

TELEVISION

COLOR

NEWS

Radio Shack Color Computer Magazine

Feb. 1989
Issue #58

\$2.25

COCO 3

HAM RADIO

PROGRAMS



C LANGUAGE

BASIC PROGRAMMING

ASSEMBLY LANGUAGE

OS-9 & BASIC 09

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for the 512K COCO 3

A ramdisk operates similar to a disk drive except it is many times faster. The 512K ramdisk allows drives 2 and 3 to be ramdisks. You can backup a disk to either ramdisk or select either one for quick program or data loading. OS-9 is not required. A memory test program is also included. \$15

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(for the Color Computer 2)

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DYNAMIC ELECTRONICS INC. Box 896; Hartselle, AL 35640 (205) 773-2758

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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.

The submission of questions, operating hints, and solutions to problems to be published in this magazine are encouraged. All submissions become the property of Dynamic Electronics, Inc. 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 magazine. 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 TXT file.

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* Included on Disk or Tape.
# OS-9 and C Procedures are
  included on DCN on DISK.
```



This month we will look at the TMODE and XMODE commands of OS-9. These two commands are the opposites sides of the same coin. They allow you to set the parameters of your system. These are the commands you will be using to select upper or lower case characters, pause or no pause after a screen of information has been displayed, or to change the baud rate to your printer.

Lets start with the TMODE command. The first thing to try is to type TMODE at the OS-9 prompt. This will get you a list of the paramaters that can be changed with TMODE and XMODE commands. In addition it gives you the current status of those parameters. The first parameter for example is the UPC/-UPC. If you have UPC showing in this spot then you are in the capital letter only mode, if -UPC is showing then you are in the mode that will display both upper and lower case letters.

We can change which ever mode we are in with the TMODE command. For those of you in the UPC mode type in TMODE -UPC at the prompt. If your one of the folks with -UPC showing type in TMODE UPC. Now type in ECHO HELLO. If you change to the UPC mode then you typed in uppercase letters, if you are in the -UPC mode you could type it in, in lowercase letters. One thing to note, if you are windowing, is that the TMODE command only affected the window you are in.

To find out the parameters for each window go to each window and type in TMODE.

In addition to UPC/-UPC there is BSB/-BSB which toggles the erase feature of the back-space. If you type in TMODE -BSB the cursor will no longer erase a character as it backs over it. BSL/-BSL toggles the erasure of a line when the shift/left arrow keys are pressed simultaneously. The ECHO/-ECHO combination toggles the echoing of key presses on the screen. If you switch to -ECHO you will no longer be able to see what you have typed on the screen. LF/-LF toggles the line feed function. If you change to the -LF mode when you press the enter key the computer doesn't drop down the screen with the output, but prints over the line you are on instead. The PAUSE/-PAUSE toggle turns the screen stop feature on and off.

The rest of the parameters in the list allows you to pick values for the various parameters. Let's change one as an example to see how things work. Change the page length for the pause command by entering the following command TMODE PAG=3. Now make sure your pause is toggled on. Type TMODE PAUSE. Now type the TMODE by itself to check the status of your changes. If everything went well the output of your last TMODE should have paused after three lines were printed. To continue push the enter key.

Lets try one more example.

The TMODE parameter list shows that the bell is equal to 7. The parameter list is in Hexadecimal, which is what the DISPLAY command likes to be fed (Of course a hexadecimal 7 and a decimal 7 are the same thing). If we put this value in a DISPLAY command then we should hear the bell sound. Type in DISPLAY 7, and listen for the bell.

Also available for the changing by TMODE is the baud rate. The default for the system is 110. If we wanted to change it to 300 then baud=01 would accomplish the job. Baud=02 would give us a baud rate of 600. For more baud rates refer to page 6-90 commands reference in your OS-9 manual. Also keep in mind that two hexadecimal digits can represent an eight bit byte. The rightmost digit in baud=00 is the 4 least significant bits of the byte, and the leftmost is the 4 most significant bits.

The XMODE command affects the same parameters as TMODE, but it updates the device descriptor of the device given to it when you type in the command. To find out the status of the parameters in TERM type in XMODE /TERM. With this command we can change the parameter for as long as the computer stays running. The TMODE command only temporarily changes the parameters, while that path is open. To change the baud rate of the printer we need the XMODE command. Type XMODE /P BAUD=02 would set the printer baud rate to 300. This baud rate would be in effect for the printer until we changed it again or we shut the computer off.

Play with the TMODE and XMODE commands. If you change things to something you didn't want don't worry the changes go away when the computer is shut off. Next month we will explore how to make those changes we want permanent. When the system boots up we will have our custom parameters ready to go.

BASIC09

Have you ever gotten tired of being where you're at and wanted to pack up and move somewhere else, like going on vacation? That is what we will try this month. We are going to pack up our program and move from BASIC09 out into the operating system.

This month's listing has only one command we haven't seen previously. That is the LEN command. If you're familiar with any type of BASIC you should be able to figure this one out. It returns a number that represents the length of the string variable enclosed in parenthesis. In our program we use B=LEN(A), so the value of B will be the number of characters in the string variable A.

It is this value that allows us to determine where to TAB to put the string in the center of the screen. If you are using a screen with 40 or 80 columns or some other number and you still want your message in the middle of the screen, then substitute the number of columns on your screen for 32 in the listings. It appears in three places in the program. Also if you have more than 16 rows on your screen you can substitute the number of rows you have for any occurrence of 16 in the program.

There is one other line that looks a little different in this program. By now you're used to seeing SHELL "DISPLAY C", but directly beneath it is the line SHELL "TMODE -PAUSE". This line will turn off the pause mode in whatever window you are in so your screen will scroll, instead of going half-way and stopping.

Basically the program takes a message from you (no more than 32 characters on a 32 column screen) and centers the message, then scrolls it up the screen, much like the credits at the end of a movie. Once we have our program entered in BASIC09 we

will pack it up and head out to the operating system and see if we can get it to run from there.

The command to accomplish this is the PACK command. Now you know why I kept using pack in the text. The syntax for the PACK command is the word PACK followed by the filename of the procedure you want packed. One warning with this command, if you pack a procedure you will no longer be able to edit it. The best approach is to pack your file under another name so you still have a copy to make changes to it if that becomes necessary. To do that first save your original file to disk, then when you pack the procedure redirect its output to another file.

As an example, for the program this month, create it as procedure SCROLL. After typing in the procedure save it to disk with this command SAVE SCROLL. With it safely saved on disk pack the procedure using this line PACK SCROLL > CREDIT which will direct the output of PACK into a file named CREDIT.

Sounds like a bit of a bother doesn't it? Why would we want to go to all this trouble? If we do this we can now run the program outside of BASIC09. For this particular program we need only have the runB module present in the execution directory of our drive or in memory. To run the program we need only call it by name from the execution directory (or specify the correct pathname) and it will automatically run. We can also load the program into memory if we have enough room. There is one strange little quirk in doing that. When I load CREDIT into memory and then check the MDIR I find that CREDIT isn't there but SCROLL is. It reverts to the original name. This in no way damages your saved editable file and if called by SCROLL the procedure still executes. If you try to call it by CREDIT like

you do when its on disk, OS-9 will not be able to find it.

If you wish to do the same to a procedure that uses graphics you need gfx (med.-res.) or gfx2 (hi.-res.) to get the procedure to run outside BASIC. Just place them in the same directory as runB.

```

PROCEDURE scroll
SHELL "DISPLAY C"
SHELL "TMODE -PAUSE"
DIM A:STRING
DIM X,Y,B,C:INTEGER
INPUT "WHAT IS YOUR MESSAGE
      (32 COLUMNS)",A
B=LEN(A)
C=(32-B)/2
SHELL "DISPLAY C"
FOR X=1 TO 16
PRINT
NEXT X
PRINT TAB(C); A
FOR Y=1 TO 16
PRINT
FOR X=1 TO 5000
NEXT X
NEXT Y
END

```

MEMORY MANAGER for The COLOR COMPUTER 2

Did you know that the 64K Color Computer 2 and earlier computers have an extra 32K that is generally not used? Our Memory Manager allows basic or machine language programs to be run in either 32K bank. Banks are exchanged with an EXEC command. Also the second bank can be used as a ramdisk to store programs. This makes cassette operation super fast because programs can be saved to the ramdisk. A third option configures the computer for the all ram mode allowing data or programs to be stored in the upper memory. Our Memory Saver 2 allows your programs to be saved even with power failures. The Memory Manager Software is available on either cassette or disk.

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This is an exciting game that uses the right joystick to move your man from the left corner of the screen. As he moves he drops tiles. To win you must tile all 15 levels and avoid Fif1 the guard dog. This program is provided as a courtesy of T & D Subscription Software (see their advertisement on page 9) and is used by permission.

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88 tilertex ISSUE #79

1 PMODE3,1:PCLS4:SCREEN1,0:COLOR
3:FORX=0TO255STEP6:LINE(X,0)-(X,
191),PSET:NEXT:FORX=0 TO 191STEP
6:LINE(0,X)-(255,X),PSET:NEXT

2 DRAW~BM15,15;C2R200D15L160D50L
15U50L25U15R200D15L160D30BR10R20
D5L5D10R5D5L20U5R5U10L5U5R20BR4D
20R20U5L15U15L5BR24D20R20U5L15U3
R5U3L5U5R15U5L20R20BR4D20R5U10F1
5R55U5L50H10R5U10L20R5BD3R5D3L5U
3~

3 PAINT(20,20),1,2:PAINT(150,60)
,1,2:PAINT(120,60),1,2:PAINT(90,
63),1,2:PAINT(72,70),1,2

4 DRAW~BM15,100;C2R200D15L160D50
L15U50L25U15R200D15L160D30BR10D2
0R20U5L15U3R5U3L5U5R15U5L20R20BL
12BU14R25F10R5E10R25D5L20G10D5F1
0R20D5L25H10L5G10L5U5E10U5H10L20
U5~

5 PAINT(20,105),1,2:PAINT(68,158)
,1,2:PAINT(115,150),1,2

6 CIRCLE(180,55),8,2:PAINT(180,5
5),2,2:DRAW~BM179,52;C1D1L1D1L1D
3R1D1R1D1~:CIRCLE(180,145),8,2:P
AINT(180,150),2,2:DRAW~BM179,142
;C1D1L1D1L1D3R1D1R1D1~

7 PLAY~T802L4CDEP4EP4EP4EFGFEGFE
CDEP4EP4EP4EF03CDEP4EP4EDC~:FORX
=1TO500:NEXT

8 CLS:PRINT~TILER TEX -- BY MIKE
SNYDER~:PRINT:LINEINPUT~(H)IGHS
PEED POKE, OR (S)UPER
SPEED (COC03), OR (N)O PO
KE ~~;A\$

9 IF A\$="H" THENPOKE65495,0:GOTO
13

10 IF A\$="S" THENPOKE65497,0:GOT
013

11 IF A\$="N" THEN 13
12 GOTO 8

13 CLEAR8000:DIMMX(16),LO\$(16),A
2(12,14),B2(12,14):FORX=1TO16:RE
AD LO\$(X):READMX(X):NEXT:LO=1:DI
MA1(11,16),B1(11,16):ML=0:FT=0
14 PMODE3,1:PCLS4:SCREEN1,0

15 DRAW ~BM2,2;C2D4R12U4D4L5U2L2
D2D4~:CIRCLE(8,8),6,1:PAINT(8,8)
,2,1:CIRCLE(8,8),2,1:GET(2,2)-(1
4,18),A2

16 DRAW~BM66,80;C2U2R4D2U2R2U1R1
U1R1U1R1U1R1L1D1L7U1L1U1L4D1R4D1
L4R5D2L3~:GET(64,64)-(75,80),A1

17 CLS:PRINT~BONUS~;B0:PRINT:SC
=SC+B0:PRINT~SCORE~;SC:B0=300:I
FLO=17THEN58ELSEPMODE3,1:PCLS4:P
O=18:X2=16:Y2=16:PLAY~T801L8CGCG
02CGCG03BAGFEDCO1CGCG02CGCG~:PY=
175:X3=224:Y3=160:PRINT:PRINT~EN
TERING LEVEL~;LO:PRINT:PRINT~PLE
ASE WAIT~

18 COLOR3:FORX=0 TO 255STEP6:LIN
E(X,0)-(X,191),PSET:NEXT:FORX=0
TO 191STEP6:LINE(0,X)-(255,X),PS
ET:NEXT

19 X=8:Y=8:FORZ=1TO192


```
20 IF MID$(LO$(LO),2,1)="" THEN
  CIRCLE(X,Y),8,2:PAINT(X,Y),2,2:
  DRAW"BM"+STR$(X-1)+", "+STR$(Y-3)
  +";C1D1L1D1L1D3R1D1R1D1"
```

```
21 IF MID$(LO$(LO),2,1)="" THEN
  CIRCLE(X,Y),8,1:PAINT(X,Y),1,1:
  DRAW"BM"+STR$(X-1)+", "+STR$(Y-3)
  +";C2D1L1D1L1D3R1D1R1D1"
```

```
22 IF MID$(LO$(LO),2,1)="" THEN
  DRAW"BM"+STR$(X-8)+", "+STR$(Y-8)
  +";C1R1D1R1D1R1D1R1D1R1D1R1D1R1
  D1R1D1R1D1R1D1R1D1R1D1R1D1R1
  D1R1D1"
```

```
23 X=X+16
24 IF X>250 THENX=8:Y=Y+16
25 NEXT
26 IF LO<17 THEN RO=1
27 IF LO<10 THEN RO=2
28 IF LO<4 THEN RO=3
```

```
29 IF LO=6 AND FT=0 THEN ML=ML-1
  ELSE IF LO=11 AND FT=0 THEN ML=
  ML-1
30 SCREEN1,0
```

```
31 D1=0:D2=0:D3=0:D4=0:D5=0:D6=0
  :D7=0:D8=0:BO=BO-1:X1=JOYSTK(0):
  Y1=JOYSTK(1):OP=OP+1:IFBO<0 THEN
```

```
BO=0
32 GET(X3,Y3)-(X3+11,Y3+16),B1
```

```
33 GET(X2+2,Y2+2)-(X2+12,Y2+14),
  B2
```

```
34 PUT(X2+2,Y2+2)-(X2+12,Y2+14),
  A2
```

```
35 PUT(X3,Y3)-(X3+11,Y3+16),A1
```

```
36 IF X1<1 AND(MID$(LO$(LO),PO-1
  ,1)<>"X" AND MID$(LO$(LO),PO-1,1
  )<>"0")THEN X2=X2-16:PO=PO-1:D4=
  1
```

```
37 IF X1>60 AND(MID$(LO$(LO),PO+
  1,1)<>"X" AND MID$(LO$(LO),PO+1,
  1)<>"0") THENX2=X2+16:PO=PO+1:D3
  =1
```

```
38 IF Y1<1 AND(MID$(LO$(LO),PO-1
  6,1)<>"X" AND MID$(LO$(LO),PO-16
  ,1)<>"0") THENY2=Y2-16:PO=PO-16:
  D1=1
```

```
39 IF Y1>30 AND(MID$(LO$(LO),PO+
  16,1)<>"X" ANDMID$(LO$(LO),PO+16
  ,1)<>"0") THENY2=Y2+16:PO=PO+16:
  D2=1
```

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```
40 IFOP>RO AND X2<X3 AND MID$(LO
$(LO),PY-1,1)<>"X" AND MID$(LO$(
LO),PY-1,1)<>"0" THENX3=X3-16:PY
=PY-1:OP=0:D8=1
```

```
41 IF OP>RO ANDX2>X3 AND MID$(LO
$(LO),PY+1,1)<>"X" AND MID$(LO$(
LO),PY+1,1)<>"0" THENX3=X3+16:PY
=PY+1:OP=0:D7=1
```

```
42 IF OP>RO AND Y2<Y3 AND MID$(L
O$(LO),PY-16,1)<>"X" AND MID$(LO
$(LO),PY-16,1)<>"0" THEN Y3=Y3-1
6:PY=PY-16:OP=0:D5=1
43 IFX2=X3 AND Y2=Y3 THEN59
```

```
44 IF OP>RO ANDY2>Y3 AND MID$(LO
$(LO),PY+16,1)<>"X" AND MID$(LO$(
LO),PY+16,1)<>"0" THEN Y3=Y3+16
:PY=PY+16:OP=0:D6=1
```

```
45 X5=X2:Y5=Y2
46 IFD1=1 THEN Y5=Y2+16
47 IFD2=1 THEN Y5=Y2-16
48 IFD3=1 THEN X5=X2-16
49 IFD4=1 THEN X5=X2+16
```

```
50 PUT(X5+2,Y5+2)-(X5+12,Y5+14),
B2
```

```
51 X5=X3:Y5=Y3:IFD5=1 THEN Y5=Y3
+16
52 IFD6=1 THEN Y5=Y3-16
53 IFD7=1 THEN X5=X3-16
54 IFD8=1 THEN X5=X3+16
55 PUT(X5,Y5)-(X5+11,Y5+16),B1
```

```
56 IF MID$(LO$(LO),PO,1)=CHR$(32
) THEN DRAW"BM"+STR$(X2+2)+"~"+S
TR$(Y2+2)+"~";C1R1D1R1D1R1D1R1D1R1
D1R1D1R1D1R1D1R1D1R1D1R1D1R1D1R1
D1R1D1R1D1R1D1~:MID$(LO$(LO),PO,
1)~"Q~":PLAY"05T255L4CP4DP4FP4~":F
T=FT+1:SC=SC+5:IFFT=MX(LO) THENL
O=L0+1:FT=0:GOTO17
57 GOTO 31
```

```
58 CLS:PRINT"GOOD JOB! YOU COMPL
ETED ALL 16 LEVELS! YOU ARE PA
ID ~";SC:PRINT"DOLLARS FOR YOUR T
IME!~":END:RUN
```

```
59 ML=ML+1:CLS:PRINT"TILER'S LEF
T- ~";3-ML
60 IF ML=3 THEN 63
```

```
61 PRINT:PRINT:PRINT"PRESS FIRE
TO CONTINUE"
```

```
62 IF(PEEK(65280) AND 3)=2 THEN
17 ELSE 62
```

```
63 CLS:PRINT"FIFI GOT RID OF YOU
.~":PRINT:PRINT:PRINT"YOU HAD ~";S
C;"DOLLARS.~"
64 END:RUN
```

```
65 DATA XXXXXXXXXXXXXXXXXXXX X X
XX XXX XXXX XXX XX X X
X XX XXXXXX X XXXXX
XX XX X X X XXXX XXXXX
XXXX XX X X X XX XXX XX
XXXXXX XX XXXXXXXXXXXX
XXXXXXXXX,84
```

```
66 DATA XXXXXXXXXXXXXXXXXXXX
XX XXXXX XXXXX XX XXX X
X XX X X XX X XXX XX X X XX
X X XX X X XX X XX XXX X X XX
XX X XX X X XXXX XXXXXX
XX X X XX X XXXXXXXXXXXX
XXXXXXXXX,81
```

```
67 DATA XXXXXXXXXXXXXXXXXXXX X X X
X X X XX X X X X X X XX X X X
X X X XX XX XXXXXX
XXXXXX XX X X XX XXXXXX
XXXXXXXXXX XX X X X
X X X XX X X X X X XXXXXXXXXXXX
XXXXXXXXX,84
```

```
68 DATA XXXXXXXXXXXXXXXXXXXX
XX XXXX XXXX XX XX X X
XX XX XX XXX X XX X X
XXXXXX X X X XXXXX X X
XXX X XX X X X X XX X XXX
XX X XX X XXXXXXXXXXXX
XXXXXXXXX,91
```

```
69 DATA XXXXXXXXXXXXXXXXXXXX X
X X X XX XXXXXX X X X XX X
X X X XX XXXX X X XX X
X X X XXXX XXXX X X X XX X
X X XXX XXXXX X X X XX X X
X X X XX X X X X XXXXXXXXXXXX
XXXXXXXXX,83
```

```
70 DATA XXXXXXXXXXXXXXXXXXXX X
X X XX X X X X XXX XX XXX X
XX XX XXXXXX XXX X
XX X XX X X X X XXX XX X X X
X XX X X X X XXX XX X X X
X X X XX X X X XXXXXXXXXXXX
XXXXXXXXX,86
```

