

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.

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WRITING PROGRAMS PART 10

PROGRAM ORGANIZATION

This is an educational series on how to write programs. We started with the first editorial assuming that our readers did not know how to write programs and have been adding additional commands each week. If you have been following this series then you should be fairly good at writing programs. Like any other subject, it takes practice to learn to write computer programs. So we recommend that you get involved and write a program to do a specific job you want.

Let's look at the procedure for writing a program. First of all you need to decide what you want the program to do. List the things you want to accomplish. These will be the options in your menu. When you run the program a menu should appear from which you can select the option you want to run.

Reserve blocks of statement numbers for each option you desire. A convenient scheme is to reserve a block of 1000 for each option. Each of these options can be a subroutine that returns you to the main part of the program when it is completed.

To branch to these subroutines we can use the following command:

```
200 ON X GO SUB 1000, 2000, 3000
```

Statement 200 would be in the main part of the program. The options would have previously been printed on the screen with a number for each option. You can expand this to any number although we just used three options. Preceding this you could use an input command as follows:

```
190 INPUT "ENTER NUMBER";X
```

Statement 200 would then transfer the program to the subroutine at 1000 if X=1, 2000 if X=2, or 3000 if X=3.

If you start with the menu when designing your program then the rest will fall into place.

DATA in STRINGS

Last month we showed how to carry data within a string. Maybe we should restate this as how to convert strings to data. We gave an example of a string carrying 5 information elements for a check. These were

1. Check Number (String)
2. Payee (String)
3. Date (String)
4. Amount (Numerical)
5. Category (String)

We only had one item that was numerical data which was the amount of the check. What is the advantages of handling data in this method? First when we use Read and Data statements the data has to be perfectly ordered. This is easy if there are a small number of data elements.

To get around the ordering problem we can define the variable within our statements. We can say N\$="CHAPPLE". This takes 5 typing strokes which are N\$="". If we had used the data method we would have DATA CHAPPLE. But this would have to be preceded by a READ N\$ command. Another point is that if one item is out of place then all of the following items will be out of place using the READ - DATA method. With string data the information in the next string would be correct if it were entered correctly.

An application for using string data would be when a second set of data is being entered with the READ and DATA Commands. This allows leaving these DATA commands for one set

of data.

DATA in REMARKS

While on the subject of entering data, let us point out that we discussed in detail how to use remarks to contain data in our first year of publication. The computer ignores remark statements. This means that we can put just about any kind of information in these statements including machine language subroutines. The only problem is how do you retrieve the information from the remarks? In our first few issues we showed how to do this. This has the advantage that data can be carried along with the program and can be defined by the program. We are going to show how to handle data as a separate file and will review the technique of carrying data within remark statements.

VARIABLES in RAM

We have been discussing methods of carrying variables within a program. Sometimes it is advantageous to have a separate file for data. For example suppose we want to write a simple word processor program. We do not want our text to be a part of the main program. So we can reserve and use a part of memory for the text. We can save our text to tape or disk as a machine language program. Remember that anything can be saved as a machine language program including Basic programs. For review the format is:

```
(C)SAVEM "FILE",BE,EN,EX
```

where "FILE" is the name of the program, BE is the beginning location in memory in decimal, EN is the ending location and EX is the execution address in decimal.

The advantage of a separate file is that information can be

read in from tape or disk from commands in our main program. We use this scheme in our invoice program. Our invoice data is carried in a separate basic program. Each invoice occupies 10 statement numbers and our master program pulls the information from the file program. We carry our data in remark statements. By using basic we can edit our file program using the basic editor.

As we have stated many times, there are usually more than one way to do a task. We want to as many different methods as possible so you will have adequate tools for your programming needs.

