Radio Shack Color Computer

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DYNAMIC COLOR NEWS

ML PROGRAMMING
HAM RADIO
BASIC PROGRAMMING
HARDWARE
GAMES
PRODUCT REVIEWS

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

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DYNAMIC COLOR NEWS

February, 1987

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A LITTLE MATH

One function of the Color computer's 6809 micro-processor is its built in ability to perform arithmetic functions. The 6809 instruction set contains commands that allow the computer to add, subtract and multipy. The A and B accumulator registers are used in all of these math commands. These two registers are 8 bit (one byte) registers that can hold a value from Ø to 255. There are a number of addressing modes that we can use with this math instruction. The simplest method is the immediate mode where we perform a math operation with the data being contained in the register we use and in the program immediately after the instruction.

EXAMPLE 2+2=4

```
START  LDA  #2
       ADDA #2
```

After executing this simple program you will find that the A register contains the value of four and we performed a simple calculation. We could also just as well used the B register to perform this addition in the same fashion.

```
START  LDB  #2
       ADDB #2
```

We might like to perform a math function using a value held in a memory location using what is called the "extended mode". I will use a text screen memory location to hold my programs data.

```
MATH   LDA  #2     ;LOAD A WITH 2
       STA  $400   ;SAVE IN MEM
       ADDA $400   ;ADD CONTENTS
                   ;OF MEMORY TO
                   ;REGISTER
```

We do subtaction in the same way as addition except the value in the register we use will contain the result of our subtraction.

IMMEDIATE MODE

EXAMPLE 5-2=3

```
START  LDA  #5
       SUBA #2
```

EXTENDED MODE SUBTRACTION:

5-2=3

```
START  LDB #5
       STB $400
       ADDB $400
```

You may recall that the A and B registers can be combined and used together to create the special "D" register. The D register can hold a value of Ø to 65535 and can perform additions and subtractions of higher valued numbers.

ADDITION
IMMEDIATE MODE

300 + 430 =730

```
START  LDD #300
       ADDD #430
```

EXTENDED MODE

```
START  LDD  #300
       STD  $400
       ADDD $400
```

SUBTRACTION
IMMEDIATE MODE

500-150=350

```
START   LDD  #500
        SUBD #150
```

EXTENDED MODE

```
START LDD  #150
      STD  $400
      LDD  #500
      SUBD $400
```

MULTIPLICATION

Addition and subtraction are pretty straight forward but multiplication is done in a different manner in Assembly language. The number in the B register is multiplied by the number in the A register with the result left in the D register.

MULTIPY

10 * 5=50

```
START   LDB  #10
        LDA  #5
        MUL
        STD  RES ;RESULT IN D
        SWI
RES     FDB  0  ;2 BYTE RESULT
```

We can also multiply using the extended mode as follows:

MULTIPLY EXTENDED MODE

```
START   LDB  #10
        STB  $400
        LDA  #5
        LDB  $400
        MUL
        STD  RES
        SWI
RES     FDB  0
        END
```

Notice that the multiply instruction contains no operand and works directly on the values in the A and B registers. Since the A and B registers are eight bit registers the largest value that we can multiply is 255*255 =65025. There are routines that are used to perform math functions using higher valued numbers and in a future issue we will examine some of them. There are commands we could use if we wished to add or decrease the A and B registers or memory position by one. These instructions are in the INCREMENT (INC) and The DECREMENT commands and are easy to use. To add one to the A or B register or a one byte memory position we would use the incrememt command as follows.

INCREMEMT

```
INCA ;INCREMENT A BY ONE
INCB ;INCREMENT B BY ONE
INC $400 ;INCREASE THE VALUE
         ;IN MEMORY BY ONE
```

The inverse of this is the Decrememt DEC instruction.

DECREMENT

```
DECA      ;DECREASE A BY ONE
DECB      ;DECREASE B BY ONE
DEC $400  ;DECREASE THE MEMORY
          ;POSITION BY ONE
```

There is even a command to add or subtract numbers to the X,Y,U or S registers. This instruction is the LOAD EFFECTIVE ADDRESS (LEA) command. This command adds together a one or two byte number to the value held in the two byte register used in the command.

ADD EFFECTIVE ADDRESS

```
START  LEAX  1X
X REG = X REG + 1
```

SUBTRACT EFFECTIVE ADDRESS

```
START  LEAX  -1X
X REG = X REG + (-1)
```

Using this command you can add a number up to $FFFF and subtact a number up to $8000. Remember you can use any two byte register you wish by changing the "X"

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in the LEA to any register you wish. Another often used commamd is the ABX or Add B and X together. In this instruction the value in the one byte B register is added to the two byte X index resister. The result of this operation is placed in the X register. Remember that since the B register is only one, it is only possible to add a number from Ø to 255 to the X register using this instruction. The ABX command is often used as a fast method for accessing tables. Notice that this command requires no Operand field which makes it execute faster.

SHIFT & ROTATE

The Shift and Rotate commands can be used to perform a multiplication or division by two. A shift or rotate command works by moving the values in the bits of a register or memory position to the right or left. Moving the value to the right divides the value in half and shifting the value to the left doubles its value. Remember a computer can only work with binary (Ø or 1) values.

SHIFT RIGHT

```
16 SHIFTED RIGHT =  8

Ø Ø Ø 1 Ø Ø Ø Ø    16
Ø Ø Ø Ø 1 Ø Ø Ø     8
```

SHIFT LEFT

```
16 SHIFTED LEFT =32

Ø Ø Ø 1 Ø Ø Ø Ø     16
Ø Ø 1 Ø Ø Ø Ø Ø     32
```

If we placed a number in the A or B register and then shifted the appropriate way we would in effect perform a simple doubling or halving of the number.

NUMBER TIMES TWO

2*2=4

```
START  LDA #2
LSLA          ;SHIFT TO LEFT
```

SHIFTING TO RIGHT DIVIDES BY TWO

4/2=2

```
START   LDB  #4
LSRB          ;SHIFT RIGHT
```

So far we have only be dealing with what is know as "absolute values" where we consider all numbers to be positive. The computer recognizes signed numbers by testing the Most Significant bit of a byte. If the number is negative, the NEGATIVE CONDITION CODE flag is set. We can use this fact to determine if a number is negative by using a Branch instruction such as BMI (Branch if Minus). In a one byte register such as the A or B register can hold a signed value of +128 to -127 and a two byte registers can have a signed number from +32676 to -32675. The computer doesn 't care if a number is signed or signed it just goes ahead and and performs the math correctly no matter if we wish to use the values as signed or unsigned numbers. Actually our computer only knows how to add. It performs subtraction by doing Two's complement addition. What it does whem subtacting two numbers is to complement the second number, add them together, and then set the flags accordingly. The complement of a number is produced by changing the set bits to cleared bits within a byte and visa versa. For example.

92 = Ø 1 Ø 1 1 1 Ø Ø

TWO'S COMPLEMENT

-93 = 1 Ø 1 Ø Ø Ø 1 1

Notice that the zero in the first position is changed to one. This signifies that it is now negative. We'll cover more on signed numbers when we do more math is a future issue of the Dynamic Color news.

One thing we haven't covered yet was how to do division. Since there is no built in division istruction like there is for multiplication we perform division by trial subtraction just like we would using a pencil and paper. Unlike the familiar method of division however, since the numbers we are to work with are in binary we must determine if a number can be subtracted from the dividend leaving a borrow.

```
DIV   LDX  #8    ;COUNT=8
      LDA  #4    ;DIVISOR
      STA  DIVI
      LDD  #1ØØ  ;DIVIDEND LOOP
      ASLB       ;SHIFT DIV
      ROLA
      CMPA DIVI  ;CAN WE SUBTRACT
      BCS  NOT   ;DOES NOT GO
      SUBA DIVI  ;SUBTRACT
      INCB       ;ADD 1 TO QUOT
NOT   LEAX -1,X  ;COUNT-1
      BNE LOOP
      STB  ANS   ;B HAS ANSWER
      STA  REM   ;A HAS REMAIN
      SWI
DIVI  FCB  Ø
ANS   FCB  Ø
REM   FCB  Ø
END
```

Next time we will cover some of the Branch Compare commands. See you then.

Send questions to:

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Interfacing Computers
Joysticks
Part 2

In this series we have been looking at methods of interfacing color computers with other devices. The principles we have been covering apply to all computers. For example the RS-232 interface we presented will work on any computer with an RS-232 port. This includes IBM clones, Apple, Commodore as well as the portable computers such as the Radio Shack model 100 & 102. The signals at the RS-232 port are the same for all computers.

JOYSTICK VOLTMETER

Last month we presented a joystick voltmeter. This allowed us to measure the values of small batteries. We had a resistor divider network that allowed us to increase the range. Remember that the joystick ports are designed for a maximum of 5 volts. If the maximum we are going to measure is 15 volts then the voltage has to be reduced 3 times with a resistor network. Suppose we wanted to measure 150 volts then we would increase the series resistor to give a full scale factor of 30 times or 150/5. For measuring a wide range of voltages, a multi-position switch can be used to switch the input to different series resistors like we showed last month.

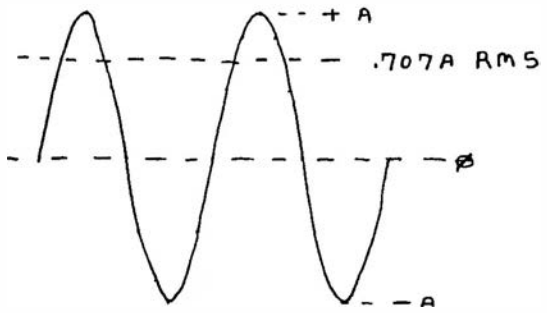
AC VOLTMETER

Power that comes into homes supplies alternating current (AC). The voltage from electrical generators is alternating. By alternating we mean that it changes from + to - many times a second. The number of times a second it varies is called the frequency (f). The voltage at any instant can be represented by the following formula:

```
v=A*SIN(2*PI*f*t)
```

where v is the voltage at any time t, PI=3.14159,and f is the frequency which is usually 60. A sine wave is shown in Figure 1.

What about measuring ac voltages? First let's give a definition. There is a conversion formula that relates an ac voltage to a dc voltage. A dc voltage has just one value like a battery.



SINE WAVE

Figure 1

ROOT MEAN SQUARE (RMS)

The RMS of an ac voltage is equivalent to a dc voltage of the same numerical value. This means that the amount of heat or power generated by the two is equivalent. If the ac voltage has a maximum value of A then the RMS is .707*A. Also the maximum is 1.414 times the RMS.

