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Magazine

July 1988
Issue # 51

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

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

```
*****
*
*   DYNAMIC COLOR NEWS
*
*       July 1988
*
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# OS-9 Programs included in DCN	
on DISK.	



This month we will be exploring the windowing system in OS-9 level II. Unfortunately this precludes any new ground being covered for level 1 users.

Last month we looked at the DISPLAY command. In the course of our investigation we used the DISPLAY command to define a window for us. OS-9 has another command to do that job for us, the WCREATE command. The difference between the two commands is that WCREATE can use decimal numbers, as opposed to DISPLAY's requirement that they be hexadecimal. Try the following command line to open a window.

```
WCREATE /w1 -s=1 0 0 40 20 4 0 0
```

This should create for us a 40 column by 20 line window with red text and a white background and white border. If we hit the clear key we can see our newly created window. You may notice that once you are at the new window that you cannot type to it. The reason for that is simple. We did not start a shell in the new window. We will get around to sending information to the new window shortly, first let's look at the equivalent DISPLAY line to do the same job.

First we would have to initialize a window and then direct the window information to that window.

```
INIZ W2 DISPLAY 1B 20 1 0 0 28  
14 4 0 0 >/W2
```

If you have enough memory to

open the second window (512K machine) you will find a window exactly like the first one, if not take my word for it. Now it is time to send something to the window. Let's face it a blank white screen with a red cursor in the upper left hand corner is boring.

One of the nice things about OS-9 is that you can send stuff anywhere by just giving it a direction to go in. Let's print a message to our newly opened window, window 1. To do this we will use our ECHO command. The only other thing we need besides our message is the direction to send it. That, of course, is /w1, our new window.

```
ECHO Hello from window 1 >/W1
```

If we now press clear to get to window 1 we will see our message waiting for us. One interesting note, if you forget to put the / before the W1, OS-9 will open a file for you called W1 and put your message in there. The / denotes a device, as in /d0 for the disk drive, and OS-9 considers your windows as devices.

Well we can print messages to the window, can we change the characteristics of this new window? The answer to that is yes! Here we will have to rely on our DISPLAY command again. Remember that the DISPLAY command will be expecting hexadecimal numbers. For demonstration let's change the foreground color of W1 from red to green. The code for text

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color is 32 and green is 3 or B. Check page 7-12 of the first part of your OS-9 manual. Type in the following command.

```
DISPLAY 1B 32 3 >/W1
```

Now when we get to window 1 we see that nothing has changed. What kind of deal is this? Maybe if we sent a new message out to the screen we could see the results of our labors. Type in this line:

```
ECHO Hello again >/w1
```

Yes, that did it. Green doesn't show up quite as well as red, but we can always change it again if we so desire.

It has been fun shipping messages out to our new window but suppose we wish to work in there. The only thing we need to do is send a shell out there ahead of us and then move out there ourselves. This is sort of like exploring brave new frontiers. Starting the shell takes one little command line that you are already familiar with, and the move is as simple as pressing the clear key. That command line is:

```
SHELL i=/w1&
```

Now we can work out of the new window instead of directing information out to it. Remember that window 1 is only 20 lines long, while the screen type we used was 24 lines long, meaning we will have a little room at the bottom of the screen that will not be used by our window.

What if we want to utilize the extra space at the bottom of our screens? We could start another window there, but to do that we will have to eliminate the one we have and build ourselves a file to open the two new windows on the same screen. At this point in time we have a shell running in window 1. To close this window we must per-

form a paradoxical feat. The SHELL i=/w1& we created is called an immortal process in window 1 (that's what the "i" stands for). To close this window we must kill an immortal. This sounds like a Herculean task straight out of mythology, but actually all we have to do is execute the shell. Press the clear key until you are at window 1. Now type EX at the prompt and your window will disappear. One note of caution here, you must have an active shell to fall back into or you will have to reboot your system. In our case we will be dropped back into the TERM shell (green screen).

Now let's build a file to open two windows on the same screen. The first window will be identical to the one we just eliminated and we will again activate a shell in it. The second window will be 3 lines long and be a message only screen (no shell).

```
BUILD TWOWIN
```

```
? /W1 -S=1 0 0 40 20 4 0 0
```

```
? /W2 0 21 40 3 1 0
```

```
?
```

We can now use the -z option of the WCREATE command to supply the command with the contents of our file. To do this type:

```
WCREATE -Z < TWOWIN
```

This creates the two windows, one with red text and a smaller one with blue text. As you can see in the file listing we didn't need the -s=1 or the border color in the description of the second window. The only remaining task is the setting up of the shell in window 1, which is accomplished just like the previous example.

```
SHELL i=/W1&
```

At this point we can then send messages from the top of the screen to the window at the



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bottom of the screen. Our work in the upper window will not bother our message in the bottom window. For instance try the following message:

```
ECHO Be sure to stop by five
oclock >/W2
```

You can then do some some work in the top window, such as list the CMDS directory in window 1 and your message is still there to remind you.

```
DIR /D0/CMDS
```

One last point, suppose after creating the message window we want to get rid of it. We can't use the EX command because there is no shell running in the window. We could create a shell, go to the window and then use EX or we could use the following command:

```
DISPLAY 1B 24 >/W2
```

Will we ever not use our old faithful DISPLAY command? That covers a lot of ground on windows. Practice up and next time we will try tackling overlay windows.

BASIC09

This month we will look at a BASIC09 program that will simulate a simple four function calculator. This will give us a chance to view the differences in BASIC09's IF/THEN statement and that of Color BASIC's. We will also complete the whole program without benefit of a GOTO statement despite the programs ability to loop back to the beginning if we wish to do another calculation.

REPEAT/UNTIL is a new command to those of us used to Color BASIC. What it will do is loop

between the keywords REPEAT and UNTIL unless the predefined condition is met. In the case of this month's program listing, I defined that condition to be a negative response to the go again question at the end of each calculation. Although GOTO is supported and valid under BASIC09, by using the REPEAT/UNTIL structure there was no need to use a line number (and subsequently remember it) to get back to the beginning of the program. A REPEAT/UNTIL loop does not have to be at the beginning of the program. It can be used anywhere in your programs.

The second command is of course the SHELL command we used last month. As you can see the INPUT command acts just like its Color BASIC counterpart, the exception that it does not automatically follow the input statement with a question mark. That is something you have to supply yourself.

The IF/THEN command differs some in BASIC09 but those differences serve to give it a little more power than its Color BASIC counterpart. You will notice that after the IF/THEN statement, I inserted a couple of program lines of code and then followed that with an ENDIF command. What BASIC09 allows you to do is put as many lines of code as you need between the IF/THEN and the ENDIF. If the condition is true those lines will be executed if not then those lines will be skipped. This should reduce the need for going to another location in the program to handle complex task after an IF/THEN condition has been met.

This elimination of GOTOS from your program will make it much easier to follow when you are going over one of your old listings because you'll have everything in front of you as you go along and won't have to

refer to another spot in the program.

The last line of the program is the end statement. This is no more necessary in BASIC09 than it is in Color BASIC, I just put it there for finality's sake.

We are now ready to type in the listing and watch it do its work. I named my procedure CALC. You're free to name yours anything you like.

PROCEDURE calc

```
REPEAT
SHELL "display c"
INPUT "What is the first
number?",a
INPUT "What is the
operation(+,-,*,./)?",b$
```

```
INPUT "What is the second
number?",c
IF b$="+" THEN
d=a+c
PRINT "The sum is "; d
ENDIF
IF b$="-" THEN
d=a-c
PRINT "The difference is "; d
ENDIF
IF b$="*" THEN
d=a*c
PRINT "The product is "; d
ENDIF
IF b$="/" THEN
d=a/c
PRINT "The result is "; d
ENDIF
INPUT "Another calculation (Y
or N)?",e$
UNTIL e$="n"
END
```

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USING INTERRUPTS

by

John Galus

No matter if you are working in Basic or machine language, every 60th of a second your computer stops whatever it is doing and, performs what is called an interrupt. When this interrupt occurs the computers status, at the time of the interrupt, is saved on the hardware stack so, that it can return to where it left off before it was interrupted. When this interrupt occurs it sends the computer to a machine language routine, located at \$10D, that normally "services" this interruption. Usually, this routine performs such tasks as, updating the screen, looking at the keyboard, and incrementing the timer. It is possible to change this interrupt vector, to point to a routine of our own. What we would simply do is change the normal interrupt vector to point to the beginning of our routine and when we are done, send it back to where it usually goes.

One important thing to know is that we must turn off this hardware interrupt before changing it. Otherwise, the system will likely crash, since an interrupt may occur at any time. We accomplish this with the Assembly language instruction ORCC #\$50. This instruction turns off all interrupts, so that we can alter its function. After

pointing the interrupt vector to our routine, we turn the interrupts back on by using the instruction ANDCC #\$AF. The beauty of interrupts is the fact, that no matter what we might be doing every 60th of a second, our routine is performed almost without any noticeable delay in our main program. Interrupts have many different applications. The most common application is there use within utilities, such as printer spoolers and in games.

An interrupt program is in the "background" and is ideal when we wish to perform a task at the same time with the normal computer operation. In the example in this article, I use this interrupt in a game application, where I create a moving background starfield, much like you would see in a space game. Now let us look at the Assembly language listing to see how this feat is done.

First we turn off all interrupts, save the old IRQ vector and place the location of our new vector there, we then clear \$F5 which we will use to toggle our interrupt on or off. Now whenever \$F5 does not equal zero we perform our starfield routine. This routine moves ten stars down a high resolution screen. When a star reaches the

end of the screen it is placed back at the top and begins its journey down the screen once again. The beginning locations of the stars are set using the FDB pseudo instruction. These starting addresses are for a Disk based PMODE4,1 screen which starts at \$E00 and ends at \$2600. For a cassette based system these addresses would be \$600 to \$1E00. You will also note that \$B7 contains the end of a graphic screen and \$BC is the beginning address, these addresses are set by the PMODE command in Basic. If you like, you can increase or decrease the amount of stars by the value in COUNT. If you do, be sure to give these new stars starting positions in the TABLE.

Take note that I/O operations such as cassette loading or saving will turn off the interrupt while in operation. You may like to create a game or other applications that uses the interrupt. By using the interrupt it is possible to do things that you thought that those "other" computers could only do.


Interrupt Basic Driver

10 'INTERRUPT BASIC DRIVER

```

20 'BY JOHN GALUS
30 'FOR DYNAMIC COLOR NEWS
40 CLEAR100,&H6FFF
50 Q=&H7000
60 READ F$:IF F$="FIN" THEN 90
70 E=VAL("&H"+F$)
80 POKE Q,E:Q=Q+1:GOTO60
90 EXEC&H7000
100 PMODE4,1:PCLS:SCREEN1,0
110 POKE&HF5,1
120 A$="";R2E2F2NL2R2":X=120:Y=12
    0
130 S$="NF2NG2D5NF4G4"
140 COLOR3,1:GOSUB210
150 I$=INKEY$:IF I$="" THEN 140
160 COLOR4,1:GOSUB210
170 IF I$=CHR$(9) THEN IF X=240
    THEN 140 ELSE X=X+10
180 IF I$=CHR$(8) THEN IF X=10 T
    HEN 140 ELSE X=X-10
190 COLOR3,1:GOSUB210
200 GOTO150
210 B$="BM"+STR$(X)+" "+STR$(Y)
220 SOUNDX,1
230 DRAWB$+S$
240 RETURN
250 DATA 1A,50,BE,1,D,BF,70,4F,8
    E,70,13,BF,1,D,F,F5,1C,AF,39,
    96,F5,27,26,10,8E,70,52,7F,70
    ,51,F6,70,51,58,AE,A5,6F,84,3
    0,88,20,9C,B7,24,14,86,80,A7,
    84,AF
260 DATA A5,7C,70,51,F6,70,51,C1
    ,A,25,E1,6E,9F,70,4F,34,4,1F,
    10,93,B7,D3,BC,1F,1,35,4,20,D
    E,0,0,0,10,9,E,80,1E,12,17,10
    ,9,9,20,84,16,73,9,91,22,19,1
    5,3,FIN
    
```

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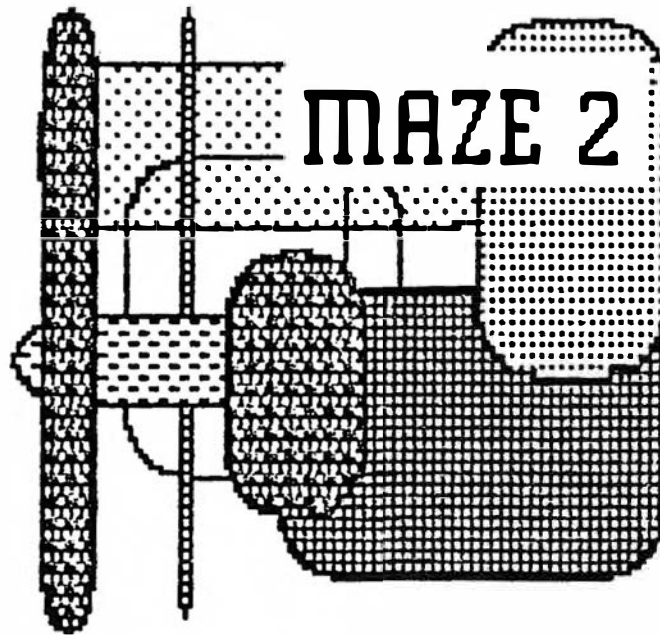


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This is a machine language game. The object is to guide your man through a 32 room world in search of the exit square. Use the arrow keys to move. The H key changes the screen colors from green to buff and back again if pressed a second time. The break key can be used to exit the game. The exit room is chosen at random. A machine language loader is included to load the machine language program. After it is loaded then a disk or tape save can be made. Next run the boot program which will clear memory and load the ML program.

This program is provided as a courtesy of T & D Subscription Software (See their advertisement on page 8) and is used by permission.

Maze 2 ML Loader

Run this program first to generate the ML program. After it is saved run the following boot basic program.

