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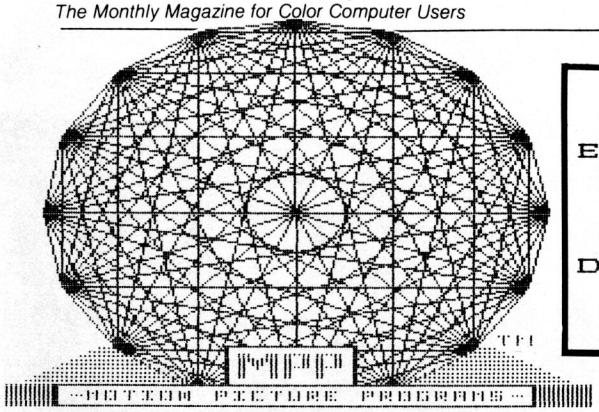
MAY, 1982

$2.50

the RAINBOW™

The Monthly Magazine for Color Computer Users VOLUME I NUMBER 11



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A WORKING PROGRAM

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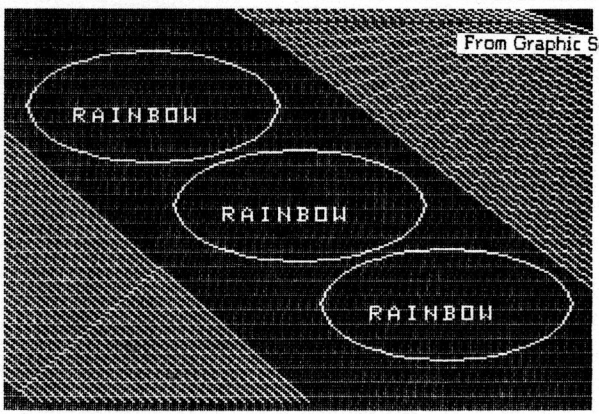

From Graphic Screen Print Program

Editor's Notes...

PRINT #-2,

First of all, I cannot tell the thousands (yes, thousands) of you who wrote with kind words about *the RAINBOW* thank you enough. So many of you took advantage of the subscription renewal offer and also took the time to say kind words to us about our magazine that we're almost willing to extend the offer.

Seriously, those of us here who work pretty hard trying to produce a top-quality magazine you will use and enjoy really do appreciate your comments and good words. We're here to stay and we hope we can show our

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the RAINBOW
PUBLISHED BY FALSOFT, INC.
5803 Timber Ridge Drive
Prospect, KY 40059

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LAWRENCE C. FALK — Editor

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Limited back issues are available for $2 each for issues 1-7, $2.50 each for issues 8 and upward. Shipping and handling costs of $2.50 per order must be added.

Payment accepted by cash, check, money order, VISA or MasterCard in U.S. funds. Please include account number, expiration date and your signature when using bank cards.

The **RAINBOW** is published every month of the year.

PRINT #-2, (From Page 1)

appreciation by continuing to produce a top-flight magazine every month.

* * * * * * *

Some really good news. Beginning next month -- rounding out our first year -- we will begin a three-part series on modeling the National Football League. These programs have been more than 18 months in the making and will run in the June, July and August issues. They'll end just as the regular NFL season starts.

Written by John Waclo, the NFL Modeling series will help you determine who will win (or lose) Sunday's games. While not intended as anything other than entertainment, the point spreads can be programmed in as well. This is a major series which we hope you will enjoy.

* * * * * * *

Also on the good news front, we're in the final planning for something we are calling the *RAINBOW SEAL OF CERTIFICATION*. Simply put, we are tired of hearing stories about people who get ripped off ordering stuff through the mail.

In order to receive the *RAINBOW SEAL OF CERTIFICATION*, a vendor will be required to submit a copy of whatever he or she is selling to us. We'll check it only to the extent that it is what it purports to be. In other words, we'll issue the Seal if someone sends in a monitor program to be sure it *is* a monitor program. But we won't guarantee its suitability to your needs. We hope our reviews will do that.

But, when you see an ad, receive a flyer, or whatever, and you see the Seal, you'll know that the merchandise offered *does* exist. Rest assurred that if anyone uses the Seal without our approval you'll see more than just casual mention of it here, in *the RAINBOW*.

As someone once said, I want to make one thing perfectly clear. There is *no charge whatsoever* to vendors for use of the Seal. Neither is there any requirement that they advertise in this magazine.

We're starting this program for one reason alone -- to provide some measure of protection for mail order sales. And this works both ways: We intend that it will protect the honest vendors as well as you, the buying public.

We hope the Seal will be helpful to you and that you will let people know you use it as a guide, if you choose to do so.

* * * * * * *

We're running along, we know and there are more interesting things in *the RAINBOW* besides what we have to say. But we hope you will welcome Bill Nolan of Prickly-Pear Software as our new columnist on Fantasy and Role-Playing games. And, too, we hope you'll also join us in belatedly welcoming Dennis Lewandowski of DSL Computer Products as our new tutor/columnist on assembly language. Dennis' column, by the way, is in direct response to your interest in *understandable* information on assembly language. Bill takes over for John Urban, who is devoting more time to his business at JARB Software. We wish John well and thank him.

* * * * * * *

Incidentally, you will be seeing more changes (for the better, we hope) in the physical appearance of *the RAINBOW*. And, the plans for those special issues we mentioned last month are moving ahead. One of the main features of the Adventure issue will be a contest -- with a pretty good first prize.

* * * * * * *

Almost finally...we're really sorry, but we can't debug programs for you. Every one of the listings in *the RAINBOW* is run, then listed for printing. We'll never (never say never) typeset them. If there is an error, we'll correct them. If you're having trouble with some of the listings, we suggest you approach each one as a learning experience. And, frankly, debugging your typos is a good way to learn programming. Also, there is *RAINBOW ON TAPE* for those who want the major listings ready to run. It is a good buy.

* * * * * * *

I must admit I had been putting off writing this column because I had been trying in vain to think of some way to explain myself. I can't, so I'll just go ahead and say that. . .

We got a number of letters this month from people who just flat didn't like the nickname we've given to our favorite computer -- CoCo. "It makes it sound like a toy," one reader wrote. Another penned that it made it appear "clownlike."

Heavens to Betsy, Miss Agnes! I thought about all that for a couple of weeks, and I agree. You'll see a change inside *the RAINBOW* this month -- CoCo is gone. In its place is, trumpets please, 80C.

80C? 80C. I sort of thought this up for myself, with a little help from some friends (some as far away as Australia). And the more I thought, the more I came to like 80C.

I know this isn't of great import. But I thought you'd like to know why we changed. (It does sound more computer-like. Doesn't it?)

LETTERS TO RAINBOW™

THOSE ROM SUBROUTINES

Editor:

In response to Ralph Coleman's letter, asking about "canned" routines, I provide the following information:

First of all, I assume he is referring to the ROM subroutines listed in the back of "Going Ahead...", as that is what I'll be illustrating.

Before starting, note there are three errors in the listing of subroutines. BLKOUT is (A008), WRTLDR is A7D8 and POLCAT is (A000).

Note the following hypothetical program we will be using in our illustration:

```
0C00 = BD       A000 = A1
0C01 = A1       A001 = C1
0C02 = C1       A002 = --
0C03 = --
0D00 = AD
0D01 = 9F       A1C1 = 34
0D02 = A0       A1C2 = 14
0D03 = 00       A1C3 = 8D
0D04 = --
```

Of the many addressing modes within the 6809 CPU, two of them are "Extended Direct" and "Extended Indirect."

When we use Extended Direct, we tell the CPU what address to go to and begin execution at that address. If we tell the CPU to EXEC 0C00 (in the program above) it will pick up the instruction BD A1 C1, which is JSR A1C1 (jump to the subroutine which starts at A1C1). When the CPU encounters this instruction, it saves the necessary return address (0C03) on the stack and then loads the program counter with the address A1C1. The program then begins execution at A1C1.

In this case, the instruction is 34 14, which is "push the contents of the X and B registers onto the S stack." It then goes onto the next instruction until it encounters a RTS (return from subroutine). The CPU then pulls the return address (0C03) from the stack and execution continues from that point. In this example, address A1C1 is known as the "effective" address.

To use Extended Indirect addressing, we tell the CPU what address to go to so it can get the effective address. Got that? Neither did I the first ten times around. Here's an example like one Lance Leventhal used to explain it:

With Extended Direct, you go to room A to pick up a clue as to where the treasure is. The clue tells you the treasure is in room C. You go to room C and get the treasure. With Extended Indirect, you go to room A to get a clue as to where the treasure is. The clue says to go to room B to get *another clue*. You go to room B, get the next clue, and it tells you to go to room C to get the treasure. You go to room C and it is there.

In our hypothetical program, if we tell the CPU to EXEC 0D00 it will pick up instruction AD 9F A0 00, which is JSR (A000). Note the parentheses around the address (A000). This is our way of informing the assembler we are using extended indirect addressing. The CPU saves the necessary return address, 0D04 on the stack and then goes to A000 to pick up the effective address. The contents of A000 (and the next byte) are A1C1. The CPU loads this into the program counter and then proceeds to execute the program at A1C1. Note that the CPU did not execute instructions from A000 because there were no instructions there. What was there was the effective address where the CPU was to go to pick up its first instruction.

The program at A1C1 is the same as before. When the program gets to a RTS it will pull the return address from the stack and execution will return to 0D04.

What we have here is two ways to get the same subroutine to run. The extended direct entry is through 0C00 and the extended indirect is through 0D00. So, now, what is the point of all this?

Most of the subroutines listed in the back of "Going Ahead..." do not show the effective address for the subroutines. Instead, the address listed is the extended indirect entry point for the subroutine. If you want to call these subroutines, you must use the extended indirect approach.

JSR POLCAT must be written as JSR (A000) -- (AD 9F 00 00). If you try to enter this subroutine with JSR A000 (BD A0 00), the CPU will expect an instruction there and the program will crash because what is at that location is an effective address and not an instruction. The only exception I have seen in this is WRTLDR. If you want to call it, JSR A7 D8 (BD A7 D8) must be used. If you try it with JSR (A7D8) the program will crash.

To help prevent some confusion, here is a list of the subroutines with their indirect and direct entry points. I would recommend using the direct points because they are faster, easier to keep track of and use less program space.

SUBROUTINE	INDIRECT	DIRECT
BLKIN	(A006)	A7DB
BLKOUT	(A008)	A7F4
WRTLDR		A7D8
CHROUT	(A002)	A282
CSRDON	(A004)	A77C
JOYIN	(A00A)	A9DE
POLCAT	(A000)	A1C1
RESET		A027
CLRSCR		A928

In the above subroutines, RESET is what is entered when you hit the RESET button on the 80C. CLRSCR is entered when you hit the CLEAR button.

I hope this clears some things up and I strongly recommend Leventhal's book, 6809 Assembly Language Programming" for anyone interested in assembly language.

Al Burzynski
San Antonio, TX

COLOR SCRIPSIT

Editor:

I really enjoy reading *the RAINBOW*. Letters are especially enjoyable because many people share clues and hints.

Here is my minor contribution: BASIC programs saved on tape can be read by *COLOR SCRIPSIT* if they have been CSAVEd in ASCII format (CSAVE "filename",A). Non-extended BASIC users can then use the text editing features of *COLOR SCRIPSIT* to edit programs. Extended Basic users already have an editor, but *COLOR SCRIPSIT* provides a global editor which I find

useful to change all occurrances of a program variable.

Jim Work
Midland, MI

NOTE FROM SNAKE

Editor:

The first few ads run for *Snake Mountain Software* were of poor quality (no fault of *the RAINBOW*). The city was hard to read, and some letters written never reached us. The true address is P.O. Box 5722, Raleigh, NC 27650 (not Baleich or Balfigh). If you had written us or ordered something and not received it, please write us again. We are sorry if this has caused any problems.

Mark D. Reeves, President
Snake Mountain Software
Raleigh, NC

80C CLUB

Editor:

I am interested in getting a TRS-80 Color User's club started in the Phoenix, AZ area. If you could, please ask anyone interested to call me at (602) 866-1651 or to write at 246 E. Voltaire Ave., Phoenix, AZ, 85022.

Larry Owen
Phoenix, AZ

BIG COMMENT COMMENT

Editor:

I am sending a simple program for users of Gary A. Davis' interesting *BIG CMNT* program in the March issue.

Users with something other than an Epson printer will want to use a different code, and will probably need to introduce a "return to normal" code at the end of each remark statement.

If your printer uses a different "widen character" code, then the number to change (14) appears in lines 240, 250 and 0624. The print wide character for the Microline 82A is 31, for example.

Some readers may not realize the second program is loaded to tape in the regular way, using (CSAVE "BIG CMNT") or some other name. The CLOADM advice is for the third program.

Readers often complain that directions dealing with machine language programs are not clear -- with some justification. The be specific:

1. Type in the second *BIG CMNT* program.

2. Save it to tape as you would any other BASIC program.

3. When the *BIG CMNT* program is in the computer, type <RUN>. It goes to memory but will still show for the command <LIST>.

4. You may now type in <NEW> or CLOAD a new program without losing *BIG CMNT*. It stays in the computer until you turn it off or put another machine language program in the same memory area.

5. When the program to be coded is in the computer, type <EXEC 1536>. A readout will indicate which lines were coded.

6. If a comment line was not enlarged, edit in a space after the "'". Most people leave a space after "REM", so there should be no problem there.

7. The newly coded program can be saved to tape in the regular <CSAVE> manner.

My simple program will introduce a "return to normal" code at the end of each remark statement -- whether there is a space there or not. You have two choices, (1) Introduce a space at the end of each remark statement before running my program (using "X" extend to edit), or (2) Use my program first and replace any last-position characters lost (displaced) by the return to normal code later. If you use the second method, do not use "X" extend to edit, or you will erase the return to normal code. Instead, use the "I" insert to restore any missing characters.

The return to normal code for the Microline 82A is 30 or 29.

Mr. Davis' program will print out the program numbers which have been changed. When you run my program, input the program numbers which were changed. Press <BREAK> after entering the last number.

The program:

```
10 'PROGRAM FOR ADDING RETURN      TO
   NORMAL CODE
20 'BY JOSEPH P. LARONDA, SOUTHERN
   CONN. STATE COL., NEW HAVEN, CT
   06410
30 INPUT "FIRST LINE CODED";C
40 R=PEEK(25)*256+PEEK(26)
50 X=PEEK(R+2)*256+PEEK(R+3)
60 R=PEEK(R)*256+PEEK(R+1)
70 IF C<>X THEN 50
80 POKE R-2,30
90 INPUT "NEXT LINE CODED";C
100 GOTO 50
```

Joseph P. Laronda
Cheshire, CT

LIKES MPP

Editor:

The "Motion Picture Programming" series is going to be a powerful aid to graphics programming. I use graphics to illustrate my biology lectures and the MPP approach will save me a lot of hours.

Lane P. Lester, Ph.D.
Lynchburg, VA

PRINTER HELP

Editor:

Help! I have a printer (its really a Teletype) that does not automatically LF after a carriage return and does not CR-LF at the end of the line. Does anyone out there know how to write a machine language program that will do the LF and CR-LF for me when I LLIST a program or use PRINT #-2, in a program.

I have been successful in modifying most BASIC programs with a CHR$(10) after the PRINT#-2, statement, but I don't know what to do with an LLIST.

Paul Lee
Hercules, CA

WAR TALK

Editor:

There's a war going on.

Wayne Green said this. Tandy said that. Rainbow says such and such.

No, the Color Computer isn't a toy. And it looks like we have to fight to prove it.

But we're winning.

After a long and dark software and information shortage, the 80C is coming of age. There is wonderful software on the market, there are periodicals to learn from, there are programs to share. A year ago, this was not the case.

There are only a few Tandy Rompaks that I like, but those are good ones. Perhaps if we make enough noise, the Corporation will realize that they do have a narrow advertising and marketing strategy. Perhaps they *will* realize what they've got.

So let the war rage on. But let 80 Microcomputing carry Color Computer articles and advertisers. Let Tandy become aware of the "underground" software and hardware support for the 80C. Its the kind of war nobody loses.

Do we want to "corner the market" or open it up? Personally, I would like to see lots of people go with the Color Computer. We would all benefit from it.

Bob Safir
Los Angeles

LIKES LEWANDOWSKI

Editor:

As a new owner of the 80C and one who is new to computers, I welcome your publication. It is appreciated further that Lewandowski assumes an ignorant past and offers an enlightened future. I look forward to many learning experiences as a result of your magazine.

Denis Maurice
Sault Ste. Marie, Ont.

Word Processing...

A SIMPLE WAY TO PAPER YOUR WORDS

By Oscar Millican

As a long-time subscriber to *the RAINBOW*, I have read all the stories on word processors -- starting with your own "Mini-Word Processor" in the August edition.

At one point I wrote what I call my *POOR MAN'S WORD PROCESSOR* and then, later, added the routines in your program (Vol. I, No. 2) to complete the listing below. I call it the *FALK/MILLICAN WORD PROCESSOR*, and it has a number of features that I consider important in a word processor.

One of the best features of this program is the way in which you can change the margins. For instance, you can begin a letter by setting a margin of 56 for the return address, and then going to a margin of 5 for the inside address and the body of the letter. By using the different margins, you can set left-side and right-side columns, centered columns, or what have you.

(Editor's Note: Mr. Millican is too kind. At best, this is the "Millican/Falk Word Processor", and it is really the "Millican Word Processor." He has taken some general ideas we incorporated into a very unsophisticated program [before there was any word processor on the market and we had to have something with which to do the RAINBOW] and made a nice little program. We hope you will like using it.)

```
10 REM FALK/MILICAN WORD PROCESS
OR
20 CLS:LINEINPUT" RESERVE BYTES
FOR STRING$ ";S$:S=VAL(S$)
30 CLS:PRINT"    "S "BYTES FOR S
TRING$":CLEARS
40 PRINT:PRINT "          SELECT
FORMAT"
50 PRINT:PRINT"     (1) ONE COLU
MN FORMAT"
60 PRINT"     (2) TWO COLUMN FOR
MAT":PRINT
70 LINEINPUT"          ENTER 1 OR
 2 ";F$:F=VAL(F$)
80 ONF GOTO90,320
90 CLS:PRINT"       ONE COLUMN F
ORMAT":N=0
100 LINEINPUT"          SET MARGI
N: ";M$:M=VAL(M$)
110 CLS:POKE1329-2*M,60:PRINT"
  MARGINS SET AT"M"SPACES"
120 IFM>39THENCLS:PRINT"  LEFT M
ARGIN SET AT"M" TYPE     BETWEEN
 MARKERS AND <ENTER>":POKE1329-M
,60:GOTO140
130 PRINT"TYPE UP TO"80-2*M"CHAR
ACTERS BETWEEN      MARKERS AND
<ENTER>"
140 PRINT" TO JUSTIFY, ENTER SPA
CES FROM    LAST SYMBOL TO RIGHT
 MARKER"
150 PRINT"ENTER ^ TO RESET MARGI
N/LINE NO"
160 PRINT"       ENTER @ TO RE-FO
RMAT"
170 X=79-2*M
180 IFM>39THENX=79-M
190 N$=" ":L=4:PRINT@353,"";
200 IFN>0THENPRINT@353," *LINE"N
"PRINTED AS FOLLOWS*"
210 IFN>0ANDM<=39THENPOKE1519-2*
M,30
220 IFN>0ANDM>39THENPOKE1519-M,3
0
230 IFA$="^"THENA$=""
240 PRINTA$:PRINT@224,"";
250 LINEINPUT">";A$:IFA$="^"THEN
90
260 IFA$="@"THEN20
270 IFRIGHT$(A$,1)=" "THENA$=LEF
T$(A$,X):GOTO300
280 PRINT#-2,TAB(M)A$
290 N=N+1:GOTO110
300 B=INSTR(L,A$,N$):C$=LEFT$(A$
,B):E$=RIGHT$(A$,X-B)
310 D$=C$+N$:A$=D$+E$:L=LEN(D$)+
4:GOTO270
320 CLS:PRINT"       TWO COLUMN
FORMAT":N=0
330 PRINT:PRINT"          SELECT
COLUMN"
340 PRINT:PRINT"          (1) LEFT
 COLUMN
350 PRINT"        (2) RIGHT COLU
MN"
360 PRINT:LINEINPUT"          ENT
ER 1 OR 2  ";C$:C=VAL(C$)
370 IFC=1THENY=0:PRINT:PRINT"
       LEFT COLUMN"
380 IFC=2THENY=42:PRINT:PRINT"
       RIGHT COLUMN"
390 PRINT:LINEINPUT"          SE
T MARGINS ";M$:M=VAL(M$)
400 CLS:POKE1287-2*M,60
401 IFC=1THENPRINT" MARGINS (LE
FT COL) SET AT"M"
402 IFC=2THENPRINT" MARGINS (RIG
HT COL) SET AT"M"
410 PRINT"TYPE UP TO"38-2*M"CHAR
ACTERS BETWEEN       MARKERS AND
 <ENTER>"
420 X=37-2*M
430 PRINT" TO JUSTIFY, ENTER SPA
CES FROM    LAST SYMBOL TO RIGHT
 MARKER"
440 PRINT"ENTER ^ TO RESET MARGI
N/LINE NO"
450 PRINT"       ENTER @ TO RE-FO
RMAT"
460 N$=" ":L=3:PRINT@321,"";
470 IFN>0THENPRINT@321," *LINE"N
"PRINTED AS FOLLOWS*":POKE1477-2
*M,30
480 IFA$="^"THENA$=""
490 PRINT:PRINTA$:PRINT@224,"";
500 LINEINPUT">";A$:IFA$="^"THEN
320
510 IFA$="@"THEN20
520 IFRIGHT$(A$,1)=" "THENA$=LEF
T$(A$,X):GOTO550
530 PRINT#-2,TAB(M+Y)A$
540 N=N+1:GOTO400
550 B=INSTR(L,A$,N$):C$=LEFT$(A$
,B):E$=RIGHT$(A$,X-B)
560 D$=C$+N$:A$=D$+E$:L=LEN(D$)+
3:GOTO520
```