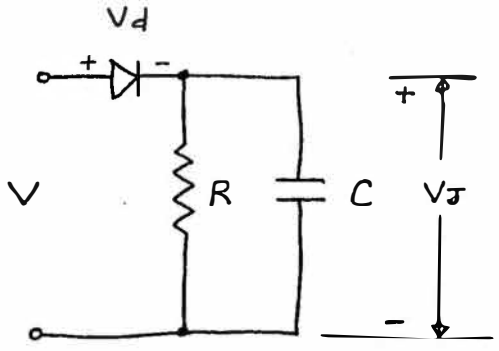
An ac voltmeter is generally constructed by rectifying the ac voltage. This means that it is changed into a direct current (DC) voltage. A diode is a device that will conduct in only one direction. If we connected a diode in series with our joystick port, we would only have the positive half of the sine-wave. Now if we connect a capacitor across the output, the capacitor will charge to the peak. This is a dc voltage which we can feed into our joystick port and measure like it were a dc voltage.

Refer to the rectifier circuit in Figure 2. The voltage across the diode is represented as Vd and is in the range of .5 to .7 volts. Vj is the output voltage applied to the joystick input. The peek of the ac input voltage is:

Vp=Vj+Vd

The RMS voltage V is .707 * Vp. Let's assume the diode voltage Vd is .5 volts. Then the following is the equation for the RMS voltage:

(1) V=.707*(Vj+.5)



RECTIFIER CIRCUIT

Figure 2

There is much more that we can cover using the joystick ports. For instance we can make a light level meter, thermometer, and power meter. Also voice can be digitized by using one of these ports. One thing nice about the computer is that we can store a set of values to display for each of the joystick values. This means for nonlinear data, the computer can print the correct value. With analog meters sometimes it is difficult to read the values from the calibrated scale.

Next month we will continue. The joysticks have a lot of potential and we want to explore them in more detail.

This game is played like the popular game, hangman. This program version can even play this game the other way around. You can play against the computer or against another opponent. This program is provided by T & D Software (see their advertisement on page 8) and is used by permission. It is compatible with the CoCo 3.

```
Ø REM COPYRIGHT (C) T&D SOFTWARE
    1987        hang man
1 GOTO3
2 CLEAR8ØØ:GOTO4
3 PCLEAR8:GOTO2
4 CLS:PRINT@233,"G A L L O W S"
5 CS=Ø:YS=Ø:CW=1ØØ:MA=3Ø:PP=1:LT
   =26:DIM MF(MA),MR(MA),MB(MA),
   ML(MA),MC(MA),LC(15Ø),SC(17Ø)
   ,WC(9Ø),L$(26),CW$(CW)
6 YS=Ø:C=2:C2=1:UL$(1)="BM+7,ØNR
   2ØBM-4,-5":UL$(2)="BM+16,+4U4
   BM+Ø,-8U8BM+Ø,+16":UL$(3)="BM
   +2Ø,+4U2BM+Ø,-8U4R8U8L16D4"
7 S=Ø
8 GOSUB321  ' load letter array
9 GOSUB366  '  load words
1Ø GOSUB251  ' blank square
11 PRINT@3ØØ,"BY:";:PRINT@332,"P
   ATRICK";:PRINT@364,"ALLAN";:P
   RINT@396,"EWING";:PRINT@484,"
   LICENSED TO T&D SOFTWARE";
12 FORL=1TO4  ' draw man angles
13 ONL GOSUB257,3Ø6,286,292
14 PCLS:NEXTL
15 PMODEPP,1
16 GOSUB237  ' draw platform
17 L2=1
18 FORL=1TO4  '  screen men
19 PMODEPP,L2
2Ø L2=L2+2
21 ON L GOSUB 19Ø,193,196,199
22 NEXTL
23 '        start game
24 PMODEPP,1
25 LINE(151,63)-(151,68),PSET
26 GOSUB2Ø2:CIRCLE(151,8Ø),5,C+1
   ,3  ' noose
27 GOSUB218:GOSUB214
28 CLS:SCREEN1,S
29 '  print h a n g m a n 2
3Ø LC=Ø:IFSK=1OR SK=2THEN4ØELSE
   COLORC+2:DRAW"BM5,25"+"S6"+L$
   (7)+L$(Ø)+L$(1)+L$(Ø)+L$(12)+
   L$(Ø)+L$(12)+L$(Ø)+L$(15)+L$(
   Ø)+L$(23)+L$(Ø)+L$(19)
31 '  print 1 or 2 players
32 COLORC:DRAW"S4BM25,8Ø"+N$(1)+
   L$(Ø)+L$(15)+L$(18)+L$(Ø)+N$(
   2)
33 DRAW"BM1Ø,11Ø"+L$(16)+L$(12)+
   L$(1)+L$(25)+L$(5)+L$(18)+L$(
   19)
34 '  get input
35 Q=4
36 PL$=INKEY$
37 COLORQ:DRAW"BM5Ø,14Ø"+UL$(3)
38 FORL=1TO2ØØ:NEXTL:Q=Q-3:IFQ<1
   THEN Q=4
39 IFPL$=""THEN36ELSEIFPL$="1"GO
   SUB2Ø5:GOSUB2Ø8:SK=1:GOTO4ØEL
   SEIFPL$="2"GOSUB2Ø5:GOSUB2Ø8:
   SK=Ø:GOTO8ØELSE36
4Ø '****   one player mode
41 ' computer score
```

```
42 COLORC+2:DRAW"S2BM1Ø,2Ø"+L$(3
   )+L$(15)+L$(13)+L$(16)+L$(21)
   +L$(2Ø)+L$(5)+L$(18)+"BM9Ø,15
   D4R4U4"
43 DRAW"BM1Ø,35"+L$(19)+L$(3)+L$
   (15)+L$(18)+L$(5)+"BM9Ø,3ØU4R
   4D4"
44 COLORC+1:DRAW"S6BM95,35"+N$(C
   S)
45 COLORC+2:DRAW"S2BM14Ø,2Ø"+L$(
   25)+L$(15)+L$(21)+L$(18)+"BM1
   9Ø,15D4R4U4"
46 DRAW"BM14Ø,35"+L$(19)+L$(3)+L
   $(15)+L$(18)+L$(5)+"BM19Ø,3ØU
   4R4D4"
47 COLORC+1:DRAW"S6BM195,35"+N$(
   YS)
48 ' ?"do you have a word"
49 COLOR C
5Ø DRAW"S2BM1Ø,9Ø"+L$(4)+L$(15)+
   "BM+16,Ø"+L$(25)+L$(15)+L$(21
   )+"BM+16,Ø"+L$(8)+L$(1)+L$(22
   )+L$(5)
51 DRAW"BM1Ø,11Ø"+L$(1)+"BM+16,Ø
   "+L$(23)+L$(15)+L$(18)+L$(4)+
   UL$(3)
52 YN$=INKEY$:IFYN$=""THEN52
53 IFYN$="Y"GOSUB2Ø5:GOSUB2Ø8:GO
   TO58 ELSEIFYN$="N"GOSUB2Ø5:GO
   SUB2Ø8:GOTO54 ELSE52
54 '  computer picks a word
55 SK=1:CC=RND(-TIMER):CC=RND(CW
   ):WD$=CW$(CC):WD=LEN(WD$)
56 GOSUB178 ' put dash & no.
57 GOTO82
58 '   you pick a word
59 SK=2
6Ø GOSUB159 '  enter word
61 AL$="ABCDEFGHIJKLMNOP#RSTU#W#
   Y#"
62 FORL=1TO WD:A$=MID$(WD$,L,1):
   A=ASC(A$)-64:MID$(AL$,A,1)="#
   ":NEXTL
63 G$="":G=13:IFWD>3THEN G=12:IF
   WD>6THEN G=11
64 FORL=1TO G
65 R=RND(26)
66 IFMID$(AL$,R,1)<>"#"THEN G$=G
   $+MID$(AL$,R,1):MID$(AL$,R,1)
   ="#" ELSE65
67 NEXTL
68 G$=G$+WD$
69 G=LEN(G$):MV$="5":CT=Ø
7Ø R=RND(G):LT$=MID$(G$,R,1)
71 IFLT$="#"THEN7Ø
72 LT=ASC(LT$)-64
73 ' ? i guess ...
74 DRAW"S2BM1Ø,8Ø"+L$(9)+"BM+16,
   Ø"+L$(7)+L$(21)+L$(5)+L$(19)+
   L$(19)
75 COLORC+1
76 DRAW"S4BM3Ø,11Ø"+L$(LT)
77 GOTO86
78 MID$(G$,R,1)="#"
79 GOSUB2Ø8:GOTO7Ø
8Ø '  main game routine
81 GOSUB159  ' ENTER WORD
82 MV$="5":CT=Ø
83 COLOR4
84 DRAW"BM1Ø,9Ø"+L$(16)+L$(9)+L$
   (3)+L$(11)+L$(Ø)+L$(Ø)+L$(1)+
   "BM1Ø,11Ø"+L$(12)+L$(5)+L$(2Ø
   )+L$(2Ø)+L$(5)+L$(18)
85 GOSUB185  '  pole keyboard
86 FORL=1TO WL
87 IFLT$=MID$(SW$,L,1)THEN12Ø
88 NEXTL
89 SOUND1,1:COLORC+1
9Ø DRAW"S4BM"+MV$+",3Ø"+L$(LT)
91 MV=VAL(MV$):MV=MV+24:MV$=STR$
   (MV)
92 CT=CT+1
93 ON CT GOSUB263,266,268,27Ø,27
   2,274,276,278,28Ø,283
94 IFCT=1ØGOTO97
95 IFSK=2THEN78
96 GOTO85
97 GOSUB2Ø8 ' clear sentence
98 COLORC+2:DRAW"S4BM5,95"+L$(19
   )+L$(15)+L$(18)+L$(18)+L$(25)
   +UL$(2) ' ? sorry
99 COLORC:DRAW"S2BM15,11Ø"+L$(2Ø
   )+L$(8)+L$(5)+"BM+16,Ø"+L$(23
   )+L$(15)+L$(18)+L$(4)
1ØØ DRAW"BM35,125"+L$(23)+L$(1)+
   L$(19)
1Ø1 COLORC+1:DRAW"S2BM1Ø,14Ø"
1Ø2 FORL=1TO WD:A=ASC(MID$(WD$,L
   ,1))-64
1Ø3 DRAWL$(A)+"BM+8,Ø":NEXTL
1Ø4 GOSUB2Ø5:GOSUB211'PUT WC
1Ø5 X2=11Ø:FORX1=245TO2Ø4STEP-2
1Ø6 COLORC
1Ø7 LINE(X1,X2)-(X1+8,X2+2),PSET
   ,BF
1Ø8 LINE(X1+8,X2)-(X1+16,X2+8),P
   SET,BF
1Ø9 COLORC+1
11Ø LINE(X1+16,X2)-(256,X2+8),PS
   ET,BF
111 NEXTX1
112 LINE(2Ø4,11Ø)-(256,12Ø),PRES
   ET,BF
113 GOSUB218 ' blank drop board
```

```
114 PLAY"V30L100O1E":GOSUB216 '
   drop board
115 GOSUB208 ' clear sentence
116 GOSUB211 ' clear word space
117 GOSUB220 ' flip pages
118 IFSK=1THEN CS=CS+1ELSEIFSK=2
   THEN YS=YS+1
119 GOTO23
120 '  picked a right letter
121 GOSUB208 '  clear sentence
122 COLORC+1:DRAW"S2BM20,80"+L$(
   18)+L$(9)+L$(7)+L$(8)+L$(20)+
   UL$(2) '  ? right!
123 DRAW"S4BM30,110"+L$(LT)
124 CO=2
125 DRAW"BM0,190S4":COLOR CO
126 FORL=1TO WD
127 DRAWUL$(1)+"BM+24,+5"
128 NEXTL
129 IFSK=1THEN131
130 PN$=INKEY$:IFPN$=""THEN131EL
   SE PN=VAL(PN$):IFPN<1OR PN>WD
    THEN131ELSE134
131 CO=CO+2:IFCO>5THENCO=2
132 IFSK=1THEN PN=RND(WD):GOTO13
   4
133 GOTO125
134 IFLT$<>MID$(SW$,PN,1)THEN125
135 MID$(SW$,PN,1)=CHR$(35)
136 PL=PN*27-24 'POINT TO LETTER
137 PL$=STR$(PL)
138 COLOR1:DRAW"BM"+PL$+",185"+N
   $(PN):COLOR C+2:DRAW"BM"+PL$+
    ",185"+L$(LT)
139 GOSUB208 '  clear sentence
140 LC=LC+1:IFLC=WD THEN142
141 IFSK=2THEN78ELSE GOTO83
142 ' win
143 IFSK=1THEN YS=YS+1
144 COLORC:IFSK=2THEN CS=CS+1:DR
   AW"S2BM20,90"+L$(9)+"BM+16,0"
   +L$(1)+L$(13):GOTO146
145 DRAW"S2BM10,90"+L$(25)+L$(15
   )+L$(21)+"BM+15,+0"+L$(1)+L$(
   18)+L$(5)
146 DRAW"BM20,110"+L$(6)+L$(18)+
   L$(5)+L$(5)+UL$(2)
147 GOSUB190 '  MAN FRONT
148 LINE(151,63)-(151,68),PRESET
149 COLORC:LINE(148,87)-(154,85)
   ,PSET:COLORC+2:DRAW"S4BM146,8
   4F2R4E2"
150 GOSUB205 ' PUT LC
151 GOSUB211 ' PUT WC
152 FORL=1TO500:NEXTL
153 GOSUB202 ' PUT MC
154 COLORC:DRAW"S2BM148,85"+L$(1
   6)+"BM148,100"+L$(15)+"BM148,
   115"+L$(15)+"BM148,130"+L$(6)
155 PLAY"O1L10V31CL100V25BBBBB
156 GOSUB202 ' PUT MC
157 GOSUB208 ' PUT SC
158 GOTO23
159 '***  ENTER WORD RTN  ***
160 COLOR2
161 ' PLEASE
162 DRAW"BM10,80S4"+L$(16)+L$(12
   )+L$(5)+L$(1)+L$(19)+L$(5)
163 ' ENTER A
164 DRAW"BM10,100"+L$(5)+L$(14)+
   L$(20)+L$(5)+L$(18)+L$(0)+L$(
   1)
165 ' WORD
166 DRAW"BM10,120"+L$(23)+L$(15)
   +L$(18)+L$(4)+L$(0)+"U2R2D2"
167 COLOR2:DRAW"BM0,190S4"
168 WD$="":WD=0
169 DRAWUL$(1)
170 GOSUB185  ' POLE KEY
171 IFLT$=CHR$(13)THEN IFWD>1THE
   N176ELSE170
172 IFLT$=CHR$(12)GOSUB211:GOTO1
   67
173 IFWD=9THEN SOUND200,1:GOTO17
   0 ELSE WD$=WD$+LT$:WD=LEN(WD$
   )
174 DRAWL$(LT)+"BM+5,+5"
175 GOTO169
176 '
177 GOSUB211 ' PUT WC
178 COLOR C:DRAW"S4BM0,190"
179 FORL=1TO WD
180 DRAWUL$(1)+N$(L)+"BM+8,+5"
181 NEXTL
182 WL=WD:SW$=WD$
183 GOSUB208 ' PUT SC
184 RETURN
185 '***  POLE KEYBOARD
186 LT$=INKEY$:IFLT$=""THEN186
187 IFLT$=CHR$(13)THEN RETURNELS
   EIFLT$=CHR$(12)THEN RETURN
188 LT=ASC(LT$)-64:IFLT<1OR LT>2
   6THEN186
189 RETURN
190 '  PUT MAN (FRONT)
191 PUT(135,70)-(167,139),MF,PSE
   T
192 RETURN
193 '  PUT MAN (RIGHT)
194 PUT(134,70)-(166,139),MR,PSE
   T
195 RETURN
196 '  PUT MAN (BACK)
197 PUT(135,70)-(167,139),MB,PSE
   T
198 RETURN
199 '  PUT MAN (LEFT)
```

