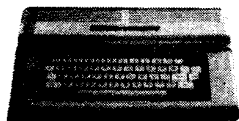
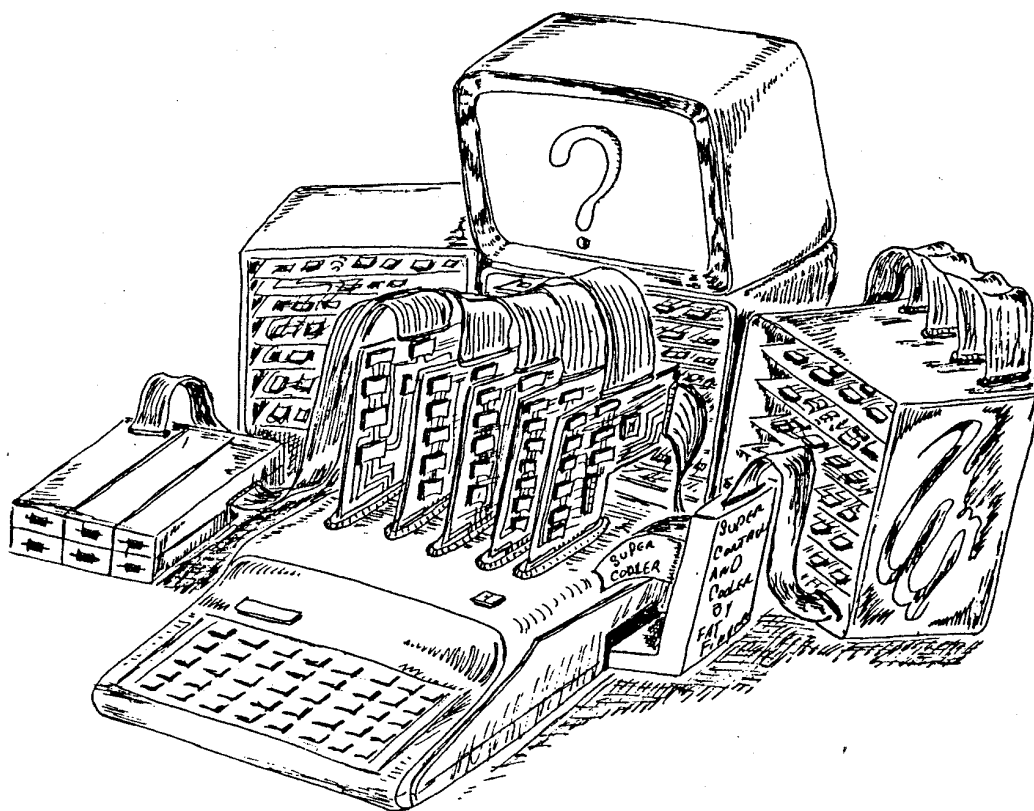
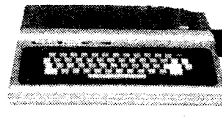


COCO-ADS



The Color Computer Users Magazine
Jan, 1987 \$1.00 Issue C-2



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PROGRAMS		ARTICLES & REVIEWS	
DISK LABEL MAKER	3	PROGRAM OF THE MONTH	5
DETESMINATS	7	MULTIPAK PAL CHIP	8
MATRICES	7	CZ PATCH REVIEW	9
COCO III FONT GENERATOR	11	COCO MIDI II REVIEW	10
DIRECTORY 40	16	COCO III'S	11
ROTATE	22	USING PRINT ERR/MSG	15
RADIATION RUN	24	DISCOVERIES	18
GAME OF LIFE	41	MAGNAVOX COLOR MONITOR REV	19
ONE ARMED BANDIT	48	THE ASSEMBLY LINE	21
ROBOMATH	51	ROMP TRU ROM	30
TRICKY WORDS	54	BUFFER COMES TO COCO	31
		COCO CLUBS	38
		COCO BBS'S	39
		CLASSIFFIED ADS	40
		COCO MEMORY	45
		JDOS COMPATIBILITY	46
		ADVENTURE WRITING PART 5	47

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EPSON PRINTER AND OTHERS.

```

100 ' *****
110 ' *
120 ' * DISKETTE LABEL MAKER *
130 ' * BY *
140 ' * LARRY W. BINENFELD *
150 ' * CORAL SPRINGS, FL *
160 ' *
170 ' *****
180 '
190 ' DESIGNED FOR STAR'S
200 ' GEMINI-10X PRINTER
210 ' CONTROL CODES FOR SUPER
220 ' SCRIPT MODE ARE USED
230 '
240 ' THIS PROGRAM CREATES
250 ' DISKETTE LABELS WHICH CAN
260 ' BE TAPED TO THE DISKETTE
270 ' JACKET FOR QUICK LOCATION
280 ' OF A DESIRED PROGRAM.
290 '
300 DATA BE,E,B2,7F,E,B1,86,14,A
7,B0,8C,12,36,26,F9,CE,E,B2,CC,2
,0,DD,EA,CC,11,3,DD,EC,CC,6,0,D
D
310 DATA EE,AD,9F,CO,4,8E,6,0,A6
,84,27,17,4C,27,30,8D,17,CC,2E,3
,A7,C 0,8D,12,86,20,A7,CO,A7,CO,
30,88
  
```

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```

320 DATA 15,20,F,30,88,20,20,A,C
6,8,A6,80,A7,CO,5A,26,F9,39,8C,7
,0,26,D1,C,ED,96,ED,81,10,26,C2
,7F
330 DATA FF,40,6F,C4,86,FE,97,6F
,86,F,BD,A2,82,86,1B,BD,A2,82,86
,53,B D,A2,82,86,0,BD,A2,82,86,1
B,BD,A2
340 DATA 82,86,31,BD,A2,82,8E,E,
B2,A6,80,27,17,BD,A2,82,7C,E,B1,
B6,E, B1,81,38,26,EF,7F,E,B1,86,
D,BD
350 DATA A2,82,20,E5,CC,D,3,BD,A
2,82,5A,26,FA,4F,7E,AE,15
360 CLEAR1000
370 FOR X=&HE00 TO &HEB0
380 READ A$:V=VAL("&H"+A$)
390 POKE X,V
400 NEXT X : EXEC &HE00
410 END
420 ' TO SAVE AS A 'BIN' FILE
430 ' RUN LINE 440
440 SAVEM"DLM",3584,3760,3584
450 END
  
```

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Program of the Month
by
Eric G. Robichaud

Well now that we're into the new year, and the holiday season is over, it's time to get back down to the real world. As I promised, I'm going to be presenting some "Hard core", technical, and hackers stuff. This month I am presenting two programs for those of you who are mathematically inclined, and next month we'll have some utilities.

The two programs I am presenting this month deal with matrices and determinants. A matrix, simply put, is a grid of numbers with any amount of rows or columns, such as:

```
2 3 4 5
8 9 3 1
1 6 4 2
2 4 3 9
```

A determinant is similar to a matrix, with the main exception being that any given determinant has a set value which can be solved for.

There are two programs this month, one dealing with determinants, and the second dealing with matrix manipulation. I will start with "DETERMINANTS", since it is the easiest to explain. This program simply (or so it seems) takes any square determinant, one with the same number of rows as columns such as the square matrix above, and solves it for the associated value. Anyone who has tried to solve a 10-by-10 determinant will immediately see the value of this short, sweet beauty, since it takes about an hour or more to solve one!

This program will NOT show you how to solve one, or what it is doing, but just pops out the answer (this goes for the second program as well). The purpose of these programs are to have them used to number-crunch otherwise tedious tasks, or to check answers that have been derived "by hand" (for college students).

For those of you who are familiar with solving determinants, I'll capsuleize how the programs work. Simply, it puts the properties of a determinant to use, to eliminate the need for expansion by minors. The program uses a loop to eliminate all numbers below the principal diagonal, so that it may multiply along the principal diagonal to find the value.

The second program, called "MATRICES" (also exhibiting my love for elaborate program names), is a bit more involved since there are more things that can be done with matrices. This program opens with a main menu that allows for four different ways of

manipulating matrices. The first is to multiply out two matrices, and is good for removing the distinct possibility of making a simple mathematical mistake (you'd be surprised to find out how often $2+2=5$), and is good also for number-crunching long tedious jobs. The last function is to add two matrices, and has the same purpose behind it. For both of these, just input the first matrix, then the second, and the computer will spit out the resultant.

The second option is to find the inverse matrix of any matrix you enter. This is pretty straight forward. The third option, my favorite, is to find the answers to simultaneous linear equations. That sounds like a mouth full, and it is! All that means is it finds out that $a=6$ and $b=7$ in the equations:

$$a+b=13$$

$$2a+b=19$$

for example. You must have the same number of equations as unknowns (variables). This routine calls in the afore mentioned one, to find the inverse matrix. The coefficient matrix, which the program asks for, is a matrix consisting of all of the coefficients to the variables. For the above example, the coefficient matrix would be:

```
1 1
2 1
```

The constant matrix is the matrix of constants; the real numbers to the right of the "equals" sign. For our example, this would be:

```
13
19
```

The program will spit out the solution set:

```
6
7
```

and voila!

These programs, granted, are advanced, and are extremely useful to those who know what they are for and how to use them. I, personally, love the ability to find solution sets to equations with 4 or 5 variables in a second or two! I can not explain the theory behind the programs or the topic any further since it is beyond the scope of this article to do so.

Now, before ending for the month, I would like, once again, to make a few notes. I fully support any program that appears in this magazine to the fullest; that is not to be taken lightly. If you have any questions or comments, you can be sure that I will reply. Also, if there are any features you would like to see, or anything you would like to see changed, please let me know; maybe your idea never occurred to me. I am planning

to run an installment every once in a while to be used to present updates, patches, comments, etc. It is important that I get user feedback so that I know what direction I should be taking on patching programs, and writing programs in the future. Don't think what you have to say isn't important; let me be the judge of that!

As per usual, if you have any questions or comments, feel free to write to me at 10

Stoneham Drive, Woonsocket, RI 02895, or reach me on SOFTWARE CONNECTION BBS (401)-765-2890.

This month's programs are available on disk or cassette for \$5.00 postage paid. I have a new utility for next month, so (any guesses?) stay tuned...

```

10 *****
20 *      DETERMINANTS      *
30 * BY: ERIC G. ROBICHAUD *
40 *   COPYRIGHT(C) 1986   *
50 *   PARAGON SOFTWARE   *
60 *****
70
80 'IF THIS PROGRAM BOMBS OUT,
    USUALLY WITH A ?/O ERROR,
    IT MEANS THAT THE DETRMNT.
    IS PROBABLY EITHER NOT
90 'DEFINED, OR HAS THE VALUE
    ZERO (0).
100
110 CLEAR:M=30
120 CLS:PRINT:LINEINPUT"HOW MANY
    ROWS/COLS. ARE THERE IN THE DETERMINANT:";R$
130 R1=VAL(R$):IF R1<1 OR R1>M OR
    R1<>INT(R1) THEN 120
140 DIM A(R1+1,R1+1)
150 CLS:PRINT:FOR X=1 TO R1:FOR Y
    =1 TO R1
160 PRINT " ELEMENT ";X;" ";Y;" ";
    ";:LINEINPUT R$
170 A(X,Y)=VAL(R$)
180 NEXT Y
190 PRINT
200 NEXT X
210 '-----EVALUATE-----
220 FOR X=1 TO R1
230 FOR Y=(X+1) TO R1
240 D=A(Y,X)/A(X,X):D=-D:FOR Z=1
    TO R1:A(Y,Z)=(A(X,Z)*D)+A(Y,Z):NEXT Z
250 NEXT Y,X
260 T=A(1,1):FOR X=2 TO R1:T=T*A
    (X,X):NEXT X
270 CLS:PRINT:PRINT" THE VALUE OF
    THE DETERMINANT IS: ";T

```

```

280 PRINT:PRINT" PRESS <ENTER>
    TO CONTINUE"
290 A$=INKEY$:IF A$="" THEN 290
ELSE 110

```

```

10 *****
20 *      MATRICES      *
30 * BY: E.G.R.      *
40 *   PARAGON SOFTWARE   *
50 *   COPYRIGHT(C) 1986   *
60 *   COCO ADS MAGAZINE *
70 *****
80
90 SOUND 125,1:CLEAR
100
110 CLS:PRINT@42,"-MAIN MENU-"
    ;
120 FL=0
130 PRINT@101,"1) MULTIPLY MATRICES ";:PRINT@133,"2) FIND INVERSE MATRIX ";:PRINT@165,"3) FIND SOLUTION SET TO";:PRINT@197,"SIMULTANEOUS LINEAR ";:PRINT@229," EQUATIONS ";
140 PRINT@261,"4) ADD MATRICES ";:PRINT@293,"5) END ";
    ;
150 SCREEN 0,1
160 A$=INKEY$:IFA$="" THEN 160
170 A=VAL(A$):IFA=0 THEN 160 ELSE
    ON A GOTO 190,600,980,1140,970
180 SOUND 30,1:GOTO 160
190 '----multiply matrices----
200 CLEAR
210 CLS:PRINT:LINEINPUT"NUMBER OF
    ROWS IN MATRIX A:";R$:R1=VAL(R$)
220 IF R1<1 OR R1<>INT(R1) OR R1>40 THEN 210
230 CLS:PRINT:LINEINPUT"NUMBER OF
    COLUMNS IN MATRIX A:";R$:C1=VAL(R$)
240 IF C1<1 OR C1<>INT(C1) OR C1>40 THEN 230
250 CLS:PRINT:LINEINPUT"NUMBER OF
    ROWS IN MATRIX B:";R$:R2=VAL(R$)
260 IF R2<1 OR R2>40 OR R2<>INT(R2) THEN 250
270 CLS:PRINT:LINEINPUT"NUMBER OF
    COLUMNS IN MATRIX B:";R$:C2=VAL(R$)

```

```

280 IF C2<1 OR C2>40 OR C2<>INT(
C2) THEN 270
290 CLS
300 IF FL=1 THEN GOSUB 1120:GOTO
330
310 IF C1<>R2 THEN PRINT:PRINT"
SORRY, THOSE TWO MATRICES CAN":P
RINT"      NOT BE MULTIPLIED.":
FORX=1 TO 1000:NEXT:GOTO 90
320 R3=R1:C3=C2:GOSUB 1080
330 PRINT" MATRIX A:":PRINT" ---
-----":PRINT:FOR X=1 TO R1:FOR Y
=1 TO C1
340 PRINT " ELEMENT ";X;",";Y;":
";:LINEINPUTA$:A(X,Y)=VAL(A$)
350 NEXT Y
360 PRINT
370 NEXT X
380 CLS
390 PRINT" MATRIX B:":PRINT" ---
-----":PRINT:FOR X=1 TO R2:FOR Y
=1 TO C2
400 PRINT" ELEMENT ";X;",";Y;":
";:LINEINPUTA$:B(X,Y)=VAL(A$)
410 NEXT Y
420 PRINT
430 NEXT X
440 IF FL=1 THEN RETURN
450 FOR X=1 TO R1
460 FOR Z=1 TO C2
470 FOR Y=1 TO R2
480 C(X,Z)=C(X,Z)+(A(X,Y)*B(Y,Z)
)
490 NEXT Y,Z
500 NEXT X
510 CLS:FOR X=1 TO R3
520 FOR Y=1 TO C3
530 PRINTUSING" #### ";C(X,Y);
540 NEXT Y
550 PRINT " "
560 NEXT X
570 PRINT
580 PRINT:PRINT:PRINT" PLEASE HI
T [ENTER] TO CONTINUE"
590 A$=INKEY$:IF A$="" THEN 590
ELSE 90
600 '--find an inverse matrix--
610 CLEAR
620 CLS:PRINT:PRINT" NUMBER OF R
OWS/COLS. IN":LINEINPUT" MATRIX
":R$
630 R1=VAL(R$):IF R1>40 OR R1<1
OR R1<>INT(R1) THEN 620
640 GOSUB 1100
650 CLS:PRINT
660 FOR X=1 TO R1
670 FOR Y=1 TO R1
680 PRINT" ELEMENT ";X;",";Y;":
";:LINEINPUTR$
690 A(X,Y)=VAL(R$)

```

```

700 NEXT Y
710 PRINT
720 NEXT X
730 FOR X=1 TO R1:B(X,X)=1:NEXT
740 FOR X=1 TO R1
750 IF A(X,X)=1 THEN 770
760 D=A(X,X):FORZ=1 TO R1:A(X,Z)
=A(X,Z)/D:B(X,Z)=B(X,Z)/D:NEXT Z
770 FOR Y=1 TO R1
780 IF Y=X THEN 840
790 IF A(Y,X)=0 THEN 840
800 D=A(Y,X):D=-D
810 FOR Z=1 TO R1
820 A(Y,Z)=(A(X,Z)*D)+A(Y,Z):B(Y
,Z)=(B(X,Z)*D)+B(Y,Z)
830 NEXT Z
840 NEXT Y
850 NEXT X
860 CLS
870 IF FL=1 THEN RETURN
880 FOR X=1 TO R1:FOR Y=1 TO R1
890 PRINTUSING"###.## ";B(X,Y);
900 NEXT Y
910 PRINT " "
920 NEXT X
930 PRINT:PRINT
940 PRINT" HIT [ENTER] TO CONTIN
UE"
950 A$=INKEY$:IF A$="" THEN 950
960 GOTO 90
970 CLS:NEW
980 '---find solution set---
990 CLEAR:GOSUB 1110
1000 CLS:PRINT:PRINT"NUMBER OF R
OWS/COLS. IN THE":LINEINPUT" COE
FFICIENT MATRIX:":R$
1010 R1=VAL(R$):IF R1>40 OR R1<1
OR R1<>INT(R1) THEN 1000
1020 PRINT
1030 FL=1:GOSUB 650
1040 FOR X=1 TO R1:FORY=1 TO R1:
A(X,Y)=B(X,Y):NEXT Y,X
1050 CLS:PRINT:PRINT"NUMBER OF R
OWS IN THE CONSTANT":LINEINPUT"
MATRIX:":R$

```

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```

1060 R2=VAL(R$):IF R2>40 OR R2<1
OR R2<>INT(R2) OR R2<R1 THEN 10
50
1070 C2=1:R3=R1:FL=0:GOTO 380'FL
=1????
1080 '----dimensions----
1090 DIM A(R1,C1),B(R2,C2),C(R3,
C3):RETURN
1100 DIM A(R1,R1),B(R1,R1):RETUR
N
1110 DIM A(40,40),B(40,40),C(40,
40):RETURN
1120 IF R1<>R2 OR C1<>C2 THEN PR
INT:PRINT" SORRY, THOSE TWO MATR
ICES CAN":PRINT" NOT BE ADDED
TOGETHER.":FORX=1TO1000:NEXT:GO
TO90
1130 RETURN
1140 '----add matrices----
1150 CLS:CLEAR
1160 FL=1
1170 GOSUB 210
1180 FOR X=1 TO R1:FOR Y=1 TO C1

1190 C(X,Y)=A(X,Y)+B(X,Y)
1200 NEXT Y,X
1210 CLS
1220 FOR X=1 TO R1:FOR Y=1 TO C1

1230 PRINTUSING" #### ";C(X,Y);

1240 NEXT Y
1250 PRINT" "
1260 NEXT X
1270 PRINT:PRINT:PRINT" PLEASE H
IT [ENTER] TO CONTINUE"
1280 A$=INKEY$:IFA$=""THEN 1280
ELSE 90

```

Multipak Pal chip DECODED

Bob Lentz of the Microworks, an old pro at working with PAL chips, kindly consented to analyze and make public the programming of the new PAL chip used in upgrading old (BIG) Multipak Interfaces. This PAL chip is part # AXX 7123 from Tandy National Parts, and sells for \$7.50.

Interestingly, the PAL chip did NOT have its verification links blown, tho considering it was only a simple combinatorial PAL with a relatively small number of inputs and outputs, even had the verification links been blown it could still have been easily read.

The PAL has three outputs to the Multipak circuitry, pins 14, 15, and 16. These are respectively called "enable bus", "enable read", and "load register" on the schematic diagram from Tandy for the old Multipak.

Looking carefully at the multipak schematic, one discovers that the "load register" line is used to allow writes to the software slot selector register at \$FF7F, the "enable read" line is used to enable reads of the software slot select register at \$FF7F, and the "enable bus" line is used to control the 74LS245 bidirectional data buffer. When the enable bus line is true (low) the data bus on the Multipak is active and data can be exchanged with addresses on devices plugged into the slots. When the enable bus line is false (high) the 74LS245 is tristated and no I/O can be performed at such times, for no valid data signals will appear on the bus coming from the multipak.

The INPUTs to the PAL chip include in effect ALL of the address lines (actually A8 thru A15 arrive as a single line having already been combined using one 74LS30 eight input NAND gate), and in addition the *CTS, the SLENB, E clock, Q clock, and the Read/*Write lines.

HERE's the MEAT of this article:

After running the PAL thru a PAL reader, Bob Lentz completely decoded its matrix. Relatively little of the possibilities it allowed were actually used. The PAL that Tandy sells as an upgrade for the old Multipak to fix it for the CoCo 3 behaves as follows:

OUTPUT line	active (low) conditions

pin 14 ("load reg")	address bus = \$FF7F only, AND R/*W = low, AND E clock = high AND Q clock = low
pin 15 ("enable read")	address bus = \$FF7F only, AND R/*W line = high, AND E clock = high
pin 16 \$FF7E ("enable bus")	address bus = \$FF40 thru \$FF7E OR if *CTS = low (true) OR if SLENB line is low (true)

The above table COMPLETELY defines the behavior of that PAL chip. Note that knowing this, you can make an exact replacement for that PAL chip using a bunch of small scale logic TTL chips.

