



DYNAMIC COLOR NEWS is published monthly by DYNAMIC ELECTRONICS, INC., P.O. Box 896, Hartselle, AL 35640, phone (205) 773-2758. Bill Chapple, President; Alene Chapple, Sec. & Treas.; John Pearson, Ph. D. Consultant; Bob Morgan, Ph. D., Consultant.

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The purpose of this newsletter is to provide instruction on Basic & Machine Language programming, Computer theory, operating techniques, computer expansion, plus provide answers to questions from our subscribers.

The submission of questions, operating hints, and solutions to problems to be published in this newsletter are encouraged. All submissions become the property of Dynamic Electronics if the material is used. We reserve the right to edit all material used and not to use material which we determine is unsuited for publication.

We encourage the submission of Basic and Machine Language Programs as well as articles. All Programs must be well documented so the readers can understand how the program works. We will pay for programs and articles based upon their value to the newsletter. Material sent will not be returned unless return postage is included. Basic & ML programs should be sent on a tape or disk & comments should be sent as a DAT or BIN file.

```
*****
*
*   DYNAMIC   COLOR   NEWS   *
*
*       Nov /Dec 1985       *
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*       Bill Chapple       *
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*
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```

#### CONTENTS

Writing Programs . . . . .	4
(Part 9)	
Check Book Program . . . . .	6
(Using Strings for Data)	
Computer Graphics . . . . .	8
(Part 10)	
Circle Demo PGM . . . . .	8
Recipe Program . . . . .	9
Large Memory Programs . . . . .	11
(Part 10)	
RAM Disk Program . . . . .	13
Electric Cost Program . . . . .	16
Editor's Comments . . . . .	19
Product Reviews . . . . .	19
New Products . . . . .	20
Classified Ads . . . . .	21



## WRITING PROGRAMS (Part 9)

This is the ninth editorial in this series. We started this series assuming that our readers did not know anything about Basic or writing basic programs. Each month we have covered new material and given example programs to demonstrate how to use the material. Last month we showed how to store characters in memory and recover them. We gave a simple word processor program that could be used for writing letters or any other writing requirements. However it did not have all of the features that would be desirable for a full feature word processor. For example after the text was written we could not edit it. For short text we can edit it with a basic editor. However we need a machine language program or subroutine to quickly edit long text.

An advantage of storing information in a memory area different from the area occupied by the program is that the data can be independently loaded or saved as a separate file. For example we could use the word processor we presented last month to write and save letters. We could load in different letters and examine them. Our program would be the same but we could have different text files.

### HANDLING DATA

Sometimes it is desirable to have the data contained within the basic program. This is the case when the data is generally the same each time the program is run. Machine language subroutines that provide fast operations and are linked with basic, and string and numerical variables are examples of data that can be contained within a basic program.

## READ & DATA

For short amounts of data or if the data is well organized the READ & DATA method can be used. This presents a problem if you have several sets of data of variable lengths. Since data elements are separated by the comma, it is awkward to handle data requiring the comma such as City, State in an address.

There are always options to be considered. There is no one program that will do everything. Sometimes certain features have to be sacrificed to obtain additional features. So we want to give you the options and suggest when to use them.

### DATA in STRINGS

A variable can be defined within basic statements or lines. For example we can write `X$="HAMMERS" ;X=35.69`. The disadvantage of this method is the amount of typing required for the variable and the equal marks plus the quotation marks for string variables.

For example let's consider a check book program. We will need the following:

1. Check number
2. Payee
3. Date
4. Amount
5. Category

To enter each item in the program will require a lot of typing. Suppose we could enter our check as follows:

```
C$(1)="101:South Central Bell:  
10-10-85: 57.35: Telephone"
```

If we have 100 checks then we will have only 100 strings and not 500 which would be required if we kept each part of the check as a separate variable which would require a lot of typing and computer memory.

A string can be broken down into a substring. This month we want to show how this is done.

#### LEFT\$

The LEFT\$ command creates a new string composed of the left part of the original string. The format is as follows:

X\$=LEFT\$ (P\$,5)

If the string P\$="COMPUTER" then X\$="COMPU". Notice that X\$ consists of the 5 left characters of P\$.

#### RIGHT\$

The RIGHT\$ command is similar to the LEFT\$ command except it operates on the right side of the string or the last characters.

Y\$=RIGHT\$ (P\$,5)

If P\$ is again "COMPUTER" then Y\$="PUTER".

#### MID\$.

The MID\$ command removes characters from the middle part of a string.

Z\$=MID\$ (P\$,2,3)

IF P\$ is "COMPUTER" then Z\$="OMP". The first number is the position where the string starts and the second number is the number of characters.

To summarize these three commands let's let the original string be S\$, the number of characters be N, and the position be P. Then

L\$=LEFT\$ (S\$,N)  
R\$=RIGHT\$ (S\$,N)  
M\$=MID\$ (S\$,P,N)

If S\$="COLOR COMPUTER", N=5, and P=4 then

L\$="COLOR": R\$="PUTER"  
M\$="OR CO"

#### LENGTH of a STRING

The number of characters in a string can be found by using the LEN command. For the preceding string S\$ the format will be:

L=LEN (S\$)

Since "COLOR COMPUTER" has 14 characters then L will equal 14.

#### VALUE of a STRING

We can not do calculations on a string. However we can convert a string into a value. If our string V\$ is "1000" then we can do the following:

V=VAL (V\$)

The preceding equation will assign the value 1000 to the numerical variable V.

Let's again look at the string containing our check book data.

C\$(1)="101:South Central Bell:  
10-10-85: 57.35: Telephone"

We choose to separate the substrings with a ":" since that is what we are used to using to separate basic commands. Our strings containing the checks will be called C\$(X). Within each string will be 5 substrings. Let's define the substrings to be S\$(Y) where Y will be from 1 to 5. Using subscripted arrays will make writing programs easier. So we will have the following substrings.

1. Check number S\$(1)
2. Payee S\$(2)
3. Date S\$(3)
4. Amount S\$(4)
5. Category S\$(5)

**CHECK BOOK  
PROGRAM**  
(USING STRINGS FOR DATA)

The following program demonstrates the principles covered in using strings for handling data. For deposits use a "-" in front of the value. This program will print the information about each check and the balance after each check.