INVENTORY PROGRAM

To give a little more practice in using strings for data and arrays we wrote the following program. We assumed that we wanted to know 7 things about each item. The items are automobiles with all the information for each car entered as one string X\$(N). This string is then broken down into seven substrings for each Car. After the information is put into arrays, a menu displays titles for the seven features and you select the feature in which you are interested. Then all cars are listed displaying the selected feature. You can display additional features or return to the main menu. The strings X\$(N) must be in the first part of the program.

```
2 PRINT"INVENTORY PROGRAM
1-1-86
4 PRINT"COPYRIGHT (c) 1986
6 PRINT"dYNAMIC eLECTRONICS
INC.
10 N=10'N=NUMBER OF ITEMS
20 'SET UP ARRAYS
30 DIM X$(N),V$(N,7),T$(7)
32 T$(1)="MAKE":T$(2)="CYLINDER
SIZE IN CC":T$(3)="NO OF
```

```

CYLINDERS":T$(4)="YEAR
34 T$(5)="TYPE":T$(6)="MILES"
:T$(7)="PRICE
40 X$(1)="CHEVROLET:4000:8:
1982:4 DOOR:58900:3395
50 X$(2)="FORD:6000:8:1978:
TRUCK:78300:1995
60 X$(3)="FORD:1900:4:1986:2
DOOR:2000:7900
70 X$(4)="DATSUN:2000:4:1981:4
DOOR:39059:2483
80 X$(5)="TOYOTA:1800:4:1983:2
DOOR:61300:2195
90 X$(6)="CHRYSLER:4000:8:1984:
4 DOOR:28353:4985
100 X$(7)="OLDSMOBILE:5000:8:
1981:4 DOOR SW:61399:5298
110 X$(8)="BUICK:3000:6:1983:2
DOOR:48300:3895
120 X$(9)="HONDA:1100:4:1982:
MOTORCYCLE:28355:2500
130 X$(10)="CHEVROLET:2000:6:
1963:2 DOOR:98500:598
500 PRINT"READING STRINGS INTO
ARRAYS
510 FOR J=1 TO N
512 PRINT"READING ITEM NUMBER";
J
515 L=LEN(X$(J))+1:C=1:A$=""
520 FOR K=1 TO L
530 B$=MID$(X$(J),K,1)
540 IF B$=":" THEN 600 ELSE IF
K=L THEN 600
550 A$=A$+B$:NEXT K
570 NEXT J
580 GO TO 700
600 'SUBSTRING IS SEPERATED
610 V$(J,C)=A$:A$="":B$=""
620 C=C+1
630 IF K=L THEN 570 ELSE NEXT K
700 PRINT"THIS SELECTS THE
FEATURES DESIRED
710 FOR J=1 TO 7
720 PRINTJ;T$(J):NEXT J
730 INPUT"SELECT NUMBER";X
735 PRINTT$(X)
740 FOR J=1 TO N
750 PRINTJ;V$(J,1),V$(J,X)
760 NEXT J
770 INPUT"ENTER NUMBER FOR MORE
INFOMATION OR PRESS ENTER
FOR FIRST MENU";X
780 IF X=0 THEN 700
800 PRINT"THIS PRINTS ALL
INFORMATION FOR SELECTED
ITEM
810 FOR J=1 TO 7

```

```

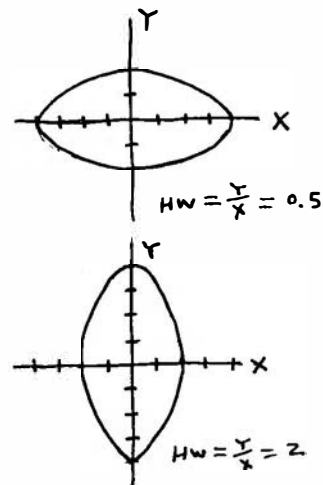
820 PRINTJ;T$(J);"-";V$(X,J):
NEXT J
830 P$=INKEY$:IF P$="" THEN 830
ELSE 700

```

COMPUTER GRAPHICS (Part 11)

Last month we introduced drawing circles with the circle command. This month we want to continue with this command and expand it so we can draw unsymmetrical circles or ellipses and circle segments or arcs.

An ellipse is a nonsymmetrical circle with a shape similar to a football. To define an ellipse for color graphics we need to establish the height to width ratio. For graphs we define the vertical axis to be Y and the horizontal axis to be X. If we let HW stand for the height to width ratio then $HW = Y/X$. If HW is less than 1 or a decimal then our football will appear to be lying on the ground. If HW is greater than 1 then it will appear to be standing on its end.



The circle command can be expanded to include HW as follows:

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

X = Horizontal
Y = Vertical

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C = Color
 HW = Height / Width

DRAWING ARCS

Suppose you just want to draw part of a circle. These circle segments are called ARCS. A circle is marked off in values from 0 to 1 with 0 being the point where the circle crosses the +X axis. The following table gives circle point values at the 4 axis crossings.

Axis	Degrees	Value
+X	0	0
-Y	-90	.25
-X	180	.50
+Y	90	.75

If we let S be the start of the arc and E be the ending of the arc, then the circle command can be expanded as follows:

CIRCLE (X,Y),R,C,HW,S,E

ARC & CIRCLE Demonstration Program

We expanded the program we gave last month to include ellipses and arcs. The variables can be changed as the program is running so the effect of different values can be observed.

```

10 PCLEARB
20 'PGM 1-2-86
30 'COPYRIGHT (c) 1985
40 'DYNAMIC ELECTRONICS INC.
50 PRINT"CIRCLE DEMO PROGRAM.
60 S=1:E=1:H=1
70 PRINT"USE 4 ARROW KEYS FOR
  POSITION
80 PRINT"PRESS <I> TO INCREASE
  SIZE
90 PRINT"PRESS <D> TO DECREASE
  SIZE
100 PRINT"PRESS <V> TO DISPLAY
  VALUES": PRINT"USES FORMULA
  CIRCLE (X,Y),R,C,H,S,E
110 INPUT "PRESS ENTER KEY TO
  CONTINUE";X$
120 X=100:Y=125:R=5