```
2 PCLEAR 4:CLS
6 PRINT
8 PRINT:PRINT"STANDBY WHILE MACH
   INE LANGUAGE PROGRAM IS BEIN
```

```
G GENERATED":PRINT
10 M=20000
12 READ X$
14 IF X$="@" THEN 40
16 L=LEN(X$)
18 FOR J=1 TO L STEP 2
20 A$=MID$(X$,J,2)
22 C$=LEFT$(A$,1):D$=RIGHT$(A$,1)
24 X=ASC(C$):Y=ASC(D$):X=X-48:Y=Y-48
26 IF X>9 THEN X=X-7
28 IF Y>9 THEN Y=Y-7
30 V=16*X+Y:POKE M,V
32 M=M+1:IF M=EN THEN 40
34 NEXT J
36 PRINTM
38 GOTO12
40 PRINT"DATA IS TRANSFERRED
42 PRINT"1 SAVE ML PGM TO DISK
44 PRINT"2 SAVE ML PGM TO CASSETTE
46 INPUT X
48 X$="MAZE 2":BE=20000:EN=23852
   :EX=20000
50 IF X=1 THEN SAVEM X$,BE,EN,EX
52 IF X=2 THEN CSAVEM X$,BE,EN,E
   X
60 END
100 DATA BD500CBD4F62864BBD4EA57
   C5080AD9FA000B7507EBD5004BD4F
   56B6507E810026037E4E2B8621BD4
   EA5BD548FB7507FBD5037BD5060B6
   507F81002703BD4F1F128632BD4EA
   5BD4EDE81591027FFB1BD4E7339B7
   FFD2B7FFD0B7FFCEB7FFCCB7FFCAB
   7FF
```

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110 DATA C9B7FFC6B7FFC4B7FFC2B7F
FC0B6FF228407B7FF2239861EBD4E
A54A811426F839B75085C664B7508
68632B75087B6508684FCB7FF20B6
50854A26FD8600B7FF20B650854A2
6FD7A508726E27A5086B650868110
26D3B65085397F5080BD50608E532
ABF
120 DATA 50837F50818608B75082BE5
083A68081FF2709BF5083BD4F827E
4EF212BD50047C5080BD4F56AD9FA
00081592707814E27037E4F051239
BD50608E52C9BF50837F50818608B
75082BE5083A68081FF2709BF5083
BD4F827E4F30128614BD4E9A8650B
750
130 DATA 80BD50047A508026F839B65
080847F2603BD506F12397F50817F
50828E5088BF5083BE5083A68081F
F2709BF5083BD4F827E4F6E123981
402502804112C6083DC3536B1F01B
65081841FB75081B6508281142505
8600B75082B65082F65081C368001
F02
140 DATA C608A680A7A431A8205A26F
67C5081B65081841FB75081810026
037C50821239B6507E81482608B6F
F228808B7FF223986C8BD4FEFBD4F
EFBD4FEF4A26F439C680F7FF201F8
95A26FDC600F7FF201F895A26FD39
8E1388301F26FC397F5080BD5019B
D50
150 DATA 60BD503739B6FF0184F7B7F
F01B6FF0384F7B7FF03B6FF238A08
B7FF238600B7FF2039B7FFD2B7FFD
1B7FFCFB7FFCCB7FFCBB7FFC8B7FF
C6B7FFC0B7FFC3B7FFC5B6FF22840
78AF0B7FF22398E00006F89680030
018C180026F5398E0000638968003
001
160 DATA 8C180026F53928CF3030303
03030303020202020202020202020
20202020202020202020202020202
02020202020202020202020202020
20202020202020202020202020202
02020202020202020202020202020
202020202020204D2041205A204
520
170 DATA 2020202020202020202020202
02020202020202020202020202020
20202020202020202020202020202
0202020202020434F505952494748
54201E431F201A1B1C1C204259205
42144202020202020202020202020
20202020202020202020202020202
020
180 DATA 2020202020202020202020202
02020202042592020412050414B45
52534B4920202020202020202020202
02020202020202020202020202020
20202020202020202020202020202
02020202020202020202020202020
20202020202020202020202020202
020
190 DATA 2020202020202020202020202
02020202020202020202020202020
2020202020202020202020202020555
34520544845204152524F57204B45
595320544F2046494E44202020202
020544845204558495420414E4420
4553434150451D202020202020202
020
200 DATA 2020202020202020202020202
02020202020202020202020202020
20202020202020202020202020202
02020202020202020202020202020
20202020202020202020202020202
02020202020202020202020202020
20202020202020202020202020202
020
210 DATA 2020202020202020202020202
02020202020202020202020202020
20202020202020202020202020202
02020202020202020202020202020
20202020202020202020202020202
02020202020202020202020202020
20202020202020202020202020202
020
220 DATA 202020474F4F4420574F524
B2020202020202020202020202020
20202020202020202020202020202
02020202020202020202020202020
2020202020202020202020505245535
320414E59204B455920544F205354
415254202020202020FF20202020202
020
230 DATA 53205920544F20504C41592
0414741494E20202020202020202020
20202020205052455353204E20544
F20515549542020202020202020FF
007E6666667E6666007C66667C666
67C003C666060606663C007C666666
66667C007E60607860607E007E606
078
240 DATA 606060003C66606E66663C0
06666667E666666003C1818181818
3C000F060606066663C0066666C786
C6666006060606060667E0063777F
7F6B6B63006676767E6E6E66003C6
6666666663C007C6666667C606000
3C666666666E3F007C6666667C666
600
250 DATA 3C66603C06663C007E18181
81818180066666666666663C006666
66663C3C18006B6B7F7F777763006
6663C183C66660066663C18181818

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007E660C1830667E0018381818181
83C003C66663E06663C003C66663C
66663C00000000000018180018303
030
260 DATA 30301800180C0C0C0C0C180
0000000000000000000018187E1818
00CFCFCF29CF30303030303030303
0303030303030BD59B5AD9FA000B7
5AD1BD5A52BD5510BD582FBD5500B
D54CBBBD594FBD54E181FF270AB65A
D1810327107E5492BD5AA6BD5911B
D5A
270 DATA A686FF20014F39B65AD1812
B260E7C5AD5B65AD5841FB75AD5BD
558D39B65AD5B15AEB2612B65AE1F
65AE2108301082708108302092702
4F3986FF39B65AD181482608B6FF2
28808B7FF2239B65AE1810F261586
BFB7FF02B6FF00840826097C5AD57
F5A
280 DATA E1BD558DB65AE1261786DFB
7FF02B6FF008408260B7A5AD5860F
B75AE1BD558DB65AE2810A261A86E
FB7FF02B6FF008408260E7F5AE2B6
5AD58B08B75AD5BD558DB65AE2810
0261C86F7B7FF02B6FF0084082610
860AB75AE2B65AD58008B75AD5BD5
58D
290 DATA 39B65AD58E5AECA686B75AD
6B65AD58E5B0CA686B75AD7BD57ED
BD570AB65AD684012703BD5705B65
AD684022703BD5736B65AD6840427
03BD574DB65AD684082703BD5764B
65AD684102703BD576FB65AD68420
2703BD577AB65AD684402703BD57A
0B6
300 DATA 5AD684802703BD57B7B65AD
784012703BD5652B65AD784022703
BD566EB65AD784042703BD56A0B65
AD784082703BD56C6B65AD7841027
03BD56D1B65AD784202703BD56E1B
65AD5B15AEB2603BD5644BD594239
BD56A08E00098601C609BD5957398
604
310 DATA C6018E0002BD59574C810C2
6F886055CC10626015CC10A26EC39
8601C6018E0005BD59574C810F26F
886015CC10926F18E00008601C604
BD59574C810F26F8C601860CBD595
75CC10A26F8398E00008601C601BD
5957C609BD59574C810F26F1C6018
601
320 DATA BD5957860EBD59575CC1092
6F1398E0004860EC602BD5957398E
000A8604C603BD59574C810F26F83
98E000A8603C603BD5957C606BD59
578607BD59578609BD5957C608BD5
957860CBD5957398E0007200AF65A
D5C401CB0B4F1F018600C600BD595
7C6
330 DATA 0ABD59574C811026F15F860
0BD5957860FBD59575CC10A26F139
8E0000860FC604BD59575CBD59578
6048E0003BD5957398E00008600C6
04BD59575CBD595786058E000ABD5
95739860CC60A8E0000BD59573986
0CC6008E0000BD5957398E0007C60
486
340 DATA 0ABD5957860BBD59575CC10
B26F18607C604BD5957C605BD5957
4C810A26F1398E0001860CC601BD5
9574C811026F8860C5CC10626F139
8602C6028E000ABD59574C810E26F
886025CC10A26F18E00008601C604
BD59574C810826F8BD59575CC1072
6F8
350 DATA BD59574C810F26F8394F5F8
E0000BD59574C840F26F85CC10C26
F339B75AD8F75AD9F65AD8C40F584
FC36800FD5ADE5FB65AD948F35ADE
1F018610B75AE04F5FE3843088207
A5AE026F63986F7B7FF02B6FF0084
08261CB65AE1F65AE25ABD5800108
300
360 DATA 00260CBD59357A5AE2BD594
2BD58E086EFB7FF02B6FF00840826
1CB65AE1F65AE25CBD58001083000
0260CBD59357C5AE2BD5942BD58E0
86BFB7FF02B6FF0084082624B65AE
1F65AE24CBD5800108300002614BD
59357C5AE1B65AE1840FB75AE1BD5
942
370 DATA BD58E086DFB7FF02B6FF008
4082624B65AE1F65AE24ABD580010
8300002614BD59357A5AE1B65AE18
40FB75AE1BD5942BD58E03986FFB7
5AE58614B75AE0BD5AB5B45AE584F
CB7FF208E00C8301F26FC7A5AE026
E9745AE5B65AE5810026DA8600B7F
F20
380 DATA 3986C8BD5920BD5920BD592
04A26F439C680F7FF201F895A26FD
C600F7FF201F895A26FD398E0000B
65AE1F65AE2BD5957398E0006B65A
E1F65AE2BD5957398E1388301F26F
C39B75AD8F75AD9BF5ADA1F104F58
1083002025048602C41FC35B2CFD5
ADC
390 DATA F65AD8C40F584FC36800FD5
ADE5FB65AD9810B2502860048F35A
DEFD5ADE1F02BE5ADC8610B75AE0E
C84EDA430882031A8207A5AE026F1
B65AD8F65AD9BE5ADA398E0000AB8
08C3E8026F9B75AEABD5AB5841F27
F9810127F5810227F1810827ED810
927

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```

400 DATA E9B75AEBCC0000FD5AD37F5
AD5BD59FCBD5A43BD5A1A8601B75A
E18608B75AE2BD558D39B6FF0184F
7B7FF01B6FF0384F7B7FF03B6FF23
8A08B7FF238600B7FF2039B7FFD2B
7FFD1B7FFCFB7FFCCB7FFCB7FFC8
B7FFC6B7FFC0B7FFC3B7FFC5B6FF2
284
410 DATA 078AF0B7FF22398E00006F8
9680030018C180026F539B65AD127
07CC0000FD5AD339FC5AD31083177
02207C30001FD5AD339CC0000FD5A
D3AD9FA00081002616BD594F7C5AD
2B65AD2841F26EB7C5AD3BD5AA67E
5A74B75AD1B65AD384012703BD5AA
6CC
420 DATA 0000FD5AD3398E000063896
80030018C180026F539BE5AE38CA0
0122038EA0028CBFF025038EA002A
680BF5AE3BB5AEA39FFFFFFFFFFFFF
FFFFFFFFFFFFFFFFFCFCFCFCFCFC
FCFCFCFCFCFCF0B0606440A0F0EC4
922E060C3818120C0A160C1A1C120
C10
430 DATA 12061410100216040610020
12001100008001000000200000000
00000010000100000030200000000
000AAA3F3F01982020DFDF03E037
FC18E7FFFF0000A8A857570000000
00000000AAA3F3F03D80202FDFD
07F0D1C33CC3FFFF0140A8A857570
000
440 DATA 00000000000AAA23E3E07F
80808F7F70C98EE3B6699FFFF0550
A8A857570000000000000000AA2A0
0000FF880807F7F06B0EFBBC33CE0
0715540000FFFF000000000000000
0AAA8E7E71FF82222DDDD03E0EFBB
C33CE7E715542A2AD5D5000000000
000
450 DATA 0000A2AAE7E7318C0000FFF
F01C0C3C76699EBD755552A2AD5D5
0000000000000000AAAEE7E7318C0
808F7F71FF8BC3B3CC3EC3755552A
2AD5D50000000000000000AA2A000
0318C80807F7F3FFCBDFB18E7EC37
55550000FFFF0000000000000000A
AAA
460 DATA 3F3F3FFC2020DFDF27E4BDF
BE718EC375555A8A8575700000000
0000000AAA23F3F3FFC0202FDFD6
7E6BDFBC33CEC375555A8A8575700
00000000000008AAA3E3E3C3C080
8F7F767E6B3F79966EBD71555A8A8
57570000000000000000A2AA00003
81C
470 DATA 80807F7F07E00D173CC3E7E

```

```

715540000FFFF0000000000000000
AA2AE7E7381C2222DDDD0670FEE83
CC3E00703C02A2AD5D50000000000
00000AAA2E7E7381C0000FFFF0C3
8FEDF9966FFFF03C02A2AD5D50000
00000000000AAAEE7E7381C0808F
7F7

```

```

480 DATA 1C38FDDFC33CFFFF03C02A2
AD5D50000000000000000000AAAA0000
381C80807F7F3C3CF3DFE718FFFF0
0000000FFFF000000000000424000
000000FFFFFFFFF00000000FFFFFFFFF
F00000000FFFFFFFFF00000000FFFF
FFFF00000000FFFFFFFFF00000000F
FFF

```

490 DATA @



```

10 CLEAR100,19900
20 PRINT:PRINT:PRINT:PRINT
30 PRINT"      LOADING GAME...
40 LOADM"MAZE 2"
50 EXEC20000

```

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Forth

Background

by
M. David Johnson

Tim Tillman's series on FORTH, which began in the March 1988 issue, will provide a welcome tutorial for Dynamic Electronics' PD-10 Color Computer FORTH.

("Good Grief!" you complain. "Another language to learn? Why?")

Have you ever designed an arcade type game in BASIC only to find that the spaceships crawled across the screen like snails?

Have you then tried to re-write the game in ASSEMBLER or C or PASCAL only to face the frustration of cryptic (if any) error messages and a seemingly endless "correction -recompile -relink - retest" loop? (We won't even talk about locked-up computers with screens full of garbage.)

Welcome to FORTH!

BASIC is an interpreter: it translates each line of code into machine instructions as the line is received. It has to re-translate the line each time you run the program. That's why it's so slow.

ASSEMBLER, C, and PASCAL compile the entire program into machine instructions in one big step and then you can run the compiled code at any time without having to go through the compile step again. That's why compiled languages like ASSEMBLER, C, and PASCAL are so

fast. But, if you have an error to correct or an update to make, you have to recompile and relink the entire program. You pay for fast execution with very slow development, testing, correcting, and updating.

TANSTAAFL: There ain't no such thing as a free lunch! (But FORTH comes close!)

FORTH is a THREADED INTERPRETER. It is almost as fast as ASSEMBLER and, at the same time, almost as easy to work with as BASIC. It does this by using a building-block method which is really nothing more than a series of deeply nested subroutines. And you can test and correct each subroutine as you develop it, right from the keyboard.

The "thread" is the way FORTH finds each subroutine. I write a subroutine and give it a name. Then, anytime FORTH sees that name in a command line, it knows to go and execute the subroutine identified by that name. Since subroutine parameters and results are passed via a stack (instead of having to go look up variables in memory,) the subroutine calls are blisteringly fast!

TANSTAAFL: there is a price. FORTH code is hard to read until you get used to it. If you have a Hewlett - Packard calculator, you have a head start: FORTH uses reverse polish

notation just like the HP. FORTH also doesn't have any built in error trapping (it will divide by zero and do arithmetic on character variables without a blink.) It also doesn't have built in floating point, or string handling. You have to program all those yourself if you want them.

FORTH was originally designed by Charles Moore for the Kitt Peak astronomical observatory. In my opinion, it is the best language in existence for real-time data acquisition and control of machinery. I am a design engineer for the Metropolitan Sanitary District of Greater Chicago. We already have one of our major pumping stations operating under FORTH, and I am just winding-up the design of a contract to automate our hydroelectric powerhouse under control of FORTH. (F83 on 4 industrial IBM PC-AT clones and 10 industrial IBM PC clones in a fully distributed network.)

FORTH is also great for game design. For example, STARFLIGHT is a new space adventure game in FORTH for IBM PC's and clones. It allows exploration of 270 star systems and 800 planets, with 7 alien races. It has animated graphics of rotating planets, graphic landing sequences, etc.

FORTH on the CoCo is comparatively rudimentary. But the extensibility of FORTH promises great opportunity for development. Like Tim, I have also had trouble getting anything other than the NEWFORTH version to run from my copy of PD-10. And, NEWFORTH is based on the very rudimentary FIG-FORTH, which is really not much more than a hacker's toy.

Frank Hogg Laboratories used to offer EFORTH but they discontinued it and were selling off all their remaining copies. You might check as they may still have a few left. The last price I saw was \$35.) I found EFORTH

quite proprietary and non-standard though, and I can't recommend it as anything more than a curiosity.

The Forth Interest Group (FIG) also sells the source code for 6809 FIG-FORTH. P.O. Box 8231, San Jose, CA. 95155, (408) 277-0668: \$15 USA/Canada/Mexico, \$16 International Surface Mail, \$18 International Air Mail; +\$2 handling fee on all orders. FIG membership is \$30 per year for USA/Canada/Mexico and \$42 per year elsewhere: membership includes the bimonthly publication FORTH DIMENSIONS. Be prepared if you buy the source code: it will take quite awhile to enter and debug, just like any other major Assembly Language program.

FIG-FORTH became a sort of "defacto" standard in the middle 1970's because it was public domain. FIG introduced the 1979 Standard later, and then followed with the current 1983 Standard. An ANSI (American National Standards Institute) Standard is currently under development. PD-10's NEWFORTH and the 6809 code available from FIG follow the older FIG-FORTH standard, and suffer from a lack of all the nice enhancements which have followed. But, again, FORTH's extensibility allows you to solve most of those problems yourself.

CAVEAT: Once you get hooked on FORTH, you won't be able to stop! It's truly addictive!