71 DATA 0000000000000000
 00 XXXXXX XXXXX 00 X
 X X 00 X XX X XXX X 00 XXX
 X 00 X X X X 00 X XX X
 XXX X 00 X X X 00 XXX XX
 XXX XX 00 00000000
 00000000,88

72 DATA 0000000000000000 0 0
 00 000 0 000 00 00 0
 0 0 00 0000 0 0 0 0 00 0 0
 0 0 0 0000 0000 0 0 0 00 0
 0 0 00 000000 0 0 0 00 0 0 0
 0 0 0 00 0 00000000
 00000000,85

73 DATA XXXX0000XXXX0000X
 XX XXX 000 XXXX XX 0 0
 X XX X X X XX000000
 000 X XX X XXXX0000000
 XXX XX X X X XXXX XXXXXX
 X 0 0 00 0 0000XXXX
 0000XXXX,86

74 DATA X0X0X0X0X0X0X0
 00 000000000000 00 0
 00 0 XXXXXXXX 0 00 0 X X
 0 00 0 X X X 0 00 0 X XX
 XXXX 0 00 0 0 00 0 0000
 000000 00 00X0X0X0X
 0X0X0X0X,86

75 DATA XXXXXXXX00000000X
 0 OXXXX XXX 0 000 OX X X
 0 0 0 OX X XXXX 0 0 0 OX X
 0 0 OX XXXX X00 000 OX
 OX XXXX X00000000X X X
 0 0 OX X X 0 OXXXXXXX
 00000000,84

76 DATA XXXXXXXXXXXXXXXXXXXX
 XX X X XX X X XX XXXX X
 X XXXX XX X XX X XX XXXXXX
 XXXXXX XX XXXXXXXXXXXXXX XX X X
 X X XX XXXX XX XXXX XX X X X
 X X X XX XXXXXXXXXXXX
 XXXXXXXXXXX,76

77 DATA 0000000000000000 0
 00 0 000 00 000000
 00 000000000000 000 0
 00 00 X X X 00 0 XXX
 XXX XX00 00 00 OXXXX
 XXXXXX 00 000000000
 00000000,88

78 DATA XXXXXXXXXXXXXXXXXXXX
 XXXX XXX X XXXX XX X X XX

X X XX XX XXXXX XXX
 XXXXX XX X X X X X X XX X X X
 X X X XX XX X X X X X XX X X X
 X X X XX X X XXXXXXXX
 XXXXXXXX,84

79 DATA 0000000000000000X X
 X0 0000 00000000X X X
 X X0 0 000 0 0000 OX
 X X X X0 0 0 OX X XXX
 XXXXXX X0 0 0 OX XXXXX
 XXXXXXXX0 0 OXXXXXXX
 XXXXXXXX,85

80 DATA 0000000000000000
 00 XXX XXX X X 00 X X
 X X XX 00 X X X X X X00 XXX X
 X X X X00 X X X X X X00 X X
 X X X X00 X X X X X 00 XXX X
 XXX XX 00 00000000
 00000000,86

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COCO III

FANCY COLORS

by

John Galus

If you own a Color Computer III, you probably know by now, that you can choose up to 16 colors out of a possible 64 in the HSCREEN2 mode using the PALETTE command. The syntax for the PALETTE instruction is the command PALETTE followed by the palette register you wish to use (0-15), then the color code of 0-63. These 16 palette registers are located at \$FFB0 to \$FFBF. Storing a number from 0-63 at one of these addresses is the same as using the PALETTE command. Each Palette register uses only 6 bits (0-5) for the 64 color combinations. In the hi-resolution screens two registers are used as FOREGROUND & BACKGROUND registers.

```

PALLETTE REGISTER #
TEXT SCREEN
FORE    BACK
  8      0

HIGH-RES
  1      0

```

For example, if we wanted a screen with a black background we would store a zero (color code for black) into palette register zero as follows:

```
PALETTE 0,0
```

The low resolution modes uses the fore & background registers in a different way. Look at pages 299 & 301 for more information on these. Actually, on any color TV or monitor there are only three possible Primary colors that can be displayed by the set, RED, BLUE, & GREEN (RGB monitors). All other colors are only mixtures of these primary colors in different amounts. In other words they are illusionary

colors.

We can even create more than 64 colors by altering the display angles to get artifact colors like we did on the older color computers. After choosing the colors we want to place in our palette registers, we use them with the HCOLOR command. This command specifies the current palette register (0-15) that will be used as the foreground and background. By changing the foreground color we can display objects of different colors on the screen. The Basic ROM uses addresses \$FEOA for the foreground color and \$FEOB for the background. When displaying something on the screen it examines these addresses and uses the values placed here either by the HCOLOR or POKE command to display that particular color. The Color Computer III can display colors on a regular TV, a composite monitor or a RGB monitor. When the computer is first turned on the color codes that corresponds to the standard color set for the composite monitor are stored into the Palette registers. To get the correct colors for a RGB monitor all you need do is type PALETTE RGB.

The colors placed into the registers are the usual colors of GREEN, YELLOW, BLUE, RED, BUFF, CYAN, MAGENTA, ORANGE, & BLACK. To obtain other interesting colors you must experiment with placing different values in the Palette registers to see what color is displayed on the screen. There is a place on page 295 of the manual to record the colors you find.

Now let's look at a few of the other new features and commands of the COCO III. First you will notice four new keys which are F1, F2, ALT, & CTRL.

Although these keys were mainly added for use with the OS-3 operating system, they can be used by in normal Basic. Here are the ASCII values of these keys:

Key	ASCII Value
F1	103
F2	4
ALT	64 CTRL 189

For example to poll for the F1 key we could do the following in Basic.

```
10 I$=INKEY$:IF I$=""THEN 10
20 IF I$=CHR$(103) THEN
CLS:?"F1 KEY WAS PRESSED."
30 GOTO10
```

Another useful new command is the BUTTON instruction. No longer must we have to remember a Peek address when using the Joystick buttons. In fact, the COCO III can now handle joysticks that have two buttons. The BUTTON command returns a 1 if pressed and a 0 if not. The new button numbers are as follows:

```
BUTTON:
0 RIGHT BUTTON 1 FOR SINGLE BUTTON JOYSTICK.
1 RIGHT BUTTON 2
2 LEFT BUTTON 1 FOR SINGLE JOYSTICK.
3 LEFT BUTTON 2
```

We also, have all the graphic commands, such as LINE, GET, PUT, DRAW, & CIRCLE that have been implemented for the new machine. Many of them use a similar syntax so that those of us that are familiar with the older Color Computer's commands can quite easily begin working with the new computer. Thanks Microware! There are many other things that can be discovered with this powerful new computer. I have just scratched the surface and tried to give you a running start. The rest is up to you.

One thing I must say is that Tandy did a great job in main-

taining compatability with the old COCO's, while many companies were abandoning their people who made them what they are today. I just hope that Radio Shack continues in its winning ways and continues to support all makes and models of the Color Computer. Only one thing that I thought they should have been added to the new computer was a Sound Chip! Well maybe it will be in the COCO IV, who knows. If you wish to find out more on the COCO III for yourself here is a list of good reference books on the subject and if you have any specific questions concerning any of the material presented in this series drop me a line. Be sure to include a Self Addressed Stamped Envelope if you want a reply. Back issues of this series are available from DYNAMIC COLOR NEWS. Write or look in this issue for further information.

REFERENCES:

ASSEMBLY LANGUAGE PROGRAMMING for the COCO 3: An ADDENDUM by LAURENCE TEPOLT Published by

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COCO III COLOR GRAPH

from
Bill Bernico Software

This program will allow you to form a pie-graph for data. The pie is divided and shows the relative values of each data element. This program is provided by Bill Bernico Software and is used by permission.

```
1 'COCO 3 COLOR GRAPH (C) 1988
  FROM BILL BERNICO SOFTWARE
```

```
2 WIDTH32:INPUT~HOW MANY PIECES
(1-16)~;P:IFP>16THEN2ELSE DIMS(P,
14):P=P-1:CLS:FORJ=0TOP:PRINT~VA
LUE FOR PIECE #~;J+1;:INPUTT:S(J
,13)=S(J,13)+T:NEXTJ:HSCREEN2:HC
LS4:HCOLOR8,4:HPRINT(8,1),~BERNI
CO SOFTWARE PRESENTS~:HLINE(0,21
)-(319,34),PSET,BF
```

```
3 HCOLOR3:HPRINT(1,3),~COCO 3 CO
LOR PIE GRAPH by Bill Bernico~:H
DRAW~BM233,55C8D128R15U128L15~:F
ORV=1TO16:HDRAW~NR15D8~:NEXTV:FO
RTX=7TO22:HPRINT(19,TX),~PIECE #
~+STR$(TX-6):NEXTTX:GOSUB6:K=0:F
ORJ=0TOP:K=K+S(J,13):NEXTJ:FORJ=
0TOP:S(J,14)=S(J,13)/K
```

```
4 NEXTJ:X=76:Y=115:F=0:FORJ=0TOP
:S=F:F=F+S(J,14):HCIRCLE(X,Y),75
:HLINE(X,Y)-(X+74*COS(6.283*S),Y
+74*SIN(6.283*S)),PSET:HLINE(X,Y
)-(X+74*COS(6.283*F),Y+74*SIN(6.
283*F)),PSET:HPAINT(X+68*COS(6.2
83*((F+S)/2)),Y+68*SIN(6.283*((F
+S)/2))),J,8:NEXTJ
```

```
5 HCOLOR2:HPRINT(35,12),~HIT~:PL
AY~02T5B~:HPRINT(35,14),~ANY~:PL
AY~03B~:HPRINT(35,16),~KEY~:PLAY
```

```
~04B~:EXEC44539:CMP:RUN
```

```
6 PALETTE7,52:PALETTE9,56:PALETT
E10,32:PALETTE11,20:PALETTE12,41
:PALETTE13,12:PALETTE14,60:PALET
TE15,48:Q=240:HPAINT(Q,58),0,8:H
PAINT(Q,66),1,8:HPAINT(Q,74),2,8
:HPAINT(Q,82),3,8:HPAINT(Q,98),5
,8:HPAINT(Q,106),6,8:HPAINT(Q,11
4),7,8
```

```
7 HPAINT(Q,122),8,8:HPAINT(Q,130
),9,8:HPAINT(Q,138),10,8:HPAINT(
Q,146),11,8:HPAINT(Q,154),12,8:H
PAINT(Q,162),13,8:HPAINT(Q,170),
14,8:HPAINT(Q,178),15,8
```

```
8 IFP=1THENCL=72ELSEIFP=2THENCL=
80ELSEIFP=3THENCL=88ELSEIFP=4THE
NCL=96ELSEIFP=5THENCL=104ELSEIFP
=6THENCL=112ELSEIFP=7THENCL=120E
LSEIFP=8THENCL=128ELSEIFP=9THENC
L=136ELSEIFP=10THENCL=144ELSEIFP
=11THENCL=152ELSEIFP=12THENCL=16
0ELSEIFP=13THENCL=166C8
```

```
9 IFP=14THENCL=176ELSEIFP=15THEN
CL=184ELSEIFP=16THENRETURN
```

```
10 HLINE(151,CL)-(250,184),PRESE
T,BF:RETURN
```

NOTE: We have modified the way we list programs so that they will be printed the way they would appear on your CoCo 2 or CoCo 3 in the 32 column mode. For lines greater than 32 characters we now leave a blank line before listing the line.

ASSEMBLY LANGUAGE

by
Doug Canfield

Last month Bill introduced us to the types of instructions that the 6809 microprocessor uses, and to the various different addressing modes. I will try to maintain continuity as I expand on what he has begun.

Programming in assembly language is not in concept much different than programming in any language; we have the same objectives in all of them. As a programmer, you realize that your program must accomplish three basic things:

- 1) Taking in information.
- 2) Processing information.
- 3) Outputting information.

What makes assembly language different, is that you must know a lot more about the internal working of your computer to accomplish these three tasks. To make a good illustration, lets think about what is required to type a character to the screen. We must generate a cursor to keep track of our place. When a key is pressed we must figure out which one it was, and know which number it is equivalent to. We must place that number in the right place in memory, so that it will appear as a character on the screen. We must update the cursor's position, keep track of the ends of lines, when to scroll the screen up, etc...

None of this is difficult, but there are a lot of things like this to remember when programming in assembly language. Fortunately, most of this type work has been done for us. All of the codes required to do

this are already in the BASIC ROM chip, and we can either jump into BASIC, and let it take care of all these things when speed is not important, or we can use these routines ourselves from within our own programs. With this background, I'd like to take a more detailed look at how the 6809 can help us reach these ends.

A computer with its microprocessor is a device that only works with numbers. It can add them, subtract them, multiply them, compare them, store them in memory, and get them from memory. The 6809 interprets some numbers as instructions, and some numbers as data. We must make sure it gets what it expects.

When the 6809 begins to execute a program, the first number it encounters will be interpreted as an instruction. If the instruction requires more data then it will look to the subsequent numbers to get the data it needs. After it gets all of the data it needs for that instruction, then it expects the next number to be another instruction, and so on... Lets take a closer look at last week's sample program to print "NEW" on the screen.

1	2	3	4	5
\$7530	86	4E	LDA	#\$4E
\$7532	B7	0400	STA	\$0400
\$7535	86	45	LDA	#\$4E
\$7537	B7	0401	STA	\$0401
\$753A	86	57	LDA	#\$57
\$753C	B7	0402	STA	\$0402
\$753F	86	60	LDA	#\$60
\$7541	B7	0403	STA	\$0403
\$7544	39		RTS	

I've rearranged the program a little from last week. Column 1 is the memory location in Hex notation. Columns 2 and 3 are the Hex contents of this location, and usually a few after it. Columns 4 and 5 show the mnemonics for the program. The \$ sign is used to indicate that the data is in hexadecimal.

After loading in the program, and typing "EXEC", \$7530 is placed in the 6809's PC (Program Counter) register. This makes the 6809 look in memory location \$7530 (30000 in decimal) to find its first instruction. When it sees an \$86, it knows to put what is contained by the next memory location (\$4E) into its A register.

-When the microprocessor uses the next address in memory to get the data it needs, this is called "Immediate addressing". We use immediate addressing when we know ahead of time what the numbers will be that we will use in our program.

Having loaded \$4E into its A register, the 6809 then looks to the next address to find the second instruction. (The program counter is incremented once for each of these operations, it would now contain \$7532 to point it to the second instruction.) The next instruction is a \$B7. This is the code for the STA instruction -"STore the byte in the A register", so the microprocessor knows to look to the next two bytes for the location of where to store whatever is in the A register. These two bytes are \$04 & \$00, the 6809 places these "side-by-side" internally and knows to store the A register in \$400. The \$04 is known as the "most significant" byte, and the \$00 is the "least significant" byte. \$400 (1024 Decimal) is the beginning of the area in memory that the Coco normally sets aside for the

"Text" screen. \$4E is the ASCII code for "N" so the Coco has just put an "N" in the upper left hand corner of the screen. The program repeats these steps until the 6809 encounters the \$39 for an instruction, which is the code for RTS -"ReTurn from Subroutine". This tells the computer to return to whatever it was doing before it started this program. For most of our purposes this will jump us back to BASIC.

Next month we will look at some changes to make to this little program that will illustrate some other forms of addressing, and if space permits, we will look at how to branch to another place in the program.

