

N O T I C E

IF YOU HAVE THE EXPANSION INTERFACE AND YOU ONLY  
GET ONE SET OF CHIPS YOU WILL HAVE TO INSTALL  
THE CHIPS IN Z9 THROUGH Z16.

IF YOU HAVE LEVEL II AND 16K RAM IN YOUR KEYBOARD  
UNIT YOU WILL NOT HAVE TO SET ANY JUMPERS WHEN  
YOU INSTALL THE CHIPS IN YOUR INTERFACE

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TRS-80 PROGRAMMING CONTEST  
WIN \$500.00-SEND S.A.S.E. TO: P.C.-G; P.O. BOX 621; FENTON, MO 63026

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To: TRS - 80 Users Group  
From: James B. Penny  
1537 Ramada  
Houston, Tx. 77062

I THOUGHT YOU MIGHT LIKE AN IMPROVED VERSION OF YOUR "ANGLO TO METRIC"  
PROGRAM. TO ME, IMPROVED MEANS SHORTER. I DON'T LIKE TO TYPE. NOTICE  
THAT THE DATA STATEMENTS ARE PEAELED OUT THREE AT A TIME. DON'T FORGET  
THE TRAILING COMMA ON LINE 20.

```
5 CLS:P.T.(20);"ANGLO TO METRIC":P.  
10 F.N=1 TO 17:READ A(N),A$,B$  
20 P.N;" ";A$;" TO ";B$,  
30 NEXT N:RESTORE  
90 P." 0 END PROGRAM":P.  
100 IN."WHICH CONVERSION DO YOU NEED";N:IF N=0E.  
110 IF N>17 GOTO 100  
120 F.Q=1 TO N:READ A(N),A$,B$:NEXT Q  
130 RESTORE  
140 IN."VALUE TO BE CONVERTED":I  
150 R=I*A(N):IF N=17 R=(I-32)*5/9  
160 P.I;" ";A$;" =";R;" ";B$  
170 IN."PRESS ENTER TO GO AGAIN";B$:G.5  
200 D.2.54,INCHES,CENTIMETERS,30.48,FEET,CENTIMETERS  
210 D..3048,FEET,METERS,.9144,YARDS,METERS  
220 D.1.609,MILES,KILOMETERS,4.929,TSP.,CUBIC CM.  
230 D.14.788,TBSP,CUBIC CM.,.2366,CUPS,LITERS  
240 D.4732,PINTS,LITERS,.9463,QUARTS,LITERS  
250 D.3.785,GALLONS,LITERS,35.24,BUSHEL,LITERS  
260 D.8.809,PECKS,LITERS,28.3495,OUNCES,GRAMS  
270 D.4536,POUNDS,KILOGRAMS,907.2,TONS,KILOGRAMS  
280 D.6214,DEGREES F.,DEGREES C.
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LET PRINTOUT RUN OR LIST YOUR TRS-80 PROGRAMS BY SIMPLY MAILING YOUR CASSETTE TO ME WHERE THEY WILL BE PRINTED AND RETURNED TO YOU. PROGRAMS REQUIRING MORE THAN 16K CANNOT BE RUN AT THIS TIME. NO COPIES OF ANY KIND WILL BE KEPT. DISCS CAN BE HANDLED AFTER DRIVES ORDERED IN FEBRUARY HAVE BEEN SHIPPED. PLEASE INCLUDE INFORMATION WITH YOUR ORDER AS INDICATED BELOW:

## DIRECTIONS FOR PROGRAMS TO BE LISTED

1. PLACE PROGRAMS BACK TO BACK ON SIDE ONE OF TAPE.
2. NOTE ONE LEVEL-I OR LEVEL-II.
3. HOW MANY PROGRAMS ARE TO BE LISTED?
4. LEVEL-II USERS: PLEASE LIMIT PROGRAM LINES TO 80 CHRS.
6. LEVEL- I USERS: DO YOU WANT ABBREVIATIONS REMOVED FROM YOUR PROGRAM (LEVEL-II FORMAT)?
5. DO YOU WANT CONDENSED PRINTING SUCH AS THIS TO LIMIT LINE WIDTH.

## DIRECTIONS FOR PROGRAMS TO BE RUN

1. PLACE PROGRAMS BACK TO BACK ON SIDE 2 OF TAPE.
2. IF INPUT# DATA IS REQUIRED: PLACE IT DIRECTLY BEHIND PROGRAM IT BELONGS WITH. WHICH PROGRAMS HAVE INPUT# DATA?
3. IF INPUT DATA IS REQUIRED: PLEASE KEEP TO A MINIMUM AND INCLUDE RESPONSES ON ORDER. WHICH PROGRAMS REQUIRE INPUT DATA?
4. TRS-80 CRT GRAPHICS AND 'PRINT AT' STATEMENTS WILL NOT APPEAR ON PRINTED OUTPUT.
5. NOTE ONE LEVEL-I OR LEVEL-II.

CHARGES- 1 CENT PER LINE BASED ON TOTAL JOB, INCLUDING ANY NUMBER OF PROGRAMS. MINIMUM CHARGE OF \$4.00 FOR PROGRAM LISTING OR \$5.00 IF SAMPLE RUNS ARE INCLUDED. A NEAR APPROXIMATION OF TOTAL LINES WILL BE SUFFICIENT FOR PAYMENT

SEND CASSETTE AND CHECK TO: PRINTOUT, P.O. BOX 8746, FORT WORTH, TEXAS, 76112

FOR SALE: TRS-80 4K RAM, LEVEL I BASIC. I've had it only 6 months. Need to sale. Why wait 3 months. With users manual. \$600 I'll pay shipping. PRIMUS E. JACKSON, JR., 497-18th ST. SO., ST. PETERSBURG, FL 33712  
Phone: (813) 898-1711

TRS-80<sup>™</sup> COMPATIBLE PERIPHERALS

- \* CENTRONICS 779 LINE PRINTER (SAME ONE THAT RADIO SHACK USES)-\$ 999.
- \* 779 WITH TRACTOR FEED OPTION (HIGHLY RECOMMENDED) - \$1,179.
- \* P1 MICROPRINTER (A LOW COST ALTERNATIVE TO THE IMPACTS) - \$ 399.

All the above printers are supplied with a special cable that allows a direct connection to the centronics parallel line printer port on your Expansion Interface unit.

The printers are warranted for 90 days. If your unit fails during this period, ship it back to us (U.P.S. charges are usually under \$10) and we will immediately send out a replacement printer.

After the warranty period call Centronics nationwide field service for repair at 800-258-1952. They usually respond to a service call within four hours.

Also available are Shugart SA400 mini-disks complete with power supply and case \$ 399.

APPARAT, INCORPORATED  
BOX 10324  
DENVER, CO. 80210

303 758-7275

TRS SOFTWARE ALSO AVAILABLE  
SEND FOR FREE CATALOG

*Charles D. Robertson*  
2800 Fort Worth National Bank Building  
Fort Worth, Texas 76102

TRS-80 USERS GROUP  
7554 SOUTHGATE ROAD  
FAYETTE VILLE, NORTH CAROLINA  
28304

DEAR GORDON,

FOR THOSE PERSONS WHICH NOW HAVE LEVEL II BASIC, I  
HAVE FOUND THAT THE FOLLOWING ERROR ROUTINE TO BE VERY  
USEFUL IN ERROR TRAPPING

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99 ON ERROR GOTO 65000
```

