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the RAINBOW

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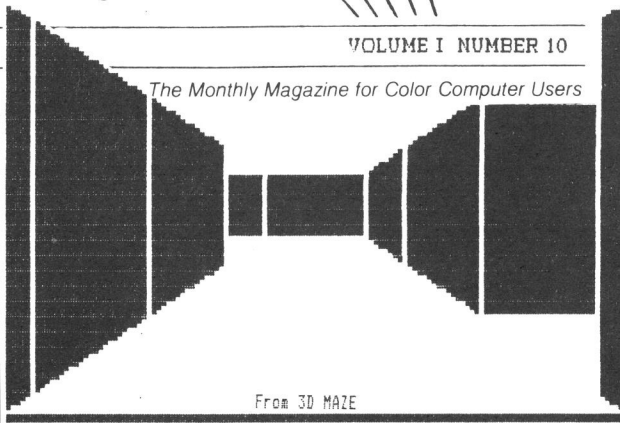
The Monthly Magazine for Color Computer Users

Under the RAINBOW

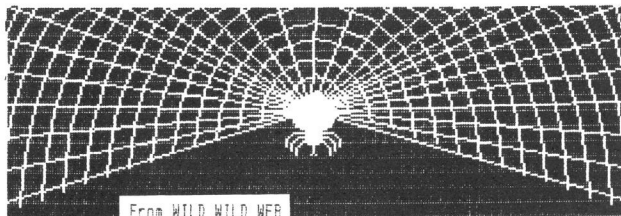
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Editor's Notes...

PRINT #-2,

Well, no one came up with a *CANTERBURY ADVENTURE* for this, the April issue, as I suggested in my column a month ago. I didn't really expect it, though, on such short notice.

But, that does give rise to telling you that we are planning a special "Adventure" issue for the future -- probably in late summer. That issue will have a whole bunch of adventure information and a lot of reviews of adventure software. While we won't stint on other useful stuff, we plan to target a good portion of

that issue of *the RAINBOW* to adventures.

And we're planning some other special issues, too. General subjects are on home utilities like money management and the like, and on educational programs. This does not mean we'll be "saving up" for these issues, but we do plan to have an emphasis on those subject areas in the coming months.

You'll see a notice inside about

(Continued on Page 32)

LETTERS TO RAINBOW



MORE PRETTYPRINT

Editor:

I just received my first issue of the RAINBOW today. Good stuff!

I have some additional information regarding prettyprinting with CoCo. As you stated, a colon must be placed right after the line number when entering extra spaces to a new statement. However, once the line has been entered, extra spaces can be added without the colon key using the BASIC editor's insert command. A note of caution, these spaces will disappear if you save the program in ASCII format.

On a different note, I read with interest your Pipeline column concerning Wayne Green and 80-Micro. Bravo for our side! Wayne seems to think he is doing his readers a favor by publishing 80-Micro. Three cheers for everyone who supports the CoCo.

Ron Crouch
Ft. Worth, TX

INTO MUSIC COMPOSING

Editor:

I have received my second issue of the RAINBOW and the back issues I ordered. I really enjoy the magazine and think it is the best.

I'm hoping that someone will come up with a really good and complete music coposer program. Radio Shack's is a fine one as far as it goes, but it left out too many essentials to be used for any serious use.

I hope to become adept at programming and your magazine is a great help toward that goal. I look forward, each month, to receiving the RAINBOW.

Norman C. Place
Zolfo Springs, FL

MORE RANDOM THOUGHTS

Editor:

In your February issue, Mr. Hasenstaub wrote in about the RND function for dice simulation. He is correct in saying that two RND

functions are necessary in order to obtain "correct" odds for given numbers.

However, when he says that by using only one RND function you will get numbers between one and twelve he is only partially correct. You can very easily get RND numbers between two and twelve by applying a conditional statement to the RND variable you are using -- although the odds for all numbers will be the same.

The following short program will produce RND numbers between two and twelve using only one RND function.

```
10 CLS
20 FOR N=1 TO 24
30 A=RND(12)
40 IF A<1 THEN GOTO30
50 PRINT A,
60 NEXT N
70 END
```

Thank you.

Rita Lawry
Cleveland, OH

ART PRINTS?

Editor:

Can anyone out there help me? I bought a Radio Shack ART GALLERY CoCo program today and was surprised (and disappointed) to find that it does not have a way to output screen contents to the printer.

I am inexperienced in programming and don't know of a way to accomplish this. Is there maybe an easy program that would "load" a picture saved on cassette, and then print using the screen print program -- which I have. Or some other way?

Gary Burkhardt
Coldwater, MI

AGREES WITH REVIEW

Editor:

Congratulations on the success and growing popularity of your publication. The capability of the Color-80 for the price is outstanding and I am sure the market will continue to grow. The one need is for more dedicated software and technical support such as the kind you are providing.

I am in agreement with the review by Rick Smith in your February issue on the 32K upgrade from one of your advertisers, Computerware. It works perfectly. The installation went well following their suggestion that low profile sockets be installed between the motherboard and the new board to allow for any minor alignment. The DM ERROR is gone.

John Arbogast
Hamilton, OH

A MERGE SYSTEM

Editor:

I enjoyed your Pipeline comments of February. The RAINBOW and the CoCo are really growing. It is refreshing to find TRS-80 Color Computer ads without having to sort through all the others.

For some time I have been looking for a merge routine to join two rather long BASIC programs. Perhaps there is a merge routine, but I couldn't find one so, being the sort of person I am, I set out to build one (Ed. Note: The September issue, No. 3, carried a merge routine).

Here is how my manual merge routine works:

If your programs are very long, you may have to edit out unnecessary lines of each program in order to get them both into memory. Also, some memory may be "taken back" from CoCo. Check the highest line number of the first program and renumber the second so that its starting line number is higher.

Now, on a blank cassette tape, CSAVE each program with its name using the ASCII format. Make note of how many "data bursts" there are in each program. The first "data burst" contains the ID and program type information. The last "data burst" contains the end of file information.

Now, CLOAD the first program, counting the "data bursts" and stop the tape recorder just before the last one. Leave the computer as is, it is still open to receive data.

Unplug the ear plug from the recorder and cue up the second

CORRECTION:

Page 20 Column 1 Line 500

SHOULD: 500 N = 4; D = 5; A \$ =
GASOLINE"; C = 159; GOSUB 440; RETURN

program just past the first "data burst." Plug the ear plug back into the earphone jack of the recorder.

Now, press PLAY on the recorder. CoCo will keep on receiving data as if it were never interrupted until it receives the end of file information from the second program.

I find it easier just to pull the earphone plug from the cassette player just before the last "data burst", let the tape play through the player's speaker, and shove it back into the earphone jack just after the first "data burst" of the second program. You have to do it fast to do it this way but you may have better luck with the process -- especially if your tape recorder has a slow startup speed.

James Richter
Corpus Christi, TX

VIDEOTEX ON CART

Editor:

Your magazine is to be complemented on the information which it provides for owners of the Color Computer.

I am interested in obtaining information on how one can either print or dump the screen while using the VIDEOTEX program. The program I have is not on tape, but on a ROM cartridge.

In closing, let me say that as a research scientist, I find the Color Computer to have great potential in the lab and that your magazine seems to contain the type of information -- in both articles and advertising -- that I need to make the best possible use of my computer.

Drest Glembocki
Brooklyn, NY

WORD PROCESSOR IS SIMPLE

Editor:

When I received the January issue of the RAINBOW I immediately began using the word processing program you printed on page 11. Would you believe that was the first time I used my printer as a typewriter. Your program is so simple its unbelievable.

The RAINBOW has been extremely helpful to me and I anxiously await each issue.

I bought my CoCo in May, 1981, with 16K Extended Color Basic, and I have since modified it with a 16K Plus board from Computerware. I also have two disk drives and an Epson MX-80 printer. Since my initial investment, I am not sure I have made the best selection. Thus far, I have not been able to print graphics except from the short programs listed

in the MX-80 manual after I enter the Radio Shack PTFX18 program that changes the computer output from seven bit to eight bit. When I try to print other graphics, all I get is garbage. The same is true when I use the Radio Shack SCREEN PRINT program.

George Klement
Grandview, MO

(Ed. Note: The LP VII and LP VIII use dot/bit graphics which work with Radio Shack's SCREEN PRINT program. The MX-80 does not have dot/bit graphics unless you install the GRAFTRAX modification. Even then, the driver routines may be different so that you will have to write your own graphics programs. Does anyone have any further details on this?)

BORDER BEGONE?

Editor:

Your magazine was just what I was looking for for my CC.

Question: What commands can I give my 32K CC to not have the border around the screen so that the whole screen can be used?

Dennis DiJusto
Bronx, NY

E.N.G.L.I.S.H.

Editor:

Got my first edition of the RAINBOW today and am finally impressed by a computer mag. Like Tom Nee of Pittsburgh, I need experts to talk to me in ENGLISH (Easy Non-Gibberish Language Including Simple Homologies), a language even more basic than BASIC. Remember it?

When I bought a TV set I was told how to plug it in, turn it on and tune in to the channel I want to watch. When I bought an adding machine I was shown the buttons and functions. I was very satisfied.

I want an inexpensive word processor, perhaps with a built-in spelling checker. Why must I wade through chips, POKE, PEEK, compiler,

smart terminals, Etc., Ad Nauseum.

Your publication comes closest, but where can I go to get ENGLISH answers to my questions?

I am a writer looking for a tool with no desire to become a programmer, technician or -- God help us -- a system analyzer.

HELP (Honestly Easy Language/Please).

Glenn Knight
Glen Burney, MD

Editor:

Regarding the letter in February from Mr. Tom Nee, I am in complete agreement with him. I would like to take the issue one step further. We are not hardware (electronics) experts either!

I'm going to stick my neck out and venture a guess that at least two-thirds of the present total market for peripherals, upgrades and software for the Color Computer consists of novices and semi-technical types that have a genuine interest in the CoCo, and, those folks that always seem to have money to spend on new things. So, why not write straightforward, plain-talk ads (and articles for that matter) about your products?

Don't get me wrong, I'm not talking about taking the CoCo to the level of a toy -- heaven forbid!!! I am talking about communicating the practical utility and worth of your products which can expand, upgrade and support the Color Computer in a manner that the layman can understand. And, in a manner that will allow him to make a buying decision.

By the way, if I'm wrong about the available marketplace, I'll withdraw my neck and extend my wrist for a slap. Maybe the RAINBOW would consider running a survey.

Jim Rauh
Kennewick, WA

(Ed. Note: O.K. everyone. Let's hear from you.)

the RAINBOW
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LAWRENCE C. FALK — Editor

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The RAINBOW is published every month of the year.

the ASSEMBLY CORNER

(EDITOR'S NOTE: Assembly Language is one of the most complicated subjects faced by personal computer users. Yet, it is one which can offer some of the greatest programming rewards for the experienced. The RAINBOW asked Dennis Lewandowski of DSL Computer Products, an experienced assembly language programmer, to write a series of tutorials on the subject. Dennis' column will appear monthly in the RAINBOW and is aimed at the beginner. We hope you will enjoy this new feature.)

By Dennis Lewandowski

Hello. And welcome to a new series of articles on 6809 assembly language. Lonnie Falk (who!) has asked me if I would share my knowledge of assembly language with the RAINBOW's readers. In deciding where to start, I will assume you have never dabbled in assembly language before and we will begin, as they say, from scratch.

First of all, you will need to become familiar with the "language" used in assembly language and you should also know about the three numbering systems we will be using.

THREE numbering systems? Eeeeh gaad! No, don't stop reading here,

one of them is decimal -- the same system you use every day and were taught in grade school. That's easy.

System two is the only set any computer in the world, including our favorite CoCo, uses. It is called binary. Binary is based on the number two and the only "legal" numbers in the system are one and zero. (That's two numbers.) Once you have one and add one to it, you get 10. Confusing at first, yes. However, binary can be converted into the third number system, hexadecimal or hex. This is the most commonly used by computer programmers and is the best compromise between the system you know (decimal) and the one your CoCo knows (binary).

Hex is based on the number 16. Hold on there! There are only 10 numbers, zero to nine. How do we get 16 of them.

Well, we won't make up any numbers to confuse you, we'll just steal a few symbols from someplace else. And that someplace is the alphabet.

So, our hex numbers will translate into decimal numbers like this:

HEX	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
DEC	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

But, since hex is based on 16 and binary on two, once you achieve 16

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hex, or two binary, you have "10" -- which is one in the "next greater" column. In other words, the number systems recycle according to their base, 2, 10 or 16.

There are whole books explaining the differences in numbering systems, and I don't (and can't) condense them all here. So, if you're a little confused by this, perhaps you can check one out of the local library and delve into it a little more deeply.

Now, about the language difference. Its not all that different. But, you might not be familiar with some of the words yet. You've already become acquainted with two of them, hex and binary. Let's borrow the dictionary format for the rest -- although we'll group them by subject, not alphabetically.

BIT -- The smallest piece of information your CoCo uses. A bit may be SET to one (1) or RESET to zero (0).

NIBBLE -- Four bits in a row, easily converted to a hex number 0 if all are reset, to an F if all are set.

BYTE -- Eight bits, or two nibbles in a row. Also easily converted from binary to hex. If all

are reset, it is 00. If all are set, it is FF.

DATA -- The arrangement of bits within a byte.

REGISTER -- A one or two byte location in which data is stored or acted upon. Can have many different uses and definitions.

MEMORY -- A series of bytes used for data storage.

ROM -- Read Only Memory. Data which has been saved for continual use and which is not meant to be changed. It cannot be erased if power is disconnected.

RAM -- Random Access Memory. A series of bytes which can be changed and reused over and over again. It will always be erased when the power is turned off.

PROGRAM -- A series of bytes designed to instruct the computer to perform in a certain manner. Can be saved on ROM or placed in RAM from tape, disk or keyboard.

BASIC -- An acronym for Beginner's All-purpose Symbolic Instruction Code. It is a series of programs, usually in ROM. CoCo uses a BASIC interpreter which must analyze each instruction before carrying it out.

MACHINE LANGUAGE -- The actual set of codes the CoCo uses to perform any function. No analysis of the instructions takes place, and the computer will do exactly what it is told.

OP CODE -- Operational Code. A name given to a machine language code, usually abbreviated to two through four letters for easy use.

ASSEMBLER -- A program which takes the OP CODE, does an analysis of it, and writes a machine language program.

I/O -- Input/Output. A computer's way of interfacing with the outside world. The keyboard is an example of input; the video display an example of output.

Well, enough definitions for now. But, in addition to helping you understand some of the terms we will be using, the definitions are the key to why assembly language can be such a good way to program.

Remember, we said that machine language is the actual set of codes the CoCo uses and that an assembler takes op codes, does an analysis, and generates a machine language program? Well, because that machine language uses the CoCo's *OWN* code, the machine language program is faster, more detailed and takes up less space than does a BASIC program. A BASIC

(Continued on next page)

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ASSEMBLY (From Page 5)

program is interpreted each time it is run. An assembly language program is interpreted only once -- when it is created. You leave out a whole step.

I can see you can see the end of this opening column in sight and are asking, is that all I'm going to get out of this, numbers and lingo? No way.

We'll get into using all of this in subsequent columns, but we do want to be firmly grounded in the basics first.

Until then, and to whet your appetite to the power of assembly language programming, I have included a short BASIC program which will put a machine language program into the memory of your CoCo and call it using BASIC's USR function. Its in this form because many of you may not have an assembler yet. The program will demonstrate the power of machine language by changing all colors of graphic blocks to the next color by using a 30 byte subroutine while leaving the text on the screen alone. It is written for Extended Color Basic. For non-extended, add a line:

```
80 POKE 275,4:POKE276,0
```

For 32K, change 12288 to 28672 in line 70.

```
70 DEFUSR0=28672
90 DATA 142,4,0,166,128,140,6,0
100 DATA 39,20,129,129,37,245,12
9
110 DATA 241,44,8,139,16,167,130
120 DATA 166, 128,32,233,128,112
,32,246,57
130 FOR X=28672 TO 28702:READY:P
OKE X,Y:NEXT
140 CLS(0)
150 Y=255:Z=480
160 FOR X=1024 TO 1216 STEP 32
170 FOR A=0 TO 31:X1=X+A
180 POKE X1,Y:POKE X1+Z,Y
190 NEXT A:Y=Y-16:Z=Z-64:NEXT X
200 PRINT0230,"PRESS THE SPACE B
AR";
210 PRINT0262,"TO INCREASE SPEED
!";
220 X=1000
230 FOR Y=0 TO X:NEXT
240 A=USR(0)
250 IF INKEY$="" THEN 230
260 X=X/2:IF X<1 THEN X=1
270 GOTO230
```

Next month we'll look at the Central Processing Unit, the CPU.



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COMING SOON! --> C.C. Mailer

This is being written in February (with Disk C.C. Writer by the way) and April still looks like the ship date for this In Demand product. We mentioned that it was coming in our Product List and it was Back Ordered before it came out of Coding not to mention Systems and Field Testing.

