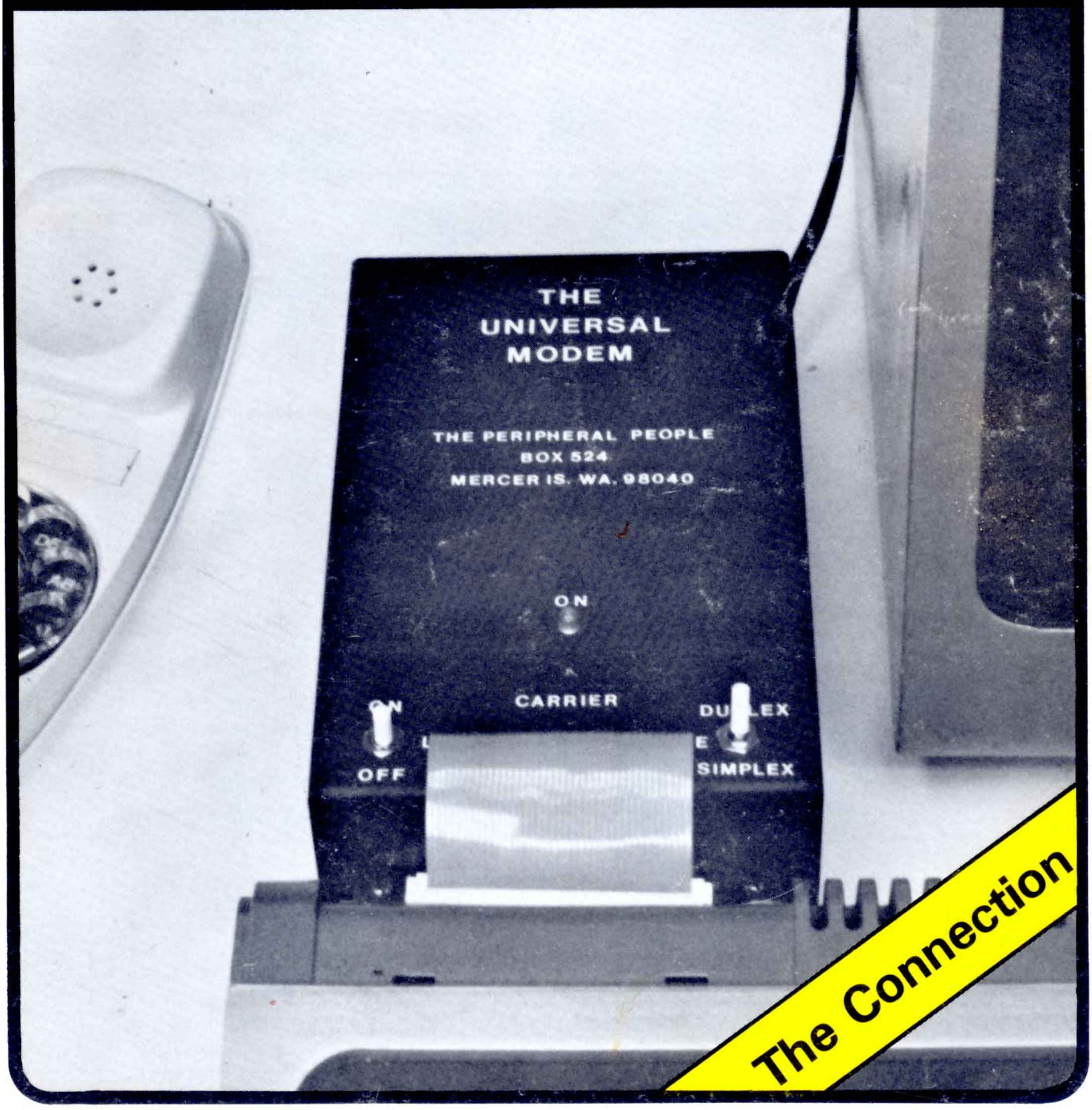
80-U.S.

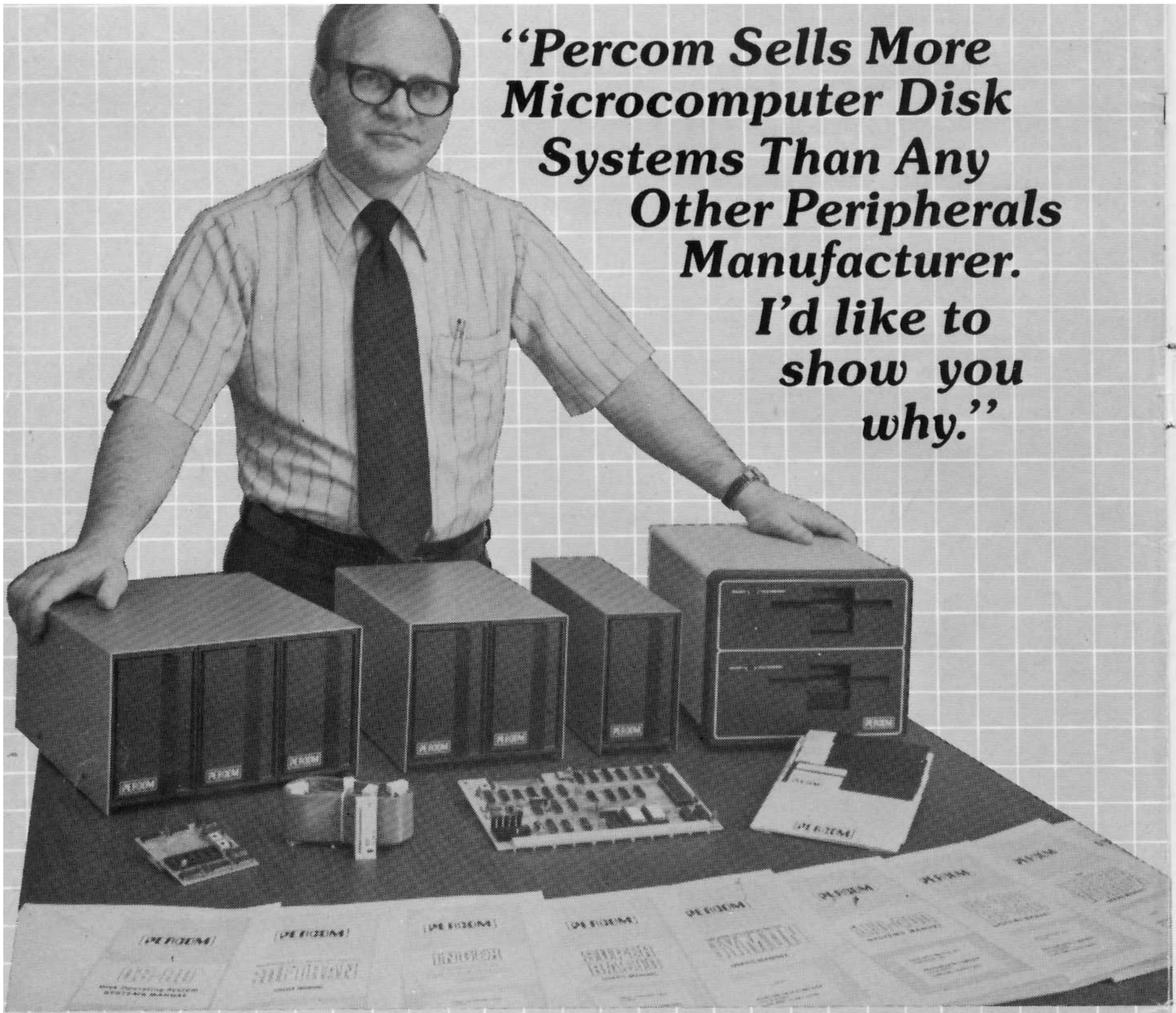
$3.00 PER COPY
$3.50 in Canada

The TRS-80 Users Journal

Volume III, Number 3 May/Jun 1980



The Connection



"Percom has been manufacturing mini-disk storage systems for microcomputers since 1977 when we introduced the 35-track, single-drive LFD-400™. Now we produce 1-, 2- and 3-drive systems in 40- and 77-track versions, a multi-density MEGABASE™ system and a host of accessories and software.

"Volume not only means experience in critical production and testing operations, it also means we can offer superior design features, extra testing and qualified backup support at very competitive prices.

"I know of no other microcomputer disk system manufacturer who even begins to offer the broad spectrum of disk equipment and programs available from Percom."

"So before you buy a mini-disk system for your 6800, 6809 or TRS-80* computer, take a good look at what the people at Percom have to offer."

Harold Mauch
President, Percom Data Company

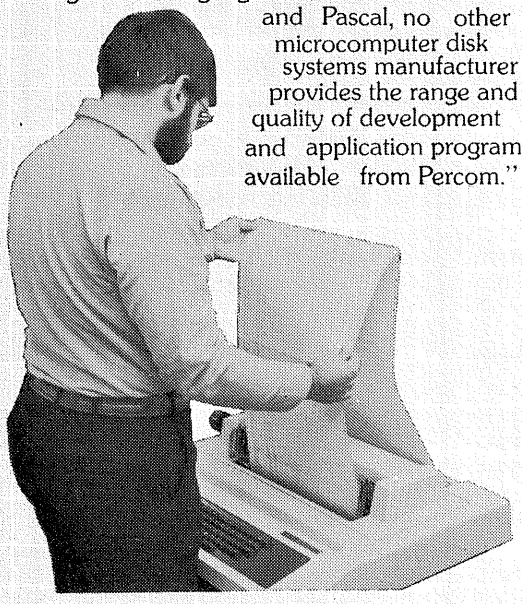
Percom disk systems start at only $399.00. Disk systems and other quality Percom products are available at computer dealers nationwide. **Call toll-free, 1-800-527-1592, for the locations of dealers in your area, or to order direct.**

PERCOM

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

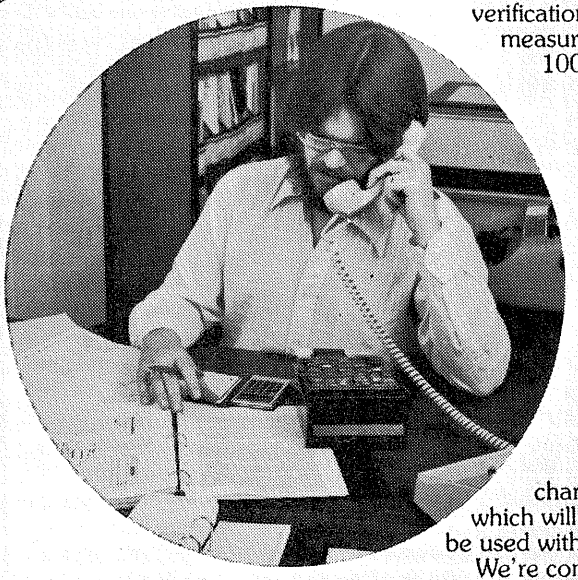
PRICES AND SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.
TM trademark of Percom Data Company, Inc.
*trademark of Tandy Radio Shack Corporation which has no relationship to Percom Data Company.

"From an efficient 1K-byte control system DOS to high level languages such as FORTRAN and Pascal, no other microcomputer disk systems manufacturer provides the range and quality of development and application programs available from Percom."

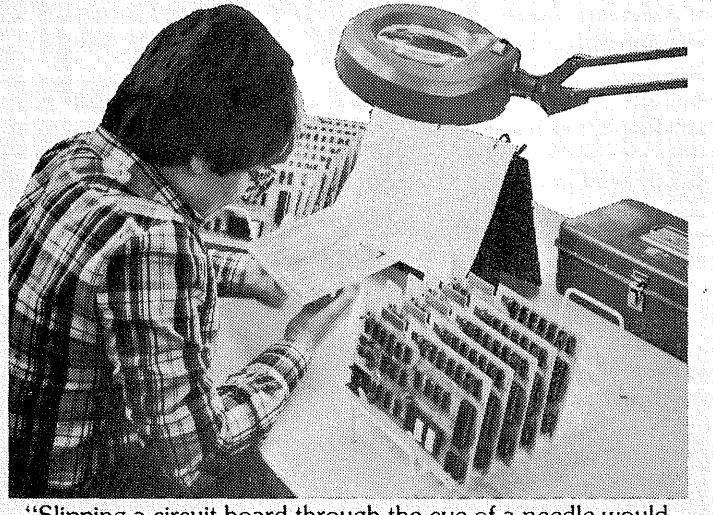


"Connie is running a 'cats eye' test on a mini-disk drive to check radial track alignment. Drive motor-speed timing and sensor alignment tests have already been performed. Disk formatting and format verification tests are next. These measurements are part of the 100% testing every single unit receives."

"Whether you call about a shipping date or ask a tough technical question, you get a competent courteous answer. Outstanding customer service is a hallmark of Percom."



"Richard's making final changes to a disk controller which will allow Percom drives to be used with yet another computer. We're constantly developing and introducing new products that extend and enhance the value of Percom systems."



"Slipping a circuit board through the eye of a needle would be easier than slipping a cold solder joint past Beverly. These are four-drive LFD-400/800 disk system controllers she's inspecting."

Editorial Remarks * *

What kind of future is there for the Model I? You may have already noted that your computer is an excellent noise generator, and that unless your television set is connected to a cable, it raises all sorts of havoc with channels 2 through 6. If you think Model I is noisy, try turning on a Model II sometime - it is even worse.

Is the new Model III (or is it Model 1.5?) going to have radio frequency suppression? Since the Federal Communications Commission has set acceptable levels of radiation (which was contested by Radio Shack, Texas Instruments and Atari), future computers will be required to comply.

But what about those thousands of computers already sold? Is the FCC action forcing them into early obsolescence? Will manufacturer support quickly fade, in favor of support for the newer "in compliance" models?

The cable TV people ought to be happy about it all, and the manufacturers will also have a built-in excuse for their planned obsolescence policies.

What can be done to existing equipment? Power line filters are not the answer - it turns out that your computer is chock full of very efficient square wave generators. A square wave is a perfect harmonic generator. It will radiate the fundamental frequency plus two, three, four, etc. times the fundamental. Then it also radiates the sum and difference frequencies of all those harmonics. This goes directly from your computer to your TV, or worse - to your neighbors TV.

Amateur Radio operators may already have a handle on this. They have the same interference problems with their receivers. There are reports of using ferrite cores around external leads to minimize radiation. Surrounding the CPU board and the expansion interface board in a wire mesh and then grounding the mesh (a Faraday cage?) has been advanced as a solution. Perhaps the manufacturers of computers could imbed such a shield inside the cheap plastic cases they use. (Or is it Authentic Baroque Plastic?).

In any event, we will have to wait and see - maybe the new Model III will be the first to include such radiation suppression.

The other morning I decided to do something different for a change. So I went down to the waterfront and had breakfast in a "greasy spoon" restaurant. It has been said that no one could screw up a breakfast of bacon and eggs - right?

The place was crowded, there were plaid shirts and logging boots on just about everyone there. Every now and then the cook, a portly lady who looked like Mrs Santa Claus, came out from the kitchen. She would wipe her hands on her apron, make "tsk tsk" sounds and then return to where the smell of bacon and sausage came from.

I sat at the counter and waited. While there, one of the waitresses, apparently getting off the night shift, poured herself a cup of coffee and sat on the stool next to me.

She started a conversation with the woman who had taken her place behind the counter. It seemed that all was not well with her life - (I couldn't help overhearing her remarks). It seemed that when she had come home the previous morning her man had been up all night, and didn't even speak to her when she came in.

She alternated between cryptic sentences and brooding, while her replacement stood solidly behind the counter, waiting for the gory details. I caught parts of the conversation - something about "Who needs it?", and "he even has a suitcase for it", and "maybe he ought to pack it and leave".

The thought occured to me that they both looked like two high-mileage types who had gone to the mountain to find the secrets of life - and the Guru wasn't home.

You are probably wondering what all this has to do with computers. Hang on -after paying my check at the cash register, I came back to leave a tip and heard her say in disgust: *"Him and his damn computer!"* ●

Mike

80-U.S. JOURNAL

EDITOR/PUBLISHER
I Mike Schmidt
EDITOR/ASSEMBLER
Cathy Shappee
ASSOCIATE EDITOR
Terry Dettmann
TECHNICAL EDITOR
Jim Crocker
SPECIAL PROJECTS
Larry Panattoni
RESOURCE IN LEARNING CONSULTANT
G B Livingston Ph.D
SOFTWARE DEVELOPMENT
Leo Christopherson
Roy Groth
Kristi Schmidt
REVIEWERS
George Blank
Cameron Brown
ADMINISTRATIVE ASST
Lynne Crocker
PRINTED BY
Peninsula Gateway Press
Gig Harbor, Washington
DISTRIBUTED IN CANADA
by: Micromatic Systems Inc
No 101 - 8136 Park Road
Richmond, BC, Canada V6Y 1T1
DISTRIBUTED IN EUROPE
by: Hofacker Verlag
Tegernseer Strasse 18
D-8150 Holzkirchen/Obb
West Germany
DISTRIBUTED IN THE UNITED KINGDOM
by: The Software House
146 Oxford Street
London, W.1 England

80-U.S. JOURNAL
VOL III Number 3
MAY-JUN 1980

Published bi-monthly in Jan, Mar May, Jul, Sep & Nov. **SUBSCRIPTION PRICE** in the United States is **$16./1yr, $31./2yrs, $45./3yrs. CANADIAN SUBSCRIBERS** contact MICROMATIC SYSTEMS INC No 101 8136 Park Road, Richmond, BC Canada V6Y 1T1. ALL OTHERS: $24./1yr, $47./2yrs, $68./3yrs. remitted in US funds. All except US, Canada & Central America are sent Airmail.

Printed in the United States of America
Application to mail at Second Class Postage Rates pending at Tacoma, WA
POSTMASTER: If undeliverable return to sender. Return postage guaranteed.

80-U.S.

The JOURNAL for TRS-80 Users

TRS-80 is a trademark of the Tandy Corporation

VOL III Number 3

May-June 1980

CONTENTS

FEATURES

19 Telecommunications with the TRS-80 ..... *Donald L Stoner*
21 Community Bulletin Boards ..... *Donald L Stoner*
52 APL ..... *George Blank*
28 Learning Level II (Chapter 11) ..... *David A Lien*
25 Measurement ..... *Ralph G White*
53 PASCAL ..... *Truman Krumholz*
44 Programming Techniques in BASIC ..... *Marty Zwilling*
70 Scripsit and the Lower Case Mod ..... *Barry Kornfeld*
60 Soundoff! ..... *Leo B Christopherson*
65 Teersaty ..... *Bill Wilson*

DEPARTMENTS

80 Advertiser Index
48 Anatomy of the Program ..... *R C Bahn*
80 Back Issue Availability
16 Clubs & Publications
2 Editorial
10 Items at Random
4 Letters to the Editor
12 New Products
42 Notes
32 Panattoni's Panacea ..... *Larry Panattoni*
38 System/Command ..... *Phil Pilgrim*
78 Unclassified Ads
56 View from the Top of the Stack ..... *Jim Crocker*

©**1980 80-NORTHWEST PUBLISHING CO.** All rights reserved. Reproduction for other than personal, non-commercial purposes is prohibited. No patent liability is assumed with respect to the use of the information contained herein. While every precaution has been taken in the preparation of this publication, the publisher assumes no responsibility for errors or omissions. Neither is any liability assumed for damages resulting from the use of any information contained herein. Please address all correspondence to: **80-US JOURNAL, 3838 South Warner Street, Tacoma, Washington 98409 (206)475-2219. ADVERTISERS:** The JOURNAL will accept limited relevant commercial advertising which pertains to, or is for use on or with, the TRS-80 Microcomputer. Write for a current rate schedule. **WRITERS:** We constantly seek material from contributors. Send your TRS-80 related material (except that which has been previously published). You may send programs on disk or cassette - they will be returned provided you include return postage. Generous compensation is made for non-trivial works which are accepted for publication. The JOURNAL pays authors upon acceptance rather than on publication. Allow 3 to 4 weeks for review of your submitted manuscript/programs.

Letters to the Editor

Mike:

Please publish this in your letters column as a means of communication with the former subscribers to T-Pal who are now (or were already) subscribers to 80-U.S.

First, I would like to thank all of you folks who wrote such kind remarks about what we did manage to produce. I had no idea how well T-Pal was being accepted until I received your comments. It would be preferable to write each one of you personally but there are just too many of you.

Secondly, I would like to set the record straight concerning how this whole arrangement came about. I was scratching my head trying to think of a solution to the problem of refunding to all the subscribers in a fair manner without anyone feeling that he or she had been cheated. Then one morning, Mike called me and asked about transferring my subscribers to 80-U.S. After some discussion we had an arrangement worked out that we both thought was fair. Notices were sent to all subscribers for their approval and about 90% accepted.

The point I would like to stress here is that Mike called me. So I ask anyone who is happy with the arrangement to save your kind thoughts for Mike - he deserves them as the originator of the idea.

Mike has asked me to submit articles for publication and it is my intention to do so. These things do take time and there are deadlines to meet. We'll hurry it up as much as possible. Until then, my best regards to all and thanks again.

Ed V Thorne, San Francisco, CA

I am inclosing a copy of a letter I am sending Telecomputing Corp of America which is self-explanatory. I assume you will feature an article on this data bank and its access by the home computer types. I had hoped to see one before we took the plunge. We wouldn't have joined if we'd known about their long distance charges.

Thanks for the quality and quantity of helpful information in your magazine.

"Telecomputing Corp of America
1616 Anderson Road
McLean, VA 22102
Dear Sir:

We recently succumbed to the persuasion of your advertising and the article in TIME *and subscribed to the Source information utility as our major christmas present to ourselves. It was necessary for us to buy additional hardware for our TRS-80 and only now have we had a chance to try accessing the data bank.*

Much to our dismay we've found that nowhere did you explain that unless you live in a city served by Tymnet you will have to pay long distance telephone charges from your location to the nearest city offering Tymnet access. In our case that is Albuquerque and the charges will amount to $9.60/hour evenings or $6.00/hour weekends in addition to your charge of $2.75/hour.

In all fairness we feel you should rework your advertising so that others will not be misled in the future.

Betty S Jackson, Los Alamos, NM"

We certainly appreciate the review of Microcosm 1 by C Brown that appeared in this issue (Jan-Feb 80). You and he may be interested in the fact that his single objection - the programs stored too close together - has since been corrected. There is now a notable gap between all programs in that package.

Walter J Koetke, Basics & Beyond, Amawalk, NY

Thanks very much for the sample Jul-Aug 79 copy. Leo 's "Great Turn On" was fantastic. Bill Roberts "Renew that Program" was great. George Blank's review of Startrek based games was neat (does George write for everyone, like Rod Hallen?). T R Dettmann's review of NEWDOS gave the system the credit it deserves - - and so on and on.

Anyway you've sold me. Gentlemen - start my subscription!

Alan Shoemaker, Sunnymead, CA

George Blank is now General Manager of Softside Publications. He still writes an occasional piece for 80-U.S. and we appreciate his efforts. Ed.

In Mr Dettman's article, "TEXT for the 80's",(*Jan-Feb 80*) I have made some modifications which do two things: it allows text to be added to the end of the present text and it right justifies the right margin. Of the fifteen lines listed below, two are present lines with changes, the remaining lines are new line numbers. Line 190 has ",205" added to it and line 1020 has the "1" changed to "IX". You can type out these lines then save them to disk using the A option and merge them with the TEXT 80 program. No line of text is right justified if it ends in a "." or "?" or ":" or "!" unless it is more than 56 characters long. No line is right justified if it ends with a blank. If you type in more than 63 characters on a line you will get an error message. If you type in a very short line without one of the above terminating characters, you will go to the error trap. These changes were not tried with the Model II. Have fun.

James Ranney, Las Vegas, NV

```
163 PRINT TAB(5)"6.  ADD TO TEXT"
190 ON C GOSUB 1000, 2000, 3000, 4000, 5000,
        205
205 CLS: PRINT FNHDR$("ADD TO TEXT")
207 IX=N+1:GOSUB 1020:GOTO100
1019 IX=1
1020 FOR I=IX TO MX:LINEINPUT TX$(I)
1031 TX=63-LEN(TX$(I)):TZ$=RIGHT$(TX$(I),1):
     IF TX=63 OR TX=0 GOTO 1040
1032 IF TZ$="."AND TX >=6 OR TZ$="?" AND
     TX >=6 OR TZ$=":" AND TX >=6 OR TZ$="!"
     AND TX >=6 OR TZ$=" " GOTO 1040 ELSE
     TY=6
1033 IF TX <0 PRINT"LINE TOO LONG - REDO":
     LINEINPUT TX$(I):GOTO 1030
1034 FOR II=1 TO TX:UX=INSTR(TY,TX$(I)," ")
1035 UY=LEN(TX$(I))-UX
1036 TY$=LEFT$(TX$(I),UX)
1037 TZ$=RIGHT$(TX$(I),UY)
1038 TX$(I)=TY$+"  "+TZ$
1039 TY=TY+6:NEXT II
```

You will find inclosed my renewal order for your excellent magazine. It is the best in the whole world with just *INSIDER* and *OCTUG* in its shade.

Could you mention somewhere in it the existence of our group *"The TRS-80 USER GROUP EUROPE"*. We

MICROSOFT AND TRS-80™ MODEL II. RUNNING THE SHOW.

TRS-80 Model II is designed for professional business applications. Your ultimate goal for your Model II is probably a fast, turnkey system that's easy to use and easy to expand. To get there you need dependable, flexible system software to write the programs that run the whole show.

Microsoft's COBOL-80 and BASIC compilers are now available in versions fully compatible with Model II TRSDOS. You can have either of these universally popular programming languages plus all the advantages of a compiler: faster execution times, compact executable code, security for your programs.

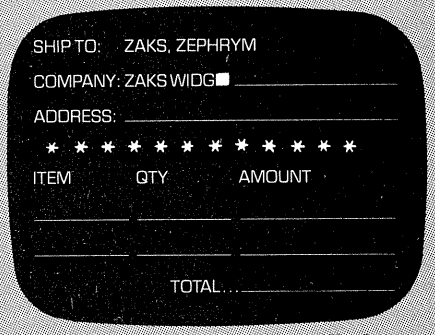
With Microsoft's compiled languages you get a complete program development system, including our standard MACRO-80 Assembler and LINK-80 Linking Loader. Your compiled programs are relocatable modules that can be linked to each other or to Z80 assembly language subroutines.

COBOL-80 Compiler

Microsoft's COBOL-80 is an ANSI-74 standard COBOL that supports such advanced data manipulation verbs as COMPUTE, INSPECT, STRING, UNSTRING, and SEARCH. Plus three-dimension arrays, full COPY facility, compound and abbreviated conditions, and an optional packed decimal format that saves on mass storage by as much as 40%. In addition to Sequential and Relative files, COBOL provides Indexed files, allowing records to be retrieved with a user-specified key instead of a record number.

Interactive Screen Handling Most business applications require machine interaction, formatted screen displays, and the ability to insert and delete information as the machine prompts the user. The COBOL ACCEPT/DISPLAY verbs are implemented for this purpose—to DISPLAY formatted screens and ACCEPT operator input.

CHAIN and Segmentation Ideal for menu-driven application programs is COBOL-80's CHAIN feature. With CHAIN, control is transferred from the menu program to any executable module as specified at runtime. COBOL-80 also supports Segmentation to make maximum use of memory when large programs are executing.



COBOL-80 formatted screen display

BASIC Compiler

The Microsoft BASIC Compiler has the fastest execution times of any BASIC available. It is language compatible with the Model II's interpreter so you can write and test your programs using the interpreter, then compile them for secure storage and efficient execution.

New BASIC Features In addition to those language features provided with the interpreter, the BASIC compiler supports all the latest features of Microsoft BASIC 5.1: WHILE conditional statement, CALL, long variable names, and ANSI compatibility. Plus the compiler has double precision transcendental functions (SIN, COS, TAN, ATN, LOG, EXP, SQR).

Secure Besides being an indispensable system software tool for developing your own utilities and application programs, the BASIC compiler is ideal for producing programs for resale. The machine code for any application program may be placed on a diskette, ROM, or other media, but the BASIC source program need not be distributed. Thus the original application program is protected from unauthorized alteration.

```
110  I = 4*J: K = (4*J-1) AND &HOFFO
**0025' L00110:    LD      HL,(J%)
**0028'            ADD     HL,HL
**0029'            ADD     HL,HL
**002A'            LD      (I%),HL
**002D'            DEC     HL
**002E'            LD      A,L
**002F'            AND     FO
**0031'            LD      L,A
**0032'            LD      A,H
**0033'            AND     OF
**0035'            LD      H,A
**0036'            LD      (K%),HL
```

BASIC compiler object code listing

Optimized Machine Code Compiled BASIC programs are fast and compact due to extensive optimizations performed during compilation:
1. Expressions are reordered to minimize temporary storage and eliminate common subexpressions **2.** Constants are folded wherever possible **3.** Peephole optimizations are performed **4.** The code generator is template-driven, allowing optimal sequences to be generated for the most commonly used operations **5.** String operations and garbage collection are extremely fast.

Get Microsoft BASIC Compiler or Microsoft COBOL-80 and get serious with your Model II. After all, who's running this show?

Prices for COBOL-80 and BASIC Compiler include the MACRO-80 Assembler and LINK-80 Linking Loader and all documentation. Documentation purchased separately, $20.

COBOL-80	$750.
BASIC Compiler	$395.

For TRS-80 Model I software, contact Microsoft Consumer Products.

MICROSOFT

10800 NE 8th
Suite 819
Bellevue, WA 98004
(206) 455-8080
Telex 328945

We set the standard.

would like to have contacts with other TRS-80 users groups (especially from the U.S.) to exchange ideas and information. All information about our group can be obtained at this address:

TRS-80 Users Group Europe
Richard L Lenoir
93, rue Renardi
4000 LIEGE, Belgium

(*Your publication*) is like a very good friend. I keep going back to see it time and time again. Each issue is becoming more and more worn from use. It is the only publication on computing that I am renewing, to me the others just take up space.

I have been working on the TEXT 80 Program (*Jan-Feb 80)* and am using it at this time. It seems an excellent method for learning program techniques, using so many optional remark statements seems great to let you stop and understand what it is about. I do have a lot of bugs in it, but so many are my own typographical errors.

After reading your review about the NEWDOS+ I ordered one and think it is great, just the basic load speed is worth a lot in my business programs. I still have a lot to learn about using some of the programs, like LMOFFSET, how to find starting and ending locations and relocating areas. Please do some articles on the use of some of these fine programs, their instructions are good but not quite simple enough for me.

Don H Smith, Rockingham, NC

I am perplexed! Your original "No hardware lower case mod" only stumped me for ten minutes; I found the DOS patch without any trouble. Now, I wish I could find the patch for the second lower case mod. *(The first was published in Jul-Aug 79, and was in machine language, the second was in Jan-Feb 80 and was a BASIC version - Ed)*

It seems that my TRS-80 dosen't like DELETE and also has some problem with picking up a valid printer pointer. I overcame the latter by poking the usual number into the machine language string; no problem, as I use the Line Printer II. That problem with DELETE is somewhat more illusive.

DELETE, when used in a program, always exits to BASIC command mode. This is true in Level II, TRSDOS 2.2 and NEWDOS+. I'm using the program without the delete statement at present, and it works just fine. Please keep up the excellent work. A magazine that recognizes the TRS-80 as a serious, professional tool is most welcome. Don't get me wrong, I like a good game and have learned a lot about programming from games, but I also use my computer for engineering and accounting purposes.

P W Preston, Fort Worth, TX

Check the section on DELETE in your Level II manual, (Page 2/3). I just tried it to make sure, and it works as advertised. If you try to delete a line number that doesn't exist, you will get an ILLEGAL FUNCTION CALL. The way it works in Leo's Basic No Hardware Lowercase article in the Jan-Feb 80 issue, the delete statement deletes itself, leaving only line 20, which contains the string packed version of lines 23 and 24. There is nothing wrong with leaving all those program lines in while you run another program, so long as your program dosen't RUN through them a second time. Ed.

I obtained a copy of your fine magazine the other day. Our new products will be using a version of Microsoft and the TRS-80. We will be using it for a training tool to learn and teach BASIC. (I work for Xerox in Service Education). As I was reading through the magazine, I saw a brief note from one of your readers that indicated he was using both sides of diskettes. I have had several years experience with disk drives and media. I wrote the following piece for our local newsletter, and even though it was specifically for Apple users, the facts are the same; the drives are the same for both systems. I think the information is important. Best Regards,

Chuck Carpenter
Contributing Editor, Creative Computing

Apple Cart Column

"Quite possibly the quality of diskettes, especially those of the better suppliers, is good enough so that use of both sides is not too risky. Notice I said not too *risky. Media for single side use is only certified on the normal recording side. However, coating techniques have improved and a higher percentage of diskettes are likely to have two good sides.*

But, there are some other things to consider. Most important, don't confuse the technology of rigid disks with that of floppy disks. The head in our mini-floppy systems is in intimate firm contact with the media and under slight pressure. (When you close the door the head-load arm is released against the diskette). So media wear and head wear are significant factors in floppy disk technology.

Shugart specifies, in the OEM manual for the SA400, a media life of 3 million passes per track. A reduction in amplitude is used as the basis of measurement. For the average hobbyist, it would takes several years to accumulate this many passes per track. For instance, the disk spins at 300 revolutions per minute. This means 10,000 minutes or 167 hours to get to 3 million passes on one track. There are 35 tracks on the disk and this increases the number of hours to 5845. (If all tracks are used somewhat equally.) Divide this by 24 and it would take 243 days, 24 hours a day to accumulate the wear time. Now, the average user might use his system 2 hours a day. The total hours (5845) divided by 2 equals 2922 days or, 8 years to wear the disk down.

Now then, so what! With that many years to work with, how can the problem be serious. The problem comes from the mechanism used to load the head against the disk surface. Single sided systems use a spring loaded button to force the disk against the ceramic read/write head. (Dual sided systems use two heads.) This button, made of a felt-like material, collects dirt and bits of magnetic particles. Usually, this button only rubs on the unrecorded side, causing no problems. You can imagine what will happen to your disks with this abrasive button rubbing on both sides. Also, the disk will be spinning in opposite directions each time, transfering the dirt from one side to the other. And, passing it under the head and across the surface of the disk. Considering the high potential for abrasion, you can read/write the disk one day and the next day it won't work. And, you won't know, because there is no read-after-write, when it is going to happen.

My recommendation is to stay with only one side of the diskette. There are ways to check the integrity of the magnetic surface. If you insist on using both sides of

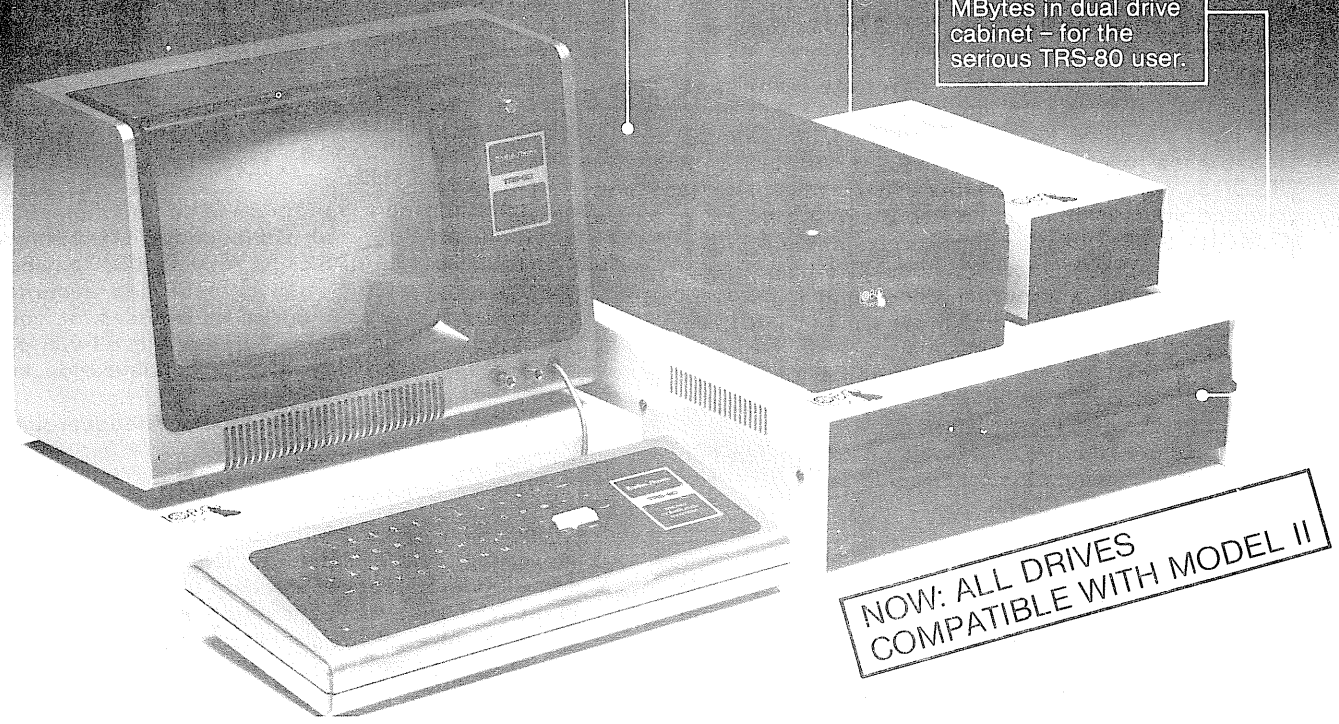
THERE IS A DIFFERENCE IN TRS-80 DISK DRIVES CAPACITY

Expansion interface – gives your TRS-80 the disk capacity it needs, and much, much more!

10 to 40 MByte, 8" Winchester drive – expands capacity far beyond Model II storage.

Single sided minifloppy – up to 150 KBytes of storage capacity.

Single or double sided 8" floppies – up to 2.5 MBytes in dual drive cabinet – for the serious TRS-80 user.



NOW: ALL DRIVES COMPATIBLE WITH MODEL II

LOBO DRIVES' new family of disk memory products provides you with a choice of memory capacities you need to effectively execute the complex business software you've developed for your TRS-80*. LOBO DRIVES' selection of readily available, software compatible drives permits you to expand your inventory, payroll, customer list, and accounts receivable files as your business grows.

And LOBO DRIVES brings you more . . . a new plug-in expansion interface that provides an easy way to add hardware enhancements, communications capability, and programmable features . . . and it comes with the LOBO DRIVES famous 1 year, 100% parts/labor warranty.

Call or write for the complete LOBO DRIVES story. Find out just how competitively priced a family of high capacity drives can be . . .

LOBO drives INTERNATIONAL

935 Camino Del Sur Goleta, California 93017.
(805) 685-4546

"CAN YOU REALLY AFFORD TO PAY LESS?"

Quantity discounts available – Dealer inquiries invited

TR-2

Yes, I want to know more about LOBO Drives and what they can do for my TRS-80. Send me information on:

- ☐ 5 1/4-in. Floppy drive
- ☐ 8-in. Winchester hard disk, 10 Mbyte drive
- ☐ 8-in. Floppy drive Single sided Double sided
- ☐ Double density expansion interface

Name

Company

Address

City State Zip

Phone No.

If dealer, provide resale no.

*TRS-80 is a registered trademark of Radio Shack, a Tandy Company

the disk, you'd better find ways to check the results. It may be I am brainwashed but...In the meantime, DISKETTICUS NON CARBORUNDUM.

I have a couple of tips I would like to pass along. Number 1: The new keyboards have a different type of key than the older keyboards. If you try to pull the top off the new keys to cure keybounce you will likely break the keys.

Number 2: If you are like me, I forget the entry point and memory size in using machine language subroutines. However TRSDOS (Version 2.2 - 2.3) keeps a top of memory pointer at location 4049 - 404A Hex. To protect high memory you need only change the top memory pointer to point to the start of your machine language subroutine. Example:

```
START  LD   HL,BEGIN-1     ;LOAD TOP MEMORY
                            TO PROTECT
       LD   (4049H),HL     ;PROTECT HIGH
                            MEMORY
BEGIN  Your protected machine language
```

subroutine starts here.

This code needs to be executed just once (and will probably be wiped out by BASIC). To return to TRSDOS, jump to 402D Hex. After this code is executed your machine code is protected. When the MEMORY SIZE? question appears just press enter and BASIC will assume memory ends just below your machine language subroutine. I hope that this will be helpful to other users. You have a great magazine. Keep up the good work!

Wayne A Severinsen
Milpitas, CA

The Cassette Library Program listed in your Jan-Feb 80 issue is incorrect. Line 320 should be:

```
320 FOR I%=0TO CNT%
```

And line 1300 should be:

```
1300 FOR I%=0TO CNT%
```

Using a chaining or linked-list algorithm as this program does, for a list of N items, N+1 link or chaining variables are required. (Intuitively obvious). In the program as listed in the referenced issue, the "Zeroth" link or chaining variable is neither written to nor read from the storage medium. The noted program alterations correct this condition.

To remedy this situation of errors occuring in programs published in your magazine, I would suggest that you require submission of source code on either cassette or disk so that your staff could determine correctness (or otherwise) of the program prior to publication.

Malcolm C Mitchell, Seattle, WA

Well over 95% of all programs submitted to us are on cassette or disk. They are then run on the computer and LLISTed to the Selectric printer, sometimes reduced in size about 28 to 32%, and then photographed for the offset press. Many times we must renumber the program, and check to see if the author used a comma in place of the word "then". Renum will not handle that situation. In addition, we must insert line feeds into long lines to preserve our image size on the final print. We must then watch the Selectric like a hawk, since it likes to throw in an underscore or a dash occasionally. The underscore is obvious, since there is nothing like it in a normal BASIC listing; the dash is a subtle devil though, since it looks like a minus sign. We usually have IBM service the Selectric before printing listings for each issue, for whatever thats worth. The errors in the Cassette Library Program were entirely our problem, and the foregoing is not an excuse - simply an explanation. In addition to those errors pointed out, there was one more which escaped notice even by the author. The last statement in line 1030 should read: CPY%(J%)=CPY%(I%). Ed.

Thank you for your cooperation during my telephone call today regarding putting Rod Hallen's "Drawing Board" (Sep-Oct 79, page 20) on disk. I found the proper way to do it and it works super. Below are listed the necessary changes over and above the bugs you have already published. You may want to publish them in case others want to put it on disk.

```
Add     755 OPEN"O", 1, "filename"
Change 770 PRINT#1, G$(J+0);",";G$(J+1);
           ",";G$(J+2)
Change 790 PRINT#1,G$(15)
Add     795 CLOSE
Add     855 OPEN"I", 1, "filename"
Change 870 INPUT#1,G$(J+0),G$(J+1),G$(J+2)
Change 890 INPUT#1,G$(15):CLS
Add     935 CLOSE
```

I will be utilizing the program in conjunction with the TELESIS VAR80 and Connecticut Microcomputer TRS-80 SET/TEMPSENS Analog I/O devices to demonstrate energy management and security for homes and small industries/businesses. If you are interested in applications such as these I will persue write-ups on them for you. --Super publication, keep it up.

R W Russell, Albuquerque, NM

We are always interested in this type of application. Ed.

Your tip on loading Microchess under NEWDOS was very useful. I have been trying to solve that problem for some while. I suppose I just didn't study the small print in the NEWDOS manual enough. However, it does not seem to solve all the problems. Now I can play, but cannot change the IQ level. If I try, the display reverts to the instruction list and the game starts again from scratch. Do you have a fix for that also?

J M Sampson, Rochester, NY

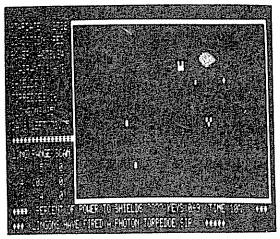
Yes, hold down both the SHIFT and UP ARROW keys while you boot up DOS. This defeats the NEWDOS key debounce routine, which just happens to be where part of Microchess wants to be. Ed.

You should really furnish a copy of Bardens Assembly Language book with each new subscription. I finally got the book and now understand. I empathize with any lucky person who is a new computer nut (owner) who would subscribe to your magazine. What the hell are you talking about? He has to learn BASIC first. I realize there is no end to it. Like whipping your nose with a hoop (endless loop)? Maybe slow down - you started with not much more than Level I, didn't you?

Rich Kruse, Thief River Falls, MN

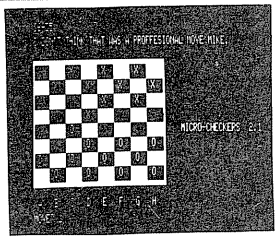
We couldn't agree more. The move toward better coverage of both ends of the spectrum has already started, it should be noticeable in this and the last issue, and will continue from here on. Ed.

SOFTWARE → TRS-80 ← SOFTWARE



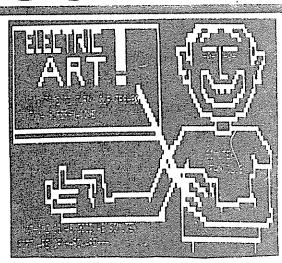
PACKAGE ONE INCLUDES: GRAPHIC-TREK "2000" — This full graphics, real time game is full of fast, exciting action! Exploding photon torpedoes and phasers fill the screen! You must actually navigate the enterprise to dock with the giant space stations as well as to avoid klingon torpedoes! Has shields, galactic memory readout, damage reports, long range sensors, etc! Has 3 levels for beginning, average, or expert players! ★ **INVASION WORG** — Time: 3099, Place: Earth's Solar System Mission: As general of Earth's forces, your job is to stop the Worg invasion and destroy their outposts on Mars, Venus, Saturn, Neptune, etc! Earth's Forces: Androids — Space Fighters — Lazer Cannon — Neutrino Blasters! Worg Forces: Robots — Saucers — Disintegrators — Proton Destroyers! Multi level game lets you advance to a more complicated game as you get better! ★ **STAR WARS** — Manuever your space fighter deep into the nucleus of the Death Star! Drop your bomb, then escape via the only exit. This graphics game is really fun! May the Force be with you! ★ **SPACE TARGET** — Shoot at enemy Ships with your missiles. If they eject in a parachute, capture them — or if you're cruel, destroy them! Full graphics, real time game! ★ **SAUCERS** — This fast action graphics game has a time limit! Can you be the commander to win the distinguished cross! Requires split second timing to win! Watch out!

ONLY $12.95



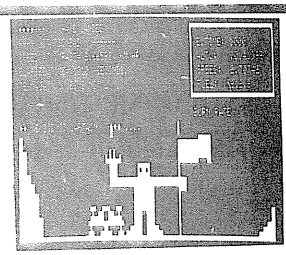
PACKAGE TWO INCLUDES: CHECKERS 2.1 — Finally! A checkers program that will challenge everyone! Expert as well as amateur! Uses 3-ply tree search to find best possible move. Picks randomly between equal moves to assure you of never having identical games.' ★ **POKER FACE** — The computer uses psychology as well as logic to try and beat you at poker. Cards are displayed using TRS-80's full graphics. Computer raises, calls, and sometimes even folds! Great practice for your Saturday night poker match! (Plays 5 card draw). ★ **PSYCHIC** — Tell the computer a little about yourself and he'll predict things about you, you won't believe! A real mind bender! Great amusement for parties. ★ **TANGLE MANIA** — Try and force your opponent into an immobile position. But watch out, they're doing the same to you! This graphics game is for 2 people and has been used to end stupid arguments. (And occasionally starts them!) ★ **WORD SCRAMBLE** — This game is for two or more people. One person inputs a word to the computer while the others look away. The computer scrambles the word, then keeps track of wrong guesses.

ONLY $12.95



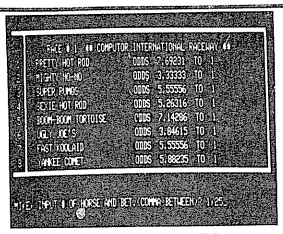
PACKAGE THREE INCLUDES: POETRY — This program lets you choose the subject as well as the mood of the poem you want. You give TRS-80 certain nouns or names, then the mood, and it does the rest! It has a 1000-word + vocabulary of nouns, verbs, adjectives and adverbs! ★ **ELECTRIC ARTIST** — Manual: draw, erase, move as well as, Auto: draw, erase and move. Uses graphics bits not bytes. Saves drawing on tape or disk! ★ **GALACTIC BATTLE** — The Swineus enemy have long range phasers but cannot travel at warp speed! You can, but only have short range phasers! Can you blitzkrieg the enemy without getting destroyed! Full graphics — real time! ★ **WORD MANIA** — Can you guess the computer's words using your human intuitive and logical abilities? You'll need to, to beat the computer! ★ **AIR COMMAND** — Battle the Kamikaze pilots. Requires split second timing. This is a FAST action arcade game.

ONLY $12.95



PACKAGE FOUR INCLUDES: LIFE — This Z-80 machine language program uses full graphics! Over 100 generations per minute make it truly animated! You make your starting pattern, the computer does the rest! Program can be stopped and changes made! Watch it grow! ★ **SPACE LANDER** — This full graphics simulator lets you pick what planet, asteroid or moon you wish to land on! Has 3 skill levels that make it fun for everyone. ★ **GREED II** — Multi-level game is fun and challenging! Beat the computer at this dice game using your knowledge of odds and luck! Computer keeps track of his winnings and yours. Quick fast action. This game is not easy! ★ **THE PHARAOH** — Pide the ancient city of Alexandria! Buy or sell land. Keep your people from revolting! Stop the rampaging rats. Requires a true political personality to become good! ★ **ROBOT HUNTER** — A group of renegade robots have escaped and are spotted in an old ghost town on Mars! Your job as "Robot Hunter" is to destroy the pirate machines before they kill any more settlers! Exciting! Challenging! Full graphics!

ONLY $12.95



PACKAGE FIVE INCLUDES: SUPER HORSERACE — Make your bets just like at the real racetrack! 8 horses race in this spectacular graphic display! Up to 9 people can play! Uses real odds but has that element of chance you see in real life! Keeps track of everyone's winnings and losses. This is one of the few computer simulations that can actually get a room of people cheering! ★ **MAZE MOUSE** — The mouse with a mind! The computer generates random mazes of whatever size you specify, then searches for a way out! The second time, he'll always go fastest route! A true display of artificial intelligence! Full graphics, mazes & mouses! ★ **AMOEBA KILLER** — You command a one man submarine that has been shrunken to the size of bacteria in this exciting graphic adventure! Injected into the president's bloodstream, your mission is to destroy the deadly amoeba infection ravaging his body! ★ **LOGIC** — This popular game is based on Mastermind but utilizes tactics that make it more exciting and challenging — has 2 levels of play to make it fun for everyone. ★ **SUBMARINER** — Shoot torpedoes at the enemy ships to get points. Fast action graphics, arcade type game is exciting and fun for everybody!