```

10 CLS
20 PRINT"CHECK BOOK DEMO
PROGRAM
30 PRINT"CARRYING DATA WITHIN
STRINGS
40 PRINT"PGM 11-1-85
50 PRINT"COPYRIGHT (c) 1985
60 PRINT"dYNAMIC eLECTRONICS
iNC.
70 DIM C$(100);PRINT
80 BA=395.35
999 'DEFINE THE CHECKS
1000 C$(1)="101; SOUTH CENTRAL
BELL; 10-10-85; 57.35;
TELEPHONE
1010 C$(2)="102; JOE WHEELER;
10-110-85; 45.98;
ELECTRICITY
1020 C$(3)="1; BANK;
10-13-85; -300.56;
DEPOSIT
1030 C$(4)="103; FIRST NAT.
BANK; 10-13-85; 189.95;
CAR PAYMENT
1040 C$(5)="104; JAMES SMITH;
10-15-85; 250; RENT
1050 C$(6)="105; CREDIT UNION;
10-17-85; 125.31; BOAT
1060 C$(7)="2; BANK;
10-18-85; -225;
DEPOSIT
1070 C$(8)="106;MASTER
CARD; 10-20-85; 100;CREDIT
CARD
1999 'MAIN PART OF PROGRAM
2000 FOR P=1 TO 100
2010 X=P
2020 GO SUB 2110
2030 IF C$(P)="" THEN END
2040 BA=BA-VAL(S$(4))
2050 PRINT"CHECK # ";S$(1),"TO
"S$(2)
2060 PRINT"ON "S$(3)," $
";S$(4)

```

```

2070 PRINT"FOR ";S$(5),"BAL="BA
2080 PRINT
2090 NEXT P
2100 END
2110 'THIS BREAKS A STRING
C$(X) INTO SUBSTRINGS
S$(Y)
2115 'LET A$ BE EMPTY
2120 A$="";L=LEN(C$(X))
2130 Y=1
2140 FOR J=1 TO L
2150 B$=MID$(C$(X),J,1)
2155 'CHECK TO SEE IF WE ARE
2157 'FINISHED
2160 IF B$=";" THEN 2200 ELSE
IF J=L THEN 2200
2170 A$=A$+B$
2180 NEXT J
2190 RETURN
2200 ': MEANS END OF STRING
2210 S$(Y)=A$; A$=""; Y=Y+1; IF
J=L THEN S$(Y-1) = S$
(Y-1) + B$
2220 GO TO 2180

```

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# COMPUTER GRAPHICS (Part 10)

In this series we have been showing how to use the powerful extended basic graphic commands. We showed how the graphic elements are contained within the bytes and how they are displayed on the screen for the low and high resolution graphic modes. We showed how to generate characters using graphics and how to draw lines. In the last couple of issues we showed how to draw boxes. This was expanded and we presented bar graphs with our character generator.

This month we want to look at additional commands.

## CIRCLE COMMAND

The format for drawing circles is:

```
CIRCLE (X,Y),R,C
```

X is the horizontal distance to the center from 0 to 256.

Y is the vertical distance to the center from 0 to 192.

R is the radius of the circle from 0 to 127.

C is the color code, if it is omitted defaults to last color.

The CIRCLE command is very powerful. Can you imagine the problem it would be if we had to calculate values and do numerous memory pokes to draw a circle? We are including a demonstration program using the circle formula so that our readers can become familiar with the CIRCLE command.

We want to ask a few questions to see if you can figure out the result before running the demo program.

1. What is the largest radius (R) that the circle can have without moving off the

screen?

2. What happens when the circle begins to move off of the screen?

3. What are the largest X and Y values that can be used?

If you guessed at the answers to the preceding questions, you can check your results with the following circle demonstration program. The program selects initial values for the variables and allows you to change them to observe what happens with different variables. The 4 arrow keys position the circle, pressing "I" increases its size by 5 units, pressing the "D" key decreases its size by 5 units and pressing "V" displays the values of the last displayed circle.

## CIRCLE DEMONSTRATION PROGRAM

```
10 'PGM 11-2-85
20 'COPYRIGHT (c) 1985
30 'DYNAMIC eLECTRONICS INC.
40 PRINT"CIRCLE DEMO PROGRAM.
50 PRINT"USE 4 ARROW KEYS FOR
   POSITION
60 PRINT"PRESS <I> TO INCREASE
   SIZE
70 PRINT"PRESS <D> TO DECREASE
   SIZE
80 PRINT"PRESS <V> TO DISPLAY
   VALUES": PRINT"USES FORMULA
   CIRCLE (X,Y),R
90 INPUT "PRESS ENTER KEY TO
   CONTINUE";X$
100 X=100:Y=125:R=5
110 PRINT"X="X,"Y="Y
120 PRINT"R="R
130 INPUT"PRESS ENTER KEY TO
   CONTINUE";X$
140 PCLS
150 PMODE 4,1:SCREEN 1,0
160 CIRCLE (X,Y),R
170 A$=INKEY$:IF A$="" THEN 170
180 A=ASC(A$)
190 IF A=94 THEN Y=Y-5 ELSE IF
   A=10 THEN Y=Y+5
200 IF A$="V" THEN 110
210 IF A$="I" THEN R=R+5
220 IF A$="D" THEN R=R-5
230 IF A=9 THEN X=X+5 ELSE IF
```



```
A=8 THEN X=X-5
240 GO TO 140
```

```
*****
```

## RECIPE PROGRAM

The following menu driven program allows you to keep a recipe file, add to it, and save it on tape or disk. This program is provided by T & D Software (advertisement on page 7) and is used by permission. This program was saved as an ASCII Basic program and merged with our word processor. It is printed exactly as saved.

```
1 REM COPYRIGHT (C) T&D SOFTWARE
  1985 **** RECIPE MACHINE ****
  10 PMODEO:GOTO60000
  15 IFPEEK(116)=&H3F THENCLEAR200
  0:ME=50 ELSECLEAR4000:ME=100
  20 MI=30:NE=0:DIM RN$(ME),NI(ME)
  ,IG$(ME,MI),CI$(ME,4),H1$(MI),H2
  $(4)
  30 CLS:PRINT:PRINT:PRINT"
  recipe machine":PRINT:PRINT
  32 PRINT" USE THIS MENU-DRIVEN P
  ROGRAM TO ORGANIZE YOUR PERSONAL RE-
  CEIPE FILE. THE DATA YOU ENTER
  CAN BE SAVED AND LOADED WITH TAPE
  AND DISK. IF YOU HAVE A PRINTER,
  THEN YOU CAN PRINT QUICK COPIES
  OF YOUR FAVORITES."
  34 GOSUB9000
  90 CLS:PRINT@230,"TAPE OR DISK?
  (T/D)"
  91 K$=INKEY$:IFK$="D" THEN DN=1:
  GOTO100
  92 IFK$("<"T" THEN91
  93 DN=-1
  100 CLS:PRINT:PRINTTAB(14)"menu"
  :PRINT
  102 PRINT" i/o device = ";
  :IFDN=1 THENPRINT"disk" ELSEPRINT
  "tape"
  104 PRINT" number of entries = ";NE
  106 PRINT" c. CHANGE I/O DEVICE
  r. READ ";:IFDN=1 THENPRINT"DISK
  FILE" ELSEPRINT
```