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.  
65000 PRINT"ERROR IN LINE #";ERL;"CODE (";ERR/2+1;")"  
65001 PRINT"TO CONTINUE WITH NEXT LINE PUSH A KEY"  
65002 C$=INKEY$:IFC$="" THEN 65002 ELSE RESUME NEXT
```

IT IS NOT NECESSARY FOR THE 'ON ERROR' LINE TO BE AT  
#99, BUT SINCE I START ALL MY PROGRAMS AT #100 THE  
LINE 99 WAS BEST. BUT THE ON ERROR LINE SHOULD BE  
EXECUTED BEFORE THE PROGRAM STARTS SO THAT ANY ERROR  
IN THE PROGRAM WILL BE SPOTTED.

WHAT THE USER WILL GET IS A DISPLAY SHOWING THE ERROR  
CODE, AND THE LINE WHERE THE ERROR OCCURED. AT THAT  
POINT THE USER CAN BREAK THE PROGRAM AND EDIT OR PUSH  
ANY KEY TO CONTINUE THE PROGRAM WITHOUT CORRECTING THE  
ERROR AT THE NEXT LINE.

ONE ITEM WHICH WASN'T MADE TO CLEAR BY THE LEVEL II  
HANDBOOK IS THE CLEAR STATEMENT. WHEN EXECUTED IN THE  
PROGRAM IT WILL ALSO CLEAR ANY DEFINE STATEMENTS AND  
ANY DIMENSION STATEMENTS. THEREFORE I STRONGLY URGE  
THAT USERS USE THE CLEAR ##### STATEMENT IF NEEDED AS  
THE FIRST STATEMENT OF THE FIRST LINE OF THEIR PROGRAMS  
TO PREVENT THE TROUBLE WHICH I HAD AT FIRST.

SINCERELY,

  
C. D. ROBERTSON

---

Would like to TRADE programs. Have about 45 games, graphics, ect. Send  
yours on cassette. Will record all I can on your cassette and return.  
Level 1 only, I have level 2 on order.  
JIM CLAYTON, 3520 SE VINEYARD RD., MILWAUKIE, OREGON 97222

---

```
3 REM MEM 4300  
4 CLS:PRINT:PRINT:PRINT  
5 PRINT"SABINE, AND NORRIS-EYRING EQUATIONS WITH MEAN PATH ETC. "  
10 PRINT"LINAS VYUUIS 85-29 86TH ST. WOODHAVEN ,N.Y. , 11421"  
12 FORN=1T03000:NEXTN:CLS  
15 PRINT:PRINT:PRINT:PRINT:PRINT:PRINT:PRINT"INSERT REQUESTED INFORMATION":  
16 CLS:PRINT:PRINT:INPUT"WHAT IS YOUR NAME";B$:CLS:PRINT:PRINT  
17 PRINT"IT IS A PLEASURE TO MEET YOU ";B$:FORN=1T01200:NEXTN
```

```

18 PRINT"I HOPE I WILL BE ABLE TO SERVE YOU WELL!":FORN=1T02000:NEXTN
19 PRINT"ENOUGH WITH TRIVIALITIES, LETS GET DOWN TO BUISNESS!"
20 FORN=1T02000:NEXTN:CLS
22 INPUT"WHAT IS THE ROOM TEMPERTURE IN DEGREES FARENHEIGHT";D
25 INPUT"WHAT IS THE LENGTH OF THE ROOM IN FEET";M
30 INPUT"WHAT IS THE WIDTH OF THE ROOM IN FEET";N
35 INPUT"WHAT IS THE HEIGHT OF THE ROOM IN FEET";O
45 V=M*N*O: S=(2*M*N)+(2*N*O)+(2*O*M)
50 INPUT"WHAT IS THE CEILING COEFFICIENT";K
55 INPUT"WHAT IS THE FLOOR COEFFICIENT";P
60 INPUT"WHAT IS THE BACKWALL COEFFICIENT";R
65 INPUT"WHAT IS THE FRONTWALL COEFFICIENT";W
70 INPUT"WHAT IS THE RIGHT SIDE WALL COEFFICIENT";Y
75 INPUT"WHAT IS THE LEFT SIDE WALL COEFFICIENT";Z
76 INPUT"AT WHAT FREQUENCY ARE THESE COEFFICIENTS VALID";J
80 Q=((N*M*K)+(N*M*P)+(N*O*R)+(N*O*W)+(M*O*Y)+(M*O*Z))/S
85 CLS
100 T=(0.049*V)/(S*Q)
125 X=(1-Q)
130 GOSUB30190
135 PRINTB$;" , HERE ARE THE SPECIFICATIONS YOU WANTED:"
150 U=(0.049*V)/(-S*L)
151 PRINT"-----"
152 F=(4*V)/S:G=(T*(1088+(1.1*(D-32))))/F:H=(U*(1088+(1.1*(D-32))))/F
153 I=F/(1088+(1.1*(D-32)))
154 PRINT"REVERBERATION TIMES AT";J;"HERTZ "
155 PRINT"      SABINE RT-60 =" ;T;"SECONDS"
160 PRINT"      NORRIS-EYRING RT-60 =" ;U;"SECONDS"
161 PRINT"-----"
165 PRINT"AVERAGE ROOM ABSORPTION COEFFICIENT";Q;"AT";J;"HERTZ "
166 PRINT"-----"
167 PRINT"MEAN FREE PATH:";F;"FEET"
168 PRINT"-----"
170 PRINT"NUMBER OF REVERBERATIONS BEFORE TOTAL DECAY OF ONE PULSE:"
175 PRINT"      SABINE ; ;G
180 PRINT"      NORRIS-EYRING ; ;H
181 PRINT"-----"
185 PRINT"INITIAL TIME-DELAY-GAP:";I;"SECONDS"
190 INPUT"-----TO CONTINUE, PRESS ENTER-----";A$
195 CLS:PRINT:PRINT:PRINT"ROOM PARAMETERS:"
196 PRINT"-----"
200 PRINT"ROOM VOLUME:";V;"CUBIC FEET"
205 PRINT"TOTAL ROOM SURFACE AREA:";S;"SQUARE FEET"
206 PRINT"-----"
210 PRINT:PRINT"WALL ABSORPTION COEFFICIENTS AT";J;"HERTZ:"
215 PRINT:PRINT"CEILING", "FLOOR", "FRONTWALL", "BACKWALL"
220 PRINT:PRINT"K, P, W, R
225 PRINT"RIGHTWALL", "LEFTWALL"
230 PRINT:PRINT,Y,Z
231 PRINT"-----"
235 PRINTB$;" , IF YOU WANT TO TRY OTHER COEFFICIENTS AT DIFFERENT
236 PRINT"FREQUENCIES ENTER A 1. TO SEE THE T-60 SPECS AGAIN ENTER A 2. "
237 INPUT" ";Y
240 IFY=1THEN50
245 GOTO85
30185 GOTO30185
30190 E=0:IFX<0THENPRINT"LOG UNDEFINED AT";X:STOP
30195 A=1:B=2:C=5
30200 IFX=ATHENX=C*X:E=E+A:GOTO30200
30205 IFX<CTHENX=B*X:E=E-A:GOTO30205
30210 X=(X-.707107)/(X+.707107):L=X*X
30215 L=(((.598979*L+.961471)*L+2.88539)*X+E-.5)*.693147
30220 IF ABS(L)<1E-6THENL=0
30225 X=L*.4342945:RETURN

```

I thought some people might like to see a new use for the ol' TRS-80, kind of a different program. How would you like to see your house or apartment floor plan on your own screen? What good is that, you may ask. You can move furniture around to see what it might look like, designers could exchange ideas without sending bulky papers through the mail, impress your friends, etc. I have enclosed a copy of a program I did for my house to show you how easy it is and to maybe give some other people some ideas on how they could do theirs.