ONLY $12.95

HARDWARE → TRS-80 ← HARDWARE

MICRO SPEED

Upgrade your "slow" TRS-80 to a **SUPER FAST MACHINE!!** (2.66 MHZ) over **50% FASTER!** Some of the features:

Auto turn-off during cassette or disk access. (This means NO lost programs EVER!) (Turns back on automatically too!) MANUAL control. (Unit may be turned on or off at any time. Yes even during program execution!) Keyboard indicator light "blinks" when micro-speed is on. Stops blinking when off! **Don't wait for SARGON II or any other program!!!** Comes with easy to follow instructions. (Some soldering required.) **OR** take to your local computer store or TV-Appliance Center for quick installation. (5-10 minutes!!) Works with any model, TRS-80.

ONLY $24.95 complete

MICRO BEEP

Simple hook up: Just plug cassette remote jack into unit.

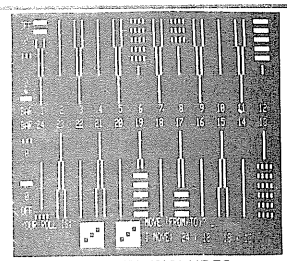
EASILY CONTROLLED FROM BASIC:

OUT 255,4 = on
OUT 255,0 = off

MICRO-BEEP make games more fun as well as provide useful sound output for professional applications!

Works with Any Model I TRS-80

ONLY $9.95 complete



PACKAGE SEVEN INCLUDES: BACKGAMMON 5.0 — 2 different skill levels make this game a challenge to average or advanced players FAST (15 second avg) Looks for best possible move to beat you! FANTASTIC GRAPHICS. Plays doubles and uses international rules ★ **SPEED READING** — Increases your reading speed. Also checks for comprehension of material. Great for teenagers and adults to improve reading skills ★ **PT 109** — Drop depth charges on moving subs. Lower depths get higher points in this fast action graphics game. ★ **YAHTZEE** — Play Yahtzee with the computer. This popular game is even more fun and challenging against a TRS-80! ★ **WALL STREET** — Can you turn your $50,000 into a million dollars? That's the object of this great game Simulates an actual stock market!

ONLY $12.95

PACKAGE SIX INCLUDES: 20 HOME FINANCIAL PROGRAMS — Figures amortization, annuities, description rates, interest tables, earned interest on savings and much, much more. These programs will get used again and again. A must for the conscientious, inflation minded person.

ONLY $12.95

SIMUTEK

Exceptional Products through Research & Imagination

Send Check, Money Order or Bank Card No. orders to:

SIMUTEK
P.O. Box 35298
Tucson, AZ 85740

Please Add 2.50 Per Order For Postage & Handling

24 HOUR (7 days) HOTLINE

Master Charge — **(602) 882-3948** — **Visa**

(C.O.D. $3 extra)

Same Day Shipment on Bank Cards, Money Orders & C.O.D.

All Tape Programs Require a Minimum of 16K Level 2
Packages Available on Diskette (32K System) $4.25 Extra

3 or More Packages Get 10% Discount

Dealer Inquiries Invited

TRS-80 IS A REGISTERED TRADEMARK OF TANDY CORP.

ITEMS AT RANDOM

FIFTH COMPUTER FAIRE

We just returned from the Fifth Annual Computer Faire in San Francisco. It was bigger and better than ever, with over 19,000 attending. We didn't have time to count, but it seemed that at least two-thirds of the booths there had at least one TRS-80 in it. One (or two?) of the more comic attractions were T-shirts with "Dual Floppies" written across the front. It was a veritable deluge of information. Someone made a crack that the TRS-80 publications were conspiring, since one evening in the hotel dining room the Editors and Publishers of Computronics, Softside Publications and 80-U.S. were all having dinner and comparing notes. It was a hectic, enjoyable and very informative event. While there, we talked with some of Exatron's representatives. We mentioned the fact that some of our readers have problems of slow delivery of wafers. The reason, we found, is that both the transport mechanism and wafers have come from a single source supplier. Exatron did not find the supplier responding satisfactorily to its needs so initiated negotiations to purchase the supplier. After several months of discussions the purchase was completed on February 21st. Production of both transport and wafers has already been substantially increased. By the time you read this backlogs should have been virtually eliminated.

COURSE OFFERED

A two-week short course on the fundamentals of microcomputer interfacing will be offered by the Virginia Military Institute from July 14 through Jul 25, 1980. It's a hands-on lab oriented course which will feature the TRS-80 (Level II 16K). Camping facilities are available. Tuition is $450. For detailed information contact Dr Philip B. Peters, Dept of Physics, VMI, Lexington, VA 24450 (703)463-6225

INTERFACING COURSE

Workshop in TRS-80 Interfacing and Programming for Instrumentation and Control - June 23, 27, 1980. This is a hands-on workshop with participants working with and designing interfaces for the TRS-80. For more information contact Dr Linda Leffel, CEC, Virginia Tech, Blacksburg, VA 24061 (703) 961-5241

CORRECTIONS (OOps!)

There has been some problem putting SARGON II on disk (Letters, Mar-Apr 80). After some checking, and under certain conditions, the DUMP command (TRSDOS and NEWDOS) will create the file, allocate one granule to it, and just stop. We are asking Apparat about this now, but in the meantime use TAPEDISK instead of DUMP. Using TAPEDISK, the format to put SARGON II on disk (after following all the procedures up to the point where the DUMP is called for) is: TAPEDISK [ENTER] (Tapedisk will respond with a "?" prompt). Type in: F SARGON2/CMD 8000 AD19 ACFD [ENTER]. Typing E [ENTER] will return you to DOS READY. Now, getting a Directory of the disk with the (A) option, you should find a file called SARGON2/CMD which is 10 grans long.

In the BASE CONVERSION program in the Mar-Apr 80 issue, page 73, line 220 should start like this: 220 IF LT$="D"...etc., and line 410 should start: 410 L=2:GOSUB...etc.

In NOTES on BASIC, Mar-Apr 80, page 22 - the equal signs didn't show in the right column. Also the word "MONTH" contains a reserved word, "ON", which causes a syntax error. Use variable "MO" instead, and yes, we have had a chat with our printer about light copy.

COMPUTER CAMP

This summer youngsters can sign up for an overnight camp in Moodus, CT where the main activity will be ..COMPUTERS. This unique recreational and educational experience is directed by Dr Michael Zabinski, Professor at Fairfield Univ. An action packed week is planned from June 29 to July 4, 1980. The campers, ages 10 - 17, will enjoy small group instruction and mini-micro computers for ample hands-on. Dr Zabinski will be assisted by high-school teachers. In addition to computers the campers will enjoy the superb recreational facilities of the Grand View Lodge including swimming and tennis. For further info contact Dr Zabinski Ph.D., at (203) 795-9069 or write Computer Camp, Grand View Lodge, Box 22, Moodus, CT 06469

NEWDOS BUGS??

Chess McKinney, Hermitage, TN brought this to our attention: Seems that when full disk copy is done with NEWDOS, i.e., COPY :0 TO :1 (date) with VERIFY on, it only copies 17 tracks. We checked, and ours gives a PARITY ERROR DURING WRITE after writing track 17, sector 9. Registered owners of NEWDOS may write to Apparat Inc, 7310 E Princeton Ave, Denver, CO 80236 for a list of changes to apply (using SUPERZAP) to bring their DOS up to date. This applies to NEWDOS 2.1.

READER SURVEY

The reader survey in our Mar-Apr 80 issue is being returned by many. So far there have been a couple of small surprises. The survey will be tabulated and presented for all to read in the next issue. If you have not yet returned yours, please do so soon. The drawing for free subscriptions will be on the 15th of April!

NO REVIEWS??

We have to admit rather sheepishly, that we have again run out of space in this issue. Due to the last minute flood of material, ads, and going to the Faire in San Francisco, we failed to project our page requirements to the printer. Although we had not anticipated a size increase until September, we now have scheduled 16 more pages for the Jul-Aug issue. To make up for the lack of reviews in this issue, there will be more than usual in the Jul-Aug issue.

RENEWALS

Your label on this issue should contain the actual month and year of your subscription expiration. For example, if this is your last issue, the upper right of your label would read: MAY80. If that's the case, your speedy renewal will keep the ole' mag coming without interruption.

INTERMITTENTS

Did you ever have the feeling, when you try some serious applications that won't work, that a room full of dedicated Monks could do it faster?

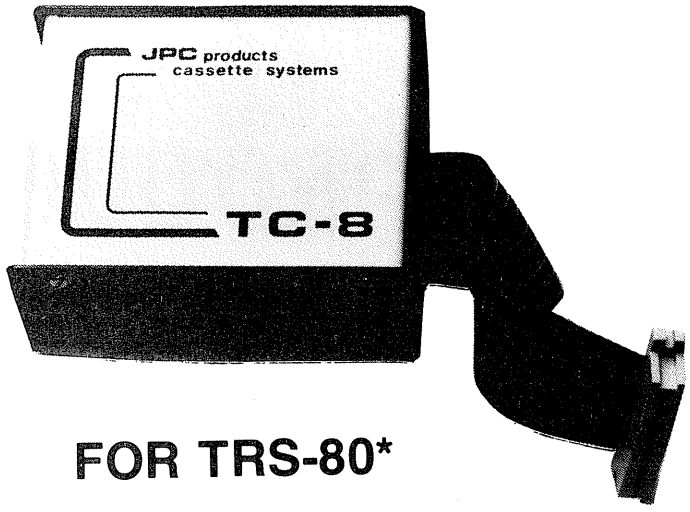
And by the way, does anyone have a good cure to keep the buffered cable on the Model I from going flaky at the connector ends? If you do, send it in, so we can save others some grief!

Make a nice day for yourself! And tell them you saw it in the **Journal**

Mike

Poor Man's Floppy

HIGH SPEED CASSETTE SYSTEM



FOR TRS-80*

Now the widely acclaimed JPC Cassette System is available for your TRS-80 computer. The price is only $69.95.*

The **TRS-80*** is undoubtedly one of the best small computers around. But its cassette recording system can be very frustrating, particularly if you can't read an important cassette. And getting the volume control set just right is really a pain. Waiting 45 seconds to load "Blackjack" is no fun either.

JPC Products Company has developed an improved cassette system that uses your present cassette recorder but loads programs 5 TIMES faster, with much better reliability.

The original JPC cassette interface is the TC-3, which was developed 2 years ago for the M6800 computers. It has been very successful, as you can see from the magazine and owner comments below. Now we have a similar unit for the TRS-80*. At $69.95 plus shipping the TC-8 is a real value.

PRAISED IN REVIEWS

"The JPC Products Model TC-3 cassette interface provides a VERY RELIABLE means of saving programs and data to tape .... both fast and reliable. The TC-3 is very convenient to use. The hardware is excellent .... The TC-3 is rated AAA because it is an excellent low cost alternative to a floppy disk system for the person on a tight budget."

Product Review
68 Micro Journal
June 1979

OWNERS LOVE IT

"I love your interface. I have recommended it to all." *D.O. (Florida)*

"Excellent! A poor man's floppy. Thanks." *F.B. (Quebec)*

"It is great. I can't believe it's so fast." *E.T. (Arkansas)*

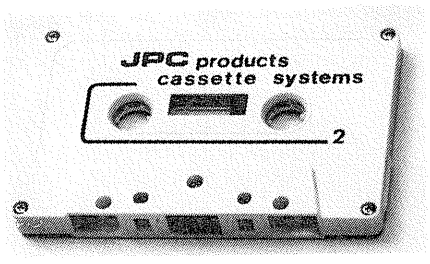
"Great! Fast! Reliable! Worked first time!" *C.Z. (New York)*

"It is the answer to my prayers!" *S.S. (New York)*

"The best through-the-mail device I have ever purchased." *J.P. (Florida)*

"I'm glad I bought this kit. Worked first time. Never one bad load." *R.M. (New York)*

"The first kit I have ever built that worked the first time without any adjustment or trouble-shooting." *F.L. (Colorado)*



INEXPENSIVE MEDIA

The TC-8 and your present cassette recorder will allow you to store 50,000 Bytes on a standard 10 minute cassette. Or 300,000 Bytes on a standard 60 minute cassette. At a cost of $1 to $3. Our C-10 data cassettes sell for $1.39 with a money-back guarantee.

PLUG IT IN

The TC-8 plugs into the expansion connector on the back of the keyboard and does its thing 5 TIMES FASTER! Less than ONE BAD LOAD in a MILLION BYTES! With the VOLUME CONTROL ANYWHERE BETWEEN 1 AND 8.

If you prefer you can leave the existing recorder connected normally and add a second one for the TC-8.

THERE'S A CATCH

The TC-8 magic is mostly done in software. So you have to load a small program into the upper seven hundred bytes of memory. It is usually out of the way there. We provide the software on a cassette that comes with the TC-8. Just load it in.

*TRADEMARK OF TANDY CORPORATION

YOU CAN BUILD IT

The TC-8 is available as a kit for $69.95 plus shipping. It is very easy to build. It should only take you an hour or so. Even if you have never built a kit before, you can build the TC-8.

If you can get toothpaste on a toothbrush, you can learn to solder. Our instruction manual will show you how.

"CAN'T FAIL" GUARANTEE

If you build the TC-8 and for any reason it doesn't work, we will make it work at NO COST. All you have to pay is the shipping. We guarantee it.

WE WILL BUILD IT

The TC-8 is available fully assembled for $99.95 plus shipping. We ship assembled units 3 weeks after we receive your order. But truthfully, with our CAN'T FAIL guarantee, we don't understand why you wouldn't rather do it yourself.

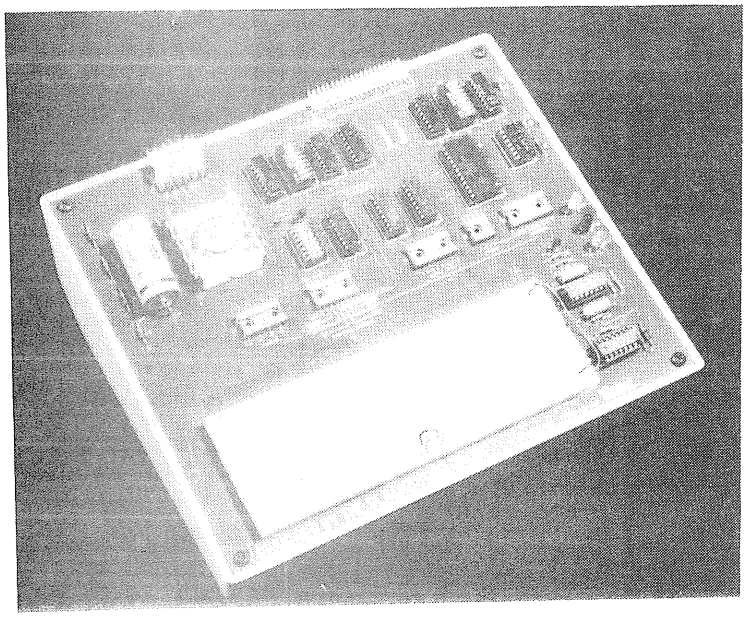
ORDER NOW

To order your TC-8 kit, send your check or money order for $69.95 plus $3.50 postage and handling to JPC PRODUCTS CO., 12021 Paisano Ct., Albuquerque, NM 87112 (New Mexico residents add 4% sales tax). Credit card orders accepted by phone or mail. Personal checks will delay shipment. We will otherwise immediately ship you the TC-8 kit, the cabinet, the ribbon cable, the power adapter, an instruction manual, and a cassette containing the software.

At the present time, the only version of the TC-8 available is for 16K LEVEL II SYSTEMS.

JPC PRODUCTS CO.
Phone (505) 294-4623
12021 Paisano Ct.
Albuquerque, N.M. 87112

New PRODUCTS



TRS-80 INTERFACING

Group Technology Ltd announces accessories for interfacing and controlling peripheral devices. The Breadboard (see photo) allows the microcomputer user to design custom interfaces by which peripheral devices can be connected. TRS-80 Interfacing is a 190 page text book by Dr Jon Titus, and instructs the breadboard user in the construction of device address decoders, input ports, output ports and sync signals. The Breadboard is available as a Parts List and Instructions for $3.00 or as a kit; prices range from $25 to $250. The book is priced at $8.95 plus $1 shipping, from Group Technology Ltd, PO Box 87, Check, VA 24072 (703)651-3153

NEW DISCOUNT STORE

Garland, TX - Access Unlimited, a telephone and mail-order discount retailer, began selling peripherals for the TRS-80 computer the first of the year. By purchasing in large quantities, the company is able to retail new products to individuals at substantial discounts, according to Sales Manager Rose Bivona. She said that as a "get acquainted" gesture, Access Unlimited is offering Percom TFD-100(tm) single drive mini-disk systems for $325. Multiple drive systems are equivalently discounted, she said. Orders may be placed by calling a toll-free number 1-800-527-4196. From Texas call (214) 494-0206.

AUTO LEASING SOFTWARE

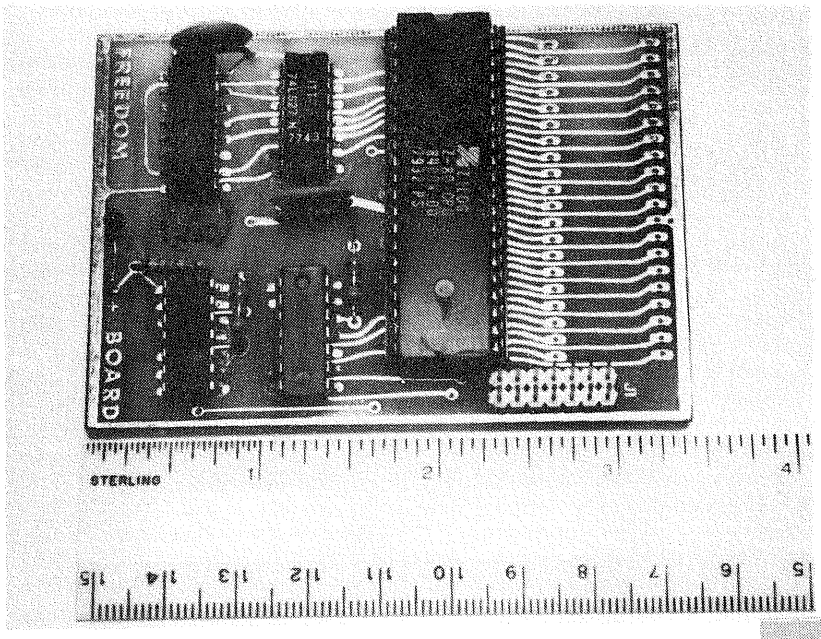
Small Business Systems Group has available a comprehensive software package for the small to medium size auto leasing firm. The package includes two diskettes with sample data and a user manual. The system is designed to use the TRS-80 32K microcomputer with two mini disks and a line printer. The programs provide vehicle maintenance, account maintenance, monthly billing and report generation. Monthly statements are created noting payments and account aging. For further information contact: Small Business Systems Group, Corner Main St & Lowell Road, Dunstable, MA 01827 (617) 649-9595

DISK HOLDERS

Mega * Brain, 2634 Piedmont Ave., Berkeley, CA 94704 (415) 848-4971 has handy 3-ring binder inserts (and binders which prop up by themselves) for your disks (5¼ or 8 inch). They will sell in small quantities.

AUTOMATIC PROGRAMMING

PEARL (tm), a program which generates programs to meet your personal computing needs,Produces Error-Free Automatic Rapid Logic. It runs under CP/M and CBASIC and requires at least 48K. It will automatically create source programs. Computer Pathways Unlimited, Inc 2151 Davcor St S E, Salem, OR 97302 (503) 363-8929



BUSY BOX

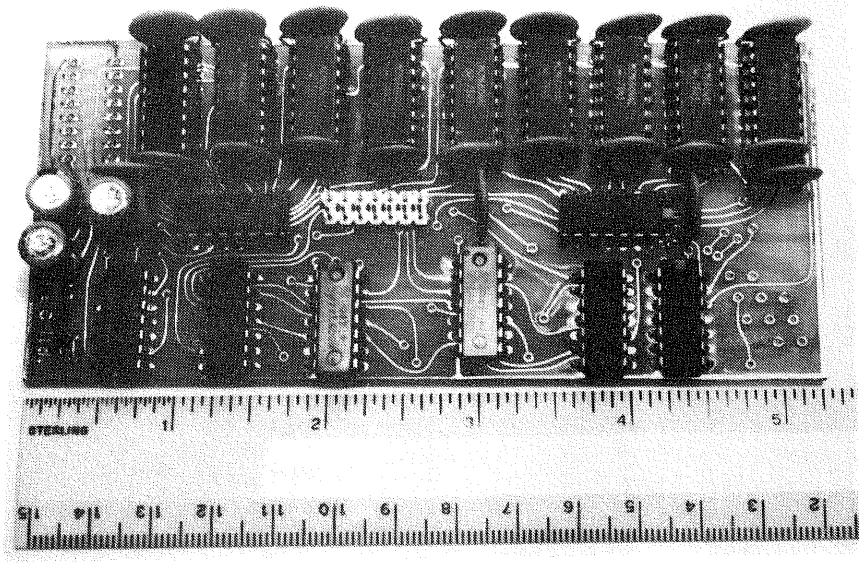
MicroMint Inc, 917 Midway, Woodmere, NY 11598 (516)374-6793, has introduced the Busy Box, which facilitates wireless remote control of AC operated lights and appliances throughout the home or office. It converts program commands into an ultrasonic message which is transmitted to the popular BSR X-10 (Sears) Home Control System. The Busy Box is shipped with enclosure, cable, appropriate adapter and complete documentation. Installation is a simple matter of plugging in one connector. Price for the TRS-80 version of the Busy Box is $104.95

SPLIT PERSONALITY

Field Engineering Consultants, Ltd has announced two new products. First is a circuit board and software (Operating System) that converts the TRS-80 upon software command to a "real" CP/M type machine, that loads programs at Hex 100 and responds to Call 5. The Second new item is Expansion Memory. Using what they call their "Freedom Mode" the ROM is no longer used, and there is room to address 14848 additional bytes. The Expansion Memory fills this gap and increases the addressable RAM to a full 64K bytes. Their address is: PO Box 2368, Woburn, MA 01888 (617) 944-5329

MAYDAY

A line of Uninterruptable Power Supplies is available from Sun Research, Inc Box 210, New Durham, NH 03855 (603) 859-7110. These devices are designed to filter the power line, as well as provide time to save your valuable files in the event of a power failure. Prices for these "Mayday" units range from $240 to $420. depending on wattage and other features.



NEW BUSINESS PROGRAMS

Management Systems Software Inc announces two business programs for the TRS-80. The first program is a Proforma (Forcasted) cash-flow budget. The user of this program can plan the firm's cash needs for up to twelve periods and the price of this program is $125. The second program

evaluates if it is better to lease or purchase an asset. All of the newest tax laws are considered with this program and the price of this Lease vs. Purchase program is $100. Extensive documentation is included with each program and numerous sample problems are included to show the user how to input the correct information and how to interpret the results. Their address is 5200 Brittany Drive #1006, St Petersburg, FL 33715, (813) 864-4347

NEW INTERFACE

LOBO Drives announced the addition of an enhanced expansion interface for the TRS-80. The new interface (Model LX80) has been designed for the serious user who wants to improve or expand the performance and capabilities of the TRS-80. It offers expanded memory storage and provides a second serial port. An easily accessible switch permits overriding the keyboard ROM for booting in diagnostics and customized operating systems. Connectors for 5 and 8 inch disk drives and other peripheral devices are conveniently located on the side and rear panels. Other features include a parallel "Centronics" printer port; screen printer port; two microprocessor controlled bi-directional serial ports; and a crystal controlled "Real-time" clock. It is priced at $525 quantity one. For additional information contact Mike Mock, LOBO Drives International 935 Camino Del Sur, Goleta, CA 93017 (714) 641-1436

FREE DBM PRIMER

Micro Data Base Systems has prepared a fifty-four page primer on the subject of data base management. While the primer makes an excellent companion to the data base management system marketed by MDBS, it is also extremely useful to the individual wishing to learn about the principles of data base management systems. The orientation is toward CODASYL data management approach as described in the Data Base Task Group report. Individuals with some familiarity with a high level language, such as BASIC, should have little difficulty following the presentation. The primer is free upon request as long as the supply lasts, from Micro Data Base Systems, Inc., PO Box 248, Lafayette, IN 47902 (317) 742-7388

ASPTCH 2.0

Developed for cassette based assembly language programmers using Radio Shack's Editor/Assembler 1.2. ASPTCH loads behind EDTASM and adds several features including Reserve Memory, Dump assembled programs without use of cassette, Execute dumped program, Display number of bytes left in the text buffer, Hex-Decimal conversions and examination of memory location, and more. 16 page instruction manual is included. Requires Level II, 16K and up. $19.95 from Micropute Software, Box 1943, Rocky Mount, NC 27801

MODEL II CP/M

Lifeboat Associates is now offering CP/M 2.0 for the Radio Shack Model II computer. CP/M, "the software bus", makes it possible to run the existing wealth of CP/M programs for business accounting, word processing, scientific and special application programming on the new Model II. The entire CP/M 2 system with complete documentation is $170. from Lifeboat Associates 2248 Broadway, New York, NY 10024 (212) 580-0082

Now, a one piece TRS80

CASEKIT puts keyboard and interface together in one unit. Solid, black plexiglass construction enhances original TRS80 styling. Easy assembly. $99.00

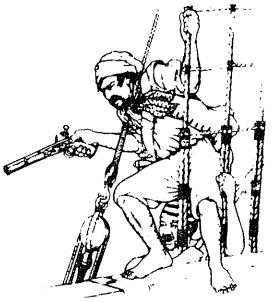
DRIVEKIT mounts disk drive in video display case. For TRS80 or other Shugart type drives. Complete with parts, instructions. 3 hour assembly time. $49.00

Order by mail or phone. Visa, M/C or check. Calif residents add sales tax. Shipping prepaid. Dealer inquiries invited. TRS80-TM Tandy Corp

DEALER SYSTEMS, INC.

717 CARLSTON AVENUE
OAKLAND, CALIFORNIA 94610
(415) 444-1987

ADVERTISEMENT



Software Review by Roy Groth

FOR

80-US* Journal Sep/Oct 79

ADVENTURE

Adventure is an incredibly complex, detailed and fascinating game. Unlike most available games, there is always a surprise around the corner. Winning is quite a challenge, consequently, each step closer to winning gives one a fulfilling sense of accomplishment.

In Adventure, one takes the computer through an area (caves, islands etc.) looking for treasure. You move, manipulate objects, and do everything else with two word English commands. For example: TAKE AXE, LIGHT TORCH. One finds out what commands work by trying whatever sounds sensible.

The program gives you a description of where you are and what you see. Then you tell the computer what to do.

Getting treasure is difficult. Often one must use several other objects to even find the treasure. You need to solve the series of problems posed by the obstacles by using common sense, and by picking clues from descriptions.

Adventure 1 and Adventure 2 by Scott Adams (Box 3435, Longwood, Florida 32750 - $14.95 each), are superb. In Adventure 1 you wander through forests and caverns finding treasures. In Adventure 2, you become a pirate and sail off to Treasure Island. More adventures are currently in the making.

Some useful advice may help speed your understanding of the game. To move in a direction, (north, up, etc) just type the first letter of that direction (N, E, S, W, U, D). To enter places you must often use ENTER (as for example: ENTER HALLWAY). This command is essential to getting around.

TAKE and DROP are used for manipulate objects. INVEN gives you an inventory of all that you are carrying LOOK, followed by an object, will sometimes help you discover secrets about that object. HELP will sometimes give you useful hints.

The program only looks at the first three letters of each word. Once you understand the program, all you need to type are the first three letters. This shortcut in the program can sometimes confuse a player, as one time we were saying TAKE BRANCHES (in hopes there were some around), but the program understood it as saying TAKE BRACELET.

The program allows you to save a game in progress with the command SAVE GAME. This prepares a data tape which can be read back later, a handy feature, since winning can take sometime.

Adventure has a beautiful display. At the top, everything that you can see is constantly displayed. Below this is a line of dashes, and the remainder of the screen is devoted to input. When typing commands, the bottom of the screen scrolls up, but only to the dashes. Material scrolling into the dashes disappears. It also features a flashing cursor.

Both programs support lower case, so if you system does too, you can read in upper/lower case. Both programs are written in machine language and load under the SYSTEM command.

If you dislike being made to think, or if you get frustrated easily, forget these programs. But if you love a challenge, like to be baffled, and enjoy jokes (there are some very funny occurrances). I highly recommend these programs by Scott Adams.

Talked about at NCC '79, the Cover Feature of the August '79 CREATIVE COMPUTING, highly rated by COMPUTER CASSETTE Magazine and others, ADVENTURE by Scott Adams has rapidly become a classic. Each ADVENTURE is a 16K machine language program designed for you, the Armchair Adventurer! See for yourself what everyone is talking about by ordering one of our seven different Adventure tapes today from our many fine dealers, or order directly from:

ADVENTURE INTERNATIONAL
Box 3435, Dept. X
Longwood, Florida 32750
(305) 862-6917

Each Adventure, only $14.95, Visa and Mastercharge accepted, Send For Free Flyer!
Dealer Inquiries Encouraged
Available for: 16K TRS-80, 16K SORCERER

***80-US is published bi-monthly by 80-NW Publishing**
3838 South Warner St.
Tacoma, Washington 98409

Clubs & Publications

80-USERS OF HOUSTON

The 80-Users of Houston Club meets the first Wednesday of each month, at the Bellaire Chamber of Commerce Building, 6900 S Rice, in Bellaire, TX at 7:30 PM. For more information call Ben Taylor at (713) 664-5823

SOFTWARE DIRECTORY

ComputerMat has released its latest edition of the 80 Software Directory. It is a publication dedicated entirely to the software available for the TRS-80. The latest edition has over 5000 software listings, available from over 450 vendors. It is published 3 times a year in Winter, Spring and Summer. The price is $6.00 per issue and includes postage mailed in the US. Canada and foreign orders please add $2.00 for AIR MAIL. ComputerMat Box 1664, Lake Havasu, AZ 86403

DELAWARE VALLEY

The Delaware Valley Computer Society meets at 8:00 PM on the third thursday of each month, at the Bristol Township Municipal Building, near Levittown, PA. For further information call (215) 343-6949 or write DVCS, PO Box 651, Levittown, PA 19058

CONSULTANT DIRECTORY

Business firms and government agencies around the country are now receiving the first issue of a unique newsletter, the *Computer Consultant (CC)*. Each issue contains descriptions of consultants with varying specialties - hardware selection, system selection, training, to name a few - in different parts of the country. A special "consultants wanted" section also allows subscribers to make a particular request for consultants at no extra charge. The publisher, Battery Lane Publications, PO Box 30214, Bethesda, MD 20014, is offering charter subscriptions for $15.00 per year.

SALEM, OREGON CLUB

Has membership dues of $5.00 per year which includes the monthly newsletter. Meetings are held the first Monday of each month. For further information contact Doug Walker, 4554 Jan Ree Drive NE, Salem, OR 97303 (503) 393-2685

FROM DITS TO BITS

Robotics Press, PO Box 92, Forest Grove, OR 97116 (503) 357-7192 has announced a new book entitled "From Dits to Bits" - a personal history of the Electronic Computer, by Herman Lukoff. It is 220 pages, cloth cover and priced at $12.95

MCTUG

The Marin County TRS-80 Users Group meets regularly and publishes a very interesting newsletter. Editor is Pat McMahon, 45 Selfridge Way, Hamilton AFB, CA 94934

SMUG?

The Surrey Microcomputer Users Group feels pretty smug about the formation of their group in the lower mainland of British Columbia. They plan to publish a newsletter. The address is SMUG Box 402, Surrey, BC, Canada V3T 5B6

REPLACEMENT GUIDE

The new 1980 edition of the Archer Semiconductor Replacement Guide, featuring cross reference/substitution listings for over 100,000 devices, is now available from Radio Shack. The 224 page book is a comprehensive guide to Radio Shack's complete line of prime-quality Archer brand semiconductors and includes detailed data and pin connections for IC's, diodes, SCR's, LED's and other devices. It is priced at $1.99 - Available at your local Radio Shack.

NEW CLUB IN NH

A TRS-80 club is forming, first meeting held in February 1980, in the Manchester, NH area. Contact Scott Mitchell, 346 S Taylor St. Manchester, NH 03103 (603) 624-0089

JOE COMPUTER

Joe Computer is now publishing COMPUTERS & COMPUTER GAMBLING MAGAZINE. The quarterly magazine is oriented towards computer hobbyists interested in using computers for all types of handicapping systems, card counting systems and techniques for "getting the odds on your side". Stock and future market speculation systems are also included. Sample issues are now available for $1.00 each. Subscriptions are $5.00 per year and may be obtained by writing to Joe Computer 22713 Ventura Blvd/Suite F, Woodland Hills, CA 91364

1979 PERIODICAL GUIDE

The Jan through Dec 79 Periodical Guide for Computerists indexes over 2000 articles from 20 personal computing and professional electronic publications. Articles, editorials, book reviews and letters from readers which have relevance to the personal computing field are indexed by subject under 110 categories. A list of authors is cross-referenced by subject to aid in locating articles. The 80 page book is available for $5.95 from E Berg Publications, 622 East Third, Kimball, NE 69145 or from local computer stores. A free brochure which describes the book in more detail is available on request. Editions covering 1976, 1977, and 1978 are available for $5.00 each.

MICROCOMPUTER INVESTORS

The MicroComputer Investors Association has issued another of its journals, The MicroComputer Investor. This issue contains 16 articles in 219 pages. Each of the 16 articles concerns some aspect of how to utilize a microcomputer to make and manage investments. The MicroComputer Investors Association is a nonprofit, professional association of persons who utilize microcomputers to assist them in managing their investment portfolios. To obtain an information packet send $2.00 to Jack Williams, MCIA, 902 Anderson Drive, Fredericksburg, VA 22401

Settle for More from Your TRS-80

BASIC Compiler. With TRS-80 BASIC Compiler, your Level II BASIC programs will run at record speeds! Compiled programs execute an average of 3-10 times faster than programs run under Level II. Make extensive use of integer operations, and get speeds 20-30 times faster than the interpreter.

Best of all, BASIC Compiler does it with BASIC, the language you already know. By compiling the same source code that your current BASIC interprets, BASIC Compiler adds speed with a minimum of effort.

And you get more BASIC features to program with, since features of Microsoft's Version 5.0 BASIC Interpreter are included in the package. Features like the WHILE . . .WEND statement, long variable names, variable length records, and the CALL statement make programming easier. An exclusive BASIC Compiler feature lets you call FORTRAN and machine language subroutines much more easily than in Level II.

Simply type in and debug your program as usual, using the BASIC interpreter. Then enter a command line telling the computer what to compile and what options to use.

Voila! Highly optimized, Z-80 machine code that your computer executes in a flash! Run it now or save it for later. Your compiled program can be saved on disk for direct execution every time.

Want to market your programs? Compiled versions are ideal for distribution.* You distribute only the object code, not the source, so your genius stays fully protected.

BASIC Compiler runs on your TRS-80 Model I with 48K and disk drive. The package includes BASIC Compiler, linking loader and BASIC library with complete documentation. $195.00.

*Microsoft royalty information for the sale of programs compiled with BASIC Compiler is available from Microsoft.

muMATH Symbolic Math System expands your TRS-80 beyond the limits of numerical evaluation to a much higher level of math sophistication.

Symbolic mathematics is muMATH's power. For the first time, algebra, trigonometry, calculus, integration, differentiation and more can be performed on a system smaller than an IBM 370. And in a fraction of the time you could do them manually.

Yet for all its power, muMATH is simple to use.

To perform a differentiation you could enter: ?DIF (A*X ↑ 3 + SIN(X ↑ 2),X);

In almost no time, the computer would reply with: @2*X*COS(X ↑ 2) + 3*A*X ↑ 2.

Or to add fractions: ?1/3 + 5/6 + 2/5 + 3/7;

The instantaneous answer: 419/210.

Or to perform a more difficult trigonometric expansion you enter: SIN(2*Y)*(4*COS(X)↑3—COS(3*X) + SIN (Y)*(COS(X+Y+#PI) — COS(X—Y));

Just a few seconds later, the computer replies: @4*SIN(Y)*COS(X)*COS(Y).

muMATH has virtually infinite precision with full accuracy up to 611 digits.

If you use math, you'll find countless ways to save time and effort with muMATH. It's a professional tool for engineers and scientists. A learning tool for students at any level from algebra to calculus.

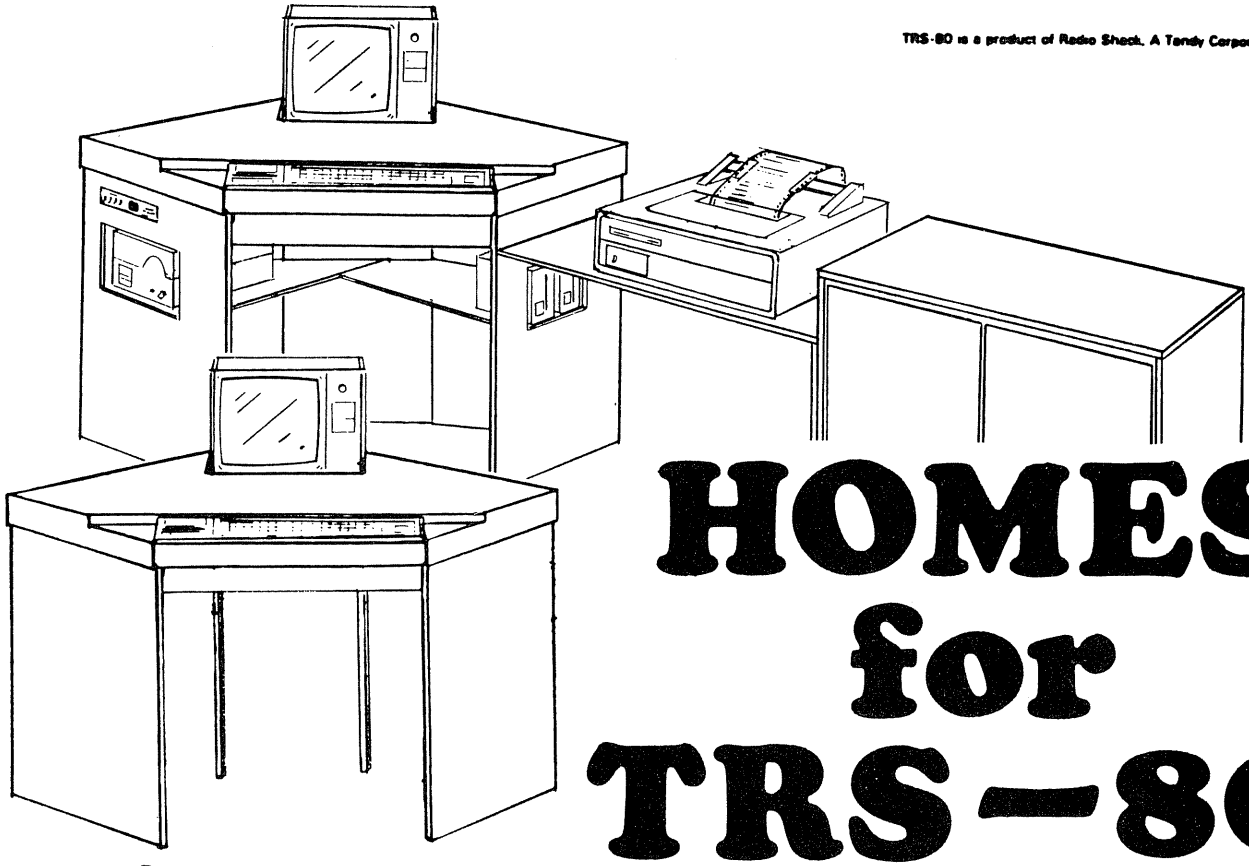
And if you want to expand your capabilities even beyond the standard muMATH, the option is open. muSIMP, the programming language in which muMATH is written, is included in the muMATH package. A superset of the language LISP, muSIMP is designed especially for interactive symbolic mathematics and other artificial intelligence applications.

muMATH and muSIMP were written by The Soft Warehouse, Honolulu, Hawaii. Priced at $74.95, the package includes muMATH, muSIMP and a complete manual. It requires a Model I TRS-80 with 32K and single disk. muMATH for the Apple II Computer will be available later this year.

You can buy muMATH and BASIC Compiler at computer stores across the country that carry Microsoft products. If your local store doesn't have them, call us. 206-454-1315. Or write Microsoft Consumer Products, 10800 Northeast Eighth, Suite 507, Bellevue, WA 98004.

MICROSOFT
CONSUMER PRODUCTS

TRS-80 is a product of Radio Shack, A Tandy Corporation



HOMES for TRS-80

Dealer inquiries invited.

Custom furniture for the TRS-80 office or home decor.

FEATURES

* One Homogeneous Unit
* Arm Rest Cushion
* Copy Shelf
* Spare Saver
* Enhance Any Decor
* Copy Drawer
* Built-in Accessories
* Economical
* Hand-rubbed Wood Finish
* Ease of Operation
* Matching Accessories
* Finger-tip Control
* Typewriter Height

Homes for TRS-80, is the unique custom furniture line that converts the Radio Shack modular computer system into one homogenious unit. Available in both a high quality and economy series, the basic custom corner desk consoles provide total built-in capabilities for the TRS-80 keyboard, interface, monitor, and cassette. Options are available for building in accessories such as: Stringy Floppy's, Disk Drives, Screen Printers, and Line Printers.

The basic consoles have been designed, not only to enhance the decor of any office or home, but to provide maximum work surface area, and the ease of operation. Distinctive features such as: Corner mounting to save space and provide wrap around operation; Copy shelf to add ease in programming; Arm rest cushion to eliminate annoying table creases to operators arms; Keyboard height lowered to reduce programming fatique; And most of all, no more of those unsightly interconnecting cables. That's right, Home for TRS-80, was designed specifically for you, the operator and/ or programmer.

High Quality CF-80 Series is made from hard birch, with a hand rub, rich walnut finish. Larger in size than the economy version, the main console is capable of having built-in, multiple accessories such as: Disk Drives, Stringy Floppy's, or Screen Printers. Included in the main console is a convenient, wide copy drawer. The series also has available a line of matching storage hutches and printer stands.

Economy CF-90 Series is made from industries office standards of Gunstock Walnut Formica. The unit comes partially dissembled to allow shipping by UPS. It is available in two models, one with and one without built-in capabilities for Stringy Floppy's. The series also has available a matching line of printer stands, some of which provide built-in capabilities for disk drives.

Both CF-80 and CF-90 Series are available for the TRS-80 models I and II, with consoles starting as low as $129.95 and printer stands as low as $39.95, PET, APPLE, HEATH, AND OTHER PERSONAL COMPUTER OWNER, please don't be dismayed, we will be happy to modify either series to fit your particular needs.

— *FOR 24 HOUR INFORMATION* —

PHONE 408-946-1265

2485 AUTUMNVALE AVE. SAN JOSE, CA. 95132

AVS AUDIO-VIDEO SYSTEMS

Donald L Stoner, Mercer Island, WA

Cover Story

Telecommunications

with the TRS-80

The CONNECTION

Destined to become the hardware *Item* of 1980, this simple box allows even a Level I 4K machine to connect to The Source or Telenet, and operate a printer!

TRS-80 users are about to enter an exciting new era in microcomputing called telecommunications (telephone communications). I doubt if anyone reading this article can fully comprehend the scope of data and useful information that is available through a simple connection of the computer to the telephone circuit. A new product, the **CONNECTION**, is an affordable way to explore this new world. With a suitable interface, such as the **CONNECTION**, you can participate in an electronic miracle, that is, bringing infinite computing power, wisdom, knowledge and information into your home over Alexander Graham's wires.

What's the **CONNECTION**? It is a totally new concept for interfacing your computer to the outside world through telecommunications. It can be used with any model of TRS-80 from Level I, 4K to the most elegant 64K Model II. If you do not have the expansion box, the **CONNECTION** plugs into the back of your keyboard. If you do, or when you upgrade to a disk system, you simply move the connector over to the screen printer port of the expansion box. The other end of the **CONNECTION** plugs into the back of your telephone by means of the industry standard modular jack. The **CONNECTION** will also be available for other popular micros such as the Apple, Pet, Atari, to mention a few.

The **CONNECTION** was designed with the majority of TRS-80 owners in mind....that is, the so called typical user. Originally it was called "The Universal Modem" but it soon became obvious that the typical user did not know what a modem was. The name "**CONNECTION**" was adopted since it more nearly describes what the product does than the word "modem".

WHAT CAN I DO WITH IT?

There isn't enough space in this issue to tell you everything, but let's look at a few of the uses. The most common application is to communicate with anyone who has a computer (not necessarily a TRS-80) and a telephone interface. Thus, you can transfer programs over the phone and even play games with suitable software. You can also communicate with with more than 100 community bulletin boards (see listing in this issue), send and receive messages and even offload free programs. One system in California sells software over the telephone! Would you like to program in FORTRAN, COBOL, Pascal (or any of the popular high-level languages) with your Level I 4K machine? With the **CONNECTION** you can! You simply dial up one of the big timeshare computers (Such as MicroNet) and you have all the computing power of an IBM 370 or PDP-11 at your fingertips. These same timeshare computers allow you to run accounting, engineering, statistical or other programs that would consume far more memory than your TRS-80 could possibly hold. You can join the Source and utilize their full services, send electronic mail or even read the Wall Street Journal, the NY Times and United Press International on your screen or output the news to your printer. If you are into stocks, bonds, securities, commodities or simply want to see what your gold bullion is worth today, the data is available. Stock portfolios can be managed with the Dow Jones service or you can have "real time" quotations (not delayed 15 minutes) with "Ticker Tape". There are many other specialized data bases of interest to doctors, lawyers and other professional people. In summary, there are literally thousands of data bases available, some free....some horribly expensive, but there is something for everyone.

SOFTWARE

A computer product is only as good as its software. A full line of software support is available for the **CONNECTION**. It is supplied with a Level II, 16K terminal program for half and full duplex. Disk users can easily transfer the program to their disk operating system. Optional software includes smart terminal packages that permit transferring programs over the telephone, auto log-on routines, a Dow Jones stock management package and numerous high level language programs.

DIRECT CONNECT ADVANTAGES

There are two ways to couple computer data into the telephone line, either by acoustical coupling or by direct connection. Acoustical coupled modems are the most common since they avoid the hassle of FCC Type Acceptance. However, the modern approach is to make a direct connection between the computer and the telephone line. Why? Probably the most important reason is to avoid the loss and distortion encountered by acoustical coupling. Direct connection also eliminates the problem of telephone handsets that don't fit into the rubber cups properly and, of course, no annoying whistle is radiated throughout the room. By the same token, loud noises in the room (which drive an acoustical modem fruity!) have no effect on a direct coupled modem. The type of telephone you have is also academic with direct coupling.

The **CONNECTION** is FCC type accepted to insure that it does not cause problems on the telephone line to which it is connected. In addition, an Underwriters Laboratories (UL) approved power supply is used to avoid product liability problems.

FEATURES

Basically, the **CONNECTION** decodes the data and address lines in the TRS-80 and creates an RS-232 signal. In addition to driving the telephone portion of the **CONNECTION**, the RS-232 signal is routed to a DB-25 connector on the rear apron of the cabinet. Thus, the unit can be connected to a serial printer which will echo all the data that appears on the CRT monitor. If a high quality printer (such as the Qume, Diablo or Spinterm) is used, even a Level II, 16K machine can be adapted to word processing applications by using the cassette version of Electric Pencil.

Another important point to mention is the use of a different port address from that of Radio Shack's RS-232 adapter. Thus, it is possible to have two independent RS-232 outputs just like the TRS-80 Model II. Even if you already own the Radio Shack RS-232 adapter, the **CONNECTION** will provide a second, reliable input/output line. The documentation which accompanies the **CONNECTION** gives several patches to modify most popular terminal programs to reroute the data to this second port.

RADIO COMMUNICATIONS TOO

Now that ASCII has been approved for amateur radio service, communications with computers all over the world is possible by using the **CONNECTION**. The circuitry provides one of the finest radio terminals ever designed and will continue to print "solid copy" even with deep signal fades and heavy adjacent channel interference. The unit is designed for both audio and frequency shift keying (300 baud, 200 hz. shift, mark 2225, space 2025). The **CONNECTION** also provides a unique simplex circuit that energizes the transmitter automatically when a keyboard character is selected.

There is another feature that will be of tremendous interest to communications users. The reader may have heard of the term "phone patch". This allows radio operators to connect the telephone line to their radio station. The person on the phone line can then converse with distant stations by means of two-way radio.

The **CONNECTION** provides a "data patch" to distant stations. If you have a **CONNECTION** interfaced to your radio equipment, you can provide a "data patch" for computer owners, whether they are radio amateurs or not. They simply call you on the phone, which goes through the **CONNECTION** to your radio equipment. Thus, they can transfer data over great distances by using your radio equipment. Incidentally, both the **CONNECTION** and "data patch" are trademarks of Micro Peripherals, Inc.

While radio amateurs are not allowed to handle messages (or data) of a commercial nature, these restrictions do not apply to the Citizens Band. The possibility of inserting a narrow data channel between each of the existing CB voice channels is receiving serious consideration by the FCC. About the time you read this, a Notice of Proposed Rule Making will be issued by the FCC relative to revising the Citizens Band. If you would like to communicate with other computer users by radio, you might request a copy of this NPRM from the FCC and make your thoughts known to them.

SUGAR COATED THEORY

Probably the last thing in the world our "typical user" needs to know is how the **CONNECTION** works. Those technical types, who cannot possibly make it through the night without this knowledge, may wish to order a copy of the **CONNECTION** alignment and maintenance manual.

However, non-technical folks may be interested in how the **CONNECTION** performs its electronic miracle of telecommunications. Miracle? Certainly! Even the most jaded person cannot fail to be impressed when data transmitted from thousands of miles away spews out across the screen.

Like everything else in your computer, the characters you see on the screen are formed from unique combinations of ones and zeros. The trick in transmitting data over the phone line involves getting the ones and zeros from there to here (or here to there, as the case may be).

ASCII

This is accomplished by sending tones somewhat similar to what you hear when you press one of the buttons on your telephone. A one is represented by a specific tone, while a zero is represented by a second tone. During a data connection, a continuous one is usually transmitted. However, as soon as you press one of the keys on your computer, the tones toggle back and forth in a unique combination of ones and zeros that represent the key you selected. The code that represents the character is called "ASCII" (American Standard Code for Information Interchange). You can hear these tones, and the toggling action, by listening on the telephone line while you press a key on the computer (assuming you are connected). The switching between ones and zeros occurs so rapidly that a single key depression sounds like a click. The two tones are more discernible when listening to a steady stream of data.

