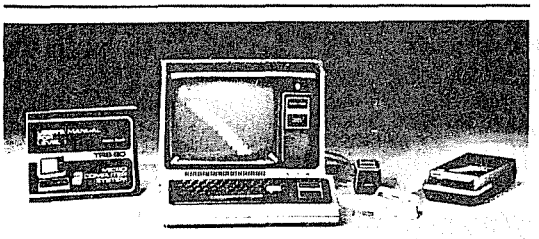
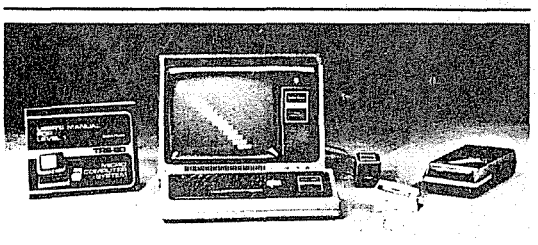
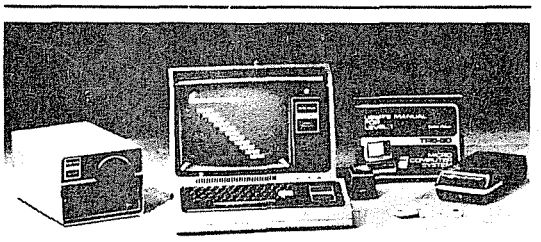
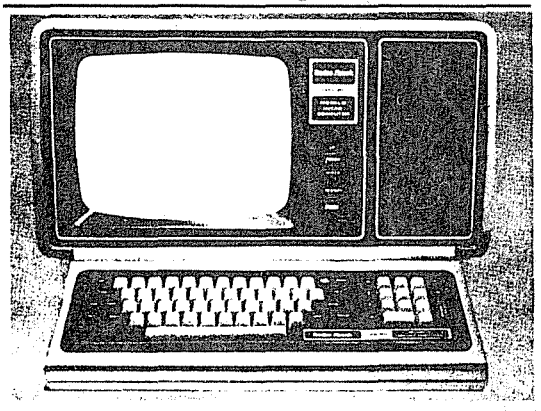
RADIO SHACK COMPUTER OWNERS
TRS-80 MODEL I AND MODEL II

TRS-80™ MONTHLY NEWSLETTER









Reprint in Two Parts Issues #1 — #6
July 1978 through December 1978

Part Two

- **PRACTICAL APPLICATIONS**
- **BUSINESS**
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- **MARKET PLACE**
- **QUESTIONS AND ANSWERS**
- **PROGRAM PRINTOUTS**

. . . . AND MORE

- D.O.S. SHORTCUTS
- NEW TRS-80 MODEL II
- ASSEMBLY FOR BEGINNERS
- DOUBLE PRECISION ROUTIN'
- REDUCE FRACTIONS

$12.00

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H & E COMPUTRONICS INC.
MATHEMATICAL APPLICATIONS SERVICE™

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NEWSLETTER INFORMATION

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THE PURPOSE OF THE **TRS-80 MONTHLY NEWSLETTER** IS TO PROVIDE AND EXCHANGE INFORMATION RELATED TO THE CARE, USE AND APPLICATION OF THE TRS-80 COMPUTER SYSTEM.

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SUBSCRIPTIONS ARE $24 PER YEAR ($30 PER YEAR-CANADA AND MEXICO, $36 PER YEAR OUTSIDE OF THE UNITED STATES, CANADA AND MEXICO-AIR MAIL). BACK ISSUES ARE AVAILABLE ($2 PER ISSUE).

HAVE ANY URGENT QUESTIONS? WE HAVE TELEPHONE HOURS - 9 A.M. - 5 P.M. OTHER TIMES, LEAVE A MESSAGE ON OUR ANSWERING MACHINE. WE WILL PROMPTLY RETURN ALL CALLS (COLLECT).

LOCAL TRS-80 CLUBS

THE COMPUTER CLUB OF ORLANDO (FLORIDA) - Contact M. Scott Adams - (305) 862-6917.

TRS-80 USER'S GROUP OF CHICAGO (ILLINOIS) - Contact John C. Longstreet, 1201 W. Chase Avenue, Chicago, Illinois 60626 or call 761-2742.

THE SOLANO TRS-80 USER'S CLUB - Fairfield, California - Contact Dave or Steve Irwin - (707) 422-3347.

TRS-80 USER'S GROUP OF WALNUT CREEK (CALIFORNIA) - Contact John Snyder, 712-C Country Wood, Walnut Creek, California 94598 or call (415) 938-9669.

INLAND COMPUTER SOCIETY - Contact Sandy Sparks, 3359 Second Street, Riverside, California 92501 or call (714) 256-5319 or (714) 784-3499.

TRS-80 USER'S GROUP OF SANTA ANA - Contact Arnold Vagts, 3713 S. Parton Street, Santa Ana, California 92707 or call (714) 549-7021.

TRS-80 BUG INC. OF FLORIDA - Contact Larry J. Harrell, 2100 N. Atlantic Avenue #402, Cocoa Beach, Florida 32931 or call (305) 784-0456.

ADVERTISING IN THE TRS-80 MONTHLY NEWSLETTER

$200 PER PAGE . . . $100 PER HALF PAGE . . . $50 PER QUARTER PAGE . . .$25 PER EIGHTH PAGE . . . $10 FOR UP TO 50 WORDS IN OUR NEW CLASSIFIED AD DEPARTMENT (STARTING JULY, 1979). . .
THESE PRICES ARE VALID FOR ISSUES 13 AND 14 **ONLY.** ADS MUST BE SUBMITTED BY THE 10th OF EACH MONTH IN ORDER TO APPEAR IN THE FOLLOWING MONTHS ISSUE. PAYMENT MUST BE INCLUDED WITH AD.

RANDOM SELECTION PROGRAM
BY
DR. PETER SHENKIN

```
1 REM ************************************************************
2 REM
3 REM                  RANDOM SELECTION PROGGRAM
4 REM                        BY DR. PETER SHENKIN
5 REM
6 REM ************************************************************
7 REM
8 REM GIVEN AN INTEGER N,REPRESENTING POPULATION SIZE AND AN
9 REM INTEGER K REPRESENTING SAMPLE SIZE THIS PROGRAM WILL
10 REM CHOOSE K DIFFERENT RANDOM INTEGERS FROM THE SET OF
11 REM INTEGERS BETWEEN 1 AND N.
12 REM ************************************************************
16 CLS
18 RANDOM
20 PRINT "HOW MANY MEMBERS ARE IN YOUR POPULATION ";
30 INPUT N
40 PRINT "HOW LARGE A RANDOM SAMPLE DO YOU WANT ";
50 INPUT K
60 DIM A(N),B(K)
70 FOR I=1 TO N:A(I)=I:NEXT I
80 FOR J=1 TO K
90 R=RND(N)
100 B(J)=A(R)
110 A(R)=A(N)
120 N=N-1
130 NEXT J
140 PRINT
150 PRINT " THE SAMPLE CHOICES ARE PRINTED 4 TO A LINE FROM"
160 PRINT " LEFT TO RIGHT. THESE CHOICES FOLLOW. ""
170 PRINT
180 FOR J=1 TO K:PRINT B(J), :NEXT J
190 END
```

H & E COMPUTRONICS INC.
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CHECKBOOK MAINTENANCE PROGRAM

By Dr. Peter Shenkin

The CHECKBOOK MAINTENANCE PROGRAM is written for use with a 16K Level II machine. Use is made of data files on the cassette recorder. This program effectively stores an entire check register on cassette tape. The greatest limitation is that at present the register can only handle 100 items. This problem may be easily rectified at some cost of efficiency or with some extra hardware. At present the entire register is read into the memory at once. More items could be fit if only part of the register had to be loaded at one time. For all program functions to still work this would entail dual cassette tapes(& expansion interface) or disk. If all REM statements are removed and the arrays are redimensioned it should be possible to fit many more than 100 items in the register.

The functions which may be performed by the CHECKBOOK MAINTENANCE PROGRAM (CMP) are listed in the menu,program lines 2020-2080. The items should be somewhat self explanatory. Items 5. and 7. deserve some mention. "5.REVIEW OF CHECK EXPENSE CATEGORIES" lists the different categories of expense and income by which entries in the register may be grouped. Up to 100 categories may be used. As written 15 categories are used.(lines 3020-3080). The reader may easily change this.

The following example shows the versatility of the program. Penny P. is about to start a new checkbook. The date is October 1,1978. Penny has $623.54 in her checking account. The next check she writes will be number 1366. From October 1 to October 10 Penny makes the following transactions:

October 1,1978-Check # 1366-Sears-Roebuck - $50.00
October 1,1978-Check # 1367-O & R Utilities- $104.77
October 1,1978-Check # 1368-N.Y. Telephone - $ 61.95
October 3,1978- DEPOSIT - Paycheck -$343.43
October 3,1978-Check # 1369- Kerri Shenkin -$360.00
October 6,1978-Check # 1370- Caldor -$ 20.14
October 6,1978-Check # 1371- Rickel -$ 12.00
October 10,1978-Check #1372- N.C.C. Assoc. -$ 61.50
October 10,1978-Check #1373- Shell Oil Co. -$ 25.00
October 10,1978-Check #1374- Gulf Oil Corp.-$ 29.26
October 10,1978-Check #1375- Commerce Bank -$210.00

Penny runs the program. The menu is printed. It reads as follows:

```
CHECKBOOK MAINTENANCE PROGRAM
CHOOSE NUMBER OF DESIRED OPTION
1. SET UP NEW CHECKBOOK
2. INPUT OLD CHECKBOOK FROM TAPE
3. ADD TO OLD CHECKBOOK
4. OUTPUT CHECKBOOK TO CASSETTE
5. REVIEW OF CHECK EXPENSE CATEGORIES
6. PRINT CHECKBOOK 10 ENTRIES AT A TIME
7. LIST BY CATEGORY
8. END THIS PROGRAM
```

PENNY presses 1 and then the ENTER button.(From now on all of Penny's replies to machine inquiries will be underlined. In addition, all of Penny's replies are followed by ENTER.) The dialogue follows:

```
INITIAL BALANCE ? 623.54
INITIAL CHECK NUMBER? 1366
INITIAL DATE IN FORM MM/DD/YY? 10/01/78

INPUT DATE ? 10/01/78  (This is date of present transaction.)
INPUT C FOR CHECK,D FOR DEP.,CM FOR MISC. CHARGE? C
CHECK ISSUED TO? SEARS-ROEBUCK
CHECK CATEGORY TYPE? 7
CHECK AMOUNT? 50.00

CHK NO.    DATE       CHK ISSUED TO        TYPE      AMOUNT      BAL.
           10/01/78                                              $623.54
1366       10/01/78   SEARS-ROEBUCK          7       $50.00      $573.54


IF ERROR INPUT E. OTHERWISE ENTER?  (PENNY presses ENTER)
ANY MORE ENTRIES (Y/N)? Y

INPUT DATE? 10/01/78
INPUT C FOR CHECK,D FOR DEP.,CM FOR MISC. CHARGE? C
```

(Penny goes on as above for the remaining two October 1 checks. Then when the machine asks for more entries Penny says "no."

```
ANY MORE ENTRIES (Y/N)?  N

          CHECKBOOK MAINTENANCE PROGRAM
CHOOSE NUMBER OF DESIRED OPTION
1. SET UP NEW CHECKBOOK
2. INPUT OLD CHECKBOOK FROM TAPE
3. ADD TO OLD CHECKBOOK
4. OUTPUT CHECKBOOK TO CASSETTE
5. REVIEW OF CHECK EXPENSE CATEGORIES
6. PRINT CHECKBOOK 10 ENTRIES AT A TIME.
7. LIST BY CATEGORY
8. END THIS PROGRAM

OPTION # ? 4

POSITION BLANK TAPE ONTO CASSETTE PLAYER
PRESS PLAY AND RECORD BUTTONS.
PRESS ENTER WHEN READY.
? (PENNY presses ENTER)- The data is loaded onto the cassette.
  Make a note of where on tape the data is. Do not record over a
  previously used part of tape.(Unless erased by bulk tape eraser)

(The 8 part MENU is printed again.)

OPTION # ? 8
ARE YOU SURE YOU WANT TO END(Y/N)? Y
READY
```

Penny rewinds the data cassette and stores it. On October 3 she is ready for 2 more entries in her checkbook. She runs the program. When the menu appears she does the following:

```
OPTION #? 2
PUT & POSITION DATA TAPE IN CASSETTE #-1.
PRESS PLAY BUTTON
PRESS ENTER WHEN READY.
?  (Penny presses enter. The cassette loads the data. The MENU appears.
    Penny chooses option 3.ADD TO OLD CHECKBOOK

OPTION #? 3

INPUT DATE ? 10/03/78
INPUT C FOR CHECK,D FOR DEP.,CM FOR MISC. CHARGE? D
WHAT WAS DEPOSITED? PAYCHECK
DEPOSIT CATEGORY TYPE = ? 50
AMOUNT OF DEPOSIT ? 343.43

CHK NO.   DATE      CHK ISSUED TO          TYPE       AMOUNT       BAL.
          10/01/78                                                 $406.82
  -1      10/03/78  PAYCHECK               50         $343.43      $750.25

IF ERROR INPUT E. OTHERWISE ENTER? (Penny presses ENTER)
ANY MORE ENTRIES(Y/N)? Y

(Penny completes her checkbook until Oct. 10. She decides to review
her store charge card payment record.

OPTION #? 7

INPUT CATEGORY NUMBER OF INTEREST? 7

CHK NO.   DATE      CHK ISSUED TO          TYPE       AMOUNT       BAL.
1366      10/01/78  SEARS-ROEBUCK          7          $50.00       $573.54
1370      10/06/78  CALDOR                 7          $20.14       $370.11
1371      10/06/78  RICKEL                 7          $12.00       $358.11

TOTAL FOR THIS ITEM = $ 82.14
PRESS ENTER TO RETURN TO MENU? (Penny presses ENTER)

OPTION # ? 6
```

The entire check register will now be printed, 10 entries at a time in the above format. Penny may save the entire checkbook on tape at any time. The program does several other things, including the recognition of several errors.

A planned expansion of this program will be to disk. One other addition will be the ability to update the entire register whenever an error is found, no matter how far back. Presently this ability only exists for errors in the present entry.