```
5 REM MEM 3217
10 CLS:GOSUB100:GOSUB800:INPUTB$
15 GOSUB600:GOSUB800:INPUTB$
18 CLS:GOSUB100:GOSUB1000:GOSUB800
20 INPUTB$:GOTO10
100 FORI=5T073:SET(I,3):NEXTI
110 FOR =21T0125:SET(I,15):NEXTI
115 FORI=75T083:RESET(I,15):NEXTI
120 FORI=95T0125:SET(I,26):SET(I,32):NEXTI
130 FORI=2T05:SET(I,29):NEXTI
140 FORI=17T021:SET(I,29):NEXTI
145 FORI=22T046STEP4:SET(I,29):SET(I+1,29):NEXTI
150 FORI=46T051:SET(I,29):NEXTI
155 FORI=54T078STEP4:SET(I,29):SET(I+1,29):NEXTI
160 FORI=78T085:SET(I,29):NEXTI
170 FORI=104T0125:SET(I,29):NEXTI
180 FORI=52T065STEP2:SET(I,38):NEXTI
190 FORI=77T087:SET(I,38):NEXTI
200 SET(94,38):SET(95,38)
210 FORI=2T0125:SET(I,46):NEXTI
300 FORI=29T046:SET(2,1):NEXTI
320 FORI=15T024:SET(20,1):NEXTI
330 SET(20,20)
340 FORI=38T045:SET(5L,1):NEXTI
350 FORI=4T09:SET(60,1):NEXTI
360 SET(60,13):SET(60,14):SET(73,4)
370 FORI=8T014:SET(73,1):NEXTI
380 SET(85,16):SET(85,17)
385 FORI=19T026STEP2:SET(85,1):NEXTI
390 FORI=26T031:SET(85,1):NEXTI
400 FORI=36T045:SET(85,1):NEXTI
410 FORI=27T033:SET(96,1):NEXTI
420 FORI=37T045:SET(96,1):NEXTI
430 FORI=27T031:SET(103,1):NEXTI
440 FORI=16T045:SET(125,1):NEXTI
450 RETURN
600 PRINT@115,"[";:PRINT@178,"[[[";:PRINT@243,"N";
610 PRINT@140,"CARPORT";
620 PRINT@159,"MASH";:PRINT@223,"ROOM";
630 PRINT@408,"FLORIDA";:PRINT@473,"ROOM";
640 PRINT@433,"MASTER";:PRINT@496,"BEDROOM";
650 PRINT@713,"LIVING";:PRINT@778,"ROOM";
660 PRINT@671,"DINING";:PRINT@736,"ROOM";
670 PRINT@927,"KITCHEN";
680 PRINT@821,"GUEST";:PRINT@884,"BEDROOM";
690 PRINT@875,"BATH";:PRINT@939,"ROOM";
700 RETURN
800 PRINT@0,"THE STEVENER HOUSE 3935 HUNTINGTON ST NE ST PETE, FL ";
810 PRINT"33703";:RETURN
1000 FORI=87T0100:SET(I,16):SET(I,17):NEXTI
1010 FORI=107T0124:FORJ=18T023:SET(I,J):NEXTJ:NEXTI
1020 FORI=96T0103:SET(I,24):SET(I,25):NEXTI
1030 SET(123,17):SET(124,17):SET(123,24):SET(124,24)
```

PLEASE SEND ALL ARTICLES AND PROGRAMS ON TAPE. IF YOU HAVE A HARD COPY THAT IS IN THE GIN FORMAT YOU MAY SEND IT IN. WHEN YOU MAKE THE TAPE TO SEND IN AN ARTICLE ALL PRINT STATEMENTS MUST BE 'LPRINT'.

1040 FORI=54T072:SET(I,16):SET(I,17):NEXTI  
 1050 FORI=46T052:FORJ=18T023:SET(I,J):NEXTJ:NEXTI  
 1060 FORI=47T050:SET(I,16):SET(I,17):NEXTI  
 1070 FORI=24T027:FORJ=20T022:SET(I,J):NEXTJ:NEXTI  
 1080 FORI=45T052:SET(I,27):SET(I,28):NEXTI  
 1085 J=27:FORI=78T081:SET(I,J):SET(I+1,J):J=J-1:NEXTI  
 1090 FORI=17T025:SET(I,30):SET(I,31):NEXTI  
 1100 FORI=3T09:FORJ=34T039:SET(I,J):NEXTJ:NEXTI  
 1110 FORI=12T014:FORJ=34T039:SET(I,J):NEXTJ:NEXTI  
 1120 FORI=4T08:SET(I,40):SET(I,41):NEXTI  
 1130 FORI=47T051:FORJ=38T041:SET(I,J):NEXTJ:NEXTI  
 1140 FORI=15T021:FORJ=42T044:SET(I,J):SET(I+10,J):NEXTJ:NEXTI  
 1150 FORI=39T043:SET(57,I):NEXTI  
 1160 FORI=57T079:SET(I,43):NEXTI:SET(79,42)  
 1180 FORI=78T084:FORJ=39T041:SET(I,J):NEXTJ:NEXTI  
 1200 RETURN

The programs I mentioned in the May newsletter I now have in Level II also. Additionally, I am offering the following programs (all 4K):

**MOON LANDER** - No longer may you sit and wonder "What would happen if..?" You now must input thrust and lateral corrections on a 'real time' basis. Demands your full attention. (Level II only, \$4.50). Watch its descent.  
**TARGET** - 2 players independently aim and fire at 3 aircraft flying over a head, each valued differently for scorekeeping. (Level II only, \$4.00).

The following programs are available in Level I or Level II:

**DOGFIGHT** - 2 players each command 1 ship, moving and firing at each other. You may not fire through the obstacles but you may bounce shots off the walls (you watch the shot's "trace"). Interesting and easy to play. \$7.50  
**DOGFIGHT II** - Same as above, but you play against the computer. He always has the correct direct angle but cannot bounce off a wall (nor shoot thru an obstacle.) Very challenging and accurate. \$7.50. (Both for \$11.00)  
**GRAPHER** - Input your own title, starting value for x, increment, and the y values as they are called for, and this program will draw a bar graph or a dot graph for you. Less than 1000 bytes, with scaling. \$5.00.  
**NUMBERS** - Play the numbers game with a friend or the computer. Whoever picks the last object or number from the pile loses. You can beat the computer (secret enclosed). \$3.00.

Please include \$1.00 for cassette, postage, and handling.

William M. Stevener  
 3935 Huntington St N.E.  
 St Petersburg, FL 33703

Sincerely,

  
 William M. Stevener

**PASSBOOK PROGRAM** to compute daily interest on either an actual days basis or on a conventional 30-day month basis. It actually computes interest daily to avoid the problem of the limited accuracy of **LEVEL I** which cannot calculate  $1.000145833$  to various powers accurately. This is the factor for 5.25% on 360-day basis.

2 REM PASSBOOK  
 4 REM BYTES LEFT 1650  
 6 REM 7/18/78  
 10 REM C. W. EVANS, (602) 933-1616  
 12 REM 9806 AMBER TRAIL, SUN CITY, AZ 85351  
 18 CLS  
 20 PRINTTAB(15); "DAILY INTEREST PASSBOOK PROGRAM.  
 21 PRINT  
 22 PRINT" THIS PROGRAM CALCULATES ACCUMULATED DAILY INTEREST  
 24 PRINT"USING ACTUAL DAYS OR A CONVENTIONAL 30-DAY MONTH.  
 26 PRINT"ENTER DATE (M,D) FOR EACH ENTRY. ENTER THE BALANCE AT

