

3. Our Editor believes it would be useful to the readers.

This cassette test tape is available for \$25 in U.S. funds and is postpaid first class/air mail to any address



**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

in the world that has international postal service.  
Order from:

Richcraft Engineering Ltd.  
Drawer 1065, Wahmeda Industrial Park  
Chautauqua, New York 14722 USA

## 5,000,000/10,000,000 BYTES

**SERIES III H** from Micro-Mainframe. Hard disk drive(s) in a Model III (\$7,995), 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.

**GL80 — \$150** — Radio Shack General Ledger 1.1 with over 30 added features: A general ledger, classified balance sheet, check register and option to use an "automatic" account number or re-do an entry or document.

**AR80 — \$200** — Radio Shack Accounts Receivable 1.2 with automatic posting of standard monthly amounts such as installment contracts.

**GL/M1 — \$50** — Modifications to convert Radio Shack General Ledger 1.1 to GL80.

**AR/M1 — \$50** — Modifications to convert Radio Shack Accounts Receivable 1.2 to AR80.

**GL/M1 and AR/M1** are supplied as program lines which must be MERGED into the original programs, or, send a disk copy of the original programs for installation at no additional charge. Documentation (apply to purchase) — \$5.

**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

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

**COMPUTRONICS**

# STATPAC® WILL MAKE YOUR STATISTICAL LIFE EVEN EASIER FOR ONLY \$185,

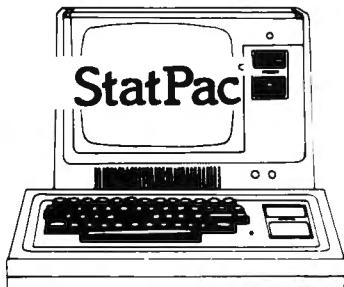
*... but not for long ...*

On Oct. 1, 1981 the price goes up to \$285. That's still a small price for statistical analyses comparable to main-frame SPSS and SAS.

The new, improved StatPac is a 3-part program written and designed for research, survey and questionnaire processing, data entry, statistical analysis, management and market analysis.

Whether you're a researcher, a programmer or reader and user of data — StatPac can fit your needs because you create the data file format to fit your specifications.

StatPac is available for Model I (requires NEWDOS) or Model III, 2 disk drives, 48K RAM and a lineprinter. StatPac handles all phases of research analysis including: frequency analysis, descriptive statistics, crosstabs & chi-square, t-test, correlation & linear regression, analysis of variance, multiple linear regression and management reports.



Buy the complete 3-disk program for only \$185 until Oct. 1. After that it is \$285. The extensive user's manual is included or may be purchased separately for \$30. MasterCard and VISA accepted. Entire package includes over 30 integrated programs.

For more information and a free 16-page brochure write or call:

612/866-9022  
Walonick Associates  
5624 Girard Ave. So.  
Minneapolis, MN 55419

## The DATA-TRANS 1000

A completely refurbished  
**IBM Selectric Terminal** with  
built-in **ASCII Interface**.

\*FOR YOUR TRS-80 WITH OR WITHOUT  
EXPANSION INTERFACE. AVAILABLE WITH  
CENTRONICS TYPE PARALLEL PORT.

### Features:

- 300 Baud Serial
- 14.9 characters per second printout
- Reliable heavy duty Selectric mechanism
- RS-232C Interface
- Documentation included
- 60 day warranty—parts and labor
- High quality Selectric printing Off-line use as typewriter
- Optional tractor feed available
- 15 inch carriage width

Also works with Exatron's Stringy floppy. for fast loading of programs. (Has RS232 built in stringy)

### HOW TO ORDER **DATA-TRANS 1000**

1. We accept Visa, Master Charge. Make cashiers checks or personal check payable to:

#### **DATA-TRANS**

- 2. All orders are shipped F.O.B. San Jose, CA
- 3. Deliveries are immediate



Desk and table top models also available.

For orders and information

## **DATA-TRANS**

45277 Fremont Blvd., #7 ✓<sup>274</sup>  
Fremont CA 94538

Phone: (408) 263-9246

**COMPUTRONICS**

# THE GUARDED BOMB

Chris Jaggi

This program is designed for a 16K Level II TRS-80.

In this game of skill and strategy, you must try to get the bomb and take it out of the room before being captured by the guard, who is determined to let the bomb go off. The location of the door you must escape through is shown at the start of the game. I assure you that there is a way to win the game in 31 time units. You are given 200 time units, so you should have plenty of time.

The DATA statements at the beginning of the program are locations on the screen where the guard reaches an intersection. If this happens, then the program will jump to a specified subroutine from lines 405 to 407. This will enable the guard to make the best move possible. If you stay far enough away from the guard, then he might not bother you unless you get too close to the bomb.

Lines 3000 to 3030 set up what the dungeon will look like. An X\$ stands for four graphics blocks, while Y\$ stands for four spaces. If you have a keypad, then your controls are "8" up, "4" left, "6" right, and "2" down. Use "5" to stop or to run into a wall (ouch!).

If you don't have a keypad, then make the following changes in lines 410, 440, 470, 500, and 401:

Change the "4" in line 410 to a "J".

Change the "8" in line 440 to an "I".

Change the "6" in line 470 to an "L".

Change the "2" in line 500 to a ",".

Change the "5" in line 401 to a "K".

With these changes, your controls would be "I" up, "J" left, "L" right, "," down, and "K" to stop.