```
TAPE FILE"
107 PRINT" w. WRITE ";:IFDN=
1 THENPRINT"DISK FILE" ELSEPRINT
"TAPE FILE"
108 PRINT" a. ADD A RECIPE
d. DISPLAY ALL RECIPES
s. SEARCH FOR A RECIPE
p. PRINT A RECIPE
l. PRINT ALL RECIPES
q. QUIT PROGRAM"
110 PRINT" your choice?"
120 K$=INKEY$:IFK$="" THEN120
122 P=INSTR("CRWADSPQL",K$)
124 IFP=0 THEN120
126 ON P GOTO180,200,219,240,270
,300,310,340,990
130 GOTO120
180 IFDN=1 THENDN=-1 ELSEDN=1
181 GOTO100
200 CLS:PRINT@230,"read filename
: ";:LINEINPUT F$:IFF$="" THEN100
202 IFLEN(F$)>12 THEN200
204 OPEN" I",#DN,F$:INPUT#DN,NE
206 FORI=1 TO NE:INPUT#DN,RN$(I)
208 INPUT#DN,NI(I):FORJ=1 TO NI(I)
210 INPUT#DN,IG$(I,J):NEXT
212 FORJ=1TO4:INPUT#DN,CI$(I,J):
NEXT
214 NEXT:CLOSE#DN:GOTO100
219 'IFNE=0 THEN120
220 CLS:PRINT@230,"write filename:
: ";:LINEINPUT F$:IFF$="" THEN100
222 IFLEN(F$)>12 THEN220
224 OPEN" O",#DN,F$:PRINT#DN,NE
226 FORI=1 TO NE:PRINT#DN,RN$(I)
228 PRINT#DN,NI(I):FORJ=1 TO NI(I)
230 PRINT#DN,IG$(I,J):NEXT
232 FORJ=1TO4:PRINT#DN,CI$(I,J):
NEXT
234 NEXT:CLOSE#DN:GOTO100
240 IFNE=ME THEN120
242 CLS:PRINT:PRINT" THIS WILL BE
ENTRY #";NE+1:PRINT
244 LINEINPUT" RECIPE NAME: ";
RN$:IFRN$="" THEN100
246 PRINT:PRINT" ENTER THE INGREDIENTS.
YOU HAVE UP TO 30 LINES. ENTER AN
EMPTY LINE TO SIGNAL THE END.":IC=1
248 IFIC>MI THEN252
250 LINEINPUT">";H1$(IC):IFH1$(IC)<>""
THENIC=IC+1:GOTO248
252 IFIC>1 THENIC=IC-1
254 PRINT:PRINT" ENTER THE COOKING
INSTRUCTIONS. YOU HAVE UP TO
```

```

4 LINES. ENTER AN EMPTY LINE T
0 SIGNAL THE END.":LC=1
256 IFLC>4 THEN260
258 LINEINPUT"->" ;H2$(LC):IFH2$(
LC)<>" THENLC=LC+1:GOTO256
260 IFLC>1 THENLC=LC-1
262 NE=NE+1:RN$(NE)=RN$:NI(NE)=I
C:FORI=1 TO IC:IG$(NE,I)=H1$(I):
NEXT:FORI=1TO4:CI$(NE,I)="" :NEXT
:FORI=1TO LC:CI$(NE,I)=H2$(I):NE
XT
264 PRINT:PRINT" enter anot
her? (y/n)"
266 K$=INKEY$:IFK$="Y" THEN240
268 IFK$<>"N" THEN266 ELSE100
270 IFNE=0 THEN120
272 I1=1
274 RN=I1:GOSUB1000
276 PRINT@448,"press f/b to go f
orward/backward press m fo
r menu";
278 K$=INKEY$:IFK$="M" THEN100
280 IFK$="F" THEN290
282 IFK$="B" THEN295
284 GOTO278
290 IFI1=NE THEN278
292 I1=I1+1:GOTO274
295 IFI1=1 THEN278
297 I1=I1-1:GOTO274
300 IFNE=0 THEN120
301 CLS:PRINT@230,"ENTER RECIPE?
";
302 LINEINPUT SN$:IFSN$="" THEN1
00
304 F=0:FORI=1TO NE:IFRN$(I)=SN$
THENF=I:I=10000
306 NEXT:IFF=0 THENPRINT:PRINT"
COULD NOT FIND "SN$".":GOSUB
9000:GOTO100
308 I1=F:GOTO274
310 IFNE=0 THEN120
312 CLS:PRINT@230,"ENTER RECIPE?
";
314 LINEINPUT SN$:IFSN$="" THEN1
00
316 F=0:FORI=1 TO NE:IFRN$(I)=SN
$ THENF=I:I=10000
318 NEXT:IFF=0 THENPRINT:PRINT"
COULD NOT FIND "SN$".":GOSU
B9000:GOTO100
319 GOSUB320:GOTO100
320 PD=-2
322 PRINT#PD:PRINT#PD," RECI
P
E: ";RN$(F):PRINT#PD," NUMBER
OF INGREDIENTS: ";NI(F)
324 PRINT#PD," ---- INGREDIEN
TS ----"
326 FORI=1 TO NI(F):PRINT#PD,"

```

```

"IG$(F,I):NEXT
328 PRINT#PD," ---- COOKING INST
RUCTIONS ----"
330 FORI=1TO4:PRINT#PD," "CI$(F
,I):NEXT
332 RETURN
340 IFNE=0 THEN120
342 FORF=1 TO NE:GOSUB320:NEXT:G
OTO100
990 CLS:PRINT@230,"OK TO QUIT? (
Y/N)"
991 K$=INKEY$:IFK$="N" THEN100
992 IFK$<>"Y" THEN991
999 END
1000 CLS:PRINT:PRINT" RECIPE:
";RN$(RN)
1002 PRINT" NUMBER OF INGREDI
ENTS: ";NI(RN)
1004 PRINT" ---- INGREDIENTS
----"
1006 FORI=1TO NI(RN):PRINT" "
;IG$(RN,I):NEXT
1008 PRINT" ---- COOKING INSTRUC
TIONS ----"
1010 FORI=1TO 4:PRINTCI$(RN,I):N
EXT
1099 RETURN
9000 PRINT@484,"press [enter] to
continue";
9002 IFINKEY$<>CHR$(13) THEN9002
ELSEReturn
60000 PCLEAR1:GOTO15

```

```

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**LARGE MEMORY PROGRAMS**  
(PART 10)

How can you use the extra 32K of memory in a 64K computer? What about utilizing the extra memory in 128K, or 256K computers? In this series we have been showing how to use the extra 32K of memory for 64K computers. For larger computers, the principles are the same. Since programs are easy to write in Basic, we have written our programs in Basic and used machine language subroutines for tasks that are not feasible with Basic. For example to move blocks of data in Basic would be very time consuming.