```

```

130 PRINT"X="X,"Y="Y
140 PRINT"R="R,"S="S
150 PRINT"E="E,"HW="H
160 PRINT"C="C
170 INPUT"PRESS ENTER KEY TO
  CONTINUE";X$
180 PCLS
190 PMODE 4,1:SCREEN 1,0
200 CIRCLE (X,Y),R,C,H,S,E
210 A$=INKEY$:IF A$="" THEN 210
220 A=ASC(A$)
230 IF A=94 THEN Y=Y-5ELSE IF
  A=10 THEN Y=Y+5
240 IF A$="V" THEN 130
250 IF A$="H" THEN INPUT"NEW
  VALUE FOR HW";H
260 IF A$="S" THEN INPUT"ENTER
  ARC STARTING VALUE";S
270 IF A$="E" THEN INPUT"ENTER
  ARC ENDING VALUE";E
280 IF A$="I" THEN R=R+5
290 IF S>1 THEN S=1
300 IF E>1 THEN E=1
310 IF A$="D" THEN R=R-5
320 IF A$="C" THEN INPUT"ENTER
  COLOR VALUE";C
330 IF A=9 THEN X=X+5 ELSE IF
  A=8 THEN X=X-5
340 GO TO 180

```

```

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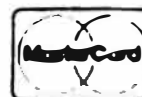
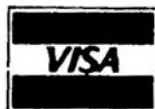
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LARGE MEMORY PROGRAMS (PART 11)

This has been an exciting series for us. As we have shown how to use the second 32K bank in 64K computers, we have thought of many applications for this bank. We showed how to put basic programs in the second bank and how to continue a program from the first bank into the second bank. We showed how to store addresses in the second bank, and for the last few months we have been developing a RAM disk for storing programs in the second bank. Last month we gave a program that will do just that. There are a couple of features that we need to be able to add to the RAM disk. These are the ability to delete programs and handle machine language subroutines.

We want to discuss what we did with the RAM disk software and look a little closer at how it works. Our main program was written in basic. We have a collection of machine language subroutines that we call from basic. This combination gives us the freedom to quickly write and edit our programs plus the fast speed of machine language programs. In other words we can have our cake and eat it too. Those of you who typed in the RAMDISK program from last month can see how fast the program operates. As soon as a program is selected from the menu to be loaded, it appears to instantaneously start. This is as fast as any RAM disk we have seen.

We improved the selection of programs by making only one key entry to select the program. With the standard disk operating system, it is necessary to type in the name of the program. How many times have you misspelled the name of a program and received an error. With our soft-

ware you just enter the number corresponding to the program and it quickly loads and starts running.

Our RAM disk can handle 20 programs. We reserved 20 bytes for each program. The program directory precedes the basic program in memory. We find the beginning of our directory by the following statement

```
8 PRINT: S=256*PEEK(25)+PEEK  
(26)-410
```

So our programs are at S, S+20, S+40, etc. Within each program area we have the following information:

BYTE(S)	INFORMATION
0-7	Name
8	0-BAS, 1-BIN
9-10	Beginning of PGM
11-12	Ending of PGM
13-14	Beginning of ML PGM
15-16	Exec. Add of ML PGM
17-19	Spares

STACKING PROGRAMS

The programs are stacked end to end in the second bank. The first program starts at 1536 (6,0). There are several vector and information pieces that we need to know.

The beginning and ending of the programs is retained in the program directory in bytes 9 - 12. We also need to know how many programs we have and the location of the last byte. This information is kept in 32000 - 32002.