CZ Patch Librarian
Review by Lee Castens

Being able to save those great CZ patches out to disk is a great idea. It allows one to switch patches without having to buy several of the RAM cartridges. The problem is that Speech systems stopped short of making it a real tool.

The CZ patch librarian only allows sending or receiving of a single patch at a time. This could greatly enhanced by allowing a group of 8 or 16 at a time. Also when selecting which patch to upload to the CZ you must scroll through all the patches in the disk. If the disk is full that means you can't enter your selection until you have scrolled through three screens and by that time you might have forgotten the number of the patch you wanted. This could easily be fixed by allowing you to make a selection at the end of any screen or by providing a menu of patches as does JUKEBOXD. Since the program is in basic this is pretty easy to do, but when I pay \$39.95 for a program I hate to have to rewrite it to make it function the way it should. For a program of this price I expect more than a one granule basic and a one granule machine language program.

It could also have patch editor so you could enter patches faster and easier than through CZ entry. Since it requires one granule for each patch you are also limited to 64 patches per disk. The patch itself takes up very little room, but one granule is the smallest space disk basic allows allocated it uses up one granule. I am very glad to have the disk storage for the CZ, but I think this program is very over priced for what it delivers. #

The DX librarian I have for the CX5M Yamaha cost the same it allows full editing of patches and can transfer 48 at a time. The CZ patch librarian would have been fairly priced at \$14.95.

I base my opinions on being a CoCo user for over four years. I have a CZ-230S, CZ-101, FB-01 and a CX5M so I have some experience with which to make a fair accessment of this product.

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RS 6

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CocoMidi II
A Review by J. R. Applegate

The CocoMidi II hardware pack brings to the Color Computer the capability of functioning as a Musical Instrument Digital Interface (MIDI) controller at a very inexpensive price when compared to the cost of MIDI interfaces of other computers.

This hardware pack will work either a Y cable or MultiPak interface and has been tested successfully on an E and F board Coco I as well as both the Coco 2 and 3. The pack provides two I/O ports which function at 31.5 KBaud allowing Midi input and output to a synthesizer or any other MIDI'ed musical instrument. It comes with two 3 ft. MIDI cables to interface to your instrument. My personal feeling is that these cables are too short but longer replacements can be easily made or purchased at most keyboard shops.

Whereas the hardware functions in exactly the same fashion as on the more popular Computers, the same can not be said for the software. Speech Systems seems to think that a \$100 computer such as the Coco is incapable of a well designed user interface. Programs such as CocoMax and Deskmate prove them false! The CocoMidi II software uses a complex menuing system and a user interface that even a person like myself with 12 years experience in Electronic Music and 9 years as a Systems Analyst found extremely difficult to use.

In the CocoMidi II program each track of music is saved onto a separate file and must be separately loaded into the system. This in itself is not so much of a problem. The problem is that you must first tell the system the maximum number of tracks to allocate and that setting is not on the same menu as the load function. And should you change the number of tracks in the middle of a load or recording, you will lose everything you have input to that point.

After selecting any menu or submenu option all other information is prompted for via prompts, one item at a time for one track at a time. Perhaps I am spoiled working with IBM PC's and VAX's but that type of user interface died in the early 70's. There is no reason why those type of applications exist on the Coco other than a lack of professional training for Coco programmers. In all fairness this is not the only Coco program with this type of interface but this program must be compared to MIDI sequencing programs for the Commodore and Apple. Those machines

have sophisticated menued and graphic interfaces in their MIDI software, which, of course, is lacking in the Speech Systems product.

Perhaps my greatest disappointment with this program was in its editor. The editor in CocoMIDI II allows you to edit the RAW MIDI data. It does not allow editing of your music in a form recognizable to most musicians. It may be useful for editing in preset changes but it will not be useful for editing your music. Other sequencer programs even on such slow, poorly designed, computers as the Commodore allow a form of editing using musical notation. On computers such as the Mac the data can be edited in a graphical fashion similar to MUSICA or LYRA. There is no reason the Coco or especially the Coco III can not accomplish the same level of performance.

None of Speech Systems products work under OS9. They are all restricted to the slow inefficient programming environment of RSDOS. Rich Parry has insisted in several discussions I've had with him on both the phone and his BBS that OS9 is a fad that will go away. Well if the Coco has a future, that future is OS9! Could you imagine a multitasking sequencer/editor that allowed editing during playback or multiple midi interfaces controlling multiple devices! No other personal computer on the market is capable of such wonders. And until Coco programmers break away from the "non relocatable code - basic language interface" ball and chain we will not see such wonders. Instead we will see programs such as CocoMidi II until it reaches the point that the Coco dies because its owners all went out and bought IBM Clones...not because MSDOS is any better but because the quality of the software was!

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COCO III

COCO 3 FONT GENERATOR

COCO 3 CHARACTER GENERATOR
ANEDITOR. WORKS BEST WITH A
MOUSE AND A RGB MONITOR.

```

240 HBUFF1,50
250 WIDTH32:DRIVE0
260 POKE&H95C9,&H7F:POKE&HFF22,6
0
270 CLEAR5000
280 DIM P(8,8),A$(72),B$(72)
290 ONBRKGOTO2020:'END
300 ONERRGOTO1200:'RE-RUN
310 T$=" 0000 0001 0010 0011 010
0 0101 0110 0111 1000 1001 1010
1011 1100 1101 1110 1111":H$="01
23456789ABCDEF"
320 POKE&HFFD9,0
330 'CREATE GRAPHICS SCREEN
340 GOSUB2450:'GO GET SPECIAL CH
ARACTERS
350 RGB:HSCREEN2
360 POKE&HE6C6,18:POKE&HE6C7,18
370 PALETTE0,0:HCLS3:HCLS0:POKE&
HFE0A,1
380 HGET(0,0)-(8,8),1:'GET NULL
390 PALETTE7,15:PALETTE2,57:PALE
TTE 6,39:PALETTE15,62
400 HCOLOR3,0:HLINE(0,170)-(360,
191),PSET,BF:HCOLOR1,0:HLINE(0,1
70)-(360,191),PSET,B
410 HCOLOR5,0:HPRINT(1,22),"CLEA
R [ INVERSE [ DISK [ UPDATE [ QU
IT":HCOLOR1,0
420 HPRINT(13,15),CHR$(93):HPRIN
T(13,17),CHR$(94)
430 HPRINT(1,1),"CoCoIII FONToge
nic II [ font editor ["
440 HCOLOR4,0
450 HPRINT(17,5),"Use the joysti
ck to"
460 HPRINT(16,7),"position the c
ursor."
470 HPRINT(16,9),"Press the fire
button"
480 HPRINT(16,11),"to set or res
et the"

490 HPRINT(16,13),"desired pixel
."
500 HPRINT(20,15),"more (":HCOLO
R3,1:HPRINT(26,15),"?":HCOLOR4,1
:HPRINT(27,15),")"
510 HCOLOR1,0
520 FORX=30TO110STEP10
530 HLINE(X,30)-(X,110),PSET
540 HLINE(30,X)-(110,X),PSET
550 NEXT
560 FORL=1TO7
570 POKE&HFE0A,18+L
580 HLINE(29-L,29-L)-(111+L,111+
L),PSET,B
590 NEXT
600 POKE&HFE0A,1
610 'EDIT CHARACTER
620 HSCREEN2
630 GOSUB990:'GET CHARACTER
640 GOSUB670:'CHAR CODE DISPLAY
650 GOTO750:'GOTO CURSOR MOVE
660 'CHARACTER CODE DISPLAY
670 HLINE(70,120)-(100,151),PRES
ET,BF
680 CODE$="Code="+STR$(D+32)
690 CHAR$="Char= "+CHR$(D+32)
700 HCOLOR3,0
710 HPRINT(3,16),CODE$
720 HPRINT(3,18),CHAR$
730 HCOLOR1,0
740 RETURN
750 X=JOYSTK(0):Y=JOYSTK(1)
760 IFX>62 OR Y>62THENX=X0:Y=Y0:
GOSUB2050
770 HLINE(XS-5,YS-5)-(XS+5,YS+5)
,PSET,B:FORL=1TO20:NEXT:HLINE(
XS-5,YS-5)-(XS+5,YS+5),PSET,B
780 IFBUTTON(0) AND P(TX,TY)=0TH
ENP(TX,TY)=1:HPAINT(XS,YS),2,1:F
ORL=1TO200:NEXT
790 IFBUTTON(0) AND P(TX,TY)=1TH
ENP(TX,TY)=0:HPAINT(XS,YS),0,1:F
ORL=1TO200:NEXT
800 X=INT(X/8)+1:Y=INT(Y/8)+1
810 IFX=TX AND Y=TY THEN750
820 IFP(TX,TY)=0THENHPAINT(XS,YS
),0,1
830 IFX<1THENX=1
840 IFY<1THENY=1
850 TX=X:TY=Y
860 XS=25+(X*10):YS=25+(Y*10)

```

```

870 IFHPOINT(XS,YS)=0THENHPAINT(
XS,YS),7,1
880 GOTO750
890 'CLEAR CHARACTER
900 FORY=1TO8:FORX=1TO8:P(X,Y)=0
:NEXTX,Y
910 GOSUB1320:GOSUB990
920 RETURN
930 'INVERSE CHARACTER
940 XC=C:TC=0:COMP=1
950 GOSUB990:GOSUB1320
960 C=XC:COMP=0
970 RETURN
980 'GET CHARACTER FROM MEMORY
990 PALETTE2,0:SOUND100,1
1000 IFTC<>0THEND=TC
1010 C=&HF09D+(D*8)
1020 FORY=1TO8
1030 P=PEEK(C)
1040 IFCOMP=1THENP=255-P
1050 V$="":P$=HEX$(P):L=LEN(P$)
1060 FORV=1TOL
1070 T=INSTR(H$,MID$(P$,V,1))-1
1080 Q$=MID$(T$,T*5+2,4)
1090 IFL=1THENV$="0000"+Q$:ELSEV
$=V$+Q$
1100 NEXTV
1110 FORX=1TO8
1120 XS=25+(X*10):YS=25+(Y*10)
1130 IFMID$(V$,X,1)="1"THENHPAIN
T(XS,YS-4),2,1:ELSEHPAINT(XS,YS-
4),0,1
1140 P(X,Y)=VAL(MID$(V$,X,1))
1150 NEXTX:C=C+1:NEXTY
1160 TX=8:TY=8
1170 PALETTE2,56
1180 RETURN
1190 'ERROR RE-RUN PROGRAM
1200 CLS:HSCREEN0:PRINT"ERROR !!
! RE-BOOTING PROGRAM":FORL=1TO10
00:NEXT:RUN260
1210 'COMMAND ect.
1220 SOUND 190,1
1230 IFY=22 AND (X>0 AND X<6)THE
NGOSUB900:** CLEAR **
1240 IFY=22 AND (X>9 AND X<16)TH
ENGOSUB940:** INVERSE **
1250 IFY=22 AND (X>18 AND X<23)T
HENGOSUB1480:** DISK **
1260 IFY=22 AND (X>25 AND X<32)T
HENGOSUB1320:** UPDATE **
1270 IFY=22 AND (X>34 AND X<39)T
HEN2020:** QUIT **
1280 IF(Y=15 AND X=26) OR (Y=16
AND X=26) OR (Y=16 AND X=27)THEN
GOSUB2220:** MORE INFO **
1290 SOUND220,1
1300 RETURN
1310 'UPDATE CHARACTER
1320 IFTC<>0THEND=TC

```

12

```

1330 C=&HF09D+(D*8)
1340 FORY=1TO8
1350 P$="":V$=""
1360 FORX=1TO8
1370 P$=P$+RIGHT$(STR$(P(X,Y)),1
)
1380 NEXTX
1390 FORV=1TO8STEP4
1400 T=INSTR(T$," "+MID$(P$,V,4)
)
1410 Q$=MID$(H$,T/5+1,1)
1420 V$=V$+Q$
1430 NEXTV
1440 POKEC,VAL("&H"+V$):C=C+1:NE
XTY
1450 GOSUB670
1460 RETURN
1470 'DISK I/O
1480 CLS:HSCREEN0
1490 PRINT@42,"DISK I/O MENU"
1500 FORY=2TO3:SET(15,Y,7):SET(5
0,Y,7):NEXT:FORX=15TO35:SET(X,1,
7):SET(65-X,1,7):SET(65-X,4,7):S
ET(X,4,7):NEXT
1510 PRINT@137,"";
1520 PRINTTAB(12)"Load font"
1530 PRINTTAB(12)"Save font"
1540 PRINTTAB(12)"Directory"
1550 PRINTTAB(12)"Set drive"
1560 PRINTTAB(12)"Quit I/O "
1570 PRINTTAB(45)"DRIVE"DR
1580 PRINT@394,""
1590 X=JOYSTK(0):Y=INT(JOYSTK(1)
/8)
1600 IFY<3THENY=3
1610 P=41+(Y*32)
1620 IFBUTTON(0)THEN1670
1630 IFP<>P1 THENPRINT@P1," ";
1640 PRINT@P,"-->";
1650 P1=P
1660 GOTO1590
1670 IFY=3THENGOSUB1830
1680 IFY=4THENGOSUB1740
1690 IFY=5THENGOSUB2490:GOTO1490
1700 IFY=6THENGOSUB1940
1710 IFY=7THENHSCREEN2:RETURN
1720 GOTO1510
1730 'SAVE CHARACTER SET
1740 PRINT@P+3,"":PRINT@P+3,"NAM
E:";
1750 GOSUB2780:N$=CK$
1760 IFN$=""THEN1810
1770 PRINT@395,"SAVING ";N$
1780 POKE&HFFD8,0
1790 SAVEMN$,&HF09D,&HFE0F,&HF09
D
1800 POKE&HFFD9,0
1810 RETURN

```

```

1820 'LOAD CHARACTER SET
1830 PRINT@P+3,"":PRINT@P+3,"NAME:";
1840 GOSUB2780:N$=CK$
1850 IFN$=""THEN1920
1860 N=VAL(MID$(N$,2,LEN(N$)-1))

1870 IFLEFT$(N$,1)="#"THENIFN<=F
-1 THENN$=A$(N):ELSE1920
1880 PRINT@394,"LOADING ";N$
1890 POKE&HFFDB,0
1900 LOADMN$
1910 POKE&HFFD9,0
1920 RETURN
1930 'SET DRIVE NUMBER
1940 PRINT@P+3,"":PRINT@P+3,"DRIVE:";
1950 FORL=1TO200:NEXT
1960 X=JOYSTK(0):DR=INT(JOYSTK(1)/21)
1970 PRINT@P+9,DR
1980 IFBUTTON(0)=0THEN1960
1990 DRIVEDR
2000 RETURN
2010 'IF BREAK OR QUIT THEN END
2020 POKE&HFFDB,0
2030 RGB:CLS:DRIVE0:END
2040 'ARROW POINT & CLICK
2050 SOUND210,1
2060 X=JOYSTK(0):Y=JOYSTK(1)
2070 HCOLOR5,0
2080 IFBUTTON(0) AND (X=13 OR X=14) AND Y=15 AND D<225THEND=D+1:
IFD=224THEND=0:GOSUB670:GOTO2080
:ELSEGOSUB670:GOTO2080
2090 IFBUTTON(0) AND (X=13 OR X=14) AND Y=17 AND D>-1THEND=D-1:
IFD=-1THEND=223:GOSUB670:GOTO2090
:ELSEGOSUB670:GOTO2090
2100 IFBUTTON(0) AND ((X=9 AND Y=18) OR (X=10 AND Y=18) OR (X=10 AND Y=19))THENGOSUB990
2110 IFX<14 AND Y<14THENX=X-10:Y=Y-10:HCOLOR1,0:RETURN
2120 IFX>38THENX=38
2130 IFY>22THENY=22
2140 IFX=X0 AND Y=Y0 AND BUTTON(0)=0THEN2060
2150 IFBUTTON(0)THENGOSUB1220
2160 HPUT(X0*8,Y0*8)-(X0*8+8,Y0*8+8),1,PSET
2170 HGET(X*8,Y*8)-(X*8+8,Y*8+8),1
2180 X0=X:Y0=Y
2190 HPRINT(X,Y),"\"
2200 GOTO 2060
2210 'MORE INFO
2220 CLS:HSCREEN0
2230 PRINT"More information and help."

```

```

2240 PRINT
2250 PRINT"To select the desired character code, position the light blue arrow on one of the yellow UP and DOWN direction indicators. Press the fire button to start. Once at the desired code releasethe button."
2260 PRINT"To edit the character currently assigned to the selected code click on the character under the code. From there you will be sent to the edit box."
2270 PRINT
2280 FORL=1TO4000:NEXT
2290 PRINT"Click to continue."
2300 IFBUTTON(0)=0THEN2300
2310 CLS
2320 PRINT"The CLEAR and INVERSE commands affect the character assigned to the current code. To have them affect your edit character make sure you update it before using these commands. After the commands are finished with"
2330 PRINT"altering the character they perform an automatic update to the current code. Simply editing the character in the edit box does nothing to the original character until it is updated."
2340 PRINT
2350 FORL=1TO4000:NEXT
2360 PRINT"Click to continue."
2370 IF BUTTON(0)=0 THEN 2370
2380 CLS
2390 PRINT"It's important to remember that if a error occurs during disk I/O ect. the program will auto reboot. All characters updated up to that point will still be in memory."
2400 PRINT"In the disk I/O menu you have the option to specify the file to load as a file number. ei. 'NAME:#10'. This can only be done after the DIRECTORY command has been executed."
2410 PRINT
2420 FORL=1TO4000:NEXT
2430 PRINT"Click to return."
2440 IFBUTTON(0)=0THEN2440ELSEHSCREEN2:RETURN
2450 'SPECIAL CHAR (ARROWS ect.)

2460 FORC=&HF09D+(59*8)TO&HF09D+(63*8):READA:POKEC,A:NEXT:RETURN

```

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```
2470 DATA 0,0,24,165,24,0,0,0,25
2,248,240,232,220,142,7,2,8,28,6
2,127,28,28,28,28,28,28,28,12
7,62,28,8,0
2480 'LOAD DIRECTORY
2490 CLS:O=0:F=0
2500 FR=FREE(DR)
2510 Y=3:FORX=1TO17STEP2
2520 DSKI$DR,17,Y,A$(X),A$(X+1)
2530 Y=Y+1:NEXT X
2540 'SEPARATE INTO SINGLE FILES

2550 FORX=1TO18
2560 B$(X*4-3)=MID$(A$(X),01,11)

2570 B$(X*4-2)=MID$(A$(X),33,11)

2580 B$(X*4-1)=MID$(A$(X),65,11)

2590 B$(X*4-0)=MID$(A$(X),97,11)

2600 NEXT X
2610 'SORT OUT FILES
2620 FORX=1TO72
2630 IFLEFT$(B$(X),1)=CHR$(0)THE
N2700
2640 IFLEFT$(B$(X),1)=CHR$(255)T
HEN2700
2650 B$(X)=LEFT$(B$(X),8)+". "+MI
D$(B$(X),9,3)
2660 A$(F)=B$(X)
2670 PRINT"FILE #"F "A$(F)
2680 O=O+1:F=F+1
2690 IF O=13THENGOSUB2720
2700 NEXT
```

```
2710 PRINT"FREE="FR
2720 O=0
2730 PRINT
2740 PRINT"Click to continue."
2750 IFBUTTON(0)=0THEN2750
2760 CLS:RETURN
2770 'INPUT SUBROUTINE INKEY$
2780 FORL=1TO200:NEXT
2790 CL=14:CK=0:CK$=""
2800 PRINTCHR$(255);
2810 TK$=INKEY$
2820 IFBUTTON(0)THEN3020
2830 IFTK$=""THEN2810
2840 IFTK$=CHR$(21)THEN2810
2850 IFTK$=CHR$(93)THEN2810
2860 IFTK$=CHR$(9)THEN2810
2870 IFTK$=CHR$(12)THEN2810
2880 IFTK$=CHR$(13)THEN3020
2890 IFTK$<>CHR$(8)THEN2970
2900 CK=CK+1
2910 IFCK<0THENCK=0
2920 IFLEN(CK$)=0THEN2810
2930 IFLEN(CK$)=1THEN3030
2940 CK$=MID$(CK$,1,LEN(CK$)-1)
2950 PRINTTK$CHR$(8);
2960 GOTO2800
2970 CK=CK+1
2980 IFCK>CL THENCK=CL:GOTO2810
2990 CK$=CK$+TK$
3000 PRINTCHR$(8)TK$;
3010 GOTO2800
3020 PRINT:RETURN
3030 CK$="":GOTO2950
3040 END OF PROGRAM
```

Using PRINTERR/ERRMSG with the
CoCo 3 and a Ramdisk

I had always wanted an easy and quick way of using the PRINTERR utility on my CoCo, but was frustrated because it was slow and a disk containing the path "/DO/SYS/ERRMSG" needed to remain in drive 0 all the time. I knew the meaning of most of the error numbers, but I still wanted to be able to edit the ERRMSG file and receive some sort of detailed explanation when an error occurred. One solution was to keep a copy of the ERRMSG file on every disk I used in DO and suffer through the wait for PRINTERR to read it and report the error.

Now, with the new CoCo3 and the recent upload of a Ramdisk driver for the 128K machine, my problems have been solved. Now, whenever an error occurs, a verbose message is printed on my screen instantly! How did I do it? The following steps will allow you to have the same thing:

Step 1 - Change the name of the ramdisk driver recently uploaded by Pete Lyall from "tmp" to "RO" and assemble the source file.

Step 2 - Load DEBUG and PRINTERR into memory and change the bytes at the following offsets:

OFFSET	OLD	NEW
-----	---	---
+17	44	52
+37	23	07

Step 3 - Save the modified PRINTERR back to disk as file "PRINTERR.TEM"

Step 4 - Verify the temporary file using the command:

"verify u <printerr.tem>printerr

Delete the temporary PRINTERR.TEM file and change the attributes of the new PRINTERR by entering "attr PRINTERR pe e".

Step 5 - Include somewhere in your STARTUP file these commands: Load RO CCrdisk (both the descriptor and the driver) Format RO r "Ramdisk" Makdir /RO/SYS Copy /DO/SYS/ERRMSG /RO/SYS/ERRMSG

Of course, any commands you included in you STARTUP file must also be in the current commands directory, which is usually /DO/CMD5 unless you have modified SYSGO. You could also include the ramdisk device descriptor and the driver in your bootfile as I have. You can also edit the ERRMSG file to include more elaborate error messages than those already there. I extended most of them to give suggestions on why the error occurred. I also added a few new ones.

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You should also copy into the new ramdisk directory any utilities that you use on a regular basis, such as LIST, DIR, MFREE, MDIR, etc.. There is enough room in the new ramdisk for me to include 38 of my most often used utilities. Now, any time an error occurs, the message will be displayed - instantly - on the standard error path (your screen) and a "beep" will sound to let you know. It will not matter what disk you have in any drive, PRINTERR will now always look to the ramdisk for the error message file, which will always be there, unless you delete the ramdisk completely. I must admit though, that the "beep" when running at 2 Mhz. is more like a "tick"!

I hope this is helpful to you. It is especially neat when using BASIC09 and errors occur. No more waiting as all the errors are listed and PRINTERR goes to the file in DO to get each message. It is amazingly fast!

Mark Griffith

DIRECTORY 40

CREATES A DISK FILE OF PORGRAM
NAMES AND DESCRIPTIONS. ALLOWS
KILLING, RENAMING AND COPYING
OF FILES.