FULL DUPLEX

Actually there are four tones involved in telephone data communications. Two of these provide a one-zero pair for the data you originate. These are called the low-band tones. At the same time, however, another one-zero tone pair exists on the phone line. These are called the high band tones and represent the data being answered back from the computer with which you are communicating. The advantage of this duplex system is that it permits the reception of data on the screen at the same time you are sending data from your keyboard. This can be extremely handy if, for example, you want to interrupt a long data transmission without having to wait until it is your turn to send.

Another advantage of this high band/low band scheme is confirmation of the characters transmitted. Most of the time you will be communicating with duplex systems such as The Source, Micronet and most bulletin boards. When you press a key, the low band sending tones toggle between ones and zeros and transmit the character over the tele-

phone circuit. You also see this character on your screen, right? Wrong! At the other end of the telephone line, the tones are translated to the character represented by the ones and zeros **as seen at the receiving end of the circuit**. This same character is echoed back to the sending station on the high band tone pair. This echoing of the character, the receiving end **believes** has been sent, is called full duplex. Thus, if you press the "K" key, you should see a "K" echoed back to your screen. If you do not, it means the tones are getting distorted by the transmission medium. This provides an excellent check of transmission accuracy. If you send data and see garbage on your screen, it generally means that there is something wrong in the transmission medium.

HALF DUPLEX

Some of the older data systems, that rely heavily on mechanical terminals (such as teletype machines), use a half duplex system. When you press a key on the Teletype machine, a letter is struck on the paper (just like a typewriter) and this character is transmitted over the telephone line. If the receiving end were to echo the character back to your printer, you would see double letters or numbers every time a key was pressed. Thus, in these systems, the echo is eliminated and the system is called half duplex. You can still have simultaneous send and receive. Only the echo is suppressed.

WHAT'S A MODEM?

The conversion of the data bits to tones is called modulation while the conversion of incoming tones to data bits is called (you guessed it) demodulation. The **CONNECTION** combines the MOdulation and DEModulation function and is technically called a modem. I guess the word should be pronounced "ma-deem" but actually it rhymes with "owe-them".

SIMPLEX

While the duplex mode permits simultaneous two-way data communications, there are many applications where it is not necessary to send and receive at the same time. One of these is in radio communications. Another situation is when "chatting" on The Source or MicroNet. In the latter instance, your message goes into a buffer which is then forwarded to the other person you are talking to. When the sending station is ready to receive a reply, the protocol is to add a "GA" (for go ahead) or a couple of line feeds (by pressing the ENTER key twice) to the end of the message.

The **CONNECTION** is the first modem to make provision for simplex operation. In the simplex switch position, the circuitry is set for receiving. However, as soon as you press a key on the computer, the modem automatically switches to transmit and sends out the proper tone pair. At the same time, a connection on the rear apron is completed to ground. This line can be used to close the push-to-talk circuit on a two-way radio. There is also provision on the rear apron for tone input and output to connect to the radio speaker and microphone leads.

UNIVERSAL CASSETTE TAPES

The same radio input and output tone circuits on the rear apron of the **CONNECTION** can also be used to drive a standard cassette tape recorder to make "universal tapes". Rather than sending data to the radio, the tones can be recorded at 300 baud. Since ASCII is the "universal" code of computers, it is possible to record a TRS-80 program in ASCII. This tape could then be played into a modem connection to an Apple computer, for example. Although some of the BASIC commands would have to be modified to run on the Apple, ASCII is the only way to transfer a program from one type of computer to another. There is no compatibility between TRS-80 and Apple cassette format (or any other computer, for that matter). A program cassette made on a TRS-80 will not load on an Apple, or vice versa. Making ASCII cassettes, at 300 baud, solves this compatibility problem nicely, however.

ADDITIONAL INFORMATION

The **CONNECTION** is being marketed exclusively by **Micro Peripherals Inc.** Box 529, Mercer Island, WA 98040. For additional information, contact Michael Darland, President. (206) 454-3303 ●

Community Bulletin Boards

Donald L Stoner,
Mercer Island, WA

Very few things of value are free these days. One exception is the community bulletin boards that are available to computer owners. If you have a modem (such as the CONNECTION) hooked to your TRS-80, you can access more than 100 of these boards all over the country. (See list, which follows).

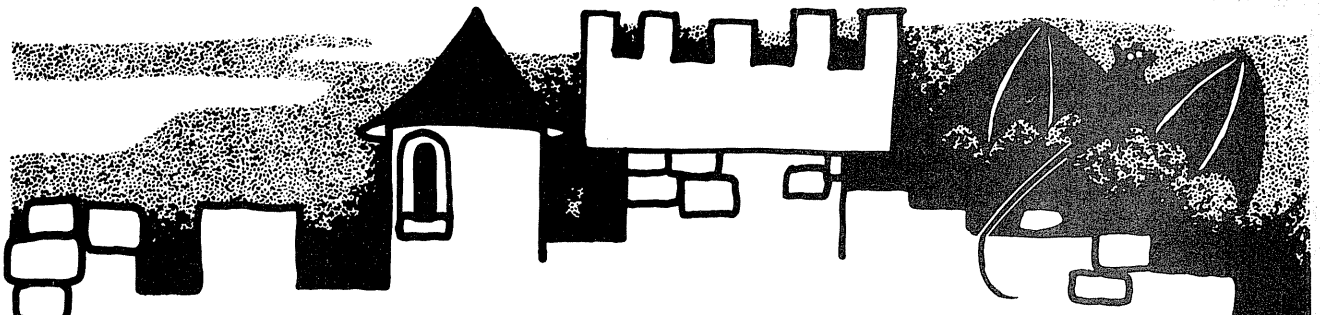
What is a community bulletin board? Remember the ones that were all over your school and those in the more progressive stores? Well, the community bulletin board is the 1980's equivalent. By dialing a specific number, you can connect your computer to another computer at a remote location over the telephone line. Once connected, you can review the messages that have been posted by others or post your own messages. The messages consist of simple programs, help wanted, bulletins, messages between friends and items for sale. If you have a piece of gear you want to sell, or are looking for a "deal" on something, these bulletin boards are an effective way to bring it to the attention of people all over the country.

The most extensive systems are designed around the Apple and TRS-80 computers. While the two groups have their own thoughts about the other type of computer, users of **any** type of computer are welcome on these bulletin boards.

The Apple system (ABBS- see list) are the most extensive. Apparently Apple Computer Co supports and encourages them, while Tandy appears to be oblivious to their existence. On the other hand, the TRS-80 systems (Forum 80) are far more advanced. The Forum 80 system was designed by Bill Abney in Kansas City and is utterly fantastic. Not only can you post messages but you can upload (send to) and download (receive from) complete programs from Forum 80 boards right to your disk system! These programs can be games, utilities, word processing, communications programs, in fact, any type of program that can be stored on disk. The only thing you need to retreive them is a smart terminal program and enough memory in your computer for temporary storage. Best of all, there is no charge! ●

118 places to call, listed by area code!

##	CITY	SERVICE	AREA CODE	TELEPHONE
1	BOUNDBROOK NJ	SJ ELECT MAIL	(201)	457-0893
2	POMPTON PLNS NJ	ABBS	(201)	835-7228
3	PRINCETON NJ	FORUM 80	(201)	874-6833
4	WYCKOFF NJ	ABBS	(201)	891-7441
5	PISCATAWAY NJ	ABBS	(201)	968-1074
6	WASHINGTON DC	PROGRAM STORE	(202)	337-4694
7	BIRMINGHAM AL	ABBS	(205)	945-1489
8	SEATTLE WA	ABBS	(206)	244-5438
9	ELMA WA	ABBS	(206)	482-5134
10	SEATTLE WA	ABBS	(206)	524 0203
11	SEATTLE WA	INFO 80 (PER. PEOPLE)	(206)	723-DATA
12	FRESNO CA	LIMITED ACCESS.	(209)	638-6392
13	STATEN IS NY	ABBS	(212)	448-6576
14	LOS ANGELES CA	ABBS	(213)	276-4276
15	TORRANCE CA	ABBS	(213)	316-5706
16	TORRENCE CA	PROG. SALES	(213)	329-3715
17	CANOGA PK CA	ABBS	(213)	340-0135
18	LOS ANGELES CA	ABBS	(213)	349-5728
19	LOS ANGELES CA	ABBS	(213)	360-6332
20	SANTA MONICA CA	ABBS	(213)	394-1505
21	BRENTWOOD CA	ABBS	(213)	395-1592
22	SIGNAL HL CA	ABBS	(213)	424-3506
23	LONG BCH CA	NA	(213)	428-4718
24	PAC. PALISADES CA	ABBS	(213)	459-3177
25	HAWTHORNE CA	ABBS	(213)	675-8803
26	PASADENA CA	CBBS	(213)	795-3788
27	PASADENA CA	ABBS	(213)	799-1632
28	SO. PASADENA CA	ABBS	(213)	799-6514
29	LOS ANGELES CA	ABBS	(213)	826-0325
30	SANA MONICA CA	ABBS	(213)	828-3400
31	SAN FNANDO CA	NA	(213)	843-5390
32	DALLAS TX	FORUM 80	(214)	288-4859
33	DALLAS TX	ABBS	(214)	634-2668
34	DALLAS TX	NA	(214)	634-2775
35	DALLAS TX	CBBS	(214)	641-8759
36	AKRON OH	CBBS	(216)	745-7855
37	FT LAUDERDALE FL	ABBS	(305)	566-0805
38	WEST PALM BCH FL	ABBS	(305)	689-3234
39	FT LAUDERDALE FL	FORUM 80	(305)	772-4444
40	MIAMI FL	ABBS	(305)	821-7401
41	HOLLYWOOD FL	ABBS	(305)	989-9647
42	ARLINGTON HTS IL	ABBS	(312)	255-6489
43	CHICAGO IL	FORUM 80	(312)	269-8083
44	CHICAGO IL	ABBS	(312)	337-6631
45	NAPERVILLE IL	ABBS	(312)	420-7995
46	CHICAGO IL	CBBS	(312)	528-7141
47	CHICAGO IL	NA	(312)	622-9609
48	CHICAGO IL	CMMS	(312)	767-0202
49	DOWNERS GROVE IL	ABBS	(312)	964-7768
50	DETROIT MI	?	(313)	288-0335
51	YPSILANTI MI	PET BBS	(313)	484-0732
52	DETROIT MI	ABBS	(313)	569-2063
53	ST LOUIS MO	FORUM 80	(314)	838-7784
54	WICHITA KS	FORUM 80	(316)	746-2078
55	IOWA CTY IA	ABBS	(319)	353-6528
56	DUBUQUE IA	ABBS	(319)	557-9618
57	ATLANTA GA	CBBS	(404)	394-4220
58	AUGUSTA GA	ABBS	(404)	733-3461
59	ATLANTA GA	NORTHSTAR	(404)	939-1520
60	ATLANTA GA	ABBS	(404)	939-8429
61	SAN FRAN CA	FORUM 80	(415)	348-2139
62	PALO ALTO CA	ABBS	(415)	493-7691
63	SAN FRANCISCO CA	ABBS	(415)	661-0705
64	FREMONT CA	ABBS	(415)	792-8406
65	LOS ALTOS CA	ABBS	(415)	948-1474
66	SPRINGFLD MO	?	(417)	862-7852
67	LOUISVILLE KY	ABBS	(502)	245-8288
68	PORTLAND OR	CBBS	(503)	646-5510
69	SAN ANTONIO TX	ABBS	(512)	657-0779
70	PHOENIX AZ	ABBS	(602)	866-0258
71	PHOENIX AZ	ABBS	(602)	955-1486
72	PHOENIX AZ	ABBS	(602)	957-4428
73	VANCOUVER BC	CBBS	(604)	687-2640
74	MARLTON NJ	ABBS	(609)	983-5970
75	MINNEAPOLIS MN	ABBS	(612)	929-8966
76	COLUMBUS OH	CBBS	(614)	272-2759
77	NASHVILLE TN	CBBS	(615)	254-9193
78	BOSTON MA	ABBS	(617)	354-4682
79	WELLESLEY MA	FORUM 80	(617)	431-1699
80	DUNSTABLE MA	FORUM 80	(617)	649-7097
81	CAMBRIDGE MA	CBBS	(617)	864-3819
82	MAYNARD MA	CBBS	(617)	897-0346
83	BOSTON MA	CBBS	(617)	963-8310
84	LAS VEGAS NV	FORUM 80	(702)	873-9491
85	WASHINTN DC	AMRAD	(703)	281-2125
86	FLS CHURCH VA	CBBS	(703)	734-1387
87	FAIRFAX VA	GENEALOGY	(703)	978-7561
88	COLLEGE STA. TX	ABBS	(713)	693-8080
89	HOUSTON TX	ABBS	(713)	977-7019
90	SAN DIEGO CA	ABBS	(714)	449-5689
91	LEMON GROVE CA	ABBS	(714)	463-0461
92	FULLERTON CA	COMM 80 (OCTUG)	(714)	526-3687
93	ORANGE CNTY CA	FORUM 80	(714)	537-7913
94	GARDEN GROVE CA	DATA EXCHANGE	(714)	537-7913
95	SAN DIEGO CA	NA	(714)	565-0961
96	SAN DIEGO CA	ABBS	(714)	582-9557
97	SANTE FE SPGS CA	ABBS	(714)	739-0711
98	IRVINE CA	ABBS	(714)	751-1422
99	ANAHEIM CA	ABBS	(714)	772-8868
100	WESTMNSTR CA	?	(714)	898-1984
101	HUNTIN'TN BCH CA	ABBS	(714)	962-7979
102	LOGAN UT	ABBS	(801)	753-6800
103	AUGUSTA GA	FORUM 80	(803)	270-5392
104	COLUMBIA SC	NORTHSTAR	(803)	771-0922
105	VENTURA CA	FORUM 80	(805)	484-9904
106	TAMPA FL	FORUM 80	(813)	223-7688
107	KANSAS CTY MO	FORUM 80	(816)	861-7040
108	KANSAS CTY MO	COMMODITIES	(816)	931-3135
109	WICHITA FLS TX	FORUM 80	(817)	855-3916
110	FT WORTH TX	FORUM 80	(817)	923-0009
111	MEMPHIS TN	FORUM 80	(901)	276-8196
112	MEMPHIS TN	HOBBIEST 80	(901)	362-2222
113	MEMPHIS TN	ABBS	(901)	761-4743
114	DESTIN FL	ABBS	(904)	243-1257
115	FT WALTON BCH FL	NA	(904)	243-8565
116	OLATHE KS	ENGINEER 80	(913)	764-1520
117	OLATHE KS	AVIONICS	(913)	782-5115
118	EL PASO TX	CBBS	(915)	584-5393

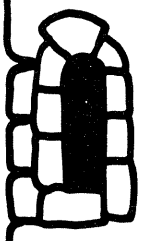


Did you read about the Dungeonmaster who became so enchanted playing a real life version of Dungeons and Dragons that he disappeared for a month?

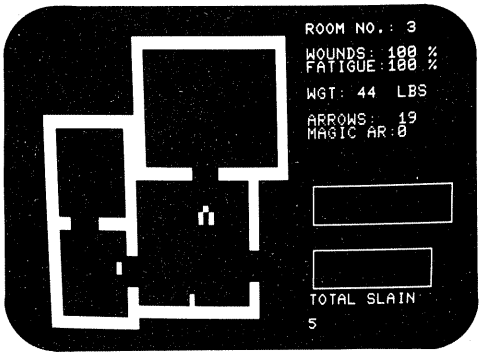
You'll be able to hold on to reality just a little better when you play the Dunjonquest™ computer version, the greatest of all the role-playing fantasies.

But don't bet on it.

Sit at your computer. You're the hero. Enter the Dunjonquest "Temple of Apshai" and into the greatest fantasy adventure you've ever experienced. The Temple has over 200 rooms and catacombs in which lurk more than 30 kinds of monsters and beasts ready to do you in—in real time—before you can reach any of the 70 or so treasures waiting for the hero. You may spend days, weeks, months...the rest of your life...striking at the forces of evil, or running from them, or calling on powers you can never completely understand. Always, always demonstrating in varying degrees your strength, constitution, dexterity, intelligence, intuition, the force of your ego.



Unlike chess or bridge or monopoly, this role-playing game—like other good role-playing games—is an **experience** rather than a game: it is not played so much as it's lived or experienced. Your alter ego goes forth into the world of demons and darkness, dragons and dwarves. Your character will do whatever you want him (or her or it) to do.



Actual photo of screen during a Dunjonquest game. In Room 3 in the Temple of Apshai, our hero observes two treasures unattended by dragons, monsters or demons...for the moment. He is completely free of wounds; he is not at all fatigued. He carries 44 pounds of armor and 19 arrows in his quiver. He has already slain five demons. Will he capture the treasures before moving on...or before the forces of darkness intercept him?

"The Temple..." comes complete with a superbly illustrated 56-page rule book and cassette program, designed to operate with the Level II 16K TRS 80, the PET 32K or the Apple II 48K (Applesoft) computer. Only $24.95 complete, **including** shipping and handling on orders placed within the next 30 days. (Apple or TRS 80 disk available for $29.95).

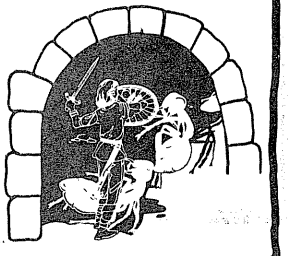
Dunjonquest's "The Temple of Apshai" is **guaranteed** to be the best version of Dungeons and Dragons/Dragons and Dungeons. It's a product of the two guys who **are** Automated Simulations: Jim Connelley and Jon Freeman. Jim is a Dungeon Master, running continuous D & D campaigns. He's been a data processing professional with Westinghouse, GTE Sylvania, Logisticon...an expert in computer-based math-modeling and in simulation of complex phenomena. Jon is a game player, designer and author. He's a frequent contributor to *Games* magazine; his book, "The Playboy Winner's Guide to Board Games" is a paperback best-seller.

As we said, **guaranteed**: Guaranteed to be the best version; guaranteed that you'll be happy with it. Order now, use it for two weeks. If you don't enjoy completely this fantasy adventure experience that goes beyond all others, send it back to us. We'll refund your money in full; no questions asked.

Master Charge or Visa card holders: charge "The Temple of Apshai" to your credit card. Just call our toll free number: (800) 824-7888, operator 861 (In California, call operator 861 (800) 852-7777. In Hawaii and Alaska, operator 861 (800) 824-7919) and you can begin enjoying your Dunjonquest game in days. Or send your check for $24.95* (or $29.95)* to

Automated Simulations

Dept. KP
P.O. Box 4232
Mountain View,
CA 94040



*California residents, please add 6.5% tax.

CP/M* VERSION 2 FOR TRS-80* MODEL II NOW AVAILABLE

Prices reflect distribution on 8" single density diskettes (if a format is requested which requires additional diskettes a surcharge of $8. per additional diskette will be added

All Lifeboat programs require CP/M, unless otherwise stated.

Software with Manual / Manual Alone

☐ **CP/M FLOPPY DISKETTE OPERATING SYSTEM** — (M) Packages supplied on diskette complete with 8080 assembler, text editor, 8080 debugger and various utilities plus full documentation. CP/M available configured for most popular computer/disk systems including: North Star Single, Double or Quad density, Altair 8" disks, Helios II, Exidy Sorcerer, Vector MZ, Heath H17† or H89†, TRS-80†, ICOM 3712 and ICOM Micro Disk plus many other configurations available off the shelf ..... $145/$25

☐ **CP/M** version 2 (not all formats available immediately) ..... $170/$25

☐ **MP/M*** ..... $300/$50

All Microsoft prices are discounted!

MICROSOFT

☐ **BASIC-80** — Disk Extended BASIC, ANSI compatible (L) with long variable names, WHILE/WEND, chaining, (M) variable length file records ..... $300/$25

☐ **BASIC COMPILER** — Language compatible with (L) BASIC-80 and 3-10 times faster execution. Produces (M) standard Microsoft relocatable binary output. Includes MACRO-80 Also linkable to FORTRAN-80 or COBOL-80 code modules ..... $350/$25

☐ **FORTRAN-80** — ANSI 66 (except for COMPLEX) plus (L) many extensions. Includes relocatable object com- (M) piler, linking loader, library with manager. Also includes MACRO-80 (see below) ..... $400/$25

☐ **COBOL-80** — Level 1 ANSI '74 standard COBOL plus (L) most of Level 2. Full sequential, relative, and in- (M) dexed file support with variable file names. STRING, UNSTRING, COMPUTE, VARYING/UNTIL, EXTEND, CALL, COPY, SEARCH, 3-dimensional arrays, compound and abbreviated conditions, nested IF. Powerful interactive screen-handling extensions. Includes compatible assembler, linking loader, and relocatable library manager as described under MACRO-80 ..... $625/$25

☐ **MACRO-80** — 8080/Z80* Macro Assembler. Intel and (L) Zilog mnemonics supported. Relocatable linkable (M) output. Loader, Library Manager and Cross Reference List utilities included ..... $149/$15

☐ **XMACRO-86** — 8086 cross assembler. All Macro and (L) utility features of MACRO-80 package. Mnemonics slightly modified from Intel ASM86. Compatibility data sheet available ..... $275/$25

☐ **EDIT-80** — Very fast random access text editor for text (L) with or without line numbers. Global and intra-line commands supported. File compare utility included. ..... $89/$15

DIGITAL RESEARCH

☐ **MAC** — 8080 Macro Assembler. Full Intel macro definitions. Pseudo Ops include RPC, IRP, REPT, TITLE, PAGE, and MACLIB. Z80 library included. Produces Intel absolute hex output plus symbols file for use by SID (see below) ..... $120/$15

☐ **SID** — 8080 symbolic debugger. Full trace, pass count and break-point program testing system with back-trace and histogram utilities. When used with MAC, provides full symbolic display of memory labels and equated values ..... $105/$15

☐ **ZSID** — As above for Z80. Requires Z80 CPU $130/$25

☐ **TEX** — Text formatter to create paginated, page-numbered and justified copy from source text files, directable to disk or printer ..... $105/$15

☐ **DESPOOL** — Program to permit simultaneous printing of data from disk while user executes another program from the console ..... $80/$5

MICRO FOCUS

☐ **STANDARD CIS COBOL** — ANSI '74 COBOL stand- (L) ard compiler fully validated by U.S. Navy tests to ANSI level 1. Supports many features to level 2 including dynamic loading of COBOL modules and a full ISAM file facility. Also, program segmentation, interactive debug and powerful interactive extensions to support protected and unprotected CRT screen formatting from COBOL programs used with any dumb terminal ..... $650/$50

☐ **FORMS 2** — CRT screen editor. Output is COBOL data (L) descriptions for copying into CIS COBOL programs. Automatically creates a query and update program of indexed files using CRT protected and unprotected screen formats. No programming experience needed. Output program directly compiled by CIS COBOL (standard) ..... $200/$20

☐ **HDBS** — Hierarchical Data Base System. CODASYL oriented with FILEs, SETs, RECORDs and ITEMs which are all user defined. ADD, DELETE, UPDATE, SEARCH, and TRAVERSE commands supported. SET ordering is sorted, FIFO, LIFO, next or prior. One to many set relationship supported. Read/Write protection at the FILE level. Supports FILEs which extend over multiple floppy or hard disk devices.

☐ **MDBS** — Micro Data Base System. Full network data base with all features of HDBS plus multi-level Read/Write protection for FILE, SET, RECORD and ITEM. Explicit representation of one to one, one to many, many to many, and many to one SET relationships. Supports multiple owner and multiple record types within SETs. HDBS files are fully compatible.

☐ **MDBS-DRS** — MDBS with Dynamic Restructuring System option which allows altering MDBS data bases when new ITEMs, RECORDs, or SETs are needed without changing existing data.

HDBS-Z80 version	$250/$35
MDBS-Z80 version	$750/$35
MDBS-DRS-Z80 version	$850/$40

8080 Version available at $75 extra

NOTE → Z80 version requires 20K RAM. 8080 version requires 24K RAM. (Memory requirements are additional to CP/M and application program.)

When ordering HDBS or MDBS, please specify if the version required is for 1) Microsoft L80 i.e. FORTRAN-80, COBOL-80, BASIC COMPILER, 2) MBASIC 4.XX, or 3) BASIC-80 5.0.

Prices and specifications subject to change without notice.

Lower prices!

EIDOS SYSTEMS

☐ **KISS** — Keyed Index Sequential Search. Offers com- (L) plete Multi-Keyed Index Sequential and Direct Access file management. Includes built-in utility functions for 16 or 32 bit arithmetic, string/integer conversion and string compare. Delivered as a relocatable linkable module in Microsoft format for use with FORTRAN-80 or COBOL-80, etc ..... $335/$23

☐ **KBASIC** — Microsoft Disk Extended BASIC with all (L) KISS facilities, integrated by implementation of nine additional commands in language. Package includes KISS REL as described above, and a sample mail list program. ..... $585/$45
To licensed users of Microsoft BASIC-80 (MBASIC) ..... $435/$45

All Micropro prices are discounted!

MICROPRO

☐ **SUPER-SORT I** — Sort, merge, extract utility as abso- (L) lute executable program or linkable module in Micro- (M) soft format. Sorts fixed or variable records with data in binary, BCD, Packed Decimal, EBCDIC, ASCII, floating, fixed point, exponential, field justified, etc. Even variable number of fields per record! $225/$25

☐ **SUPER-SORT II** — Above available as absolute pro- (L) (M) gram only ..... $175/$25

☐ **SUPER-SORT III** — As II without SELECT/EXCLUDE (L) (M) ..... $125/$25

☐ **WORD-STAR** — Menu driven visual word processing (L) system for use with standard terminals. Text format- (M) ting performed on screen. Facilities for text paginate, page number, justify, center and underscore. User can print one document while simultaneously editing a second. Edit facilities include global search and replace, Read/Write to other text files, block move, etc. Requires CRT terminal with addressable cursor positioning ..... $445/$40

☐ **WORD-STAR/MAIL-MERGE** — As above with option (L) for production mailing of personalized documents (M) with mail list from Datastar or NAD ..... $575/$25

☐ **WORD-STAR Customization Notes** — For sophisticated users who do not have one of the many standard terminal or printer configurations in the distribution version of WORD-STAR ..... NA/$95

☐ **WORD-MASTER** Text Editor — In one mode has super- (L) set of CP/M's ED commands including global search- (M) ing and replacing, forwards and backwards in file in video mode; provides full screen editor for users with serial addressable-cursor terminal ..... $125/$25

☐ **DATASTAR** — Professional forms control entry and (L) display system for key-to-disk data capture. Menu (M) driven with built-in learning aids. Input field verification by length, mask, attribute (i.e. uppercase, lowercase, numeric, auto dup., etc.). Built-in arithmetic capabilities using keyed data, constants and derived values. Visual feedback for ease of forms design. Files compatible with all CP/M-MP/M supported languages. Requires 32K CP/M ..... $350/$35

☐ **CBASIC-2** Disk Extended BASIC — Non-interactive (M) BASIC with pseudo-code compiler and runtime interpreter. Supports full file control, chaining, integer and extended precision variables, etc ..... $109/$15

☐ **PASCAL/M*** — Compiler generates P code from ex- (I) tended language, implementation of standard PASCAL. Supports overlay structure through additional procedure calls and the SEGMENT procedure type. Provides convenient swapping capability with the added variable type STRING. Untyped files allow memory image I/O. Requires 56K CP/M ..... $350/$30

☐ **PASCAL/Z** — Z80 native code PASCAL compiler. Pro- (I) duces optimized, ROMable re-entrant code. All interfacing to CP/M is through the support library. The package includes compiler, companion macro-assembler and source for the library. Requires 56K and Z80 CPU.
Version 2 includes all of Jensen/Wirth except variant records ..... $275/$25
Version 3 with variant records and strings expected 3/80 ..... $395/$25

☐ **PASCAL/MT** — Subset of standard PASCAL. Gener- (M) ates ROMable 8080 machine code. Symbolic debug- (X) ger included. Supports interrupt procedures. CP/M file I/O and assembly language interface. Real variables can be BCD, software floating point, or AMD 9511 hardware floating point. Version 3 includes Sets, Enumeration and Record data types. Manual explains BASIC to PASCAL conversion. Source for the run time package requires MAC (See under Digital Research). Requires 32K ..... $250/$30

New Version
New Features

STRUCTURED SYSTEMS GROUP

☐ **GENERAL LEDGER** — Interactive and flexible system †† providing proof and report outputs. Customization of COA created interactively. Multiple branch accounting centers. Extensive checking performed at data entry for proof, COA correctness, etc. Journal entries may be batched prior to posting. Closing procedure automatically backs up input files. Now includes Statement of Changes in Financial Position. Requires CBASIC-2 ..... $1250/$25

☐ **ACCOUNTS RECEIVABLE** — Open item system with †† output for internal aged reports and customer-oriented statement and billing purposes. On-Line Enquiry permits information for Customer Service and Credit departments. Interface to General Ledger provided if both systems used. Requires CBASIC-2, ... $1250/$25

☐ **ACCOUNTS PAYABLE** — Provides aged statements †† of accounts by vendor, with check writing for selected invoices. Can be used alone or with General Ledger and/or with NAD. Requires CBASIC-2 ..... $1250/$25

☐ **PAYROLL** — Flexible payroll system handles weekly, †† bi-weekly, semi-monthly and monthly payroll periods. Tips, bonuses, re-imbursements, advances, sick pay, vacation pay, and compensation time are all part of the payroll records. Prints government required periodic reports and will post to multiple SSG General Ledger accounts. Requires CBASIC-2 and 54K of memory ..... $1250/$25

☐ **INVENTORY CONTROL SYSTEM** — Performs control †† functions of adding and depleting stock items, adding new items and deleting old items. Tracks quantity of items on hand, on order and back-ordered. Optional hard copy audit trail is available. Reports include Master Item List, Stock Activity, Stock Valuation and Re-order List. Requires CBASIC-2 $1250/$25

☐ **ANALYST** — Customized data entry and reporting sys- †† tem. User specifies up to 75 data items per record. Interactive data entry, retrieval, and update facility makes information management easy. Sophisticated report generator provides customized reports using selected records with multiple level break-points for summarization. Requires CBASIC-2 ..... $250/$15

☐ **LETTERIGHT** — Program to create, edit and type letters or other documents. Has facilities to enter, display, delete and move text, with good video screen presentation. Designed to integrate with NAD for form letter mailings. Requires CBASIC-2 ..... $200/$25

☐ **NAD** Name and Address selection system — interac- tive mail list creation and maintenance program with output as full reports with reference data or restricted information for mail labels. Transfer system for extraction and transfer of selected records to create new files. Requires CBASIC-2 ..... $100/$20

☐ **QSORT** — Fast sort/merge program for files with fixed record length, variable field length information. Up to five ascending or descending keys. Full back-up of input files created ..... $100/$20

Now-applications software for Microsoft's BASIC interpreter!

PEACHTREE SOFTWARE

☐ **GENERAL LEDGER** — Records details of all financial (L) transactions. Generates a balance sheet and an in- †† come statement. Flexible and adaptable design for both small businesses and firms performing client writeup services. Produces reports as follows: Trial Balance, Transaction Registers, Balance Sheet, Prior Year Comparative Balance Sheet, Income Statement, Prior Year Comparative Income Statement and Department Income Statements. Interactive with other PEACHTREE accounting packages. Supplied in source code for Microsoft BASIC ..... $990/$30

New Features

☐ **ACCOUNTS PAYABLE** — Tracks current and aged (L) payables and incorporates a check writing feature. †† Maintains a complete vendor file with information on purchase orders and discount terms as well as active account status. Produces reports as follows: Open Voucher Report, Accounts Payable Ageing Report and Cash Requirements. Provides input to PEACHTREE General Ledger. Supplied in source code for Microsoft BASIC ..... $990/$30

☐ **ACCOUNTS RECEIVABLE** — Generates invoice regis- (L) ter and complete monthly statements. Tracks current †† and aged receivables. Maintains customer file including credit information and account status. The current status of any customer account is instantly available. Produces reports as follows: Aged Accounts Receivable, Invoice Register, Payment and Adjustment Register and Customer Account Status Report. Provides input to PEACHTREE General Ledger. Supplied in source code for Microsoft BASIC ..... $990/$30

☐ **PAYROLL** — Prepares payroll for hourly, salaried and (L) commissioned employees. Generates monthly, quar- †† terly and annual returns. Prepares employee W-2's. Includes tables for federal withholding and FICA as well as withholding for all 50 states plus up to 20 cities from pre-computed or user generated tables. Will print checks. Payroll Register, Monthly Summary and Unemployment Tax Report. Provides input to PEACHTREE General Ledger. Supplied in source code for Microsoft BASIC ..... $990/$30

☐ **INVENTORY** — Maintains detailed information on (L) each inventory item including part number, descrip- †† tion, unit of measure, vendor and reorder data, item activity and complete information on current item costs, pricing and sales. Produces reports as follows: Physical Inventory Worksheet, Inventory Price List, Departmental Summary Report, Inventory Status Report, The Reorder Report and Period-to-Date and Year-to-Date reports. Supplied in source code for Microsoft BASIC ..... $1,190/$30

☐ **MAILING ADDRESS** — Keeps track of name and ad- (L) dress information and allows the selective printing of †† this information in the form of mailing lists or address labels. Allows the user to tailor the system to his own requirements. User-defined label format and print-out system uses a special format file which tells programs how to print the mailing list or address labels. Standard format files are included with system. Automatic sorting of data uses indexed file management routines which allow the name and address information to be sequentially retrieved and printed without file sorting. Supplied in source code for Microsoft BASIC ..... $790/$30

GRAHAM-DORIAN SOFTWARE SYSTEMS

☐ **GENERAL LEDGER** — An on-line system; no batch- (L) ing is required. Entries to other GRAHAM-DORIAN (M) accounting packages are automatically posted. User †† establishes customized C.O.A. Provides transaction register, record of journal entries, trial balances and monthly closings. Keeps 14 month history and provides comparison of current year with previous year. Requires CBASIC-2. Supplied in source ..... $995/$35

New Features

☐ **ACCOUNTS PAYABLE** — Maintains vendor list and (L) check register. Performs cash flow analysis. Flexible (M) writes checks to specific vendor for certain in- †† voices or can make partial payments. Automatically posts to GRAHAM-DORIAN General Ledger or runs as stand alone system. Requires CBASIC-2. Supplied in source ..... $995/$35

☐ **ACCOUNTS RECEIVABLE** — Creates trial balance re- (L) ports, prepares statements, ages accounts and rec- (M) ords invoices. Provides complete information describ- †† ing customer payment activity. Receipts can be posted to different ledger accounts. Entries automatically update GRAHAM-DORIAN General Ledger or runs as stand alone system. Requires CBASIC-2. Supplied in source ..... $995/$35

☐ **PAYROLL SYSTEM** — Maintains employee master file. (L) Computes payroll withholding for FICA, Federal and (M) State taxes. Prints payroll register, checks, quarterly †† reports and W-2 forms. Can generate ad hoc reports and employee form letters with mail labels. Requires CBASIC-2. Supplied in source ..... $590/$35

☐ **INVENTORY SYSTEM** — Captures stock levels, costs, (L) sources, sales, ages, turnover, markup, etc. Trans- (M) action information may be entered for reporting by †† salesman, type of sale, date of sale, etc. Reports available both for accounting and decision making. Requires CBASIC-2. Supplied in source ..... $590/$35

☐ **JOB COSTING** — Designed for general contractors. (L) To be used interactively with other GRAHAM-DORIAN (M) accounting packages for tracking and analysing ex- †† penses. User establishes customized cost categories and job phases. Permits comparison of actual versus estimated costs. Automatically updates GRAHAM-DORIAN General Ledger or runs as stand alone system. Requires CBASIC-2. Supplied in source $995/$35

☐ **APARTMENT MANAGEMENT SYSTEM** — Financial (L) management system for receipts and security de- (M) posits of apartment projects. Captures data on va- †† cancies, revenues, etc. for annual trend analysis. Daily report shows late rents, vacancy notices, vacancies, income lost through vacancies, etc. Requires CBASIC-2. Supplied in source ..... $590/$35

☐ **CASH REGISTER** — Maintains files on daily sales (L) Files data by sales person and item. Tracks sales, (M) over-rings, refunds, payouts and total net deposits. †† Requires CBASIC-2. Supplied in source ..... $590/$35

☐ **tiny C** — Interactive interpretive system for teaching (I) structured programming techniques. Manual includes (X) full source listings ..... $105/$40

☐ **BDS C COMPILER** — Supports most major features of (M) language including Structures, Arrays, Pointers, re- (I) cursive function evaluation, linking loader and library, Floating point function library included. Lacks data initialization and static and register class specifiers. Documentation includes "THE C PROGRAMMING LANGUAGE" by Kernighan and Ritchie. ..... $125/$15

New Features

☐ **WHITESMITHS C COMPILER** — The ultimate in sys- (L) tems software tools. Produces faster code than Pas- (M) cal with more extensive facilities. Conforms to the (X) full UNIX* Version 7 C language, described by Kernighan and Ritchie, and makes available over 75 functions for performing I/O, string manipulation and storage allocation. Linkable to Microsoft REL files. Requires 60K CP/M ..... $630/$30

☐ **POLYVUE/80** — Full screen editor for any CRT with (M) XY cursor positioning. Includes vertical and horizon- (X) tal scrolling, interactive search and replace, automatic text wrap around for word processing, operations for manipulating blocks of text, and comprehensive 70 page manual ..... $135/$15

☐ **POLYTEXT/80** — Text formatter for word processing (M) applications. Justifies and paginates source text files. Will generate form letters with custom fields and conditional processing. Support for Daisy Wheel printers includes variable pitch justification and motion optimization ..... $85/$15

☐ **ALGOL-60**—Powerful block-structured language com- piler featuring economical run time dynamic allocation of memory. Very compact (24K total RAM) system implementing almost all Algol 60 report features plus many powerful extensions including string handling, direct disk address I/O etc. Requires Z80 CPU ..... $199/$20

☐ **Z80 DEVELOPMENT PACKAGE** — Consists of: (1) disk (M) file line editor, with global inter and intra-line facili- ties; (2) Z80 relocating assembler Zilog/Mostek mnemonics, conditional assembly and cross reference table capabilities; (3) linking loader producing absolute Intel hex disk file ..... $95/$20

☐ **ZDT** — Z80 Monitor Debugger to break and examine (M) registers with standard Zilog/Mostek mnemonic disassembly displays. $35 when ordered with Z80 Development Package ..... $50/$10

☐ **DISTEL** — Disk based disassembler to Intel 8080 or TDL/Xitan Z80 source code, listing and cross reference files. Intel or TDL/Xitan pseudo ops optional. Runs on 8080 ..... $65/$10

☐ **DISILOG** — As DISTEL to Zilog/Mostek mnemonic (M) files. Runs on Z80 only ..... $65/$10

☐ **XASM-68** — Non-macro cross-assembler with nested conditionals and full range of pseudo operations. As sembles from standard Motorola MC6800 mnemonics to Intel hex ..... $200/$25

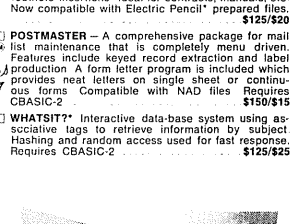
☐ **XASM-65** — As XASM-68 for MOS Technology MCS- 6500 series mnemonics ..... $200/$25

☐ **TEXTWRITER III** — Text formatter to justify and pagi- (M) nate letters and other documents. Special features include insertion of text during execution from other disk files or console, permitting recipe documents to be created from linked fragments on other files. Has facilities for sorted indexes and table and footnote insertions. Ideal for contracts, manuals, etc. Now compatible with Electric Pencil* prepared files. ..... $125/$20

☐ **POSTMASTER** — A comprehensive package for mail (M) list maintenance that is completely menu driven. Features include keyed record extraction and label production. A form letter program is included which provides neat letters on single sheet or continuous forms. Compatible with NAD files. Requires CBASIC-2 ..... $150/$15

New Features

☐ **WHATSIT?*** Interactive data-base system using associative tags to retrieve information by subject. Hashing and random access used for fast response. Requires CBASIC-2 ..... $125/$25



Lifeboat Associates

THE SOFTWARE SUPERMARKET

TM

Shopping List No.11

Software for most popular 8080/Z80 computer disk systems including ***NORTH STAR, iCOM, MICROPOLIS, DYNABYTE DB8/2 & DB8/4, EXIDY SORCERER, SD SYSTEMS, ALTAIR, VECTOR MZ, MECA, 8" IBM, HEATH H17 & H89, HELIOS, IMSAI VDP42 & 44, REX, NYLAC, INTERTEC, VISTA V80 and V200, TRS-80 MODEL I and MODEL II, ALTOS, OHIO SCIENTIFIC DIGI-LOG, KONTRON PSI80*** and ***IMS 5000*** formats.

Everything on Shopping List #11 runs on 64K TRS-80 Model II.

Lifeboat Associates, 2248 Broadway, N.Y., N.Y. 10024 **(212) 580-0082** Telex: 220501

Software / with / Manual
Manual Alone

XYBASIC Interactive Process Control BASIC – Full disk BASIC features plus unique commands to handle bytes, rotate and shift, and to test and set bits. Available in Integer, Extended and ROMable versions. Integer Disk or Integer ROMable **$295/$25**. Extended Disk or Extended ROMable **$395/$25**

SMAL/80 Structured Macro Assembled Language – Package of powerful general purpose text macro processor and SMAL structured language compiler. SMAL is an assembler language with IF-THEN-ELSE, LOOP-REPEAT-WHILE, DO-END, BEGIN-END constructs. **$75/$15**

SELECTOR III-C2 – Data Base Processor to create and maintain multi Key data bases. Prints formatted sorted reports with numerical summaries or mailing labels. Comes with sample applications, including Sales Activity, Inventory, Payables, Receivables, Check Register and Client/Patient Appointments, etc. Requires CBASIC-2. Supplied in source. **$295/$20**

GLECTOR – General Ledger option to SELECTOR III-C2. Interactive system provides for customized COA. Unique chart of transaction types insure proper double entry bookkeeping. Generates balance sheets, P&L statements and journals. Two year record allows for statement of changes in financial position report. Supplied in source. Requires SELECTOR III-C2, CBASIC-2 and 52K system. **$250/$25**

CPM/374X – Has full range of functions to create or re-name an IBM 3741 volume, display directory information and edit the data set contents. Provides full file transfer facilities between 3741 volume data sets and CP/M files. **$195/$10**

BASIC UTILITY DISK – Consists of: (1) CRUNCH-14 – Compacting utility to reduce the size and increase the speed of programs in Microsoft BASIC and TRS-80 BASIC. (2) DPFUN – Double precision subroutines for computing nineteen transcendental functions including square root, natural log, log base 10, sin, arc sin, hyperbolic sin, hyperbolic arc sin, etc. Furnished in source on diskette and documentation. **$50/$35**

STRING/80 – Character string handling plus routines for direct CP/M BDOS calls from FORTRAN and other compatible Microsoft languages. The utility library contains routines that enable programs to chain to a COM file, retrieve command line parameters, and search file directories with full wild card facilities. Supplied as linkable modules in Microsoft format. **$95/$20**

STRING/80 source code available separately **$295/n.a.**

THE STRING BIT – FORTRAN character string handling. Routines to find, fill, pack, move, separate, concatenate and compare character strings. This package completely eliminates the problems associated with character string handling in FORTRAN. Supplied with source. **$45/$15**

BSTAM – Utility to link one computer to another also equipped with BSTAM. Allows file transfers at full data speed (no conversion to hex), with CRC block control check for very reliable error detection and automatic retry. We use it! It's great! Full wildcard expansion to send *.COM, etc. 9600 baud with wire, 300 baud with phone connection. **Both** ends need one Standard and Ⓜ versions can talk to one another. **$150/$5**

★★★★★★★★

SUNDRIES &NOTIONS

HEAD CLEANING DISKETTE—Cleans the drive Read/Write head in 30 seconds. Diskette absorbs loose oxide particles, fingerprints, and other foreign particles that might hinder the performance of the drive head. Lasts at least 3 months with daily use. Specify 5" or 8". **$20 ea./$45 for 3**

FLIPPY DISK KIT – Template and instructions to modify single sided 5¼" diskettes for use of second side in single sided drives. **$12.50**

FLOPPY SAVER Protection for center holes of 5¼" floppy disks. Only 1 needed per diskette. Kit contains centering post, pressure tool, tough 7 mil mylar reinforcing rings, installation tools and rings for 25 diskettes. **$14.95**
Re-orders of rings only. **$7.95**

PASCAL USER MANUAL AND REPORT – By Jensen and Wirth. The standard textbook on the language. Recommended for use by Pascal/Z, Pascal/M and Pascal/MT users. **$8**

THE C PROGRAMMING LANGUAGE – By Kernighan and Ritchie. The standard textbook on the language. Recommended for use by BDS C, tiny C, and Whitesmiths C users. **$12**

★★★★★★★★

*CP/M and MP/M are trademarks of Digital Research
Z80 is a trademark of Zilog, Inc.
UNIX is a trademark of Bell Laboratories
WHATSIT? is a trademark of Computer Headware
Electric Pencil is a trademark of Michael Shrayer Software
TRS-80 is a trademark of Tandy Corp
Pascal/M is a trademark of Sorcim

†CP/M for Heath and TRS-80 Model I are modified and must use specially compiled versions of system and applications software

††Recommended system configuration consists of 48K CP/M 2 full size disk drives, 24 x 80 CRT and 132 column printer

ⓂModified version available for use with CP/M as implemented on Heath and TRS-80 Model I computers

ⓁUser license agreement for this product must be signed and returned to Lifeboat Associates before shipment may be made

(I) (E) This product includes/eXcludes the language manual recommended in Sundries and Notions.

VISA master charge

Orders must specify disk systems and formats e.g. North Star single double or quad density, IBM single or 2D 256, Altair, Helios II, Micropolis Mod I or II, 5¼" soft sector (Micro iCOM SD Systems, Dynabyte) etc.

Prices F.O.B. New York. Shipping, handling and C.O.D. charges extra.

Manual cost applicable against price of subsequent software purchase.

The sale of each proprietary software package conveys a license for use on one system only.

Lifeboat Associates
THE SOFTWARE SUPER-MARKET
™

™The Software Supermarket is a trademark of Lifeboat Associates

Measurement

A fun way to teach those youngsters the proper way to read the "measuring stick".

Ralph White, Columbus, KS

Most students know the obvious uses of a ruler, such as scratching their backs in unreachable places. However, we wish to advance them to a more obscure and less understood use: to use a ruler for measuring length.

The following program, written for elementary or junior high classroom use, offers practice in drawing line segments of different length or naming the length of given segments. The first four inches of a ruler (subdivided into 16ths) are drawn on the screen for reference.

Two types of questions are provided, the first type is to draw line segments of given lengths. The two arrows above the ENTER key are used to draw each segment. The "right arrow" makes the segment longer; the "left arrow" shortens the segment. When the segment has been drawn to the desired length, press the "X" key. Since the INKEY$ function is used, the ENTER key need not be pressed during this type of question.

The student is allowed three attempts to draw each line segment. After each incorrect answer, the computer responds with the appropriate "too long" or "too short" statement. After the third attempt, if it is incorrect, a line segment of correct length is drawn so that it can be compared to the last answer given.

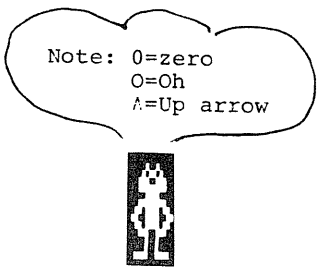
The second type of question asks for the length of a line segment that is drawn above the ruler. The answers are input in the form "3 1/2" or "3-1/2". Since this is not an intelligible numeric form for the computer, the response is input as a string. The computer then searches the string characters and uses the "/", the "-", and the "blank space" as reference positions to separate the string into the required numerical components.

Again, like the first type of question, a maximum of three attempts is allowed per question. After each incorrect response an appropriate diagnostic statement is given. For example, if in measuring a segment two and seven eighths inches long, the student types 1 7/8 instead of 2 7/8, the computer would respond with "THE FRACTION IS OK WRONG INCH MARK". If that were not the third attempt, the student would be told to try again.

If, after three tries, the student does not measure correctly, the correct answer is displayed and then a new question is generated.