```
32000 - Number of Programs  
32001-2 - Last Free Byte
```

DELETING PROGRAMS

We looked at deleting the programs but ran out of time. Let's consider what is involved in deleting programs. First we need to know how many bytes the program occupied. This we can

get from the program directory. Lets call this number N.

In the program directory all programs after the deleted one have to be moved forward 20 bytes. We also have to move the beginning and ending pointers. In fact these values have to be reduced by N.

We have to reduce the value in 32001-2 by N bytes. We will have N more bytes of memory after the program is deleted.

We have to do a block move in the second bank. Our machine language subroutines will do this for us.

USING THE RAMDISK

Let's look at using the RAM disk. Last month we showed how to save the basic and machine language subroutines as one machine language program. The basic program starts at 29185 and 410 bytes of memory must be reserved for the directory. So all of the memory from 28775 up is required for the RAM disk.

If a program requires use of this memory area then the RAM disk will not work. You can not use the same memory for two different requirements at the same time. The RAM disk will not work with programs that configure the computer for the all RAM mode since the RAM disk was designed for the normal power up, 2 bank mode.

If a program requires the "EXEC" command then to return to the RAM disk menu it will be necessary to EXEC 32170. Most of the times all that will be required is to enter "EXEC".

Next month we will continue our program and add the delete feature.

SHIP WAR

This is an exciting game that

requires one joystick. You are engaged in a sea battle and try to sink enemy ships before you are destroyed. You have a cannon which you can move to get in position and adjust your angle of fire. If you hit a ship it disappears. If you miss, the amount of the miss is displayed on the screen.

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   *** SHIP WAR ***
2 GOTO60000
3 L=LEN(P$):IF L>30 THEN6
4 Z1=30-L:Z1=INT(Z1/2):IFZ1>0 TH
  ENZ1=Z1-1
5 P$=STRING$(Z1,32)+P$
6 DRAW"S2":FOR P=1 TO LEN(P$):I$
  =MID$(P$,P,1):Z2=ASC(I$)-64
7 X=X+8:IF X>242 THEN X=8:Y=Y+8
8 IF Z2>=-16 AND Z2<=-7 THEN Z2=
  Z2+47:GOTO13 ELSEIFZ2=-1 THENZ2=
  41:GOTO13
9 IF Z2=-19 THEN Z2=28
10 IF Z2=-18 THEN Z2=29
11 IF Z2=-20 THEN Z2=30
12 IF Z2<0 THEN Z2=27
13 DRAW"BM=X;,=Y;":ON Z2 GOSUB 1
  5,16,17,18,19,20,21,22,23,24,25,
  26,27,28,29,30,31,32,33,34,35,36
  ,37,38,39,40,41,42,43,44,45,46,4
  7,48,49,50,51,52,53,54,55
14 NEXT:DRAW"S4":RETURN
15 DRAW"BR4ND4NF4G4D4BR8U4":
  RETURN
16 DRAW"ND8R8D4NL8D4L8":RETURN
17 DRAW"NR8D8R8":RETURN
18 DRAW"ND8R6F2D4G2L6":RETURN
19 DRAW"NR8D4NR6D4R8":RETURN
20 DRAW"NR8D4NR6D4":RETURN
21 DRAW"NR8D8R8U4L1":RETURN
22 DRAW"D4ND4R8U4D8":RETURN
23 DRAW"BM+4,OD8":RETURN
24 DRAW"BR6D8L4U2":RETURN
25 DRAW"DBU4R4NE4NF4":RETURN
26 DRAW"D8R8":RETURN:'L
27 DRAW"ND8R4ND3R4D8":RETURN
28 DRAW"ND8R8D8":RETURN
29 DRAW"D8R8U8L8":RETURN
30 DRAW"ND8R8D4L8":RETURN
31 DRAW"R8D8NH3NF2L8U8":RETURN:
  'Q
32 DRAW"R8D4L4NF4L4D4U8":RETURN
```

```

33 DRAW"NR8D4R8D4L8":RETURN
34 DRAW"R4ND8R4":RETURN
35 DRAW"D8R8U8":RETURN
36 DRAW"D4F4E4U4":RETURN
37 DRAW"D8R4NU3R4U8":RETURN
38 DRAW"F8BL8E8":RETURN
39 DRAW"F4ND4E4":RETURN
40 DRAW"R8G8R8":RETURN
41 RETURN:' SPACE
42 DRAW"BM+1,+4;R6":RETURN:' -
43 DRAW"BM+2,+6;D2R2U2L2":RETURN
44 DRAW"BM+2,+6D2R2ND2U2L2":RETU
RN
45 GOTO29
46 DRAW"BM+4,+OD8NL4R4":RETURN' 1
47 DRAW"R8D4L8D4R8":RETURN' 2
48 DRAW"BM+0,OR8D4NL6D4L8":RETUR
N:' 3
49 DRAW"D4R8NU4D4":RETURN:' 4
50 DRAW"NR8D4R8D4L8":RETURN' 5
51 DRAW"NR8D8R8U4L4":RETURN' 6
52 DRAW"R8G8":RETURN' 7
53 DRAW"R8D8L8U4NU4R8":RETURN' 8
54 DRAW"R8D8L8R8U4L8U4":RETURN' 9
55 DRAW"R8D4L4BD4D1":RETURN
56 REM
60 DRAW"BM=X; ,=Y; C=C;R8U2L2U1R8
D1L2D2R6D2L14U1L2U1L2":PAINT(X+8
,Y+1),C,C:RETURN
61 DRAW"BM=X; ,=Y; C=C;F2R6E2L2U3
L4D3L2":PAINT(X+6,Y),C,C:RETURN
62 DRAW"BM=X; ,=Y; C=C;R8U2R4D2R6
U2R4D2R6D2L26H3":PAINT(X+4,Y+1),
C,C:RETURN
80 CLS:PRINT:PRINT"          s
hip war":PRINT
82 PRINT" IN SHIP WAR, YOU CONTR
OL A 250 MM CANNON. YOU MUST FI
RE YOUR CANNON AT THE ENEMY SH
IPS AND SINK THEM.":PRINT
84 PRINT" THE ENEMY SHIPS FIRE S
URFACE TORPEDOES AT YOU. SOME
TIMES THE TOPEDOES LAUNCHED
BY THE ENEMIES WILL MISS YOU.
"
86 PRINT:PRINT" THE RIGHT JOYSTI
CK IS USED IN THIS GAME."
88 GOSUB9000:CLS:PRINT:PRINT
90 PRINT" MOVING THE JOYSTICK LE
FT AND RIGHT MOVES YOUR CANNO
N APPRO- PRIATELY. MOVING THE J
OYSTICK UP AND DOWN ADJUSTS TH
E CANNON ANGLE. A HIGHER ANGLE
WILL GIVE A LONGER SHOT DISTANCE.
":PRINT
92 PRINT" AFTER EACH SHOT YOU TA
KE, YOU WILL BE INFORMED HOW M
ANY METERS SHORT OR LONG T