```
1 ' *** 40 COLUMN VERSION 12/0
1/86
4 ' ***          JIM PEASLEY      **
*          *** REDWOOD CITY,
CA. *** ***          72726,1153
***
6 'DESCRIPTION FORMATTER BY ERIC
TILENIUS
8 ' ENTER THE DISK NAME IN LINE
134
10 CLEAR1000:DIM PR$(48):WIDTH40
:PALETTE CMP
12 CLS6:LOCATE10,15:ATTR3,7,B:PR
INT" READING DIRECTORY";:FL=0
14 F=FREE(0):R=1
16 FORZ=3TO11:DSKI$0,17,Z,A$,B$
18 X$=A$:GOSUB20:X$=B$:GOSUB20:N
EXTZ:GOTO44
20 FORJ=1TO128STEP32
22 P1$=MID$(X$,J,8)
24 IFLEFT$(P1$,1)=CHR$(255)THENR
=R-1:GOTO44
26 IFLEFT$(P1$,1)=CHR$(0)THENGOT
O42
28 IFP1$="DIR" THEN42
30 IFP1$="DOS BOOT"THEN42
32 IFP1$="DIR40" THEN42
34 P2$=MID$(X$,J+8,3)
```

```
36 IFP1$="DISK" "AND P2$="FIL"
THEN42
38 P3$=MID$(X$,J+11,1)
40 PR$(R)=P1$+"."+P2$+P3$:R=R+1
42 NEXTJ:RETURN
44 CLS6:LOCATE12,15:ATTR3,7,B:PR
INT" SORTING NAMES";:POKE65497,0
```

```
46 NS=0:FOR K=1 TO R-1
48 IFPR$(K)<=PR$(K+1)THEN52
50 TE$=PR$(K):PR$(K)=PR$(K+1):PR
$(K+1)=TE$:NS=1
52 NEXT:IF NS=1THEN46
54 POKE65496,0
56 IF FL=2 THEN FL=0:GOTO134
58 'CREATE/UPDATE DISK FILE
60 CLS6:LOCATE12,15:ATTR3,7,B:PR
INT" FILING NAMES";:GOSUB228
62 IF X=R AND FL=0 THEN CLOSE:GO
TO134
64 IF FL=1 THEN GET#1,P:D$=DE$:L
SETPF$=NP$:LSETDE$=D$:PUT#1,P:CL
OSE:GOTO134
66 IF X<R THEN FL=3
68 IF X>R THEN FL=4
70 IF FL>1 THEN GOSUB232
72 IF FL=2 THEN 104
74 NN=0:IF X=0 THEN FL=0
76 IF FL=4 THEN R=R+1
78 FOR K=1 TO R:AD=0
80 IF K>X THEN 88
82 GET#1,K:P$=PF$:D$=DE$
84 IF P$=LEFT$(PR$(K+NN),12)THEN
92
86 IF FL=4 THEN NN=NN-1:GOTO98
```

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```

88 P$=PR$(K):D$=STRING$(90,32)
90 AD=1:SOUND100,1
92 LSETRR$=P$+D$:PUT#2,K+NN
94 IF FL=3 AND AD=1 THEN NN=NN+1
:K=K-1
96 IF K+NN=R THEN 100
98 NEXT K
100 IF FL=4 THEN R=R-1
102 GOTO128
104 IF P=1 THEN 118
106 FOR K=1 TO P-1
108 GET#1,K:INFO$=PF$+DE$
110 LSET RR$=INFO$
112 PUT#2,K
114 NEXT
116 IF P=X THEN 128
118 FOR K=P+1 TO X
120 GET#1,K:INFO$=PF$+DE$
122 LSET RR$=INFO$
124 PUT#2,K-1
126 NEXT
128 CLOSE
130 KILL"DISK.FIL":RENAME"TEMP.F
IL"TO"DISK.FIL"
132 IF FL=2 THEN 14
134 ATTR2,5:CLS6:LOCATE8,0:PRINT
"DISK NAME HERE":LOCATE22,0:PRIN
T F;" FREE GRANS":PRINTSTRING$(4
0,"-"):P=3
136 FOR K=1TOR
138 IF K/2=INT(K/2)THEN LOCATE20
,P:PRINTUSING"##.";K;PRINT " ";P
R$(K):P=P+1:GOTO142
140 LOCATE0,P:PRINTUSING"##.";K;
:PRINT " ";PR$(K);
142 NEXTK
144 LOCATE8,21:PRINT"0 = Next di
sk directory
146 LOCATE8,22:ATTR3,2,B:PRINT"
Select a Program ";ATTR2,5:INPU
TP
148 IFP=0THENCLS3:LOCATE12,12:PR
INT"Insert next disk":LOCATE12,1
3:PRINT"Hit <ENTER>";:INPUTI:DRI
VE0:RUN"DIR40
150 IFP<10RP>R THEN146
152 FT=ASC(RIGHT$(PR$(P),1))
154 GET PROGRAM DESCRIPTION
156 GOSUB228:GET#1,P:P$=PF$:D$=D
E$:CLOSE#1
158 GOSUB200:LOCATE9,14:PRINT"<E
>xecute":LOCATE9,15:PRINT"<D>ire
ctory":LOCATE9,16:PRINT"<N>ext"
:LOCATE9,17:PRINT"<C>opy":LOC AT
E9,18:PRINT"<K>i11":LOCATE9,19:P
RINT"<R>ename":LOCATE9,20: PRINT
"<A>dd description"
160 LOCATE14,22:ATTR3,1,B:PRINT"
SELECT";:ATTR2,5

```

```

162 I$=INKEY$:IFI$="D"THEN 134
164 IFI$="R"THEN GOSUB234:LOCATE
19,19:PRINT"to: ";:LINEINPUT NP$:
IF NP$="*"THEN134 ELSE188
166 IFI$="E"THENGOTO222
168 IFI$="N"THENP=P+1:IF P>R THE
N 134 ELSE 150
170 IFI$="A"THEN LOCATE2,4:LINEI
NPUT G$:GOSUB228:LSETPF$=P$:LSET
DE$=D$:PUT#1,P:CLOSE:P=P+1:IF P>
R THEN 134 ELSE 150
172 IF I$="C"THEN GOSUB234:LOCAT
E18,17:PRINT"Which Drive? ";:GOT
O178
174 IFI$="K"THEN LOCATE20,18:PRI
NT"Sure Y/N";:INPUT PK$:IF PK$<>
"Y"THEN 134 ELSE KILL P$:FL=2:GO
TO60
176 GOTO162
178 DR$=INKEY$:IFDR$="*"THEN 134

180 IFDR$=""THEN178
182 DR=VAL(DR$):IF DR<0 OR DR>3
THEN172 ELSEPRINTDR$;
184 IF DR=0 THEN CLS:COPY P$:GOT
O134
186 COPY P$+":0"TO P$+": "+RIGHT$
(STR$(DR),1):GOTO134
188 Z=INSTR(NP$,"/"):Y=INSTR(NP$
"."):X=Z+Y:IF X=0THEN164
190 L=LEN(NP$):IF L>12 THEN 164
192 EX$=RIGHT$(NP$,L-(X-1)):PN$=
LEFT$(NP$,X-1)
194 IF LEN(PN$)<8 THEN PN$=PN$+"
":GOTO194
196 NP$=PN$+EX$:RENAME P$ TO NP$

198 PR$(P)=PN$:FL=1:GOTO60
200 CLS6:L=3
202 LOCATE12,1:ATTR2,2:PRINT " ";
P$;" ";:ATTR2,5
204 IF LEN(D$)<38 THEN 218
206 FOR CX=38 TO 1 STEP -1
208 IF MID$(D$,CX,1)=CHR$(32) TH
EN CC=CX:GOTO 212
210 NEXT CX:GOTO 218
212 LOCATE1,L:PRINT LEFT$(D$,CC-
1):D$=MID$(D$,CC+1)
214 L=L+1
216 IF LEN(D$)>38 THEN 206
218 LOCATE1,L:PRINTD$
220 RETURN
222 IF FT=0 THEN WIDTH32:LOADP$,
R
224 IF FT=2 THEN WIDTH32:LOADMP$
:FOR DL=1TO2000:NEXT:EXEC
226 SOUND130,2:LOCATE8,22:PRINT"
DATA FILE - CAN'T LOAD...":FOR D
L=1TO1500:NEXT:GOTO156

```

```

228 OPEN"D",#1,"DISK.FIL",102:FI
ELD#1,12 AS PF$,90 AS DE$:X=LOF(
1)
230 RETURN
232 OPEN"D",#2,"TEMP.FIL",102:FI
ELD#2,102 AS RR$:RETURN
234 LOCATE12,23:ATTR2,7,8:PRINT"
* to abort ";ATTR2,5:RETURN
236 '*** END OF FILE ***

```

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Discoveries.....

Letter from Art Flexser..(Spectro systems)

"ADOS in it's present version is only partially compatible with CoCo III. There are conflicts in several areas that use some of the same tokens. Also there are different problems that occur if you are using an ADOS on eeprom or loaded from disk."

Art is very concious of this and is even now burning the midnight oil to produce ADOS III, a version specifically and solely for the CoCo III. It is also planned that the user will be able to configure the default screen width and colors as well.

Again, this modified DOS will be able to disk load each time you power up or the source code can be burned into a EPROM that one can insert into your controller. If you buy the program from Art and want to burn an EPROM, look for my AD in the back page of CoCoAds.

If you have experienced difficulty using the patched version of TW64, the author has provided a later version that corrects the earlier issues sold by other than CMD in Canada. This one works!

Keep your eyes on Moreton Bay software where an expanding effort to produce Graphics information, animation software and a continuing exploration of CoCo III capabilities. You may speak to a young lady there that answers the phone, named Linda.

Since I've gotten spoiled using my two Teacs, and the controller is mounted inside my "F" board, I've ordered a new controller and drive just to load stuff into CoCoIII. I can't part with my old machine that I have spent so much time altering, modifying, drilling and cutting traces, burning chips (EPROMS) and sometimes really burning chips when I do something stupid. Send me your questions about CoCo and I will give it my best shot. I will also be pleased to discuss any of your efforts and discoveries that we can put in this column.

Don't forget.. SASE

John C. Burke

38699 Greenwich Circle
 Fremont Ca. 94536

A Review of the Magnavox 8515 Color Monitor

The Magnavox 8515, also known as the Magnavox Professional RGB Monitor 80, is a multi-input color monitor which is suitable for use with the COCO 3. The technical specifications given in the operation guide are as follows:

Picture Tube Type:	13" Diagonal.
Deflection Angle:	90 Degrees
Video Input Signal:	Composite Video, 1V p-p negative sync, phono co TTL level digital video, separate horizontal & vertical syncs.
	Analog video, 0.7V p-p.
Horizontal Res:	640 dots (RGB).
Character Field:	25 lines of 80 characters.
Audio Input Level:	Up to 150mW, phono
Audio Output Level:	Up to 1W 5% dist
Power Supply:	120VAC +- 10%, 50-60 Hz.
Power Consumption:	75W maximum.
Dimensions (mm):	320H x 350W x 387D

Although not quoted in the operation manual, to the best of my knowledge, the dot pitch is 0.42mm, and the bandwidth is 12 MHz.

The monitor weighs about 20 pounds, and is somewhat front-heavy. It is off-white, a near-perfect match to the COCO 3. The power switch is a large, flush pushbutton on the lower front panel with an LED power indicator light. A fold-up tilt stand is included. When tilted up, the COCO 3 snuggles nicely up to the monitor, leaving the front controls accessible. The screen has an anti-glare coating. A combined composite video/audio cable is supplied, as well as a TTL RGB cable which connects the monitor to an IBM PC.

The controls in the back of the monitor include full picture control - horizontal and vertical centering, horizontal width, and vertical height. A "VCR button" is included to allow the monitor to be used with a VCR, VLP, or a video camera. Likewise a pushbutton in the rear allows engaging/disabling of a comb filter. The comb filter is intended for viewing alternate video sources (other than computer).

Composite video and audio inputs are via phono jacks in the rear. Also in the rear, TTL RGB and analog RGB inputs are via standard 8 pin and 6 pin DIN sockets respectively.

Excepting the power switch, all front

controls are behind a flip-down cover. These include the standard color, hue, contrast, brightness, and sharpness controls (the color and hue are unnecessary and inoperative with RGB input). A pushbutton toggle controls switching between composite and RGB inputs. Both may be connected at once. A monochrome pushbutton toggles between monochrome and color display. When in monochrome mode, the monitor imitates a green monochrome monitor (color signal information is killed). A volume control adjusts speaker volume.

There is a two year warranty, covering defects in materials and workmanship (non-commercial use within the USA).

The most important specification on a color monitor is how it looks. My subjective opinion - this monitor looks awfully good, at least as good or better than any I've seen. This includes the Tandy CM-8 and the Atari ST monitor. The analog RGB colors are crisp and brilliant. The 80 column text display of the COCO 3 is very readable, rivaling that of an 80 column monochrome display (the COCO 3 text font itself is another matter!). My preference is the black on cyan display, although the black on green default display is almost as nice. Interestingly, the reverse combinations are noticeably less readable.

The composite display is noticeably less clear than the analog RGB display, but still nicer than that on a TV. The black on cyan 80 column COCO 3 text screen is even readable with composite input! The quality in this case is perhaps a little better than the 81 column text display of the COCO II on a good TV (e.g. in Telewriter).

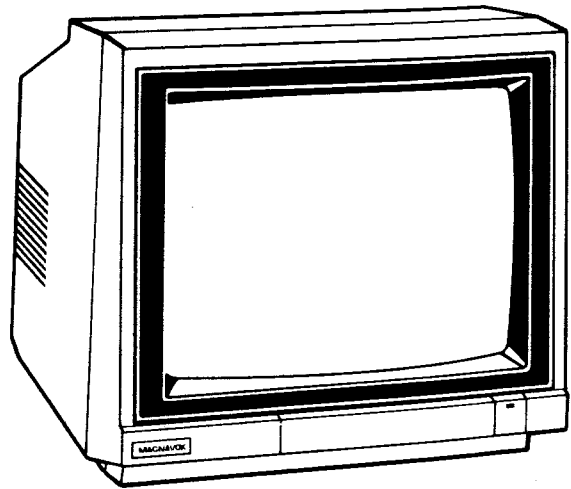
Monochrome composite input is useable, but mediocre. Using my Wordpak RS to generate monochrome input to the monitor resulted in the top half of the first row of characters being chopped off. Use of the monochrome switch on the monitor has little effect on the analog RGB text display, other than dimming it a bit. In the case of the composite text display, the switching is between green on black and white on black.

Although I have not had occasion to thoroughly test the audio, the quality seems adequate - about as good as that of a portable TV.

I am very happy with the 8515. I would recommend it for anyone who is interested in a quality color display from a COCO 3. Anyone who has, or is considering buying another non-COCO 3 computer should especially give serious consideration to this monitor.

Dennis Skala

MAGNAVOX PROFESSIONAL



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RGB TTL, RGB Analog, Composite Video Inputs • make monitor compatible with all three standard video signal types.

Green Raster Display Switch • emulating monochrome performance for text applications, this switch disables the monitor's ability to display anything other than green light — a feature normally found on more expensive products.

Etched Faceplate • the CRT face is treated with a special glare-reducing process to help eliminate eye fatigue caused by reflections from the monitor face.

Dark Glass CRT • the tube glass used in this product incorporates a special dark background material which helps to improve image contrast and reduce operator eye strain — a feature normally found on more expensive products.

640 Dots of Resolution (Horizontal) • in RGB, the monitor system will display 640 dots of image resolution on each scan line, the minimum number required to display 80 characters.

240 Lines of Resolution (Vertical) • the monitor will produce 240 vertical scan lines, standard for RGB use.

Displays 2000 Characters, 80 x 25 • this monitor system will display 25 lines of 80 characters each.

Comb Filter on Composite Input • when used with a composite input signal, the monitor's comb filter improves the resolution quality of the visual image.

Line Level Audio Input • provides convenient connection to a VCR or any device which generates a line level audio signal.

Image Size and Position Controls • located on the back panel, these controls allow the user to adjust both the size and position of any image displayed on the CRT, assuring compatibility with computer and other video devices.

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PART 5.
SHIFTS AND ROTATES

In this part of the series, we will examine the Assembly Language instructions known as SHIFTS and ROTATES. As the names of these commands suggest, these shift and rotate instructions allows us to manipulate the actual bits of the computers registers. Registers, if you don't know are areas within the micro-processor itself that information is stored and manipulated. We may also shift or rotate a area of memory, if we like. There are several different instructions concerning these shifts and rotates, each has its advantages and disadvantages. Basically, shifts or rotates operate on one byte or eight bit registers or memory positions. For example, the number 11 is actual stored in memory or a register, in binary as follows.

0 0 0 0 1 0 1 1

Using these rotates and shift commands it is possible to move the zero's or one's in each bit, either to the right or to the left, depending on which instruction we were to use. If we were to rotate the above number once to the left, using the ROL command, our new result held in that one byte would now equal 22, represented in binary as follows.

0 0 0 1 0 1 1 0

You may see that in effect we have doubled this value, in fact rotates and shifts are often used in simple multiplication or division by two. We can rotate or shift a number to either the right or left. Receiving different result depending on which command we use, more on this later. Let's first examine the ROTATE instructions. These instructions take on the following format

(R) DENOTES REGISTER (A OR B)
(M) DENOTES MEMORY

ROTATE LEFT:
ROL (R) OR (M)
ROTATE RIGHT:
ROR (R) OR (M)

The difference between a rotate and a shift is that, the rotate command will circulate the bits through what is called the Carry Bit. So, if we were to rotate a number eight

times, we would still end up with our original number. This effect is useful when we wish to examine the value in a byte but, do not want to lose it. Shifts, on the other hand do not recirculate the data in the register or memory. Instead a zero is shifted in place of the previous bit, that was in the opposite end of the shift direction. Here's an example

LSR LOGICAL SHIFT RIGHT
STARTING VALUE
1 0 0 1 0 1 0 1
AFTER LSR
0 1 0 0 1 0 1 0 CARRY 1

As you can see the one in the first bit was replaced by zero and the one in the last bit fell into the Carry Bit. A few more shifts and the result would eventually become 0 0 0 0 0 0 0 0 clearing the register or memory byte. The LSL Logical Shift Left works in the same way but, in reverse. Here are the formats for these logical shift commands.

LOGICAL SHIFT RIGHT
LSR (R) OR (M)
LOGICAL SHIFT LEFT
LSL (R) OR (M)

Another kind of shift is called the "ARITHMETIC SHIFT". These shifts are used when we wish to work with "signed" numbers. In a signed number the most significant bit indicates its sign, if it's 1 then the number is negative if zero the number is positive. The arithmetic shifts takes this fact into account and adjusts the results accordingly. If we tried to use a logical shift using signed number we would get a wrong answer. Here is the arithmetic shifts format.

ARITHMETIC SHIFT RIGHT
ASR (R) OR (M)
ARITHMETIC SHIFT LEFT
ASL (R) OR (M)

We can use these commands when attempting to access a two byte address table use a one byte index, as follows.