CHECKBOOK MAINTENANCE PROGRAM
BY
DR. PETER SHENKIN

```
10 REM      CHECKBOOK MAINTENANCE PROGRAM
15 REM               BY DR. PETER SHENKIN
17 REM ***************************************************************
20 REM    THIS SELF-DOCUMENTING PROGRAM WILL KEEP TRACK OF ALL
22 REM    CHECKBOOK ITEMS. DEPOSITS AND EXPENSES MAY BE
24 REM    CATEGORIZED. UP TO 100 CATEGORIES ARE ALLOWED.
25 REM    CATEGORIES ENTERED FROM PROG. LINES 3020-3089
26 REM    CHECKBOOK ITEMS MAY BE STORED ON CASSETTE AND READ
28 REM    IN FROM CASSETTE. AT PRESENT DIMENSIONING IS SET UP
30 REM    FOR 100 ITEMS IN YOUR CHECKBOOK AT ANY ONE TIME.
32 REM    THIS MAY BE CHANGED BY CHANGING DIMENSION VAR. V IN 101
34 REM    TO RUN PROGRAM DELETE REM STATEMENTS FOR MEMORY SPACE.
36 REM    JUST CLOAD PROGRAM AND RUN. THERE SHOULD BE NO PROBLEM
100 CLEAR 6000
101 V=100
102 DIM CN%(V),D$(V),P$(V),T%(V),A(V),B(V)
105 GOSUB 990
110 REM CHECK MENU
120 GOSUB 2000
990 REM SUBROUTINE WITH PRINTUSING FORMAT VARIABLES
1000 H$="CHK NO.    DATE      CHK ISSUED TO       TYPE     AMOUNT       BAL. !"
1010 Z$="####    %       %    %                %     ##   $$######.## $$######.##"
1020 Z1$="         %       %                                          $$######.##"
1099 RETURN
1100 REM SUBROUTINE PRINTING FORMATS
1110 PRINTUSING H$;ZZ$
1199 RETURN
1200 REM SUBROUTINE FOR PRINTING CHECKBOOK INFORMATION
1210 PRINTUSING Z$;CN%(I);D$(I);P$(I);T%(I);A(I);B(I)
1215 RETURN
1230 REM SUBROUTINE FOR INPUTTING CHECKBOOK INFO. FROM TAPE
1235 INPUT #-1,CN%(I),D$(I),P$(I),T%(I),A(I),B(I)
1240 RETURN
1245 REM SUBROUTINE FOR OUTPUTTING CHECKBOOK INFO. ONTO TAPE
1250 PRINT #-1,CN%(I),D$(I),P$(I),T%(I),A(I),B(I)
1255 RETURN
1260 REM SUBROUTINE FOR PRINTING PREVIOUS BALANCE
1262 PRINTUSING Z1$;D$(I-1);B(I-1)
1265 RETURN
1299 RETURN
```

```
1500 REM SUBROUTINE TO ENTER NEW ENTRY
1510 INPUT "INPUT DATE ";D$(I)
1515 PRINT "INPUT C FOR CHECK,D FOR DEP.,CM FOR MISC.  CHARGE";
1520 INPUT Z9$
1525 IF Z9$="C" GOTO 1540
1526 IF Z9$="D" GOTO 1570
1527 IF Z9$="CM" GOTO 1600
1530 PRINT "INPUT ERROR.  TRY AGAIN":GOTO 1515
1540 CN%(I)=CI :CI=CI+1
1550 INPUT "CHECK ISSUED TO";P$(I)
1555 INPUT "CHECK CATEGORY TYPE";T%(I)
1560 INPUT "CHECK AMOUNT";A(I)
1565 B(I)=B(I-1)-A(I)
1569 GOTO 1610
1570 CN%(I)=-1
1575 INPUT "WHAT WAS DEPOSITED ";P$(I)
1580 INPUT"DEPOSIT CATEGORY TYPE = ";T%(I)
1585 INPUT "AMOUNT OF DEPOSIT ";A(I)
1590 B(I)=B(I-1)+A(I)
1595 GOTO 1610
1600 CN%(I)=-2
1602 INPUT "WHY CHARGED TO ACCT.  ";P$(I)
1604 INPUT "CHARGE AMOUNT";A(I)
1605 INPUT "CHARGE CATEGORY TYPE = ";T%(I)
1606 B(I)=B(I-1)-A(I)
1608 GOTO 1610
1610 CLS
1613 GOSUB 1100
1614 GOSUB 1260
1615 GOSUB 1200
1618 FOR K=1 TO 4:PRINT:NEXT K
1620 PRINT "IF ERROR INPUT E. OTHERWISE ENTER"; :INPUT Z8$
1621 IF Z8$="E" GOTO 1623
1622 GOTO 1625
1623 Z8$="ZZZZ":IF Z9$="C" THEN CI=CI-1
1624 CLS:GOTO 1510
1625 PRINT "ANY MORE ENTRIES (Y/N)"; :INPUT Z9$
1630 IF Z9$="N" GOTO 1690
1635 IF Z9$="Y" GOTO 1650
1640 PRINT "INPUT ERROR.  TRY AGAIN. ":GOTO 1625
1650 I=I+1 :CLS:GOTO 1510
1690 CN%(0)=I
1699 RETURN
```

```
2000 REM MENU SUBROUTINE
2010 CLS
2020 PRINT"        CHECKBOOK MAINTENANCE PROGRAM  "
2025 PRINT:PRINT "CHOOSE NUMBER OF DESIRED OPTION":PRINT
2030 PRINT "1. SET UP NEW CHECKBOOK"
2035 PRINT "2. INPUT OLD CHECKBOOK FROM TAPE"
2040 PRINT "3. ADD TO OLD CHECKBOOK"
2050 PRINT "4. OUTPUT CHECKBOOK TO CASSETTE"
2055 PRINT "5. REVIEW OF CHECK EXPENSE CATEGORIES"
2060 PRINT "6. PRINT CHECKBOOK 10 ENTRIES AT A TIME. "
2070 PRINT "7. LIST BY CATEGORY"
2080 PRINT "8. END THIS PROGRAM"
2090 PRINT:INPUT "OPTION # ";Z
2092 CLS
2094 ON Z GOSUB 2200,2400,2600,2800,3000,3200,3500,'3900
2097 GOTO 2010
2099 RETURN
2200 REM SUBROUTINE FOR SETTING UP NEW CHECKBOOK
2210 I=1
2215 INPUT "INITIAL BALANCE";B(0)
2217 INPUT "INITIAL CHECK NUMBER";CI
2218 INPUT"INPUT INITIAL DATE IN FORM MM/DD/YY";D$(0)
2219 CLS
2220 REM NOW WRITE CHECK ,MAKE DEPOSIT,OR OTHER CHARGE
2225 GOSUB 1500
2250 RETURN
2400 REM SUBROUTINE FOR INPUTTING OLD CHECKBOOK FROM TAPE
2410 CLS:PRINT "PUT & POSITION DATA TAPE IN CASSETTE #-1. "
2412 PRINT "PRESS PLAY BUTTON. "
2415 PRINT "PRESS ENTER WHEN READY. ":INPUT Q
2420 INPUT #-1,CI,CN%(0),B(0),D$(0)
2430 FOR I=1 TO CN%(0)
2440 GOSUB 1230
2450 NEXT I
2460 RETURN
2600 REM SUBROUTINE TO ADD TO CHECKBOOK
2610 GOSUB 1500
2620 RETURN
2800 REM SUBROUTINE FOR OUTPUTTING CHECKBOOK TO CASSETTE
2810 CLS:PRINT"POSITION BLANK TAPE INTO CASSETTE PLAYER"
2812 PRINT"PRESS PLAY AND RECORD BUTTONS. "
2815 PRINT "PRESS ENTER WHEN READY. ":INPUT Q
2820 PRINT #-1,CI,CN%(0),B(0),D$(0)
2830 FOR I=1 TO CN%(0)
2840 GOSUB 1245
2850 NEXT I
2860 RETURN
```

```
3000 REM SUBROUTINE TO REVIEW EXPENSE CATEGORIES
3010 PRINT "CATEGORY   DESCRIPTION"
3020 PRINT "     1.       LOAN PAYMENT"
3022 PRINT "     2.       BANK CARD PAYMENT"
3024 PRINT "     3.       MEDICAL EXPENSE"
3025 REM THIS SPACE IS TO PUT IN CATEGORIES & DESCRIPTIONS IN
3026 PRINT "     4.       HOUSEKEEPING MONEY"
3028 PRINT "     5.       MORTGAGE
3030 PRINT "     6.       HOME EXPENSE,UTILITIES,ETC. "
3050 PRINT "     7.       STORE CHARGE CARD PAYMENT"
3052 PRINT "     8.       INSURANCE"
3060 PRINT "    50.       PAYCHECK DEPOSIT "
3062 PRINT "    51.       CONSULTING FEE "
3064 PRINT "    52.       MEDICAL REIMBURSEMENT"
3066 PRINT "    53.       OTHER BUSINESS INCOME"
3068 PRINT "    54.       MISC.  DEPOSITS"
3088 PRINT
3090 INPUT "PRESS ENTER TO RETURN TO MENU";Z3
3099 RETURN
3200 REM SUBROUTINE TO REVIEW CHECKBOOK
3210 CLS
3215 I=1
3220 GOSUB 1100
3230 GOSUB 1260
3240 FOR I=1 TO CN%(0)
3250 GOSUB 1200
3260 IF I/10=INT(I/10) GOSUB 3300
3270 NEXT I
3280 PRINT:INPUT"THE END.  PRESS ENTER TO RETURN TO MENU.";Z3
3290 RETURN
3300 REM SUBROUTINE FOR TEN ENTRY SCREEN DISPLAY
3310 IF I=CN%(0) RETURN
3320 PRINT
3330 INPUT "PRESS ENTER FOR MORE ENTRIES.";Z3
3335 CLS:GOSUB 1100
3340 RETURN
3500 REM SUBROUTINE FOR LISTING BY CATEGORIES
3505 REM E1 IS TOTAL OF ITEM
3506 E1=0
3510 INPUT "INPUT CATEGORY NUMBER OF INTEREST";Z5
3520 GOSUB 1100
3530 FOR I=1 TO CN%(0)
3540 IF T%(I)=Z5 GOTO 3560
3550 GOTO 3580
3560 GOSUB 1200
3570 E1=E1+A(I)
3580 NEXT I
3590 PRINT:PRINT "TOTAL FOR THIS ITEM =$";E1
3595 PRINT"PRESS ENTER TO RETURN TO MENU";:INPUT Z3
3599 RETURN
3900 REM SUBROUTINE TO END
3905 CLS
3910 PRINT "ARE YOU SURE YOU WANT TO END(Y/N)";:INPUT Z3$
3920 IF Z3$="N" RETURN
3930 IF Z3$="Y" END
3940 PRINT "INPUT ERROR. TRY AGAIN.":GOTO 3910
```

BITS AND PIECES

by

HOWARD Y. GOSMAN

SURVEY PARTICIPATION

94% of our earlier subscribers (#1 - #3999) returned our survey (pages 47 and 48). The response was just fantastic. We do appreciate the active participation by so many subscribers and wish to encourage future subscriber involvement. The many helpful suggestions will help us improve the quality of each future Newsletter issue.

The most common suggestions that we received related to the quality of print, quality of program printouts, number of typing errors and the size of the Newsletter, (1) As you can see, we have purchased typesetting equipment which does give high quality print. (2) Program printouts come from the RADIO SHACK LINE PRINTER. Poor quality of the printouts in Issue #1 were due to the use of an old ribbon. We did not change the ribbon prior to the printout. We now use a fresh ribbon for printouts and an improved method of duplicating these printouts. (3) Hopefully, all typing errors have been eliminated. (4) The size of the Newsletter has increased from 16 pages (Issue #1) to 24 pages (present issue). Our goal is to reach 36 pages by Issue #12. Detailed results of survey (especially repair information) will be published next month.

NEW PRODUCTS FROM RADIO SHACK (NEW BUT NOT YET FOR SALE)

RADIO SHACK will soon be selling a full size disk drive with 250K capacity. Software will include an advanced BASIC, FORTRAN, CP/M and more. Probably release date, March, 1979.

A 3.0 D.O.S. will be released shortly with a new disk manual. In the meantime, make sure that if you do have a disk drive, you have the 2.1 D.O.S. with a 50-page manual and 14-page addendum to the disk manual.

RADIO SHACK will be releasing a complete business system for disk (before the end of the year). The system will include accounts payable, accounts receivable, inventory control, and payroll. The new system will be high quality (especially in comparison to some of the earlier cassette programs sold by RADIO SHACK).

RADIO SHACK will be releasing a large number of new software diskettes and disks before the end of the year. Many of the programs were purchased from KILOBAUD.

THE NEW TRS-80 MICROCOMPUTER CATALOG

RADIO SHACK has just published a brand new TRS-80 MICROCOMPUTER CATALOG (CATALOG NO. RSC-2). The catalogs are available at all local RADIO SHACKS (if there are any left.). The full-color 20-page catalog contains the following new products: (1) TRS-80 SYSTEM DESK ($199), (2) TELEPHONE INTERFACE I ($149), (3) RS-232-C SERIAL INTERFACE BOARD ($149), (4) PRINTER CONNECTION CABLE ($39), (5) TRS-80 TECHNICAL MANUAL ($9.95), (6) TRS-80 QUICK PRINTER ($499) and (7) a LINE PRINTER STAND ($99).

NEW FROM MICROTRONIX (PAGE 24)

RS-232 INTERFACE ($99) - available immediately.

RADIO SHACK compatibledisk drives ($350) - available immediately.

MICROTRONIX has a special case for RADIO SHACK disk drives (as well as disk drives purchased anywhere else). The case will hold 3 disk drives. The case has a 16 AMP power supply with a fan and air filter (to solve the disk drive heating problem). The cost of the case and 3 disk drives is $1400 (or $300 without the disk drives). Immediate delivery is available.

Also available for immediate delivery - 16K memory ($140) and the RADIO SHACK EXPANSION INTERFACE.

Three cassettes are available at $9.95 each or 3 for $19.95 . . . . .
(1) A RENUMBERING PROGRAM, (2) A PROGRAM FOR MERGING TWO OR MORE PROGRAMS and (3) A STATEMENT ANALYSIS PROGRAM (locates and lists all branches such as GOTO and GOSUB).

For more details, call (800) 523-4550.

LOWER CASE MODIFICATIONS

There are a couple of companies selling a lower case modification for the TRS-80. Several readers have reported that the LOWER CASE MODIFICATION doesn't work. If you have any further information related to LOWER CASE MODIFICATIONS, please call.

RADIO SHACK'S TOLL FREE NUMBER

You can now call 1-800-433-1679 and reach computer services directly. RADIO SHACK COMPUTER SERVICES has a staff of 20 experts that can answer many of your computer questions. In order to avoid typing up the line, you leave your name and telephone number...and someone on the staff will promptly call you back. This is the same toll-free number that was formerly used by the TANDY COMPUTER STORE.

NEXT MONTH....A COMPLETE RANDOM ACCESS MAILING LIST AND CUSTOMER INFORMATION PROGRAM.

ADDENDUM TO LEVEL II BASIC REFERENCE MANUAL

The following information has been obtained directly from RADIO SHACK and does not appear in the LEVEL II MANUAL:

1. After an INPUT # is performed from cassette, subsequent READ statements will automatically RESTORE data each time a READ is performed. To fix this, simply perform the statement POKE16553,255 before the first READ is performed. (LEVEL II only-not a problem in DISK BASIC).

2. When performing an INPUT # from cassette, the maximum number of bytes which can be read is 248. This does not affect disk operations.

3. If the RESET button is pressed when the expansion interface is attached to the TRS-80, any programs in memory will be lost.*

4. If a BASIC program is stopped during execution, and alteratios are made to the program, or EDIT mode is entered, then ALL VARIABLES will be set to zero. The program must be RUN again from the beginning.

5. If an LPRINT or LLIST is performed without a TRS-80 lineprinter being attached, the computer will "freeze-up". The user must press RESET or attach a lineprinter and turn it on.

6. All functions in LEVEL II BASIC always return single precision values (6-7 digits of accuracy).** All trigonometric functions use or return radian angles. Use of degrees angles are described in the LEVEL II BASIC MANUAL.

7. Frequent occurrences of SYNTAX errors may be caused by one of two subtle erros. (a) If a letter or the @-symbol were typed with the SHIFT key depressed, the letters will appear to be correct on the screen, but are really invalid. Try retyping the line, and beware of the SHIFT key. (b) Sometimes a pace is required in a BASIC statement. The following line is incorrect:

   IFD<OD=Ø

   The characters "OD" represent a double precision zero. The correct statement reads (note the space and THEN)

   IFD<Ø THEN D=Ø

8. The format of a CLOAD? command to verify from cassette #2 is

   CLOAD#-2,?"filename"

***FREEZE-UP PROBLEMS**

In our readers survey, several people have complained about random freeze-up problems. Reports from readers state that these "freeze-ups" have occurred from time to time, but not frequent enough to necessitate repairs. To lose as little information (data or program) as possible, turn off the interface, then press the reset button. You will lose any data in the interface (if you have more than 16K), but will not lose your program (or data with 16K). These "freeze-ups" may be due to heat. One reader claims that he has eliminated the problem by placing a small fan next to his computer.

****ALL FUNCTIONS HAVE 6-7 DIGIT ACCURACY**

Functions such as square root, exponents, sine, cosine, etc. yield only 6 or 7-digit accuracy (despite the implied 16-digit accuracy). The 6 or 7-digit accuracy is especially disastrous is business programs requiring exponentiation. We have compiled several routines that will give 16-digit accuracy to most functions (especially exponents and square roots). They will be published next month.

NEVER PULL OUT THE CASSETTE RECORDER JACKS!

Robert Andrew (#6238) found a simple method of avoiding the sometimes necessity of pulling out the cassette recorder jacks. PRESS FAST FORWARD or REWIND on the cassette recorder. Type PRINT #1,A on your keyboard, then PRESS ENTER. The tape will move exactly 40 units (according to the tape counter). Any program or data in memory will not be affected. PRESS STOP (on the cassette recorder) to move less than 40 units. To move more than 40 units, PRESS PRINT #-1,A: PRINT #-1,A (to move 80 units) or PRINT #-1,A: PRINT #-1,A: PRINT #-1,A (to move 120 units), etc.

SPECIAL SOFTWARE FOR DOCTORS

The Canadian Medical Association in Ottawa, Canada has developed a package of programs for the TRS-80 LEVEL II. These programs called A,B,C--**A**ppointment (including registration), **B**illing (including accounting) and **C**umulative Patient Profiles. These programs are currently being tested and will soon be available to interested practitioners. Write to CAPO SYSTEM (Computer-Aided Physicians' Offices), Dr. J.F. Brandejs, Director, The Canadian Medical Association, P.O. Box 8650, Ottawa, Ontario, Canada K1G 068.

OUR NEW SOFTWARE CATALOG

Please do not request our free SOFTWARE CATALOG (advertised in BYTE, KILOBAUD, CREATIVE COMPUTING and PERSONAL COMPUTING). Subscribers will be the first ones to get it. The new catalog will contain the largest list of TRS-80 software available.

S-100 BUS...TELEPHONE INTERFACE II

The S-100 BUS and TELEPHONE INTERFACE II will be released by RADIO SHACK within the next 90-days.

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INVENTORY CONTROL FOR TRS-80

by

DR. PETER SHENKIN

The management of inventory is one of the businessman's prime responsibilities. Knowing what is in stock and how much it cost, knowing what items have been selling, knowing what items need reordering, etc. can make the difference between a successful and an unsuccessful enterprise. With the advent of the microcomputer in general and the TRS-80 in particular, it is now possible for the small businessman to implement a computerized inventory system which will do all of the above, if desired, and more. The accompanying program is written for a 16K Level II machine and needs neither expansion interface nor printer to run. Obviously a printer would be quite handy for printouts of reports. As listed, the system is dimensioned for 50 different kinds of inventory items. With REM statements deleted there should be memory space for about 100 items. A disk system would increase the allowable number of items quite a bit. The beauty of the below system is that it works on a computer which sells for less than $1000.

To see what the system can do one need only RUN the program and examine the menu which appears as follows:

```
INVENTORY CONTROL
ENTER NUMBER OF DESIRED OPTION.

1. ADD ITEM TYPES TO INVENTORY FILE (OR START FILE)
2. INVENTORY LIST (ENTIRE OR BY CLASS OR BY VENDOR)
3. PROCESSING CHANGES OF INVENTORY AMOUNTS
4. READ INVENTORY FILE FROM CASSETTE
5. WRITE INVENTORY FILE ONTO CASSETTE
6. UPDATE TO BEGIN NEW INVENTORY PERIOD
7. ACTIVITY REPORT
8. EDITING INVENTORY FILE
9. END THIS PROGRAM

INPUT OPTION NUMBER & PRESS ENTER?
```

The first option to choose is 4 if an inventory file is already stored on cassette. Otherwise 1 is the choice as a file must be created. We'll choose option 1 here. For our inventory items we picked some selections from the Radio Shack 1979 catalog and invented amounts for variables not mentioned in the catalog (e.g. dealer cost, amount of sales). Our procedure will be to enter seven items into inventory, manipulate the inventory somewhat, save it on cassette, then read the cassette file and add five additional items to inventory.

In the following, our replies to machine queries will be enclosed in " " marks. Comments will generally be enclosed in ( ). Machine output will always be printed in CAPITALS.

On the last line of the menu we press " 1 " and ENTER. We see:

ADDITIONAL INVENTORY ITEM SUBROUTINE

HAS ANY EXISTING FILE BEEN READ FROM THE TAPE? (Y/N)? " Y "

(Try N here and you are sent back to the MENU. Try anything besides Y or N and you will see INPUT ERROR. ENTER AGAIN. Then the machine cycles back to the above Y/N question.)