If, heaven forbid, you should ever get bored with the game, try playing against a rougher time limit by changing the value of TI in line 310. Lots of luck, and happy deactivating!

```
0 DATA 68,76,84,104,120,132,248,264,268,276,292,296,304,376
10 DATA 416,420,492,496,504,516,520,532,544,556
20 REM COMPUTRONICS CONTEST
30 REMA THE GUARDED BOMB
40 REMAR B Y : CHRIS JAGGI
50 REMARK VERSION 2.0
100 CLS : GOTO 10000
200 CLS : FOR X=1 TO 4 : PRINT A$(X); : NEXT
210 A=700 : B=536
220 C$=CHR$(136)+CHR$(171)+CHR$(151)+CHR$(132) : D$="
230 C$(1)=C$
240 PRINT @A,C$; : PRINT @B,C$;
310 AA=0 : Z=732 : BB=3 : TI=200 : G=0 : R=0
320 PRINT @668,"TIME ";
330 PRINT @248,(::);
340 PRINT @108,"DOOR";CHR$(94);":": :PRINT @A-64,"YOU";
350 PRINT @B-7,"GUARD";: FOR X=1 TO 1000 : NEXT
360 PRINT @108,STRING$(8,32);
370 PRINT @A-64,"";: PRINT @B-7,"      ";
400 Q$= INKEY$ : PRINT @Z, TI;D$; : TI=TI-1 : IF TI=-1 THEN 2520
401 IF R<1 AND A=248 THEN GOSUB 8000 ELSE IF Q$="5" THEN AA=0:
Q$="" ELSE IF Q$<>"1" THEN GOSUB 600
402 IF R=1 THEN GOSUB 9000 ELSE IF AA=0 THEN 405
403 ON AA GOSUB 410,440,470,500
405 IF B<269 THEN FOR X=1TO9: IF B>B(X) THEN NEXT : GOTO 409:
ELSE ON X GOSUB 4000,4005,4005,4005,4010,4015,4015,4000,4020
406 IF B<493 AND B>268 THEN FOR X=1 TO 8 : IF B>B(X+9)
THEN NEXT:
GOTO 409: ELSE ON X GOSUB 5000,5005,5010,4020,5015,4000,5020,5025
407 IF B>493 THEN FOR X=1TO7: IF B>B(X+9+8) THEN NEXT :
GOTO 409:
ELSE ON X GOSUB 6000,5020,6010,6015,6020,6020,5020
409 GOTO 7000
410 IF Q$="4" OR AA=1 THEN C=PEEK(15360+A-4) :
IF C>128 AND C<192 THEN AA=0 ELSE 430
420 RETURN
430 AA=1: PRINT @A,D$;:A=A-4: PRINT @A,C$(1);
440 IF Q$="8" OR AA=2 THEN C=PEEK(15360+A-63):
IF C>128 AND C<192 THEN AA=0 ELSE 460
450 RETURN
460 AA=2: PRINT @A,D$;:A=A-64: PRINT @A,C$(1);
470 IF Q$="6" OR AA=3 THEN C=PEEK(15360+A+5):
IF C>128 AND C<192 THEN AA=0 ELSE 490
480 RETURN
490 AA=3: PRINT @A,D$;:A=A+4: PRINT @A,C$(1);
500 IF Q$="2" OR AA=4 THEN C=PEEK(15360+A+65):
IF C>128 AND C<192 THEN AA=0 ELSE 520
510 RETURN
520 AA=4: PRINT @A,D$;:A=A+64: PRINT @A,C$(1);
540 RETURN
600 IF Q$="4" THEN AA=1 ELSE IF Q$="8" THEN AA=2
ELSE IF Q$="6" THEN AA=3 ELSE IF Q$="2" THEN AA=4
610 RETURN
2510 IF G>1 THEN GOSUB 9000 ELSE IF R=1 AND G>1
THEN PRINT @896,"TOO LATE";STRING$(29,32);
ELSE PRINT @896,STRING$(37,128);: GOSUB 10000: GOTO 200
2511 G=1:R=0: GOTO 2510
2520 PRINT @Z,"OUT      ";: GOTO 2510
2900 CLEAR 2000: DEFINT A-Z: DIM B(24)
2910 FOR X=1TO24: READ T:B(X)=T: NEXTX
3000 X$=STRING$(4,191):Y$="      ";
A$(1)=STRING$(68,121)+STRING$(56,128)+  
X$+X$+Y$+X$+Y$+X$+Y$+X$+X$+X$+Y$+X$+X$+Y$+X$+  
X$+X$+X$+Y$+X$+Y$+X$+X$+X$+X$+Y$+X$+X$+Y$+  
3010 A$(2)=X$+X$+X$+Y$+Y$+X$+Y$+X$+Y$+Y$+Y$+Y$+Y$+  
X$+X$+X$+X$+Y$+X$+X$+Y$+X$+X$+Y$+X$+X$+Y$+  
X$+Y$+X$+Y$+X$+X$+Y$+X$+Y$+X$+Y$+X$+Y$+X$+  
X$+Y$+X$+Y$+X$+X$+Y$+X$+Y$+X$+Y$+X$+Y$+X$+  
3020 A$(3)=Y$+X$+X$+STRING$(44,128)+  
STRING$(20,191)+ STRING$(16,128)+ STRING$(24,191)+  
STRING$(16,32)+X$+X$+ STRING$(16,32)+X$+ STRING$(16,32)+X$+
STRING$(8,32)
```

continued on page 58

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.