LDX #TAB
LDB COU
ASLB
LDX B,X
SWI
COU FCB 1
TAB FDB \$1000
FDB \$2000
FDB \$3000
END

In the above example the "X" register would be loaded with \$2000 the second tow byte value in the table. We will perform a division now using the LSRB instuction.

```
LDB #8
LSRB 1/2
LSRB 1/4
LSRB 1/8
SWI
END
```

In this example we divide the number 8 in the "B" register by 8, leaving us with a result of one. There are many other uses for these shift and rotatw instructions. I will leave you this month with a program that may help better illustate these powerful commands. Type it in using your Editor/Assembler execute it and follow the directions in the program. I hope that this program will prove instructive in teaching you the in's and out's of the shift and rotate assembly language instruction, see you later.

```
00010 *****
00020 * *
00030 * *
00040 * ROTATE & *
00050 * SHIFT *
00060 * *
00070 * BY JOHN GALUS *
00080 * JUNE 1986 *
00090 * *
00100 *****
00110 KEY EQU $A1C1
00120 CLS EQU $A928
00130 SCR EQU $A30A
00140 START JSR CLS
00150 LDX #MES1
00160 JSR PRT
00170 CLR DIR
00180 LOOP1 JSR KEY
00190 BEQ LOOP1
00200 CMPA #3
00210 LBEQ FIN
00220 CMPA #'R
00230 LBEQ ROTATE
00240 CMPA #'S
00250 LBEQ SHIFT
00260 CMPA #'A
00270 LBEQ ARITH
00280 BRA LOOP1
00290 ROTATE JSR LR
00300 JSR CLS
00310 LDX #MES2
00320 JSR PRT
00330 LDB DIR
00340 BNE ROTL
```

```
00350 LDA #$80
00360 ROTX STA POS
00370 ROTR JSR KEY
00380 BEQ ROTR
00390 CMPA #3
00400 LBEQ START
00410 LDA POS
00420 PSHS A
CC
00430 LDB #9
00440 STB IH
00450 R1 PULS A
CC
00460 RORA
00470 PSHS A
CC
00480 STA POS
00490 JSR CLS
00500 JSR OP
00510 DEC IH
00520 BEQ ROTR
00530 LG JSR KEY
00540 BEQ LG
00550 BRA R1
00560 ROTL JSR KEY
00570 BEQ ROTL
00580 CMPA #3
00590 LBEQ START
00600 LDA #1
00610 STA POS
00620 PSHS A
CC
00630 LDB #9
00640 STB IH
00650 R1TL PULS A
CC
00660 ROLA
00670 PSHS A
CC
00680 STA POS
00690 JSR CLS
00700 JSR OP
00710 DEC IH
00720 LBEQ ROTL
00730 IKM JSR KEY
00740 BEQ IKM
00750 JMP R1TL
00760 SHIFT LDA #0
00770 STA DIR
00780 JSR LR
00790 LDA DIR
00800 CMPA #0
00810 LBNE SHIFL
00820 LDA #$80
00830 SX STA POS
00840 JSR CLS
00850 LDX #MES2
00860 JSR PRT
00870 SH1 JSR KEY
00880 BEQ SH1
```

00890	CMPA	#3		01350	BNE	SKIP	
00900	LBEQ	START		01360	LDA	#32	
00910	JSR	SHOW		01370	JSR	SCR	
00920	BRA	SH1		01380	LDA	#'1	
00930	SHIFL	LDA	#1	01390	JSR	SCR	
00940	BRA	SX		01400	LDX	#SPA	
00950	ARITH	LDA	#2	01410	JSR	PRT	
00960	STA	DIR		01420	SKIP	LDA	#'1
00970	JSR	LR		01430	JMP	OUT	
00980	LDA	DIR		01440	ZERO	PSHS	A
00990	CMPA	#2		01450	LDB	SPOT	
01000	LBNE	ARTL		01460	CMPB	#8	
01010	LDA	#80		01470	BNE	NEXT	
01020	AA STA	POS		01480	LDA	#32	
01030	JSR	CLS		01490	JSR	SCR	
01040	LDX	#MES2		01500	LDA	#'0	
01050	JSR	PRT		01510	JSR	SCR	
01060	ART JSR	KEY		01520	LDX	#SPA	
01070	BEQ	ART		01530	JSR	PRT	
01080	CMPA	#3		01540	NEXT	LDA	#'0
01090	LBEQ	START		01550	OUT JSR	SCR	
01100	JSR	SHOW		01560	LDA	#32	
01110	BRA	ART		01570	JSR	SCR	
01120	ARTL	LDA	#1	01580	PULS	A	
01130	BRA	AA		01590	DEC	SPOT	
01140	PRT LDA			01600	LBNE	HERE	
X+				01610	RTS		
01150	BEQ	RET		01620	LR JSR	CLS	
01160	JSR	SCR		01630	LDX	#MES3	
01170	BRA	PRT		01640	JSR	PRT	
01180	RET RTS			01650	GET JSR	KEY	
01190	SHOW	JSR	CLS	01660	BEQ	GET	
01200	LDA	DIR		01670	CMPA	#'R	
01210	LDY	#TAB		01680	LBEQ	RET	
01220	ASLA			01690	CMPA	#'L	
01230	LDY	A		01700	BNE	GET	
Y				01710	INC	DIR	
01240	JSR			01720	RTS		
Y				01730	S1 LSR	POS	
01250	OP LDB	#8		01740	RTS		
01260	STB	SPOT		01750	S2 LSL	POS	
01270	LDX	#MES4		01760	RTS		
01280	JSR	PRT		01770	A1 ASR	POS	
01290	LDA	POS		01780	RTS		
01300	HERE	LSLA		01790	A2 ASL	POS	
01310	BCC	ZERO		01800	RTS		
01320	PSHS	A		01810	TAB FDB	S1	
01330	LDB	SPOT		01820	FDB	S2	
01340	CMPB	#8		01830	FDB	A1	
				01840	FDB	A2	
				01850	SPA FCC	/	/
				01860	FCB	0	

W A N T E D

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```

01870 MES1      FCC      /PRESS R FOR ROT
ATE S FOR SHIFTA FOR ARITHMETIC
. TO END PRESS BREAK./
01880      FCB      0
01890 MES2      FCC      /PRESS ANY KEY TO
SEE IT WORK.    PRESS BREAK TO S
TOP./
01900      FCB      0
01910 MES3      FCC      /PRESS L FOR LE
FT R FOR RIGHT./
01920      FCB      0
01930 MES4      FCC      /CARRY
01940      FDB      $0D00
01950 FIN SWI
01960 POS FCB      0
01970 SPOT      FCB      0
01980 DIR FCB      0
01990 IH-FCB      0
02000      END      START

```

RADIATION RUN

A NICE LITTLE GAME.
INSTRUCTIONS ARE IN THE
PROGRAM.

```

10 X=RND(-TIMER)
20 'POKE359,57
30 CHT=1.1
40 AUDIOON
50 CLS:PRINT"          RADIATION
RUN    ",," YOU ARE STUCK IN A
CONTROL",," ROOM AND DANGEROUSLY
RADIO-",," ACTIVE MOLECULES HAV
E FOUND",," THEIR WAY OUT OF THE
CONTAIN-",," ER. YOUR JOB IS TO P
UT THEM",," BACK IN.",,,,,,,,,,
60 PRINT"HIT 'I' FOR INSTRUCTION
S, OR 'P'      TO PLAY THE GAME
."
70 I$=INKEY$
80 I$=INKEY$:IF I$="I"THEN 90ELSE
E IF I$="P"THEN210 ELSE80
90 CLS:PRINT"          INSTRUCTIO
NS",," THERE ARE MANY PIECES
OF IN-",," SULATED PIPES LAYING A
BOUT.",," THE MOLECULE STARTS OUT
IN ONE",," OF THE PIPES AND FOLL
OWS THE",," PATH OF PREVIOUSLY LA
YED ONES."
100 PRINT" THE FLOOR IS FILLED W
ITH PIPES",," EXCEPT FOR ONE EMPT
24 Y SPACE.",," YOU MOVE THE PIPES A

```

ROUND BY",," POINTING, WITH THE A
RROW KEYS, TO THE PIECE THAT YO
U WANT TO",," MOVE INTO THE EMPTY
SPACE."

110 PRINT:PRINT" PRESS ANY KEY
TO CONTINUE."

120 IFINKEY\$=""THEN120

130 CLS:PRINT" BY DOING THIS, Y
OU CAN MAKE",," A PATH TO THE CON
TAINER, THUS",," SAVING THE DAY.
ONCE YOU ARE",," DONE MAKING THE
PATH YOU CAN",," PRESS <E>. THIS
WILL EXCITE",," THE MOLECULE AND
IT WILL MOVE",," MUCH QUICKER DO
WN THE PATH."

140 PRINT" YOUR SCORE IS A FUNC
TION OF",," HOW QUICKLY YOU FINIS
H EACH",," LEVEL. THE ONLY WAY TO
LOSE IS IF YOU LET THE ATOM LE
AK OUT THE END OF A PIPE OR T
AKE TOO LONG IN MAKING THE PAT
H."

150 PRINT:PRINT" PRESS ANY KEY
TO CONTINUE"

160 I\$=INKEY\$:IF I\$=""THEN160

170 CLS:PRINT:PRINT" IF YOU SHOU
LD LOSE, HIT ANY KEYTO RESTART T
HE GAME."

180 PRINT:PRINT" PRESS ANY K
EY TO PLAY."

190 IFINKEY\$=""THEN190

200 IFCHT<>1.1THENEND

210 FORQ=0TO9:READR\$(Q):NEXTQ

220 PMODE1,1:PCLS:SCREEN1,0

230 DIM MP(4,4)

240 CS=.25

250 NSC=1:SCR=0:GOSUBB30

260 '***START***

270 AUDIOON:X=46:Y=46:XG=X:YG=Y:

X1=2:Y1=10

280 CX=CS:CY=0

290 COLOR1,1:LINE(0,160)-(254,0)

,PRESET,BF

300 COLOR4,1

310 FORQ=0TO240STEP20:LINE(Q,0)-

(Q,160),PSET:NEXTQ:FORQ=0TO160ST

EP20:LINE(0,Q)-(240,Q),PSET:NEXT

Q


```

320 FORQ=4T0150STEP20:FORW=4T023
0STEP20:PAINT(W,Q),3,4
330 R=RD(8):DW$="BU8C1L2R4BR6BD
6D4BD6BL6L4BL6BU6U4"
340 IFQ=4ANDW=4THENR=2
350 IFQ=4ANDW=24THENR=5
360 IFR=1THENDW$=";L2U4R2U2L2U2R
4D6L2D2L2D2L2U2L2D2L2U4R4U2BR12B
D2C1D4BD6BL6L4"
370 IFR=2THENDW$=";RBU2L16D4R16U
2L14C1BD8BR4R4BU16L4"
380 IFR=3THENDW$=";U8L2D16R4U16L
2D14C1BR8BU4U4BL16D4"
390 IFR=4THENDW$=";U8L2D6L6D4R6D
6R4U6R6U4L6U6D8R4L12R6D6"
400 IFR=5THENDW$=";L2U2L6D2R4D2L
4R10D6L4U4L2R4D2C1BR8BU4U4BU6BL6
L4"
410 IFR=6THENDW$=";R2U2R6D2L4D2R
4L10D6R4U4R2L4D2BL8BU4C1U4BU6BR6
R4"
420 IFR=7THENDW$=";U2L2U6R2D4R2U
4D10R6U4L4U2D4R2BD8BL4C1L4BL6BU6
U4"
430 DRAW"BM"+STR$(W+6)+"", "+STR$(
Q+6)+"";C2;XDW$;"
440 NEXTW:NEXTQ
450 DRAW"BM206,162;C2R8L2D2L4D2R
4D2R2C4L8C2":LINE(204,170)-(216,
180),PSET,BF:COLOR1,1
460 LINE(X-4,Y-4)-(X+12,Y+12),PR
ESET,BF
470 PLAY"T5;02;DFGBCGGCEEDFGBCGG
CFED":AUDIOON
480 '*** PROGRAM ***
490 I$=INKEY$
500 IFI$="E"THENCX=2*SGN(CX):CY=
SGN(CY)*2
510 IFX>6ANDI$=CHR$(8)THENXG=X-2
0:GOSUB610ELSEIFX<226ANDI$=CHR$(
9)THENXG=X+20:GOSUB610
520 IFY>6ANDI$="^"THENYG=Y-20:GO
SUB610ELSEIFY<146ANDI$=CHR$(10)T
HENYG=Y+20:GOSUB610
530 PSET(X1,Y1,2):X1=X1+CX:Y1=Y1
+CY:IFPPOINT(X1,Y1)=4THENIFCX=0T
HENY1=Y1+SGN(CY)*2ELSEX1=X1+SGN(
CX)*2
540 IFY1>164THEN780
550 IFTM=10000THEN730
560 TM=TM+1:IFX1<20RY1<2THEN730E
LSEIFPPOINT(X1,Y1)=3THEN690
570 IFPPOINT(X1,Y1)=1THEN730
580 PSET(X1,Y1,4)
590 GOTO490
600 '*** MOVE PIECE ***
610 GET(XG-4,YG-4)-(XG+14,YG+14)
,MP,G

```

```

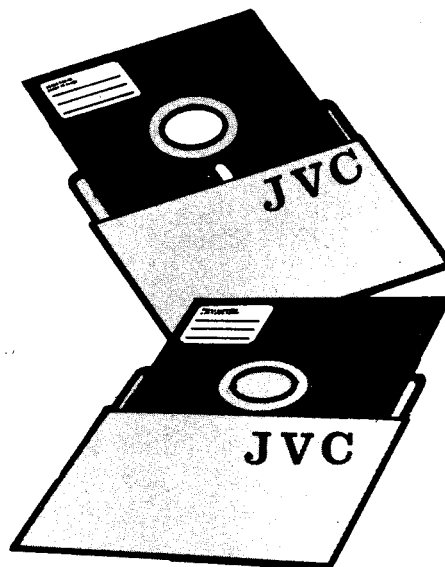
620 PUT(X-4,Y-4)-(X+14,Y+14),MP,
PSET
630 PLAY"T250;V31;A":AUDIOON
640 LINE(XG-4,YG-4)-(XG+12,YG+12
),PSET,BF
650 'PLAY"T250;A"
660 X=XG:Y=YG
670 RETURN
680 '*** TURN?? ***
690 'IF(X1+2)/20=INT((X1+2)/20)O
R(X1-2)/20=INT((X1-2)/20)OR(Y1+2
)/20=INT((Y1+2)/20)OR(Y1-2)/20=I
NT((Y1-2)/20)THEN400
700 IFCX=0THENY1=Y1-CY:IFPPOINT(
X1+2,Y1)=3THENCX=-1*ABS(CY):CY=0
:GOTO580ELSECX=ABS(CY):CY=0:GOTO
580
710 IFCY=0THENX1=X1-CX:IFPPOINT(
X1,Y1+2)=3THENCY=-1*ABS(CX):CX=0
:GOTO580ELSECY=ABS(CX):CX=0:GOTO
580
720 '*** DEATH ***
730 IFX1>0ANDY1>0THENPSET(X1,Y1,
2)
740 FORW=5T01STEP-1:FORQ=12T01ST
EP-1:PLAY"T250;0"+STR$(W)+"":+ST
R$(Q):AUDIOON:NEXTQ:NEXTW:PLAY"T
250;ECECECECECECE":FORQ=1T01000:N
EXTQ:AUDIOON
750 I$=INKEY$
760 IFINKEY$=""THEN760ELSERUN
770 '*** WIN!! ***
780 PLAY"T503FGGFGGCEFD"
790 IFCS<2THENCSS=CS+.125
800 NSC=NSC+1:SCR=SCR+(10000-TM)
:GOSUB830
810 GOTO270
820 '***SCORE***
830 COLOR1,1:LINE(0,178)-(200,19
1),PSET,BF:FORW=4T02STEP-1:XD=0:
Q$=STR$(SCR)+" "+STR$(NSC)
840 FORQ=1T0LEN(Q$)
850 W$=MID$(Q$,Q,1)
860 D$=DR$(VAL(W$))
870 IFW$=" "THEND$=""
880 XD=XD+14:IFD$<>" "THENDRAW"BM
"+STR$(XD)+"",178;C"+STR$(W)+"":XD
$;":PLAY"T250;"+STR$(W*3):COLOR1
,1:AUDIOON
890 NEXTQ:NEXTW
900 RETURN
910 DATA"BR2R4F2D8G2L4H2U8D8E6",
"BR4D2L2R2D10L2R4","BD2E2R4F2D2G
2L4G2D4R8","BD2E2R4F2D2G2L4R4F2D
2G2L4H2","D8R6U6D6R2L2D6","R8L8D
4F2R4F2D2G2L4H2","BR8BD2H2L4G2D8
F2R4E2U2H2L4","D2U2R8D2G4D6","BR
2R4F2D2G2F2D2G2L4H2U2E2R2L2H2U2"
,"BR6L4G2D2F2R6U4D8G2L4H2"
920 GOTO920

```

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MTERMCON UTILITY
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PRINT @:
LDD WITH 0=511 THEN JSR \$A557
CLEAR HALF SCREEN:
LDB #\$60
LDX #\$04FF
JSR \$A92D

PRINT A CARRIAGE RETURN:
JSR \$B95B

USE PLAY COMMAND:
PLAY LDX #SONG
LEAX -1,X
STX \$A6
JSR \$9F
JSR \$9A55
SWI
SONG FCC #"CDEFGAB"##
FCB 0
END

LINE INPUT:
JSR \$A390 OR JSR \$A393

PRINT A NUMBER IN D:
LDD #100
JSR \$BDCC

INPUT A NUMBER TO B 0-255:
JSR \$A390
LDX #\$2DD
STX \$A6
JSR \$B70B ;GET A NUMBER 0-255
JSR \$BDCC

INPUT A NUMBER TO X 0-65535
JSR \$A390
LDX #\$2DD
STX \$A6
JSR \$B73D
TFR X,D
JSR \$BDCC

EXECUTE A NEW:
JSR \$AD19

JOYSTK:
JSR \$A9DE
LDA \$15A ;LEFT JOY UP/DOWN
LDA \$15B ;LEFT JOY RIG/LEFT
LDA \$15C ;RIGHT JOY UP/DOWN
LDA \$15D ;RIGHT JOY RIGHT/LEFT

PRINT A SPACE:
JSR \$B9AC

BLOCK MOVE:
LDD #\$400
STD \$41 ;DESTINATION TOP

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```
LDD #$420
STD $43 ;SOURCE TOP
LDD #$41F
STD $45 ;DESTIATION BOTTOM
LDD #$440
STD $47 ;SOURCE BOTTOM
JSR $AC20 ;BLOCK MOVE
```

```
ANOTHER BLOCK MOVE 0-255 BYTES:
LDB #10 ;NUMBER OF BYTES TO MOVE
LDX #$400 ;START
LDU #$500 ;DESTINATION
JSR $A59A
```

```
WARM START:
JMP $A027 COLOR BASIC
JMP $80C0 EXTENDED BASIC
```

```
SOUND COMMAND:
LDB #10 ;PITCH
STB $8C
LDB #10 ;DURATION
JSR $A951
```

```
INKEY$:
JSR $A1C1 OR JSR $A1B1
```

```
TURN ON CASSETTE AND WRITE LEADER:
JSR $A7DB
```

```
WRITE BLOCK TO CASSETTE:
JSR $A7F4
```

```
GET INTO SYNC FOR CASSETTE READ:
JSR $A77C
```

```
READ A BLOCK FROM CASSETTE:
JSR $A70B
```

HERE IS A SHORT EXAMPLE OF HOW TO WRITE AND READ TO THE CASSETTE:

```
WRITE:
JSR $A7DB ;WRITE LEADER
LDA #1
STA $7C ;FILE TYPE DATA
LDA #$FF
STA $7D ;NUMBER OF BYTES
LDX #$400
STX $7E ;START OF SAVE AREA
JSR $A7F4 ;WRITE A BLOCK
```

```
READ:
JSR $A77C ;GET IN SYNC
LDA #1
STA $7C ;FILE TYPE DATA
LDA #$FF
STA $7D ;FILE SIZE
LDX #$400
```

STX \$7E ;READ TO LOCATION
JSR \$A70B

\$7C: CONTAINS THE FILE TYPE
0-FILE HEADER
1-DATA
\$FF-END OF FILE
\$7D: CONTAINS NUMBER OF BYTES FROM 0-255 TO
READ OR WRITE.
\$7E: CONTAINS THE STARTING ADDRESS OF WHERE
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(AT END OF READ OR WRITE "X" WILL CONTAIN THE
STARTING ADDRESS IN \$7E PLUS THE FILE LENGTH
IN \$7D)

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JSR \$A2BF

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Buffer Comes to CoCo...
Written by
Lee Veal

For years Color Computer owners have been faced with the problem of bridling their fantastic machine with things like printers. The Color Computer is a great machine, but printers are dreadfully slow, even when they're going at full tilt. This is very detrimental to a Color Computer's effective through-put. Most programs available then and now must have the whole system dedicated to them for the duration of the work to be done. That means that from the first character of data input to the system to the last line printed, the system is literally shackled to that application.

The Color Disk Scripsit word processor made a weak attempt to alleviate some of that by adding a spooling feature to its repertoire, but a software spooler which uses the CoCo's "bit banger" serial I/O port is very sluggish at its best. It did, however, give the user a facility whereby he/she could be printing one document while editing another. The word processing application could not be exited without abruptly terminating the printer function, but if you were patient and could live with the sluggishness of the system's performance you could overlap that printing with other word processing.

Spooling on the Color Computer was pretty much limited to that type of software spooling. Many spooling programs have been written to take advantage of the CoCo's additional 32K bank of memory even before OS-9 did. Many of these programs are variations on the theme of the software spooler contained in the Color Disk Scripsit. Until the architecture of the CoCo is changed we're not going to get very good software spoolers on the CoCo. Please don't get me wrong they're better than nothing. I have used software spoolers in specific situations, but if I am using one of them and the next thing that I need to do is pull up VIP Writer which also uses that extra memory, too. Bam!!! There goes the stuff I had spooled.