PRICKLY - PEAR SOFTWARE
QUALITY PROGRAMS FOR YOUR 16K EXTENDED COCO

Fantasy Gamer's Package
Two programs: The first will display your choice of 99 different rooms in Hi-Res graphics at the touch of a key. All standard sizes, plus some with pools, pillars, stairs, odd shapes, etc. Saves lots of game time spent describing room sizes, shapes, and door locations. Includes a super fast dungeon designing system and a completely keyed sample dungeon module — ready to play. The second program in the package generates **COMPLETE** characters including abilities, race, classes, hit points, age, thieving skills, much more, and also generates monsters. This package was developed by an active DM, and has been tested in his campaign. 20 pages of documentation. **$19.95**

Mathpac I
Finally! A totally flexible, menu-driven set of elementary math programs for the color computer! **MATHPAC I,** developed and tested by an elementary teacher in his own classroom, allows the user to chose the operation (+−*/), difficulty level, number of problems, and a drill or testing format. This program employs sound educational principles, and even includes suggestions for classroom use. **$19.95**

The Great Word Game
Perhaps the best word game ever for Coco. There's great graphics, music, and crisp formatting. Plenty of on-screen instructions. Two to four players compete. If you like Scrabble® and Probe® you'll love this one. **$19.95**

Household Helper
This menu driven program will convert to or from metric, convert recipes to serve more or fewer people, project gasoline cost for trips or around town driving, keep track of your bills coming due, more. **$14.95**

Vinyl covers
Clear, super-heavy upholstery vinyl cut and sewn to **fit.** Color computer, specify if disk system, **$9.95.** Tape recorder or disk, fits Radio Shack, **$5.95.** Printer, specify make and model, **$9.95.** Add **$1.50** shipping, or **$2.50** shipping on a set. These are really nice.

Notice:
It is our policy never to advertise an item unless it is already in our inventory, and ready to be shipped.

NEW THIS MONTH

Viking!
A simulation for 1 to 4 persons. Each begins as a landowner, and by farming their land, buying and selling land, expanding their fishing fleet, building on to their manufactory, increasing their population, equiping and training more soldiers, and regulating their taxes, each player tries to increase their economic power and rank until one becomes ruler over all. But beware plagues, rats, raiders, revolts, bad weather, and other misfortunes which may lie along the road to success. As you progress, see the map of your holdings increase. Playable in 1 to 2 hours, and different every time, you may have an addiction problem. **$19.95**

Starfinder
This astronomical "star" computes the current sidereal time, and converts declination and right ascension to altitude and azimuth — or the other way around. Just enter your latitude and longitude, and the time of day. We include instructions to help you equip your dobsonian or tripod with setting circles. Quit wasting your time looking, and spend more time seeing. **$19.95**

Football
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Tutorial...

USING A GRAPHIC CHARACTER SET FOR THE COLOR COMPUTER

By M. H. Endres

One of the so-called disadvantages of the TRS-80 Color Computer has been the 80C's inability to mix High-Res graphics and text printing on the same screen display. I say "so-called" because it is really quite easy -- simple in fact -- to mix high resolution graphics and high quality 5x7 matrix characters on the CRT (or printer) at the same time.

While a number of other computers do this by hardware switching, character-generating ROMS and complex video timing, we can do the very same thing -- better and with more flexibility -- by using the 80C's very powerful graphics instruction set in Extended Color Basic. We do it "softly!"

Let's start out by looking (and loading) Listing 1. This is your "basic" listing to get a complete (less lower case) character set into your 80C's memory. You can, of course, go right ahead and add the lower case letters just by continuing the DATA statements with the proper strings with which to DRAW the characters desired. Change lines 80 and 90 to reflect the additional data strings to be read in and you will have both upper and true lower case with which to work in a graphics screen mode. I have found that all-caps is adequate for my graphics programs, so I've never bothered to generate the lower case. But if you want it, be my guest!

Listing 1 merely contains a DIM statement, DATA statements that contain the strings that DRAW each character and a read loop that assigns each string a label in a subscripted string called L$(X) in which X just happens (not by accident) to be the decimal number that represents the ASCII character the string will DRAW when called upon. There you are! An indexed list of ASCII characters from <SPACE> to Z developed and stuffed into your 80C's memory much faster than it took to write this down. Beats character-generating ROMS all to heck.

```
10 REM BASIC PROGRAM FORMAT
20 REM GRAPHIC SCREEN CHARACTER
30 REM SET FOR TRS-80C
40 REM BY SOLUS CO.
50 REM BOX 8, SPIRIT LAKE, ID
60 REM 83869..(208) 623-5911
65 '
70 DIML$(90)
80 REM READ ASCII CHAR 32-90
90 FOR Z=32 TO 90:READL$(Z):NEXT
998 GOTO998
999 END
1000 DATA "BR4"
1010 DATA "BR2U0BU2U4BM+2,6"
1020 DATA "BRBU6D2BR2U2BEBD6"
1030 DATA "BRU2LR4LD2BL3BU4RU2D2
R2U2D2RBD4"
1040 DATA "BUR2DUREHL2HERUDR2BD5
"
1050 DATA "BUE4BL3LURDBR3BD5URDL
"
1060 DATA "BR4BU2G2LHE3UHLGDF4"
1070 DATA "BR2BU6D2BR2BD5"
1080 DATA "BR4BU6LGD4FR"
1090 DATA "REU4HLBR4BD6"
1100 DATA "BUE4G2U2D4U2L2R4L2H2F
4BD"
1110 DATA "BU3R4L2U2D4BR2BD"
1120 DATA "BR3BULURD2GBR2BU"
1130 DATA "BRBU3R2BRBD3"
1140 DATA "BR2LURDBR2"
1150 DATA "UE4UBD6"
1160 DATA "BUU4ER2FD4GL2HBR4BD"
1170 DATA "BRBU5ED6LR2BR"
1180 DATA "BU5ER2FDG4R4"
```


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```
1190 DATA "BU5ER2FDGLRFDGL2HBR4B
D"
1200 DATA "BR3U6G3R4BD3"
1210 DATA "BUFR2EUHL3U3R4BD6"
1220 DATA "BU3R3FDGL2HU3E2RBRBD6
"
1230 DATA "BU6R463D3BR3"
1240 DATA "BR4BU2DGL2HUER2L2HUER
2FDGFBD2"
1250 DATA "BUFR2EU4HL2GDFR2BRBD3
"
1260 DATA "BRBURULDBU3RULDBR3BD4
"
1270 DATA "BR2BULURD2GBRBU5LURDB
R2BD4"
1280 DATA "BR4BU663F3"
1290 DATA "BRBU4R2EL2BD2R2BR3BD2
"
1300 DATA "E3H3BR4BD6"
1310 DATA "BU5ER2FD62BD2UBR2BD"
1320 DATA "BU5ER2FD4GL2HUER3BD3"
1330 DATA "U4E2F2D2L4R4D2"
1340 DATA "RU6LR3FDGL2R2FDGL3BR4
"
1350 DATA "BR4BUGL2HU4ER2FDBD"
1360 DATA "RU6LR3FD4GL2BR3"
1370 DATA "U3R4L4U3R4BD6L4R4"
1380 DATA "U3R4L4U3R4BD6"
1390 DATA "BR2BU3R2D2GL2HU4ER2FB
D5"
1400 DATA "U6D3R4U3D6"
1410 DATA "BRR2LU6LR2BRBD6"
1420 DATA "BU2DFR2EU5BD6"
1430 DATA "U6BR463F3"
1440 DATA "R4L4U6BR4BD6"
1450 DATA "U6F2E2D6"
1460 DATA "U6DF4U5D6"
1470 DATA "R4L4U6R4D6"
1480 DATA "U6R3FDGL3BR4BD3"
1490 DATA "BUU4ER2FD4GL2HBR2BU1F
2"
1500 DATA "U6R3FDGL3RF3"
1510 DATA "BUFR2EUHL2HUER2FBD5"
1520 DATA "BU6R4L2D6BR2"
1530 DATA "U6D6R4U6D6"
1540 DATA "BU6D4F2E2U4BD6"
1550 DATA "U6D6E2F2U6D6"
1560 DATA "UE2H2UDF2E2UDG2F2D"
1570 DATA "BU6DF2E2UDG2D3BR2"
1580 DATA "BU6R4D62LR2LG2DR4"
```

As an aside, for those of you who are inclined to adventure, it may have already occurred to you that this method of generating characters is *not* limited to English. How about one for Chinese? Arabic? Hebrew? Whatever? Further, for you logic designers, just a few minutes with graph paper will provide you with a complete set of logic symbols to do layouts "on screen." In fact, you can use this for any written or drawn character or symbol.

Let's play a bit with these newly created characters. Add the lines in Listing 2 to the program you have already loaded, RUN it, and you will display the character set you have just developed. You're "writing" in high-res graphics mode.

```
91 REM ADD THESE LINES
92 REM TO DISPLAY THE CHARACTER
93 REM SET.
95 PMODE4,1
100 PCLS
110 SCREEN1,1
120 X=1:' HORIZ COUNTER
130 DRAW "BM10,10":' HOME UP
140 FOR Z=33 TO 90:' CHAR. CODE
150 DRAWL$(Z)
160 DRAWL$(32):'SPACE RIGHT
170 X=X+1
180 IF X>30 THEN DRAW "BM10,30":
X=1:' SKIP TO NEW LINE
190 NEXT Z
998 GOTO998
```

But how do we *use* this new ability? How do we keep track of what's what? Its tough to look at "BR4BU2DGL2HUER2L2HUER2FDBD2" and say "Aw shucks, I knew that was an 8 all the time!"

Got a printer? DELETE Lines 91 through 190 and add the program lines in Listing 3. RUN it and you will be rewarded with a complete dump of what you have available to use in writing

(Continued on next page)

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GRAPHIC CHARACTERS (From Page 9)

your new, improved and "character-ized" graphics routines. The program will print a listing of the ASCII decimal number, the character generated and the appropriate string to generate it. Save this dump for future reference when you need to "print" in graphics mode.

```
91 REM ADD THESE LINES TO DUMP
92 REM ASCII CODE/CHARACTER
93 REM AND GRAPHIC STRING
94 REM COMPOSITION TO LINE
95 REM PRINTER FOR REFERENCE
96 REM IN OTHER PROGRAMS
100 FOR Z=32 TO 90
110 PRINT#-2,"ASCII #";Z;":CHARA
CTER (";CHR$(Z);") ***GRAPHICS S
TRING(";L$(Z);")"
115 PRINT#-2,:' EXTRA SPACE
120 NEXT Z
```

All the characters in this particular set are developed as 5x7 dot matrix characters and would normally occupy an 8x12 pixel "zone." The extra three pixels to the right of each character are used for spacing and the extra five pixels below each character are used for line to line spacing. These figures are just for reference, however, and are not etched in stone simply because by using our new "printing" on the graphics screen, we may not care about line to line or character to character spacing. We may want to s-t-r-e-t-c-h out our printing or blow it up. We may want it to run diagonally up and down.

In fact, we can do anything we want to with these characters just by specifying a START location. Just remember that all the characters in this set are drawn beginning at the lower left-hand corner of our 5x7 pixel block. After speficying the START location, all that remains is to DRAW the appropriate ASCII-indexed string.

Let's see how it works. First, DELETE lines 91 through 120 from your "basic" program. Now, add the lines in Listing 4. Our specified location is X-128, Y-96 -- smack dab in the middle of the screen. (Please note I am assuming that you are a little familiar with the 80C's graphic commands. If not, this might be a good time to review them in the Extended Basic book.)

```
95 PMODE 3,1
100 PCLS
110 SCREEN 1,1
120 DRAW "BM128,96;XL$(65);"
121 GOTO 121: 'LOOP
```

What the addition of Listing 4 does for us is simply to "print" an A right in the middle of the graphics screen. Simple, huh?

Let's jive it up a bit. EDIT Line

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120 to read: DRAW "S30;BM128,96;XL$(65);"

Can you do this nifty "blow-up" in any standard print-mode that you know of? I cannot think of a single one. Please note that the blown-up letter still *starts* at the same spot on the screen as it did before. In order to re-center the letter in its larger state, the X-Y coordinates of the DRAW statement have to be changed to something like 110,100.

Now, EDIT Line 120 again to read: DRAW "S30;C3;BM110,110;XL$(65);"

Not only have you re-centered the A, you have also changed the color. That's what the C in Line 120 does.

Let's get a little more fancy. DELETE lines 95 through 121 and add the lines in Listing 5. With this addition, we have placed squashed circles on our graphics screen, painted them a pretty color and then, with our graphics character set, printed a "title" in each of the circles we drew. The extra corner color is just for fun!

```
91 REM ADD THESE LINES FOR A
92 REM DEMO OF HOW TO USE THE
93 REM GRAPHICS LETTER SET
95 PMODE 3,1
96 PCLS
97 SCREEN 1,1
100 X=64:Y=48
110 FOR Z=1 TO 3
120 CIRCLE (X,Y),55,4,.5
130 PAINT (X,Y),4,4
140 X=X+64:Y=Y+48
150 NEXT Z
155 A$=L$(84)+L$(32)+L$(73)+L$(3
2)+L$(84)+L$(32)+L$(76)+L$(32)+L
$(69)
160 DRAW "S8;C1;BM30,55;XA$;"
170 DRAW "S8;C2;BM95,103;XA$;"
180 DRAW "S8;C3;BM159,151;XA$;"
190 Y=12
200 FOR X=224 TO 100 STEP -4
210 LINE (X,0)-(256,Y),PSET
220 Y=Y+4
230 NEXT
240 Y=180
250 FOR X=12 TO 132 STEP 4
260 LINE (0,Y)-(X,192),PSET
270 Y=Y-4
280 NEXT
290 GOTO290
```

Look at Line 155. There are several ways we can manipulate our newly found ability to print words on the graphics screen. In Line 155, we have created the word TITLE and called it A$. We did it this way because, as you can see in Lines 160, 170 and 180, we needed to print TITLE three times. This way, I didn't have to dublicate Line 155 each time. Saves memory and typing.

If you need to print the same word more than once, by all means build a string once, label it, and call on the label whenever you need it.

Note the L$(32) in every other string segment. For each character string you print, in order to provide a space between characters, you must call and DRAW L$(32) which is merely "BR4" -- our graphics "space."

Should you know in advance that you will need to spell out a number of words, just add "BR4" to the beginning of each string in the DATA statements -- thereby automatically adding a space to each one. Just remember to start printing four pixel locations to the left of where you want the first character to appear in order to compensate for the leading space.

One absolutely super ability you have with this method of character generation is calculation of character designation. You can actually use a math expression to stipulate what character you want to print. For example, let's go back to our simple letter A printed in the middle of the screen. DELETE Lines 91 through 290 and add those of Listing 6. What happens with this one? Right smack there in the middle of the screen the 80C will print out random characters for you -- as computed by the RND(X) function in Line 111.

```
111 X=RND(90)
112 IF X<33 THEN 111
120 DRAW "S30;C3;BM110,110;XL$(X
);"
122 GOTO100
```

(Continued on Page 13)

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GRAPHIC CHARACTERS (From Page 11)

Now does that give you ideas? It should. You can use it for screen scoring for a game by reading the graphic characters for the numbers into memory at the beginning of the program. Then, when the program needs them, it can DRAW them by the direct index label you've stored them under; DRAW L$(X), where X is the score you wish to print.

For this application, use Listing 7. Note the space ("BR4") is stored as L$(10) for simplicity.