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```
200 PUT(134,70)-(166,139),ML,PSE
    T
201 RETURN
202 '  PUT MAN CLEAR
203 PUT(135,70)-(169,139),MC,PSE
    T
204 RETURN
205 '  PUT LETTER CLEAR
206 PUT(0,0)-(255,45),LC,PSET
207 RETURN
208 '  PUT SENTENCE CLEAR
209 PUT(0,50)-(130,150),SC,PSET
210 RETURN
211 '  PUT WORD CLEAR
212 PUT(0,165)-(255,192),WC,PSET
213 RETURN
214 COLORC+1:LINE(139,140)-(190,
    143),PSET,BF  ' DROP FLOOR (S
    TRAIGHT)
215 RETURN
216 COLOR2+1:DRAW"BM141,150M141,
    153M190,141M190,139M141,150"'
    DROP BOARD (ANGLE)
217 RETURN
218 COLOR1:LINE(139,140)-(188,15
    3),PSET,BF 'BLANK DROP BOARD
219 RETURN
220 '  FLIP PAGES
221 CT=0:S1=1:SP=75:Z=0
222 FORL=1TO8STEP2
223 PMODEPP,L
224 SCREEN1,S
225 Z=Z+1:IFZ>1THEN PLAY"O1V15L7
    0D-"
226 FORL1=1TO (SP*2):NEXTL1
227 IFS1<>1THEN228ELSE SP=SP-5:I
    FSP<-75THEN S1=0
228 IFS1<>0THEN229ELSE SP=SP+5:I
    FSP>75THEN S1=1
229 NEXTL
230 CT=CT+1:IFCT<>14THEN222ELSE
    PMODEPP,1:SCREEN1,S
231 RETURN
232 '*************************
233 '*
234 '*     DRAWING ROUTINES
235 '*
236 '*************************
237 ' DRAW HANGMAN PLATFORM
238 PCLS
239 COLOR C+1
240 LINE(0,165)-(255,192),PSET,B
    '         MAIN FLOOR
241 GET(0,165)-(255,192),WC,G
    '    WORD CLEAR
242 LINE(190,50)-(200,158),PSET,
    BF   '     UPRIGHT BEAM
243 LINE(200,165)-(115,158),PSET
    ,BF '        PLATFORM
244 LINE(140,50)-(190,60),PSET,B
    F   '     HORIZONTAL BEAM
```