BACK ISSUES

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Taking Control

Basic Programming

Part 10

This is a series on computer programming using basic. Each month we take a few basic commands and show how to use them in basic programs. Previous material is also reviewed and if you are interested in writing basic programs then the material covered in this series should be adequate. It takes practice to become proficient in programming so we suggest you write practice programs to improve your skills.

For the past couple of months we have been concentrating on writing a word processor program as an example program. This program used peeks and pokes as well as some of the other concepts we had covered. Our text was placed in memory as it was written and a section of the program allowed the text to be saved on a disk or tape. Let's look at our method of saving the text before starting on new material.

MACHINE LANGUAGE SAVES

Any data can be saved by using the machine language save

technique. There are three things that must be entered when saving a machine language program or data. These are are:

- (1) Beginning in decimal
- (2) Ending in decimal
- (3) Execution in decimal

The following are examples for a disk and cassette save of the program "FIRST" that begins at 10000, ends at 14989, and has an execution address at 10000:

```
SAVEM "FIRST", 10000, 14989, 10000  
CSAVEM "FIRST", 10000, 14989, 10000
```

The beginning and ending are just the start and ending locations of the program or data in memory. For data the execution address can be any number between the beginning or ending addresses. For a machine language program the execution address is the location where the program starts. Most of the time this is the same as the beginning. A very nice feature of this method of saving data is that each byte can contain any

value from 0 to 255. A basic program and a machine language program could be saved with one machine language save command if the proper arguments were given. The term argument means the values for the beginning, ending, and execution addresses. The term "address" is the same as "pointer" or "vector" and designates a location in memory.

We also stored variables in memory. The advantage of doing this was to prevent the variable from changing or being erased as the program was run. In fact the variables are not lost if another program is run and then the original program rerun as long as the data was not written over by the second program. All variables are set to 0 by basic when a program is run. If a program has to be stopped to peek or poke memory or list part of it, it can be continued by entering the CONT command. Another way is to enter GO TO 10 or some other line number. This does not erase variables.

LINE INPUT

This powerful command allows any character to be entered from the keyboard. This includes the comma. An example for using the LINE INPUT command instead of INPUT would be for entering a City and State or any other information using a comma. The comma is used to separate variables in basic data statements, but the LINE INPUT command allows the comma to be included in a string. The following example program demonstrates using the LINE INPUT command.

LINE INPUT DEMO PROGRAM

```
10 PRINT"THIS IS CONT-1 AND
20 PRINT"DEMONSTRATES USING THE
30 PRINT"LINE INPUT COMMAND
40 PRINT"ENTER YOUR CITY, STATE
50 PRINT"AND ZIP CODE
```

```
60 LINE INPUT X$:CLS
70 PRINT"THE VARIABLE X$ CONTAINS
80 PRINT"THE INFORMATION YOU ENTERED.
90 PRINT"NOW ENTER ?X$ AND NOTICE THAT
100 PRINT"THE INFORMATION IS CONTAINED
110 PRINT"IN X$ INCLUDING THE COMMENTS.
```

USING FILES

In our word processor example last month we stored data in memory and saved the data as a machine language program or file when we had finished. It is possible to save the data on a tape or disk as it is generated. A file has to be opened before it can be used and closed when it is no longer needed. To open a disk file named "TEXT" enter the following:

```
OPEN "O",#1,"TEXT"
```

For a cassette enter the following:

```
OPEN "O",#-1,"TEXT"
```

Let's suppose the variable X\$ contains our string. To put it into the file after it has been opened enter the following:

```
(1) PRINT #1, X$
(2) PRINT #-1, X$
```

Command (1) is for a disk and (2) is for a cassette. A disk can have up to 15 files opened while a cassette can only have one.

Notice that there is a letter in quotations after the open command. This letter can either be an "I" or an "O". If data is to be stored on the disk or cassette, use the "O" for output. If data is to be read from the disk then use "I" for input. Next is the file number pre-

ceeded by the "#" symbol. This can be an integer from 1 to 15 for a disk. For a cassette the file is -1.

An advantage of printing strings to a file is that the string is saved as it is generated. In case of a power failure, the strings that were printed to the file before the power failure would be preserved.

Another advantage of reading strings from a disk or cassette is that memory is conserved. Suppose a 20 page document were to be printed from a text disk file. It would not be feasible to read all of the text into a 64K computer's memory. However a string at a time could be read from a disk or cassette file and printed using only a small part of the computer's memory.

Closing a File

After data has been written to the file it is necessary to close it. The CLOSE command will close all files if no argument is given. CLOSE #2 will close file #2 and CLOSE #-1 will close the cassette file. This command could be included with the menu of a program to terminate entering data.

End of File

It is necessary to know when all data has been read from a file. Basic has an EOF command that tells if there is more data. The argument for the EOF command is the file number. If X represents the file number then the following can be used to determine if more data is in the file:

```
IF EOF (X) (>)0 THEN CLOSE X:
END
```

The EOF command returns a 0 if there is more data. The preceding statement checks to see

if the EOF is not equal to 0. If it is equal to zero then the procedure continues. If it is not equal to zero then there is no more data and the file is closed.

FILE DEMO PROGRAM

We wrote a program to demonstrate using a file for a cassette or disk. This program allows a sentence to be entered as a string. It uses the LINE INPUT command which allows all characters to be entered including the comma. The computer stores the strings in a buffer and transfers them to a disk or tape when the buffer is filled. The program could be easily modified to allow the string to be printed to a printer.

To stop entering data just press the "@" and then the enter key. We used this to indicate the ending of data and to implement the closing of the file.

```
5 CLS
10 PRINT"CASSETTE & DISK FILE DE
MO
20 PRINT"COPYRIGHT (C) 1988
30 PRINT"DYNAMIC ELECTRONICS INC
.
40 PRINT:INPUT"PRESS A KEY TO CO
NTINUE";XX:CLS
50 PRINT"CONT-2 CASSETTE & DISK
FILE PGM
60 PRINT"THIS PROGRAM ALLOWS A F
ILE TO
70 PRINT"BE CREATED AND OPENS IT
TO
80 PRINT"RECOVER THE DATA FROM T
HE FILE.
90 PRINT"IT SUPPORTS BOTH A CASS
ETTE
100 PRINT"AND DISK FILES
110 PRINT"1 CREATE A FILE
120 PRINT"2 READ DATA FROM FILE
130 INPUT"ENTER NUMBER";N
140 IF N=1 THEN 180
150 IF N=2 THEN 400
160 GOTO40
170 '
180 PRINT"THIS CREATES A FILE
```

Dynamic Color News July 1988

```
190 INPUT"ENTER FILE NAME";X$
200 PRINT"1 DISK FILE
210 PRINT"2 CASSETTE FILE
220 INPUT"NUMBER";Y
230 IF Y=1 THEN 340 ELSE IF Y=2
    THEN 270
240 GOTO 40
250 '
260 'CASSETTE FILE
270 OPEN "O", #-1, X$
280 LINE INPUT A$
290 IF A$="@ " THEN CLOSE:PRINT"F
    ILE IS CLOSED":GOTO40
300 PRINT #-1,A$
310 GOTO 280
320 '
330 'DISK FILE
340 OPEN "O", #1, X$
350 LINE INPUT A$:IF A$("<"@ " THE
    N 370
360 CLOSE:PRINTX$" IS CLOSED":GO
    TO40
370 PRINT#1,A$
380 GO TO 350
390 '
400 PRINT"THIS RECOVERS DATA FRO
    M FILE
410 INPUT"ENTER FILE NAME";X$
420 PRINT"1 DISK FILE
430 PRINT"2 CASSETTE FILE
440 INPUT"ENTER NUMBER";N
450 IF N=1 THEN OPEN "I", #1 ,X$
    : CLS:GOTO 540
460 IF N=2 THEN OPEN "I", #-1,X$:
    CLS: GOTO490
470 GO TO 40
480 '
490 LINE INPUT #-1,A$
500 PRINTA$
510 IF EOF(-1)=0 THEN 490 ELSE P
    RINT"END OF DATA FILE IS CLOS
    ED":GOTO40
520 GO TO 490
530 '
540 LINE INPUT #1,A$
550 PRINTA$
560 IF EOF(1)=0 THEN 540 ELSE PR
    INT"END OF DATA FILE IS CLOSE
    D":GOTO40
570 GO TO 540
```



These are collections of programs from Dynamic Color News. Number after program is the issue number.

DCN-1

* 64K all RAM, * 2- bank address file, Alarm Clock, Loan Interest, Character Generator, * Bank Switching.
* CC-2 Memory managers

DCN-2

Check Book Program., Ball Team Sort Program., Card Shuffling, Student Study Program, Address File.

DCN-3

Restore-Recover program lost after NEW command, Fast Food, Bar Graph, Memory Peek & Poke, Graphics draw.

DCN-4

Address File with Sort up to 100 names, Morse Code Generator, Star Constellations, Dueling Cannons.

DCN-5

COLOR COMPUTER 3 PROGRAMS
CC-3 Memory Manager- Switch 8K blocks #38, CC-3 Error Trapping- Program to print error message #37, CC-3 Graphics #38, CC-3 Graphics Save #40

DCN-6

Accounts Payable- Business program #38, Dog Race (game) #40, Compound Interest-Figure best investment deal. #40, Address File Disk Sort (up to 100 names) #40, Invoice Program- Example for writing your own #36.

DCN-7

Meteors (game) #41, Graphics print-Use regular print for large picture #42, Parachute (game) #42, Music (Peace)- Hear quality computer music, #43, Genealogy-Keep records of your family tree #39.

DCN-8

Oware (Game) #36, Save the Maiden (Word game) #43, Printer Utilities - Print information on screen to printer #44, Graphics-Screen Dump Program #44.

Programs are \$5.95 each tape or disk. Add \$1 shipping. Checks, VISA & MC.

DYNAMIC ELECTRONICS
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HARTSELLE, AL 35640

DYNAMIC ELECTRONICS INC.

PUBLIC DOMAIN SOFTWARE

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

* PD-1 GAMES

MENU BAS 0 B 1
 BEAST BAS 0 B 1
 BEAST DAT 1 A 1
 BOBO BAS 0 B 3
 GUNNER BAS 0 B 2
 HOW BAS 0 B 3
 LANDER BAS 0 B 3
 LIFE BAS 0 B 3
 MAX BAS 0 B 3
 POKER BAS 0 B 2
 BIORITHM BAS 0 B 3
 BLACKBOX BAS 0 B 2
 BLOCKADE BAS 0 B 1
 BUSJUMP BAS 0 B 1
 CHUTE BAS 0 B 2
 GO BAS 0 B 3
 MANOMAN BAS 0 B 2
 OTHELLO BAS 0 B 2
 TARTUS BAS 0 B 1
 TARTUS2 BAS 0 B 1

* PD-2 GAMES

MENU BAS 0 B 1
 RUBIC BAS 0 B 5
 FRACTAL BAS 0 B 1
 KALSCOPE BAS 0 B 2
 TARTUS BAS 0 B 1
 TARTUS2 BAS 0 B 1
 WORLD3D BAS 0 B 4
 LIFE BAS 0 B 2
 ADVENT BAS 0 B 4
 ADVENT DOC 1 A 2
 HURKLE BAS 0 B 2
 REVERSE BAS 0 B 2
 GUESSFR BAS 0 B 2
 SCRAMBLE BAS 0 B 3
 PIZZA BAS 0 B 2
 CINQUAIN BAS 0 B 2

* PD-3 GAMES

MENU BAS 0 B 1
 AANDAN BAS 0 B 2
 STARTREK BAS 0 B 9
 TREKINST BAS 0 B 3
 SEQUENCE BAS 0 B 2
 ALPHABET BAS 0 B 3
 GEOGRAPH BAS 0 B 4
 FLASH BAS 0 B 4
 BAGELS BAS 0 B 3
 OREGON BAS 0 B 9
 MULTIPLY BAS 0 B 2

* PD-4 HL GAMES

MENU BAS 0 B 1
 PONG BIN 2 B 1
 SQUASH BIN 2 B 2
 BLOCKADE BIN 2 B 2
 GERM BIN 2 B 1
 WIGWORM BIN 2 B 2
 GRID BIN 2 B 2
 ZEROQ BIN 2 B 2
 3DTICTAC BIN 2 B 7
 HOPBOP BIN 2 B 5
 ICEWAR BAS 0 B 6
 CIVILWAR BAS 0 B 4
 TICTACTO BIN 2 B 7

* PD-5 GAMES

MENU BAS 0 B 1
 CAVE BAS 0 B 4
 WARGAME BAS 0 B 2
 WARGAME BIN 2 B 1
 WARGAME2 BAS 0 B 5
 WARROOM BIN 2 B 3
 NORAD BAS 0 B 3
 ANDREA BAS 0 B 5
 CURSE BAS 0 B 4
 GARGOYLE BAS 0 B 6
 KINGTUT BAS 0 B 7
 TAIPAN BAS 0 B 6

DSK-6

SPELL & FIX- FIND
 SPELLING ERRORS
 IN TXT DISK FILES

MENU BAS 0 B 1
 MANUAL TXT 1 A 12
 SPELLFX2 BAS 0 B 1
 SPELLFX2 BIN 2 B 6
 SPELLFIX BAS 0 B 1
 DICT TXT 1 A 33
 COREDICT TXT 1 A 1
 SAMPLE TXT 1 A 1
 BUILD BAS 0 B 1
 LIST BAS 0 B 1
 RESET BAS 0 B 1
 APPEND BAS 0 B 1
 ADDWORDS BIN 2 B 3

PD-7 DISK UTILITIES

MENU BAS 0 B 1
 BASIC84 BIN 2 B 1
 BSEARCH BIN 2 B 1
 DISKCOMP BIN 2 B 1
 DISKTEST BIN 2 B 3
 DISKWASH BAS 0 B 1
 DOS64K BAS 0 B 2
 DSDBOOT BIN 2 B 1
 LIST BIN 2 B 2
 PRINT BIN 2 B 3
 PRINTDIR BAS 0 B 1
 RECOVER BIN 2 B 1
 ROMBACK BAS 0 B 1
 ROMFIX BIN 2 B 1

PD-8 DISK UTILITIES

SCRN51 BAS 0 B 1
 SCRNS1 BIN 2 B 1
 SCRNDEMO BAS 0 B 2
 SDC BIN 2 B 1
 SQUEEZE BIN 2 B 1
 SSDBOOT BIN 2 B 1
 TAPE2DSK BAS 0 B 1
 TIMER BIN 2 B 2
 UNLOCK BIN 2 B 1
 BACKUP BIN 2 B 1
 BACKUP1 BIN 2 B 1
 MORE BIN 2 B 3
 SPEAK BIN 2 B 3
 PCLEARFX BIN 2 B 1
 MULTBACK BIN 2 B 1
 MULTBACK DOC 1 A 1

PD-9

TERMINAL PROGRAMS

MENU BAS 0 B 1
 TELETERM BIN 2 B 3
 TELETERM CAS 2 B 3
 TTHELP DAT 1 A 4
 MTERM BIN 2 B 6
 MTERM VIP 1 A 19
 MTERCONFIG BAS 0 B 3
 MTERM+ BIN 2 B 6
 DATATRDE BIN 2 B 3
 KERMIT BAS 1 A 1
 KERMIT BIN 2 B 2
 HAYESAE BIN 2 B 4
 HAYESAE DOC 1 A 6

PD-10

COLOR COMP. FORTH

MENU BAS 0 B 1
 FORTHMAN UL1 2 B 7
 FORTHMAN UL2 2 B 7
 FORTHMAN UL3 2 B 1
 FORTH BIN 2 B 3
 EDIT DAT 1 A 3
 FRTHDOC1 TXT 1 A 7

FRTHDOC2 TXT 1 A 7
 FRTHDOC3 TXT 1 A 1
 FRTHDOC4 TXT 1 A 7
 32KFORTH BIN 2 B 4
 NEWFORTH BIN 2 B 3
 WE BAS 0 B 1

PD-11 MCPAINT

A COMPLETE GRAPHICS
 DEVELOPMENT PROGRAM
 WITH INSTRUCTIONS

RUN-ME BAS 0 B 1
 MCPAINT BIN 2 B 11
 ICONS SYS 2 B 3
 MCDOC DOC 1 A 11
 PRINTDOC BAS 1 A 1
 GLASDEMO BIN 2 B 6
 STARS BIN 2 B 2
 1940S SET 2 B 1
 BLOON SET 2 B 1
 BOLD SET 2 B 1
 FANCY SET 2 B 1
 GREEK SET 2 B 1
 GREEKU SET 2 B 1
 HEBREW SET 2 B 1
 OLDENG SET 2 B 1
 TYPING SET 2 B 1
 EPSON DRV 2 B 1
 EPSON2 DRV 2 B 1
 ANIMATE BAS 0 B 1
 ANIMAT BIN 2 B 1
 BANNER BAS 0 B 2
 MCUTIL BIN 2 B 1