```

27 PRINT"THE START OF THE PERIOD. THEN ENTER EACH DEPOSIT AMOUNT (+)
28 PRINT"AND EACH WITHDRAWAL AMOUNT (-) AT THE END OF THE PERIOD
30 PRINT"ENTER A '0' AMOUNT IN ORDER TO COMPUTE INTEREST TO THE
32 PRINT"FINAL DATE. THE PROGRAM PRINTS DAY #, THE DETAILS
34 PRINT"SHOWN IN THE PASSBOOK, AND THE ACCUMULATED INTEREST.
38 PRINT
40 INPUT"IT ENTER WHEN READY.":A#
80 CLS
85 REM DELETE LINE 90 IF RATE IS 5.25%
90 GOT0100
97 Q=5.25/36000
99 GOT0110
100 INPUT"WHAT IS ANNUAL INTEREST %?":R:Q=R/36000
105 INPUT"ENTER 1 IF ACTUAL DAYS METHOD, 2 IF 30-DAY MONTH":G
106 IFG>2GOT0105
110 I=0
120 INPUT"WHAT IS STARTING DATE AND BALANCE (M,D,B)":M,D,B
122 IF(M>12)+(D>31)GOT0120
123 IFG=1PRINT"IS IT LEAP YEAR (1=YES, 0=NO)":INPUTL:GOSUB400:GOT0130
125 GOSUB174
130 E=H
140 PRINT
150 PRINT" # DATE WITHDRAWAL DEPOSIT BALANCE INTEREST
155 PRINTH;M;";";D;TAB(33);B
158 PRINTTAB(22);"MONTH, DAY, AMOUNT, (M,D,A)":INPUTM,D,A
160 IF(M>12)+(D>31)GOT0158
162 IFG=2GOSUB174:GOT0205
166 IFG=1GOSUB400:GOT0205
173 REM *TEST FOR SHORT MONTHS*
174 C=D
175 IF(M=2)+(M=4)+(M=6)+(M=9)+(M=11)GOT0185
180 GOT0200
185 IFM=2GOT0187
190 GOT0195
187 IFD=28PRINT"IS IT LEAP YEAR (1=YES, 0=NO)":INPUTL:IFL=1RETURN
190 IFD>27D=31
195 IFD=30C=31
200 H=30*(M-1)+D:RETURN
205 F=H
209 IFE=FGOT0232
210 FORN=ETOF-1
220 I=I+I*Q+B*Q
230 NEXTN
232 B=B+A
233 I=(INT((I-INT(I))*100+.5001))/100+INT(I)
240 PRINTH;M;";";C)
250 IFA<0PRINTTAB(13);A;:GOT0270
260 PRINTTAB(23);A;
270 PRINTTAB(33);B;
280 PRINTTAB(43);I
290 E=F:GOT0158
400 ONMGOTO401,402,403,404,405,406,407,408,409,410,411,412
401 H=D:GOT0420
402 H=D+31:GOT0420
403 H=D+59+L:GOT0420
404 H=D+90+L:GOT0420
405 H=D+120+L:GOT0420
406 H=D+151+L:GOT0420
407 H=D+181+L:GOT0420
408 H=D+212+L:GOT0420
409 H=D+243+L:GOT0420
410 H=D+273+L:GOT0420
411 H=D+304+L:GOT0420
412 H=D+334+L:GOT0420
420 C=0:RETURN

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# Tapetalk™

FOR YOUR TRS-80

TAPETALK, a truly unique publication for the first generation of computer pioneers, is a bi-monthly "Magazine" exclusively for the TRS-80 system. ALL ON CASSETTE, JUST LOAD IT IN.

We are dedicated to the premise that you deserve the full potential from your TRS-80.