- ISOLATOR (ISO-1) 3 filter isolated 3-prong sockets; integral Surge/Spike Suppression; 1875 W Maximum load, 1 KW load any socket \$62.95
- 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 \$62.95
- SUPER ISOLATOR (ISO-3), similar to ISO-1 except double filtering & Suppression \$94.95
- ISOLATOR (ISO-4), similar to ISO-1 except unit has 6 individually filtered sockets \$106.95
- SUPER ISOLATOR (ISO-11) similar to ISO-2 except double filtering & Suppression \$94.95
- CIRCUIT BREAKER, any model (add-CB) Add \$ 8.00
- CKT BRKR/SWITCH/PILOT (-CBS) Add \$16.00

AT YOUR  
DEALERS

Master-Card, 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



## MEDCOMP INCORPORATED ANNOUNCES

UCSD Pascal Operating System Version 4.0  
for the TRS-80 Model II 64K

- Requires 64K with one disk drive
- Supports four drives
- Keyboard type-ahead on both console and remote
- Supports both Serial and Parallel Printers
- Clock support
- "dummy" USER device for output
- Universal Formatting
- Disk drivers for hard disk or non 8" floppies

For more information write:

**MEDCOMP INCORPORATED**  
392 Pleasant Street  
Brockton, MA 02401  
(617) 965-0529

# MAYDAY™

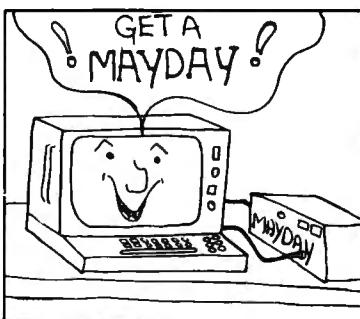
*The Complete Uninterruptible Power Supply*



The lights blinked -  
even the slightest power failure



can ruin a data disk and  
cause loss of the program.



Protect your time and  
investment -

for more information contact ...

**Sun - Technology, Inc.**  
Box 210  
New Durham, New Hampshire 03855  
(603) 859-7110



We honor:



(Manufacturing high technology products since 1970)

**COMPUTRONICS** INC.

# CORRECTIONS

Errors were printed in both the TITLE and LABELS programs in our July 1981 issue.

The main problem with the TITLE program by John P. Stebbins is that plus signs (+) were printed as number signs (#). This happened extensively in the program listing, but it can easily be corrected: simply change ALL of the number signs to plus signs.

In the LABELS program by Frank P. Vlamings, two lines need to be changed, as follows:

```
10 CLS:CLEAR 500:DIM N(200),N(200),H(30),J(30),K(30),L(30),M(30)
7210 PRINT W$;: IN$=IN$+W$: WL%=WL%+1
```

The following program lines were inadvertently left out of the GRAPHICS TEXT PRINTING PROGRAM by Joseph Rosenman in our August 1981 issue. They should be tacked on to the end of the listing that appears in there.

```
2560 DATA 129, 194, 188, 143, 188, 194, 130, 247
2570 DATA 174, 153, 183, 179, 140, 179, 187, 166, 157, 247
2580 DATA 144, 194, 143, 188, 143, 194, 160
2590 REM
2600 REM    IN-PROGRAM TEXT INITIALIZATION.
2610 H=12 : REM H=NUMBER OF LINES.
2620 REM TEXT GOES HERE INTO THE "A" ARRAY. MAX OF 48 LINES.
2630 A(1)="      Graphic Print Program"
2640 A(2)="      "
2650 A(3)="      by Joseph Rosenman"
2660 A(4)="      " : A(5)="      "
2670 A(6)="This program will print any text on an"
2680 A(7)="EPSON MX-80 printer, with a graphics border"
2690 A(8)="around it. It also centers on the page,"
2700 A(9)="and centers the text to the longest line."
2710 A(10)="      "
2720 A(11)="      ENJOY IT!!!!"
2730 A(12)="* * * * * * * * * * * *"
2740 RETURN
2750 END
```

In addition, the following test program should have been included with the GRAPHIC TEXT PRINTING PROGRAM, as described in the article:

## TEXTPRNT

```
10 REM NORMAL TEXT PRINTER ROUTINE FOR GRPHPRNT DATA.
20 REM    BY JOSEPH ROSENMAN    JUNE, 1981.
30 CLS : CLEAR 3000 : DEFSTR A-G : DIM A(50) : K=0
40 C = "" : PRINT "DO YOU WANT A DIRECTORY?"
50 INPUT "<ENTER> FOR NONE, <#> FOR DRIVE"; C
60 IF LEN(C) = 0 GOTO 120
70 H=VAL(C) : IF H=0 GOTO 80 ELSE ON H GOTO 90,100,110
80 CMD"DIR #": GOTO 40
90 CMD"DIR 1": GOTO 40
100 CMD"DIR 2": GOTO 40
110 CMD"DIR 3": GOTO 40
120 PRINT : LINE INPUT "WHAT IS THE INPUT FILESPEC: ";B
```

```
130 OPEN "I",1,B
140 INPUT#1,K
150 FOR I=1 TO K : PRINT @ 896, STRING$(63," ")
160 LINE INPUT#1, A(I) : PRINT @ 896, A(I) : NEXT I
170 PRINT @ 896, STRING$(63," ") : PRINT @ 896, A(1)
180 CLOSE 1 : PRINT "FILE LOADED" : PRINT : PRINT
190 PRINT "TYPE <Y> TO PRINT OR <Q> TO QUIT"
200 C=INKEY$ : IF C = "" GOTO 200
210 IF C <> "Y" AND C <> "Q" GOTO 200 ELSE IF C = "Q" END
220 INPUT "LEFT MARGIN WIDTH";J
230 D=STRING$(J," ")
240 FOR I=1 TO K
250 LPRINT D; A(I) : NEXT I
260 LPRINT CHR$(12)
270 CLS : PRINT "PRINTING CONCLUDED" : PRINT @ 524,
"PRINT AGAIN? (Y/N)"
280 C=INKEY$ : IF C = "" GOTO 280
290 IF C = "Y" GOTO 240 ELSE IF C <> "N" GOTO 270
300 CLS : PRINT "PRINT ANOTHER FILE? (Y/N)"
310 C=INKEY$ : IF C = "" GOTO 310
320 IF C = "Y" GOTO 30 ELSE IF C <> "N" GOTO 310
330 END
```