INPUT DATA FOR NEXT ITEM

ITEM NUMBER ? " 26-1151 "
DESCRIPTION (< 20 CHARACTERS) ? " SCREEN PRINTER "
VENDOR NUMBER ? " 26 "

(Instead of a vondor number an item class code could be put in here. In fact, we have just taken as our vendor number that part of the R.S. catalog number coming before the hyphen.)

QUANTITY ON HAND ? " 1 "
LAST ORDER UNIT COST ? " 400 "
SELLING PRICE ? " 599 "
AVERAGE UNIT COST ? " 350 "

(The average cost per unit is automatically recomputed after the record of each new shipment is entered into this program via the use of option 3.)

REORDER POINT ? " 0 "

(When making use of option 2, INVENTORY LIST, the user may obtain a list of all those items whose QUANTITY ON HAND have fallen below their REORDER POINT)

MAXIMUM INVENTORY ? " 2 "
SOLD THIS INV. PERIOD ? " 1 "
SOLD LAST INV. PERIOD ? " 0 "
SOLD 2 INV. PER. AGO ? " 0 "

(The first two of these last three items are used in the ACTIVITY REPORT of option 7.)

(We now see the following printout for this item:)

ITEM NO. : 26-1151 DESCRIPT. :SCREEN PRINTER
VENDOR NO. : 26
QUANT. ON HAND : 1 LAST UNIT COST: 400
SELLING PR. : 599 AVERAGE COST: 350
REORDER PT. : 0 MAX INV. : 2
ORDERS THIS INV. PERIOD: 1
ORDERS LAST INV. PER: 0 PREV. PER: 0

IF OK PRESS 1, OTHERWISE PRESS 0? "1"

(If 0 is pressed here all the questions about this item are repeated. For any question already answered correctly just press ENTER. For those questions answered in error just fill in the correct entry when prompted.)

DO YOU DESIRE MORE ENTRIES? (Y/N)? " Y "

(An N here sends you back to the menu, but with the just entered item now on the inventory list.)

INPUT DATA FOR NEXT ITEM.

ITEM NUMBER ? "26-1150"

From here on we just repeat the above process for item 26-1150 and then for 5 additional items, for a total of 7 items on our inventory file. After the seventh item, which is a multitester kit, # 28-4014, when we are prompted with DO YOU DESIRE MORE ENTRIES (Y/N)? we reply with N. Then we find ourselves back at the menu.

Now we are shipped 2 screen printers at a cost to us of $420 a piece. On the menu by INPUT OPTION NUMBER & PRESS ENTER? we press 3. and ENTER. The following takes place:

CHANGING INVENTORY AMOUNTS

FOR EACH ITEM OF INTEREST IT WILL BE NECESSARY TO ENTER THE ITEM NUMBER AND PRESS ENTER. INFORMATION ABOUT THAT ITEM WILL THEN BE DISPLAYED. THEN THE USER MUST INDICATE WHETHER THE ITEM SUPPLY IS BEING DIMINISHED OR INCREASED, AND BY HOW MUCH.

(The above stays on the screen for a few seconds. If this time is not sufficient it may be increased by changing the 200 in step 1695 to some larger integer.)

ITEM NUMBER :? "26-1151"
ITEM NO. : 26-1151 DESCRIP. :SCREEN PRINTER
VENDOR NO. : 26
QUANT. ON HAND : 1 LAST UNIT COST: 400
SELLING PR. : 599 AVERAGE COST: 350
REORDER PT. : 0 MAX INV. : 2
ORDERS THIS INV. PER: 0 PREV. PER: 0

INPUT A FOR ADDITIONS, D FOR DELETIONS, R FOR END
? " A"
INPUT NO. OF UNITS TO ADD? "2"
UNIT COST? "
PRESS 1 AND ENTER IF IN ERROR. JUST ENTER IF OK? (Press ENTER)

(If 1 was pressed here the old information about the item would be printed as above and we would start from INPUT A FOR ADDITIONS.)

DO YOU DESIRE MORE ENTRIES?(Y/N)? " N "

(A Y here would have brought us to ITEM NUMBER :?)

(A check of the 26-1151 record at this moment would show a QUANT. ON HAND of 3 and an AVERAGE COST of 396.66)

We now see the MENU in front of us again. Suppose we want a listing of all information we have on all items in inventory. This information cannot reasonably fit on one line we have chosen to present it a block at a time just as we have presented the information on item 26-1151 several times already. The information on each item stays on the screen for about 10 seconds. Then information on the next item in inventory is displayed. If you wish to examine the information on one item for a longer length of time, pressing SHIFT @ will stop processing and keep the given item in display. A touch of any button has the effect of resuming processing. There are many types of reports which may be displayed on the screen. Many times, one prefers to display just a little information about each item but to print information on several items together. This is done in the ACTIVITY REPORT of option 7. We shall see the activity report later. To get out INVENTORY LIST we choose option 2 and get:

CHOOSE DESIRED OPTION AND PRESS ENTER
1. COMPLETE INVENTORY LIST
2. INVENTORY LIST BY VENDOR
3. LIST OF ITEMS BELOW REORDER POINT
OPTION # ? " 1 "

(We now get the printout, one item at a time, about 10 seconds per item. When done we automatically return to the MENU.)

Now we wish to save the seven items in our inventory on a tape file. This involves option 5. We press 5 and ENTER and get:

PREPARE TAPE RECORDER AND INV. TAPE.
PRESS ENTER WHEN READY?

(We put a new cassette into the cassette player, wind the cassette past the leader and press down the PLAY and RECORD buttons. We then press ENTER. The inventory file is now recorded onto the cassette. We can now turn off the computer.)

Now suppose it is a little later and we wish to place 5 more names on the inventory file. We get the program tape and load the inventory program into the TRS-80. We might try option 1 first, but the question HAS ANY EXISTING FILE BEEN READ FROM TAPE?(Y/N)? should remind us to load the inventory data tape. We answer N to the question and try option 4. We get the following:

PREPARE TAPE RECORDER AND INV. TAPE.
PRESS ENTER WHEN READY?

(We press ENTER and the inventory file is read into the machine. A note is in order here. On our TRS-80 we have experienced some difficulty in reading data files into the machine from cassette with 100% accuracy. The reading in step 4 may have to be repeated several times before it comes out correct. The machine may generate an error (FD error occurs alot). Just press RUN and start again)

After the file is read the MENU is again displayed. We now use option 1 to add 5 more items to the inventory file, for a total of 12. When done we press N in answer to the DO YOU DESIRE MORE ENTRIES?(Y/N)? question and return to the MENU.

We now decide that we would like to change the MAXIMUM INVENTORY amount for the SCREEN PRINTER from 2 to 3. To do this option 8, EDITING INVENTORY FILE is necessary. We choose option 8 and see:

EDITING ITEM ENTRIES

FOR EACH ITEM MAKE THE APPROPRIATE CHANGES AND PRESS ENTER AFTER EACH CHANGE.
JUST PRESS ENTER WHEN ITEM IS NOT CHANGED.

(In about 3 seconds we see:

ITEM NUMBER (99999 FOR RETURN)? "26-1151"

(Then we get:)

```
ITEM NO.              :26-1151      DESCRIP.  :SCREEN PRINTER
VENDOR NO.            :26
QUANT. ON HAND:  3  LAST UNIT COST:  400
SELLING PR.  :  599      AVERAGE COST  :  396.66
REORDER PT. :  0      MAX INV. :  2
ORDERS THIS INV. PERIOD  :  1
ORDERS LAST INV. PER:  0  PREV. PER:  0
```

```
ITEM NUMBER                          ?  (We press ENTER)
DESCRIPTION (   20 CHAR)             ?  (We press ENTER)
VENDOR NUMBER                        ?  (We press ENTER)
QUANTITY ON HAND                     ?  (We press ENTER)
LAST ORDER UNIT COST                 ?  (We press ENTER)
SELLING PRICE                        ?  (We press ENTER)
AVERAGE UNIT COST                    ?  (We press ENTER)
REORDER POINT                        ?  (We press ENTER)
MAXIMUM INVENTORY                    ?  "  3  "
# SOLD THIS INV PERIOD               ?  (We press ENTER)
# SOLD LAST INV PERIOD               ?  (We press ENTER)
# SOLD 2 INV. PER. AGO               ?  (We press ENTER)
```

(The block printout of all the information about the SCREEN PRINTER now flashes on the screen, but the MAX INV. entry now equals 3. On the screen we also see the question:)

DO YOU DESIRE MORE ENTRIES ?(Y/N)? "N "
(The MENU now flashes on the screen.)

We would like a listing of the activity (sales) of each item for several consecutive inventory periods. An inventory period could be a year, quarter, month, week or even a day depending upon the enterprise. This involves option 7. ACTIVITY REPORT. We choose option 7 and get:

ITEM NO.	DESCRIPTION	ON HAND	THIS PER.	LAST PER.
26-1151	SCREEN PRINTER	3	1	0
26-1150	LINE PRINTER	2	4	5
26-1140	EXPANSION INTER	4	5	3
64-2227	SOLDER KIT	15	3	5
28-174	METAL DETECTOR	2	1	0
28-4014	MULTITESTER KIT	3	2	3
28-4004	INTERCOM KIT	4	3	4
28-182	LIE DETECTOR KIT	2	9	0
21-1531	40 CHANNEL CB	1	1	0
31-2076	120 WATT RECEIVER	1	1	0

PRESS ENTER FOR MORE OF REPORT? (We press ENTER)

ITEM NO.	DESCRIPTION	ON HAND	THIS PER.	LAST PER.
40-2028	SPEAKER SYSTEM	2	2	2
12-775	SHORTWAVE RADIO	3	2	3

END OF REPORT. PRESS ENTER TO RETURN TO MENU? (We press ENTER)
(Since this system was designed to be usable without a line printer the ACTIVITY REPORT is displayed 10 entries at a time. This may be easily modified. It actually makes the report very usable for someone with a SCREEN PRINTER.)

There are several things we have not done yet. Option 6, UPDATE TO BEGIN NEW INVENTORY PERIOD, is used at the beginning of an inventory period. When invoked, this option sets all ORDERS THIS INV. PERIOD entries to 0, changes all ORDERS LAST INV. PER entries to the old ORDERS THIS INV. PERIOD entries for the same item and also replaces the PREV. PER entries with the old ORDERS LAST INV. PER entries. For example, if we invoked option 6 and then ran an ACTIVITY REPORT, the first two lines of the activity report would be:

ITEM NO.	DESCRIPTION	ON HAND	THIS PER.	LAST PER.
26-1151	SCREEN PRINTER	3	0	1

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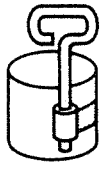
This inventory system is far from complete. Its biggest drawback is probably that it is not designed for use by either line printer or disk. This limits applicability in an obvious manner. Hard copy reports are generally desired and many small businesses have more than 100 or so types of inventory items. It happens that it is relatively simple to redesign the system to handle both printer and disk. Another possible problem is that the integrity of data recorded on cassette does not seem as high as that recorded on disk. We have gotten many recording errors. Possibly a higher quality tape would be helpful. We're just not sure. But it would be quite something if 599.95 was changed to 199.95 without anyone knowing.

The astute reader will notice that no provision has been made for entirely removing an item from inventory. This would be a simple addition. It probably would also be handy to have a routine which would sort inventory data so that reports come printed either sequentially by ITEM NO. or possibly alphabetically by DESCRIPTION. Option 2 does have the ability to produce a list of all items which have reached the REORDER PT.

Everyone who uses inventory reports has some of his own pet reports. These probably are not included here. If the necessary data is included then it should be relatively simple to produce just about any report. If the information has not been provided then the user may modify the inventory file accordingly. This should also be easy. Remember, however, the more that is in the file, the fewer the number of items that can fit on the file.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INVENTORY CONTROL
BY
DR. PETER SHENKIN

```
10 REM          INVENTORY CONTROL FOR TRS-80
20 REM                      BY DR. PETER SHENKIN
30 REM ************************************************************
40 REM  THIS PROGRAM IS DESIGNED FOR A 16K LEVEL II TRS-80.
50 REM  IN ITS PRESENT FORM AN EXPANSION INTERFACE IS NOT
60 REM  NEEDED.  A LIMITATION IS THAT ONLY 50 DIFFERENT KINDS
70 REM  OF ITEMS MAY BE HANDLED.  FOR ESTABLISHMENTS WITH
80 REM  LARGER INVENTORIES, OR WHERE HARD COPY IS NEEDED WE
90 REM  SUGGEST THE R.S. BUSINESS SYSTEM.  A DISK-BASED VERSION
95 REM  OF THIS PROGRAM IS AVAILABLE.
120 REM ************************************************************
130 PRINT
190 CLEAR 2500
200 DIM N$(50),D$(50),V$(50),Q(50),U(50),P(50),AC(50)
210 DIM RL(50),RA(50),S(3,50)
230 NI=0
240 GOSUB 3200
400 CLS
410 PRINT "           INVENTORY CONTROL"
420 PRINT " ENTER NUMBER OF DESIRED OPTION. "
425 PRINT
430 PRINT "1. ADD ITEM TYPES TO INVENTORY FILE(OR START FILE)"
440 PRINT "2. INVENTORY LIST(ENTIRE OR BY CLASS OR BY VENDOR)"
450 PRINT "3. PROCESSING CHANGES OF INVENTORY AMOUNTS"
460 PRINT "4. READ INVENTORY FILE FROM CASSETTE"
470 PRINT "5. WRITE INVENTORY FILE OOTO CASSETTE"
480 PRINT "6. UPDATE TO BEGIN NEW INVENTORY PERIOD"
483 PRINT "7. ACTIVITY REPORT"
486 PRINT "8. EDITING INVENTORY FILE"
490 PRINT "9. END THIS PROGRAM"
500 PRINT
510 INPUT "INPUT OPTION NUMBER & PRESS ENTER";OP
520 ON OP GOSUB 1000,1300,1600,1900,2200,2500,3000,3500,2800
540 GOTO 400
1000 REM SUBROUTINE FOR ADDING ITEM TYPES TO INVENTORY FILE
1010 CLS
1015 PRINT "ADDITIONAL INVENTORY ITEM SUBROUTINE":PRINT
1020 PRINT "HAS ANY EXISTING FILE BEEN READ FROM TAPE?(Y/N);
1030 INPUT Z9$
1040 IF Z9$="N" GOTO 1290
1050 IF Z9$="Y" GOTO 1075
1060 GOSUB 5200
1070 GOTO 1010
1075 I=NI+1
```

```
1080 CLS
1085 PRINT "INPUT DATA FOR NEXT ITEM.":PRINT
1090 GOSUB 6700
1230 REM EXHIBIT DISPLAY FOR THIS ITEM
1240 GOSUB 6000
1250 GOSUB 6200
1260 IF Z8=0 GOTO 1080
1270 GOSUB 6500
1280 NI=NI+1:IF Z9$= "Y" GOTO 1075
1290 RETURN
1300 REM SUBROUTINE GIVING INVENTORY LIST
1310 CLS:PRINT "CHOOSE DESIRED OPTION AND PRESS ENTER"
1320 PRINT "1.  COMPLETE INVENTORY LIST"
1330 PRINT "2.  INVENTORY LIST BY VENDOR"
1340 PRINT "3.  LIST OF ITEMS BELOW REORDER POINT"
1350 INPUT "OPTION # ";N8
1360 ON N8 GOSUB 1380,1410,1440
1370 RETURN
1380 FOR I=1 TO NI
1390 GOSUB 6000
1400 FOR J = 1 TO 2000:NEXT J
1403 NEXT I
1405 RETURN
1410 INPUT "DESIRED VENDOR NUMBER ";VN$
1420 FOR I=1 TO NI
1430 IF V$(I)<>VN$ GOTO 1435
1432 GOSUB 6000
1433 FOR J=1 TO 300 :NEXT J
1434 FOR J= 1 TO 1000:NEXT J
1435 NEXT I
1439 RETURN
1440 FOR I= 1 TO NI
1450 IF Q(I) >= RL(I) GOTO 1470
1460 GOSUB 6000
1465 FOR J= 1 TO 1000:NEXT J
1470 NEXTI
1480 RETURN
1600 REM SUBROUTINE FOR CHANGING INVENTORY AMOUNTS
1610 REM AVERAGE COST AUTOMATICALLY CHANGED WITH ADDITIONS
1615 REM TO INVENTORY
1620 CLS
1630 PRINT "       CHANGING INVENTORY AMOUNTS"
1640 PRINT
1650 PRINT "FOR EACH ITEM OF INTEREST IT WILL BE NECESSARY TO
1660 PRINT "ENTER THE ITEM NUMBER AND PRESS ENTER.  INFORMATION
1670 PRINT "ABOUT THAT ITEM WILL THEN BE DISPLAYED.  THEN THE
1680 PRINT "USER MUST INDICATE WHETHER THE ITEM SUPPLY IS BEING"
1690 PRINT "DIMINISHED OR INCREASED, AND BY HOW MUCH."
1695 FOR I=1 TO 200:NEXT I
```

```
1700 CLS
1705 I=0
1710 PRINT @ 320,"ITEM NUMBER :";:INPUT IT$
1720 I = I+1
1730 IF IT$=N$(I) GOTO 1800
1740 IF I=NI GOTO 1770
1750 GOTO 1720
1770 PRINT:PRINT "ITEM NOT ON INVENTORY LIST."
1775 FOR J=1 TO 200:NEXT J
1780 GOTO 1870
1800 GOSUB 6000 : REM LIST ITEM INFORMATION
1810 PRINT "INPUT A FOR ADDITIONS,D FOR DELETIONS,R FOR END"
1812 INPUT R$
1814 IF R$ = "R"   RETURN
1815 IF R$="A" OR R$="D" GOTO 1820
1817 GOSUB 5200
1819 GOTO 1800
1820 IF R$="A" GOTO 1840
1822 CLS:PRINT"HOW MANY ITEMS DO YOU WISH TO DELETE";:INPUT Q1
1824 IF Q1<= Q(I) GOTO 1828
1825 PRINT:PRINT "ONLY ";Q(I);" ITEMS IN INVENTORY. TRY AGAIN"
1826 FOR I= 1 TO 300:NEXT I
1827 GOTO 1822
1828 PRINT "ARE YOU SURE YOU WANT TO DELETE ";Q1;" ITEMS(Y/N)";
1829 INPUT Z9$
1831 IF Z9$="Y" OR Z9$="N" GOTO 1834
1832 GOSUB 5200
1833 GOTO 1828
1834 IF Z9$="N" GOTO 1800
1835 Q(I)=Q(I) - Q1:S(0,I)=S(0,I)+Q1
1836 GOTO 1870
1840 INPUT "INPUT NO.  OF UNITS TO ADD";Q1
1845 INPUT "UNIT COST";UI
1847 Z5=0
1850 INPUT "PRESS 1 AND ENTER IF IN ERROR. JUST ENTER IF OK";Z5
1855 IF Z5=1 GOTO 1800
1858 AC=(AC(I)*Q(I)+Q1*UI)/(Q(I)+Q1)
1859 AC(I)=INT(100*AC)/100
1860 Q(I)=Q(I) + Q1
1865 GOTO 1870
1870 GOSUB 6500
1875 IF Z9$= "Y" GOTO 1700
1880 RETURN
1900 REM SUBROUTINE FOR READING INV.  FILE FROM CASSETTE
1910 CLS:PRINT "PREPARE TAPE RECORDER AND INV.  TAPE."
1920 INPUT "PRESS ENTER WHEN READY";Z7
1930 INPUT #-1,NI
1940 FOR I=1 TO NI
1950 GOSUB 5000
1960 NEXT I
1970 RETURN
```

```
2200 REM SUBROUTINE FOR WRITING INV FILE ONTO CASSETTE
2210 CLS:PRINT "PREPARE TAPE RECORDER AND INV.  TAPE."
2220 INPUT "PRESS ENTER WHEN READY";Z7
2230 PRINT #-1,NI
2240 FOR I= 1 TO NI
2250 GOSUB 5100
2260 NEXT I
2270 RETURN
2500 REM UPDATE TO BEGIN NEW INVENTORY PERIOD
2510 FOR I=1 TO NI
2520 S(2,I) = S(1,I) : S(1,I)=S(0,I) : S(0,I) = 0
2530 NEXT I
2535 CLS:PRINT "UPDATE COMPLETE":FOR I=1 TO 200:NEXT I
2540 RETURN
2800 REM END PROGRAM SUBROUTINE
2805 CLS
2810 INPUT"ARE YOU SURE YOU WISH TO END PROGRAM(Y/N)";Z7$
2820 IF Z7$="N"  RETURN
2830 IF Z7$="Y"  END
2840 GOSUB 5200
2850 GOTO 2805
3000 REM SUBROUTINE FOR ACTIVITY REPORT
3010 CLS:GOSUB 3300
3020 FOR I= 1 TO NI
3030 GOSUB 3250
3040 IF I/10 = INT(I/10) GOTO 3070
3050 NEXT I
3055 PRINT
3056 INPUT "END OF REPORT.  PRESS ENTER TO RETURN TO MENU";Z4
3060 RETURN
3070 PRINT:INPUT "PRESS ENTER FOR MORE OF REPORT";Z4
3080 CLS
3090 GOSUB 3300
3100 GOTO 3050
3200 REM SUBROUTINE WITH PRINTUSING FORMAT VARIABLES
3210 H$="ITEM NO.   DESCRIPTION    ON HAND THIS PER.  LAST PER.  !"
3220 Z$="%      %  %                %  ####     ####         ####  "
3225 RETURN
3250 REM SUBROUTINE FOR PRINTING ACTIVITY INFORMATION
3260 PRINTUSING Z$;N$(I),D$(I),Q(I),S(0,I),S(1,I)
3270 RETURN
3300 REM SUBROUTINE FOR PRINTING HEADING
3310 PRINTUSING H$;ZZ$
3320 RETURN
```

```
3500 REM EDITING SUBROUTINE
3510 CLS
3520 PRINT "          EDITING ITEM ENTRIES"
3530 PRINT
3540 PRINT "FOR EACH ITEM MAKE THE APPROPRIATE CHANGES AND"
3550 PRINT "AND PRESS ENTER AFTER EACH CHANGE.  JUST PRESS
3560 PRINT "ENTER WHEN ITEM IS NOT CHANGED."
3570 FOR I= 1 TO 1000:NEXT I
3580 CLS
3590 I=0
3600 PRINT @ 320,"ITEM NUMBER (99999 FOR RETURN)";:INPUT IT$
3610 IF IT$="99999" RETURN
3620 I=I+1
3630 IF IT$=N$(I) GOTO 3700
3640 IF I = NI GOTO 3670
3650 GOTO 3620
3670 PRINT:PRINT "ITEM NOT ON INVENTORY LIST."
3675 FOR J=1 TO 200:NEXT J
3680 GOTO 3755
3700 GOSUB 6000 : REM LIST ITEM INFORMATION
3710 PRINT
3720 GOSUB 6700
3730 CLS
3740 GOSUB 6000
3750 PRINT:PRINT
3755 GOSUB 6500 : REM QUERY SUBROUTINE
3760 IF Z9$="Y" GOTO 3590
3780 RETURN
5000 REM SUBROUTINE FOR READING RECORD FROM CASSETTE
5010 INPUT #-1,N$(I),D$(I),V$(I),Q(I),U(I),P(I),AC(I),RL(I),
A(I),S(0,I),S(1,I),S(2,I)
5020 RETURN
5100 REM SUBROUTINE FOR COPYING RECORD ONTO CASSETTE
5110 PRINT #-1,N$(I),D$(I),V$(I),Q(I),U(I),P(I),AC(I),RL(I),
A(I),S(0,I),S(1,I),S(2,I)
5120 RETURN
5200 REM SUBROUTINE FOR INPUT ERROR
5210 PRINT:PRINT "INPUT ERROR.  ENTER AGAIN."
5220 FOR K=1 TO01000:NEXT K
5230 PRINT:RETURN
6000 REM SUBROUTINE DISPLAYING DATA FOR 1 ITEM
6010 CLS
6020 PRINT "ITEM NO.       : ";N$(I);"   DESCRIP.  :";D$(I)
6030 PRINT "VENDOR NO.     : ";V$(I)
6040 PRINT "QUANT. ON HAND: ";Q(I);" LAST  UNIT COST:";U(I)
6050 PRINT "SELLING PR.  :";P(I);"   AVERAGE COST  : ";AC(I)
6060 PRINT "REORDER PT. : ";RL(I);"  MAX INV. : ";RA(I)
6070 PRINT "ORDERS THIS INV.  PERIOD  : ";S(0,I)
6080 PRINT "ORDERS LAST INV.  PER:";S(1,I);" PREV.  PER:";S(2,I)
6085 PRINT
6090 RETURN
```