```
5 REM INPUTS STRINGS FOR NUMBERS
6 REM 0 THROUGH 9 ONLY
10 DIM L$(10)
20 FOR Z=0 TO 10:READL$(Z):NEXT
999 END
1000 DATA "BUU4ER2FD4GL2HBR4BD"
1010 DATA "BRBU5ED6LR2BR"
1020 DATA "BU5ER2FDG4R4"
1030 DATA "BU5ER2FDGLRFDGL2HBR4B
D"
1040 DATA "BR3U663R4BD3"
1050 DATA "BUFR2EUHL3U3R4BD6"
1060 DATA "BU3R3FDGL2HU3E2RBRBD6
"
1070 DATA "BU6R4G3D3BR3"
1080 DATA "BR4BU2DGL2HUER2L2HUER
2FDGFBD2"
1090 DATA "BUFR2EU4HL2GDFR2BRBD3
"
1100 DATA "BR4"
```

Where to go from here? Why, let your imagination be your guide.

(EDITOR'S NOTE: For those of you interested in sharing graphics character sets -- Chinese, Arabic, Hebrew, Old English or whatever -- the RAINBOW will be pleased to receive and print them. Please include the sets on tape.)

Software Review...

GREAT WORD GAME IS...WELL...GREAT

THE GREAT WORD GAME is a lot of fun and one of those word games that really grows on you. If you like Scrabble or Probe, then you're sure to be really pleased with this offering (from Prickly-Pear Software, 3518 S. Randi Place, Tucson, AZ, 85730, $19.95).

The plot here is simply that each player (up to four can play at a time) makes up a word and the computer keeps track of it. The other players all try to guess the word -- letter by letter or the whole word -- and the one who does best wins.

While this sounds a lot like a many other word games you have probably seen, this one does it all with style. For one thing, it uses each player's name, hides the mystery letters behind color blocks, and flashes the score from time to time. And, with all the names and so on, *THE GREAT WORD GAME* is one of the most friendly games we've seen. The program really does appear to have a kindly personality all its own.

This one will let you use spaces to confuse your opponents (but not in the middle of words) and really makes you guess. By that I mean if you're using "really" as the mystery word, it only gives one "L" at a time. No going through the vowels to flesh out words quickly with *THE GREAT WORD GAME*!

This one is educational and fun.

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Software Review...

HIGH QUALITY SCREEN PRINT IS EXCELLENT

GRAPHIC SCREEN PRINT PROGRAM (GSPR) is an excellent utility for anyone who wants copies of graphic screens on a piece of paper. We're talking about high-res graphic screens here.

Available from Custom Software Engineering Inc. (807 Minutemen Causeway, Cocoa Beach, FL 32931, $7.95), this program has many advantages over other programs we have seen.

First, and probably most important, it will print graphics from any of the PMODEs, not just the two-color ones. With the other program (from Radio Shack), you are forced to change a program from a four-color mode -- if it is using the four-color screens -- to two-color in order to make it work. *GSPR* also distinguishes between colors by shifting of dot patterns, so you can get a better representation of what a four-color screen looks like. This is really nice!

The program is in machine language, and is simple to relocate anywhere in 32K of memory. The instruction sheets, three pages in all, are easy to follow and make this process easy.

Being a user with the 1.0 ROM, we have one minor problem. *GSPR* does not have a built-in eight-bit driver, so it is necessary to load a driver first. For those with the 1.1 ROM, this is not necessary. We used the eight-bit driver printed in last month's *RAINBOW* and *GSPR* worked like a charm!

The program allows "normal" graphics (exactly like those on the screen) or reverse (the opposite). It is a good program and well worth the small cost.

Software Review...

C.C. PILOT IS A BIT RUDDERLESS

We believe PILOT has many possibilities for Computer Aided Instruction (CAI). For one thing, it is an easy language to learn, is oriented to the question and answer format, and can be used effectively in teaching situations.

From the standpoint of experimenting with PILOT, *C.C. PILOT* (Snake Mountain Software, P.O. Box 5722, Raleigh, NC, 27650) is a good buy at $5.95. It will run on a 4K system and, although in BASIC, executes quickly.

While professionally done as to duplication, the manual which comes with *C.C. PILOT* is something less than impressive. We do not believe you should expect to be taught a

CO-RESIDENT EDITOR/ASSEMBLER (CORES9)

CORES9 is a complete full function editor/assembler package that will allow you to create, edit and assemble 6809 machine language programs for the color computer. It features a powerful full function text editor and supports the entire 6809 instruction set with all addressing modes, forward and reverse lable references, will output object code directly to memory or "CLOADM" compatible tapes and much more.

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language with documentation (especially at this price) but we do believe each function of the program should be explained clearly and in some detail. On the other hand, the program examples do help give some insight to how things work.

We believe CAI is one of the 80C's major strengths and for those interested in PILOT as a tool in this area, this program can certainly whet your interest for more extensive explorations into this area.

Software Review...

CREATAVADER GIVES OPTIONS GALORE

We know, you *don't* hate little creatures from outer space, but that's about all the Space Invader games give you to blast away at. And then there was Snail Invaders. But snails are pretty harmless.

Now, however, whether your dislike is Communists, whales, those little smiling yellow "Have A Good Day" faces, cats or your mother-in-law, you can blast away to your heart's content at something that really bugs you with *CREATAVADER* from Illustrated Memory Banks (P.O. Box 289, WIlliamstown, MA, 01267, $18.95).

CREATAVADER works on the Space Invader principle, but gives you a choice of lots of different things to shoot at. No matter what is your pet hate, you can probably find it here with this program. And if you can't, you can create your own targets with it using a simple built-in drawing function. Draw one, and there is a whole screen full of them to shoot at.

Written in Extended Basic, *CREATAVADER* isn't as fast as a machine language program, but it more than makes up for that in creativity. The routines used for the Snail Invaders program which was listed in the March issue of *the RAINBOW* have been sharpened and the program works flawlessly.

This is one that definitely should be in your library.

Software Review...

SCEPTER OF KZJRGLA FUN TO SEEK

When last we went adventuring, it was in this dungeon and there were all these creatures, poison gas, trap doors, walls and we were looking for a scepter that would give us control of the kingdom.

SCEPTER OF KZIRGLA is a low-res graphics adventure game that can be a great deal of fun and has some real-time action that makes it almost arcade-like in some respects. Available from Rainbow Connection Software (3514 6th Place NW, Rochester, MN 55901, $16.95 tape, $21.95 disk; $2 discount to all *Rainbow* subscribers), this is of the same ilk as *QUEST* (April issue) in that it uses graphic representations for the adventurers rather than words alone.

The story is simple, you have to make your way through a 13-level dungeon to get to the scepter. Along the way there are all kinds of creatures, possible treasures and waiting traps. Sometimes, you have to hammer your way through a wall. Your position is shown on the screen by a color block, and all the various other things are shown by other blocks. You have to make your way through 13 rooms (one on each level) to get to the scepter.

The fighting is the best. You are usually attacked quickly by some sort of creature and you have to act fast, otherwise he (she or it) gets the first -- and maybe subsequent -- blows in. This fighting is in real-time and is pretty authentic.

There is good sound in the program and there are a few special things. The whole adventure is explained well in four pages of documentation. And, there is a flying carpet, a couple of spells you can cast, and the like.

SCEPTER OF KZIRGLA is a good buy.

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Education...

GET READY FOR FINALS WITH TESTEM

By Jorge Mir
RAINBOW Utilityman

Its about the time for the school year to be ending, and so the *RAINBOW Utilityman* can think of no better utility for this important month than a way to help all our reader-students do the best they can on their final exams.

So, here's a program called *TESTEM*, which aids in learning many different types of data and should be quite useful for anyone trying to learn or memorize data.

For that matter, it will probably have some useful aspects for teachers, too. One of the worst tasks we've come up against is thinking up "wrong" answers for multiple choice tests. This program, through one of its applications, will do that for you, too.

To explain how *TESTEM* works, we will assume you want to learn the names of the states and their capitals.

When you RUN the program, you are presented with a menu of *TESTEM*'s various functions. The first thing you must do is select Item 1, which allows you to enter the data (states and capitals in this case).

The program then asks you for Subject One and Subject Two. You can enter the word "States" for Subject One and the word "Capitals" for Subject Two.

Next, you are prompted to enter the data. As Item 1 under the subject "states," you would enter the word "Alabama" and under the subject "capitals" you would enter the word "Montgomery." Item 2 could be "Alaska" and "Juneau", etcetera, until all states and their capitals are entered.

Once you have finished entering data, press <ENTER> when prompted for additional input. The program will return to the main menu.

It is best to save your data before going on. The menu gives you a choice as to whether you want to save data to disk or tape. If you have previously stored data on disk or tape, you can select the appropriate item number from the menu and load that data into memory.

You have other options before you run the program. You can list the data to review it before you begin the test or you can edit the data for any reason you want. If you choose to edit, you are asked for a subject (a state in our example) and the program then searches for that item and its related answer. You are then requested to reenter the data, replacing the old information.

Once you are satisfied the data is correct, you can choose to be tested.

The program gives you a choice as to whether you want to be tested on a "multiple choice" or "fill in the blank" basis. Multiple choice is the easiest of the two; with fill in the blank, you must spell the proper response correctly.

You are also given the choice of being tested on subject one or subject two. In other words, do you want to be asked the capitals or the states?

This gives you added flexibility in how the test is conducted and gives you a better opportunity to review your knowledge of the data.

You can end the program before all questions are asked by entering an "S" under fill in the blank or <ENTER> in multiple choice. The program asks whether you want to end the session to allow you to proceed in the event you accidentally pressed an incorrect key.

If you give an incorrect response as your answer, *TESTEM* will display the proper answer. And, you will see the question again, with a reminder that the first time you answered it it you answered wrong.

Once you answer an item correctly, it will not be asked again.

When all items have been answered correctly, the program displays the number of tries you took to get them all right.

Obviously, this program has hundreds of applications.

```
10 CLEAR5000:GOSUB 200
20 CLS:PRINT TAB(12)"TESTEM"
30 PRINT TAB(12)"------"
40 PRINT:PRINT"    1 - ENTER NEW
 DATA"
50 PRINT"    2 - LOAD CASSETTE F
ILE"
60 PRINT"    3 - LOAD DISK FILE"
70 PRINT"    4 - EDIT DATA"
80 PRINT"    5 - REVIEW DATA"
90 PRINT"    6 - SAVE TO CASSETT
E"
100 PRINT"    7 - SAVE TO DISK"
110 PRINT"    9 - EXIT TO BASIC"
120 PRINT"    0 - START TEST"
130 I$=INKEY$:IF I$=""THEN130
140 I=VAL(I$):IF I<0 OR I>9 THEN
 130
```

(Continued on Page 18)

TESTEM (From Page 17)

```
150 IF I=0 THEN 230
160 ON I GOTO 1550,1700,1750,189
0,1990,2090,2130
170 CLS:PRINT"THANKS FOR PLAYING
 WITH ME."
180 PRINT:PRINT"I HOPE YOU ENJOY
ED LEARNING     ABOUT "Q1$" AND
"Q2$"."
190 END
200 DIM A(100),C$(100),S$(100)
210 FOR I=1 TO 100:A(I)=0:NEXT I
:G=0:N=0
220 RETURN
230 CLS:PRINT"YOU HAVE YOUR CHOI
CE OF FILL-IN OR MULTIPLE CHOICE
 QUESTIONS"
240 PRINT:INPUT"WOULD YOU LIKE T
O FILL-IN THE   ANSWERS (Y OR N)
";Z$
250 IF Z$="Y" THEN 300
260 CLS:PRINT"********MULTIPLE C
HOICE*********"
270 PRINT"ANSWER EACH QUESTION W
ITH A 1,  2, 3, OR 4."
280 X=1:PRINT"TO STOP TYPE 0 (A
ZERO) FOR     YOUR ANSWER."
290 GOTO 340
300 CLS
310 PRINT"************FILL-IN***
**********"
320 PRINT"YOU MUST SPELL EXACTLY
 "
330 X=2:PRINT:PRINT"TO STOP TYPE
 'S' FOR YOUR ANSWER"
340 REM
350 PRINT"YOU HAVE YOUR CHOICE A
S TO      WHICH ITEM YOU WANT TO
 BE ASKED AND WHICH ITEM YOU WAN
T TO      ANSWER:"
360 PRINT TAB(5) Q1$", OR"
370 PRINT TAB(5) Q2$
380 PRINT:FRINT"IS "Q1$" WHAT YO
U WANT"
390 INPUT"TO BE ASKED (Y/N)";Z$
400 Y=2
410 IF Z$="Y" THEN Y=1
420 CLS
430 REM***PICK A Q1$***
440 FOR I=1 TO 10
450 R=RND(NN)
460 IF A(R)<>2 THEN 520
470 NEXT I
480 REM***DON'T WASTE TIME PICKI
NG
490 FOR R=1 TO NN
500 IF A(R)<>2 THEN 520
510 NEXT R:GOTO 1330
520 IF A(R)=1 THEN PRINT"YOU MIS
SED THIS QUESTION BEFORE,LET'S T
RY IT AGAIN."
530 IF A(R)=1 THENSOUND 100,2:SO
UND 150,2:SOUND 200,5
540 PRINT
550 IF X=1 THEN 690
560 REM **** FILL-IN SECTION
570 IF Y=2 THEN 620
580 A$=C$(R)
590 PRINT"WHAT IS THE ANSWER FOR
:"
600 PRINT S$(R);
610 GOTO 650
620 A$=S$(R)
630 PRINT"'' C$(R)''"
640 PRINT'IS THE CORRECT ANSWER
FOR:"
650 INPUT Z$
660 IF LEN(Z$)=1 THEN 1290
670 IF Z$=A$ THEN 1230
680 GOTO 1160
690 REM***MULTIPLE CHOICE SECTIO
N
700 REM***THE VALUE OF C IS CORR
ECT ANSWERS
710 C=RND(4)
720 REM***PICK 4 Q1$ FOR THE CHO
ICES
730 FOR I=1 TO 4
740 B(I)=RND(NN)
750 NEXT I
760 B(C)=R
770 REM***MAKE SURE THEY ARE DIF
FERENT
780 IF B(1)=B(2) THEN 730
790 IF B(1)=B(3) THEN 730
800 IF B(1)=B(4) THEN 730
810 IF B(2)=B(3) THEN 730
820 IF B(2)=B(4) THEN 730
830 IF B(3)=B(4) THEN 730
840 IF Y=2 THEN 990
850 REM ***PRINT Q2$ CHOICES
860 FOR H=1 TO 4
870 PRINT H;
880 IF LEN(C$(B(H)))>29 GOTO 900
890 PRINT C$(B(H)):GOTO 950
900 SP=28
910 IF MID$(C$(B(H)),SP,1)=" " T
HEN 930
920 SP=SP-1:GOTO 910
930 PRINT MID$(C$(B(H)),1,SP)
940 PRINTTAB(3) MID$(C$(B(H)),SP
+1)
950 NEXT H
960 PRINT:PRINT"WHICH OF THE ABO
VE IS THE RIGHT ANSWER FOR:"
970 PRINT"''S$(R)''?"
980 GOTO 1120
990 REM***PRINT Q1$ CHOICES***
1000 FOR H=1 TO 4
1010 PRINT H;
1020 IF LEN(S$(B(H)))>29 THEN 10
40
1030 PRINT S$(B(H)):GOTO 1090
1040 SP=28
1050 IF MID$(S$(B(H)),SP,1)=" "
THEN 1070
1060 SP=SP-1:GOTO 1050
1070 PRINT MID$(S$(B(H)),1,SP)
1080 PRINT TAB(3)MID$(S$(B(H)),S
P+1)
1090 NEXT H
1100 PRINT:PRINT"WHICH OF THE AB
OVE IS THE RIGHT ANSWER FOR:"
1110 PRINT TAB(4)"''C$(R)''"
1120 I$=INKEY$:IF I$="" THEN 112
0
1130 Z=VAL(I$)
1140 IF Z<1 OR Z>4 THEN 1290
1150 IF Z=C THEN 1230
1160 A(R)=1
1170 PRINT:PRINT"WRONG!!! THE CO
RRECT ANSWER IS:"
1180 IF Y=1 THEN AA$=C$(R) ELSE
AA$=S$(R)
1190 PRINT:PRINT "     "AA$
1200 SOUND 50,5
1210 FOR H=1 TO 3000:NEXT H
1220 CLS:GOTO 1260
1230 A(R)=2:N=N+1
1240 CLS:PRINT"RIGHT! YOU HAVE"N
"CORRECT"
1250 SOUND 200,1
1260 PRINT:G=G+1
1270 IF N<50 THEN GOTO 430
1280 GOTO 1330
1290 INPUT"DO YOU WANT TO STOP";
Z$
1300 IF LEFT$(Z$,1)="Y" THEN 133
0
1310 PRINT "ANSWER THE LAST QUES
TION AGAIN"
1320 ON X GOTO 1120,650
1330 PRINT
1340 PRINT"YOU ANSWERED"N"RIGHT
IN ONLY"
1350 PRINT G"GUESSES"
1360 INPUT"WOULD YOU LIKE TO TRY
 AGAIN";Z$
1370 IF LEFT$(Z$,1)="Y" THEN GOS
UB 210:GOTO 230
1380 GOTO 20
1390 CLS:FOR XX=1 TO NN
1400 PRINT S$(XX)" = "C$(XX)
1410 IF XX/14<>INT(XX/14)THEN 14
50
1420 PRINT @480," <PRESS ANY KEY
 TO CONTINUE>";
1430 IF INKEY$=""THEN1430
1440 CLS
1450 NEXT XX
1460 PRINT:PRINT"*****END OF LIS
T TO TEST******"
1470 IF INKEY$="" THEN 1470
1480 CLS:PRINT"DO YOU WANT TO RE
VIEW DATA      AGAIN?"
1490 I$=INKEY$:IF I$="" THEN 149
0
1500 IF I$="Y" GOTO 1390
1510 GOTO 20
1520 DIM A(100),B(4),C$(100),S$(
100)
```

```
1530 FOR I=1 TO 100:A(I)=0:NEXT
1540 RETURN
1550 CLS '***ENTER DATA***
1560 PRINT"ENTER SUBJECT ONE:"
1570 INPUT Q1$
1580 PRINT"ENTER SUBJECT TWO:"
1590 INPUT Q2$
1600 NN=1
1610 CLS:FOR X=1 TO 2
1620 PRINT"ITEM NO."NN
1630 PRINT:PRINT Q1$":"
1640 INPUT S$(NN)
1650 IF S$(NN)="" THEN NN=NN-1:G
OTO20
1660 PRINT:PRINT Q2$":"
1670 INPUT C$(NN)
1680 NN=NN+1:GOTO 1610
1690 GOTO 20
1695 REM*** FILE STORAGE AREA **
1700 CLS:INPUT"FILE NAME";NN$
1710 NN$=NN$+"/TST"
1720 PRINT:PRINT"PRESS ANY KEY W
HEN RECORDER IS  READY."
1730 IF INKEY$=""THEN1730
1740 DV=-1:GOTO 1800
1750 CLS:INPUT"FILE NAME";NN$
1760 NN$=NN$+"/TST"
1770 PRINT:PRINT"PRESS ANY KEY W
HEN DISK IS READY"
1780 IF INKEY$=""THEN1780
1790 DV=1
1800 OPEN"I",DV,NN$
1810 INPUT#DV,NN
1820 INPUT#DV,Q1$
1830 INPUT#DV,Q2$
1840 X=0
1850 X=X+1:INPUT#DV,S$(X)
1860 INPUT#DV,C$(X)
1870 IF EOF(DV)=0 THEN 1850
1880 CLOSE DV:GOTO20
1890 CLS:PRINT TAB(10)"EDIT MODE

1900 PRINT:PRINT Q1$;:INPUT SR$
1910 FOR X=1 TO NN
1920 IF SR$=S$(X) THEN 1940
1930 NEXT X:GOTO20
1940 PRINT:PRINT Q2$": "C$(X)
1950 PRINT:PRINT"REENTER DATA:"
1960 PRINT Q1$;:INPUT S$(X)
1970 PRINT Q2$;:INPUT C$(X)
1980 X=NN:GOTO 20
1990 CLS:PRINT Q1$" AND "Q2$
2000 FOR X= 1 TO NN
2010 PRINT S$(X)" = "C$(X)
2020 IF X/14<>INS(X/14) THEN 205
0
2030 PRINT @480," <PRESS ANY KEY
 TO CONTINUE>";
2040 IF INKEY$=""THEN 2030 ELSE
CLS:PRINT Q1$" AND "Q2$
2050 NEXT
2060 PRINT @480,"     < END OF L
IST >";
2070 IF INKEY$=""THEN 2070
2080 GOTO 20
2090 CLS:INPUT"FILE NAME";NN$
2100 PRINT:PRINT"PRESS ANY KEY W
HEN RECORDER IS  READY."
2110 IF INKEY$=""THEN 2110
2120 DV=-1:GOTO 2170
2130 CLS:INPUT"FILE NAME";NN$
2140 PRINT:PRINT"PRESS ANY KEY W
HEN DISK IS READY"
2150 IF INKEY$=""THEN 2150
2160 DV=1
2170 NN$=NN$+"/TST"
2180 OPEN"O",DV,NN$
2190 PRINT#DV,NN:PRINT #DV,Q1$:P
RINT#DV,Q2$
2200 FOR X=1 TO NN
2210 PRINT#DV,S$(X)
2220 PRINT#DV,C$(X)
2230 NEXT X
2240 CLOSE DV:GOTO20
```

LAP-CRADLERS UNITE!

Editor:

Enjoyed your article on a "Desk For CoCo," but what about us lap cradlers -- we folk who like to lay back in a comfortable recliner with that Lil Ole Console in the lap and the left eye on the basketball game on the other TV set 16 feet away? Surely we must be a substantial minority.

Paul Siegal, Ph.D.
University, AL

(Ed's Note: Dr. Siegal attached a snapshot of a small console he uses. Its in color, and we're sorry that we do not yet have the capability of reproducing it.)

-- Available June 1, 1982 --

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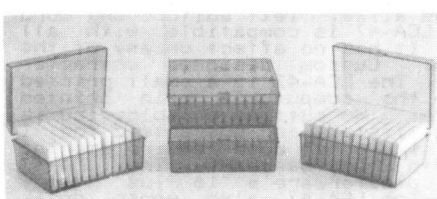

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Report...

80C HAS A PLACE AT COMPUTER FAIRE

By Brian James

Can a Color Computer owner find happiness (and software) at the giant West Coast Computer Faire held in San Fransisco (March 19-21)?

As I walked into the Civic Center I expected a lot of Apples and IBMs, and in this respect I wasn't disappointed. However, there were some 80CC's here and there among the 600-plus exhibits and some of the new software and hardware looked very useful.

The award for the most sneaky use of the 80CC goes to an *exclusive* IBM software dealer. On his front table between two new IBM PC's sat a Radio Shack color TV with an outstanding display about IBM software. The display, of course, was being run by Tandy's *ART GALLERY* software package and an 80CC hidden under the table!

I spoke with Tim Hayes of Seebree's Computing. He apparently did not know that his speedup POKES do not work on all versions of the 80CC (does he read *the RAINBOW*?), and he promised to make some conversions to his software. Seebrees sells a flight simulator and a number of other games for the 80CC.

Kraft Systems was displaying a heavy duty joystick with selectable spring return centering, free-floating operation and more. Kraft said their 80C joysticks will be available in one or two months for $65.

The *TELEWRITER* program was on prominent display by Berkeley Microcomputer and the "Word Processing Lowerkit" was being sold by two other vendors. Dennis Kitsz was around to answer questions about the Lowerkit.

Ron Levine Software was selling *BWINDO*, a smart disassembler and cross-referencer with many unique features. Votrax was using an 80C to show off *Type-'N'-Talk*, a $375 speech synthesizer that was very understandable.

Scott Adams' Adventure International had a very large display, including two new 80C games and "Star Trek." The AI price list had two other 80C games -- *SPACE INTRUDERS* and *COLOR CRAPS*.

It appears Albrecht's *TRS-80 COLOR BASIC* book is just about to become available. John Wiley and Sons displayed the cover of the new

book, but no book. It should be ready by now.

No doubt the most interesting 80C display was found at George Associates. On display was an expansion unit that used a Z-80A software base and could run CP/M, FLEX and OS-9 software. The dual-density floppy disk controller supports up to 800K per diskette. The 80C was running an 80x25 display on a nine-inch monitor. The expansion unit plugs into the 80C without modification. It had a special show price of $1,268 with deliveries expected to begin in mid-July.

There were a number of other 80C displays -- including Exatron, Radio Shack with *Color Scripsit, Cube Puzzle* and *Audio Spectrum Analyzer* and I am sure some that I missed. At least one vendor was selling software from Computerware and others had memory upgrades.

A word should be said for the keynote address by Seymour Papert, author of the LOGO language. Papert said the major reason for the language is to teach young persons and that -- although there have been high hardware costs -- it can run on a system in the $500 price range. Someone should look into it for the 80C.

Software Review...

CMAILIST HAS MANY FINE FEATURES

For anyone who has a club membership list, wants to send Christmas or other kinds of cards, a mail list program is a good way to make your 80C a very useful tool.

And, with software like *CMAILIST*, the creation and maintenance of a mailing list is easy and effective.

For $19.95 (from Peacock Ent., Pheasant Run Box 494, RD#3, Canastota, NY, 13032) you can not only create and maintain medium-sized mailing lists, but -- in the 32K version -- set up a tickler file that will allow you to always "remember" Uncle Donald's birthday is in October.

CMAILIST lets you enter and print out files of names, addresses and (in 32K) telephone numbers. It also has search features which allow you to extract specific records of a certain type and, also in 32K, has that "tickler" system which will let you enter in the month of the birthday of anyone and have a label printed out for everyone whose birthday falls in the month you select!

Because *CMAILIST* has the ability to search any of its fields, you can "hunt" for people you remember from a list. Are you going on a visit to Detroit and want to call up those nice people from the Motor City you met when you were both vacationing in Indianapolis last year? Just ask the program to find all the people who live in "Detroit", their names -- and address -- will come back to you quickly.

The program has an automatic save to tape feature, which means it is really difficult to lose your records. And, it will print out both mailing and return address labels -- one beside or right after the other for easy application to envelopes.

Alan Morgan, who authored the program, is also to be complimented for the written documentation. It leads the user through the many functions of this mini-data base and does it easily.

Subscribers and readers of *the RAINBOW* can claim a 20 percent discount on the retail price.

---

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FRP Games Aids...

HERE ARE SOME NEW FRP ROUTINES

By Bill Nolan
RAINBOW Columnist

(EDITOR'S NOTE: Bill Nolan joins the RAINBOW's staff of writers as the new Fantasy-Role Playing Game columnist. An experienced programmer and FRP player -- there's a rumor he changes into a Dungeon Master on a weekly basis -- he will share a number of new directions in this series.)

Hello, fantesy game fans. This is the first of what I hope will be a long series of columns about using the 80C as an aid in fantasy gaming.

Who am I? Well, my name is Bill Nolan, I live in Tucson, AZ, and I DM a game of Dungeons & Dragons every Friday night. I also write software for Prickly-Pear Software here in Tucson, and some of the ideas I present here have been used in some of my programs available for sale.

Each month I will try to present one good routine for you to type into your 80C dealing with a different aspect of the game. Since the only fantasy game with which I can claim familiarity is D&D, I am sure my bias will show. If there is enough interest in the idea, I'll write a menu to drive these routines and devote a column to that, so you could end up with a pretty complete program. Kind of a patchwork quilt.

This month you get two programs; one short, and one longer. The first short one is addressed to a need I have seen expressed in letters to *the RAINBOW* about a good way to roll the basic six characteristics of a D&D character.

The program below (Listing 1) does it by using Method I from Page 11 of the DM's Guide. It rolls four six-sided dice, throws out the lowest, and records the total of the three others in a small array. After doing this six times, the program returns to the array and prints out the six values.