In this series we gave programs for running Basic in the second 32K memory bank, converting the memory to the "All RAM mode", and storing addresses in the second bank. We showed how to move data from one bank to the other. During the last few months we have been developing a "RAM DISK" program where we can use the first bank in its normal mode and use the second bank for storing programs. This month we have a working RAM Disk program that will allow Basic programs to be stored in the second bank. There is a little more work that needs to be done on the program such as handling machine language programs and deleting programs. We will add these features next month.

**RAM DISK FEATURES**

There are some features with standard disk operating systems that are not desirable. For example to find out the programs that are on a disk we type "DIR <ENTER>" and the names of the programs are displayed on the screen. To run a program on the disk we have to type <RUN "PROGRAM">. It would be much nicer to have a menu of features and

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By Steve Hartford

Sitting on the back porch one afternoon, you see a strange, flashing UFO descend from the clouds & land out in the corn field. Being the curious type, you run out to investigate and find a spaceship with it's hatch open. As you step inside, the hatch closes and the ship takes off! You must find a way to get back home. A great graphics adventure! 32K & one disk drive required.

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enter a number for the desired feature. This is the approach we took with our program. The main menu has 6 features as follows:

- 1 DISPLAY PROGRAMS
- 2 SAVE A PROGRAM
- 3 DELETE A PROGRAM
- 4 CLEAR ALL PROGRAMS
- 5 RETURN TO LAST PROGRAM
- 6 LOAD A PROGRAM

When programs are displayed a number appears to the left of the program. If you are selecting a program to run or delete, just enter the number beside the program.

Another feature that we added is "5 RETURN TO LAST PROGRAM". When this option is selected the computer returns and runs the last program.

We added a couple of machine language subroutines for initialization and program switching. We will explain these in detail. Also we moved the Basic Ram Disk program to upper memory just below the machine language subroutines. Then we saved both programs as a machine language program. We will show how to do this.

#### MACHINE LANGUAGE SUBROUTINES

Last month we gave values for loading in the machine language subroutines. They occupied memory from 32015 to 32163. This month we reserved the following:

32165-6 Beg Vector of last Pgm.  
32167-8 End Vector of last Pgm.  
32170 Machine language subroutine for program vector switching. This switches from the Basic Ram Disk program to the program to be run and back.

32195 Program initialization subroutine. This is the execution address when everything

is saved as a machine language program.

Now let's look at the machine language subroutines.

```
32170 LDD D 25 'Put the vector
      in location 25 in the D
      register.
32172 LDX E 32165 'Put the
      vector in 32165 into the
      X register
32175 STX D 25 'Store X in 25
32177 STD E 32165 'Store D in
      32165
32180 LDX E 32167
32183 LDD D 27
32185 STX D 27
32187 STD E 32167
32190 JMP E 44661 'Go to the
      run routine
32193 NOP
32194 NOP
32195 LBSR 32015 'Branch to the
      subroutine at 32015
32198 LBSR 32070 'Branch to the
      subroutine at 32070
32201 BRA 32170 'Branch to
      32170
```

The decimal values are as follows:

```
32170 220, 25, 190, 125, 165
32175 159, 25, 253, 125, 165
32180 190, 125, 167, 220, 27
32185 159, 27, 253, 125, 167
32190 126, 174, 117, 18, 18
32195 23, 255, 73, 23, 255
32200 125, 32, 223
```

Add these values to the ones we gave last month and you will have a complete set. Save the new collection of programs as follows:

(C)SAVEM "ML",32000,32300,32000

We are going to combine these with the Basic program and save the combination as a machine language program. We want to give a procedure for combining the two programs. This assumes you have typed in the Basic Ram Disk Program. The procedure is as follows:

1. Put the Basic RAM Disk Program at 29185. To do this POKE 29184,0: POKE 25,114: NEW
2. (C)LOAD "RAMDISK"
3. Load the machine language program. (C)LOADM "ML"
4. EXEC 32170. This puts the RAM Disk's Basic vectors in 32165-32168.
5. Now you can save the combination as a machine language program. (C)SAVEM "RAMDISK", 29184, 32300, 32195

#### OPERATION

To load and operate the Ram Disk turn the computer on and wait for the familiar OK. Now load the Ram Disk by (C)LOADM "RAMDISK". The Ram disk menu should appear as previously discussed. Select a "4" to clear all programs and then select "5" to return to the last loaded program. This will return you to the power up mode and you can load a program from tape or disk. To get back to the Ram Disk just EXEC if no other machine language programs were loaded or EXEC 32170. The Ram Disk menu should appear and then you can save the program you loaded by selecting "2" from the menu. You will be prompted for a program name and the program will be displayed with a program number and the amount of bytes left will also be displayed.

If you want to add another program select "5" and you will be returned to the last loaded program. Press the "BREAK" key to stop the program and you can then load another program. Return to the Ram disk with EXEC (32170) and save the program. You can repeat this procedure as long as there is room in the second bank for programs.

You can run any program in the Ram Disk file by selecting "6" which will display the programs. You then select the number of the program to run and the program is quickly loaded

and run.

We used fixed memories as follows:

- 32000 - Number of programs
- 32001,2 - Last free RAM
- 32003,4 - Location for next Program

Next month we want to finish the Ram disk program by adding the "delete program" feature and including machine language programs.