* PD-12

PHODE 4 PICTURES

CHURCH, ROSES, HOUSE
 RUN "PIXFILES"
 JOYSTICK IS REQUIRED

XIXCMP BAS 0 A 3
 OUTPOST BAS 0 A 3
 OUTPOST BIN 2 B 3
 SFIELD BAS 0 A 2
 SFIELD BIN 2 B 3
 PIXFILES BAS 0 B 3
 TRUCK BIN 2 B 3
 MODEM BIN 2 B 3
 HORSE BIN 2 B 3
 MISSION BIN 2 B 3
 CLOISTER BIN 2 B 3
 RAIN BIN 2 B 3
 EAGLE BIN 2 B 3
 ROSES BIN 2 B 3
 CHURCH BIN 2 B 3
 GARDEN BIN 2 B 3
 PRES BIN 2 B 3
 LONI4 BAS 0 A 3

PD-13

GRAPHICON PICTURE
 DISK-1. REQUIRES
 PIXFILES/BAS FROM
 PD-12 & JOYSTICK

PICTURES GCM 1 B 68

PD-14

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

PICTURES GCM 1 B 68

PD-15

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

PICTURES GCM 1 B 68

PD-16

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

PICTURES GCM 1 B 68

PD-17 DISK UTILITIES

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

PD-18 TAPE TO DISK
 DISK UTILITIES

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

* PD-19 GAMES

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

* PD-20 GAMES

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

PD-21 MUSIC

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

ORCH BIN 2 B 0
ORCH DOC 1 A 3
OCNVRT BIN 2 B 2
GHOSBUST MUS 4 M 3
STELMO MUS 4 M 2
MASH MUS 4 M 2
BONDI MUS 4 M 2
2001 MUS 4 M 2
ARIA MUS 4 M 2
INVENTI MUS 4 M 1
BATTSTAR MUS 4 M 2
BOND2 MUS 4 M 2
CLOENCT MUS 4 M 2
SCARBORO MUS 4 M 1
FUQUEINC MUS 4 M 1
MINUET MUS 4 M 1
LONGTIME MUS 4 M 2
MESSIAH MUS 4 M 3

* PD-22 MUSIC-1

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

ADDPLAY BAS 0 B 1
DEPLAY BAS 0 B 1
MSQUEZ BAS 0 B 2
ALSOFAK MUS 2 B 5
BOOGIE MUS 2 B 6
CIRCUS MUS 2 B 5
CLOWN MUS 2 B 2
CLOWNS MUS 2 B 4
HAYDEN MUS 2 B 8
JGOOD MUS 2 B 4
PEACE MUS 2 B 2
PEACH MUS 2 B 5
PUFF MUS 2 B 6
GOODDIEY MUS 2 B 4

* PD-23 MUSIC-2

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

ADDPLAY BAS 0 B 1
DEPLAY BAS 0 B 1
MSQUEZ BAS 0 B 2
RAIN MUS 2 B 2
SONATA3 MUS 2 B 3
STRAV MUS 2 B 4
FOGQY MUS 2 B 4
FUNERAL MUS 2 B 3
HARDDAY MUS 2 B 2
INVENT MUS 2 B 2
INVENT11 MUS 2 B 3
INVENT15 MUS 2 B 3
INVENT7 MUS 2 B 3
INVENT8 MUS 2 B 2
JOPLIN MUS 2 B 4
KHAN MUS 2 B 8

* PD-24 MUSIC-3

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

ADDPLAY BAS 0 B 1
DEPLAY BAS 0 B 1
MSQUEZ BAS 0 B 2
PEANUTS MUS 2 B 3
ROCK MUS 2 B 5
ROXANNE MUS 2 B 5
SCHERZO MUS 2 B 2
TEACH MUS 2 B 2
PIANOMAN MUS 2 B 5
STRANGER MUS 2 B 5
CAHELOT MUS 2 B 4

CHACONNE MUS 2 B 6
DIAMOND MUS 2 B 3
DOWNROAD MUS 2 B 4
FANTASY1 MUS 2 B 2

* PD-25 MUSIC-4

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

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

* PD-26 LAST WILL

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

* PD-27 GAMES

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

PD-28 COMM. CC-TALK,
BBS, TERM

BBS'S DAT 1 A 1
CCT IO 2 B 1
CCTALK BAS 0 B 1
CNFG40V1 BAS 0 A 5
CNFG40V2 BAS 0 A 4
CTLKEY BAS 1 A 1
MTERM1 DOC 1 A 11
MTERM2 DOC 1 A 8
MTERM40 BIN 2 B 8
REDIAL BAS 0 A 1
PACREDIA BAS 0 A 1

PD-29 COMM, WORD
PRO, GAMES

GOSTSHIP BAS 0 B 8
INT RATE BAS 0 B 2
INVSTANL PC 0 B 4
MENU BAS 0 B 4
MOTOJUMP BAS 0 B 3
SCREEN MAX 2 B 6
SCREEN1 BIN 2 B 3
SCREEN2 BIN 2 B 3
SCREEN2 MAX 2 B 6
STRINGTU BAS 0 B 4
TTERM DSK 2 B 4

USING BAS 0 B 3
WF-DOC JP 0 B 2
WORDFILE JP 0 B 4
PARM1 DAT 1 A 1

PD-30 CHECK BOOK,
UTILITIES

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

PD-31

PIRATES TREASURE -
As you explore the
cave looking for the
treasure, a picture
appears on the screen
as you go from room
to room. These pic-
tures are loaded from
disk. A computer with
a disk drive is re-
quired and a ramdisk
is preferred.

PD-32

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

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

PD-33

EDUCATIONAL PROGRAMS

ABBREV BAS 0 B 4
ABCPPOP BAS 0 B 3
ALPHAAL BAS 0 B 1
EDUCATE BAS 0 B 1
HANGP BAS 0 B 1
HOMONYM BAS 0 B 1
SPELWORD BAS 0 B 1
MATH BAS 0 B 2
DRILL BAS 0 B 2
MLTP BAS 0 B 1
ROUND BAS 0 B 2
AREA BAS 0 B 6
METCONV BAS 0 B 3
NUMBERS BAS 0 B 2
SIEVE BAS 0 B 1

PD 34

!! BULLETIN BOARD!!
With this software
you can run your own
bulletin board at
300 or 1200 baud.
Instructions are
included.

SCF EDI 0 B 3
GMF EDI 0 B 4
SUL EDI 0 B 4
SMP EDI 0 B 2
64K BAS 0 B 1
STARTUP BAS 0 B 2
COTERM BIN 2 B 1
USER SYS 0 B 8
COBBS SYS 0 B 9
STARTI DOC 1 A 6
USER DOC 1 A 1
COBBSREV DOC 1 A 5
OPERAT DOC 1 A 7
SMH EDI 0 B 3
MENU DOC 1 A 11

PD 35

ADDRESS FILES AND
FINANCE PROGRAMS

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

PD 36

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

COMPSC1 BAS 0 B 6
COMPSC2 BAS 0 B 3
COMPSC3 BAS 0 B 9
COMPSC4 BAS 0 B 5
COMPSC5 BAS 0 B 9
COMPSC6 BAS 0 B 6
GETPUT BAS 0 B 2

PD 37

COMP. SCIENCE PGMS 2:

These programs are
tutorials on basic
programming.

IFTWEN BAS 0 B 9
EXTENDED BAS 0 B 2
GETPUT BAS 0 B 2
COMPSC18 BAS 0 B 8
COMPSC19 BAS 0 B 5
COMPSC17 BAS 0 B 7
EXTDEMO BAS 0 B 3

* PD 38

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

ABBREV BAS 0 B 4
ABCPPOP BAS 0 B 3
ALPHAAL BAS 0 B 1
EDUCATE BAS 0 B 1
HANGP BAS 0 B 1
HOMONYM BAS 0 B 1
SPELWORD BAS 0 B 2
MATH BAS 0 B 2
DRILL BAS 0 B 2
MLTP BAS 0 B 1
ROUND BAS 0 B 2
AREA BAS 0 B 6
METCONV BAS 0 B 3
NUMBERS BAS 0 B 2

PD 39

ADDRESS FILES AND
FINANCE PROGRAMS

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

*PD-40

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

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

Pictures can be loaded
with CoCo MAX or our
PIXFILES/BAS program.
They can be printed on
a graphics printer.
See Dynamic Color News
issue #44 for a graph-
ics screen dump pro-
gram. Our DYPRINT
package allows large
blown up pictures to
be printed using
standard print.

All program collections are available on disk. Collections with a *
are also available on tape.

1-4 \$4.95, 5-9 \$4.50, 10 - \$4.00

Add \$1 shipping. Specify Tape or Disk. Checks, VISA, or MC.

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HARTSELLE, AL 35640

* PD-41
Picture files

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

* PD-42
Picture files

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

* PD-43
Picture files

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

PD-44
Terminal program with documentation. This will work with the CoCo-3. Instructions are included.

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

* PD-45
Picture Files

DRAGON MAX 2 B 3
HOT LIPS MAX 2 B 3
ANIMALS MAX 2 B 3
CLOWN F MAX 2 B 3
FISH MAX 2 B 3

3 MEN MAX 2 B 3
S MAP MAX 2 B 3
BUGS MAX 2 B 3
CFISH MAX 2 B 3
HERO MAX 2 B 3
WMAP MAX 2 B 3
GSCOTT MAX 2 B 3
STATES MAX 2 B 3
HORSE MAX 2 B 3
CROSS MAX 2 B 3
FOODW MAX 2 B 3
RSTONE MAX 2 B 3
COCO MAX 2 B 3
ALIEN MAX 2 B 3
PIXFILES BAS 0 B 3

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

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

* PD-47
Miscellaneous Pgs

T BAS 0 B 2
SANTEE2 BAS 0 B 1
MILEAGE BAS 0 B 1
M BAS 0 B 1
DIGITS BAS 0 B 1
NUMBLIST BAS 0 B 1
COUNT BAS 0 B 1
SC BAS 0 B 1
DRAWTEXT BAS 0 B 1
SAMPLE BAS 0 B 1
QRSCRHRT BAS 0 B 2
HRTEXT2 BAS 0 B 3
DRAW BAS 0 B 2
WRITER BAS 0 B 1
TYPEBET BAS 0 B 2
WRITEBET BAS 0 B 2
TEXT2 BAS 0 B 2
SANTEE BAS 0 B 2
SHUTTLE BAS 0 B 1
AJOCK BAS 0 B 1
PLATFORM BAS 0 B 1
MAZE BAS 0 B 4
DISKZAPR BAS 0 B 2
ZAP BAS 0 B 3
DETHSHIP BAS 0 B 3
BACKUP35 BAS 0 B 1
BOOT BAS 0 B 1
SCRNLST BAS 0 B 1
DOSSTART BAS 0 B 1
LABEL BAS 0 B 2
DSKDSABL BAS 0 B 1
NOFREEO BAS 0 B 1
FORMATER BAS 0 B 1
ROMRAM BIN 2 B 1
SUPDUP BIN 2 B 1
TESTTEXT BAS 0 B 1

* PD-48
Miscellaneous Pgs

EXTBAS BAS 0 B 3
DISAPPEAR BAS 0 B 1
PAINT BAS 0 B 1
DATA BIN 2 B 1
DATA2 BIN 2 B 1
SCRDATA BIN 2 B 1
FILL2 BIN 2 B 2
QUADDRWA BAS 0 B 1
CELTIC BAS 0 B 2
ALL RAM BAS 0 B 1
CHARGEN BIN 2 B 1
ROMRAM BIN 2 B 1
OBSTACLE BAS 0 B 1
64K RAM BAS 0 B 1
COLORSEL BAS 0 B 1
TRIG BAS 0 B 4
ALGEBRA BAS 0 B 4
PLAY BAS 0 B 1
STATECAP BAS 0 B 2
MLSOUNDS BAS 0 B 1
ROTATION BAS 0 B 2

PARABOLA BAS 0 B 2
INSTAPIC BAS 0 B 1
CLOVER BAS 0 B 1
MAT-PLOT BAS 0 B 1
WHEEL 1 BAS 0 B 1
LETTER-R PAR 1 A 1
3-LINES ROT 1 A 1
TRAPZOID ROT 1 A 2
PYRAHID ROT 1 A 2
CUBE ROT 1 A 3
51X24 BAS 0 B 2
WINDOW BAS 0 B 5
GGPRTSU BAS 0 B 1
KALEIDO BAS 0 B 1
OK8JAPRT BAS 0 B 1
NUMCNVTR BAS 0 B 1
ADVRTN BAS 0 B 1

* PD-49
Miscellaneous Pgs.

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

* PD-50
Miscellaneous PGMS

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

* PD-51
Games & Programs

DRAGRACE BAS 0 B 1
WORMER BAS 0 B 2
SIMON BAS 0 B 2
RIDER BAS 0 B 2
MISSILE BAS 0 B 3
LETSHOOT BAS 0 B 7
SHOOTGAL BAS 0 B 2
MISSILE2 BAS 0 B 3
FENCE BAS 0 B 3
BANDIT BAS 0 B 1
CHICKEN BAS 0 B 2
MAXIMUM BAS 0 B 3
FLIGHT BAS 0 B 2
COVERUP BAS 0 B 2
WORLDMAP BAS 0 B 4
POUNCE BAS 0 B 1
MARTIANS BAS 0 B 2
FINDIT BAS 0 B 3
SCRAMBLE BAS 0 B 5
BOUNBABY BAS 0 B 2
CHICK BAS 0 B 3
BOBO BAS 0 B 3
RUBIC BAS 0 B 4
MCJUMP BAS 0 B 3

PD-56

Glossary, Memory
Maps, Programs

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

* PD-57
Picture Files

VAMPIRE PIC 2 B 3
ATLANTA BAS 0 B 3
NOGHOST PIC 2 B 3
AIRPORT BAS 0 B 4
S EASTON BAS 0 B 4
15HLSSTEP BAS 0 B 4
HAGAR PIC 2 B 3
SUNSET BAS 0 B 3
S NICKS BAS 0 B 4
SNOOPY1 BAS 0 B 3
MICKY BIN 1 B 8
DONALD BIN 2 B 8
SNOOPY2 BAS 0 B 4
SNOOPY3 BAS 0 B 4
SNOOPY4 BAS 0 B 4

* PD-58
Miscellaneous Pgs.

DISKLIST BAS 0 B 1
DIRLIST BAS 0 B 2
HL ADDR BAS 0 B 1
DISKDUMP BAS 0 B 1
PRINTUL BAS 0 B 2
CALPRINT BAS 0 B 3
ALPHSONG BAS 0 B 1
PAINT BAS 0 B 1
DOGPICT BAS 0 B 2
EVADER BAS 0 B 1
NUKATTC BAS 0 B 2
BASICHAP BAS 0 B 3
JOYPAINT BAS 0 B 1
PUMPKIN BAS 0 B 1
HOMOYMS BAS 0 B 1
ABBREV BAS 0 B 4
CONVERT BAS 0 B 3
CASDDIR BAS 0 B 1
CVERT BAS 0 B 1
FLASCARD BAS 0 B 1
MESSAGE BAS 0 B 1
RELOCAT BAS 0 B 1
COUNT BAS 0 B 1
CALENDAR BAS 0 B 1
DOGS BAS 0 B 1
DOGFIGHR BAS 0 B 1
BEAST BAS 0 B 1

* PD-59
GAMES, UTILITIES

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

* PD-52
Picture files

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

* PD 53
Picture Files

INDIAN MAX 2 B 6
HOMECOME MAX 2 B 6
GRIN BIN 2 B 3
TARD BIN 2 B 3
STUD BIN 2 B 3
COMET BIN 2 B 3
DESERT BIN 2 B 3
FOOD BIN 2 B 3
SMIRK BIN 2 B 3
PLAYA BIN 2 B 3
HELLO BIN 2 B 3
GROVER BIN 2 B 3
DRIVE IN BIN 2 B 3
TIME BIN 2 B 3
KOALA BIN 2 B 3
PATTERN BIN 2 B 3
HAGAR BIN 2 B 3
CHIPS BIN 2 B 3

* PD 54
Picture Files

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

* PD-55
Picture Files

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

PLAYER GUITAR

by
Bill Bernico



This program is a simulation of a player guitar. Like a player piano, the program plays a tune and shows where the note is on the neck of the guitar. Watch the fingering change as the tune is played. This program is used by permission.