continued from page 56

```
3030 A$(4)= STRING$(8,32)+X$+X$+ STRING$(16,32)+X$+
STRING$(16,32)+X$+ STRING$(16,32)+ STRING$(68,191)
3040 GOTO 200
4000 IF BB=1 THEN BB=4: RETURN : ELSE BB=3: RETURN
4005 IF B>A OR A=132 THEN BB=1: RETURN :
ELSE IF A=132 THEN BB=1: RETURN : ELSE IF A>0 AND
B>A THEN BB=1: RETURN : ELSE IF B+60>A OR A=248 OR
A=184 THEN BB=3: RETURN : ELSE BB=4: RETURN
4010 IF A<>248 AND R<1 THEN PRINT @248,"(:)::";
IF BB=3 THEN BB=4: RETURN : ELSE BB=1: RETURN
4011 IF BB=3 THEN BB=4: RETURN : ELSE BB=1: RETURN
4015 BB=2: RETURN
4020 IF BB=3 THEN BB=4: RETURN : ELSE BB=1: RETURN
5000 IF B-192>=A THEN BB=2: RETURN : ELSE IF B>A THEN BB=2:
RETURN : ELSE IF B+60>A THEN BB=3: RETURN : ELSE BB=4: RETURN
5005 IF A>272 AND A<B THEN BB=1: RETURN : ELSE IF A<B+60
THEN BB=3: RETURN : ELSE BB=4: RETURN
5010 IF BB=3 AND B>A THEN BB=2: RETURN : ELSE IF BB=3 THEN
BB=3: RETURN : ELSE IF A>B THEN BB=3: RETURN :
ELSE IF A>272 AND A<B THEN BB=1: RETURN : ELSE BB=2: RETURN
5015 BB=4: RETURN
5020 IF BB=3 THEN BB=2: RETURN : ELSE BB=1: RETURN
5025 IF B<A AND (A<508 OR A=508-64 OR A=508-128)
THEN BB=3: RETURN : ELSE IF B<A THEN BB=4: RETURN :
ELSE BB=3: RETURN
6000 IF B>A THEN BB=2: RETURN : ELSE IF BB=3 THEN BB=3:
RETURN : ELSE BB=1: RETURN
6010 BB=3: RETURN
6015 IF A=516 THEN BB=1: RETURN : ELSE IF B>A THEN BB=2:
RETURN : ELSE BB=3: RETURN
6020 IF A>515 AND A<B THEN BB=1: RETURN : ELSE IF B>A
THEN BB=2: RETURN : ELSE BB=3: RETURN
7000 ON BB GOSUB 7100,7200,7300,7400
7010 GOTO 400
7100 C=PEEK(15360+B-4): IF C>128 AND C<191 THEN 2510
```

```

1110 PRINT @B,D$;:B=B-4: PRINT @B,C$;: RETURN
7200 C=PEEK(15360+B-64): IF C>128 AND C<191 THEN 2510
7210 PRINT @B,D$;:B=B-64: PRINT @B,C$;: RETURN
7300 C=PEEK(15360+B+4): IF C>128 AND C<191 THEN 2510
7310 PRINT @B,D$;:B=B+4: PRINT @B,C$;: RETURN
7400 C=PEEK(15360+B+64): IF C>128 AND C<192 THEN 2510
7410 PRINT @B,D$;:B=B+64: PRINT @B,C$;: RETURN
8000 C$(1)=CHR$(136)+CHR$(175)+CHR$(151)+CHR$(132):
PRINT @A,C$(1)::R=1: PRINT @896,"YOU'VE GOT IT NOW
GET OUT OF THE ROOM";: RETURN
9000 IF R>1 THEN RETURN ELSE IF A<116 AND A>248
AND A>184 THEN PRINT @664," YOU HAVE";:
PRINT @Z-2,"SAVED US ALL";: FOR X=1TO1000:
NEXT :G=1: GOTO 2510
9010 RETURN
10000 PRINT @896,"HIT <ENTER> TO PLAY GAME";
10010 Q$=INKEY$: IF Q$=CHR$(13) THEN RUN 2900 ELSE 10010

```

Chris Jaggi  
345 Roberts Road  
Barrington, IL 60010

**24 HOUR ORDER LINE**

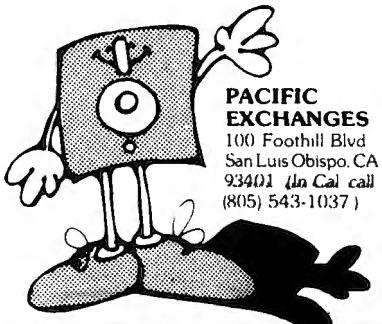
**(914) 425-1535**

**THE BIGGEST NAME IN LITTLE COMPUTERS™**

**wabash®**

# **When it comes to Flexible Disks, nobody does it better than Wabash.**

MasterCard, Visa Accepted.  
Call Free: (800) 235-4137



# **H&E COMPUTRONICS INC.**

# COMPUTRONICS<sup>INC.</sup>

• • EVERYTHING For Your TRS-80\* Model II or Model III • •

\* TRS-80™ is a trademark of Tandy Corp.