#### RAM DISK PROGRAM

```

1 'RAM DISK PROGRAM
2 'COPYRIGHT (c) 1985
3 'DYNAMIC eLECTRONICS INC.
4 'PROGRAM 11-3-85
5 'MACHINE LANGUAGE SUBROUTINES
  ARE REQUIRED. PROGRAM IS
  DESIGNED FOR TAPE AND DISK
  OPERATION
8 PRINT: S=256*PEEK(25)+PEEK
  (26)-410
10 PRINT"SECOND BANK MEMORY
  MANAGER PGM
20 PRINT"1 DISPLAY PROGRAMS
30 PRINT"2 SAVE A PROGRAM
40 PRINT"3 DELETE A PROGRAM
50 PRINT"4 CLEAR ALL PROGRAMS
52 PRINT"5 RETURN TO LAST
  PROGRAM
53 PRINT"6 LOAD A PROGRAM
55 X$=INKEY$
56 IF X$="" THEN 55
60 X=VAL(X$):ON X GO SUB 1000,
  2000, 3000, 4000, 5000, 6000
70 GO TO 5
980 MS=INT(V/256): LS=V-256*MS:
  RETURN
990 V=256 * PEEK(M) + PEEK(M+1)
  :RETURN
1000 PRINT"THESE ARE THE
  PROGRAMS
1005 'STORE LUMBER OF PGMS IN
  32000
1010 N=PEEK(32000):PRINT"THERE
  ARE "N"PROGRAMS"
1012 F=256 * PEEK(32001) +
  PEEK(32002) - 1536
1013 PRINT F "BYTES USED"
1014 PRINT29964-F"BYTES FREE
1015 FOR K=1 TO N

```



# CoCo Comm-4 Begins The CoCo Multi-Tasking Era

## 4 Channel Serial Communication Interface

COMM-4 allows serial I/O capabilities. Board supports full modem control. Enhances multi-tasking and/or multi-user features of OS-9.

### Typical System Configuration:

- Terminal
- Letter Quality Printer
- Modem
- High-speed Printer

\*NOTE: The configuration shown above is only one of the several possible configurations with a single COMM-4 unit. Virtually any serial device compatible with the CoCo can be used with COMM-4.

The COMM-4 unit comes completely assembled in a plug-in cartridge. The cartridge plugs into any slot of a buffered, powered expansion device (not provided). The commercially available expansion devices (such as Multi-Pak) are required for COMM-4 operation.

Each of the four (4) serial channels is controlled by an independent serial controller. These serial controllers are part of the unit hardware and allow multi-tasking and/or simultaneous I/O applications without the use of software timing loops.

Communications are interrupt-driven. Standard communication baud rates from 50 to 19,200 are supported by COMM-4. The COMM-4 unit provides for the use of a "break key" (keyboard interrupt system). Connections to COMM-4 are made via DB-25 plugs for any RS-232 compatible serial device.

With the COMM-4 unit installed in the expansion device slot, COMM-4 is always enabled regardless of hardware/software slot selection methods. The COMM-4 unit will not interfere with existing device(s) in any other expansion slot.

The COMM-4 unit is configured so that two (2) COMM-4 units can be installed on the same expansion device. In the dual COMM-4 configuration, the available, interrupt-driven serial communications channels become eight (8). In order to operate properly, the two COMM-4 units must be interconnected with a jumper cable which is provided when ordered in the dual COMM-4 configuration. In the COMM-8 configuration, all features of the COMM-4 are available (but for all 8 channels).

### Items supplied with a COMM-4 unit:

- 1) COMM-4 cartridge
- 2) Users Manual
- 3) Interrupt cable (and jumper cable if ordered as COMM-8)

### Installation of COMM-4 is accomplished in two phases as follows:

- 1) Hardware installation
  - a. Power down on CoCo and expansion device
  - b. Plug COMM-4 into any slot on expansion device
  - c. Plug interrupt cable into COMM-4 cartridge
  - d. Plug other end of interrupt cable into serial I/O port on CoCo
  - e. Plug user serial cables into DB-25 connectors on COMM-4
  - f. Power up entire system
- 2) Software installation (the following installation instructions are general and will vary with some systems due to user configuration).
  - a. Install COMM-4 disk (35 track, single-sided double density)
  - b. Load device descriptors and drivers
 

OR

 Merge device descriptors and drivers into boot files using OS-9 procedure files
  - c. Note: Disk contains commented course code and object code and procedure files
  - d. For basic users, a sample basic program will be provided in users manual (not on disk). (Note: Color basic will not support multi-tasking.)

### The documentation included with COMM-4 provides:

1. Hardware theory of operation
2. Software theory of operation
3. Installation instructions
4. Applications examples
5. Commented program listings
6. Schematic diagrams
7. Parts lists
8. Assembly drawings

If dual COMM-4 (COMM-8) units are to be installed, it will be necessary to specify, with order of second COMM-4, in order for necessary jumper cables to be supplied (no extra charge).

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```

1017 IF N<K THEN RETURN
1020 GO SUB 1500
1025 NEXT K
1030 RETURN
1500 'GET PGM NAME
1506 N$="": V = S + 20 * (K-1)
1507 FOR Q=0 TO 7
1510 A=PEEK(V+Q) : A$=CHR$(A):
      N$=N$+A$
1520 NEXT Q
1525 'PRINT THE NAME
1530 PRINTK;N$;
1535 'FIND TYPE OF PROGRAM
1540 T=PEEK(V+Q):IF T>=1 THEN
      T$="BIN" ELSE IF T=0 THEN
      T$="BAS"
1545 PRINT " / "+T$
1550 RETURN
2000 PRINT"THIS SAVES A PROGRAM
2010 P$="B"
2015 PN=PEEK(32000):PX = S + 20
      * PN + 8
2020 IF P$="M" THEN GO SUB 2500
      ELSE IF P$="B" THEN GO SUB
      2200 ELSE 2010
2025 EXEC 32090
2030 GO SUB 2900
2040 POKE 32000,PN+1:GO SUB
      1000
2050 RETURN
2200 '
2500 PRINT"THIS HANDLES BASIC
      PROGRAMS
2510 POKE PX,0:PX=PX+1
2520 FOR J=0 TO 3
2525 'MOVE PGM VECTORS TO
      474-477
2530 A=PEEK(32165+J):POKE
      474 + J, A :NEXT J
2535 'SET UP NEW LOCATION
      VECTOR
2540 M=32001:GO SUB 990:GO SUB
      980:POKE 478,MS:POKE
      479,LS:NL=V
2542 GO SUB 2590
2545 'CALCULATE NEW END OF DATA
2550 X1=PEEK(476)-PEEK(474): X2
      = PEEK(477) - PEEK(475):
      PL=256*X1+X2
2560 V=1+PL+NL:GO SUB 980:POKE
      32001,MS: POKE 32002,LS
2565 GO SUB 2590
2570 RETURN
2590 POKE PX,MS
2595 PX=PX+1:POKE PX,LS
2596 PX=PX+1
2600 RETURN
2900 INPUT "PROGRAM NAME";N$

```