1 'PLAYER GUITAR by Bill Bernico
(C) 1988 BILL BERNICO SOFTWARE

PROGRAM PLAYS A TUNE
AND SHOWS WHERE EACH NOTE IS
ON THE NECK OF THE GUITAR AS
IT PLAYS

2 CLS:PRINT"THIS IS A SIMULATION
OF A PLAYERGUITAR. LIKE A P
LAYER PIANO, ITPLAYS A PRE-PR
OGRAMMED SONG. YOUGET TO CHOO
SE THE SPEED. HIT EITHER S
, M, OR F TO PLAY THE SONG
SLOW, MEDIUM OR FAST.",,,,,,
"HIT ANY KEY TO BEGIN":EXEC44
539

3 S\$=CHR\$(202):F\$=CHR\$(128):W\$=C
HR\$(207):CLS5:FORX=8TO488STEP
32:PRINT@X,S\$;:NEXT:FORX=11TO
491STEP32:PRINT@X,S\$;:NEXT:FO
RX=14TO494STEP32:PRINT@X,S\$;:
NEXT:FORX=17TO497STEP32:PRINT
@X,S\$;:NEXT:FORX=20TO500STEP3
2:PRINT@X,S\$;:NEXT

4 FORX=23TO503STEP32:PRINT@X,S\$;

:NEXT:FORX=9TO23:PRINT@X,F\$;:
NEXT:FORX=105TO119:PRINT@X,F\$
;:NEXT:FORX=201TO215:PRINT@X,
F\$;:NEXT:FORX=297TO311:PRINT@
X,F\$;:NEXT:FORX=393TO407:PRIN
T@X,F\$;:NEXT:FORX=489TO503:PR
INT@X,F\$;:NEXT

5 PRINT@8,"e";:PRINT@11,"a";:PRI
NT@14,"d";:PRINT@17,"g";:PRIN
T@20,"b";:PRINT@23,"e";:PRINT
@0,"player";:PRINT@32,"guitar
";:PRINT@128,"select";:PRINT@
160,"speed";:POKE1189,32:PRIN
T@192,"S-M-F ";:FORX=1216TO12
21:POKEX,PEEK(X)-64:NEXT

6 I\$=INKEY\$:IF I\$=""THEN 6

7 IFI\$="S"THENPLAY"T1":GOTO11

8 IFI\$="M"THENPLAY"T2":GOTO11

9 IFI\$="F"THENPLAY"T6":GOTO11

10 GOTO 6

11 PLAY"L2":GOSUB78

12 GOSUB94

13 PLAY"L5":GOSUB91

14 PLAY"L8":GOSUB87

15 GOSUB89

16 PLAY"L5":GOSUB93

17 PLAY"L4":GOSUB94

18 PLAY"L2":GOSUB78

19 GOSUB89

20 PLAY"L1":GOSUB87

21 PLAY"L2":GOSUB75

22 GOSUB84

23 PLAY"L5":GOSUB83

24 PLAY"L8":GOSUB78

25 GOSUB81

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```

26 PLAY "L5":GOSUB 83
27 PLAY "L4":GOSUB 84
28 PLAY "L5":GOSUB 81
29 PLAY "L8":GOSUB 77
30 GOSUB 78
31 PLAY "L5":GOSUB 80
32 PLAY "L4":GOSUB 83
33 PLAY "L2":GOSUB 78
34 PLAY "L10":FORX=1TO4:GOSUB 86:G
OSUB 83:NEXT
35 FORX=1TO4:GOSUB 86:GOSUB 84:NEX
T
36 GOSUB 86
37 PLAY "L3":GOSUB 89
38 PLAY "P6":GOSUB 89
39 PLAY "P2L10":FORX=1TO4:GOSUB 86
:GOSUB 83:NEXT
40 GOSUB 86
41 FORX=1TO4:GOSUB 85:GOSUB 89:NEX
T
42 PLAY "L2":GOSUB 91
43 GOSUB 91
44 PLAY "L1":GOSUB 96
45 PLAY "L2":GOSUB 78
46 GOSUB 94
47 PLAY "L5":GOSUB 91
48 PLAY "L8":GOSUB 87
49 GOSUB 89
50 PLAY "L5":GOSUB 93
51 PLAY "L4":GOSUB 94
52 PLAY "L2":GOSUB 78
53 GOSUB 89
54 PLAY "L1":GOSUB 87
55 PLAY "L2":GOSUB 75
56 GOSUB 84
57 PLAY "L5":GOSUB 83
58 PLAY "L8":GOSUB 78
59 GOSUB 81
60 PLAY "L5":GOSUB 83
61 PLAY "L4":GOSUB 84
62 PLAY "L5":GOSUB 81
63 PLAY "L8":GOSUB 77
64 GOSUB 78
65 PLAY "L5":GOSUB 80
66 PLAY "L4":GOSUB 83
67 PLAY "L2":GOSUB 78
68 GOTO 6
69 PRINT@8, "E";:PLAY "O2E":PRINT@
8, "e";:RETURN
70 PRINT@72, "F";:PLAY "O2F":PRINT
@72, S$;:RETURN
71 PRINT@168, "F#";:PLAY "O2F#":PR
INT@168, S$+W$;:RETURN
72 PRINT@264, "G";:PLAY "O2G":PRIN
T@264, S$;:RETURN
73 PRINT@360, "G#";:PLAY "O2G#":PR
INT@360, S$+W$;:RETURN
74 PRINT@456, "A";:PLAY "O2A":PRIN
T@456, S$;:RETURN
75 PRINT@11, "A";:PLAY "O2A":PRINT
@11, "a";:RETURN
76 PRINT@75, "A#";:PLAY "O2A#":PRI
NT@75, S$+W$;:RETURN
77 PRINT@171, "B";:PLAY "O2B":PRIN
T@171, S$;:RETURN
78 PRINT@267, "C";:PLAY "O3C":PRIN
T@267, S$;:RETURN
79 PRINT@363, "C#";:PLAY "O3C#":PR
INT@363, S$+W$;:RETURN
80 PRINT@459, "D";:PLAY "O3D":PRIN
T@459, S$;:RETURN
81 PRINT@14, "D";:PLAY "O3D":PRINT
@14, "d";:RETURN
82 PRINT@78, "D#";:PLAY "O3D#":PRI
NT@78, S$+W$;:RETURN
83 PRINT@174, "E";:PLAY "O3E":PRIN
T@174, S$;:RETURN
84 PRINT@270, "F";:PLAY "O3F":PRIN
T@270, S$;:RETURN
85 PRINT@366, "F#";:PLAY "O3F#":PR
INT@366, S$+W$;:RETURN
86 PRINT@462, "G";:PLAY "O3G":PRIN
T@462, S$;:RETURN
87 PRINT@17, "G";:PLAY "O3G":PRINT
@17, "g";:RETURN
88 PRINT@81, "G#";:PLAY "O3G#":PRI
NT@81, S$+W$;:RETURN
89 PRINT@177, "A";:PLAY "O3A":PRIN
T@177, S$;:RETURN
90 PRINT@273, "A#";:PLAY "O3A#":PR
INT@273, S$+W$;:RETURN
91 PRINT@369, "B";:PLAY "O3B":PRIN
T@369, S$;:RETURN
92 PRINT@465, "C";:PLAY "O4C":PRIN
T@465, S$;:RETURN
93 PRINT@20, "B";:PLAY "O3B":PRINT
@20, "b";:RETURN
94 PRINT@84, "C";:PLAY "O4C":PRINT
@84, S$;:RETURN
95 PRINT@180, "C#";:PLAY "O4C#":PR
INT@180, S$+W$;:RETURN
96 PRINT@276, "D";:PLAY "O4D":PRIN
T@276, S$;:RETURN
97 PRINT@372, "D#";:PLAY "O4D#":PR
INT@372, S$+W$;:RETURN
98 PRINT@468, "E";:PLAY "O4E":PRIN
T@468, S$;:RETURN
99 PRINT@23, "E";:PLAY "O4E":PRINT
@23, "e";:RETURN
100 PRINT@87, "F";:PLAY "O4F":PRIN
T@87, S$;:RETURN
101 PRINT@183, "F#";:PLAY "O4F#":P
RINT@183, S$+W$;:RETURN
102 PRINT@279, "G";:PLAY "O4G":PRI
NT@279, S$;:RETURN
103 PRINT@375, "G#";:PLAY "O4G#":P
RINT@375, S$+W$;:RETURN
104 PRINT@471, "A";:PLAY "O4A":PRI
NT@471, S$;:RETURN
O4F":PRIN
T@87, S$;:RETURN
101 PRINT@183, "F#";:PLAY "O4F#":P
RINT@183, S$+W$;:RETURN
102 PRINT@279, "G";:PLAY "O4G":PRI
NT@279, S$;:RETURN
103 PRINT@375, "G#";:PLAY "O4G#":P
RINT@375, S$+W$;:RETURN
104 PRINT@471, "A";:PLAY "O4A":PRI
NT@471, S$;:RETURN

```

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

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

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

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

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

VALUPACK - This oisk could have been calleo CoCoPack II because it contains oozens more programs in lots of catagories.

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

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

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

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

Bill Bernico Software
708 Michigan Avenue
Sheboygan, WI 53081

Editor's Comments

Dean and I had a wonderful trip out West during the week of Memorial Day. This was the first time for both of us to vacation West of the Mississippi. We were gone 10 days and visited Mount Rushmore in South Dakota, Yellowstone and the Teton National Parks in Wyoming, and Pikes Peak in Colorado. We took a picture of the mile high stadium in Denver as we passed on the interstate. We traveled a total of 4200 miles in 10 days and spent 9 nights in our van.

Our route took us through Tennessee, Kentucky, Illinois, Missouri, Iowa, and South Dakota where we stopped to see the president's faces carved in the side of Mount Rushmore. It was cold and we wore our winter coats. Wyoming really looked desolate. There are some remote areas in Alabama but not as remote as Wyoming. The streams were beautiful and at times I wished I had brought my canoe although it was a little cool for boating. The wind blew continuously and we saw many windmills which were mostly used for pumping water for cattle. One rest area had two windmills which supplied power for the area. I would like to reserve a couple of weeks to revisit the area and bring my canoe or rent one and explore some of the unpolluted streams. The middle of the Summer would probably be the best time for this.

Yellowstone was really beautiful and cold on the last day of May. We saw "Old Faithful" which was about 15 minutes late

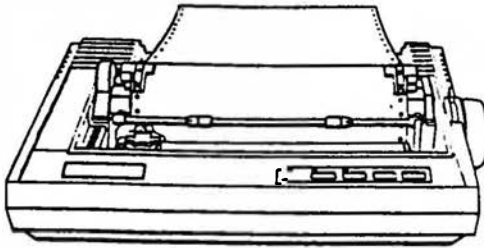
in erupting and I got it all on my VCR. We saw wild buffalo, elk, deer and various other wild animals. About the only animal we did not see was the bear. We saw waterfalls, canyons, and tall mountains. We took a train ride to the top of Pikes Peak at an altitude of 14100 feet. It doesn't take long to get tired at that altitude. A couple of young people got off the train part of the way up and were going to camp out and hike up the rest of the way. This looked like it would be an interesting experience but I bet it would really be cold there.

I appreciate the letters we have received. We tailor our editorials to the desires of our readers. We added the OS-9 and are starting a hardware series in this issue due to requests. If you have a question or an answer to a question I would like to hear from you.

I don't know what has happened to our Product Review Section. We have not received a product to review in a long time. This is good free advertising for dealers and I don't understand why we are not receiving products to review.

We did receive some new product information this month. I think it is good to announce new products so our readers can know about them.

The response to our Computer Clubs and Bulletin Board section is good. Let us know if the listing has an error or if an entry should be deleted. We are cancelling the PEN-PAL section



SP-1200AS PRINTERS

How would you like a printer that does the following?

- * Uses both single sheet or pin fed paper, Tractor or Friction feed.
- * Has near letter quality print.
- * Will store several pages of print in its 10K buffer and free your computer while printing is being completed.
- * Automatically loads paper.
- * Prints Italics, superscripts, subscripts, bold, double width characters.
- * Allows special characters to be created and loaded. Make your own characters sets.
- * Prints International Characters from France, Germany, England, Denmark, Italy, and Spain.
- * Has 8 graphics modes.
- * Prints Pica, Elite, Condensed, and Condensed-Elite.
- * Front panel or software selection of print types.
- * Can be used with IBM compatible or any other computer with an ASCII port.
- * Color Computer Cable is included.
- * Dyprint Software is included for making LARGE signs or blowing up any PMODE 4 Graphics picture.
- * Two (2) year warranty. Compare the warranty on other printers.
- * A professional printer for only \$229.

Free UPS Shipping. Give street address. Order SP-1200AS and specify tape or disk software for DYPRINT.

Checks VISA or MC Cards

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

due to lack of interest.

You may have noticed our cover this month. We are proud to have a professional artist, Tamara Moore, to draw a picture for our covers.

Recently I talked to a manager at a local Radio Shack store about the future of color computers. He told me that the color computer 2 was being discontinued. Also he told me that a plant was being built in California just to build color computers. This must be for the color computer 3 since the color computer 2 is being discontinued. I asked about a new model coming out this Fall and he said that this is a good possibility. The color computer has always been thought of as a game computer by Radio Shack.

We will be covering more on the color computer 3 starting next month. We will not abandon the color computer 2, but will just be adding more on the color computer 3. That are many more software programs and hardware items that can be designed for all color computers.

OPERATING HINT

Checking Tape Programs - You can check the programs on a cassette tape by using the SKIPF command. Load the tape and rewind it. Then type SKIPF"X where X is a file that is not on the tape. The name of each file will be displayed on the screen as they are found on the tape. If there is an error the computer will give an error message and stop the recorder. All files or programs before the recorder stopped are good. If the recorder goes to the end of the tape without indicating an error then all of the files are good. Press the rear reset button to reset the computer.

KWIK KOPYUR

by

Andrew Bartels



Put this here!

Are you tired of switching disks six times for one drive backups?? Well here's the program you have been waiting for! This program is called Kwik Kopyur, and it let's you backup your 35 track disks in only two passes. The best part is it only requires a 128K CoCo 3.

To use Kwik Kopyur, type in the listing. After saving it, run it. It will create a machine language file on disk called KWIKKOPY.BIN. To start it, LOADM, EXEC, and follow the prompts. To ensure proper operation, always reset your computer before executing it.

So, don't switch six times during your next one drive copy. Copy it with Kwik Kopyur!