So, what's the next best alternative? Hardware spoolers or, as I prefer to call them, printer buffers. These devices are little "in between" computers which are connected between your computer and your printer. They have a microprocessor, ROM, RAM, indicators, switches, input port, output port, etc. They are computers in their own right, but their role in life is not for use as a general purpose computer like the CoCo. These "in between" computers are specifically designed to buffer a computer's printed output and simultaneously drive a printer.

A printer buffer accepts data much faster than a real printer, therefore the computer can complete its part of the work much sooner than if it had been directly tied to the printer. That's the biggest single advantage of using a hardware spooler, when the word processor is finished "printing", the user is free to not only do other word processing but just about any other possible application. Your kid or grandkid could turn off the CoCo, plug in a ROM pack and play Devil Assault. You could even boot up OS-9 and start testing on some pet project. And, if while OS-9 was up, you printed a program or something, then guess what, that printed data would be put into the printer buffer right behind the data which was already there.

There are several suppliers from which you can get a printer buffer. Tandy, TAXAN, and Cosmos Computer Services just to name a few all have some type of hardware spooler which they market. But the focus of this review will be on a printer buffer built and marketed by Johnathon Freeman Designs (JFD). Their device is called the JFD-2068 Universal Printer Buffer according to the documentation, but my particular unit is labelled JFD-1064. In either case, the unit is referred to simply as JFD-UPB. This discrepancy only served as a portent for other problems which I found in the documentation that I'll detail later.

The JFD-UPB comes as a sturdy metal box which is equipped with 4 data ports, 12 DIP switches, 2 buttons, and a power jack. The word "universal" in the name is the device's watchword. The JFD-UPB comes equipped with a dual port scheme which allows it to take data from either a serial or parallel port on a computer, and then send that data to either an RS-232C serial or Centronics parallel printer. There are actually four possible combinations for data transmission:

serial	to	serial
serial	to	parallel
parallel	to	parallel
and parallel	to	serial

According to the documentation booklet which came with the unit, the JFD-UPB can be connected to practically any computer or printer. Many times that kind of statement means that, if your computer and printer are in the mainstream then you probably won't have many problems. Since I planned to use this new buffer with my CoCo and my Citizen MSP-15 printer, then their documented statement was going to be put to the test very early in the process.

Summary---

The JFD-UPB is an excellent price/performance option for the CoCo (or any computer for that matter). It offers versatility, flexibility, and expandability for the CoCo user. The JFD-UPB is not specifically designed with the CoCo in mind, but it makes available many facilities which have not been readily available to the CoCo community. The insides are neatly laid out and the soldering was done with meticulous care. I highly recommend this device to anyone interested in removing the "printer-bound" burden from their computer.

The JFD-UPB is supplied by:

Johnathon Freeman Designs
1067 Dolores St.

San Francisco, Ca 94110
(415) 822-8451

In the Dallas Area the device can be purchased through:

Benjamin Engineering, Inc
809 Canyon Creek Square, Suite 102
Richardson, Tx 75080
(214) 469-8928

Benjamin Engineering has excellent prices on this as well as other devices. They can supply the JFD-UPB and a parallel male-to-male cable for well under the advertised list price. (The cost of the parallel cable is not included with the JFD-UPB because of the possibility of different requirements, but my MSP-15 and my DWP-210 printers both have a female connector which are going to require a male connector.) The 4-pin DIN to DB25 cable will have to be acquired from other sources, but, even with that, the total cost is still well under the advertised list price. Call for current prices and shipping information.

C O C O P R O G R A M P A C K S

Here is a great way for you to increase your library of programs for your COCO. Each pack contains very useful programs for learning, application, and are ready to use. Each has the size of each program with a description. The codes are: F-FILE G-GAME B-BUSINESS U-UTILITY E-EDUCATION C-CASSETTE D-DISK P-PRINTER K-KEYBOARD J-JOYSTICK HF-HOME FINANCE PICTURE ART

PROGRAM PACK # 1

IN-OUT	263	DESIGN	ROMRAM	2083	U,84K	64KTEST	2029	U,64K
UPPER32K	529	U,64K	HEXTODEC	435	U	DEC<>HEX	1596	U
BASECONV	1332	U	DISKTEST	1402	U,D	SOUNDDEM	2090	DEMO
CONVERGE	783	E,B	TESTPATT	2314	U	COMPLAWS	4014	G,K
CHESS	9664	G,K	CHECKERS	3067	G,K	PATROL2	5876	G,J
ELECTMAZ	7125	G,J	ICE	3586	G,J	TANKS	3469	G,J
DODGE-EM	2839	U,D	SOISAYS	3950	G,K	DOORS	1087	G,K
FUELCOST	1170	HF	OHMSLAW	1895	B	LANDER	1984	G,K
WHERISIT	4497	G,K	HANGMAN	2592	G,K	OTHELLO	7267	G,K
GOLDMINE	5201	G,K	STATCAP	2462	EDUC	PINGPONG	1383	G,J
BIORYTHM	5107	G,K,P	CALENDAR	4532	U,P	MAILLIST	2958	F,P,C

PROGRAM PACK # 2

DISKLIST	2111	U,D,P	DIRLIST	2386	U,D,P	ML ADDR	1997	U,D,P
DISKDUMP	1181	U,D,P	PRINUTIL	2496	U,K	CALPRINT	4795	U,P
ALPHSONG	1036	E,M	PAINT	1102	DRAW	DOGPIC	3003	PICTURE
EVADER	1178	G,K	NUKATTC	3282	G,K	BASICMAP	6781	U,K
JOYPAINT	176	DRAW	PUNKIN	1018	PICT	HOMOYMS	1676	EDUC
ABBREV	7156	EDUC	CONVERT	5118	E,B	CASTLE	8172	ADV
CASSDIR	1012	U,P,C	CVERT	1776	U,E	FLASCARD	1985	EDUC
MESSAGE	312	U	RELOCAT	965	U	DISKLIST	1538	U,D
DSKTAPE	1667	U,D,C	BEAST	2227	G,K	DOGFIGHT	2145	G,J
PLANE	1066	G,J	DOGS	1547	G,K	CALENDAR	1830	U,P
COUNT	590	U						

PROGRAM PACK # 3

BOXLABLE	993	U,C	MONOL	15132	G,K	ATOMS	2803	G,K
FLIP	2700	G,K,J	POWER UP	249	U,P	DISKSORT	1883	U,D
READBIN	461	U,D	MACDATA	898	U,C	CUBES	2263	G,K
HEXLOAD	1812	U	HANGMAN	2509	G,K	OHMS	1234	U,E
SPEDMATH	6303	EDUC	SCRDUMP	133	U,P	DSKCLEAN	505	U,D
DIRGET	252	U,D	DIRSAVE	295	U,D	ML ADDR	262	U,D
WALLHIT	2112	G,K,J	TEMPCONV	571	U	CHKBOOK	2248	HF,C
DIS	4104	U,P	LOCFind	669	U	MISSLETT	767	G,E
MEMORIE	2767	G,K	FISH	2088	G,K	CHIPER	770	G,K
CARCAL	1388	HF	BIGHILLG	2140	G,K	PROTECT	3095	G,K,J
STOCK	5227	G,K	JUMP	1999	G,K	FOOTBALL	7078	G,K
BOWLSUM	2491	FILE	HILOW	5709	G,K	MEMTEST	1889	U

PROGRAM PACK # 4

COMMAND	5154	G	PACMAN	16605	G	TYCOON	4317	G
DIALER	2324	U	DEXICON	1715	U	DISK FIX	893	D,U
DISKTIME	1170	D,U	DOS64A	6569	U	GDS	10055	G
PIXCMP	4490	PIC	ROMPACK	928	U	SOUND	58	U
SPOOLER	159	U	UT	3148	U	Z	8311	U
QUADDRW	263	DRAW	B	2183	U	CLOCK	370	U
COPY DIR	1055	D,U	DDCOPY	3193	D,U	FDCTST	6277	G
FIND	622	G	ODIE	6154	PIC	PEANUTS	6154	PIC
SPACE	6154	PIC	ISLAND	13403	ADV	PATTERN	4572	ART
CHEKBOOK	7098	FIN						

PROGRAM PACK # 5								
MLDISK	3070	D,U	SORT	794	U	TELETERM	5792	COMM
DSK EDIT	8165	D,U	HEALTH	18728	EDU	SOUND	58	EDU
TOF	3019	G	AIRPORT	12031	G	CUBE	5907	G
OBJECTS	4211	G	TANKS	8323	G	CIA	13777	ADV
TRIANGLE	4539	PIC	WORLDMAP	7435	EDU	GARFIELD	6154	PIC
HALLDEMO	1910	PIC	LINES	2263	ART	KALVOS	1259	G
CASTLE	21217	ADV						

PROGRAM PACK # 6								
SLITHER	2156	G	TUMBLERS	3979	G	ELIZA	7083	G
ICELAND	3472	G	EDUCATE	1511	G	DUNGEON	4362	ADV
PIXDUMP	2140	U,P	CONTOUR	1143	U	SLOSKROL	218	U
COPYDIR	1566	D,U	DIRLIST	1535	D,U	PILOT	4135	G
INVITE	1533	U	MATHPAL	6460	EDU	DUPER	2971	U
IN-OUT	226	ART	GOLDMINE	5646	G	HUSTLE	1239	G
HOBBIT	3634	G	CONNECT4	2647	G,K	OTHELLO	5800	G,K
BIOTYTHM	1787	G,P	SIMON	782	G,K	TICTACT	4269	G,K
3-D-T	4263	G,K	DARTBORD	4431	G,K	COPTER	3022	G

PROGRAM PACK # 7								
D-ADV	17651	ADV	SWORDS	9198	G	TROLL	11561	ADV
QUEST	8439	G	SURVIVE	9751	ADV	SPELWORD	2135	EDU
CUBIC	5331	G	DOTMAT	16651	G	FLIGHT	5435	G
GRID	3715	PIC	TIGER	6154	PIC	ZIGGY	6154	PIC
LABELPRT	420	U,C	PEEK	1799	U	ROMDUMP	421	U
DISASSY	7512	U	MLFINDER	440	U	COLORBAR	91	U
PATTERN	994	U	PORT	249	U	PAYMENT	340	U
PHONE	1629	F	LOAN	6038	BUS			

PROGRAM PACK # 8								
LOANAMOR	1633	FIN	MLTTD	840	U	BLACKJK	7520	G,K
SLITTER	2137	G,K	IDKIT	12911	G	SPACE	17397	PIC
FARMING	12878	G	TREK	10169	G,K	DSCOPY	1946	D,U
DSKSPEED	1470	D,U	EXREF	5524	U	ALARM	4150	U
CLOCK	1112	U	PHONEDIR	2393	F,C	TICKTAPE	5510	U
FINANCE	18343	FIN	BARTENDR	5710	REF	DSKLIBRY	5598	F,D
MESSAGE	828	U	FLIPPAGE	5734	U	DSKAID	8025	D,U

PROGRAM PACK # 9								
DECIDE	4795	G	BIBLE	3249	EDUC	BOMBER	2604	G,K
WEATHERX	4797	U	PROJEVAL	9107	B	FILES	8401	B,C
SUB	9473	ADV	DATAPRNT	413	U	DISKDIRE	4979	D,U
BASEBALL	21936	PIC	AMORLN	3655	F	ASSMLBER	6211	U
GUITAR	10886	E,M	POKER	6924	G,K	TANK	4132	G,J
TRIANGLE	7007	PIC	SHIPS	3756	PIC	HANDBALL	3883	G,J
TRAIL	7938	G,K,J						

PROGRAM PACK # 10								
KINGDOM	11949	ADV	CHECKS	6453	F,D,C	BONGOCARD	1701	G,P
DKS2TP	2483	D,U	SLOTS	3984	G,K	DATAFILE	7239	F
MLADFND	2762	U	ICE	6060	G	ASSMBLER	12803	U
DISMON	13924	U	SIMSAS	636	G,K	DISKNAME	7820	D,U
SQUEEZE	3166	D,U	STATUS	7787	D,U	DISKLOOK	684	D,U
MAZE	7106	G,K	CROSROAD	2991	G,J	ANIMALS	6219	E,K
DSKLOCK	2795	D,U	SELFMAIL	985	U,P			

PROGRAM PACK # 11

COMBAT	5862	G	MCONVERT	2895	U	FRACTION	7192	G,E
BALONS	4976	G,K,J	DATA3	6066	B,F	LIFE	7561	G
MUSCOMP	3441	G,E	BOGCEL	6013	G,K	OFFSET	2241	U
BATSHIP	7357	G,K	DUMPALL	5409	U	GEOGAME	8452	G,E
MAILLIST	4641	B	VALENCE	2414	G,E	GRAPHDZN	4942	PIC
WEREWAND	10443	ADV	POKER	5943	G,K	ASSMBLER	11338	U
MAZE3	6237	G	RUBCUBE	10321	G			

PROGRAM PACK # 12

CIPHER	772	G,K	COPYM	1929	U	SCRPRINT	3033	U,P
MOPLY	15219	G,K	SOUNDS	5276	U,E	DISTANCE	7454	U
DATES	3221	U	PHONWORD	1424	U	ROBOTS	5201	G,K
DIGGEM	5850	G,K	CONNT4	8002	G,K	ROLLON	4360	G,K
WILLSADV	10330	ADV	BASICMAP	6159	U	GRAPHICS	10794	U
RACEWAY	7335	G,K	TYPING	2803	E,G	CHECKS	6951	FIN
MONEYHLP	8074	FIN	WORDPRC	9387	B,C			

PROGRAM PACK # 13

CADIOH	9696	EDU	HAUNTHSE	12572	ADV	DISKHLP	8162	D,U
FINT-IT	4782	G,K	MISSLES	4154	G,K	PLANE	1066	G,J
FLASHCRD	4062	EDU	COMPTALK	3815	G	HOMEUTIL	12284	FIN
CHKBOOK	6601	FIN	SHAPES	6463	G,K	VIPERS	5169	G
POKING	7137	EDU	BUGS	13238	G	GEOSTUDY	7579	EDU
USASTUDY	7720	EDU	HEALTH	18697	EDU			

PROGRAM PACK # 14

DISKWASH	2150	D,U	AUTODIAL	2326	U	MASTMESS	5980	B
BIGPRINT	5751	U	TRIVIA	8053	G	D-TO-D	3539	D,U
SORT32	967	U	CHARACTR	3794	G	64KLOOK	16361	U
SCRIPT	5553	EDUC	LOADINTR	6184	B	FINDAWRD	3966	G
BUTR17	3543	U	BATTSHIP	4039	G,K	FLY	6252	G
64KMEMT	2798	U	OTHELLO	7144	G,K	FINANAD	12250	EDU
SPDSHEET	10430	BUS	METCONV	2238	U	CRACE	3630	G,J

PROGRAM PACK # 15

DKTODK	4764	D,U	ATTACKER	7439	G	BIORYTHM	2309	G,P
HANGMAN	2592	G,K	TREK	8730	G,K	3DTT	7614	G,K
TYPEFACE	5280	U,P	STAT-LOG	4937	F	WORDSCAR	3863	G
DSKMSTER	9083	D,U	TYPING	4799	E,G	CHECKS	5675	FIN
200DD	8383	ART	FISHING	2091	G	MEMORY	2729	G
HORSERAC	5373	G	KRAKEN	10046	ADV	KINGS	13660	ADV
STOCKS	9603	B,U	CYRPTO	6252	G			

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			502 365 7785	COLORAMA	KY	718 837 2881	KING BYTE C.C.	NY
			502 937 4594	COLORAMA	KY	800 323 0905	MCI MAIL SERVICE	
			503 649 4497	BEE COLOR BBS	OR	803 279 5392	AUGUSTA TBBS	SC
			503 761 6345	BIT BUCKET SYS	OR	803 288 0613	DLOAD OS9	SC
			504 277 6926	CHALMETTE BBS	LA	803 393 7399	PEE DEE EXCH	SC
			504 876 1790	BAYOU BOARD	LA	803 791 7389	MIDLAND 80	SC
			504 885 5619	STARBASE 6809	LA	804 285 0041	SKELTON ISLAND	VA
			512 285 5028	COLORAMA	TX	804 862 4663	3 MUSKETEERS	VA
			512 353 1508	COLORAMA	TX	804 868 0922	PEN COLOR BD	VA
			512 629 7670	COBBS	TX	804 887 5302	GAMMA COLOR 80	VA
			512 674 0264	SA COLOR BOARD	TX	805 484 5491	COLORAMA	CA
			513 236 8307	DACCUG	OH	805 656 3746	VENTURZ BBS	CA
			513 396 7467	CINSOFT	OH	805 687 9400	COCO CORNER 1	CA
			513 399 1262	COLORAMA	OH	806 374 9711	BURG BOARD	
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THE GAME OF LIFE

Steven M. Ostrom
12612 Cedar Lake Road
Minnetonka, MN 55343
612-546-7608

The program accompanying this article was written after reading the Games column in the October, 1984 issue of OMNI magazine, page 188. This article in OMNI should be referenced for a much broader explanation of the game of Life than will be published here.

The game of Life was invented many years ago, before home computers were so popular. It was mainly played by people who had access to large company computers during evening hours.

Even though it is called a game, it is really more like a model of a living system. I like to compare it to watching a time lapse film of a colony of bacteria, as cells come to life, grow, and die in their own microcosm. This way, the game of 'Life' takes on a more real meaning.

Home computers such as our Color Computer are ideal tools to use to watch this game in action. The screen output by the computer is actually a grid, with pixels (picture elements) that can be turned on or off to display letters or pictures. Think of these pixels as cells. If a pixel is ON, that cell is alive. If a pixel is OFF, that cell is dead.

As in any game, or as in life itself, there are certain rules which must be followed. There are only three rules to the game of Life. These rules will determine whether any given cell is ON or OFF for the next generation. Every cell has eight neighboring cells, one each at the top, bottom, left and right, as well as one at each corner. The diagram below shows a cell (C) surrounded by its eight neighbors.

```
1 2 3
4 C 5
6 7 8
```

The rules of the game are as follows:

- 1) If a cell has 2 ON neighbors and 6 OFF neighbors, it does not change its present state in the next generation. If it was alive, it remains alive. If it was dead, it remains dead.
- 2) If a cell has 3 ON neighbors and 5 OFF neighbors, it will be ON in the next generation. If it was alive, it remains alive. If it was dead, it will be 'born'.
- 3) If a cell has any other combination of ON and OFF neighbors, it will be OFF in the next generation. If it has 0 or 1 ON neighbors,

it dies of loneliness. If it has four or more ON neighbors, it dies of overcrowding.

The computer will keep track of these rules for you. The BASIC part of this program will handle all the normal housekeeping chores and the machine language part will do the actual rule monitoring and screen updating. Machine language was chosen for these functions because of all the calculations which must be performed on each cell. As it is, even the machine language part takes about three seconds to complete a generation. Some starting arrangements may take over 1000 generations to finally reach a stable condition.

The machine language part of the program will evaluate each pixel of the computer display grid. The grid size used here is from the PMODE 1 screen, utilizing 120x96 of the 128x96 available pixels. This means that the state of each of the 11,520 pixels is being determined while looking at 92,160 neighboring pixels during each new generation. That's a lot of testing going on in the three seconds it takes for each generation!

The right-hand part of the screen will indicate which cycle is currently being displayed. This number can go as high as 9,999 generations, but generally no more than 2,000 will ever be needed.

After you type RUN, the program will briefly explain what it is doing, then give you a menu from which you may choose a desired action. There are eight menu choices. (You may add others of your own if you wish.)

The first choice allows you to make up your own starting arrangements for the live cells on the grid. This is the experimentation mode and should be tried only after you try some of the preset modes. By trying some of the preset modes first, you get a better feeling for what might make up an interesting starting configuration of live cells.

The second menu choice is called BLACKOUT. This preset example is only one of millions of possible arrangements which will die out after one generation because it satisfies only Life Rules #1 and #3. Letting it go more than a few generations will be a waste of time since the screen will stay blank after the cells have died. Here is an example of the setup for BLACKOUT:

```
o o o o o
o o o o o
o o x x o
o o o o o
o o o o o
```

(o => pixel OFF, x => pixel ON)

The third choice from the menu is called BLINKER, since it will oscillate back and forth between two shapes indefinitely, reminiscent of a blinking light. Here is an example of the setup for BLINKER:

```
o o o o o
o o o o o
o x x x o
o o o o o
o o o o o
```

The fourth menu item is a still-life called a BLOCK. This is a perfectly stable starting configuration consisting of four ON pixels in a tight square. No cells are born and none will die. It will remain constant generation after generation. Here is an example of the setup for BLOCK:

```
o o o o o
o o o o o
o o x x o
o o x x o
o o o o o
```

Menu item number five is a little more exciting. It has been named T-TETROMINO. It will undergo some interesting shape transformations for the first nine generations, then it will become a stable shape called the TRAFFIC LIGHT, which is really four BLINKERS arranged in a square. Here is an example of the setup for T-TETROMINO:

```
o o o o o
o o o o o
o x x x o
o o x o o
o o o o o
```

The most interesting of the starting shapes provided for you from this menu is choice number six. This one is called R-PENTOMINO. It starts off as five interconnected dots and finally reaches a stable condition after 1,103 generations! The screen will be nearly filled with a variety of shapes at the end, including BLOCKS, BLINKERS, GLIDERS (see below) and other interesting stable patterns. R-PENTOMINO will take about one hour to reach its final state. It is worth the wait, but you may want to watch TV, read a book, or eat dinner during most of the generations. Here is an example of the setup for R-PENTOMINO:

```
o o o o o
o o x x o
o x x o o
o o x o o
o o o o o
```

The seventh menu choice is one called GLIDER. GLIDERS are formed during the R-PENTOMINO generations above, but are 42

interesting in themselves, so I included one as a menu choice. This shape will change slightly from generation to generation but will always return to the original shape after diagonally moving one pixel away, and will glide off the screen eventually. Here is an example of the setup for GLIDER:

```
o o o o o
o o x o o
o o o x o
o x x x o
o o o o o
```

The eighth and final menu item is the standard QUIT, which will return you to BASIC.