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```
6200 REM OK SUBROUTINE
6210 PRINT
6220 PRINT "IF OK PRESS 1,OTHERWISE PRESS 0";:INPUT Z8
6230 IF Z8=0 OR Z8=1 GOTO 6270
6240 GOSUB 5200
6250 GOSUB 6000
6260 GOTO 6210
6270 REM
6290 RETURN
6500 REM QUERY SUBROUTINE
6510 PRINT "DO YOU DESIRE MORE ENTRIES ?(Y/N)":INPUT Z9$
6520 IF Z9$<> "Y" AND Z9$<> "N" GOTO 6530
6525 RETURN
6530 GOSUB 5200
6540 CLS:GOTO 6510
6700 REM DATA ITEM INPUT SUBROUTINE
6710 INPUT "ITEM NUMBER                    ";N$(I)
6720 INPUT "DESCRIPTION( < 20 CHAR)        ";D$(I)
6730 INPUT "VENDOR NUMBER                  ";V$(I)
6740 INPUT "QUANTITY ON HAND               ";Q(I)
6750 INPUT "LAST ORDER UNIT COST           ";U(I)
6760 INPUT "SELLING PRICE                  ";P(I)
6770 INPUT "AVERAGE UNIT COST              ";AC(I)
6780 INPUT "REORDER POINT                  ";RL(I)
6790 INPUT "MAXIMUM INVENTORY              ";RA(I)
6800 INPUT "# SOLD THIS INV. PERIOD        ";S(0,I)
6810 INPUT "# SOLD LAST INV. PERIOD        ";S(1,I)
6820 INPUT "# SOLD 2 INV. PER. AGO         ";S(2,I)
6830 RETURN
```

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CREDIT CARD INFORMATION STORAGE
BY
STAN TISHLER

```
5 GOSUB 3000
10 CLEAR 3000:CLS:DIMN$(150),A$(150),P$(150),Z$(150),X$(150)
15 DIMY$(150),R$(150)
20 CLS:PRINT@20,"*  *  SELECTION  *  *":PRINT
30 PRINTTAB(20)"1.  TO BUILD A FILE"
40 PRINTTAB(20)"2.  TO SEE THE ENTIRE FILE"
50 PRINTTAB(20)"3.  TO SEE AN INDIVIDUAL NAME"
60 PRINTTAB(20)"4.  TO MAKE CORRECTIONS"
70 PRINTTAB(20)"5.  TO SAVE THE CURRENT FILE ON TAPE"
80 PRINTTAB(20)"6.  TO INPUT A FILE FROM TAPE"
90 PRINTTAB(20)"7.  TO ADD TO A FILE":PRINT:PRINT
95 PRINTTAB(19);:INPUT Q:IF Q>7 OR Q<1 GOTO 20
99 ON Q GOTO 110,200,300,400,500,600,700
110 FOR I=1 TO 50:CLS
120 GOSUB 1000
140 NEXT
143 IF FRE(X$)<100 GOTO 150
145 NEXT
150 PRINT"FILE CLOSED--":INPUT"TO SEE THE SELECTOR HIT ENTER";X
160 GOTO 20
200 A9$="1":CLS:FOR I=1 TO P1
201 IF N$(I)="END" THEN P1=P1-1:GOTO 210
205 GOSUB 2000
208 INPUT"PRESS ENTER FOR NEXT CARD (OR ENTER 'END')";A9$:CLS
209 IF A9$="END" THEN A9$="":GOTO 20
210 NEXT I
215 PRINT"FILE COMPLETE.  ";P1;" CREDIT CARDS ON FILE."
217 INPUT"FOR SELECTOR PRESS ENTER";X:GOTO 20
300 CLS:INPUT"ENTER THE NAME OF THE CREDIT CARD.";N$
310 FOR I=1 TO P1:IF N$=N$(I) THEN 330
315 NEXT I
320 PRINT"NAME NOT ON FILE":GOTO 340
330 GOSUB2000
340 PRINT:PRINT"FOR ANOTHER CARD TYPE 1, OTHERWISE 0";:INPUT X:CLS
345 INPUT X:CLS
350 IF X=1 GOTO 300 ELSE 20
```

```
400 CLS:PRINT"ENTER THE NAME FOR THE CARD YOU WISH TO CHANGE. "
405 INPUT N$
410 FOR I=1 TO P1:IF N$=N$(I) GOTO 421
415 NEXT
420 PRINT"NAME NOT ON FILE":GOTO 488
421 GOSUB 2000
425 INPUT"DO YOU WANT TO CHANGE THIS RECORD (Y/N)";Q$
426 IF LEFT$(Q$,1)="N" GOTO 488
427 PRINT"SELECT THE ITEM YOU WISH TO CHANGE: 1. NAME 2. NUMBER
428 PRINT "3. # OF CARDS 4. CARD HOLDERS 5. ADDRESS
429 PRINT "6. PHONE NUMBER 7. EXPIRATION DATE
430 PRINT "8. THE ENTIRE RECORD 9. END CHANGES":INPUT B1
434 ON B1 GOTO 450,455,460,465,470,475,480,435,488
435 INPUT"DO YOU WANT TO CHANGE THE ENTER RECORD (Y/N)";A2$
437 IF A2$="N" GOTO 427
440 GOSUB 1000
445 GOTO 488
450 INPUT"CHANGE NAME (Y/N)";A2$:IF A2$="N" GOTO 427
452 INPUT"ENTER NAME";N$(I):GOTO 427
455 INPUT"CHANGE NUMBER (Y/N)";A2$:IF A2$="N" GOTO 427
457 INPUT"ENTER NUMBER";A$(I):GOTO 427
460 INPUT"CHANGE # OF CARDS (Y/N)";A2$:IF A2$="N" GOTO 427
462 INPUT"ENTER NEW # OF CARDS";Z$(I): GOTO 427
465 INPUT"CHANGE CARD HOLDERS (Y/N)";A2$:IF A2$="N" GOTO 427
467 INPUT"ENTER ALL CARDHOLDERS";P$(I):GOTO 427
470 INPUT"CHANGE ADDRESS (Y/N)";A2$:IF A2$="N" GOTO 427
472 INPUT"ENTER NEW ADDRESS";X$(I):GOTO 427
475 INPUT"CHANGE PHONE NUMBER (Y/N)";A2$:IF A2$="N" GOTO 427
477 INPUT"ENTER NEW PHONE NUMBER";Y$(I): GOTO 427
480 INPUT"CHANGE EXPIRATION DATE (Y/N)";A2$:IF A2$="N" GOTO 427
482 INPUT"ENTER NEW EXPIRATION DATE";R$(I):GOTO 427
485 GOTO20
488 INPUT"FOR ANOTHER CORRECTION TYPE '1', OTHERWISE '0'";X
490 IF X=1 GOTO 400
499 GOTO 20
500 CLS:INPUT"MAKE PREPERATIONS FOR CASSETTE. "
505 PRINT "WHEN READY HIT ENTER";X
510 PRINT"COPYING. . . .
520 PRINT#-1,P1
525 FOR I=1 TO P1
530 PRINT#-1,N$(I),A$(I),Z$(I),P$(I),X$(I),Y$(I),R$(I):NEXT
540 PRINT"COMPLETE--NOTE TAPE LOCATION
550 INPUT"TO SEE THE SELECTOR, HIT ENTER";X:GOTO 20
```

```
600 CLS:INPUT"WHEN READY HIT ENTER";X
610 PRINT"DATA BEING ENTERED. . . . . "
620 INPUT#-1,P1
625 FOR I=1 TO P1
630 INPUT#-1,N$(I),A$(I),Z$(I),P$(I),X$(I),Y$(I),R$(I):NEXT
640 PRINT"COMPLETE":INPUT"TO SEE SELECTOR HIT ENTER";X:GOTO20
700 CLS:INPUT"HOW MANY ADDITIONAL NAMES ARE YOU ADDING";B
710 P1=P1+B
720 FOR I=P1+1-B TO P1:CLS
730 GOSUB 1000
770 IF FRE(X$)<100 GOTO 790
780 NEXT
790 PRINT"FILE CLOSED--":INPUT"TO SEE THE SELECTOR HIT ENTER";X
800 GOTO 20
999 STOP
1000 CLS
1005 PRINT@960,"ENTER 'END' WHEN DATA ENTRY IS COMPLETE."
1006 PRINT@(0)," "
1010 PRINT"DO NOT USE ANY COMMAS OR COLONS."
1012 INPUT"ENTER CREDIT CARD NAME";N1$(I)
1013 IF LEN(N$(I))>24 PRINT"NAME TOO LONG":GOTO 1010
1015 IF N$(I)="END" THEN P1=I:GOTO 150
1020 INPUT"ENTER CREDIT CARD NUMBER";A$(I)
1021 IF LEN(A$(I))>20 PRINT"TOO LONG.":GOTO 1020
1023 INPUT"ENTER THE NUMBER OF CARDS RECEIVED";Z$(I)
1025 IF LEN(Z$(I))>1 PRINT"ERROR.  REENTER.":GOTO 1023
1030 INPUT"ENTER THE NAMES OF ALL CARD USERS";P$(I)
1031 IF LEN(P$(I))>32 PRINT"TOO LONG-USE ABBREVIATIONS.":GOTO1030
1033 PRINT"ENTER ADDRESS  TO BE NOTIFIED IF CARD IS LOST"
1034 INPUT"(STREET CITY STATE ZIP--NO COMMAS)";X$(I)
1035 IF LEN(X$(I))>100 PRINT"TOO LONG.  ABBREVIATE.":GOTO 1033
1037 INPUT"ENTER PHONE NUMBER TO REPORT LOSS";Y$(I)
1038 IF LEN(Y$(I))>12 PRINT"TOO LONG.  REENTER.":GOTO 1037
1039 INPUT"ENTER EXPIRATION DATE";R$(I)
1050 RETURN
2000 PRINTTAB(0)"CARD NAME";TAB(25)"CARD NUMBER";TAB(47)"EXPIRATION
 DATE"
2010 PRINTSTRING$(55,"-")
2020 PRINTTAB(0)N$(I);TAB(25)A$(I);TAB(53)R$(I)
2025 PRINTSTRING$(55,"-")
2030 PRINT"ADDRESS      CITY     STATE     ZIP
2050 PRINTX$(I)
2055 PRINTSTRING$(55,"-")
2060 PRINTTAB(0)"TELEPHONE #";TAB(15)"# OF CARDS";TAB(28)"CARDHOLDERS"
2080 PRINTTAB(0)Y$(I);TAB(19)Z$(I);TAB(28)P$(I)
2090 PRINTSTRING$(60,"=")
2100 RETURN
```

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```
3000 CLS:PRINT"                    CREDIT CARD INFORMATION STORAGE
3010 PRINT"                    ---------------------------------
3020 PRINT"THE PURPOSE OF THIS PROGRAM IS THE SAVING OF PERTINENT
3030 PRINT"CREDIT CARD DATA.  WE ALL HAVE WALLETS FULL OF CREDIT CARDS
3040 PRINT"AND IF THEY ARE LOST OR STOLEN WE HAVE A SERIOUS PROBLEM.
3050 PRINT"THIS PROGRAM DOES NOT PREVENT THEIR LOSS BUT CAN HELP YOU
3060 PRINT"MINIMIZE YOUR LIABILITY BY KNOWING WHICH CARDS WERE LOST
3070 PRINT"AND WHOM TO NOTIFY.
3080 PRINT:PRINT"CURRENT LAWS LIMIT YOUR LOSSES TO THE FIRST $50 OF
3090 PRINT"UNAUTHORIZED USE.  PROMPT NOTIFICATION TO THE CREDIT CARD
3100 PRINT"COMPANIES CAN REDUCE THIS AMOUNT AS WELL AS GETTING YOU
3110 PRINT"RAPID REPLACEMENT CARDS.  JUST ONE WORD OF CAUTION:"
3115 PRINT "DO NOT USE ANY COMMAS OR COLONS WHEN ENTERING DATE.
3120 PRINT:INPUT"PRESS ENTER TO BEGIN";A$
3130 RETURN
```