```

10 'KWIK KOPYUR 1.1
20 'FROM DIGITAL INNOVATIONS
30 'COPYRIGHT (C) 1988
40 'BY ANDREW BARTELS
45 'LICENSED TO DYNAMIC ELECTRON
    ICS INC..
50 PCLEAR8: CLEAR500: CLS: PRINT "KW
    IK KOPYUR 1.1 DATA LOADER": PR
    INT "FROM DIGITAL INNOVATIONS"
    : PRINT "COPYRIGHT (C) 1988": PR
    INT "BY ANDREW BARTELS"
60 PRINT@256, "LOADING DATA..."

```

```

70 X=&HOE00
80 READA$: IFA$="END" THEN 100
90 FORY=1 TO LEN(A$) STEP 2: POKEX, V
    AL("&H"+MID$(A$, Y, 2)): X=X+1: N
    EXT: GOTO 80
100 X=&H1118
110 READA$: IFA$="END" THEN 130
120 FORY=1 TO LEN(A$) STEP 2: POKEX,
    VAL("&H"+MID$(A$, Y, 2)): X=X+1:
    NEXT: GOTO 110
130 X=&H11CA
140 READA$: IFA$="END" THEN 160
150 FORY=1 TO LEN(A$) STEP 2: POKEX,
    VAL("&H"+MID$(A$, Y, 2)): X=X+1:
    NEXT: GOTO 140
160 PRINT@256, "READY TO SAVE TO
    DISK... "; : SOUND 200, 3: LINE INPU
    TA$
170 SAVEM "KWIKKOPY", &HOE00, &H13E
    C, &HOE85
180 CLS: PRINT "NOW JUST LOADM 'KWI
    KKOPY ': EXEC ": PRINT: PRINT: END
190 DATA "343610BEC006B60E6BA7A4F
    COE67ED22BE0E69AF24AD9FC0046D
    262623AE2430890100AF246C23A62
    3811325066C228601A723A6228123
    27197A0E6626D72012BDA9288E0E5
    CA680AD9FA0024D26F77E0E4F7FFF
    40EC22FD0E6735B63F494F2045525
    24F52000000000000023031323334
    353637393A"
200 DATA "0C0E6C3410BE0E77A680BF0
    E7735900F71BEE0008C00E6102602
    07BDF652867FB795C98610B7FF22B
    DOF88BDOFADBD0FE88602B70E6BBD
    10128E0E6CBF0E77CC2000FD0E668
    601B70E68CC2000FD0E698620B70E
    66BD0E794D2708B7FFA1BD0E0020E

```

Dynamic Color News July 1988

7BD10508E0E6CBF0E77CC2000FD0E
668601B70E68"
210 DATA "8603B70E6BCC2000FD0E698
620B70E66BD0E794D2708B7FFA1BD
0E0020E7BD10128602B70E6B8E0E6
CBF0E77FC0E67FD11CBCC2000FD0E
698620B70E66BD0E794D2708B7FFA
1BD0E0020E7BD10508603B70E6B8E
0E6CBF0E77BE11CBBF0E67CC2000F
DOE698620B70E66BD0E794D2708B7
FFA1BD0E0020"
220 DATA "E78E05009F888E118ABDOFA
38E050A9F888E11CDBDOFA3BD100B
81591027FF236E9FFFECC80808E1
0F8ED818C111826F9CC20208E118A
ED818C11CA26F939A680AD9FA0024
D26F739BDA9288E04089F888E10A8
BDOFA38E04279F888E10B9BDOFA38
E04479F888E10CCBDOFA38E04649F
888E10DFBDOF"
230 DATA "A38E04809F888E10F8BDOFA
3398E050A9F888E1119BDOFA3BD10
0B8159270139BDA9288E1240BDOFA
3BD100BDOFAD39AD9FA00027FA39
8E05009F888E118ABDOFA38E05079
F888E1132BDOFA38E05279F888E11
45BDOFA3BD108EBD100B8E05009F8
88E118ABDOFA38E050A9F888E1158
BDOFA3398E05"
240 DATA "009F888E118ABDOFA38E050
49F888E1165BDOFA38E05279F888E
1145BDOFA3BD108EBD100B8E05009
F888E118ABDOFA38E050A9F888E11
7BDOFA339C60386C8978CBDA9513
9BDA9288E11DABDOFA3BD100B6E9F
FFFE4B77696B20204B6F707975722
0312E3100436F7079726967687420
284329203139"
250 DATA "38380042793A20416E64726
5772042617274656C730046726F6D
204469676974616C20496E6E6F766
174696F6E7300"
260 DATA "END"
270 DATA "0057616E7420496E7374727
56374696F6E732028592F4E293F00
496E7365727420536F75726365204
469736B00416E6420507265737320
3C454E5445523E2E0052656164696
E67204469736B00496E7365727420
44657374696E6174696F6E2044697
36B0057726974696E67204469736B
00"
280 DATA "END"
290 DATA "000000416761696E2028592
F4E293F00534F5252592C20544849
532050524F4752414D20495320464
F52205448450D434F434F2033204F

4E4C592E20495420574F4E2754205
74F524B0D4F4E205448495320434F
434F2E2020505245535320414E592
04B45590D544F20434F4E54494E55
452E2E2E002D"
300 DATA "2D3E546869732070726F677
2616D2069732064657369676E6564
20746F0D68656C7020616C6C20796
F75206F6E65206472697665203132
384B0D436F436F203320757365727
32077686F20484154452068617669
6E6720746F0D73776170206469736
B7320362074696D65732077697468
207468650D42"
310 DATA "41434B55503020636F6D6D6
16E642E2020576974682074686973
0D70726F6772616D20796F7520636
16E2074616B6520616476616E7461
67650D6F662074686520436F436F2
0332773206578747261206D656D6F
727920746F0D646F206F6E6520647
269766520636F7069657320696E20
4F4E4C592054"
320 DATA "574F0D70617373657321204
A75737420666F6C6C6F7720746865
2070726F6D7074732E0D546F20636
F6E74616374207468652061757468
6F722C2077726974653A0D2020204
469676974616C20496E6E6F766174
696F6E730D202020632F6F20416E6
47265772042617274656C730D2020
203138353920"
330 DATA "45617374203874682053747
26565740D2020204D6573612C2041
72697A6F6E612038353230332D363
634390D507265737320616E79206B
657920746F2073746172742E2E2E2
E00"
340 DATA "END"

OPERATING HINT

Basic programs can be transferred between two computers using the serial port either directly or through telephone lines with a modem. Both computers must have a terminal program. If the computers are the same types then each byte of a basic or machine language program can be transferred. For different type computers, the files must be in ASCII.

ham radio & computers

by

bill chapple W4gqc

The emphasis in this series is on using the computer for ham radio applications. However many of the programs can be used for other purposes. This is the case with the program I have this month. If you are interested in having audio control a device such as a tape recorder or motor then this article is for you.

Computers are very powerful tools and can be programmed to do various tasks. The tasks that need to be done at a ham radio station are numerous. In this series I have presented software for generating Morse Code, Radioteletype (RTTY), Weather Facsimile (WEFAX), Audio Frequency Generator, Audio Frequency Meter, RTTY and Slow Scan Tuning Meter, Station Log, plus several more. The Morse code required a special interface for the RS-232 or printer port. The RTTY, WEFAX and frequency meter programs used the cassette port and only required adapters to interface with a transceiver's microphone and audio out circuits.

For some applications the audio amplitude must be measured. The color computers have a built in analog to digital (A/D) converter routine that was designed to convert the joystick voltages into a number. The converter is 6 bits and can give values from 0 to 63. I have been working on two schemes for using the A/D converters. The first uses the cassette port. The main problem with this port

is that with no signal the digitized audio is "0". At first this may seem to pose no problem but it does. Audio amplifier circuits are biased between ground and the supply voltage. So with no audio component the level should be the supply voltage divided by 2.

We can correct the bias problem if we use one of the joystick ports. This is the second method with which I have been experimenting. A joystick circuit has 5 volts which can be reduced to 2.5 volts with two equal resistors. See Figure 1. The junction of the two resistors is connected to the joystick output pin. The audio will be coupled into the junction of the two resistors with a large series capacitor. With no audio the joystick voltage will be 2.5 volts. As audio is applied the voltage will swing above and below the 2.5 volts depending upon the amplitude of the audio.

AUDIO SQUELCH

Have you ever wished you could record what is being said on a repeater or a specified frequency? Something is needed to turn on a tape recorder when there is activity on the frequency. The motor relay circuit in the color computers can be used to turn the tape recorder on and off. A normal squelch circuit in most receivers can be enabled with short high energy

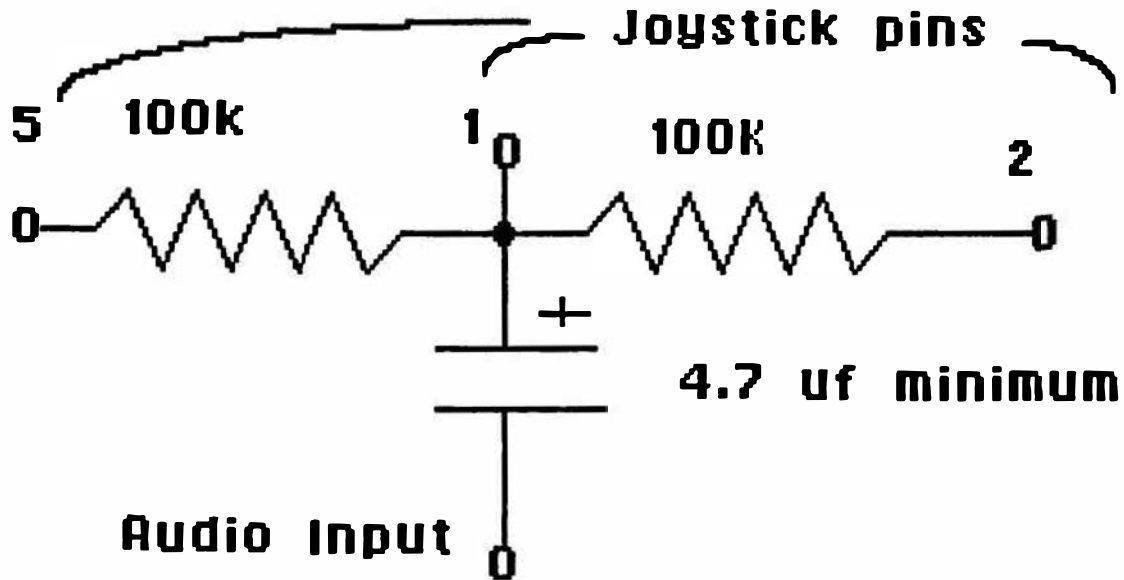


Figure 1

crashes. This is undesirable. I wrote software that allows a variable delay to overcome short static crashes. It also allows different amplitude levels to be required to activate the squelch.

My interest was just in turning on the audio with a signal. If you want the motor to come on also just add the MOTOR ON command after each AUDIO ON command and MOTOR OFF command after each AUDIO OFF command.

I used the arrow keys to adjust the parameters. Use the left-right arrow keys to adjust the ON-OFF time delay and use the up-down arrows to adjust the amplitude at which the circuit responds. The audio signal should not exceed 5 volts peak to peak.

When no signal is applied the joystick reading is 31 which represents 2.5 volts. The amplitude threshold adds an offset to

this value and the digitized audio has to either exceed $31 +$ the offset or be less than $31 -$ the offset. For weak signals the offset should be 1. For strong signals values of 10 or 20 may be used. Of course the receiver's audio control can be adjusted for best performance.

USING THE SQUELCH

The offset and delay are constantly being displayed. These can be changed with the arrow keys as discussed. If the delay is + then the audio comes on. If it is - it goes off. At first set the offset for 1 which is the most sensitive. The audio level control can be adjusted until the audio comes on through the television speaker. The delay will increase to the positive limit when a strong signal is present. It will go to the negative limit when no signal is

present. If it is at the negative limit and a strong signal appears, it will then increase its value until it becomes positive at which time the audio will come on. This delay allows static crashes to be screened out. It will not take long to get a feel for the best setting using the arrow keys and the receiver's audio output control.

Audio Squelch Program

```

10 PRINT"HAM AUDIO CONTROL
PROGRAM
20 PRINT"BY BILL CHAPPLE W4GQC
30 PRINT"COPYRIGHT (C) 1988
40 PRINT"DYNAMIC ELECTRONICS INC
50 OS=0:L=10:CLS
60 A=JOYSTK(0):IF Y>=0 THEN
AUDIO ON
70 X=0
80 IF A>31+OS THEN X=1
90 IF A<31-OS THEN X=1
100 IF X=0 THEN Y=Y-1:GOTO120
110 Y=Y+X:IF Y>=0 THEN AUDIO ON
120 IF Y<0 THEN AUDIO OFF
130 PRINT@,"SIGNAL LEVEL="Y
140 PRINT"AMPLITUDE="A
150 PRINT"OFFSET="OS" UP-DOWN
ARROWS
160 PRINT"DELAY="L" LEFT-RIGHT
ARROWS
170 IF Y>L THEN Y=L
180 IF Y<-L THEN Y=-L
190 X$=INKEY$
200 IF X$=CHR$(8) THEN L=L-1
210 IF X$=CHR$(9) THEN L=L+1
220 IF X$="B THEN OS=OS+1
230 IF X$=CHR$(10) THEN OS=OS-1
240 IF OS<0 THEN OS=0
250 IF L<5 THEN L=5
260 IF L>50 THEN L=50
270 GOTO60
    