After you have tried the preset starting conditions, please experiment with menu choice number 1. You might be very surprised at what you can produce from a simple starting figure and the three simple Rules of Life. You may want to investigate the interactions between multiple starting figures. For example, see what will happen if you send a GLIDER crashing into a stable BLINKER, or see what will happen if you start with two R-PENTOMINOS in close proximity.

The machine language routine contained in the DATA statements is position independent. If you should want to move it to another location in memory, just change the hexadecimal numbers located in lines 100, 110, 130 and 140.

I hope you enjoy this fairly old pastime. Please feel free to write to me or COCO ADS with any setups you've tried that produce especially interesting results.

```
10 'THE GAME OF LIFE
20 'ADAPTED FROM OMNI MAGAZINE
30 'BY
40 'STEVEN M. OSTROM
50 '12612 CEDAR LAKE ROAD
60 'MINNETONKA, MN 55343
70 '
80 'COPYRIGHT FEBRUARY 10,1985
90 '
100 CLEAR200,&H6CEF:PCLEAR4:DIM
XC(100),YC(100):COLOR6,5
110 DEFUSR0=&H6CF0
120 CLS:PRINT"PLEASE WAIT WHILE
THE MACHINE LANGUAGE ROUTINE I
S BEING POKED INTO MEMORY AND DA
TA STATEMENTS ARE CHECKED FOR AC
CURACY..."
130 X=&H6CF0:TT=0
140 READML:TT=TT+ML:IFML=999THEN
160
150 POKEX,ML:PRINT@268,&H6FFF-X:
X=X+1:GOTO140
```

```

160 IFTT=71473THEN170ELSECLS:PRI
NT"RECHECK DATA STATEMENTS FOR
  TYPING ERRORS!!!":END
170 CLS:INPUT"DO YOU WANT TO USE
  THE SPEED-UP POKE (N=NO, Y=YES)
";A$
180 IF A$="Y"THENPOKE65495,0ELSE
IFA$<>"N"THEN170
190 CLS:PRINT"THIS IS THE GAME O
F LIFE. THE GAME FOLLOWS THREE
  SIMPLE RULES WHICH ARE EXPLAINE
D BELOW. IT WILL BE EASIER TO
  UNDERSTAND IF YOU THINK OF EACH
DOT AS A BACTERIAL CELL OR
  A PERSON."
200 PRINT"YOU WILL CONTROL THE I
NITIAL ARRANGEMENT OF CELLS A
ND WATCH WHAT HAPPENS TO THE AR
RANGEMENT AFTER EACH GENERATION
OR CYCLE."
210 PRINT@480,"PRESS <ENTER> TO
CONTINUE...";:INPUTA$
220 CLS:PRINT"THIS GAME WAS INVE
NTED MANY YEARS AGO, AND THI
S VERSION IS ADAPTED FROM THE O
CTOBER, 1984 ISSUE OF OMNI MAGA
ZINE, STARTING ON PAGE 188."
230 PRINT:PRINT"AS YOU READ THE
FOLLOWING RULES,KEEP IN MIND THA
T THEY REPRESENT NEAR LIFE-LIKE C
ONDITIONS FOR SOME TYPES OF BA
CTERIAL CELLS."
240 PRINT@480,"PRESS <ENTER> TO
CONTINUE...";:INPUTA$
250 CLS:PRINT"rule #1:IF A LIVE
CELL HAS EXACTLY 2
LIVE NEIGHBORS (CELLS WHI
CH TOUCH IT HORIZONTAL
LY, VERTICALLY OR DIAGONA
LLY) IT STAYS ALIVE IN T
HE NEXT CYCLE."
260 PRINT" IF A DEAD CELL
HAS EXACTLY 2 LIVE
NEIGHBORS IT STAYS DEAD
IN THE NEXT CYCLE."
270 PRINT@480,"PRESS <ENTER> TO
CONTINUE...";:INPUTA$
280 CLS:PRINT"rule #2:IF A LIVE
CELL HAS EXACTLY 3
LIVE NEIGHBORS IT STAYS A
LIVE IN THE NEXT CYCLE
.":PRINT
290 PRINT" IF A DEAD CELL
HAS EXACTLY 3 LIVE
NEIGHBORS IT BECOMES ALI
VE, OR IS BORN, IN THE N
EXT CYCLE."
300 PRINT@480,"PRESS <ENTER> TO
CONTINUE...";:INPUTA$
310 CLS:PRINT"rule #3:IF A LIVE

```

```

CELL HAS ANY OTHER NUMB
ER OF LIVE NEIGHBORS,
IT DIES IN THE NEXT C
YCLE."
320 PRINT" IF A DEAD CELL
HAS ANY OTHER NUMBER O
F LIVE NEIGHBORS, IT
STAYS DEAD IN THE NEXT CY
CLE.":PRINT
330 PRINT" WITH 0 OR 1 LI
VE NEIGHBORS, THE
CELL DIES OF LONELINESS.
WITH 4 TO 8 LIVE NEIG
HBORS, THE CELL DIES OF
OVERPOPULATION
."
340 PRINT@480,"PRESS <ENTER> TO
CONTINUE...";:INPUTA$
350 CLS:PRINT"YOUR COLOR COMPUTE
R WILL KEEP TRACK OF THESE RUL
ES FOR YOU. IT WILL PLAY NATUR
E AND CONTROL THE RULES OF LIFE
FOR THE CELLS.YOU WILL BE GIVEN
A CHOICE WITH THE MENU ON THE NE
XT SCREEN."
360 PRINT"YOU MAY CHOOSE TO STAR
T WITH YOUR OWN ARRANGEMENT O
F CELLS OR WATCH WHAT HAPPENS TO
SOME SPECIAL ARRANGEMENTS T
HAT HAVE BEEN PREPROGRAMMED FOR
YOU."
370 PRINT"THE CURRENT NUMBER OF
CYCLES WILL BE DISPLAYED AT T
HE RIGHT OF THE SCREEN."
380 PRINT@480,"PRESS <ENTER> TO
CONTINUE...";:INPUTA$
390 N$(0)="R4D8L4U8":N$(1)="BR2D
2NL2D6NL2R2":N$(3)="R4D4NL4D4L4"
:N$(4)="D4R4NU4D4":N$(5)="NR4D4R
4D4L4":N$(2)="R4D4L4D4R4":N$(6)=
"NR4D8R4U4L4":N$(7)="R4D8":N$(8)
="D8R4U4NL4U4L4":N$(9)="ND4R4D4N
L4D4L4":BL$="C5D8R2U8R2D8"
400 CLS:PRINT"MENU":PMODE1,1:PCL
S:CY=0:PD=0:PE=0:PF=0:PG=0
410 PRINT"1. YOUR OWN ARRANGEME
N T 2. BLACKOUT - DIES AFT
ER 1 CYCLE 3. BLINKER - OSCILLATE
S BY CYCLE 4. STILL LIFE - STABLE
=0 CYCLES 5. T TETROMINO - STABL
E=9 CYCLES 6. R PENTOMINO - STABL
E=1103 CY. 7. GLIDER - MOVES ONE
DIRECTION 8. QUIT"
420 INPUTC
430 IFC<1ORC>8ORC<>INT(C)THEN400
440 DNC GOTO460,720,730,740,750,
760,770
450 POKE65494,0:END
460 CLS:PRINT"YOU WILL BE WORKIN

```

```

6 ON A GRID 120 X 96. YOU MAY
TURN ON UP TO 99 PIXELS AT ANY P
OSITIONS YOU WISH. KEEP LIFE'S
RULES IN MIND WHEN SETTING UP YO
UR STARTING ARRANGEMENT.":PRIN
T:PRINT
470 N=0
480 N=N+1
490 INPUT "X-COORDINATE (0-119)";
XC(N)
500 IF XC(N)<0ORXC(N)>119ORXC(N)
<>INT(XC(N))THEN490
510 INPUT "Y-COORDINATE (0-95)";Y
C(N)
520 IFYC(N)<0ORYC(N)>95ORYC(N)<>
INT(YC(N))THEN510
530 PSET(2*XC(N),2*YC(N),6)
540 IFN=99THEN570
550 INPUT "DONE OR MORE (D OR M)"
;ZC$
560 IFZC$="D"THEN570ELSEIFZC$="M
"THEN480ELSE550
570 CLS:PRINT@224,"PRESS AND HOL
D <CLEAR> TO STOP GENERATIONS A
ND RETURN TO THE MENU FROM THE
GRAPHICS SCREEN.":PRINT@480,"PR
ESS <ENTER> TO BEGIN...":INPUTA
$:SCREEN1,1:LINE(240,0)-(240,191
),PSET
580 PCOPY1TO3:PCOPY2TO4
590 GOSUB630
600 Z=USR(0)
610 CY=CY+1
620 IFPEEK(&H153)=191THEN400ELSE
590
630 D=INT(CY/1000):Y=0:H=D
640 GOSUB700
650 E=INT(CY/100)-D*10:Y=14:H=E
660 GOSUB700
670 F=INT(CY/10)-D*100-E*10:Y=28
:H=F
680 GOSUB700
690 G=CY-D*1000-E*100-F*10:Y=42:
H=G
700 DRAW"BM250,"+STR$(Y)+";"+BL$
:DRAW"C6BM250,"+STR$(Y)+";"+N$(H
)
710 RETURN
720 PSET(120,96,6):PSET(122,96,6
):GOTO570
730 PSET(118,96,6):PSET(120,96,6
):PSET(122,96,6):GOTO570
740 PSET(120,96,6):PSET(122,96,6
):PSET(120,98,6):PSET(122,98,6):
GOTO570
750 PSET(118,96,6):PSET(120,96,6
):PSET(122,96,6):PSET(120,98,6):
GOTO570
760 PSET(120,94,6):PSET(122,94,6
):PSET(118,96,6):PSET(120,96,6):

```

```

PSET(120,98,6):GOTO570
770 PSET(120,94,6):PSET(122,96,6
):PSET(118,98,6):PSET(120,98,6):
PSET(122,98,6):GOTO570
780 DATA 142,255,255,48,1,172,14
1,3,5,38,248,111,141,2,242,111,1
41,2,239,111,141,2,236,134,32,23
0,141,2,230,61,211,186,227,141,2
,221,237,141,2,220
790 DATA 111,141,2,218,174,141,2
,212,166,141,2,207,39,45,166,141
,2,200,39,13,166,136,223,132,3,1
29,1,38,4,108,141,2,189,166,136,
224,132,192,129,64
800 DATA 38,4,108,141,2,176,166,
136,224,132,48,129,16,38,4,108,1
41,2,163,166,141,2,155,39,12,166
,31,132,3,129,1,38,4,108,141,2,1
45,166,132,132
810 DATA 48,129,16,38,4,108,141,
2,133,166,141,2,126,129,95,39,45
,166,141,2,117,39,13,166,136,31,
132,3,129,1,38,4,108,141,2,106,1
66,136,32,132
820 DATA 192,129,64,38,4,108,141
,2,93,166,136,32,132,48,129,16,3
8,4,108,141,2,80,166,141,2,76,12
9,2,37,20,129,3,34,16,39,2,32,20
,166,137
830 DATA 12,0,138,64,167,137,12,
0,32,8,166,137,12,0,132,63,32,24
2,111,141,2,40,174,141,2,34,166,
141,2,29,39,39,166,136,224,132,1
92,129,64,38
840 DATA 4,108,141,2,17,166,136,
224,132,48,129,16,38,4,108,141,2
,4,166,136,224,132,12,129,4,38,4
,108,141,1,247,166,132,132,192,1
29,64,38,4,108
850 DATA 141,1,235,166,132,132,1
2,129,4,38,4,108,141,1,223,166,1
41,1,216,129,95,39,39,166,136,32
,132,192,129,64,38,4,108,141,1,2
02,166,136,32,132
860 DATA 48,129,16,38,4,108,141,
1,189,166,136,32,132,12,129,4,38
,4,108,141,1,176,166,141,1,172,1
29,2,37,20,129,3,34,16,39,2,32,2
0,166,137
870 DATA 12,0,138,16,167,137,12,
0,32,8,166,137,12,0,132,207,32,2
42,111,141,1,136,174,141,1,130,1
66,141,1,125,39,39,166,136,224,1
32,48,129,16,38
880 DATA 4,108,141,1,113,166,136
,224,132,12,129,4,38,4,108,141,1
,100,166,136,224,132,3,129,1,38,
4,108,141,1,87,166,132,132,48,12
9,16,38,4,108
890 DATA 141,1,75,166,132,132,3,

```

129,1,38,4,108,141,1,63,166,141,
 1,56,129,95,39,39,166,136,32,132
 ,48,129,16,38,4,108,141,1,42,166
 ,136,32,132
 900 DATA 12,129,4,38,4,108,141,1
 ,29,166,136,32,132,3,129,1,38,4,
 108,141,1,16,166,141,1,12,129,2,
 37,20,129,3,34,16,39,2,32,20,166
 ,137
 910 DATA 12,0,138,4,167,137,12,0
 ,32,8,166,137,12,0,132,243,32,24
 2,111,141,0,232,174,141,0,226,16
 6,141,0,221,39,47,166,136,224,13
 2,12,129,4,38
 920 DATA 4,108,141,0,209,166,136
 ,224,132,3,129,1,38,4,108,141,0,
 196,166,141,0,188,129,29,39,13,1
 66,136,225,132,192,129,64,38,4,1
 08,141,0,175,166
 930 DATA 132,132,12,129,4,38,4,1
 08,141,0,163,166,141,0,155,129,2
 9,39,12,166,1,132,192,129,64,38,
 4,108,141,0,143,166,141,0,136,12
 9,95,39,47,166
 940 DATA 136,32,132,12,129,4,38,
 4,108,141,0,122,166,136,32,132,3
 ,129,1,38,4,108,141,0,109,166,14
 1,0,101,129,29,39,13,166,136,33,
 132,192,129,64
 950 DATA 38,4,108,141,0,88,166,1
 41,0,84,129,2,37,20,129,3,34,16,
 39,2,32,20,166,137,12,0,138,1,16
 7,137,12,0,32,8,166,137,12,0,132
 ,252
 960 DATA 32,242,108,141,0,44,166
 ,141,0,40,129,30,16,37,253,55,11
 1,141,0,30,108,141,0,27,166,141,
 0,23,129,96,16,37,253,37,158,186
 ,16,174,137,12
 970 DATA 0,16,175,129,156,183,37
 ,244,57,0,0,96,25,253,0,255,0,25
 5,0,255,0,255,0,0,999

WANTED

1) A MULTI-PAK FOR THE COCO I
 2) A KEYBOARD FOR THE COCO II
 BOTH TO BE IN WORKING ORDER
 JERRY PFEFFER
 802 CARDINAL
 JEFFERSON CITY, MS 65101
 314 636 8019

Coco Memory Map

Address	Device
-----	-----
FF00-FF3F	Internal PIA's
FF40-FF5F	R/S 1793 disk controller
(&ghost)	
FF50-FF5F	R/S hard disk
FF60-FF63	R/S X-Pad
FF64-FF67	
FF68-FF6B	R/S RS-232 Pak, PBJ 2-SP
Port #1	
FF6C-FF6F	R/S Modem M1/M2, PBJ 2-SP
Port #2	
FF6E-FF6F	SS Realtime Clock
FF70-FF73	SS Stereo Pak
FF74-FF77	SS SC-01 Voice, LR Tech hard
disk (SCSI)	
FF76-FF79	R/S 80 Column
FF78-FF7B	SS EARS
FF7A-FF7B	Orchestra 90
FF7C	PBJ C-C Bus slot select
FF7D-FF7E	R/S Speech Sound Pak, (C-C
bus ghost)	
FF7F	R/S Multi-pak slot select,
(C-C bus ghost)	
FF80-FF83	
FF80-FFBF	Real Talker ghost
FF84-FF87	
FF88-FF8B	
FF8C-FF8F	
FF90-FF93	PBJ PC-Pak Parallel, Coco Max
FF94-FF97	PBJ PC-Pak Realtime Clock,
Coco Max	
FF98-FF9B	PBJ Word Pak, (Coco Max
ghost)	
FF9C-FF9F	PBJ Word Pak, (Coco Max
ghost)	
FFA0-FFA3	
FFA4-FFA7	
FFA8-FFAB	
FFAC-FFAF	
FFAD-FFAF	DSL 128K
FFB0-FFB3	(Coco Max ghost)
FFB4-FFB7	(Coco Max ghost)
FFB8-FFBB	(Coco Max ghost)
FFBC-FFBF	(Coco Max ghost)
FFC0-FFDF	SAM chip, Banker 256
FFE0-FFF1	Reserved by Motorola
FFF2-FFFF	Interrupt vectors

R/S= Radio Shack

PBJ= PBJ, Inc.

SS= Speech Systems, Inc.

Manufacturers are STRONGLY encouraged to
 conserve the limited I/O space.

Addresses should be fully decoded to
 eliminate "ghost" addresses,
 which can cause unnecessary conflicts between
 devices.

JDOS Compatibility

The following is a list of software which is compatible with JDOS. It is not a complete list but may be of help to CoCo'ers who have or who are thinking of buying JDOS.

COMPATIBLE

COMPUTERWARE

- Color Scribe
- Merge'n Mail
- Personal Finance System
- Home Money Manager
- CoCo Cookbook
- Color Connection
- Advanced Editor
- The Sourcerer
- Color Basic Compiler
- Basic Programming Utilities
- Business Software
- Macro Assembler
- OS-9 Software
- FLEX Software
- Major Istar

COMPUTER SYSTEMS CENTER

- DynaCalc(RSDOS)

DERRINGER

- ProColor Series
- Dynagraph
- Sidewise

RADIO SHACK

- Edtasam
- Scriptsit
- Trivia Fever

FRANK HOGG LABS

- Flex operating system

MARK DATA PRODUCTS

- Machine language programs

PXE Computing

- Autoterm

SPECTRO SYSTEMS

- ADOS(see note below)

TOM MIX

- All educational programs

THE OTHER GUY'S SOFTWARE

- CoCo Windows
- OS/9 Utilities
- Keep-Trak Accts Recv

SUNRISE SOFTWARE

- Business Bankbook
- Color Bankbook
- Superdisk Utility
- Radiolog

RAINBOW CONNECTION

- Screen Machine

SUGAR SOFTWARE

- Rental Property
- Sports Stats Packages
- TIMS
- TIMSMAIL
- TIMSUTILITY

CoCo Knitter

most can be ordered as
JDOS compatible

TRUE DATA PRODUCTS supplies a patch, gratis, when you buy their disk drive with JDOS. This patch by Jean Foster enables RSDOS and allows the use of many JDOS incompatible programs. Elite*Word and Elite*Spel can be run with full 22K with this patch.

Telewriter is also compatible with this patch but I believe there is some loss of memory. JDOS will read disks formatted for either 35 tracks(RSDOS) or 40 tracks.

Although DYNA-CALC is compatible with JDOS, the double disk system is not supported. DYNA-CALC overlays its own DOS on JDOS.

TRIVIA FEVER uses an OS-9 DOS and can be run in either RSDOS or JDOS. This would indicate OS-9 and OS-9 based programs would be compatible since they overlay their own DOS. ADOS also overlays its own DOS. However, disks formatted with JDOS are not readable with ADOS. They must be modified by using a utility such as JDISKMOD by Paul J. Martos. It should be noted that J&M continually improves JDOS and the upgraded chips are exchanged for the old chip either free(RAINBOW Fest) or by mail at a modest charge.

Jane P. Bragg

MUSICA to COCOMIDI Convert

A review by J. R. Applegate

If your like me you have amassed a very large collection of MUSICA files over the years. Wouldn't it be wonderful to transfer those files to CocoMidi II and add additional tracks or event to them? Well, thats what I thought till I tried to use the Convert program I ordered from Speech Systems. For \$29.95 I got a Musica to CocoMidi program that did not work with the version of CocoMidi I ordered in the same order!

Not only do you have to convert the musica files to CocoMidi format, but you also need to run a separate program to convert the CocoMidi files to CocoMidi II format. This is a ridiculously slow and time consuming task. In addition, if you want to place each voice into a separate track (for use with a multi timbral synthesizer) you must first go into Musica and save each a separate file with each voice (using CLRVOICE to clear the others). Were that not enough I found that this program ignores the repeat bars in Musica!

ADVENTURES FROM THE OTHER SIDE (WRITING)

Part V: Polishing it Up, Adding The Bells and Buzzes, & Making the Sale.

By: Michael E. Salsbury

Well, we've come a long way in this series of articles. We took a thought and put it on paper. Took the paper and made it a data set. Took that and made it a game. Now we want to turn that game into money, or at least prestige. Here's how to do it, sort of. I can't guarantee that your game will be a hit, but then neither can anyone else.

I suppose first off you'll want to know how to make a graphic adventure out of your game, since that's where the big bucks are. There are several ways that I know of to do that, and I will cover as many as I can think of here.

The easiest way to turn your game into a graphic adventure is to buy one of those programs like Super Screen Machine that lets you have hi-res and text on one screen and write your program's text in a way that the screen program show it off well. Then, using a graphics program like Graphicom or CoCoMax, draw scenes that cover the parts of the screen your adventure's text doesn't. Save those to disk, and write `LOADM"graphics"` type statements in the program so that it loads different pictures when you are wherever you have to be to see them. This approach has the advantage of being fast and simple. It also has the disadvantage of being expensive.