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BAR GRAPH PROGRAM
BY
RICHARD CLINTON (#4279)

```
5 CLS
10 PRINT " BAR GRAPH PROGRAM - AT MOST 10 CLASSES ALLOWED"
20 PRINT " FOLLOW DIRECTIONS AND ENTER DATA AS ASKED. "
30 INPUT " PRESS ENTER WHEN READY TO BEGIN. ";Z9
50 PRINT "INPUT DESIRED HEADING.  NO COMMAS PERMITTED, PLEASE"
60 PRINT:INPUT "HEADING";H$
70 INPUT "INPUT NUMBER OF DATA CLASSES";NI
75 K=NI
80 IF NI=INT(NI) AND NI<= 10  GOTO 100
90 PRINT "INPUT ERROR, TRY AGAIN. "
95 FOR I=1 TO 200:NEXT I:CLS:GOTO 70
100 CLS:PRINT"ENTER NO.  OF OBSERVATIONS IN EACH DATA CLASS"
110 PRINT:PRINT "CLASS      OBSERVATIONS"
120 FOR I=1 TO NI
130 PRINT I;"       ";:INPUT C(I)
140 NEXT I
145 CLS
150 GOSUB 1100
160 GOSUB 1000
170 C2=CM/50
180 FOR I=1 TO NI
190 D(I)=C(I)/CM*50
200 NEXT I
210 FOR I=1 TO NI
220 PRINT @ 832-64*I, I;TAB(5)C(I);TAB(12);
230 FOR J = 1 TO D(I):PRINT CHR$(143);:NEXT J
240 NEXT I
250 PRINT @ 16, H$
260 PRINT "OBSERVATION"
270 PRINT " #  VALUE"
275 FOR I=1 TO 10000
280 NEXT I
300 END
1000 REM GRAPH BOUNDARY SUBROUTINE
1010 FOR X=24 TO 127:SET(X,41)
1015 NEXT X
1020 RETURN
1100 REM HORIZONTAL SCALING SUBROUTINE
1110 CM=0
1120 FOR I= 1 TO K
1130 IF C(I)>CM THEN CM=C(I)
1140 NEXT I
1150 PRINT @ 1017,CM;
1160 PRINT @ 970,0
1170 PRINT @ 0,
1180 RETURN
```

BITS AND PIECES

by

HOWARD Y. GOSMAN

OUR NEW SOFTWARE POLICY

COMPUTRONICS is now selling high quality software. We have obtained the non-exclusive rights to sell software from various software companies. OBVIOUSLY, COMPUTRONICS CAN NOT PRINT SOFTWARE SOLD BY OTHER COMPANIES IN THE TRS-80 MONTHLY NEWSLETTER.

Our new software policy will not affect the quality of the programs published in the Newsletter. We will continue to publish major programs written by our staff and contributed by subscribers.

In order to insure the quality of the software we are selling, we will include a short evaluation form with each order. Subscribers are encouraged to submit more detailed evaluations for publication in future Newsletter issues.

OUR FUZZY CRYSTAL BALL

RADIO SHACK has taken the time and trouble to refute some of our information concerning new products soon to be sold by RADIO SHACK. As a matter of fact, a recent RADIO SHACK TRS-80 UPDATE (distributed to RADIO SHACK store managers and staff) suggested that perhaps our Newsletter uses a fuzzy "crystal ball."

A recent RADIO SHACK release (November 1, 1978) is entitled "Rumors-Bad Information." It states, "There have been a number of questions raised and rumors started by various TRS-80 User's Group newsletters and other publications which might end up as questions in your store."

All of our published information related to new products (and future products) sold by RADIO SHACK (and other companies) comes from reliable sources. Our intentions are to publish accurate information. The accuracy of our information is only as good as the accuracy of our sources. Hopefully, the majority of our "CRYSTAL BALL" information will prove to be accurate.

NO S-100 BUS FROM RADIO SHACK

An S-100 BUS addition to the RADIO SHACK TRS-80 would allow users to have a greater choice of equipment to be used in future system expansion. We stated that RADIO SHACK would be releasing an S-100 BUS within the next 90-days (see page 72).

According to the November 1, 1978 RADIO SHACK TRS-80 UPDATE (for store managers and staff), "Contrary to some continuing rumors and very recent magazine information, RADIO SHACK will not produce a device which adapts the TRS-80 to accept S-100 plug-in boards. At one time, Tandy Computers was developing such an adaptor, but of course they are no longer in existence."

Our misinformation related to the S-100 Bus comes from a phone call to TANDY COMPUTERS (see Page 19). Upon hearing a rumor about the pending release of the S-100 Bus, we called TANDY COMPUTERS 800 telephone number to ask about the availability of the S-100 Bus. We were told that it would be released within the next 90 days. This information was confirmed by the store manager. TANDY COMPUTERS (formerly a division of TANDY CORPORATION) no longer exists. We incorrectly assumed that RADIO SHACK (also a division of TANDY CORPORATION) would soon be selling the S-100 Bus.

BUT . . . AN S-100 BUS IS COMING

MICRO COMPUTER DEVICES INC., producer of the SELECTRA-TERM (see ad in this issue) will be producing and selling an S-100. Their S-100 Bus should be ready within the next 90-days. Complete details related to the new S-100 will be published as soon as it is available.

REAL-TIME CLOCK

RADIO SHACK has announced a new program that allows Level II/Expansion Interface owners to use the Interface's Real-Time Clock without having to purchase the Mini-Disk system (see page 23). The tape will be shipped with all new Level II computers and will be available to present owners at no charge (according to an October 23, 1978 RADIO SHACK TRS-80 UPDATE).

A KEYBOARD DEBOUNCE PROGRAM

RADIO SHACK has a new program that extends the keyboard "debounce" time to eliminate multiple characters on one key depression. The problem occurs on Level II computers, due to keyboard contacts becoming contaminated with dust, dirt, cigarette smoke particles and other foreign substances.

THE NEW RADIO SHACK MICROCOMPUTER NEWSLETTER

RADIO SHACK will be sending out another issue of their MICROCOMPUTER NEWSLETTER. You probably received their previous issue several months ago. It will contain information on the following: (1) The KEYBOARD DEBOUNCE and CLOCK programs, (2) MICROCHESS and GAMES PAC I, (3) RS-232C and TELEPHONE INTERFACE, (4) GENERAL LEDGER I Disk program, (5) MAILING LIST SYSTEM for disk and tape programs, and (6) assorted information and program tips.

THE NEW RADIO SHACK MAILING LIST SYSTEMS

According to RADIO SHACK'S October 23, 1978 TRS-80 UPDATE, two new mailing list programs are now available (or will be available very shortly). The two mailing list programs, one on disk and one on tape, allow the user to manage a mailing list. He can create the list, add to it, change information, sort it, and print mailing labels-either of the entire list or a selected portion of it. Selected lists may be printed by specified names, cities, zip code area, state, or even a special "select code". The tape version will sell for $19.50 . . .the Disk version will sell for $39.95.

RADIO SHACK DELIVERY SCHEDULES

As of October 19, 1978, there was about an 12 week wait for delivery on the LEVEL II BASIC KIT (to add to a LEVEL I computer). There is about a 14 week wait for disk delivery (which may be shorter now). It is still possible to obtain immediate delivery on disks and LEVEL II from some RADIO SHACK stores.

FROM OUR CRYSTAL BALL DEPARTMENT-ON DISKS

On page 69, we reported that RADIO SHACK will soon be selling a full size disk drive with 250K capacity. RADIO SHACK (in a recent release) stated that they do not have any plans for releasing a full size disk drive in the near future. Despite RADIO SHACK'S official denial, I am sure (based on rumor, my crystal ball and knowledgeable sources) that RADIO SHACK will be selling a 250K capacity disk drive (with up 1K system capacity) before June.

MICROTRONIX (see ad this issue) is selling the MICROPOLIS METAFLOPPY disk for under $500. The MICROPOLIS has the capacity of storing 315K on one disk drive (or over 1000K on four disk drives). It should be noted that at the present time, the MICROPOLIS will only store 85K (when used with the TRS-80 and 2.1 D.O.S.). MICROTRONIX (and at least three other companies) claim that they will soon have larger storage capacity on the MICROPOLIS METAFLOPPY (with a controller card modification).

SHUGART (the manufacturer of the RADIO SHACK mini disk) already has a dual density (double capacity) disk drive for sale. I am sure that RADIO SHACK must be looking into this possibility.

TEXAS INSTRUMENTS is about to strike. 1979 will probably be the year that TEXAS INSTRUMENTS will introduce personal and small business computers. Based on their past track record, TI will probably introduce a blockbuster. I do believe that TI will introduce a small inexpensive business computer with huge storage capacity. I'm also sure that RADIO SHACK is feverishly working on counter moves to insure their dominance of the personal and small business computer market. LOOK FOR A SURPRISE FROM RADIO SHACK WITHIN THE NEXT 100 DAYS.

What else? Look for a 70K disk drive for $125. It should be hitting the market around June. I'm sure that RADIO SHACK will take notice and look into the posibilities. (Information obtained from the November, 1978 Computer Retailing)

RADIO SHACK IS DOWN ON THOSE 16K RAM KITS

There is more and more interest about the 16K's that are being advertised for $79-$149 (compared to RS's almost $300). Here's RS's advice (from an RS release). "Yes, lots of folks are advertising 16K RAM kits for much less money than ours. There are outstanding reasons why your customer should still buy ours (RADIO SHACKS). We buy our RAM chips from only two prime vendors. We buy only top-grade chips. Even with this approach, in final testing, only 40% of the chips we receive will work reliably! There are some top name manufacturers whose chips just won't work. The chips can appear to work, but funny non-repeatable things happen whenever the computer gets into the memory area which uses those chips. Basically, very tight quality control on memory chips has not yet been achieved. The amount of power required to refresh those chips is critical. If the chips are not tested quite thoroughly, it is common to find that the particular chips used may require more power to refresh than the specifications call for, and more power than the Z-80 microprocessor can furnish. When this is the case, very strange

things will happen." If you're unit is not working, RS repair centers will not replace bad "foreign" chips. they will check your unit and repair any other faults. If you have used chips from other companies, RS will return the unit to you with a note that it contains bad RAM chips. It will be up to the customer to effect his own repairs or replacements for chips purchased elsewhere. **NOTE**-ALL RADIO SHACK OWNERS SHOULD KEEP THEIR PROOF OF PURCHASE. UNLESS THIS PROOF OF PURCHASE IS INCLUDED, IT WILL BE ASSUMED THAT YOU DO HAVE RADIO SHACK RAMS.

Our position related to RAMS was previously stated (see page 23).

TELEPHONE INTERFACE I

(According to an RS release) - "This new TRS-80 peripheral extends the capabilities of the RS-232C system to allow communication to be conducted over telephone lines. There is one significant limitation you should know about: The Telephone Interface I is an "originate only" interface. It does not allow communication between two TRS-80's. In a telephone link using this type of interface, **one** of the two computers which the TRS-80 might tie into as a terminal are so equipped.

An "originate/answer" interface will be available in the not-too-distant future, so be patient."

RADIO SHACK DISKETTES

1. A 2.2 DOS DISKETTE should be available in stores at this time.
2. A 3.0 DOS DISKETTE is coming.
3. (According to an RS release)... "We discovered that a few DOS system disks somehow got out with two extra files on them. . .Names/CMD and PGM/CIM. These are files which are used in quality testing and are supposed to be "killed" before the disks are shipped. They are blank files and contain no data or programs. If your customer should get one and ask you, tell him to simply kill both of them."

FORTRAN-80

MICROSOFT (who developed the RS version of BASIC) has just announced their new TRS-80 FORTRAN The TRS-80 FORTRAN will be supplied on two minidiskettes and requires a 32K system with one disk drive. The FORTRAN-80 by MICROSOFT is comparable to FORTRAN compilers on large mainframe and minicomputers. All of ANSI Standard FORTRAN X3.9-1966 is included except the COMPLEX data type. An assembler, editor and loader are also included. The TRS-80 FORTRAN will be available in January, 1979 for $350. More details next month.

What is FORTRAN? In short, FORTRAN is a high level computer language (BASIC is the computer language now used by your TRS-80) that removes the drudgery of standard operations and permits the user to instruct the computer in simpler terms. FORTRAN simulates with the computer the methods people use to solve problems in mathematics, business, and science.

THE ELECTRIC PENCIL

The ELECTRIC PENCIL is a word processing system (not an electrical device for writing on your video screen). The ELECTRIC PENCIL is the most powerful word processing system available for under $1000 (it sells for $99.95).

"The Electric Pencil is a Character Oriented Word Processing System. This means that text is entered as a continuous string of characters and is manipulated as such. This allows the user enormous freedom and ease in the movement and handling of text. Since lines are not delineated, any number of characters, words, lines or paragraphs may be inserted or deleted anywhere in the text. The entirety of the text shifts and opens up or closes as needed in full view of the user. The typing of carriage returns as well as word hyphenation is not required since each line of text is formatted automatically. As text is typed in and the end of a screen line is reached, a partially completed word is shifted to the beginning of the following line. Whenever text is inserted or deleted, existing text is pushed down or pulled up in a wrap around fashion. Everything appears on the video display screen as it occurs thereby eliminating any guesswork. Text may be reviewed at will by variable speed scrolling both in the forward and reverse directions.

By using the search or the search and replace function, any string of characters may be located and/or replaced with any other string of characters as desired. Specific sets of characters within encoded strings may also be located and used in creating selective mailing lists.

When text is printed, the ELECTRIC PENCIL automatically inserts carriage returns where they are needed. Numerous combinations of Line Length, Page Length, Character Spacing, Line Spacing and Page Spacing allow for any form to be handled. Right Justification gives right-hand margins that are even. Pages may be numbered as well as titled." (Quoted with permission from the ELECTRIC PENCIL MANUAL)

In short, here's how the ELECTRIC PENCIL works. Turn on your computer. Load the ELECTRIC PENCIL SYSTEM (a cassette tape). You are now ready to type any page of text (a letter, a book, an article, a mailing list, a form, etc.). The ELECTRIC PENCIL will let you correct mistakes anywhere in your text, store the complete text on cassette and/or print it out on your LINE PRINTER or any other typing device hooked up to your TRS-80. With a lower case modification, you can type both upper and lower case letters.

The ELECTRIC PENCIL WORKS ON BOTH LEVEL I and LEVEL II. It does require 16K.

Now for some more ELECTRIC PENCIL details.

The ELECTRIC PENCIL is a machine language tape (not written in basic). The ELECTRIC PENCIL MANUAL is superb so you will not have any trouble understanding how to use it. Turn on your computer. When your computer is ready type SYSTEM (this will allow your computer to accept machine language tapes. A star and question mark will appear (*?). Prepare your tape and recorder. Type in PENCIL, press PLAY on your recorder and ENTER on your computer. Your computer is now ready to use this advanced word processing system.

Before beginning, the ELECTRIC PENCIL program will ask you if you have a lower case modification on your computer, You answer yes or no (lower case to be discussed later).

A blinking white cursor will appear in the upper left-hand corner of your screen. You can now start typing. You never have to press the ENTER key because the ELECTRIC PENCIL allows you just to type your text. It automatically will set up your text. It will never chop off a word at the end of a line. It automatically will start a new line (if a word is too long to fit on a previous line).

Using the SHIFT KEY (or SHIFT-BREAK with the lower case modification), your ELECTRIC PENCIL system can follow a whole bunch of commands (in addition to writing your text).

1. DELETE CHARACTER - deletes one or more characters from your text and automatically repositions all words and lines.
2. INSERT CHARACTER - inserts one or more characters into your text and automatically repositions all words and lines.
3. DELETE LINE - deletes an entire line and repositions all other lines.
4. INSERT LINE - adds another line of text and will move down all other lines to make room for your new line (and will reposition all words if necessary).
5. STRING SEARCH - a function that is used to locate any string of characters that may exist in the file.
6. TAPE READER - enters a file (text) onto your computer from your recorder.
7. TAPE WRITER - stores text from computer onto cassette tape.
8. WORD NUMBER - tells you how many words have been written.
9. LEFT MARGIN - will set up the size of your line (for example, 30 characters per line 40 characters per line, etc.).
10. LEFT MARGIN - will set up the position of a left margin (if you don't want to type starting at the left margin displayed on your computer).
11. PAGE SPACING - sets the number of spaces (empty lines) between pages during printing.
12. PRINTING - actually prints your text on typewriter or LINE PRINTER.
13. UNDERLINING - allows for word **underlining.**
14. LINE LENGTH - sets the number of characters per line that will be printed.

The above is only a partial list of ELECTRIC PENCIL commands. The ELECTRIC PENCIL is FAST and COMPLETE. It has all commands used on $5000 word processing systems. THE ELECTRIC PENCIL IS NOT AVAILABLE ON DISK (FOR THE TRS-80). THE ELECTRIC PENCIL WAS WRITTEN BY MICHAEL SHRAYER-COPYRIGHT 1978.

BUYING A PRINTER

There are hundreds of printers available that can be used with your TRS-80 COMPUTER SYSTEM. We will examine some of the most popular alternatives below.

1. The TRS-80 LINE PRINTER is a dot-matrix printer (as opposed to a solid character printer. It will print upper case letters only. Quality of print is the same as the quality of our program printouts. If you examine our program printouts closely, you can see the little dots used to print each character. The advantage of the TRS-80 LINE PRINTER and other dot-matrix printers is speed. The LINE PRINTER will print 60-100 characters per second (depending on the size of the print) or 21 lines per minute. You can plug in the LINE PRINTER directly to your TRS-80 interface. It is reliable and virtually indestructible. It's great for printing out mailing lists and forms (in quantity). The LINE PRINTER will not give business letter quality (or lower case letters). The cost of the LINE PRINTER is $1299. The optional tractor feed is a necessity (adding $300 to the cost). You can have the line printed repaired by RADIO SHACK or CENTRONICS will come to your home or office to repair it.