```
245 DRAW"BM141,150M141,153M190,1
   41M190,139M141,150"'DROP BOAR
   D (ANGLE)
246 DRAW"BM165,60F30U3H30"
    '      SUPPORT BEAM
247 COLORC:LINE(200,110)-(202,11
   2),PSET,B '  BUTTON
248 COLORC+1:LINE(151,61)-(151,7
   0),PSET
249 PCOPY1TO3:PCOPY2TO4:PCOPY1TO
   5:PCOPY2TO6:PCOPY1TO7:PCOPY2T
   O8
250 RETURN
251 '******* BLANK SQUARE  **
252 PMODEPP,1:PCLS
253 GET(0,0)-(255,45),LC,G
       '  LETTER CLEAR
254 GET(0,50)-(130,150),SC,G
       '  SENTENCE CLEAR
255 GET(135,70)-(167,139),MC,G
       '  MAN CLEAR
256 RETURN
257 '**************************
258 '****** HANGMAN *** FRONT *
259 '**************************
260 GOSUB263:GOSUB266:GOSUB268:G
   OSUB270:GOSUB272:GOSUB274:GOS
   UB276:GOSUB278:GOSUB280:GOSUB
   283
261 GET(135,70)-(167,139),MF,G
262 RETURN
263 CIRCLE(150,80),12,C+2 ' HEAD
264 PAINT(150,80),C,C+2
265 RETURN
266 CIRCLE(147,78),1,C+1 'L EYE
267 RETURN
268 CIRCLE(154,78),1,C+1 'R EYE
269 RETURN
270 PSET(150,82,C+1):PSET(150,80
   ,C+1)  'NOSE
271 RETURN
272 COLORC+2:LINE(148,87)-(152,8
   7),PSET       '    MOUTH
273 RETURN
274 COLOR C+1:LINE(142,92)-(158,
   115),PSET,BF    'BODY
275 RETURN
276 COLORC+2:LINE(137,92)-(140,1
   07),PSET,BF:COLORC:LINE(137,1
   08)-(140,110),PSET,BF '  L. A
   RM
277 RETURN
278 COLORC+2:LINE(160,92)-(164,1
   07),PSET,BF:COLORC:LINE(160,1
   08)-(164,110),PSET,BF '  R. A
   RM
279 RETURN
280 COLORC+2:LINE(142,115)-(148,
   133),PSET,BF    ' LEFT LEG
281 COLOR C:LINE(143,135)-(147,1
   38),PSET,BF     ' LEFT SHOE
282 RETURN
283 COLORC+2:LINE(152,115)-(158,
   133),PSET,BF  ' RIGHT LEG
284 COLORC:LINE(152,135)-(157,13
   8),PSET,BF  ' R. SHOE
285 RETURN
286 '    HANGMAN (BACK-SIDE)
287 PUT(125,70)-(157,139),MF,PSE
   T
288 LINE(137,87)-(144,84),PRESET
   ,BF
289 PAINT(142,80),C,C+2
290 GET(125,70)-(157,139),MB,G
291 RETURN
292 '  HANGMAN LEFT-SIDE VEIW
293 CIRCLE(140,80),12,C+2'HEAD
294 PAINT(142,80),C,C+2
295 CIRCLE(134,78),1,C+2 'EYE
296 CIRCLE(130,82),2,C+2'NOSE
297 COLORC+2:LINE(130,87)-(137,8
   7),PSET'  MOUTH
298 CIRCLE(142,80),3,C+2'EAR
299 COLORC+1
300 LINE(135,92)-(145,115),PSET,
   BF'BODY
301 COLORC+2:LINE(138,92)-(142,1
   07),PSET,BF:COLORC:LINE(138,1
   08)-(142,110),PSET,BF 'HAND
302 COLORC+2:LINE(137,115)-(143,
   135),PSET,BF'LEG
303 COLORC:LINE(143,135)-(133,13
   8),PSET,BF 'SHOE
304 GET(125,70)-(157,139),ML,G
305 RETURN
306 ' HANGMAN (RIGHT-SIDE VEIW)
307 CIRCLE(140,80),12,C+2 'HEAD
308 PAINT(138,80),C,C+2
309 CIRCLE(146,78),1,C+2 'EYE
310 CIRCLE(151,83),2,C+2 'NOSE
311 COLORC+2:LINE(144,87)-(150,8
   7),PSET  'MOUTH
312 CIRCLE(138,80),3,C+2  'EAR
313 COLOR C+1
314 LINE(137,92)-(147,115),PSET,
   BF'BODY
315 COLORC+2:LINE(138,92)-(142,1
   07),PSET,BF:COLORC:LINE(138,1
   08)-(142,110),PSET,BF 'HAND
316 COLORC+2:LINE(138,115)-(144,
   135),PSET,BF' LEG
317 COLORC:LINE(138,135)-(148,13
   8),PSET,BF'SHOE
318 GET(125,70)-(157,139),MR,G
319 RETURN
320 '      NUMBERS  ( 8 BY 16 )
321 DATA"BM+8,0NR12U16NR12M+12,+
   16NU16
```

```
322 DATA"BM+8,ØR4U16NG4D16R4"
323 DATA"BM+8,-16R8D8L8D8R8"
324 DATA"BM+8,-12U4R8D8NL4D8L8NU
   4R8"
325 DATA"BM+8,-8NU8R8L1U8D16BM+1
   ,Ø"
326 DATA"BM+8,-16NR8D8R8D8NL8"
327 DATA"BM+8,-16NR8D16R8U8NL8D8

328 DATA"BM+8,-12U4R8D16
329 DATA"BM+8,ØU16R8D8NL8D8NL8"
330 DATA"BM+8,-8NR8U8R8D16"
331 FORN=ØTO9
332 READN$(N)
333 NEXTN
334 '      DATA FOR LETTERS
335 '      (LETTERS 8 BY 16)
336 DATA"BM+5,Ø"
337 DATA"BM+8,ØU8NR8U4E4F4D12"
338 DATA"BM+8,ØU16R4F4G4NL4F4G4N
   L4BM+4,Ø"
339 DATA"BM+8,-16NR8D16R8
340 DATA"BM+8,ØNR4U16R4F4D8G4BM+
   4,Ø"
341 DATA"BM+8,ØU16NR8D8NR4D8R8"
342 DATA"BM+8,ØU16NR8D8NR4D8BM+8
   ,Ø"
343 DATA"BM+8,-12E4NR7G4D8F4R4E4
   U4NL4BM+Ø,+8
344 DATA"BM+8,ØU16D8R8U8D16
345 DATA"BM+8,ØR4U16NL4NR4D16R4
346 DATA"BM+8,ØNU4R8NU16
347 DATA"BM+8,ØU16D8NE8F8
348 DATA"BM+8,ØNU16R8
349 DATA"BM+8,ØU16M+8,+8M+8,-8D1
   6
350 DATA"BM+8,ØU16M+12,+16NU16
351 DATA"BM+12,ØH4U8E4R4F4D8G4L4
   BM+8,Ø
352 DATA"BM+8,ØU16R8D8L8D8BM+8,Ø
   "
353 DATA"BM+12,ØH4U8E4R4F4D4G8E4
   H4F8
354 DATA"BM+8,ØU16R8D8L8F8
355 DATA"BM+12,ØR4E4H4L4H4E4R4BM
   +4,+16
356 DATA"BM+8,-16R8L4D16BM+4,Ø
357 DATA"BM+8,ØNU16R8NU16
358 DATA"BM+8,-16M+8,+16M+8,-16B
   M+Ø,16
359 DATA"BM+8,ØNU16M+8,-8M+8,+8N
   U16"
360 DATA"BM+8,ØM+8,-16M-4,+8M-4,
   -8M+8,+16
361 DATA"BM+12,ØU8M-4,-8BM+8,ØM-
   4,+8D8BM+4,Ø"
362 DATA"BM+8,-16R12M-12,+16R12"

363 FORL=ØTO26
364 READL$(L)
365 NEXTL:RETURN
366 FORL=1TO CW:READ CW$(L):NEXT
   L:RETURN
367 DATAAARDVARK,ADULT,AEROSOL,A
   IRCRAFT,AMBITIOUS,ANKLE,APACH
   E,AQUARIUM,ATHLETE,BABOON,BAR
   ,BILLIARDS,BLUBBER,BOTH,BROWN
   ,BUTTERFLY
368 DATACANNIBAL,CARTOON,CELERY,
   CHOCOLATE,CLIMB,COLLEGE,COMPU
   TER,CONQUEST,COP,COURAGE,CYCL
   E,DAM,DECOY,DEW,DISCIPLE,DUMB
   ,EIGHT,EMPTY,ESCAPE,EXHIBIT,E
   YE
369 DATAFATIGUE,FLIGHT,FORT,FRUS
   TRATE,FUZZY,GENIUS,GLACIER,GR
   ADUATE,GORILLA,GYPSY,HELP,HIK
   E,HOLIDAY,HUSBAND,ICICLE,IMPO
   RTANT,IVORY,JACKET,JUMP,KANGA
   ROO,LISTEN,LIPSTICK,LUNCH,MAG
   NET,MAGIC,MINIATURE,MONTH,MOP
   ,MYSTERY,NEWS,OCEAN
370 DATAOXYGEN,PAPER,PARTY,PLEAS
   E,POWDER,PUZZLE,QUIET,QUEEN,R
   ACE,REPORT,ROUND,SCRIBBLE,SHA
   RK,SMILE,SNOW,SURPRISE,TAXI,T
   HIRTEEN,TOAST,TRUST,UNDER,UNC
   LE,UNIVERSE,VOICE,VOLUNTEER,W
   AIST,WHEEL,WOOD,WRINKLE,YAWN,
   YOUNG,ZOO
371 '
372 '     HANGMAM RULES/HINTS
373 '
374 'YOU MAY PLAY AGAINST THE
       COMPUTER OR ANOTHER PLAY
   ER.      WORDS USED MAY BE UP
   TO 9        LETTEERS IN LENGTH
   .  IF A         MISTAKE IS MAD
   E WHEN ENTER-      ING A WORD,
    SIMPLY PRESS         THE CLEA
   R KEY.
375 'THE COMPUTER ONLY TURNS 1
       LETTER AT A TIME, SO THE
   RE       MAY BE MORE OF THE SA
   ME          LETTERS YOU HAVE P
   REVIOUSLY      GUESSED.  THE C
   OPUTER'S         WORDS MAY BE
   CHANGED BY          EDITING TH
   E DATA LINES AT        THE END
    OF THE PROGRAM.
376 'TO TURN A LETTER, PRESS THE
       NUMBER WHICH IS WRITTEN
          OVER THE LETTER
```

OPERATING HINT

Convert from Hex to Decimal & Decimal to Hex by the following extended basic commands.

Decimal = &H (HEX NUMBER)
HEX = HEX$ (DECIMAL NUMBER)

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HAM RADIO & COMPUTERS
by
Bill Chapple W4GQC

In this series we are developing software and hardware for ham radio applications. For our readers who are interested in other computer applications, the principles we are covering here can be used for controlling different devices. For example the Morse Code keyer that we presented last month consisted of hardware and software. The hardware was used to drive a relay that keyed the transmitter. This relay could be used for controlling any other device such as a motor or lights. It could control a high power relay for turning on heaters or an air conditioner. The software is similar to any other program we would need to write.

RECEIVING MORSE CODE

In our Interfacing Computers section we showed how to bring a signal into the computer with our RS-232 interface circuit. Morse code is composed of dots and dashes plus times when nothing is being received. Let's let a star(*) represent the key down. The representation for W4 will be:

```
* *** ***       * * * * ****

   W                   4
```

Notice the 6 spaces between the W and 4. This is equivalent to two dashes. Let's formulate the bits as follows:

Dot = 1 time element
Dot space = 1 element
Dash = 3 elements
Dash space = 1 element
Character space= 6 elements
Word space= 12 elements

We can decode the bits and form characters and words that can be printed to the screen or to a printer. This involves software. This month we want to take a look at what will be required with software and hardware to have the computer decode and print Morse code. First let's look at the hardware.

HARDWARE

As we have stated many times, the hardware requirements for interfacing a color computer are few. Look at the interface circuit we used last month for the Morse keyer. The relay could possibly be replaced with a field effect transistor (FET) for the newer solid state rigs.

For receiving Morse code some signal conditioning needs to be done with hardware. An audio signal needs to be run through a filter and rectified to give a dc voltage representing a signal. We can trade off hardware with software by using machine language subroutines for filtering and rectifying. It is not very hard to build an audio rectifier so we may use this approach to simplify the programming.

The audio signal will need to be run into the interface unit. One easy way to do this is to put two jacks on the interface cabinet and connect an external speaker to one of the jacks. Connect the two jacks together and the audio is then available to the interface.

For those who want to build their own, the interface we present last month can be expanded for the reception of

Morse code by adding one chip and some support circuitry. Anyone with a little electronics experience can build the interface and we will show what will need to be added for receiving Morse code.

SOFTWARR

Basic can be used to decode the bits if a dc level is presented to the RS-232 port. If we include a rectifier in the interface, then we can use basic for restoring the characters. This is probably the approach that will be used.

This month let's look at some programming techniques. As with any program we need to define our objectives. Since we are using a computer why don't we let it automatically track the speed. Also we would like to use our keyer so we need to integrate the two programs into one. Let's look at a procedure for establishing a basic time element. The following formula detects the output from the interface:

```
900 A=PEEK(65314) AND 1:RETURN
```

The dot is the basic time element which varies with speed. How can the length of a dot be determined? The procedure will be to look at the input and advance a counter until the signal disappears. After the signal disappears, we can compare it against a reference to see if the bit was a dot or dash.

Let's expand our subroutine as follows:

```
900 A=PEEK(65314) AND 1:IF A=0
    THEN 950
910 B=B+1
950 RETURN
```

The preceeding subroutine will time the bit. The variable B contains the time. This can be compared with a previous time variable to determine if it is a

HAM RADIO PROGRAMS

This is a collection of 3 programs for Ham Radio use. These are supplied on tape or disk and are Color Computer 3 compatible.

MORSE - This program allows a key to be pressed and then sounds the Morse equivalent. The speed is varied with the right and left arrows. It also will send random characters. This is an excellent tool for developing code speed for the the Novice, Technician, or General class licenses.

DX - Consists of two parts. The first part allows notes to be typed onto the screen. The second part allows the countries for a letter or number prefix to be displayed. To go from one part to the other press the down arrow. The notes are reprinted after going to the DX section. This provides a way to write notes for your QSO's and eliminates DX station lists.

ANTENNA - An antenna design program that calculates the dimensions for a wide spaced Yagi antenna of up to 4 elements. Simply run the program and enter the desired frequency. The dimensions will be printed in feet and inches.

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dot or a dash. For example if we let the variable C contain the time for a dot then we might want to do the following:

```
10 IF B>4*C THEN C=B/3 'ADJUST
   DOT FOR SLOWER SPEED
   REFERENCE
15 IF B<.8*C THEN C=B 'CHANGE
   DOT REFERENCE FOR FASTER
   SPEED
```

Notice that the variable C will contain the dot time. We can use some similar comparisons for timing the spaces. We will also need a variable to contain the character bits, and a look up table to convert the Morse character to ASCII.

Next month we will continue with decoding Morse code. We have received numerous requests for software for other ham radio applications. After we finish the Morse code copier, we will look at other applications.

BACK ISSUES

Back issues of **DYNAMIC COLOR NEWS** are available for **$1.95** each, 3 for **$5**, or 12 for **$15** pp.

Foreigners other than Canada add **$2** for Air Mail postage.

OPERATING HINT

For Deleting characters using the extended basic's editor just pres the "D" key for each character. This saves having to count the characters when using the multiple character delete method.

SCROLLING AROUND
by
John Golus

You are familiar with scrolling of the screen from seeing your text crawl up the screen when it reaches the bottom of the screen. In this article I provide four Assembly language routines that scroll this text screen in all directions UP, DOWN, RIGHT and LEFT. In these routines, depending on what direction we are scrolling, I move the text and then clear the area where the next information would be displayed. For example if we scrolled the screen to the left the right column would become blank. Here we could place new data to give the program the effect as though this information were entering from off the far right of the text screen. I also include a Basic program that illustrates these four routines by scrolling the words Dynamic Color News around the screen. Be sure to save this Basic program before running it because one error could "crash" the system destroying your work! I leave it up to you to make good use of these routines. For instance you could use them with a word processor type program or a scrolling action game.

```
10 'SCROLL ROUTINES
20 'BY JOHN GALUS
30 'FOR DYNAMIC COLOR NEWS
40 ' UP = &H7F70
50 ' DOWN = &H7F90
60 ' RIGHT = &H7FB0
70 ' LEFT = &H7F30
80 CLEAR10,&H7F2F:X=&H7F30
```

```
90 DEFUSR0=&H7F30:DEFUSR1=&H7F70
   :DEFUSR2=&H7F90:DEFUSR3=&H7FB
   0
100 READ A$:IF A$="FIN" THEN 120
110 A=VAL("&H"+A$):POKEX,A:X=X+1
   :GOTO100
120 IF C=3 THEN 180
130 C=C+1:ON C GOSUB150,160,170
140 GOTO100
150 X=&H7F70:RETURN
160 X=&H7F90:RETURN
170 X=&H7FB0:RETURN
180 CLS:PRINT@232,"DYNAMIC COLOR
    NEWS";
190 I$=INKEY$:IF I$=""THEN190
200 IF I$="B THEN Z=USR1(0)
210 IF I$=CHR$(10) THEN Z=USR2(0
   )
220 IF I$=CHR$(9) THEN Z=USR3(0)
230 IF I$=CHR$(8) THEN Z=USR(0)
240 GOTO190
250 DATA 8E,4,1,10,8E,4,0,C6,1E,
   A6,80,A7,A0,10,8C,5,FE,22,9,5
   A,26,F3,30,2,31,22,20,EB,B6,5
   ,FF,B7,5,FE,8E,4,1F,C6,60,E7,
   84,30,88,20,8C,5,FF,25,F6,39,
   FIN
260 DATA 8E,4,20,10,8E,4,0,EC,81
   ,ED,A1,8C,6,0,26,F7,8E,5,DF,C
   C,60,60,ED,81,8C,6,0,25,F9,39
   ,FIN
270 DATA 8E,5,E2,10,8E,6,2,EC,83
   ,ED,A3,8C,4,0,22,F7,8E,4,0,CC
   ,60,60,ED,81,8C,4,20,25,F9,39
   ,FIN
280 DATA 8E,6,1,10,8E,6,2,EC,83,
   ED,A3,8C,4,0,22,F7,8E,4,0,C6,
   60,E7,84,30,88,20,8C,5,FF,25,
   F6,39,FIN
```

OPERATING HINT

Programs can be stacked by changing vectors in locations 25-28. Do a memory peek and write down the values. Let V=PEEK(27) + 2. Poke this value into 25. POKE 256*V, 0: NEW. The new program can now be loaded. This occupies memory above your first program. You can return to the first program by restoring the original values in 25-28.

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BASIC PROGRAMMING

In this series we are showing how to write basic programs. We usually give a few programming examples and then have a feature program. Our interest is in writing an address file program that will use the extra memory in 256K or 512K computers. Last month we presented a program that would sort on names, zip code, or telephone numbers. This month we have improved the program and made it compatible with the Color Computer 3.

HIGH SPEED

There are a few memory pokes that allow the computer to operate at the high speed rate. We want to look at these pokes and explain when the high speed mode can be used. Generally you will be safe if you use the high speed for anything except input/output (I/O) operation. This means that as long as the computer is running a program and is not printing, loading, or saving data then the high speed can be used. We have started using it within our programs and are impressed with the faster speed with which computations can be made. The following is an example of using the high speed mode.

```
10 INPUT"ENTER 2 FOR COLOR
   COMPUTER 3";C3
20 POKE 65494+ C3, 0
30 ?"HIGH SPEED MODE ENABLED
```

To disable the high speed do the following:

```
100 POKE 64595 + C3, 0
110 ?"SLOW SPEED MODE
```

Lines similar to the preceeding can be incorporated within your program. We will add this feature to our address file before we are finished.

ADDRESS FILE
with IMPROVEMENTS

We made some improvements to the address file presented last month. First of all we made it compatible with the color computer 3. We did this by eliminating the PRINT @ commands which are not compatible with the color computer 3 in the 40 and 80 column modes.

The second thing we did was to revise the way the first 3 lines are entered into memory. Instead of allocating 15 characters to a line, we now allow any number to be in any of the first 3 lines up to a total of 45 characters. The procedure for entering data is to press the ENTER key when you want a line feed. When you have finished a section press the down arrow. Let's represent a carriage return with * and down arrow with @. Then the key strokes for an address will be as follows:

```
1 James A. Smith *
 2536 First Ave NE *
 Apt. 7A CR *@

4 Huntsville @

5 AL @

6 35801 @

7 2058957003 @
```

Notice for the first 3 lines the enter key must be pressed at the end of each line. The down arrow must be pressed at the end of each section. We found this arrangement to work much better than our organization last month because this gives us a variable length for the information. The third line is blank for some addresses. The program counts the number of carriage returns in the first 45 spaces of the

addresses and prints an extra blank line if it is needed to give a total of 6 address lines for printing labels.

Also we added line 6 which automatically relocates the program in lower memory. We removed some comments to save space.

Next month we want to look at merging files. For example can we have 20 of these address files on a disk or ramdisk and create a second group of files that are sorted in order zip codes or names?

ADDRESS FILE LISTING