```

```

HE SHOT WAS RELATIVE TO THE SH
IP YOU ARE SHOOTING AT."
94 GOSUB9000:CLS:PRINT:PRINT:PRI
NT:PRINT:PRINT
96 PRINT" THE GAME ENDS WHEN YOU
HAVE 5 DAMAGE POINTS, OR WHEN
YOU SINK THE LAST ENEMY SH
IP."
98 GOSUB9000
100 CLEAR500:PLAY"V31T200L200":P
MODE4:SCREEN1,1:PCLS:PMODE3
102 COLOR3,1:LINE(0,0)-(255,120)
,PSET,BF
104 COLOR2,1:LINE(0,120)-(255,17
0),PSET,BF
106 COLOR4,1:LINE(0,170)-(255,19
1),PSET,BF
108 LINE(0,170)-(255,191),PRESET
,B:LINE(8,176)-(247,185),PRESET,
BF
110 NS=5:FORI=1 TO 5: SX(I)=RND(8
)+40*I:SY(I)=117:IFI=3 THENST(I)
=3:SA(I)=40+RND(10) ELSEST(I)=RN
D(2):SA(I)=20+RND(30)
112 C=1:X=SX(I):Y=SY(I):ON ST(I)
GOSUB60,61,62
113 IFST(I)=1 THENSL(I)=SX(I)+16
ELSEIFST(I)=2 THENSL(I)=SX(I)+8
ELSESL(I)=SX(I)+28
114 NEXT
116 PX=120
120 SF=0:FF=0:OD=0:OX=0:OY=120:D
G=20:TY=140:OD=21
148 LINE(8,176)-(247,185),PRESET
,BF
150 H=JOYSTK(0):V=JOYSTK(1):P=PE
EK(&HFF00)AND1:IFV>53 THENDG=OD+
1:IFDG>50 THENDG=50
151 IFV<10 THENDG=OD-1:IFDG<20 T
HENDG=20
152 IFPX=OX THEN154
153 COLOR2,1:LINE(OX,OY)-(OX+8,1
69),PSET,BF:LINE(PX,180-DG)-(PX+
8,170),PRESET,BF:OX=PX
154 IFOD=DG THEN162
155 COLOR2,1:TY=180-DG:IFDG>OD T
HENLINE(PX,TY)-(PX+8,TY),PRESET
ELSELINE(PX,OY)-(PX+8,OY),PSET
156 OY=TY
159 X=100:Y=178:P$=STR$(OD):DRAW
"C1":GOSUB6
160 P$=STR$(DG):X=100:Y=178:DRAW
"C0":GOSUB6
162 OD=DG:IFH<10 THENPX=PX-2:IFP
X<4 THENPX=4
164 IFH>53 THENPX=PX+2:IFPX>242
THENPX=242
169 IFP THEN150