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ADVENT	DOC 1 A 2
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SQUASH	BIN 2 B 2
BLOCKADE	BIN 2 B 2
GERM	BIN 2 B 1
WIGHORN	BIN 2 B 2
GRID	BIN 2 B 2
ZEROG	BIN 2 B 2
3DICTAC	BIN 2 B 7
HOPBOP	BIN 2 B 5
ICEWAR	BAS 0 B 6
CIVILWAR	BAS 0 B 4
TICTACTO	BIN 2 B 7

* PD-5 GAMES

MENU	BAS 0 B 1
CAVE	BAS 0 B 4
WARGAME	BAS 0 B 2
WARGAME	BIN 2 B 1

KERMIT	BAS 1 A 1
KERMIT	BIN 2 B 2
HAYESAE	BIN 2 B 4
HAYESAE	DOC 1 A 6

PD-10

COLOR COMP. FORTH

MENU	BAS 0 B 1
FORTHMAN	UL1 2 B 7
FORTHMAN	UL2 2 B 7
FORTHMAN	UL3 2 B 1
FORTH	BIN 2 B 3
EDIT	DAT 1 A 3
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1940S	SET 2 B 1
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FANCY	SET 2 B 1
GREEK	SET 2 B 1
GREEKU	SET 2 B 1
HEBREW	SET 2 B 1
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PD-13

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PICTURES GCM 1 B 68

PD-14

GRAPHICON PICTURE DISK-2. REQUIRES PIXFILES/BAS FROM PD-12 & JOYSTICK

PICTURES GCM 1 B 68

PD-15

GRAPHICON PICTURE DISK-3 REQUIRES PIXFILES/BAS FROM PD-12 & JOYSTICK

PICTURES GCM 1 B 68

PD-16

GRAPHICON PICTURE DISK-4 REQUIRES PIXFILES/BAS FROM PD-12 & JOYSTICK

PICTURES GCM 1 B 68

PD-17 DISK UT.

64KBHW	BAS 0 A 1
AUTOSTRT	BAS 0 B 1
BAKDIR	BAS 0 A 3
BIN,BAS	BAS 0 A 1
CASSLABL	BAS 0 B 1
CURSOR	BAS 0 B 1
CUSTOM	BAS 0 B 3
CUSTOMIZ	BAS 0 B 1
DIR	BIN 2 B 1
DIR32	BAS 0 A 2
DIR32C	DOC 1 A 3
DIRLISTR	BAK 0 B 1
DIRLISTR	BAS 0 B 1

PD-18 TAPE TO DISK DISK UTILITIES

DIRSORT	BAS 0 A 1
DISK-DIR	BAS 0 A 1
DISKLABL	BAS 0 A 1
LOADSOLU	BAS 0 B 1
MENU	BAS 0 B 1
PDIR	BAS 0 A 1
SORT	BAS 0 B 1
SORTPRT	BAS 0 B 1
SORTSAVE	BAS 0 A 1
SOUTLION	BIN 2 B 1
SUPERBAC	BIN 2 B 1
T2D	BIN 2 B 2
TIMER	BAS 0 B 1
TPTODSK	BIN 2 B 1

* PD-19 GAMES

3DMAZE	BAS 0 A 2
BOXES	BAS 0 B 1

CLOSE EN	BAS 0 B 2
CRITICAL	BAS 0 B 1
GAMMON	BAS 0 B 3
GOLDMINE	BAS 0 A 3
HOCKEY	BAS 0 A 1
HOGJOWL	BAS 0 A 8
HORSERAC	BAS 0 A 3
JUMPING	BAS 0 B 1
KALIDESC	BAS 0 B 1
MASTMIND	BAS 0 B 1
MEMORY	BAS 0 B 1
MOONBASE	BAS 0 B 2
NAMES	BAS 0 B 4
OTHELLO	BAS 0 B 4

* PD-20 GAMES

PEG	BAS 0 B 3
RABBIT	BAS 0 B 1
SAFE	BAS 0 B 2
SAUACER	BAS 0 B 1
SHOOTEM	BAS 0 B 2
SIMMON	BAS 0 A 1
SLITHER	BAS 0 A 2
SPACE WA	BAS 0 B 4
STAR TRE	BAS 0 B 1
SUBCHASE	BAS 0 B 2
SUBDESTR	BAS 0 B 2
SUNDANCE	BAS 0 B 2
TANKS	BAS 0 B 2
TOWER	BAS 0 B 2
UNDROVER	BAS 0 B 1

PD-21 MUSIC

PLAY MUSIC THROUGH YOUR TV OR MONITOR. COMPOSE, EDIT MUSIC.

ORCH	BIN 2 B 8
ORCH	DOC 1 A 3
OCNVRT	BIN 2 B 2
GHOSTBUST	MUS 4 M 3
STELMO	MUS 4 M 2
MASH	MUS 4 M 2
BOND1	MUS 4 M 2
2001	MUS 4 M 2
ARIA	MUS 4 M 2
INVENTI	MUS 4 M 1
BATTSTAR	MUS 4 M 2
BOND2	MUS 4 M 2
CLOSENCT	MUS 4 M 2
SCARBORO	MUS 4 M 1
FUGUEINC	MUS 4 M 1
MINUET	MUS 4 M 1
LONGTIME	MUS 4 M 2
MESSIAH	MUS 4 M 3

* PD-22 MUSIC-1

LOADM "NAME/MUS"	
EXEC TO PLAY MUSIC	
THROUGH TV OR MON.	
ADDPLAY	BAS 0 B 1
DEPLAY	BAS 0 B 1
MSQUEZ	BAS 0 B 2
ALSOSSPAK	MUS 2 B 5
BOOGIE	MUS 2 B 5
CIRCUS	MUS 2 B 5
CLOWN	MUS 2 B 2
CLOWNS	MUS 2 B 4
HAYDEN	MUS 2 B 8
JBGOD	MUS 2 B 4
PEACE	MUS 2 B 2
PEACH	MUS 2 B 5
PUFF	MUS 2 B 6
GOODIEY	MUS 2 B 4

* PD-23 MUSIC-2

LOADM "NAME/MUS"
EXEC TO PLAY MUSIC
THROUGH TV OR MON.

ADDPLAY BAS 0 B 1
DEPLAY BAS 0 B 1
MSQUEZ BAS 0 B 2
RAIN MUS 2 B 2
SONATA3 MUS 2 B 3
STRAV MUS 2 B 4
FOGGY MUS 2 B 4
FUNERAL MUS 2 B 3
HARDDAY MUS 2 B 2
INVENT MUS 2 B 2
INVENT11 MUS 2 B 3
INVENT15 MUS 2 B 3
INVENT7 MUS 2 B 3
INVENT8 MUS 2 B 2
JOPLIN MUS 2 B 4
KHAN MUS 2 B 6

* PD-24 MUSIC-3

LOADM "NAME/MUS"
EXEC TO PLAY MUSIC
THROUGH TV OR MON.

ADDPLAY BAS 0 B 1
DEPLAY BAS 0 B 1
MSQUEZ BAS 0 B 2
PEANUTS MUS 2 B 3
ROCK MUS 2 B 5
ROXANNE MUS 2 B 5
SCHERZO MUS 2 B 2
TEACH MUS 2 B 2
PIANOMAN MUS 2 B 5
STRANGER MUS 2 B 5
CAMELOT MUS 2 B 4
CHACONNE MUS 2 B 6
DIAMOND MUS 2 B 3
DOWNROAD MUS 2 B 4
FANTASY1 MUS 2 B 2

* PD-25 MUSIC-4

LOADM "NAME/MUS"
EXEC TO PLAY MUSIC
THROUGH TV OR MON.

FANTASY2 MUS 2 B 3
GRENGRAS MUS 2 B 4
HUMOR MUS 2 B 4
INCROW MUS 2 B 3
STARWARS MUS 2 B 2
SUITEGM MUS 2 B 6
SUPERMAN MUS 2 B 2
WHENIM64 MUS 2 B 4
ROOTBEER MUS 2 B 7
WAYUARE MUS 2 B 3
AXELF MUS 2 B 2
TOCATTI MUS 2 B 3

* PD-26 LAST WILL

LOAN BAS 0 B 1
LASTWILL BAS 0 B 6
IMEGA BAS 0 B 3
AWARI BAS 0 B 1
BACARAT BAS 0 B 2
BAGELS BAS 0 B 1
BLACKJAC BAS 0 B 1
CHUCK BAS 0 B 1
CONCENTR BAS 0 B 1
CUBES BAS 0 B 2

* PD-27 GAMES

DEFUZE BAS 0 B 1
DR ZEE BAS 0 B 1

FLIPFLOP BAS 0 B 1
GO-FISH BAS 0 B 2
HANGMAN BAS 0 B 2
HIGHLOW BAS 0 B 1
JACKPOT BAS 0 B 1
KEYS BAS 0 B 1
L E M BAS 0 B 3
LUNARLD BAS 0 B 2
NUMBERS BAS 0 B 1
OBSTACLE BAS 0 B 1
POOLGAME BAS 0 B 4
RETURN BAS 0 B 1
REVERSI BAS 0 B 2
STARTREK BAS 0 B 2
TTREK BAS 0 B 3

PD-28 COMM.CC-TALK
BBS, TERM

BBS'S DAT 1 A 1
CCT IO 2 B 1
CCTALK BAS 0 B 1
CNFG4OV1 BAS 0 A 5
CNFG4OV2 BAS 0 A 4
CTLKEY BAS 1 A 1
MTERM1 DOC 1 A 11
MTERM2 DOC 1 A 8
MTERMA0 BIN 2 B 8
REDIAL BAS 0 A 1
PACREDIA BAS 0 A 1

PD-29 COMM, WORD
PRO, GAMES

GOSTSHIP BAS 0 B 8
INT RATE BAS 0 B 2
INVTANL PC 0 B 4
MENU BAS 0 B 4
MOTOJUMP BAS 0 B 3
SCREEN MAX 2 B 6
SCREEN1 BIN 2 B 3
SCREEN2 BIN 2 B 3
SCREEN2 MAX 2 B 6
STRINGTU BAS 0 B 4
TTERM DSK 2 B 4
TTHELP DAT 1 A 4
USING BAS 0 B 3
WF-DOC JP 0 B 2
WORDFILE JP 0 B 4
PARM1 DAT 1 A 1

PD-30 CHECK BOOK,
UTILITIES

CHECKBOK BAS 0 B 4
CHECKBOK DOC 1 A 9
DIRR CMD 2 B 1
DVIEW BAS 0 B 1
FILEMAID BAS 0 B 2
LISTER BAS 0 B 1
PAINTPOT BAS 0 B 4
SCREEN MAX 2 B 6
SCREEN1 BIN 2 B 3
SCREEN2 BIN 2 B 3
SCRENE2 MAX 2 B 6
SPECZAP BAS 0 B 5
TAPETYPE BIN 2 B 1
TTERM DSK 2 B 4
DVIEW DSK 0 B 1
MENU BAS 0 B 4

PD-31

PIRATES TREASURE. As you explore the cave looking for the treasure, a picture appears on the screen as you go from room to room.

These pictures are loaded from disk. A computer with disk drive is required.

PD-32

Color Computer 3 moving pictures. Consists of a beautiful waterfall and a colorful bouncing ball.

WATRFALL BAS 0 B 1
WATRFALL BIN 2 B 1
WATRFALL MGE 1 B
BALL BAS 0 B 1
BALL2 BAS 0 B 1
BOUNCE BIN 2 B 1
BALL2 HR1 2 B 4
BALL2 HR2 2 B 4
BALL2 HR3 2 B 4
BALL2 HR4 2 B 4

* PD-33

EDUCATIONAL PROGRAMS

ABBREV BAS 0 B 4
ABCPPOP BAS 0 B 3
ALPHAAL BAS 0 B 1
EDUCATE BAS 0 B 1
HANGP BAS 0 B 1
HOMONYM BAS 0 B 1
SPELWORD BAS 0 B 1
MATH BAS 0 B 2
DRILL BAS 0 B 2
MLTP BAS 0 B 1
ROUND BAS 0 B 2
AREA BAS 0 B 5
METCONV BAS 0 B 3
NUMBERS BAS 0 B 2
SIEVE BAS 0 B 1

* PD 35

ADDRESS FILES AND
FINANCE PROGRAMS

PHONE BAS 0 B 1
LABELPRT BAS 0 B 1
LETTER BAS 0 B 3
MAILST BAS 0 B 2
PHONLST BAS 0 B 1
MINIWORD BAS 0 B 2
LNWIDTH BAS 0 B 1
CHKWRITE BAS 0 B 2
CHKANAL BAS 0 B 4
PRNTCHK BAS 0 A 1
CHECKS BAS 0 B 4
CHKSTUB BAS 0 B 1
TOTALS DAT 1 A 1
CHECKS DAT 1 A 1
GRAPH BAS 0 B 4
LOAN BAS 0 B 3
CALC BAS 0 B 1
PAYMENT BAS 0 B 1
CASHJNL BAS 0 B 3
AMORT BAS 0 B 3

* PD 36

COMP.SCIENCE PGMS 1
These programs are tutorials on basic programming.

COMPSC1 BAS 0 B 8

COMPSC2 BAS 0 B 3
COMPSC3 BAS 0 B 9
COMPSC4 BAS 0 B 5
COMPSC5 BAS 0 B 9
COMPSC6 BAS 0 B 5
GETPUT BAS 0 B 2

* PD 37

COMP.SCIENCE PGMS 2

These programs are tutorials on basic programming.

IFTHEN BAS 0 B 9
EXTENDED BAS 0 B 2
GETPUT BAS 0 B 2
COMPSC18 BAS 0 B 8
COMPSC19 BAS 0 B 5
COMPSCI7 BAS 0 B 7
EXTDEMO BAS 0 B 3

* PD 38

EDUCATIONAL PGMS
These programs are excellent learning tools for school children.

ABBREV BAS 0 B 4
ABCPPOP BAS 0 B 3
ALPHAAL BAS 0 B 1
EDUCATE BAS 0 B 1
HANGP BAS 0 B 1
HOMONYM BAS 0 B 1
SPELWORD BAS 0 B 2
MATH BAS 0 B 2
DRILL BAS 0 B 2
MLTP BAS 0 B 1
ROUND BAS 0 B 2
AREA BAS 0 B 5
METCONV BAS 0 B 3
NUMBERS BAS 0 B 2

* PD 39

ADDRESS FILES AND
FINANCE PROGRAMS

PHONE BAS 0 B 1
LABELPRT BAS 0 B 1
LETTER BAS 0 B 3
MAILST BAS 0 B 1
WORDPROC BAS 0 B 3
MAILST BAS 0 B 2
PHONLST BAS 0 B 1
MINIWORD BAS 0 B 2
LNWIDTH BAS 0 B 1
CHKWRITE BAS 0 B 2
CHKANAL BAS 0 B 4
PRNTCHK BAS 0 A 1
CHECKS BAS 0 B 4
CHKSTUB BAS 0 B 1
TOTALS DAT 1 A 1
CHECKS DAT 1 A 1
GRAPH BAS 0 B 4
LOAN BAS 0 B 3
CALC BAS 0 B 1
PAYMENT BAS 0 B 1
CASHJNL BAS 0 B 3
AMORT BAS 0 B 3

PD-40

TAPE-DSK & DSK-TAPE
With these programs you can copy a disk to tape or a tape to disk.

T2D BIN 2 B 2
DTCOPY BIN 2 B 1
DSK-TP BAS 0 B 1
DISKLIST BAS 0 B 1
DIRLIST BAS 0 B 2
DISKDUMP BAS 0 B 1
CASSDIR BAS 0 B 1

* PD-41

Picture files

STAMPS MAX 2 B 3
STARTREK MAX 2 B 3
ST-TREK2 MAX 2 B 3
SCHOOL MAX 2 B 3
SATURN MAX 2 B 3
ESCHER MAX 2 B 3
LABOR MAX 2 B 3
MASK MAX 2 B 3
BUG BOX MAX 2 B 3
SPACE MAX 2 B 3
EASTER MAX 2 B 3
SPACE 2 MAX 2 B 3
POPEYE MAX 2 B 3
GARFIELS MAX 2 B 3
BEETLE B MAX 2 B 3
POLO MAX 2 B 3
HAGAR MAX 2 B 3
X-PAD MAX 2 B 3
CASTLE MAX 2 B 3
MUSIC TV MAX 2 B 3
COCO MAX 2 B 3

* PD-42

Picture files

TITLES MAX 2 B 3
PIXFILES BAS 0 B 3
THOLIAN MAX 2 B 3
3001AD MAX 2 B 3
F15 MAX 2 B 3
QUEEN MAX 2 B 3
BRONCOS MAX 2 B 3
STARTRK MAX 2 B 3
ROOM MAX 2 B 3
RAMBO MAX 2 B 3
OWL MAX 2 B 3
ENTERPR MAX 2 B 3
STAR-T3 MAX 2 B 3
NCC-1701 MAX 2 B 3
SAT-2 MAX 2 B 3
ATMOSP MAX 2 B 3
STARWARS MAX 2 B 3
ORIENTAL MAX 2 B 3

* PD-43

Picture files

STAMP MAX 2 B 3
STRIPE MAX 2 B 3
WOMAN MAX 2 B 3
BLUEJAY MAX 2 B 3
LUCY MAX 2 B 3
OLD ENG MAX 2 B 3
MENU1 MAX 2 B 3
OWL MAX 2 B 3
VAN GOG MAX 2 B 3
WOMAN1 MAX 2 B 3
PSH MAX 2 B 3
DUCKPOND MAX 2 B 3
RANGER MAX 2 B 3
PLANET MAX 2 B 3
CHRSTMAS MAX 2 B 3
PEACE MAX 2 B 3
WOMAN3 MAX 2 B 3
HAWK MAX 2 B 3
PHASER MAX 2 B 3
PIXFILES BAS 0 B 3

PD-44
Terminal pgm with
documentation. This
will work with the
CoCo-3. Instruc-
tions are included.