Mailing lists are a natural for the Color Computer and you add the ability to merge SELECTED Names and Addresses with your C.C. Writer Letters and you really have some Power. TransTek has some Fortune 500 Customers who recognize a Bargain too but the software listed above puts Real Systems in the reach of Individuals, Social Organizations, and Small Businesses (like us). Write for details.

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Game...

AN A-MAZING GAME FOR YOUR FUN!

By Scott L. Bain

Welcome to the world of three dimensional mazes.

The following program, *3D MAZE*, is designed to put you right in the action, searching through a labyrinth for a way out.

Type in the program and run it. It will display a message and have you wait a short time while it creates a maze. Every time you run *3D MAZE*, the maze will be re-drawn. It is never the same twice.

Next, you will have to choose between fast and slow screens. *3D MAZE* is written in BASIC, and while the paint command used for the slow screens makes a more attractive display, it also slows down the response time for moving from about one-half second to nearly three seconds. Since the score-timer is always running, it makes the game more difficult when the response is slow.

While it may not be as pretty, the fast screen has some advantages. First, the quick moves are nice.

And, second, with the fast screen you have another choice -- whether or not to use a "helper trail." The helper-trail causes the program to leave a trail of "crumbs" behind you. This is very helpful to keep you from exploring the same area twice and getting lost in a maze of little twisty passages, all alike.

Once the screen comes up, you will see a view of the corridor in the direction you are facing, or just a wall in front of you. If you are facing a wall, just keep turning until you're facing down a hallway.

Now, you can move freely through the maze. The up-arrow key will move you forward, the down-arrow will turn you completely around, and the right- and left-arrows will turn you in that direction. This will be an immediate turn, by the way.

You're looking for a hole in the floor. Once you find it, move into it and you will be out of the maze and the game will be over. The program will then switch to the text screen and display an overhead view of the maze, indicating areas you have explored and those you haven't. It will also tell you how long it took you to find the hole and where the hole was.

Occasionally you'll push a key,

(Continued on next page)

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MAZE (From Page 7)

hear the register beep, and it will seem nothing happened. Don't worry. This is because the new area you are looking at is just like the old one. One dead end looks like another. This is particularly a problem with the slow screen, so we've added a second, higher pitched, beep to tell you when your move is completed on the slow screen.

Also, the limit of your forward vision is four squares. Sometimes this will mean that the corridor you're looking down goes farther than you can see. The lesson here is that a dead end that is four squares away may not be a dead end.

The hole is always on the northernmost wall, somewhere. But, since you don't know which direction you're facing when you start, it could, effectively, be on any wall.

The system used here to generate the maze is called "frontier cell." If you're interested in learning more about it, let the RAINBOW know.

The listing:

```

2 '          3DMAZE          '
3 '          BY              '
4 '          SCOTT L. BAIN   '
5 '          '                '
6 '          P.O. BOX 178114  '
7 '          SAN DIEGO, CA   '
8 '          92117           '
9 '          -----          '
10 PMODE 0,1:PCLEAR4:PCLS:CLS
15 POKE65495,0
20 DIM M(11,11),F(50,2),V(5,2)
25 FORI=1TO10:SOUND110,1:NEXTI
30 PRINT@331," \          /":PRINT@39
5,"/          \":PRINT@364,"3DMAZE"
35 PRINT@0,"PLEASE WAIT 1 MINUTE
   WHILE I CREATE THE MAZE. ";
40 FR=0:X=5:Y=5:M(X,Y)=1:FORI=-1
TO1:FORJ=-1TO1:IFI<>0ANDJ<>0THEN
50ELSEIFI=0ANDJ=0THEN50
45 M(X+I,Y+J)=-1:FR=FR+1:F(FR,1)
=X+I:F(FR,2)=Y+J
50 NEXT J,I

```

```

55 CR=RND(FR):X=F(CR,1):Y=F(CR,2)
)
60 Z=0:FORI=-1TO1:FORJ=-1TO1:IFI
<>0ANDJ<>0THEN70
65 IFM(X+I,Y+J)=1THENZ=Z+1
70 NEXTJ,I
75 IFZ<2THEN95
80 M(X,Y)=-2
85 FOR I=CR TO FR
90 F(I,1)=F(I+1,1):F(I,2)=F(I+1,
2):NEXTI:FR=FR-1:GOTO110
95 M(X,Y)=1:FORI=-1TO1:FORJ=-1TO
1:IFI<>0ANDJ<>0THEN105
100 IFM(X+I,Y+J)=0ANDX+I>0ANDX+I
<11ANDY+J>0ANDY+J<11THEN M(X+I,Y
+J)=-1:FR=FR+1:F(FR,1)=X+I:F(FR,
2)=Y+J
105 NEXT J,I:PRINT".":GOTO85
110 IF FR<0THEN55
115 X=5:Y=5
120 D=RND(4)
125 TX=10:TY=RND(10):IF M(TX,TY)
<>1 OR TY=5 THEN 125
130 V(0,1)=0:V(0,2)=1:V(1,1)=1:V
(1,2)=0:V(2,1)=0:V(2,2)=-1:V(3,1)
=-1:V(3,2)=0:V(4,1)=0:V(4,2)=1:
V(5,1)=1:V(5,2)=0
135 CLS:PRINT"TURN THE SOUND UP.
":PRINT:PRINT"YOUR OBJECT IS TO
FIND THE HOLE IN THE FLOOR AND E
SCAPE.":PRINT
140 PRINT"USE THE ARROW KEYS TO
MOVE YOUR SELF FORWARD, OR
TURN RIGHTOR LEFT, OR TO TURN AR
OUND.":PRINT"USE THE 'C' KEY TO
CHANGE SCREENS.":PRINT
145 TIMER=0
150 PRINT"WOULD YOU LIKE:":PRINT
"1- EASY TIMER, SIMPLE SCREEN.":
PRINT"2- HARD TIMER, COMPLETE SC
REEN.":INPUT SP: IF SP<>1 AND SP
<>2 THEN CLS:GOTO 135
155 IF SP=2 THEN TL=0:PRINT"NO H
ELPER TRAIL POSSIBLE.":FORI=1TO1
50:NEXTI:GOTO 165
160 INPUT"DO YOU WANT A HELPER T
RAIL";A$:IF MID$(A$,1,1)="Y" THE

```

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```

N TL=1 ELSE TL=0
165 IFPAGE=2THENPAGE=1ELSEPAGE=
2
170 PMODE 0,PAGE
175 POKE65495,0
180 IF X=TX AND Y=TY THEN 440
185 RESTORE
190 PCLS:LINE(0,0)-(254,190),PSE
T:LINE(254,0)-(0,190),PSET
195 LINE(10,8)-(244,182),PSET,B:
IF M(X+V(D,1),Y+V(D,2))<.1THENC9
=1ELSEC9=0
200 X1=X:Y1=Y:DR=D-1:DL=D+1
205 M(X,Y)=1.1
210 FOR I=1 TO 4
215 X1=X1+V(D,1):Y1=Y1+V(D,2)
220 READ E1,F1,E2,F2,B1,B2,B3,B4
,B5,B6,B7,B8,D1,D2,D3,D4,D5,D6,D
7,DB,CY,CR
225 LINE(E1,F1)-(E2,F2),PSET,B
230 IF X1=TX AND Y1=TY THEN CIRC
LE(126,CY),CR,,5
235 IF M(X1,Y1)=1.1 AND TL=1 THE
N PSET(126,CY,5)
240 IF M(X1+(V(DL,1)),Y1+(V(DL,2
)))<.1 THEN 255
245 IF SP=2 THEN LINE(B1,B2)-(B3
,B4),PRESET,B
250 LINE(D1,D2)-(D3,D4),PSET,B
255 IF M(X1+(V(DR,1)),Y1+(V(DR,2
)))<.1 THEN 270
260 IF SP=2 THEN LINE(B5,B6)-(B
7,B8),PRESET,B

```

```

265 LINE(D5,D6)-(D7,DB),PSET,B
270 O1=X1+(V(D,1)):O2=Y1+(V(D,2
))
275 IF O1<1 OR O1>10 OR O2<1 OR
O2>10 THEN 290
280 IF M(O1,O2)<1 THEN 290
285 NEXT I
290 IFSP =2 THENLINE(128,B)-(128
,96),PRESET,B:LINE(128,98)-(236
,188),PRESET:LINE(126,98)-(22,180
),PRESET:PAINT(128,5),5,5
295 IF C9=1 THEN LINE(12,6)-(242
,184),PRESET,BF:GOTO305
300 LINE(E1+2,F1-2)-(E2-2,F2+2),
PRESET,BF
305 SCREEN 1,1
310 POKE65494,0
315 IFSP=2THEN SOUND 200,2
320 A#=INKEY#
325 IF A#<>"^" THEN 345
330 IF M(X+V(D,1),Y+V(D,2))<.1TH
EN 345
335 X=X+V(D,1):Y=Y+V(D,2)
340 SOUND 100,3:GOTO 165
345 IF A#<>CHR$(8) THEN 365
350 SOUND 100,3
355 D=D+1:IF D>4 THEN D=1
360 GOTO 165
365 IF A#<>CHR$(9) THEN 385
370 SOUND 100,3
375 D=D-1:IF D<1 THEN D=4
380 GOTO 165

```

(Continued on next page)

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POLYGON (From Page 10)

```

70 GOSUB1000
75 DRAW "SBEM3,15"+N$(VAL(A$))+N
$(VAL(B$))
90 PI=3.14159
100 FOR T=0 TO 2*PI STEP PI/75
110 R=COS(M*T)*95
120 X1=COS(T)*R+128:Y1=SIN(T)*R+
96
130 A=T+PI/3
140 R2=COS(M*A)*95
150 X2=COS(A)*R2+128:Y2=SIN(A)*R
2+96
160 LINE (X1,Y1)-(X2,Y2),PSET
170 NEXT T
180 FOR T=1 TO 500:NEXT
190 GOTO2
1000 N$(1)="BR4NU4BR"
1010 N$(2)="BR2U2R3U2NL3BD4NL3"
1020 N$(3)="BR2R3U2NL2U2NL3BD4"
1030 N$(4)="BR2BU2NU2R3U2D4"
1050 N$(5)="BR2R3U2L3U2R3BD4"
1060 N$(6)="BR2U4NR3D2R3D2NL3"
1070 N$(7)="BR2BU3UR3D4"
1080 N$(8)="BR2U4R3D2NL3D2NL3"
1090 N$(9)="BR2BU2NR3U2R3D4"
1095 N$(0)="BR2U4R3D4NL3"
1100 RETURN

```

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For ease of reference, issues 1-5 are stapled together as one packet, all on white paper. These are a special reprint. Issues 6 and 7, which have been out of stock for some time, are available as a single issue, also on white paper in a reprint form. However, we will break the packets and ship whichever ones you wish. All back issues now available would be \$18.50, plus \$2.50 postage and handling -- a total of \$21. VISA and MasterCard accepted.

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MOTION PICTURE PROGRAMMING--THE DETAILS

By Arnold Pouch

In last month's issue of *the RAINBOW*, you read about what a powerful tool Motion Picture Programming (MPP) can be for CoCo programmers who are still using commands like DRAW, PSET, COLOR, LINE and PAINT to create graphics. MPP is a method of producing superior graphic programs packed with action that does not necessitate long hours with BASIC's graphic commands.

Superior Graphics Software offers these programming tools to CoCo users. Our CoCo is a special and powerful computer and has vast amounts of untapped capabilities. MPP is one of them, and it eliminates the need to produce what I call Big Ugly Graphics Moving Everywhichway to show motion.

All I ask in return is that you never again produce graphics with B.U.G.M.E.'s. Mark your programs with MPP so we will all know who spent the time and artistic effort to create them this easy, better, way.

Here are all the necessary tools you need to produce MPP. This tutorial is presented in three sections:

- I. Conversion Instructions
- II. Diagram
- III. MPP Course

CONVERSION INSTRUCTIONS

These instructions are based on Chromasette's excellent *DRAWER* program (August, 1981). We show here how to convert *DRAWER* to *MPP DRAWER*.

For 16K Extended Color Basic, make the following changes:

```

10 Change CLEAR10 to CLEAR20
14 Remove PCLS
16 Remove FOR...NEXT
20 Insert after A$=INKEY$:
IF A$="<" THEN250 ELSE IF A$=">"
THEN20 ELSE
    228 Delete PRINT"TAPE":PRINT"
SAVE OR LOAD":
    Insert: PRINT "MPP TAPE
INPUT/OUTPUT":PRINT" INPUT =<":
PRINT " OUTPUT = >":
    
```

Add the following lines:

```

250 CLS:PRINT:PRINT"TO LOAD MPP
PICTURE TAPES":PRINT:PRINT"READY YOUR
MPP TAPE IN CASSETTE":PRINT:INPUT
"PRESS <ENTER> WHEN READY";ZZ
    
```

```

252 SCREEN1,SC:CLOADM:GOTO20
    
```

```

280 CLS:PRINT:PRINT"TO SAVE MPP
PICTURES TO TAPE":PRINT:PRINT"READY
YOUR CASSETTE WITH FRESH TAPE AND
PRESS RECORD AND PLAY. DON'T FORGET
TO CHECK THE VOLUME"
    
```

```

282 PRINT:INPUT"HOW MANY GRAPHICS
PAGES?
4-PAGES
5-PAGES
6-PAGES";ZZ
    
```

```

284 PRINT:INPUT"TYPE NAME OF MPP
PICTURE ";ZZ$
    
```

```

286 CLS:PRINT@236,"STANDBY"
    
```

```

288 CSAVEM ZZ$,1536,1536+(1536*ZZ)-1,
44553
    
```

```

290 SCREEN1,SC:GOTO20
    
```

Also, delete lines 156-168 and 170-178.

For 32K, make these additional changes:

10 change PCLEAR6 to PCLEAR8 and remove CLEAR20

12 Change MP=6 TO MP=8

(Continued on next page)

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226 Change both occurrences of "1-5"
to "1-8"
282 Change and add: 6-PAGES?
7-PAGES?
8-PAGES";ZZ

MPP COURSE

First of all, it is essential that you familiarize yourself with the full instructions which accompany Chromasette's *DRAWER* program. If you forget them, use the "H" for HELP command. It will not only give you a rundown of the commands, but will also tell you what the last command you gave was and show the exact X-Y coordinate of the cursor.

To help simplify these instructions, we will assume you will use PMODE 3,1 on a four-page MPP picture with two extra pages of Motion Modifiers (MM's). Your 4+2 pages will reside in memory locations 1536 through 10751 (PCLEAR 6). All references to higher memory addresses for 32K Extended Basic (and for Disk) will be omitted.

Now, take a look at the diagram. It is laid out in three sections: An MPP memory map is in the center; the three steps necessary to create MPP are on the left; and the Input/Output routines which will allow you to start and stop MPP drawing are on the right.

Connecting lines between the flowcharts and the memory map have been removed for the sake of clarity. Instead, we show the exact memory addresses for the START and END above each I/O box.

Now, to MPP...

STEP 1 - DRAW...

1. Place the converted *DRAWER* in your recorder, type PCLEAR6, and CLOAD it. RUN the program after it loads.

2. You will see blank memory pages 1-4. It's a mess. Press the <K>lear key to clear the screen. Now press the <P>age key and press 3. You have

switched the screen to pages 3 through 6. Pages 5 and 6 are still a mess, so press the K key again. Now that you have cleaned up the pages, press P and 1 to go back to pages 1-4.

3. Well, don't just sit there -- DRAW! Use the arrow keys, since the joysticks are difficult to control.

4. I don't see anything! Do something. Why don't you try a round clock face? Ah. That's better.

5. Lets draw the Motion Modifiers (MM's) now. These are simply repetitive drawings of a certain section of your picture where you want action to take place. These drawings are each a little different from the previous one and show a "time/motion" relationship -- such as 10 pictures of a clock hand moving from 15 minutes past the hour to 25 past the hour. MM #1 shows the clock hand at 16 after, MM #2 at 17 past, and so on up to MM #10 at 25 past.

6. Sounds like a lot of tedious work, right? It is, but your converted *DRAWER* program will do most of it for you automatically. We don't want the MM's to be visible, so press P and 3. Now press <I>mage copy and follow the menued instructions to copy and move as many MM's as you think you will need for a smooth animation. When you <P>ut your MM's on pages 5 through 6, set them in neat rows so you can later program to GET them with just one GET command in a FOR...NEXT loop.

7. With the Image copy, you now have 10 pictures of a section of a clock showing 15 minutes after the hour. Put that cursor to work now -- and change each picture to the correct time. If your picture is complex, you can use as many MM's as you like to fill all of pages 5 and 6.

8. Getting tired? Just one thing before we can stop. Use the <H>elp command and your cursor to find the X-Y coordinate for all your GET MM's and their X-Y PUT coordinates in your

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MPP (From Page 15)

starts set correctly. Changing them will not affect your picture, only SCREEN can do that.

6. If your programming is finished, or you just want to take a break for a day, you can CSAVE "MPPBASIC" any time you wish to stop. You will now have two tapes saved, your picture tape and your basic tape.

7. You can restart at any time from this point by reloading the two tapes. For the picture tape, type in PCLEAR6:CLOADM and for the program tape just CLOAD.

STEP III -- COMBINE

1. When your picture tape and your program tape are completed to your satisfaction, load them both into memory (as in the paragraph above) but *DO NOT RUN OR EXEC THE PROGRAM!*

2. Now, your pictures reside in memory in locations 1536 through 10751 and your program is located in memory starting at 10752 (because we PCLEARed 6 before it was loaded). We do not know where the end of the Basic program is located, and this is what we have to find out.

3. Follow these steps carefully:

Type ?PEEK(27)	the answer will be your A value
Type ?PEEK(28)	the answer will be your B value
Type ?HEX\$(A)	the answer will be your A\$ value
Type ?HEX\$(B)	the answer will be your B\$ value
Type ?%HA%B\$	the answer will be your AB value

4. You now have everything you need to finish your MPP. Go to Line 4 in your Basic program, where you put in the X's after the POKES, and substitute the values you just found to make the line operational:

```
4          POKE27,A:POKE28,B:POKE29,A:
          POKE30,B:POKE 31,A:POKE32,B
```

5. Place a fresh tape in your recorder, set it to play and record, and type in CSAVEM "MPPNAME", 1536,AB,44661. Then press <ENTER> and you will make a complete MPP tape.

Once you have made a copy, as in Number 5 above, turn your CoCo off, let it sit for about 15-30 seconds and turn it back on. Place the newly made tape in the recorder, press PLAY and type in PCLEAR6:CLOADM:EXEC. The tape will load and the program will auto-start with your MPP graphics in motion!

Next month, we'll list out an MPP program to show you how one type of graphic can be done.

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PIPELINE

PIPELINE

Probably the most successful single BBS in the CoCo world is the Connection-80 of Woodhaven, N.Y., operated by Bob Rosen. The BBS' first anniversary was on March 23 and Bob reports that more than 15,000 calls have come in to his system. Remember, Connection-80 is free and can be reached at (212) 441-3755 via terminal. Bob, who is the System Operator, can be contacted in person at (212) 441-2887. Connection-80 has been a real service to CoCo users and we salute Bob and his service.

We feel constrained to point out that the *SANWLET* reviewed in last month's issue is a 4K program. Author Britt Monk mentions this to us by way of saying he believes we should not have been so unkind to his graphics in the review. We certainly see his point and pass it along to you. And, for the record, *SANWLET* is one of the few machine language programs available for the 4K CoCo.

Does anyone really think the CoCo is soon headed for oblivion? Guess not and, for sure, here's some new proof from Tandy. In a thick batch of news releases -- complete with photographs -- Tandy is announcing a whole stable of educational software expressly written for CoCo. Among the most important: An agreement with Harper & Row publishers (a big time outfit) calling for H&R to develop and market educational courseware for schools. Judging by the large number of CoCo-related products, including a series of packages in cooperation with Children's Television Workshop (the people who brought you *Sesame Street*, *The Electric Company* and others), we'd say CoCo is only starting to make its impact felt in the market!

Speaking of big-time news on CoCo, we hear a report that Walter Cronkite's *UNIVERSE* program will feature graphics by CoCo next fall. This, we understand, isn't a one-time shot -- but a continuing exposure of our favorite computer throughout the year-long series on CBS.

We were asked the other day whether it would be possible to save a BASIC program with *CSAVEM* and then load it back in and have it be a machine language program. The answer is simply, "no." Through use of a program called a compiler, however, you are able to convert BASIC into machine language. We did a little checking around and hear that there are at least a couple of firms "working on" a compiler for CoCo. We'll keep you abreast of developments.

Nelson Software is shipping its *SUPER COLOR WRITER* program and says that an updated version, called *SUPER COLOR WRITER II* will be available by the first of April. Daniel Nelson says it's a "guarantee" that *SCW II* will be introduced on that date.

Armadillo Software says it has a *FORTH* program available on tape or disk. Two exceptional things about their announcement. First, they'll send tape and disk version for the same price ("so if you don't have a disk yet, you'll be all set when you get one"). Second, Armadillo will customize its program for any disk system you're using.

And, speaking of "other" disk systems, Cer-Comp is marketing a full function disk operating system for the TallGrass Technology disk controller. There are three systems in one package: A free-standing disk

system for use without the BASIC ROM system; a fully supported external system that interfaces with assemblers, editors and other types of programs; and a system which interfaces with Basic and Extended Basic. The system will work even with a 4K machine and uses only a little over 1K. Watch for a review.

Missing your monthly dose of fantasy-role playing game aids? Author John Urban hooked up on the losing side of the U.S. Postal Service this month. The series will continue next month.

The first computerized encyclopedia? Its available from Moses Engineering and comes on 48 cassette tapes. We know Roger Olsen will be pleased to note that the first item is reported to be "aardvark."

Radio Shack is now marketing a voltage spike regulator through all its retail stores under the familiar Archer brand.

UPDATE: Last month we asked whether anyone had received any software from Seebree's Computing. At press time, one reader wrote in to say he had.

By the by, we suggest you be sure to read advertisements carefully before you order. Most all will say what version of CoCo they are written for, and you should be sure they will run on yours. As always, the dishonest few make trouble for the rest of us ... but since it is easy to copy programs, it is understandable why software houses won't usually refund money to people who want to return programs because they might not be "what I expected."

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Home Finance...

COLOR BILLBARS HELP CHART SPENDING

By Mark S. Mosty

This program will allow you to produce graphic displays of amounts spent in various budget categories. It should be very helpful in comparing expenses from month to month.

I became interested in writing *COLOR BILLBARS* through general dissatisfaction with other home finance programs which failed to provide the user with comparative graphics or hard copy.

I use the program each month when I have finished balancing my checkbook and setting up next month's budget. The program is written in Color Basic and will, of course, run under Extended Color Basic as well. It requires 16K and uses about 5200 bytes of memory. I use a Line Printer VII and the printer routines are coded accordingly.

To adapt this program to your use, make the following changes:

1. Account names are located in lines 230-270 and 470-510.

2. Change the divisors to suit your needs by adjusting the "D" values in lines 470-510, using the following formula:

-- Take the highest value in the desired range (example, 500)

-- Divide by 25 (500/25=20) and use this value for your divisor.

3. Change the Scale Values in lines 440-450 to suit the range you have selected.

4. Make any necessary changes in the printer routine in lines 1360-1590.

COLOR BILLBARS can be adapted for a variety of uses, such as incorporation into a checkbook balancing program to provide graphic display of key accounts or to display virtually any numerical information.

The listing:

```
10 '
20 ' COLOR BILLBARS
30 '
40 ' BY MARK S. MOSTY
50 ' 714 LEE ST.
60 ' KERRVILLE, TEXAS 78028
70 '
80 ' PRINT FORMATTED FOR LPVII
90 '
100 DIM A(5,12)
110 ' INPUT NEW YEAR
120 CLS:PRINT@99,"IS THIS A NEW
YEAR? (Y/N)"
```

```
130 GOSUB 170
140 IFZ$="Y" THEN180
150 IFZ$="N" THENGOSUB190:GOTO290
160 GOTO120
170 Z$=INKEY$:IFZ$<>" " THEN RETUR
N ELSE 170
180 CLS:PRINT@99,"TYPE NEW YEAR.
.. " ; INPUTY:GOS
UB190:GOTO290
190 ' MAIN MENU
200 CA=255:CB=207:CC=191:CD=159:
CE=239
210 CLS(6)
220 PRINT@72,"WHICH ACCOUNT...?"
;
230 PRINT@104," 1. LCRA/LSG
";
240 PRINT@136," 2. PHONE CO.
";
250 PRINT@168," 3. FOOD
";
260 PRINT@200," 4. GASOLINE
";
270 PRINT@232," 5. UTILITIES
";
280 RETURN
290 PRINT@264,"OR...
";
300 PRINT@296," 6. READ TAPE
";
310 PRINT@328," 7. SAVE TO TAPE
";
```

(Continued on next page)

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(other tapes available)

BILLBARS (From Page 19)

```

320 PRINT@422," SELECT KEY AND P
RESS " ;:PRINT@462,"(1-7)";
330 PRINT@118,CHR$(CA);:PRINT@15
0,CHR$(CB);:PRINT@182,CHR$(CC);:
PRINT@214,CHR$(CD);:PRINT@246,CH
R$(CE);
340 GOSUB170
350 IFZ$="1" THEN GOSUB470:GOSUB5
20:GOTO1010
360 IFZ$="2" THEN GOSUB480:GOSUB5
20:GOTO1010
370 IFZ$="3" THEN GOSUB490:GOSUB5
20:GOTO1010
380 IFZ$="4" THEN GOSUB500:GOSUB5
20:GOTO1010
390 IFZ$="5" THEN GOSUB510:GOSUB5
20:GOTO1010
400 IFZ$="6" THEN1610
410 IFZ$="7" THEN1690
420 GOTO340
430 ' SCALES ADJUSTED HERE
440 SA=25:SB=50:SC=75:SD=100:SE=
125:RETURN
450 SA=100:SB=200:SC=300:SD=400:
SE=500:RETURN
460 ' DIVISORS (D) AND ACCOUNTS
ADJUSTED HERE AND AT 230-270
470 N=1:D=5:A$="LCRA/LSG":C=255:
GOSUB440:RETURN
480 N=2:D=5:A$="PHONE CO.":C=207
:GOSUB440:RETURN
490 N=3:D=20:A$="FOOD":C=191:GOS
UB450:RETURN
0 N=4:D=5:A$="GASOLINE":C=159:
GOSUB440:RETURN
510 N=5:D=5:A$="UTILITIES":C=239
:GOSUB440:RETURN
520 ' INPUT UPDATE
530 CLS:PRINT@99," DO YOU WANT T
O UPDATE THIS ACCOUNT? (Y
/N)";:PRINT
540 GOSUB170
550 IFZ$="Y" THEN750
560 IFZ$="N" THEN580
570 GOTO 540
580 CLS:PRINT@99,"DO YOU WISH TO
REVIEW THE ENTRIES? (Y/N
)";
590 GOSUB170
600 IFZ$="Y" THEN 640
610 IFZ$="N" THEN GOSUB190:GOTO29
0
620 GOTO 590
630 ' REVIEW ROUTINE
640 GOSUB 210
650 PRINT@88," ";:PRINT@264,"
";:PRINT@296," DO
YOU WISH ";:PRINT@328," TO
REVIEW...? ";:PRINT@422," SELE
CT KEY AND PRESS ";:PRINT@462,"(
1-5)";
660 GOSUB 170

```

```

670 IFZ$="1" THEN GOSUB470:GOTO10
10
680 IFZ$="2" THEN GOSUB480:GOTO10
10
690 IFZ$="3" THEN GOSUB490:GOTO10
10
700 IFZ$="4" THEN GOSUB500:GOTO10
10
710 IFZ$="5" THEN GOSUB510:GOTO10
10
720 GOTO660
730 ' UPDATE ROUTINE
740 SOUND 150,4:PRINT" INCORR
ECT RESPONSE...":PRINT:RETURN
750 PRINT" UPDATE: "A$:PRINT:
PRINT" ROUND OFF DOLLAR AMOUN
TS...":PRINT
760 INPUT" WHICH MONTH (1-12)
";M:PRINT:IF M>12 OR M=VAL("") T
HEN GOSUB 740 ELSE 780
770 GOTO 760
780 INPUT" WHAT AMOUNT : $";M
(T):PRINT
790 IF N=3 AND M(T)>500 THEN GOS
UB 880
800 IF N<>3 AND M(T)>125 THEN GO
SUB 880
810 A(N,M)=M(T)/D
820 PRINT" ANOTHER MONTH? (Y/
N) ";:PRINT

```

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```

830 Z$=INKEY$:IFZ$="" THEN830
840 IFZ$="Y" THEN 760
850 IFZ$="N" THEN RETURN
860 GOTO 830
870 ' OVERLOAD ROUTINE
880 CLS:SOUND 150,4:PRINT@99,"AM
OUNT TOO LARGE...YOU'LL HA
VE TO ADJUST THE SCALES":PRINT@1
98,"(SEE LINES 440-450)":PRINT@
259,"PRESS 'ENTER' TO CONTINUE";
:INPUT E$:GOSUB190:GOTO290
890 ' SCREEN SUBROUTINES
900 CLS0:PRINT@7,A$;:PRINT@22,Y;
:RETURN
910 PRINTCHR$(128);STRING$(A(N,M
),C);:RETURN
920 X$=""
930 PRINT@32,M$;:GOSUB910:PRINT@
64,X$;:RETURN
940 PRINT@96,M$;:GOSUB910:PRINT@
128,X$;:RETURN
950 PRINT@160,M$;:GOSUB910:PRINT
@192,X$;:RETURN
960 PRINT@224,M$;:GOSUB910:PRINT
@256,X$;:RETURN
970 PRINT@288,M$;:GOSUB910:PRINT
@320,X$;:RETURN
980 PRINT@352,M$;:GOSUB910:RETUR
N
990 PRINT@387," 0":PRINT@391,SA:
PRINT@396,SB:PRINT@401,SC:PRINT@
406,SD:PRINT@411,SE;:PRINT@429,"
DOLLARS";:RETURN
1000 ' SCREEN 1
1010 GOSUB900
1020 M=1:M$="JAN":GOSUB930
1030 M=2:M$="FEB":GOSUB940
1040 M=3:M$="MAR":GOSUB950
1050 M=4:M$="APR":GOSUB960
1060 M=5:M$="MAY":GOSUB970
1070 M=6:M$="JUN":GOSUB980
1080 GOSUB990
1090 PRINT@484,"C=CONTINUE M=MEN
J P=PRINT";
1100 GOSUB170
1110 IFZ$="C" THEN1160
1120 IFZ$="P" THEN1290
1130 IFZ$="M" THENGOSUB190:GOTO29
0
1140 GOTO1100
1150 ' SCREEN 2
1160 GOSUB900
1170 M=7:M$="JUL":GOSUB930
1180 M=8:M$="AUG":GOSUB940
1190 M=9:M$="SEP":GOSUB950
1200 M=10:M$="OCT":GOSUB960
1210 M=11:M$="NOV":GOSUB970
1220 M=12:M$="DEC":GOSUB980
1230 GOSUB990
1240 PRINT@488," M=MENU P=PRINT
";
1250 GOSUB170
1260 IFZ$="P" THEN1290

```

```

1270 IFZ$="M" THENGOSUB190:GOTO29
0
1280 GOTO1250
1290 ' PRINTER ROUTINE
1300 CLS:PRINT@99,"IS THE PRINTE
R READY?";:PRINT@137,"(Y/N)";
1310 GOSUB170
1320 IFZ$="Y" THEN1350
1330 IFZ$="N" THEN140
1340 GOTO1310
1350 CLS:PRINT@99,"PRINTING..."
1360 PRINT#-2,CHR$(31):PRINT#-2,
TAB(7);A$;TAB(24);Y;
1370 PRINT#-2:PRINT#-2:PRINT#-2,
CHR$(30):PRINT#-2,TAB(8)"!";:PRI
NT#-2,CHR$(13);
1380 GOTO1390
1390 M=1:M$="JAN":GOSUB1580:GOSU
B1590
1400 M=2:M$="FEB":GOSUB1580:GOSU
B1590
1410 M=3:M$="MAR":GOSUB1580:GOSU
B1590
1420 M=4:M$="APR":GOSUB1580:GOSU
B1590
1430 M=5:M$="MAY":GOSUB1580:GOSU
B1590
1440 M=6:M$="JUN":GOSUB1580:GOSU
B1590
1450 M=7:M$="JUL":GOSUB1580:GOSU
B1590
1460 M=8:M$="AUG":GOSUB1580:GOSU
B1590
1470 M=9:M$="SEP":GOSUB1580:GOSU

```

(Continued on next page)

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BILLBARS (From Page 21)

```

B1590
1480 M=10:M$="OCT":GOSUB1580:GOS
UB1590
1490 M=11:M$="NOV":GOSUB1580:GOS
UB1590
1500 M=12:M$="DEC":GOSUB1580:GOS
UB1590
1510 PRINT#-2,CHR$(26);:PRINT#-2
,TAB(9)"!";:PRINT#-2,CHR$(13);
1520 PRINT#-2,TAB(8)"!";:PRINT#-2
,STRING$(58,"-");
1530 PRINT#-2,CHR$(26);:PRINT#-2
,CHR$(13);
1540 PRINT#-2,TAB(11)"0";TAB(19)
SA;TAB(29)SB;TAB(39)SC;TAB(49)SD
;TAB(59)SE
1550 PRINT#-2,CHR$(13);:PRINT#-2
,TAB(34)"DOLLARS":SOUND100,5
1560 GOSUB190:GOTO290
1570 ' PRINTER SUBROUTINES
1580 A(N,M)=A(N,M)*2:PRINT#-2,TA
B(4)M$;TAB(8)"!";TAB(10)" ";:PRI
NT#-2,STRING$(A(N,M),"*"):RETURN
1590 PRINT#-2,CHR$(26);:PRINT#-2
,TAB(9)"!";:PRINT#-2,CHR$(13);:R
ETURN
1600 ' LOAD TAPE ROUTINE
1610 CLS:MOTORON:PRINT@99,"INPUT
DATA FROM TAPE...";:PRINT@165,"
POSITION TAPE...";:PRINT@197,"PR
ESS 'PLAY'";:PRINT@229,"PRESS 'E
NTER'";:SOUND 100,5:INPUT E#
1620 OPEN "I",#-1,"BILLBARS"
1630 IF EOF(-1)THEN1660
1640 INPUT#-1,Y:FORN=1TO5:FORM=1
TO12:INPUT#-1,A(N,M):NEXTM,N
1650 GOTO1630
1660 CLOSE #-1:SOUND100,5
1670 GOSUB190:GOTO290
1680 ' SAVE TO TAPE ROUTINE
1690 CLS:MOTORON:PRINT@99,"SAVE
DATA TO TAPE...";:PRINT@165,"POS
ITION TAPE...";:PRINT@197,"PRESS
'PLAY' AND 'RECORD'";:PRINT@229
,"PRESS 'ENTER'";:SOUND 100,5:IN
PUT E#
1700 OPEN "O",#-1,"BILLBARS":PRI
NT#-1,Y:FORN=1TO5:FORM=1TO12:PRI
NT#-1,A(N,M):NEXTM,N:CLOSE#-1:S
OUND100,5
1710 CLS:PRINT@98,"TAPE SAVE COM
PLETE...";:PRINT@162,"DO YOU WAN
T TO BACK UP A TAPE? (Y/N
)";
1720 GOSUB 170
1730 IFZ$="Y"THEN1680
1740 IFZ$="N"THEN GOSUB190:GOTO2
90
1750 GOTO1720

```

SUBSCRIPTION RATES TO BE INCREASED

Effective May 1, subscription rates to *the RAINBOW* will be increased by \$4 per year to \$16 for an annual subscription of 12 issues. The single copy price was increased to \$2.50 on March 1.