2. CENTRONICS 779 is equal in every way to the TRS-80 LINE PRINTER. You can purchase the CENTRONICS 779 at local computer stores and save yourself $200-$400. Make sure that you have the correct printer connection cable (or buy one from RS for $39). If you do purchase your printer from a non-RADIO SHACK store, make sure that you will get the same service and make sure that it can be plugged directly into your interface.

3. OTHER CENTRONICS PRINTERS do almost anything. More expensive CENTRONICS PRINTERS work faster, have attachments for special forms, have lower-case letters, have better print... You can find out more about CENTRONICS PRINTERS by calling their toll-free telephone number (available from toll-free information).

4. The TRS-80 QUICK PRINTER delivers about 150 lines per minute. The QUICK PRINTER has the advantage of being inexpensive ($499). It does require the expansion interface. It works just like the TRS-80 LINE PRINTER. It also has lower case letter. Its main disadvantage in the use of the special aluminum-finish paper. You can use office copiers to make copies of its printouts. The QUICK PRINTER is a low cost method of getting hard copy. It will not printout mailing lists on labels.

5. The SELECTRA-TERM (soon to be called SELECTRA-PRINT) is an IBM SELECTRIC II with the necessary conversions to make it compatible with the TRS-80. MICRO COMPUTER DEVICES converts a factory new IBM SELECTRIC II to a computer output terminal. The SELECTRATERM offers excellent business quality print (both upper and lower case). Its main disadvantage is its slow speed (15 characters per second-certainly faster than anyone can type). It is an excellent

choice for use with the ELECTRIC PENCIL as a word processing printer. Because of its slow speed, it would not be a good choice for use with a large quanty of printing (mailing lists on labels, invoices, etc.). The SELECTRA-TERM sells for about $2,000. BE CAREFUL. THERE IS A SPECIAL SELECTRA-TERM FOR USE WITH YOUR TRS-80. The TRS-80 will normally print upper case letters when the shift-key is used (although the video screen will slways display upper case letters-unless modified). The SELECTRA-TERM for the TRS-80 has a special switch that reverses this process to allow TRS-80 computer owners to use their computer as a standard typewriter.

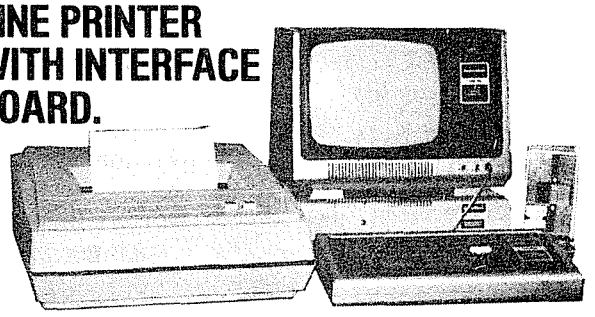
6. The ANDERSON JACOBSON AJ841 (sold by MICROTRONIX) is a completely refurbished SELECTRIC (similar to 5, above). The advantage is its price (about $1000.)

7. THE SPINTERM is the best of all possible combinations (at lease for the price of $3000 or so). The SPINTERM gives high quality solid character print. It is much faster than the SELECTRA-TERM (about 55 characters per second). The SPINTERM uses interchangeable print thimbles (similar to the "balls" used on the I.B.M.). Special thimbles with foreign characters, math and scientific characters, and different sized print are available. the SPINTERM must be connected to a TRS-80 with an RS-232 interface.

8. EXPANDOR'S MODEL 123P BLACK BOX PRINTER ($449) is a low cost printer that used standard continuous pin feed paper (for normal hard copy or mailing labels). The BLACK BOX PRINTER is a small, lightweight, portable, quiet, impact printer that prints 80 columns wide, at 10 characters per second, on 8½ inch wide pressure fed or sprocket fed paper. Up to five copies may be printed at one time (with carbons). This low cost printer is a low cost printer that gives good copy (upper case only) on standard white paper. More details available from MICROTRONIX (ad this issue).

SURPLUS PRINTER FOR TRS80*
OKIDATA CP110
LINE PRINTER
WITH INTERFACE
BOARD.

*T.M. - RADIO SHACK



NO SOFTWARE OR HARDWARE CHANGES.
REQUIRED. JUST PLUG IN AND RUN!

- 5x7 Impact Dot Matrix
- 80 Char/Line
- 64 Char ASCII (Upper Case)
- 110 Char/Sec.
- 66 Lines/Min.
- Accepts 8-1/2" TTY Roll paper

PRINTER **$650.00**

INTERFACE: BUILT **$100.00**
KIT **$ 60.00**
INFOR & SCHEMATIC **$ 5.00**

Shipped Freight collect. Send check, M.O.; VISA master charge

INCLUDES - Power Supply, Built in Selftest, Parallel Interface, Line Buffer and Cables. Housed in a three piece plastic cabinet with all control electronics. Retail for over $1,100. PRINTER BRAND NEW NEVER USED IN FACTORY SEALED CARTON. Operating Manual Included. *Supplies* Service Manual **$20.** *Limited*
Guaranteed to be in good working order at time of delivery.

Write for Interface Info on Heath, Apple, Imsai, Sol, Northstar

INTERNATIONAL ELECTRONICS EQUIPMENT CORP.
P.O. Box 522542, Miami, Florida 33152

TRS232 PRINTER INTERFACE

Small System Hardware is offering a low-cost printer interface as an alternative to the Radio Shack interface box. The printer package in the Electric Pencil has been specially configured to support either the Radio Shack interface or the TRS 232 printer interface. The TRS 232 interface allows you the versatility of using any of a large number of computer terminals or printers with your TRS-80 and the Electric Pencil. In addition, each TRS 232 is delivered with cassette software for driving the printer from LEVEL-II Basic, thus this one interface will support both word processing and normal program listing and documentation. The TRS232 comes completely assembled and tested with documentation and software for $39.95.

The TRS232 printer interface is a low-cost software-driven output port. The interface is totally self-contained, and includes all the electronics necessary for converting the tape recorder output level to RS-232 compatible voltage levels. Normal operation of the cassette recorder is maintained.

Any RS-232 compatible printer may be used with TRS232. This includes most standard computer terminals, Diablo printers, the new Teletype model 43 terminal, TI Silent, etc. In addition, provisions have been included for driving a 20-mil current loop so that commonly available teletypes may also be used if desired.

The TRS232 is small (about 1" x 2" x 3") and installs in series with the power and cassette cables on your TRS-80 computer. The cassette output cable from the computer plugs into the TRS232. A second cassette cable (furnished) connects the TRS232 to the recorder so that standard recorder functions are maintained. Two short cables are attached to the TRS232; one plugs into the power input jack on the TRS-80 and the second mates with the plug from the TRS-80 power supply, Finally, there is a standard DB-25 connector on the TRS232 which mates with the printer cable. The TRS232 may be left in place at all times, since it does not interfere with cassette operation and power requirements are negligible.

The TRS232 is shipped fully assembled and tested, and includes documentation, cassette software and source listings for driving printers from LEVEL-II Basic or from your own machine language programs. It may be ordered for $39.95 plus $2.00 for handling and postage (Calif. residents add 6% tax) from:

SMALL SYSTEM HARDWARE
Post Office Box 366
Newbury Park, CA 91320

LOWER CASE MODIFICATION*

LOWER CASE MODIFICATION INSTRUCTIONS

To modify the TRS-80 for lower-case operation with the electric pencil, changes must be made to the screen display memory and to the keyboard. There are many ways to accomplish this modification and it is up to the user to determine the most satisfactory approach. The modification requires changes to the circuit boards within the keyboard enclosure of your TRS-80, thus your warranty will be voided by this modification. We have modified several computers ourselves and have had no difficulty with the TRS-80 after making the changes, however, WE CANNOT ACCEPT RESPONSIBILITY FOR DAMAGE TO YOUR COMPUTER CAUSED BY INSTALLATION OF THIS MODIFICATION!

SCREEN MEMORY MODIFICATION

The TRS-80 video display uses a dedicated block of 1024 bytes of memory located in memory space at 3C00 Hex. When received from the factory, there are only 7 memory chips installed in this block of memory, providing 128 possible characters for screen display. The stock TRS-80 uses 64 of these combinations for graphics and a second 64 for the upper-case subset of the ASCII character set. Bits 0-5 control the character selection, and the highest bit (bit 7) is used to determine if the character is alpha-numeric or graphic. Bit 6 is missing!

To add lower-case display, bit 6 must be implemented. This may be accomplished by switching the memory chip for bit 7 to bit 6, thereby enabling lower-case letters and eliminating graphics, or by addition of an 8th memory chip. We prefer adding the extra chip. In either case, if you plan to use Level II Basic, you must include a switch to disable bit 6, or Basic will place a lot of funny characters on the screen!

Refer to the top portion of the figure on page 23. A low-power 2102A memory chip (available at most electronic stores) is piggy-backed onto an existing 2102A, and appropriate connections are made. Take the new 2102A, carefully bend pins 11 and 12 up from their normal position, then slide the chip down over the 2102 located at position Z45 on the larger of the two TRS-80 circuit boards (the Z-number is printed on the circuit board next to each chip). Be sure that the chip is oriented to place pin 1 on top of pin 1! When all pins are aligned and contacting (except 11 and 12, of course), carefully solder each of the 14 pins from the added chip to the chip on the circuit board. Work quickly but be sure you get a good solder joint! Now, connect a small piece of insulated wire (wire-wrap wire is ideal) to pin 11. Locate pin 13 on chip Z44, and attach the other end of the wire to the pad which is connected to this pin.

Between chips Z29 and Z30 there are three traces, two wide and one narrow. Cut the narrow trace with a sharp knife. Attach two pieces of insulated wire to each of the cut ends of this trace, and a third piece to pin 12 of the added memory chip. Run these three wires to a single-pole double-throw switch as shown in the diagram. This switch changes the screen memory from the original 7-bit configuration to the new 8 bit configuration, thus allowing you to switch back and forth between Basic and The Electric Pencil.

KEYBOARD MODIFICATION

One change must be made to the keyboard; a CONTROL key must be added. It is possible to isolate and use one of the present keyboard keys (such as the down-arrow) as a CONTROL key, but we recommend adding another key.

Install your new control key, or isolate one of the existing keys by cutting the traces on the keyboard circuit board. Locate Z2 and Z4 on the lower-left of the circuit board. Attach wires to pin 4 of Z2 and pin 10 of Z4 (these wires may be attached to the top or bottom of the circuit board, as desired). Attach the other ends of these wires to the control key. Be sure you leave enough slack in the wires to allow re-assembly of of your computer. This completes installation of the lower-case modification.

This modification will work only with The Electric Pencil! To enable lower-case entry, type SHIFT-BREAK. The keyboard will now operate as a normal typewriter, entering lower-case characters unless the shift key is depressed. If you type a second SHIFT-BREAK, the keyboard will return to upper-case only operation.

The lower-case character set for some TRS-80's will appear strange. In some cases, the small 'a' is raised above the line. All of the characters which normally extend below the line (g,j,p,q,y) will also be seen in a raised position. Of course, when these characters are printed their appearance will depend only upon the printer character set.

A kit of parts for this modification is available, and you may have the kit professionally installed if you wish. Contact Small System Hardware (see page 24) for further information.

*Reprinted with permission from The Electric Pencil Operator's Manual.

PLEASE NOTE

On page 70 we stated that several readers have reported that the LOWER CASE MODIFICATION doesn't work. IF YOU FOLLOW THE INSTRUCTIONS IN THE ELECTRIC PENCIL MANUAL and use the kit supplied by MICROTRONIX (and other companies) . . . THE MODIFICATION **DOES** WORK. Our machine was modified without any problems (and in only a couple of minutes). Your local computer store will probably modify your TRS-80 if you bring them the modification kit with instructions (and some money!). . . or if you are so inclined, you can easily do the modification yourself.

COMPUTRONICS, MICHAEL SHRAYER SOFTWARE, INC. (and everyone else!) CANNOT ACCEPT RESPONSIBILITY FOR DAMAGE TO YOUR COMPUTER CAUSED BY INSTALLATION OF THIS MODIFICATION.

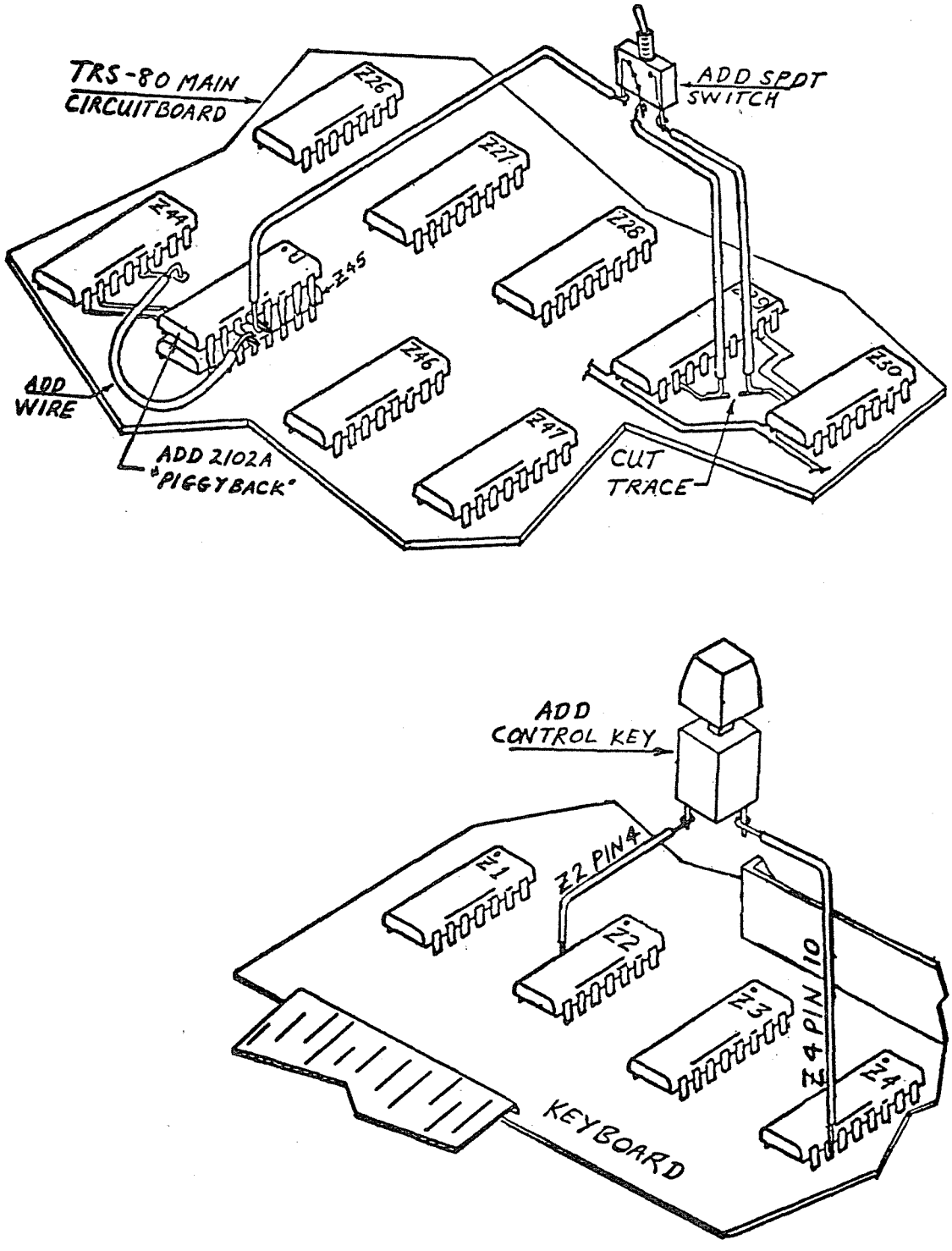


DIAGRAM OF TRS-80 LOWER-CASE MODIFICATION

H & E COMPUTRONICS INC.
MATHEMATICAL APPLICATIONS SERVICE™

ADDITIONAL TRS-80 LINE PRINTER INSTRUCTIONS

As noted by several subscribers, information is scarce concerning instructions for using the TRS-80 LINE PRINTER. Subscribers are encouraged to add to the following list of "additional instructions" to help LINE PRINTER owners.

1. LPRINT " " can be used to print a blank line.
2. LPRINT CHR$ (32) can also be used to print a blank line.
3. Apparantly, LPRINT CHR$ (10) and LPRINT CHR$ (13) have no visible affect on the LINE PRINTER (as stated on page 10/3 of LEVEL II manual.
4. You cannot print a character on the LINE PRINTER without getting an automatic line feed. It may be possible to modify the LINE PRINTER to print characters without line feed, but that would probably make it necessary to add statements to each program line to give you a line feed.
5. CHR$ (11) or CHR$ (12) can be used with LPRINT to move paper to the top of a form. Here's how it works. When you turn on your computer, your line printer will print 66 lines per page. Verify this by typing in PRINT PEEK (16424) followed by ENTER. 67 is displayed (67-1 or 66 is the number of lines per page). If you type LPRINT CHR$ (11) or LPRINT CHR$ (12), the LINE PRINTER will print 66 blank lines. Now let's say you printed a mailing list or letter that used up 40 lines on the LINE PRINTER. Now typing LPRINT CHR$ (11) will move the LINE PRINTER 26 spaces (66-40). If you are using 6 line mailing lables you may want to change the size of the lines per page used on the LINE PRINTER from 66 to 6. Just type in POKE 16424,7 (always add 1 to your desired page or form size). Now if you used 4 lines of your 6 line label to print an address, type in LPRINT CHR$ (11) to reach the top of the next label (NOTE-you may have to add an extra couple of spaces to account for the space between labels).
6. PRINT PEEK (16425) will tell you how many lines of your form have been used.