```
5 CLS
6 POKE14*256,0:IF PEEK(25)<>14 T
   HEN POKE25,14:RUN"PROG
10 PRINT"aDDRESS fILE pROGRAM
20 PRINT"cOPYRIGHT (c) 1987
30 PRINT"dYNAMIC eLECTRONICS iNC
40 FOR XA=510 TO 530:READ A:POKE
    XA,A:NEXT XA 'LOAD ML SUBROU
   TINE
50 NF=PEEK(9999)
60 PRINT"1 ADD TO FILE":PRINT"2
   MODIFY FILES":PRINT"3 PRINT F
   ILES":PRINT"4 CLEAR ALL FILES
   ":PRINT"5 SORT FILE":PRINT"6
   SAVE FILE":PRINT"7 LOAD FILE
110 INPUT"ENTER NUMBER";X
120 ON X GOTO 1000,2000,3000,400
   0,5000,6000,7000
1000 CLS:PRINT"THIS ADDS TO FILE
   S":NF=PEEK(9999):POKE9999,NF+
   1:BE=10000:BF=BE+100*NF:PRINT
   "THIS IS FILE #"NF
1017 INPUT"PRESS Y FOR A DIFFER
   FILE NO TO START";Y$:IF Y$="Y
   " THEN INPUT"ENTER NEW NUMBER
   ";NF:POKE 9999,NF:GO TO 1000
1018 PRINT"FILE NUMBER "NF
1020 M=BF:FOR J=0 TO 99:POKE M+J
   ,32:NEXT J
1030 PRINT"ENTER NAME & STREET":
   NC=45:GOSUB1900:NC=15:PRINT"E
   NTER CITY":M=BF+45:GOSUB1900:
   PRINT"ENTER STATE":M=BF+60:GO
   SUB1900:PRINT"ENTER ZIP":M=BF
   +75:NC=10:GOSUB1900:PRINT"ENT
   ER PHONE NR":M=BF+85:GOSUB 19
   00
1100 POKE 502, NF:INPUT"PRESS EN
   TER FOR MORE ADDRESSES, PRESS
    1 TO RETURN TO MENU.";V
1105 NF=NF+1:POKE 502,NF:IF V=0
   THEN 1000 ELSE RUN
1900 FORW=0TONC:POKEM+W,32:NEXT
1910 C=0:X=M:FOR K=0 TO NC
1920 A$=INKEY$:IF A$="" THEN 192
   0
1930 PRINTA$;:A=ASC(A$):IF A=10
   THEN POKE M+K,32:PRINT:RETURN
1935 IF A=8 THEN K=K-1:GO TO 192
   0
1945 POKE M+K,A:NEXT K:FOR AA=0
   TO NC-1:POKE M+AA,32:NEXT AA
1950 PRINT"TOO MANY CHARACTERS -
    REDO"
1960 GO TO 1910
1999 '
2000 PRINT"FILES CAN BE MODIFIED
    WHILE":PRINT"BEING PRINTED.
    PRESS 'L' AND":PRINT"THE LIN
   E NUMBER WILL BE ASKED":PRINT
   "FOR.  PRESS THE NUMBER OF TH
   E":PRINT"LINE TO EDIT AND MAK
   E YOUR":PRINT"CHANGE. USE SHI
   FT @ TO SLOW":PRINT"DISPLAY
2005 PRINT:INPUT"PRESS ENTER TO
   CONTINUE";PP
2010 GOTO 60
2999 '
3000 PRINT"THIS PRINTS THE FILES
    ON 6 LINES FOR LABELS
3001 IF P>1 THEN P=0 ELSE IF TN>
   1 THEN TN=0
3002 IF P=1 THEN P$="ON" ELSE P$
   ="OFF
3003 IF TN=1 THEN TN$="ON" ELSE
   TN$="OFF
3004 PRINT"1 PRINTER IS "P$:PRIN
   T"2 TELEPHONE PRINT IS "TN$
3005 INPUT "CHANGE";PP:IF PP=1 T
   HEN P=P+1:GOTO3000
3006 IF PP=2 THEN TN=TN+1:GOTO30
   00
3007 NF=PEEK(9999):IF NF=0 THEN
   PRINT"THERE ARE NO FILES":INP
   UT"PRESS ENTER TO CONTINUE";W
   :GOTO60
3010 BE=10000:INPUT"ENTER FILE N
   UMBER OR PRESS RETURN FOR ALL
    FILES";N
3012 IF N>NF THEN PRINT"LARGEST
   FILE IS"NF:GOTO3010
3015 IF N>0 THEN NF=N ELSE IF N=
   0 THEN NF=0
3016 CLS:PRINT:PRINT:PRINT
3020 PP=0:M=BE+100*NF:PRINT"THIS
    IS FILE#"NF:X=45:J=0:W=1
```

```
3032 CR=0:FOR PQ=M TO M+44:A=PEE
   K(PQ):IF A=13 THEN CR=CR+1
3040 NEXT PQ:GOSUB3900:X=15:FORJ
   =3TO4:W=J+1:GOSUB 3900
3045 IF J=3 AND P=1 THEN PRINT#-
   2,", ";:GOTO3070
3047 IF J=4 AND P=1 THEN PRINT#-
   2," ";:GO TO3070
3050 IF P=1 THEN PRINT#-2," "
3070 NEXT J
3080 X=10:M=M+75:J=0:W=6:GOSUB 3
   900:IFP=1 THEN PRINT#-2," "
3082 J=0:W=7:AP=P:M=M+10:IF TN>0
   THENGOSUB 3900
3086 P=AP:IF P=1 THEN PRINT#-2,C
   HR$(13):IF CR=2 THEN PRINT#-2
   ," "
3120 PRINT:NF=NF+1:IF NF=PEEK(99
   99) THEN 3130 ELSE 3020
3130 INPUT"LAST FILE PRESS ENTER
    FOR MENU OR ENTER FILE NUMBE
   R TO CONTINUE";X:IF X=0 THEN
   RUN ELSE NF=X:GOTO3020
3200 PRINT:PRINT:NC=15:M=BE+100*
   NF:IF PP>5 THEN 3300
3205 IF PP=1 THEN NC=45
3300 M=M+15*(PP-1):GOSUB 1900:GO
   TO3020:NC=10:M=M+75+10*(PP-6)
   :GO SUB 1900:GOTO 3020
3900 PRINTW;:FOR K=0 TO X-1:AX=M
   +X*J+K
3910 A=PEEK(AX):B=PEEK(AX+1):IF
   A=32 AND B=32 THEN 3940
3915 A$=CHR$(A):PRINTA$;:IF P=1T
   HEN PRINT#-2,A$;
3917 X$=INKEY$:IF X$="" THEN 392
   0 ELSE 3950
3920 NEXT K
3940 PRINT:RETURN
3950 IF X$="L" THEN INPUT"LINE N
   UMBER TO CHANGE";PP:GOTO3200:
   RETURN
3960 IF X$="F" THEN INPUT"NEW FI
   LE NUMBER";NF:RETURN
3965 NEXT K:RETURN
3985 FOR LL=Q TO 800:NEXTLL:RETU
   RN
3999 END
4000 PRINT"THIS CLEARS ALL FILES
   ":INPUT"PRESS ENTER TO CLEAR
   FILES OR BREAK TO ABORT";CF
4010 POKE 9999,0:RUN
5000 PRINT"THIS SORTS THE FILES"
   :PRINT"N NAME SORT":PRINT"T T
   ELEPHONE SORT":PRINT"Z ZIP CO
   DE SORT":PRINT"PRESS M FOR ME
   NU
5010 INPUTS$:N=PEEK(9999):S=1000
   0:PRINT"S="S
5020 IF S$="N" THEN GO SUB5200 E
   LSE IF S$="T" THEN GOSUB 5600
    ELSE IF S$="Z" THEN GOSUB540
   0 ELSE GOTO 5000
5030 PRINT"SORTING COMPLETED":GO
   TO60
5200 PRINT"THIS SORTS ON NAMES":
   OS=0:GOSUB 5800:RETURN
5400 PRINT"THIS SORTS ON ZIP COD
   ES":OS=70:GOSUB5800:RETURN
5599 '
5600 PRINT"THIS SORTS ON TELEPHO
   NE NUMBERS":OS=85:GOSUB5800:R
   ETURN
5800 X=NF-1:FOR J=0 TO X:FORK=J+
   1TOX:PRINTJ;K:P=S+100*J+OS:Q=
   S+100*K+OS
5820 FOR L=0 TO 8
5830 M1=P+L:M2=Q+L:A=PEEK(M1):B=
   PEEK(M2)
5840 IF A<B THEN GOTO 5870
5850 IF A=B THEN NEXT L
5860 GO SUB 5900
5870 NEXT K:NEXT J:RETURN
5900 PRINT"EX "J" AND "K
5910 P1=P-OS:Q1=Q-OS
5950 XX=P1:GOSUB 5990:POKE500,MS
   :POKE501,LS:XX=P1+99:GOSUB 59
   90:POKE 502,MS:POKE503,LS:XX=
   Q1:GOSUB 5990:POKE 504,MS:POK
   E505,LS
5960 EXEC 510:RETURN
5990 MS=INT(XX/256):LS=XX-256*MS
   :RETURN
6000 PRINT"THIS SAVES THE FILES
6010 NF=PEEK(9999):BE=9999:EN=BE
   +100*NF+1:PRINT"NUMBER OF FIL
   ES="NF
6020 PRINT"BEGINNING="BE:PRINT"E
   NDING="EN
6025 Z=FREE(0):IF Z<10 THEN PRIN
   T"NOT ENOUGH ROOM":END
6026 PRINT"THERE ARE "Z" GRANULE
   S FREE"
6030 INPUT"ENTER NAME FOR FILES"
   ;N$
6040 SAVEM N$,BE,EN,BE
6050 INPUT"PRESS ENTER FOR ANOTH
   ER SAVE OR PRESS 1 FOR MENU";
   X:IF X>0 THEN 60
7000 INPUT"ENTER 1 FOR DIRECTORY
   ";X:IF X=1 THEN DIR
7010 INPUT"ENTER FILE TO LOAD";F
   $:LOADM F$
7020 PRINT"FILE "F$" IS LOADED":
   RUN
9000 INPUT"MEMORY";M
9010 A=PEEK(M):A$=CHR$(A)
9020 PRINTM;A;CHR$(A)
```