Present subscribers to *the RAINBOW* may renew their subscriptions at the old rate of \$12 per year through May 15. After May 15, all renewal subscriptions will also be \$16 per year. We are offering this special renewal rate only for those who currently hold subscriptions to *the RAINBOW* and renew before May 15 or to those who subscribe for the first time for a period of more than one year before May 1.

Since its appearance in July, 1981, *the RAINBOW* has grown from four pages of editorial copy to 44. While advertising has played a major role in holding down the subscription price, continued printing and postage price increases necessitate this small increase in price. We hope you will understand the reason for it.

Canadian and Mexican subscriptions will be increased \$4 also. Canadian and Mexican subscribers will also be able to take advantage of the special renewal rate. However, subscribers in those two countries will be an additional \$2 per year postage and handling -- making the differential \$6 for Canadian and Mexican subscriptions. The new subscription rate to Canada and Mexico will be U.S. \$22 per year. Renewals from Canadian and Mexican subscribers will be accepted at U.S. \$18 until May 15.

We are especially sorry to have to make what is a significant increase for Canadian and Mexican subscribers. The reason for this increase is simply because of postal rules by Canada and Mexico -- which do not allow third class mailings from the United States and require *the RAINBOW* to be mailed in envelopes. This represents a major out-of-pocket cost for us and we are merely passing it along. Last month's issue of *the RAINBOW* cost 71 cents to mail to Canada and Mexico, not counting the cost of envelopes and handling.

Non-U.S. subscribers other than those in Canada and Mexico will experience a \$5 increase.

Renewals at the old rate may be made for one year only.

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COMPARISON CHART	SUPER COLOR WRITER			THE COMPETITION		
System Size	4K	16K	32K	4K	16K	32K
TAPE Text space	N/A	8K	24K	N/A	2K	18K
ROMPAK Text space	2.5K	15K	31K	N/A	N/A	N/A
DISK Text space	N/A	6.5K	22.5K	N/A	0.5K	16.5K
Right Justify	YES			NO		
Video Window	YES			NO		
Edit any ASCII File	YES			NO		

The figures speak for themselves and with professional features like PROGRAMMABLE function string commands to perform up to 28 commands automatically, PROGRAMMABLE text file chaining, PROGRAMMABLE column insert & delete, and right hand JUSTIFICATION with punctuation precedence, the choice is clear but there's still more!

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DEALER INQUIRES ARE INVITED.

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COMMUNICATIONS

THE SUPER "COLOR" TERMINAL

Time Share, Smart Terminal, High-speed Data X'fer & Videotex

The Super "Color" Terminal turns the Color Computer into a Super-smart terminal with all the features of VIDEOTEX(TM) plus much more. COMMUNICATE with Dow Jones & Compuserve and with computers like the TRS-80(TM) MODEL I, II, III, APPLE etc. via modem or RS-232 direct! Save the data to tape or print it! Reduces ON—LINE cost to a minimum!

FEATURES

10 buffer size settings from 2-30K • Buffer full indicator • Lprints buffer contents • Full 128 ASCII keyboard • Compatible with Super "Color" Writer files • UPLOAD & DOWNLOAD ASCII files, Machine Language & Basic programs • Set RS-232 parameters • Duplex Half/Full • Baud Rate: 110, 300, 600, 1200, 2400, 4800 • Word Lengths: 5, 6, 7 or 8 • Parity: Odd, Even or None • Stop Bits: 1-9 • Local linefeeds to screen • Tape save & load for ASCII files, Machine code & Basic programs • Unique clone feature for copying any tape.

Super "Color" Terminal Disk

The Disk version offers all the features listed above plus Host ability in full duplex • Lower case masking • 10 Keystroke Multiplier (MACRO) buffers on disk to perform repetitive log-on tasks and send short messages (up to 255 bytes) • Programmable prompts for send next line • Selectable character trapping • Set printer line length • Pagination • Linefeed with CR option • Printer Baud: 110, 300, 600, 1200 & 2400 • Documentation

TAPE \$39.95 ROM PAK \$49.95 DISK \$69.95
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2716 2K 5v EPROM \$5.95 ea. 2K Static RAM \$19.95 ea.

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VEGAS 5-PAK Requires 16K Extended Basic **TAPE \$19.95**

The THRILLS OF A VEGAS CASINO at home. Five action packed Vegas games for up to four players: **CASINO CRAPS** • **21** • **ONE ARMED BANDIT** • **UP & DOWN THE RIVER** • **KENO**. Bank tracks players' winnings from game to game • realistic cards • regulation tables • boards • authentic sounds • lively graphics • official rules in each game.

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2-1-0 TANK COMBAT live terrains • the experienced arcade player can design combat scenario. **STELLAR BATTLE** pilot a Flex-Wing Fighter at incredible speeds in enemy space taking out Dorian Tye Fighters defending the Imperial Star Fortress. **GALACTIC BLOCKADE** maneuver your craft in a course that boxes your opponent but avoid cosmic debris and hostile space probes!



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SOFTWARE
SYSTEMS**



P.O. Box 19096 Minneapolis, MN 55419 612/827-4703

TRS-80[®] BASIC

LEVEL II SYSTEM REFERENCE CARD MODEL I

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LEVEL II MEMORY MAP

ADDRESS	HEX	DESCRIPTION
12000	3000	BASIC ROM
12004	3004	RESERVED
14000	3700	COMMUNICATION STATUS ADDRESS
14004	3704	COMMUNICATION DATA ADDRESS
14008	3708	INTERRUPT LATCH ADDRESS
1400C	370C	DISK DRIVE SELECT LATCH ADDRESS
14010	3710	CASSETTE SELECT LATCH ADDRESS
14112	37E0	LINE PRINTER ADDRESS
14114	37E2	TTY/USER CHECK CONTROLLER ADDRESS
14130	3800	KEYBOARD MEMORY
14132	3804	CRT VIDEO MEMORY
14134	3808	VIDEO MEMORY ADDRESSES (FOR HSI-RESTART)
14136	380C	KEYBOARD DCC
14140	3810	VIDEO I/O
14142	3814	PRINTER I/O
14144	3818	RESERVED
14146	381C	POC INTERRUPT VECTOR
14148	3820	COMMUNICATIONS INTERRUPT VECTOR
14150	3824	RESERVED
14152	3828	IN MICR HEATSEAL INTERRUPT
14154	382C	BASIC I/O
14156	3830	I/O BUFFER
14158	3834	RESERVED
14160	3838	USER PROGRAM MEMORY
20070	7000	END OF BASIC SYSTEMS
32767	7FFF	END OF THE SYSTEMS
40951	FFFF	END OF A8K SYSTEMS
80535	FFFF	END OF A8K SYSTEMS

MAGIC NUMBER IS 318

131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146
147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162
163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178
179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194
195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210
211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226
227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242
243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258
259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274
275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290
291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306
307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322
323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338
339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354
355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370
371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386
387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402
403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418
419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434
435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450
451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466
467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482
483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498
499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514
515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530
531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546
547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562
563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578
579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594
595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610
611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626
627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642
643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658
659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674
675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690
691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706
707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722
723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738
739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754
755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770
771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786
787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802
803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818
819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834
835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850
851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866
867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882
883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898
899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914
915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930
931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946
947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962
963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978
979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994
995	996	997	998	999	1000	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010

NEW!

QUICK REFERENCE

TRS-80[®] BASIC AND ASSEMBLER

MODEL II SYSTEM REFERENCE CARD

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MODEL II MEMORY MAP

ADDRESS	HEX	TRSDOS	DESCRIPTION
10000	2000	High memory command area	
10004	2004	High memory command area	
10008	2008	High memory command area	
1000C	200C	High memory command area	
10010	2010	High memory command area	
10014	2014	High memory command area	
10018	2018	High memory command area	
1001C	201C	High memory command area	
10020	2020	High memory command area	
10024	2024	High memory command area	
10028	2028	High memory command area	
1002C	202C	High memory command area	
10030	2030	High memory command area	
10034	2034	High memory command area	
10038	2038	High memory command area	
1003C	203C	High memory command area	
10040	2040	High memory command area	
10044	2044	High memory command area	
10048	2048	High memory command area	
1004C	204C	High memory command area	
10050	2050	High memory command area	
10054	2054	High memory command area	
10058	2058	High memory command area	
1005C	205C	High memory command area	
10060	2060	High memory command area	
10064	2064	High memory command area	
10068	2068	High memory command area	
1006C	206C	High memory command area	
10070	2070	High memory command area	
10074	2074	High memory command area	
10078	2078	High memory command area	
1007C	207C	High memory command area	
10080	2080	High memory command area	
10084	2084	High memory command area	
10088	2088	High memory command area	
1008C	208C	High memory command area	
10090	2090	High memory command area	
10094	2094	High memory command area	
10098	2098	High memory command area	
1009C	209C	High memory command area	
10100	2100	High memory command area	
10104	2104	High memory command area	
10108	2108	High memory command area	
1010C	210C	High memory command area	
10110	2110	High memory command area	
10114	2114	High memory command area	
10118	2118	High memory command area	
1011C	211C	High memory command area	
10120	2120	High memory command area	
10124	2124	High memory command area	
10128	2128	High memory command area	
1012C	212C	High memory command area	
10130	2130	High memory command area	
10134	2134	High memory command area	
10138	2138	High memory command area	
1013C	213C	High memory command area	
10140	2140	High memory command area	
10144	2144	High memory command area	
10148	2148	High memory command area	
1014C	214C	High memory command area	
10150	2150	High memory command area	
10154	2154	High memory command area	
10158	2158	High memory command area	
1015C	215C	High memory command area	
10160	2160	High memory command area	
10164	2164	High memory command area	
10168	2168	High memory command area	
1016C	216C	High memory command area	
10170	2170	High memory command area	
10174	2174	High memory command area	
10178	2178	High memory command area	
1017C	217C	High memory command area	
10180	2180	High memory command area	
10184	2184	High memory command area	
10188	2188	High memory command area	
1018C	218C	High memory command area	
10190	2190	High memory command area	
10194	2194	High memory command area	
10198	2198	High memory command area	
1019C	219C	High memory command area	
10200	2200	High memory command area	
10204	2204	High memory command area	
10208	2208	High memory command area	
1020C	220C	High memory command area	
10210	2210	High memory command area	
10214	2214	High memory command area	
10218	2218	High memory command area	
1021C	221C	High memory command area	
10220	2220	High memory command area	
10224	2224	High memory command area	
10228	2228	High memory command area	
1022C	222C	High memory command area	
10230	2230	High memory command area	
10234	2234	High memory command area	
10238	2238	High memory command area	
1023C	223C	High memory command area	
10240	2240	High memory command area	
10244	2244	High memory command area	
10248	2248	High memory command area	
1024C	224C	High memory command area	
10250	2250	High memory command area	
10254	2254	High memory command area	
10258	2258	High memory command area	
1025C	225C	High memory command area	
10260	2260	High memory command area	
10264	2264	High memory command area	
10268	2268	High memory command area	
1026C	226C	High memory command area	
10270			

Software Review...

QUEST WILL KEEP YOU UP LATE QUESTIONING

QUEST is advertised as a "new idea in adventure games" and it is. It is also entertaining, a lot of fun and exercises the mind.

Too, *QUEST* (Aardvark-80, 2352 S. Commerce, Walled Lake, MI, 48088, \$14.95) is a lot of fun to play. But, it is more than a simple hack-and-slash adventure and it makes for quite a bit of enjoyment.

I couldn't get away from *QUEST*. There were a couple of times when I tried to leave and go to bed, but it seemed like I was in a good position to attack Moorlock's Castle...until something happened.

This game uses the low-res screen to draw a map of a land of castles, towers, ruins and the like. Each type of thing is shown by a symbol -- and your position is shown by a symbol, too. You move around using the arrow keys and, when you get near something it shows up on the screen. A message line at the bottom alerts you to what it is.

The screen starts out almost blank, with just you, Moorlock's Castle, a river and a couple of cities shown. You have to discover the location of the other places -- and discover how to get into them yourself.

You are not the only person in this land. There are bands of wizards, pilgrims, soldiers and the like. Sometimes some of the other bands have hired soldiers for protection. You can run away from these groups, try to fight or make friends. Sometimes your overtures are accepted, other times not. Like life, no?

By the way, your band can buy weapons and implements in the cities. This frequently gets you into a bargaining situation with a shopkeeper. But, you need gold to buy...and if you are long on gold and short on men, they won't be able to carry it all. And, you need food for the men. Or they'll die of starvation. The more men you have the more you can carry. But the more food you need.

This is an easy-to-play game that is a lot of fun. The combinations are endless and, frankly, I never missed not having the high-res screen. It's really not necessary.

You will really enjoy *QUEST*!

Oh...did I mention Moorlock's Castle is on the other side of the river from you and that there isn't a bridge???

Software Review...

CAVE HUNTER IS PACMAN WITH A TWIST

At first *CAVE HUNTER's* game layout looks familiar, like that of *PACMAN*. But ol' P-M has it easy compared to what you have to go through to rack up the points in *CAVE HUNTER*.

This program, (from Mark Data, 23802 Barquilla, Mission Viejo, CA, 92691, \$24.95) is in machine language and does have those little dots, a PAC-like figure and some small villains who try to do you in.

BUT...there is more. You see, to be a *CAVE HUNTER*, you have to actually hunt through a cave and find something in it. And that's the rub, because it seems the little villains know where the loot is. Or, at least, they know how to keep you from getting either (1) it or (2) back to the surface.

The purpose of the game is to venture down into the cave, get the treasure and return to the surface. You steer your *CAVE HUNTER* with your joystick and try to avoid the bad guys.

As someone said: "Easy it isn't." But, as someone *must* have said: "Fun, it is."

Response to the joysticks is good and the action is fast-paced. There is a lot of planning involved, and you do get some "free time" -- you can stay on the surface while you plot your next move. Of course, if you stay there too long, the bad guys figure out where you are and it's difficult to get back into the cave.

In a word, *CAVE HUNTER* is enjoyable.

Software Review...

EL CASINO IS FOR ALL VEGAS ADDICTS

Before author Arnold Pouch accuses me of not knowing what the original El Casino is, I want to assure him -- and you -- that I have visited that pleasure dome in Freeport, the Bahamas. It is reputed to be the largest casino in the world.

In some ways, *EL CASINO* (from Superior Graphic Software, 406 Little Mountain Road, Waynesville, NC, 28786, for \$49.95) is the largest casino of its type in the world, too. It is three programs on tape or disk that cover three of the most popular game of chance in any casino.

All, too, are done with Pouch's Motion Picture Programming (MMP). This offers some of the most imaginative graphics we have seen for the CoCo.

(Continued on Page 28)

Color Computer

40 of the world's best-known songs, scored for easy playing on the TRS-80 Color Computer, including favorite popular, classical, folk and seasonal music selections.