```
10 CLS:CLEAR:DIM DA(17,7)
20 FOR X=1 TO 17:FOR Y=0 TO 7:RE
AD DA(X,Y):NEXT Y:NEXT X
30 CLS:PRINT@65,"";:INPUT "ENTER
 THE LEVEL";L
35 PP=DA(L,0):OL=DA(L,1):FT=DA(L
,2):MS=DA(L,3):HS=DA(L,4):HN=DA(
L,5):CW=DA(L,6):RL=DA(L,7)
40 PRINT@97,"";:INPUT "ENTER THE
 DEXERITY (9-18)";D
45 D=D-8:ON D GOSUB 200,210,220,
230,240,240,240,250,260,270
50 CLS:PRINT@67,"HIT THE NUMBER
OF THE RACE.";:PRINT@99,"1. DWAR
F":PRINT@131,"2. ELF":PRINT@163,
"3. GNOME":PRINT@195,"4. HALF-EL
F":PRINT@227,"5. HALFLING":PRINT
@259,"6. HALF-ORC":PRINT@291,"7.
 HUMAN"
60 K$=INKEY$
70 K$=INKEY$:IF K$="" THEN 70
80 K=VAL(K$):IF K<1 OR K>7 THEN
70
90 ON K GOSUB 100,110,120,130,14
0,150,160:GOTO 500
100 OL=OL+10:FT=FT+15:CW=CW-10:R
L=RL-5:RETURN
110 PP=PP+5:OL=OL-5:MS=MS+5:HS=H
S+10:HN=HN+5:RETURN
120 OL=OL+5:FT=FT+10:MS=MS+5:HS=
HS+5:HN=HN+10:CW=CW-15:RETURN
130 PP=PP+10:HS=HS+5:RETURN
140 PP=PP+5:OL=OL+5:FT=FT+5:MS=M
S+10:HS=HS+15:HN=HN+5:CW=CW-15:R
L=RL-5:RETURN
150 PP=PP-5:OL=OL+5:FT=FT+5:HN=H
N+5:CW=CW+5:RL=RL-10:RETURN
160 RETURN
200 PP=PP-15:OL=OL-10:FT=FT-10:M
S=MS-20:HS=HS-10:RETURN
210 PP=PP-10:OL=OL-5:FT=FT-10:MS
=MS-15:HS=HS-5:RETURN
220 PP=PP-5:FT=FT-5:MS=MS-10:RET
URN
230 MS=MS-5:RETURN
240 RETURN
```

(Continued on Page 24)

TEXT EDITOR

by John Waclo

WORD PROCESSOR FOR THE COLOR COMPUTER
✲Reviewed in RAINBOW AND CCN✲

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ROLE-PLAYING GAMES (From Page 23)

```
250 OL=OL+5:RETURN
260 PP=PP+5:OL=OL+10:MS=MS+5:HS=
HS+5:RETURN
270 PP=PP+10:OL=OL+15:FT=FT+5:MS
=MS+10:HS=HS+10:RETURN
500 PRINT@67,"PICK POCKETS ----
 ";PP
510 PRINT@99,"OPEN LOCKS ------
 ";OL
520 PRINT@131,"FIND TRAPS ------
  ";FT
530 PRINT@163,"MOVE SILENTLY ---
  ";MS
540 PRINT@195,"HIDE IN SHADOWS -
  ";HS
550 PRINT@227,"HEAR NOISE ------
  ";HN
560 PRINT@259,"CLIMB WALLS -----
  ";CW
570 PRINT@291,"READ LANGUAGES --
  ";RL
580 PRINT@355,"WANT TO GO AGAIN?
 (Y/N)";
590 K$=INKEY$
600 K$=INKEY$:IF K$="" THEN 600
610 IF K$="Y" THEN 30 ELSE END
800 DATA 30,25,20,15,10,10,85,0,
35,29,25,21,15,10,86,0,40,33,30,
27,20,15,87,0,45,37,35,33,25,15,
88,20,50,42,40,40,31,20,90,25,55
,47,45,47,37,20,92,30,60,52,50,5
5,43,25,94,35
810 DATA 65,57,55,62,49,25,96,40
,70,62,60,70,56,30,98,45,80,67,6
5,78,63,30,99,50,90,72,70,86,70,
35,99.1,55,100,77,75,94,77,35,99
.2,60,105,82,80,99,85,40,99.3,65
,110,87,85,99,93,40,99.4,70,115,
92,90,99,99,50,99.5,75
820 DATA 125,97,95,99,99,50,99.6
,80,125,99,99,99,99,55,99.7,80
```

As stated in the DM's Guide, the player should be allowed to arrange the resulting list of six scores in whatever order desired. Like most of the programs I will present here, this one does the job intended -- but without a lot of fancy graphics or error-trapping. (We have to save something for our commercial products!)

You will notice that three of the lines in this program consist of multiple IFs, connected by ANDs (Example: IF the first die is equal to OR smaller than the second die AND equal to OR smaller than...etc.). Following the IF statement, your 80C will test the condition you give (IS the first die equal to or smaller than the second?). If the condition is true, it returns a 1, if false a 0. When there are two conditions or more connected by AND statements, the 80C compares the value returned, and *ALL* must be 1's in order for the final result to be 1.

With the OR statement, however,

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any one of the values returned can be a 1 and the result will be a 1. Like this:

```
        1                 0
 AND    1          AND    1
----------        --------
 equal  1          equal  0

        1                 1
  OR    1           OR    0
----------        ---------
 equal  1          equal  1
```

This is called Boolean Alegbra and there is an excellent discussion of it in the back of the *Getting Started* manual that came with your computer. To handle the more complex if-then-and-or-else sets used to create good D&D programs requires some understanding of these concepts.

The second program (Listing 2) computes the thieving ability scores for any thief from 1st to 17th level (17th level is the highest shown in the Player's Handbook table on thieving abilities, page 28). After checking the level, the program figures in any dexterity and racial adjustments needed before printing out the results.