OUR NEXT TWO ISSUES

Our next two issues will contain a FEDERAL INCOME TAX PROGRAM (both long and short forms), a WORD PROCESSING SYSTEM (for cassette or disk) and an introduction to machine language and assembly language.

TWO NEW BOOKS FOR THE TRS-80

INTRODUCTION TO TRS-80 GRAPHICS by Don Inman is due to be released this month ($8.95-175 pages). The book begins with the most basic concepts of line drawing and leads the reader on to geometric shapes, moving figure animation, and other more advanced topics.

REAL TIME BASIC FOR THE TRS-80 by Bob Albrecht and Don Inman is due to be released April, 1979 ($6.95-150 pages). This book will teach you how to read and understand programs in BASIC.

Both of the above books will be available from COMPUTRONICS. You will receive an ad from us when they are in stock.

16-DIGIT ACCURACY FOR SQUARE ROOTS

The following program will give 16-digit accuracy to square root calculations. The TRS-80 LEVEL II BASIC presently gives 6-digit accuracy.

```
 5 REM-ROUTINE TO FIND SQUARE ROOT OF A NUMBER
 6 REM-WITH AT LEAST 16-DIGIT ACCURACY
 7 REM-                              BY
 8 REM-                    HOWARD Y. GOSMAN
10 CLS: INPUT "ENTER NUMBER"; X#
20 Y#=SQR (X#)
30 PRINT Y#
40 Y#=(X#/Y#)/2
50 PRINT Y#
60 IF Y#=A# GOTO 100
70 A#=Y#   :go to 40
80 PRINT:PRINT:PRINT "THE SQUARE ROOT OF"; X#; "IS"; Y#: PRINT
90 INPUT " TO FIND THE SQUARE ROOT OF ANOTHER NUMBER PRESS ENTER"; X
100 GOTO 10
```

WORD PROCESSING PROGRAM

The following short program will simulate a word processing program. The program was not designed to be any kind of complete word processor or complete program. It will only simulate some of the functions of a word processor. COMPUTRONICS has expanded this program into a full WORD PROCESSING PROGRAM for cassette or disk. We are still working on getting out some remaining "bugs." Our complete word processing program will be published in one of the next two issues (assuming that all "bugs" are eliminated).

```
10 CLEAR 1000
20 CLS
30 A$=INKEY$   :IF A$="   " GOTO 30
40 B$=B$+A$
50 PRINT @0, B$
60 GOTO 30
```

TOLL FREE NUMBER FOR DATA PROCESSING SUPPLIES

Data Research Associates can supply all types of tractor feed supplies (forms, paper, invoices, mailing labels, post cards, specialized forms, etc.). They also sell diskettes and 60 or 90 minute certified cassette tapes. For more information call;

(800) 431-2302 - (914) 638-1480 - (212) 220-4747

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EOQ INVENTORY MODEL

by

DR. PETER SHENKIN

If a businessman orders too great a quantity of any particular item he will find himself burdened with high inventory costs. For example, a tailor who orders 10000 yards of fabric at one time just to make sure he has the fabric will have to pay interest on the money he borrows to buy the fabric and also takes the chance that the fabric goes out of style before it is used. An inventory "holding cost" can be attached to this. However, if the tailor keeps ordering just a few yards at a time there is also a cost attached. There is bookkeeping and secretarial cost, shipping cost, etc. These costs tend to be more or less the same no matter how large the order, e.g. there may be a minimum shipping charge and for all orders the tailor can reasonably be expected to make this is his charge. This fixed charge per order is a reorder cost. Now, if he reorders often, his reorder costs are high but his carrying costs are low. On the other hand if he reorders infrequently, but alot each time, then his reordering costs are low but his carrying charges are high. The tailor must balance the two costs to get the lowest total cost.

The following EOQ (Economic Order Quantity) inventory program tells the tailor how to balance the two costs for a minimum total. The main assumptions used for this model is that the tailor uses the material more or less uniformly throughout the year, that he never can have a stockout and that his supplier is very reliable as to delivery time. Suppose that the tailor uses 600 yards of Cloth ZZ per year at a cost of $20 per yard. Also assume that it costs him $4 (20%) a year to hold a yard of cloth in inventory and that a reorder costs $12. With these numbers let's run the EOQ program:

```
DEMAND?     600
REORDER COST?  12
HOLDING COST?  4

TO MINIMIZE TOTAL COSTS OF INVENTORY :
          REORDER 60 ITEMS AT A TIME

THIS MEANS ORDER APPROXIMATELY 10 TIMES PER YEAR
OR ABOUT EVERY 37 DAYS.
```

So the tailor's problem is solved.

In using this model remember the assumptions we made. Mathematicians frequently simplify a model by assuming certain things. If these assumptions do not actually hold in practice then the model may give erroneous answers. This type of inventory model is frequently used to help the businessman to decide whether to take a quantity discount he is offered or not.

```
5 CLS
10 PRINT"          EOQ INVENTORY MODEL "
20 PRINT
30 PRINT"IN INVENTORY THEORY A REORDER COST IS A FIXED COST ASSESSED
35 PRINT"EACH TIME AN ORDER FOR AN ITEM IS PLACED, NO MATTER WHAT
40 PRINT"THE ORDER QUANTITY IS.
50 PRINT"A HOLDING COST IS A COST DUE TO HOLDING INVENTORY, E.G. INTEREST
60 PRINT"A STOCKOUT COST IS DUE TO RUNNING OUT OF AN ITEM.
65 PRINT"IN THIS PROGRAM WE ASSUME THAT THERE WILL BE NO STOCKOUTS.
70 PRINT"IN ADDITION THE ITEMS ARE USED UNIFORMLY THROUGHOUT THE YEAR
75 PRINT"WE CAN TAKE DELIVERY OF A REORDER WHENEVER WE WANT.
80 PRINT "DEMAND IS IN NUMBER OF ITEMS USED PER YEAR.
85 PRINT "REORDER COST IS IN DOLLARS PER REORDER.
90 PRINT "HOLDING COST IS IN DOLLARS PER ITEM PER YEAR.
95 PRINT
99 INPUT "TO BEGIN PRESS ENTER";Z9
200 CLS
210 INPUT "DEMAND              ";D
220 INPUT "REORDER COST        ";CR
230 INPUT "HOLDING COST        ";CH
240 Q=SQR(2*CR*D/CH)
250 Q1 = INT(Q+.5)
300 PRINT
320 PRINT "TO MINIMIZE TOTAL COSTS OF INVENTORY :"
330 PRINT"          REORDER ";Q1;" ITEMS AT A TIME"
340 PRINT
350 PRINT"THIS MEANS ORDER APPROXIMATELY";INT(D/Q1+.5);" TIMES PER YEAR
360 PRINT"OR ABOUT EVERY ";INT(365/INT(D/Q1+.5)+.5);" DAYS."
```

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RANDOM ACCESS MAILING LIST PROGRAM

by

HOWARD GOSMAN and PETER SHENKIN

The following is a simple random access mailing list program. It will allow you to create or add to a file of people, to access and correct individual records in the file, and to print the file sorted by either ZIP or last name. Line printer operation is supported so this program can actually be used to print out mailing labels. With a little modification the program can also be sued to keep track of files other than mailing list types.

We'll now show how this program operates. In the following, our replies to machine queries will be enclosed in " " marks (not necessary when you run the program). Comments will be enclosed in ( ). Machine output will always be printed in CAPITALS.

Carefully type the program statements into your **LEVEL II DISK SYSTEM.** This program will run with 1 disk drive and 16K of memory. When you are through type SAVE "MAILLIST" and press ENTER. The program will be saved on the disk in drive 0. When you are ready to run the program put the disk in drive 0, turn on the machine, load BASIC and press LOAD "MAILLIST", R. The disk drive turns on and you should see on the CRT:

```
                                ***MENU***
TO BUILD OR ADD TO A FILE TYPE 1
TO SEE THE ENTIRE FILE TYPE 2
TO SEE AN INDIVIDUAL NAME TYPE 3
TO PRINT SORTED FILE TYPE 4
? "1"              (We shall begin by starting a data file. Hence we type 1 and enter.)

NAME OF FILE? "DATA 3"
NEW FILE -- PRESS ENTER TO CONTINUE? ( we press ENTER. Since this file did not pre-
      viously exist it has no records in it and is thus a new file for the purposes of this program.
      If we had wanted to append some names to an old file we would have just used the name
      of the old file when asked for NAME OF FILE?. If an old file was spelled incorrectly the
      NEW FILE statement comes up. Then we know an error has been made. Press BREAK
      and RUN and start over. Later KILL the misspelled file.)

NUMBER? "TRS8422" (Membership number (or ID #) of 1st person on file)
FIRST NAME? "JOHN"
LAST NAME? "SMYTHE"
COMPANY OR APARTMENT NO.? "#C8"
STREET ADDRESS? "4120 SOUTH STREET"
CITY AND STATE? "WARREN OH."        (No commas here)
ZIP CODE? "44483"

(Screen clears and on top of screen we see:)
      TRS8422
      JOHN SMYTHE
      #C8
      4120 SOUTH STREET
      WARREN OH.        44483
```

PRINT O IF OK, 1 OTHERWISE, 2 TO RETURN TO MENU? "1" (Press 2 here if you want to ignore this person altogether. Pressing O loads the record on the disk file. We pressed 1. John Smythe's street address is wrong.)

NUMBER? (Just press ENTER. The machine prompts for any corrections. If there are none just press enter)
FIRST NAME? (Just press ENTER)
LAST NAME? (Just press ENTER)
COMPANY OR APARTMENT NUMBER.? (Just press ENTER)
STREET ADDRESS? '4121 SOUTH STREET" (Make necessary corrections.)
CITY AND STATE? (Just press ENTER)
ZIP CODE? (Just press ENTER)

(Screen clears and we see:)

TRS8422
JOHN SMYTHE
#C8
4121 SOUTH STREET
WARREN OH. 44483

PRINT O IF OK, 1 OTHERWISE, 1 TO RETURN TO MENU?"O"

FOR ANOTHER NAME TYPE 1, ELSE TYPE 0? "1"

NUMBER? (Works just like before.)
(After entering a few more names like this we type 0 and return to the MENU.

(One of the people on the list we constructed is named Joan Tide. We wish to review her records and possibly change them. Thus we choose option 3 from the MENU and see:)

NAME OF FILE? "DATA3"

ENTER LAST NAME OF RECORD YOU WISH TO SEE? "TIDE"

TRS8423
JOAN TIDE
430 OVERHILL
COLUMBUS OH. 43214

INPUT 1 IF CORRECT PERSON
INPUT 1 IF CORRECT LAST NAME BUT WRONG PERSON
INPUT 3 IF INCORRECT LAST NAME
? "1" (Option 2 is included as the program is searching through the file and selects the 1st TIDE. If there were 2 TIDE'S on the file & Joan was the 2nd one then pressing 2 will continue searching the file from the present place.)

TRS8423
JOAN TIDE
430 OVERHILL
COLUMBUS OH. 43214

INPUT 1 TO CHANGE
INPUT 2 TO SEE ANOTHER PERSON
INPUT 3 TO PRINT ON LINE PRINTER
INPUT 4 TO RETURN TO MENU

CHOICE = ? "1" (From here change works just as when making up file.)

(MENU option 2 prints the entire file in order of entry either on the CRT or on the line printer. If the CRT is chosen then to stop the scrolling on the screen simultaneously press @ and SHIFT. This stops action. To continue press any key. MENU option 4 sorts the file by Last name or by ZIP and then prints the sorted file either on the CRT or on the CRT and the line printer. The sort routine chosen was chosen to make it possible to run the program on the 16K machine. Thus we had to choose a routine which uses very little memory. The tradeoff is that the sort is slow when alot of anmes are on file. Below are a few entries from a sort by ZIP.)

```
TRS8232
BILL                          SLABOOZ
KING ENTERPRISES
2002 FLAMINGO
AYER MA                         01432

TRS8425
ABBY                            GLADE
ONCON INC.
424 W. FIRST
WEST FORK NJ                    07234

TRS8434
IRWIN                           JONES
CONDOR
52 WEST 79TH STREET
NEW YORK NY                     10024

TRS8435
BORISLAV                        BAROV
P. O. BOX 1151
WINTER PARK FL                  32789


TRS8436
JONATHAN                         THAU
4231 W. 16TH COURT
MIAMI FL                        33122
```

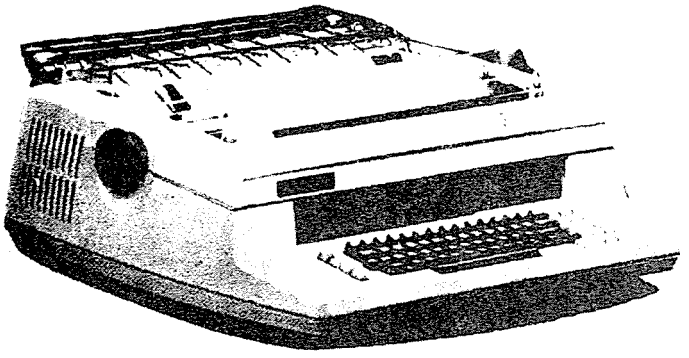
```
10 CLEAR 1000
20 CLS :PRINT@ 10, "***MENU***" :PRINT :PRINT
30 PRINT "TO BUILD OR ADD TO A FILE TYPE 1"
35 PRINT "TO SEE THE ENTIRE FILE TYPE 2"
40 PRINT "TO SEE AN INDIVIDUAL NAME TYPE 3"
50 PRINT "TO PRINT SORTED FILE TYPE 4"
90 INPUT Q:ON Q GOTO 100,200,400,3000
95 GOSUB 1300:GOTO 10
100 REM-STARTS OR ADDS TO EXISTING FILE
102 CLS:INPUT "NAME OF FILE";F7$:OPEN"R",1,F7$
106 IF LOF(1)=0 INPUT"NEW FILE--PRESS ENTER TO CONTINUE";Z9
109 IF LOF(1)=0 GOTO 115
110 GOSUB 9200
115 LR=LR+1:GOSUB 9300:GOSUB 6000
130 GOSUB 5100:GOSUB 6200
135 IF Z9=1 GOSUB 6020:GOTO 130
140 IF Z9=2 CLOSE 1:GOTO 10
155 GOSUB9100:GOSUB 9000:PUT 1,PR:PRINT
160 F$="":N1$="":N2$="":C$="":A1$="":A3$="":ZP$="":N$="":A2$=""
170 INPUT"FOR ANOTHER NAME TYPE 1, ELSE TYPE 0";X
175 IF X=1 GOTO115
180 CLOSE:GOTO20
200 CLS:REM-PRINTS ENTIRE FILE
207 INPUT"TO PRINT FILE ON MAILING LABELS TYPE 1...ELSE TYPE 0";R
208 GOSUB 4000
210 CLS:GOSUB 9200:E=LR
225 FOR LR=1 TO E
230 GOSUB 9300:GOSUB 9100:GET 1,PR:GOSUB 5000
270 NEXT
272 CLOSE
275 PRINT :INPUT"TO SEE MENU PRESS ENTER";X:GOTO20
400 REM-TO SEE OR CHANGE AN INDIVIDUAL RECORD
405 INPUT "NAME OF FILE";F7$:OPEN"R",1,F7$
410 CLS
412 IF LOF(1)=0 PRINT:PRINT "NO RECORDS ON FILE":PRINT:GOTO472
413 INPUT"ENTER LAST NAME OF RECORD YOU WISH TO SEE";LN$
415 GOSUB9200:E=LR
425 FOR LR=1 TO E
430 GOSUB9300:GOSUB 9100:GET 1,PR
441 X=INSTR(NAM$,"*"):N2$=LEFT$(NAM$,X-1)
445 IF LN$=N2$ GOTO500
470 NEXT
471 PRINT "NAME NOT ON FILE."
472 CLOSE
475 PRINT:INPUT"TO SEE MENU PRESS ENTER";X:GOTO20
500 CLS:GOSUB 9400
510 PRINT:PRINT"INPUT 1 IF CORRECT PERSON"
515 PRINT"INPUT 2 IF CORRECT LAST NAME BUT WRONG PERSON
520 PRINT"INPUT 3 IF INCORRECT LAST NAME
530 INPUT Z9
540 ON Z9 GOTO 600,470,413
550 GOSUB 1300:GOTO 500
```

```
600 CLS:GOSUB 9400:PRINT
605 PRINT
610 PRINT"INPUT 1 TO CHANGE"
615 PRINT"INPUT 2 TO SEE ANOTHER PERSON
620 PRINT"INPUT 3 TO PRINT ON LINE PRINTER
625 PRINT"INPUT 4 TO RETURN TO MENU
630 PRINT:INPUT"CHOICE = ";Z9
640 ON Z9 GOTO 700,410,680,272
680 R=1:PRINT:INPUT"PRESS ENTER WHEN LINE PRINTER READY";Z9
690 CLS:GOSUB 5100
695 R=0:GOSUB 5100:GOTO 605
700 REM CHANGE SUBROUTINE
710 GOSUB 5100:GOSUB 6020:GOSUB 5100:PRINT:GOSUB 6200
720 IF Z9=1 GOTO 710
725 LR=E
726 IF Z9=2 CLOSE 1:GOTO 10
730 GOSUB 9100:GOSUB 9000:PUT 1,PR
750 PRINT:INPUT "PRESS 1 FOR MORE,0 TO RETURN TO MENU";Z9
760 IF Z9=0 CLOSE 1:GOTO 10
770 IF Z9=1 GOTO 410
780 GOSUB 1300:GOTO 750
1300 REM INPUT ERROR SUBROUTINE
1310 PRINT"INPUT ERROR! TRY AGAIN!":FOR K=1 TO 300:NEXT K
1320  RETURN
3000 REM SORT ROUTINE
3005 GOSUB 4000
3010 INPUT"INPUT 1 IF LINE PRINTER TO BE USED,0 OTHERWISE";Z9
3015 IF Z9<>1 AND Z9<>0 GOSUB 1300:GOTO 3010
3020 IF Z9=1 R=1
3030 GOSUB 9200:REM FIND NUMBER OF RECORDS ON FILE
3040 LIR=LR
3050 CLS:PRINT"CHOOSE SORT KEY:1 IF LAST NAME,2 IF ZIP";
3060 INPUT Z9:IF Z9<>1 AND Z9<>2 GOSUB 1300:GOTO 3050
3070 INIT$= " ":LOW$="ZZZZZZZZZ":LR=1
3075 FOR J=1 TO LIR
3080 FOR I=1 TO LIR
3090 LR=I:GOSUB 9300:GOSUB 9100:GET 1,PR
3100 LR$="00"+STR$(LR):LR$=RIGHT$(LR$,3)
3110 IF Z9=1 A$=NAM$+LR$
3120 IF Z9=2 A$=RIGHT$(CSZ$,5)+LR$
3125 IF A$<=INIT$ GOTO 3300
3130 IF A$<LOW$  LOW$=A$
3140 GOTO 3300
3300 NEXT I
3310 INIT$=LOW$:LR=VAL(RIGHT$(LOW$,3))
3320 GOSUB 9300:GOSUB 9100:GET 1,PR:GOSUB 5000
3325 LOW$="ZZZZZZZZZ"
3330 NEXT J
3340 PRINT:INPUT"SORT COMPLETE.PRESS ENTER TO RETURN TO MENU";Z9
3350 GOTO 10
```

```
4000 REM EMPTY FILE PRINT SUBROUTINE
4010 CLS:INPUT"NAME OF FILE ";F7$:OPEN "R",1,F7$
4020 IF LOF(1)=0 PRINT "NO RECORDS ON FILE":GOTO 272:RETURN
5000 REM PRINTING SUBROUTINE
5010 PRINT NUM$:IF R=1 LPRINT NUM$
5020 X=INSTR(NAM$,"*"):PRINT RIGHT$(NAM$,26-X);" ";LEFT$(NAM$,X-1)
5025 IF R=1 LPRINT RIGHT$(NAM$,26-X);" ";LEFT$(NAM$,X-1)
5030 IF CMP$>"!" PRINT CMP$:IF R=1 LPRINT CMP$
5035 PRINT ADD$:IF R=1 LPRINT ADD$
5040 PRINT CSZ$:IF R=1 LPRINT CSZ$
5050 IF R=1 LPRINT " ":IF CMP$<"!" LPRINT " "
5060 PRINT:RETURN
5100 REM PRINTING SUBROUTINE  ,NO LSET REQUIRED
5110 CLS:PRINTF$:PRINTN1$;" ";N2$:IF C$>"!" PRINTC$
5115 PRINT A1$:PRINT A2$
5117 IF R=1 LPRINT F$:LPRINTN1$;" ";N2$:IFC$>"!" LPRINTC$
5120 IF R=1 LPRINT A1$:LPRINT A2$;" ";Z$:RETURN
6000 REM INPUT SUBROUTINE
6020 CLS:PRINT:INPUT "NUMBER";F$
6030 INPUT"FIRST NAME";N1$:INPUT"LAST NAME";N2$
6040 INPUT"COMPANY OR APARTMENT NO. ";C$
6050 INPUT"STREET ADDRESS ";A1$:INPUT"CITY AND STATE";A3$
6070 INPUT "ZIP CODE";ZP$
6080 N$=N2$+"*"+N1$
6085 A2$=A3$+STRING$(26-LEN(A3$)-LEN(ZP$)," ")+ZP$:RETURN
6200 PRINT:REM OK OR NOT SUBROUTINE
6210 INPUT"PRINT 0 IF OK,1 OTHERWISE,2 TO RETURN TO MENU";Z9
6220 IF Z9 = 0 OR Z9=1 OR Z9=2RETURN
6230 GOSUB 1300:GOTO 6200
9000 LSET NUM$=F$:LSET NAM$=N$:LSET CMP$=C$:LSET ADD$=A1$:LSET CSZ$=A2$
9005 LSET D2$=STRING$(127," ")
9010 RETURN
9100 FIELD 1, SR*127 AS D$, 23 AS NUM$, 26 AS NAM$, 26 AS CMP$,
   26 AS ADD$, 26 AS CSZ$, ABS((SR-1)*127) AS D2$
9110 RETURN
9200 REM-FINDS NUMBER OF RECORDS ON FILE
9210 SR=1:PR=LOF(1)
9227 GOSUB 9100
9230 GET 1, PR
9240 IF NAM$<"!" LR=PR*2-1 ELSE LR=PR*2
9250 RETURN
9300 REM-CALCULATES PR AND SR
9310 PR=INT((LR-1)/2)+1:SR=LR-2*INT((LR-1)/2)-1:RETURN
9400 PRINT NUM$:F$=NUM$:X=INSTR(NAM$,"*")
9411 N1$=RIGHT$(NAM$,26-X):N2$=LEFT$(NAM$,X-1)
9413 PRINT N1$;" ";N2$
9415 C$=CMP$
9420 IF CMP$>"!" PRINT CMP$
9425 A1$=ADD$:A2$=CSZ$
9427 A3$=LEFT$(CSZ$,21)
9428 ZP$=RIGHT$(CSZ$,5)
9430 PRINT ADD$:PRINT CSZ$:RETURN
```