## REGULAR FEATURES INCLUDE:

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\*\*\*\*\*  
\* ENTER A PROGRAMMING CONTEST. WIN A SCREEN \*  
\* PRINTER, EXPANSION INTERFACE, 16K CONVERSION \*  
\* KIT, LEVEL II MODIFICATION OR ONE OF MANY \*  
\* OTHER PRIZES. \*  
\*\*\*\*\*

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Signature \_\_\_\_\_

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Nickname \_\_\_\_\_

4k                       Level I

16k                      Level II

MAIL COUPON OR CALL TODAY (408) 629-2461



DEAR TRS-80 FOLKS

RADIO SHACK HAS MADE A FEW MISTAKES IN THE PRINTER INSTRUCTIONS AND IN THE DUAL CASSETTE OPERATIONS. FIRST-- A HEAVY SLIP OF PAPER IN BETWEEN THE RIBBON GUIDE AND THE PLATEN WILL AID IN LOADING PAPER OR FORMS INTO THE PRINTER. SECOND-- YOU MUST TYPE "LPRINT" " IN ORDER TO SKIP A LINE. AN LPRINT BY ITSELF DOES NOTHING. THIRD-- THE MANUAL SAYS YOU CAN CONTROL LINE SPACING BY POKING INTO MEMORY (16424) A VALUE LESS THAN 66. I CAN'T GET ANYTHING LIKE THAT TO WORK ON MINE. HAS ANYONE ELSE?

FOURTH-- THE DUAL CASSETTE OPERATION IS SUPPOSED TO BE CONTROLLED BY THE COMMAND CLOAD#N WITH N=THE NUMBER OF THE CASSETTE TO BE USED. THAT COMMAND DOESN'T WORK! CLOAD#-N FOLLOWED BY A COMMA AND THE NAME OF THE PROGRAM IN QUOTATION MARKS DOES WORK.

FIFTH-- THE COMMAND CLOAD?#N DOES NOT WORK EITHER! BUT THE COMMAND CLOAD#-N FOLLOWED BY A COMMA THEN THE '?' AND THE NAME OF THE PROGRAM IN QUOTES IMMEDIATELY AFTER IT WITHOUT ANY FURTHER PUNCTUATION.

FINALLY-- BELOW IS A LITTLE PROGRAM I USE TO CONTROL THE LINE PRINTER FOR NOTES LIKE THIS ONE. YOU SHOULD NOTE YOU CAN SKIP A LINE BY TYPING IN 2 QUOTES WITH A SPACE BETWEEN AND INDENT BY STARTING THE LINE WITH A SINGLE QUOTE AND SKIPPING IN TO WHERE YOU WISH TO START.

```
100 CLS : CLEAR 85
200 INPUT A$ : LPRINT A$ : PRINT
300 PPRINT "FREE SPACE " : FRE(A$)-15
400 PRINT : CLEAR : GOTO 200
```

HERE IS A NICE LITTLE SUBROUTINE FOR A SQUARE ROOT FOUND IN DR ENGELS SIMULATIONS. SINCE LEVEL II HAS A SQ(R) FUNCTION BUILT-IN THIS IS FOR LEVEL I PEOPLE. JOHN REVELLE, 7136 BELITA AVE  
ROHNERT PARK, CA 94928

```
900 REM Q=SQUARE ROOT(R)
910 Q=0
920 IF R<=0 THEN 970
930 Q=1
940 S=0
950 Q=(R/S+S)/2
960 IF ABS((R/Q)/Q-1)>= .0001 THEN 940
970 RETURN
```

---

#### SWISS CHEESE DISPLAY

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1 (714) 444-0356

```
10 CLS
20 SET(RND(127),RND(47))
30 RESET(RND(127),RND(47))
40 GOTO 20
```

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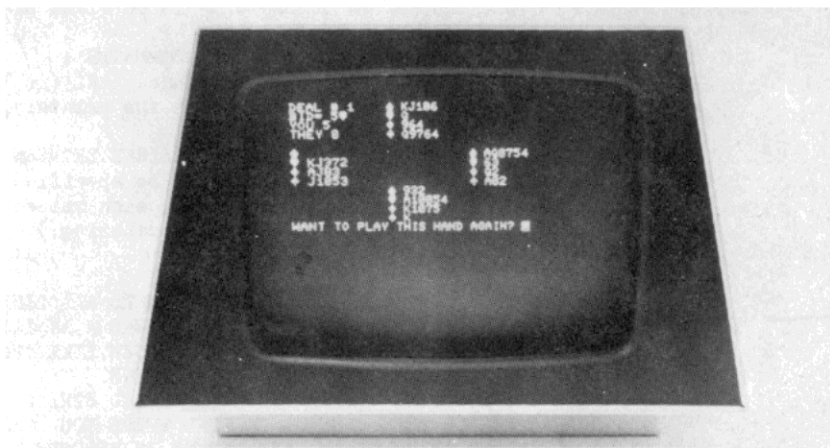
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HAVING RECEIVED SOME NEW HARDWARE & SOFTWARE, I THOUGHT I'D LET YOU HEAR ABOUT THEM. SO FAR I'VE RECEIVED THE EDITOR/ASSEMBLER PROGRAM, LEVEL II, & THE EXPANSION INTERFACE. ALSO I'M AWAITING MY MINI-DISK, WHICH SHOULD ARRIVE SOON. TO SUM-UP LEVEL II IN ONE WORD; EXCELLENT !

BUT FIRST A DISCOVERY ABOUT LEVEL I, IF WHILE RUNNING A PROGRAM THAT HAD SEVERAL NESTED LEVELS OF 'GOSUB's , YOU DID A 'BREAK' WHILE IT WAS IN THAT PART OF THE PROGRAM, CHANCES ARE THAT IF YOU DID A 'RUN' RIGHT AFTER THE 'BREAK' IT TOLD YOU 'SORRY'. THE "FIX" IS TO FIRST HIT 'ENTER' ONCE OR TWICE, THAT SEEMED TO CLEAR THAT PROBLEM UP.

AND NOW ABOUT THE EDITOR/ASSEMBLER, IT HAS 13 COMMANDS :