```
9999 X=RND(TIMER)
10000 CLS:FOR C=1TO6:D1=RND(6):D
2=RND(6):D3=RND(6):D4=RND(6)
10010 IF (D1=<D2) AND (D1=<D3) A
ND (D1=<D4) THEN C(C)=D2+D3+D4:G
OTO 10050
10020 IF (D2=<D1) AND (D2=<D3) A
ND (D2=<D4) THEN C(C)=D1+D3+D4:G
OTO 10050
10030 IF (D3=<D1) AND (D3=<D2) A
ND (D3=<D4) THEN C(C)=D1+D2+D4:G
OTO 10050
10040 C(C)=D1+D2+D3
10050 NEXT C:PRINTC(1):PRINTC(2)
:PRINTC(3):PRINTC(4):PRINTC(5):P
RINTC(6)
10060 PRINT"GO AGAIN (Y/N)"
10070 K$=INKEY$
10080 K$=INKEY$:IF K$="" THEN 10
080
10090 IF K$="Y" THEN 10000 ELSE
END
```

This program will give exactly the same results you could have had if you wanted to take paper and pencil (ugh!) and figure the abilities using the Player's Handbook (or other official source). I think that consistancy from campaign to campaign is important to the game, so I will try to take no liberties with the numbers. If I do, I know that some kind soul out there will be sure to let me know.

If you do have complaints, write me at P.O. Box 4577, Mecca, Saudi Arabia. However, if you have comments or suggestions, send a note to me at Prickly-Pear Software, 3518 S. Randi Place, Tucson, AZ, 85730. If you want a reply, please enclose a S.A.S.E.

Till next month...May all your dragons be still in the egg.

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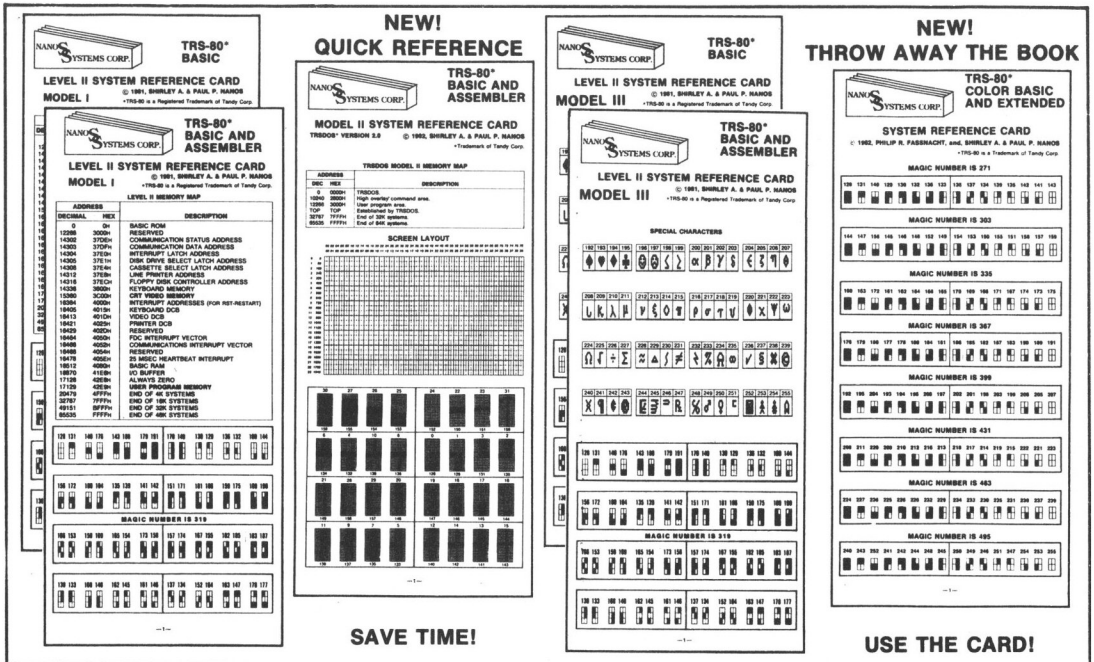

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GETTING TOGETHER IN 80C USER'S GROUPS

By Dick White

The single most pressing need that any serious computer owner has is for information. Possibly next is encouragement and the comfort that comes with working with others who are doing similar things.

For most readers of *the RAINBOW*, the 80C is a hobby and the association with others can make it all the more rewarding. For those who hope to profit from their machines, information gained from others can be invaluable. These are all reasons why people get together to form User or Special Interest Groups.

In the computer area, there are a variety of these groups with diverse interests. Some have interest in computers in general, others serve a single brand, such as TRS-80's or Apples. Still others focus on a specific machine.

In the Cincinnati area, where I live, we have all these groups and are actively developing a COSIG (Color Computer Special Interest Group) as a part of CINTUG (Cincinnati TRS-80 User's Group). Here, we see very satisfying results from both the CCSIG and CINTUG in terms of member interest and membership growth. My comments reflect, in part, some of the things we have learned.

First, remember Pogo, who said "We have met the enemy and they are us." Indeed, if you are wondering why *they* don't get something going in your area for 80C owners, remember that "they" includes *you*.

Start out by going to some User's Group meetings. Sure, you may be the only 80Cist among them now, but you will learn a lot of things that apply to you, too. Bring 80C to the meetings and show fellow members what it can do! Seeing some *TELEWRITER* text on the screen after a rousing game of *PAC ATTACK* will convince the other members you belong.

Even though you may be the only 80C owner there, you've already taken the first step. Then, get some letters off to magazines like *the RAINBOW*. They'll publish them along with your name and address.

(Ed. Note: Its the RAINBOW's policy to help 80C Clubs in any way we can!)

You should also make yourself known to the Radio Shack store managers and Computer Center people in your area and be sure they get meeting notices when your group starts to function. While they cannot tell you who has purchased a 80C in your area, they can and generally will pass on your name and telephone number to others.

This is especially true if you do a good job of selling yourself and your intentions and make the Radio Shack people feel welcome to become a part of the group on a personal basis. Don't expect Radio Shack to provide official blessing for the group or to come up with any financial support. That is against company policy, which is theirs -- and not ours -- to make. Don't put a Radio Shack employee in the position of having to turn down a request that you knew they probably could not honor going in. No one likes to say no.

Once you get some people interested, you need to make the group become a functioning organization. That doesn't mean a lot of bylaws and Rules of Order, but it does mean members should have some agreement on what the group is about.

A big sticking point early on can be program trading -- or stealing, according to some software publishers and vendors. My rule is that if a program is for sale commercially, I don't want to find it being copied at the CCSIG meeting.

We don't do ourselves any favors by discouraging those who are willing to provide good programs at reasonable prices, nor do we help ourselves if copying induces local computer stores not to carry 80C products. Right now, 80C software is inexpensive compared to that which is available for other systems. If we are willing to buy reasonably priced programs so that authors get a satisfactory return for their investment, they will not be forced to jack up prices of future offerings.

On the other hand, trading of programs written by group members should be strongly encouraged and, if the programs are good enough, their authors should be encouraged to publish them. For anyone so interested, group members are good testers.

Programs such as these should constitute a CCSIG library, and be one good reason to join. These public domain programs can also be grouped together on cassettes and sold to raise money for the group.

(Continued on next page)

USER'S GROUPS (From Page 27)

Initially, meetings can be held in members' homes until the group gets too large. Then, free meeting space is available in places like schools, banks, public buildings and the like. Basic requirements are tables, chairs and power outlets.

We have been quite successful in asking members to bring their computers and we leave plenty of meeting time for people to talk in small groups around the computers. Obviously, comparing, sharing and discussing is a big part of the reason for having a CCSIG.

As the group grows, there will be a need for short business meetings. These can be short and well organized. Formal programs can be held as well. Radio Shack people are a good source for programs, as are members of the group itself with some particular topic in which they have special expertise. Always be on the lookout for outsiders who can give presentations on microcomputer topics.

Communication is the key to success. Being part of a larger group is helpful if the group's newsletter can carry 80C material and announcements. This also enriches the total program. Here, CINTUG meets one weekend and CCSIG another -- providing two good meetings a month. We also separately mail CCSIG meeting notices, since some CCSIG members do not belong to CINTUG. No problem here, since CINTUG must sell itself just as CCSIG must.

Mailings are funded by sale of C-10 cassettes. There can also be dues if necessary. In any case, be sure to welcome anyone who comes to at least a couple of meetings so they can see whether your organization is for them.

I could go on but I won't. I have tried to share some ideas and experiences and to show that a User's Group is fun and not a horror to start. Have some patience. You may not have 10 at the first meeting -- or the second or third -- but if you make everyone feel comfortable and a part of the group with a responsibility to recruit others, you stand a good chance of having an active and successful operation.

RAINBOW

Sofdware Review...

NO BAH FOR THIS HUMBUG

A monitor is a program which allows you to change various memory locations directly, "write" machine language using hex numbers, check and manipulate the 80C's registers and the like.

There are a number of monitors on the mnarket, several of which have been reviewed in *the RAINBOW*. We would, however, have to say that the documentation for ***HUMBUG*** (Star-Kits, P.O. Box 209, Mt. Kisco, NY, 10549, $39.95 tape and disk, $69.95 ROM pack) surpasses them all. Now the program isn't too shabby either -- but you will find the explainations of how this program works to be very good.

We do not wish to lead you astray -- any monitor is a fairly sophisticated affair and no one's documentation is going to approach a tutorial in programming on the machine language level. But we have seen a pretty substantial number of these programs, and this one has a very good explaination of what happens when you do thus-and-so.

As to the program, ***HUMBUG*** does all those things most monitors do,

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and then adds some bonuses. For example, you can single-step through a program (we are talking machine language programs here) and have I/O control of the keyboard. Then, it has some rather unusual functions, such as being able to run the 80C from a remote terminal! There are also commands which allow you to use the CSAVEM function even if you do not have Extended Basic.

HUMBUG is fast, uses up just 4K of memory and can be easily relocated. All its commands are two letter combinations, and -- when more information is required -- it prompts the user for that infomation.

In short, *HUMBUG* is a well-done professional program that takes itself seriously and is capable of serious work.

Software Review...

COLORFORTH IS GOOD IMPLEMENTATION

We admit to some prejudice here. Our first really serious programmable calculator was a Hewlett-Packard model that introduced us to something entirely new -- a mysterious way of calculating called RPN, Reverse Polish Notation.

RPN uses a stack of numbers and what you do is enter numbers you want to manipulate onto the stack. So, if you wish to add two and three, you first enter the two, then enter the three, and tell the calculator to add the two numbers together. (By contrast, other systems have you enter the two, tell the calculator you are going to add, and then tell it to add the three.)

So, with the arrival of *COLORFORTH* from Armadillo International Software (P.O. Box 7661, Austin, TX, 78712, $49.95 for tape *and* disk versions), we were able to greet old friend RPN again. That is the system FORTH uses.

Personal preference again, but it would seem to us that, besides BASIC, the languages to learn would be FORTH, PILOT and PASCAL. PASCAL seems to be the "in" thing right now, PILOT is well suited to Computer Aided Instruction and FORTH is, well, a very powerful language.

One reason is that RPN is a very fast means of manipulating numbers. Another is that FORTH is a compiled, as well as interpreted, language. That means you can make it become machine code pretty easily and that runs fast.

As for *COLORFORTH*, the 16K program works very well and is easy to operate. It comes with extensive documentation, although it doesn't teach you the language. Armadillo sells an inexpensive book which will do that. If you are not acquainted with FORTH, spend the extra $16 for the book, "Starting FORTH."

Our first brush with FORTH was a very positive experience. This was no doubt helped a great deal by the program, which behaved flawlessly and made our preliminary ventures into the language easy. Our programs did run faster and it was easy to get the "hang" of the language.

If you're interested in a second language, FORTH and *COLORFORTH* would be a good bet.

Software Review...

LABYRINTH HAS ITS TWISTS & TURNS

Here is an extensive maze game with a couple of added features to help your playing enjoyment and speed that is highly acceptable.

In fact, when I first started playing *LABYRINTH* (Aardvark-80, 2352 S. Commerce, Walled Lake, MI 48088, $14.95) I checked again to be sure it wasn't in machine language. Its not -- the program is written in 16K Extended -- but it is fast.

The basics of the program are quite simple, you are placed somewhere in a maze and have to find your way out. That, alone, can make things enjoyable. But, there is more. You can also look at the maze from the "top" to find out just where you are and where the way out is.

If that makes it seem like cheating, it may be in a way. But, because you are not the only one in the maze, it sometimes helps to restore confidence.

See, there are these maze creatures that pop out from around corners and such. If you don't shoot them before they shoot you, there's trouble.

This is a good game, well done and enjoyable to play.

Color Computer Club

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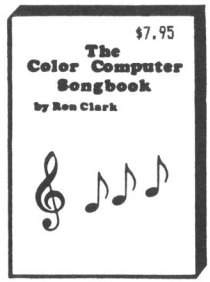

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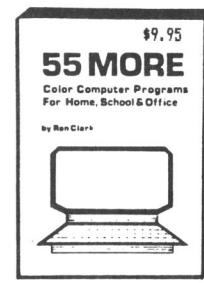

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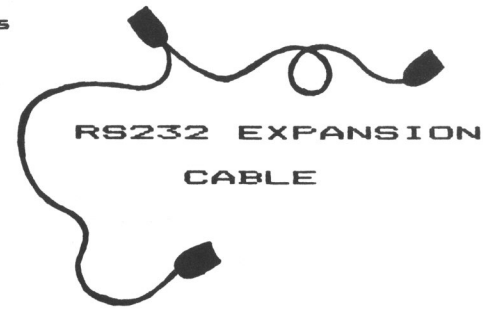

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Reply...

MORE INFO ON THE SPEEDUP POKE

By Alan J. Morgan

The 6883 SAM chip is a programmable synchronous address multiplexer and as such can be ordered to perform a multitude of tasks. These functions can be set with the POKE command directly from the screen or by a Basic or machine language program. The following, in response to several questions which have been asked in the *Letters To RAINBOW* column, will give some insight to the speedup command and its function.

The addresses that control the speed are located at decimal 65494 through 65497. Addresses 65494 and 65496 are used to toggle OFF, while 65495 and 65497 toggle ON the higher speed. The use of 65495 does not really change the speed of operation, but increases the speed of the REFRESH cycles to 1.8 MHz. The speed remains the basic .9 MHz for all I/O operation (REFRESH must always be equal to or greater than operation time). This causes inconsistancies in the operation and, although you can output or input, the CPU does not recognize what is going on and I/O errors will occur.

Changing the 6821 PIA chips to a faster speed type will do nothing to rectify the situation by itself. This is where the address 65497 comes into play. With the high speed PIAs and POKEing 65497, all operation is now at the higher frequency rate. But two problems still remain.

The first one is that the synch to the normal TV set hookup is not equipped to operate at this speed. To see what happens, type in POKE 65497,0. Strange looking, isn't it? Well, this is because the signals cannot synch up at this speed, but this can be overcome in some instances by an internal adjustment of the synch circuits within the 80C.

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BE FOREWARNED: Not all 80C's can be adjusted due to the component values used!

The second is the keyboard. At the higher speed, the bounce is so bad that very little is recognized unless you deliberately force each key entry. The only alternative here would be to replace the keyboard with one which can operate at 2 MHz.

I conclude that operating at a higher CPU speed is possible, although internal changes are necessary. For the hobbyist this would not be much challenge, but an interesting undertaking. For the normal programmer or user, my opinion is that he should be happy with the .9 MHz and the option to increase the REFRESH to 1.8.

If speed seems that important to you, ask the question: "What will I gain?" The answer, which may be surprising, is "Nothing." Look at specs for the IBM -- they're no faster than the TRS-80 Model III and the 80C is faster than a Mod III.

The answer to speed is not in the hardware, but the software, specifically machine language.

For those interested, a good rundown on the SAM chip is in the May 27, 1981 issue of Engineering Design News. It is available at many libraries.

SUBMITTING MATERIAL TO RAINBOW

Contributions to the RAINBOW are welcome from everyone. We like to run a variety of programs which would be useful/fun/helpful to other 80C owners.

Program submissions should be on tape or disc. We're sorry, but we do not have the time to key in programs. All programs should be supported by some editorial commentary, explaining the program and how it works. We're more interested in how it works than how you developed it. Programs should be learning experiences.

If you wish, editorial material can be written with any of the word processors currently available for the 80C, or for Scripsit 2.0 running TRSDOS 2.0a for the Model II. Typed (or printed out) copy double spaced is fine, however. Please do not imbed control codes for any particular printer.

We do pay for substantative submissions, based on a number of criteria. Those wishing renumeration should so state when making submissions.

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Hardware Review...

CER-COMP DISK HAS GOOD OPTIONS

Perhaps it is because we never seem to have enough of it, but we've always been very interested in time. So, when skimming through the utilities manual for Cer-Comp's *CCMD+9* disk operating system, we were instantly impressed that it had a real-time clock available for display on the screen.

That is probably an unfair way to look at a system as complete and complex as this one available from Cer-Comp (5566 Ricochet Ave., Las Vegas, NV 89110, prices at the end of the review), but the fact is that there *is* a real-time clock and it is a real joy for us to be able to sit and work with the 80C and know what time it is at all times. So complete is the clock function, that you are able to control the "ticks." Since a clock loses time with keyboard scans and other types of input/output operations, this is an important feature if you want an accurate time.

There are really several parts to the Cer-Comp system. One is an interface board itself -- which plugs into the 80C's ROM port just like Radio Shack's disc controller. Another is the Disk Operating System, or DOS, which is different from Radio Shack's. Then, there are disk utilities, an assembler, a text editor and a text processor. There is also a disassembler, but we have not seen it.

The parts, one at a time:

The controller plugs into the slot easily, although you may have to break off a piece of plastic in the disk cable plug if you are using the Radio Shack cable supplied with *their* disk system. That's easy to do and no problem at all.

Its a bare controller -- using the Tall Grass Technology system. This allows you to have almost any kind of drive, including double sided drives. With double sides and double density, you have a possible storage capacity of 3.2 million bits! A hefty amount -- some four times what's available on the 80C. This solves one of the problems we had with Exatron's disk system, which used only single sides and single density.

As we said, the board is bare, it isn't in a case. But, there is no problem plugging it in and it stays in the port securely.

The DOS is more like most DOS's in that, unlike Radio Shack's, it can be "seen" by the user. What that means is you enter the system in the DOS, can transfer to Basic, go back to DOS, etcetera. You can, however, give DOS commands from Basic.

Personally, I *like* to know the DOS is there. And, since this system is more like most, it gives you experience with a "traditional" system. While I view this as a plus, I am sure others will consider it not to be so. Its a personal preference.

The *CCMD+9* uses hard sectored disks. This isn't a problem, except you have to buy hard -- rather than soft -- sectored diskettes.

I found *CCMD+9* easy to use. I also appreciated a "wild card" function that enabled me to operate on groups of files. By using the wild card, I was able to look at all programs which were utilities, simply by so specifying. That's handy.

As with anything of this sort, you have to take time with the manuals. I will say the manuals are good, although I wished they had a few more examples.

Cer-Comp says its disk system is really three systems in one. The first is a free-standing system with some 11 commands that allow you to load, save and otherwise operate on files. The second, with 10 functions, lets you do all the things you need to do with disks to use them effectively -- such as reading and writing data in either sequential or random access files. Random files, by the way, can allow for very fast access to any particular piece of information.

Finally, there is a Basic interface that allows you to use the DOS from Basic. This can be done either directly (from the keyboard) or by your program.

There are nine utilities, including the aforementioned CLOCK. Other utilities allow for backup, copy, dump of a file and so on. The utilities are good and the structure of having utilities on a disk (rather than in the ROM) allows the addition of a utility.

In addition, a disk editor and assembler are available. And, the *TEXTPRO* word processing program (*RAINBOW*, April) is also supplied in a disk version.

We liked the disk editor. The program allows you to do just about anything you want with a Basic program (which must be saved in

ASCII, as opposed to binary form). Of particular note is the ability to move program lines throughout the program at will. This can be extremely useful.

The editor/assembler is a full-function program which uses all the 6809 op codes. You can use it to write machine language tapes, save the tapes and then load them back in at some future time. Needless to say, if written well, an assembler is a joy to have in programming in assembly language -- provided the program is a good one. Cer-Comp's is.

All in all, we were very pleased with this system and found it to be highly professional and easy to use. -- understanding that you don't just plug in a disk operating system and start telling it to do things, of course.

It will be well worth your time to look into this system when considering a disk. It is impressive.

Disk Controller $159.95; Controller alone $99; DOS on an EPROM $69. Assembler $34.95; Editor $24.95; Utilities $19.95; Editor/Assembler $39.95; Disassembler $29.95.

Software Review...

CALIXTO ISLAND IS GOOD ADVENTURE

OK, people. We're in this room, see. And there's this treasure, understand? And we've got to find it but there's no door to the room (that we could find) and . . .

Well, really. This is what *CALIXTO ISLAND* (Mark Data Products, 23802 Barquilla, Mission Viejo, CA, 92691, $19.95) is all about.

It is an Adventure in the classic sense. Written in machine language and designed to run in 16K, *CALIXTO ISLAND* is fun, challenging and a ball to play. There are enough twists and turns of the plot to keep anyone happy as a clam for hours.

When we say an Adventure in the classic sense, we are talking about words on the screen and commands you have to type in. This does require some imagination -- but since the first Adventure was written to take place in a Cave somewhere, there's no adventurer worth his salt who doesn't have a lot of imagination.

CALIXTO ISLAND is a fitting heir to the Colossial Cave. Its more fun, too. You'll really enjoy this one!

Software Review...

WARKINGS HAS ARCADE-LIKE ACTION

WARKINGS is a two-player game in which the action can get fast and furious. Its in machine language and runs on the 16K 80C.

In this game (available from Tom Mix Software, 3424 College N.E., Grand Rapids, MI, 49505, $19.95), there are two kings behind two castles fighting with each other.

All that stands between each king's castle's walls and a bouncing arrow (cannon ball, guided missile?) is a shield. Using the joysticks, the players must shield their castles from the arrow or risk damage to the walls. Too many hits and the arrow can break through the walls and kill the king.

There are three levels of play in this fine game. The layout is colorful, the sound is good and its fun to play. The joysticks respond very well to the program and, in sum, *WARKINGS* will give you hours of good fun and fast action.

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TERMS-CHECK OR MONEY ORDER ONLY.INCLUDE $1.00 FOR ONE PROGRAM, $2.00 FOR MORE THAN ONE PROGRAM FOR SHIPPING.

Utility...

HERE'S EASY ANIMATION FOR YOU

By Arnold Pouch

Even if you have not read the two previous articles on Motion Picture Programming (*the RAINBOW*, March and April, 1982), or had an opportunity to see an MPP runnong on an 80C, you will be able to type in the two programs below, combine them, and produce a complete MPP which will demonstrate the power of this new animation technique.

This program will display a full-color, hires, all-graphic action picture and give it full animation with only 14 short BASIC program steps.

For those of you who have read the two previous articles or who have purchased the *MPP TUTORIAL* package, the two listings will give you a "picture" tape and a "MPPBasic" tape as a sample of how combining them will work.

To produce the finished tape, follow these simple instructions:

1. Key in Listing 1 and CSAVE "PICTURE" to tape.

```
1 '*****************************
2 '
3 ' SUPERIOR GRAPHIC SOFTWARE
4 '
5 '         THE GLOBE
6 '
7 '   A DEVELOPMENT PROGRAM
8 '  TO BE USED AS A BASE TO
9 '   LEARN  MPP PROGRAMING
10 '
11 '*****************************
12 'AFTER USING MOTION PICTURE
   PROGRAMING - - GOING BACK TO
    SET THIS PROGRAM THE OLD
   FASHIONED WAY WAS A REAL BIG
       PAIN IN THE NECK!!

13 ' USE THIS PROGRAM ONLY TO
   PRODUCE A PICTURE IN GRAPHIC
MEMORY 1536 THRU 9215 (PCLEAR 5)
 THEN CAPTURE THE PICTURE WITH
    THE MPP PROGRAM WHICH IS
  PROVIDED IN THE SECOND PROGRAM.
```

```
14 '****************************

15 REM MAKE THE GLOBE***********
16 PCLS:PMODE4,2:PCLS:PMODE4,1:S
CREEN1,1:N=16:DIM A(N),B(N):PI=3
.14159
17 FOR R = 1 TO 2:Z=0
18 FOR T = 0 TO 2*PI-.001 STEP 2
*PI/N:Z=Z+1
19 A(Z)=COS(T)*110+112 :B(Z)=SIN
(T)*95+97:NEXT T
20 PCLS:FOR S=1TO N-1:FOR D=S+1
TO N
21 X1=FIX(A(S))+15:Y1=FIX(B(S))
22 X2=FIX(A(D))+15:Y2=FIX(B(D))
23 LINE (X1,Y1)-(X2,Y2),PSET
24 NEXT D,S
25 REM GLOBE SUPPORT**********
26 PMODE3,1:SCREEN 1,0
27 COLOR2,1
28 FOR X=0 TO 36 STEP 4
29 Y=X/2
30 LINE(40-X,163+Y)-(46+X,163+Y)
,PSET
31 LINE(206-X,163+Y)-(212+X,163+
Y),PSET
32 NEXT X
33 REM TOP BOX*****************
34 COLOR1,1
35 LINE(96,162)-(152,181),PSET,B
F
36 COLOR 4,1
37 LINE(96,162)-(152,181),PSET,B
38 REM BOTTOM LONG BOX*********
39 COLOR1,1
40 LINE(22,181)-(230,191),PSET,B
F
41 COLOR 4,1
42 LINE(22,181)-(230,191),PSET,B
43 REM END FILLERS*************
44 COLOR2,1
45 LINE(0,181)-(20,191),PSET,BF
46 LINE(232,181)-(254,191),PSET,
BF
47 REM MPP CAP LETTERS*********
48 DRAW"BM102,166;C3;D11R2U11R2D
3R2U1D3R2U2D4U2R2U3R2D1U3R2D11R2
U11BR4D11R2U11R8D6L2U6D6L6BR14R6
U6D6R2U6L8D11L2U11"
49 REM LETTERS IN BAMMER*******
50 DRAW"BM28,186;C2;R4BR4C3D2U4D
1R4U1D4BR4U4R4D4L4BR10U4L2R4BR4R
4L2D4L2R4BR4U4R4D4L4BR8U4D1R2D2R
2D1U4BR12R4D2L4U2D4BR8R4L2U4L2R4
BR4D4R4L4U4R4BR4R4L2D4BR6U4D4R4U
4"
51 DRAW"BM132,184;C3;R4D2L4U1D3U
1R2BR2BD1R1BR3R4L4U2R2L2U2R4BR12
R4D2L4U1D3BR8U4R4D2L2D1BR2BD1R1B
R3U4R4D4L2BR10NU2L4U4R4BR4R4D2L4
U1D3U1R2BR2BD1R1BR3U4R4D2NL2D2BR
4U3NU1R4U1D4BR4R4U2L4U2R4BD2BR4C
2R4"
52 ' SUPERIOR GRAPHIC SOFTWARE
53 PMODE3,2
54 DRAW"BM144,168;C2;R4U2L4U2R4B
R4D4R4U4BR4ND4R4D2L2BR6NR2U2NR4D
4R4BR4U4R4D2L2D1BR2BD1R1BR3U4BR4
NR4D4R4NU4BR4U4R4D2L2D1BR2BD1R1"
55 DRAW"BM154,172;D2L4U4R4BR4ND4
R4D2L2D1BR2BD1R1BR3U4R4D2NL2D2BR
4U4R4D2L2BR6NU2ND2R4NU2D2BR4U4BR
4NR4D4R4"
56 DRAW"BM140,180;R4U2L4U2R4BR4N
D4R4D4NL4BR4U2NR2U2R4BR4R4L2D4BR
6BU1NU3R2ND1R4ND1R2U3BR4ND4R4D2N
L2D2BR4U4R4D2L2D1BR2BD1R1BR3NR4U
2NR2U2R4"
57 'REGISTERED TRADE MARK ******
58 DRAW"BM214,109;R4L2D4BR6U4D1R
2BR4U1D4"
59 PMODE3,1
60 PMODE4,1:SCREEN 1,1
61 GOTO61
```

2. Key in Listing 2 and CSAVE "MPPBASIC" to tape. Type in Listing 2 *exactly* as shown. Don't add any blank spaces or program steps of your own.