## BUSINESS/80 presents

- All orders processed within 24 Hours
- 30-Day money back guarantee
- Add \$3.00 for shipping in UPS Areas
- Add \$4.00 for C.O.D. or NON-UPS Areas
- Add \$5.00 to Canada or Mexico
- Add exact postage to all other countries

### NEW PROFESSIONAL BUSINESS SYSTEMS NEW

PBS  
for  
TRS-80 MODEL II  
or  
TRS-80 MODEL III  
with 2 Disk Drives  
and 48K (64K for Model II)

- ★ Each Module Can Be Operated Individually Or As A Coordinated System.
- ★ Turn-Key Error Catching Operation For Beginners.
- ★ Each Module Is Accompanied By More Than 100 Pages Of Step-By-Step Documentation.
- ★ Manuals Available Separately. (\$35 each)
- ★ Each Module Sells For:
  - \$195 (Model III TRSDOS Version)
  - \$295 (Model II TRSDOS Version)
  - \$495 (Model II Peachtree CP/M Version)

BUSINESS/80 \* BUSINESS/80

### GENERAL LEDGER

#### Processes

- ★ Flexible design allows system to be easily adapted to both small businesses and also to firms performing client writeup services.
- ★ Add, change or delete records within the Chart of Accounts (Master) File.
- ★ List the Chart of Accounts File.
- ★ Key in transactions into the Transactions (Journal Entries) File.
- ★ List the Transactions File.
- ★ If other Peachtree Software packages are present, pass summary transactions from these packages to the General Ledger at the end of the accounting period.
- ★ At the end of an accounting period, print out the major reports:
  - (1) Trial Balance (Detail Report)
  - (2) Transaction Registers
  - (3) Balance Sheet
  - (4) Prior Year Comparative Balance Sheet
  - (5) Income Statement
  - (6) Prior Year Comparative Income Statement
  - (7) Department Income Statements

#### File Information

There are two main computer files maintained within the General Ledger System.

- (1) The of Accounts File
  - Account Number
  - Description
  - Account Type
  - Balance Sheet Column Code
  - Current Amount
  - Year-To-Date Amount
  - Budget Amount
  - Prior Year Monthly Amounts
- (2) The Transactions File
  - Account Number
  - Description
  - Source Code
  - Reference
  - Date
  - Amount

### ACCOUNTS RECEIVABLE

#### Processes

- ★ Add, change or delete records within the Customer File.
- ★ List the entire Customer File, or any Customer within the File.
- ★ Enter invoices, payments, credits and adjustments.
- ★ Prepare invoices and statements.
- ★ Produce the following reports:
  - (1) Aged Accounts Receivable
  - (2) Invoice Register
  - (3) Payment, Credit and Adjustment Register
  - (4) Customer Account Status Report
- ★ At the end of a month, post the following items to the General Ledger:
  - (1) Invoiced Sales
  - (2) Freight Charges
  - (3) Sales Tax
  - (4) Service Charge Income
  - (5) Cash Payments
  - (6) Discounts Allowed
  - (7) Returns/Credits
  - (8) Income Adjustments
  - (9) Accounts Receivable

#### File Information

There are three main computer files maintained within the Accounts Receivable System, the Customer File, the Invoice File, and the Transaction File.

#### CUSTOMER FILE

- Customer Account Number
- Customer Name
- Address
- Phone
- Type of Account
- Credit Terms
- Credit Limit
- Tax Rate
- Discount Rate
- Date of Last Credit
- Date of Last Debit
- Amount of Last Credit
- Amount of Last Debit
- Current Balance
- High Balance
- Year-To-Date Sales
- Year-To-Date Payments
- Automatic Billing Amount

#### INVOICE FILE

- Invoice Number
- Invoice Date
- Invoice Amount
- Credit Terms

#### TRANSACTION FILE

- Transaction Type
- Transaction Date
- Transaction Amount

## ACCOUNTS PAYABLE

### Processes

- \* Add, change or delete records within the Vendor File.
- \* List the Vendor File.
- \* Enter vouchers.
- \* Automatically determine which vouchers to pay.
- \* Print checks and a Check Register.
- \* Produce the following reports:
  - (1) Open Voucher Report.
  - (2) Accounts Payable Aging 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 (cont'd)

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 affecting 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 ANALYSIS SYSTEMS

50 N. PASCACK ROAD  
SPRING VALLEY, NEW YORK 10977



24 HOUR  
ORDER  
LINE  
(914) 425-1535



NEW TOLL-FREE  
ORDER LINE  
(OUTSIDE OF N.Y. STATE)  
(800) 431-2818

# THE ORIGINAL MAGAZINE FOR OWNERS OF THE TRS-80™\* MICROCOMPUTER

\* TRS-80™ IS A TRADEMARK OF TANDY CORP

SOFTWARE  
FOR TRS-80™  
OWNERS

H & E COMPUTRONICS INC.