MTRM43 BIN 2 B 8
CONFIG43 BAS 0 B 4
MTSTART BAS 0 B 4
MTERM1 DOC 1 A 11
MTERM2 DOC 1 A 8
MTERM3 DOC 1 A 7
DOS BOOT DAT 1 A 1
" " 0 B 1
** " 1 A 1
READD0C BAS 0 B 1

* PD-45
Picture Files

DRAGON MAX 2 B 3
HOT LIPS MAX 2 B 3
ANIMALS MAX 2 B 3
CLOWN F MAX 2 B 3
FISH MAX 2 B 3
3 MEN MAX 2 B 3
S MAP MAX 2 B 3
BUGS MAX 2 B 3
CFISH MAX 2 B 3
HERO MAX 2 B 3
WMAP MAX 2 B 3
GSCOTT MAX 2 B 3
STATES MAX 2 B 3
HORSE MAX 2 B 3
CROSS MAX 2 B 3
FOODW MAX 2 B 3
RSTONE MAX 2 B 3
COCO MAX 2 B 3
ALIEN MAX 2 B 3
PIXFILES BAS 0 B 3

* PD-46
Talk and Music
Files (C)LOADM
"FILE" then EXEC.

TALK BIN 2 B 11
TALK2 BIN 2 B 11
WILLTELL BIN 2 B 9
MUSICBOX BIN 2 B 1
BEATLES BIN 2 B 4
JUMP BIN 2 B 5
GRELN BIN 2 B 5
GHOST BIN 2 B 4
JINGLE BIN 2 B 3
WORLD BIN 2 B 5
CTRYROAD BIN 2 B 2

* PD-47

Miscellaneous Pgms

T BAS 0 B 2
SANTEE2 BAS 0 B 1
MILEAGE BAS 0 B 1
M BAS 0 B 1
DIGITS BAS 0 B 1
NUMBLIST BAS 0 B 1
COUNT BAS 0 B 1
SC BAS 0 B 1
DRAWTEXT BAS 0 B 1
SAMPLE BAS 0 B 1
GRSCRWRT BAS 0 B 2
HRTEXT2 BAS 0 B 3
DRAW BAS 0 B 2
WRITER BAS 0 B 1
TYPEBET BAS 0 B 2
WRITEBET BAS 0 B 2
TEXT2 BAS 0 B 2
SANTEE BAS 0 B 2
SHUTTLE BAS 0 B 1
AJOCK BAS 0 B 1
PLATFORM BAS 0 B 1

MAZE BAS 0 B 4
DISKZAPR BAS 0 B 2
ZAP BAS 0 B 3
DETHSHIP BAS 0 B 3
BACKUP35 BAS 0 B 1
BOOT BAS 0 B 1
SCRNLIST BAS 0 B 1
DOSSTART BAS 0 B 1
LABEL BAS 0 B 2
DSKDSABL BAS 0 B 1
NOFREEG BAS 0 B 1
FORMATER BAS 0 B 1
ROMRAM BIN 2 B 1
SUPDUP BIN 2 B 1
TESTTEXT BAS 0 B 1

* PD-48

Miscellaneous Pgms

EXTBAS BAS 0 B 3
DISAPPEAR BAS 0 B 1
PAINT BAS 0 B 1
DATA BIN 2 B 1
DATA2 BIN 2 B 1
SCRDATA BIN 2 B 1
FILL2 BIN 2 B 2
QUADDRAW BAS 0 B 1
CELTIC BAS 0 B 2
ALL RAM BAS 0 B 1
CHARGEN BIN 2 B 1
ROMRAM BIN 2 B 1
OBSTACLE BAS 0 B 1
64K RAM BAS 0 B 1
COLORSEL BAS 0 B 1
TRIG BAS 0 B 4
ALGEBRA BAS 0 B 4
PLAY BAS 0 B 1
STATECAP BAS 0 B 2
MLSOUNDS BAS 0 B 1
ROTATION BAS 0 B 2
PARABOLA BAS 0 B 2
INSTAPIC BAS 0 B 1
CLOVER BAS 0 B 1
HAT-PLOT BAS 0 B 1
WHEEL 1 BAS 0 B 1
LETTER-R PAR 1 A 1
3-LINES ROT 1 A 1
TRAPZOID ROT 1 A 2
PYRAMID ROT 1 A 2
CUBE ROT 1 A 3
51X24 BAS 0 B 2
WINDOW BAS 0 B 5
GGPRTSU BAS 0 B 1
KALEIDO BAS 0 B 1
OK83APRT BAS 0 B 1
NUMCNVTR BAS 0 B 1
ADVRTN BAS 0 B 1

* PD-49

Miscellaneous Pgms.

BC BIN 2 B 10
PEDRO BIN 2 B 11
BLOCKADE BAS 0 B 3
REPEAT BAS 0 B 1
AIRPLANE BAS 0 B 1
BUSTOUT BAS 0 B 1
GOLF BAS 0 B 7
CITY BAS 0 B 2
AIR-RAID BAS 0 B 2
MAZE BAS 0 B 4
DUALDUP BIN 2 B 2
DIRMAP BAS 0 B 3
CHESS BAS 0 B 5
WHATZIT BAS 0 B 4
BATLSHIP BAS 0 B 3
SP*ROCKS BAS 0 B 1

* PD-50

Miscellaneous PGMS

GOBBLER BAS 0 B 2

PYTHON BAS 0 B 2
LUNAR BAS 0 B 2
LUNALANA BAS 0 B 1
AMAZING BAS 0 B 2
BALLOON BAS 0 B 1
VAPORWRM BAS 0 B 2
ABM BAS 0 B 3
BULLSEYE BAS 0 B 1
CRASH BAS 0 B 1
DOTS BAS 0 B 3
F-16 BAS 0 B 3
KRYPTON ART 2 B 3
KRYPTON BAS 0 B 1
KRYPTON GAM 0 B 1
NUKEATK BAS 0 B 2
ASTEROID BAS 0 B 1
PRIX BAS 0 B 2
ONE BIN 2 B 3
TWO BIN 2 B 3
THREE BIN 2 B 3
FOUR BIN 2 B 3
TEMPEST BAS 0 B 2
SNAKE BAS 0 B 2
SCORE DAT 1 A 1
OTHELLO BAS 0 B 4
ROCKS BAS 0 B 3
LANDER BAS 0 B 2

* PD-51
Games & Programs

DRAGRACE BAS 0 B 1
WORMER BAS 0 B 2
SIMON BAS 0 B 2
RIDER BAS 0 B 2
MISSILE BAS 0 B 3
LETSHOOT BAS 0 B 2
SHOOTGAL BAS 0 B 2
MISSILE2 BAS 0 B 3
FENCE BAS 0 B 3
BANDIT BAS 0 B 1
CHICKEN BAS 0 B 2
MAXIMUM BAS 0 B 3
FLIGHT BAS 0 B 2
COVERUP BAS 0 B 2
WORLDMAP BAS 0 B 4
POUNCE BAS 0 B 1
MARTIANS BAS 0 B 2
FINDIT BAS 0 B 3
SCRAMBLE BAS 0 B 5
BOUNBABY BAS 0 B 2
CHICK BAS 0 B 3
BOBO BAS 0 B 3
RUBIC BAS 0 B 4
MCJUMP BAS 0 B 3

* PD-52
Picture files

COCO MAX 2 B 6
COL COCO MAX 2 B 6
MOOSHEAD MAX 2 B 6
COKE MAX 2 B 6
CUBS MAX 2 B 6
REDS MAX 2 B 6
BREAKERS MAX 2 B 6
USFL MAX 2 B 6
SPACE BIN 2 B 3
GIZMO MAX 2 B 3
DINASOUR MAX 2 B 3

* PD 53
Picture Files

INDIAN MAX 2 B 6
HOMECOME MAX 2 B 6
GRIN BIN 2 B 3
TARD BIN 2 B 3
STUD BIN 2 B 3
COMET BIN 2 B 3
DESERT BIN 2 B 3
FOOD BIN 2 B 3
SMIRK BIN 2 B 3
PLAYA BIN 2 B 3

HELLO BIN 2 B 3
GROVER BIN 2 B 3
DRIVE IN BIN 2 B 3
TIME BIN 2 B 3
KOALA BIN 2 B 3
PATTERN BIN 2 B 3
HAGAR BIN 2 B 3
CHIPS BIN 2 B 3

* PD 54
Picture Files

PENTAGON PIC 2 B 3
GRID 2 PIC 2 B 3
SNOWFLAK PIC 2 B 3
CONETUNL PIC 2 B 3
4-POINT PIC 2 B 3
BALSTR MAX 2 B 3
CARTOON MAX 2 B 3
HUELEWIS MAX 2 B 3
STARTREK MAX 2 B 3
HOUSE1 MAX 2 B 6
HOUSE2 MAX 2 B 6
LIFECYCL MAX 2 B 6
COCOMAG MAX 2 B 3
MASCATL MAX 2 B 3
COLUMBIA MAX 2 B 3
POLO MAX 2 B 3
ET BAS 0 B 7
WHEEL 1 PIC 2 B 3

* PD-55
Picture Files

PARKERPT MAX 2 B 3
TOWER PIC 2 B 3
TOWER2 PIC 2 B 3
SCREEN PIC 2 B 3
BOMB PIC 2 B 3
ANDRON PIC 2 B 3
SALE PIC 2 B 3
CHIPS PIC 2 B 3
TUNLROAD BIN 2 B 3
LONEROAD BIN 2 B 3
CITYROAD BIN 2 B 3
LAKEROAD BIN 2 B 3
CROSSROAD BIN 2 B 3
BLACK BIN 2 B 3
CAL1 BIN 2 B 3
CAL2 BIN 2 B 3
CAL3 BIN 2 B 3
3-LEAF PIC 2 B 3
5-STARS PIC 2 B 3
SPHERE PIC 2 B 3
15-LEAF PIC 2 B 3

* PD-56
Glossary, Memory
Maps, Programs

COCO VIP 1 A 4
VIP ON 3 VIP 1 A 1
BEEF VIP 1 A 1
MCTRM3 VIP 1 A 1
GLOSSARY VIP 1 A 7
POKEPEEK VIP 1 A 17
WIDTH VIP 1 A 1
COCO 3 VIP 1 A 17
MISSLES BAS 0 B 2
CLOCK BAS 0 B 1
JET BAS 0 B 4

* PD-57
Picture Files

VAMPIRE PIC 2 B 3
ATLANTA BAS 0 B 3
NOGHOST PIC 2 B 3
AIRPORT BAS 0 B 4
S EASTON BAS 0 B 4
1SMLSTEP BAS 0 B 4
HAGAR PIC 2 B 3

SUNSET BAS 0 B 3
S NICKS BAS 0 B 4
SNOOPY1 BAS 0 B 3
MICKEY BIN 1 B 8
DONALD BIN 2 B 8
SNOOPY2 BAS 0 B 4
SNOOPY3 BAS 0 B 4
SNOOPY4 BAS 0 B 4

* PD-58
Miscellaneous Pgms

DISKLIST BAS 0 B 1
DIRLIST BAS 0 B 2
ML ADDR BAS 0 B 1
DISKDUMP BAS 0 B 1
PRINUTIL BAS 0 B 2
CALPRINT BAS 0 B 3
ALPHSONG BAS 0 B 1
PAINT BAS 0 B 1
DOGPICT BAS 0 B 2
EVADER BAS 0 B 1
NUKATIC BAS 0 B 2
BASICMAP BAS 0 B 3
JOYPAINT BAS 0 B 1
PUMPKIN BAS 0 B 1
HOMOYMS BAS 0 B 1
ABBREV BAS 0 B 4
CONVERT BAS 0 B 3
CASSDIR BAS 0 B 1
CVERT BAS 0 B 1
FLASCARD BAS 0 B 1
MESSAGE BAS 0 B 1
RELOCAT BAS 0 B 1
COUNT BAS 0 B 1
CALENDAR BAS 0 B 1
DOGS BAS 0 B 1
DOGFIGHR BAS 0 B 1
BEAST BAS 0 B 1

* PD-59
GAMES, UTILITIES

64X64F BAS 0 B 1
RND#'S BAS 0 B 1
SCROLLER BAS 0 B 1
COCOBUG BAS 0 B 2
DRWBOARD BAS 0 B 1
SPACE BAS 0 B 1
DIR-ADDR BAS 0 B 1
BACKGAMN BIN 2 B 2
CHESS BIN 2 B 3
BATTLE BIN 2 B 2
GERM BIN 2 B 1
BLEEP BAS 0 B 2
TICKER BAS 0 B 3
LEAKYTAP BAS 0 B 3
UTOPIAN BAS 0 B 4
COLORDOT BAS 0 B 3
STAYALIV BAS 0 B 2
TIMEFLT BAS 0 B 3
NAVYGUNS BAS 0 B 2
ATACMAN BAS 0 B 3
CALENDAR BAS 0 B 1
POKER25 BAS 0 B 1
VIEWERS BAS 0 B 1
STUFF BAS 0 B 1

* PD 60 Basic Pgms

S NICKS BAS 0 B 4
1SMLSTEP BAS 0 B 4
SUNSET BAS 0 B 3
3DTT BAS 0 B 4
BATTSHIP BAS 0 B 2
CRACE BAS 0 B 2
FLY BAS 0 B 3
KINGS BAS 0 B 6
KINGTUT BAS 0 B 7
OREGON BAS 0 B 9
POKER BAS 0 B 2
ROBOTS BAS 0 B 3
ROLLON BAS 0 B 2
SORCERER BAS 0 B 6