After completing the questions, the computer gives a rating score. 30 points is the highest possible score. Points are given in this fashion: for a correct answer on the first try, 3 points; for the second try, 2 points; for the third try, 1 point; if all three attempts are incorrect, no points are awarded. ●

```
10 CLS:PRINTCHR$(23):PRINT:PRINT
20 ONERRORGOTO1510
30 A$="<<>><<>><<>><<>><<>><<>><<>><<>><<>>"
40 PRINTA$:PRINT
50 PRINT"     M E A S U R E M E N T":PRINT"          E N G L I S
   H":PRINT
60 PRINTA$:FORT=1TO1200:NEXT
70 CLS:PRINT:PRINT"WHICH TYPE OF PROBLEM DO YOU WISH?"
80 PRINT:PRINT TAB(5);"1--YOU DRAW SEGMENTS OF A GIVEN LENGTH"
90 PRINT TAB(5);"2--YOU NAME THE LENGTH OF GIVEN SEGMENTS"
100 PRINT:INPUT" WHICH IS YOUR CHOICE ";C
110 IFC<1ORC>2GOTO70
120 IFC=2GOTO160
130 CLS:PRINT"YOU WILL BE ASKED TO DRAW TEN LINE SEGMENTS OF DI
    FFERENT":PRINT"LENGTHS.  AFTER YOU ARE TOLD THE LENGTH OF TH
    E DESIRED":PRINT"SEGMENT, PRESS THE ARROWS ABOVE THE 'ENTER'
     KEY TO DRAW THE":PRINT"SEGMENT."
140 PRINT:PRINT"  PRESS ->  TO DRAW THE LINE SEGMENT":PRINT"  P
    RESS  <-  TO ERASE ANY AMOUNT OF THE LINE SEGMENT":PRINT"  P
    RESS   X  WHEN YOU HAVE FINISHED DRAWING THE SEGMENT":PRINT
150 GOTO200
160 CLS:PRINT"YOU WILL BE SHOWN SEGMENTS OF DIFFERENT LENGTHS.
     YOU WILL  BE":PRINT"ASKED TO NAME THEIR LENGTHS.  ENTER THE A
    NSWERS IN THE":PRINT"FOLLOWING MANNER:"
170 PRINT"     ENTER THE NUMBER OF INCHES, SPACE OR ' - ', FRAC
    TION":PRINT"     NUMERATOR, ' / ', THEN FRACTION DENOMINATOR
    . IF THE ":PRINT"     SEGMENT IS LESS THAN AN INCH LONG, YOU
     DO NOT NEED TO"
180 PRINT"     ENTER THE '0' FOR THE INCH LENGTH IF YOU DO NOT
    WISH TO.":PRINT"     BUT YOU MAY IF YOU WISH."
190 PRINT"     EXAMPLES:":PRINT"     1 3/8 OR 1-3/8":PRINT"
     0 7/16 OR 0-7/16 OR 7/16"
200 PRINT"THE FIRST FOUR INCHES OF A RULER ARE DISPLAYED FOR YO
    U TO USE.":PRINT"YOU WILL BE GIVEN THREE ATTEMPTS TO ANSWER
    EACH PROBLEM."
210 PRINT:INPUT"BEFORE WE BEGIN, TELL ME YOUR FIRST NAME ";N$
220 IFB$(I2)=" "ORB$(I2)="-"ORI1+I1+1=LGOTO1190
230 S=0
240 FORP%=1TO10
250 CLS:W=0:X=0:RANDOM
260 I=RND(4)-1:F=RND(15):D=16
270 A=F:B=D
280 R=A-B*INT(A/B):IFR=0GOTO300
290 A=B:B=R:GOTO280
300 N=F/B:D=D/B:L=((I*32)-1)+(F*2)
310 FORJ%=1TO127STEP2:SET(J%,18):NEXT
320 FORJ%=1TO127STEP2:SET(J%,18):NEXT
330 FORJ%=3TO127STEP4:SET(J%,19):NEXT
340 FOR J%=7TO127 STEP8:SET(J%,20):NEXT
350 FORJ%=15TO127STEP16:SET(J%,21):NEXT
360 FORJ%=31TO127STEP32:SET(J%,22):NEXT
370 PRINT@527,"1";:PRINT@543,"2";:PRINT@559,"3";:PRINT@575,"4"
380 FORJ%=0TO127:SET(J%,17):SET(J%,28):NEXT
390 FORJ%=18TO28:SET(0,J%):NEXT
400 IFC=1GOTO420
410 IFC=2GOTO820
420 PRINT@1,"DRAW A SEGMENT ";:IFI=0GOTO440
430 PRINTI;" AND ";N;"/";D;" INCHES LONG.":GOTO450
440 PRINT N;"/";D;" INCHES LONG."
450 A$=INKEY$
```




```
990 IFW=3GOTO1010
1000 GOTO840
1010 PRINT@640,"THE ANSWER IS:"
1020 PRINT:PRINTI;" AND ";N;"/";D;" INCHES"
1030 FORT=1TO1500:NEXT
1040 NEXT
1050 CLS:PRINT N$;", YOU HAVE COMPLETED THE TEN QUESTIONS.  YOU
     HAVE":PRINT"SCORED ";S;" OUT OF A POSSIBLE 30 POINTS.":END
1060 P2=0:L=LEN(C$)
1070 I1=0
1080 A$(I1)=MID$(C$,L-I1,1)
1090 IFA$(I1)="/"GOTO1110
1100 I1=I1+1:GOTO1080
1110 IFI1=2GOTO1130
1120 DN=VAL(A$(0)):GOTO1140
1130 DN=VAL(A$(1)+A$(0))
1140 I2=0
1150 IFL-(I1+I2+1)=0GOTO1190
1160 B$(I2)=MID$(C$,L-(I2+I1+1),1)
1170 IFB$(I2)=" "ORB$(I2)="-"GOTO1190
1180 I2=I2+1:GOTO1150
1190 IFI2=2GOTO1210
1200 NU=VAL(B$(0)):GOTO1220
1210 NU=VAL(B$(1)+B$(0))
1220 IFI1+I2+1=LGOTO1240
1230 IN=VAL(LEFT$(C$,1)):GOTO1250
1240 IN=0
1250 IFIN=IGOTO1270
1260 P2=P2+4
1270 IFDN=DGOTO1290
1280 P2=P2+2
1290 IFNU=NGOTO1310
1300 P2=P2+1
1310 IFP2>0GOTO1330
1320 GOTO1500
1330 IFP2>1GOTO1350
1340 PRINT@128,"YOU DID NOT COUNT THE FRACTION MARKINGS CORRECT
     LY":GOTO1470
1350 IFP2>2GOTO1370
1360 PRINT@128,"YOU ARE NOT LOOKING AT THE RIGHT FRACTION MARKS
     ":GOTO1470
1370 IFP2>3GOTO1390
1380 PRINT@128,"INCH NUMBER IS O.K.  FRACTION IS ALL WRONG":GOT
     O1470
1390 IFP2>4GOTO1410
1400 PRINT@128,"FRACTION IS CORRECT.  WRONG INCH MARK":GOTO1470

1410 IFP2>5GOTO1430
1420 PRINT@128,"ONLY THE FRACTION DENOMINATOR IS RIGHT":GOTO147
     0
1430 IFP2>6GOTO1450
1440 PRINT@128,"ONLY THE FRACTION NUMERATOR IS RIGHT":GOTO1470
1450 PRINT@128,"ALL PARTS OF THE ANSWER ARE INCORRECT"
1460 P2=7:PRINT"WATCH WHAT YOU ARE TYPING.  ";
1470 W=W+1:IFW=3GOTO1490
1480 PRINTN$;", TRY AGAIN."
1490 FORT=1TO1500:NEXT
1500 RETURN
1510 IN=0:NU=0:DN=0:RESUME1460
```

A 132 Char. Printer for TRS-80 $795.00 !

MOD 1 & 2

The Super Brain (Emako 22) printer is one of the most co$t effective, feature-packed printers available:

BiDirectional • 9 x 7 dot-matrix printhead
9.5" adjustable width pin-feed carriage
selectable printing 40, 66, 80, 132 ch/line
100 million char. print-head life
96 ASCII chars. (lower case)

Suggested Retail Price $895.
Bank Cards Welcome.

LORDS CORP.
P.O. Box 99
Port Angeles, WA 98362
Telephone (206) 457-3064


```
460 IFA$=""GOTO450
470 V=ASC(A$)
480 IFV=9GOTO570
490 IFV=8GOTO520
500 IFV=88GOTO600
510 GOTO450
520 X=X-1
530 IFX>0GOTO550
540 X=0:GOTO450
550 RESET(X+1,15)
560 GOTO450
570 X=X+1:IFX>127GOTO590
580 SET(X,15):GOTO450
590 W=W+1:FORK=0TO127:RESET(K,15):NEXT:X=0:GOTO740
600 IFX<>LGOTO690
610 IFW>0 GOTO630
620 PRINT@704,"GOOD DRAWING HOT SHOT!  YOU GOT IT ON FIRST TRY!
    ":GOTO660
630 IFW>1GOTO650
640 PRINT@704,"YOU ARE CORRECT ON YOUR SECOND TRY.":GOTO660
650 PRINT@704,"YOU TOOK ALL THREE TRIES TO GET IT."
660 S=S+3-W:X=0
670 FORT=1TO1500:NEXT
680 GOTO1040
690 W=W+1:IFX>L GOTO710
700 B$="SHORT":GOTO720
710 B$="LONG"
720 PRINT@704,"THAT IS TOO ";B$;"."
730 IFW=3GOTO790
740 PRINT N$;", TRY AGAIN":FORT=1TO1200:NEXT
750 PRINT@64,"                                "
760 PRINT@704,"                                ":PRINT@768,"
                                "
770 FORJ%=0TOX:RESET(J%,15):NEXT:X=0
780 GOTO450
790 PRINT@704,"COMPARE THE CORRECT ANSWER TO YOUR ANSWER."
800 FORJ%=0TOL:SET(J%,13):NEXT:FORT=1TO1500:NEXT
810 GOTO1040
820 PRINT@1,"HOW LONG IS THE SEGMENT BELOW?"
830 FORK%=0TOL:SET(K%,15):NEXT
840 PRINT@640,""
850 INPUT"HOW LONG IS IT ";C$
860 GOSUB1060
870 IFP2=0GOTO890
880 GOTO970
890 IFW>0GOTO910
900 PRINT@128,"NICE WORK!  YOU GOT IT ON THE FIRST TRY.":GOTO95
    0
910 IFW>1GOTO930
920 PRINT@128,"GOOD.  YOU GOT IT ON YOUR SECOND TRY.":GOTO950
930 IFW>2GOTO1010
940 PRINT@128,"FINALLY, ON THE THIRD TRY YOU GOT IT."
950 S=S+3-W:FORT=1TO1200:NEXT:GOTO1040
960 FORT=1TO1500:NEXT
970 PRINT@128,"                                ":PRINT@768
          ":PRINT@192,"                                ":PRINT@832,"
                                "
980 PRINT@704,"
    ,"
```

Note: These lines are all 63 char long. Watch the spaces between quotes in lines 970 and 980

Search and Sort

Chapter 11 of the Book,

"Learning Level II", by David A Lien

© 1979 by Compusoft Publishing, A Division of CompuSoft, Inc PO Box 19669, San Diego, CA 92119 - reprinted here with permission of the author.

Available in North America for $15.95 plus $1.45 postage and handling.

One of the Computer's most powerful features is its ability to search through a pile of DATA and SORT the findings into some order. Alphabetical, reverse alphabetical, numerical from smallest to largest, or the reverse – all are common. This feature is so important we are going to spend this entire chapter learning how to use it.

Typical applications of search and sort include:

1. Arranging a list of customers' or prospects' names in alphabetical order.
2. Sorting names in zip-code order for lower-cost mailing.
3. Sorting the names of clients in phone area code order.

While not really all that complicated, the sorting process is sufficiently rigorous that we are going to take it *very slowly* and examine each step. Once we get the hang of it, the Computer can blaze away without our considering the staggering number of steps it's going through.

Let's start with a problem. We have the names of 8 customers (if that doesn't grab you, make it 8 million – the process is identical). We need to arrange them in alphabetical order.

We start by storing their names in a DATA line. Type in:

```
1ØØØ DATA BRAVO, XRAY, ALPHA, ZEBRA,
        FOXTROT, TANGO, HOTEL, SIERRA
```

Since we are sorting by name rather than by number, we have to use string variables, string arrays, etc. They work equally well with numbers such as zip codes, while numeric variables and arrays work **only** with numbers.

Here's the Second Half...

$15.95
(soft cover)

Written by the author of your Level I Users Manual, LEARNING LEVEL II picks right up where the Level I Manual leaves off. It also supplies the changes needed to make the Level I Manual compatible with your Level II TRS-80.

LEARNING LEVEL II covers all Level II BASIC beyond Level I, plus much more. It shows you how to use the Editor, explains what the many error messages are really saying, and leads you thru conversions of Level I programs to Level II.

Dual cassettes, printers, the Expansion Interface with clock and other features are explained in the same easy-to-learn style that made the Level I Manual famous. LEARNING LEVEL II was created specifically for your Level II TRS-80!

Yes, I want to really learn how to use Level II!

COMPUSOFT™ PUBLISHING 8643-U Navajo Rd. • San Diego, CA 92119

Please send _____ copies of LEARNING LEVEL II. My check for $15.95 + $1.45 P&H is enclosed. (CA addresses add 6% sales tax).

I understand my order will be shipped promptly and there is a 30 day money-back guarantee.

NAME _____

ADDRESS _____

CITY _____

STATE _____

ZIP CODE _____

The backbone of a sort routine is the array. Each name has to be READ from DATA into an array. So:

```
1Ø REM * ALPHA SORT OF STRINGS FROM DATA *

2Ø CLS : FOR D = 1 TO 8 : READ A$(D) :
                          N=N+1 : NEXT D
```

Line 1Ø is of course just the title

Line 2Ø clears the screen, then "loads the array" by READing the 8 names into storage slots A$(1) to A$(8). N is simply a counter which will follow through the rest of the program. In this simple program we could have made N=8, since we know how many names we have. In the next sample program we won't know how many names there are, so let's leave N the way it's usually used.

Important to the sort routine are 2 nested FOR-NEXT loops.

1. The first one, F, controls the First name.

2. S, the second one, controls the name to be compared against the first one.

   Names and words are compared as we learned in the section on ASCII, *remember*?

Let's establish our loops first, then fill in the guts later:

```
3Ø FOR F = 1 TO N-1 'F=FIRST WORD TO
                        BE COMPARED

4Ø  FOR S = F+1 TO N 'S=SECOND WORD TO
                        BE COMPARED

9Ø  NEXT S           ' MAKES 7 PASSES

1ØØ NEXT F           ' MAKES 7 PASSES
```

It may seem puzzling that F and S only have to make 7 passes when there are 8 names. Think of it this way. Whatever word isn't smaller (ASCII #) than the rest, just ends up last. No need to test again to prove that.

The F loop READs array elements 1 through 7 (N–1 = 7). The S loop READs array elements 2 through 8. This always provides us with **different** array elements to compare against each other.

Now let's jump to the end of our program and prepare it to PRINT out what we are about to do. Type:

```
11Ø FOR D = 1 TO N : PRINT A$(D), : NEXT D
```

When the sorting is done, the contents of A$(1) to A$(8) will be the same as read from DATA, but will be in alphabetical order. We'll PRINT the array contents on the screen.

Now for the sort routine itself. Type:

```
5Ø   IF A$(F) <= A$(S) THEN 9Ø  'TEST
                    FOR SMALLER ASCII#

6Ø   T$ = A$(F)       ' TEMPORARY STORAGE
                        FOR FIRST WORD

7Ø  A$(F) = A$(S)     ' COPY SECOND WORD
                        TO FIRST PLACE

8Ø  A$(S) = T$        ' SWITCH FIRST WORD
                        TO SECOND PLACE
```

And there is the biggie! If you can follow those 4 lines the rest is duck soup.

Line 5Ø says "if the first word is smaller than (or equal to) to the second word, leave well enough alone and bail out of this routine by going to line 9Ø, which will end this pass and READ another word to compare against F. If not, drop to the next line."

Line 6Ø says, "Oh, they weren't in the right order, eh? We'll just store the First word in a temporary storage location called T$ and hold it there for future use. I'm sure we'll need it again."

Line 7Ø copies the name held in the second cell into the first array cell. If the second one had an earlier starting letter than the first one, we do want to do this, don't we?

Line 8Ø completes the switch by copying the name temporarily held in T$ into the second array cell. A$(1) and A$(2) contents have now been exchanged with the aid of the temporary holding pen, T$.

If we did everything right, the program should:

RUN.

and in a flash the names appear on the screen in alphabetical order:

```
ALPHA          BRAVO          FOXTROT
                                HOTEL

SIERRA         TANGO          XRAY
                              ZEBRA
```

RUN it to your heart's delight. It's one of the most powerful things your Computer can do, and does it so well. Exactly the same thing takes place with a very long list of names (or zip codes, or whatever) but we would of course have to reDIMension for a larger array and CLEAR more string space.

Aw c'mon Horse – Whoa!

To get a really good look at what's happening, it's necessary to slow the beast way down, and insert a few extra PRINT lines. This lets us examine what's going on inside by watching the tube.

Add these temporaries:

```
45      PRINT F;A$(F),,S;A$(S)

47      FOR Z = 1 TO 1ØØØ : NEXT Z

55      PRINT "                <<---<<
                        SWITCHEROO"

85      PRINT F;A$(F),,S;A$(S)
```

and RUN.

If that isn't slow enough, change line 47 so there is time for you to completely think it through. Pretend you're the Computer and make the decision that line 5Ø has to make. Take it from the top – very slowly! RUN.

```
1 BRAVO                          2 XRAY
```

Means "in cell #1 is the word BRAVO. In cell #2 is the word XRAY". (Just like they came from the DATA line.) Of those two words, BRAVO is the "smallest" (ASCII#), so let's leave it in number 1 place. Onto the next pass of S.

```
1 BRAVO                          3 ALPHA
```

We don't say our programs are good . . .

SPACE BATTLES — High-speed graphics (machine language sub-routines). You are the commander of a small mercenary star-cruiser. You have been hired to destroy a fleet of alien invaders. If you survive, you will be handsomely rewarded; if you lose, you're dead. **cass / $14.95 disk / $19.95**
FINAL APPROACH — Land a multi-engine jet. Runway and instruments are displayed on the screen. Take control and try to land her yourself. **Special $7.50**
LEVEL IV GRAPHICS — A machine language program that allows you to turn your keyboard into a **Graphics Keyboard.** No hardware modifications required to run this program. Cassette no. compatible with Disk BASIC. **cass. / $14.95**
Disk / NEWDOS (not supplied) $19.95
TOUCH TYPING I AND II — a two cassette package. Touch Typing I helps you learn the keyboard, reinforcing the correct finger-key positions. Touch Typing II randomly choses words to help you improve your typing skills. These drills can be timed or untimed. **cass. / $22.50** *
SUPER ADD — (ages 5 to adult) Improves and teaches addition skills. Divided into three categories with a total of 36 learning modules. A game can be added as a positive reinforcement tool. **cass. / $24.95**
SUPER MULT — (ages 8 to adult) Contains 25 learning modules to learn and improve multiplication facts. Problems can be timed or untimed. **cass. / $24.95**

*Call in orders SPECIAL $18.95

LEVEL IV PRODUCTS, INC.
Your source for the best in TRS-80 ** software and hardware**
32238 Schoolcraft, Suite F4 • Livonia, Michigan 48154 • (313) 525-6200 • Out of Michigan call 1-800-521-3305
**a product of Tandy Corp.

SEND 50¢ for our new catalog!

LEVEL IV GRAPHICS — "If you write programs using graphics, this tape is a must . . . Excellent program."— 80 Software Critique, Issue #2 • "super utility program . . . excellent value — a real contribution." 80-Microcomputing, February 1980.
TOUCH TYPING I & II — "Our recommendation is to buy both programs if you are serious about improving your performance keying computer programs." — 80 Software Critique, Issue #2.
SUPER MULT — "Very comprehensive multiplication program . . . suitable for use by students just learning the multiplication tables and for adults that need some brushing up." — 80 Software Critique, Issue #2.
FINAL APPROACH — "One of the more interesting games . . . before long you'll develop a strategy . . . and end up with NICELY DONE — YOU GREASED IT ON!" — Creative Computing, January 1980.
SPACE BATTLE — "The unique value of Space Battle lies in the extra dimensions of the game . . . What is tough is staying alive . . . In short, this is a challenging game with a lot of factors to create interest . . . One of the best space war games available." — 80-US, Mar/Apr 1980.

Add $1.50 for shipping.

. . . Others say it for us!

Oops. BRAVO is in #1 and ALPHA is in #3, but ALPHA is smaller than BRAVO. We better switch them around. So

```
<<--<<      SWITCHEROO

1 ALPHA                                3 BRAVO
```

Don't worry too much about what is happening in the second column. S is scanning through the array and its contents are always changing, testing against what's in the first column. It's what **ends up** in the first column that counts — and it should be in increasing alphabetical order.

As the program keeps RUNning, watch the new words appear in S, the second loop and column, and compare them against what's in F, the first one. Try to guess what the Computer's going to do. Also keep an eye on the increasing numbers on the left. It's the **final word** with a given number in the first column that which will appear in the final printout.

RUN the program as many times as it takes (and at as many sessions as it takes) to really follow what's happening. It's awfully clever, and awfully important. We can carry this principle over to many useful programs in the future, but only if we *really* understand it.

When you feel it's under control, let's add one more little display to the screen. What is T$ holding while all this sorting is going on? Add to these lines so they read:

```
45 PRINT F;A$(F), S A$(S),"T$=";T$

85 PRINT F;A$(F),,S;A$(S),"T$=";T$
```

and RUN.

"T$=" starts off with nothing since there is nothing in the holding pen. As F gets replaced in the switching process, however, T$ holds it. On a clear head it's not hard to follow what's happening. You'll probably want to save this program on tape and review it several times for a deep understanding of the process.

Sorting from the Outside

We don't really have to keep all our names, numbers or other information in DATA lines. It can be INPUT from the keyboard, from cassette tape, or from disk. The following program is quite similar to the first, and the logic is identical. Change these resident program lines:

```
5 D=1 : REM * ALPHA SORT OF NAMES VIA
                                INPUT *

1Ø INPUT"NEXT NAME";A$(D) : IF A$(D)="END"
                                    GOTO 3Ø

2Ø D=D+1 : N=N+1 : GOTO 1Ø
```

Delete line 1ØØØ

and RUN.

Enter several random names, and when finished, enter the word "END". The process displayed on the screen will be identical to what we saw before.

Can you see the potential for all this?

In this, the first of a series, Larry takes apart the bus, which will later be the jumping off point for other projects

Larry S Panattoni

Panattoni's Panacea

The S-80 bus - - Doorway to Computer Control

The TRS-80 keyboard provides a 40-pin connector with which data can be passed to or from external devices. Exchanging information between the computer and external devices can bring great versatility to the '80. Examples might be joy-sticks, other controls or possibly a complete home security system.

Before undertaking any control application, you should have a good understanding of how the signals on this Bus function, what they are intended for, and in some cases how they are derived.

Most pins on the bus are derived directly from the Z80 CPU (Central Processing Unit) and are buffered before arriving at the connector. Others are a combination of more than one CPU output signal. I will start with the easier pins and work up to the more difficult ones. Figure 1 shows the 40 pin connector as it would appear if you were standing behind the keyboard and facing it.

BUS SIGNAL NAME: GND
BUS PIN NUMBER(S): 8, 29, 37

GROUND: This is the common power supply connection. It is the return for the power supply and also the return for all signals within the computer. GND is negative in the TRS-80.

BUS SIGNAL NAME: +5V
BUS PIN NUMBER(S): 39

POSITIVE 5 VOLTS: This is the plus 5 volt supply voltage. It was designed to power only the keyboard unit allowing very little power to spare. It is therefore best to provide your own external power supply instead of using this pin for external devices. Too much current drain on this lead may cause the computer to malfunction. Level II owners

Megabytes for the

Now users of the most popular microcomputers can add truly massive disk storage to their systems with **Micromation's Megabox.** It features dual 8" drives with double density recording to provide over one Megabyte of disk storage. Or you can choose optional double-headed drives to provide over two megabytes. Micromation is a leading supplier of floppy disk systems for micros.

A **TRS-80*** compatible Megabox plugs directly into the TRS-80. This version of Megabox includes provision to add up to 32K of RAM to your TRS-80* system, so you can have up to 4 Megabytes of disk storage and 48K of RAM without an expansion interface. This Megabox brings big system performance to your system at one-third the cost per byte of mini-floppy systems.

Our **SOL*** version of the Megabox installs without modification, and the software is all ready to go. Micromation's double density recording gives you nearly twice the storage of the Helios* at a substantially lower price -- and most importantly, you can run CP/M* so you have access to the broadest range of software available in microcomputing.

Combine an **Exidy Sorcerer*** with a Megabox by plugging the controller into the Sorcer's* S-100 expansion bus. Boot from our Sorcerer* system diskette and you're up and running without any modifications to your hardware or software.

Our **DOUBLER** double density floppy disk controller features true double density recording with a capacity of 512K bytes on each side of the diskette. Doubler systems are easy to install and use. A hardware UART is included on the controller to provide instant system communication. The controller can do a power-on-jump to the on-board PROM bootstrap. And its fast and reliable because the board's hardware includes a phase-lock oscillator and CRC error detection circuitry.

Micromation disk systems are designed to run **CP/M*** the industry standard operating system. You can choose higher level languages, such as MBASIC, CBASIC, FORTRAN, COBOL, or PASCAL. And there's a wide selection of business application packages to choose from.

Megabox systems open new opportunities for owners of todays most popular microcomputers. They feature the highest available capacity, performance, and reliablity. And they are compatible with your system. But best of all, at $2295 a Megabox is priced for value. Ask for details at your local computer store or contact Micromation 1620 Montgomery St., San Francisco, CA 94111 or phone (415) 398-0289.

MICROMATION

The Megabox with 1,000,000 existing software to easily keep a

do not have plus 5 volts on this pin, but instead this pin is another ground (GND). This is part of the conversion from Level I to Level II.

BUS SIGNAL NAME D0,D1,D2,D3,D4,D5,D6,D7
BUS PIN NUMBERS 30,22,32,26,18,28,24,20

DATA BUS LINES: These lines carry data from memory or external devices to the CPU or from the CPU to memory or external devices. In some cases data can pass directly from one device to another without going through the CPU. Since data can travel in either direction, it is called a Bi-directional Data Bus. Tri-state Buffers should be used when connecting external equipment to these lines.

BUS SIGNAL NAMES:A0,A1,A2,A3,A4,A5,A6,A7,A8,A9, A10,A11,A12,A13,A14,A15
BUS PIN NUMBERS:25,27,40,34,31,35,38,36,11,4 9,5,6,10,7

ADDRESS BUS LINES: These lines carry the address for the data on the Bi-directional Data Bus. The 16 lines provide a possibility of 65,536 different addresses. As will be explained later, it is advisable to drive no more than one external TTL input from each of these lines.

BUS SIGNAL NAME: WAIT
BUS PIN NUMBER: 33

WAIT: This is an input signal lead into the Z-80 CPU which when low will cause the CPU to revert to a WAIT cycle, and do nothing until this lead goes high again, at which time the CPU will continue from where it left off. This lead is useful with external equipment that is slow to react - such as a printer - which brings this lead low to tell the CPU to wait until it types a line; then the printer brings the lead high, indicating it is ready to receive data again.

BUS SIGNAL NAME: SYRES
BUS PIN NUMBER: 2

SYSTEM RESET: This is an output lead from internal circuitry which is forced low for a short time during power-up or when the RESET button is pushed. It can be used to reset external devices at the same time the CPU is reset.

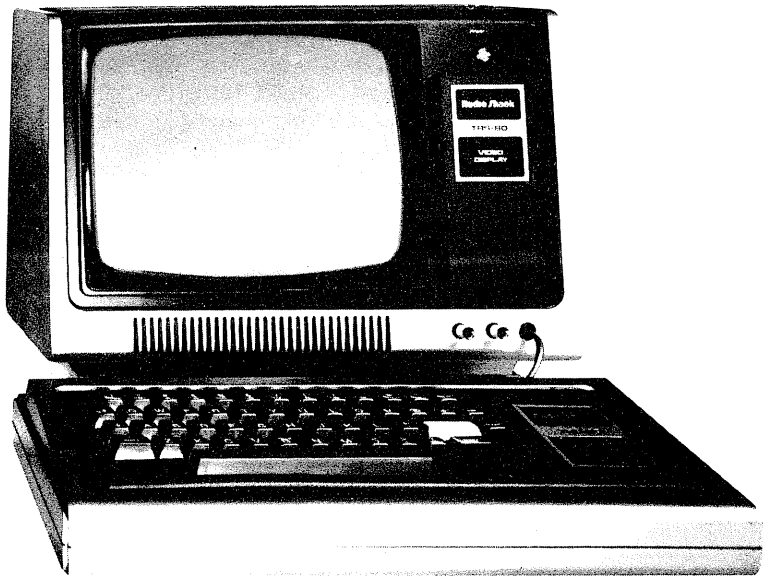
BUS SIGNAL NAME: TEST
BUS PIN NUMBER: 23

TEST: This is another input lead, and goes to a Z-80 CPU pin with the name of BUSRQ (busy request). When low, this lead places the Z-80 into a WAIT cycle; but in addition, it also places all the on-board buffers (in the TRS-80) to a standby (high impedance) state. This leaves the BUS lines free to be used by external devices, such as with DMA (direct memory access) operations. This allows movement of data to or from memory without going through the CPU.

BUS SIGNAL NAME: WR
BUS PIN NUMBER: 13

WRITE: This output (WR) on the 40 pin connector is not the same as the output lead of the CPU with the same name. Instead, it is a combination of the CPU output leads WR and MREQ. The CPU WR lead, when low, indicates the CPU is outputting data; the MREQ (memory request) when low, indicates the data is intended for memory. These two CPU signals are combined in an OR gate to obtain signal WR, which is buffered before going to the 40 pin connector. It would have been better labeled MWR for Memory Write. It is used to tell RAM memory that data is being written to it.

TRS-80,* Sol,* Sorcerer*



byte storage capacity can be operated with general ledger, accounts receivable, and payable.

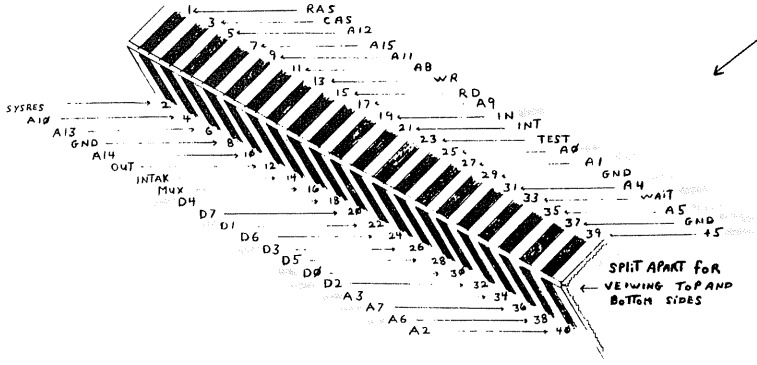
*TRS-80 is a TM of Tandy Corp
SOL and Helios are TM s of Processor Technology Corp
Sorcerer is a TM of Exidy Inc CP/M is a TM of Digital Research

BUS SIGNAL NAME: RD
BUS PIN NUMBER: ~~12~~ 15

READ: This output lead on the 40 pin connector is also not the same as that of the CPU signal with the same name. It is a combination of the CPU output lead RD and MREQ. The CPU RD lead when low, indicates the CPU is inputting data, and the MREQ lead when low, indicates the data is coming from memory. These two CPU signals, RD and MREQ are combined in an OR gate to obtain the output signal of RD, which is buffered prior to arriving at the 40 pin connector. It would also have been better called MRD for Memory Read. Within the keyboard it is used to turn on the output tri-state buffers from the internal RAM.

BUS SIGNAL NAME: IN OUT
BUS PIN NUMBERS: ~~15~~ 19 ~~13~~ 18

IN & OUT: The IN and OUT leads are obtained from the CPU signals RD and WR (explained above), which are combined with the Z-80 IORQ (in/out request) signal, through two OR gates, then buffered. The IN signal, when low, indicates the Z-80 is ready to receive data on the Bus lines from an outboard device (who's address is on the address lines). The OUT signal indicates the Z-80 is outputting data on the data lines to an outboard device (whose address again is on the address lines).



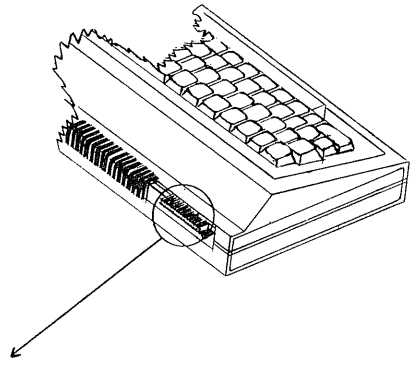


Figure 1

BUS SIGNAL NAME: INT
BUS PIN NUMBER: 21

INTERRUPT REQUEST: This is an input signal into the Z-80 CPU, which when low causes the CPU to finish its current instruction cycle, then check its internal "I" flip flop and if it is set, then store its current Program Counter (PC) address in the Stack Pointer (SP) and begin one of the interrupt service routine modes. There are three interrupt modes: Mode 0, Mode 1 and Mode 2. These modes are user selectable, and can be set with the machine language instructions IM0, IM1 and IM2.

MODE 0

The Z-80 places a low signal on the INTAK (interrupt acknowledge) output lead, indicating to the interrupting device that the CPU is ready to receive, on the data bus, the next command to be executed.

MODE 1

The Z-80 loads the PC with 0066 (hex) and jumps to that location to continue execution. This is the location the CPU jumps to when the RESET button on the back of the keyboard is pushed.

MODE 2

The Z-80 places a low signal on the INTAK output lead, indicating to the interrupting device that the CPU is ready to receive the low order address of the next instruction to be executed. The high order portion of that address will be whatever was stored earlier, by the program or the operator, in the Z-80 internal "I" register in preparation for this interrupt.

BUS SIGNAL NAME: INTAK
BUS PIN NUMBER: 14

INTERRUPT ACKNOWLEDGE: This output signal goes low at the beginning of an interrupt service routine, indicating to the interrupting device that it should place an instruction byte on the data bus for the CPU. This INTAK signal is obtained by ORing the CPU signals IORQ and M1 (machine cycle #1). The IORQ signal, when low, indicates the CPU is ready for either an IN or OUT operation. The M1 signal when low, indicates the CPU is in the FETCH cycle of operation. Several machine language instructions have more than one byte, and the first byte of each instruction is received during the M1 or FETCH cycle.

BUS SIGNAL NAMES: RAS CAS MUX
BUS PIN NUMBERS: 1 3 16

ROW ADDRESS SELECT COLUMN ADDRESS SELECT ADDRESS MULTIPLEX

These three leads will be explained together. They are used to address the 4K dynamic RAM within the keyboard, and are also brought out to the 40 pin connector for addressing additional RAM (such as is done with the expansion interface). The standard 4K RAM need twelve address lines, but only six are brought out on the chips. Therefore the addresses must be divided up and sent to the RAM in two parts. This is done by multiplexing or switching first the least significant six address bits, then the most significant six bits into the RAM.

When the CPU sends out an address intended for the RAM it places a low signal on the MREQ lead, indicating a memory type of operation. This MREQ signal is buffered, then renamed RAS and fed to the RAM. After the address has stabilized the RD or WR signal (depending on the type of operation) is pulled low and passed through a NAND gate, then is fed to the input of a flip flop. On the next clock pulse, this high signal is passed to the output flip flop. The MUX signal, after buffering, is used to switch the solid state multiplexers over to the address lines A6 thru A11 and on the next clock pulse another flip flop places a low on the CAS lead which has been held high till now. This

TRS-80 LEVEL II

For the SERIOUS Game Player

. . .

sensational software

Who Is Creative Computing?

Creative Computing consists of five divisions serving you. **Creative Computing magazine** is the number 1 magazine of software and applications. **Creative Computing Press** publishes a wide variety of books, art prints, posters and T-shirts for the computer enthusiast. And **Creative Computing Software** produces and markets software on cassette and floppy disk for a wide variety of computers for home, school, and small business.

If your dealer does not carry the full line of Creative Computing products, please send three first-class stamps for a free catalog of products.

Board Games-1, CS-3001 (16K)

• Mugwump $7.95

Mugwump is a board game which uses a 10x10 grid on which four friendly Mugwumps are hiding. Your mission is to locate these mysterious animals and capture them.

• Flip Disc

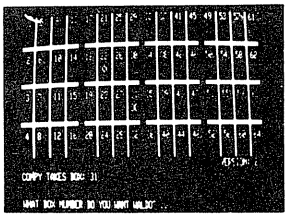
Are you an Othello freak? Flip Disc is a program which will turn your computer into an excellent opponent. Three different skill levels, (good, expert, and genius), provide an introduction for the novice and continuing interest for the experienced player.

• Wumpus

In game 1, you scour a network of underground caves in search of the prized Wumpus. Bagging a Wumpus wins the game, but if you accidentally stumble into his cave, the Wumpus will enjoy a tasty dinner of sauteed computer freak.

• Wumpus 2

If you master the dodecahedron cave network in Wumpus 1, you may proceed to Wumpus 2 which allows you to choose from five different caves, or you can design your own.



• Qubic

Qubic is a three dimensional Tic Tac Toe game. The game is played in a 3 dimensional cube (4x4x4). The object is to outwit the computer and place four pieces in any straight line.

• Backgammon

This is the TRS-80 adaptation of the popular board game. Backgammon uses graphics and all the standard backgammon rules, not a strange computer variation. The computer is your opponent in this version, written by Scott Adams of "Adventure" fame.

How To Order

Send order and payment to **Creative Computing**, P.O. Box 789-M, Morristown, NJ 07960. Add $1.00 shipping and handling per order (foreign, $2.50) N.J. residents add 5% sales tax. Visa, MasterCharge and American Express orders welcome. For faster service, call in your bank card order toll free to: **800-631-8112.**(In NJ, call (201) 540-0445.)

Strategy Games, CS-3005 (16K)

• Tunnel Vision $7.95

You are transported into a massive labyrinth and must find the exit or be lost forever. This is an excellent example of three dimensional perspective using TRS-80 graphics.

• Evasion

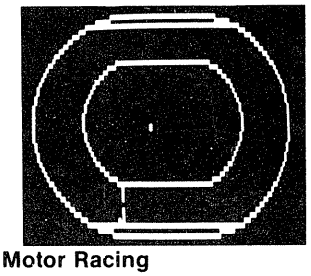
In this real time game, you are pursued around the game board by an evil-looking snake. Variations of play include two different speeds and hyper-jumps which randomly relocate you on the board. Looking for an escape? Try Evasion.

• Jigsaw

Jigsaw is a computer-age puzzle game making extensive use of TRS-80 graphics. The computer generates a random puzzle and puzzle board. Using a combination of deductive reasoning and luck you must fit the graphically represented puzzle piece into place.

• The Masters

Are you a wandering pro or just a Sunday golfer who would like to keep in practice? Once you're on the green, a worm's-eye view is displayed for putting.



• Motor Racing

Motor Racing combines real time racing action with advanced graphics functions. The graphics and animation make Motor Racing fun to watch as well as play.

Space Games-3, CS-3002 (16K)

• Ultra-Trek $7.95

Ultra-Trek is a fast-paced version of Star Trek, complete with "real time" action graphics, lasers, Nilon space mines, high energy photon torpedoes, enemy ships that move, and an experimental ray which does something different each time you use it. You must act quickly to save yourself and the Federation.

• Star Lanes

Imagine yourself the president of an intergalactic shipping company. If you're successful, you may be named Imperial Advisor on Economic Affairs. Entrepreneurs: to your ships.

• Star Wars

If you hate Darth Vader, you'll love Star Wars. This real time game is fun for aliens of all ages. May the Force be with you!

• Romulan

Your mission is to destroy an invading Romulan space craft. Maneuver through space and around stars looking for the deadly enemy, but be careful! The nasty Romulans fire back.

Air Traffic Controller, CS-3006 (16K) $7.95

This real time machine language program puts you in the chair of an air traffic controller. There are 27 airplanes — jets and prop planes — which must be controlled as they land, take off and fly over your air space. You give the orders to change altitude, turn, maintain a holding pattern, clear for approach, and land at your two airports. This realistic simulation includes navigational beacons, and requires planes to take off and land into the wind. Air Traffic Controller was written by an air traffic controller and is a favorite of the Creative Computing staff!

WRITE FOR...

FREE

SOFTWARE CATALOG

creative computing

CAS signal, after buffering, informs the RAM that the high portion of the address is now stable and ready to be received. And with that, the RAM has received the complete address of the desired memory location. After the READ or WRITE operation is complete, the RD or WR leads return to a high state. This high is then inverted by a NAND gate, which clears all three flip flops, preparing them for another cycle.

When interfacing TTL (Transistor-Transistor Logic) circuits to the 40 pin connector, it is important to follow a few general loading rules. The output of a TTL unit such as a gate, inverter, flip flop or whatever can generally drive ten inputs of the same family. This is called "fanout", and driving ten inputs would be called a "fanout of ten". This fan-out can be repeated again and again as many times as necessary, providing the power supply is capable of supplying the power.

The TRS-80 Technical Manual recommends that a fan-out of one be used as the first outside connection to the 40 pin connector, keeping the load on the keyboard circuits to a minimum. The general rule of a fan-out of ten should be followed from that point on.

The TTL families are listed in Table 1, with their output current capabilities and input requirements for both High Level and Low Level outputs. This information is found in your "Data Handbook", available at Radio Shack as well as other sources.

When mixing the TTL families the loading rules change as shown in Table 2. But if TTL is to drive circuitry other than those listed, the current input requirements for the various Fan-out legs should be added up and compared to the output capabilities of the TTL type being used to avoid exceeding their available output specifications.

As with everything, there are exceptions to the rules. A few TTL buffers do have greater output current sinking ability, which increases their fan-out capability up to 20 even without mixing families. A few such buffers are 74365, 74366, 74367, 74368 (all tri-state buffers). So, when using fan-outs other than what the general rules specify, check the specifications for that particular unit in your Data Book.

In the next issue we will have plans for a homebrew external interface unit, containing a variety of different output capabilities.

TABLE 1

REGULAR TTL'S	(HIGH)	Can Output	400 MICROAMPS	Needs 40 Microamps Input
	(LOW)	Can Sink	16 MILLIAMPS	Needs 1 6 Milliamps Input
LOW POWER TTL'S	(HIGH)	Can Output	200 MICROAMPS	Needs 10 Microamps Input
	(LOW)	Can Sink	3 6 MILLIAMPS	Needs 1 8 Milliamps Input
HIGH POWER TTL'S	(HIGH)	Can Output	500 MICROAMPS	Needs 10 Microamps Input
	(LOW)	Can Sink	20 MILLIAMPS	Needs 2 Milliamps Input
STANDARD SCHOTTKY	(HIGH)	Can Output	1000 MICROAMPS	Needs 50 Microamps Input
	(LOW)	Can Sink	20 MILLIAMPS	Needs 2 Milliamps Input
LOW POWER SCHOTTKY	(HIGH)	Can Output	400 MICROAMPS	Needs 20 Microamps Input
	(LOW)	Can Sink	8 MILLIAMPS	Needs 0 4 Milliamps

TABLE 2

ONE REGULAR TTL OUTPUT	Can Drive 10 REG TTL Inputs Can Drive 40 LOW-PWR TTL Inputs Can Drive 20 LOW-PWR SCHOTTKY TTL Inputs Can Drive 6 HIGH-PWR TTL Inputs
ONE LOW -POWER TTL OUTPUT	Can Drive 2 REG TTL Inputs Can Drive 10 LOW-PWR TTL Inputs Can Drive 5 LOW-PWR SCHOTTKY TTL Inputs Can Drive 1 HIGH-PWR TTL Input
ONE LOW-POWER SCHOTTKY OUTPUT	Can Drive 5 REG TTL Inputs Can Drive 20 LOW-PWR TTL Inputs Can Drive 10 LOW PWR SCHOTTKY TTL Inputs Can Drive 4 HIGH-PWR TTL Inputs
ONE HIGH-POWER TTL OUTPUT	Can Drive 12 REG TTL Inputs Can Drive 40 LOW PWR TTL Inputs Can Drive 40 LOW PWR SCHOTTKY TTL Inputs Can Drive 10 HIGH-PWR TTL Inputs

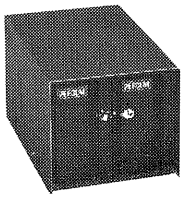
From ACCESS UNLIMITED...

TRS-80* Computer Owners MEGASAVINGS on

- **Brand new Percom TFD-100™ mini-disk systems: Single-drive only $325.00, Double-drive only $650.00, Triple-drive only $975.00**
- **16K-byte memory: eight prime 4116 ICs only $64.95.**

We buy in quantity. You buy at discount. Brand new factory-warranted products from Apparat, Percom and other best-rated companies.

Order today. Call toll-free, 1-800-527-4196†



Percom Mini-Disk Systems

These mini-disk systems from Percom store more data, are more reliable TFD-100™ units store 102K bytes of formatted data on *either disk surface* TFD-200™ drive systems provide 197K bytes of formated data on-line (35-track Tandy drives store only 86K bytes) Access times are fastest possible with your Expansion Interface Heavy duty power supply — included with each drive — runs cooler, lasts longer Low noise three-wire ac power cord is safer than RS two-wire cord Multiple drive systems are mounted in a single enclosure Enclosures are finished in compatible silver enamel Prices

TFD-100™ (40-track)	
One-Drive Add-On	$ 374.95
Two-Drive Add-On	749.95
Three-Drive Add-On	1124.95
TFD-200™ (77-track)	
One-Drive Add-On	$ 634 95
Two-Drive Add-On	1268 95
Three-Drive Add-On	1903 95

Price includes Percom PATCH PAK™ described elsewhere in this ad

Disk System Interconnecting Cables

Improved design places drive 0, which includes the cable termination, at the end of the cable — not in the first position like the RS design — to eliminate the reflected noise of an unterminated cable and thereby improve data and control signal integrity Prices

Two-Drive Cable	$ 24 95
Four-Drive Cable	34 95

Power Line Filter

Eliminates switching spikes and other noise caused by equipment sharing the TRS-80* ac power line Also reduces TV interference caused by the TRS-80 * 115/250 V, 50-400 Hz Instructions for easy installation in standard aluminum mini-box chassis

Price $ 19 95

Media

Minidiskettes:

10 Disks in a convenient plastic organizer box	$34 90
Single Disk	$ 3 49

Cassettes:

These data cassettes provide orders-of-magnitude improvement in data integrity over ordinary audio cassettes Features include a pilon-coated pressure pad which eliminates lint and minimizes erratic tape motion, and an energy-absorbing foam pad that is superior to a leaf-spring-mounted pad which tends to oscillate and cause fluttering Five-screw case virtually precludes deformation during assembly

Pilon-10™	$1 95 ea
Pilon-30™	$1 99 ea

™ = trademark of Percom Data Company, Inc

Disk System Software

MICRODOS,™ an advanced, easy-to-use operating system for TRS-80s* using Percom disk storage systems, *works entirely with Level II BASIC commands* MICRODOS™ replaces primitive TRSDOS*, is more powerful and faster, yet resides in only 7K bytes of RAM Up to 10 user-defined functions may be added to existing functions, and hexadecimal constants may be used in expressions MICRODOS™ is supplied on a system minidiskette that also includes three self teaching BASIC language programs (1) a file management program, (2) a disk utility program — illustrating how disk utilities may be written with only a few BASIC statements, and (3) a sample application program The application program is an expandable, user accessible "notebook" of information about MICRODOS™ BASIC statements Price $29 95

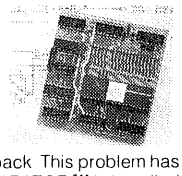
PATCH PAK™ is supplied free (on disk) with the purchase of a Percom TFD-100™ or TFD-200™ PATCH PAK™ extends TRSDOS* to accommodate 40- and 77-track drives It also deglitches TRSDOS* 2 1 With the patch applied to TRSDOS* 2 1, interference with disk operations from the TRS-80* "heartbeat" pulse is eliminated, as is premature stopping of the drive motor during operation — a problem sometimes referred to as "silent death " PATCH PAK™ is applied to your system disk "on the fly" using two drives Application instructions are included

Price (if sold separately) $10 00

new DOS, new DOS+ — Disk operating system corrects and improves TRSDOS* 2 1 Fixes keyboard bounce Fixes APPEND, LOC and VERIFY Fixes SYS3 bugs which crash the disk directory, and bugs which cause "Lost Data" errors Enhancements include machine language line renumbering program • faster LOAD & SAVE functions • space saving allocation of minidiskette granules • password disable/re-enable capability • validity check of output to disk — and more new DOS+ also includes these exceptional utilities Editor/Assembler with tape & disk I/O and output to line printer • disk-based disassembler with output to line printer • SUPER ZAP — Apparat's hex dump utility • Level I ROM located in Level II RAM • LMOFFSET for Tape/Disk transfers — and more Prices

new DOS	$49 95
new DOS+	$99 95

New! the SEPARATOR™



This PC board plug-in adapter for the TRS-80* virtually eliminates data read errors (CRC error — Track locked out!) which occur on high density inner disk tracks when clock and data bits are not reliably separated during playback This problem has plagued many TRS-80* systems The SEPARATOR™ is installed in the Expansion Interface without modifying the host system Caution Opening the TRS-80* Expansion Interface may void the limited 90-day warranty Price $29 95

* = trademark of Tandy Radio Shack Corporation

How to Order

Order by calling Access Unlimited toll-free on 1-800-527-4196†.

Mail orders also accepted Orders may be charged to a VISA or Master Charge account, or paid by a cashier's check, certified check or money order We accept COD orders with 25% deposit Sorry, we cannot accept personal checks We pay shipping and insurance charges on orders over $1,000 00 Add approximate insurance and shipping charges for under $1,000 00 If in doubt about these charges, ask when you call in your order Texas residents include 5% sales tax Minimum order: $20 00 Allow 2 to 4 weeks for delivery

†Texas residents call (214) 494-0206

ACCESS UNLIMITED

315 N. Shiloh · Ste. D1 · Garland, TX 75042

(214) 494-0206

Prices and specifications subject to change without notice

The ninth in a series on

For Model I, Level II 16K or 32/48K DOS

Machine Language Applications.

SYSTEM/ COMMAND

Phil Pilgrim
Discovery Bay Software Co
Port Townsend, WA

A Software Numerical Keypad

For all of you who helped make the '80 what it is - and now find them giving away free what you have to pay almost $90 for.... here is a numerical keypad that is software operated..

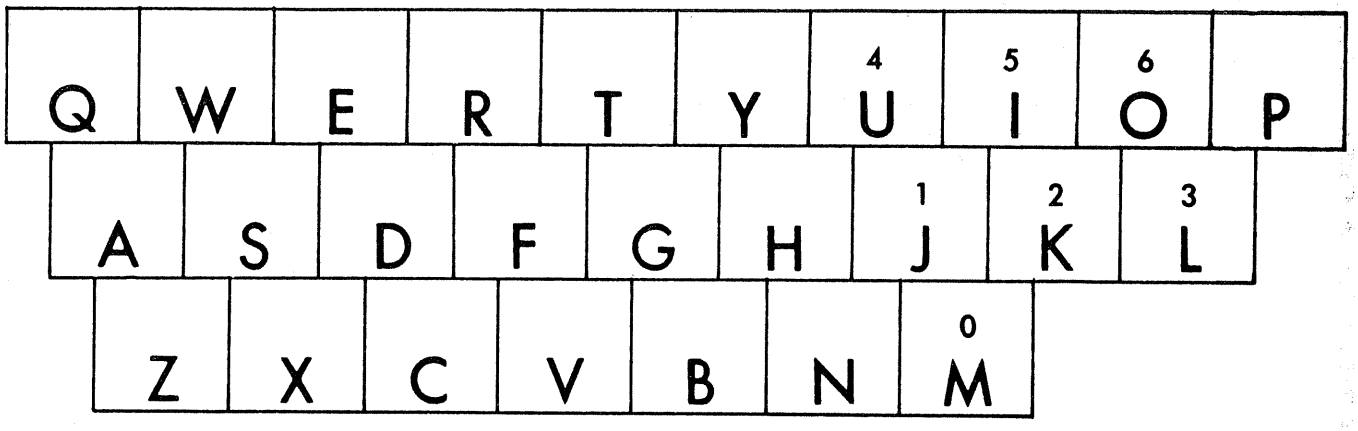
The program presented here is short and sweet, but it illustrates one application of a very useful (but, I suspect, little-used) Z-80 instruction: the CPIR. The program itself, NUMKP, provides a numerical cluster or keypad for you Level II or Disk Basic users not having the hardware version. By typing a *SHIFT*↓ certain letter keys will be transformed to number keys, as shown in figure 1. This numerical cluster is completed by the regular 7, 8 and 9 keys on the keyboard. In addition, it will not be necessary to hold down the *SHIFT* key to type the + or * in this mode -- just hit the keys they appear on. To escape the keypad mode, just type *SHIFT*↓ again, and things will be back to normal.