MONTHLY  
NEWSMAGAZINE  
FOR TRS-80™  
OWNERS

## MONTHLY NEWSMAGAZINE

### Practical Support For Model I, II, III & Color

- PRACTICAL APPLICATIONS
- NEW EXPANDED BUSINESS SECTION
- GAMBLING • GAMES
- EDUCATION
- PERSONAL FINANCE
- BEGINNER'S CORNER
- NEW PRODUCTS
- SOFTWARE EXCHANGE
- MARKET PLACE
- QUESTIONS AND ANSWERS
- PROGRAM PRINTOUTS
- .... AND MORE

ALL PRICES AND SPECIFICATIONS SUBJECT TO CHANGE

## NOW IN OUR 4th YEAR

PROGRAMS AND ARTICLES PUBLISHED IN RECENT ISSUES  
INCLUDE THE FOLLOWING:

- FINCALC - A COMPLETE FINANCIAL APPLICATIONS PACKAGE
- INFORMATION SYSTEM REVIEW
- STATISTICAL COMBINATIONS
- PASCAL'S TRIANGLE
- ASSEMBLY LANGUAGE FOR BEGINNERS
- DISK FILES
- MOD-III REVIEW
- KEYBOARD THUNDER AND LIGHTING EXPLAINED
- DOS COMMANDS IN LEVEL II
- PROBABILITY CURVE GENERATOR
- CALCULATOR SIMULATIONS
- THE MEGABYTE GAP
- STOCKS AND BONDS
- BUDGET ANALYSIS (FOR BUSINESS AND HOME)
- NEWDOS/80 REVIEW
- DUTCHING - THE HORSE SYSTEM THAT CAN'T LOSE
- A SIMULATED GOLF GAME
- CONTINUOUS FORM SOURCES
- TAX/SAVER REVIEW
- .... AND MORE

**FREE\*** WITH YOUR SUBSCRIPTION OR RENEWAL **FINCALC** A Complete Financial Analysis Package Used To Calculate Markup, Margin, Annuities, Compound Interest, Nominal And Effective Rates, Sinking Funds, Mortgage Calculations, Future Value, Savings and Insurance, Percentage Difference Between Two Numbers, Amortization Schedule and More . . . . .

SEND FOR OUR NEW 64 PAGE SOFTWARE CATALOG (INCLUDING LISTINGS OF HUNDREDS OF TRS-80™ PROGRAMS AVAILABLE ON CASSETTE AND DISKETTE). \$2.00 OR FREE WITH EACH SUBSCRIPTIONS OR SAMPLE ISSUE

\* All programs are supplied on cassette (add \$3 for Diskette Version - add \$5 for modified Mod-II Version).

**COMPUTRONICS**  
MATHEMATICAL APPLICATIONS SERVICE™

50 N. PASCACK ROAD  
SPRING VALLEY, NEW YORK 10977  
ONE YEAR SUBSCRIPTION \$24 .....

TWO YEAR SUBSCRIPTION \$48 .....

SAMPLE OF LATEST ISSUE \$ 4 .....

START MY SUBSCRIPTION WITH ISSUE.....

(#1 - July 1978 • #12 - June 1979 • #24 - July 1980 • #30 - January 1981)

NEW SUBSCRIPTION..... RENEWAL.....

NEW TOLL-FREE  
ORDER LINE  
(OUTSIDE OF N.Y. STATE)  
**(800) 431-2818**

**NEW!!!**  
**MOD-II NEWSLETTER**  
**\$18/year (or 12 issues)**

 **24 HOUR ORDER LINE**  
  
 **(914) 425-1535**

CREDIT CARD NUMBER \_\_\_\_\_ EXP. DATE \_\_\_\_\_

SIGNATURE \_\_\_\_\_ NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_ CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

\*\*\* ADD \$12/YEAR (CANADA, MEXICO) - ADD \$24/YEAR AIR MAIL - OUTSIDE OF U.S.A., CANADA & MEXICO \*\*\*

# DOSPLUS

## MODEL I or MODEL III

from MICRO SYSTEMS  
SOFTWARE INC.

**MODEL III DOSPLUS READY NOW!** That's right! DOSPLUS 3.3 for the MODEL III is available now. We have our MODEL III, and now you can have our DOS. All the great features of our popular MODEL I DOS, plus Single or Double Density Operation. The best gets better! Order now, and soon your MODEL III will be all the computer it can be. Experience excellence. Experience DOSPLUS.

**\$99.95**

**DOSPLUS:** The flagship of the Micro-Systems line. This is the BEST disk operating system currently available. It offers you all the features you could ever use, speed, reliability, and much more! Full support of variable length records. No more internal errors during file handling due to poorly written operating systems. Allows use of ISAM technique. Supports 35-80 track drives. The two operating systems are basically the same. However, Dosplus 3.2D will operate double density. The double density DOS has some differences peculiar to double density operation. Both systems offer DOS commands from BASIC, BASIC rerun, and BASIC program compressor. DOS utilities include a sector display/modify program, a utility to purge files, AND a utility to restore purged or killed files. Free space map and the most comprehensive directory on the market. Try it and you'll never use anything else. All this and much more for only \$99.95 either system.