* PD-61 Pictures			SLOTS	BAS	0 B 2	CASDIR	BAS	0 B 1	PD-69 Disk Utilities	JETI	BIN	2 B 3					
			TROLL	BAS	0 B 6	CONTOUR	BAS	0 B 1		MOONLIT	BAS	2 B 3					
HAGAR	PIC	2 B 3	-----			CONVERGE	BAS	0 B 1	DIRPBR	BAS	0 B 2	RONDO	BIN	2 B 4			
SHIPS	BAS	0 B 2	* PD-64 Basic Pgms			CONVERT	BAS	0 B 3	DISKLOOK	BAS	0 B 1	LOOKLOVE	BIN	2 B 1			
SIGNS	BAS	0 B 1	OHMSLAW	BAS	0 B 1	COUNT	BAS	0 B 1	DKTODK	BAS	0 B 3	MENU	BAS	0 B 1			
SPACE	BAS	0 B 8	POWER UP	BAS	0 B 1	CVERT	BAS	0 B 1	DSK2TP	BAS	0 B 2	WE	BAS	0 B 1			
3GUYS	MAX	2 B 3	ROMPACK	BAS	0 B 1	DEC, HEX	BAS	0 B 1	DSKLIBRY	BAS	0 B 3	MESSAGE	BAS	0 B 1			
AIRPORT	BIN	2 B 6	ROMRAM	BAS	0 B 1	FUELCOST	BAS	0 B 1	DSKMSTER	BAS	0 B 4	OBJECTS	BIN	2 B 2			
BIGCAT	MAX	2 B 3	SCRDUMP	BAS	0 B 1	HEXLOAD	BAS	0 B 1	DSKSPEED	BAS	0 B 1	ODIE	PIX	2 B 3			
CUBE	BIN	2 B 3	SLOSROL	BAS	0 B 1	HEXTODEC	BAS	0 B 1	DTOD	BAS	0 B 2	TANK	BIN	2 B 4			
DOGPICT	BAS	0 B 2	SORT	BAS	0 B 1	IN-OUT	BAS	0 B 1	D UTIL	BAS	0 B 2	TRIANGLE	BIN	2 B 2			
EARTH	MAX	2 B 3	SPEDMATH	BAS	0 B 3	HOMONYMS	BAS	0 B 1	DDCOPY	BAS	0 B 2	WORLDMAP	BIN	2 B 4			
GARFIELD	PIX	2 B 3	SPOOLER	BIN	2 B 1	JOYPAINT	BAS	0 B 1	DIRGET	BAS	0 B 1	PAINT	BAS	0 B 1			
GIRL	MAX	2 B 3	UPPER32K	BAS	0 B 1	KALVOS	BAS	0 B 1	DIRLIST	BAS	0 B 2	SCRDATA	BIN	2 B 1			
NEHWAVE	MAX	2 B 3	STRIKE	BAS	0 B 1	LINES	BAS	0 B 1	DIRSAVE	BAS	0 B 1	RES	BAS	0 B 1			
OLIVER	MAX	2 B 3	SHIPS	BAS	0 B 2	MACDATA	BAS	0 B 1	DISK FIX	BAS	0 B 1	SCAN	BAS	0 B 1			
OWL	MAX	2 B 3	WILLSADV	BAS	0 B 5	MISSLETT	BAS	0 B 1	DISKDIRE	BAS	0 B 3	-----					
PEANUTS	PIX	2 B 3	RACEWAY	BAS	0 B 4	* PD-67 Basic Pgms			DISKDUMP	BAS	0 B 1	* PD 72 Basic and Machine Lang. Pgms					
SHUTTLE	MAX	2 B 3	TREK	BAS	0 B 4	LOAN	BAS	0 B 3	DISKEDIT	BAS	0 B 4	FIND	BAS	0 B 1			
SR-71	MAX	2 B 3	TXTCNVRT	BAS	0 B 1	LOANAMOR	BAS	0 B 1	DISKLST	BAS	0 B 1	LOC FIND	BAS	0 B 1			
ZEBCHES	MAX	2 B 3	-----			64KLOOK	BAS	0 B 8	DISKTEST	BAS	0 B 1	ML ADDR	BAS	0 B 1			
ZIGGY	PIX	2 B 3	* PD-62 Basic Pgms			ASSEMBLR	BAS	0 B 3	DISKTIME	BAS	0 B 1	MLFINDER	BAS	0 B 1			
-----			* PD-65 Music			DISASSY	BAS	0 B 4	DSKCLEAN	BAS	0 B 1	MLTTD	BAS	0 B 1			
ALARM	BAS	0 B 2	MUSIC	BIN	2 B 7	FINANCE	BAS	0 B 8	MASTRDSK	BAS	0 B 4	READBIN	BAS	0 B 1			
BIBLE	BAS	0 B 2	MUSIC1	BAS	0 B 1	ROMDUMP	BAS	0 B 1	* PD-70 Basic Pgms			RELOCAT	BAS	0 B 1			
BINGOCD	BAS	0 B 1	SOUND	ASM	1 A 1	WEREWAND	BAS	0 B 5	MLADFND	BAS	0 B 2	CHKBOOK	BAS	0 B 3			
CHECKS	BAS	0 B 3	SOUNDDEM	BAS	0 B 1	CHECKS	BAS	0 B 4	BIGHILL	BAS	0 B 1	FINANAD	BAS	0 B 6			
CLOCK	BAS	0 B 1	SOUNDS	BAS	0 B 3	MONEYHLP	BAS	0 B 4	BLACKJK	BAS	0 B 4	GRAPHICS	BAS	0 B 5			
DATA3	BAS	0 B 3	SOUNDS2	BAS	0 B 1	CHKBOOK	BAS	0 B 3	CIA	BAS	0 B 6	HOMEUTIL	BAS	0 B 6			
DATES	BAS	0 B 2	SHAN	BIN	2 B 1	STAT-LOG	BAS	0 B 3	CIPHER	BAS	0 B 1	LIFE	BAS	0 B 4			
DECIDE	BAS	0 B 3	SYNMUSIC	BIN	2 B 4	WORDPRC	BAS	0 B 5	CUBES	BAS	0 B 1	MCONVERT	BAS	0 B 2			
EXREF	BAS	0 B 3	DEEPPURP	BIN	2 B 5	WORDSCAR	BAS	0 B 2	DOGFIHT	BAS	0 B 1	METCONV	BAS	0 B 1			
FILES	BAS	0 B 4	ALFEX	BIN	2 B 2	TYPING	BAS	0 B 2	FISH	BAS	0 B 1	JOYLIST	BAS	0 B 1			
FLIPPAGE	BAS	0 B 3	BACH	BIN	2 B 4	* PD-68 Basic Pgms			FLIP	BAS	0 B 2	CLOCK	BIN	2 B 1			
LABELPRT	BAS	0 B 1	BUMBLE	BIN	2 B 3	ART	BAS	0 B 1	FOOTBALL	BAS	0 B 4	CAMELOT	BIN	2 B 2			
MESSAGE	BAS	0 B 1	CANON	BIN	2 B 3	BARGRAPH	BAS	0 B 1	GOLDMINE	BAS	0 B 3	FIRE	BIN	2 B 6			
OFFSET	BAS	0 B 1	DIAMOND	BIN	2 B 3	BEGIN	BAS	0 B 1	HANGMAN	BAS	0 B 2	CLOCK	DAT	1 A 1			
PHONE	BAS	0 B 1	ENTAIN	BIN	2 B 1	BWDUMP	BIN	2 B 1	HILOW	BAS	0 B 3	* PD 73 Basic Pgms					
PHONEDIR	BAS	0 B 2	FUNERAL	BIN	2 B 3	CHAR	BAS	0 B 2	HOBBIT	BAS	0 B 2	CARTEL	BAS	0 B 7			
PILOT	BAS	0 B 2	GRENGRSS	BIN	2 B 4	COM	BAS	0 B 2	HUSTLE	BAS	0 B 1	DODGE-EM	BAS	0 B 2			
PROJEVAL	BAS	0 B 4	HILLST	BIN	2 B 4	DISHON	BAS	0 B 7	JUMP	BAS	0 B 1	DOGS	BAS	0 B 1			
SPELWORD	BAS	0 B 1	* PD-66 Basic Pgms			DOT	BAS	0 B 1	MEMORY	BAS	0 B 2	DOORS	BAS	0 B 1			
VALENCE	BAS	0 B 2	64KMEMT	BAS	0 B 2	EDITOR	BAS	0 B 3	PROTECT	BAS	0 B 2	PINGPONG	BAS	0 B 1			
-----			AUTODIAL	BAS	0 B 2	EXTNDKYB	BAS	0 B 4	QUEST	BAS	0 B 4	CACAPHON	BAS	0 B 1			
* PD-63 Basic Pgms				FINDAWRD	BAS	0 B 2	EXTNDKYB	DOC	1 A 7	SLITHER	BAS	0 B 1	SUB	BAS	0 B 5		
ANIMALS	BAS	0 B 3	FLASHCRD	BAS	0 B 2	FREE	BAS	0 B 1	STOCK	BAS	0 B 3	SURVIVAL	BAS	0 B 5	TREK	BAS	0 B 5
BALOONS	BAS	0 B 3	64KTEST	BAS	0 B 1	GRADBOOK	BAS	0 B 1	* PD-71 Basic & Machine Lang. Pgms			TYCOON	BAS	0 B 2			
BATSHIP	BAS	0 B 4	ABBREV	BAS	0 B 4	GRNDSTFF	BAS	0 B 1	DISASSEM	BAS	0 B 2	SCRAMBLE	BAS	0 B 5			
BUGS	BAS	0 B 6	BASECONV	BAS	0 B 1	INSTR	BAS	0 B 1	PAYMENT	BAS	0 B 1	SIMON	BAS	0 B 2			
CONNECT4	BAS	0 B 4	BIORYTHM	BAS	0 B 3	LET	BAS	0 B 3	STATCAP	BAS	0 B 2	WHERISIT	BAS	0 B 2			
DIGGEM	BAS	0 B 3	BOWLSUM	BAS	0 B 2	STOCKS	BAS	0 B 5	TEMPCONV	BAS	0 B 1	WALLHIT	BAS	0 B 1			
FACTORS	BAS	0 B 4	BOXLABEL	BAS	0 B 1	TWOLINER	BAS	0 B 1	ECHOSONG	BAS	0 B 1	TACTACT	BAS	0 B 2			
GEOGAME	BAS	0 B 4	CALENDAR	BAS	0 B 2	ATOMS	BAS	0 B 2	MUSCONV	BAS	0 B 1	CHBASIC	BAS	0 B 1			
KINGDOM	BAS	0 B 6	CALENR2	BAS	0 B 1	BEAST	BAS	0 B 1	FUGUE	BIN	2 B 3	-----					
MAZE3	BAS	0 B 3	CAR CALC	BAS	0 B 1	* PD-69 Basic Pgms											
MISSILES	BAS	0 B 2	-----			CONTOUR	BAS	0 B 1									
POKER	BAS	0 B 4	* PD-61 Pictures			CONVERGE	BAS	0 B 1									

PUBLIC DOMAIN SOFTWARE

This large collection of programs will allow you to quickly expand your library. All programs are available on disk and programs with a * are available on tape. Some programs require a joystick. Instructions are included in some collections as DAT, DOC, or TXT files. Prices are as follows:

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C PROGRAMMING

by

Norm Matice

Last month we finished up with a simple C program that asked for input from the user and then used that input to print out a message. At that time we used %s in our output line as a place marker for the position of the string we had asked for. In C place markers such as %s are known as conversion specifications.

C has a number of conversion specifications. This month we will take a look at the more popularly used ones. The best way to do this is to do a line-by-line dissection of the listing below. The first line is the #include <stdio.h> which allows the standard input/output header to be included in the program. As I stated last month it is not necessary to be included in every program, but its a good habit to include it.

The second line is #define HI "hello". It defines that the variable HI will contain the string "hello". In this regard it can be used just like a string variable in BASIC. The #define statement is not confined to just strings. It can be used to define any type of C variable. For example if we wished to define a variable with the value of pi we could use the following line, #define PI 3.14159. Then any place we used PI in the program the compiler would substitute the value 3.14159.

As I said last month every C program must have a main() and ours is in line 3. Line 4 follows with the left brace that defines the start of the program. Line 5 designates that the

variable num will be a decimal integer and in addition assigns a value of 3 to that variable. In line 6 the variables sum and bill are designated as floating point numbers. As can be seen by line 6 simple math functions can be handled by the assignment statements. If I had wanted to I could have assigned values to the variables later in the program, but assigning them while they were being defined saved a few lines of code.

Line 8 (the space counts as a line, but isn't necessary for the program to compile) has a printf statement like we encountered last month. Notice that the n is missing from this line. This is the carriage return character. With it gone, the next line to be printed will appear on the same line as this one when output on the computer. This gives you an idea why there is a space between the ~ and the for in line 9. The n is in line 9 so there will be a carriage return after that line.

Line 10 simply prints a blank line and line 10 is another space for easier readability in the listing. Line 11 prints the headings for the output of our program. Line 12 prints another blank space on the screen. Line 13 is unique to the Color Computers version of C. Due to the limitations of implementing C on a 64k computer the pffinit(); statement is needed to print out floating point numbers. There is no special place this statement has to be except before the printing out of the floating point numbers. If you wanted to run this listing on a mainframe

computer running Unix and C you would leave this line out. For those of you with 512k CoCo IIIs you still need it, because the compiler is written for 64k even though you have it running on a 512k system.

Line 14 is another space for readability of the listing. Line 15 is the start of the output of the table. The %c in each of the lines from 15 to 21 is there to allow the printing of the % symbol in the output. The %c is the single character conversion specification and it will print a single character enclosed by single quotes (the apostrophe on the 7 key) in the line. The program will print out a table of conversion specifications, their symbols and a sample output. The %.2f in line 20 holds the output of sum to two decimal points. You can allow as many places behind the decimal points as you desire, up to the amount printed by a floating point number, by changing the 2 in the statement to the number desired.

Line 22 is yet another space for ease of reading and line 23 is the right brace to signify the end of the program. In addition to the conversion specifications in the program there are conversions specs for unsigned decimal integers, unsigned hexadecimal and unsigned octal numbers. Perhaps we will look at them at a later date. For now get familiar with the conversion specifications of this program.

RENEWAL TIME?

If 2/89 is beside your name on your address label then your subscription has expired.

C listing, name specs.c for compiling.

```
#include <stdio.h>
#define HI "Hello"
main()

    int num=3;
    float sum=4.5+3.7, bill=1e9;

    printf("Conversion Specifications");
    printf(" for C");
    printf(" ");

    printf("Specification   Type Results");
    printf(" ");
    pffinit();

    printf("dec. integers   %cd   %d", '%', num);
    printf("single char.    %cc   %c", '%', '!');
    printf("string              %cs   %s", '%', HI);
    printf("dec. float          %cf   %f", '%', sum);
    printf("short float         %cg   %g", '%', sum);
    printf("format float        %c.2f %%.2f", '%', sum);
    printf("e-notation          %ce   %e", '%', bill);
```

editor's comments

This issue is the beginning of our sixth year. We first started as a newsletter and have now grown to a 40-50 page monthly magazine. I have enjoyed writing articles and editing the magazine. There have been many computer subjects covered in the past five years, and I wish I knew more of the material than I do. I am constantly referring to our back issues for information on various computer subjects.

Some of you may be interested in the equipment we have and some of our other activities. We have several color computers that are no longer usable. We used to sell memory upgrades and wore the sockets out on one of our older computers by plugging and unplugging these upgrades. It is too expensive to repair these computers, so we have a computer junkyard with a few computers that we can use for spare parts.

We now have three color computer 3 computers and one color computer 2. Two of our color computer 3 computers have 512K of memory and the other has 128K. We use the 512K computers for backing up disks as well as for other purposes.

When I first started, a 64K computer was about as much memory as could be reasonable obtained. However most software used 32K since the second 32K bank was not recognized by basic. I designed the first 128K memory expander for color computers. It consisted of two 64K independent banks. I liked this arrangement because I could put different programs in each

bank. With the memory management software, which was developed in this magazine, I had four 32K independent memory banks.

Next came 256K memory expanders with ramdisk software. Spectrum Projects had a version called Thunder Ram. It had software built in ROM which eliminated the problem of having to find a disk with the ramdisk software. Next J & R Electronics came out with a 512K expander which gave two ramdisks for color computer 1 and the 8 chip color computer 2. This consisted of a circuit board that plugged into the SAM chip (MC 6883) socket. As the color computer 2 computers went through several redesigns, there was not enough room for the case to fit over the circuit assembly.

Two production modifications to the color computer 2 stopped memory expansion. The first was the use of two 41464 chips. These were 256K chips with an architecture of 4 bits by 64K words. Two of these chips give 64K bytes. I designed a piggy back 128K assembly using 4 of these chips. We sold quite a number of these. I even got ambitious and stacked 4 of these units. This was used for about 2 years until the color computer 2 I was using failed last December. I replaced a couple of the chips but could not get it to work again, so I retired it.

Fortunately during the Christmas season, a local customer traded in his complete color computer 3 system for a

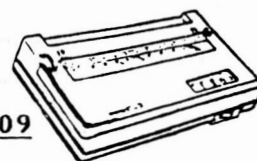
MSDOS computer. His color computer 3 was updated to 512K and is doing the job that the color computer 2 with 4 memory banks was doing.

We have several printers with one being devoted entirely to printing labels. During production of this magazine we use a MSDOS computer for our final draft. We transfer the information from the Color Computer to the MSDOS computer directly by using terminal programs. The final draft is done in one pass with a program we purchased for the MSDOS computer. It makes the type look very professional. I have written several utilities that facilitate our production. One allows basic programs to be listed so that they are easier to read for our readers that like to type them in. This month I wrote a new program that leaves a blank line before printing a basic line if the line is over 32 characters. This makes it easy to find the start of the line. Previously I had a program that indented each continuing line 3 spaces. Programs listed in this issue use the new format which allows the program lines to be printed exactly as they would appear on your 32 character screen.

I am pleased to have Doug Canfield continue the Assembly Language Programming section. This will give me more time for other activities. Doug lives near by and is a very good programmer. If you want to program in assembly language then you need to read his article.

Also Norm Matice started a series in programming in C last month. This requires the OS-9 operating system. If you want to program in C then you should read his articles.

I want to thank each of you for your support. If you have any problems I can usually be reached in the evenings and on weekends if you would like to call.



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BASIC PROGRAMMING

ASCII and BASIC

by

Bill Chapple

In this series I am showing how to write useful basic programs. Basic is included in read only memory (ROM) in all color computers. In fact Tandy's color basic is the best version of basic that I have used.

In this editorial I want to show how basic can operate on an ASCII file to create a new basic program. The most useful program for me is a word processor. In a way this is easy to understand because of the large volume of writing I do each month. However, I use my word processor for other purposes beside writing editorials and letters. If you have a word processor then this article should help you get the most from it.

SAVING PROGRAMS IN ASCII

Basic program commands consist of "TOKENS" which are one or two bytes. This takes much less memory than the program would take if it were in ASCII or TEXT form. However if a program is saved in ASCII form, it can be edited by a word processor. When basic saves a program in ASCII format, it converts the TOKENS to text. When an ASCII basic program is loaded, the tokens have to be restored as the program is placed into memory. This takes a little time and is a reason not to use the ASCII format. However for some applications, such as generating or editing a new program, the use of a word processor is a definite advantage. To save a program in ASCII just place ~,A after the name with your save command.

Suppose our program is called "COMPUTER" then to save "COMPUTER" in ASCII format type the following:

```
CSAVE ~COMPUTER~,A
```

or

```
SAVE "COMPUTER",A
```

WORD PROCESSORS and BASIC

A word processor can either be used to write a basic program or to edit one that already exists. Most of the time when I write a basic program, I start with a word processor. The advantage is that I have a full screen editor and can move through my program at will quickly making changes and additions. When I finish, I save the program as an ASCII file with a BAS extension. Then when I return to basic I can load in the program.

The word processor is very useful for editing a basic program. The program must have been saved with the ASCII extension. It can then be loaded into the word processor for editing.

There are some rules that must be followed for the program to work when it is again loaded by basic. First of all each character after a carriage return or at the beginning of each line must be a number. Basic will look for a number as it begins generating tokens when it is being loaded. If it does not find a number at the beginning of a line, then an error

message will be printed and the loading process will be terminated. Look at the following example:

```
10 X=35: PRINT" THIS IS
A TEST"
```

Notice that the second line does not begin with a number. The works " A TEST" should be with line 10 and not on the next line. Let's look at another example:

```
XX10 'THIS IS A PROGRAM
```

This line is unacceptable because the XX characters are not numbers. A word processor could be used to remove these characters and make the line acceptable as follows:

```
10' THIS IS A PROGRAM
```

MODEMS & OTHER COMPUTERS

When transferring programs from other computers by modem or directly, the data in the buffer may have extra characters as was demonstrated in the previous example. These characters can be removed by a word processor or a basic program designed for this purpose. Suppose we are to design a basic program for this purpose. When we encounter the XX10, as in the previous example, there are 3 possibilities for the line which are:

1. The extra characters should be removed from the beginning of the line.

Example

```
XX10 'THIS IS A PROGRAM
```

2. The line should be combined with the preceding line.

Example

```
10 X=35: PRINT" THIS IS
A TEST"
```

3. The line should be deleted. This may be the case for data at the beginning of the file.

EXAMPLE

TEST PROGRAM DATA FOLLOWS

PROGRAM DEVELOPMENT

I have written several basic programs for operating on ASCII files. A recent example is one I wrote when we transferred the King James's Bible from our MS-DOS Computer to a color computer. The problem was that the MSDS files were too long. So I wrote a program that opened a file and created new files of not over 300 lines long. This gave files of about 12,000 to 15,000 bytes. The original files were up to 60,000 bytes long which is too big for most word processors.

To make things simple and since most errors are caused by a number not being at the beginning of the line, I wrote a program that checks to see if a number is at the beginning of the line. If a number is not first, then the line is discarded and not used in the new file. This allows a new file to be created that has the errors removed which will take care of most errors.