The Color Computer Songbook

Color Computer

The must-have handbook, loaded with tips, tricks, secrets, shortcuts, hints and scores of complete ready-to-run graphics programs.



Color Computer Graphics

Color Computer

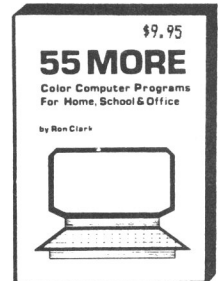
The must-have software ideabook, overflowing with hints, secrets, shortcuts, and color techniques ...with 101 ready-to-run programs.



101 Color Computer Programming Tips & Tricks

Color Computer

An all-new and different collection of tested, ready-to-run software for businessmen, teachers, students and hobbyists.



55 MORE Color Computer Programs for the Home, School & Office

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CONNECTION-80
OF WOODHAVEN
BOB ROSEN
93-15 86 DRIVE
WOODHAVEN, NY 11421

Word Processing Lowerkit

It converts your screen from an illegible checkerboard to this:

This photograph was taken of an ordinary television screen being fed by a Color Computer unmodified except for the installation of the lowerkit. Characters:

ABCDEFGHIJKLMN O PQRSTU VWXYZ []
abcdefghijklmnopqrstu vwxyz _ ^
01234567890!"#\$%&'()*:;+,<.>/?

- Complete and ready to install—no software needed
- Nothing to solder—fully assembled, tested, guaranteed
- Compatible with all Color Computer software
- Absolutely no loss of hi-resolution graphics modes
- Optional cut-off switch restores original reverse-caps display
- European, Kata Kana (Japanese) and Greek characters optional

\$79.95 complete

CONNECTION-80
OF WOODHAVEN
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93-15 86 DRIVE
WOODHAVEN, NY 11421

CHECK OUT OUR COLOR BBS AT (212) 441-3755.....24 HOURS EVERY DAY

colorcom/e

The ULTIMATE Color Computer Smart Terminal Program

LOOK AT THESE FEATURES:

1. FULL ONLINE AND OFFLINE SCROLLING, 1 OR 12 LINES AT A TIME.
2. SELECTABLE BAUD RATE (300, 600, 1200) AND PARITY. FULL OR HALF DUPLEX, TOO!
3. OUTPUTS ALL OR ANY PART OF RECEIVED TEXT TO PRINTER
4. ONLY TERMINAL PROGRAM ON THE MARKET THAT AUTOMATICALLY OPENS AND CLOSES THE BUFFER WHEN DOWNLOADED. COLORCOM/E WILL THEN SEARCH THROUGH THE BUFFER FOR THE CORRECT FILE AND WRITE IT TO CASSETTE FILE. ALLQWS YOU TO READ MULTIPLE FILES AND WRITE THEM AS CASSETTE FILES, SELECTIVELY!!!
5. FOR THE 32K COCO, GIVES YOU A BUFFER OF 30,300 BYTES FOR FOR STORING FILES FOR DOWNLOADING. MORE THAN ANY OTHER TERMINAL PROGRAM!

TO ORDER YOUR ROM-PAK, SEND CHECK OR M.O. FOR \$49.95 TO CONNECTION-80, BOB ROSEN, 93-15 86 DRIVE, WOODHAVEN, NY 11421.

N O W --- Radio Shack Disc Interface\$149.95

CONNECTION-80
OF WOODHAVEN
BOB ROSEN
93-15 86 DRIVE
WOODHAVEN, NY 11421

CHECK OUT OUR COLOR BBS AT (212) 441-3755.....24 HOURS EVERY DAY

CASINO (From Page 25)

Of particular interest is the Craps game, which gives you a wide variety of bets to make and keeps track of all of them on the graphics screen. No shifting screens to keep up with the four players who can stand at the *EL CASINO* table at one time!

But the real turn-on is when its time for the "bones" to roll! A hand at one end of the table shakes back and forth and then opens up as the dice come rolling toward you. Not a flicker in the graphics, folks. Of course, the game keeps track of all your bets -- and almost all of the traditional ones are available. Even the "hard ways."

Blackjack, also played in *EL CASINO*, uses graphically displayed cards, somewhat similar to a number of the arcade games. It does a good job and its also nice to know you won't get thrown out of *this* casino for card-counting. The program will count cards for you!

Lastly are Slot Machines, which operate fairly much the way all slots do. Motion Picture Programming does give this interesting graphics.

All three programs are also available individually.

Software Review...

SPACE INVADERS BY COMPUTERWARE

Space Invaders is a game, frankly, which captures the imagination of thousands. The other day I was in a large airport and, with some time between connections, I stopped in at the arcade to see what was new.

As usual, there were a few things new, but there were a number of the old standbys around, too. Space Invaders was one of the old friends. And, as usual, there were people waiting to play.

If Space Invaders is the Monopoly of the electronic generation (gee, now *there's* some philosophy. And I bet you thought you were reading a review!), then everyone will have one version or another eventually. And you could do far worse than to buy *COLOR INVADERS* from Computerware (Dept. C, Box 66B, Encinitas, CA, 92024, \$24.95 on tape, \$29.95 on disk).

Is there anyone out there who doesn't know how to play Space Invaders? I thought not, so we'll do without the explanation of the game itself.

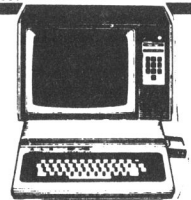
However, the Computerware *COLOR INVADERS* game is in machine language, which means you have excellent control of the joystick in

(Continued on Page 31)

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 label references, will output object code directly to memory or "CLOADM" compatible tapes and much more.

Price \$39.95



TEXT EDITOR

This program is a line/character oriented text editor for the color computer, that will enable you to create and edit text files for Basic programs, letters, text data files, or almost anything you might want to put on paper. It features functions for adding, inserting, deleting, moving and copying text lines or paragraphs; powerful string search and replace commands, single and automatic line numbers and line editing with 9 sub commands to insert, delete, change, add and remove individual or multiple characters. Tape commands allow you to save, load, append, and skip tape files; also it is compatible with Basic ASCII tape formats. A MUST HAVE PROGRAM!!

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SYSTEM MONITOR (TRSMON)

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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 March 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 SASE 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 are working on 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. 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.

We decided that this was the best way to run FLEX and OS-9 on the Color Computer because it does remove the roms from the memory map and leaves the full 48K for user programs. If you just put in memory for FLEX and use the Basic hooks for I/O, all you have is a little over 30K for user programs. In addition, very few FLEX programs will run without being modified and some won't run very well, if at all (our DATAMAN+ for example). Let me state it again. **ALL FLEX COMPATIBLE PROGRAMS WILL RUN WITHOUT MODIFICATION!!!** and the same goes for OS-9!

It is also the **ONLY** way OS-9 will run because 30K is just not enough.

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.

If you don't have a Color Computer, we can sell you one complete with 64K ram, 24K rom, Single RS disk drive and FLEX for only \$1,490, set up and ready to go.

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INVADERS (From Page 28)

your battle against the alien critters. Too, the aliens move across the screen well, and quickly. The play is good and in real time. Its a fine version.

COLOR INVADERS has eight skill levels and a maximum of 999,999 points. Computerware asks for notification of anyone who makes more than 15,000 on skill level eight. In short, it is a demanding game.

I liked **COLOR INVADERS** and you will, too.

Review...

NEW SYSTEM CARD HAS IT ALL

Do you spend a lot of time thumbing through *Getting Started With Color Basic* and *Going Ahead With Extended Color Basic* looking for the exact syntax for some command that isn't quite explained to your satisfaction on the system card you got with CoCo?

Did you ever wish there was just a little more information somewhere...that was easy and quick to get to?

Enter the **TRS-80 COLOR BASIC AND EXTENDED SYSTEM REFERENCE CARD** from Nanos Systems Corp., P. O. Box 24344, Speedway, IN, 46224, \$4.95). It is a shirt-pocket foldup card that's 16 pages long and just what the doctor ordered!

And, just like CoCo, it is in eight colors -- plus grey, white and black. No more trying to figure out whether this CHR# puts a red or a magenta block in such-and-such a place. Its all here, and in color.

Want to know when **PLAY** and **SOUND** shift octaves? The notes are represented on a staff ... and the notes shift colors, too, when the octaves shift.

There is a very well-done illustration of **PRINT USING**, all error messages with short explanations, and a list of derived functions. Also: detailed instructions for playing music, making a circle and drawing. There are the CoCo's color groupings, a screen line layout and a line printer control code command set (for the LP VII).

We are very impressed with this product and feel it will be helpful to anyone who programs in BASIC.

Review...

LIGHT PEN OFFERS INTERESTING IDEAS

One of the really interesting possibilities for a few different applications with our CoCo comes from such gee-whiz things as a light pen.

One specifically made for CoCo is now available from Moses Engineering (Regent Drive, Route 7, Greenville, SC, 29609, \$19.95 kit, \$39.95 assembled with joystick).

The Moses light pen uses the right joystick and the JOYSTK(0) reading to operate. It senses the brightness of colors on the screen and, if the software gets a reading matching the brightness, it can be programmed to do various things. Needless to say, this opens up all sorts of possibilities.

This particular product comes in two forms -- assembled and with a joystick attached and unassembled. Even the most klutzy of you need not fear the kit -- it was easy to assemble, took only 20 minutes, and did not require any messing with the CoCo itself.

To do the assembly, just open the joystick up, remove the innards, drill a hole for a phono jack (which is supplied) and solder two connections from the phono jack to two clearly marked parts of the joystick control. Put the whole thing back into the case and screw it back together. (No kidding, friends, I really can't do this kind of stuff well, but it was easy.)

You can buy the kit assembled for \$20 more, and you get another joystick. The modification does not hurt the joystick.

Then, when you want it, you plug the light pen in the phono jack on the joystick and you're ready.

The sample programs Moses Engineering supplies are just that, samples. They are not sophisticated, but are to show what the light pen can do. It has excellent potential.

In one program, you simply point the light pen at the end of a cannon, and, after reacting to the reading, the cannon fires at the top of the screen. In another, the screen is divided into three colors and the pen reads the relative brightness of the colors and tells you which one it is. These are, however, quite simple programs which -- being in BASIC -- take some time to react. It boggles the mind what one might do with some of the really good software -- in BASIC or machine language -- were it adapted to the light pen.

We believe you'll find this an interesting accessory and will open up several programming possibilities for you.

? #-2, (From Page 1)

subscription rates. Honestly, we've held off on them as long as possible. I did a little checking with some of you by telephone, and the overwhelming response was that the RAINBOW was worth our new base rate of \$16. Please note: All of you who have helped us get started can renew your subscriptions at the current \$12 base rate for a limited time. Its a way of mixing the bad with the good and, in a way, saying "thank you" for your confidence in our ability to provide you with a good magazine in a timely manner.

Our Canadian and Mexican subscribers will note that their postage differential also increases. I am very sorry about this, but there is just no option. Canadian and Mexican postal regulations require us to mail to those countries in certain ways -- and the ways are expensive. Believe me, we make absolutely no money on the portion of Canadian and Mexican subscriptions we are forced to charge for postage.

Of course, Canadians and Mexicans will be able to take advantage of the special renewal rate on our base subscription. But, those renewals must include the additional postage charges. If anyone has an idea of a way to reduce these charges, we'll do it -- and pass the savings on back to you either in a subsequent announcement or in a refund.

Now to the good news! For all those who don't like to see in our listings, we call your attention to the announcement inside about RAINBOW ON TAPE. We've thought long and hard about doing this -- and finally arranged a way to handle it so that you can get a quality product at the lowest possible cost. Incidentally, RAINBOW ON TAPE will be mailed first class mail, so it should come within a couple of weeks after you receive the

RAINBOW. For those of you who choose to subscribe to RAINBOW ON TAPE, you'll get a price break and quicker delivery. There will be no documentation sent with RAINBOW ON TAPE, the documentation is in the magazine itself.

Incidentally, the RAINBOW is now a truly international publication. A separate edition is being published in Australia for Australian and Asian markets through a license to Gregg Wilson of Australia. Gregg, who's a most interesting and charming fellow, also holds license rights to much of the software you can buy through our advertisers in this country and Canada.

Finally, we're planning an announcement shortly that should be of interest to everyone who purchases software. We hope it will be an answer to the problem of availability of advertised software. More about this later.

And, thanks to all of you for your interest and continued support of the RAINBOW!

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THREE NEW WORD PROCESSORS OFFER A VARIETY OF FEATURES

By Lawrence C. Falk

Three more word processing systems have hit the market since our last look at these programs, and all three have a number of excellent features to offer for the CoCo owner looking for a way to have his computer (and printer!) help him put words on paper.

Among the systems is Tandy Corp.'s entry into the field, appropriately named *COLOR SCRIPSIT*, Nelson Software's *SUPER COLOR WRITER* and *TEXTPRO* from Cer-Comp. All three programs are in machine language, which give a fast reaction to operator input and all have a variety of features. These programs, and the four word processors reviewed in the December edition of *the RAINBOW*, give a wide range of software from which to choose. Perhaps no single computer has as much word processing software available as does CoCo. And that is a point which should not be missed by your friends seeking to buy a computer.

Too, we believe that the preponderance of word processing software means that CoCo owners will have a variety of other business and utility oriented programs to choose from in other areas as well. Software support? Here it is in abundance -- for every need and every pocketbook.

TEXTPRO is, as we said, a machine language program which uses the "regular" screen to display letters -- that is, black letters on a green background for upper case. It is a line-based text editor, in that each line is numbered, by the writer or by the program.

You can number lines manually, much the same as you number BASIC programs. Or, you can let *TEXTPRO* do it. Its much easier to assign the task to the program -- and once that is done *TEXTPRO* does provide a simple way to insert lines: All you do is insert a line by using a number in between those already in existence. Since this is so much like the way you program in BASIC, it comes naturally.

TEXTPRO also uses commands similar to BASIC commands to perform many of its functions, such as copying lines from one part of the text file to another, deleting lines and moving them. One would suppose it could also be used to perform major surgery on BASIC programs -- so long as they were saved in the ASCII format. We have not tried this, but -- especially with the line numbers making it easy -- it seems a real interesting possibility.

The program's "replace" function is excellent, it will replace one text string with another with the blink of an eye. However, its "search" does not lend itself to the line-basis format, since it displays *all* the lines which contain a particular text string -- and these can scroll off the screen.

TEXTPRO, as *COLOR SCRIPSIT* and *SUPER COLOR WRITER*, has a true "scroll" through the text buffer (the characters you input). Its "scroll" is based more on lines, however, sometimes making it a bit difficult to follow in the text entry mode. However, in the edit mode, the cursor can be moved through the buffer at will. The editor is efficient and easy to use and the commands to do the most common things are easy to learn.

COLOR SCRIPSIT uses a red screen with a yellow "status line" on the bottom which tells you at a glance what amount of memory is left, what line you are on and what position in that line the cursor presently occupies. This is the most sophisticated status update of any of the seven word processors we have seen and is very similar to the status line which all other versions of *Scripsit* use. There is also a little box which tells you whether you are in capital or lower case letters. Upper case letters are shown backgrounded in red -- similar to the black on the familiar text screen.

COLOR SCRIPSIT also uses the "regular" 32-character screen, but with a difference. As reported previously in *The Pipeline*, it flips screens on the same line to give you 64 characters of width in the same line. However, once the display is "flipped," you cannot see the first part of the line. You have true scrolling in that you can move the cursor through the text at will at any time you wish.

As far as editing is concerned, you can insert, delete and change characters easily. This program also uses a device called wordwrap (as does *SUPER COLOR WRITER*), which keeps words from breaking up at the end of a line. *COLOR SCRIPSIT* goes this one better, however, and allows for hyphenation of words. The program allows you to set the amount

(Continued on next page)

of characters you want it to use in looking for possible places to hyphenate. Once you place the program in the hyphenation mode, it moves through the text and locates all the possible hyphens. When it finds one, it gives you the option of moving the hyphenation to a logical point or just leaving the word alone.

COLOR SCRIPSIT also supports finding and replacing text. It has the added feature of giving you an option as to whether you want to change a particular string after it has been found.

This is pretty important. As an example, suppose you asked someone to type in something for you, and the person typed in all the letter "i's" without capitalizing them. You could use this feature to go through the text and locate the lower case "i's" and make them "I's." The problem is, the program would also locate all the "i's" in the middle of words as well. Because you can give a yes/no decision to any change, it makes this sort of thing easy to use.

SUPER COLOR WRITER is now available. It uses a full-scroll text buffer and a "normal" screen, with the green and black reversed -- much as does **WORD PROCESSOR/TEXT EDITOR** does. This makes the screen very readable in the standard 32-character line. And, if you don't like the color set, you can switch it (to orange letters!).

This program has many of the same features the others do. Every function has a control key, and there are a large number to keep track of. For this reason, probably, a "help" screen is available -- showing the most-used commands. This is a nice touch.