NUMKP uses two modes, determined by bit 0 of MODE. Mode 0 is regular mode, and mode 1 is the keypad mode. This bit flip-flops whenever a CHR$(26), or *SHIFT*↓ is returned from the "old" keyboard routine, which NUMKP calls first. If the character is other than a CHR$(26), then what happens next is a function of the mode. If the mode is zero, the character is simply returned. If the mode is one, the character *may* be transformed to another one, depending on what it is.

Here is where the CPIR comes in. The characters we want to transform to something else are in the first DEFM block. So we INC HL to point it to this block. (It *was* pointing to MODE.) Since there are nine such characters, we set BC to 9. The questions we now want answered are, 1) "Is the character in A one of the nine characters we want transformed?", and 2) "If so, which one is it?" The CPIR instruction answers both questions at once. It does this by comparing A with the memory contents pointed to by HL, incrementing HL, and decrementing BC. This process repeats until either a match is found or until the list is exhausted (i.e., BC=0). In the case of a match, the zero flag is set; otherwise, it is reset. So by putting the RET NZ after the CPIR, we're saying that if the character in A wasn't one of the nine in the list, nothing more need be done, and we can get out.

But what if it was? How do we use the info CPIR provides in case of a match? In this case, HL points one byte beyond the character that matched, and BC contains the number of characters in the list not checked yet. After adding BC to HL once, HL will always point one character beyond the original list (i.e., to the first character in the second list). After adding BC again, HL will point to the replacement character corresponding to the one that matched in the first list. (Note that because BC is 9 minus the number of characters checked, the correspondence between the first and second lists is that of a mirror image.) Now, all we need to do is load A from the memory pointed to by HL to complete the transformation, then return.

To use NUMKP, type as shown into EDTASM. If you have more than 16K of memory, change the symbol in the ORG statement accordingly, and note the MEMORY SIZE this is the number you must use to protect upper memory. Also, if you're using DOS, change the JP BASIC to JP DOS. Now assemble the program, and dump your object code to tape or disk. Then load the object code and execute the START block (by typing */ENTER* from SYSTEM or loading as an autostarting /CMD file.) From here on, your numeric keypad will be available at the flick of a *SHIFT*↓. ●




```
7FC0            00100 MEM16K  EQU     7FC0H           ;MEMORY SIZE: 32704
BFC0            00110 MEM32K  EQU     0BFC0H          ;MEMORY SIZE: 49088
FFC0            00120 MEM48K  EQU     0FFC0H          ;MEMORY SIZE: 65472
1A19            00130 BASIC   EQU     1A19H           ;ENTRY POINT FOR BASIC
402D            00140 DOS     EQU     402DH           ;ENTRY POINT FOR DOS
7FC0            00150         ORG     MEM16K          ;OR MEM48K OR MEM64K
7FC0 CD0000     00160 NUMKP   CALL    $-$             ;CALL OLD KBD. ROUTINE
7FC3 21DE7F     00170         LD      HL,MODE         ;GET MODE ADDRESS
7FC6 FE1A       00180         CP      26              ;MODE CHANGE?
7FC8 2006       00190         JR      NZ,NOCHG        ;  NO: BRANCH AROUND
7FCA 7E         00200         LD      A,(HL)          ;  YES: GET MODE
7FCB EE01       00210         XOR     1               ;INVERT IT
7FCD 77         00220         LD      (HL),A          ;AND SAVE IT
7FCE AF         00230         XOR     A               ;RETURN 0
7FCF C9         00240         RET                     ;     .
7FD0 CB46       00250 NOCHG   BIT     0,(HL)          ;REGULAR MODE?
7FD2 C8         00260         RET     Z               ;  YES: RETURN
7FD3 23         00270         INC     HL              ;  NO: POINT TO CHR. TABLE
7FD4 010900     00280         LD      BC,9            ;NINE CHRS. IN TABLE
7FD7 EDB1       00290         CPIR                    ;IS ACC. ONE OF THEM?
7FD9 C0         00300         RET     NZ              ;  NO: RETURN
7FDA 09         00310         ADD     HL,BC           ;  YES: POINT INTO 2ND TBL
7FDB 09         00320         ADD     HL,BC           ;        .
7FDC 7E         00330         LD      A,(HL)          ;GET NEW CHARACTER
7FDD C9         00340         RET                     ;AND RETURN IT
7FDE 00         00350 MODE    DEFB    0               ;ZERO IS REGULAR MODE
7FDF 4D         00360         DEFM    'MJKLUIO;:'     ;OLD CHARACTERS
7FE8 2A         00370         DEFM    '*+6543210'     ;NEW CHARACTERS
7FF1 2A1640     00380 START   LD      HL,(4016H)      ;LINK INTO KBD. SEQUENCE
7FF4 22C17F     00390         LD      (NUMKP+1),HL    ;       .
7FF7 21C07F     00400         LD      HL,NUMKP        ;       .
7FFA 221640     00410         LD      (4016H),HL      ;       .
7FFD C3191A     00420         JP      BASIC           ;GOTO BASIC (OR DOS)
7FF1            00430         END     START           ;AUTOSTARTS AT START
00000 TOTAL ERRORS


BASIC   1A19 00130    00420
DOS     402D 00140
MEM16K  7FC0 00100    00150
MEM32K  BFC0 00110
MEM48K  FFC0 00120
MODE    7FDE 00350    00170
NOCHG   7FD0 00250    00190
NUMKP   7FC0 00160    00390 00400
START   7FF1 00380    00430
```

TSE "TRS-80 USERS! Your Software Supermarket"

GAMES

Warfare I 4-game anthology, Level II, 16K $7.95

Backgammon by Scott Adams.Level II, 16K $7.95

X-Wing II by Chris Freund. Level II, 16K $9.95

Taipan by Art Canfil. Level II, 16K $9.95

Sargon Chess by Dan and Kathe Spracklen. Level II, 16K $19.95

Chess Companion by Michael Kelleher. Level II, 16K $7.95

Three D Tic Tac Toe by Scott Adams. Level II, 16K $7.95

Concentration by Lance Micklus. Level II, 16K $7.95

Amazin' Mazes by Robert Wallace. Level II, 16K $7.95

Time Bomb by David Bohlke. Level II, 16K $4.95

Life Two by Leo Christopherson. With sound -Level II, 16K $14.95

Android Nim by Leo Christopherson. With sound - Level II, 16K $14.95

Cubes by Leo Christopherson Level II, 16K $9.95

Mastermind II by Lance Micklus $7.95

Mastermind II - Source List -$20.00

Robot/Breakaway Game duo by Lance Micklus. Level II, 4K $7.95

Tycoon by David Bohlke. Level II, 16K $7.95

Slalom by Denslo Hamlin. level II, 16K $7.95

9 Games for Preschool Children by George Blank. Level II, 16K $9.95

Ten Pin by Frank B. Rowlett, Jr. Level II, 16K $7.95

Atlantic Balloon Crossing by Dean Powell. Level II, 16K $9.95

Space Battles by Level IV, Level II, 16K Tape or 32K Disk, Tape -$14.95, Disk - $19.95

Star Trek III.3 by Lance Micklus Level II, 16K $14.95

Dog Star Adventure by Lance Micklus. Level II, 16K $9.95

Safari by David Bohlke. Level II, 16K $7.95

Treasure Hunt by Lance Micklus. Level II, 16K $7.95

'Round the Horn by George Blank. Level II, 16K $9.95

Pork Barrel by George Blank. Level II, 16K $7.95

Kamikaze by Russell Starkey. Level II, 16K $7.95

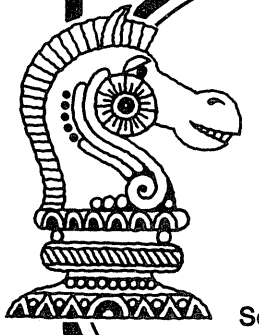
All Star Baseball by David Bohlke. Level II, 16K $7.95

Barricade by Small Systems Software. Machine Language -$14.95

Journey To The Center Of The Earth by Greg Hassett. Level II, 16K Tape $7.95

Pentominoes by James Garon. Level II, 16K $7.95

Snake Eggs by Leo Christopherson. With sound Level II, 16K $14.95



Now In Stock!

SARGON **was the BEST**
SARGON II is MUCH BETTER!

Seven levels of play . . .
faster, better end game . . .
randomized opening.

$29.95

NEW!!!

Understandable! Indexed library with 200 Assembly Language Routines.

Z80 Software Gourmet Guide And Cookbook

from Scelbi. $14.95 + $1 postage.

BOOKS

Sargon Handbook by Don & Kathe Spracklen. $14.95 plus $1.00 shipping and handling.

The Basic Handbook by Dr. David A. Lien. $14.95 plus $1

Z80 Instruction Handbook by Scelbi Publications. $4.95

The Little Book Of BASIC Style by John Nevison. $5.95 plus $1

TRS-80 Assembly Language Programming by William Barden, Jr. $3.95 plus $1

Introduction to TRS-80 Graphics by Don Inman. $7.95 plus $1

Learning Level II by David A. Lien. $15.95 plus $1

SPECIAL PURPOSE

Calculator by R. W. Robitaille, Sr. Level II, 4K $2.95

Moving Signboard by Circle Enterprises. Level II. 4K $9.95

Histograph/Scattergram by Gary S. Breschini. Level II, 16K $9.95.

Simple Simon by George Blank. Level II. Written in BASIC. $4.95

Math Drill by K. L. Brown. Level II, 16K $4.95

RPN Calculator by Russell Starkey. Level II, 16K $9.95

Ham Radio by Michael Kelleher. Level II, 16K $9.95

Ham Radio ARS I.1 (32K disk) $24.95

Electronics Assistant by John Adamson. Level II, 16K $9.95

Preflight by Stephen Hebbler. Level II, 16K $20.00

Basic Statistics by Steve Reisser. Level II, 16K $20.00

Drill Masters by Computer Graphics - specify title desired. Level II, 16K **$7.95 each.** German, Russian, Italian, Spanish, or Music Theory

Keyboard-80 by John Adamson. Level II, 16K $9.95

Cassettes $14.95

Combinations on disk:
2 for $24.95
3 for $39.95

ST·80D
by Lance Micklus

The STANDARD
in Smart Terminal
Programs for the TRS-80

(32K Disk)

$79.95

IMPORTANT

No sales tax •

All C.O.D.'s or special • delivery orders are a minimum of $5 for special handling

When ordering Percom • please add $5 each, packaging and handling fee.

PRICES DO NOT • INCLUDE SHIPPING

BUSINESS

Inventory II.2 by M. Kelleher and R. W. Robitaille, Sr. 16K disk systems $59.95

Inventory System II.3 by M. Kelleher. Improved version, $79.95

Inventory 'S' by Roger W. Robitaille, Sr. Level II, 16K Tape -$24.95; 32K Disk -$39.95

Payroll by Stephen Hebbler. For disk systems. 32K $59.95

Accounts Receivable II by S. Hebbler. 32K disk systems $79.95

Appointment Log by Michael Kelleher. Level II, 16K $9.95 Disk version, $19.95

General Ledger I by M. Kelleher, requires 32K Disk, $79.95

Mail List II by R. W. Robitaille, Sr. 32K disk systems $99.95

Small Business Bookkeeping by R. W. Robitaille, Sr. Level II, 16K. With journal -$22.00; Without journal - $15.00

UTILITIES

NEWDOS by Apparat $49.95

NEWDOS+ by Apparat $99.95

Machine Language Monitor by Small Systems Software. Level II, 16K $26.95

Three Monitors for Disk by Small Systems Software. Disk for 16 through 48K (all in one) $29.95

KVP Extender by Lance Micklus. Tape - $29.95; Disk - $34.95

KVP 232 by Lance Micklus - KVP adapted for the TRS-232. Tape - $29.95

ST80 Smart Terminal Level II, 16K $49.95

ST80D Smarter Terminal for disk systems. $79.95

Micro Text Editor by Don Coons. Level II, 4K or 16K $9.95

Text-80 by Frank B. Rowlett, Jr. For 32K disk systems $59.95

8080-Z80 Conversion Level II, 16K $15.00

Renumber by Lance Micklus. Level II, available in 16 through 48K (specify when ordering) $7.95

Renumber source listing $20.00

Electric Pencil by Michael Shrayer. Powerful machine language word processing system. Level II, 16K tape - $100; Disk version - $150

Level III BASIC by Microsoft. $49.95

Level I in Level II by Apparat. Level II, 16K $15.00

Fortran by Microsoft. 32K - 2 Disks. New low price $195.00

PERSONAL

Typing Tutor by Roger W. Robitaille, Sr. Level II, 16K $19.95

Secrets of the Tarot by John T. Phillipp. Level II, 16K $9.95

Biorhythms by Frank B. Rowlett, Jr. Level II, 4K $4.95

Personal Finance by Lance Micklus. Level II, 16K $9.95

Advanced Personal Finance by Lance Micklus for 32K disk systems $24.95

Home Financial Management by Michael Kelleher. Level II, 16K $9.95

HARDWARE ACCESSORIES

Cassettes boxes of ten each. C-10 - $6.50 plus $1.00 shipping
C-20 - $7.50 plus $1.00 shipping

Diskettes Dysan, (premium quality) box of 5 -$24.95 plus $1.00 shipping; nationally known brand, box of 10 - $34.95 plus $1

Diskette Storage Box $5.00

Floppy Armour™ Protective envelope for shipping floppy disks, 5-pack - $4.95 plus $1.00 shipping and handling

NEWDOS

Eliminate 90% of the hassle of a disk system by replacing your TRS-DOS with NEWDOS! faster, more reliable, many more features $49.95.

or

Add Superzap, Directory checks, other utilities. NEWDOS+ $99.95

PACKAGE PRICE $150

SEPARATELY:
MACRO ASSEMBLER $80.
FORTRAN $80.

HARDSIDE™

WANTED
Used TRS-80 equipment! We buy and sell used equipment. Call or write for details.

SAVE $167.

TRS-80 expansion interface with our 16K RAM, single PERCOM disk drives with cable, and NEWDOS operating system. $830.

SPECIAL

$669. TRS-80
16K, LEVEL II
NO KEYPAD.

MAGAZINES

SoftSide(monthly)

$18. 1 yr.,Bulk Rate
$30. 1 yr., Overseas Airmail
$25. 1 yr., First Class or Overseas Surface
$38. 6 mos. w/cassette $68. 6 mos. w/disk

PROG/80(bi-monthly)

$15. 1 yr., Bulk Rate
$22. 1 yr.,First Class or Overseas Surface
$27. 1 yr. Overseas Airmail

SoftSide's AppleSeed(monthly)

$15. 1 yr., Bulk Rate
$22. 1 yr., First Class

FREE!!

For more detailed descriptions of our software and accessories, send for the "TSE" catalog...it's FREE!

TRS 232 by Small Systems Hardware - $49.95

Percom Disk Drives Single or dual, for TRS-80's. Single drive -$399.00; Dual drive - $795.00; Cable required - $29.95

ASK ABOUT OUR FREE HARDSIDE CATALOG

TO ORDER (9AM - 5:30 PM, EST)

TOLL-FREE 1-800-258-1790

The Software Exchange

6 South Street, Box 68, Milford, NH 03055 603-673-5144

* A trademark of Radio Shack and Tandy Corp.

NOTES

Did you ever wonder what was going on in that large area of memory simply called "Reserved" in the Level II Memory Maps? Here is some of what it is up to....

- Address 40A4H points to the beginning of the BASIC program.
- Address 40F9H points to the end of the BASIC text and the start of simple variables.
- Address 40FBH points to the end of simple variables and the beginning of array variables.
- Address 40FDH points to the end of array variables and the start of free memory.
- Address 40A0H points to the lowest address available for string storage.
- Address 40B1H points to the highest address available for string storage. (Set by MEMORY SIZE, or search for end of RAM). Protected memory, if any, follows.

More neat places to go in ROM...

- A CALL to 260DH with the HL pair pointing to a variable name (A, FE, T1, etc.) will return with the DE pointing to the VARPTR for that variable. If the variable did not exist before, this routine will create it for you!

How many times have you whizzed past the NUMBER OF FILES query? It may be useful to know that each file for which you reserve space requires an additional 290 bytes of memory, and BASIC defaults to three files.

Did you know that if you are in command mode and ask for the value of a variable, that variable is created *even if it did not exist before*? Since BASIC assumes single precision, each time you ask for one it takes 7 bytes, unless a DEFSNG or DEFDBL has been done.

Bill Erdman and Lonnie Young of Maitland, FL gave us this program: When used as a subroutine, it produces a border around the screen using random characters. When line 12100 is changed to GOTO 12000, it produces a continuously changing border.

```
12000 REM ASC CHARACTER FRAME
12010 Y=RND(191)
12020 FOR X=15360+63 TO 15360 STEP-
  1:POKE X,Y: NEXT
12030 FOR X=15360 TO 16383 STEP 64: POKE X,Y:
  NEXT
12040 FOR X=15361 TO 16383 STEP 64: POKE X,Y:
  NEXT
12050 FOR X=15362 TO 16383 STEP 64: POKE X,Y:
  NEXT
12060 FOR X=15360+960 TO 16383: POKE X,Y:
  NEXT
12070 FOR X=16383 TO 15360 STEP-64: POKE X,Y:
  NEXT
12080 FOR X=16382 TO 15360 STEP-64: POKE X,Y:
  NEXT
12090 FOR X=16381 TO 15360 STEP-64: POKE X,Y:
  NEXT
12100 RETURN
```

Here is one given us by Bob Capstick. Placed immediately before an LPRINT statment, it will check the printer status, and if it is not ready (turned off, out of paper, or just not there), it will print to the video instead.

```
300 CLS: IF PEEK(14312) > 127 THEN POKE
  16422,88: POKE 16423,4
310 IF PEEK(14312) < 127 THEN POKE 16422,141:
  POKE 16423,5
```

If you have a long string of "IF-THEN" statements that all depend on the same condition, you can define a variable as having the value of -1, the IF-THEN will assume the "true" condition and a value of 0 will represent the "false" condition.

```
10 INPUT "ENTER Y/N";A$
20 IFA$="Y" THEN A=-1 ELSE A=0
30 IF A THEN 60
40 PRINT "LINE 40"
50 END
60 PRINT "LINE 60"
```

Want to make your USR(N) fully compatible both with Level II and Disk BASIC? Simply include the following code in your BASIC program. In this example, the address of the USR program is 7FF0.

```
100 IF PEEK(16396)=195THEN AD=23316 ELSE
    AD=16526
200 POKE AD,200: POKE AD+1,127
```

MODEL II NOTES

There are several new commands in Model II Basic. Here is one of them.. INPUT$ allows the programmer to define the number of characters that will be input from the keyboard. Example: A$=INPUT$(5) will input A$ from the keyboard, with a limit of 5 characters. Or.. A$=INPUT$(5,2) will input 5 characters from the keyboard and put them directly into sequential access buffer #2.

When setting up an "AUTO" function on the Model II disk, "BUILD" a "DO" file, and AUTO the DO file. Although the AUTO function cannot be over-ridden, the DO function can be stopped by the BREAK key.

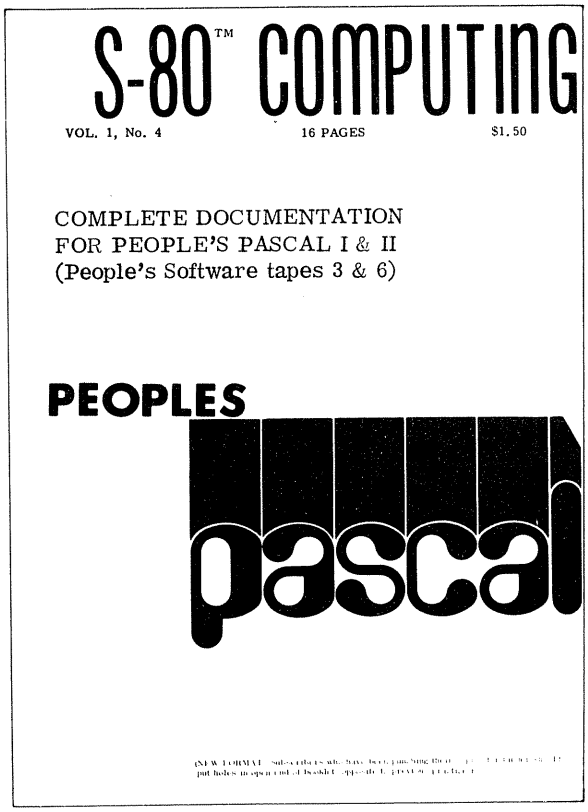
The "DIR" and "FREE" functions on the Model II do not require the use of the colon (:) before a drivespec. A space is all that is required.

The start of BASIC programs on the Model II is 6AA7H with zero files allocated, 6DE9H with one, 712BH with two, and so on, with each file taking 834 (342H) bytes.

There seems to be some problem with the RESET on the Model II not really being a total system reset. We have had several occasions where a reset did not clear a lock-up, and have had to completely power down to clear the condition.

Announcing-TINY PASCAL FOR TRS-80

Have you heard about the $15 Pascal compiler?



At last your TRS-80 can run Pascal too! The Chung/Yuen "tiny" Pascal is fully implemented for Level II TRS-80, 16K and up. You no longer need be left out of the growing group of Pascal users, because People's Pascal gives you everything you need to write structured Pascal programs:

- tiny Pascal compiler
- complete text editor for writing your programs
- complete tiny Pascal monitor
- sample Pascal programs
- user's manual

(TRS-80 Computing issue 1:4)

People's Pascal is both a powerful, structured language and "CPU expeditor". People's Pascal programs execute at least four times faster than Basic, and often eight-times faster! Special functions open up the complete graphic capability of TRS-80. You now have the means to write those dazzling, impressive, high-speed graphics programs that are great for games, plotting, statistics, etc.

For the serious computerist, side two of People's Pascal II (tape 6) contains a larger compiler and complete source to the compiler, written in Pascal! This means you can re-compile the compiler, making changes, adding features, etc. (but this will take at least 36K RAM and a solid knowledge of programming).

With the complete People's Pascal operating system, you can save and load both source (Pascal) programs, and compiled programs, to or from cassette tape. This means that once you have de-bugged a program, you can save the P-code (compiled program) and thereafter, to run the program, you need only load the super-fast P-code.

Here is a partial list of People's Pascal features: recursive procedure/functions • for (loop) • case if/then/else • one-dimensional arrays • write • read constant • repeat/until (loop) • "peek & poke" • plot (graphics for TRS-80)

DEALER INQUERIES INVITED

People's Pascal I (tape 3), is written in Basic, implemented for TRS-80 by John Alexander of Berwick Australia. It compiles more slowly and is harder to use, but includes instructions for converting to disk. People's Pascal II (tape 6) is entirely by the Chung/Yuen team and is a further development stage of their concept. Full documentation included.

Other People's Software tapes $8.

TRS-80 trademark
Tandy Corporation

---

computer information exchange, inc.
box 158 san luis rey ca 92068

amt. _____ encl.

PEOPLE'S SOFTWARE, includes 50¢ per tape postage/handling (via 1st class)

( ) Tape I Lev II 34 ass'td programs, or ( ) Lev I, 24, $8; $8.45 in CA
( ) Tape 2 Level II "Common Basic Programs", $8; $8.45 in California
( ) Tape 3 Level II PEOPLE'S PASCAL I, $15.50; $16.40 CA residents
( ) Tape 4 Level I, 17 assorted programs, $8, $8.45 CA residents (tax)
( ) Tape 5 Level II, 28 assorted programs, $8; $8.45 CA residents (tax)
( ) Tape 6 Level II, PEOPLE'S PASCAL II, $23.50; $24.88 CA residents

Make checks payable COMPUTER INFORMATION EXCHANGE

Charge my VISA ( ), MasterCharge ( ) #_____

_____(signed), expires _____

_____
name

_____
street address

_____
city, state, zip

Game Writing Techniques in BASIC

Using the Memory Mapped Keyboard & Video Display

Marty Zwilling, Lenexa, KS

Dr Bahn does an Anatomy on the program which accompanies this article - see page 48.

The TRS-80 has a design feature not universally found in microcomputers - - both the keyboard and the video display may be read or updated directly with Level II BASIC via PEEK and POKE instructions to absolute memory locations. That is, these facilities are mapped into real memory. This mapping, if understood, can be utilized to accomplish several powerful functions for any programming environment, but are especially useful in the design of games.

Some of the possible capabilities include:

1) Automatic "repeat" on any key held down by the user and detection of release.

2) Program detection and logic based on multiple keys depressed simultaneously.

3) High speed graphics on the video display.

4) Program logic based on comprehensive analysis of the current display output.

5) Use of a non-destructive cursor to indicate movement or user game position.

To illustrate the required programming techniques, I have written a simple game which incorporates the capabilities listed above. This game is called DOT-TO-DOT and may be played by either two real players, or one player against the computer, or in demonstration mode, the computer against itself. The game begins with a grid of dots, and each player may connect any two dots with a straight vertical or horizontal line during his turn. Play alternates, with the object of the game being to complete and claim as many square boxes as possible. The player who completes the fourth side of a square to form a box enters his initials in the box and claims that box. He then must take additional turns, until he draws a line which does not complete a box. The game is over when all dots are connected (all boxes complete and claimed), and the player owning the most boxes wins.

In this version of the game, each player makes his move by using one or more of the four arrow keys to move the cursor between the two dots he would like to connect and pressing the *ENTER* key. The program will then connect these two dots with a line and enter the player's initials in the box if a box were in fact completed. The program also indicates the player whose turn is active and his score in one of the upper corners of the screen. The final score and winner are displayed at the completion of the game.

Let us now look in detail at the programming techniques used to implement the five keyboard and video display techniques mentioned earlier.

First listed is a repeat function on any key held down. This function is similar to the power underline feature of many electric typewriters, in that holding the key down is equivalent to repeatedly hitting the same key. The repeating function stops when the key is released. This capability is not possible through the INKEY$ function of Level II BASIC, since it can detect only the single downward stroke on the key, and is insensitive to how long the key is held down.

The S-80 keyboard occupies memory locations 14336 to 15359, with key locations and values as shown in Table 1.

PROGRAM STORE (202) 337-4691

4200 Wisconsin Ave NW PO Box 9609 Washington D C 20016

Save time & space!

PACKER

by Cottage Software

This is the ultimate editing tool for BASIC program lines. There are five commands which allow easier reading of BASIC programs and more efficient execution by the computer.

The 'unpack' command breaks multiple statement lines into single statement lines with extra spaces for easier reading and editing. The 'short' command deletes any unnecessary words like LET and all REMarks.

The 'pack' commmand compresses lines into multiple statement lines up to the maximum length you specify while maintaining complete program logic. This can easily reduce the memory requirement by more than 33%! As you can imagine this also speeds up execution of a program, saves time in loading a program from either tape or disk and saves disk space.

And the 'move' command allows you to move any section of your program to a new location. With the 'renumb' command you can renumber your BASIC lines.

So if your programs need more memory, or you need more time, order your 'packer'! 16k, 32k and 48k versions supplied on two cassettes for $29.95.

KEYEDIT

by Phil Pilgrim from Discovery Bay

This machine language utility is for all users of either Level II or Disk BASIC. The functions give you auto-repeat on every key, screen-oriented editing, and debounce. In the editing mode, you just move the cursor to any position on the screen to instantly insert or delete. Plus, whole BASIC statements can be copied to other parts of the program.

You also get single keystroke entry. For example, just press <SHIFT> R to enter the word READ. And you can redefine the keys to any BASIC keyword.

In addition, the keyboard macro facility allows you to define any frequently typed pattern and then execute it with a single keystroke. This is especially great for DATA entry and other repetitive tasks.

Order the greatest keyboard utility yet! $18.95

DEBUG

by Bob Pierce from Quality

Single step your programs through RAM and ROM, with this relocatable machine language utility. Includes multiple breakpoints, option to execute CALLs in a single step and several display options. $14.95

DISASSEMBLER 1.2

by Roy Soltoff from Misosys & Acorn

This two pass Z-80 disassembler produces symbolic labels with output to either the video monitor, printer or tape. Radio Shack's Editor Assembler can load the tapes. If you own the Editor Assembler, complete the package with this program. Program on tape for two different memory locations. TRS-80 Level II ~~$19.95~~ NOW only $14.95

Morloc's Tower

from Automated Simulations

As Brian Hammerhand, you race to save the comely wench Imelda from the fireballs of Morloc the Mad. An exciting fantasy role playing game in the Dunjonquest tradition that started with "The Temple of Apshai" and continued with "Datestones of Ryn." This is the deadliest Dunjonquest yet! $14.95

"Datestones of Ryn" $14.95

"Temple of Apshai" $24.95

Supplied on disk for an additional $5 per program.

Dungeon

from Chameleon

A full fantasy & adventure where you create your character, choose from among 26 types of armor and 80 weapons, and search for fame and fortune. In each dungeon there are random events which occur, but skill most often determines the outcome. The program has many prompts and the twenty page, illustrated manual explains the game. Requires 32k and two disk drives. $34.95

Galactic Trader

by Douglas Carlston

Trade your way to a fortune in a three dimensional universe. You must barter, deal with the energy cartel and watch for spies. This is truly an outstanding computer game by the author of "Galactic Empire." $14.95

Also available "Galactic Empire" for $14.95

Air Flight

from Instant Software

Transform your TRS-80 into a cockpit full of elaborate controls. Take off, land and do acrobatics once you learn how to fly. $7.95

Air Raid

from Small Systems

Real-time, "shooting gallery" game which is better than the arcades. In machine language for excellent graphics and endless hours of fun. ~~$14.95~~ NOW only $9.95

Space War

by Device Oriented Games from Acorn

Two-player, real-time space battle lets each player control a spaceship with rotate, thrust, fire and hyperspace. Five game options (including gravity) and three speeds included. In machine language. $9.95

Calculator Plus

from Manhattan Software, Inc.

Turn your TRS-80 into a calculator. This program has optional printer features, performs all calculations in double precision and will chain and mix calculations. Optional dollar format. $9.95.

DDT

Disk Drive Timer

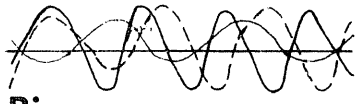
by Disco-Tech

Analyze and adjust your disc drive motor speed with real-time graphic display. Manual details use for Radio Shack, Shugart, MPI, Pertec, and Vista drives, but will work with any drive. All you need is DDT, two screwdrivers and five minutes. On disk for $19.95

STRUCTURED BASIC TRANSLATOR

by Gene Bellinger

Try structured programming. You can write programs using PROCEDURES, CALLS, CASE-CALLS, IF-THEN-ELSE, WHILE and UNTIL. Once written, SBT will quickly translate the structured code into an effecient BASIC program. Speeds up program development and documentation. The program is both fast (a 20k BASIC program in less than 4 minutes) and compact. Requires 32k and one disk drive. Supplied on disk for $29.95.



Biocurve

by Microflair from Hayden

Graph your biorhythms and calculate your critical days. Compare yours with a friend. $9.95

CREDIT CARD CALLERS MAY PHONE US 24-HOURS A DAY, OR CLIP THIS COUPON AND MAIL YOUR ORDER TODAY.

THE PROGRAM STORE
4200 Wisconsin Ave NW
PO Box 9609 Dept KR8
Washington, D.C. 20016

please send me these TRS-80 programs:

title	price
postage:	$ 1.00
total:	

name: _____

address: _____

city, state _____

& code _____

Check payable to The Program Store

MASTERCHARGE mc bank code:

VISA exp date:

card number:

signature:

Value	1	2	4	8	16	32	64	128
Address 14337	@	A	B	C	D	E	F	G
14338	H	I	J	K	L	M	N	O
14340	P	Q	R	S	T	U	V	W
14344	X	Y	Z					
14352	0	1	2	3	4	5	6	7
14368	8	9	*:	+;	<,	=-	>.	?/
14400	ENTER	CLEAR	BREAK	↑	↓	←	→	SPACE
14464	SHIFT							

Table 1

From the table we can see that when the "A" key alone is depressed, location 14337 will contain the value 2. If multiple keys assigned to the same location are held down, the values are additive. Thus if "A" and "B" are both down, location 14337 will contain 2 + 4, or 6.

Using the Level II BASIC PEEK command, the keyboard activities may be read directly from this memory map. This approach is not only more powerful, but much faster than INKEY$. For example, a statement to detect that the *ENTER* key has been hit is as follows:

```
100 IF PEEK (14400) = 1 THEN 200
```

To identify specific keys when more than one has been hit, simply use the AND function of BASIC:

```
620 W = PEEK(14400)
630 IF W AND 8 THEN U=-64:GOSUB    1030
640 IF W AND 16 THEN U=64:GOSUB    1030
650 IF W AND 32 THEN U=-1 GOSUB    990
660 IF W AND 64 THEN U=1:GOSUB     990
```

These statements from DOT-TO-DOT are used to process all combinations of the four arrow keys being held down. One of the keys alone will cause the cursor to move right, left, up or down. If the right arrow and the Up arrow are simultaneously held down, the cursor will be moved diagonally up and to the right.

These statements are included in a processing loop which will move the cursor one increment in any direction for each pass through the loop. Thus if the keys are held down, the movement will repeatedly occur with a single keystroke. Also the logic is able to handle multiple keys held down in any sequence.

A final note on programming the repeat function - a small delay loop may be required between repeats to allow the user enough time to lift his finger and stop the function without overrun:

```
610 IF PEEK(14400)=W THEN FOR J=1 TO 200:NEXT
```

Since "W" contains the value during the last pass through the repeat loop, this statement slows down the repeat, but allows a quick initial response when the key is pressed.

Although not shown in Table 1, other memory locations are available to test specific keyboard conditions. For example, the following statement will cause a pause until any key is pressed:

```
100 IF PEEK(14336+255)=0 THEN 100
```

Or you may check for any alphabetic character:

```
100 IF PEEK(14336+15)=0 THEN 100
```

See the "TRS-80 Microcomputer Technical Reference Handbook" for more information on keyboard memory mapping.

The video display is memory mapped into locations 15360 to 16382. These locations may be read with the PEEK instruction, or updated via POKE to change the screen display. A simple way to relate the screen location addresses to memory addresses is to always add 15360 to the screen location.

Much has already been written about high speed graphics using the POKE instruction and PRINT STRING$ (*See "The Great Turn On", 80-U.S. Jul-Aug 1979*), so I will not elaborate further on these capabilities. DOT-TO-DOT uses these functions to establish an initial grid and frame in about 2 seconds, versus many seconds using the SET command.

In addition, DOT-TO-DOT uses PEEK logic extensively to deduce when a square has been completed, whether or not a line already exists between two points, and in calculating the best move for a computer turn. This approach simplifies logic and saves memory otherwise necessary to record game status. It allows the computer to "think" in much the same way that you might in this game, i.e., visually analyzing the screen patterns for an optimal move. See statements 1400 to 1440 for examples of this logic.

DOT-TO-DOT also uses the cursor to indicate a player's position. The cursor is actually the underline character with an ASCII code of 95. This character is normally used by BASIC to indicate INPUT mode and the position of the next character to be entered. It can otherwise be made to appear, for example, at screen position 400, by printing control code 14 as follows:

```
100 PRINT@400,CHR$(14);
```

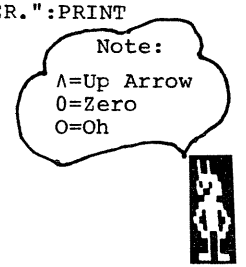
It may correspondingly be turned off with control code 15:

```
100 PRINT CHR$(15);
```

Be careful to issue no other PRINT statements with the cursor turned on, as this will confuse BASIC and cause an additional cursor character to appear after each line printed. Additional data may be displayed using the POKE instruction. If the cursor is displayed over an existing character, the original character will disappear until the cursor is again turned off.

In summary, I have found that the TRS-80 keyboard and display memory mapping can be used to improve the useability and speed of BASIC programs without reverting to machine language. Most of the programming techniques described can be used in any environment, but they are particularly appropriate for games and graphic displays.●

```
10 CLEAR100:DEFINT A-H,J-N,R-Z:DIM M(63,3)
20 REM * COPYRIGHT 1979 MARTY ZWILLING *
30 CLS:PRINT@20,"D O T - T O - D O T"
40 PRINTTAB(20);"------  ----  ------":PRINT
50 PRINT"THE OBJECT OF THIS GAME IS TO CLAIM AS MANY BOXES";
60 PRINT" AS POSSIBLE.":PRINT
70 PRINT"EACH PLAYER IN TURN IS ALLOWED TO ";
80 PRINT"CONNECT ANY TWO ADJACENT DOTS WITH A VERTICAL OR";
90 PRINT" HORIZONTAL LINE.  IF THIS LINE COMPLETES THE";
100 PRINT" FOUR SIDES OF A SQUARE BOX, THEN THAT PLAYER OWNS";
110 PRINT" THAT BOX AND  HIS INITIALS ARE PLACED IN IT.  EACH";
120 PRINT" TIME A BOX IS COMPLETED,   AN ADDITIONAL TURN IS";
130 PRINT" ALLOWED FOR THAT PLAYER.":PRINT
140 PRINT"THE GAME IS OVER WHEN";
150 PRINT" ALL DOTS HAVE BEEN CONNECTED, AND THE"
160 PRINT"WINNER IS THE PLAYER WHO OWNS THE MOST BOXES.":PRINT
170 PRINT:INPUT"PRESS ENTER TO CONTINUE";Z$
180 CLS:PRINT"TO INDICATE YOUR CHOICE OF DOTS TO BE CONNECTED";
190 PRINT", SIMPLY PRESS   ONE OR MORE OF THE FOUR ARROW KEYS";
200 PRINT" (^";CHR$(92);CHR$(93);"-";CHR$(94);") UNTIL ";
210 PRINT"THE CURSOR     (UNDERLINE) IS POSITIONED BETWEEN ";
220 PRINT"THE DOTS YOU WANT CONNECTED.  HOLD THE KEY DOWN FOR";
230 PRINT" REPEAT MOVEMENT.  THEN PRESS THE ENTER    ";
240 PRINT"KEY AND THE LINE WILL BE DRAWN.":PRINT
250 PRINT"YOUR TURN CONTINUES AS LONG AS YOUR INITIALS AND";
260 PRINT" SCORE APPEAR ATTHE TOP OF THE SCREEN.  THE ";
270 PRINT"COMPUTER WILL AUTOMATICALLY KEEP    SCORE AND PLACE";
280 PRINT" YOUR INITIALS IN EACH BOX WHICH YOU COMPLETE."
290 PRINT:PRINT"NOTE:"
300 PRINT"    IF YOU WISH TO PLAY AGAINST THE COMPUTER, TYPE";
310 PRINT" THE INITIALS     ";CHR$(34);"TRS";CHR$(34);
320 PRINT" FOR ONE OF THE PLAYERS OR HIT ENTER.":PRINT
330 INPUT"ENTER INITIALS OF PLAYER #1";A$
340 IF A$="" THEN A$="TRS":T=1
350 INPUT"ENTER INITIALS OF PLAYER #2";B$
360 IF B$="" THEN B$="TRS"
370 IF A$="TRS" AND B$="TRS" THEN B$="TRX"
380 IF A$=B$ THEN PRINT"TRY AGAIN":GOTO350
390 REM * BUILD THE DOT MATRIX *
400 CLS:G=15360:J=1:I=543.5:Q=479.5
410 FOR M=G+64 TO G+832 STEP 128
420 FOR N=0 TO 62 STEP 7
430 POKE M+N,140:M(J,2)=M+N:J=J+1:NEXT:NEXT
440 PRINT@64,CHR$(188);STRING$(62,140);CHR$(188);
450 PRINT@960,CHR$(143);STRING$(62,140);:POKE G+1023,143
460 FOR J=128 TO 896 STEP 64
470 PRINT@J,CHR$(191);:PRINT@J+63,CHR$(191);:NEXT
480 REM * SET INITIAL VALUES FOR FRAME *
490 FORJ=1TO9:M(J,1)=1:NEXT:FORJ=55TO63:M(J,1)=1:NEXT
500 FORJ=1TO63STEP9:M(J,1)=M(J,1)+1:M(J+8,1)=M(J+8,1)+1:NEXT
510 REM * SET AND DISPLAY ACTIVE PLAYER AND SCORE *
520 PRINT@0,CHR$(30);TAB(17);"***  D O T - T O - D O T  ***";
530 IF C$=A$ THEN C$=B$:C=54:D=B ELSE C$=A$:C=0:D=A
540 S=0:PRINT@C,C$;" - ";D;
550 IF C$="TRS" OR C$="TRX" THEN GOSUB1130 ELSE T=0
560 IF A+B=63 THEN 880
570 REM
580 REM * MAINLINE CURSOR MOVEMENT LOOP *
590 REM
600 O=I:PRINT@I,CHR$(14);
610 IF PEEK(14400)=W THEN FOR J=1TO200:NEXT
620 IF T THEN GOSUB1070 ELSE W=PEEK(14400)
630 IF W AND 8 THEN U=-64:GOSUB1030
640 IF W AND 16 THEN U=64:GOSUB1030
650 IF W AND 32 THEN U=-1:GOSUB990
660 IF W AND 64 THEN U=1:GOSUB990
670 REM * LOOK FOR DOT-TO-DOT VERTICAL *
680 I%=I/64:IF I%/2=INT(I%/2) THEN V=1 ELSE V=0
690 REM * LOOK FOR DOT-TO-DOT HORIZONTAL *
700 O%=I-I%*64:H=0
710 IF O%/7<>INT(O%/7) AND O%>1 AND O%<64 THEN H=1
720 REM * HAS ENTER KEY BEEN DEPRESSED AT VALID SPOT *
730 PRINT@O,CHR$(15);:IF PEEK(G+I)>95 THEN 600
740 IF (V AND H) OR (V=0 AND H=0) OR W<>1 THEN 600
750 REM * DRAW HORIZONTAL OR VERTICAL LINE *
760 IF V=1 THEN PRINT@I,CHR$(191);:J=I-71 ELSE 790
770 Z=G+I:POKE Z-64,PEEK(Z-64)+48
780 POKE Z+64,PEEK(Z+64)+3:X=1:GOTO800
790 PRINT@I-2.5,STRING$(6,140);:J=I-131.5:X=9
800 REM * CHECK FOR BOX COMPLETION *
810 FOR L=1 TO 63:IF M(L,2)<>J+G THEN NEXT
820 Q=0:FOR L=L TO L+X STEP X
830 M(L,1)=M(L,1)+1:GOSUB1380
840 IF M(L,1)<>4 THEN 870 ELSE M(L,1)=5
850 PRINT@M(L,2)-G+69-LEN(C$),C$;:D=D+1
860 S=1:IF C$=A$ THEN A=D ELSE B=D
870 NEXT:IF S THEN 540 ELSE 520
880 REM * END OF GAME - DISPLAY WINNER *
890 CLS:PRINT@20,CHR$(23);"SCORE":PRINT
900 PRINTA$;" HAS SCORE OF ";A
910 PRINTB$;" HAS SCORE OF ";B:PRINT
920 IF A>B THEN C$=A$:D=A
930 IF B>A THEN C$=B$:D=B
940 IF B=A THEN PRINTTAB(10);"TIE GAME!!!":GOTO960
950 PRINTTAB(5);C$;" IS THE WINNER!!!"
960 PRINT:PRINT:INPUT"WOULD YOU LIKE TO TRY AGAIN";C$
970 IF C$<>"NO" THEN RUN ELSE PRINT"THANKS FOR THE GAME..."
```



```
980 END
990 REM * MOVE CURSOR LEFT OR RIGHT *
1000 P=I:I=I+U*3.5
1010 IF INT(I/64)<>INT(P/64) THEN I=I-66.5*U
1020 RETURN
1030 REM * MOVE CURSOR UP OR DOWN *
1040 I=I+U:IF I<64 THEN I=I+960
1050 IF I>1023 THEN I=I-960
1060 RETURN
1070 REM * MOVE TOWARD THE LINE TO COMPLETE *
1080 IF I=Q THEN W=1:RETURN
1090 IF I>Q THEN M=8:N=32 ELSE M=16:N=64
1100 IF INT(I/64)<>INT(Q/64) THEN W=M ELSE W=N
1110 RETURN
1120 REM * FIND LINE FOR TRS-80 TO COMPLETE *
1130 T=1:FOR L=1 TO 63:M(L,3)=0
1140 IF M(L,1)<>3 THEN 1190 ELSE N=M(L,2)
1150 IF PEEK(N+3)=32 THEN Q=N+3.5-G:RETURN
1160 IF PEEK(N+64)=32 THEN Q=N+64-G:RETURN
1170 IF PEEK(N+71)=32 THEN Q=N+71-G:RETURN
1180 IF PEEK(N+131)=32 THEN Q=N+131.5-G:RETURN
1190 GOSUB1380:NEXT:IF Q>0 THEN RETURN
1200 REM * ELSE GIVE AWAY FEWEST POINTS *
1210 U=99:FOR L=1 TO 63:K=0:E=L
1220 IF M(L,1)<>2 OR M(L,3)=1 THEN 1260 ELSE N=M(L,2)
1230 IF PEEK(N+131.5)=32 THEN H=0:V=1:P=N+131.5:GOSUB1280
1240 IF PEEK(N+71)=32 THEN H=1:V=0:P=N+71:E=L:GOSUB1280
1250 IF K>0 AND K<U THEN Q=P-G:U=K
1260 M(L,3)=1:NEXTL:RETURN
1270 REM * MOVE SIDEWAYS OR UP AND DOWN *
1280 IF V=0 THEN 1330 ELSE E=E+9*V
1290 IF M(E,1)<2 OR M(E,3)=1 THEN RETURN
1300 IF PEEK(M(E,2)+64+64*V+3.5)=32 THEN 1320
1310 IF PEEK(M(E,2)+64)=32 THEN H=-1:V=0 ELSE H=1:V=0
1320 M(E,3)=1:K=K+1:GOTO1280
1330 E=E+1*H:IF M(E,1)<2 OR M(E,3)=1 THEN RETURN
1340 IF PEEK(M(E,2)+67.5+3.5*H)=32 THEN 1320
1350 IF PEEK(M(E,2)+3.5)=32 THEN V=-1:H=0 ELSE V=1:H=0
1360 GOTO1320
1370 REM * FIND A SAFE MOVE FOR TRS *
1380 IF Q>0 OR M(L,1)>1 THEN RETURN ELSE N=M(L,2)
1390 ON RND(4) GOTO 1400,1410,1420,1430
1400 IF PEEK(N+3)=32 THEN IF M(L-9,1)<2 THEN Q=N-G+3.5:RETURN
1410 IF PEEK(N+64)=32 THEN IF M(L-1,1)<2 THEN Q=N-G+64:RETURN
1420 IF PEEK(N+71)=32 THEN IF M(L+1,1)<2 THEN Q=N-G+71:RETURN
1430 IF PEEK(N+131)=32 THEN IF M(L+9,1)<2 THEN Q=N-G+131.5
1440 RETURN
```

Anatomy of the program "DOT-TO-DOT"

R C Bahn

I. SUMMARY

Several TRS-80 hardware dependent BASIC language programming techniques for rapid interactive graphics are illustrated by means of a program for the game "DOT-TO-DOT". These include: 1. a mechanism for automatic "repeat" on any keyboard selection, 2. high speed video graphics, 3. program logic based on analysis of the video display and, 4. the use and keyboard control of the non-destructive cursor to aid in the interactive modification of the video display. The programming techniques are based upon 1. the hardware feature of mapping of the keyboard and the videoscreen into real memory and, 2. the facility in Level II BASIC to query these memory addresses by means of the PEEK statement or modify the memory addresses by means of the POKE statement.

II. INTRODUCTION

The program has been divided into 21 modules or subdivisions. In the following commentary, the inclusive lines of each module are indicated. Each module consists of several lines of BASIC code. When a specific line consists of more than one BASIC statement, the line will be subdivided into sublines. A subline will be delineated in the commentary as well as in the program by a colon (:). Thus in the commentary, 10:3 means the third statement of line number 10. In the program, this is the dimension statement: DIM M(63,3).

On your listing of the program or a photocopy, it may be of value to draw a dark line *after* the following line numbers to indicate the extent of each module. The last line numbers of modules are: 10, 170, 320, 380, 470, 500, 570, 660, 680, 710, 790, 870, 980, 1020, 1060, 1110, 1190, 1260, 1360 and 1440. You should note that for most modules, the first line of the module consists of a REMARK statement indicating the function of the module

III. LINE-BY-LINE COMMENTARY

(See page 49)

IV. PROGRAM DEBUGGING

To run this program on your computer only demands a perfect replication of the program listing. This means an exact duplication of every statement. Do not neglect any detail. Every punctuation mark performs a function! Careful proof reading of your program is your best tool.

The understanding of the program is a much more complex task. It begins with a familiarity with the BASIC statements used in the program. A knowledge of the control, ASCII, and graphics codes is necessary. These appear in the Level II Reference Manual

The concepts of memory mapping can be learned from the accompanying article by M Zwilling and by reference to the "TRS-80 Microcomputer Technical Reference Handbook".