### DOSPLUS CONTAINS ALL OF THE FOLLOWING FEATURES . . . .

- 1) Radio Shack compatibility
- 2) Error free variable length records
- 3) Full lower case detection and support
- 4) Repeating keyboard with NO keybounce EVER
- 5) Shift [0] typewriter keyboard option
- 6) Execute only protection feature for BASIC programs
- 7) Automatic track support for 35 through 80 track drives (mixed)
- 8) Device I/O handling with FORCE command
- 9) Supports high speed clock modification (up to 4.0mhz)
- 10) Supports mixed mode (single & double density) automatically
- 11) Allows disable-enable to break key
- 12) Allows user to define step rate per drive and re-configure system disk
- 13) Allows for efficient use of double-headed drives
- 14) Built in screen printer (shift [CLEAR] with [BREAK] key abort
- 15) Multiple command chaining with "DO"
- 16) Built in memory test with CLEAR command
- 17) New printer driver which allows complete forms control and paging
- 18) Automatic serial printer driver with optional auto linefeed
- 19) Execute any DOS command from BASIC and return to BASIC
- 20) Free space map of diskette with optional output to printer
- 21) Copy with variable length files
- 22) Complete RS232 control from keyboard with status check
- 23) Create and pre-allocate files from DOS
- 24) Display current date and time from DOS
- 25) More information from Directory with optional printer output
- 26) Enter DEBUG with shift [BREAK] to allow use of [BREAK] from BASIC
- 27) New DISKDDUMP/CMD sector display/modify program (works with filespecs)
- 28) New DISKZAP/CMD single/double density disk editor
- 29) New BACKUP (more reliable, no more pack ID check)
- 30) New FORMAT (more reliable, no need to bulk erase disk first)
- 31) New MAP utility (maps out disk, showing where files are located)

### PLUS New DOSPLUS Z80 Extended Disk BASIC

- 1) Faster loads and saves
- 2) BASIC Reference utility (lines, variables, keywords, printer option)
- 3) BASIC Renumber utility (renumber section of text, block text move)
- 4) Shorthand features for almost ANY direct command (LOAD, SAVE, etc.)
- 5) Shorthand features for editing (listing and editing with single key)
- 6) CMD "M" instantly displays currently set variables
- 7) Global search and replace in BASIC text
- 8) Line printer TAB to 255
- 9) OPEN"E" to end of sequential file (for output)
- 10) DI (delete and insert text line)
- 11) DU (duplicate text line)
- 12) "R" & "V" options after LOAD and RUN (files open & save variable)
- 13) OPEN"D" allowed (Model II compatible) equal to OPEN"R"
- 14) DOS commands from BASIC
- 15) Automatic, error-free variable length records
- 16) Single step execution with TRON (fabulous for debugging)
- 17) CRUNCH (BASIC program compressor)
- 18) New TBASIC (tiny BASIC) offers full BASIC commands
- 19) TBASIC and DOSPLUS together only use BK of RAM (40K left in 48K TRS-80)

**COMPUTRONICS**  
MATHEMATICAL APPAREL & EQUIPMENT

50 N. PASACK ROAD  
SPRING VALLEY, NEW YORK 10977

**DOSPLUS—\$99.95**  
(MODEL I or MODEL III)



NEW TOLL-FREE  
ORDER LINE  
(OUTSIDE OF N.Y. STATE)  
(800) 431-2818

HOUR  
**24** ORDER  
LINE  
(914) 425-1535

\*All orders processed within 24-Hours  
★30-Day money back guarantee on all Software  
★Add \$3.00 for shipping in UPS Areas  
★Add \$4.00 for C.O.D. or NON-UPS Areas within U.S.A.  
★Add \$5.00 to Canada and Mexico  
★Add proper postage outside of U.S., Canada and Mexico



# FREE



## 1981 FALL EDITION CATALOG OF COMPUTER SUPPLIES AND ACCESSORIES

Our latest edition...yours

FREE for the asking! This direct-order catalog features 80-pages of more than 1700 supply products...many of which are designed for small business computer applications. Plus, we've just introduced 100 new products this fall...specially featured in a 20-page supplement. Some of these popular products are flexible disks, printer ribbons, and many hard-to-find products. And all are available for immediate shipment from our two stocking distribution centers.

To receive your FREE catalog, simply call 800-323-0628 (in Illinois call 312-377-0990) or circle the Reader Service Card number below.

**VISIBLE COMPUTER**  
SUPPLY CORPORATION

A Subsidiary of Wallace Business Forms, Inc.  
3626 Stern Drive | 1615 S. Stockton St.  
St. Charles, Illinois 60174 | Lodi, CA. 95241

Send for your free copy today!





comp  
case

• RS204

• AP101	Apple II with Single Disk Drive .....	\$109
• AP102	Apple II with Double Disk Drives .....	119
• AP103	Apple II, 9 inch Monitor & Double Drives ..	129
• AP104	Apple III, two additional Drives & Silentype ..	139
• AP105	12 inch monitor plus accessories .....	99
• RS201	TRS-80 Model I, Expansion Unit & Drives ..	109
• RS202	TRS-80 Monitor or TV set .....	84
• RS204	TRS-80 Model III .....	129
• RS205	Radio Shack Color Computer .....	89
• P401	Paper Tiger 440/445/460 .....	99
• P402	Centronics 730/737 - Line Printer II/IV .....	89
• P403	Epson MX70 or MX80 .....	89
• CC90	Matching Attaché Case .....	75