The **CLEAR** key is the control. As an example, to delete a character, you hit **CLEAR** and "D". To get the help screen, its **CLEAR** and "H". The program has a "status line" at the top of the screen and the cursor changes colors, depending on what sort of mode you're in. This is helpful in keeping things straight.

SUPER COLOR WRITER has a unique feature in its search command, the ability to use a "wild card" to mask letters. Now, lets say you never learned the old rule that goes "i before e, except after c" and you have spelled several words like "recieved," "recieve" and so on. You want to change them. You can "mask" the "ie" out, and find all occurrences of the word with either spelling.

All three programs do all of the "simple" things like move and copy text, center material and justify copy. Keep in mind these are difficult to do on a typewriter -- and extremely easy with a word processing program. Also remember that studies show you can type much more quickly on a computer screen than on a piece of paper.

Getting information in is only half the battle, however. The other half is in the printing. All programs allow you to set such things as right and left margins, line spacing and number of lines per page. All also allow you to set "headers" and "footers," -- those standard lines that run on the top and bottom of the page when you have long documents. All also allow the computer to number the pages for you.

TEXTPRO and **SUPER COLOR WRITER**, however, also allow you a great amount of leeway in the use of control codes. Control codes are those things you send to a printer to change the type size and the line. For instance, in the LP VII, the **CHR\$(30)** is a control code to run double-wide letters.

These two programs allow you to

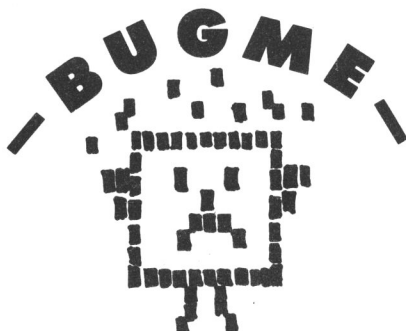
HELP STAMP OUT **BIG UGLY GRAPHICS**

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BUGME's

USE
MPP

DON'T

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imbed the control codes into your text, and change things "on the fly." Too, both also allow you to change the parameters you selected to print your document while you are doing the printing. This can be real important if you are trying to set a half-column, go to a full column for several lines, and then go back to a half column. It also means if you are using a printer which has different character sets, you can vary the character sets just by typing in a control code.

All three programs use tape for storage. *TEXTPRO* comes in a disk version as well. *SUPER COLOR WRITER* is advertised in both Rom Pak and disk versions, but we did not receive them for review. Since the tape version is in machine language, it is difficult to adapt to disk, but, I suppose, could be done. With *COLOR SCRIPSIT* on a ROM Cart, you cannot use a disk drive, because the disk will have to use the same port. *COLOR SCRIPSIT* does have the plug-in-and-run advantage, and does not use CoCo memory for the program.

As with the four word processors we reviewed earlier, each of these programs has some very real advantages. We hope this rundown will help you choose the right one for your uses.

TEXTPRO, by Bill Vergona, Car-Comp, 5566 Richochet Ave., Las Vegas, NV, 89110, \$39.95.

COLOR SCRIPSIT, by Robert Kilgus, at Radio Shack dealers and stores, \$39.95.

SUPER COLOR WRITER, by Tim Nelson, Nelson Software, P.O. Box 19096, Minneapolis, MN, 55419, \$49.95 tape; \$74.95 Rom Pak; \$99.95 disk.

Software Review...

MONEY MINDER II WILL HELP BUDGET

MONEY MINDER II from Harmonycs (P.O. Box 1573, Salt Lake City, UT, 84110-1573, \$8.95) is a fine addition to a software library and a useful program for anyone who wants to keep track of where his money is going.

Designed to operate on the 16K CoCo, the program allows you to set up to 56 categories of expenditure and assign checks to any of them. It also will work against a budget, so that you can place deposits in the categories as you wish and then monitor how you draw checks against them.

The large number of categories can be especially useful when you come to income tax time. And, since there are also printout and data tape save routines, you can keep track of things all year long and get a printout at any time.

If we have one complaint about *MONEY MINDER II*, it is the documentation. It would be greatly improved with some examples running all the way through the text and, we believe, would help the user. We were impressed by the program but wished access to its features had been made easier.

That being said, *MONEY MINDER II* does have some fine features. We particularly liked the way category balances are displayed in that if you only use part of the categories the program will not force you to "look at" a page or two of empty screens.

Too, a routine to allow you to look at the last entry in each category is included. This is especially useful when you wonder just "where you are" in the program. Despite the best of intentions, you know you're not going to enter in checks every day as you write them. The last entry feature works with keyboard or data tape entries -- whichever is last.

Finally, there is a particularly helpful feature called "Transfer Balances." Simply put, it allows you to handle your entries a week (or month, or whatever) at a time. It keeps a running total of balances forward and does not require you to read in long amounts of data from tape to get "up to date."

We believe you will be pleased with this program.

Software Review...

DANCING DEVIL IS DEVILISHLY FUN

You, or your kids, can keep busy for hours with *DANCING DEVIL*. It is a good program that will provide a lot of enjoyment.

Available from Tom Mix Software (3424 College N.E., Grand Rapids, MI, 49505, for \$14.95), this program lets you combine both musical and artistic talents.

Its somewhat similar to another program available for the black and white TRS-80's, but now it is available for the CoCo with all the enhancements CoCo can give it.

DANCING DEVIL features a little devil who will dance to any song you want to enter into the Computer. You do this through a menu system that is easy to use and the note selection is very easy. Even if you don't want to use a song, *per se*, you can just use notes.

Then, in step two, you program in the steps the devil can make in connection with the notes. Again, a

(Continued on next page)

DEVIL (From Page 35)

simple menu format is used to make things extremely easy. And, the devil will do a devilish number of things, from jumps to the Charleston.

Finally, you select the performance item on the menu, a curtain goes up, and the devil does his stuff. You can choose how fast you want him to run through it, and how many times (1 to 255) you want him to repeat. When the performance is over, the devil bows and the curtain goes down.

You can save your routines to tape and load them back from memory. In addition, there are two pre-programmed routines for a demonstration.

DANCING DEVIL rates a "NEAT!" from the resident 13-year-old. A major accolade!

Music... -----

JULIE'S SONG...

Julie Kerr, 10, of Bellevue, Wash., is as interested in music as she is in computers. So, she wrote the following program as an example of how CoCo can be used in a musical application.

The program generates a random sound for a couple of seconds, then starts at another random sound. You can maneuver the second sound up or down the scale until you think it matches the first. The program will tell you how close you came to a match!

Julie's mother, by the way, says it is only Julie among her family who consistently gets the "Tuned By An Expert" message.

This program's idea, and the code for it, was Julie's idea and inspiration. We hope you like it.

The listing:

```

5 ' TUNING
7 ' BY JULIE KERR
10 CLS5
20 PRINT "LISTEN TO THE FIRST SO
UND"
30 PRINT "THEN LISTEN TO THE SEC
OND SOUND"
40 PRINT "TUNE THE SECOND SOUND
TO THE"
50 PRINT "FIRST SOUND BY PRESSIN
G <L> TO"
60 PRINT "GO LOWER AND <H> TO GO
HIGHER."
70 PRINT "WHEN YOU THINK IT'S IN
TUNE,"
80 PRINT "PRESS <T>."
90 PRINT
100 FOR T=1 TO 1500:NEXT T

```

```

110 N=RND(100)+50
120 SOUND N,100
130 T=RND(100)+50
140 SOUND T,2
150 C$=INKEY$
160 IF C$="H" THEN T=T+1
170 IF C$="L" THEN T=T-1
180 IF C$="T" THEN GOTO220
190 IF T=0 THEN T=1
200 IF T=201 THEN T=200
210 GOTO140
220 IF T=N THEN PRINT"TUNED BY A
N EXPERT!":GOTO260
230 IF T>N-10 AND T<N+10 THEN PR
INT "VERY GOOD":GOTO260
240 IF T>N-20 AND T<N+20 THEN PR
INT"YOU NEED A LITTLE MORE PRACT
ICE":GOTO260
250 PRINT "PRACTICE MAKES PERFEC
T"
260 PRINT"THE TONE WAS"N"- YOU C
HOSE" T

```

FREE GAME --- BREAK OUT

SEND A S.A.S.E. FOR A FREE LISTING OF THIS PROGRAM. WRITTEN IN MACHINE LANGUAGE, VERY FAST, HAS ON SCREEN SCORING, ETC. NEEDS JOYSTICKS. COMES WITH COMPLETE INSTRUCTIONS ON HOW TO ENTER IT AND RUN THE GAME.

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This game, brought to you by the IMB dynamic duo of Fred Scerbo and Dale Haggerty (a.k.a. Snail), will let you sit in your web and try to get some ants for lunch. Use the right joystick to direct your little web and the "fire" button to shoot out a web at the ant. You're measured on how long it takes you.

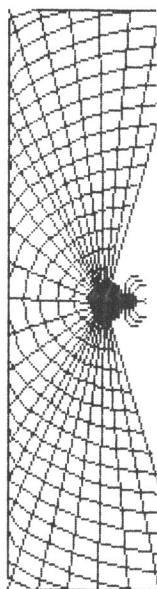
As always, please remember this game is for your personal use and pleasure and is not to be copied for any other reason. Similarly, the routines are for use in the game, but not for use in any software you write.

Get those ants!

```

1 POKE65495,0: CLEAR500: CLS0: SR=3
: C=1: GOSUB3: GOT09
3 SR=3: C=C+1: P$=CHR$(128): FORI=
2T014: FORJ=4T013: SET(J,I,C): NEXT
J: NEXT I
5 FORK=0T011STEP11: FORJ=18T023: S
ET(J+K,2,C): NEXTJ: FORJ=17T024: SE
T(J+K,3,C): NEXTJ: FORI=4T014: FORJ
=16T025: SET(J+K,I,C): NEXTJ: NEXTI
: NEXTK
7 FORK=0T07STEP7: FORJ=39T058: FOR
I=2T07: SET(J,I+K,C): NEXTI: NEXTJ:
FORI=3T06: SET(59,I+K,C): NEXTI: FO
RI=4T05: SET(60,I+K,C): NEXTI: NEXT
K: RETURN
9 PRINT@257,P$;: FORY=1T028: READA
: PRINTCHR$(A);: NEXT
11 DATA105,108,108,117,115,116,1
14,97,116,101,100,128,128,128,10
9,101,109,111,114,121,128,128,12
8,98,97,110,107,115
13 PRINT@329,P$;: FORY=1T012: READ
A: PRINTCHR$(A);: NEXT
15 DATA98,111,110,117,115,128,12
8,128,103,97,109,101
17 PRINT@399,CHR$(98)+CHR$(121);
19 PRINT@448,P$;: FORY=1T031: READ
A: PRINTCHR$(A);: NEXT
21 DATA102,114,101,100,128,115,9
9,101,114,98,111,128,128,97,110,
100,128,128,100,97,108,101,128,1
04,97,103,103,101,114,116,121
23 FORJH=1T02: GOSUB3: NEXTJH
25 W$="BU2U7R2D6FEU4R2D4FEU6R2D7
G2L2HGL2H2BD2BR12"
27 IL$="U9R2D9L2BR4U9R2D7R4D2L6B
R7U9R5F2D5G2L5BE2U5R2FD3GL2"
29 EB$="U9R7D2L5D2R3DL3D2R5D2NL7
BR2U9R5F2DGDFDG2L5BE2U2R2FGL2BU3
U2R2FGL2"
31 PMODE3,1: PCLS5: SCREEN0,0
33 DRAW"S4BM16,16C3U4L2R4BR4D4U2
R4U2D4BR4NR4U2NR2U2R4"
35 DRAW"S16BM10,60C4"+W$+IL$
37 DRAW"BM70,110"+W$+IL$
39 DRAW"BM130,160C3"+W$+EB$
41 FORY=0T060STEP60: FORI=34T0124
STEP30: PAINT(I+Y,55+WL),4,4: NEXT

```



```

I: WL=50: NEXTY
43 FORI=160T0220STEP30: PAINT(I,1
53),3,3: NEXTI
45 LINE(0,0)-(256,192),PSET,P: SC
REEN1,1: FORI=2T0100STEP8: LINE(0,
92+I)-(30+I,192),PSET: LINE(124+I
,0)-(256,0+I),PSET: NEXT
47 FORI=0T024STEP8: LINE(0,94)-(3
2-I,192),PSET: LINE(256,100)-(256
-I,0),PSET: NEXT
49 FORWA=1T02000: NEXT: CLS0
51 PMODE4,1: PCLS5: SCREEN0,0
53 AR$="C0R18L2NE6U3L3D3L8U3L3D3
L8U3L3D3U5L3D5U3L3D3F2R7NG5U2R8D
2RND5R2U2R5NF7": DRAW"S2BM118,92;
"+AR$
55 DRAW"C0S2BM118,122L18R2NH6U3R
3D3R8U3R3D3R8U3R3D3U5R3D5U3R3D3G
2L7NF5U2L8D2LND5L2U2L5NG7"
57 DIMA(6)
59 DIMB(6)
61 GET(108,89)-(129,95),A,G
63 GET(107,119)-(128,125),B,G
65 PMODE4,1: PCLS5: SCREEN0,0
67 CIRCLE(126,41),10,0,.9
69 PAINT(126,40),0,0
71 CIRCLE(126,52),4,0
73 PAINT(126,52),0,0
75 DRAW"S4BM126,50;C0L8G3D3BM126
,50R8F3D3BM126,52L6G3D3BM126,52R
6F3D3BM126,54L4G3D3BM126,54R4F3D
3BM126,54D5NF3NG3"
77 DIMS(24)
79 GET(110,32)-(142,60),S,G
81 PCLS5
83 FORI=0T090STEP15: LINE(126,48)
-(0,I),PSET: LINE(126,48)-(256,I)
,PSET: NEXT
85 FORI=32T0224STEP16: LINE(I,0)-
(126,48),PSET: NEXT
87 FORI=2T0146STEP9: CIRCLE(128,4
5+(I/2.5)),3+I,0,1.3,.5,1: NEXT
89 PUT(111,40)-(143,68),S,AND
91 I=126
93 SCREEN1,1
95 TIMER=0
97 C=RND(10): IFC=>6THEN101: S=IF
C<=5THEN107

```

(Continued on next page)

```

99 GOTO115
101 FORY=1T06:I=I+4:IF I=>230THE
N103ELSE105
103 COLOR5,5:LINE(I,150)-(21+I,1
56),PRESET,BF:I=10
105 PUT(I,150)-(21+I,156),A,PSET
:NEXT:GOTO97
107 GOSUB115:FORY=1T06:I=I-4:IF
I<=10THEN109ELSE111:=230
109 COLOR5,5:LINE(I+4,150)-(25+I
,156),PRESET,BF:I=230
111 PUT(I+4,150)-(25+I,156),R,PS
ET:NEXT:GOTO97
113 GOTO113
115 IFPEEK(339)=255THEN101
117 L=JOYSTK(0)*4
119 PLAY"V3105L255BC"
121 COLOR0,0:LINE(127,70)-(L,151
),PSET:COLOR5,5:LINE(127,70)-(L,
151),PRESET:COLOR0,0
123 IFPOINT(L,153)=5THENRETURN
125 SOUND1,1:COLOR0,5:FORWS=3T09
STEP3:CIRCLE(L,152),WS,0,.6:NEXT
WS:LINE(I-8,146)-(28+I,158),PRES
ET,BF:DRAW"SBM"+STR$(RND(200)+2
2)+","+STR$(RND(30))+AR$:LO=RND(
2):IF LO=>1THEN I=20ELSEI=220
127 TA=TA+1:IFTA<15THEN101
129 TE=TIMER:SE=INT(TE/60)
131 POKE65494,0:SCREEN1,0:FORW=1
T05:PLAY"O1T55BCBCB":NEXT:FORW=
1T01500:NEXT
    
```

the RAINBOW
Programming Tip...
**A SELF-MAILER SAVES
TIME AND ENVELOPES**

Dr. Lane Lester of Liberty Baptist College in Lynchburg, Va., didn't plan to send in a submission, but we're very impressed with the letter he mailed the other day and would like to pass its concept along as a hint to those who want to use their CoCo as a word processor and don't want to hassle with envelopes.

Dr. Lester has formatted his word processing program to use the first page as a self-mailer that doesn't require an envelope. Using plain white printer paper, he sets his return address on the left-hand margin 26 lines down from the top of the paper. Then, he starts the address of the person to whom he is writing 33 lines down and 35 spaces

(Continued on Page 40)

```

133 CLS0:PRINT@228,"YOU TOOK";:P
RINTUSING"####.##";SE;:PRINT" SE
CONDS.";
    
```

```

135 FORI=1T03000:NEXT:RUN
137 REM 'THE WILD WILD WEB' BY
FRED B.SCERBO & DALE 'SNAIL'
HAGGERTY,COPYRIGHT (C) 1982,
IMB,ILLUSTRATED MEMORY BANKS
BOX 289,WILLIAMSTOWN, MA
01267-0289
    
```



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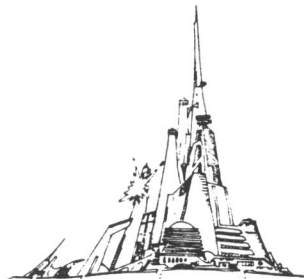
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TRS 80 COLOR

ENVELOPE (From Page 38)

from the left-hand margin.