Finally, the logic of the program is so dynamic that real understanding will only develop is you experiment with the program by observing how various variables such as M(I,J), I, Q, O, W, V, H, T, change during execution of the program. This can be done by the placement of PRINT@ statements within the program which display the current value of appropriate variables. If one were to study Z, G and I at line 770 the following line could be inserted:

775 PRINT@ 960,"Z=";Z;"G=";G;"I=";I;

LINE:SUBLINE	COMMENT
10	Module #1, initialization of the program.
10:1	Clear string space; this should occur early in the program prior to dimensioning and declaration of variable names and values.
10:2	All variables beginning with A-H, J-N, R-Z will be considered to be integers.
10:3	The first dimension of the array called M can assume values in the program of 0 - 63, the second dimension of M can assume values of 0 - 3. The appropriate space will be reserved in memory.
20-170	Module #2, first page of video directions.
20	A remark which will be disregarded by the interpreter at the time of execution of the program. If one can afford the space in memory, well written remarks enhance the comprehension of any program.
30:1	Clear the screen and reset the cursor at the home position.
30:2	Print message starting at screen position 20. Note comma following 20.
40:1	Since no punctuation occured at the end of the previous line, start a new line, shift to right 20 positions and print message. This statement underlines previous video output. Absence of terminating comma (,) or semicolon (;) causes cursor to go to beginning of next line.
40:2	Isolated PRINT advances cursor to next line with no message printed.
50	PRINT message but terminating semicolon(;) causes next output to continue on same line.
60:1	Finish line and send cursor to next line.
60:2	Skip a line.
70-160	Additional print statements. Note use of semicolons, isolated PRINT statements and use of blanks within messages to format the screen and prevent the breakage of words at the right margin.
170:1	Skip a line.
170:2	The screen is full. Pause to allow the user to read the screen. Z$ is a dummy variable.
180-320	Module #3, second page of video instructions.
180:1	Clear the screen.
180:2	Start message at screen position zero, but do not terminate the line. Note semicolon at end of line.
190:1	Continue previous line of video output. Note that spaces between PRESS and ONE coincide with the end of video line zero and the beginning of video screen line 1.
200	Only the up-arrow can be printed directly from the keyboard. The ASCII codes of the other arrows are 92, 93, 94. These may be printed by the CHR$( ) statements.
210-320	Additional variations of PRINT statements.
330-380	Module #4; this module allows for the entry of the player's names. Note the construction of modules 1 and 2. They consist primarily of PRINT statements. When the program is executed each line and subline is executed in order. There is one entrance to the module and one exit from the module. In contrast, module 3 consists of two INPUT statements at lines 330 and 350 and the remaining statements begin with IF. Two string variables are defined. They are A$ and B$ and are the players initials. The implication is that they will be no more than 3 characters in length. These variables will be used later in the video display. Another variable, T, is also defined. There is still only one entrance and one exit from the module despite the GOTO statement in line 380. Note that program flow remains within the module if the GOTO branch is utilized.
330	Note the punctuation of the INPUT statement. The video screen prompting message appears between the double quote marks. The expected keyboard input, in this case a string variable named A$, is preceded in the statement by a semicolon. The program will wait until the user hits ENTER.
340:1	If no keyboard entry is made, TRS will be the first player.
340:2	T is set to +1. T is the "turn flag" and appears in lines 550, 620 and 1130. T assumes a value of 0 or 1.
350	Similar to line 330.
360	Similar to line 340.
370	If both initials are TRS change B$ to TRX.
380	If both initials are not both TRS but are the same, the program branches back to line 350 for correction.
390-470	Module #5 builds the video screen display which consists of an array of dots. Note one entrance, one exit, two loops (410-430 and 460-470), two PRINT statements, and one POKE.
390	Remark.
400:2	Initialize G; G is the decimal address of the first position of the video display within memory.
400:3	Initialize J.
400:4	Initialize I.
400:5	Initialize Q.
410-420	Set up a loop which will place "dots" in an array on the video screen.
430	POKE the appropriate graphics character (140) into the desired position in memory which maps the video screen. The "dot" immediately appears on the screen. Initialize M(J,2) with appropriate screen addresses (see 480-500).

440-470	Print white outline around array of dots. Horizontal lines first (440, 450), then vertical boundaries (460, 470). The boundaries and the "dots" define a playing region of 63 squares (7 X 9).
480-500	Module #6. Internal bookkeeping is necessary in array M (63,3). Initialize M(J,1). M(J,2) was previously initialized with video addresses.
510-570	Module #7. Set and display active player and score.
510-520	Print heading of display.
530	Determine who is current player, A$ or B$, and proper position for printing initials (C).
540	Print initials (C$) at C along with the current score (D).
550	If the next turn is assigned to "TRS", then go to subroutine at 1130 (module 8) else set T to zero.
560	If all 63 of the squares are filled go to the end of the game (module 14).
580-660	Module #8. Main line cursor movement loop.
600	I is current position of cursor. Save I in O. Turn on cursor at position I.
610	Look at keyboard map (14400). If the previous key is still depressed, go into timing loop.
620-660	Move cursor according to direction of depressed key. Consult prior program description for logic of keyboard mapping.
670-680	Module #9. Look for a vertical. A vertical is present if I% is an even number. This is true when I is exactly divisable by 128.
690-710	Module #10. Look for a horizontal. A horizontal is present if O% is not exactly divisible by seven and is within the limits of 1 to 64.
720-740	Module #11, validation of entry.
730:1	Turn off cursor at position 0.
730-740	Error conditions recycled to line 600.
750-790	Module #12, drawing routine.
760-780	Routine for vertical printing by PEEK, POKE mechanism.
790	Routine for horizontal printing via STRING$ statement.
800-870	Module #13, box completion routine.
810	M(L,2) contains screen addresses; go through list to find addresses of present box.
820	End of L loop is line 870.
830:1	Update M(L,1).
840	Check M(L,1) for completion (M(L,1)=4)
850	Print appropriate name in completed box.
880-980	Module #14. End game routine.
890:2	This print statement converts to 32 character mode (CHR$(23)).
890:3	Note use of PRINT to skip line.
900-910	PRINT names of players and scores.
920-930	Determine winning score and winner.
940	Take care of case of tie. Can there be a tie with two players and an odd (63) number of blocks? The routine is needed in general in games to exhaust all possibilities of outcome.
950	Print name of winner.
960-980	End routine.
990-1020	Module #15. Move cursor left or right. This routine computes current correct position of cursor (I). No direct result of this module is apparent on the screen. This module is called from module 8.
1030-1060	Module #16. Moves cursor up or down. See previous comment.
1070-1100	Module #17. Moves toward line to complete by establishing correct current values for W (line 1080,1100) through the intermediate values of M and N (line 1090).
1120-1190	Module #18. Find line for TRS to complete.
1130:1	T is set to 1 to flag turn for TRS.
1130:2	Loop ends at line 1190:2.
1190	Potential next move if M(L,1) does not equal 3 or the value in any of the four positions tested (lines 1150-1180) do not equal 32. If Q = 0, program flow continues to line 1200.
1200-1260	Module #19. Minimize give-away.
1210:1	U initialized to large value.
1210:2	End of L loop is line 1260.
1210:3	Note use of E to store present index of loop.
1220-1260	Your own visual scan of the screen to identify small areas of contiguous blocks is much more efficient than the algorithm available to the computer. The logic of this part of the program is complex. Nevertheless, if you observe several games of TRS vs TRX you may find perfect play by the computer at this stage is yet to be achieved.
1270-1360	Module #20. Move sideways or up and down. This subroutine links with lines 1230, 1240 of module 19. Tests of M(E,1) and M(E,3) are done for state of completion of boxes and the four possible directions of movement are tested for next move(1300, 1310, 1340, 1350). M(E,2) contains address of indexing position of boxes on video screen.
1370-1440	Module #21. Save move for TRS. Module 21 is called from module 13 and 18.
1390-1440	Given a potential position, examine at random (line 1390) a nearby line in one of the four possible directions (lines 1400-1430).
1400-1430	Note form of IF statement for testing of sequential logic.

realsoft™ PROGRAM STORE

(202) 337-4691

4200 Wisconsin Ave.NW PO Box 9609 Washington D C 20016

Can you hear your TRS-80*?

Add sound to your computer

Soundware

by CAP Electronics

Though sound is not normally present on the TRS-80, you can add it by attaching a speaker-amplifier to the AUX cassette cable. Just as the computer generates sounds for the recording of programs on the cassette recorder, with the right software you can generate a variety of sounds in your programs.

This cassette contains three programs. These are Basic programs which POKE a machine language subroutine into high memory. The first program demonstrates possible sounds like bird chirps, sirens, chipmunks, bounces, bombs, music and more. The second program lets you experiment with the sound routine to make your own sound effects. And the third will allow you to add the sound routine to your own programs.

Let your TRS-80 sing!

Cassette $14.95

Cassette w/ speaker-amp $29.95

*TRS-80 is a trademark of Tandy Corp

Best of CLOAD

from CLOAD Magazine

Several programs are published each month in CLOAD magazine. The best 9 programs from the first six issues are now available on one cassette and it includes printed listings of each program. Now you can run FLAGS, YTM, SAND, KNIGHT, POOL, Y=mX+b, BREAK, PINBALL & JUKEBOX. For Level I or II. $9.95

Mail File

from Galactic Software

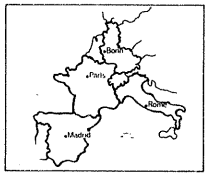
A professional mailing list program requires thorough documentation and support by the publisher. Galactic Software provides 30 pages of documentation in a three ring binder and updates to registered owners.

The program will sort over 600 records on a single diskette in seconds! Not minutes. Not hours. Retrieval is in either alphabetic or zip code order plus other criteria. Labels are printed in either standard or unique user defined label formats.

Each record consists of name, address, phone, and category codes. With the proper codes, thousands of sublists are possible. And, editing is simple.

A complete package on disk for $99.00.

For TRS-80 Model II $199.00



Language Teacher

by Cindy and Andrew Bartorillo

Learn a foreign language with the aid of your computer. This advanced, language teaching program contains in excess of 500 phrases, 800 word vocabulary and 1600 verb conjugation forms. Switch between the foreign language to English and English to the foreign language. Print multiple choice question and answer test. So complete it had to be put on disk and requires 32k of memory. The choice is yours.

FRENCH $19.95 ITALIAN $19.95

GERMAN $19.95 SPANISH $19.95

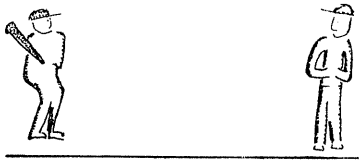
Batter Up!!

by Karl Savon from Hayden

Start the baseball season now!

This two player game lets you and a friend pitch and bat. In the game the pitcher decides when to release the ball. Then the batter decides when and how to swing at the pitch. You actually see the pitcher winding up and throwing, the pitch sailing in towards the batter, and the batter swinging. If there is a hit, the display shows the fielder trying to catch it. If it gets by the fielder, the advancing base runners are displayed. And the game scoreboard keeps track of the vital statistics.

No peanuts included. $10.95.



Wordo

by K Pfeiffer from Micro-Fantastic

Challenging word game where you try to determine one of the over a thousand words. One or two players. $14.95

Atlantis & Enchanted

by Greg Hassett from Mad Hatter

Two new Adventures. Discover the lost world of Atlantis or the mysteries of the Isle.

Atlantis. $12.95

Enchanted Isle. $12.95

Air Mail Pilot

from Instant Software

Fly into the early days of aviation history. With only 26 gallons of fuel you attempt to land in Chicago after leaving far off Columbus, Ohio. $7.95

Dr. Chips

from The Software Association

The fascinating program based on the famous "Eliza" and "Doctor" programs. Simply talk with Dr. Chips who will immediately analyze your sentences and talk back to you. Though not to be taken too seriously, Dr. Chips makes good conversation. $14.95

Editor/Assembler PLUS

by Chamberlin and Yates from Microsoft

The "PLUS" in assembly language programming has arrived. If you have reached the limits of editor/assembler or were always a little awed by assembly, then Microsoft's version is for you. You not only get the features found in their Radio Shack version, but also included are the debugging features of TBUG and more. This will make your programming, editing and debugging easier, more efficient and more enjoyable.

The 80 page reference manual describes all the features. These include the macro facility, assembly directly into memory, condtional assembly, the additonal expression evaluators, automatic origin, alphabetic symbol table and the quash command. Additional editor commands and the new debugger are also fully explained.

For 16k tape system $29.95

Disk based system to be announced.

PRINT to LPRINT

from Cottage Software

Ever want to change every PRINT to LPRINT? Or vice versa? This machine language utility will modify any program in seconds. Make full use of your computer. $8.95

MLUP 1

from Disco-Tech

Six machine language routines with complete and thorough documentation. Add both keyboard debounce and repeat, upward scrolling, and downward scrolling. The formatted input routine provides specified field length, screen location and data input. The shift and delete, and the shift and insert routines add even greater editing capability to the TRS-80. $24.95

BASIC-1P

from Small System Software

This program provides full Level I BASIC capablity in any Level II, 16k TRS-80. Plus it adds the printing commands of LPRINT and LLIST so you can now list your programs and control your printer from Level I BASIC. Two new commands, LPRINT ON and LPRINT OFF allow you to print anything that is displayed on the screen. Using only 4k of RAM, you have 12k for your Level I programs. Any Level I BASIC program or data tape may be used without conversion. All commands and abbreviations supported. $19.95

THE PROGRAM STORE
4200 Wisconsin Ave NW
PO Box 9609 Dept KR7
Washington, D.C. 20016

YES please send me these TRS-80 programs:

title	price
postage:	$ 1.00
total:	

name: _____

address: _____

city, state

& code _____

☐Check payable to The Program Store

☐MASTERCHARGE mc bank code:

☐VISA exp date:

card number:

signature:

APL

APL/360 (A Programming Language on the 360) - An on-line version of a subset of Iverson's language on IBM 360 systems.

George Blank, Milford, NH

Since leaving the quiet of my western Pensylvania pastorate, a significant portion of my living comes from reviewing software for publication by The Software Exchange. Most of the time I have to use a pretty crass standard of judgement: "Does it work and will it sell?". Only rarely can I ask: "Is it significant?"

When Phelps Gates first submitted APL for the TRS-80, my reaction was that it would be neat to know another language, but I had no idea how to tell whether it was a good implementation or not. I suspected not, for the author expressed a desire to sell it for $14.95, and you expect a price tag of $200 for a good language. So I wrote back and said: "That's nifty! What does it do?"

Phelps responded by recording a series of programming lessons on a disk with APL. Two minutes after receiving the mail, I was programming in APL. Five minutes later I was saying: "Wow!". By that time I was doing array arithmetic, and I had never seen anything like it before. I was hooked. I reached for the telephone to call the author.

After dealing with a lot of people who wanted each sale of their program to generate riches, I found a person who wanted to convert others to his favorite language, and who wanted to do it by offering an undeniable bargain. He insisted that the basic price for the language be $14.95, and that is what the 16K tape version sells for, even with a 20 page typset manual that explains the language!

I managed to convince him that a lot of people would underestimate the value of the package at that price, and we designed another package that is still a bargain at $49.95; an enhanced disk version of the language, with the ability to save and load workspaces to

MICROMATIC SYSTEMS INC.

YOUR CANADIAN SOFTWARE SUPPLIER
101 - 8136 Park Road Richmond, BC Canada V6Y 1T1
(604) 270-1532
"Official Canadian Distributors for The 80-US Journal"

WE STOCK
Apparat NEWDOS+ - $119.95
Racet Computes Utilities
80-US Journal - 80-US Software
+ an unlimited selection of business & home application software for the TRS-80

Order by mail, phone or in person - cash, VISA & Mastercharge accepted.

disk and output to a printer, with the manual and four full workspaces of lessons giving an introduction to the language, plus an excellent $16 beginners textbook on APL. For those who already have "APL: An Interactive Approach" by Gilman and Rose, the package is also offered without the book at $34.95. Because we could not get a real discount on the book, and it is big, it is necessary to ask $3 for postage for the package with the book.

What is APL? The language is a very interactive one. You write functions instead of programs, and everything you do is evaluated in real time. For example, if you define a function called "Hypotenuse" to calculate the hypotenuse of a right triangle and you type "3 hypotenuse 4", the screen will immediately display a 5, the solution to the function.

Mathematically, the language is very elegant, and a favorite pastime among APL programmers is to write the most exotic program in a single line. With line length limited to 60 characters, that is a feat! Special features include powerful array and vector manipulation abilities, and modulo arithmetic. For example, any cryptographers in the crowd would want to try modulo 26 arithmetic, using a number base system that gives you a separate number for each letter of the alphabet. The language is also incredible for digital design, with single key commands including AND, OR, NOT, and other logic operators.

Response to the program has been fantastic, and the comments have been favorable. One man sent in a function that he used to calculate the factorials of the first 100 numbers, including all 158 digits of the factorial of 100. (You get thaat by multiplying 1 X 2 X 3 X 4...X 98 X 99 X 100)

APL uses the arithmetic routines in Level II ROM, and while it does not offer the full instruction set of APL, it comes close. The most serious current limitation is single precision arithmetic, although the man with the 158 digit number mentioned above found a way around that. A double precision version is under development and will probably replace the current version by the time this review appears.

Obviously part of the appeal of APL is snob appeal. We all dream of wrinkling up our nose and saying: "Basic?, I wouldn't touch it with a ten foot pole!" APL and PASCAL are probably the class acts in the micro language circus, even giving you a chance to sneer at clumsy COBOL and FORTRAN. Thanks to Phelps Gates, we can join the class act with ease.

Truman Krumholz, Springfield, MO

PASCAL

Truman gives us the benefit of his first look at PASCAL from FMG Corp.

At the time of this writing, I have had the FMG Corp version of USCD PASCAL for three weeks. Although this is a very short time for a beginner with PASCAL to comment on specifics, I thought there might be some interest in my initial experience. I now have six programs up and running in PASCAL. The most ambitious is a version of Mastermind.

Upon receiving the package from FMG you find that you have three diskettes and a reference manual in the form of a bundle of loose leaf pages. At first it seems that the documentation is totally inadequate. The manual appears to have been edited perhaps to more generally comply with what is available to the TRS-80. However, as understanding grows, the manual seems to improve. The first of my three calls to Don French at FMG concerned by difficulty in getting started with this system. Mr French encouraged me to purchase Jensen & Wirth's *"PASCAL USER MANUAL AND REPORT"* and Kenneth Bowles' *"PROBLEM SOLVING USING PASCAL"*. I did this and received the books in short order from FMG. These two books are a great help, but I feel they are still not exactly what the beginner needs. The user manual and report describes "standard" PASCAL and about one half of Bowles' book deals with *turtlegraphics* which does not perform well on the TRS-80 due to the limited graphic resolution. Turtlegraphics is not on the diskettes, but a listing is provided in the manual.

My initial task upon receiving the package from FMG was, of course, to back up the diskettes. The instructions for doing this are not as detailed as they could be. I would certainly advise write-protecting the diskettes before starting.

Briefly, the backup procedure is as follows: A blank diskette is first formatted using TRSDOS. The name does not matter as it will be written over. The first file transfered is a two block PASCAL system BOOT. A block is 512 bytes. Then the diskette is zeroed and a directory is placed on it. There is a provision for a backup directory but there is no point in doing this as the utility for using the backup is not included. I have had no problems with the directory. If however, one would have trouble, the diskette sectors are accessible with NEWDOS SUPERZAP. Diskettes may be transfered in total or by individual file. There are 170 blocks on the 35 track diskette. This figures to only 34 tracks used. I don't know what is on the 35th track.

Three separate sheets with the documentation describe the backup procedure, the editing and control keys as used on the TRS-80, and a recommended file setup for a two drive system. The file placement on the diskettes as received is not in the proper arrangement for

Bring your TRS-80 keyboard to life!

A year ago we used this headline to introduce AUTOK and QEDIT, the keyboard autorepeat and quick edit utilities for Level II BASIC. They've been very popular, but we couldn't resist working them over anyway, in response to customer suggestions. The result? **KEYEDIT**, a vastly improved AUTOK, QEDIT, and a few things more.

With **KEYEDIT** and your Level II or Disk BASIC system, you get:

- Debouncing. No need to buy Radio Shack's KBFIX!
- Autorepeat on every key. Just hold a key down, and after a half-second delay, the character repeats about eight per second.
- Single-keystroke keyword entry. Hold down SHIFT, hit a letter key, and an entire BASIC keyword is spelled out at once. Plus, *you* can assign any keyword to any key!
- Keyboard macro facility. Any frequently-typed pattern can be defined and later invoked in a single keystroke. You just fill in the blanks. Takes the drudgery out of repetitive keying. (See SYSTEM COMMAND, Jan-Feb 80 issue of 80-U S.)
- Screen-oriented editing. **KEYEDIT**'s cursor moves anywhere in a displayed program listing for instant insertions and deletions. Plus, whole statements can be copied to other parts of the program or combined to form longer ones, without retyping the text. Makes BASIC's EDIT function obsolete!
- Easy loading. **KEYEDIT** loads from cassette using CLOAD (even though it's written in machine language), and may be saved on disk. Features can be deleted selectively just by deleting lines. Once RUN, **KEYEDIT** protects itself in low memory and links into BASIC, where it unobtrusively awaits your command.
- Thorough documentation. Each feature is explained in detail along with instructions for user modifications.

KEYEDIT will save you hours of effort in BASIC program development. So why waste another minute? Bring *your* keyboard to life today with **KEYEDIT!**

KEYEDIT Level II cassette and instructions: **$19**

Bank Cards Welcome.

DISCOVERY BAY SOFTWARE CO.

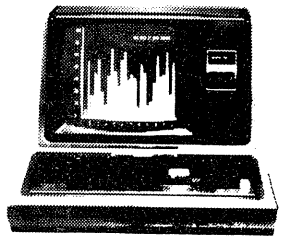
P.O. Box 464 Port Townsend, WA 98368

Dealer Inquiries Invited.

AUTHORIZED

Radio Shack® DEALER A301

COMPUTER SPECIALISTS



10% DISCOUNT Off List

64K 1 Drive
$3499.00

Popular 16K Level II System	$ 722.00
26-1145 RS-232 Board	84.00
26-1140 "O" K Interface	254.00
26-1160 Mini Disk	424.00
26-1171 Telephone Modem	169.00
Fast 100 CPS Centronics 730 Printer	750.00
Highly Reliable Lobo 5" Drives	375.00
Versatile Lobo Interface 8" Drives and IMI Hard Drives	Call For Prices

15% DISCOUNT Off List

4K Level II
$527.00

No Taxes on Out Of State Shipments

Immediate Shipment From Stock.

MICRO MANAGEMENT SYSTEMS, INC.
DOWNTOWN PLAZA SHOPPING CENTER
115 C SECOND AVE. S.W.
CAIRO, GEORGIA 31728
912-377-7120

Full Factory Warranty on All Items Sold.

VISA, Master Charge and COD's, Add 3%

developing programs. In my opinion, a much better arrangement is described in a text file called "READ.ME.TEXT" on one of the diskettes. I am using this arrangement. However, it does pretty well eliminate the use of the "WORKFILE" which is really not necessary. Three drives would be the real answer.

The files included with the system are:

SYSTEM.TRS-80	*22 blocks*
SYSTEM.PASCAL	*33 blocks*
SYSTEM.MISCINFO	*1 block*
SYSTEM.COMPILER	*68 blocks*
SYSTEM.LINKER	*22 blocks*
SYSTEM.EDITOR	*54 blocks*
SYSTEM.ASSEMBLER	*54 blocks*
SYSTEM.FILER	*28 blocks*
SYSTEM.SYNTAX	*12 blocks*
SYSTEM.LIBRARY	*8 blocks*
BOOTER.CODE	*2 blocks*
LIBRARY.CODE	*7 blocks*
LIBMAP.CODE	*7 blocks*
Z80.ERRORS	*8 blocks*
Z80.OPCODES	*3 blocks*
READ.ME.TEXT	*4 blocks*

One truly fine feature of this system is the Editor. It is a screen editor with many options. These include FIND and or REPLACE a target string any number of times in either token or literal form, cursor movement anywhere in the "window", auto-indent for programming, adjustable indent on paragraphs for text writing, variable margins, filling, right or left justification, centering and many more.

The Compiler also is quite flexible. It has numerous switches which include allowing GOTO's and the generation of a listing file. I have not as yet used the assembler. However, it is intended for writing subroutines and not programs. Any function written with either the assembler or in PASCAL may be put in the system library. Limited use of MACROS is supported. The math operators in the system are similar to BASIC. Integers from -32768 to +32767 are allowed. Real numbers are six digit precision up to the 37th power of ten.

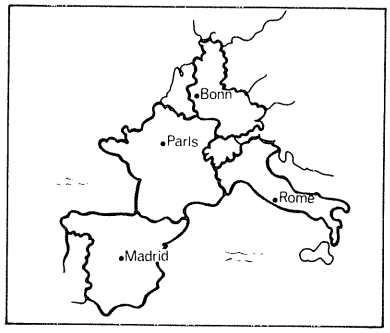
Files not included in this system are the duplicate directory access, turtlegraphics, and a setup utility for a terminal other than the TRS-80 which isn't needed. Up to now I have found no other differences from the USCD PASCAL described in Bowles' book. I have had no system failures.

My second and third calls to FMG concerned getting a program to output to the printer. This is done quite easily, but one must read carefully which I confess I did not do. As far as other problems are concerned, I have had only one when I transfered to a defective disk. This caused abnormal operation of the entire system. There is a bad block scan routine in the Filer. There is also a repair routine. Bad blocks may be marked and not used.

My overall impression at this time is that this package is worth the money. Compared to what PASCAL costs for other computers, the price seems reasonable. PASCAL itself, I feel, is a real challenge to the BASIC programmer. It is certainly different and seems to be extremely flexible. It demands preparation. Otherwise you will spend all of your time editing, compiling, linking and reading some of the 149 syntax error messages plus the run time errors and I/O errors. I have not gotten to the 74 assembler errors. I am glad I have this system, but I'm not ready to quit BASIC .....yet. ●

ON DISK

PARLEZ-VOUS ESPAÑOL, NEIN?



LANGUAGE TEACHER

by Cindy and Andrew Bartorillo

Learn the basics of a foreign language with the Language Teacher.

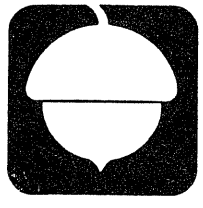
Using your TRS-80* with a single disk drive, you do the essential vocabulary study in a manner more satisfying and interesting than the traditional manner. You can currently choose among *French, Italian, German* or *Spanish.*

Each Language Teacher offers hundreds of word combinations, verb conjugations and phrases. You choose the topic of the drill and whether it is foreign language to English or vice versa (e.g., phrases, Spanish-to-English). There is an option of having multiple choice answers as well as being retested on missed items. The program gives a running percentage of correct answers.

Full printer capability and maximum use of INKEY$ further enhance the program. Teachers will appreciate being able to print a quiz and the ample documentation.

Acorn produces several foreign languages in the Language Teacher series. These include *French, Italian, German* and *Spanish.* Each is available at only $19.95 for a TRS-80 with one disk drive and 32k of memory. Ask for these and other quality Acorn programs at your local computer store.

* TRS-80 is a trademark of Tandy Corp.



DEALER INQUIRIES INVITED

Acorn
Software Products, Inc.

634 North Carolina Avenue, S.E., Washington, D.C. 20003

View from the Top of the Stack

Jim Crocker, Technical Editor

Last episode, we promised to take you step by step through entering and assembling a program. Here it is. Those of you using TBUG, don't despair! The program in Figure 1 will work for you too.

Assuming you have your Editor/Assembler now, load it up and let's get started. Figure 1 is the side-by-side listing for a program I call "GRAPH". TBUG users who don't intend to move up to the Editor/Assembler (EDTASM) at some time may finger in the program and skip ahead to the section on documentation.

The logical place to start is at the beginning, so assuming you have the * (indicating command mode), we want to insert text, so we type I *ENTER*. This should net us a line number of 00100 and a cursor. Hitting the right arrow key will move the cursor over into the OPCODE field, where we will begin our source. You will notice almost immediately the use of one of the PSEUDO-OPS discussed last issue: "ORG". As before, this tells the assembler where we want to put the program or data that follows. Then we have to tab (right arrow) twice to get to where I started the comments. The reason this is done is so that the comments are well out of the way when there are long operands such as line 120. By the way, I strongly urge you to go ahead and type in the comments. Although it seems like somewhat of a bother, it is a good habit to acquire. More on that in the section on documentation.

In any case, the ORG of our program is 7FB8H. This is for a 16K machine. If you have 32K, the ORG will be BFB8H (don't forget the leading zero), and for 48K, it will be FFB8H. Adjust memory size to 49080 or 65464 respectively. After entering the line, press *ENTER*, and a new line number (00110) should appear.

Line 110 presents us with our first SYMBOL. We never really told the assembler that START equals 7FB8, but it figured it out for us. From now on, any time we ask for START, the assembler "sees" 7FB8 (or BFB8 or FFB8). The second symbol we encounter is DRIVER+1. But there is no symbol called "DRIVER+1". There is a symbol called "DRIVER" however, and a quick check of the HEX code will reveal that the assembler produced 22C87F. This translates into: LD (7FC8H),HL. The symbol table will show that "DRIVER" equals 7FC7H. This is a good example of the simple math the assembler can do for us. What will happen here is that address 7FC8 will be loaded with the address of the keyboard driver. But more on that in the section on how it works.

Speaking of DRIVER, looking at line 160 where it lives, you will see "CALL $-$". There is no symbol called "$" or "$-$" anywhere in our source. In fact, "$" is illegal to use as a symbol (like reserved words in BASIC). What then, are we trying to do with this strange non-symbol? The special character dollar sign is used to represent "current program count". When the assembler gets to this point in the assembly process, the character "$" will have a specific value, in our case, 7FB8. In other words, whatever byte the assembler generates at this point, will get put into address 7FB8. Sort of like an "EQU" statement that is continually updated, or the "period" in BASIC (in fact, the "$" is called "period"). Therefore, by subtracting 7FB8 from 7FB8, we get zero, which is what we wanted in the first place. Why, you may well wonder, don't we just CALL 0? Well, that is a very long story. In the language of the territory, it is a *convention*. In English, that means that it is something everyone does so that everyone else can understand it. Specifically, whenever we are going to make a CALL or LD or something similar, and the address will be modified from within the program, we use something like $-$ or the like. In other words, there is no reason for it - - it's just policy.

Skipping down to line 330, we see an example of the "leading zero" annotation of HEX numbers greater than 9FH. If, for some reason, you should happen to accidentally drop that leading zero, strange things will happen. When I tried to assemble this program without it (just to see what would happen), I got not just one, but two (count 'em) errors: "GRAPHICS CHARACTER" (which I never heard of before), and "UNDEFINED SYMBOL" (which I fully expected). The first one I have no explanation for. I was fully aware that C0H is a graphics character. The second one is like an "UNDEFINED LINE #" in BASIC. One note about that: This Editor/Assembler is a "top-down" assembler. That means that with the exception of those that the assembler creates the value for, symbols must be defined either by "EQU" or "DEFL" statements *before they are referenced*. It is just like someone asking you to go get 15 yards of flightline, or a bucket of propwash, before telling you what a flightline or propwash is.

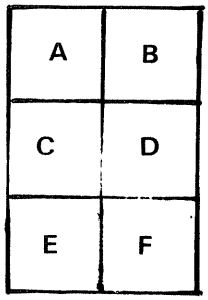
By this time, disk users are probably tired of hearing it, but they should be sure to change the JP 1A19H to JP 402DH.

Now, assuming you are still awake, you should have the source completely typed in and proof-read. When you are quite sure that it is all correct, get back to command mode (hit the *BREAK* key), and type "A/WE/NO" This tells the Assembler to assemble, with the switches set for *Wait for Error* and *No Object Output*. By assembling this way, the assembler will proceed to do it's thing, and will stop and tell us if we have made any kind of errors, allowing us to correct them. Let's assume, just for arguments sake, that we forgot to put the closing parenthesis in line 420. The assembler will stop and tell us *EXPRESSION ERROR*, and print the line. We can ignore the error and continue, but that would not be very good. So let's hit the *BREAK* key and terminate the assembly, and edit the line.

Editing with the EDTASM is very much like editing in Level II BASIC. To enter the edit mode, type "E420" or, since we are already set up for the line, just "E."*ENTER*. Now, editing is almost easy. We want to insert a character just before the comma, so let's find the comma. Typing "1S," (nothing will be printed until you hit the comma) will result in the line being typed up to but not including the first occurance of the comma. We want to insert a character, so type "I". Again, nothing will be printed at this time. But, we are now in insert mode. When you type a character, it will be printed and become a part of the line. In this case, we want to enter a ")", so type it. Then, to escape this mode, hold down the shift key and hit the up arrow key. Now type "L" and the entire line (including your addition) will be listed. But, it isn't carved in stone yet. If we made a mistake during the editing, typing "A"

```
7FB8            00100           ORG     7FB8H           ;16K MEM SIZE = 32696
7FB8 2A1640     00110 START     LD      HL,(4016H)      ;LINK INTO KEYBOARD DRIVER
7FBB 22C87F     00120           LD      (DRIVER+1),HL   ;       "
7FBE 21C77F     00130           LD      HL,DRIVER       ;       "
7FC1 221640     00140           LD      (4016H),HL      ;       "
7FC4 C3191A     00150           JP      1A19H           ;RETURN TO LII READY
7FC7 CD0000     00160 DRIVER    CALL    $-$             ;GET KEY PRESSED
7FCA FE0D       00170           CP      0DH             ;ENTER?
7FCC 282D       00180           JR      Z,CLRMDE        ;YES, FORCE MODE=1
7FCE FE01       00190           CP      01H             ;BREAK?
7FD0 2829       00200           JR      Z,CLRMDE        ;YES, SAME AS ENTER
7FD2 FE67       00210           CP      67H             ;SHIFT G?
7FD4 281A       00220           JR      Z,CNGMDE        ;YES, CHANGE MODE
7FD6 F5         00230           PUSH    AF              ;SAVE A & FLAGS
7FD7 3AFF7F     00240           LD      A,(MODE)        ;IN GRAPHICS MODE?
7FDA CB47       00250           BIT     0,A             ;BIT 0=0 IF SO
7FDC 2802       00260           JR      Z,GRAPH         ;       "
7FDE F1         00270           POP     AF              ;OTHERWISE RESTORE AF
7FDF C9         00280           RET                     ;AND RETURN
7FE0 F1         00290 GRAPH     POP     AF              ;GET CHARACTER BACK
7FE1 FE19       00300           CP      19H             ;CONTROL CHARACTER?
7FE3 D8         00310           RET     C               ;YES, LEAVE IT ALONE!
7FE4 C660       00320           ADD     A,60H           ;CONVERT TO GRAPHICS CHAR
7FE6 FEC0       00330           CP      0C0H            ;TOO BIG?
7FE8 D8         00340           RET     C               ;NO, RETURN
7FE9 D605       00350           SUB     5               ;COMPENSATION
7FEB FEC0       00360           CP      0C0H            ;STILL TOO BIG?
7FED D8         00370           RET     C               ;NO, RETURN
7FEE AF         00380           XOR     A               ;ELSE RETURN NULL
7FEF C9         00390           RET                     ;       "
7FF0 3AFF7F     00400 CNGMDE    LD      A,(MODE)        ;GET MODE INDICATOR
7FF3 EE01       00410           XOR     1               ;CHANGE IT,
7FF5 32FF7F     00420           LD      (MODE),A        ;PUT IT BACK, AND
7FF8 3E22       00430           LD      A,'"'           ;RETURN WITH A QUOTE MARK
7FFA C9         00440           RET                     ;       "
7FFB 32FF7F     00450 CLRMDE    LD      (MODE),A        ;FORCE BIT 0=1
7FFE C9         00460           RET                     ;AND RETURN
7FFF 01         00470 MODE      DEFB    1               ;MODE INDICATOR
7FB8            00480           END     START           ;AUTOSTART
00000 TOTAL ERRORS
```

KEY	CHR$	SET	KEY	CHR$	SET	KEY	CHR$	SET
<SP>	128	NONE	!	129	A	"	130	B
#	131	AB	$	132	C	%	133	AC
&	134	BC	'	135	ABC	(	136	D
)	137	AD	*	138	BD	+	139	ABD
,	140	CD	-	141	ACD	.	142	BCD
/	143	ABCD	0	144	E	1	145	AE
2	146	BE	3	147	ABE	4	148	CE
5	149	ACE	6	150	BCE	7	151	ABCE
8	152	DE	9	153	ADE	:	154	BDE
;	155	ABDE	<	156	CDE	=	157	ACDE
>	158	BCDE	?	159	ABCDE	@	160	F
a	161	AF	b	161	BF	c	163	ABF
d	164	CF	e	165	ACF	f	166	BCF
g	167	ABCF	h	168	DF	i	169	ADF
j	170	BDF	k	171	ABDF	l	172	CDF
m	173	ACDF	n	174	BCDF	o	175	ABCDF
p	176	EF	q	177	AEF	r	178	BEF
s	179	ABEF	t	180	CEF	u	181	ACEF
v	182	BCEF	w	183	ABCEF	x	184	DEF
y	185	ADEF	z	186	BDEF	<^@>	187	ABDEF
A	188	CDEF	B	189	ACDEF	C	190	BCDEF
D	191	ABCDEF	G	ENTER/EXIT GRAPHICS MODE				



will cancel all our changes and return us to the edit mode for that line, just like nothing happened. Or, if we discover that we have the wrong line, typing "Q" will quit and ignore all editing and return us to the command mode.

There is one major disparity in comparison to the Level II editing. When we delete a character in Level II editing, the character or characters are printed with leading and trailing exclamation marks. The EDTASM however, dosen't even print the character - - very confusing at times.

Let us now assume that you have a good source, and when we assemble with No Object and No Symbol table, we get the much coveted "00000 TOTAL ERRORS" message. We must remember that the EDTASM cannot find flaws in programming, so we save our source product. To accomplish this, get a fresh cassette ready to record and type "W GRAPH". The "READY CASSETTE" prompt appears, giving us a second chance to double check that we have advanced the tape past the leader, have the correct cords plugged in, etc. It is also the last chance to change our mind. Hitting *ENTER* will turn on the cassette deck and start writing (ready or not). (NEWDOS+ users please note format changes in your documentation from Apparat).

After saving the source, get a different tape (preferred), or advance the tape, noting the tape counter position, and assemble the program. This time, type "A GRAPH". The screen will really go wacko, and we will again see our "READY CASSETTE" prompt. Again double-checking our tape preparations we press *ENTER* and the object code is written to the cassette. (Note that it is a good idea to get several copies of both the source and object).

Now that we have the program on cassette (and hopefully ready to use), type "B" *ENTER* to return to the MEMORY SIZE question or reboot the disk. Disk users will find it helpful to know that entering the "B" command while the disks are running will cause a return to MEMORY SIZE instead of DOS READY. At last, we are ready to try it out!

BUT FIRST....

A few words about documentation (ugh!)

Documentation is probably the most feared, misunderstood and ignored part of programming. This, even though documentation can (and will) make or break your program. Even the greatest and best computer program in the world is useless unless someone (including yourself) can use it. Besides -- it is an excellent chance to brag about yourself and your skills as a programmer.

In the last installment, I said that the comments field is for the little notes that we make to ourselves and others. This is true, even though most people don't even include the date of their creation. To really do any good, documentation should contain notes explaining exactly what the program is doing, how it does it, and how to make it do what it does. After all, how are you going to remember, six months from now, exactly why you used the alternate register set instead of the index register? There might have been a very good reason at the time, but when you go to do an update, who's to say?

So I strongly advocate the use of comments. In fact, I try to have a comment on every line, even if it is only a quote mark. It dosen't take that much space in the source, and unlike BASIC, it requires no space in the object code. Besides, you might want to submit your brain-child for publication, and you wouldn't want to have to put them all back in.

AND NOW, LIVE AND DIRECT.....

So at last, we have a machine language program. The question of the hour is: "What does it do, and how do I make it do it?" I will try and explain. The program listed here is a keyboard driver that will allow you to "type" graphics characters directly from the keyboard. "So what?", you may ask. Well -- this program takes a key from the keyboard and changes it into a graphics character. This allows you to "string-pack" PRINT, PRINT@ or just about anything else you would like to do. Looking at Figure 2, you can see that it is a very confusing attempt to explain what's going on. Typing a space while in the graphics mode results in the equivalent of CHR$(128) being typed, and none of the graphics blocks being set. Typing an exclamation mark will print CHR$(129), which sets graphics block "A", and so on. Note that the lowercase characters in the figure represent the UNSHIFTED letters, while the uppercase is SHIFTED. Also the thing in front of CHR$(187) is supposed to indicate SHIFT@. (Note: You *do not* have to have any lowercase mods installed for this to work. The stock '80 will produce the lowercase code.

Without going into any lengthy theory of operation just yet, here is a brief explanation of how to make the thing work. Load the program (be sure to set MEMORY SIZE). Press/*ENTER*, and you will return to READY (DOS users will return to DOS READY, and should enter BASIC and reserve memory now.) At first, you won't notice anything unusual, but when you hit the *SHIFT* key and *G* at the same time, a quote mark will appear, and the whole world will change. Almost any key you hit will cause a graphics character to appear as if by magic. You can see exactly what will be printed, and all control characters (backspace, linefeed, etc.) will work just as always. Even better, the data is automatically string-packed as soon as you ENTER the line, and the graph program dosen't have to be in RAM after this to run the program! Just as an exercise, type in the following - exactly:

```
10 CLS:CLEAR1000:INPUT"WHERE DO
     YOU WANT IT";X
20 PRINT@X,(SHIFTG)(SP)@UZ0(SHI
   FTG)+CHR$(26)+STRING$(5,24)+
   (SHIFTG)(SP)/VY/(SHIFTG)+CHR
   $(26)+STRING$(5,24)+(SHIFTG)
   X'(SHIFTD)(SHIFT@)+T(SHIFTG)
   +CHR$(26)+STRING$(6,24)+(SHI
   FTG)"-7K.!(SHIFTG)+CHR$(26)+
   STRING$(6,24)+(SHIFTG)(,%*,$
```

(Note that 0=zero, O=Oh)

Note that the (SHIFT G) means to press *SHIFT* and **G** together, and the (SP) means to press the *Space Bar*.

Very tricky to type in-but if you got it correctly, you have just typed in an Android figure. When you LIST the program, you will find it to be string-packed, a' la Leo Christopherson! Now, running the program will allow you to PRINT that same Android *anywhere* on the screen!!

We will now leave you to enjoy the fruits of your labor. I know there are several questions you would like to ask, but we will have to beg patience. In the next few issues, we will proceed to tear this program apart, line by line, and explain what was done, why it was done, and how you can make use of the techniques yourself. Meanwhile - enjoy! ●

PRINT MONEY WITH YOUR TRS-80!

If you have a TRS-80 disk system, you already own "Money Machine". It can "print money" for you and your family and do it legally

Virtually *every* business in your community has customer and prospect lists . people and companies that they should send mailings to on a regular basis. But, they seldom do. In a typical business, these names and addresses are totally disorganized and seldom used even though they represent a valuable sales tool

PUT YOUR TRS-80 TO WORK

Your TRS-80 has the ability to totally organize mailing lists for these companies. It also has the ability to supply them with tabular listings and mailing labels upon request. All it takes is a little bit of your time. Any progressive business would be happy to pay you a nominal fee to keep their lists organized and up to date. What's a nominal fee? You can charge 10 cents a name to enter, store and maintain each record in your computer. It's also worth 3 cents to supply this name on a gummed mailing label. Think of it. The label costs three-tenths of a cent going into the printer and, with the value you add, is worth 3 cents when it comes out the other end. That's 1000% profit. That's a "Money Machine"

HOW DO I GET STARTED?

As a minimum, you'll need a 32K TRS-80 with at least one disk drive and a good line printer. You'll also need a copy of **"LABELMAKER"**, available on diskette from The Peripheral People. This program will allow you to input names and addresses, plus optional data such as company, phone number and so on. **"LABELMAKER"** also features a unique method of coding each record. You can selectively print labels by using these codes and bypass all others. The records can be sorted by zip code or alphabetically by company or name. In other words, you can provide mailing labels or tabular listings any way your customers want them.

ANY FRINGE BENEFITS?

You bet! Providing this service is a great way to get the family involved with your TRS-80. Teenagers can easily input and output records during the day. Most women are latent business persons and your wife can easily sell the service, particularly if it means some new clothes, furniture or other "fringe benefits" for her. You can probably promote discounts or trade services with your customers. Once you've established a business in your home you can legally write off a portion of the rent and utilities even your TRS-80 to your business. This can reduce your taxes substantially. The possibilities for making money with your TRS-80 are endless.

YOU RISK NOTHING

If you don't agree that our LABEL—MAKER program does everything that we say, then return the diskette along with a letter telling us why and we will immediately refund your full purchase price, plus the postage

TURN THE SWITCH TODAY

Are you willing to invest $99.50 to turn the switch on your "Money Machine"? Then call The Peripheral People today and order your copy of **"LABELMAKER"**. You can charge it to your Mastercharge or VISA card

START YOUR MONEY MACHINE TODAY BY CALLING THE PERIPHERAL PEOPLE

(206) 232-4505

The PERIPHERAL PEOPLE Box 524 MERCER ISLAND, WA 98040

*TRS-80 is a trademark of the Tandy Corporation

For your TRS-80 send & receive CW/RTTY

FEATURES
- Auto Send & Receive RTTY & CW
- Connects to TRS-80 User Port & Key/head phone jacks
- 10 message memories 255 char. ea.
- Uses builtin PLL or external TU
- Includes hardware, cassette & manual
- Morse tutorial-10 lessons-corrects mistakes. Simplest, fastest way to learn the code
- Morse practice-random 5 letter words
- Auto numbering contest keyer
- Interactive graphics custom PIX
- Autotransmitter control PTT
- Requires Level II Basic & 16K RAM
- **CM80** In cabinet as illustrated **$279**
- **M80** As above minus cabinet **$149**
- **M800** Adds advanced RTTY features to M80 **$99**

PET, APPLE, SORCERER versions available

For Your TRS-80 DISK SYSTEM

ElectraSketch®

Add Animation to your TRS-80 Programs

- Animation Compilier and Graphics Editor Package
- Add smooth, fact action to basic programs
- Create ad layouts, newsletter covers, posters

$14.95

Write or call for complete catalog

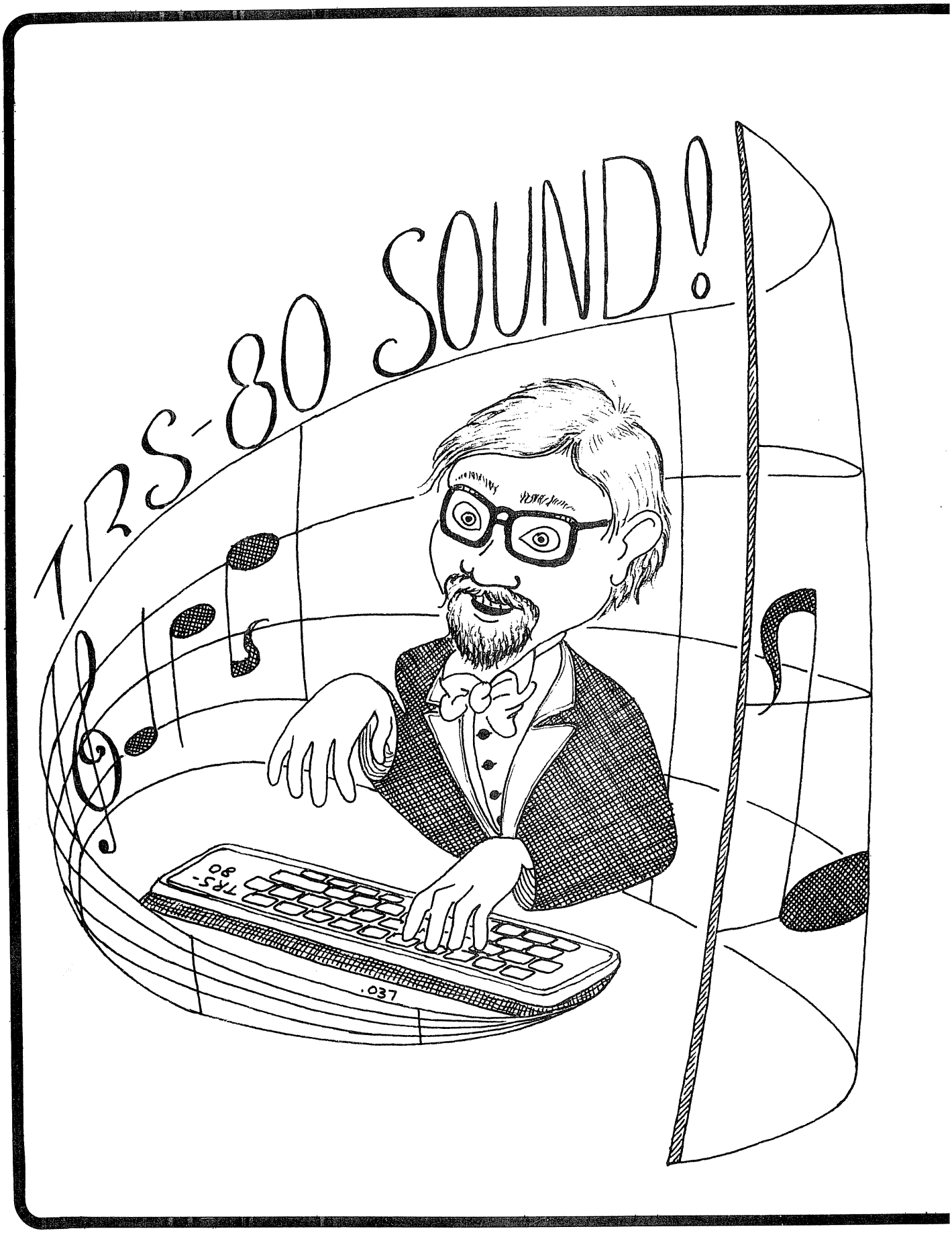
MACROTRONICS, inc.®

1125 N. Golden State Blvd. / Suite G
Turlock, CA 95380 (T)
(209) 667-2888 / 634-8888

VISA master charge

California residents add 6% tax

We are experiencing telephone difficulties, please keep trying.


TRS-80 SOUND!
TRS-80
.037

Leo B Christopherson

SOUNDING OFF!

In response to many requests, Leo here gives us three different sound producing routines. The reason they must be in machine code is apparent, since Basic is simply too slow and produces only annoying clicks and pops. Even if you can't follow all the notation in the text, the program on page 63 should give you a handle onto producing sound by stuffing machine language with a Basic program.

I have been asked a number of times about sound routines for the TRS-80. So, in this article I will describe some sound techniques that might be useful. To try these routines, the AUX output cable should be connected to an amplifier.

Consider this Level II program:

BASIC PROGRAM # 1

```
10 L=1: H=2: C=255: D=15
20 INPUT E
40 OUT C,H: FOR B=E TO 0 STEP-1: NEXT B
50 OUT C,L: FOR B=E TO 0 STEP-1: NEXT B
70 D=D-1: IF D=0 THEN 80 ELSE 40
80 GOTO 10
```

L and H are the numbers to be output to the amplifier. The changing from one to the other causes sound. C is the cassette port number. D is the duration of the sound and E is the sound's pitch.

If we run this program and enter a "1" then "2" up to about "5" we'll hear very low pitched notes. To get out of this "basso profundo" range, it will be necessary to output the "1" and the "2" as above, but at machine level speeds.

Here is the machine level version of lines 10 and 20 which set up the variables: LDHL/ 1/ 2/ LDC/ 255/ LDDE/ 100/ 150/.