```

```

172 SF=1: SX=PX+4: SY=110: SD=DG
174 IFDG<25 THENLY=5: CY=8
176 IFDG>24 AND DG<35 THENLY=7: C
Y=9
178 IFDG>34 AND DG<45 THEN LY=10
: CY=9
180 IFDG>44 THENLY=12: CY=12
181 CN=1: CIRCLE(SX,SY),3,0
182 'PLAY"V31T200L20001AFDFEFADE
FADEFDEABCBDC"
183 PLAY"V31T200L20002": FORTU=1
TO 15: PLAYSTR$(RND(12)): NEXT
200 IFSF=0 THEN250
202 IFCN=1 THENCIRCLE(SX,SY),3,3
ELSEIFCN=2 THENCIRCLE(SX,SY),2,
3 ELSEIFCN=3 THENCIRCLE(SX,SY),1
,3 ELSEPSET(SX,SY,3)
203 IFCN=CY THEN210
204 CN=CN+1: SOUND CN*5+140,1: SY=S
Y-LY: IFLY>1 THENLY=LY-1
206 IFCN=2 THENCIRCLE(SX,SY),2,0
ELSEIFCN=3 THENCIRCLE(SX,SY),1,
0 ELSEPSET(SX,SY,0)
208 GOTO200
210 SY=SY+2: SOUND255-SY,1: IFSY<1
14 THEN206
212 F=0: FORI=1 TO 5
214 IFSA(I)=0 THEN218
216 IFSX(I)<=SX AND SX<=SL(I) TH
ENF=I
218 NEXT: IFF<>0 THEN220
219 LINE(8,176)-(247,185),PRESET
,BF: X=8: Y=178: DRAW"CO": P$="COMPL
ETE MISS": GOSUB3: SF=0: FORTD=OT05
00: NEXT: GOTO250
220 IFSA(F)=SD THEN230
222 IFSA(F)>SD THENMS=(SA(F)-SD)
*50: P$=STR$(MS)+" METERS SHORT"
224 IFSD>SA(F) THENMS=(SD-SA(F))
*50: P$=STR$(MS)+" METERS LONG"
226 LINE(8,176)-(247,185),PRESET
,BF: X=8: Y=178: DRAW"CO": GOSUB3
228 SF=0: FORTD=OT0500: NEXT: GOTO2
50
230 SF=0: X=SX(F): Y=SY(F): C=3: ON
ST(F) GOSUB60,61,62: SA(F)=0: POKE
&HFF22,PEEK(&HFF22)AND247: PLAY"0
1FAFD" : POKE&HFF22,PEEK(&HFF22)
OR 8: NS=NS-1: IFNS=0 THEN900
250 REM
260 S=RND(5): IFSA(S)=0 THEN150
265 AX=SX(S)+4: AY=SY(S)+8
270 IX=(2-RND(3))*RND(8)
275 IY=2: AF=1
280 PSET(AX,AY,1): AC=1
300 IFAC>6 THENCIRCLE(AX,AY),AC-
4,2 ELSEPSET(AX,AY,2)
310 AX=AX+IX: AY=AY+IY: IFAX<0 OR

```

```

AX>255 OR AY>152 THEN330
320 AC=AC+1: IFAC>6 THENCIRCLE(AX
,AY),AC-4,1: PLAY"03AD" ELSEPSET(
AX,AY,1): PLAY"04AD"
321 GOTO300
330 IFAX>80 AND AX<175 THEN345
340 PLAY"03BAGFEDCO2BAGFEDCO1BAG
FEDC": AF=0: GOTO148
345 BQ=PEEK(&HFF22): FOR IU=OT010
: POKE&HFF22,(BQ AND 7) OR (RND(3
1)*8): NEXT: POKE&HFF22,BQ
350 PLAY"01AGDGAFDGEO2FAFDGEFD"
GAFEO1FFFADAA": LINE(8,176)-(247,
185),PRESET,BF: X=8: Y=178: DRAW"CO
": DM=DM+1: P$="DAMAGE "+STR$(DM):
GOSUB3
355 FORTD=OT0800: NEXT: IFDM<5 THE
NAF=0: GOTO148
356 CC=1: FORI=140 TO 40 STEP -20
: FORJ=I TO I-24 STEP -2: CIRCLE(1
28,96),J,CC: NEXT: SOUND CC*10+1,1
: CC=CC+1: IFCC=4 THENCC=0
357 NEXT
360 LINE(8,176)-(247,185),PRESET
,BF: X=8: Y=178: DRAW"CO": P$="GAME
OVER": GOSUB3
365 FORTD=OT03000: NEXT
370 LINE(8,176)-(247,185),PRESET
,BF: X=8: Y=178: DRAW"CO": P$="PRESS
FIRE TO PLAY AGAIN": GOSUB3
375 IFPEEK(&HFF00)AND1 THEN375 E
LSE100
399 GOTO150
900 LINE(8,176)-(247,185),PRESET
,BF: X=8: Y=178: DRAW"CO": P$="YOU W
IN!": GOSUB3: FORTD=OT06: PLAY"01CD
EFGAB02CDEFGAB03CDEFGAB04CDEFGAB
05CDEFGAB": NEXT: FORTD=OT0500: NEX
T: GOTO360
9000 R=RND(-TIMER): PRINT@484,"pr
ess [enter] to continue";
9010 IFINKEY$<>CHR$(13) THEN9010
9020 RETURN
60000 PCLEAR4: GOTO80