```

2905 A=LEN(N$): B=PEEK(32000)
2910 M=S+20*(B)
2915 FOR J=0 TO 7: POKE(M+J),
      32: NEXT J
2920 FOR J=1 TO A: X$=MID$(N$,
      J,1): X=ASC(X$):POKE
      M+J-1,X
2927 NEXT J
2930 RETURN
3000 PRINT:PRINT"DELETE FEATURE
      NOT INCLUDED":RETURN
4000 PRINT"THIS CLEARS ALL
      PROGRAMS
4010 FOR J=S TO S+400
4020 POKE J,32: NEXT J
4025 POKE 32000,0: POKE
      32001,6: POKE 32002,0
4030 PRINT"PROGRAMS ARE CLEARED
4035 GO SUB 1000
4040 RETURN
5000 EXEC 32170:RUN
6000 PRINT"THIS LOADS A PROGRAM
6010 GO SUB 1000
6020 INPUT"ENTER PROGRAM
      NUMBER";Q
6030 Q=Q-1:Z=S+20*Q+9
6040 FOR J=0 TO 3: A=PEEK
      (Z+J): POKE 474+J,A:NEXT J
6050 A=PEEK (32165): B=PEEK (32
      166) :POKE478,A:POKE479,B
6060 X1=PEEK (476) - PEEK(474):
      X2=PEEK (477) - PEEK(475):
      PL=256*X1+X2
6070 PB=256*A+B:V=PB+PL:GO SUB
      980: POKE 32167,MS:POKE
      32168 ,LS
6080 PRINT"PROGRAM IS LOADED
      AND RUNNING
6090 EXEC 32115:EXEC 32170
6100 '32115 MOVES DATA FROM THE
      SECOND BANK TO THE FIRST
6110 '32170 EXCHANGES PROGRAM
      VECTORS AND RUNS PROGRAM

```

```

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```

# ELECTRIC COST PROGRAM

Do you want to keep records of your monthly electric costs? Each month you can enter the data for that month, print the results for all the months on the screen or a printer, draw a three dimensional graph on the screen, and save the results on tape or disk. The program is menu oriented and instructions are included within the program.

This program is provided by T & D Software (advertisement on page 7) and is used by permission.

```

1 REM COPYRIGHT (C) T&D SOFTWARE
  1985  ** ELECTRIC COST **
2 PMODEO:GOTO60000
5 DRAW"BM+8,0 R4U7L4D7":RETURN
20 CLEAR1000:DIM EU(12),DT$(12),
  EC(12)
30 CLS:PRINT:PRINT"      elec
  tric cost":PRINT
32 PRINT" THIS HOME APPLICATIONS
  PROGRAM IS GEARED TOWARD KEEPING
  TRACK OF YOUR ELECTRICAL USE
  .":PRINT
34 PRINT" EACH MONTH YOU NEED TO
  ENTER A SMALL AMOUNT OF DATA
  . DATA CAN BE SAVED TO TAPE AND
  DISK.":PRINT
36 PRINT" YEARLY REPORTS CAN BE
  DISPLAY- ED ON THE SCREEN OR PR
  INTED ON A PRINTER AS YOU WISH.
  "
37 GOSUB9000:CLS:PRINT:PRINT
38 PRINT" ALSO INCLUDED IS A HIGH
  RESOL- UTION THREE DIMENSIONAL
  GRAPH WHICH SHOWS ELECTRIC C
  OST OVER A YEAR'S TIME.
40 PRINT" TO LEAVE THE GRAPH AND
  RETURN TO THE MENU, PRESS ANY
  KEY.":PRINT
42 PRINT" YOU SHOULD NOTE THAT '
  KWH' STANDS FOR KILOWATT-HO
  URS. A KILOWATT-HOUR IS A BAS
  IC UNIT OF ELECTRICAL CONSUMPT
  ION."
59 GOSUB9000
90 IFPEEK(&HC000)=68 THENDN=1 EL

```

```

SEDN=-1
100 CLS:PRINT:PRINT"
  menu":PRINT
110 PRINT"      i/o device = ";
:IFDN=1 THENPRINT"DISK" ELSEPRIN
T"TAPE"
120 PRINT
130 PRINT"      c. CHANGE I/O DEVI
  CE      1. LOAD DATA FILE
          s. SAVE DATA FILE
          e. ENTER A BILLING
          d. DISPLAY YEARLY
          p. PRINT YEARLY RE
          g. GRAPH ELECTRIC
          q. QUIT"
          PERIOD
          REPORT
          PORT
          COST
140 PRINT:PRINT"      your c
  hoice?"
150 K$=INKEY$:IFK$="" THEN150
160 P=INSTR("CLSEDPGQ",K$):IFP=0
  THEN150
170 ON P GOTO200,210,240,260,400
  ,500,600,990
199 GOTO100
200 IFDN=1 THENDN=-1 ELSEDN=1
201 GOTO100
210 GOSUB10000:IFF$="" THEN100
215 OPEN"I",#DN,F$
220 FORI=1 TO 12:INPUT#DN,DT$(I)
  :INPUT#DN,EU(I):INPUT#DN,EC(I):N
  EXT
225 CLOSE#DN:GOTO100
240 GOSUB10000:IFF$="" THEN100
245 OPEN"O",#DN,F$
250 FORI=1 TO 12:PRINT#DN,DT$(I)
  :PRINT#DN,EU(I):PRINT#DN,EC(I):N
  EXT
255 CLOSE#DN:GOTO100
260 CLS:PRINT@226,"ENTER BILLING
  PERIOD NUMBER"
265 PRINT@266,"(1-12) ";;INPUT B
  P
270 IFBP<1 OR BP>12 OR BP<>INT(B
  P) THEN100
275 CLS:PRINT@228,"ENTER START A
  ND END DATE"
280 PRINT@261,"FOR BILLING PERIO
  D";BP
285 PRINT@295,"--> ";;LINEINPUT
  DT$
290 CLS:PRINT@228,"ENTER KILOWAT
  T-HOURS USED"
295 PRINT@261,"FOR BILLING PERIO
  D";BP
300 PRINT@298,"--> ";;LINEINPUT
  EU$
305 IFEU$="" OR VAL(EU$)<0 THENS
  OUND1,1:GOTO290
310 CLS:PRINT@228,"ENTER COST OF