The next way is to write a subroutine in Basic that will "print" character strings on a hi-res screen. Then, as you load pictures from disk (or draw with graphics commands in the program) the pictures and text are together. The way to do this is to use the draw command to draw letters one at a time, as well as periods, commas, hyphens, and other symbols you may need. Put the string part of the `DRAW` statements you create into a string array. Then write a program to go through a string one at a time draw the characters on the high res screen next to each other. Then, go through your program and replace the `PRINT` statements with `P$="text"` and `GOSUB` to the hi-res print routine.

Another way is to do the adventuring on a text screen and just "flip" to hi-res every so often. This is the preferred way for beginners, since it requires the least work for acceptable results. Not as classy as, say, Trekboer, but easier to write!

Lastly, try "dissecting" someone else's graphic adventure and see how he's doing it. If you like his method, learn it and do it yourself. If it involves machine language,

don't come to me as I know nothing about that subject.

How about sound effects? You can get some great sound effects by using the `PLAY` command's tempo and octave features. Check out the Extended Basic manual and see what you can create. For example, you might try `PLAY"T255L25501AAAAAAAAAAGGDGDCBACE"`. Just slip little things like that in when sounds are needed. For speech, I recommend buying *Speak Up!* from Classical Computing. It is fairly cheap, works reasonably well, needs no hardware, and is simple to learn to program.

As for music, they tell me `MUSICA 2` allows you to use your music from Basic programs. I don't have it, so I don't know how well it works. Then again, there's the `PLAY` statement too. It's pretty powerful in the hands of someone who, unlike me, knows something about music.

Next, how about some space saving? If you can get ahold of one of those space-crunchers like *The Stripper* from Eigen Systems, you can take all unnecessary space out of your program, as well as pack together lines that are too spread out. You can also `RENUMBER` the program. This gives it a better look, too. A simple `RENUM 10,0,10` can work wonders on a sloppily numbered game. Once you've rubbed out all the rough spots you can, you're ready to submit it to a company to see if they will buy it.

Before you do that, there's a lot of writing and typing to do. First of all, most companies require some or all of the following:

- List of words the game accepts.
- Map of the game's maze, fully labeled.
- List of all variables and Basic commands used.
- Complete solution for the game.
- Listing on paper of the program.
- Step-by-step, line-by-line analysis of the program. (i.e., In line 1, initialization of the variables, line 2 clear screen, etc.)
- Instruction sheet or manual for the game.
- Ideas for advertising or special game features.
- Letter from you outlining the game, its theme, and how you came to write it.

What they want to know is enough that they can tell that YOU wrote the particular game, and not someone else. They cannot afford to accidentally sell some pirated work. It would send them to prison!

Other things to think about are artwork for the manual, cover, etc. Also important is that your program is "nice" to the user. According to the president of Aardvark Technical Services, "The age of the computer insult is over. Adventures should be polite to the customer." Keep that in mind. Flashy title screens with room for the publisher's name are a plus, too.

Last but not least, try the program out on a non-computer friend (if you have one) and see if they can use it, given your manual. If so, you're ready to submit it. Be sure, though, that you submit it to only one company at a time, and that you tell that company you are only sending it to them. It is even better to contact them first to see what other special things may have to be shipped with your tape or disk. You may need only to send the program and a solution, but you may need any number of things, like a notarized statement saying you did in fact write it. Again, better safe than sorry.

That covers everything I wanted to impart to you in this article. Good luck with your adventure writing, and don't forget us here at CoCo Ads when you write a game. We publish things here, too, and adventures are almost always welcomed. You might want to cut me in on the profits if you make it big. My only disk drive is totally dead and I can't afford to repair it after totalling my mother's new car this summer!

If you have any questions or comments, or want to send me a copy of your adventure, here comes my address. However, send a SASE if you expect an answer or your tape/disk back! (Also expect a wait of at least a week, maybe longer, as I am extremely busy this fall.)

Michael E. Salsbury
Room 729 Booth Hall
505 Comstock Avenue
Syracuse, NY 13210

ONE-ARMED BANDIT

A SLOG MACHING GAME WITH
MACHINE LANGUAGE SUB-ROUTINES

```

10 '***ONE-ARMED BANDIT***
11 '***BY MIKE POUNDS***
12 '
13 '***PROGRAM AND ALL ROUTINES
14 '   ARE PUBLIC DOMAIN***
15 '
    ***32K ECB. DISK OPTIONAL***

16 '
17 '
18 '***NOTE*** POKE31584,0 BEFORE
    LOADING!!! *****
*****
50 CLEAR3000,31583:DIMC$(39):S=4
:GOSUB780:IF PEEK(31584)=100THEN
55
51 GOSUB1500
55 IF PEEK(188)=6 THEN POKE32648
,&H0D:POKE32649,&H86:POKE32650,&
H0D:POKE32651,&H8C:POKE32652,&H
0D:POKE32653,&H92:GOTO85: '***NON
DISK
60 IFPEEK(31584)<>100 THENLOADM"
SLOT/DRI":POKE31584,100
70 POKE32648,&H15:POKE32649,&H86
:POKE32650,&H15:POKE32651,&H8C:
POKE32652,&H15:POKE32653,&H92: '
*****USE FOR DISK SYSTEMS*****
*
80 FORI=1TO2000:NEXT
85 '
90 DEFUSR0=&H7F8F:DEFUSR1=&H7FD3
:DEFUSR2=&H7FE1:DEFUSR3=&H7FEF
100 PMODE4,1:PCLS:SCREEN1,1:PMOD
E3,1:GOSUB280
110 A=USR0(0):GOTO440
120 T=RND(-TIMER):Q=15:T=.5
130 POKE65495,0:FORI=1TO7:D=USR3
(0):B=USR1(0):C=USR2(0):SOUND255
,1:NEXT:FORI=1TO6:B=USR1(0):D=U
SR3(0):C=USR2(0):SOUND254,1:NEX
T:FORI=1TO6:C=USR2(0):B=USR1(0):
D=USR3(0):SOUND253,1:NEXT
140 M=RND(Q):N=RND(Q):O=RND(Q)
150 FORI=1TOQ
160 IF I<M THEN B=USR1(0):FORR=.
5 TO T STEP.5:NEXT:T=T+.1:W1=W1+
1:IF W1=7 THEN W1=1
170 IF I<N THEN C=USR2(0):FORR=.
5 TO T STEP.5:NEXT:T=T+.1:W2=W2+
1:IF W2=7 THEN W2=1
180 IF I<O THEN D=USR3(0):FORR=.
5 TO T STEP.5:NEXT:T=T+.1:W3=W3
+1:IF W3=7 THEN W3=1

```



```

190 IF I<M OR I<N OR I<D THEN SO
UND253,1:NEXT
200 POKE65494,0
210 W1=W1+1:IF W1=7 THEN W1=1
220 W2=W2+1:IF W2=7 THEN W2=1
230 W3=W3+1:IF W3=7 THEN W3=1
240 IF W1=W2 THEN GOSUB610
250 GOTO440
260 CLS:PRINTW1;W2;W3
270 A$=INKEY$:IF A$="" THEN 270EL
SE SCREEN1,1:GOTO120
280 DRAW"C2"
290 DRAW"BM45,95;R140U40L45D40L2
U40L46D40L1U40L46D40
300 DRAW"BM38,100;R152U50L152D50

310 PAINT(40,98),3,2
320 LINE(205,45)-(205,105),PSET:
LINE-(215,110),PSET:LINE-(215,19
2),PSET:LINE(35,192)-(35,110),P
SET:LINE-(25,105),PSET:LINE-(25
,45),PSET:LINE-(45,35),PSET:LINE
-(185,35),PSET:LINE-(205,45),PS
ET'DRAW"BM25,95;U40E20R140F20D1
40L180U100
330 DRAW"BM185,130;R4D20L4U20
340 DRAW"BM178,125;R16D30L16U30
350 PAINT(180,126),0,2
360 DRAW"BM220,192;NU70L1U70NR10
DIR10ND70L2D70
370 LINE(15,192)-(15,40),PSET:FO
RI=191 TO 48 STEP-3:LINE(35,I)-
(15,I-10),PSET:NEXT:LINE(15,40)-
(33,31),PSET:LINE-(175,31),PSET:
II=45:FORI=25 TO 44STEP2:LINE(I,
II)-(I-10,II-5),PSET:II=II-1:NEX
T:FORI=44 TO 186 STEP4:LINE(I,35
)-(I-10,31),PSET:NEXT
380 PAINT(30,100),2,2:COLOR1:LIN
E(45,35)-(185,35),PSET
390 LINE(203,105)-(26,105),PSET:
LINE(213,110)-(36,110),PSET:FORI
=39 TO 212STEP4:LINE(I,110)-(I-
10,105),PSET:NEXT
400 COLOR2:LINE(28,192)-(15,184)
,PSET:LINE(22,192)-(15,187),PSET
:LINE(16,192)-(15,190),PSET
410 PAINT(30,100),2,2
420 N$="SPENT":XB=10:YA=5:GOSUB6
80:N$="O":XB=54:YA=5:GOSUB680:N$
="WON":XB=176:YA=5:GOSUB680:N$=
"O":XB=208:GOSUB680
430 RETURN
440
450 IF AU=1 THEN 480
460 A$=INKEY$:IF A$="A" THEN AU=1
:GOTO490 ELSE IF A$=" " THEN 490

```

```

470 GOTO460
480 A$=INKEY$:IF A$=" " THEN AU=0
:GOTO460
490 POKE65495,0:LINE(54,5)-(160,
10),PSET,BF:SP=SP+1:N$=STR$(SP
):N$=RIGHT$(N$,LEN(N$)-1):XB=54
:GOSUB680
500 DRAW"C1;BM220,192;NU70L1U70N
R10DIR10ND70L2D70"
510 DRAW"C2;BM220,192;NE26U1E24
NF9R1F8NG18D1G17"
520 COLOR2:LINE(220,192)-(230,14
0),PSET:LINE(222,192)-(232,140),
PSET
530 CIRCLE(236,140),6,2,.4:LINE(
242,140)-(232,192),PSET:LINE(240
,140)-(230,192),PSET
540 SOUND255,1:SOUND250,1
550 DRAW"C1;BM220,192;NE26U1E24
NF9R1F8NG18D1G17"
560 COLOR1:LINE(220,192)-(230,14
0),PSET:LINE(222,192)-(232,140),
PSET
570 CIRCLE(236,140),6,1,.4:LINE(
242,140)-(232,192),PSET:LINE(240
,140)-(230,192),PSET
580 DRAW"C2;BM220,192;NU70L1U70N
R10DIR10ND70L2D70"
590 SOUND250,1:SOUND240,1
600 POKE65494,0:GOTO120
610 IF W2=W3 THEN DU=2:F1=F1+1:G
OTO630ELSE DU=1:F1=0
620 IF W3=5 OR W3=6 THEN 630ELSE
RETURN
630 IF W1=1 THEN SC=SC+DU*2 ELSE
IF W1=2 THEN SC=SC+DU*3 ELSE IF
W1=3 THEN SC=SC+DU*1 ELSE IF W1
=4 THEN SC=SC+DU*4 ELSE IF W1=5
THEN SC=SC+DU*15 ELSE SC=SC+DU*5

640 IF W3<>W2 THEN 660 ELSE IF F
1=2 AND W3=5 THEN SC=SC+2000:FOR
I=1TO25:SOUND200,4:SOUND150,2:NE
XT:ELSE IF F1=2 THEN SC=SC+150:F
ORI=1TO20:SOUND200,2:SOUND200,3:
NEXT
650 IF F1=2 THEN F1=0
660 N$=STR$(SC):N$=RIGHT$(N$,LEN
(N$)-1):LINE(208,5)-(255,10),PRE
SET,BF:XB=208:GOSUB680:RETURN
670 HI RES LETTERS
680 PMODE4,1:FORLP=1 TO LEN(N$):
S$="S"+STR$(S):X$=STR$(XB):Y$=ST
R$(YA):W$=S$+" ";BM"+X $+" ",Y$:DR
AW W$:L$=MID$(N$,LP,1):L=ASC(L$)

690 IF L=32 THEN L=39:GOTO750
700 IF L=45 THEN L=38:GOTO750
710 IF L>=65 THEN L=L-54:GOTO750

```

```

720 IF L=32 THEN L=10:GOTO750
730 IF L=8 THEN L=37:GOTO750
740 IF L<=57 THEN L=L-48
750 '
760 DRAW C$(L):XB=XB+(S+4)
770 NEXT:ST=0:PMODE3,1:RETURN
780 C$(0)="BM+0,+1D2F1R1E1U2H1L1
G1"
790 C$(1)="BM+1,+1D0E1D4R1L2"
800 C$(2)="R3D2L3D2R3BM+3,-4"
810 C$(3)="R3D2L3R3D2L3BM+6,-4"
820 C$(4)="D2R3D2U4BM+3,+0"
830 C$(5)="R3L3D2R3D2L3BM+6,-4"
840 C$(6)="D2R3D2L3U4R3BM+3,+0"
850 C$(7)="R3D4BM+3,-4"
860 C$(8)="R3D2L3U2D4R3U4BM+3,+0
"
870 C$(9)="R3D4U2L3U2BM+6,+0"
880 C$(10)="BM+6,+0"
890 C$(11)="BD1D3U2R3D2U3H1L1G1"

900 C$(12)="D4R2E1H1L2R2E1H1L2"
910 C$(13)="D4R3UBM+0,-2UL3BM+6,
+0"
920 C$(14)="R2F1D2B1L2U4BM+6,+0"

930 C$(15)="D4R3L3U2R3L3U2R3BM+3
,+0"
940 C$(16)="D4U2R3L3U2R3BM+3,+0"

950 C$(17)="D4R3U2LBM-2,-2R3BM+3
,+0"
960 C$(18)="D4U2R3D2U4BM+3,+0"
970 C$(19)="R3LD4RL3RBM+5,+0"
980 C$(20)="R3LD4L2UBM+6,-3"
990 C$(21)="D4U2R1E2G2F2"
1000 C$(22)="D4R3BM+3,-4"
1010 C$(23)="D4U4F1R1E1D4"
1020 C$(24)="D4U4F3D1U4"
1030 C$(25)="D4R3U4L3BM+6,+0"
1040 C$(26)="D4U2R3U2L3BM+6,+0"
1050 C$(27)="BD1D2F1R1BU1F1BU1U2
H1L1G1"
1060 C$(28)="D4U2R1F2H2R2U1H1L2"

1070 C$(29)="R3L3D2R3D2L3BM+6,-4
"
1080 C$(30)="R3L1D4BM+5,+0"
1090 C$(31)="D4R3U4BM+3,+0"
1100 C$(32)="D3F1R1E1U3"
1110 C$(33)="D4ER1F1U4BM+3,+0"
1120 C$(34)="D1F3BU4D1G3"
1130 C$(35)="D1F1R1E1U1BD2BL1D1G
1"
1140 C$(36)="R3D1G3R3"
1150 RETURN
1500 IF PEEK(31584)=100 THEN RET
URN
1590 '

```

```

1600 CLS:PRINT"      ONE-ARMED BA
NDIT";PRINT:PRINT"INSTRUCTIONS:"
:PRINT:PRINT"PRESS THE SPACEBAR
TO INSERT YOUR DOLLAR";PRINT"PRE
SSING 'A' WILL AUTOMATICLY INS
ERT YOUR MONEY FOR YOU. HOLD DOW
N THE SPACE BAR TO RETURN TO MAN
UAL."
1610 GOSUB1750
1620 PRINT"PAYOFFS.....":PRINT:P
RINT"PAYS OFF ON TWO OF A KIND O
N THELEFT ONLY OR THREE OF A KIN
D":PRINT"-----
-----":PRINT"                2 OF
A      3 OF A ":PRINT"
      KIND      KIND"
1630 PRINT
1640 PRINT"CHERRIES----- 2 -----
---- 4
1650 PRINT"GRAPE----- 3 -----
---- 6
1660 PRINT"PEACH----- 1 -----
---- 2
1670 PRINT"APPLE----- 4 -----
---- 8
1680 PRINT"JACKPOT----- 15 -----
---- 30
1690 PRINT"BELL----- 5 -----
---- 10
1700 GOSUB1750
1710 PRINT"3 OF A KIND TWICE IN
A ROW PAYS $150.00 AND IF THE SE
COND 3 IN AROW IS JACKPOTS THEN
THE PAYOFF IS $2000.00!!!
1715 PRINT:PRINT"(NOTE: THE COLO
R IS CORRECT IF THE MACHINE IS
BLUE)"
1720 PRINT@32*8,"PRESS ANY KEY T
O START"
1730 A$=INKEY$:IF A$=""THEN1730E
LSERETURN
1740 GOTO1740
1750 PRINT@32*15,"PRESS ANY KEY
TO CONTINUE";
1760 A$=INKEY$:IF A$=""THEN1760
1770 CLS:RETURN

```

ROBOMATH

A NICE WAY FOR THE YOUTH TO
HELP LEARN THEIR MATH.
INSTRUCTIONS ARE IN THE
PROGRAM.

```

10 *****
20 *      ROBOMATH      *
30 *    LEONARD HYRE    *
40 *****
50 CLS:FL=185:FW=185:TM=0:TN=0
60 GOSUB 1100
70 GOSUB 820:GOSUB 670
80 REM
90 IF MA=4 THEN 280
100 FD=RND(9):SD=RND(9):IF MA=2
    THEN SD=RND(FD)
110 FD$=STR$(FD):SD$=STR$(SD)
120 B$=NU$(VAL(FD$))
130 DRAW"BM88,50;C3;S4;XB$;"
140 FOR X=1TO300:NEXT
150 IF MA=1 THEN DRAW"BM113,50;C
    3;BR6U12BD6BL6R12"ELSE IF MA=2 T
    HEN DRAW"BM113,50;C3;BU6R12"ELSE
    IF MA=3 THEN DRAW"BM113,50;C3;E
    12BG6BH6F12"
160 IF MA=1 THEN RA=FD+SD ELSE I
    F MA=2 THEN RA=FD-SD ELSE IF MA=
    3 THEN RA=FD*SD
170 C$=NU$(VAL(SD$))
180 DRAW"BM138,50;C3;S4;XC$;"
190 DRAW"BM113,62;C4;U2R6D4L3D3B
    D2D2
200 A1$=INKEY$:IFA1$=""THEN 200
210 D$=NU$(VAL(A1$)):DRAW"BM96,9
    0;C3;XD$;"
220 IF RA<10 THEN A3=VAL(A1$):GO
    TO 270
230 A2$=INKEY$:IFA2$=""THEN 230
240 IF A2$=CHR$(13) THEN 260
250 E$=NU$(VAL(A2$)):DRAW"BM116,
    90;C3;XE$;"
260 A3$=A1$+A2$:A3=VAL(A3$)
270 IF A3=RA THEN 370 ELSE 430
280 FD=RND(9):SD=RND(9)*FD:IF SD
    <10 THEN 280
290 FD$=STR$(FD):SD$=STR$(SD):C1
    $=MID$(SD$,2,1):C2$=MID$(SD$,3,1
    )
300 B1$=NU$(VAL(C1$)):B2$=NU$(VA
    L(C2$))
310 DRAW"BM80,50;C3;S4;XB1$;":DR
    AW"BM96,50;C3;S4;XB2$;"
320 DRAW"BM113,50;BU6R13BU3BL8R2
    BD6L2;":C3$=NU$(VAL(FD$)):DRAW"B.
    M140,50;C3;S4;XC3$;"
330 A1$=INKEY$:IFA1$=""THEN330
340 D$=NU$(VAL(A1$)):DRAW"BM110,
    90;C3;XD$;":RA=SD/FD:A1=VAL(A1$)
:IF A1=RA THEN 370 ELSE 430

```

```

350 GOTO 350
360 'GOT IT RIGHT
370 DRAW"BM115,155;C3;S4;XXR$;"
380 FORX=1TO3:PLAY"T48V3105CDEFG
    ":NEXT X
390 DRAW"BM115,155;C1;XXR$;"
400 FOR T=1 TO 300:NEXT:DRAW"BM3
    0,25;C2;D80":FORX=1TO 2:PLAY"Q1T
    208V31AGAG":NEXT X:DRAW"BM30,25;
    C3;D80"
410 GOTO 560
420 'GOT IT WRONG
430 DRAW"BM115,155;C3;BU12D10F2E
    2U4BD4F2E2U10"
440 FOR S=1TO3:PLAY"T5V3101GDGD"
    :NEXTS
450 DRAW"BM115,155;C1;BU12D10F2E
    2U4BD4F2E2U10"
460 FOR T=1TO300:NEXT
470 TT=RND(3)
480 FOR T=1 TO TT
490 FW=FW-10:IF FW=<100 THEN FW=
    100
500 PAINT(167,FW),2,4
510 PLAY"T801V31CCC"
520 TN=TN+1:IF TN=8 THEN 1680
530 NEXT T
540 PAINT(85,50),1,4:PAINT(82,77
    ),1,4
550 GOTO 80
560 PAINT(85,50),1,4:PAINT(82,77
    ),1,4
570 ZZ=RND(3)
580 FOR T=1 TO ZZ
590 FL=FL-10:IF FL=<10 THEN FL=2
    2
600 PAINT(204,FL),4,4
610 PLAY"05T60V31CCEEG6"
620 TM=TM+1
630 NEXT T
640 IF TM=>17 THEN 1490
650 GOTO 80
660 'DRAW THE SCREEN
670 PMODE3,1:PCLS:LINE(20,130)-(
    40,180),PSET,B:LINE(26,130)-(35,
    126),PSET,B:CIRCLE(30,120),10:LI
    NE(22,115)-(38,115),PSET:LINE(22
    ,118)-(38,118),PSET:CIRCLE(30,12
    1),3:LINE(30,100)-(30,110),PSET
    680 LINE(20,130)-(15,150),PSET,B
    :LINE(40,130)-(46,150),PSET,B:LI
    NE(30,160)-(30,186),PSET:LINE(10
    ,186)-(50,186),PSET:LINE(15,150)
    -(20,156),PSET:LINE(46,150)-(40,
    156),PSET:CIRCLE(30,140),5:CIRCL
    E(30,150),5:DRAW"BM10,186;C4H1U2
    E2R3F2R1E3"
690 DRAW"BM50,186;E1U2H2L3G1L1H3
    "