```
9030 X$=INKEY$:IF X$="M" THEN 90
   00
9035 IF X$="C" THEN INPUT"MEMORY
    TO CHANGE";MC:INPUT"VALUE";V
   A:POKEMC,VA:M=M-11
9040 M=M+1:GOTO9010
9500 DATA190,1,244,16,190,1,248,
   166,132,230,164,167,160,231,1
   28
9510 DATA 188,1,246,35,243,57
```

OPERATING HINT

You can print your disk directory to a printer by POKE 111,254:DIR <ENTER>

RENEWAL TIME?

The date beside your name on the address label indcates the last issue you will receive. Send in your renewal if you want to continue receiving technical information on Color Computers. This is the last issue for those with 2/87.

EDITOR'S COMMENTS

This is the beginning of our fourth year. It seems that there is a lot of interest in hardware projects. Last month we had two projects and we are looking at using the joystick ports for various applications. These are very useful ports and we will show many applications for them.

John Galus is continuing on Assembly Language programming. The material this month is very useful. If you are interested in writing machine language programs and subroutines, you should read this section.

For those of you who purchased a new color computer 3 and a multipak expander, you will have to pay to have the expander upgraded. Although the expander is advertised as being compatible, Radio Shack will not upgrade the expander without charging an additional $35. I don't think it is fair for them to ignore a design goof and charge customers for Radio Shack's error. They try to justify this by saying it is an upgrade. I am printing a letter I received from them.

In our Ham Radio series we are looking at requirements for receiving and displaying characters generated by Morse code. This month we are covering a few principles and will continue next month. This is an area in which I am involved, and the software and hardware techniques can be applied to other applications.

In our programming series we improved the address file program we have been developing. Our program will handle 200 names but we want to expand it so we can handle 1000 or 2000 names with a disk or ramdisk.

We have an exciting game "GALLOWS" from T & D Subscription Software. This is similar to the popular "Hangman" game and I am sure our reader's will enjoy it.

We are still receiving questions and appreciate them very much. If you have a question please write and we will answer it in our Question and Answer section.

It has been a year since Dean and I were married. She has really been an asset to Dynamic Color News. I used to get so frustrated with secretaries that I about decided that I could do better without one. Dean handles all of our orders, advertising, subscriptions, printing plus many other tasks. If you will compare what we are producing now with what we had a year ago, you can see how we have grown. I want to thank all of you for your support. - Bill-

Radio Shack
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January 30, 1987

Mr. Bill Chapple
President
DYNAMIC COLOR NEWS
1001 Highway 36 East
P.O. Box 896
Hartselle, AL 35640

Dear Mr. Chapple,

I am writing in reference to a letter dated January 12 which you mailed to Ed Juge, director of Market Planning for Radio Shack. I apologize for neglect on our part to provide you with the necessary information you requested concerning the Multi-Pak Interface and the Color Computer 3.

I will do my best to answer your questions and please feel free to print the following in your publication:

There seems to be some confusion among consumers regarding the Multi-Pak Interface upgrade for the Color Computer 3. If you are running dedicated Color Computer 2 software on a Color Computer 3, the Multi-Pak Interface does not need the upgrade. However, if you wish to take advantage of the advanced features of the CoCo 3 and are running dedicated CoCo 3 software, the upgrade is necessary.

Two different upgrades are available, depending on the model of Multi-Pak Interface. If you have interface model #26-3024, a PAL chip should be installed. If you have the newer interface model #26-3124, a satellite PC board should be installed. Any Radio Shack Repair Center will install the upgrade for approximately $35, including the cost of the upgrade kit, installation and tax.

Please keep in mind that this is an upgrade--not a fix--and costs for the upgrade are not covered by Radio Shack's 90-day warranty on the Multi-Pak Interface.

I hope this clears up any confusion or answers any questions you might have concerning this subject. Please feel free to contact me at (817) 390-3487 if you should have any additional questions or problems in the future.

Thanks again for your support and best wishes to DYNAMIC COLOR NEWS.

Cordially,

Fran McGehee

Fran McGehee
Marketing Information Representative

cc: Barry Thompson
Product Manager, Computer Merchandising

David Goyne, Vice President
Support Services

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.

Great Products - CoCo Max II and the CoCo Max III - are getting better !!! Now, Spectrum Projects offers a software and hardware upgrade that allows you to run CoCo Max II on the CoCo III. The kit contains a software patch on disk to modify the CoCo II system and a special replacement PAL chip for the 26-3024 Multi-Pak Interface. (Note- at this time, no patch is available for the Tandy 26-3124 Multi-Pak.) The complete package of software, chip and instructions is only $29.95 plus $3.00 S/H U.S. ($5.00 other). Spectrum Projects, P. O. Box 264, Howard Beach, NY 11414.

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.

DISKMAN

Have you ever wished you had a disk manager that would do all of those nice disk manipulation tasks that are desired? Tothian Software has such a program named DISKMAN. A warning appears at the beginning of the instructions because it is possible to loose data with this type program if improperly used. However by following the instructions, backup directories can be made of all your disks from which you can restore a lost directory. One disk can be reserved to contain the directories of the other disks. Then if a directory is lost, it can be reloaded from the directory disk. For this to work, a backup directory will have to be saved on the directory disk.

The directories can be placed in alphabetical order. This makes it easy to find a program. No longer do you have to search through all of your files to find a program. You can look for it in its alphabetical location. A nice feature of the backup directory is that a program that has been killed can be restored by loading the backup directory.

Also included is a section that allows a sector to be examined and changed. After entering the track and sector, characters are displayed on the screen with 32 across by 8 lines. You can move to any character with the cursor keys and change it. The value is indicated at the bottom of the screen in decimal and hex. After completing the changes, the new values can be saved to the disk.

Files can be exchanged on the disk directory. This involves marking two files by pressing the space bar. When the second one is marked, the files switch locations on the directory.

The directory catalog can be printed out. If you have a disk that contains the directories of all of your disk, then you can print the directories from the master disk.

In summary we found DISKMAN to be a very good disk manager. The alphabetizing feature makes it easy to locate files, and the disk directory backup feature allows a disk to be restored

COLOR COMPUTER 3

512K MEMORY UPGRADE

Upgrade your **Color Computer 3** to **512K**. Our plug in board is easy to install and will give you the maximum addressable memory. With **512K** you can have two **ramdisks** with the software below or access it with OS-9 level 2. **Order MC-30 $119.95 * REDUCED ***

512K RAMDISK

A ramdisk operates from memory just like a disk drive except it is many times faster. The **512K ramdisk** allows drive 2 and 3 to be ramdisks. With a one drive system, you can backup a disk to either **ramdisk** or select either ramdisk for quickly loading programs. Resetting the computer does not erase the **ramdisks**. Also included is a memory test program. Use our **UPS** for retaining indefinitely the programs in the ramdisks.

CC-3 ramdisk $19.95

UNINTERRUPTER POWER SUPPLY (UPS) * reduced price *

Just leave your computer on and our UPS will protect your computer's memory when power fails. Programs loaded into your ramdisk will be retained when power fails. Assembly consists of a dry battery, switch, light emitting diode, & electronic control circuit. Easy installation. Mounts inside all color computers.

UPS $49.95.

Checks, Visa, or MC
Add $3 shipping

DYNAMIC ELECTRONICS
BOX 896 (205) 773-2758
HARTSELLE, AL 35640

after it has crashed. DISKMAN costs $21.95. For more information contact Tothian Software, Box 663, Rimersburg, PA 16248.

CHESS-32K

If you are interested in learning or improving your chess game then CHESS-32 is for you. This high quality game is inexpensive and can provide many hours of entertainment. The program comes either on tape or disk. This is similar to the checkers-32 program which we reviewed in our June 1986 issue.

To start the program enter RUN "CHESS". After the program loads, a chess board is drawn on the screen with the chessmen set up. The cursor will be blinking. For a black and white tv press SHIFT W. This will make the board and men easier to identify.

The cursor can be moved with the arrows. Press the "F" key to indicate the "FROM" space. Press the "T" key to indicate the "TO" space. After the moves have been defined, pressing "ENTER" will complete the move. The computer then makes its move.

There are several levels of difficulty. These are Novice, Apprentice, Challenger, Expert, Master, and Grandmaster. Chess-32 sells for $5.95 + $1 S/H. Applied Machine Intelligence, P. O. Box 358, Salida, CO 81201.

OPERATING HINT

To double your computer's speed, POKE 65495,0. To return to normal speed ,POKE 65494,0. For the CoCo-3 POKE 65497,0 to enable double speed and POKE 65496,0 to return to normal speed.

QUESTIONS & ANSWERS

These are questions that have been asked us. If you have a question that you would like for us to answer send it to us at Box 896, Hartselle, AL 3564Ø. We will print your answers here. For a personal reply send $1Ø with your question.

Question: In Reference to your Morse Keyer is there supposed to be an adaptor cable to the CoCo Serial I/O Connector. Your schematic looks like you are using 14 pin header plugs for wires on and off the board. If so would you send me a schematic of the adaptor cable. Also do you have any information on RTTY/CW Software that will work with Kantronics hardware?

Answer: The plug on the power supply is not standard. We used a 14 pin header to give us a standard plug. Any other type plug could be used. I am not familar with the Kantronics hardware interface. If they are using the ASCII port then our software may work. We are going to cover other applications for ham radio in future editions.