```

```

+ ++ + ++ + ++ ++ ++ + ++ + ++ +
+ RENEWAL TIME? +
+ +
+ The date beside your name on +
+ the address label indicates +
+ 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 1/86. +
+ + ++ + ++ + ++ ++ ++ + ++ + ++

```

NEW

NEW

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)

CoCo COMM-4 Price.....\$108.00

Don't Forget Our Full Character Set Board:

Easy to install board adds:

- All 96 Standard ASCII Characters
- Upper & Lower Case Displayed Simultaneously with NO Inverse Video
- True Lower Case Descenders
- Braces & Vertical Bar Characters
- Slashed Zero
- Other Features

Board is hardware driven and requires NO software drivers. NO effect on any memory.

Enhances CoCo screen for:

- OS-9 Operating System Programming
- "C" Language Programming
- Word Processing
- Communications Terminal Modes

See our Review in Sept '85 RAINBOW Magazine

PRICE.....\$38.00 (+\$2.00 shipping/handling if charge)

See our Review in Oct '85 HOT COCO



CoCo Devices
Box 677, Seabrook, TX 77586
713-474-3232



1 JANUARY 1986						
SUN	MON	TUES	WED	THUR	FRI	SAT
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

C-change date..E-enter..D-delete
L-look..R-return to BASIC..P-prt

PRODUCT REVIEWS

This section is open to all producers and dealers of color computer products. We will review your 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.

COCO CALENDER

Have you ever wished you had an easy way to remember important dates or keep up with your appointments. The COCO Calendar allows you to enter any information for any month and day from 1985 to the year 2000. The information can be anything you desire up to 3 standard 32 character lines.

COCO Calendar is a collection of disk programs. The information for each year is saved as a DAT file on the disk. To start

the program type RUN "BOOT". A title screen will appear and then a question asking the date. You must enter a year from 1985 to 2000, the number of the month, and the number of the day. If there is a memo for the entered day then the memo will be printed on the screen. The calender is then drawn on the screen.

If there is a memo for any day in the month, a dark square will appear near the number of the day. To enter a memo just press the "E" key. You will be prompted for the day and can then enter you message. After pressing 'ENTER' the message will be printed on the screen and you will be asked if the printed message is correct. If not then you can change it.

To look at a memo just press "L" and then enter the day. If there is no message for that day, this will be stated. You can print out the memo by pressing "P".

For deleting a month you press "D". You can either delete the whole month or a day. You can delete a whole year by going to basic and using the "KILL"

```

* * * * *
* DCN PROGRAMS on Tape or DISK *
* A collection of the programs *
* from May, June, & July 1985 *
* DCN. The collection includes *
*
* 1. 64K All RAM Program *
* 2. 2-Bank address file Pgm. *
* 3. Alarm Clock Program *
* 4. Loan Interest Program *
* 5. Character Generator pgm. *
* 6. Bank Switching Program *
* (Allows full use of other *
* 32K bank for 64K comp.) *
*
* Order DCN-1 *
*
* Tape $9.95, Disk $11.95 *
* Add $3 shipping, Foreign $3 *
*
* * * * *

```

command to remove the DAT file.
 The calender can be printed if you have a graphics printer and a graphics print routine.
 We found the COCO Calender easy and enjoyable to use. This is a good way to keep up with birthdays, aniversaries, doctor's appointments, and other important information.

Spectrum Projects, P. O. Box 21272, 93-15 86th Dr., Woodhaven, NY 11421. \$24.95 + \$3 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

HOMEWARE

HOMEWARE consists of six programs to put your Color Computer to work in your home.

The CALENDAR module creates calendars on the screen or on paper. It will also add personal notes to specified dates on a large format calendar.

The SAVINGS module does compound interest calculations including: Starting principal, time (years), yearly interest rate, future principal, and interest earned.

The LOAN module calculates the number of years to pay back a loan, the amount of each payment, or the balloon payment, and will calculate the total amount repaid.

The DIRECTORY module keeps track of telephone numbers, addresses, bitrhdates, or other information you wish to record.

The INVENTORY module can keep track of household possessions for insurance purposes.

The HOME-WRITER module is an easy-to-learn word processor.

The entire set costs \$49.95 with individual modules \$19.95 each. SAVINGS and LOANS are sold as one module. 16K ECB+ML - sold on tape but work with disk. For more information contact: Tothian Software, Inc., P. O. Box 663, Rimersburg, PA 16248.