```

OPERATING HINT

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

HAM RADIO PROGRAMS

MORSE - Morse Code practice program for developing code speed for the the Novice, Technician, or General class licenses.

DX - Displays countries by entering the first letter or number of the DX call sign.

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

Order HR-1 (3 programs) \$11.95 T or D

MORSE TERMINAL

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

STATION LOG

Keep a record of your contacts. Save and load records to tape or disk. Add to the log and quickly find stations. Print the log to a printer HR-3 \$9.95

THERMOMETER

Now your computer can give you the temperature in both Fahrenheit and Centigrade. Assembly plugs into a joystick port and consists of two thermistor on a 10' and a 20' cable for both inside and outside temperatures. CC-THERM 2 \$19.95.

DCN on DISK or TAPE PROGRAMS

\$6.95 each or 6 for \$35 including ship.

AUDIO GENERATOR - Generates exact audio frequencies using digital sine waves. \$44.

FREQUENCY COUNTER - Accurately measure audio frequencies up to 12000 hertz. \$45.

TUNING METER - Indicates proper tuning for RTTY and Slow Scan Television. \$46.

WEFAX - Weather facimile program draws weather maps on the screen. \$47.

HAM MATH - Solves most problems with circuits, antennas, decibels, etc. \$48.

HAM RTTY - Uses the cassette port. Interface instructions are included. Operate at 60, 87, 75, & 100 baud Baudot. \$50.

All programs are color computer 3 compatible unless indicated and are on tape or disk. A 32K computer is required. Please specify tape or disk software.

Checks, VISA or MC, Add \$3 shipping.

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HARTSELLE, AL 35840

Questions & Answers

These are letters that have been written to us. If you have a question then we would like to hear from you. If you want to call I can usually be reached in the evenings and weekends. - Bill.

* * * *

Dear Sir:

I have a very early model of COCO which is in a grey case, however it is very good for my use. It has extended basic and 32K ram. The Catalog number is 26-3001 and the S/n is 0033466 if this is any help for identification.

My question is do you have any upgrade for RAM to 64 or greater for this unit and if so how hard is the rework. I am a experienced retired Electronic Tech out of Aerospace.

Please state price of chips if available. Also do you have a upgrade on the keyboard and will it fit into the grey case model.

I use this unit for RTTY on the HF bands as well as Oscar 10 and it is exceptional for this purpose.

Thank You

I.J. Bauer

Mr. Bauer we have discontinued all of our upgrades for the older computers. I would suggest that you purchase a color computer 2 which is being closed out. The price is \$69. We have a few color computer 2 kits available for \$49.95 if you like to solder. The cost of a memory upgrade and a keyboard

would be close to the cost of a new computer. If you still want to upgrade the older computer there were articles in the Rainbow and other magazines several years back that would show you how to do it. Thanks for your letter.

* * * *

Dear Sirs

Enclosed is my check for renewal and my order for two PD Disks. I really enjoy your magazine and wish you continued success. I particually like the articles on OS9 and Forth and hope to see these series continued. A beginners tutorial on OS9 is long over due and Rainbow does not seem to be interested in filling the void. I would also like to see some PD disks with OS9 files. I'm sure there are many out there but getting them or finding them is difficult.

Sincerely,

John Schuster

John thanks for your letter. We are searching for more public domain program packages. Our OS-9 series is here to stay with Norm Matice writing it. There is much interest in OS-9 and Forth and we will continue as long as the interest holds and we have material to print. We try to write all of our editorials so that they can be understood. Thanks for your comments and we are glad that you enjoy the magazine.

* * * *

Dynamic Color News July 1988

Dear Bill

Enclosed is my check for 27 back issues of "DCN" inclusive of #7 thru #33. I would like to suggest that you slash your "ZEROs" in your programs.

Reference your magazine #49, May 88, pg 46, top right column, subject of anamometers. Check a magazine called "THE MOTHER EARTH NEWS" #68 Mar/Apr 81, Pgs 176,177,178. Titled "Wind-Monitoring Station". I don't know if that article is the one you are interested in or not. You ought to be able to find an issue somewhere, maybe write to them for a back issue. THE MOTHER EARTH NEWS, 105 STONEY MOUNTAIN ROAD, HENDERSONVILLE, NC 28791. I would like to make a copy of the article to send to you, but you know how it is, "Absolutely no part of this publication may be reproduced in any manner without explicit written permission from the publisher". Hope you can find a copy someplace.

Best Wishes,

Jack Lyckberg

Jack thanks for your letter and the information on the anamometer article. Recently I read the article and am looking at methods of building one for color computers. Sometimes we slash zeros, but we had a problem with one of our printers which printed pt for #. When we corrected this we eliminated the slash in the zeros. Thanks for your order for back issues and we hope the information in them will be of use to you.

* * * *

Dear Sirs,

Great! I sent my check May 5th for the first 12 back issues

& to start my subscription. The back issues came today--20 day, Great! Thanks much for the sample disk. When did you start doing that? Are back issues to be had? How much? And how much per year?

OK, I am as good as my word. I like your product and the way you print to one side so it can be put into a three ring binder. Here is another check for \$30. Send me back issues 13-36. I will get up to date some time in June.

Thanks again,

Wm A. Richter

Mr. Richter thanks for your letter and order. If we did not sell back issues and some of our other products we could not make it. We started putting our editorials and programs on disk and tape last October. We have gone back and put all except a few issues which we could not salvage on disk. The cost is \$60 a year or \$35 for 6 months. We run an advertisement for these inside the back cover. I am glad you liked the sample disk. Also I am glad you could put the magazine in a 3 ring binder. We try to leave a little space in the middle for this purpose. Again thanks for your support.

* * * *

Dear Bill:

I ordered your 60 wpm RTTY tape from the May issue - Works good no problems - I hope I can interface it with my teletype machine so I can use it as a printer.

In the June issue p. 41 "IMPROVED RTTY PROGRAM", I loaded this program in my R/S Color Computer II 64K and printed it - No mistakes that I can find.

Then I tried "RUN ENTER". Screen shows run but nothing happens. Any suggestions? Would be glad to send you a tape and print out if it would help. I am 65 years old & retired & enjoy programming the computer.

Ken Leseney KAOJRZ

Ken thanks for your letter. It appears that the computer is looking for the machine language program "RTTY" in line 30. You also need to type in the preceding program which generates the machine language program "RTTY". The program will save the machine language part to a cassette or disk. Have the cassette tape at the start of RTTY/BIN so it can be loaded when the improved RTTY program is run.

I don't know of any uses for the old RTTY machines. I hauled mine to the local dump. The

COCO and a printer can do all that the old teletype machines could do and it is much quieter.

We rearranged the DCN on Tape and DISK so that the RTTY program is first. We also generated the machine language program and put it next so that all that is required is to type "CLOAD" and then "RUN" after the program is loaded.

I noticed you later ordered the DCN on tape which should take care of the problem. We have quite a number of retired people that are subscribers. 73's and thanks for your order and letter.

* * * *

If you have a question or an answer to a question I would like to hear from you. I want to thank each of you who have written. - Bill.

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We have had requests for a hardware series. In this series we will discuss the architecture of the computer and show how to build some hardware accessories. The term hardware means physical devices that do a specified function. Hardware can not be easily changed. Software is a collection of instructions that make the computer perform a specified task.

Hardware History

Before microcomputers became readily available, engineers designed hardware for each task that was desired. For example supposed a digital clock were needed. This involved obtaining a stable time reference which was a crystal oscillator operating at a high frequency. Frequency counters or dividers were used to divide the oscillator's frequency down to a second, minute, and hour. Next it was necessary to design a display circuit. All of these pieces had to be wired together which was expensive from a parts count and required much labor. Now if a clock is desired software is written to make the computer serve as a clock. We presented an alarm clock program in issue #17.

Interface hardware is required to bring information into the microprocessor. In issue #35 we presented a joystick voltmeter. It would have been impossible to do this project if the interface circuitry were not

available.

Another example is the serial or RS-232 port which allows the computer to interface with a printer, modem, or another computer. The keyboard has to have circuitry to allow the computer to recognize the key that was pressed. The expansion port on the right of the computer allows various types of hardware devices to be connected to the computer.

There are hardware devices that complement the operation of the microprocessor. We will be examining these and where possible we will show how to build a hardware device.

Microprocessor Structure

Thanks to the microcomputer, we can now write software instructions that replace point to point wiring as was required a few years back. Let's take a look at the structure of a microcomputer. A microprocessor is bus structured. This means that all devices or peripherals are connected together by means of the address and data buses. This defines the interconnecting wiring. Tri-state logic is used. For computers we are familiar with the concept of two states which can be represented by a "0" or "1". Tri-state means that there are three conditions which are "0", "1", and disconnected. A device that is not being used is disconnected by the select logic.

Memories

There are two basic types of memories used in computers. The first are permanent memories called read only memories (ROM). These are used as the computer is powered up to initialize the computer. They contain instructions for basic, extended basic, and disk basic. The information contained within these memories is permanent and is not lost when the computer is turned off. If the operation of the computer is to be changed or upgraded, then different ROMS must be obtained to implement the upgrade. We are familiar with different disk operating systems such as ADOS and JDOS. These are contained within ROM chips that can be plugged into the socket on a disk controller.

The second type of memory is called random access memory (RAM). Static and dynamic make up the two kinds of RAM. Dynamic RAMS are used in most computers because of the large amount of information that each chip can contain. However these chips must be refreshed and refresh circuits must be included. Memory chips are rated in terms of kilobytes (1000 bytes) or simply K. A byte is the basic computer word and consists of 8 bits. A 1K memory will contain 1024 bytes. This is actually 2 raised to the 10th power. Computers are designed around binary arithmetic which uses the base 2. However to keep things simpler we round down to the nearest 1000 when talking about memories. A 32K memory will contain 32*1024 bytes. The color computer 2 contains 64K of memory and the color computer 3 contains 128K of memory.

Static memories do not require refresh circuits. These are generally used in portable computers such as Radio Shack's model 100 and 102. They do not

require much power. Large memories using these chips are more expensive than dynamic memories.

Peripherals

A peripheral is a hardware chip that allows the computer to communicate with an external device. These are sometimes called input/output (I/O) devices. These are required for the keyboard, a printer, the cassette, and a television or monitor. The Motorola 6821 is a peripheral interface adapter (PIA) and has been used extensively in the color computers.

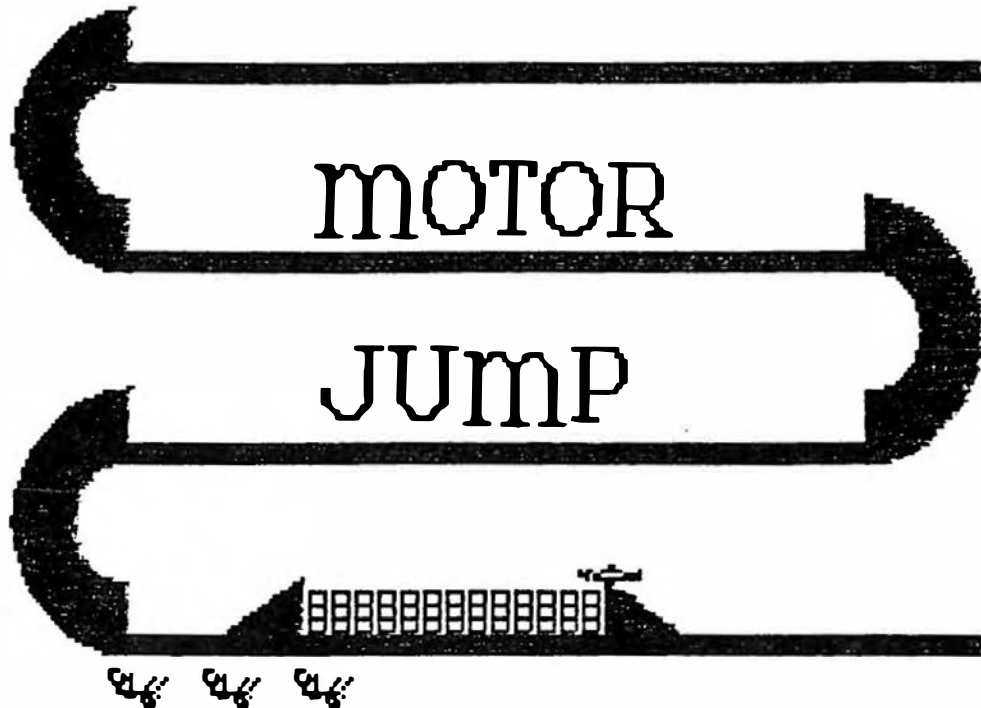
Select Circuitry

As stated earlier all devices are connected together in what is called a bus structured arrangement. In this arrangement there are 8 data lines and 16 address lines. The select circuitry enables only one device at a time for the microprocessor to use. The logical question would be how does the select circuitry know which device to select? Each device is designated a specified part of the memory. The microprocessor can only load a byte from a device or store a byte in a device. If the memory for a device is used then the device becomes active and can either receive a byte or place a byte on the data bus for the microprocessor to use.

Next month we will continue. It is not hard to design or build hardware accessories for computers if the operation is understood. This is the purpose of this series.

OPERATING HINT

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



You can try your skill at riding the motorcycle and jumping the barrels. Everytime you miss or loose control of your motor, a dead cyclist is added at the bottom of the screen. When you complete your jump another barrel is added. Press the "F" key to go faster and the "S" key to go slower. It is time to start so good luck.

```

100 'MOTOJUMP
110 'UPLOAD BY TIM HOUSE
120 'AUTHOR UNKNOWN
130 GOTO 1890
140 GOTO170
150 PMODE4
160 PCLEAR4
170 COLOR 3,3
180 CLS
190 GOSUB1900
200 PRINT@231,"ONE MOMENT PLEASE
";
210 GOSUB1780
220 SOUND100,2:SOUND5,2:SOUND150
,4:PRINT@228,"DO YOU WANT INS
TRUCTIONS?";:FORX=1TO1000:NEX
T
230 PRINT@224," PRESS
<Y/N>"
240 A$=INKEY$: IFA$=""THEN240ELSE

```

```

IFA$="Y"THENGOSUB1550
250 CLS8
260 B=1:M=0:XD=16:YD=10
270 LINE(56,141)-(255,153),PRESE
T,BF:LINE(0,160)-(255,191),PR
ESET,BF:SCREEN1,1
280 LINE(56,153)-(75,141),PSET:L
INE(75,141)-(75,153),PSET:PAI
NT(70,150)
290 GET(48,131)-(75,153),BL,G
300 LINE(6*B+71,141)-(6*B+90,153
),PRESET,BF
310 FORJ=1TOB
320 E=6*J+71
330 DRAW"BM"+STR$(E)+",153U9R4D9
L4U3R4U3L4"
340 NEXT
350 E=E+6:LINE(E,153)-(E,141),PS
ET:LINE(E,141)-(E+19,153),PSE
T
360 PAINT(E+1,150)
370 E=3*B+27
380 PUT(238,11)-(238+XD,11+YD),M
C,AND
390 PLAY"T402CCDO3L2CO2L4DO3L2CL
4"
400 PLAY"T7001"
410 R=INT(B/2):Q=0:X=238:Y=11:IF
R<>0THENW=2ELSEW=0
420 IFW>0THENPUT(X,Y)-(X+XD,Y+YD
),MW,AND ELSEPUT(X,Y)-(X+XD,Y
+YD),MC,AND
430 R$=INKEY$:PLAY"1"
440 IF R$="F" THEN R=R+2:Q=Q+1:W

```

Dynamic Color News July 1988

```

=3: IFQ>E/22THENDR=-1:GOSUB138
0:GOTO310
450 IF R$="S" THEN R=R-1:IF R<0
    THEN R=0
460 IFX>31THENK=X ELSEK=31
470 PUT(K,Y)-(K+XD,Y+YD),BK,PSET
480 X=X-R*4:W=W-1
490 IFX<20THEN510
500 GOTO 420
510 FOR D=1 TO INT(500/R):NEXT D
520 Q=0:W=0:X=20:Y=55
530 IFW>0THENPUT(X,Y)-(X+XD,Y+YD
    ),MU,AND ELSEPUT(X,Y)-(X+XD,Y
    +YD),MR,AND
540 R$=INKEY$:PLAY"2"
550 IF R$="F" THEN R=R+2:Q=Q+1:W
    =3:IFQ>E/22THENDR=1:GOSUB1380
    :GOTO310
560 IF R$="S" THEN R=R-1:IF R<0
    THEN R=0
570 K=31:IFX>31THENK=X:IFK>207TH
    ENK=207
580 PUT(K,Y)-(K+XD,Y+YD),BK,PSET
590 X=X+R*4:W=W-1
600 IFX>220THEN620
610 GOTO 530
620 FOR D=1 TO INT(500/R):NEXT D
630 Q=0:W=0:X=220:Y=99
640 IFW>0THENPUT(X,Y)-(X+XD,Y+YD
    ),MW,AND ELSEPUT(X,Y)-(X+XD,Y
    +YD),MC,AND
650 R$=INKEY$:PLAY"3"
660 IF R$="F" THEN R=R+2:Q=Q+1:W
    =3:IFQ>E/22THENDR=-1:GOSUB138
    0:GOTO310
670 IF R$="S" THEN R=R-1:IF R<0
    THEN R=0
680 K=31:IFX>31THENK=X:IFK>207TH
    ENK=207
690 PUT(K,Y)-(K+XD,Y+YD),BK,PSET
700 X=X-R*4:W=W-1
710 IFX<20THEN730
720 GOTO 640
730 '
740 W=0:X=20:Y=143
750 IFW>0THENPUT(X,Y)-(X+XD,Y+YD
    ),MU,AND ELSEPUT(X,Y)-(X+XD,Y
    +YD),MR,AND
760 R$=INKEY$:PLAY"4"
770 IF R$="F" THEN R=R+2:W=3
780 IF R$="S" THEN R=R-1:IFR<0 T
    HEN R=0
790 K=31:IFX>31THENK=X
800 PUT(K,Y)-(K+XD,Y+YD),BK,PSET