ASCII BASIC PROGRAM RESTORER

```
10 CLS:PCLEAR 1 'RESERVE MAXIMUM
MEMORY
```

```
20 CLEAR 20000:DIM A$(400) 'SETU
P ARRAY FOR 400 LINES
```

```
30 PRINT"ASCII BASIC FILE CONVER
SION PGM
```

```
40 PRINT"by BILL CHAPPLE
```

```
50 PRINT"COPYRIGHT (C) 1989
```

```
60 PRINT"DYNAMIC ELECTRONICS INC
```

```
70 PRINT"THIS CLEANS UP ASCII BA
SIC
```

KING JAMES BIBLE ON DISK

The complete King James Bible is in short ASCII files for use with most word processors such as Telewriter or VIP. Each file is about 12-15K long and is divided at the end of chapters only. These are excellent study sources for Pastors and Bible teachers. Use your word processor to arrange your sermon or lesson. A large television set can be used for displaying the Bible to the deaf or bible portions can be displayed for a television broadcast. There are 26 disks for the *Old Testament* and 8 disks for the *New Testament*.

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KJB-9 Judges 20-21 Ruth 1 Samuel 1-23	KJB-22 Jeremiah 13-43	I. Timothy II. Timothy Titus Philemon Hebrews
KJB-10 1 Samuel 24-31 2 Samuel 1-22	KJB-23 Jeremiah 44-52 Lamentations Ezekiel 1-16	KJB-34 James I. Peter II. Peter I. John II. John III. John Jude Revelation
KJB-11 2 Samuel 23-24 1 Kings 1-20	KJB-24 Ezekiel 17-44	
KJB-12 1 Kings 21-22 2 Kings 1-25	KJB-25 Ezekiel 45-48 Daniel Hosea Joel	
KJB-13 1 Chronicles	KJB-26 Amos, Obadiah, Jonah, Micah, Nahum	
KJB-14 2 Chronicles 1-32		

```

80 PRINT"FILES SO THAT CAN BE LO
ADED
90 PRINT"BY BASIC. LINES THAT DO
NOT
100 PRINT"START WITH A NUMBER AR
E
110 PRINT"REMOVED FROM THE FILE
120 INPUT"ENTER C FOR CASSETTE F
ILE";C$
130 INPUT"PRESS D FOR DISK DIREC
TORY";D$:IF D$="D" THEN DIR
140 INPUT "ENTER FILE NAME & EXT
";N$
150 INPUT"ENTER NEW FILE & EXT";
M$
160 IF C$ <> "C" THEN 180
170 OPEN "I", #-1, N$:GOTO 200 '
CASSETTE FILE
180 OPEN "I",#1,N$ 'DISK
190 ' READ DATA INTO AN ARRAY
200 FOR J=1 TO 400 'SET UP FOR 4
00 LINES
210 IF C$="C" THEN 250 'BRANCH I
F CASSETTE FILE
220 'LINE INPUT IS USED SO COMMA
S CAN BE ACCEPTED
230 LINE INPUT #1, A$(J):IF EOF(
1)=-1 THEN 270 'CHECK FOR END OF
DISK FILE
240 GOTO 260
250 LINEINPUT #-1, A$(J): IF EOF
(-1)=-1 THEN 270 'CHECK FOR END
OF CASSETTE FILE
260 PRINTA$(J):NEXT J 'PRINT THE
FILE AS IT IS BEING READ
270 X=J:CLS:PRINT"DATA IS LOADED
"
280 'X=NUMBER OF LINES IN THE FI
LE
290 '
300 IF C$="C" THEN CLOSE #-1 ELS
E CLOSE #1 'CLOSE FILE
310 IF C$="C" THEN OPEN "O",-1,
M$:GOTO330 'OPEN THE NEW CASSETT
E FILE
320 OPEN "O",#1,M$ 'OPEN THE NE
W DISK FILE
330 FOR J=1 TO X
340 A$=A$(J): PRINTA$ 'PRINT THE
FILE AS IT IS BEING PROCESSED
350 'TEST LEFT CHARACTER
360 Y$=LEFT$(A$,1): Y=ASC(Y$): L
=LEN(A$) 'FIND VALUE OF A$
370 IF Y=32 THEN A$=RIGHT$(A$,L-
1): GOTO360 'ACCEPT SPACE FOR TH
E LEFT CHARACTER
260 IF Y<48 THEN
PRINT"UNAUTHORIZED CHARACTER GO
ING TO NEXT LINE":GOTO 300
380 IF Y>57 THEN 420
390 'THE ASCII VALUES FOR NUMBER
S IS FROM 48 FOR A 0 TO 57 FOR A
9
400 IF C$="C" THEN PRINT#-1, A$
ELSE PRINT#1, A$ 'REWRITE THE LI
NE TO THE DISK OR CASSETTE FILE
410 GO TO 430
420 PRINT"UNAUTHORIZED CHARACTER
IN LINE. GOING TO NEXT LINE " '
THIS PROGRAM OMITTS LINES WITH UN
AUTHORIZED CHARACTERS AT THE BEG
INNING.
430 NEXT J
440 PRINT"THE CONVERSION IS FINI
SHED"
450 CLOSE

```



PRODUCT REVIEWS

CoCo 3 Wheel

Reviewed by Norm Matice

CoCo 3 Wheel is a takeoff of the popular game show Wheel of Fortune. The wheel, the dollar amounts on the wheel, the buying of vowels, and puzzles to guess are all there. The only thing missing are Pat and Vanna. Like the game show the puzzles come in four different categories, people, places, phrases and things.

As each letter is guessed it is put on the used letter board. If it is part of the puzzle then those letters in the puzzle are revealed. You can continue to spin or guess the puzzle. The game will accommodate up to 6 players.

There was only one thing that bothered me about the game. With each spin, some of the text on the screen would change colors. This was not a problem for the most part, but occasionally I would have yellow text on a white background. When combinations such as this would come up it would make reading the screen extremely difficult. That aside, the game has plenty of color in it and allows for the use of a composite or RGB monitor.

If you like Wheel of Fortune or want a hangman type game you may want to check this game out. The game lists for \$21.00 and is available from Sportsware, 1251 South Reynolds Road, Suite 414, Toledo, Ohio 43615. They also have a version available for the CoCo 2.

Black Grid

Reviewed by Norm Matice

Black Grid is a strategy game, from Sportsware. According to the paperwork I got with the game, it is based on a game called Black Box. I had never seen the game Black Box so the concept of the game was new to me. Instructions are included as part of the program. Due to the fact that this is a strategy game you will want to read the instructions carefully. I had to read them twice to figure out just how to play the game.

Fortunately there are a couple of different modes on the disk that help you ease into the rules of the game. One allows you to see where your targets are and how the shot you fired travels. With this screen it is possible to catch on to the concept of the game.

The game itself has the option of filling from two to nine grids with targets. This is on an eight by eight matrix. The object of the game is to figure out which of the grids are filled. The way to do this is to shoot your ray down a column or row and watch its behavior. There are four possible behaviors. The ray can go straight through, indicating no filled blocks in that row or column. It can be deflected by passing within a certain distance from a block. It can be reflected or it can actually hit a filled block.

The object of the game is to find all the hidden filled locations using the least number of turns. While playing the game

with two filled blocks I was able to find them both. When I tried with nine locations filled, it became quite obvious that the game would take a great deal of thought and planning to be able to find all the locations.

This is a game that can provide you a challenge for hours. It is available from Sportsware, 1251 South Reynolds Road, Suite 414, Toledo, Ohio 43615 and cost \$21.00.

Super Pitfall

Color Computer 3 Game

Reviewed by Norm Matice

Pitfall Harry is at it again. This time around its Super Pitfall that takes him back underground. Its your job to keep him alive while he explores the subterranean labyrinth that holds his girl, his pet and the priceless Raj diamond. To get him out alive you must free the girl, the cat, and possess the diamond. Sound simple? Nothing ever is with Harry around.

The pit is filled with all sorts of mortal danger. There are snakes, scorpions, spider, fish, eels, frogs, bats, vultures all packing lethal bites. Fortunately Harry is packing heat. In addition to the gun he carries into the pit with him there are more to be found lying around at different levels. Of course its awfully hard to shoot small creatures, such as scorpions and spiders, so Harry possesses the agility needed to jump out of the way of danger.

A couple of things I had trouble with were trying to figure out how to fire the gun and how to get into the explorer mode of play. I couldn't seem to find how to use them in the instruction book that comes with the game. The gun I finally

fired from the space bar on the keyboard. The explorer mode is accessible from the how many players line of the set up screen. Other than that, the instruction seem to explain everything else I encountered in the game.

Actually wandering around the different levels of the maze, I was impressed with how much territory you can cover and still be in new uncharted areas. One of the things I was thankful for was the option to turn the music off at anytime. It was a nice tune to start, but the repetition of it was starting to get on my nerves. In fact the game has many options and can be played in many configurations. It includes everything from one player novice to two player expert.

The game requires a 128K CoCo III, with TV or monitor, and a joystick. It is an engaging game that can keep a person occupied for hours. It is available from Radio Shack on ROM pak for \$29.95.

GFL CHAMPIONSHIP FOOTBALL II

Color Computer III Game

Reviewed by Norm Matice

GFL Championship Football II is just what you would suspect from the name of the game. It is a football simulation on the computer. To play you will need a Color Computer III with 128K and a joystick. The game has 20 teams all rated for various strengths and weaknesses as stated on page 35 of the instruction booklet.

As the game opens you will have the option of selecting your opponent. Until you have had a chance to practice up a little, it is wise to pit a good team (for yourself) against a weaker team (for the computer). After picking teams you have the option of a fast game or a re-

gular game. A fast game consists of 7&1/2 minute quarters as opposed to 15 minute quarters. After this the game begins with the other team kicking off to you.

The screen is split into three distinct areas. On the upper left portion of the screen is a player's eye view of the action. This view will show the field for whichever way the player is turned or moving. On the upper right hand side is an overhead view (much like what a blimp would see). This view will help you get a feel for the relative positions of both team's players. The ball is represented on this view by a brown square. You are the largest of the blue squares. The bottom of the screen holds the vital statistics, such as, time, down, yards to go and quarter.

The portion of the screen for the player's view was a bit of a disappointment due to the poor quality of the graphics. In defense of the game I will say

that this is due to the memory limitations of a ROM pac. There is only 16K in which to program. This isn't too much of a distraction though. I found that the game was easier to follow watching the overhead view.

One of the things you notice playing the game is that the computer is much more accomplished at passing then you will be to start. This is one of the areas that will take practice. The other thing that is a little strange is the choice of numerous offensive plays, but no choice of defensive plays. The best you can do on defense is control one defender. The computer will handle the others.

If football is your game, GFL Championship Football II will no doubt keep you happy. The computer can be a formidable opponent and your offensive choices are a deciding factor in the outcome of the game. The ROM pac is available at Radio Shack stores and cost \$29.95.

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PROGRAMS! PROGRAMS! and even more PROGRAMS!
from Bill Bernico Software

Response from my Rainbow ad (May '88 - Page 56) was so great that I'm extending my offer. I'm selling ALL 7 of my "Pack" disks at half price. That's right, you'll get COCOPACK, FUNPACK, VALUPACK, SUBPACK, UTILPACK and 3-PACK (Volumns 1 & 2). These 'Pack' disk originally sold for \$6 EACH! Now they can be yours for the low low price of just \$21.00. That's HALF PRICE! I'll even pay shipping and handling. \$21 is all you pay. You'll get games, graphics, utilities, tutorials, educational, home help, disk management, font styles, printer, music, graphic lettering and input programs and many more useful, helpful and entertaining programs for your CoCo 1, 2 AND 3. Over 230 programs in all, and over 50 of those are for the new CoCo 3. The graphics are terrific.

Here's what you'll find on each disk:

COCOPACK - Over 60 programs, featuring selections from all catagories. Many graphic screen fonts.

FUNPACK - This disk includes additional and expanded fonts as well as 'CoCoSize', the exercise program for the Color Computer. (See the Rainbow review April '87 page 143 for details)

VALUPACK - This disk could have been called CoCoPack II because it contains dozens more programs in lots of catagories.

SUBPACK - Attention programmers! Here's a disk crammed with dozens of handy subroutines for you to use in your own programs. Throw dice, deal cards, display text on the graphics screen (CoCo 1&2) and much more!

UTILPACK - Find ML addresses, format your printer, figure business and finance deals, or calculate camera settings. These are just SOME of the many Utilities you'll find.

3-PACKs - Volumns 1 and 2 of contain many many programs just for the Color Computer 3. The graphics capabilities of this marvelous machine make it a natural for exciting games, graphics, and all the other catagories as well. A must for your growing collection of CoCo 3 programs!

Just to see if you're paying attention, for anyone who orders this collection of my goodies, I'll throw in disk number 8...it's called 3-PACK (Volumn III) and it's loaded with many more goodies just for the Color Computer 3. Remember, \$21 will get you 8, not 7 disks. U.S. funds only. Send cash, check or money order only to:

**Bill Bernico Software
708 Michigan Avenue
Sheboygan, WI 53081**

QUESTIONS & ANSWERS

Dear Sirs,

I have a Color Computer II, a double disk drive, DMP -132 printer a deluxe RS 232 Program pak, a multi-pak interface, a Kenwood Transceiver and a General Ham License. I also have a strong desire to get into digital communication. I am more interested in AMTOR and RTTY than I am in PACKET.

Can you advise me what more I'll need except DATA CONTROL VIXIT. I can't decide which one to get. Can you tell me if the MFJ-1278 will function. If it will, I'd prefer it because of the lower price. I'm retired on a fixed income.

Please advise me what you would recommend and if you have any software programs that will accomplish what I want.

Thank you for your help.
Les Anderson

ANSWER:

Les thank you for your question. I am not familiar with the MFJ units as all I have done is look at their advertisements in the catalog.

We have a RTTY program that just requires connecting your transceiver's audio to a cassette cable and connecting the audio from your computer to your mike jack. We showed how to do this in our DCN issue #50.

Before you purchase a commercial unit, make sure they have software for a color computer. If a terminal program is required, we have some in our public domain collection.

+ + +

Dear Bill,

Help. Since receiving your sample copies OCT-NOV of DCN I

have been trying to have the Improved Morse Keyer Program on PG 35, OCT 88 to run for me. I have typed in this program many times and when I try to run it, it comes up with this LINE
730 SYNTAX ERROR
780 NF ERROR
590 FC ERROR

I am a beginner here with a TRS80C Model 2. I wired up the interface from page 37 figure 1 and can you tell me if PIN 2 on the coco serial is correct? As I understand Pin 2 is the Receive Terminal. Can this be correct? So "Bill" after struggling with this problem for a long time can you please let me know if the program in OCT 88 issue is correctly printed? Your help will be greatly appreciated by me. I am 67 years old Bill. But have aged somewhat with this problem. HO HO. Hoping to hear from you soon regarding this problem.

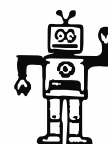
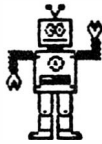
ANSWER:

As far as I know the program is correct as printed. I take a working program and print it. We do reformat the printout so that when a line is longer than 32 characters we indented the continuation 3 spaces. Starting this month we just leave a space before listing a long line. You may check to make sure a zero (0) is not interchanged with an O.

You are correct about an error in our drawing in the October issue. Pin 4 should be used instead of pin 2 to send data. The diagram is correct in our November issue. If you have a vacuum tube transmitter then you will have to use the circuit in the October issue.

+ + +

If you have a question or a solution to a problem, we would like to hear from you.



A CHALLENGING GAME

The Robot is after you!!! All you have to do is avoid it. This is an exciting one player game. Use the arrow keys to control your movements. Your score is indicated by the growing bar at the bottom of the screen. Hang in there and out smart the robot.

```

10 CLS:GOSUB 1490

20 DIM R(5),Y(5),B(5),PX(12),PY(
12),T(3),F(12,12),YX(12,12),YY(1
2,12)
30 GOSUB 270:GOSUB 430:GOSUB 710

40 FOR I=480 TO 511:READ A:POKE
I+1024,A:NEXT
50 IF INKEY$="" THEN 50
60 POKE 1535,52

70 MX=128:DX=14:MY=95:DY=10:XR=1
2:YR=8:XY=1:YY=5:RR=1:TA=0:O=0
80 FOR X=1 TO 12
90 PX(X)=MX+(X-7)*DX+1
100 NEXT X
110 FOR Y=1 TO 12
120 PY(Y)=MY+(Y-7)*DY+1
130 NEXT Y
140 PCLS 0
150 FOR A=2 TO 6
160 POKE 1535,51

170 LINE(MX-A*DX,MY-A*DY)-(MX+A*
DX,MY+A*DY),PSET,B
180 NEXT
190 FOR A=3 TO 5

200 LINE(MX-DX,MY-A*DY)-(MX+DX,M
Y+A*DY),PRESET:REM VERT OPEN

210 LINE(MX-DX,MY+A*DY)-(MX+DX,M
Y+A*DY),PRESET

220 LINE(MX-A*DX,MY-DY)-(MX-A*DX
,MY+DY),PRESET:REM HORIZ OPEN

230 LINE(MX+A*DX,MY-OY)-(MX+A*DX
,MY+DY),PRESET

```

```

240 NEXT
250 POKE 1535,51
260 GOTO 580
270 PMODE 4,1
280 PCLS 0
290 GET (0,0)-(12,8),B,G

300 DRAW "BM 2,3;R2;U2;R3;D2;R2;
D3;L1;U2;L1;D5;R1;D1;L2;U3;L1;D3
;L2;U1;R1;U5;L1;D2;L1;U3"
310 GET (1,1)-(12,8),R,G
320 PCLS 0

330 LINE (6,3)-(6,7),PSET:LINE (
4,5)-(8,5),PSET
340 GET (1,1)-(12,8),T,G
350 PCLS 0
360 LINE (6,3)-(6,5),PSET
370 LINE (6,5)-(8,8),PSET
380 LINE (6,5)-(4,8),PSET
390 LINE (4,4)-(8,4),PSET
400 CIRCLE (6,2),1
410 GET (1,1)-(12,8),Y,G
420 RETURN
430 FOR Y=1 TO 5
440 FOR X=1 TO 12
450 READ F(X,Y)
460 NEXT X,Y
470 FOR Y=8 TO 12
480 FOR X=1 TO 12
490 READ F(X,Y)
500 NEXT X,Y

510 DATA 1,1,1,1,1,0,0,1,1,1,1,1
,1,1,1,1,1,0,0,1,1,1,1,1,1,1,1
,1,0,0,1,1,1,1,1,1,1,1,1,0,0,1
,1,1,1,1,2,1,1,1,0,0,0,0,1,1,1,1

520 DATA 1,1,1,1,0,0,0,0,1,1,1,3
,1,1,1,1,1,0,0,1,1,1,1,1,1,1,1
,1,0,0,1,1,1,1,1,1,1,1,1,0,0,1
,1,1,1,1,1,1,1,1,0,0,1,1,1,1,1

530 FOR Y=6 TO 7
540 FOR X=1 TO 12
550 F(X,Y)=0
560 NEXT X,Y
570 RETURN

580 PUT (PX(XY)+1,PY(YY)+1)-(PX(
XY)+12,PY(YY)+8),Y,PSET