- "A" ASSEMBLE, WITH 5 OPTIONS, 'NO'(no object code), 'NL'(no listing), 'NS'(no symbol table), 'LP'(list on the printer), AND 'WE'(wait after errors).
- "I" INSERT, USED TO INSERT EITHER NEW LINES OR LINES BETWEEN OLD ONES. (commands reference lines can be specified with a starting line # and an increment for each subsequent line. this program has 'AUTO' line numbering.)
- "R" REPLACE, TO WRITE OVER OR REPLACE A LINE.
- "D" DELETE, DELETES LINES.
- "N" NUMBER, MORE LIKE A 'RENUMBER' FUNCTION, CHANGES ALL LINE NUMBERS SO THAT THEY BEGIN WITH A CERTAIN NUMBER & AN INCREMENT.
- "E" EDIT, A LINE EDITOR WITH SUBCOMMANDS VERY MUCH LIKE THOSE IN LEVEL II. A BIG ASSET IN CHANGING A LINE.
- "F" FIND, SEARCHES THE TEXT BUFFER FOR A SPECIFIED STRING OF 16 CHARACTERS OR LESS. USEFUL TO FIND WHERE YOU USED A LABEL OR CONSTANT OR WHATEVER. THE STRING IS REMEMBERED UNTIL YOU GIVE IT A NEW ONE, SO REPEATED CALLS WITH JUST 'F' WILL FIND THE NEXT OCCURANCE OF THE STRING.
- "P" PRINT, MUCH THE SAME AS 'LIST'. HAS 3 OPTIONS. 'P' BY ITSELF, WILL LIST 15 LINES.(one screens worth)
- "L" LOAD, THIS ADDS (repeat adds) A SOURCE FILE TO THE TEXT BUFFER FROM CASSETTE USING A FILENAME. (up to 6 characters)
- "W" WRITE, OPPOSITE OF 'LOAD', SAVES THE TEXT BUFFER ON CASSETTE. NOTEWORTHY FEATURE; ALL TAPES CREATED BY THE EDT/ASMBLR ARE MADE AT LEVEL II's RATE OF 500 BAUD, EVEN IF YOU'RE WORKING ON A LEVEL I TRS-80.
- "H" HARDCOPY, LIKE 'P' ONLY OUTPUT GOES TO THE LINE-PRINTER.
- "T" TYPE, SAME AS 'H' EXCEPT NO LINE NUMBERS ARE PRINTED.
- "B" BASIC, TO RETURN TO "BASIC".

THE EDT/ASMBLR PROGRAM TAPE IS A 500 BAUD TAPE & CAN BE LOADED AS IS ON A LEVEL II MACHINE, OR WITH THE HELP OF A 'SYSTEM' PROGRAM TAPE PROVIDED FOR LEVEL I USERS.(250 baud & loads in a few seconds) WHEN LOADED, YOU GIVE THE STARTING ADDRESS & HIT 'ENTER'. THIS ACCORDING TO THE MANUAL WILL REWARD YOU WITH THE MESSAGE; "TRS-80 EDITOR/ASSEMBLER 1.0" AND A PROMPT THAT IS AN ASTERISK NOT A '>'. SURPRISE I GOT VERSION 1.1 NOT 1.0 !

THE ASSEMBLER RECOGNIZES THE STANDARD ZILOG MNEMONICS. MACRO's &

CONDITIONAL ASSEMBLY ARE NOT SUPPORTED, BUT, OPERAND EXPRESSIONS MAY CONTAIN '+' AND '-' ARITHMETIC OPERATORS, ALONG WITH '&' (logical and), PLUS '<' (shift) OPERATORS. PARENTHESES NOT BEING ALLOWED. CONSTANTS CAN BE HEX, OCTAL, OR DECIMAL. LABELS CAN BE UP TO 6 CHARACTERS LONG. THE STANDARD ASSEMBLER FORMAT (line #, label, op-code, operand, comments) IS HELPED ALONG BY USING THE RIGHT ARROW KEY AS A TRUE HORIZONTAL TAB TO THE NEXT 8 CHARACTER FIELD (there are 8 fields on a line). TWO THINGS ARE THE SAME AS IN LEVEL II, shift '@' WILL HALT COMPUTER ACTIVITY AND HOLD IT UNTIL ANOTHER KEY IS PRESSED, shift BACK-ARROW WILL DELETE ALL OF THE CURRENT LINE BEING TYPED IN. UP-ARROW WILL PRINT THE PRECEDING LINE OF TEXT, AND DOWN-ARROW PRINTS THE NEXT LINE.

ASSEMBLY IS DONE COMPLETELY IN-MEMORY FROM THE TEXT BUFFER AND AS A RESULT CANNOT BE CLASSIFIED AS A "X (number) PASS ASSEMBLER". THE OBJECT

CODE (given with the output listing by the way) IS SAVED IN MEMORY FOR OUTPUT TO CASSETTE, AND LATER EXECUTION. THE PROGRAM WILL NOT IMMEDIATELY EXECUTE. THE MANUAL STATES THAT ABOUT 7K IS LEFT OVER IN A 16K MACHINE FOR TEXT BUFFER USAGE. IF YOU NEED TO ASSEMBLE LARGER PROGRAMS THEN THEY CAN BE DONE IN SECTIONS, AND LATER EACH SECTION CAN BE LOADED IN ORDER AND EXECUTED AS A WHOLE.

ERROR MESSAGES ARE VERY GOOD, FOR EXAMPLE; "line number too large", "string not found", "branch out of range", "multiply defined symbol". NO SHORT FORM (2 character) ERROR MESSAGES HERE !

PSEUDO-OPS SUPPORTED ARE; "ORG", "EQU", "DEFL", "DEFB", "DEFW", "DEFS", "DEFM", "END". THERE ARE TWO ASSEMBLER COMMANDS THAT CAN BE A PART OF THE TEXT, "\*\*LIST ON", AND "\*\*LIST OFF" TO CONTROL LISTING OUTPUT.

THE MANUAL FOR THE EDT/ASMBLR IS FAIRLY COMPLETE, THOUGH IT DOES NOT TRY TO TEACH YOU ASSEMBLY LANGUAGE PROGRAMMING SKILLS. THE SAMPLE PROGRAM INCLUDED IN THE MANUAL WHICH PAINTS THE SCREEN WHITE, HOLDS IT & THEN RETURNS TO BASIC. THIS IS VERY FAST ! AS SOON AS YOU RELEASE THE "ENTER" KEY, THE SCREEN IS WHITE, NEARLY INSTANTANEOUSLY SO.

INCLUDED IN THE MANUAL ARE FIVE PAGES ON COMMANDS AND SUCH, ABOUT 6 PAGES ON USE & INTRODUCTION TO ASSEMBLER FORMATS & Z-80 INTERNAL DETAILS THEN COMES THE BULK OF THE MANUAL; THE Z-80 INSTRUCTION SET. WHAT YOU ARE GIVEN IS ALMOST EXACTLY LIKE WHAT YOU CAN FIND IN THE ZILOG ASSEMBLY LANGUAGE PROGRAMMING MANUAL. EACH INSTRUCTION IS DETAILED AND EXPLAINED, ALONG WITH HOW IT AFFECTS OTHER REGISTERS, FLAGS, ETC. THE Z-80'S HARDWARE IS EXPLAINED, ITS ADDRESSING MODES AND TIMING ARE TOO. NEXT YOU GET BOTH A NUMERIC & AN ALPHANUMERIC LIST OF EACH INSTRUCTION (something I had'nt seen before). ALSO YOU GET A MEMORY MAP FOR LEVEL II (really not needed if you have level II since it's manual has one), AND 2 PAGES THAT DETAIL THE ENTRY POINTS FOR SUBROUTINES IN BOTH LEVEL'S I & II.