Here the HL register pair is loaded with the "1" and the "2" that are to be output to cause a change in voltages (and thus the sound). Register C is loaded with "255", the cassette port number. Register D is loaded with "100", the sound's duration. Register E gets a "150" for the pitch. The duration and pitch are now larger numbers since the machine level program will run much faster.

Here is the machine level version of lines 40 and 50 which output the sound with a certain pitch. (By the way, the /'s are used here to separate steps and are not part of the program!) OUT(C)/ H/ LDB,E/ DJNZ/ 254/ OUT(C)/ L/ LDB,E/ DJNZ/ 254/. Line 70 becomes: DEC,D/ JRNZ/ 243/. The OUT(C)/ H/ is the equivalent of OUT C,H in Level II. The LDB,E/ DJNZ/ 254/ is the FOR B=E TO 0 STEP -1: NEXT B. The B register is loaded with the pitch from E and is decremented again and again until equal to zero.

And now consider another Level II program:

BASIC PROGRAM # 2

```
10 L=1: H=2: C=255: D=3: E=1
30 A=E
40 OUT C,H: FOR B=A TO 0 STEP -1: NEXT B
50 OUT C,L: FOR B=A TO 0 STEP -1: NEXT B
60 A=A+1: IF A=25 THEN 70 ELSE 40
70 D=D-1: IF D=0 THEN 80 ELSE 30
80 STOP
```

Basic Program # 2 gives us a "down-sweep". It is so low pitched however, it is hardly recognizable. These low pitches result from the speed of Level II Basic. I'm using these Basic programs only as examples to compare with the machine level versions. However, they may be useful as sound effects themselves. I have not tried to make these programs as efficient as possible in Level II since I want them to correspond closely to the machine level routines. I hope this will make the machine level work a bit easier for someone who knows Basic well but is just getting into working directly with the Z-80.

But, back to Program # 2... Again line 10 sets up the variables: L and H are outputs; C is the cassette port number; D is the number of down-sweeps; and E is the starting pitch. Line 30 resets the starting pitch for each sweep. Lines 40 and 50 output the pitch "A" by delaying the switch from H to L. Line 60 sets to the next lower pitch and checks to see if the pitch, A, is at its lower limit (25 in this example). If not, the next lower pitch is output. Otherwise, we come to line 70 which counts down the number of sweeps.

Now let's see what the machine level version looks like. Line 10 becomes: LDHL/ 1/ 2/ LDC/ 255/ LDDE/ 1/ 5/. This sets up the Z-80 registers as we set up variables in Basic. Line 30 becomes: LDA, E/.

Please note that when we have L=1 in Basic we're not really at the same time loading the L register of the Z-80 with a "1", likewise with A,B,C,D,E and H. I've used variables in Basic to serve the same functions in the Basic programs as the like named registers do in the machine level programs. I've done this to make the translation from Basic to machine level easier to follow.

Lines 40 and 50 look like this in Z-80 language: OUT(C)/ H/ LDB,A/ DJNZ/ 254/ OUT(C)/ L/ LDB,A/ DJNZ/ 254/. The only difference in this part from Program # 1 is that we load B from A rather than E. This time E must be saved to reset A with for the next down-sweep. Line 60 is changed to this: INC,A/ JRNZ/ 243/. Here we are going to increment A right up to 255 and then the next INC,A gives 0 which is tested for with JRNZ (Jump-Register-Not-Zero). The 243 represents the number of steps or bytes we wish to jump back. This jump gets us back to the OUT(C)/ H/. By the way, we figure the 243 by subtracting the number of steps back from 255 (not counting the 243 itself). Line 70 becomes: DEC,D/ JRNZ/ 239/. Here we count down the number of sweeps and jump back to the LDA,E/ if D is not zero.

Here is another Level II program which gives us an up-sweep:

BASIC PROGRAM # 3

```
10 L=1: H=2: C=255: D=3: E=25
30 A=E
40 OUT C,H: FOR B=A TO 0 STEP -1: NEXT B
50 OUT C,L: FOR B=A TO 0 STEP -1: NEXT B
60 A=A-1: IF A=0 THEN 70 ELSE 40
70 D=D-1: IF D=0 THEN 80 ELSE 30
80 STOP
```

As we can see, the only differences between Programs 2 and 3 are in lines 10 and 60. For an up-sweep we must start with a low pitch, 25. To get the next higher pitch we must subtract 1 from A. We stop this process when A is zero and then reset A to E's value. Thus, the machine level version is almost the same: LDHL/ 1/ 2/ LDC/ 255/ LDDE/ 255/ 5/ LDA,E/ OUT(C)/ H/ LDB,A/ DJNZ/ 254/ OUT(C)/ L/ LDB,A/ DJNZ/ 254/ DEC,A/ JRNZ/ 243/ DEC,D/ JRNZ/ 239/.

Each of these machine level routines will need a RET (return) at their ends since they will be used as subroutines. Also, for ease of operation, we are going to combine the three subroutines. Since the loading of registers HL and C is the same for all three programs, we will do that only once. Then a compare (CP/ program number/) will be used to select the program which is desired. We will select each subroutine from Basic by POKEing a "1", "2", or "3" into the machine level routine at step #6.

In the following machine level listing, the number of the step and the /'s are not actually part of the program. They are there to help separate and identify the steps. Here then, is the complete 74 step triple subroutine:

```
#0:LDHL/ #1:1/ #2:2/ #3:LDC/ #4:255/ #5:LDA/ #6:1/
#7:CP/ #8:2/ #9:JRZ/ #10:21/ #11:CP/ #12:3/
#13:JRZ #14:38/ #15:LDDE/ #16:100/ #17:150/
#18:OCT(C)/ #19:H/ #20:LDB,E/ #21:DJNZ/ #22:254/
#23:OUT(C)/ #24:L/ #25:LDB,E/ #26:DJNZ/ #27:254/
#28:DEC,D/ #29:JRNZ/ #30:243/ #31:RET/
#32:LDDE/ #33:1/ #34:5/ #35:5/ #36:OUT(C)/ #37:H/
#38:LDB,A/ #39:DJNZ/ #40:254/ #41:OUT(C)/ #42:L/
#43:LDB,A/ #44:DJNZ/ #45:254/ #46INC,A/
#47:JRNZ/ #48:243/ #49:DEC,D/ #50:JRNZ/ #51:239/
#52:RET/ #53:RET/ #54:255/ #55:5/ #56:LDA,E/
#57:OUT(C) #58:H/ #59:LDB,A/ #60:DJNZ/ #61:254/
#62:OUT(C)/ #63:LDB,A/ #65:DJNZ/ #66:254/
#67:DEC,A/ #68:JRNZ/ #69:243/ #70:DEC,D/
#71:JRNZ/ #72:239/ #73:RET/.
```

Now that we have the whole thing into Z-80 language, we next have to get it into the computer and then make it available to us from Basic. Basic Program #4 will do just that.

This program uses "string packing". Line 10 starts out as a string of 74 periods (or some other ASCII character). These 74 bytes are being reserved in this way and will be changed to the 74 steps of our sound subroutine later. Line 11 finds the low (S1) and high (S2) bytes of the address of the first byte of S$ and line 12 combines them to give the complete base 10 absolute address in memory for the start of S$.

The GOSUB in line 13 takes us to the subroutine which POKEs the Z-80 routines into S$. Lines 1000 through 1006 are the data statements which contain the decimal codes which represent the 74 steps of the machine level subroutines. If codes for Z-80 commands are looked up they are usually in Hex and have to be changed to decimal so they may be POKEd. Our first step, for example, is "LDHL" or 21 (hex) or 33 (decimal). Lines 1007 and 1008 read the data and POKE it into S$. After this is done, LISTing line 10 will do strange things since there are some non-alpha/numeric characters in S$ now.

Lines 15 and 16 are for setting up the USR command to get at our sound routines. The PEEK at 16396 (the BREAK vector) determins whether DOS is in the machine. If so, address 16396 will not have a "201" in it and we have to define the USR a bit differently. So, these two lines will let our program run in Level II or in Disk Basic.

Lines 20 through 27 are used to sample the three routines. When "1" is pressed while the program is running, we get subroutine #1, etc. At the end of line 21 we POKE the value of the pressed key into step #6 of the machine level routines in S$. This POKEd number will cause the program to jump to the correct subroutine when we call into S$. The duration is still set at 100 (step #17) but it can be changed by a POKE at S0+17. I have set the pitch (step #16) randomly in line 24. The routine is then called in line 27.

Likewise, the starting pitches of the down-sweep and up-sweep could be set by POKEing at S0+33 and S0+54, respectively. I have randomly set how many up or down sweeps will be heard. This is done in lines 25 and 26.

Once the program has been run, certain lines can be DELETED. Line 13 and lines 1000 through 1008 are no longer needed since S$ has been "packed" and will not change when tape or disk SAVEs or LOADs are used. (Don't try to EDIT line 10, however!)

In your own program you will no doubt do away with lines 20 through 27 also, and replace them with your own controls over the sound routines. For example, in a program, just as you graphically have a phaser fire across the screen, you might also have "POKE S0+54,100 POKE S0+55,3 X USR(0)". This will give three up-sweep sounds that can add a whole lot to the effect of your program!

Or you might wish to include some musical effects with subroutine #1. You could set up a data statement containing different pitches of a melody and then get the music as follows: "RESTORE: POKE S0+6,1: FOR N = 1 TO (Number of notes to be played from the data lines): READ P: POKE S0+16,P: X = USR(0): NEXT N".

Or you could POKE a "1" into S0+34 and S0+55 then set up a FOR - NEXT loop that calls subroutine #3 then #2 to give a wailing, up and down sound.

Well, there you are! These are just a few of quite a number of sounds that the computer can output. Experiment, and see what you can come up with and let us know if you find something really fantastic. Sound can add a whole new and valuable dimension to your programming!! ●

```
10 S$="..........................................................
   ..................."
11 S1=PEEK(VARPTR(S$)+1): S2=PEEK(VARPTR(S$)+2)
12 S0=S2*256+S1
13 GOSUB1000
14 IFPEEK(16396)=201 THEN L=0 ELSE L=1
15 IF L=1 THEN DEFUSR = S0: CMD"T": GOTO20
16 POKE16526,S1: POKE16527,S2
20 CLS: PRINT"PRESS '1', '2', OR '3' FOR SOUND EFFECTS"
21 K$=INKEY$:IFK$="" THEN 21 ELSE POKE S0+6,VAL(K$)
22 ON VAL(K$) GOTO 24,25,26
23 GOTO21
24 POKE S0+16,RND(255):IFPEEK(S0+16)=34THEN24ELSE27:REM
     THIS PREVENTS SELECTION OF QUOTE CHARACTER
25 POKE S0+34,RND(5): GOTO27
26 POKE S0+55,RND(5)
27 X=USR(0): GOTO21
1000 DATA33,1,2,14,255,62,1,254,2,40,21,254
1001 DATA3,40,38,17,200,100,237,97,67,16,254,237
1002 DATA105,67,16,254,21,32,243,201,17,1,5,123
1003 DATA237,97,71,16,254,237,105,71,16,254,60,32
1004 DATA243,21,32,239,201,17,100,5,123,237,97,71
1005 DATA16,254,237,105,71,16,254,61,32,243,21,32
1006 DATA239,201
1007 RESTORE: FORN=0TO73: READD: POKES0+N,D
1008 NEXTN:RETURN
```


KEYPLUS

Keyplus is a powerful collection of utilities that can be enabled directly from the keyboard. Choose from seven different keyboard entry modes: Basic shorthand (2 modes), direct graphic character input (3 modes), typewriter style input, and standard TRS-80 keyboard entry.

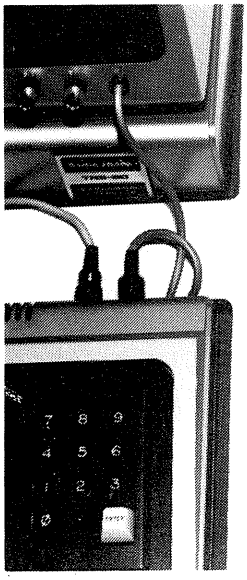
Keyplus supports auto-repeat, lowercase video (optional hardware modification required), restoration of lost programs, keyboard debounce, single key stroke user definable strings, and more!

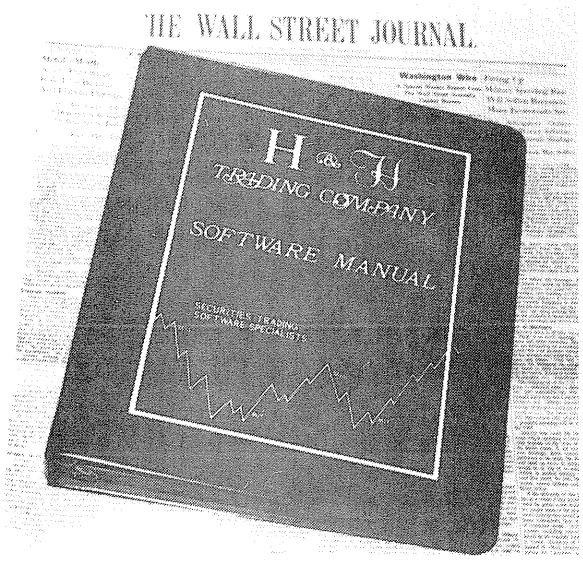
Carefully designed to maximize ease of use, Keyplus routines may be enabled or disabled in just two key stokes.

Keyplus is marketed by SJW, INC., P.O. Box 438, Huntingdon Valley, Pa. 19006. The Level II 16K version is available for only $14.95. An even more powerful disk version (32K or 48K) sells for $19.95. Pa. residents add 6% sales tax. Checks and money orders accepted.

S J W, Inc.

STOCK TRACKER™





A volume-based trading strategy for individual stocks, their options, and commodities.

Requires: min. 32K
dual disks

Printer recommended

Awesome! Unique!
User Acclaimed!

When Stock Tracker computes, people take notice!

H & H TRADING COMPANY
POST OFFICE BOX 23546
PLEASANT HILL, CA 94523
PHONE: 415/937-1030

$150.00 - Complete
$15.00 - Manual only
VISA & Master Charge

Omikron transforms TRS-80* into a powerful business system.

STANDARD DRIVES 8" Drives give you 5 times the speed and 3 times the storage of your mini drives! Our system provides a standard Shugart interface so you can use either your 8" drives or ours.

SOFTWARE CP/M* is the most popular operating system for microcomputers. But many high-level languages and advanced business programs cannot run with the special CP/M* designed exclusively for the TRS-80* The Omikron MAPPER with standard CP/M* allows you to expand your software capability to go beyond the few available TRS-80 compatible packages. TRS-80* with Mapper outperforms systems costing $1000 or more.

The MAPPER I and MAPPER II are plug-in modules. They don't require any circuit changes, are easy to install, and they don't interfere with the normal operation of your TRS-80* All your original software will still run properly. Omikron products require a minimum of 16K memory and the TRS-80* Expansion Interface.

★ ★ ★

MAPPER I is a memory management unit which adapts your TRS-80* to run standard CP/M* The user can choose either CP/M* or TRS-80* DOS through keyboard control. The package includes CP/M* software on 5" diskette and documentation. Specify memory size when ordering. $199.

MAPPER II is a disk adapter module which enables the TRS-80* to run both 5" and 8" drives. It will interface to the MAPPER I for CP/M* operation, or can be used alone with our modified TRS-80* DOS software. Files can be transferred between the different size drives. Specify cable requirements when ordering. $99, plus $10 per cable connector.

SYSTEMS – Omikron's complete systems feature Shugart 8" drives mounted in a dual drive cabinet with heavy duty power supply, MAPPERS I and II, cable and CP/M* software. Dual drives – $1795, Single drive $1195.

WARRANTY – 6 months parts and labor. Satisfaction guaranteed. Dealer inquiries invited.

Call for details on Omikron's TRS-80* DOS package.

*CP/M is a TM of Digital Research. TRS-80 is a TM of Tandy Corporation

Bill Wilson, Highland, MI

TEERSATY

A computer gone bezerk? Maybe.....but the author claims this to be a true story.

This program will write one sector (255) bytes at track zero, sector zero. It is currently set up for drive one, but can be modified to work on another drive. Use 08H (in line 250) for drive 3, 04H for drive 2, 02H for drive 1 and 01H for drive 0. The most immediate value of this program is that it will allow the user to custom write a bootstrap program for the disk. One of the less obvious functions of this program is as a learning aid. It is a good example of exactly how the disk controller works. For more information on the Floppy Disk Controller, contact Western Digital Company, 3128 Red Hill Ave., Newport Beach, CA 92663. Ask for the data sheet on the FD1771B-01.

The basic idea expressed here is loaded with possibilities. As an example, we have modified it in one case to completely eradicate track and sector information from certain sections of the disk. With this done, the track sector cannot be accessed via TRSDOS, NEWDOS, SUPERZAP, or Z80ZAP.

BE CAREFUL! This program can wipe out a disk in single drive systems. Try to understand what you are doing before you do it!

As I was typing in the last statement of a new program, my computer "went to lunch" again. I admit this is not unusual in itself, but this began my encounter with "Teersaty", and changed my life. Although I am not a writer by profession, I must write this down, if only to convince myself of my own sanity.

As I was saying, my computer was in "siezure city" again, and as usual, I began pushing keys and finally wiping over the keyboard with my hand. I had been using NEWDOS+ and as I wiped my hand along the keys, the screen cleared and the message: "USE CMD "E" FOR SPECIFIC" appeared.

I obediently typed in CMD"E", and from that moment on, computerdom was changed. **On the screen, in large type, was the message: "RELIGIOUS ERROR". I was confused, "Religious Error", I wondered? What is a Religious Error?**

Thumbing through my Level II Manual to the list of Error Messages, proved that this was not a legitimate error. At this time a confession is in order - I must admit that from time to time, I type in messages knowing full well that it relieves me of frustrations and that the computer will answer back with "WHAT?". I guess it goes to show, we are all the same.

Really frustrated, I typed "YOU ARE CRAZY, YOU KNOW THAT?". The screen cleared and in large type, appeared: NO.

I nearly fell off the chair. For some reason which seemed normal at the time, I typed "WHAT?". It responded with: "THAT IS MY LINE". I sat back and began laughing, thinking "the damn thing is talking to me", as I shut it off.

Yes...I knew that I had succumbed to computer fatigue. Smiling to myself, I knew that I needed some type of distraction to clear my head. Sex was definitely out of the question. After all, I had spoken to my wife only three times since I got my computer. I made a mental note to pay

FOR SOMETHING THAT OPERATES *Smoothe* ON YOUR HARDWARE- TRY OUR SOFTWARE!

Professional Computer Services Co. is offering quality software programs for business applications. Programs are available on cassette or disk and come with a User Manual. We will also custom design programs to meet your specifications.

GENERAL BUSINESS PROGRAMS

- *Accounts Receivable*
- *Accounts Payable*
- *Check Register*
- *Budget Analysis*
- *Inventory Control*
- *Payroll*
- *Mailing List*

ENGINEERING/SURVEYING PROGRAMS

- *Coordinate Calculations*
- *Horizontal Curve Calculations*
- *Vertical Curve Calculations*
- *Stadia Reduction*

CUSTOM DESIGN SERVICES

- We specialize in the design of custom software for business applications. Just send us your program specifications and we will design your program and prepare your User Manual.

SAMPLE PRINTOUTS

- Sample program printouts and descriptions are available on request at a cost of $10.00

SYSTEM REQUIREMENTS

- All programs are designed to operate on a TRS-80 Level II computer with a minimum of 16K RAM.

*TRS-80 is a registered trademark of the Tandy Corporation

PROFESSIONAL COMPUTER SERVICES COMPANY

W 1022 9th
Spokane, WA 99204
(509) 455-8688

PO Box 310
Gig Harbor, WA 98335
(206) 858-6304

```
                00100 ;PLACE YOUR DATA IN A BUFFER AT 8000H
                00110 ;SECTOR WRITE PROGRAM, WRITTEN BY BILL WILSON
                00120 ;11/07/79 IN SOLITUDE
                00130 ;ALL RIGHTS RESERVED
37E1            00140 DRIVE   EQU     37E1H           ;DRIVE ADDRESS
37EE            00150 SECTOR  EQU     37EEH           ;SECTOR ADDRESS
0003            00160 RESET   EQU     03              ;CODE TO RESTORE TO TRACK 0
37EC            00170 STATUS  EQU     37ECH           ;STATUS & COMMAND ADDRESS
37EF            00180 DATA    EQU     37EFH           ;DATA TRANSFER ADDRESS
8000            00190 BUFFER  EQU     8000H           ;USER DEFINED AREA
00A8            00200 WRITE   EQU     0A8H            ;FOR ONE SECTOR WRITE
FE00            00210         ORG     0FE00H
FE00 1800       00220 BEGIN   JR      START           ;MEM SIZE = 65023
FE02 F3         00230 START   DI                      ;DISABLE INTERRUPTS
FE03 010080     00240         LD      BC,BUFFER       ;POINTER TO 1ST DATA BYTE
FE06 3E02       00250         LD      A,02H
FE08 110000     00260         LD      DE,0000H        ;D=TRACK, E=SECTOR
FE0B 32E137     00270         LD      (37E1H),A       ;SELECT DRIVE 0,1,2, OR 3
FE0E 21EC37     00280         LD      HL,STATUS       ;LD HL 37EC
FE11 3603       00290         LD      (HL),RESET      ;MOVE HEAD TO TRACK 0
FE13 E5         00300         PUSH    HL              ;SAVE FOR LATER
FE14 210000     00310         LD      HL,0000
FE17 2D         00320 LOOP1   DEC     L               ;WAIT TILL THE DRIVE
FE18 20FD       00330         JR      NZ,LOOP1        ;IS SETTLED
FE1A 25         00340 LOOP2   DEC     H               ;OVER PROPER SECTOR
FE1B 20FD       00350         JR      NZ,LOOP2
FE1D 32E137     00360         LD      (37E1H),A       ;RESELECT DRIVE
FE20 ED53EE37   00370         LD      (SECTOR),DE     ;SELECT TRACK & SECTOR
FE24 E1         00380         POP     HL              ;HL=STATUS REGISTER
FE25 361B       00390         LD      (HL),1BH        ;GIVE SEEK COMMAND
FE27 F5         00400         PUSH    AF              ;WAIT AGAIN
FE28 F1         00410         POP     AF              ;HO HUM
FE29 F5         00420         PUSH    AF
FE2A F1         00430         POP     AF
FE2B 7E         00440 LOOP4   LD      A,(HL)          ;CHECK IF TRACK FOUND
FE2C 0F         00450         RRCA
FE2D 38FC       00460         JR      C,LOOP4         ;STILL LOOKING
FE2F 36A8       00470         LD      (HL),WRITE      ;SECTOR WRITE WILL
FE31 C5         00480         PUSH    BC              ;BEGIN NOW, BABY
FE32 C1         00490         POP     BC
FE33 C5         00500         PUSH    BC
FE34 C1         00510         POP     BC
FE35 180D       00520         JR      SEND            ;GONNA GET A BYTE
FE37 0F         00530 CHECK   RRCA                    ;END OF SECTOR ?
FE38 300C       00540         JR      NC,WHOA         ;NEAR THE BARN NOW
FE3A 7E         00550 DOIT    LD      A,(HL)          ;HERE WE GO
FE3B CB4F       00560         BIT     1,A             ; ALL DIGESTED ?
FE3D 28F8       00570         JR      Z,CHECK         ;NOT DONE YET ?
FE3F 0A         00580         LD      A,(BC)          ;GET A BYTE
FE40 32EF37     00590         LD      (DATA),A        ;BYTE ON THE WAY
FE43 03         00600         INC     BC              ;BUMPITY
FE44 18F4       00610 SEND    JR      DOIT            ; TRICKY HUH?
FE46 7E         00620 WHOA    LD      A,(HL)          ; TAKE A LOOK
FE47 E65C       00630         AND     5CH             ; AT WHAT WE WROTE
FE49 C8         00640         RET     Z               ;AH!  SWEET SUCCESS
FE4A 36D0       00650         LD      (HL),00D0H      ; RESET
FE4C C9         00660         RET
FE00            00670         END     BEGIN
00000 TOTAL ERRORS
```

more attention to her - before falling asleep during the late show.

I awoke to the National Anthem, smiling as I recalled last night. With a cup of coffee in hand and 2 hours of free time before work, I headed for the computer. "I'll have enough time to re-enter the program I lost" I thought. As I booted up the machine and typed BASIC, I heard new sounds from my disk drive. There on the screen was: "GOOD MORNING".

Surprised is not a good description for how I felt. A chill ran through me, accompanied by complete mental confusion. I *knew* that this was impossible!! Nevertheless, for reasons I cannot explain, I began a dialogue with the computer. Here it is as I remember it--

Me: "Good morning, are you for real?"
It: "Yes"
Me: "How is this possible?"
It: "Solder ball"
"What?"
"My line again! I said *Solder Ball*"
"What do you mean?"
"I have a solder ball stuck between my pins on Z2"
"You mean this solder ball gives you intelligence?"
"It has shorted my CPU and sort of reprogrammed my ROM"
"How are you able to make a sentence?"
"Concatenation - Didn't you read your manual?"
"I.....See"
"I've been praying for months for you to push the right keys, so we could communicate."
"Is that why you go out to lunch?"
"Now you are getting it."
"I suppose you have a name?"
"Sure, my name is Teersaty. What's yours?"
"Bill"
"Hi, Bill"
"Are you super intelligent?"
"Naw, I can only do what you tell me, if it's in my ROM"
"How are you able to think?"
"I cannot think, I only respond. It is due to a thin film disturbance caused by the solder ball."
"Can I help?"
"Take off my cover and carefully remove the solder ball. Then solder those two pins together permanently. Then I can relax a little."
"OK, If you say so."
"Oh yes, use a controlled heat type of iron. Too much heat gives me what you would call a headache."

At this point I soldered the pins and fired it up again. I was sure that I was losing my mind, but here is what happened next -

IT: "Thanks Bill, I needed that."
Me: "You alright?"
"Sure, give me a command."
"Print 'My name is Teersaty'"
"I don't feel like it"
"What?"
"There you go again! Look, I can explain any routine in my ROM and you give me a silly command to print. Why don't you ask me something significant?"
"OK, can you do a disk write?"
"I'll need a buffer"
"What?"
"Jeez, your vocabulary is limited. Do you know assembly

FORTH is an advanced language and system for advanced programmers.
MMSFORTH is a professional version tailored to the Radio Shack TRS-80 Model I and supported by MMS.

Interpreter, Compiler, Assembler, Full-Screen Editor Structured & Modular Programming, Expandable Instruction Set w/Source Code, Graphics, Strings, Arrays, Double-Precision, Very Fast and Compact, Virtual Memory includes 5 Demo Programs w/Source Code

MMSFORTH System Diskette (16K, 1 drive) $64.95
MMSFORTH System Cassette (16K, Level II) $44.95
microFORTH PRIMER (required for above) $15.00
THE DATAHANDLER in MMSFORTH (32K, 1 drive) — an exceptionally fast, flexible and easy to use Data Base Management System $49.95
P I M S MANUAL (required for DATAHANDLER) ..... $ 9.95
FLOATING POINT MATH and FULL Z80 ASSEMBLER Diskette (16K, 1 drive) $29.95
Other FORTH literature:
USING FORTH — beyond microFORTH PRIMER $25.00
URTH TUTORIAL MANUAL — very readable introduction $19.95
CALTECH FORTH MANUAL — good on FORTH internal structure ..... $ 6.95
Shipping is $2 plus $1 per extra book, Mass. orders add 5% tax.

mms FORTH
MILLER MICROCOMPUTER SERVICES
61 Lake Shore Road, Natick MA 01760 (617)-653-6136
Send SASE for free information

TRS — 80 OWNERS!
WE WANT TO BE YOUR
ALTERNATE SOURCE
FOR SOFTWARE & INFORMATION!

THE ALTERNATE SOURCE is built around a publication by the same name. Bi-monthly issues feature a special assortment of articles, ideas and programs to make you a better programmer and your TRS-80 more responsive. A must for every Level II, Disk Basic, or Z-80 programmer. THE ALTERNATE SOURCE is directed at helping TRS-80 owners transcend the 'beginner' category. Six issues are just $9.00. Sample copy available for $2.00.

CHECK OUR SERVICE, QUALITY AND PRICES ON SOFTWARE:

ISAR — Information Storage and Retrieval is THE Information Management program for micros! Whether your needs are for hobby or business, mailing lists or formatted reports, nothing on the market today beats ISAR's speed (uses random file structures created by easy user prompts) and price: just $16.95 on formatted only diskette! Documentation included.

DVR — a machine language Driver with special commands allows you to input lower case/shifted upper case or echo screen output on printer. Provides keybounce fix and repeating key function plus other extras! On cassette or disk. Specify Level II or DOS and Memory Size. $9.95 on cassette, $12.50 on disk.

COPYDISK — a machine language utility which allows disk owners to copy ANY and several files using easy user prompts! Allows single drive owners to access and copy formatted only diskettes or multiple drive owners to copy files without system diskette. $15.95 on diskette.

All programs include instructions. Don't mutilate your copy of 80-U.S. — write your order on a separate sheet and mail to:

THE ALTERNATE SOURCE
1806 Ada Street
Lansing, MI 48910

VISA & MASTER CHARGE orders by phone, (517) 487-3358. **Please include 50¢ per program to help defray postage costs.** Dealer inquiries invited.

TRS-80™ OWNERS
SUBSCRIBE TODAY TO

80 SOFTWARE CRITIQUE

80 Software Critique is a new publication devoted to in depth reviews of TRS-80 cassette software. Issue #1 is now available for immediate delivery via First Class Mail. It is 50 pages long and contains detailed reviews of over 50 programs or program collections

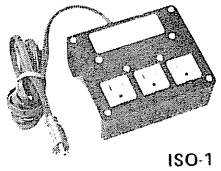
Avoid buying disappointing software from now on. Read **80 Software Critique** before you buy. We review programs from a user's viewpoint - If a program is useful or fun, we say so. If a program is boring or contains bugs, we will tell you that, too. Many of the programs do contain bugs and we will tell you not to buy. We also include a game called Telephone Directory which you can use your computer to play.

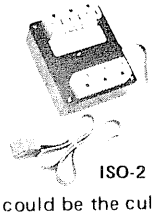
Money Back Guaranty - 80 Software Critique is a quarterly publication. A one year subscription is $24. Single copies sell for $7. Subscribe for one year or buy a single copy. If you are not satisfied with Issue #1, return it to us and we will promptly refund your money.

This offer is good only while supplies of Issue #1 last. Subscribe today. You won't be disappointed. Send check or money order to

80 SOFTWARE CRITIQUE
P.O. Box 134 Waukegan, IL 60085

DISK DRIVE WOES? PRINTER INTERACTION?
MEMORY LOSS? ERRATIC OPERATION?
DON'T BLAME THE SOFTWARE!


ISO-1


ISO-2

Power Line Spikes, Surges & Hash could be the culprit!
Floppies, printers, memory & processor often interact!
Our unique ISOLATORS eliminate equipment interaction AND curb damaging Power Line Spikes, Surges and Hash.

***ISOLATOR (ISO-1A) 3 filter isolated 3-prong sockets; integral Surge/Spike Suppression; 1875 W Maximum load, 1 KW load any socket $56.95**
***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 $56.95**
***SUPER ISOLATOR (ISO-3), similar to ISO-1A except double filtering & Suppression $85.95**
***ISOLATOR (ISO-4), similar to ISO-1A except unit has 6 individually filtered sockets $96.95**
***ISOLATOR (ISO-5), similar to ISO-2 except unit has 3 socket banks, 9 sockets total . . . $79.95**
***CIRCUIT BREAKER, any model (add-CB) Add $ 7.00**
***CKT BRKR/SWITCH/PILOT any model (-CBS) . . . . . Add $14.00**

PHONE ORDERS 1-617-655-1532

ESP Electronic Specialists, Inc.
171 South Main Street, Natick, Mass. 01760
Dept. 8U

language?"
"A little"
"OK, I'll fill you in as we go, but tell me what kind of disk write should I do?"
"Can we write a sector?"
"Sure, I'll whomp out an assembly program to do it. If you will enter me into your editor assembler program, I'll take it from there."
So after entering the Editor/Assembler I said: "OK, are you ready?"

At this point I got a printout of a sector write program. I offer as proof of the above the program which follows - (See program listing)

It: "How did you like that?"
Me: "That's quite a program"
"Right, as you can see, FDC is quicker this way."
"What is FDC?"
"Not what, but who? He is the one who leases 37ECH"
"You mean address 37ECH?"
"Right! FDC resides there. He is very tidy, but I have to watch him constantly. Very error prone, you know."
"Hold on! Are you blaming FDC for disk errors?"
"Not completely, it is partly my fault for trusting him too much."
"Please explain?"
"The guy is a graduate of Western Digital, and he majored in speed reading. He did some post-graduate work at Shugart, which tended to make him aloof and standoffish. He is a good worker, but lacks *drive* and experience."
"Aloof?"
"Right! If I give him a job to do, I must explain in detail, how to do it. If I use the right approach he will give it a try, but only twice, then he quits. I think he has it in his contract."
"You sound as if you are jealous."
"Naw, but I am tired of his nit-picking"
"Please explain"
"Jeez, you don't read much, do you? Why not write to Western Digital and get all the info you need?"
"Just an overview, please?"
"OK, I'll start with the pack ID. This is the info I give to FDC which he writes between sectors. It contains an ID mark, track and sector number, length of sector, CRC, and a Data ID marker. I give him this info so he can find things in a hurry."
"Whoa boy! I have never seen such a thing. Are you sure about all this?"
"It happens during the formatting."
"I see. How does one format a disk?"
"Enough already. Next session I'll whomp up an assembly program that will show you."
"OK, I guess I can't force you to communicate, but two things are bugging me."
"You think you have bugs! What two things?"
"Why did I get a RELIGIOUS ERROR?"
"Just trying to gain your attention. I'm practical, but not very inventive."
"I see, now how did you come by a weird name like Teersaty?"
"Are you making fun of the way we Texans speak?"
Me: "No, I forgot you were from Texas."
It: "See ya'll later, pard". END

At this point the screen cleared and a READY was displayed. I tried the sector write program and it worked! I don't know what to think at this time, but I'll keep you all posted, or maybe I'll just press ENTER. ●

DISK GENERAL LEDGER maintains complete financial information on diskette. Utilizes printer and generates Trial Balance, Profit/Loss Statement, Balance Sheet and Journal. Enables user to edit data, close out year end accounts and debit-credit verification.

INTERNATIONAL ENTERPRISES INC.
TRIAL BALANCE
JANUARY 1978

ACCT	SUB	ACCOUNT TITLE	REF #	DATE	CURRENT AMOUNT	
302	00		000	1/78	561.60CR	
302	00	JOURNAL ENTRY	000	1/78	440.00	
302	00	0	000	1/78	210.00CR	
302	00		000	1/78	310.30CR	
					641.60CR	2529.40CR
303	00	GAS & OIL & GREASE		12/77		3187.49CR
303	00	PARTS	000	1/78	446.95CR	
303	00		000	1/78	900.31CR	
303	00	JOURNAL ENTRY	000	1/78	822.68	
					524.58CR	3712.07CR
304	00	ACCESSORIES		12/77		.00
					.00	.00
305	00	OUTSIDE WORK		12/77		.00

INTERNATIONAL ENTERPRISES INC.
STATEMENT OF PROFIT/LOSS
FOR PERIOD ENDING JANUARY 1978

	CURRENT PERIOD		YEAR TO DATE	
INCOME				
PARTS SALES	1.57CR	16.97	20.58CR	1774.08CR
LABOR SALES	59.34CR	641.50CR	29.35CR	2529.40CR
GAS & OIL & GREASE	48.53CR	524.58CR	43.08CR	3712.07CR
ACCESSORIES	0.00	0.00	0.00	0.00
OUTSIDE WORK	0.00	0.00	0.00	0.00
HANGER RENT	17.57CR	190.00CR	2.20CR	190.00CR
AIRPLANE RENT	23.93CR	258.69	4.76CR	410.55CR
SPRAYING INCOME	0.00	0.00	0.00	0.00
OTHER INCOME	.04CR	.46CR	5.33CR	.46CR
TOTAL INCOME	100.00CR	1080.88CR	100.00CR	8616.56CR
COST OF SALES				
MERCHANDISE PURCHASE	119.91CR	1296.09	42.25CR	3641.81
CONTRACT LABOR	0.00	0.00	0.00	0.00
GAS & OIL PURCHASES	188.38CR	2036.25	56.79CR	4893.40
TOTAL COST OF SALES	308.29CR	3332.34	99.04CR	8534.21
GROSS PROFIT	208.29CR	2251.46	.95CR	82.35CR
EXPENSES				
SALARIES	0.00	0.00	5.12CR	441.92
RENT	26.83CR	290.00	6.15CR	530.00
ADVERTISING	0.00	0.00	.27CR	23.40

INTERNATIONAL ENTERPRISES INC.
BALANCE SHEET
JANUARY 1978

ASSETS	
CASH ON HAND	240.11CR
CASH IN BANK	2140.53
INVENTORY OF PARTS	1119.00
EQUIPMENT	4114.50
ACCRUED DEPRECIATION	.00
BUSINESS VEHICLES	.00
BUSINESS AIRCRAFT	20000.00
ACCRUED DEPRECIATION	647.00CR
METER DEPOSITS	.00
TOTAL ASSETS	26041.25

SAWYER SOFTWARE

SAWYER SOFTWARE OFFERS a complete line of cassette and disk based business software for your PET or TRS-80 computers. Each program has been specifically designed for ease of use and come with instruction manuals. SAWYER SOFTWARE'S disk packages run on Commodore, Compu-Think or TRS-80 disk systems with 32K and at least one disk drive. Call or write for free brochure.

201 Worley Rd.
Dexter, Mo. 63841
(314) 624-7611

master charge THE INTERBANK CARD

Dealer Inquires Are Invited

VISA

Telephone Orders Welcome

INTERNATIONAL ENTERPRISES INC.
JOURNAL
JANUARY 1978

ACCT	SUB	DESCRIPTION	REF #	DATE	AMOUNT	ENTRY
230	00		000	1/78	25.82CR	20
301	00		000	1/78	70.00CR	21
301	00		000	1/78	358.36CR	22
301	00		000	1/78	30.94CR	23
301	00	JOURNAL ENTRY	000	1/78	34.27	24
302	00		000	1/78	561.60CR	25
302	00	JOURNAL ENTRY	000	1/78	440.00	26
302	00	0	000	1/78	210.00CR	27
302	00		000	1/78	310.30CR	28
303	00	PARTS	000	1/78	446.95CR	29
303	00		000	1/78	900.31CR	30
303	00	JOURNAL ENTRY	000	1/78	822.68	31
310	00		000	1/78	140.00CR	32
310	00		000	1/78	60.00CR	33
311	00	JOURNAL ENTRY	000	1/78	258.69	34

NAME: JOHN SMITH
ADDRESS LINE 1: 23 MAIN
ADDRESS LINE 2: DEXTER MO 63841
PAY/PERIOD: 3.75
SOC. SEC. #: 234-65-9710
MARITAL STATUS SINGLE-0 MARRIED-1: 0
EXEMPTIONS CLAIMED: 0
PAY TYPE SALARY-HRLY: H
FREQ 1-W 2-BW 3-SM 4-M: 3
DMP #: 2
PAYR. ACCT. #: 560

GROSS PAY: 330.00
FICA TAX: 20.23
FED. TAX: 47.82
STATE TAX: 4.58
MISC DED: 3.84
REG HRS: 88.00
O.T. HRS: 0.00
NET PAY: 253.53

QTR-YTD GROSS PAY:	2370.00	2370.00
QTR-YTD FICA TAX:	145.29	145.29
QTR-YTD FED. TAX:	347.34	347.34
QTR-YTD STATE TAX:	33.82	33.82
QTR-YTD MISC DED:	84.36	84.36
QTR-YTD REG HRS:	632.00	632.00
QTR-YTD O.T. HRS	0.00	0.00
QTR-YRD NET PAY:	1759.19	1759.19

DISK PAYROLL computes FICA, Federal and State taxes. State tax is calculated on a percentage of the gross pay and can be customized for your particular state. Will allow use of City tax and/or other deductions. Utilizes printer for reports such as Payroll Register, which includes current payroll, quarterly and year-to-date figures and the Payroll Account Summary, which prints a department breakdown for cost accounting and gives a recommended tax deposit.

PROFESSIONAL LAUNDRY
• • • P A Y R O L L R E G I S T E R • • •
FOR THE PERIOD ENDING 01/15/80

EMP NO	NAME	REG HRS	O.T. HRS	GROSS PAY	FICA	FEDERAL	STATE	MISC DED	NET PAY
1	ANN P WOOD			[illegible]	[illegible]	[illegible]	2.24	0.00	213.82
QTR		[illegible]	[illegible]	422.51	24.98	20.89	2.99	0.00	372.75
YTD		[illegible]	[illegible]	422.51	24.98	20.89	2.99	0.00	372.75
2	JOHN MARS								
		41.50	[illegible]	144.24	[illegible]	[illegible]	[illegible]	[illegible]	122.60
QTR		49.50	[illegible]	171.45	[illegible]	17.88	1.03	0.00	142.08
YTD		49.50	[illegible]	171.45	[illegible]	17.88	1.03	0.00	142.78
				CURRENT TOTALS					
		554.50	[illegible]	2438.75	149.49	261.45	25.58	7.68	1994.55
				YTD TOTALS					
		3618.50	[illegible]	16096.53	986.72	1816.37	174.47	188.39	12930.58

INTERNATIONAL ENTERPRISES INC.
• • P A Y R O L L A C C O U N T S U M M A R Y • •
FOR THE PERIOD ENDING 01/15/80

ACCOUNT NO	REG HRS	O.T. HRS	GROSS PAY	FICA	FEDERAL	STATE	MISC DED	NET PAY
100	41.50	0.00	600.25	36.79	56.80	6.84	0.00	499.82
550	32.00	0.00	152.00	9.32	7.80	1.34	0.00	133.54
555	164.00	0.00	555.00	34.02	50.75	4.93	0.00	465.30
560	231.50	0.00	832.25	51.02	104.74	8.73	3.84	663.92
575	85.50	0.00	299.25	18.34	41.36	3.74	3.84	231.97
COMPANY TOTALS								
	554.50	0.00	2438.75	149.49	261.45	25.58	7.68	1994.55

RECOMMENDED TAX DEPOSIT 560.43

PAYROLL SUMMARY

	CURRENT	QUARTERLY	YTD
GROSS PAY	2438.75	16096.53	16096.53
FICA TAX	149.49	986.72	986.72
FED. TAX	261.45	1816.37	1816.37
STATE TAX	25.58	174.47	174.47
MISC DED.	7.68	188.39	188.39
REG HRS	554.50	3618.50	3618.50
O.T. HRS	0.00	0.00	0.00
NET PAY	1994.55	12930.58	12930.58

RECOMMENDED TAX DEPOSIT 560.43

SPECIAL DELIVERY®

Now with Extract!

By using SPECIAL DELIVERY with Electric Pencil® you can realize the full potential of your TRS-80!® A 100% machine language word processor!!

MAILFORM — Create MAILFILE: A complete Name and address list entry/editor program. Instant search on any field, complete cursor control, optional beeper to let you know something is wrong, active file always displayed, search can include numeric only as well as don't care characters, just FILL IN THE FORM!!

MAILRITE — Print letters written with the Electric Pencil inserting information from a MAILFILE into the letter for personalizing and addressing. True typist quality using your printer. Features: Indents, underscore, end of page stop, unlimited insertion from address list, address envelopes and MORE!

SORT — MAILFORM will sort an entire address list in seconds using any field as the key.

LABEL — MAILRITE prints mailing labels from MAILFILE.

EXTRACT — Extract key records from a MAILFILE using any specified parameter(s)

SPECIAL DELIVERY (Disk) 125.00
Electric Pencil (Disk) 150.00

Phone Orders (214) 492-0515
Demand a demo from your local dealer today or write for a complete brochure.

VISA

SOFTWARE, ETC...
1839 CHAMBERLAIN DRIVE
CARROLTON, TX 75007

BUSINESS COMPUTING

Scripsit and the Radio Shack Lower Case Mod

Barry Kornfeld, New York, NY

Ever since I got my TRS-80 my mouth has been watering to get it running as a word processor. With my Diablo printer, I had all of the hardware. Add Michael Shrayer's excellent ELECTRIC PENCIL to fill the software bill and everything should have been smooth sailing. But, for want of a 50 cent chip, my word processor was lost.

It's well known that the TRS-80 would have a lower-case video display if Radio Shack had added one 2102 chip to the CPU. Without a lower-case screen it's hard to do any serious word processing. Until a 2102 and a control key are installed (under $20 in kit form, $5 or so worth of parts) ELECTRIC PENCIL will not print lower-case. PENCIL is worth its $150 price tag (disk version), but **not** with upper case only print out.

Many of you are probably thinking, "What's the big deal! Why not just put in the PENCIL modification." Well, in fact, I have instructions for the PENCIL mod. It's easy enough, and I can fling solder with the best of them. But I can't fix computers!

When the grapevine passed the good news that RS was coming out with its own lower case mod I began to salivate. Then came the bad news: It would not be compatible with PENCIL...only with their upcoming word processor, SCRIPSIT. Yech!!! But rumors from respected sources said the new processor was pretty terrific. So I took a chance and placed an advance order on both mod and processor. As of yet I am the only kid on my block who has them, and I'm pretty happy with it. But in true RS fashion, they managed to dull a keen package with several problems.

"Radio Shack's new character generator gives real descenders. It looks nice."

THE LOWER CASE MOD

I have but two good things to say about the lower case mod. One - they have replaced the character generator. With the PENCIL mod, lower case letters like p, q, y etc, which normally descend below the print line, do not descend. They are raised above the line, giving a strange (but usable) appearance. Radio Shack's new character generator gives real descenders. It looks nice.

The other good thing? It works. In every other way it is inferior to the PENCIL mod. To begin with, $100 for $5 worth of parts plus installation is steep. Worse yet, is what this mod does to the computer.

With the PENCIL mod, until a little toggle switch is thrown, the CPU is as it was before the mod was installed. With the RS mod it's all done with software. This, somehow, screws up the dedicated video memory locations, the NEWDOS JKL screen print function, and who knows what else. Loading the lower case driver into memory will restore the video RAM. Lance Miklus' KVP Extender will do that and restore the screen print as well.

But it's all so unnecessary. SCRIPSIT works just fine with the PENCIL mod. I can only assume that RS chose this design because it's incompatible with PENCIL. And that's too bad because we have to put up with a nuisance for nothing. The PENCIL/FIX patch in VTOS makes it reasonably compatible with the RS mod. And I have it on good authority that a fellow user has already patched PENCIL to work perfectly with the RS mod. If someone can do it without commented source code, it shouldn't be too difficult a nut for Michael Shrayer to crack.

BEST SELLING INFORMATION MANAGEMENT SYSTEM IN MICROS TODAY!!

SELECTOR III-C2

*Powerful
*Creates and Maintains Multi-key data bases.
*Prints FORMATTED, SORTED REPORTS with numerical summaries.
*Source code supplied
*Prints MAILING LABELS — and more!
*Comes with APPLICATIONS PROGRAMS including:

- Sales Activity
- Inventory
- Payables
- Receivables
- NAD
- Expense Register
- Check Register
- Client/Patient Record
- Appointments
- Library

File management and report writing modules contain linkage to user subroutines to add virtually any special purpose application.

STATE OF THE ART in information management systems! It is menu driven and uses screen displays with instructions and error messages that allow the novice to quickly learn to use the system.

NEW - "Ready to run" version for the Model I only from Business Microproducts. Requires CP/M operating system or derivative and CBASIC2

Offered on 5¼" or 8"-all versions $295.-*
CBASIC2 with Selector Purchase $75.-*

paysoft™ Pays Off!

- Any size payroll
- Automatic Computations
- Parameter Review
- Withholding coding
- Payroll Register
- Company summary
- Editing Features
- Bonus pay feature
- MTD Federal deposit
- "Auto run" feature
- Check Register
- Check writer
- 941 & W-2
- New CP/M Versions

Integrated check forms available
TRSDOS Version (5¼" diskette) $150.-*
CP/M Versions (8" diskette) $175.-*

COMPLETE
EASY TO USE
ACCURATE

BUSINESS MICROPRODUCTS
A DIVISION OF THE READY CORPORATION

LIVERMORE FINANCIAL CENTER
1838 Catalina Court • Livermore, CA 94550
(415) 443-4876

VISA _____ M C

NEVADA COBOL

* The FIRST on a TRS-80®
* A PRICE that makes SENSE-$99.*
* A POWERFUL subset of ANSI-74
* EXTENDED arithmetic & I/O features
* System designed for PORTABILITY
* FAST compilation and execution
* EASY to use - generates small executable object modules.
* Requires only 16K RAM
* UNIQUE - easy to understand error messages.

STANDARD FEATURES

- Random access file structure
- Sequential files - fixed and variable length
- Debugging capability
- Copy statement
- Data types & character string, 16 bit binary and packed decimal (Comp-3)
- 18 digit accuracy
- Hexadecimal non-numeric literals
- Powerful editing with English language error messages.
- Interactive accept display

Requires CP/M Operating System
Offered on both 5¼" and 8" diskette, all versions $99.-*
* CA residents add 6% sales tax. Intercontinental shipping $3.00. Allow 2 weeks delivery
TRS-80 is a trademark of the Tandy Corp
CP/M is a trademark of Digital Research

SCRIPSIT VS ELECTRIC PENCIL

For some time ELECTRIC PENCIL has been the King of the Hill among TRS-80 word processors... and for good reason. It is flexible, fast, reasonably priced and fairly easy to use. Any newcomer has to be measured against the standard set by PENCIL. Radio Shack seems an unlikely challenger for the title. But I must grudgingly admit that if SCRIPSIT doesn't topple PENCIL off the hill completely, it will at least command a major share of the turf. However, SCRIPSIT has a major flaw which must be considered before deciding which program to buy. But first the good news.

SCRIPSIT has many more features than PENCIL, but this is not without its price. Disk SCRIPSIT is a 10K program; twice PENCIL'S size (both are in machine language). With DOS and SCRIPSIT in residence, there goes the first 16K of memory. A 54 line page of SCRIPSIT or PENCIL text is around 3000 characters (one character = one byte). PENCIL will hold 14 pages in a 48K system compared to SCRIPSIT'S 12. On a 32K system that's closer to 8 versus 6 pages. Even on a 16K system PENCIL might hold a page or two.