```

```

590 PUT (PX(XR)+1,PY(YR)+1)-(PX(
XR)+12,PY(YR)+8),R,PSET
600 POKE 1535,50
610 FOR X=1 TO 12
620 FOR Y=1 TO 5

630 IF F(X,Y)=1 THEN PUT (PX(X)+
1,PY(Y)+1)-(PX(X)+12,PY(Y)+8),T,
PSET
640 NEXT Y,X
650 POKE 1535,49
660 FOR X=1 TO 12
670 FOR Y=8 TO 12

680 IF F(X,Y)=1 THEN PUT (PX(X)+
1,PY(Y)+1)-(PX(X)+12,PY(Y)+8),T,
PSET
690 NEXT Y,X
700 GOTO 930
710 FOR Y=1 TO 5
720 FOR X=1 TO 12
730 READ YX(X,Y),YY(X,Y)
740 NEXT X,Y

          1000 TX=XY:TY=YY
750 DATA 1,0,1,0,1,0,1,0,1,0,1,0
,1,0,1,0,1,0,1,0,0,1,0,-1,1,
0,1,0,1,0,1,0,1,0,1,0,1,0,1,
0,0,1,0,1,0,-1,0,-1,1,0,1,0,1,0,
1,0,1,0,1,0,1,0,0,1,0,1,0,1,0,-1
,0,-1,0,-1,1,0,1,0,1,0,1,0,1,0,0
,1,0,1,0,1,0,1,0,-1,0,-1,0,-1,0,
-1,0,0,0,0,0,0,0,0
760 DATA 0,1,0,1,0,1,0,1
770 FOR Y=6 TO 7
780 FOR X=1 TO 12
790 READ YX(X,Y),YY(X,Y)
800 NEXT X,Y

810 DATA 0,-1,0,-1,0,-1,0,-1,0,0
,0,0,0,0,0,0,0,0,1,0,1,0,1,0,1

820 DATA 0,-1,0,-1,0,-1,0,-1,0,0
,0,0,0,0,0,0,0,0,1,0,1,0,1,0,1

830 FOR Y=8 TO 12
840 FOR X=1 TO 12
850 READ YX(X,Y),YY(X,Y)
860 NEXT X,Y

870 DATA 0,-1,0,-1,0,-1,0,-1,0,0
,0,0,0,0,0,0,0,0,1,0,1,0,1,0,1,0,-
1,0,-1,0,-1,0,-1,-1,0,-1,0,-1,0,
-1,0,-1,0,0,1,0,1,0,1

880 DATA 0,-1,0,-1,0,-1,-1,0,-1,
0,-1,0,-1,0,-1,0,-1,0,-1,0,0,1,0
,1

890 DATA 0,-1,0,-1,-1,0,-1,0,-1,
0,-1,0,-1,0,-1,0,-1,0,-1,0,-1,0,
0,1

900 DATA 0,-1,-1,0,-1,0,-1,0,-1,
0,-1,0,-1,0,-1,0,-1,0,-1,0,-1,0,
-1,0

910 RETURN

920 DATA 32,32,32,32,40,16,18,5,
19,19,32,1,14,25,32,11,5,25,32,2
0,15,32,2,5,7,9,14,41,32,32,32,5
3

930 SCREEN 1,1
940 GOSUB 990
950 IF CV THEN 1550
960 GOSUB 1080
970 IF CV THEN 1360
980 GOTO 940

990 IF XY=6 OR XY=7 OR YY=6 OR Y
Y=7 THEN GOSUB 1200 ELSE X=YX(XY
,YY):Y=YY(XY,YY)

1010 XY=XY+X:YY=YY+Y

1020 IF F(XY,YY)=3 THEN CV=1:GOT
01040

1030 IF F(XY,YY)=1 THEN TA=TA+1:
LINE (TA-51*0,180-0)-(TA-51*0,18
5-0),PSET:SOUND 99,1:IF TA=255 A
ND 0=0 THEN 1470

1040 PUT (PX(TX)+1,PY(TY)+1)-(PX
(TX)+12,PY(TY)+8),B,PSET:F(TX,TY
)=0

1050 PUT (PX(XY)+1,PY(YY)+1)-(P
X(XY)+12,PY(YY)+8),Y,PSET:F(XY,Y
Y)=2
1060 IF CV THEN RETURN
1070 RETURN

1080 IF XR=YR THEN X=0:Y=YX(XR,Y
R):GOTO 1120

1090 IF XR=13-YR THEN X=-YY(XR,Y
R):Y=0:GOTO 1120

1100 IF(((XR=6 OR YR=6)AND(XR<YR
))OR((XR=7 OR YR=7)AND(XR>YR)))
THEN GOSUB 1260:GOTO 1120
1110 X=-YX(XR,YR):Y=-YY(XR,YR)
1120 TX=XR:TY=YR
1130 XR=XR+X:YR=YR+Y
1140 IF F(XR,YR)=2 THEN CV=1

```

```

1150 PUT (PX(TX)+1,PY(TY)+1)-(PX
(TX)+12,PY(TY)+8),T,PSET
1160 F(TX,TY)=1

1170 PUT (PX(XR)+1,PY(YR)+1)-(PX
(XR)+12,PY(YR)+8),R,PSET:F(XR,YR
)=3
1180 IF CV THEN RETURN
1190 RETURN

1200 IF PEEK(341)=247 AND YY<>1
AND YY<>9 AND YY(XY,YY)<>1 THEN
X=0:Y=-1:RETURN

1210 IF PEEK(342)=247 AND YY<>4
AND YY<>12 AND YY(XY,YY)<>-1 THE
N X=0:Y=1:RETURN

1220 IF PEEK(343)=247 AND XY<>1
AND XY<>9 AND YX(XY,YY)<>1 THEN
X=-1:Y=0:RETURN

1230 IF PEEK(344)=247 AND XY<>4
AND XY<>12 AND YX(XY,YY)<>-1 THE
N X=1:Y=0:RETURN
1240 X=YX(XY,YY):Y=YY(XY,YY)
1250 RETURN

1260 IF XY<YY THEN LY=XY:ZY=YY E
LSE LY=YY:ZY=XY

1270 IF 13-ZY<LY THEN RY=13-ZY E
LSE RY=LY

1280 IF RR=RY THEN X=-YX(XR,YR):
Y=-YY(XR,YR):RETURN

1290 IF RR<RY THEN GOSUB 1320:GO
TO 1310
1300 IF RR>RY THEN GOSUB 1340
1310 RETURN

1320 RR=RR+1:IF YX(XR,YR)=0 THEN
IF XR>6 THEN X=-1:Y=-1 ELSE X=1
:Y=1 ELSE IF YY(XR,YR)=0 THEN IF
YR>6 THEN X=1:Y=-1 ELSE X=-1:Y=
1
1330 RETURN

1340 RR=RR-1:IF YX(XR,YR)=0 THEN
IF XR>6 THEN X=1:Y=-1 ELSE X=-1
:Y=1 ELSE IF YY(XR,YR)=0 THEN IF
YR>6 THEN X=1:Y=1 ELSE X=-1:Y=-
1
1350 RETURN
1360 FOR X=1 TO 10:NEXT

1370 SOUND 108,3:SOUND 108,2:SOU
ND 147,10:FOR T=1 TO 40:NEXT T:S
OUND 108,3:SOUND 147,2:SOUND 170
,10
1380 RESTORE:GOSUB 430
1390 CLS

1400 PRINT:PRINT:PRINT:PRINT~
UGH!~
1410 PRINT~ HE GOT YOU~

1420 PRINT:PRINT~BUT BEFORE HE D
ID YOU MANAGED TO SCORE ~;STR$(
TA);~,000 POINTS~

1430 PRINT:PRINT~THAT'S NOT TOO
BAD. WANT TO TRY AGAIN~;
1440 INPUT ANS$

1450 IF LEFT$(ANS$,1)=~Y~ THEN S
CREEN 1,1:CV=0:GOTO 70
1460 END

1470 CLS:PRINT:PRINT:PRINT:PRINT
:PRINT~C O N G R A T U L A T I O
N S !~:PRINT:PRINT~ YOU HAVE SA
VED YOUR SELF - AND ALL HUMANIT
Y AS WELL~:PRINT:PRINT~DO YOU WI
SH TO CONTINUE ON TO TRY AND S
ET A NEW RECORD~;

1480 INPUT A$:IF LEFT$(A$,1)=~Y~
THEN O=5:SCREEN 1,1:CV=0:GOTO 1
040 ELSE PRINT~YOU DESERVE A BRE
AK~:END

1490 PRINT:PRINT~ ROB
OTRUN~:PRINT

1500 PRINT~ THE ROBOT IS AFTER Y
OU! ALL YOU HAVE TO DO IS AVOID I
T. USE THE ARROW KEYS TO CONTROL
YOUR MOVE-MENT.~

1510 PRINT~ YOUR SCORE IS INDICA
TED BY THE GROWING BAR AT THE BO
TTOM OF THE SCREEN.~

1520 PRINT~ IF YOU HANG IN THERE
LONG ENOUGH YOU WIN.~

1530 PRINT:PRINT~ GOOD LUCK!!
!~
1540 RETURN

1550 PUT(PX(XR)+1,PY(YR)+1)-(PX(
XR)+12,PY(YR)+8),R,PSET:GOTO 1360

```

HAM RADIO PROGRAMS

For Radio Shack Color Computers

MORSE - This program allows a key to be pressed and then sounds the Morse equivalent. 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 - Type in a prefix for a foreign country and have the country displayed.

ANTENNA - An antenna design program that calculates the dimensions for a wide spaced Yagi antenna of up to 4 elements.

Order HR-1 (3 programs) \$11.95

MORSE TERMINAL

When used with an interface this converts your color computer into a Morse Terminal. To transmit just type the Morse characters and the computer keys your transmitter. In the receive mode the computer decodes and displays the Morse characters on the screen. Instructions are included for building an interface with off the shelf parts. HR-2 \$12.95

STATION LOG

Keep a record of your contacts. Just enter the information as it is requested. Items that are the same such as date, frequency, and type of emission need only be entered once and changed as needed. Save and load records to tape or disk. Add to the log and quickly find stations. Print the log to a printer. HR-3 \$9.95

THERMOMETER

Now your computer can give you the temperature in both Fahrenheit and Centigrade. Assembly plugs into a joystick port & consists of a thermistor on a 10' cable for the single unit and a second thermistor on a 20' flat cable for the dual unit. The dual unit can be used to measure inside and outside temperature. CC-THERM \$12.95, CC-THERM 2 \$19.95.

MEMORY SAVER 2

A battery backup for all color computers. Leave programs in your computer and the Memory Saver will preserve them in case of a power failure. A real time saver for cassette systems. MS-2 \$39.95

WEATHER FACSIMILE (WEFAX)

Draw weather maps on the screen. Feed transceiver's audio into the cassette port. Requires a joystick. WEFAX \$6.95.

HAM RTTY TERMINAL

Uses the cassette port. Requires simple interface to connect cassette audio into the Mic jack and receiver audio into the cassette port. Interface instructions are included. 60, 75, & 100 WPM Baudot. RTTY \$6.95.

* MORSE KEYER (new) *

Send characters direct from the keyboard or select up to 10 preprogrammed messages to automatically call CQ, CQ DX, First Transmission, Weather, DE your call, etc. Also allows entering the call letters of the station worked and his name which can automatically be sent by pressing only one key. Order the cable below for a super keyer for less than \$25. M-KEYER \$12.95

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Dynamic Electronics Inc.
P. O. Box 896 (205) 773-2758
Hartselle, AL 35640

HAM RADIO & COMPUTERS

by
bill chapple w4gqc

RECEIVING MORSE CODE

In this series I am showing how to use the Radio Shack Color Computers for ham radio applications. In the October and November 1988 issues of Dynamic Color News, I showed how to build a simple interface to allow the computer to be a deluxe Morse code keyer. This interface used the RS-232 or printer port and could be built completely in the cable.

We have had many requests for a more simple Morse interface than we use in our Morse terminal program. That interface required a power supply with 3 voltages and a couple of integrated circuits. What I would like is a simple interface for receiving Morse code like I developed for keying a transmitter.

To use the RS-232 port for receiving would require that somehow I obtain a plus and minus voltage source. This was what was used in the Morse terminal interface and was one of the reasons that a power supply was required.

After looking at the cassette, printer, and joystick ports, I discovered that 5 volts was available on the joystick port and that perhaps I needed to take a different approach at receiving Morse code. I have been amazed at the joystick ports because of their usefulness. We wrote a series on using them for other applica-

tions such as a voltmeter and thermometer. I decided to use a circuit similar to the keyer circuit and let the joystick input change with an audio signal. I connected the receiver's audio into the base of a 2N2222 transistor through a 10K resistors. A second 10K resistor was connected across the base and emitter of the transistor. I then connected a 100K resistor from the 5 volts in the joystick port to the collector of the transistor. I also connected a .1 microfarad capacitor across the resistor. The input to the joystick port goes to the collector of the transistor. See Figure 1 for the schematic diagram.

With no audio signal, the joystick port should be high and give a reading of 63. When a signal is present, the reading should go low indicating a signal. The capacitor and resistor form a time constant and hold the signal low on the negative half of the audio cycle.

To connect the audio to the computer, an external speaker and a "Y" adapter will be required. It may be possible to use the computer's audio circuit, but the audio has to be turned off for the joystick port to work. I may be able to work this out later, but for now I am using an external speaker.

SOFTWARE

Since I had previously developed software for decoding Morse code, I decided to basically use it and add a few improvements. First of all, I knew that a machine language subroutine would be required for the timing. I used 30000-30100 in my previous program so I decided to stay with this memory location. However I decided to use the USR function so that I could return the time directly to basic and not have to use memory peeks to obtain the time. The USR function is much faster and actually saves some basic steps.

Basic is fast enough to combine the bits into a character. I used an array for the character look up table and set up the array for 130 characters. A character that is not a Morse character causes a space to be printed. This saves cluttering up the screen.

The program automatically adjusts for speed. If the computer's speed is too slow, it is doubled and if it is too fast, it is divided by two.

As the program is run, an option to select the double speed mode is available. This should be used for fast speed stations and the normal speed should be used for very slow stations. There is a speed range where both will work.

Since there are many stations that do not send properly, I looked at a feature that would copy some of them. I added a section that allows for wide spaces between elements. For example an "R" is dit-dah-dit. If too much space is left between the elements, the computer will print the characters for dit, dah, and dit which will be ETE since a single dit is an "E" and a single dah is a "T". With this wide space option, more time is allowed between characters for the computer. I picked a value that seemed the best compromise and it enabled me to copy some stations that I would

not have been able to previously copy. To enable the wide space press the right arrow while receiving. To return to narrow spacing press the left arrow. To find out the kind of spacing you are using press the "S" key and the information will be printed on the screen.

The machine language is transferred to memory by a READ -DATA arrangement. This allows the subroutine to be contained within the program.

Next month I want to combine the Deluxe Morse keyer with this program to have a new Morse terminal program. This program works very well and I am pleased with it. Remember that if a station does not send properly, then the computer can not display it correctly. Static (QRN) and interference from other stations (QRM) will cause errors. Adjust the receiver's volume and frequency for the best copy.