OVERALL I'D RATE IT AS A VERY GOOD 'STANDARD' ASSEMBLER. IT HAS NO FANCY THINGS LIKE MACRO'S BUT THEN THOSE ARE NOT ESSENTIAL & THERE ARE MANY GOOD THINGS THAT CAN BE DONE WITH THIS ASSEMBLER. IT'S CERTAINLY BETTER THAN A LOT OF ASSEMBLERS.

THE FIRST THING I DID WITH THE EDT/ASMBLR WAS TO DUMP LEVEL I, SINCE I WAS IN A HURRY TO GET LEVEL II IN WHICH ARRIVED AT THE SAME TIME AS MY EDT/ASMBLR. LEVEL II IS EASY TO DUMP, JUST USE THE BUILT-IN 'PEEK' FUNCTION. IDEAS FOR FUTURE PROGRAMS INCLUDE AN ADD-ON ROUTINE FOR LEVEL II THAT WILL RENUMBER THE SOURCE LINES (basic lines that is), AND SOME VECTOR-LINE GRAPHIC SUBROUTINES. PLEASE CONTACT ME IF YOU WOULD LIKE TO WORK WITH ME AT DEVELOPING SUCH THINGS OR MAYBE YOU HAVE SOMETHING WE CAN DO TOGETHER.

LEVEL II MAKES MY TRS-80 SEEM LIKE A NEW COMPUTER, COMPARED TO THE CAPABILITIES OF LEVEL I. LEVEL I WAS NICE TO WORK WITH AS A BEGINNER, AND I WOULD NOT HESITATE TO RECOMMEND IT FOR SOMEONE ELSE WHO WAS ALSO JUST STARTING, BUT JUST TRY DOING SOME OF THOSE REALLY FAR OUT & HI LEVEL PROJECTS & IT'S THEN THAT THE LEVEL I LIMITATIONS SHOW UP.

I REALLY HATE TO SAY TOO MUCH ABOUT LEVEL II, SINCE I'M SURE THAT SOMEONE WITH MORE EXPERIENCE AT ARTICLE WRITING & SUCH (DR. JACK CRENSHAW for example), WOULD DO A FAR BETTER JOB AT EXPLAINING IT'S VIRTUES AND ABILITIES.

THE EXPANSION INTERFACE CONNECTS TO THE TRS-80 VIA A RIBBON CABLE THAT IS BOTH STURDY AND KINDA SHORT, (this impairs the keyboard mobility somewhat). IT COMES WITH YET ANOTHER BLACK POWER PACK TO PLUG IN, BUT AT LEAST IT ALLOWSONE TO HIDE BOTH OF THE PACKS INSIDE THE INTERFACE'S CASE. A JUMPER CABLE CONNECTS THE CASSETTE OUTPUT FROM THE KEYBOARD TO THE INTERFACE. THE TWO CASSETTES ARE THEN HOOKED UP TO THE INTERFACE.

AFTER PEERING INSIDE IT'S CASE IT APPEARS THAT ONE WILL BE ABLE TO JUST ADD 8 MORE MEMORY CHIPS (or 16), WITHOUT CHANGING ANY JUMPERS AROUND OR FIDDLING WITH THOSE DIP SWITCHES INSIDE THE CASE (keyboard). I THINK LEVEL II DETERMINES MEMORY SIZE BY SOFTWARE MEANS NOT HARDWARE, DOES ANYONE KNOW YET FOR SURE ?

I'VE SEEN VERSION 1.0 OF THE DISK OPERATING SYSTEM, IT'S A NICE PACKAGE ! THE BAD THING ABOUT IT IS THAT IT TAKES APROX. 10K OF MEMORY TO RUN THE DOS, LEAVING ABOUT 5.4K LEFT FOR PROGRAMMING IN A 16K MACHINE.

JUST TRY AND GUESS WHAT I'LL BE GETTING TO PLUG INTO MY EXP. INTERF. ! HOWEVER THE DOS SHOULD REALLY BE A WINNER, WHAT WITH PASSWORDS ON FILES, FILE CONCATENATION, THE ABILITY TO RE-ASSIGN DEVICES (line printer output to the video screen), ALSO I THINK THE UTILITIES INCLUDED A DEBUGGER SORT OF LIKE "T-BUG".

WITH MORE & MORE OF US GETTING LEVEL II NOWADAYS, WE SHOULD BE ABLE TO CRANK OUT SOME FANTASTIC SOFTWARE. AS A SIDE NOTE ON LEVEL II'S SPEED BY USING AN INTEGER 'FOR-NEXT' LOOP, MY TRS-80 WILL COMPLETE :

10 FOR I=0TO10000

20 NEXT

IN ABOUT 12½ SECONDS, THIS IS A BIT FASTER THAN THE TIMES GIVEN FOR THE "PET" AND "APPLE" IN A RECENT ISSUE OF BYTE MAGAZINE. NOT BAD CONSIDERING WE HAVE ONLY A 1.771 MHz CLOCK RATE !

HOWARD E. FOILES  
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- (1) Bubble Babble, (2) Bus Lines, (3) Dandy Notes, (4) TRS-80 Owners Don't Baudot To Anyone, (5) Floppy Copy, (6) Padded Bits, (7) Under Disk-ussion, (8) Tandy Say — "Don't Make ASCII Of Self."

# Reference List

## SOFTWARE ON CASSETTES

I am compiling a list of all software on cassettes. My last two issues were free but they quickly ran out. Now I am trying to increase the size of the list and increase the number printed. Therefore when the next issue is printed in mid-August, it will sell for \$1.00 ppd.

If you sell any programs on cassettes for the TRS-80, please let me know. I would also like to list original software for trade by individuals or clubs.



ROBERT ELLIOTT PURSER, Box 466, EL DORADO, CA 95623

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\*\*\*NOTE: ALL PAYROLL PACKAGES (both LEVEL I and LEVEL II) require a change in the "Initialization and Summary" program.  
Line 2100 should read: 2100 A(12)\*A(12)+I

---

Dear Bob,

I have been reading your newsletter for 4 issues now, and I find them very valuable. I wasn't one of the people who bought the Level I and then waited for Level II. I ordered the 16K Level II as soon as allowed, and have been enjoying it for over a month now. So much of the problems mentioned in the newsletter don't apply to me. For example, we Level II users have no problem with the "double size" characters (32 ch. per line). We just PRINT CHR\$(23) after we clear the screen each time. But according to the original sales brochures, the Level I was supposed to be software selectable for 32 ch/line, too. What happened!?!

I have convinced my school to buy two of the Level I, 4K units, and so now I have both levels available. Gads, what do you level I users do about editing? It is so easy in Level II and so tedious in L I.