```
1 '  SUPERIOR GRAPHIC SOFTWARE

2 '          TRADEMARK

3 '          COPYRIGHT
               12/81
4 '       WAYNESVILLE, N. C.
```

(Continued on Page 39)

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IMPERIAL BEACH, CA 92032

LASER STAR & HELO BATTLE.....$14.95
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TELEWRITER

the Color Computer Word Processor

the only one with all these features for your TRS-80 Color:

51 column x 24 line screen display ■ Sophisticated full-screen editor
Real lower case characters ■ Powerful text formatter
Works with any printer ■ Special MX-80 driver
Runs in 16K or 32K ■ Disk & cassette I/O

requires absolutely no hardware modifications

TELEWRITER

Telewriter is the powerful word processor designed specifically for the Color Computer. It can handle almost any serious writing job and it is extremely easy to use. It has all the advanced features you need to create, edit, store, format and print any kind of text. With Telewriter you can quickly produce perfect, finished copy for letters, reports, term papers, articles, technical documentation, stories, novels, screenplays, newsletters. It is also a flexible and efficient way to take notes or organize ideas and plans.

51 x 24 DISPLAY

The Color Computer is an incredibly powerful and versatile computer, but for text editing it has some major drawbacks. The small 32 character by 16 line screen format shows you too little of the text and, combined with its lack of lower case letters, bears little resemblance to the way text really looks on the page. Reverse video in place of lower case just adds confusion.

Telewriter eliminates these shortcomings with **no hardware modifications required.** By using software alone, Telewriter creates a new character set that has **real lower case letters**, and puts 24 lines of 51 characters on the screen. That's more on-screen characters than Apple II, Atari or TRS-80 Model III. That's more than double the Color Computer's standard display.

FULL SCREEN EDITOR

The Telewriter editor is designed for maximum ease of use. The commands are single key (or single key plus control key), fast, and easy to remember. There is no need to switch between insert modes and delete modes and cursor movement modes. You simply type. What you type is inserted into the text at the cursor, on the screen. What you see on the screen is always the current state of your text. You can move quickly through the text with one key cursor movement in all 4 directions, or press the shift key simultaneously for fast, auto-repeat. You can jump to the top or bottom of the text, the beginning or end of a line, move forward or backward a page at a time, or scroll quickly up or down. When you type past the end of the line, the wordwrap feature moves you cleanly to the next.

. . . one of the best programs for the Color Computer I have seen . . .
— Color Computer News, Jan. 1982

You can copy, move or delete any size block of text, search repeatedly for any pattern of characters, then instantly delete it or replace it with another. Telewriter gives you a tab key, tells you how much space you have left in memory, and warns you when the buffer is full.

FORMAT FEATURES

When it comes time to print out the finished manuscript, Telewriter lets you specify: left, right, top, and bottom margins; line spacing and lines per page. These parameters can be set before printing or they can be dynamically modified during printing with simple format codes in the text.

. . . truly a state of the art word processor . . . outstanding in every respect.
— The RAINBOW, Jan. 1982

Telewriter will automatically number pages (if you want) and automatically center lines. It can chain print any number of text files from cassette or disk without user intervention. You can tell it to start a new page anywhere in the text, pause at the bottom of the page, and set the Baud rate to any value (so you can run your printer at top speed).

You can print all or any part of the text buffer, abort the printing at any point, and there is a "Typewriter" feature which allows you to type straight to your printer. Because Telewriter lets you output numeric control codes directly (either from the menu or during printing), it works with **any** printer. There's even a special driver for the Epson MX-80 that lets you simply select any of its 12 fonts and do underlining with a single underline character.

CASSETTE AND DISK I/O

Because Telewriter makes using cassette almost painless, you can still have a powerful word processor without the major additional cost of a disk. The advanced cassette handler will search in the forward direction till it finds the first valid file, so there's no need to keep retyping a load command when you are lost in your tape. The Verify command checks your cassette saves to make sure they're good. You can save all or any part of the text buffer to disk or cassette and you can append pre-existing files from either medium to what you have in the buffer already.

AVAILABLE NOW

Telewriter turns your Color Computer into the lowest cost hi-power word processor in the world today. It runs in 16K or 32K (32K recommended) and is so simple you can be writing with it almost immediately. It comes with 63 pages of documentation and is fully supported by Cognitec. Telewriter costs $49.95 including shipping (California residents add 6% tax). To order, specify disk or cassette and send check or money order to:

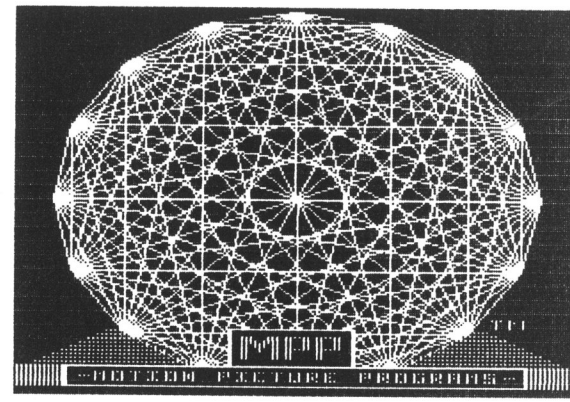
Cognitec
704 Nob Ave.
Del Mar, Ca. 92014

Or call (714) 755-1258 weekdays 7 AM-4PM PST. We will gladly answer your questions.

Apple II is a trademark of Apple Computer, Inc.; Atari is a trademark of Atari, Inc.; TRS-80 is a trademark of Tandy Corp.; MX-80 is a trademark of Epson America, Inc.

MPP(From Page 37)

```
5 POKE27,44:POKE28,190:POKE29,44
:POKE30,190:POKE31,44:POKE32,190
6 'POKE65495,0:'HI-SPEED POKE
7 PCLEAR5:PMODE4,1:SCREEN1,1
8 DIM A(12),B(100),N1(100),N2(10
0)
9 PMODE3,2:GET(140,163)-(204,181
),N1,G
10 PMODE3,1:GET( 94, 87)-(158,10
5),N2,G
11 GET( 28,184)-( 35,188),A,G
12 GET( 35,184)-(225,188),B,G
13 PUT(218,184)-(225,188),A,PSET
14 PUT( 28,184)-(218,188),B,PSET
15 IF T=08 THEN PUT( 94, 87)-(15
8,105),N1,OR
16 IF T=10 THEN PUT( 94, 87)-(15
8,105),N1,PSET
17 IF T=22 THEN PUT( 94, 87)-(15
8,105),N2,OR
18 IF T=24 THEN PUT( 94, 87)-(15
8,105),N2,PSET:T=0
19 T=T+1:GOTO11
```



3. PCLEAR5. Then CLOAD "PICTURE" and RUN the program to set up your picture in memory locations 1536 to 9215.

4. Press BREAK when the picture is completed.

5. PCLEAR5. CLOAD "MPPBASIC". *Do not RUN or EXEC this program!*

6. LIST and check the program. Check the MPP POKEs at Line 5. You can tell if they are correct by following this simple MPP routine from the keyboard:

-- PRINT PEEK(27) provides the POKE value for POKE 27, 29 and 31.

-- PRINT PEEK(28) provides the POKE value for POKE 28, 30 and 32.

-- The values in Line 5 can be higher than your PEEKs but they cannot be lower. If you typed Listing 2 carefully, the values will be the same or higher. If they are lower, simply delete one of the REM lines (1, 2, 3 or 4). That will make your PEEK values lower. (You MPP programmers already know how to set the POKE values properly, don't you?)

7. Save both "Picture" and "MPPBasic" to tape as a finished program (now stored between 1536 and 11451) to tape by typing: CSAVEM "MPP-PROG",1536,11451,44661 <ENTER>.

8. Now, rewind the tape you have just made, type PCLEAR5:CLOADM:EXEC and <ENTER> it. Your program will load and auto-start for you. See what just 14 lines can do!

9. For those of you who are already MPP programmers, you can now load your MPP Drawer program right over your picture in memory and go to work modifying it as you wish.

COLORTERM (c)

The 16K Color Computer* as an intelligent terminal with 51 or 64 columns by 21 lines and lower case!

- 300 or 110 Baud
- user programmable keys
- automatic repeat when key is held down
- dump your files to host
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- 4-way cursor control
- any data format (commercial systems, TSO, bulletins etc.)
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Cassette and Manual $34.95 (u.s.) $40.95 (Canadian)

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Martin Consulting, 94 Macalester Bay, Winnipeg, Manitoba, R3T 2X5 Canada

*T.M. OF TANDY CORP

PIPELINE

Do you love your Color Computer? Most of us do, you know, and if you do, too, now there's a tee shirt available for you. HARMONYCS carries a line of shirts (and software) and you can get a catalog from them at P.O. Box 1573, Salt Lake City, UT, 84110-1573.

Speaking of such items, some are also available from Armadillo International Software in Austin, TX, and from Superior Graphic Software, Waynesville, NC. We have not seen their offerings yet but they are advertised.

And speaking of advertisers, several offer discounts to subscribers of *the RAINBOW*. You should read advertisments carefully to note these special offers when they occur.

The *GAUNTLET* program from Britt Monk, CDP, is no longer available from him. Monk says that he sees this as an encouraging sign, since the program -- in an "enhanced" version -- has been purchased by the Avalon Hill Game Co. and will be re-released shortly. Monk says he is still developing programs and that his *BRICKAWAY* game is still available.

Thanks to you, we've received several reports that Seebree's Computing has shipped the *RED BARON* program they advertised previously.

We believe the *PIPELINE* is an appropriate place to commend Arnold Pouch of Superior Graphic Software for his sharing of his Motion Picture Programming techniques. This form of animation -- details of which ran in a three-part series which concludes this month -- is unique and fun to use. Pouch could well have kept the "secret" to himself. He has opened some real vistas for 80C users and we say "thanks" on behalf of a lot of us.

Electronic Specialists of Natik, MA, is out with a 40-page catalog of computer interference control products. We have not seen any of the products, but have looked through the rather extensive catalog.

Tandy has formally announced what was reported here earlier, that Children's Television Workshop (Sesame Street) will develop two "serious, comprehensive series of programs for classroom use at the grade 1-4 level" designed expressly for the 80C. They will use the popular Sesame Street characters and deal with English language and computer literacy. Children's Television Workshop is also doing 80C programs for home use.

If you need an extra $100, try entering a contest in which all you have to do is identify the most practical way an individual can justify purchase of a personal computer. The rules are a page long, so we won't try to duplicate them here, but you can get details by writing to OCEAN, P.O. Box 2331, Springfield, VA, 22152.

This seems an appropriate place to mention that we really want to help 80C clubs and user's groups in any way we can. Let us know about meeting times and places and we'll make sure that we get them in *the RAINBOW*. There may be a whole lot of people out there who are looking for you.

Don Inman, the author, tells us a new book on 80C graphics will soon be available from the Reston (VA) Publishing Co. We'll have a review when a copy is made available to us.

For all of you who have been asking about something that might be able to convert tape programs to disk -- without messing up the disk operating system -- there may be a solution at hand. Tom Mix Software reports it is about to market a program that will handle the transfer without any problems. Should be ready soon, we understand.

Cognitec informs us that *TELEWRITER* on disk should be available by the time you read this.

Peacock Ent.
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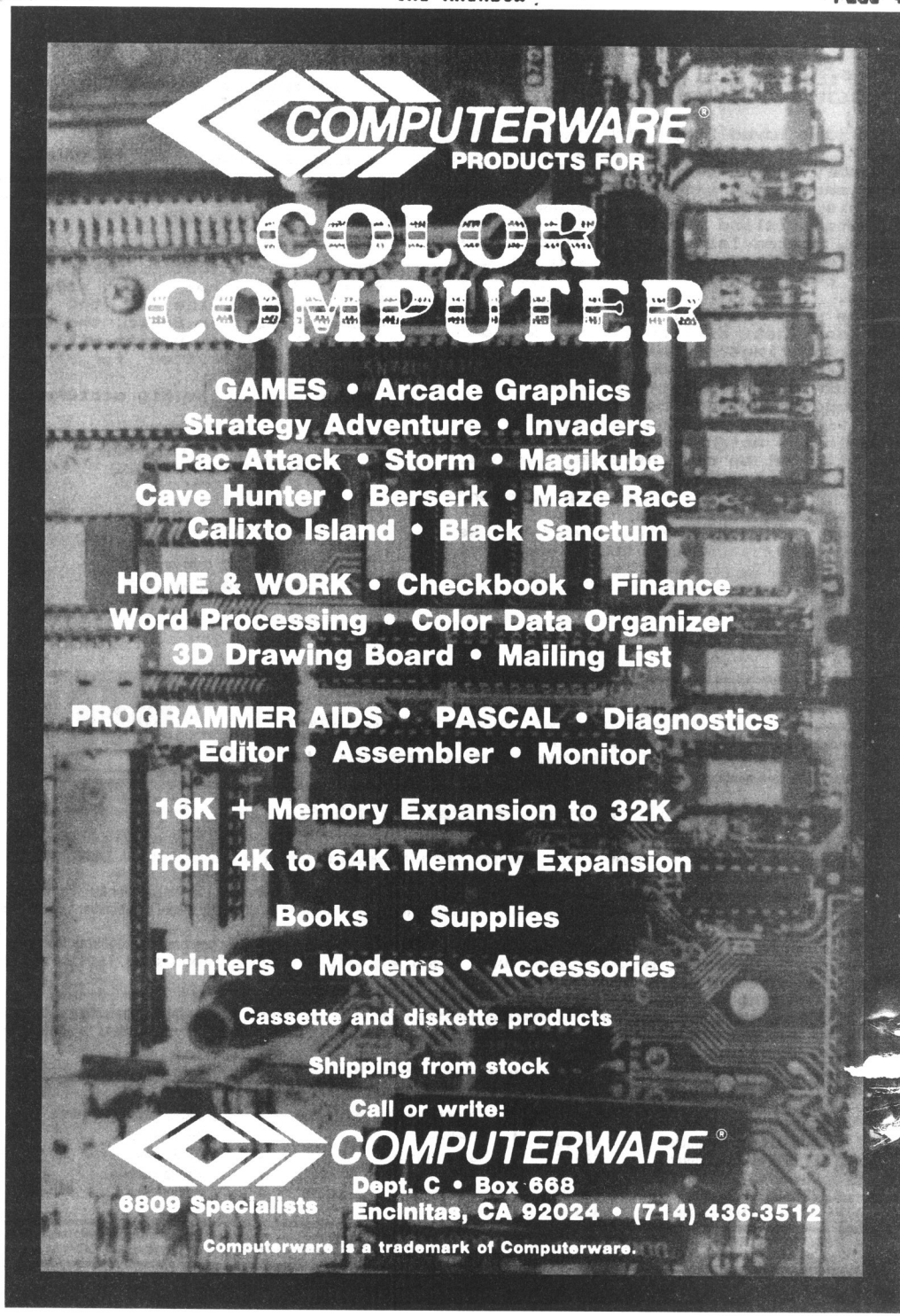
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Software Review...

PLAY IT AGAIN COMPUTER ISLAND

I just loved the old "Name That Tune" program on TV, and that is probably one of the reasons why I am so pleased with *NAME THAT SONG*.

This 16K Extended program from Computer Island (Dept. R, 227 Hampton Green, Staten Island, NY 10312, $10) features 72 songs that you can get your 80C to play and for you to guess.

The songs range from the easy to the somewhat difficult and all are true renderings of the tunes. I got some and missed some, but had an absolute ball playing the game.

Computer Island calls it a game for kids, and my kids (as well as the kids in the neighborhood) enjoyed it a lot. But so did the kids' parents. All of them! And, to make things better, there is a "grownup version" available as well.

You (and your kids) will like *NAME THAT SONG* too! Its a winner.

Utility...

80C'S OWN CINERAMA

Remember Cinerama? That was the super-duper development in the movies that had a real wide screen that made you feel like you were "in" the picture.

Mark Reeves of Snake Mountain Software contributed this *CINERAMA SCREEN PRINT* that lets you print out a double-size of the graphic screens. Being in Basic, the program is a bit slow, but it will get you there. It was written for the Line Printer VII.

We hope you like big pictures!

```
10 'DOUBLE SIZE SCREEN PRINT
20 'SNAKE MOUNTAIN SOFTWARE
30 'P.O. BOX 5722
40 'RALEIGH, NC  27650
50 'JAN. 1982
60 '
70 ' Q=COLOR VARIABLE
80 ' Q=1 FOR NORMAL PRINT
90 ' Q=0 FOR REVERSE PRINT
100 Q=1
```


COLOR COMPUTER DISK SYSTEM

A complete disk drive system for the color computer, featuring the Tall Grass Technology Double density, buffered disk controller. This system will support up to 4 51/4 in. disk drives with a maximum capacity of 3.2 Mega bytes of storage using double sided 80 track drives. This is a minimum of 4 times the capacity of the "Standard" color computer disk drive system.

DISK OPERATING SYSTEM (CCMD+9)

This is a full featured "Basic" compatible disk operating system which does "NOT" require extended Basic and will even run on a 4K color computer. It includes a complete dynamic allocation system that leaves no wasted or unused space on the disk. It will automatically repack disk space when files are deleted to reduce file fragmentation and increase access time.

This system features three operating systems in one, the first is a free standing system which has 11 commands for loading, saving, removing, changing, checking, analyzing and executing files on disk. It can be configured to allow any mixed combinations of 35, 40 and 80 track drives.

The second system is a completely supported external access system for interfacing with virtually any program requiring the use of the disk system. It includes 10 functions for opening, closing, reading, writing sequencial and random access files. There are also 13 subroutine functions and 7 I/O subroutines accessable to the programmer.

The third system is a Basic interface system which includes 6 direct execute Basic commands and 6 indirect commands which conform to the standard Basic tape & printer I/O commands and allow use of string and numeric variables for disk parameters. Up to 9 files can be active at once, all disk file memory allocation is done automatically at run time. Also, Basic has access to all the free standing DOS commands either directly or under program control.

PRICES:

Controller w/CCMD+9 Eprom	$159.95
Disk Controller only	$99.00
CCMD+9 Dos on 2732 Eprom	$69.00
CCASM9 disk assembler	$34.95
CCEDT9 disk text editor	$24.95
CCDISS disk disassembler	$29.95
CCUTLY disk utilities	$19.95
CDTPRO Text processor	$39.95

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Meteroids
Space Wars $49.95

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Las Vegas, Nv. 89110

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```
110 PRINT#-2,CHR$(18);
120 FORX=0TO251STEP7
130 FORY=191 TO 0 STEP-1
140 M=0
150 IF PPOINT(X,Y)=Q THEN M=M OR
 3
160 IF PPOINT(X+1,Y)=Q THEN M=M
OR 12
170 IF PPOINT(X+2,Y)=Q THEN M=M
OR 48
180 IF PPOINT(X+3,Y)=Q THEN M=M
OR 64
190 M=M+128
200 PRINT#-2,CHR$(M);CHR$(M);
210 NEXTY
220 PRINT#-2,CHR$(13);
230 FORY=191 TO 0 STEP-1
240 M=0
250 IF PPOINT(X+3,Y)=Q THENM=M O
R 1
260 IF PPOINT(X+4,Y)=Q THEN M=M
OR 6
270 IF PPOINT(X+5,Y)=Q THEN M=M
OR 24
280 IF PPOINT(X+6,Y)=Q THEN M=M
OR 96
290 M=M+128
300 PRINT#-2,CHR$(M);CHR$(M);
310 NEXTY
320 PRINT#-2,CHR$(13);
330 NEXTX
340 FORY=191 TO 0 STEP-1
350 M=0
360 IF PPOINT(252,Y)=Q THEN M=M
OR 3
370 IF PPOINT(253,Y)=Q THEN M=M
OR 12
380 IF PPOINT(254,Y)=Q THEN M=M
OR 48
390 IF PPOINT(255,Y)=Q THEN M=M
OR 64
400 M=M+128
410 PRINT#-2,CHR$(M);CHR$(M);
420 NEXTY
430 PRINT#-2,CHR$(13);
440 FORY=191 TO 0 STEP-1
450 M=0
460 IF PPOINT(255,Y)=Q THEN M=M
OR 1
470 M=M+128
480 PRINT#-2,CHR$(M);CHR$(M);
490 NEXTY
500 PRINT#-2,CHR$(13);CHR$(30);
510 END
```

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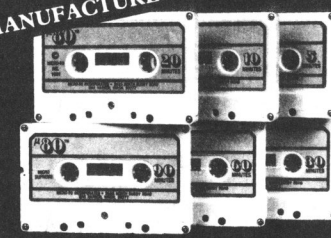

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RANDOM NUMBERS ONCE AGAIN

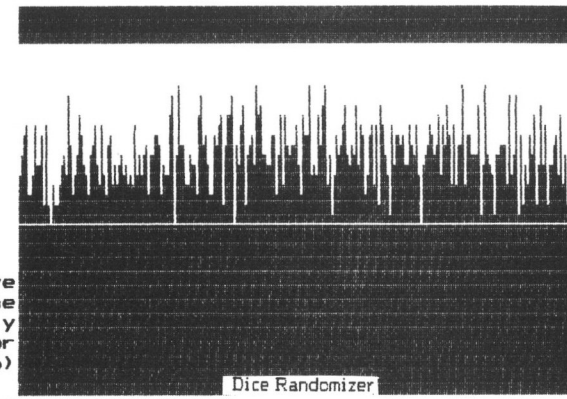
By John L. Urban

(EDITOR'S NOTE: Mr. Urban is leaving the RAINBOW's columnist staff this month to devote more time to his software firm. The following is a reply to the many letters we have received concerning the random number generator in some of his previous columns. FRP gamers will, we are sure, wish John well and will want to read Bill Nolan's column on FRP, which begins with this issue.)

Due to the response I have had on RND rolls prompted by the computer, I want to explain exactly why I choose the RND(15)+3 (or RND(18)) methods over the RND(3d6) method.

Basically, RND(15)+3 will give a wider span of numbers than adding three six-sided dies together. A bell-curve of 20 rolls of three six-sided die will show a median of eight or nine, while a bell-curve of 20 rolls of an 18-sided die will show a median of about 12 or 13. Also, the number 18 actually appears quite a bit more using the RND(15)+3 method than the 3d6 method.

If you don't know what a bell curve is, just make a graph with the numbers 1 to 13 on the vertical side and the numbers 3 to 18 on the horizonal. Then roll three six-sided dice 20 times and write down the results. Plot the answers on the graph.



Dice Randomizer

This will show the *Law of Probability* and the curve will look bell-shaped -- less numbers at both ends and more in the middle.