SPINTERM T.M.

A fast word processing I/O printer with Proportional Spacing.



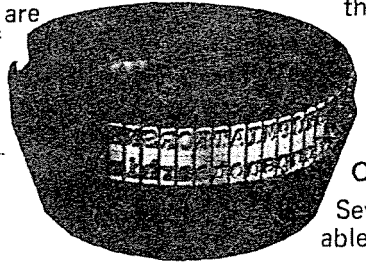
Two SPINTERMs, model PS-20 Receive Only, and model PS-10 Keyboard Send/Receive, are microprocessor controlled serial, impact terminals designed for remote printing applications where impeccable print quality is required. The SPINTERM prints up to 55 characters per second while receiving data at rates up to 120 characters per second via the RS-232 interface. The unique print element—a thimble— contains up to 128 fully formed characters. All 125 characters on the print thimble are entirely visible to the operator.

These excellent features are standard in the SPINTERM:

- Built-in self test.
- Send/Receive with Keyboard & Receive Only models.
- Industry standard RS-232 interfaces.
- 55 Characters per Second maximum print rate.
- Impeccable OCR print quality.
- Microprocessor electronics.
- High resolution plotting and graphing.
- Lowest operating noise level.
- Quick change ribbon cartridge.
- Quick change print fonts.
- Die-cast aluminum covers hinged at top and bottom.
- Operator engineered control panel.
- Prints original and up to five copies.

PRINT ELEMENT

The SPINTERM's unique small-diameter, low-mass print wheel is a low-cost, long-life fiberglass reinfo d plastic wheel that consists of 64 cylindrically arranged spring action fingers on which two characters are mounted, one above the other. Normal life of the thimble is more than 30 million impressions. The small diameter, shared finger arrangement and low-mass enable the printer to get to the next character to be printed faster than daisy-wheel printers, which increases the printer throughput.



PRINT RIBBON CARTRIDGE

Print ribbons are contained in an easily replaceable ribbon cartridge. Continuous loop nylon fabric ribbons are available in black or red/black inking. An all black multi-strike film ribbon produces sharp, camera ready print quality.

KEYBOARD

The Model PS-20 SPINTERM keyboard is divided into three sections: an alphanumeric 46-key section, a control section consisting of 4 operator function keys and a 15 key numeric keypad for rapid entry of numeric data. The keyboard uses "Hall-effect" key switches for high reliability and long life.

OPERATOR CONTROL PANEL

The operator control panel provides switches to set and operate machine function and configure the interface operating mode and indicator lights.

OPERATING NOISE LEVEL

The SPINTERM is incredibly quiet—only 60 dB with the standard cover on, and 67 dB maximum with the cover removed. The low operating noise level permits the SPINTERM to be comfortably used in any office environment.

OPTIONAL INTERFACES

Several interfaces for both models are available which meet most user requirements.

COMMUNICATIONS CAPABILITY

The SPINTERM can be interfaced to a data communication network through a Bell-103-type modem, or its equivalent. It communicates in either half or full duplex at data rates of 110, 150, 200, 300, 600 or 1200 baud. Each received character is checked for correct parity and a parity bit is generated for each character transmitted.

Received characters are stored in a 256 character communication line buffer while keyboard generated characters pass through a 16-character buffer. Interface configuration is accomplished using the operator control panel.

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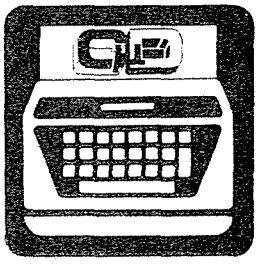

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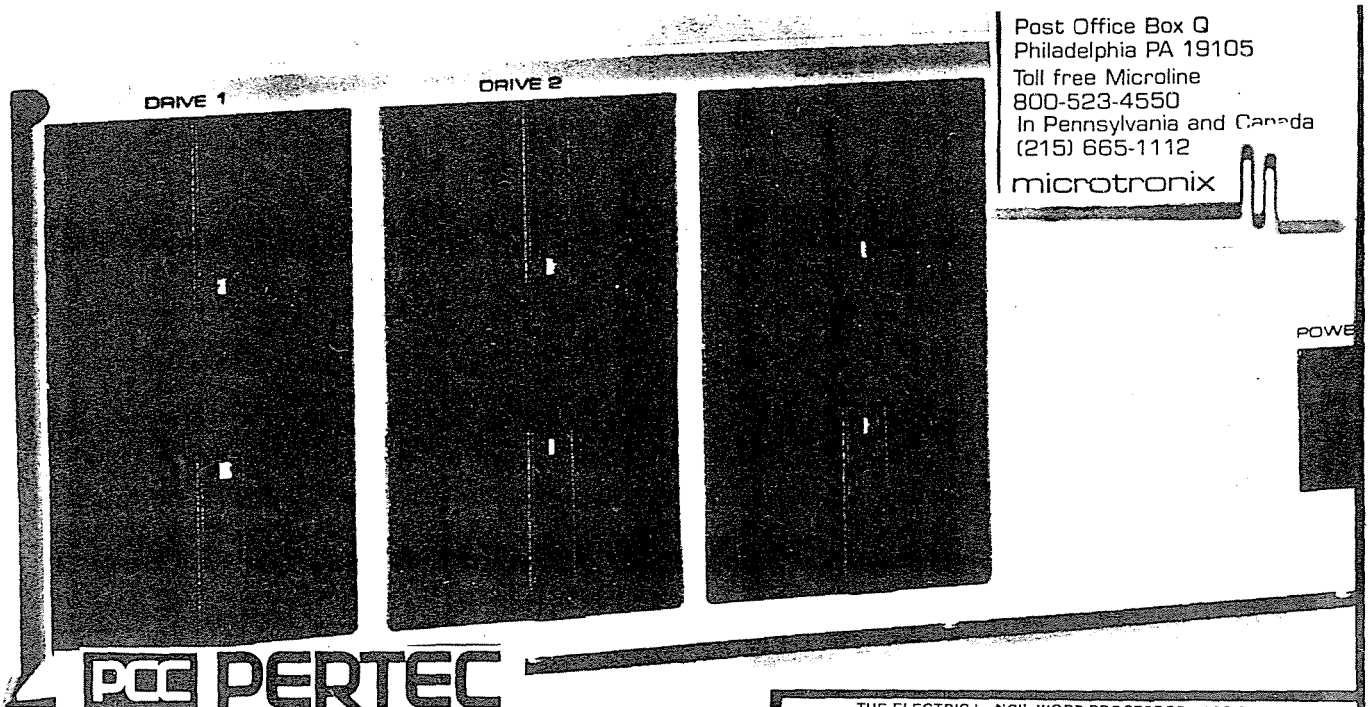

PERTEC

FD200 Microfloppy™ Disk Drive Specifications

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Seek Time	25 msec track to track
Head Settling Time	10 msec (last track addressed)
Head Loading Time	35 msec (maximum)
Error Rate (Maximum)	1 per 10^9 recoverable, 1 per 10^{12}
Head Life	20,000 hours (normal use)
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Instantaneous Speed Variation	± 1.0%
Start/Stop Time	1 second (maximum)
Recording Parameters	
Transfer Rate	125/250K bits/sec
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Maximum Bits per Side per Disk[1]	1 million/2 million
Maximum Bits per Track[1]	25,000/50,000

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Michael Shrayer's ELECTRIC PENCIL, highly respected as a superior word processor for home computers and small businesses, is now available for the TRS-80! In addition to all standard ELECTRIC PENCIL editing and printing features, this new version offers a transparent cursor, two key rollover, repeating keyboard, upper and lowercase entry and display (after simple modification - documentation included) or upper case only in unmodified TRS-80's. THE ELECTRIC PENCIL runs printers using Radio Shack's expansion interface or will operate RS-232 and 20-mil current loop printers using our TRS232 printer interface. LEVEL-I or LEVEL-II 16K computers may be used. THE ELECTRIC PENCIL opens a whole new world of practical applications for the TRS-80 computer!

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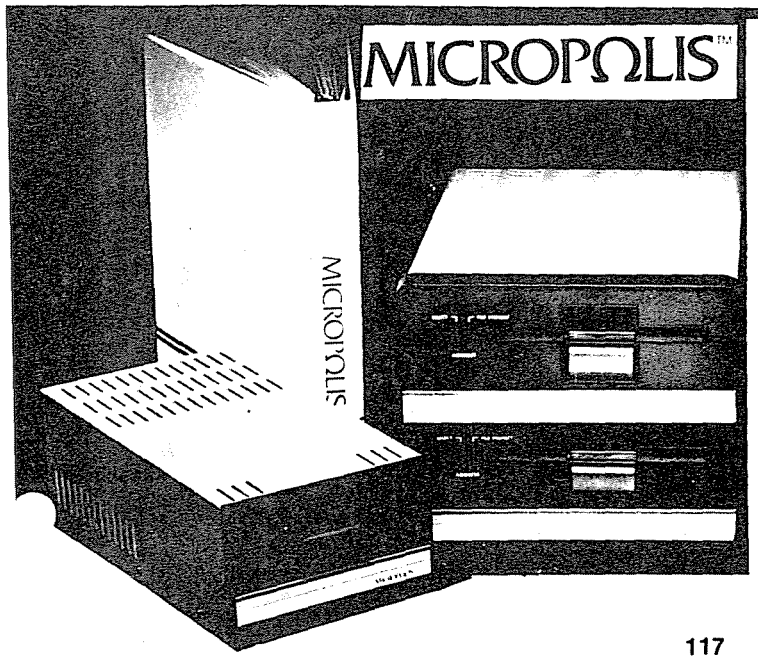

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Capacity/drive: 143,000
Transfer rate: 250,000 bits/second
Average rotational latency time: 100 msec
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```
1 REM-PRIME FACTORIZATION OF AN INTEGER
2 REM-                  BY
3 REM-        DR.  PETER SHENKIN
5 CLS
10 PRINT "           PRIME FACTORIZATION OF AN INTEGER"
20 PRINT
30 PRINT "THIS PROGRAM WILL DETERMINE ALL PRIME FACTORS OF AN INTEGER.
40 PRINT
50 INPUT "PRESS ENTER TO BEGIN";Z9
100 CLS
110 PRINT @ 320," "
120 INPUT "DESIRED INTEGER";IN
130 NF=0
140 CLS
150 PRINT "PRIME FACTORS OF ";IN
160 PRINT
170 PRINT "FACTOR        NUMBER OF TIMES"
180 PRINT SGN(IN),1
200 FOR I=2 TO IN-1
210   S=0
220   IF IN/I <> INT(IN/I) THEN 270
230   IN = IN/I :S= S+1 : NF=NF+1
240   GOTO 220
270 IF S=0 GOTO 300
280 PRINT   I,S
290 IF IN<> 1 GOTO 300
295 GOTO 330
300 NEXT I
310 PRINT
320 IF NF = 0  PRINT IN ;" IS PRIME"
330 PRINT
340 INPUT "INPUT 1 FOR ANOTHER NUMBER,0 TO END";Z8
350 IF Z8 = 1 GOTO 100
360 IF Z8 = 0  END
370 PRINT "INPUT ERROR.  TRY AGAIN."
380 FOR I= 1 TO 300:NEXT I
390 GOTO 340
```

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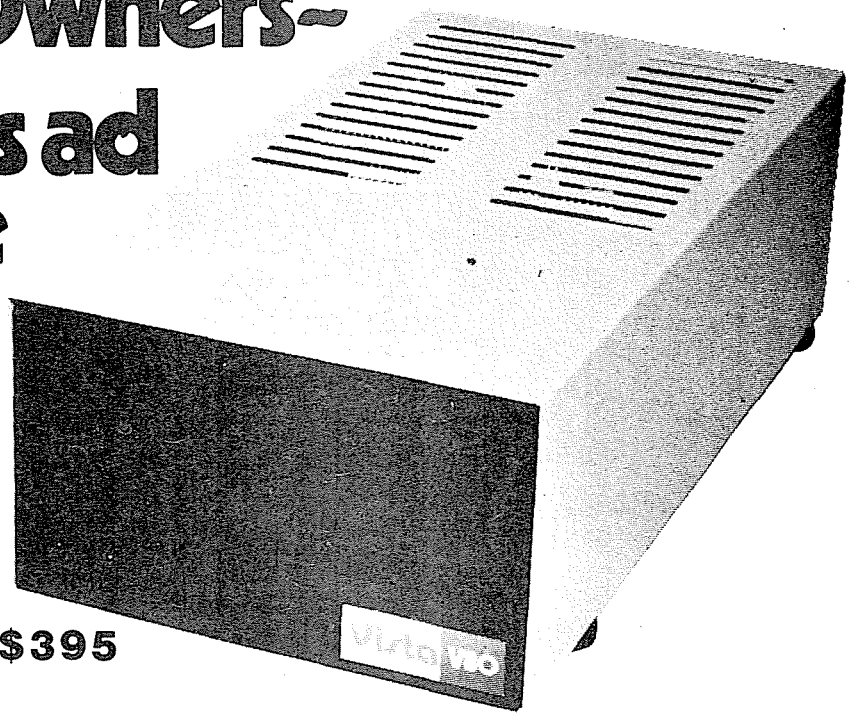

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