Forgive me my naivete, but being completely non-electronics oriented, I am going to ask some possibly dumb questions. First, there has been a lot going around about the ground loops in the audio recorder. And everybody offers suggestions about special adapter cords, boxes, and the like. Yet nobody has suggested what to me is the most obvious. Why not take the back off the recorder and cut the ground wire to the ear jack? Wouldn't it work? If not, will somebody tell me why not?

And in the last issue of the newsletter, you offered some 16K chips. Since I have the 16K unit, I can't take advantage of that yet. But if I eventually get the expansion box I will be quite interested. My question is: do I need any special knowledge or tools? Or is it a case of simply unscrewing the box and pushing in the chips. Does this have any bad side-effects? For example, when you PRINT MEM, do you get the new correct amount?

In issue number 3, Win Jones reported his TRS-80 stolen. Has he recovered it? Are thefts a problem? Have others been stolen?

Someone with a line printer(not screen printer) could do a lot of us a favor and offer hard copy to those of us without a printer. After we finally get a program running, it is usually quite different from anything we originally had on paper. We would like a printed copy but certainly don't want to take the time to write it all down again. I would be willing to pay a moninal fee to get a hardcopy of many of my programs. And the person offering this service would pick up a lot of programs for himself that way, too.

What ever happened to the TRS-80 Owners Newsletter that Radio Shack promised would be sent to owners. Did it die on the vine?

How about someone compiling a list of places that buy software? There seem to be more and more outfits coming out with purchasing plans and royalties for the TRS-80 software. It would be nice to have a list of them, along with their rates. Sure would help some of us who want to seel some of our original programs, but don't know where the best place is.

There seems to be quite some comment about cheap tapes working fine. Maybe on the Level I, but not on Level II; the faster baud rate seems to be extra critical of even the smallest dropouts. Lukily, we Level II users have the CLOAD? command so we can check the tape before eliminateing the resident program.

I especially enjoyed the "Snoopy"picture that Michael Yarbrough submitted in your latest issue. I found it a real bore to type in, but well worth the time when completed! I would like to see more graphics like these, so I can put them all in one program, then loop through each one.

I would like to contact anyone who is writing CAI programs in math for 7th graders or above. I am writing some for various areas like Number Theory, Trigonometry, Geometry, Logic, Probability, Topology, and others; I am always looking for new approaches and new topics.

John R. Olsen Jr.  
P.O. Box 181  
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Sincerely,



---

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```

5 DIM A(100)
10 CLS:PRINTTAB(20)"PILLBOX 2"
15 PRINT:PRINT:PRINT:PRINT:INPUT"WHAT IS THE FIRST NAME OF PLAYER #1 ";A$
16 PRINT:INPUT"                                PLAYER #2 ";B$
17 CLS
20 Z=4:REM-----LETHAL DISTANCE-----
30 REM-----GUN #1 DISTANCE FROM CENTER-----
31 D=RND(45)+8
40 REM-----GUN #1 HEIGHT-----
41 E=42-RND(25)
50 REM-----GUN #2 DISTANCE FROM CENTER-----
51 F=RND(45)+72
60 REM-----GUN #2 HEIGHT-----
61 G=42-RND(25)
70 SET(D,E):SET(F,G)
100 REM-----DRAW PILLBOXES-----
110 FOR I=-2 TO 2
120 SET(D+I,E):SET(D+I,E+1)
130 SET(F+I,G):SET(F+I,G+1)
140 NEXTI
200 REM-----SET HEIGHT OF MOUNTAIN-----
210 M=RND(20)+8
212 IF M > E M=E-2
214 IF M > G M=G-2
220 REM-----DRAW TERRAIN-----
230 FOR I=0 TO D+5
240 FOR J=E+2 TO 47
250 SET(I,J):NEXTJ:NEXTI
260 FOR I=F-5 TO 127
270 FOR J=G+2 TO 47
280 SET(I,J):NEXTJ:NEXTI
300 REM-----DRAW MOUNTAIN-----
310 K=(M-(E+2))/(63-(D+6))
320 L=E+2
330 FOR I=D+6 TO 63
340 L=L+K
350 FOR J=L TO 47
360 SET(I,J):NEXTJ:NEXTI
370 K=(G+2-M)/(F-6-64)
380 L=M
390 FOR I=64 TO F-6
400 L=L+K
410 FOR J=L TO 47
420 SET(I,J):NEXTJ:NEXTI
425 PRINT@900,A$;"S PILLBOX ";
426 PRINT@937,B$;"S PILLBOX ";
480 REM-----CHOOSE GUN TO FIRE FIRST-----
490 P=RND(2)
500 PRINT@0,"
505 K=0:L=64:IF P=2 K=32:L=160
510 PRINT@K,"BARREL ANGLE  MUZZLE VELOCITY";
520 PRINT@L,;:INPUTA
530 IF(A < 0)OR(A > 90) GOTO520
540 PRINT@L+16,;:INPUTV
550 IF (V<100)OR(V>2000) GOTO540
570 V=V/10
600 REM-----COMPUTE SINE & COSINE OF ANGLE-----
610 A=A/57.2958
640 W=A*A*A
650 S=A-W/6+W*A*A/120-W*A*A/5040
660 A=1.5708-A
670 W=A*A*A
680 C=A-W/6+W*A*A/120-W*A*A/5040
700 Q=V*C:R=V*S

```

LEVEL 11

```

710 K=D:L=E:IF P=2 Q=-Q:K=F:L=G
715 L=47-L
719 REM-----COMPUTE & PLOT TRAJECTORY
720 T=.05
725 B=0
730 T=T+.1
740 X=K+Q*T+2.3
745 IF(X<0)OR(X>127) GOTO800
750 Y=47-(R-16*T)*T-L
755 IF Y<0 GOTO730
756 IF Y>47 GOTO700
760 B=B+2:A(B)=X:A(B+1)=Y
770 IF POINT(X,Y) GOTO800
780 SET(X,Y)
790 GOTO730
800 IF P=1 GOTO 830
810 IF ABS(D-X)<Z GOTO900
820 P=1:GOTO850
830 IF ABS(F-X)<Z GOTO900
840 P=2
845 REM-----ERASE TRAJECTORY-----
850 FORI=0 TO B STEP 2
860 RESET(A(I),A(I+1))
870 NEXTI
875 PRINT00."
876 PRINT064."
877 PRINT0128."
880 GOTO500
890 REM-----HIT WITHIN 2 UNITS OF GUN-----
900 FOR I=1 TO 100
910 SET(X+RND(11)-6,Y-RND(10))
915 RESET(X+RND(5)-3,Y-RND(5)+2)
920 NEXTI
930 FOR I=0 TO 4000:NEXTI
940 GOTO10

```

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