I asked Joe Bennett of JARB Software to write the following program for me. Although it is short, it requires Extended Basic. It will illustrate the differences between rolls of dice using RND(15)+3 and 3d6.

```
0 REM ************************
1 REM * RND(18) AND RND(3d6)  *
2 REM * PROGRAM -             *
3 REM *   WRITTEN MAR. 1982   *
4 REM *         BY            *
5 REM *    JOHN L. URBAN      *
6 REM *        AND            *
7 REM *    J. E. BENNETT      *
8 REM * (c)1982 JARB SOFTWARE *
9 REM ************************
10 PMODE 1,1:PCLS(2):SCREEN1,1
11 GOSUB 1000
30 FORI=0TO255
40 R=0:FORII=1TO3:R=R+RND(6):NEX
TII:R=R*5
50 LINE(I,176)-(I,176-R),PSET
60 NEXTI
61 PMODE1,3:PCLS(3):SCREEN1,1
62 GOSUB1000
70 FORI=0TO255
80 R=(RND(15)+3)*5
90 LINE(I,176)-(I,176-R),PSET
100 NEXTI
```

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```
110 PMODE1,1:SCREEN1,1:FORI=1TO1
00:NEXTI:PMODE1,3:SCREEN1,1:FORI
=1TO100:NEXTI:GOTO110
1000 LINE(0,86)-(255,86),PSET:RE
TURN
```

The first thing that will happen when you run the program is that the screen will change to green. You'll see an orange line about halfway up. This is the number's maximum (18) and is for reference. The lines which form from left to right with varied lengths are the graphic representations of the 3d6 rolls -- 256 of them. Once this simulation is completed, the screen will change to blue and vertical lines will appear again. This is the RND(15)+3 simulation. To compare the two, the screen will flash back and forth.

By running this program a few times you will see that:

-- The number 18 appears more frequently in the RND(15)+3 simulation.

-- The span of numbers seems wider in the RND(15)+3 simulation.

You, as the programmer or referee, will have to decide which method to use. I favor RND(15)+3 because it gives a slight advantage to the players.

I hope this clears up any controversy and I wish to thank all of you who have written and responded to my articles. Thanks, too, to all who have supported this series and read the FRP Column with interest.

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the ASSEMBLY CORNER

By Dennis S. Lewandowski
RAINBOW Columnist

(Mr. Lewandowski, president of DSL Computer Products, is an experienced teacher and programmer in assembly language.)

Did you enjoy last month's program? I hope so, because assembly language can be fun.

This month we are going to discuss the Central Processing Unit (the CPU for short) itself. First of all, the main question has to be how does it work?

In a nutshell, when any CPU is created, the design engineers make an instruction set of control codes. The CPU will react to any one code in only one way. Normally, an instruction is two bytes long, however, they may be any length the designer chooses. The 6809 has a few instructions which are four bytes long (47 to be exact) and the remainder are two bytes in length.

The CPU contains all the logic, arithmatic and address processing information needed to interact with it. We will use the CPU's registers to handle these things.

Registers? Plural? Humm, just how many of these registers are there?

Well, there are either eight or nine, depending on how we look at it. Look at Figure 1 on this page, and you'll see a programmers model of the 6809 CPU. It has X and Y index registers; U and S stack pointers, the PC-program counter and the accumulators. The accumulator can be used as two eight-bit registers called A and B, or as one 16-bit register called simply D. The last two parts of the CPU are the DP-direct page register and the CC-condition code register.

Now, let's look at each of these things one at a time:

The X and Y index registers are called that because they conveniently lend themselves to the indexed addressing mode. This mode is where a register is set up as a pointer to a location in memory. The X and Y registers can be set up so they automatically increase to the next location. (Yes, they can be set up to increment to two or more, but we're into the basics right now.) The name "index" or "pointer" refers to the fact that these registers are meant primarily for the purpose of indexing or pointing to memory locations.

The U and S stack pointers could also be used as index registers, however, their primary function is to point at a memory location where a stack of data will be found. The stack itself consists of the contents of the CPUs registers. Now, why would we want to duplicate the CPUs registers anywhere?

Let's just say we're running our program and we want to use the D register for a 16 bit add, but our program is already using A or B -- or both (remember, the D register is a combination of A and B). Well, we can just "push" A on the stack, do our 16-bit add with the D register, store the information if we need to keep it, and "pull" A off the stack and continue on with our program. Handy, huh?

Also, the CPU automatically stacks some registers if it performs a jump or branchs to a subroutine. The U stack pointer -- also called the user stack -- is for the programmer who wishes to set his own stack.

The PC or program counter does just what the name implies. It counts the memory locations of the program the CPU is running. That way, the CPU knows what has already been done and what needs to still be done.

Now for the accumulators. Are there one, two or three of them? Really, there is only one, a 16-bit accumulator referred to as D.

If a program does an add, subtract or any other math function, the CPU will always store the result in the D register. Now, let's assume we only need an eight-bit math function (numbers 0-255). Rather than waste space in the CPU, we can split the 16-bit D register into two eight-bit registers -- A or B. Both can be independent of one another.

The DP register is an eight-bit register. Direct page refers to the addressing mode in which a two byte address is given for a memory location in most CPUs. The direct page is 00xx where the two leading bytes are always 00 -- but that is where *other* CPUs leave direct addressing. The 80C's 6809 will allow us to place a direct page anywhere in memory. All we have to do is put any two hexidecimal numbers in the direct page register and

(Continued on next page)

ASSEMBLY CORNER (From Page 47)

voila that is where all the direct addresses are.

Finally for this month, there is the flag or condition code register. This is an eight bit register and each bit has a special meaning to the CPU. In order the bits are:

Entire flag - this flag is set if the CPU has stored the "entire" register set on the stack during a push. If only a partial set is stored, the flag would be reset.

FIRQ Mask (Fast Interrupt Request Mask) - If this flag is set, it tells the CPU to ignore fast interrupt requests until it is reset.

Half Carry flag - This flag is set if, while doing eight-bit math, there is a carry from the second nibble to the first.

IRQ Mask (Interrupt Request Mask) - If this mask is set, the CPU will ignore any standard interrupt requests (except non-maskable interrupts).

Negative flag - If the first bit of any math operation puts a one into the involved register, this flag will be set, noting this is a negative number in signed math.

Zero flag - If any instruction, except a load or store, makes a register all zeroes, this flag will be set.

Overflow flag - If a math operation causes a number larger than the register being used can handle, this flag will be set.

Carry flag - If a carry is caused by a math function, this flag will be set also. Arithmatic shifts (believe me for now) use the carry flag.

The key word in all these descriptions is "if." The flags we just discussed are the basis of any program logic. At this point, I think we'll stop and let you digest this material.

Next month: The addressing modes and a 6809 emulator program.

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If you are into secrets...or just want to do some experimenting with code, *JARBCODE* from JARB Software is a great way to go.

This program comes to readers of *the RAINBOW* courtesy of Joe Bennett of JARB Software. While offered for sale by JARB, it is reproduced here with permission of the owners. You are authorized to make copies necessary for your own use, but you may not make copies for anyone else.

A full manual, 27 pages in length, is available from JARB Software, which will explain all the details of using this program. The manual may be ordered for $7 from JARB at 1169 Florida St., Imperial Beach, CA, 92032. California residents should add tax. All orders should include $1 shipping charge.

JARBCODE is the only program printed in this month's issue of *the RAINBOW* which is not included on the *RAINBOW ON TAPE* for May.

JARBCODE is an easy-to-use program designed to encode and/or decode any alphanumeric message you wish to send or receive. While no code is totally unbreakable, it will be somewhat difficult for anyone not knowing the key to break the code.

The program's main menu offers you several choices. The first you will probably wish to use is "Code Choices." Here, you will get another menu which gives several options. Choose the one you wish. This discussion, however, will deal only with the straight numerical code.

You need to remember which code choice you use. That is the only way the person who receives the message will be able to decode it (unless he works for the CIA, KGB or so forth).

You must also note the code key. For straight numerical code, you enter any positive number and the computer will then assign the following 25 consecutive numbers as its coding sequence.

When you type in your start number, press <ENTER> and the complete sequence will be displayed. If the sequence is satisfactory to you, press "Y" and you will be returned to the Main Menu. If you don't like the sequence, press "N". Then, you will be returned to the start of the straight numerical code section to select a new start number for a different sequence.

Once you have assigned a start sequence, you can begin encoding messages. The computer will first ask whether a code choice has been made. Since you have made a choice, press "Y". The 80C will then tell you to "ENTER MESSAGE".

The computer will accept any alphanumeric character, including punctuation and spaces. A single message entry may not exceed 225 characters. Punctuation and spaces count toward the 225 character limit.

Type the message in slowly to allow the 80C time to process the input. When the complete message has been typed in (or an error occurs) press the up arrow key. The computer will then display the entered message and ask if it is correct.

If the message is not correct, enter a "N" or "NO". Then the message input procedure will begin anew.

If the message is correct, press

(Continued on Page 52)

An Amazing Offer. . .

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EXCITING NEWS FOR COLOR COMPUTER USERS

FLEX, OS-9 and the Radio Shack Disk System ALL on the SAME Color Computer

Would you believe that you can run FLEX, OS-9 and Radio Shack disk software on the same Color Computer, and all you have to do is change the disk? That's right, just change the disk. If you have a 32K Color Computer with the Radio Shack disk system, all you need to do is make a trivial modification to access the hidden 32K, as described in the Feb. issue of COLOR COMPUTER NEWS and the April issue of '68' Micro. You can get FLEX from us right now. OS-9 will be ready by summer. Please note that this will only work with the Radio Shack disk system and 32K/64K memory chips that RS calls 32K. Maybe they put 64K's in yours, too. If you don't have a copy of the article, send a legal size SASE (40¢ stamps) and we'll send it to you.

Using this system to run FLEX and OS-9 has many advantages. First, it gives you 48K from zero right up to FLEX. This means that *ALL* FLEX compatible software will run with *NO MODIFICATIONS* and *NO PATCHES!* There are no memory conflicts because we moved the screen up above FLEX which leaves the lower 48K free for user programs.

What you end up with is 48K for user programs, 8K for FLEX and another 8K above FLEX for the screens and stuff. We have a multi screen format so you can page backward to see what scrolled by and a Hi-Res screen that will enable us to have 24 lines by 42 character display is on the way. That's better than an Apple!

We also implemented a full function keyboard, with a control key and escape key. All ASCII codes can now be generated from the Color Computer keyboard!

We also added some bells and whistles to Radio Shack's Disk system when you're running FLEX or OS-9. We are supporting single or double sided, single or double density, 35, 40 and 80 track drives. If you use double sided drives, the maximum is three drives because we use the drive 3 select for side select. When you are running the Radio Shack disk, it will work with the double sided drives but it will only use one side and only 35 tracks. Using 80 track drives is okay, but will not be compatible with standard Radio Shack software. You can also set each drive's stepping rate and drive type. (SS or DS - SD or DD)

In case you don't understand how this works, I'll give you a brief explanation. The Color Computer was designed so that the roms in the system could be turned off under software control. In a normal Color Computer this would only make it go away. However, if you put a program in memory to do something first (like boot in FLEX or OS-9), when you turn off the roms, you will have a full *64K RAM* System with which to run your program (FLEX or OS-9). When the roms are turned off, it is as if you had removed them from the computer. They are gone!

Now, we need the other half of the 64K ram chips to work, and this seems to be the case most of the time, as the article states. Of course, you could also put 64K chips in.

Some neat utilities are included.

MOVEROM moves Color Basic from ROM to RAM. Because it's moved to RAM you can not only access it from FLEX, you can run it and even change it!! You can load Color Computer cassette software and save it to FLEX disk. Single Drive Copy, Format and Setup commands are also included.

Installing FLEX is simple. Insert the disk and type:

RUN "FLEX"

That's all there is to it! You are now up and running in the most popular operating system for the 6809. There are hundreds of software packages now running under the FLEX system. Open your Color Computer to a whole new world of software with FLEX.

FLEX $99.00

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JARBCODE (From Page 50)

"Y" or "YES." The computer will then encode the message and present the code on the screen. If the coded version is too large to be handled on the screen, the computer will pause so you can copy that portion of the code down. Press <ENTER> to continue.

When you have copied the code to a piece of paper, press <ENTER>. You will be returned to the Main Menu.

The format for coded messages is:

1. The first quote mark shows the beginning of a coded character.
2. The number is the number component of a coded character.
3. The dash is a separator.
4. The letter is the character portion of the coded character.
5. The next quote is the end of a coded character. Quote marks do not have to be written down.

Codes will look like this: 25-B 20-; 2-F etcetera.

The Decoding process is also selected from the Main Menu. Again, you must select the type message you are receiving. In this case, we are using straight numerical code.

Once you tell the 80C that you are using straight numerical code, it will ask for the code key. The computer will set up an array for decoding and will display a message for entering the message. Once you have read this message, press <ENTER>.

Now you enter each code pair at a time. You type in the number, a comma, and the letter. If the "letter" is a punctuation mark, it must be enclosed in quotes. Each letter will show as it is decoded. When you have finished, type "00,ZZ" and the entire message will be displayed.

There is no limit to the length of a message to be decoded. However, take care that it does not scroll off the screen before you copy it down.

We hope you enjoy *JARBCODE*. And we hope you have lots of secrets to keep you busy coding!

The listing:

```
1 CLS0
2 DATA 10,1,18,2,3,15,4,5,2,25,1
0,1,18,2,32,19,15,6,20,23,1,18,5
3 FORI=1TO8:READA:POKE1164+I,A:N
EXTI:FORI=1TO2:READA:POKE1231+I,
A:NEXTI:FORI=1TO13:READA:POKE129
0+I,A:NEXTI
```


™TRS80 color

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

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

NOTE: This and other interesting and needed articles for the Radio Shack TRS-80 color computer™ are being included monthly in 68 Micro Journal—The Largest specialty computer magazine in the world!

68 MICRO JOURNAL
5900 Cassandra Smith Road
Hixson, Tennessee 37343
615 842-4600

68 Micro Journal™ was established with one objective in mind; to provide a Magazine **FOR** 68xx Users **BY** 68xx Users. Because of a strict advertiser policy, **68 Micro Journal™** has gained a strong following WORLDWIDE because the reader KNOWS what he is getting when purchasing from a **68 Micro Journal™** Advertiser. It has gained a strong User following because most of the material published is contributed BY USERS, and, therefore, is relevant to the Users needs.

Currently, and even before the Color Computer™ hit the stores, **68 Micro Journal™** was devoting more space to the TRS-80C Color Computer™ and information concerning the Motorola 6809 (which is the CPU in the Color Computer™) than ANY OTHER Computer Magazine. Examples include:

REVIEWS of the three major Disk Control Systems for the Color Computer™, most of the Monitors, Assemblers, and Disassemblers, Word Processors and Editors, "Terminal" Programs (for use with Modems, Communications with other Computers, etc.), and of course, Games.

HINTS for Expanding Memory, Power Supply Cooling, repairing sticky keyboards, disabling the ROM PAK "Take Over", hooking up to Printers, etc.

DISCUSSIONS of the 6883 Synchronous Address Multiplexer, using the Color Computer™ with 64K and 96K memory (which it is ALREADY capable of handling), thoughts on Programming, etc.

I suggest that you subscribe to **68 Micro Journal™**, SOON, as many back issues are sold-out.

We still, and will continue to, lead in the type information you need to **FULLY UTILIZE** the **POWER of the 6809 in the Radio Shack TRS-80 Color Computer™.**

Bob Nay
Color Computer Editor

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USA: 1-year $24.50; 2-year $42.50; 3-year $64.50
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** Sample issue - $3.50

```
4 FORI=1TO255STEP5:SOUNDI,1:NEXT
I:FORI=1TO200:NEXTI:FORI=255TO1S
TEP-5:SOUNDI,1:NEXTI
5 FORI=0TO300:NEXTI:SOUND100,2:S
OUND110,2:SOUND130,2:SOUND140,4:
SOUND100,2:SOUND140,6:FORI=1TO20
0:NEXTI
6 CLEAR2500:DIMA$(59),A(26),B(25
):R1=0:RM$="":FORI=1TO23:READ0:N
EXTI:CLS0
7 FORH=0TO63:SET(H,0,8):SET(H,31
,8):NEXTH:FORV=1TO30:SET(0,V,8):
SET(63,V,8):SET(1,V,8):SET(62,V,
8):NEXTV
8 FORH=11TO20:SET(H,8,2):NEXTH:F
ORH=41TO50:SET(H,8,2):NEXTH
9 E=1125:EE=1140
10 '**************************
11 '*        JARBCODE        *
12 '*   ORIGINALLY WRITTEN   *
13 '*           BY           *
14 '*   JOSEPH EARL BENNETT  *
15 '*   ADAPTED FOR THIS USE *
16 '*      ON JAN.10,1981    *
17 '*  WITH THE ASSISTANCE OF *
18 '*     HARRY DAVID STOW   *
19 '*    FOR JARB SOFTWARE   *
20 '**************************
21 PRINT@238,"    ";:PRINT@269,"
 * * ";
22 FORH=14TO47:SET(H,19,3):SET(H
,22,3):NEXTH:FORV=19TO22:SET(14,
V,3):SET(15,V,3):SET(46,V,3):SET
(47,V,3):NEXTV
23 FORH=11TO20:SET(H,5,2):NEXT:F
ORH=41TO50:SET(H,5,2):NEXT:FORV=
6TO7:SET(11,V,2):SET(20,V,2):SET
(41,V,2):SET(50,V,2):NEXT:A$="
                "
24 A$=A$+"WRITTEN BY JOSEPH E. B
ENNETT---COPYRIGHT 1981 JARB SOF
TWARE---ADAPTED WITH THE ABLE AS
SISTANCE OF HARRY D. STOW---THIS
 PROGRAM DEDICATED TO COMPUTER W
IDOWS EVERYWHERE---"+"
                "
25 FORA=1TOLEN(A$)-15:E1=E1+1:IF
E1>4THENGOSUB60
26 PRINT@328,MID$(A$,A,15);
27 POKEE+E1,239:POKEEE+E1,239:SO
UNDRND(240),1:POKEE+E1,128:POKEE
E+E1,128
28 NEXTA:SOUND1,4:SOUND255,1:SOU
ND1,4
29 A$="":A=0:A1$=CHR$(128)+CHR$(
128)+CHR$(128)+CHR$(128)+CHR$(12
8)+CHR$(128)
30 PRINT@69,A1$;:PRINT@84,A1$;:P
RINT@101,A1$;:PRINT@116,A1$;:A1$
="":FORI=1TO1500:NEXT:CLS0
31 DATA 16,18,5,45,9,14,9,20,9,1
,12,9,26,9,14,7,32,22,1,18,9,1,2
,12,5,19,2,5,32,23,9,20,8,32,25,
15,21,32,9,14,32,1,32,13,15,13,5
,14,20
32 FORI=0TO25:READZ:POKE1251+I,Z
:NEXTI:FORI=0TO22:READZ:POKE1284
+I,Z:NEXTI
33 GOSUB62
34 CLS:PRINT:PRINT:PRINTTAB(11)"
MAIN MENU"
35 L1$="":C$="":C1$="":M1$="":M$
=""
36 Z$="":PL=0
37 PRINT:PRINT
38 PRINTTAB(5)"1. CODE CHOICES"
39 PRINTTAB(5)"2. ENCODING MESSA
GES"
40 PRINTTAB(5)"3. DECODING MESSA
GES"
41 PRINTTAB(5)"4. RECALL LAST ME
SSAGE"
42 PRINTTAB(5)"5. END PROGRAM"
43 PRINT:PRINT:PRINTTAB(5)"PRESS
 YOUR CHOICE"
44 FORH=0TO63STEP2:SET(H,0,8):SE
T(H,31,8):NEXTH
45 FORV=1TO30STEP2:SET(0,V,8):SE
T(63,V,8):NEXTV
46 POKE1431,127:D$=INKEY$:SOUND1
00,1:FORI=0TO30:NEXTI:POKE1431,1
43:FORI=0TO40:NEXTI
47 IFD$=""THEN46
48 D=VAL(D$)
49 IFD=1THEN162
50 IFD=2THEN122
51 IFD=3THEN70
52 IFD=4THEN219
53 IFD=5THEN61ELSE54
54 PRINT@456,"                ";
55 FORA9=0TO50:NEXTA9
56 PRINT@456,"INVALID RESPONSE";
57 SOUND225,1:FORA9=0TO40:NEXTA9
58 Z1=Z1+1:IFZ1>10THEN59ELSE54
59 Z1=0:PRINT@456,"
  ";:GOTO46
60 E1=1:E=1125:EE=1140:RETURN
61 CLS:END
62 FORA=32TO90:A$=A$+CHR$(A):NEX
TA
63 A$(B)=A$:B=B+1
64 B$=MID$(A$,2,58)+LEFT$(A$,1)
65 SOUNDRND(200),1
66 SET(RND(63),RND(12),RND(8)):S
ET(RND(63),RND(13)+18,RND(8))
67 IFB>25THEN69ELSE68
68 A$=B$:GOTO63
69 FORI=0TO1000:NEXT:RETURN
70 CLS:PRINTTAB(7)"DECODING A ME
SSAGE"
71 M1$=""
```

(Continued on next page)

JARBCODE (From Page 53)