810 X=X+R*4:W=W-1
820 IFX>39THEN840

830 GOTO 750
840 X=50:FORI=1TO3
850 PUT(X,Y)-(X+XD,Y+YD),MU,AND
860 R$=INKEY$:PLAYSTR$(I+4)
870 IF R$="F" THEN R=R+2
880 IF R$="S" THEN R=R-1:IF R<0
    THEN R=0
890 PUT(48,131)-(75,153),BL,PSET
900 X=X+25/3:Y=Y-5
910 NEXT
920 X=76:Y=128
930 FOR J=1TOR
940 PUT(X,Y)-(X+XD,Y+YD),MR,PSET
950 PLAY"8"
960 PUT(X,Y)-(X+XD,Y+YD),BK,PSET
970 X=X+4
980 NEXT J
990 Q=0:FORI=1TO5:Y=Y+3:IFQ<>0TH
    ENX=X+5:GOTO1020
1000 IFPPOINT(X,Y+10)=0THENQ=-1:
    X=X+1:GOTO1000
1010 IFQ=0THENX=X+2
1020 IFX<B*6+77ORX>233THENGOSUB1
    380:GOTO310
1030 PUT(X,Y)-(X+XD,Y+YD),MR,AND
    :PLAYSTR$(8-I)
1040 PUT(X,Y)-(X+XD,Y+YD),BK,PSE
    T
1050 NEXT
1060 X=X+2:IFQ=0THENGOSUB1380:GO
    TO310
1070 PUT(X,Y)-(X+XD,Y+YD),MR,AND
    :PLAY"2;2"
1080 PUT(X,Y)-(X+XD,Y+YD),BK,PSE
    T
1090 X=X+4:IFX<238THEN1070
1100 IFB<11THENX=B*8:IFB>5THENX=
    X+8
1110 IFB>10THENX=(B-10)*8:IFB>15
    THENX=X+8
1120 DRAW"BM"+STR$(X+140)+", "+ST
    R$(Y)+"U9R4D9L4U3R4U3L4"
1130 B=B+1:IFB>20THEN1150
1140 GOTO300
1150 FOR D=1 TO 500:NEXT
1160 CLS8
1170 PRINTSTRING$(32,147);:PRINT
    STRING$(32,243);
1180 PRINT" FINE JOB, DAREDEVIL
    ! YOU HAVE"
1190 PRINT" SUCCESSFULLY JUMPED
    20 BARRELS"
1200 IFM=0THENPRINT" WITHOUT
    AN ACCIDENT!":GOTO1230
1210 PRINT" IN LESS THAN 6 CRAS
    HES. IN"
1220 PRINT" FACT, YOU ONLY HAD";

```


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```

:IFM=1THENPRINT" 1 CRASH. " EL
SEPRINTM;"CRASHES. "
1230 IF M=0 THEN X$="WORLD 'S GRE
ATEST"
1240 IF M=1 THEN X$="NATIONAL CH
AMP
1250 IF M=2 THEN X$="LOCAL EXPER
T"
1260 IF M=3 THEN X$="BLOCK PRO"
1270 IF M=4 THEN X$="AMATEUR BIK
ER"
1280 IF M=5 THEN X$="WALKING DEA
D"
1290 PRINTSTRING$(32,211);:PRINT
" YOUR RATING: ";X$
1300 A$=INKEY$:PRINTSTRING$(32,1
63);:PRINTSTRING$(32,195);:PR
INT" DO YOU WANT TO TRY AGA
IN?"
1310 PRINTSTRING$(32,179);:PRINT
STRING$(32,227);:PRINT" P
RESS <Y> OR PRESS <N>"
1320 PRINTSTRING$(32,147);
1330 PRINTSTRING$(32,227);
1340 FORX=255TO5STEP-5:SOUNDX,1:
NEXT
1350 A$=INKEY$:IFA$=""THEN1350EL
SEIFA$<>"N"THEN260
1360 CLS8:PRINT@235," CHICKEN ";
:FORN=1TO6:FORX=150TO250STEP3
0:SOUNDX,1:NEXTX:NEXTN
1370 FORX=1TO500:NEXT:CLS0:END
1380 IFX<31THENX=31ELSEIFX>238TH
ENX=238
1390 IFY<100ANDX>207THENX=207
1400 PUT(X,Y)-(X+XD,Y+YD),BK,PSE
T
1410 IFQ<=E/22THEN1440ELSEX=X+20
*DR:IFX<31THENX=31ELSEIFX>207
THENX=207
1420 IFDR<0THENPUT(X,Y)-(X+XD,Y+
YD),MR,AND ELSEPUT(X,Y)-(X+XD
,Y+YD),MC,AND
1430 SOUND210,20:PUT(X,Y)-(X+XD,
Y+YD),BK,PSET
1440 A$="BM"+STR$(X)+", "+STR$(Y)
:DRAWA$+"BF2D2F1R1E1U1H1L1BF4
D2R1U1R2E3G3F3H3R3E3G3F1BL4D1
F1R1E1H1L1BL5H3R2E2D3G1L2"
1450 PLAY"T7001":FORI=1TO50:PLAY
STR$(RND(12)):NEXT
1460 PUT(X,Y)-(X+XD,Y+YD),BK,PSE
T
1470 DRAW"BM"+STR$(X)+", "+STR$(Y
)+"BD10U2R1F1D1R1U1E1R2U1R1D1
R2F2U1R1D1E2D2L10"
1480 PLAY"T202ACACACAC":FORI=1TO
500:NEXT
1490 PUT(X,Y)-(X+XD,Y+YD),BK,PSE
T
1500 M=M+1:IFM=6THEN1690
1510 Y=160:IFM>3THENY=175
1520 IFM<4THENX=M*24ELSEX=(M-3)*
24
1530 DRAW"BM"+STR$(X)+", "+STR$(Y
)+"BF2D2F1R1E1U1H1L1BF4D2R1U1
R2E3G3F3H3R3E3G3F1BL4D1F1R1E1
H1L1BL5H3R2E2D3G1L2"
1540 RETURN
1550 CLS:PRINT" IN THIS GAME YOU
WILL DRIVE A"
1560 PRINT" MOTORCYCLE THROUGH A
N APPROACH"
1570 PRINT" AND OVER A ROW OF BA
RRELS. TO"
1580 PRINT" LAND SAFELY, YOU MUS
T LAND ON"
1590 PRINT" THE RIGHT RECEIVI
NG RAMP."
1600 PRINTSTRING$(32,34);:PRINT"
TO CONTROL THE SPEED:"
1610 PRINT" PUSH <F> TO GO
FASTER"
1620 PRINT" PUSH <S> TO GO
SLOWER"
1630 PRINTSTRING$(32,34);:PRINT"
ACCELERATING TOO FAST CAUSES
YOU TO SKID AND TO CRASH!
!!!"
1640 PRINT" YOU DON'T HAVE TO PU
SH <ENTER> TO CONTROL THE CY
CLE'S SPEED."
1650 PRINTSTRING$(32,34);
1660 INPUT" PRESS <ENTER> TO S
TART ";I$
1670 CLS8:SOUND200,5:SOUND100,5
1680 RETURN
1690 CLS8
1700 PRINTSTRING$(32,147);:PRINT
STRING$(32,207);
1710 PRINT" TOO BAD !"
1720 PRINT" YOUR BODY COULDN
'T"
1730 PRINT" TAKE ANY MORE."
1740 PRINT" YOUR NEXT OF KIN
HAS"
1750 PRINT" BEEN NOTIFIED."
1760 GOTO 1300
1770 END
1780 COLOR0,5:PCLS
1790 DIMMC(4),BK(4),MW(4),MR(4),
MU(4),BL(16):GOTO1830
1800 CIRCLE(31,40),31,,1,.25,.75
:CIRCLE(31,40),15,,1,.25,.75:

```

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CIRCLE(224, 84), 31, , 1, .75, 1.25
:CIRCLE(224, 84), 15, , 1, .75, 1.2
5:CIRCLE(31, 128), 31, , 1, .25, .7
5:CIRCLE(31, 128), 15, , 1, .25, .7
5
1810 DRAW"BM30, 10D12R224D4L224BD
28D12R194U12BD16L194BD28D12R1
94U12BD16L194BD28D12R224D4L22
4"
1820 PAINT(20, 20):RETURN
1830 DRAW"BM113, 35D2R2D1U3BG2G2L
4U1D1G2L2G1D1F1R1E1U1BE2R3D1R
2U2R2D2R2F1D1G1L1H1U1BL7U1R4G
1L3R3D2L1"
1840 DRAW"BM154, 38D1F1R1E1U1H1L1
BF2F2H2R2E1R1F1R3U2R1D2U1R1U1
D1L1G1D3R1F1D1G1L1H1U1E1H1L3D
1R1L1G1H1BE2L1U1R1D1R3D2
1850 GET(102, 34)-(118, 44), MC, G:G
ET(0, 0)-(16, 10), BK, G:GET(152,
36)-(168, 46), MW, G
1860 FORI=102TO118:FORJ=34TO44:K
=PPOINT(220-I, J):
1870 PSET(I, J+50, K):NEXT:NEXT:FO
RI=152TO168:FORJ=36TO46:K=PPO
INT(320-I, J):PSET(I, J+50, K):N
EXT:NEXT
1880 GET(102, 84)-(118, 94), MR, G:G
ET(152, 86)-(168, 96), MU, G:PCLS
:GOTO1800
1890 PCLEAR 4:GOTO 150
1900 REM
1910 PRINT@288, STRING$(32, 252);
1920 X=255
1930 DE=10
1940 READA$
1950 IFA$="END"THENRETURN
1960 A$=A$+" "
1970 X1=LEN(A$)
1980 FORT=1TOX1
1990 PRINT@X, LEFT$(A$, T);
2000 GOSUB2170
2010 X=X-1
2020 FORD=1TODE:NEXT
2030 NEXT
2040 Y=32-(LEN(A$))
2050 Y=Y-1
2060 FOR T = Y TO 1 STEP-1
2070 X=X-1:PRINT@X, A$;
2080 FORD=1TODE:NEXT
2090 NEXT
2100 FORT= X1 TO 0 STEP-1
2110 PRINT@X, RIGHT$(A$, T);
2120 FORD=1TODE:NEXT
2130 NEXT
2140 GOTO1940
2150 DATA M O T O J U M P
2160 DATA END
2170 PLAY"T255L25504"
2180 PLAY"O5BAGFEDCO4BAGFEDC"
2190 RETURN

```

➔ IT'S HERE! !⬅

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BUSTOUT

This game requires a joystick. Use your paddle to break down the walls. Play against a friend and see who can get the highest score.

```

10 CLS:PRINT"ENTER (1) BEGINNER"
   :PRINT"      (2) EXPERT"
20 A$=INKEY$:IF A$="" THEN GOTO2
   0
30 IF A$="1"GOTO40
40 CLS(0)
50 INPUT"HOW MANY BALLS";T:IF T>
   20 THEN 50 ELSE A=0:CLS:T=T+
   1
60 FORX=10 TO 53:SET(X,5,1):SET(
   X,7,1):SET(X,9,1):NEXTX
70 N=JOYSTK(0):IF N<10 THEN N=10
80 IF N>50 THEN N=50
90 IF N=M GOTO 130
100 RESET(M,29):RESET(M+1,29):RE
   SET(M+2,29)
110 M=N
120 SET(M,29,1):SET(M+1,29,1):SE
   T(M+2,29,1)
130 IF A=0 GOTO190
140 IF A<=10 THEN B=B*-1:A=10:SO
   UND 200,1
150 IF A>=53 THEN B=B*-1:A=53:SO
   UND 200,1
160 IF C<=5 THEN D=D*-1
170 IF C=5 THEN SOUND 150,1
180 IF A>0 GOTO 210
190 G=PEEK(65280):IF G=126 THEN
   GOSUB300
200 IF G=254 THEN GOSUB300
210 RESET(A,C)
220 IF A=0 GOTO70
230 A=A+B:C=C+D
240 IF A<10 THEN A=10
250 IF A>53 THEN A=53
260 IF POINT(A,C)=1 THEN GOSUB 4
   60
270 SET(A,C,1)
280 IF C=28 THEN GOSUB330
290 GOTO70
300 A=11:B=1:C=RND(9):C=C+9:D=1
310 PRINT@1,T-2:PRINT@25,S
320 RETURN
330 IF A=M GOTO 390

```

```

340 IF A=M+1 GOTO 390
350 IF A=M+2 GOTO 390
360 T=T-1:IF T=1 THEN GOSUB610
370 RESET(A,C)
380 A=0:RETURN
390 IF A=M THEN B=B-1
400 SOUND 100,1
410 IF A=M+2 THEN B=B+1
420 IF B>2 THEN B=2
430 IF B<-2 THEN B=-2
440 D=D*-1
450 RETURN
460 RESET(A,C):RESET(A+1,C)
470 IF C=5 THEN SOUND 25,1
480 IF C=5 THEN S=S+50
490 IF C=7 THEN SOUND 50,1
500 IF C=7 THEN S=S+25
510 IF C=9 THEN SOUND 75,1
520 IF C=9 THEN S=S+10
530 PRINT@25,S
540 D=D*-1:C=C+D
550 FOR X=10 TO 53
560 Y=POINT(X,5):IF Y=1 THEN RET
   URN
570 Y=POINT(X,7):IF Y=1 THEN RET.
   URN
580 Y=POINT(X,9):IF Y=1 THEN RET
   URN
590 NEXT
600 GOTO 40
610 CLS
620 PRINT"YOUR SCORE WAS";S
630 IF S>W THEN W=S
640 S=0
650 PRINT"THE HIGH SCORE WAS";W
660 PRINT"DO YOU WISH TO PLAY AG
   AIN (Y/N) ?"
670 A$=INKEY$:IF A$="" GOTO 670
680 IF A$="N" GOTO720
690 IF A$="Y"GOTO40
700 GOTO670
720 END

```

OPERATING HINT

You can do memory peeks or pokes, or list part of your program, and then continue the program by typing "CONT ENTER". You do not loose your variables with this procedure.

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Multiprogram Manager
MPM Program Listing
Machine Lang. Prog.

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#3 Apr 84 N
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#4 May 84
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Ham Radio & Comp.(10)
Basic Programming
(Fast Sorting)

#39 June/July 87
Genealogy Program
ML Programming (14)
Measuring Light with
Joystick Ports
EPROMS (4)
CoCo 3 Graphics Demo
Ham Radio & Comp.(11)
Morse Terminal Pgm.
Calendar Program

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

#41 Sep 87
Astro Dodge Game
ML Programming (16)
Reformatting Data (1)
Meteors Program
Computer Terminology
Ham Radio & Comp.(13)
Relay Interface

(Hardware Project)
#42 Oct 87
Taking Control (1)
(Basic Programming)
ML Programming (17)
Disk Cataloger Pgm
Reformatting Data (2)
Parachute (Game)
Ham Radio & Comp.(14)
HAM RTTY Program

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

#44 Dec 87
Kingpede (Game)
Taking Control (3)
Printer Utilities
Ham Radio & Comp.(19)
Audio Generator Pgm
Reformatting Data (3)
Screen Dump Program

#45 Jan 88
Living Maze (Game)
ML Programming (20)
Ham Radio & Comp.(17)
Frequency Counter Pgm
Taking Control (4)
Reformatting Data (6)
FANTASY2 Music Pgm

#46 Feb 88
Using ROM Routines
Taking Control (5)
OS-9 (New Series)
BARRACAT (Card Game)
Ham Radio & Comp.(18)
Improved Ham Log Pgm

#47 Mar 88
Using ROM Rout. (2)
Taking Control (6)
OS-9 & Basic 09
Coast-Coast (Game)
Logic (Ed. Game)
Forth Prog. Lang.
ML Loader Pgm.
Ham Radio & Comp.(18)
WEFAX -Weather Pgm.

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

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

#50 June 88
OS-9 & Basic 09
Media Master (Pgm)
Mysterious Island (G)
Taking Control (9)
Basic Prog.
Improved Word Proc.
Forth & Forth-Editor
Ham Radio & Computers
Improved RTTY Program
Airplane (Game)

NEW PRODUCTS

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

Fraser Instrument Company introduces the PIA and EXTENDER boards. EXTENDER is a plug-in board that brings the cartridge slot lines out for easy access, 2 vertical and 1 horizontal connectors are included on the board along with a logic analyzer connector. PIA boards are input/output boards that have breadboard connectors. Several popular chips have been used. Versions include PIA 6821 (the same PIA that CoCo uses) with 16 I/O and 4 control lines. PIA 6522 has 16 I/O and 4 control lines along with 2-16 bit timers and a serial I/O port and PIA 8255 which has 24 I/O lines, 3 modes of operation. Boards are \$45. each plus \$3.50 S+H, Send inquiries to: Fraser Instrument Co. P.O. Box 712DC Meridian, ID 83642 or call 208-888-5728 Mon-Fri 9-6 MST.

Dynamic Electronics Inc. is proud to announce the release of DYTERM-2 which is a 300-2400 baud terminal program for all color computers. DYTERM-2 is a basic program with machine language subroutines which can be modified to suit the user's needs. It supports 300-2400 baud rates; 1 or 2 stop bits; even, odd, or no parity; and 7 or 8 bit words. Files can be uploaded or downloaded and saved to a tape or disk. The cost is \$19.95 + \$3 shipping. Dynamic Electronics Inc., Box 896, Hartselle, AL 35640 (205) 773-2758.

PRODUCT REVIEWS

This section is open to all producers and dealers of color computer products. We will review your product free of charge and write an editorial on the product. We did not receive any products to review this month.

MODEMS

Now you can access bulletin boards and other computers. These MODEMS are complete with our DYTERM-2 software which is compatible with all color computers. You can also use your computer for telephone dialing and answering. A cable for connecting the modem to your computer is included. Installation just requires connecting the MODEM to the phone line and to your computer with the included cables.

Features are as follows:

- * 300/1200/ or 2400 baud
- * Pulse or Tone Dialing
- * Full/ Half Duplex Operation
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- * Works with any computer with an ASCII port
- * Automatic Answering Option
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- * CoCo Cable is Included
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M-1200 for 300/1200 baud \$119

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

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

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

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

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

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

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1 year	\$60.00	\$75.00
6 months	35.00	49.00
1 month	6.95	8.95

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If you want a free listing send us the information. These listings will be kept current.

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

DISPLAY ADS

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

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

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

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

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