```





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```

ELECTRICITY"
315 PRINT@261,"FOR BILLING PERIO
D";BP
320 PRINT@298,"--> ";:LINEINPUT
EC$
325 IF EC$="" OR VAL(EC$)<0 THEN
SOUND1,1:GOTO310
330 CLS:PRINT:PRINT:PRINT
335 PRINT"      BILLING PERIOD #"
;BP:PRINT
340 PRINT"      DATE: ";DT$:PRINT
350 PRINT"      KILOWATT HOURS USE
D: ";EU$
355 PRINT"      ELECTRIC COST: ";:P
RINTUSING"$#####.##";VAL(EC$)
360 PRINT:PRINT:PRINT:PRINT"
is the input correct? y/n"
361 K$=INKEY$:IFK$="N" THEN260
362 IFK$<>"Y" THEN361
365 DT$(BP)=DT$:EU(BP)=VAL(EU$):
EC(BP)=VAL(EC$)
369 GOTO100
400 CLS
405 TC=0:TU=0:PRINT" #      date
      kwh      cost"
410 FORI=1 TO 12:PRINTUSING" ##
%      % ##### $#####.##";I;D
T$(I);EU(I);EC(I)
415 TU=TU+EU(I):TC=TC+EC(I):NEXT
420 PRINT" YEARLY TOTALS->";:PRI
NTUSING"##### $#####.##";TU;TC
429 IFTU=0 THENTU=1
430 PRINT" AVERAGE COST PER KWH
";:PRINTUSING"$##.#####";TC/TU
440 GOSUB9000
449 GOTO100
500 PD=-2
505 TC=0:TU=0:PRINT#PD," #
DATE      KWH      COST"
510 FORI=1 TO 12:PRINT#PD,USING"
## %      % ##### $#####.##"
;I;DT$(I);EU(I);EC(I)
515 TU=TU+EU(I):TC=TC+EC(I):NEXT
520 PRINT#PD," YEARLY TOTALS->";
:PRINT#PD,USING"##### $#####.##"
;TU;TC
529 IFTU=0 THENTU=1
530 PRINT#PD," AVERAGE COST PER
KWH ";:PRINT#PD,USING"$##.#####"
;TC/TU
549 GOTO100
600 PCLS:Pmode3:PCLSO:CLS:PRINT@
230,"generating graph..."
630 DRAW"BM6,0 C1 D7BL2":GOSUB5:
GOSUB5
635 DRAW"BM12,30 D7R4U7L4D3R4D4L
4":GOSUB5
640 DRAW"BM12,60 NR4D7R4U4L4D4":

```

```

GOSUB5
645 DRAW"BM12,90 D3R4NU3D4BL4":G
OSUB5
650 DRAW"BM12,120 R4D3L4D4R4BL4"
:GOSUB5
655 DRAW"BM12,157":GOSUB5
656 DRAW"BM40,160 D7 BM56,160 R4
D3L4D4R4 BM74,160 R4D3NL2D4L4 BM
92,160 D3R4U3D7 BM110,160 NR4D3R
4D4L4 BM128,160 NR4D7R4U4L4 BM14
6,160 R4D7"
657 DRAW"BM164,160 D7R4U7L4D3R4
BM182,160 R4D7U4L4U3 BM198,160 D
7BL4":GOSUB5
658 DRAW"BM216,160 D7BR6U7 BM234
,160 D7BR4NR4U4R4U3L4
660 COLOR1,0:LINE(30,0)-(30,154)
,PSET:LINE-(249,154),PSET:LINE(3
0,155)-(249,155),PSET:LINE-(249,
0),PSET:CC=2
670 FORI=1 TO 12:EC=EC(I)
672 N1=EC/20*30:X1=32+(I-1)*18:X
2=48+(I-1)*18:N2=154-N1:IFN2<8 T
HENN2=8
673 IFEC>1 THEN680
675 LINE(X1,N2)-(X1+8,N2-8),PSET
:IFI=12 THEN678 ELSEIFEC+3<EC(I+
1) THEN678 ELSELINE-(X2+8,N2-8),
PSET:GOTO679
678 LINE-(X2,N2-8),PSET
679 LINE-(X2,N2),PSET:PAINT(X1+4
,N2-2),CC,1:GOTO690
680 COLOR1,0:LINE(X1,N2)-(X2,153
),PSET,B:PAINT(X1+2,152),CC,1:LI
NE(X1,N2)-(X1+8,N2-8),PSET:IFI=1
2 THEN685
681 IFEC(I)+3<EC(I+1) THEN685
682 LINE-(X2+8,N2-8),PSET:LINE-(
X2,N2),PSET:N3=EC(I+1)/20*30:N4=
152-N3-6:LINE(X2+8,N2-8)-(X2+8,N
4),PSET:LINE-(X2,N4+8),PSET:PAIN
T(X1+4,N2-2),CC,1:IFEC-EC(I+1)>2
THENPAINT(X2+4,N2),CC,1
684 GOTO690
685 LINE-(X2,N2-8),PSET:LINE-(X2
,N2),PSET:PAINT(X1+4,N2-2),CC,1
690 CC=CC+1:IFCC=1 THENCC=2 ELSE
IFCC=4 THENCC=0
699 NEXT I
700 Pmode4:SCREEN1,1:Pmode3
790 CT=0
791 CT=CT+1:IFCT=100 THENSOUND1,
1:CT=0
799 IFINKEY$="" THEN791 ELSE100
990 CLS:PRINT@232,"ok to quit? y
/n"
991 K$=INKEY$:IFK$="N" THEN100
992 IFK$<>"Y" THEN991

```

```

999 END
9000 PRINT@484,"press [enter] to
continue";
9010 IFINKEY$<>CHR$(13) THEN9010
ELSERETURN
10000 CLS:PRINT@230,"filename: "
;:LINEINPUT F$:RETURN
60000 PCLEAR4:GOTO20

```

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+ ++ + ++ + ++ ++ ++ + ++ + ++ +
+
+
+ RENEWAL TIME? +
+
+ The date beside your name on +
+ the address label indcates +
+ the last issue you will re- +
+ ceive. Send in your renewal +
+ if you want to continue re- +
+ ceiving technical informa- +
+ tion on Color Computers. +
+ This is the last issue for +
+ those with 12/85. +
+
+ + ++ + ++ + ++ ++ ++ + ++ + ++

```

## EDITOR'S COMMENTS

Perhaps you are wondering why we are late with this issue. We have received some letters from our subscribers asking if we are still printing this newsletter. First of all I was involved in a traffic assident on November 12. I had a broken hip, broken finger, and a broken bone in my hand. I stayed in the hospital for 10 days, had surgery and a pin put in my hip, my finger was operated on th day I left, and a cast was put on my arm. This immobilized me for about 6 weeks. As a result we were not able to produce a newsletter for November. I am slowly recovering and we are combining the November and December newsletters. All subscribers will have their expiration date extended one month. We hope to get this issue mailed before Christmas and I believe this is the best

issue we have produced.