DISTO SUPER RAMDISK 256K

This is a ROM PAK the size of a typical controller. Inside this low noise metal case lives 256K of memory and all the circuitry needed to access it as a RAMDISK. With the proper software (included), this SUPER RAMDISK will be just like another disk drive. You can format it, save a file to it, load a file from it and delete files from it. In fact, anything that can

be done on a regular drive can be done on a RAMDISK, only faster.

MEMORY MAP

Location	Function
65344	LSB of RAM add. (A0-A7)
65345	MSB of RAM add. (A8-A15)
65346	HSB of RAM add. (A16-A19)
65347	R/W RAM DATA

It has 20 address lines and could be upgraded to one mega-byte of memory by an experienced person. For more information contact: Spectrum Projects, Inc, P. O. Box 21272, Woodhaven, NY 11421. (718) 441-2807

```
*****
*                                     *
*          BACK ISSUES                *
*                                     *
* Back issues of DCN are             *
* available for $1.95 each,          *
* 3 for $5, or 12 for $15 pp.      *
*                                     *
* Foreigners other than Can-        *
* ada add $2 for Air Mail           *
* postage.                          *
*                                     *
*****
```

EDITOR'S COMMENTS

This has been an exciting month for us. I am recovering quickly from my accident in November and appreciate those who wrote and called. We decided to expand and add our own printing facilities. We are very pleased with this. As soon as we write a few pages we can print them and not have a week or so delay from the printer. This also allows us to see what we are getting and to improve the appearance of the newsletter. We can do colors and

can reduce and enlarge.

We didn't quite finish the improvements for the RAM disk we gave last month. So we decided to give comments on how the program works. The RAM disk we gave last month works very well. If you have a disk drive you can see how much faster it is to load in programs with the RAM disk. This works on tape or disk.

In our graphics section we are continuing with drawing circles. We expanded this to include ellipses and arc segments. In our programming series we reviewed carrying data within strings and gave an inventory program. If you have been following this series then you should be pretty good at writing programs now. Writing programs is like any other learning process. It just takes time and practice.

Dealers we are having to increase our advertising rates a little. Now you can add color to your ads. Even with the increase, our rates are still very low.

Let me make a few comments to those of you who have not been associated with computers very long. The Radio Shack Color Computers can be made to do about anything you can imagine. They have been out several years and there is plenty of hardware and software support for them. They are heavily used in industry for control applications. So if your computer does not do what you need, look around for software or hardware that will do your task. How many of the competitor's computers are expandable to 512K and up? Do you know of a RAM disk for them?

- - -

CLASSIFIED ADS

1. 10 cents a word, \$3 minimum.
2. Name, Address, & Telephone

listed free.

- 3. Send payment with ad.
- 4. Closing date 1st of the preceding month. Ex. Nov ad closing is Oct. 1.

DISPLAY ADS
(Rate sheet 2 - March 1986)

Closing 1st of preceding month.

Pages	1 time	2 times	3 times
*2	25	23	22
1	30	27	25
1/2	23	20	18
1/4	15	13	12

* We can use colored paper at no extra charge if ads are on both sides.

We can do ads in Red, Blue, or Brown. No all one color ads will be accepted. For color ads send artwork for each color. Add 40% for each color. Example: One page black and red for 3 times costs \$25 + 10.00 = \$35.00 each month.

**QUESTIONS
and ANSWERS**

These are questions that have been asked us. Our answers along with the questions are printed here for our readers' benefit.

Question: What is a RAM disk? I just have a tape system. Do I need a disk drive to use a RAM disk?

Answer: A RAM disk is a program that manages memory so that it works similar to a disk drive. By this we mean that we can select programs from the directory and run them. We can also save programs to the RAM disk.

The type of RAM disk you have determines whether you need a

disk drive. Some require a disk drive and some will work with a cassette system. Check the specifications of the RAM disk before you purchase it to make sure it meets your needs.

Question: Can I have longer files with my Telewriter Word Processor if I expand my memory to 128K?

Answer: The length of a text file for Telewriter is fixed by the program's software. The software would have to be modified to use the extra memory for a continuous file.

- * DCN PROGRAMS on Tape or DISK *
 - * This is our second collection of programs from Dynamic Color News. This collection includes: *
 - * 1. Check book program. *
 - * Data in remark statements. *
 - * Prints to screen or printer. *
 - * 2. Ball Team Sort Program. *
 - * with information on sorting. *
 - * 3. Card Shuffling Program. *
 - * (Using Random Numbers) *
 - * 4. Student Study Program. *
 - * Randomly picks questions and answers. *
 - * 5. Address File Program. *
 - * Print mailing labels, search for address by name, zip code, city, or state. *
 - * Order DCN-2 *
 - * Tape \$9.95, Disk \$11.95 *
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