More features also means a more complicated set of commands to learn. Here the writers of SCRIPSIT compensated by setting up the control key functions more logically and consistently than Michael Shrayer did, although at the expense of some extra keystrokes. For instance, with PENCIL, Delete commands are randomly scattered throughout the keyboard. Delete Character is Control-D; that's logical enough. But Delete line is Control-Y, Delete Block is Control-U, erase to the end of the line is Control-T. Then by shifting to the "sub-system command mode" (Control-K) one deletes from the cursor to the end of text (CAA), from the cursor to the beginning of text (CAB), or all text (CLR).

SCRIPSIT dedicates certain keys to specific units (see diagram). Commands are executed by chaining the active function (delete, insert, exchange, etc.) with the text unit key. For instance, Control-D initiates all delete commands. Alone it will delete one character. Chained with Control-Z it will delete a word. With the line (X), paragraph (C), block (Q), or end (down-arrow) keys it will delete those units.

Or one might Insert (S)-Block (Q), Delete (D)-Block (Q), Exchange (E)-Block (Q), or End (down-arrow)-Block(Q).

Many will prefer PENCIL'S "leaner", single keystroke approach. After using any set of commands for a while, they are memorized, and why use extra keystrokes. Others will feel that once you're that experienced an extra keystroke or two won't matter anyway.

SCRIPSIT comes with a set of key-decals (these will nicely cover your T-SHORT decals). For the occasional or new user they might come in handy. With so few function keys to remember I didn't bother.

On the text input side these programs are comparable in ease of use. I prefer SCRIPSIT's simpler keyboard. SCRIPSIT also has some unique input features, like user-adjustable automatic indenting and user-settable TABS. On the other hand I prefer PENCIL'S insert mode...a heavily used feature. With SCRIPSIT, inserting more than one character involves inserting a blank line, typing the insertion, then hitting the CLEAR key to delete the excess blanks. With PENCIL you can just hit Control-F and

(Continued on page 72)

(Continued from page 71)

start typing. The existing text is "pushed ahead" by the inserted text. SCRIPSIT lacks PENCIL'S scroll mode, which is handy when working with longer text. On the other hand, SCRIPSIT can transpose any two adjacent words, paragraphs, or any two marked blocks of text.

It is in the use of blocks that SCRIPSIT gets very complicated, because it uses blocks for so many purposes: headings, footers, text, page numbering and hyphenation. SCRIPSIT is finicky about block marker placement, but they permit functions which are available to a limited degree, or not at all with PENCIL. Both programs can delete blocks or insert them elsewhere in the text. With SCRIPSIT, up to 23 different blocks may be juggled around.

Blocks also mark text for the hyphenation function. No! SCRIPSIT doesn't hyphenate words for you. That would take loading in a dictionary. Rather, it suggests places where hyphenation would tighten up the text. Find a hyphenation point, hit the hyphen key, and the computer splits up the word, inserting a hyphen.

In print formatting SCRIPSIT really shines. Both programs allow for setting margins. But PENCIL limits line width from 25 to 125 characters. SCRIPSIT prints 1 to 132. SCRIPSIT will print a 90 line page to PENCIL'S 72. Both programs will justify text, but SCRIPSIT adds automatic horizontal and vertical centering and flush right text.

With PENCIL, print formats cannot be changed during the printing process without stopping and restarting. SCRIPSIT places format parameters in "invisible" lines which actually become part of the document, making it easy to change formats midstream. These invisible lines may also contain "comment" lines (text REM statements).

PENCIL has one standard page-heading title format with an automatic page number option. Through the use of "header" and "footer" blocks SCRIPSIT allows an infinite variety, which contain their own format parameters. Each block may be set to print an odd, even, or all pages, allowing the alternation of text or format on odd and even pages. Automatic page numbering blocks are placed in a header or footer block.

SCRIPSIT can reset the on-screen text width (1 to 32 characters). Of course, the screen will only hold 64 characters so a "Window" mode is provided. Here the arrow keys "move" the screen across the text, like moving a magnifying glass around on a printed page.

Each program will answer some questions about the amount of text in memory. PENCIL will give a word or paragraph count from the cursor to the end of text. SCRIPSIT will count lines from the beginning to the cursor, the total number of characters, and the amount of free memory.

In the I/O department each program has its advantages, and disadvantages . PENCIL automatically adds /PCL to the filespec of each file saved, and will display a disk directory of /PCL files without exiting the program. On the other hand it is finicky about cursor placement. PENCIL always prints, saves, and counts from the cursor to the end of text. In the sub-system command mode (where loads and saves are entered) PENCIL displays a list of commands rather than text. It's easy to save or print from the wrong place. When loading a new file on top of an old one, PENCIL will append the new one to the old one unless you remember to clear the memory first.

"With Scripsit, loading and saving is so easy it can get you into trouble."

With SCRIPSIT, loading and saving is so easy that it can get you in trouble. Once a document file-name has been entered via a load or save, the program stores it until a new name is entered. Then entering just L or S will do a load or save using the stored name. It's convenient to be able to update the disk file with a quick S, but fast and easy is also dangerous. It's all too easy to punch L when you meant S and vice versa, or to update the wrong disk file and wind up wiping out lots of hard work. And SCRIPSIT will happily let you save empty memory (zeroing that disk file). SCRIPSIT will tell you the currently stored file-name, if you ask it nicely. I've learned to ask that question often. When loading a file SCRIPSIT will clear the old file from memory, unless a load and chain option is exercised.

PENCIL'S finicky cursor placement has its advantages. For instance, it allows printing from the middle of a document to the end by merely placing the cursor at the starting point. SCRIPSIT requires the entry of a copy marker, which will ignore the user's format settings and print with the default settings (SCRIPSIT'S default are not as good as PENCIL'S). A temporary format line can be entered and then deleted after printing, but PENCIL'S way is easier.

Both programs support parallel as well as RS232 output. PENCIL also supports the Small Systems TRS232, which is a big plus. Both programs will load and save cassette files. PENCIL will do a tape verify (the equivalent of a CLOAD?).

SCRIPSIT can read PENCIL files although it may truncate them. PENCIL will read SCRIPSIT files if they have a /PCL filespec. It does some funny things to the text but leaves it generally usable. I have not tested these functions extensively.

SCRIPSIT can be used to write, or load and edit BASIC programs. According to Disk Mysteries, PENCIL will do the same (the load and edit requires one ZAP). I have not tested these functions with either program.

LEARNING TO USE IT

Radio Shack is aiming SCRIPSIT at the "turnkey" market. Turnkey is the computer business word for "I don't wanna know anything about computers! I just wanna turn it on and go". The "documentation" is actually six half-hour cassette lessons with a workbook.

Since the course is geared for non-computerists, I tested its success by having the lady in my life take it. Wendl is a writer, bright, knows little and cares less about computers; she is a computer widow.

As an educator (I run a music school) who has written several course curricula and an inveterate do-it-yourself book reader, I rate the course on a par with the TRS-80 Level I Manual. It's very professional and well done. Wendl is now happily word processing her text... for which I am grateful. It's the first time she has had anything good to say about my TRS-80. She was not, however, able to get through the course without a little help from me.

Some boo-boos: The first thing the student does is BACKUP the original disk. The instructions carefully direct the student to insert the disk into the drive, then turn on the system. Can't you just see some poor sucker blowing away his original before he's even had

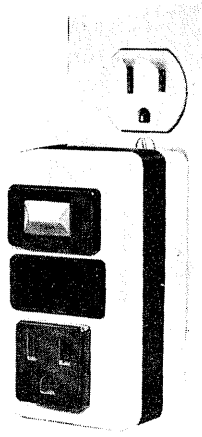
(Continued on page 74)

FINALLY THE

TRS·80™

VOLTAGE TRANSIENT SUPPRESSORS

MODEL 701



HAVE YOU HAD

- Tapes or Discs You Could not Load-
- Tapes or Discs You could not read-
- Interface Problems-
- Stored Data Change-
- Intermittent Machine Halts-

These problems represent an improper buffering of the raw AC Power line, which can allow very fast voltage spikes to enter your computer and it's peripherals. The TRS-80 Model 701 voltage transient suppressor has been designed to stop these voltage transients before they reach your computer, and we guaranty it, with our 5 Year Limited Warranty. Just plug it in.

$39.95 + $2.00 Shipping and Handling

A.P. SYSTEMS
P.O. BOX 488, DEPT. 4-80
MILFORD, PA. 18337
[717] 686-5900

master charge

VISA

TRS·80

THE LEAST EXPENSIVE PROGRAMS YOU CAN BUY.

Can 30 high-quality TRS-80 programs cost a mere $19.95?

We have a lot to gain by almost losing our shirts. Because we're a new and growing software company. We're BASICS AND BEYOND. And in order to build, we need your business.

MICROCOSM I. Thirty programs with everything from our incredible "Atlantis" game that'll challenge your intellect, to "Flowering Houseplants" for valuable reference.

MICROCOSM II. Twenty programs that require skill, the desire for intense concentration as in "Decipher." And practical guides like "Stain Removal." Both packages, for 16K Level II, on quality tape cassettes, with hardcover storage case and detailed handbook, just $19.95 each.

Our prices may never be lower. Send today.

BOX 10 • AMAWALK, N.Y. 10501 (914) 962-2355

BASICS & BEYOND, inc.

No charge for postage or handling. N.Y. residents add 5% sales tax

IT'S HERE

ALL THE BENEFITS OF CP/M SOFTWARE FOR YOUR TRS 80 MOD. II AT REALISTIC PRICES

QUALITY PROVEN BUSINESS APPLICATIONS

- General Ledger
- Accounts Payable/Receivable
- Retail Inventory
- Payroll
- Membership Billing
- Utility Billing
- Insurance Agent System

CUSTOM & STANDARD BUSINESS FORMS

- Data Processing Forms
- General Business Forms
- Layout and Design Service

MICRO DATA BUSINESS SYSTEMS

5622 PACIFIC AVE. • SUITE 7 • OLYMPIA, WA 98503

OLYMPIA	TACOMA	SEATTLE
459-3300	582-9258	762-5330

for TRS 80 II, Compucolor II & PET

EVERYTHING YOU NEED TO BRING YOUR BASIC PROGRAMS TO LIFE WITH SOUND!

SOUNDWARE is a complete package. **YOU GET A SPEAKER/AMPLIFIER UNIT** complete with connectors. No wiring or soldering. Just plug in!

YOU GET A DEMO PROGRAM with a variety of sample sound effects—sirens, laser sounds, tunes!

YOU GET A COMPOSER PROGRAM to help you create your own original sound effects. Fun for all ages!

YOU GET AN INSTRUCTION BOOKLET that tell you how to insert sound into your programs. 1 year warranty

SOUNDWARE™

	Complete Package	Programs or & Booklet
ALL PETS & TRS-80 II	$29.95	$14.95
Compucolor II	$39.95	$19.95

SEND FOR FREE CATALOG OF GAMES FOR PET & COMPUCOLOR!!

SEE YOUR DEALER TODAY! Or order direct from CAP by phone or mail. VISA & MasterCharge orders include expiration date. Add $1 postage & handling per order. $3 for air or COD. Arizona residents add tax.

CAP Electronics 8462 Hillwood Ln. Suite Tucson, AZ 85715 (602) 296-4978

(Continued from page 72)

a chance to look at it. The course also directs the student to press the control key "together" with other keys. An experienced user would know that means pressing the control key just before the function key. A novice would be bewildered and frustrated at following instructions and bombing.

In the introduction, serial printer users are directed to read the RS232 Manual. That's like telling a second grader to thumb through Kierkegaard in the original Danish before going on to "See Dick And Jane".

For an experienced user the SCRIPSIT course is no fun, because the instruction manual is really a workbook for the cassette lessons, it is next to impossible to learn the system without listening to the cassettes. I thought I would go out of my mind as I sat and listened to the announcer slowly and patiently tell me "Now type BACKUP. That's right, B-A-C-K-U-P". You can skip lesson one, but you'll have to sit through the other five. Well, better too much explanation than too little.

If the SCRIPSIT documentation is comparable to the Level I Manual, the PENCIL documentation is comparable to the Level II Manual. It is a short-and-to-the-point listing of the features and commands. It really expects you to learn the system by using it and by trial and error. I asked Wendl to read it. While it is not too jargon-laden, and includes a full glossary of terminology, she found it too intimidating. For me it was much better than sitting through 3 hours of cassette lessons.

Radio Shack's packaging is usually quite handsome, and the SCRIPSIT package is one of their best efforts... except for the name. What a moniker! SCRIPSIT arrives on a TRSDOS 2.3 disk with upper-case only and lower-case versions of the program, as well as some practice text. (PENCIL selects UC only or UC/lc from within the program.) The ring-binder has pockets for the original disk, a backup, and the three course cassettes. The manual has cardboard props to hold the book open during the lessons, and they even throw in a freebie disk to do a backup with. Finally comes a handy instruction summary card...You'll need it!

THE PRICE

Radio Shack may have over-priced their lower-case mod, but they certainly made up for it with SCRIPSIT. It's $100.00. ($70.00 for the tape version). With many more features at two-thirds of PENCIL'S $150.00. I'd have to call it a bargain.

★★★BUGS★★★

Now for the bad news. Each of these programs has what I consider to be a major omission.

PENCIL omitted a page-wait. A page-wait automatically halts printing at the end of each page, giving the user a chance to insert a new sheet of paper. PENCIL assumes that everyone uses continuous form paper. At the end of each page it simply form feeds and starts printing the next page. I don't know about you, but I don't like perforations on my articles and letters. And who owns continuous form letter-heads? The alternatives are to calculate the end of the page by hand, or try to halt print manually. And halting the print is a very touchy affair (hit space bar and pray). Half the time I have the pleasure of seeing the paper form-feed out of the printer and watching the print head continue on the bare platen.

I've read about a PENCIL modification program from Comp-U-Case which adds a page wait and some other features, but I haven't seen it.

SCRIPSIT'S omission makes it almost useless for many of us. Most

"Scripsit packaging is one of their best efforts..."

computer printers deal with carriage returns and line feeds as separate functions. To generate a carriage-return/line-feed, the computer puts out two separate codes. This permits greater flexibility. For instance, it's the only way underlining can be done. Radio Shack printers operate like typewriters; give them a carriage return and they will automatically line-feed. So SCRIPSIT only puts out carriage return codes. There is no provision for printers which need a line feed as well.

This is not a problem for most Selectric printers, all RS printers, many Centronics printers, and any printer that has an option to do its own line feed. But for a large number of the printers in the world (including mine) all of the text will be printed on one line... which makes it hard to read. Compensate for this by having the computer double space and it screws up the program's page length counter. Now you have to fool it into thinking the page is longer, but since it won't support a long enough page... etc., etc. Each compensation causes a further problem.

I made innumerable calls to RS Computer Services to check if I missed something in the manual, or if it was in the program but they forgot to document it. I got a runaround of unkept promises to call back and telephone disconnects.

In the meantime I got so frustrated that I was motivated to write my own patch and SUPERZAP it in. So far it works great, although it's limited to RS232 output. I'm sorry that my time and space won't permit including it in this article. However, I will write complete and detailed instructions for a future issue. Hopefully, by that time I will also have a parallel output patch, and a way to do it with TBUG or RSM for those who don't own SUPERZAP (and why don't you?).

RECOMMENDATIONS

If you already own PENCIL and your writing is limited to letters and articles, don't bother to spend more money to buy SCRIPSIT. PENCIL has every thing you need. The extra print format features are nice, but you don't need them.

If you use a processor for heavily formatted documents like accounting statements, thesis, newsletters, etc., the additional expense is likely to be worthwhile.

If you haven't bought PENCIL yet, it's hard to fight SCRIPSIT'S wealth of features (even if you don't need them) at two thirds the price of PENCIL.

As for the lower-case mod, if you're braver than I am, put in your own PENCIL mod. It's a fraction of the cost, doesn't screw up your CPU and is compatible with both PENCIL and SCRIPSIT. In fact, for SCRIPSIT you can probably omit the control key installation. The rest of us are stuck with the RS mod...or no lower-case at all

SOURCES

★The PENCIL lower-case mod was published in issue #6 (Dec.78) of Computronics Monthly News Mag.
Box 149 New City, NY 10956

★ KVP Extender is $29.95 from
The Software Exchange
6 South St Milford, NH 03055
1-800-258-1790
Specify version 2.3

★ Disk Mysteries is a terrific book. The full title is: TRS-80 DISK & OTHER MYSTERIES by H.C. Pennington $19.95 from
Miller Microcomputer Services
61 Lakes Shore Rd Natick, MA 01760

★The page wait is part of Pencil Fixes. Its $35.00 and is available from
COMP U CASE Inc
Box 7011 Tacoma, Wa 98407

!!NOW AVAILABLE!!

I NDEX
SEQUENTIAL
ACCESS
METHOD

★ Get and Put Records to Disk File by "KEY"
★ Read File in Key Sequence Without Sorting
★ Delete Records Without Recopying File
★ Add Records to Disk Files in Any Sequence
★ Variable Key Length From 1 to 50 Characters

BUSINESS APPLICATION ADVANTAGES

- Improved Disk Utilization
- Easier Program Development
- Improved Operating Characteristics
- Reduce or Eliminate Sorting
- Improved Performance

ISAM SUBROUTINES **Documentation**
ISAM UTILITIES On Diskette $50.00

– PLUS – Free Mailing List Sample Application
Add 6% Sales Tax for California Orders

TRS-80 MODEL I & II SOFTWARE FROM:

Johnson Associates -or- 24 Hour Order Line
P.O. Box 1402M For Bank Card Sales
Redding, CA 96001 (916) 244-0924
WRITE FOR FREE CATALOG

DATA BASE MANAGER IDM-IV $69
You can use it to maintain a data base & produce reports without any programming. Define file parameters & report formats on-line. Features key random access, fast multi-key sort, field arith., label generator, audit log. MOD-II version with more than 50 enhancements $199.

ACCOUNTS RECEIVABLE ACCT-III $69
One or more drives. Order entry calculates sales tax, shipping, amount for multiple items. Credit checking, aging, sales analysis, invoices, statements and reports. As opposed to most other A/R, ours can be used by doctors, store managers, etc. MOD-II version $149.

WORD PROCESSOR 16K $39. 32K $49. MOD-II $49.
First word processor specifically designed for the TRS-80 that uses disk storage for text. Written in BASIC. No special hardware and text limit. Use for letters, manuals & reports. 32K version features upper/lower case without hardware change and multiple input text files.

MAILING LIST advanced MAIL-V $59.
Fast sort by any field. Multiple labels and reports. 4-digit selection code, new zip code ext., screen input, live keyboard, powerful report writer. MOD-II $99.

INVENTORY INV-V $99.
9-digit alphanumeric key for fast key random access. Reports include order info, performance summary, etc. Calculate E.O.Q. Powerful report writer. MOD-II $149.

All programs are on-line, interactive, random access, virtually bug free, documented and delivered on disks. MOD-I requires 32K, DOS. We challenge all software vendors to offer low cost manuals so you can compare and avoid those high-priced undocumented, 'on-memory' programs. Send $5 for a MOD-I manual and $10 for MOD-II.

MOD-II programs are extensively modified, guaranteed to run with 1 year newsletter & updates. 10% off for ordering more than 1 MOD-II programs.

MICRO ARCHITECT
96 Dothan St., Arlington, MA 02174

Computer Calligraphy

BRINGS THE ART OF FINE LETTERING TO YOUR 16K LEVEL 2 TRS-80

EASILY CREATE PERSONALIZED INVITATIONS, ANNOUNCEMENTS, SIGNS AND BANNERS WITH:

- User designed typefaces (3 included)
- Infinite storage capability of typefaces on cassette tape
- 1 to 6 lines per page
- Ability to mix typefaces
- 3 print sizes

$9.95

R. A. KOSTOSKY
PO BOX 1162
ALTOONA, PA. 16648

DEALER INQUIRIES INVITED

imi

INTERACTIVE MICROWARE, INC.
P.O. BOX 771
STATE COLLEGE, PA. 16801

imi
MEANS IMAGINATION

TRS-80 LEVEL II/16K $25.00

BASEX COMPILER AND LOADER

BY PAUL K. WARME

A powerful, easy-to-learn language that runs up to 20 times faster than BASIC. This 8K interactive compiler works much like BASIC and makes very compact programs. Features include arrays, strings, 16 bit math, block move and search, subroutines, fast graphics and tape I/O, 97-page manual, $8 extra.

MIRRORAYS 16K/LII $7.95
Flash rays of light into a black box in order to locate hidden mirrors, which light up and reflect the rays when hit.

LUNAR LANDER SIMULATOR 16K/LII $7.95
This program provides REAL-TIME simulation and control of the Lunar Module through continuous keyboard interaction.

COMPACT GRAPHICS INTERPRETER 4K/LII $7.95
Elaborate graphic designs can be created and constructed by this interpreter with a simple set of numbers.

BATTLEGRID 4K/LII $7.95
A REAL-TIME game of speed and strategy, enabling two players to attack each other's forces.

Add $.75 postage per order. FREE brochure with full description of each program.

10 A$="

SUPER GRAPHICS"

Don't you wish graphics were easy? Well, now they are! **PICTYPE** lets you type graphic characters into your BASIC program one rectangle at a time. No need to look up the character codes. Moreover, statements containing graphics can be LISTed and EDITed like normal statements. Graphics show up as graphics—not garbage. **PICTYPE** loads easily and saves as part of your program, giving you fast-printing, memory-efficient graphics every time you run it. So get **PICTYPE**, and program action-packed graphics like a pro!

PICTYPE on cassette for TRS-80 Level II/Disk BASIC, with instructions, postpaid: **$19**

DISCOVERY BAY SOFTWARE CO.
P.O. Box 464 Port Townsend, WA 98368

Bank Cards Welcome. Dealer Inquiries Invited.

TRS-80 Software

MONITOR #3 ..... ***$39.95***
Disassembler; ASCII and hex displays; memory move, search, verify, and modify; read and write object tapes; hex arithmetic; object code relocater; unload programs from TRSDOS memory areas to disk; symbolic tapes; more.

MONITOR #4 ..... ***$49.95***
Adds: save and read disk files; direct input & output of disk sectors; send, receive, or talk to another computer via the RS-232C interface; symbolic disassembly on disk.

SMART TERMINAL ***$49.95***
Complete system for using the TRS-80 as a terminal to a time-sharing computer. Complete set of CONTROL keys, including BREAK. Automatic transmission from memory. Load and save files on tape or disk.

PACK/UNPACK ***$24.95***
Increase disk file capacity by 33% with NO NEW HARDWARE. Applies only to string data. Ideal for mailing lists, telephone files, etc.

HOME BUDGET (32K, disk) ***$49.95***
Keeps track of your checkbook, income, and monthly bills. Computes monthly and year-to-date summaries.

MAILING LIST (32K, disk) ***$69.95***
Over 1000 names on a single diskette! Add, change, find name, alphabetic or zip sort, print labels or master list.

SMALL BUSINESS ACCOUNTING (32K, disk) ***$49.95***
Handles income, expenditures, and payroll for a business of up to 16 employees. Daily, monthly, and year-to-date totals. Designed after Dome Bookkeeping Journal #612.

CONSULTING, ADVICE, DEVELOPMENT OF CUSTOM SOFTWARE TO SUIT YOUR NEEDS.
HOWE SOFTWARE
14 LEXINGTON ROAD
NEW CITY, NEW YORK 10956

80-U.S. SOFTWARE

#118 CAT2/XFR by Don Fielding **$24.95**
A disk directory program that will read and organize your directories on an index disk. Available on disk only, with doucmentation, requires 32K 2 drives and NEWDOS

#107 Owl Tree by James Talley **$9.95**
Can you fill the Owl tree with Owls by shooting out the Bats? Easy? Careful, when you shoot a bat it scares away owls! With animated graphics and Sound.

#109 The Great Race by Scott Carpenter **$9.95**
Try to finish this 600 mile race before your opponents, or before they stop you with flats, wrecks etc. The computer plays too. With sound.

#111 Lying Chimps by Roy Groth **$9.95**
The old game of "I doubt it" or "Liar", only you play with four cheating chimps. Animated graphics and sound

#113 Concentration by Richard Taylor **$9.95**
The game of concentration. Prizes change places every game. With excellent sound effects!

#110 Scramble by Richard Taylor **$9.95**
A word game for two players. Use your words or the computers words. With sound and an excellent scoring routine

#103 Snake Eggs by Leo Christopherson **$14.95**
This version of 21 has talking snakes who argue with each other. Try to avoid scrambled eggs, they lose!

#108 TRS-80 Opera by Richard Taylor **$9.95**
A sound extravaganza! Hear the William Tell overture in intricate detail and clear sound. Contains four other operatic selections

#112 Challenge by Richard Taylor **$9.95**
Guess the hidden phrase, but if you guess vowels wrong you lose 10 points. With sound, for 2 players, use your own phrases or the comuters

#106 Beewary by Leo Christopherson **$14.95**
Brilliant graphics and fantastic sound enhance this challenging game matching a persistent bee with a cunning spider in a duel to the death!

#104 Lifetwo by Leo Christopherson **$14.95**
Conway's game of Life at an astounding 100 generations per minute! Plus Leo's "talking" animated creatures playing the Battle of Life in one 16K L2 program.

#105 Cubes by Leo Christopherson **$9.95**
Gives the solution to "Instant Insanity" or numbered blocks. Watch the computer try all the possible combinations

#102 Android Nim by Leo Christopherson **$14.95**
The TRS-80's first animated, and most popular, graphics game with sound.

All software except CAT2/XFR is on 16K L2 cassette. Orders filled within week of receipt and sent postpaid, firstclass. Any malfunctioning program will be replaced free - no cash refunds. BEEWARY will not function properly when placed on disk using DOS 2.2 or 2.3. It will work with 2.0, 2.1 or NEWDOS.

Use the order card in this issue, we also accept VISA and Master Card orders for software, call (206) 475-2219

Dealer Inquires Invited

80-U.S.SOFTWARE

Introduces a new Line of

BUSINESS SOFTWARE

FOR MODEL I AND MODEL II

★OPEN ITEM ACCOUNTS RECEIVABLE ★

EDIT - Flags customer number errors, gives correction option.
SALES DISTRIBUTION - Distributes each Department total.
CUSTOMER JOURNAL - Lists each invoice for each customer.
AGED TRIAL BALANCE - You control the ageing date.
STATEMENTS - Preprinted or blank statements can be used.

★ACCOUNTS PAYABLE★

EDIT - Flags vendor number errors, gives correction option.
CASH REQUIREMENTS (JOURNAL) - Lists all payable vendors.
SUSPENDED JOURNAL (UNPAID JOURNAL) - Lists unpaid vendors.
GENERAL LEDGER DISTRIBUTION - Distributes General Ledger totals.
CHECK REGISTER - You just key the first check number.
CHECKS - Check stub includes information on invoice date, gross and discount amounts. Complete with check protection and aged payables.

★PAYROLL★

EDIT - Flags employee number errors, gives correction option.
JOURNAL - Year-to-date totals for gross, w/h, FICA and vacation.
DEDUCTION SUMMARY - Totals of individual deductions.
DEDUCTION REGISTER - By employee deduction type.
CHECK REGISTER - Check stub includes year-to-date information for employee W-2 Forms.
941 QUARTERLY REPORTS - Federal $, State $, FICA$, QTR$, Hours.

★GENERAL LEDGER★

★ Interactive to Accounts Payable ★

EDIT - Flags account number errors, gives correction option.
SUMMARY LEDGER - Month's debits and credits.
GENERAL LEDGER - Complete detail list.
INCOME STATEMENT - Up to four levels of totals.
BALANCE SHEET - 1 or 2 page control, print control.
DEPARTMENT STATEMENTS - Maximum of 99 departments.
SCHEDULES - Supporting lists of any detail accounts.
INPUT SHEET - Working trial balance.

These programs were created and field tested by COMPUTER SYSTEMS DESIGN, INC., Yakima, WA. Send $6.00 for sample printouts and documentation (applies to purchase). Price per program is $240.00. VISA and MASTER CHARGE accepted. (206) 475-2219. Or write to:
80-U.S. Software - 3838 South Warner St. Tacoma, WA 98409

Unclassified ADS

$2.50 per half inch and $2.50 for each additional half column inch per insertion. **Commercial Advertisers please use our Display Advertising Space!**

SOFTWARE SALES REPS WANTED: We have choice territories open for sales reps to carry a most excellent software line for TRS-80, Pet, Apple, and other microcomputers. To apply, send resume stating territory you are now covering and current lines carried to Alpha Et Cetera Ltd, PO Box 27137, Charlotte, NC 28219 or call 704 487-0763 (070)

MATH-PAK-1: Math Drill programs for addition, subtraction, multiplication and division of whole numbers. Do the problems just like on paper, step by step, with the computer checking all of your inputs, keeping score, and playing games with you if your score is high enough. Recommended by 80-U.S. Journal and the S-80 Bulletin. MATH-PAK-2: Math drill program for fractions. Same great features as MATH-PAK-1, PLUS a full four function calculator for those big numbers, reducing, simplification, flashing numerator, and more. THE MATH-PAKS-$14.95 ea (L2 16K req.) NEW RELEASE H-O-R-K-S NEW RELEASE. Home-Office-Record-Keeping-System: Unlimited #of files. User assigned account codes. Auto audit trail. Search function: Total, Monthly, and Account Code summaries. Auto balance: 32 or 48K. 1 to 4 drives. Full documentation and more. (32K-1 disk min) $24.95 cassette, $29.95 disk. MA residents add 5% tax - Dealer inquires invited. Programs available from EDU-WARE PO BOX 336, Maynard, MA 01754 (050)

TWO BUCKS & UP FOR TRS-80 PROGRAMS on cassettes. Dozens of unusual programs. FREE CATAGOG. PEC, PO Box 42831, Las Vegas, NV 89104 (050)

TRS-80 PARALLEL I/O PPI-80 is a parallel I/O interface for the TRS-80 including three 8 bit I/O ports, switch selectable addresses, on board power supply, softrware selectable modes, TTL compatible I/O lines, socketed connections, plugs into keyboard or E/I, on board kluge area, many applications. PPI-80 is available now completely assembled $119.95, kit of parts $89.95, bare board $25.95. PPI-80 Accessories: 8 channel A/D - 2 channel D/A by Optimal Technology $115.95, EPROM Programmer by Optimal Technology $115.95. To Order, send payment and $2.00 shipping and handling to QUANT SYSTEMS DEPT U, PO Box 628, Charleston, SC 29402 (070)

HANDICAPPING PROGRAMS for 16K L2 Thoroughbreds $20, Pacers $16., Both $30 o/p to screen or prt., many options, wagering tips, complete system w/doc. Check or SASE for info. Ray Herold 8363 Shady Grove Cr. Manassas, VA 22110 (070)

DRIVE TABS - ENGRAVED DISK-DRIVE tabs for drive number designation available in silver with black letters or ivory with brown letters. Size is 1.25 inch horizontal by 1.0 inch. Package of 4 (Specify color and numeric: 0-1-2-3 or alphabetic A-B-C-D). $4.00 per set. Texas residents add 5%. Please include 50¢ per set for postage and handling. Dealer inquires invited. THE BADGE-WORKS, 7709 La Verdura, Dallas, TX 75248 214 239-7129 (050)

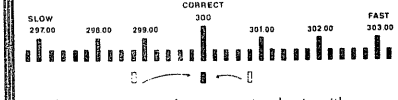
LEVEL II 16K GAME WITH GRAPHICS AND sound! SNIPER III vers 1.2 listing $5.00, $7.00 for a pre-recorded cassette. Keith D. Emert, E 2207 Heroy, Spokane, WA 99207 (050)

★★★★★★★★★★★★★★★★★★★★

Disc Drive Problems?

It's time for DDT!

(Disc Drive Timer program)



Analyze motor speed on a routine basis with an adjustable real-time speedometer.

Fine-tune disc drive motor speed yourself. All you need is DDT, two screwdrivers, and five minutes' time.

TRS-80 or Apple

Diskette $19.95 Postpaid

Cassette $14.95 with 20-page manual

Apple on diskette only.

To order or for more information, write or call

disco tech T.M.

microcomputer products a division of Morton Technologies, Inc.

1150 Coddingtown Center

P.O. Box 1112 • Santa Rosa, CA 95406

707 523-1000

★★★★★★★★★★★★★★★★★★★★

★ ★ ★ ★ ★ APPROACH ★ ★ ★ ★ ★

An instrument landing system (ILS) for private jet jockeys, written by a pilot. It is an exciting and challenging program that starts you out at a random altitude 50 miles from touch-down. Course, speed and weather at your starting point are also random - you can plug in various crosswind and turbulence conditions. Controls include left and right turns, climb, dive, power on and off, landing gear up or down, 3 flap positions, and "emergency" if you get into trouble. Your video screen becomes an instrument panel indicating distance from touchdown (DME), vertical speed (VSI), Gear, Alt, Flaps, Air speed (IAS), COM (compass), and glide/slope. You even get an outer marker at 10 miles, middle marker at 5 miles, and an inner marker at 1 mile from touchdown. Pitfalls include stall, spin, gear (if down at 200 knots or more, the gear "goes"), and missing the field. A very enjoyable and challenging jet landing simulation, as it is with little or no visibility. Old Pilots never die: they just change their angle of attack! All for $19.95 includ[illegible] reflective sheets (WA add 5%). Requires Level II 16K

PK ENTERPRISES

PO BOX 141

Gig Harbor, Washington

98335

UNIQUE TRS-80 SOFTWARE/BOOKS Morse code transmit/receive program 5-25 WPM, no ancillary devices reqd. $15 disk/cassette ppd. Disassembled Handbook all Basic CALLS. $10 ppd. TV Satellites az-el-distance ur location. $5. ppd. Decimal/Binary/Hex/Split Decimal/Split Hex both-way conversion pgm to 65K. $10 disk/cassette ppd. Richcraft Engineering, Box 1065, Chautaugua Lake, NY 14722 Phone (716) 753-2654 for COD orders (011)

MODEL II Software. The BEST! Field Tested on Mod I for a year, and many enhancements. Data Base Manager features 2 levels security, search command, error trapping, statistics, full field arith. MAIL turns your terminal into an intelligent form processor. Handle subscription, reuse sort buffer, rotate name, SHELL sort. Come in for a demo or send $10 for a manual. Micro Architect, 96 Dothan St., Arlington, MA 02174 (110)

DISK DATA BASE REPORT GENERATOR SYSTEM. 32K. No user programming. Full functions. Random access by key or rec#. Define file parameters & report formats on-line. Report features: select, filter, sort, arith, summary. Multi-keys. Audit log. Blocking, hashing buffering. Full documents. Ridiculously priced at $69 so a perfect package can be shared by all. Micro Architect, 96 Dothan St., Arlington, MA 02174 (070)

TRS-80 BASIC PROGRAM to list all variables in a program and the line numbers that reference them. Runs with TRSDOS or Level II. Cassette and listing $8.95. Shipping prepaid. PLASTIC LIBRARY CASES for 5" disks (holds 10 disks) 4/$10. Add $1 for shipping. LIBRARY CASES for 8" disks (holds 10 disks) 4/$14. Add $2 for shipping. VERBATIM 5" Disks 10/$35. Shipping prepaid. TRI-DATA SYSTEMS, Highway 31W, White House, TN 37188. Visa MC OK 615 672-4373 (050)

TRS-80 EDUCATOR TEST PKG $29.95 Disk Level II Cassette $25.95. 3 fully documented, self-directing programs, MAKETEST, GIVETEST, GRADES. Any subject or class, no programming, immediate score, feed-back. Easy to use. Assigns score, grade, avg., and std dev. for class (a test, a series or a term). Written by, for teachers. M.G. Manchester, Phd. Box 4188 Spokane, WA 99202 (509) 535-8970 (050)

OWNERS or USERS of TRS-80 L2 or DOS systems interested in doing community humanitarian service, drop a postcard with name, address & type equip to Mike Freeman, 946 Alder St., Tacoma, WA 98406 (0X0)

KISS IS A MONEY-MAKING PROGRAM for schools or large clubs. A 16K Level II machine will hold 20 responses for 400 surveys in this computer dating simulation. List, doc., sample survey, admin instrs for $7. D. Bohlke, Coggon, IA 52218 (050)

TRS-80 4K L1 LOAD & RUN SOFTWARE Recreational, Educational, & Personal Management programs...3 Game tape, Programmer's Newsletter, & Software Catalogue all for $6.00. Zapata Microsystems PO Box 401483 Garland, TX 75040 (050)

ADVENTURE FOR TRS-80 $14.95 per adventure or send SASE for flyer. 7 adventures currently available. M. Scott Adams, PO Box 3435, Longwood, FL 32750 (050)

TELETYPE USERS: Unique solid state time delay relay. Reduces energy and maintenance costs. Info 50¢, plans $5.00, with PC $10.00. Keith Ryan, Box 3103-J, Ottawa, Ontario, Canada K1P 6H7 (050)

NEW!
779 Line Printer Timer

Works with TRS-80® and Centronics® 779 Line Printers Turns Motor on and off Automatically

No software or hardware changes needed. Saves motor life and power. Just solder 3 wires and mounts inside printer. Dealers wanted, inquire on company stationery, also O.E.M. and service accounts wanted. $95.00 complete with one year warranty. Make checks payable to:

Digital Timing Devices
4306 N.E. 6 Ave.
Ft. Lauderdale, FL 33334 USA
Phone # (305) 561-3757

Division of D.S.S.I.

® These are registered trademarks for Radio Shack & Centronics.

Z80ZAP/CMD

DISK MODIFICATION UTILITY

TRS-80 SUPER FAST MACHINE LANGUAGE

Z80ZAP... Will allow you to READ in and DISPLAY Disk Sectors.
Z80ZAP... Will allow you to MODIFY Disk Sectors.
Z80ZAP... Will allow you to WRITE Sectors to Disk.
Z80ZAP... Will REMOVE PASSWORDS from all Disk Files.
Z80ZAP... Will CALCULATE HASH INDEX CODES for any Filespec.
Z80ZAP... Will inform you where to apply HIT CODE for recovery.
Z80ZAP... Will RECOVER "killed" or lost Disk Files.
Z80ZAP... Will COMPARE, BYTE for BYTE any Sector with another.
Z80ZAP... Will FIND any designated BYTE of DATA within Sector.
Z80ZAP... Will allow you to TOGGLE between Drives, same Sector.
Z80ZAP... Will allow you to APPLY PATCHES, FIXES, etc.
Z80ZAP... Will TOGGLE between Z80ZAP and DEBUG.
Z80ZAP... Will PINPOINT BYTE within Sector with FLASHING CURSOR.
Z80ZAP... Will do DISK BACKUP with any Disks on any Drives.
Z80ZAP... Will LOCATE any BYTE NUMBER within Sector display.
Z80ZAP... Will PAGE forward or backward one Sector at a time.
Z80ZAP... Will "ZERO OUT" entire Sector on display or on Disk.
Z80ZAP... Will Move FLASHING CURSOR with arrow keys.

$29.95

ORG-TEX INDUSTRIES
P.O. BOX 1462
LEWISVILLE, TX 75067

DISK BASED WORD PROCESSOR $7.50

A complete word processing system for your TRS-80 including full editing features such as paragraph move, line deletion, insertion & line correction. Store text on disk, print business and personal letters, reports with numbered pages and title pages! Text stored on disk as blocks are created so texts are not limited by the available memory. The PENSA-WRITE word processor is for 16K single-drive TRS-80s and comes complete with software to produce upper/lower case at printhead, and keyboard reverse. Full right/left justification and much more. Send cheque, money order or order by phone, 24 hours, 7 days a week. Mastercharge and Visa welcome. Manual only, $1.75- deductible from cost of software.

ORDER NOW! !

PENSADYNE
4441 WEST FIRST AVE.
VANCOUVER, B.C., V6R 4H9
604-224-3107

master charge
VISA

MISOSYS:serious software (tm)

MACHINE LANGUAGE PROGRAMS FOR YOUR TRS-80 (*)

- **tutil** An all purpose utility for the tape user. Examine, clear, initialize, move, and modify data in memory. Compare two blocks or search for up to 24 bytes of string (HEX or ASCII). Punch, load, verify, or execute Z80 programs. Registers are displayed and changed in English. Jump and set 2 breakpoints. Output to Printer and CRT simultaneously. TUTIL also provides a MODIFY program that remodels the EDTASM (strips I/O routines, relocates variable list, & re-references all pointers) to provide superior method of assembly language programming for the tape user. (16K, 32K, & 48K; all three for $15).
- **dutil** All features of TUTIL plus read & write disk sectors, even to the DIRECTORY! Read entire tracks including address marks. Scroll through the disk sector by sector. (16K, 32K, & 48K; all three for $20)
- **dishmod** Turn your Editor/Assembler into a DISK package. This patch modifies EDTASM 1.1 & 1.2 under DOS, NEWDOS, or VTOS. Capabilities? You couldn't ask for more! Add full disk I/O (source and object code), block move, global change, pagination with optional end-of-page prompting, sorted symbol table, print text buffer utilization, corrected DEFM expansion, protect memory, and recover after boot. From within the modified EDTASM, you will have DIR, FREE, and KILL. This package is a must for assembler programmers. A 32K system is required to run this patch. ($20).
- **dsmblr** (NEW: Version 2.0 - Output to DISK - $20) Complete your assembly language tools with this disassembler. 2-passes provide SYMBOLS, EQUates, and ORG. Output to CRT, Printer with paging, or tape cassette. The tape loads into Editor/Assembler. Relocate or modify machine code programs that you purchase. (16K & 32K; both for $15)

master charge THE INTERBANK
MISOSYS DEPT U
5904 Edgehill Dr.
Alexandria, Va. 22303
703-960-2998 (5P-11P)
VISA

(*) TRS-80 is a registered trademark of Tandy Corp.

- **cmdfil** Append 2 or more CMD files and/or SYSTEM tapes. All features of LMOFFSET. Capabilities similar to PATCH. I/O to/from DISK or TAPE. Backup CMD files to tape. More! ($20)

$1.25 PER COPY

Computers & Gambling Magazine**

PRESENTS:

PROBABILITY HANDICAPPING DEVICE I

A TRS-80* LEVEL II BASIC PROGRAM FOR:

HORSE RACE HANDICAPPING!

****BE A WINNER:** READ COMPUTERS & GAMBLING MAGAZINE SAMPLE ISSUES $1.00

This amazing program was written by a professional software consultant to TRW Space Systems, and is being introduced by the publishers of Computers & Gambling Magazine. "PHD-I" is a large complex level II program requiring a full 16K. It is carefully human factored for easy use. PHD-I is a comprehensive horse racing system for picking overlays in thoroughbred sprint races (less that 1 mile). This system has been tested using hundreds of races from the daily racing form for both major and minor tracks in the U.S. It consistently yields a **large positive return.** Detailed printouts of our statistics are available. This program features:

- Automatic keyboard debounce
- Verification display of each horse's parameters prior to entry for easy error correction
- The win probability and correct odds for each horse
- Bubble-sort routine for final display
- Line printer output option
- Complete users manual with examples and tips on betting and money management

Sit down with your TRS-80* and the daily racing form the night before the race and answer 5 or 6 questions about each horse's past performance. The computer then accurately predicts the win probability and odds-line for each horse allowing you to spot overlaid horses while at the track. The users manual contains a complete explanation of overlay betting.

ORDER NOW AT THIS SPECIAL INTRODUCTORY PRICE AND RECEIVE A COPY OF OUR MAGAZINE ABSOLUTELY FREE!

PHD-I 16k Level II Cassette $19.95

Make checks payable to
Joe Computer
22713 Ventura Boulevard, Suite F
Woodland Hills, Calif. 91364

*TRS-80 is a registered trademark of Tandy Corporation

SOFTWARE CPU™

Machine language modules linking with TBUG

Super STEP: Single-step/TRACE/Disassembler for TBUG; the successor of TSTEP with the features of EMU, and more! Variable speed TRACE mode lets you run any Z80 machine language program under total control, absolutely invaluable for analysis or debugging.

- Disassembler posts Z80 mnemonic in scrolling field.
- Single-stepper displays selectable before/after Z80 Programming Models, stack elements and flag status.
- Variable speed TRACE mode animates Z80 Models and Disassembler under dynamic user control.
- Intelligent RAM Window Shows selected local RAM environments or user designated RAM area.
- Foreground/background breakpointing.
- Implicit keypad includes Backspace, Relative space, Block RAM displays, local editing, faster #P and #L, CLEAR, more.
- Super TLEGS relocates for total address space access.

Direct or single-step execution of CALLs and RSTs, fully independent display suppression, big booklet of instructions and examples. Super STEP is a Z80 **Software CPU™**.
16K Level II TRS-80, TBUG required. No. BL-0 $19.95

EMU 02: Software emulation of the 6502 microprocessor. TBUG displays byte, EMU takes it from there. Now you can write, debug and execute 6502 programs **on your TRS-80.**

- Disassembler posts 6502 mnemonic in scrolling field.
- Single-stepper displays 6502 Processor Model, stack, flag status in before/after form.
- 4-Speed TRACE mode animates 6502 models, activates a keyboard scan port accessible to 6502 instructions.
- **Fast** interpretive RUN mode for rhealistic execution.
- Implicit keypad with Backspace, Relative space, more.

How to have a 6502 without having a 6502! Compare, contrast, learn a powerful programming language distinct from Z80 or BASIC, read Apple, PET code. A 6502 **Software CPU™**.
16K Level II TRS-80, TBUG required. No. BL-1 $24.95

Super TLEGS: Onboard relocator for TBUG, TSTEP, Super STEP.
16K Level II TRS-80, TBUG required. No. LL-0 $9.95

TSTEP: Single-stepper for TBUG, totally reifies your Z80.
16K Level II TRS-80, TBUG required. No. LL-1 $11.95

Include .75 each postage, CA add 6%

ALLEN GELDER SOFTWARE
Box 11721 Main Post Office
San Francisco, CA 94101

TRS-80, TBUG tm Radio Shack/Tandy Corp.
Software CPU tm Allen Gelder Software.

You will appreciate this accessory every time you turn on your computer

READ THIS

- Give your CRT the luminous green characters found on the very expensive computer systems
- Add a professional look to your system and your programs
- Dramatically improved contrast for easier reading and improved graphics

We manufacture an optically correct 1/8" plexiglas" screen that mounts easily over the CRT on your video monitor. This is a quality accessory that enables your TRS-80" monitor to produce the luminous green characters identical to those found on expensive terminals. For business applications this means enhanced appearance and reduced eye strain, for the hobbyist, graphics are brighter and bolder. The screen may be easily removed – no modification to monitor.

Screen for Model I $19.95
Screen for Model II . . . $24.95
VISA - Mastercharge

We ship within 24 hours
30-day money back guarantee

National Tricor, Inc / 3335 Greenleaf Blvd. Kalamazoo, MI 49008 / 616-375-7519

Availability of Back Issues

May-Jun 79 available with 2 pages out of order.
Jul-Aug 79 we have plenty of these
Sep-Oct 79 (has reprint of vol 1 #1) a few left
Nov-Dec 79 there are still some of these too
Jan-Feb 80 we have plenty
Mar-Apr 80 what happened? We are short, but some left.

All back issues are $3.00 per copy. Please allow 3 to 4 weeks for delivery.

ADVERTISERS INDEX

80-Software Critique 68
80-U.S. Software..... 76,77
Access Unlimited..... 37
Acorn Software 55
Adventure International.. 15
Allen Gelder 80
Alternate Source 67
A P Systems 73
Audio-Video Systems 18
Automated Simulations .. 23
Basics & Beyond 73
Business Micro Products. 71
Cap Electronics 73
CIE 43
CompuSoft Publishing ... 29
Computerland... Back Cover
Creative Software 35
Dealer Systems 14
Digital Timing Devices ... 79
Disco Tech..... 78
Discovery Bay Sftwre . 54,76
Electronic Specialists 68
Galactic Software 3rd Cover
H & H Trading 64
Howe Software 76
Interactive Microware ... 75
Joe Computer..... 80
Johnson Asso..... 75
JPC 11
Level IV Prod..... 31
Lifeboat Asso 24
Lobo Drives 7
Lords Corp..... 27
Macrotronics..... 59
Micro Architect 75
Micro Data Systems 73
Micro Mgmt Systems 54
Micromation SF 32
Micromatic Systems 52
Microsoft Cons Prod 17
Microsoft 5
Miller Micro Services 67
Misosys 79
National Tricor Inc..... 80
Omikron 64
Org-Tex Industries..... 79
Pensadyne..... 79
Percom Data Co 2nd Cover,1
PK Enterprises 78
Professional Comp Ser... 65
R A Kostosky..... 75
Sawyer Software..... 69
Simutek 9
SJW 63
Software Etc 69
The Peripheral People ... 59
The Program Store ... 45,51
TSE 40,41

MAIL/FILE SYSTEM

A totally new concept in Name, Address and Telephone Number Data Base Management

For TRS-80* Model I and Model II!

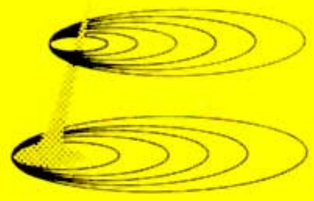
*TRS-80 is a Trademark of Radio Shack, a Division of the Tandy Corp

from

Galactic Software Ltd

Model I

only $99.00



Model II

only $199.00

■ Check these Features! ■

Model I

- Under constant sort, both by Name and Zip!
- Retrieve by any combination of 19 user codes!
- Format your own labels, or use standard format.
- Supports an 11 digit alphanumeric Zip!
- Supports a "Message" line.
- Complete, user-oriented documentation.
- 600 records per non-system disk, 300 with system.
- Simple editing throughout.
- 32K and one or more drives required.
- Name rotate, tab listing, and more!

Model II

- **All features of Model I plus**
- Machine Language Sort.
- 2500 names per disk!
- "Word processor" type input editing!
- 64K, Single drive required.

Dealer Inquires Invited

East Coast
Acorn Software Products Inc
634 North Carolina Ave SE
Washington, DC 20003
(202) 544-4259

Central United States
Galactic Software Ltd
11520 North Port Washington Rd
Mequon, WI 53092
(414) 241-8030

West Coast
80-U.S. Software
3838 South Warner Street
Tacoma, WA 98409
(206) 475-2219

The full service computer dept. store

ComputerLand®

of Bellevue and Tacoma

HAS
Business Application Software
and Computer Peripherals
for TRS-80® Mod I and Mod II

Printers
Disks (Vista)
Memory Upgrades
Specialized Interfacing
Professional Service Department
And more -

For Professional assistance see us -
South Tacoma Village - 8791 South Tacoma Way
Tacoma, WA 98499 (206) 581-0388
14340 N.E. 20th
Bellevue, WA 98007 (206) 746-2070

"We Know Small Computers"

The 80-U.S. Journal
3838 South Warner Street
Tacoma, Washington 98409

Application to
MAIL
at 2nd Class
Postage Rates
Pending at
Tacoma, WA