```

```

700 PAINT(29,147),2,4:PAINT(17,1
47),2,4:PAINT(43,147),2,4:PAINT(
24,116),2,4
710 LINE(0,0)-(255,191),PSET,B:L
INE(5,3)-(250,191),PSET,B
720 LINE(62,3)-(62,191),PSET,B:L
INE(66,3)-(66,191),PSET:PAINT(64
,10),2,4:PAINT(10,10),3,4:CIRCLE
(30,20),20,2,.25:PAINT(30,20),2,
2:FORX=20 TO 40 STEP10:CIRCLE(X,
20),2:NEXTX
730 LINE(76,35)-(168,55),PSET,B:
LINE(76,75)-(168,95),PSET,B:LINE
(200,10)-(215,180),PSET,B:FORX=2
0 TO 170 STEP10:LINE(200,X)-(215
,X),PSET:NEXTX
740 DRAW"BM84,28;C3;XXW$;XXH$;XX
A$;XXT$;XBL$;XXI$;XXS$;":DRAW"BM
220,70;C4;S6;XXF$;":DRAW"BM220,9
0;C4;S6;XXU$;":DRAW"BM220,110;XX
E$;":DRAW"BM220,130;XXL$;
750 LINE(190,5)-(232,185),PSET,B
:PAINT(192,7),2,4:PAINT(2,2),2,4

```

```

760 CIRCLE(120,150),25:LINE(90,1
20)-(150,180),PSET,B:PAINT(92,12
8),4,4:LINE(165,100)-(180,180),P
SET,B:FORX=110TO170STEP10:LINE(1
65,X)-(180,X),PSET:NEXTX
770 'SHOW THE SCREEN
780 SCREEN1,0
790 GOTO 80
800 RETURN
810 'LEARN THE ALPHABET
820 XA$="BM+1,0U4E2R1F2D4BL3BU2R
2BD2BR3"
830 XB$="BM+2,0U6BL1R3F1D1G1L1R1
F1D1G1L3BR7"
840 XE$="BM+5,0L4U6R4BD3BL2L1BD3
BR6"
850 XF$="BM+1,0U6R4BD3BL2L1BD3BR
6"
860 XH$="BM+1,0U6BR4D6BL3BU3R3BR
4BD3"
870 XI$="BM+5,-6L4R2D6L2R4BR3"
880 XL$="BM+1,-6D6R4BR3"
890 XO$="BM+5,-1U4H1L2G1D4F1R2BR
4"
900 XR$="BM+1,0U12R7D6L7R2F6"
910 XS$="BM+1,-1FU1BD1R3U3L4U3R4
D1
920 XT$="BM+3,0U6L3R6BR2BD6"
930 XU$="BM+1,-6D5F1R2E1U5BD6BR3
"
940 XW$="BM+1,-6D6R1E2U1D1F2R1U6
D6BR3"
950 XY$="BM+1,-6D1F2D3U3E2U1BD6B
R2"
960 BL$="BM+1,0BR7"
970 'LEARN THE NUMBERS

```

```

980 NU$(1)="BM+4,0R4BL2U12G2"
990 NU$(2)="BM+1,0BU10U2R8D5LBD7
R8"
1000 NU$(3)="BM+1,0BU2D2R8U6L4BR
4U6LBD2"
1010 NU$(4)="BM+4,0BU4U8BD8R8BL3
BU8D12"
1020 NU$(5)="BM+2,0BU2D2R8U6L6U6
R6"
1030 NU$(6)="BM+3,0RBU5L8BD5U12"
1040 NU$(7)="BM+4,0BU12R8D4G8"
1050 NU$(8)="BM+2,0U12R8D6L6BR6D
6L8"
1060 NU$(9)="BM+2,0U2BD2R8U12L8D
6R8"
1070 NU$(0)="BM+0,0U12R8D12L8"
1080 RETURN
1090 'SET UP TITLE SCREEN
1100 CLS0:PR=226:PX=32:SS=100
1110 X$=CHR$(159):Y$=CHR$(128)
1120 X1$=STRING$(6,X$):Y1$=STRIN
G$(4,Y$)
1130 BG$=X$+Y1$+X$+Y$+X$+Y1$+X$+
Y$+X$+Y1$+X$+Y$+X$+Y1$+X$
1140 FOR TI=1 TO 7
1150 PRINT@PR,X1$+Y$+X1$+Y$+X1$+
Y$+X1$;
1160 PRINT@PR+PX,BG$;:PRINT@PR+2
*PX,BG$;:PRINT@PR+3*PX,X1$+Y$+X$
+Y1$+X$+Y$+X1$+Y$+X$+Y1$+X$;
1170 PRINT@PR+4*PX,BG$;:PRINT@PR
+5*PX,BG$;
1180 PRINT@PR+PX*6,X$+Y1$+X$+Y$+
X1$+Y$+X1$+Y$+X1$;
1190 PRINT@PR+3*PX+5,CHR$(154);:
PRINT@PR+3*PX+19,CHR$(154);
1200 PRINT@PR+PX*7,STRING$(32,12
8);
1210 SOUND SS,1:SS=SS+15
1220 PR=PR-32
1230 NEXT TI
1240 PRINT@328,"by"+CHR$(128)+"l
eonard"+CHR$(128)+"hyre";
1250 FOR T=1TO100:NEXT
1260 FOR SS=1 TO 10:PLAY"05V31T2
00CG":NEXT
1270 FOR T=1 TO 400:NEXT:PLAY"T2
03L16CP1602L32GP32GP32LBAGP9L16B
P1603C"
1280 FOR T=1 TO 100:NEXT:CLS2:PR
INTSTRING$(64,175);
1290 PRINTSTRING$(13,175)+CHR$(1
28)+"robo"+CHR$(128)+STRING$(45,
175);
1300 PRINTCHR$(175)+" TAKE YOUR
PICK-SPACE CADET "+CHR$(175);:
PRINTSTRING$(32,175);:PRINT"
1> ADDITION":PRINT"
2> SUBTRACTION":PRINT"

```

```

3> MULTIPLICATION":PRINT"
4> DIVIDE ":PRINT"
5> instructions"
1310 PRINTSTRING$(96,175);
1320 PRINT"ENTER 1, 2, 3, 4 OR 5
.....";
1330 A$=INKEY$:IFA$=""THEN 1330
1340 MA=VAL(A$):IF MA=<0 OR MA>5
THEN SOUND1,4:GOTO 1330
1350 IF MA=5 THEN 1400
1360 PRINT@488,"one minute pleas
e";
1370 SOUND 100,1:SOUND 150,1:SOU
ND 125,1
1380 RETURN
1390 'HOW TO PLAY
1400 CLS:PRINTSTRING$(32,149);:P
RINT@46,"ROBO"
1410 PRINTSTRING$(32,149);
1420 PRINT"robo- THE FRIENDLY CO
CO ROBOT HAS BEEN STRANDED BY
ACCIDENT ON A STRANGE PLANET. you
r MISSION IS TO RESCUE HIM!"
1430 PRINT"YOU FIGURE OUT THE AN
SWERS FOR THE MATH PROBLEMS SHO
WN.FOR EACHONE CORRECT ROBO'S SH
IP SENDS DOWN A FUEL CANISTER.
FILL THEFUEL TANK AND SAVE ro
bo.";
1440 PRINT"BUT--be careful--WRON
G ANSWERS FILL UP THE AIR TANK
AND IF IT GETS FULLALL FUEL IS L
OST! ";
1450 PRINT" <enter key>";
1460 A$=INKEY$:IFA$=""THEN 1460
1470 GOTO 10
1480 'RESCUE ACCOMPLISHED
1490 SCREEN0,0:CLS0:FOR X=1 TO 3
:PLAY"V31T7002CE03CE04CE05CE":NE
XTX
1500 PRINT@104,"into"+CHR$(128)+
"hyperspace";:PMODE 4,1:PCLS0
1510 FOR ST=1TO30:O=RND(255):D=R
ND(180):PSET(O,D):NEXT:LINE(0,18
0)-(25,170),PSET:LINE-(45,184),P
SET:LINE-(60,178),PSET:LINE-(85,
184),PSET:LINE-(100,175),PSET:LI
NE-(120,180),PSET:LINE-(140,180)
,PSET:LINE-(160,170),PSET
1520 LINE-(185,182),PSET:LINE-(2
05,174),PSET:LINE-(220,185),PSET
:LINE-(255,176),PSET:PAINT(2,189
),1,1:SCREEN1,1:FORT=1TO300:NEXT
1530 LINE(128,180)-(132,170),PSE
T,BF:LINE(130,168)-(130,170),PSE
T:LINE(128,168)-(132,166),PSET,B
F:LINE(129,167)-(131,167),PRESET
:LINE(130,175)-(130,180),PRESET:

```

```

LINE(126,172)-(134,172),PSET
1540 FORXG=1TO3:FOR SG=1 TO 3:LI
NE(130,165)-(120,140),PSET:LINE(
130,165)-(140,140),PSET:PLAY"V31
T20005GCP2GC":LINE(130,165)-(120
,140),PRESET:LINE(130,165)-(140,
140),PRESET:NEXTSG:FORT=1TO100:N
EXT:NEXTXG
1550 XX=10
1560 FORMV=1TO8:CIRCLE(XX,40),12
,1,.25:PLAY"V31T255L25504C05BG":
CIRCLE(XX,40),12,0,.25:XX=XX+15:
NEXT MV:CIRCLE(XX,40),12,1,.25
1570 FORT1=1TO3:FORSG=1TO3:LINE(
XX,44)-(XX,140),PSET:PLAY"T25505
GCGC":LINE(XX,44)-(XX,140),PRESE
T:NEXT SG:NEXTTI
1580 LINE(XX-2,45)-(XX+2,165),PS
ET,BF:FORT=1TO100:NEXT
1590 LINE(XX-4,165)-(XX+4,180),P
RESET,BF:PLAY"03T50CDEF6":Z=1
1600 FOR UP=165 TO 65 STEP-20:LI
NE(XX-2,UP)-(XX+2,UP-20),PRESET,
BF:SOUND Z,1:Z=Z+20:NEXT UP
1610 LINE(XX+2,40)-(XX+25,40),PS
ET:CIRCLE(XX,40),12,0,.25:LINE(X
X-80,40)-(XX-6,40),PSET:CIRCLE(X
X-86,40),12,1,.25:PLAY"T100V3105
GCD4GC03GC02GC":LINE(XX+25,40)-
(XX-80,40),PRESET:CIRCLE(XX-86,40
),12,0,.25
1620 DRAW"BM70,100;U10BD5R8BU5D1
0BR4U10R8BD5L8BD5R8BR4BU10D2BD3B
R4BU1U2BD8U2BD2R8U5L8U5R8D2BD8BR
40BU2D2R8U5L8U5R8D2BD8BR4U10R8D5
L8BR8D5BR8U10R8BD5L8BR8BD5BR6U10
R8BD5L8BD5R8"
1630 FORSD=1TO12:PLAY"T180V3103C
FD4CF05CFFC04FD03FC":NEXTSD:FORX
=1TO400:NEXT
1640 CLS2:PRINT@32,STRING$(32,15
9);:PRINT@64," YOU DI
D IT! ";:PRINT@288," WA
NT TO TRY AGAIN <Y OR N> ";
1650 A$=INKEY$:IF A$=""THEN 1650
1660 IF LEFT$(A$,1)="Y"THEN 10 E
LSE END
1670 'SORRY-TRY AGAIN
1680 FOR T=1TO15:PLAY"V31T10001C
DEFG02AB":NEXT T:PRINT:PRINT
1690 CLS2:PRINTSTRING$(32,183):P
RINT@64," so"+CHR$(1
28)+"sorry";:PRINT:FORT1=1TO150:
NEXT:PRINTSTRING$(32,183);:PRINT
@128,"YOU CAN'T SAVE 'ROBO' EVER
YTIME!":PRINTSTRING$(32,183);

```

```

1700 PRINT@161,"WILL YOU TRY AGA
IN <Y OR N> ";:PRINT@448,STRIN
G$(32,183);
1710 A$=INKEY$:IFA$=""THEN 1710
1720 IF LEFT$(A$,1)="Y"THEN 10 E
LSE END

```

TRICKY WORDS

AN EDUCATIONAL PROGRAM TO HELP
LEARN THE PROPER WAY TO USE
TRICKY WORD'S ???????????

```

10 'TRICKY WORDS
20 CLS3
30 GOSUB350
40 PRINT @234,"TRICKY WORDS";
50 FOR X=1 TO 2000:NEXT X
60 CLS4
70 PRINT@229,"TYPE YOUR FIRST NA
ME";:PRINT@296,"AND PUSH ENTER."
;
80 GOSUB350
90 INPUTN$
100 C=0:W=0:RESTORE
110 FOR M= 1 TO 10
120 Y=RND(8):IFY=1 THEN 120
130 CLS(Y)
140 PRINT@65,"PRESS 1 OR 2 TO IN
DICATE":PRINT@97,"THE CORRECT AN
SWER. THEN":PRINT@129,"wait FOR
THE NEXT QUESTION."
150 GOSUB350
160 READ A1$,A2$,A3$,A4$,A5$,A6$
,A7$
170 'SET UP QUESTION AND TWO ANS
WERS
180 PRINT@194,A1$;:PRINT@265,"1)
"A2$;:PRINT@297,"2)"A3$;
190 B$=INKEY$
200 IFB$=""THEN 190
210 'CORRECT RESPONSE
220 IFB$=A4$THEN PRINT@386,A6$"!
";:SOUND 147,5:SOUND 175,5:FOR T
=1 TO 500:NEXT T:C=C+1
230 'INCORRECT RESPONSE
240 IFB$<>A4$THEN SOUND 50,5:PRI
NT@353,A7$," "N$".":PRINT@385,"
THE CORRECT ANSWER IS "A5$".":F
OR T=1 TO 1800:NEXT T
250 NEXT M
260 CLS(Y)

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270 IFY=1 THEN 260
280 PRINT@65,N$",";
290 'END DISPLAY IF SATISFACTORI
LY COMPLETED
300 IF C>7 THEN PRINT@161,"YOU G
OT"C"CORRECT OUT OF 10.":PRINT@1
93,"YOU ARE FINISHED. GOOD JOB!
";GOSUB350
310 'END DISPLAY IF UNSATISFACTO
RILY COMPLETED
320 IF C<8THEN PRINT@161,"YOU GO
T"C"CORRECT OUT OF 10.":PRINT@19
3,"YOU MUST DO THIS PROGRAM OVER
";PRINT@225,"UNTIL YOU GET AT LE
AST 8 RIGHT.":PRINT@289,"wait!!
THE COMPUTER WILL RESET":PRINT@3
21,"ITSELF.":GOSUB350:FOR X=1 TO
7000:NEXT X:GOTO100
330 GOTO330
340 'BORDER
350 H=RND(128)+127
360 FOR X=32 TO 63:PRINT@X,CHR$(
H);:NEXT X
370 FOR X=480 TO 511:PRINT@X,CHR
$(H);:NEXT X
380 FOR X=0 TO 448 STEP 32:PRINT
@X,CHR$(H);:NEXT X
390 FOR X=31 TO 479 STEP 32:PRIN
T@X,CHR$(H);:NEXT X
400 RETURN
410 'QUESTIONS AND ANSWERS
420 DATA ? HIS APPLE.,ITS ,IT'S
,2,IT'S,CORRECT,SORRY
430 DATA ? MAIL IS LATE.,YOUR
,YOU'RE,1,YOUR,GOOD GOING,WHOOPS
440 DATA ? BOOKS ARE RUINED.,TH
EIR,THERE,1,THEIR,ALL RIGHT,TOO
BAD
450 DATA LET'S GO ? THE MOVIES
.,TOO,TO ,2,TO,GREAT,AFRAID NOT
460 DATA ? ARE SIX BOYS ABSENT.
,THERE ,THEY'RE,1,THERE,NICE GO
ING,NOT QUITE
470 DATA THE CAR HAS LOST ? SH
INE.,ITS ,IT'S,1,ITS,EXCELLENT,I
NCORRECT
480 DATA I EARNED ? DOLLARS.,T
OO,TWO,2,TWO,SUPER,NOT EXACTLY
490 DATA ? NOT BEING QUIET!,THE
Y'RE,THEIR ,1,THEY'RE,VERY NICE
,NOT REALLY
500 DATA I LIKE CHOCOLATE ? MU
CH.,TO ,TOO,2,TOO,WA TO GO,WRONG
ANSWER
510 DATA ? INVITED TO MY PARTY.
,YOUR ,YOU'RE,2,YOU'RE,GOOD,DOP
S

```

W A N T E D



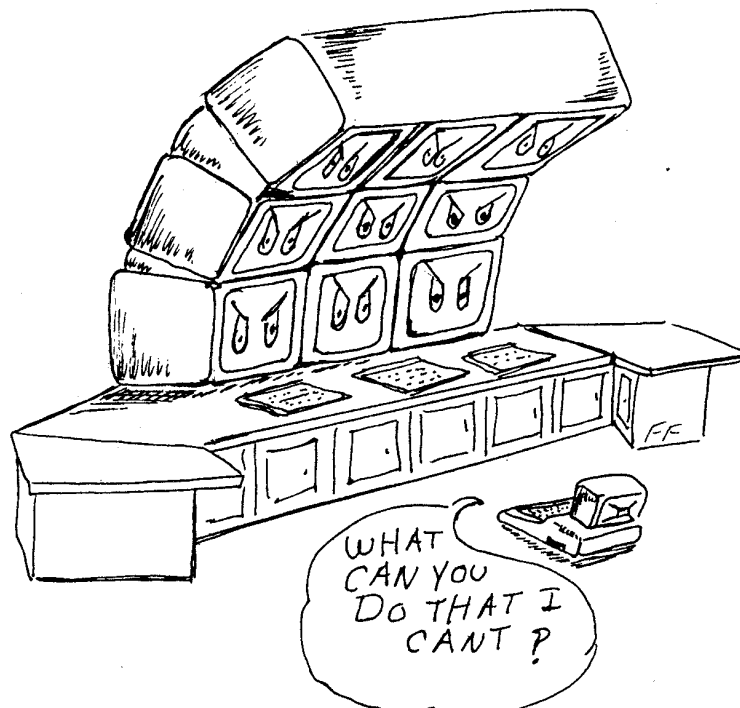
YOUR PROGRAM TO MARKET
IF YOU HAVE WRITTEN ANY GOOD
PROGRAMS THAT WOULD BE WORTH
MARKETING, WE WOULD LIKE TO HELP.

SEND US A COPY OF YOUR PROGRAM
WITH ANY TEXT OF HOW TO USE YOUR
PROGRAM. WE WILL REVIEW IT, AND
IF IT LOOKS GOOD, WE WILL SEND A
CONTRACT FOR YOUR REVIEW.

SEND ALL MATERIAL TO:

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ALL MATERIAL WILL BE RETURNED TO YOU.





INTERNATIONAL COLOR COMPUTER CLUB
17710 MOSS POINT DR SPRING, TX 77379

The (all new) International Color Computer Club was formed to help people get to know the Color Computer and how it operates, to make available to it's members all the information about the Color Computer that we can find, including information which Radio Shack isn't willing to give you. To make programs available so you may extend your library.

Programming is difficult to learn, and the club is a place you can turn to for help with problems you might have in writing a program of adapting a piece of hardware. We can-not solve all problems, but with hundreds of other members with expertise in every aspect of the Color Computer, we can solve most on them.

New members will receive a new member kit which contains all the programs which are in the current library of programs (165 programs to date), data on the CoCo, and a poke & peek book, all to help you along with your programming.

New members will receive a subscription to COCO ADS, (if you now have one, it will be extended) which is the clubs newsletter to its members. Members may place unlimited FREE classified ads in COCO ADS (one per month) and a discount on all display ads.

You are asked to donate some of your programs you wrote to help increase the library. These programs are available to you FREE, with a small charge for postage and blank tape or disk cost. You also may download programs from the clubs own BBS.

A list of other COCO members will be furnished to you that are in your area.

I hope you have found this informative and decide to join our club. We would really like to have you. I'm sure that you will find the benefits of the club worthwhile. All this for only \$30.00 per year.

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AGE
(0-10) _____ (11-15) _____ (16-20) _____ (21-30) _____ (31-40) _____ (40+) _____

TYPE OF COCO YOU OWN _____ MEMORY SIZE _____

EXT BASIC _____ .DO YOU HAVE A - PRINTER _____ MODEM _____



DISK _____ CASSETTE _____ OTHER _____

HAVE YOU WRITTEN ANY PROGRAMS ? _____

WOULD YOU SHARE THEM WITH OTHER MEMBERS ? _____

WHAT IS YOUR PRIMARY REASON FOR YOUR COCO? _____

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