We have received much support recently for our newsletter in terms of new subscriptions, orders for back issues and our DCN-1 collection of programs, and dealer advertisements. You can help us if you order something from one of our advertisers. Tell them that you saw their advertisement in Dynamic Color News (DCN). This will let them know that their advertisement is paying off. We have very low rates and will continue with these rates as long as we can.

Also we are expanding our editorials and programs. This month we have two programs from T & D Subscription Software. We have an agreement with them so that we can print one or two of their programs each month. We will select programs that support our editorials and are of interest to our readers. These programs are menu oriented and can be saved to tape or disk. So if you like what we have been printing, then you will like the future issues even more.

We are continuing with our editorials. This month we show how to carry several variables in one string. This is in our Basic Programming series. Our RAM disk program is included so you can store programs in the second 32K memory bank. For our Computer Graphics series we show how to draw circles.

We need more letters and operating hints to publish. If you have something you would like to share with our readers please send it to us so we can print it.

## PRODUCT REVIEWS

This section is open to all producers and dealers of color computer products. We will review you product free of charge and write an editorial on the product. We do not use a rating

system but will explain what the product does, and what can be expected from it. Any comments about the review from the firm submitting the product will be printed in a later issue.

\* \* \* \* \*

## ROMAN NUMERALS

How experienced are you in writing numbers in Roman Numerals. Instead of our familiar 0123456789, the characters for Roman numerals consists of I, V, X, C, L, and M. These are letters of our alphabet. For example 1985 in Roman numerals is MCMLXXXV. The arithmetic using these numerals must have been very hard for the Romans.

To become proficient in using Roman numerals, Creative Technical Consultants has produced a program for this purpose. The program comes on tape and requires a 16K computer with Extended Color Basic.

After the program is loaded and RUN a title appears after which the following menu is displayed:

- 1) ARABIC TO ROMAN PRACTICE
- 2) ROMAN TO ARABIC PRACTICE
- 3) MISSING ROMAN LETTER GAME
- 4) ARABIC TO ROMAN CONVERTER

The user selects a number from the above group. A second menu appear if numbers from 1-3 were selected. The second menu allows the user to select a level of difficulty. The computer then randomly selects an Arabic or Roman numeral and displays it on the screen. A timer starts and displays the elapsed time at the bottom of the screen. It is then necessary to enter the Arabic or Roman equivalent for the displayed characters. The computer then tells you if you got it correct or not. This continues for 10 problems and then

the final score is displayed and you are given the option of continuing or returning to the main menu.

Option 4 of the main menu converts arabic numbers to Roman numerals. We ran this part and entered 1985 and the Roman equivalent was MCMLXXXV.

Roman Numerals is a Basic program and can be modified to suit the user's requirements. We found it to be a very good educational program. It is exciting to run and will quickly improve one's skill in converting numbers for Arabic to Roman numerals or from Roman numerals to Arabic numbers.

Creative Technical Consultants, P. O. Box 652, Cedar Crest, New Mexico 87008, \$15.95 Tape + \$2 S/H.

- DCN STAFF -

## NEW PRODUCTS

This section is available free for producers and dealers of color computer products. These products have not been reviewed by us but are included for our reader's information. Send a description of new products to:

New Products  
Dynamic Electronics Inc.  
P. O. Box 896  
Hartselle, AL 35640

+ + + + +

## IRON-ON TRANSFERS

CoCo Warehouse has announced a product that allows computer graphic designs to be transferred to a T-shirt. A special ribbon is supplied for your printer and the design can be printed on regular computer paper. Colored pins are available to color the design after

## MEMORY EXPANDERS

which it can be ironed onto a T-shirt. The ribbons cost \$14.95 each and a set of 5 color pens cost \$14.95. For more information contact: CoCo Warehouse, 500 N. Dobson, Westland, MI 48185 (313) 722-7957.

## COCO-UTIL

COCO-UTIL from Spectrum Projects, Inc. is an extremely powerful and flexible program which converts disk files between MSDOS and TRS-80 Color Computer diskettes. If you own an IBM/PC (or true compatible) and a TRS-80 COCO, or if you need to migrate application files from one of those systems to the other, COCO-UTIL is the perfect tool for the job. For more information contact Spectrum Projects, Inc. P. O. Box 21272, Woodhaven, NY 11421, (718) 441-2807, \$29.95 + \$3 S/H.

## HARD DRIVES

J & M Systems announces their new hard drive for the Color Computer in 5, 10, and 20 MByte capacities. OS/9 can be booted directly from JDOS. The software can run with virtually any Winchester drive with ST412 type interface. The drives may be partitioned in up to 7 logical units, or left as one large logical unit, with the OS/9 restriction that the maximum partition size is 7 MBytes. The hard drive systems are complete with case, power supply, cables, OS/9 drivers, and instructions. The drives run under the OS/9 operating system, and require J & M System's JFD-CP disk controller. For more information contact: J & M Systems, 15100-A Central S.E., Albuquerque, NM 87123, (505) 292-4182. \$495 to \$795.

Dynamic Electronics Inc. has a new line of memory expanders for increasing the memory in Color Computers to 512K. These consist of solderless assemblies that mount under the memory chips and the SAM chip. The two chip Korean CoCo 2 can be expanded to 128K. The popular 256K "Thunder RAM" and "Banker RAM" can be expanded to 512K. For more information contact: Dynamic Electronics Inc., P. O. Box 896, Hartselle, AL 35640, (205) 773-2758. \$34.95 to \$79.95

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### Mailing List:

Over 1700 bona fide Color Computer owners, including schools and clubs. Many are proven mail-order purchases. Printed list - \$5.00; Cassette with Telewriter tape file or list -\$12.00. C-J Enterprises, P. O. Box 652, Cedar Crest, NM 87008.

**X-RATED Adventure Game!**

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