```
72 FORA9=0TO25:A(A9)=0:NEXTA9:PR
INT:PRINT"PLEASE ENTER YOUR CHOI
CE:"
73 PRINT"1. STRAIGHT NUMERICAL S
EQUENCE"
74 PRINT"2. ADDITIVE NUMERICAL S
EQUENCE"
75 PRINT"3. USER CHOSEN SEQUENCE
"
76 PRINT"4. RETURN TO MENU"
77 PRINT:PRINT"PRESS NUMBER OF Y
OUR CHOICE.";
78 Z$=INKEY$:SOUND180,1:FORI=0TO
20:NEXTI:IFZ$=""THEN78
79 IFZ$<"1"ORZ$>"4"THEN80ELSE84
80 CLS:FORA9=0TO10:SOUND199,1:PR
INT@226,"INVALID ENTRY, TRY AGAI
N."
81 FORA7=0TO20:NEXTA7
82 SOUND200,1:PRINT@226,"
                ":FORA7=0TO20:
NEXTA7:SOUND201,1
83 NEXTA9:GOTO70
84 TC=VAL(Z$):ON TC GOTO 85,109,
115,34
85 CLS:M1$="":PRINTTAB(13)"DECOD
E:"
86 PRINTTAB(2)"STRAIGHT NUMERICA
L SEQUENCE"
87 PRINT:PRINT"PLEASE ENTER THE
ONE NUMBER KEY";
88 PRINT" (YOU MUST HAVE THE COR
RECT KEY":PRINT"TO DECODE YOUR M
ESSAGE).":PRINT:INPUTK1
89 FORA9=0TO25:K2=K1+A9:A(A9)=K2
:NEXTA9
90 CLS:PRINTTAB(4)"ARRAY ASSIGNM
ENT COMPLETE":PRINT:PRINT"ENTER
CODE AS WRITTEN (NUM,CHAR)";
91 PRINT"SEPARATE EACH NUMBER FR
OM EACH"
92 PRINT"CHARACTER WITH A COMMA.
"
93 PRINT:PRINT"EXAMPLE: 214,Z":P
RINT
94 PRINT"ENTER ONLY ONE NUMBER,C
HARACTER":PRINT"PAIR AT A TIME."
95 PRINT:PRINT"WHEN READY, PRESS
 <ENTER> KEY";:INPUTZ$
96 Z$=""
97 CLS
98 PRINT:PRINT"ENTER NUMBER,CHAR
ACTER"
99 PRINT"IF CHARACTER IS A PUNCT
UATION":PRINT"MARK, ENCLOSE IT I
N QUOTES."
100 PRINT"EXAMPLE: 21,"+CHR$(34)
+","+CHR$(34):PRINT"WHEN MESSAGE
 IS DONE, ENTER":PRINT"(00,ZZ) T
O SIGNIFY COMPLETION.";
101 INPUTN1,L1$
102 IFL1$="ZZ"THEN107
103 FORA9=0TO25:IF A(A9)=N1 THEN
 104 ELSE NEXTA9
104 FORA8=1TO58:L2$=MID$(A$(A9),
A8,1):IFL2$=L1$THEN105ELSENEXTA8
105 M1$=M1$+MID$(A$(0),A8,1)
106 CLS:PRINT@0,M1$:GOTO98
107 CLS:PRINT@0,M1$
108 PRINT"WHEN READY TO RETURN T
O MENU":INPUT"PRESS <ENTER>";Z$:
GOTO34
109 CLS:PRINTTAB(13)"DECODE:":PR
INTTAB(2)"ADDITIVE NUMERICAL SEQ
UENCE":M1$=""
110 FORA9=0TO25:A(A9)=0:NEXTA9
111 PRINT:INPUT"PLEASE ENTER STA
RT KEY NUMBER";SK
112 INPUT"NOW ENTER ADDITIVE KEY
 NUMBER";AK
113 FORA9=0TO25:A(A9)=SK:SK=SK+A
K:NEXTA9
114 GOTO90
115 CLS:M1$="":PRINTTAB(12)"DECO
DE:":PRINTTAB(1)"USER CHOSEN NUM
ERICAL SEQUENCE"
116 PRINT:PRINT"YOU MUST HAVE TH
E COMPLETE KEY":PRINT"(26 NUMBER
S) TO DECODE A MESSAGE";:PRINT"I
N THIS SECTION"
117 PRINT"DO YOU HAVE THE COMPLE
TE KEY":INPUT"(YES/NO)";Z$
118 IFLEFT$(Z$,1)<>"Y"THEN34
119 CLS:PRINT"OKAY, NOW WE CAN B
EGIN."
120 FORA9=0TO25:O=O+1:PRINT"ENTE
R KEY NUMBER #"O;:INPUTN1:A(A9)=
N1:CLS:NEXTA9
121 GOTO90
122 PL=0:Z$="":CLS:M1$="":PRINTT
AB(8)"ENCODE MESSAGES":PRINT:PRI
NT"HAVE YOU CHOSEN A CODE YET (Y
/N)";
123 Z$=INKEY$:SOUND180,1:FORI=0T
030:NEXTI:IFZ$=""THEN123
124 IFZ$="Y"ORZ$="N"THEN126
125 CLS:PRINT@224,"INVALID RESPO
NSE, TRY AGAIN.....":FORI=0TO30:
SOUND170+I,1:NEXTI:GOTO122
126 IFZ$="N"THEN162
127 IFR1<>1THEN128ELSE129
128 PRINT"THAT IS INCORRECT, YOU
 HAVE NOT":PRINT"CHOSEN YOUR COD
E YET!!":FORA9=1TO8:SOUND180,2:S
OUND190,1:SOUND200,2:NEXTA9:FORI
=1TO960:NEXTI:GOTO162
129 PRINT:PRINT"ENTER MESSAGE (N
UMBERS, LETTERS,";:PRINT"AND PUN
CTUATION ARE OKAY)":PRINT"ENTER
A (^) TO END MESSAGE."
130 PRINT:PRINT
131 M1$="*"
```

(Continued on Page 56)

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SOFTWARE AUTHORS WELCOMED

JARBCODE (From Page 56)

```
132 M$=INKEY$
133 PRINT@224,"CHARACTER COUNT I
S";PL
134 IFM$=""THEN132
135 IFM$="^"THEN143
136 IFASC(M$)<32THEN132
137 M1$=M1$+M$
138 RM=1:RM$=M1$:PL=PL+1:IFPL>=2
25THEN139ELSE142
139 CLS:PRINT"SORRY, BUT YOUR ME
SSAGE IS TOO":PRINT"LONG. PLEASE
 LIMIT EACH SECTION":PRINT"OF ME
SSAGE TO APPROXIMATELY 225":PRIN
T"CHARACTERS OR LESS.":PRINT"PRE
SS ANY KEY TO BEGIN AGAIN."
140 Z$=INKEY$:IFZ$=""THEN140
141 M1$="":PL=0:CLS:GOTO129
142 PRINT@256,M1$:GOTO132
143 PRINT"IS THIS CORRECT?":PRIN
TM1$:INPUT"YES/NO";Z$
144 IFLEFT$(Z$,1)<>"Y"THEN145ELS
E146
145 PRINT"SORRY, LET'S TRY AGAIN
.":FORA9=0TO600:NEXTA9:GOTO122
146 PRINT"GOOD, LET'S GO ON THEN
.":FORA9=0TO600:NEXTA9
147 CLS
148 FORA9=1TOLEN(M1$):C$=MID$(M1
$,A9,1)
149 C1=ASC(C$)-31
150 A8=RND(25)
151 C2$=A$(A8)
152 C1$=MID$(A$(A8),C1,1)
153 C2=A(A8)
154 IFC1$=CHR$(34)THEN150
155 IFC1$=CHR$(32)THEN150
156 SOUNDRND(250),1
157 PRINTCHR$(34)+RIGHT$(STR$(C2
),LEN(STR$(C2))-1)+"-"+C1$+CHR$(
34)+"  ";
158 PL=PEEK(1408):PL1=PEEK(1409)
:PL2=PEEK(1410):IFPL=96ANDPL1=96
ANDPL2=96THEN160ELSE159
159 PRINT:PRINT"TO CONTINUE,PRES
S <ENTER> KEY";:INPUTI$:CLS:PRIN
T"ENCODING CONTINUES----"
160 NEXTA9
161 PRINT:PRINT"ENCODING COMPLET
E":INPUT"WHEN READY PRESS <ENTER
>";Z$:GOTO34
162 CLS:PRINT:PRINT:PRINT:PRINTT
AB(10)"CODE CHOICES":PRINTTAB(14
)"MENU"
163 Z1=0
164 PRINT:PRINTTAB(2)"1. STRAIGH
T NUMERICAL CODE"
165 PRINTTAB(2)"2. ADDITIVE NUME
RICAL CODE"
166 PRINTTAB(2)"3. USER ASSIGNED
 CODE"
167 PRINTTAB(2)"4. RETURN TO MEN
U"
168 PRINT:PRINTTAB(5)"PRESS YOUR
 CHOICE";
169 FORH=0TO63STEP2:SET(H,0,8):S
ET(H,31,8):NEXTH:FORV=1TO30STEP2
:SET(0,V,8):SET(63,V,8):NEXTV
170 Z$=INKEY$:POKE1399,127
171 IFZ$=""THEN173
172 IFZ$<"1"ORZ$>"4"THEN174ELSE1
76
173 FORI=0TO40:NEXTI:POKE1399,14
3:FORI=0TO40:NEXTI:SOUND32,1:GOT
0170
174 PRINT@422,"                "
;:FORA9=0TO40:NEXTA9:SOUND200,1:
SOUND205,1:PRINT@422,"INVALID RE
SPONSE";:FORA9=0TO40:NEXTA9:Z1=Z
1+1:IFZ1>10THEN175ELSE174
175 PRINT@422,"
";:Z1=0:GOTO170
176 A1=VAL(Z$):ON A1 GOTO177,190
,204,34
177 CLS:PRINTTAB(3)"STRAIGHT NUM
ERICAL SEQUENCE":PRINT:PRINT"ENT
ER THE START NUMBER OF YOUR":PRI
NT"CODE SEQUENCE (ANY NUMBER)";:
INPUTB1
178 R1=1
179 CLS:PRINT"DETERMINING SEQUEN
CE.....":FORA9=0TO25:A(A9)=
B1+A9:SOUNDRND(250),1:NEXTA9
180 FORA9=0TO480:NEXTA9:CLS
181 PRINT"IS THIS SEQUENCE SATIS
FACTORY?"
182 FORA9=0TO25:PRINTA(A9);:NEXT
A9
183 PRINT:PRINT"PRESS (Y/N) TO C
ONTINUE";
184 Z$=INKEY$:IFZ$=""THEN184
185 IFZ$="N"THEN188
186 IFZ$="Y"THEN189
187 FORI=1TO10:SOUND170,2:SOUND1
90,1:SOUND200,2:NEXTI:GOTO184
188 CLS:PRINT"SORRY, LET'S TRY A
GAIN":FORA9=0TO500:NEXTA9:GOTO17
7
189 CLS:PRINT"RETURNING TO MAIN
MENU.":FORI=0TO20:SOUNDRND(100),
1:NEXTI:GOTO34
190 CLS:PRINTTAB(3)"ADDITIVE NUM
ERICAL SEQUENCE":PRINT:PRINT"ENT
ER THE START NUMBER OF YOUR":PRI
NT"SEQUENCE (ANY NUMBER)";:INPUT
B1
191 INPUT"NOW ENTER THE ADDITIVE
 VALUE";B2
192 R1=1
193 CLS:PRINT"DETERMINING SEQUEN
CE.....":FORA9=0TO25:A(A9)=
B1:B1=B1+B2:SOUNDRND(250),1:NEXT
A9
194 FORA9=0TO480:NEXTA9
195 CLS:PRINT"IS THIS SEQUENCE S
ATISFACTORY?"
196 FORA9=0TO25:PRINTA(A9);:NEXT
A9
197 PRINT:PRINT"PRESS (Y/N) TO C
ONTINUE";
198 Z$=INKEY$:IFZ$=""THEN198
199 IFZ$="N"THEN203
200 IFZ$="Y"THEN189
201 FORI=1TO10:SOUND170,2:SOUND1
90,1:SOUND200,2:NEXTI:GOTO198
202 IFLEFT$(Z$,1)<>"Y"THEN203ELS
E204
203 CLS:PRINT"SORRY, LET'S TRY A
GAIN.":FORA9=0TO500:NEXTA9:GOTO1
90
204 CLS:PRINTTAB(5)"USER ASSIGNE
D SEQUENCE":PRINT:PRINT"ENTER TH
E REQUIRED SET OF":PRINT"NUMBERS
 (26 OF THEM) ON REQUEST"
205 PRINT"WRITE THEM DOWN FOR FU
TURE USE"
206 FORA9=0TO25:PRINT"NUMBER"A9+
1"=";:INPUTB1:SOUND200,1:A(A9)=B
1:B(A9)=B1
207 IFA9>0THEN208ELSE209
208 FORI=0TOA9-1:IF A(A9)=B(I) T
HEN 217 ELSE NEXTI
209 NEXTA9:PRINT:PRINT"INPUT OF
KEY NUMBERS COMPLETE"
210 FORA9=0TO500:NEXTA9:CLS:PRIN
T"IS THIS SEQUENCE SATISFACTORY?
":FORA9=0TO25:PRINTA(A9);:NEXTA9
:PRINT:PRINT"PRESS (Y/N) TO CONT
INUE";
211 R1=1
212 Z$=INKEY$:IFZ$=""THEN212
213 IFZ$="N"THEN216
214 IFZ$="Y"THEN189
215 FORI=1TO10:SOUND170,2:SOUND1
90,1:SOUND200,2:NEXTI:GOTO212
216 CLS:PRINT"SORRY, LET'S TRY A
GAIN.":FORA9=0TO500:NEXTA9:GOTO2
04
217 CLS:PRINT" YOU HAVE REPEATED
 A NUMBER THAT";:PRINT"HAS ALREA
DY BEEN ENTERED. PLEASE";:PRINT"
PRESS ANY KEY TO START RE-ENTRY.
";
218 Z$=INKEY$:SOUND150,1:FORI=0T
020:NEXTI:IFZ$=""THEN218ELSE204
219 CLS:IFRM=1THEN223
220 PRINT@230,"NO MESSAGE IN MEM
ORY.":PRINT:PRINTTAB(4)"PRESS AN
Y KEY TO RETURN."
221 Z$=INKEY$:SOUND150,2:SOUND17
5,1:SOUND200,2:FORI=1TO30:NEXTI:
IFZ$=""THEN221
222 GOTO34
223 PRINTTAB(3)"LAST MESSAGE IS
AS FOLLOWS:":PRINT:PRINTRM$
224 PRINT:PRINT"PRESS ANY KEY TO
 RETURN."
225 Z$=INKEY$:IFZ$=""THEN225
226 GOTO34
```

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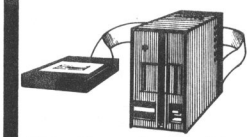

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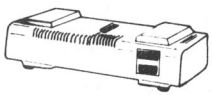

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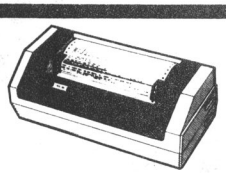

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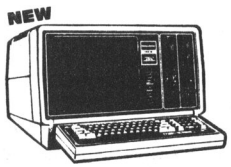

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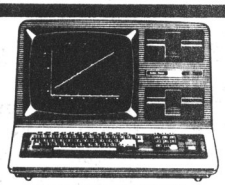

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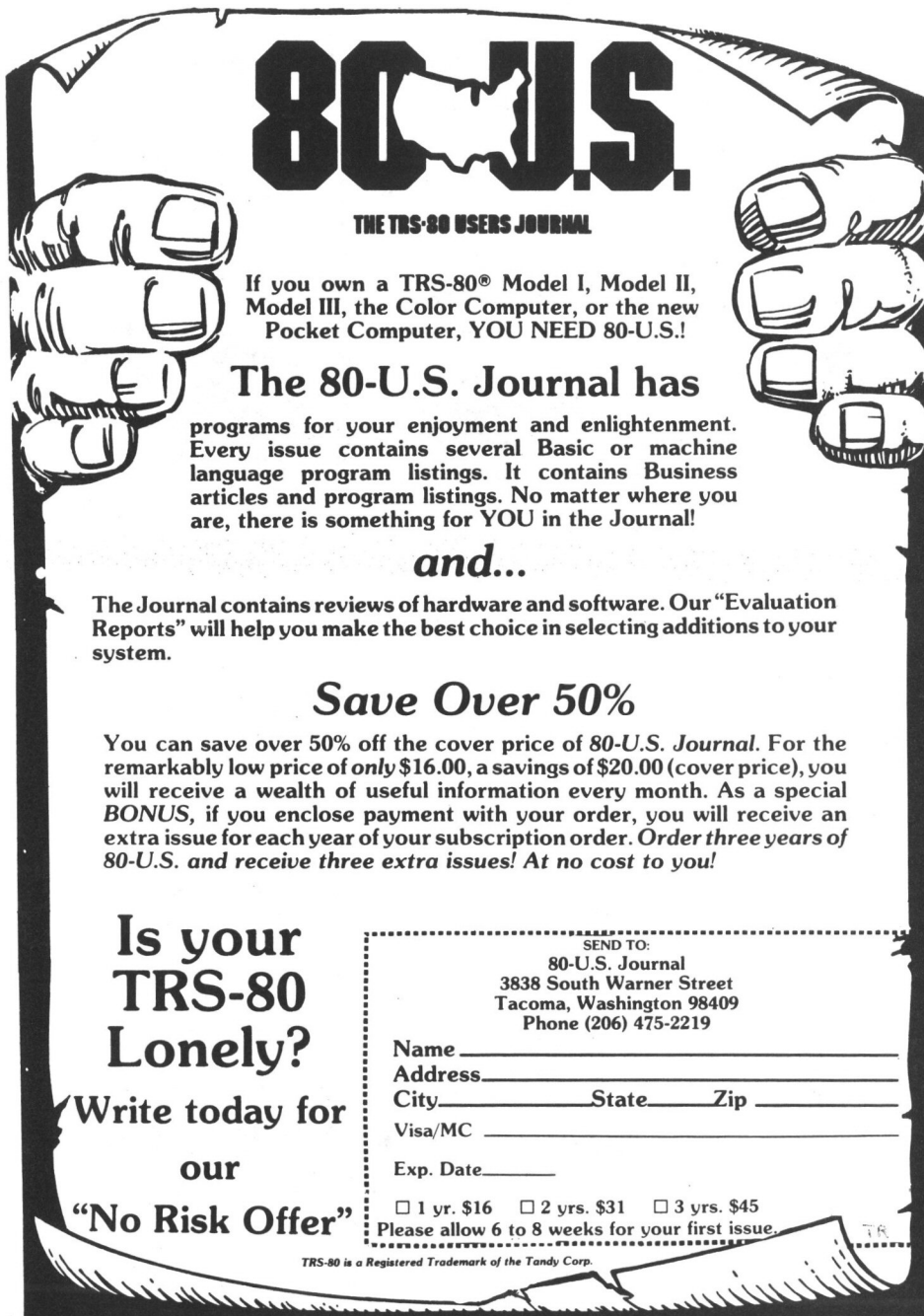
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CORRECTIONS

Nothing worse than correcting a correction...but here one is:

The correction on Page 2 of the April issue should have said that Page 20, Column 1, Line 500 should have been started with "500" rather than with " 0".

Some of you will have to put the last Q$ statement of Line 44 in the March SKY-EYE program at the beginning of Line 45 and add a close quote at the end of that string. Also in Line 44, change the letter "P" in the B$ to a "B". Thanks to Alexander Ornstein of Farmington Hills, MI, for this catch.

WATCH OUT FOR FAULTY DISK DRIVES

Radio Shack reports that some 80C disk drives have experienced some problems.

Check the serial number of your drive. If the number is below 004751, and it does not have a marking of "G" or "D" on it, return the drive to your local service department.

We are advised that there is no cost for this repair.

There have been some rumors about different colored dots on the bottom of the drives. Radio Shack says, however, that this should be the way to check.

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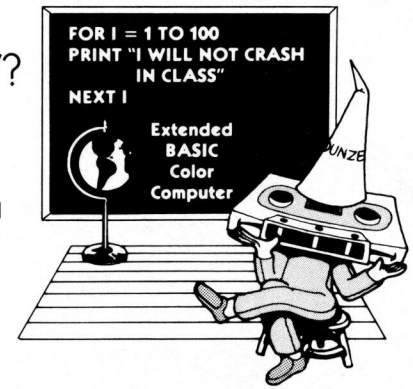

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