**computer case company**

5650 INDIAN MOUND CT. COLUMBUS, OHIO 43213 (614) 868-9464



## ADVERTISING DIRECTORY

Advanced Operating Systems .....	Cover 4
Adventure International .....	19
Alpha Byte Stores .....	17
Alpha Products .....	Cover 2
American Computer Center .....	12
Astro Graphics .....	54
AT-80 .....	54
Benchmark Software .....	11
BT Enterprises .....	32-33
Computer Case .....	64
Computer Options .....	57
Computer Shopper .....	51
Cook Laboratories .....	53
Cornucopia Software .....	7
Data Trans .....	55
Dynacomp .....	29
Electronic Specialists .....	57
Exatron .....	Cover 3
Exatron .....	49
H & E Computronics .....	60-63
IJG .....	8
IJG .....	10
IJG .....	21
M. B. Rowe & Assoc. ....	39
Med Systems Software .....	53
Micro Architect .....	14
Micro Design .....	3
Microsette Co .....	6
Micro Systems Software .....	31
Microtek .....	27
NEBS .....	13
Pacific Exchanges .....	59
Percom .....	4-5
Prosoft .....	9
Realty Software .....	7
SBSG .....	14
Scientific Engineering Laboratories .....	4
68 Micro Journal .....	14
Soft Sector Marketing .....	37
Soft Tools .....	47
Spelaid .....	59
Sun Technology .....	57
Unique Software .....	25
Van Horn Office Supplies .....	59
Virginia Micro Systems .....	6
Visible Computer Supply Corp .....	64
VR Data .....	15
Walonick Associates .....	55

**COMPUTRONICS**

# TIRRED OF WAITING?



Frustrating isn't it! No matter how much you speed up your program it still seems to take forever to save data onto a cassette. Wouldn't it be great if someone could design a mass storage system with the speed of a disk, but at half the cost? *Exatron did, the Exatron Stringy Floppy (ESF)* .

Totally self-contained, the ESF is an extremely fast, reliable, and economical alternative to cassette or disk storage of programs or data. All of the ESF's operations are under the computer's control, with no buttons, switches, knobs or levers to adjust or forget.

The ESF uses a miniature tape cartridge, about the size of a business card, called a wafer. The transport mechanism uses a direct drive motor with only one moving part. Designed to read and write

digital data only, the ESF suffers from none of the drawbacks of cassettes - without the expense of disks.

Several versions of the ESF are available, for the *TRS-80*, *Apple*, *PET*, *OSI* and an *RS 232* unit. Even the slowest of the units is 15 times faster than a cassette, and all are as reliable as disk drives - in fact a lot of users say they are *more* reliable!



*excellence in electronics*

## exatron

To get further information about the ESF give Exatron a call on their Hot Line 800-538 8559 (inside California 408-737 7111).

If you can't wait any longer then take advantage of their 30 day money-back guarantee, you've nothing to lose but time!

181 Commercial Street  
Sunnyvale, CA 94086



**COMPUTRONICS**

50 N. PASACK ROAD  
SPRING VALLEY, NEW YORK 10977

U S POSTAGE  
STANDARD  
BULK RATE  
Permit #58  
New City, N Y 10956

FORWARDING POSTAGE GUARANTEED  
RETURN POSTAGE GUARANTEED

## Designing Computer Software Programs is Serious Business

ADVANCED OPERATING SYSTEMS  
A Division of Howard W Sams & Co., Inc.

Dear Software Designer:

Microcomputers, their peripherals, and software are a part of the most volatile industry in existence today.

Companies associated with this growing area come and go at a painful rate. Presently, good software is at a premium. The average computer owner is far more sophisticated than he was a year ago. He demands an ever increasing diet of faster high resolution games that can only be met by the best programmers. The day of the small businessman, who has the time to sweat through the debugging of his general ledger while on the line, is gone.

While state of the art programmers exist, they must feel confident that their efforts will be developed and marketed by a company with the experience and strength to assure complete success for their products.

Advanced Operating Systems is a division of ITT and specifically related to Howard W. Sams & Co., Inc. (Sams Books). Our professional experience goes back to the birth of the microcomputer industry. Advanced Operating Systems benefits from the strength of ITT, one of the largest companies in the world, as well.

Advanced Operating Systems is committed to helping the micro trade grow in a businesslike and professional manner. Our 150 representatives in the field will sell your product both to computer stores and direct to the consumer. You'll be represented by one of the top advertising agencies in the United States. Your product will benefit from professional package design, effective copy and layout design. You can be assured your program will receive extensive advertising in both computer and general interest magazines, as well as catalog sales.

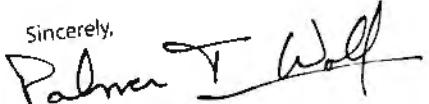
If you want the security of dealing with a company that will reliably send your royalty checks month after month, while providing you with professional, yet personal attention, write or call me to discuss your programming efforts.

We are easy people to deal with. We understand your problems, and we pay competitive royalties. Even more importantly, we can do more for you and your program than any existing software firm.

We are interested in state of the art games, business, professional and utility programs.

Let me hear of your work, completed or still in process. We are ready to go to work for you!

Sincerely,



Palmer T. Wolf  
Software Acquisition Manager

450 St. John Road  
Suite 792  
Michigan City, IN 46360  
(219-879-4693)