Once that information is entered, he has his printer move to the top of the next page, prints a "letterhead," spaces down several spaces and starts the letter off with the date and "Dear _ _ _:" salutation.

Owing to the number of word processors on the market, we won't try to tell you how to format yours, but here's how the program could be written in BASIC. With every word processor we've seen for the CoCo, the actual formatting should be easy to accomplish.

```

10 FOR X=1 TO 26:PRINT #-2: NEXT
20 PRINT #-2,"Lane P. Lester,
Ph.D."
30 PRINT #-2,"Liberty Baptist
College"
40 PRINT #-2,"Lynchburg, VA 24506"
50 FOR X=1 TO 4:PRINT #-2:NEXT
60 LINEINPUT "NAME";A$
70 LINEINPUT "STREET ADDRESS";B$
80 LINEINPUT "CITY, STATE, ZIP";C$
90 PRINT #-2,TAB(35)A$:PRINT
#-2,TAB(35)B$:PRINT #-2,TAB(35)C$
100 FOR X=1 TO 33:PRINT #-2:NEXT X

```

Once you've done this, simply use whatever you wish to make a "letterhead" and write the letter. Then, once done, make a triple fold in the paper and you have a letter on one side and (on the top sheet which becomes the "back") an envelope, all addressed and ready to mail. Just tape the paper together.

Its a neat trick that can save you hours of time.

Utility...

FOR THE GAMERS... SCREEN-SCORING

By Charles H. Santee

I have enjoyed the RAINBOW very much and, especially, the SNAIL INVADERS game by Fred Scerbo and Dale Haggerty of IMB. It is especially interesting.

Being very interested in on-screen scoring on the graphics pages, I have written up a routine which, I believe, will conserve a great deal of memory. It is one I have been using in games.

To insert this routine into a game, use lines 1000 to 2130 without the documentation included in the listing so you can follow the routine's logic. Or, you can run the program as is to see how it works.

A few notes...

1. If you would like a set number of digits on the screen for the score

(e.g., 0057), edit line 2030 as:
 LS=LEN(SS\$):SS\$=RIGHT\$(SS\$,LS-1)
 :SS\$=STRING\$(5-LS,"0")+SS\$

2. If you want a right to left "flip" of numerals delete lines 2105 and 2115 and edit the lines listed below as follows:

```

1015 NEXT X
:E$="C1BRNU4RU4RD4RU4RD4RU4RNL4D2NL4
D2L8C3":RETURN

```

```

2085 GG$=GG$+E$+G$(V)

```

3. When the above method is used and a score is very large, GG\$ may give an LS error.

The listing:

```

5 '%%%% CLEAR ENOUGH SPACE FOR
THE GRAPHICS AND STRINGS %%%
10 CLEAR 600
15 GOSUB 1000:'%%%% GO TO THE
SUBROUTINE WHICH MAKES A
FILE OF GRAPHIC NUMBERS %%%
20 '%%%% THIS ROUTINE SELECTS
SOME NUMBERS TO BE DRAWN
IN A GAME, THE NUMBERS
DRAWN WOULD BE THE SCORE %%%
25 CLS:INPUT"FIRST NUMBER";F
30 INPUT"LAST NUMBER";L
35 INPUT"INPUT STEP";ST
40 '%% SET UP GRAPHIC SCREEN %
45 PMODE 3,1:PCLS:SCREEN 1,0
50 '%% the numeric variables SC
is the score %%%
55 FOR SC = F TO L STEP ST
60 GOSUB 2000
65 FOR P = 1 TO 200:NEXT P:'%%
PAUSE SO THAT THE SCORE CAN
BE VIEWED
70 NEXT SC
80 GOTO 25:'% TRY NEW NUMBERS %
1000 '"$"$"$"$ This subroutine
sets up a table of graphic
strings to be used in the
draw statement which can be
used to draw the numbers
0 through 9 "$"$"$"$
1005 FOR G = 0 TO 9
1010 READ G$(G)
1015 NEXT G:RETURN
1020 '### THE NUMERAL 0 ###
1025 DATA"BR2U4R3D4NL3BR3"
1030 '### 1 ###
1035 DATA"BR4NU4BR4"
1040 '### 2 ###
1045 DATA"BR2U2R3U2NL3BD4NL3BR3"
1050 '### 3 ###
1055 DATA"BR2R3U2NL2U2NL3BD4BR3"
1060 '### 4 ###
1065 DATA"BR2BU2NU2R3U2D4BR3"
1070 '### 5 ###
1075 DATA"BR2R3U2L3U2R3BD4BR3"
1080 '### 6 ###
1085 DATA"BR2U4NR3D2R3D2NL3BR3"
1090 '### 7 ###

```



```

1095 DATA"BR2BU3UR3D4BR3"
1100 '### 8 ###
1105 DATA"BR2U4R3D2NL3D2NL3BR3"
1110 '### 9 ###
1115 DATA"BR2BU2NR3U2R3D4BR3"
2000 '"#$"#$ This subroutine
        converts the numeric
        variable into a graphic
        variable and draws the
        numbers on the screen
2005 '%% INITIALIZE THE GRAPHIC
        VARIABLE %%%
2010 GG$=""
2015 '%% CONVERT THE NUMERIC
        VARIABLE TO A STRING %%%
2020 SS$=STR$(SC)
2025 '%% DELETE THE LEADING
        BLANK FROM THE STRING %%%
2030 LS=LEN(SS$):SS$=RIGHT$(SS$,
        LS-1)
2035 '%% The next step is to
        pick off each decimal of
        numerical string, convert
        that string back to a
        numeral, and use that
        numeral to call up the
        graphic string.
2040 '%% The graphics are
        combined to form one
    
```

```

        graphic for drawing the
        score.
2045 L=LEN(SS$):'### DEFINE
        THE NUMBER OF NUMERALS
        IN THE STRING
2050 '### REPEAT THE STEPS BELOW
        FOR EACH NUMERAL
2055 FOR A=1 TO L
2060 '%% DEFINE EACH NUMERAL IN
        THE STRING
2065 N$=MID$(SS$,A,1)
2070 '%% DETERMINE THE VALUE
        OF THE NUMERAL %%%
2075 V=VAL(N$)
2080 '%% USE THAT VALUE TO
        CALL UP THE GRAPHIC
        REPRESENTATION OF THE
        VALUE AND ADD THE GRAPHIC
        STRINGS TOGETHER %%%
2085 GG$=GG$+G$(V)
2090 '%% DO IT AGAIN FOR
        THE REST OF THE NUMERALS %
2095 NEXT A
2100 '%% ERASE THE LAST GRAPHIC
        BY REDRAWING THE OLD SCORE
        WITH THE BACKGROUND COLOR
2105 DRAW"BM0,20C1S8"+OG$
2110 '%% REDEFINE THE NUMBER TO
        BE ERASED NEXT TIME (OLD
        GRAPHIC)
2115 OG$=GG$
2120 '%% DRAW THE NEW GRAPHIC
        (PRESENT SCORE)
2125 DRAW"BM0,20C3S8"+GG$
2130 RETURN
    
```

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Utility...

AN 8-BIT DRIVER FOR BASIC USE

By Mark Reeves

Yes, you can get a free eight-bit printer driver from Radio Shack that will allow you to print the bit image graphics and so on (as well as access some of the special characters on the LP VIII). One of the problems with it, though, is that it is in machine language and, sometimes, can be a little difficult to use. But what do you want, its free!

At SNAKE MOUNTAIN SOFTWARE we wanted to have a little more versatility in an eight-bit driver, especially a program that would allow us to move it anywhere in memory. That is important, because it lets us put the driver in some vacant place in the RAM -- out of the way of any program.

Still, it is important that a driver be in machine language, because of the speed. The program below is in BASIC, but POKES machine

(Continued Next Page)

8-BIT (From Page 41)

code into memory. And, because the machine code is position-independent, it can be used easily, simply and anywhere in memory.

There is nothing special about this program. The only thing you might have to adjust is the location where you wish the driver to load. This is accomplished simply by changing the value of the variable LD in line 200 to whatever decimal number you wish.

If you have an assembler, its easy to translate the hexadecimal codes in the data statements into assembly language Op Codes, assemble this and make a tape. It works just as well in BASIC, but you might want to get some practice working with the assembler.

The listing:

```
200 LD=492: 'OR ANY ADDRESS YOU WISH
210 FOR I=0 TO 40
220 READ VL$
230 PK=VAL("&H"+VL$)
240 POKE LD+I,PK
250 NEXT I
260 EXEC LD
270 END
280 DATA 83,00,00,30,8D,00,08
290 DATA 8F,01,68,96,96,97,E6
300 DATA 39,34,04,D6,6F,5C,2B
310 DATA 02,35,84,35,04,32,62
320 DATA 34,04,F6,FF,22,54,25
330 DATA FA,BD,8E,0C,35,84
```

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RAINBOW ON TAPE is available from *the RAINBOW*, 5803 Timber Ridge Dr., Prospect, KY, 40059, for \$5 each or \$50 per year (12 tapes). Kentucky residents please add 5% state sales tax. No "back issue" tapes are available, although plans will be announced shortly to make selected groups of programs from back issues available. All tapes are guaranteed to load.

"Obviously, one of the major time-consuming tasks for people who want to type in programs from *the RAINBOW* is the typing-in process," said Lawrence C. Falk, publisher of the magazine. "The new *RAINBOW ON TAPE* service will eliminate this problem -- and the need to spend additional hours debugging typographic errors."

RAINBOW ON TAPE will be sent first class mail to avoid Postal Service delays.

Utility...

**SAVE ML PROGRAMS
TO YOUR DISK**

By Jorge Mir
RAINBOW Utilityman

SAVEM is a disk version of a program previously published in *the RAINBOW* that facilitates the saving of machine language programs. Additional features have been incorporated into this new version of the program which I find useful with the disk system.

The program starts by relocating itself to the upper part of RAM. It checks to determine whether you have a 16K or 32K system and relocates itself starting at hex location &H3600 for 16K or &H7600 for 32K. Since most machine language programs occupy the lower RAM area, relocating *SAVEM* to a higher location will avoid conflict most of the time. In

(Continued on Page 44)



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DISK SAVE (From Page 42)

the event that the program you wish to save covers the RAM areas noted above, you can have *SAVEM* relocate itself to any RAM area by changing lines 720-800, thus avoiding conflict with the program to be copied.

After relocating itself, *SAVEM* presents you with a menu through which you can choose to copy a program from cassette or disk. It also provides for copying a program currently in RAM (if you choose this option and have no program in RAM, *SAVEM* will crash).

To load from cassette, you are asked for the program name and, after you input it, the cassette tape is searched for the program. If you want to offset load the program, you indicate so as part of the program name just as you would do if you were offset loading a program from cassette without the aid of the *SAVEM* program (see the manual for the syntax).

Once the program is loaded into RAM, the hex and decimal values of the start, end and execute addresses are displayed for information purposes. In addition, you are asked whether the target program was offset loaded and, if so, *SAVEM* then asks for the offset hex value so it can correct the reference at the start of the program. In addition, you are asked for the title you wish to use for the program you are saving and you are given a choice of saving the program to tape or disk.

Before you indicate you want the program saved to tape, you should have the recorder ready in the record mode.

If the program is saved to disk, *SAVEM* creates a data file indicating the start, end and execute points of the target program. This comes in handy later on when you want to load from disk and copy the programs to other disks or cassette tapes since, as you may have already found out, the disk system does not use locations &H007E-&H007F or &H01E7-&H01E8 to indicate the start and end of programs.

To load from disk, you can load any machine language program with the *SAVEM* program, provided the program was previously copied from cassette using *SAVEM*. Before loading from disk, the *SAVEM* searches for the start, end and execute addresses previously stored on disk when the target program was loaded from cassette and then transferred to disk. If the program was not previously saved using

SAVEM, it returns to the program name prompt.

Once the program is loaded into RAM you are given a choice of saving to disk or cassette and an option to change the title of the program.

In loading from memory, when your program is already stored in RAM, you can still copy to cassette or disk since *SAVEM* determines to various addresses needed as well as the name (which is stored in locations &H01D2-&H01D9). This choice was added since, in some instances, you may not know the exact name of the program stored on cassette. If that is the case, you simply type CLOADM and the program is loaded into RAM. You then can run *SAVEM* to copy to disk or tape.

There are no special operating instructions to run *SAVEM*. However, it must be loaded and RUN before attempting to copy any programs. If you load *SAVEM* after you have a machine language program in RAM, it may not function properly.

SAVEM is to be used only to copy your own programs from tape to disk and vice-versa.

The listing:

```

10 GOTO 730
20 CLS:PRINT TAB(10)*" SAVEM *"
30 PRINT TAB(10)"-----"
40 PRINT @165,"1 - LOAD FROM DIS
K"
50 PRINT @197,"2 - LOAD FROM CAS
SETTE"
60 PRINT @229,"3 - COPY PROGRAM
IN RAM"
70 PRINT @261,"4 - END PROGRAM"
80 I$=INKEY$:IF I$=""THEN80
90 I=VAL(I$):IF I<1 OR I>4 THEN
80
100 IF I=3 OR I=4 THEN 130
110 PRINT:INPUT"PROGRAM NAME":N$
120 IF LEN(N$)>8 THEN 110
130 ON I GOTO 150,310,320
140 END
150 IF LEN(N$)=8 THEN 170
160 N$=N$+" ":GOTO150
170 LOADM N$
180 CLOSE#1:R=0
190 OPEN"D",#1,"SAVEM/DAT",20
200 FIELD #1, 8 AS NAME$, 4 AS B
EGIN$, 4 AS TAIL$, 4 AS START$
210 IF R=LOF(1) THEN 110 ELSE R=R
1
220 GET #1, R
230 IF NAME$=N$ THEN 240 ELSE210
240 A$=PROG$
250 A=VAL("&H"+BEGIN$)
260 B=VAL("&H"+TAIL$)

```

(Continued on Page 4

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DISK SAVE (From Page 44)

```

270 C=VAL("&H"+START#)
280 CLOSE #1
290 CLS:PRINT"PROGRAM: "N#
300 GOTO 420
310 CLOADM N#
320 PG#=""
330 FOR X=474 TO 481
340 Y=PEEK(X):IF Y=32 THEN Y=143
350 PG#=PG#+CHR$(Y)
360 NEXT X
370 A=PEEK(487)*256+PEEK(488)
380 B=PEEK(126)*256+PEEK(127)-1
390 C=PEEK(157)*256+PEEK(158)
400 Y#=""
410 CLS:PRINT"PROGRAM: "PG#
420 PRINT"          DECIMAL"," HEX
"
430 PRINT"          -----"," ---
-"
440 PRINT"START: "A," "HEX$(A)
450 PRINT" END: "B," "HEX$(B)
460 PRINT"ENTRY: "C," "HEX$(C)
470 IF LEFT$(I$,1)="Y" THEN 510
480 IF I<>3 THEN 510
490 PRINT:INPUT"WAS PROGRAM OFFS
ET LOADED";Y#
500 IF LEFT$(Y$,1)="Y" THEN INPU
T"OFFSET ADDRESS (TYPE '&H'+####
)";I:A=A+I:GOTO410
510 PRINT:INPUT"WHAT IS THE TITL
E YOU WISH TO USE FOR THIS PRO
GRAM";A#
520 A#=LEFT$(A$,8)
530 PRINT"PROGRAM CAN BE SAVED O
N:"
540 PRINT"      (D) DISK"
550 PRINT"      (C) CASSETTE"
560 PRINT:INPUT"YOUR CHOICE";I#
570 IF I#="D" THEN 600
580 IF I#="C" THEN 700
590 GOTO 560
600 SAVEM A#,A,B,C
610 OPEN"D",#1,"SAVEM/DAT",20
620 FIELD #1, 8 AS NAME$, 4 AS B
EGIN$,4 AS TAIL$, $ AS START#
630 R = LOF(1)+1
640 LSET NAME$=A#
650 LSET BEGIN#=HEX$(A)
660 LSET TAIL#=HEX$(B)
670 LSET START#=HEX$(C)
680 PUT #1,R
690 CLOSE#1:GOTO 710
700 CSAVEM A#,A,B,C
710 PRINT:PRINT"ALL DONE":GOTO 2
0
720 DATA BD,B3,ED,1F,02,7E,96,A7
730 IF PEEK(&H25)<>&H7F THEN 780
740 CLEAR200:FOR I=0T07:READE#
750 POKE&H7603+I,VAL("&H"+E#):NE
XT
760 DEFUSR0=&H7603:X=USR0(&H7618
)

```

MAKE LETTERHEADS FOR CORRESPONDENCE

Let's face facts folks, while a lot of printers can use single sheet paper, its a hassle. Yet, with all the sophisticated word processors out, your CoCo is an excellent tool for writing letters -- and it and the word processing software is a heck of a lot less expensive than a good electric typewriter.