Question: I just received the January issue of the Radio Shack Color Computer Magazine. I read your article with enthusiasm and would like to have a few questions answered, if possible. I have been a ham radio operator for about one year. I am handicapped and would like to monitor code. I have just purchased a cheap TRS Color Computer 2 (Series #2Ø64Ø65) with 16K. I also have a new CCR-82 cassette recorder. Here are the questions. 1. Can the interface in the January issue be used to monitor code with the proper program? 2. Is 16K enough to monitor code? Of course, bucks is a problem and I need to use the hardware I now have. Could you list what I need to monitor cw with the hardware I now have or is this even possible? Thanks so much for your help. Ham radio and the computer have opened a new world for me. A s.a.s.e. is enclosed.

Answer: See our ham radio editorial in the February 1987 issue. We will be showing how to receive Morse code in the future. A 16K computer will probably be large enough.

Question: You have stated that programs can be transferred between two computers if both have terminal programs. How do you save the programs after they are transferred?

Answer: This is a good question. The DYTERM program we gave last month allows data to be entered into a buffer. The beginning and ending of the buffer is known. All of the data can be saved as a machine language program. If you want the data saved as ASCII then it is necessary to open a file on disk and write the data into the file. We transfer text and articles from our Model 1ØØ to a color computer and then save it on disk. Also we can transfer files from a color computer to our model 1ØØ to an IBM clone. Computers do not have to be the same type to do this.

OPERATING HINT

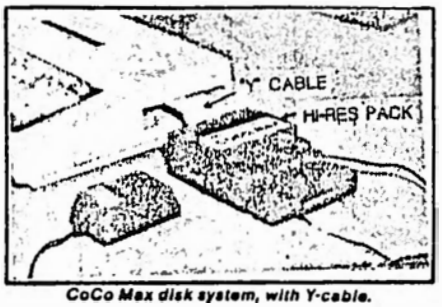
The vector in locations 135-6 determine the screen position of the cursor. The cursor can be moved to any screen location by poking values into these locations. This works with the CoCo 3 in the 32 character display mode,

CoCo Max™ II

You'll use it all the time and love using it.

What is CoCo Max?

Simply the most incredible graphic and text creation "system" you have ever seen. A Hi-Res Input Pack (more on the pack later) is combined with high speed machine language software. The result will dazzle you.



CoCo Max disk system, with Y-cable.

Is CoCo Max for you?

Anyone who has ever held a pencil or a crayon for fun, school or business will love it. A 4 year-old will have fun doodling, a 15 year-old will do class projects and adults will play with it for hours before starting useful applications (illustrations, cards, artwork, business graphics, flyers, charts, memos, etc.) This is one of the rare packages that will be enjoyed by the whole family.

What made CoCo Max an instant success?

First there's nothing to learn, no syntax to worry about. Even a child who can't read will enjoy CoCo Max. Its power can be unleashed by simply ***pointing*** and ***clicking*** with your mouse or joystick. With ***icons*** and ***pull down menus,*** you control CoCo Max intuitively; it works the same way you think.

Don't be misled by this apparent simplicity. CoCo Max has more power than you thought possible. Its blinding speed will astound you.

It lets you work on an area 3.5 times the size of the window on the screen. It's so friendly that you will easily recover from mistakes: The ***undo*** feature lets you revert to your image prior to the mistake. As usual, it only takes a single click.

Later, we will tell you about the "typesetting" capabilities of CoCo Max II, but first let's glance at a few of its graphic creation tools:

With the ***pencil*** you can draw free hand lines, then use the ***eraser*** to make corrections or changes. For straight lines, the convenient ***rubber-banding*** lets you preview your lines before they are fixed on your picture. It's fun and accurate. Lines can be of any width and made of any color or texture.

The ***paint brush,*** with its 32 selectable brush shapes, will adapt to any job, and make complicated graphics or calligraphy simple.

For special effects, the ***spray can*** is really fun: 86 standard colors and textures, all available at a click. It's like the real thing except the paint doesn't drip.

CoCo Max will instantly create many shapes: circles, squares, rectangles (with or without rounded corners), ellipses, etc. Shapes can be filled with any pattern. You can also add hundreds of custom patterns to the 86 which are included.

The ***Glyphics*** are 58 small drawings (symbols, faces, etc.) that can be used as rubber stamps. They're really great for enhancing your work without effort.

Pull down menus

Zoom in!

Control Over Your Work

CoCo Max's advanced "tools" let you take any part of the screen, (text or picture) and perform many feats:

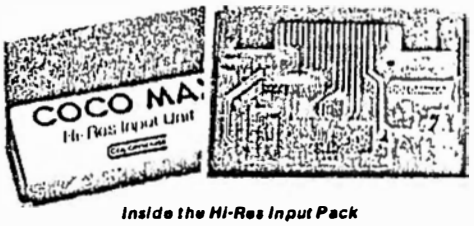
• You can move it around • Copy it • Shrink or enlarge it in both directions • Save it on the electronic ***Clipbook*** • Flip it vertically or horizontally • Rotate it • Invert it • Clear it, etc. etc.

All this is done instantly, and you can always ***undo*** it if you don't like the results.

For detail work, the ***fat bits*** (zoom) feature is great, giving you easy control over each pixel.

To top it all, CoCo Max II works in color. Imagine the pictures in this ad in color. If you own a Radio Shack CGP-220 or CGP-115, you can even print your work in full color!

There is so much more to say, such as the capability to use CoCo Max images with your BASIC programs, the possibility to use CoCo Max's magic on any standard binary image file. There are also many advanced features such as the incredible ***lasso.***



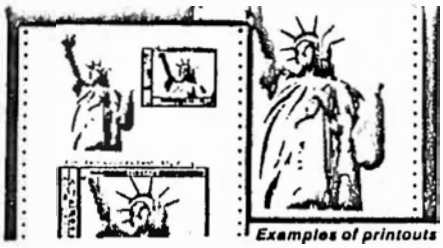
Inside the Hi-Res Input Pack

Why a Hi-Res Input Pack?

Did you know that the CoCo joystick input port can only access 4096 positions (64x64)? That's less than 10% of the Hi-Res screen, which has 49152 points! (256x192). You lose 90% of the potential. The Hi-Res Input Pack distinguishes each of the 49152 distinct joystick or mouse positions. That's the key to CoCo Max's power. The pack plugs into the rom slot (like a rom cartridge). Inside the pack is a high speed multichannel analog to digital converter. Your existing joystick or mouse simply plugs into the back of the Hi-Res Pack.

Electronic Typesetting...

You'll be impressed with CoCo Max's capability. Text can be added and moved around anywhere on the picture. (You can also rotate, invert and flip it...) At a click, you can choose from 14 built in ***fonts*** each with 16 variations. That's over 200 typestyles!



Examples of printouts

Printing Your Creations

There are a dozen ways to print your work. All are available with a click of your joystick (or mouse) without exiting CoCo Max. Your CoCo Max disk includes drivers for over 30 printers!

All the CoCo Max pictures are unretouched screen shots or printouts (Epson RX-80).

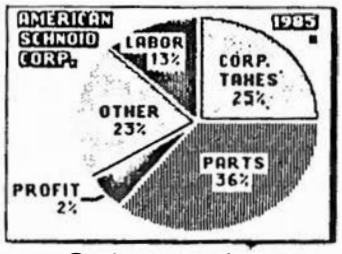
CoCo Max II™

The whole family will enjoy CoCo Max. Here are a few examples of the possibilities.

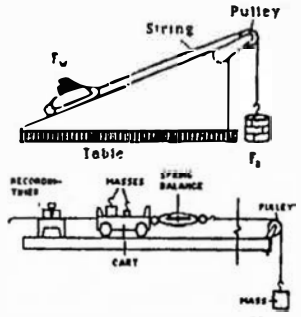
All these pictures are unretouched screen photos or printouts (on an Epson RX-80).

❶ ***Publish a newsletter or bulletin***

❷ ***Fun for children while stimulating creativity.***

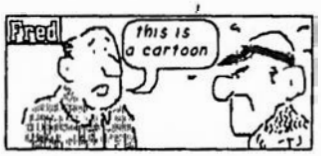


❸ ***Business graphs, charts, diagrams. Also memos***

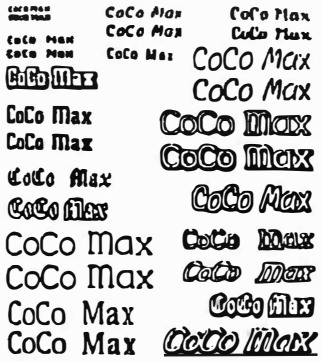


❹ ***Junior's homework and science projects. Term papers too!***

❼ ***Video portrait (with optional digitizer).***

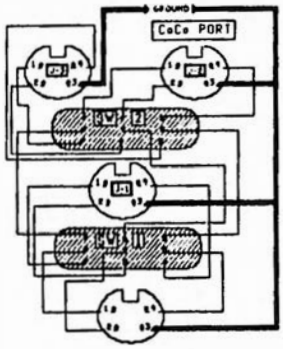


❽ ***This is a cartoon.***

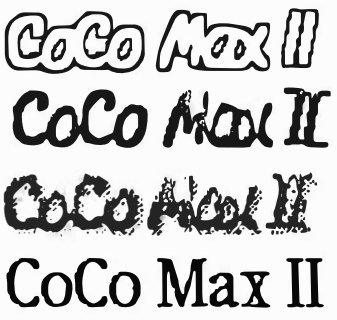


❺ ***Over 200 typestyles to choose from! generate flyers.***

❻ ***A new way to express your imagination.***



❾ ***schematics and floor plans.***



❿ ***Logos and letterheads.***

System Requirements:

Any 64K CoCo and a standard joystick or mouse. (The koala pad and the track ball work, but are not recommended.)
Disk systems need a Multi-Pak or our Y-Cable.
CoCo Max is compatible with any Radio Shack DOS and ADOS.
Note: the tape version of CoCo Max includes almost all the features of CoCo Max II except *Shrink, Stretch, Rotate,* and *Glyphics.* Also, it has 5 fonts instead of 14.
CoCo Max is not compatible with JDOS, DoubleDOS, MDOS, OS-9, the X-pad, and Daisy Wheel Printers.

Printers Supported:

Epson MX, RX, FX and LX series, Gemini, Star, Micronix, Delta 10, 10X, 15, 15X, SG-10, Okidata 82A, 92, 93, C. Itoh Pro-writer, Apple Image-writer, Hewlett-Packard Thinkjet, Radio Shack DMP 100, 105, 110, 120, 200, 400, 500, Line Printer 7, Line Printer 8, TRP-100, CGP-220. (DMP-130 use Line Printer 8), PMC printers, Gorilla Banana.
Color printing: CGP-200, CGP-115

Pricing

CoCo Max on tape $69.95
with Hi-Res Pack and manual.
CoCo Max II (disk only)..... $79.95
with Hi-Res Pack and manual.
Upgrade: CoCo Max to CoCo Max II
New disk and manual..... $19.95
New features of CoCo Max II: 14 fonts and glyphic font, dynamic shrink and stretch, rotate, multiple drive capability, 68 page scrapbook, point and click file load, color printer drivers, full error reporting.
Upgrade: CoCo Max tape to disk
manuals, disk and binder $24.95
Y-Cable: *Special Price*..... $19.95
Super Picture Disks #1, #2, and #3
each: $14.95
All three picture disks $29.95

Font Editor Option

A font is a set of characters of a particular style. CoCo Max includes 15 fonts. You can create new fonts of letters, or even symbols or graphics with the font editor. Examples: set of symbols for electronics, foreign alphabets, etc. $19.95

Video Digitizer DS-69

This new Low Cost Digitizer is the next step in sophistication for your CoCo Max system. With the DS-69 you will be able to digitize and bring into CoCo Max a frame from any video source: VCR, tuner, or video camera. Comes complete with detailed manual and C-SEE software on disk. Multi-Pak is required.
New Low Price Save $50..... $99.95
New: faster DS-69A..... $149.95

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Add $3 shipping
Foreign $5

These are collections of programs from Dynamic Color News.

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1.* 64K all RAM
2.* 2- bank address file
3. Alarm Clock
4. Loan Interest
5. Character Generator
6.* Bank Switching
  * Won't work on CC-3

DCN-2

1. Check Book Program.
2. Ball Team Sort Program.
3. Card Shuffling
4. Student Study Program
5. Address File

DCN-3

1. Restore-Recover program lost after NEW command.
2. Fast Food
3. Bar Graph
4. Memory Peek & Poke
5. Graphics draw

DCN-4

1. Address File with Sort
2. Morse Code Generator
3. Star Constellations
4. Dueling Cannons

Programs are $7.95 each tape or disk. Add $2 shipping. Checks, VISA & MC.

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(Rate sheet 2 - March 1986)
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1	30	27	25
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1/3	19	17	15
1/4	15	13	12

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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.

Artwork must be camera ready and can be enlarged or reduced at no extra cost. Rates are per page or fraction thereof. Enclose payment with ad copy. No X-Rated ads.

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BOWLING LEAGUE SECRETARY

FOR CO-CO 1,2 AND 3

Reviewed in RAINBOW Magazine

September 1986 page 141

...a well organized menu-driven program with very good documentation....a well-planned program which does what it was designed to do.....

**MAINTAINS ALL STATISTICS FOR LEAGUES WITH OVER 200 BOWLERS AND ANY NUMBER OF TEAMS.
**PREPARES ABC STYLE STANDINGS REPORTS.
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