MORSE CODE DECODER

```

10 KK=.5 'NARROW SPACING
20 DEFUSRO=30031

30 DIM A$(130) 'SET UP ARRAY FOR
  THE CHARACTERS

40 CLS:PRINT~MORSE CODE RECEIVER
  PROGRAM
50 PRINT~COPYRITE (c) 1989

60 PRINT~DYNAMIC eLECTRONICS INC
  .

70 PRINT~WRITTEN BY BILL CHAPPLE
  W4GQC

80 PRINT:PRINT~PRESS THE RIGHT A
  RROW FOR WIDE SPACING ON RECEIV
  E AND THE LEFT ARROW FOR NARROW
  SPACING. PRESS THE S KEY TO SHOW
  THE SPACING THAT IS PRESENTLY
  IN USE.
90 PRINT

100 IF PEEK(33021)=50 THEN C3=2
  'COLOR COMPUTER 3 TEST

110 PRINT~PRESS D FOR DOUBLE SPE
  ED
120 D$=INKEY$:IF D$="" THEN 120

```



```

130 IF DS=~D~ THEN DS=1
140 IF DS=1 THEN POKE 65495+C3,1
    ELSE POKE 65494+C3,0
150 ' LOADM ML SUB

160 FOR J=30000 TO 30072:READ A:
POKEJ,A:NEXTJ
170 'INITIALIZE THE ARRAY

180 FOR J=0 TO 129:A$(J)=CHR$(32
):NEXTJ
190 'DEFINE THE CHARACTERS
200 A$(5)=~A~:A$(24)=~B~
210 A$(26)=~C~:A$(12)=~D~
220 A$(2)=~E~:A$(18)=~F~
230 A$(14)=~G~:A$(16)=~H~
240 A$(4)=~I~:A$(23)=~J~
250 A$(13)=~K~:A$(20)=~L~
260 A$(7)=~M~:A$(6)=~N~
270 A$(15)=~O~:A$(22)=~P~
280 A$(29)=~Q~:A$(10)=~R~
290 A$(8)=~S~:A$(3)=~T~
300 A$(9)=~U~:A$(17)=~V~
310 A$(11)=~W~:A$(25)=~X~
320 A$(27)=~Y~:A$(28)=~Z~
330 A$(63)=~0~:A$(47)=~1~
340 A$(39)=~2~:A$(35)=~3~
350 A$(33)=~4~:A$(32)=~5~
360 A$(48)=~6~:A$(56)=~7~
370 A$(60)=~8~:A$(62)=~9~
380 A$(85)=~.~:A$(115)=~ ,
390 A$(76)=~?~:A$(97)=~*~
400 PRINT

410 X=USRO(0) 'GET TIME FROM ML
SUBROUTINE

420 A=PEEK(29999) 'A TELLS WHETH
ER WE WERE TIMING DATA OR SPACES

430 IF A=0 THEN 520 '0 IS A SPAC
E

440 'THE FOLLOWING IS AUTOMATIC
SPEED ADJUSTMENTS
450 IF X>(6*S) THEN S=2*S
460 IF X<(S/2) THEN S=S/2
470 IF S<1 THEN S=2
480 W=0:IF X>=2*S THEN W=1
490 Q=2*Q+W

500 IF Q>=128 THEN Q=0 '128 IS T
HE LARGEST CHARACTER WE HAVE. I
F GREATER THAN 128 THEN MUST BE
AN ERROR.
510 GOTO 410
520 P$=INKEY$:IF P$=~ THEN 580

530 ' THE FOLLOWING ALLOWS FOR A

```

```

DDITIONAL SPACING BETWEEN BITS.

540 IF P$=CHR$(8) THEN KK=.5:GOT
0580

550 IF P$=CHR$(9) THEN KK=2.0:GO
T0580

560 IF P$=~S~ AND KK=.5 THEN PRI
NT~CLOSE SPACING~

570 IF P$=~S~ AND KK=2.0 THEN PR
INT~WIDE SPACING
580 IF X<KK*S THEN 410

590 PRINTA$(Q);:IF X>5*S THEN PR
INT~ ~;

600 IF JOYSTK(0)>55 THEN 600 'TH
IS IS SPACE BETWEEN WORDS. THIS
CAUSE THE PROGRAM TO WAIT UNTIL
ADDITIONAL CHARACTERS ARE BEING
SENT
610 Q=1
620 GOTO410

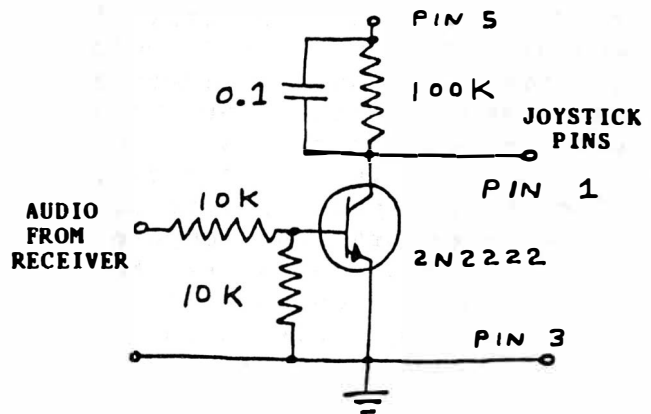
630 DATA 189,169,222,182,1,90,12
9,55,36,3,134,1,57,79,57,18,18

640 DATA 79,183,117,47,57,18,18,
18,18,18,18,18,18,141,223,183
,117,47,79,95,253,117

650 DATA 38,141,213,177,117,47,3
8,18,252,117,38,195,0,1,16,131,2
55,220,36,6,253,117,38,32

660 DATA 232,18,252,117,38,126,1
80,244,,,

```



MORSE DECODER INTERFACE

FIGURE 1

DYNAMIC COLOR NEWS
CUMULATIVE INDEX

Editor's Comments, Questions and Answers, and Operating Hints are included in all issues. Product reviews are in issues since #17. Numbers in Parentheses indicate the part of a series. A N indicates the issue is not available on disk or tape. All issues except #1,2,3, 16, & 17 are available on disk or tape.

#1 Feb 84 N
Basic Programming
Programming Theory
Multiprogram Manager
MPM Program Listing
Machine Lang. Prog.

#2 Mar 84 N
Basic Programming
Memory Expansion
Machine Lang. Prog.

#3 Apr 84 N
ASCII Part 1
Basic Programming
Machine Lang. Prog.

#4 May 84
ASCII Part 2
ML Programming-
Interrupts
Installing an
Interrupt switch
Utility Program

#5 June/July 84
Powerful Remarks
(Remarks for data)
ASCII Part 3
Uninterrupted Power
Machine Lang. Prog.

#6 Aug 84
Powerful Remarks (2)
Data in Remarks
Check Book Program
Word Processor
Machine Lang. Prog.

#7 Sept 84
Machine Lang. Prog.
Writing Position
Independent Code
Powerful Remarks (3)

#8 Oct 84
Basic Programming
(Data Handling Tech)
Machine Lang. Prog.
(Memory Searching)

#9 Nov 84
Computer Sound (1)
Basic Programming
(Sorting)
Ball Team Sort Pgm

#10 Dec 84
Random Numbers
Computer Sound (2)
Sound Learning Pgm
Sound Demo Program

#11 Jan 85
Random Numbers (2)
Card Shuffling
Computer Sounds (3)
Machine Language Subs
Sound Program Disc.

#12 Feb 85
Large Memory Pgm (1)
Computer Graphics (1)
Video Reverser (hard)

#13 Mar 85
Large Memory Pgm (2)
Computer Graphics (2)
Writing Programs (1)

#14 Apr 85
Large Memory Pgm (3)
Computer Graphics (3)
Graphics Demo Program
Writing Programs (2)
Print Demo Pgm

#15 May 85
Writing Programs (3)
Gas Mileage Program
Large Memory Pgm (4)
Data Move Program
Computer Graphics (4)
Graphics Demo Program

#16 June 85 N
Writing Programs (4)
Grade Book Program
Computer Graphics (5)
Character Gen. Pgm
Large Memory Pgm (5)
Address File Program

#17 July 85 N
Large Memory Pgm (6)
64K RAM Program
Writing Programs (5)
Alarm Clock Program
Computer Graphics (6)
Character Gen. Pgm.
CoCo Heat Problem

#18 Aug 85
Writing Programs (6)
Address File Program
Large Memory Pgm (7)
Study Program
Computer Graphics (7)
Line Demo Program

#19 Sept 85
Writing Programs (7)
Fast Food Program
Computer Graphics (8)
Bar Graph Program
Vector Correction Pgm
Large Memory Pgm (8)

#20 Oct 85
Writing Programs (8)
Word Processor Pgm
Bar Graph with
Character Generator
Second Port
Page -1 for 32K + MEM
Large Memory Pgm (9)

#21 Nov/Dec 85
Writing Programs (9)
Check Book Program
Computer Graphics(10)
Circle Demo PGM
Recipe Program
RAM Disk Program
Electric Cost Program

#22 Jan 86
Writing Programs (10)
Inventory Program
Computer Graphics(11)
ARC & Circle Demo PGM
Large Memory Pgm(11)
Ship War (Game)

#23 Feb 86
Writing Programs (11)
File DEMO Program
Basic Basic (1)
Computer Graphics(12)
Draw Demo Program
Interfacing Comp. (1)
Bouncing Ball (Game)

#24 Mar 86
Interfacing Comp. (2)
Electronic Billboard
Writing Programs (12)
Basic Basic (2)
Computer Graphics(13)
Draw Program
(Scrolling)
Large Memory Pgm(12)
Readisk Subroutines

#25 Apr 86
Interfacing Comp. (3)
Writing Programs (13)
Basic Basic (3)
Tanks (Game)
Large Memory Pgm(13)
Upper Memory Program
Computer Graphics(14)
Graphics Programming
(GET & PUT)

#26 May 86
Writing Programs (14)
ML Programming (1)
Interfacing Comp. (3)
Roulette (Game)
Page -1 Pgm Dev.
Basic Program Restore
Large Memory Pgm (F)
Computer Graphics(14)
Graphics Draw Program

#27 June 86
ML Programming (2)
ML Program (Addition)
Page -1
Mem. Peek & Poke Pgm
Writing Programs (15)
Inventory Program
Interfacing Comp. (5)
Chords (Music Pgm)
Computer Graphics(16)
Graphics Draw Program

#28 July 86
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ML Add with Carry
Graphics Zoom Program
Writing Programs (16)
File Program
Interfacing Comp. (6)
ASCII Demo Program
Astro Dodge Game
Computer Graphics (F)

#29 Aug 86
ML Programming (4)
ML Subtract Program
Interfacing Comp. (7)
Organize VCR Tapes
Ham Radio & Comp. (1)
Horse Code Program
Disk Disassembler
Basic Prog. (17)

#30 Sept 86
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ML Data Move Program
Disk File Utility
Basic Programming
File Program
Ham Radio & Comp. (2)
Antenna Design Pgm
Interfacing Comp. (8)
ML Output Subroutines

#31 Oct 86
Money Chase (Game)
ML Programming (6)
Multiple Choice Test
Basic Programming
Address File Pgm (1)
Introduction to OS-9
Interfacing Comp. (9)
Ham Radio & Comp. (3)

#32 Nov 86
Star Constellations
ML Programming (7)
CoCo 3 (1)
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Duelling Cannons
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OX Program (Ham)
Interfacing Comp.(10)
Hardware Interface

#33 Dec 86
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Lucky Money (Game)
Interfacing Comp.(11)
DYTERM Terminal Pgm
Basic Programming
(Sorting)
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#34 Jan 87
Cassette Control Sw.
ML Programming (9)
Jungle Adventure
Interfacing Comp.(12)
Ham Radio & Comp. (6)
Horse Code Keyer Pgm
CoCo 3 (3)
Basic Programming
Address File & Sort

#35 Feb 87
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Interfacing Computers
(Joystick Voltmeter)
Ham Radio & Comp. (7)
Scrolling Around
Basic Programming
Address File

#36 Mar 87
OWARE (Game)
Joystick Ohmmeter
EPROMS (1)
ML Programming (11)
CoCo 3 (LowerCase
Char & Rev.Video)
Ham Radio & Comp. (8)
Basic Programming
Invoice Program

#37 Apr 87
Diver (Game)
EPROMS (2)
ML Programming (12)
Using Joystick Port
for Measuring Temp.

Ham Radio & Comp. (9)
CoCo 3 (Error Trap)
Basic Programming

#38 May 87
Joystick Digital
Thermometer
Accounts Payable
(Business Pgm)
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ML Programming (13)
CoCo 3 Memory Manager
Ham Radio & Comp.(10)
Basic Programming
(Fast Sorting)

#39 June/July 87
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Measuring Light with
Joystick Porta
EPROMS (4)
CoCo 3 Graphics Demo
Ham Radio & Comp.(11)
Calendar Program

#40 Aug 87
Job Costing Program
ML Programming (15)
Basic Programming
Ham Radio & Comp.(12)
Compound Interest Pgm
CC-3 Hi-Res Graphics
Save Program
Dog Race Program

#41 Sep 87
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Reformatting Data (1)
Meteora Program
Computer Terminology
Ham Radio & Comp.(13)
Relay Interface
(Hardware Project)

#42 Oct 87
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(Basic Programming)
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Disk Cataloger Pgm
Reformatting Data (2)
Parachute (Game)
Ham Radio & comp.(14)
HAM RTTY Program

#43 Nov 87
Save the Maiden (G)
Taking Control (2)
ML Programming (18)
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Music Program
HAM Radio & Comp.(15)
(Packet Radio)

#44 Dec 87
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Audio Generator Pgm
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#47 Mar 88
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OS-9 & Basic 09
Coast-Coast (Game)
Logic (Ed. Game)
Forth Prog. Lang.
ML Loader Pgm.
Ham Radio & Comp. (18)
WEFAX -Weather Pgm.

#48 Apr 88
Marriage of ML & Bas
Area Code (Program)
OS-9 & Basic 09
Taking Control (7)
(Basic Programming)
Forth Programming (2)
Fast Dir (Disk Pgm)
Ham Radio & Computers
Tuning Meter Pgm
Atlanta (Picture)

#49 May 88
Advance (Game)
Marriage of ML & Bas
Superspell (Ed. Pgm.)
OS-9 & Basic 09
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Basketball Math (G)
Taking Control (8)
Ham Radio & Computers
Ham Math Program

#50 June 88
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Media Master (Pgm)
Mysterious Island (G)
Taking Control (9)
Basic Prog.
Improved Word Proc.
Forth & Forth-Editor
Ham Radio & Computers
Improved RTTY Program
Airplane (Game)

#51 July 88
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Using Interrupts
Maze (ML Game)
Forth Background
Taking Control (10)
Player Guitar (prog)
Kwik Kopyur (Disk UT)
Ham Radio & Computers
Audio Squelch Prog
Hardware
Motor Jump (game)
Bustout (game)

#52 Aug 88
OS-9 & Basic 09
Trio (three Progs)
COCO III (new series)
Hi-Res Screen Saving
With Prog
EDT-MAC (AL Ut)
Taking Control (11)
Teacher Grade Prog
Ham Radio & Computers
Handy Ham Prog
Hardware (RS-232
switch)
U.S. States (prog)
Loan Program

#53 Sept 88
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COCO III (part 2)
Educational TRIO
Neighboring States
Basic Programming
(Direct Access Files)
Direct Access File Pgm
Aliens (CoCo 3 game)
Ham Radio & Computers
Bible Quiz

#54 Oct 88
OS-9 & Basic 09
COCO III (part 3)
Squares (game)
CoCo COOTIE (game)
Basic Programming
(Using Disk Files)
Grade Program
Flashcard (Ed. Pgm)
Ping Pong (game)
Ham Radio & Computers
Improved Morae Keyer Pgm
World Map (Pgm)

#55 Nov 88
OS-9 & Ba. 09 (redirection)
COCO III (part 4)
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Disk Drive Problems
(Double side utilities)
Ham Radio & Computers
Morae Keyer Interface
Forward (game)
Ba. Programming (Disk I/O)
Disk I/O Program
Drill (Math Pgm)

#56 Dec 88
OS-9 & Basic 09
(Using Multiuser Feature)
Screen Dump Pgm
(DHP-105 printer)
COCO III (part 5)
Asseby Language
Basic Programming-DSK I/O
ML Address Finder Pgm
Ham Radio & Computers
SWK & Power Pgm
Hangman (word game)

#57 Jan 89
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COCO III (high resolution I
Air Attack (game)
Ba. Programming (ML Loader
Machine Language Loader
C Programming (new)
Math (educational game)
Ham Radio & Computers
VHF Antenna Design Pgm
AUTOEXEC Pgm
OS-9 & Basic 09

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Syslink (312) 622-4442 Chicago Syslink Net-
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DYNAMIC COLOR NEWS

ON Disk or Tape

Now you can have all of our editorials and programs for your tape or disk library. Programs are ready to load and run. We have a variety of programs such as games, geneology, home management, business, and utility programs. The editorials are saved with a 32 column width as a word processor file so you can review them on your screen or print them on your printer. Software is included for viewing the editorials. Combine each part of a series to form a booklet on each subject.

If you are interested in programming then study the examples given in our programming series. Example programs are included on disk or tape. We are covering both basic and assembly (machine language) programming. Suppose you want to use the extra memory in a 64K color computer. Then review the editorials and examples on managing the extra memory and run the memory manager programs.

Do you want to learn to interface your computer using the joystick port? We had a series on this with example programs for making a voltmeter, thermometer, ohmmeter, and light meter.

If your interest is ham radio then we have articles each month since August 1986. We covered Morse code, Antenna design, DX stations, Morse Keyer, Morse Terminal, and Radio Teletype with support programs.

We support the color computer 3 and have given programs for using the memory manager, graphics and error trapping.

All programs are ready to run and complement the editorials in the magazine. We have covered many subjects and there is much more to come. All of our back issues are available on disk or tape. See our cumulative index for a list of subjects. We also have program collections of key programs from past issues. See our advertisement in this issue.

COST

	USA & Can.	Foreign (Air)
1 year	\$60.00	\$75.00
6 months	35.00	49.00
1 month	6.95	8.95

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1. 10 cents a word, \$3 minimum.
2. Name, Address, & Telephone listed free.
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You don't have to pay a lot for QUALITY disks. Our disks are complete with labels, sleeves, and write protect tabs and work on COCO's and MSDOS computers. These are double sided double density disks and will be replaced if defective. DSK-2 \$4.95 for package of 10. Add \$1.00 S/H. Dynamic Electronics Box 896, Hartselle, AL 35640. (205) 773-2758

WANT TO BUY Software accumulations and hardware for Color Computer I, II, and III. Need Radio Shack Manuals and software also. No Public Domain. Also Books & Back Issue of magazines. Send Lists. Celestial Themes Atelier, Stephine Ring, Box 132, HCR Rte 3, Staples, MN 56479 (218) 587-2940.

Dynamic Color News is now available on tape or disk for \$6.95 for 1 month, \$35 for 6 months, \$60 for 12 months.

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(Rate sheet 3 - March 1988)
Closing 1st of preceeding month.
Example: Ad for March issue should be received by Feb. 1.

Pages	1X	3X	6X	12X
1/4	20	18	16	15
1/2	30	27	25	23
1	40	37	35	33
2	70	65	60	55

We can do titles for your ad in Red, Blue, Green, or Brown. No all one color ads will be accepted. For color ads send artwork for each color and add 30% per color. Example: One page black and red for 3 times costs \$37 + 11.20 = \$48.20 each month for the three monthss.

Artwork must be camera ready and can be enlarged or reduced at no extra cost. Rates are per page or fraction thereof. We can set up your ad for a reasonable price. Enclose payment with ad copy. Contracts are available. Call or write for a contract form. No X-Rated ads.

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