But those single sheets!

One answer is simply to print out your name and address on the inside of your letterhead, using white pin feed paper. That eliminates the problem of feeding in single sheets -- and, another annoyance -- it satisfies the little "paper out" selector which some printers have and which is activated when single sheets pass the little metal reed.

The EAST TEXAS COLOR COMPUTER CLUB, and president Ron Garrett, have come up with a unique solution that you might consider. Let your CoCo and printer print a letterhead. Because the CoCo and line printer graphics are so versatile (especially with the LP VII and LP VIII), you can get just about as fancy as you wish!

Ron and the EAST TEXAS COLOR COMPUTER CLUB have generously consented to allow us to print the following program, which is what the club uses to produce its letterhead (see the illustration). With a little imagination, you can adapt this program to your own use. Please do not use their graphics. They are copyrighted and listed here for illustrative purposes only.

The Club (2101 East Main St., Henderson, TX, 75652) is always looking to attract members and publishes a bi-monthly newsletter. Those interested should contact Garrett.

The listing:

```

1 CLS:PRINT@232,"SET PRINTER TO
8          BIT POSITION"
2 PRINT@380," ":INPUT" HIT <EN
TER> WHEN READY";Z#
3 'COPYRIGHT AUG/1981 BY THE EAS
T TEXAS COLOR COMPUTER CLUB
4 '2101 EAST MAIN STREET
5 'HENDERSON, TEXAS 75652
10 DEFUSR0=15785
770 GOTO 20
780 CLEAR200:FORI=0T07:READE#
790 POKE&H3603+I,VAL("&H"+E#):NE
XT
800 DEFUSR0=&H3603:X=USR0(&H3618
)
810 GOTO 20

```

```

20 PMODE 4,1:PCLS:SCREEN 1,1
30 LINE(88,10)-(168,10),PSET
40 LINE-(171,23),PSET
50 LINE(167,10)-(170,23),PSET
60 LINE(88,10)-(85,23),PSET
70 LINE(89,10)-(86,23),PSET
80 LINE(86,23)-(170,23),PSET
90 LINE(86,24)-(170,24),PSET
100 LINE(171,23)-(171,77),PSET
110 LINE(85,23)-(85,77),PSET
120 LINE(86,23)-(86,77),PSET
130 LINE(170,23)-(170,77),PSET
140 LINE(150,23)-(150,77),PSET
150 LINE(85,77)-(171,77),PSET
160 LINE(85,78)-(171,78),PSET
170 LINE(91,25)-(148,25),PSET
180 LINE-(148,75),PSET
190 LINE-(91,75),PSET
200 LINE-(91,25),PSET
210 LINE-(96,30),PSET
220 LINE-(108,29),PSET
230 LINE-(121,28),PSET
240 LINE-(133,29),PSET
250 LINE-(146,30),PSET
260 LINE-(150,24),PSET
270 LINE(146,30)-(147,40),PSET
280 LINE-(148,49),PSET
290 LINE-(147,59),PSET
300 LINE-(146,68),PSET
310 LINE-(150,74),PSET
320 LINE(146,68)-(133,69),PSET
330 LINE-(121,70),PSET
340 LINE-(108,69),PSET
350 LINE-(96,68),PSET
360 LINE-(91,73),PSET
370 LINE(96,68)-(95,49),PSET
380 LINE-(96,30),PSET
390 FOR X=60 TO 77 STEP 2
400 LINE(150,X)-(170,X),PSET:NEX
T
410 LINE(153,26)-(167,57),PSET,B
420 CIRCLE(162,30),3
430 LINE(155,34)-(165,36),PSET,B
F
440 LINE(155,38)-(165,40),PSET,B
F
450 FOR X=157 TO 163 STEP 4
460 LINE(X,42)-(X+2,42),PSET,BF
470 LINE(X,46)-(X+2,48),PSET,BF
480 LINE(X,50)-(X+2,52),PSET,BF
490 LINE(X,54)-(X+2,56),PSET,BF
500 NEXT
510 CIRCLE(115,40),8
520 CIRCLE(135,39),8
530 CIRCLE(115,42),4
540 CIRCLE(135,41),4
550 CIRCLE(126,50),7,,1,.15,.5
560 CIRCLE(106,38),20,,1,0,.1
570 CIRCLE(115,48),30,,.5,.1,.28
580 CIRCLE(171,33),10,5,1,.75,.2
5
590 CIRCLE(84,33),10,5,1,.25,.75
600 CIRCLE(171,70),5,5,1,.75,.25
610 CIRCLE(84,70),5,5,1,.25,.75

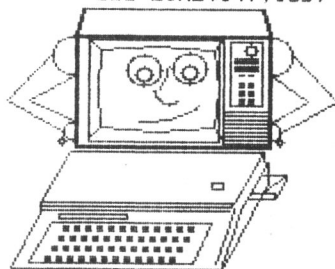
```

```

620 LINE(181,33)-(200,55),PSET
630 LINE-(176,70),PSET
640 LINE(172,43)-(187,55),PSET
650 LINE-(172,65),PSET
660 LINE(74,33)-(55,55),PSET
670 LINE-(79,70),PSET
680 LINE(84,43)-(65,55),PSET
690 LINE-(84,65),PSET
700 CIRCLE(79,75),2
710 CIRCLE(175,75),2
720 REM DRAW COMPUTER
730 LINE(83,80)-(168,80),PSET
740 LINE-(168,84),PSET
750 LINE-(170,85),PSET
760 LINE-(170,95),PSET
770 LINE-(150,138),PSET
780 LINE-(57,138),PSET
790 LINE-(70,110),PSET
800 LINE-(70,105),PSET
810 LINE-(83,80),PSET
820 LINE(70,105)-(155,105),PSET
830 LINE(70,107)-(154,107),PSET
840 LINE(70,109)-(153,109),PSET
850 LINE(150,138)-(150,135),PSET
860 LINE-(158,109),PSET
870 LINE-(170,85),PSET
880 LINE(147,135)-(155,109),PSET

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```

890 LINE-(154,107),PSET
900 LINE-(155,105),PSET
910 LINE(162,100)-(173,100),PSET
920 LINE-(173,103),PSET
930 LINE-(162,103),PSET
940 LINE(168,100)-(178,91),PSET
950 LINE-(168,91),PSET
960 LINE(145,95)-(150,98),PSET,B
970 LINE(173,103)-(178,94),PSET
980 LINE-(178,91),PSET
990 LINE(155,105)-(168,80),PSET
1000 LINE(75,115)-(145,115),PSET
1010 LINE-(137,135),PSET
1020 LINE-(65,135),PSET
1030 LINE-(75,115),PSET
1040 FOR X=80 TO 135 STEP 5
1050 LINE(X,117)-(X+2,119),PSET,
BF

```

(Continued Next Page)

LETTERHEADS (From Page 47)

1060 NEXT
 1070 FOR X=78 TO 133 STEP 5
 1080 LINE(X,122)-(X+2,124),PSET,
 BF
 1090 NEXT
 1100 FOR X=75 TO 130 STEP 5
 1110 LINE(X,127)-(X+2,129),PSET,
 BF
 1120 NEXT
 1130 FOR X=72 TO 127 STEP 5
 1140 LINE(X,132)-(X+2,134),PSET,
 BF
 1150 NEXT
 1160 LINE(78,111)-(108,113),PSET
 ,B
 1170 DRAW"BM82,145;NF2L6G2D8F2R6
 E2;BR5NF2U8E2R6F2D8G2NL6;BR7NU12
 R10;BR7H2U8E2R6F2D8G2NL6BR7U12R6
 F2D3G2L6R3F6
 1180 DRAW"BM20,20;NR15D7NR10D8R1
 5;BD32H2L11G2D4F2R11F2D3G2L11H2;
 BD9R7NR8D15
 1190 LINE(27,42)-(20,57),PSET:LI
 NE(27,42)-(35,57),PSET:LINE(25,5
 0)-(29,50),PSET
 1200 DRAW"BM235,20;L8ND15L8;BD22
 NR15D8NR10D8NR15;BD7F8NE8NG8F8;B
 D32H2L11G2D4F2R11F2D3G2L11H2"
 1210 LINE(228,89)-(220,104),PSET
 :LINE(228,89)-(235,104),PSET:LIN
 E(225,97)-(232,97),PSET
 1220 DRAW"BM37,167;H2L6G2D8F2R6E
 2;BR5NF2U8E2R6F2D8G2NL6;BR7U12F5
 E5D12;BR5U12R6F2D3G2L6;BR15BU7D1
 0F2R6E2U10;BR5R5ND12R5;BR5NR10D6
 NR7D6R10;BR5U12R6F2D3G2NL6F5;BU1
 BR28NE2L6H2U8E2R6F2BU2;BR5D12R10
 ;BR5BU2NU10F2R6E2U10;BR5ND12R6F2
 D2G2NL6F2D2G2L6"
 1230 CIRCLE(27,120),8
 1240 CIRCLE(27,120),4,5,1,.1,.9
 1250 DRAW"BM25,184;E1R1F1G3D1R3;
 BR3U5;BR4G1D3F1R1E1U3H1NL1;BR4ND
 5;BR6NR3D2NR2D3R3;BR2U4NR3E1R1F1
 D4;BR4NH1R1E1U1H1L1H1E1R1F1;BU1B
 R3R1ND5R2;BR6ND5F2E2D5;BR3U4NR3E
 1R1F1D4;BR3U3BU1U1;BR3ND5F5U5
 1260 DRAW"BM125,184;D2ND3R3ND3U2
 ;BR3NR3D2NR2D3R3;BR3U5F5U5;BR3D5
 R1E1U3H1L1;BR6NR3D2NR2D3R3;BR3U5
 R2F1D1G1NL2F2;BR4NH1R1E1U1H1L1H1
 E1R1F1;BR3NE1D3F1R1E1U3H1NL1;BR4
 ND5F5U5;BR8R3G3D2;BR7NH1R1E1U1H1
 L2U2R3;BR5NF1L1G1D3F1R1E1H1NL2;B
 R5BU3NR3D2R2F1D1G1L1H1;
 1270 DRAW"BR7D1NR3U1E3H1L1G1
 1280 FOR X=15742 TO 16360
 1290 READ A:POKE X,A:NEXT
 1300 DATA 0,0,142,61,152,191,1,1
 07,134,126,183,1,106,183,1,103,1
 42,63,80,191,1,104,127,63,175,57
 ,13,111,39,3,126,140,241,50,98,1

89,161,177,129,95,39,1,57,52,52
 1310 DATA 150,182,129,0,39,14,12
 9,2,39,19,129,4,39,35,53,52,18,1
 34,32,57,134,16,183,63,181,134,3
 2,32,7,134,16,183,63,181,134,96,
 183,63,176,134,28,183,63,183,183
 1320 DATA 63,179,32,18,134,32,18
 3,63,181,134,192,183,63,176,134,
 28,183,63,183,127,63,179,158,186
 ,191,63,177,191,63,190,127,63,18
 7,134,18,189,63,106,134,27,189,6
 3,106
 1330 DATA 134,16,189,63,106,134,
 0,189,63,106,134,112,189,63,106,
 246,63,181,84,84,52,4,16,142,63,
 201,52,32,189,62,219,53,32,142,6
 3,193,166,128,68,125,63,175,39,1
 1340 DATA 67,138,128,167,160,140
 ,63,201,38,238,16,140,63,233,45,
 222,142,63,201,127,63,186,166,12
 8,183,63,180,124,63,186,140,63,2
 33,38,5,189,62,114,32,53,166,132
 ,177
 1350 DATA 63,180,38,15,124,63,18
 6,166,128,140,63,233,38,239,189,
 62,114,32,31,189,62,114,32,208,1
 82,63,186,74,39,85,134,28,189,63
 ,106,141,69,182,63,186,189,63,10
 6,182,63,180,189,63,106,57,53,4,
 90,38,134,134,13,189
 1360 DATA 63,106,115,63,187,246,
 63,176,190,63,190,58,193,32,38,1
 1,246,63,187,193,0,38,4,246,63,1
 81,58,191,63,190,122,63,183,39,3
 ,126,61,254,134,30,189,63,106,53
 ,52,134,32,57,125,63,179,39,3,12
 0,63,186,57,141,245
 1370 DATA 182,63,180,189,63,106,
 122,63,186,38,245,57,134,7,183,6
 3,185,190,63,190,191,63,188,190,
 63,188,230,132,156,183,45,2,198,
 0,247,63,192,79,142,63,193,120,6
 3,192,102,134,246,63,176,193,32,
 38,23,246,63,187,39,9,246,63,185
 ,193,7,39,11,32,7,246,63
 1380 DATA 185,193,4,39,2,103,134
 ,76,129,8,45,216,182,63,181,16,1
 90,63,188,49,166,16,191,63,188,1
 22,63,185,246,63,176,193,32,38,9
 ,246,63,185,193,3,38,168,32,5,12
 5,63,185,38,161,16,190,63,190,49
 ,33,16,191,63,190,57,52,4,214,11
 1
 1390 DATA 193,254,53,4,39,14,16,
 190,128,0,16,140,69,88,38,3,126,
 130,115,57,50,98,52,23,26,80,141
 ,48,95,141,47,198,8,52,4,95,68,6
 9,88,141,37,53,4,90,38,243,141,2
 8,53,3,129,13,39,8,12,156,214,15
 6,209,155,37
 1400 DATA 6,15,156,141,20,141,16

(Continued on Page 51)

TELEWRITER

Provides your COLOR COMPUTER with:

REAL LOWER CASE CHARACTERS ■ A POWERFUL TEXT FORMATTER
51 COLUMN × 24 LINE SCREEN DISPLAY ■ SPECIAL DRIVER FOR EPSON MX-80
ADVANCED CASSETTE HANDLING FEATURES ■ A SOPHISTICATED FULL-SCREEN TEXT EDITOR

and requires absolutely no hardware modifications

TELEWRITER

Telewriter is a 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 × 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 a line, the wordwrap feature moves you cleanly to the next.

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.

Telewriter will automatically number pages (if you want) and automatically center lines. It can chain print any number of text files from cassette 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 HANDLER

Telewriter makes cassette as simple to use as possible. It 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. You can save all or any part of the text buffer, and you can append pre-existing files to what you have in the buffer already. You can abort an append or filesearch without harming the program or the text in the buffer.

Telewriter will maintain compatibility with popular Color Computer disk systems, but, since it makes using cassette almost painless, you can still have a powerful word processor without the major additional cost of a disk.

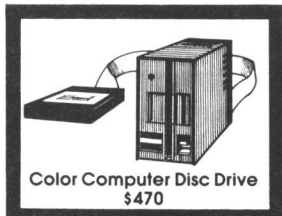
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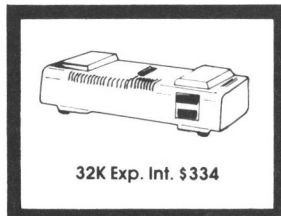
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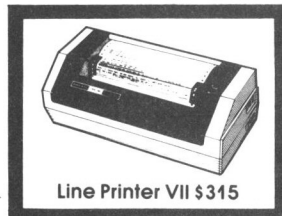
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```

,246,255,34,84,37,250,53,148,198
,2,247,255,32,141,0,158,149,140,
158,151,126,167,211,0,192,6,0,0,
128,32,255,0,255,0,32,0,30,159,3
0,128,0,0,0,0,0,0,0,0,128,128,
128,128,128,128
1410 DATA 128,128,128,128,12,
8,128,128,128,128,128,128,12,
8,128,128,128,128,128,128,12,
8,128,128,128,128,0,0,0,0,0,0,
0
1420 Y=USR(0)
1430 CLS:PRINT @ 232,"I AM FINIS
    
```

```

HED"
1440 INPUT" WRITE A LETTER"
;L$
1450 IF LEFT$(L$,1)="Y" THEN CLS
:PRINT#-2,CHR$(13):GOTO1460 ELSE
END
1460 LINE INPUTA$:IF A$="-_" THEN
PRINT#-2,CHR$(31):GOTO 1460
1470 IF A$="[" THEN PRINT#-2,CHR
$(30):GOTO 1460
1480 IF A$="]" THEN PRINT#-2,STR
ING$(50,32);:GOTO 1460
1490 PRINT#-2,A$:GOTO 1460
    
```

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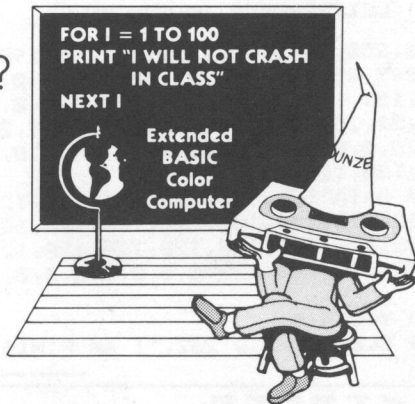
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