

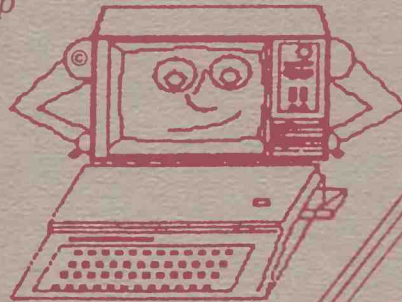
International Color Computer Club, Inc.

Newsletter Volume 3, # 1

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Worldwide Membership



HOT INFO

for
COCO
FANS

Color
Computer
TRS-80C
MC-10

Dragon 32 & 64
TDP-100

h361(3) H21W 9

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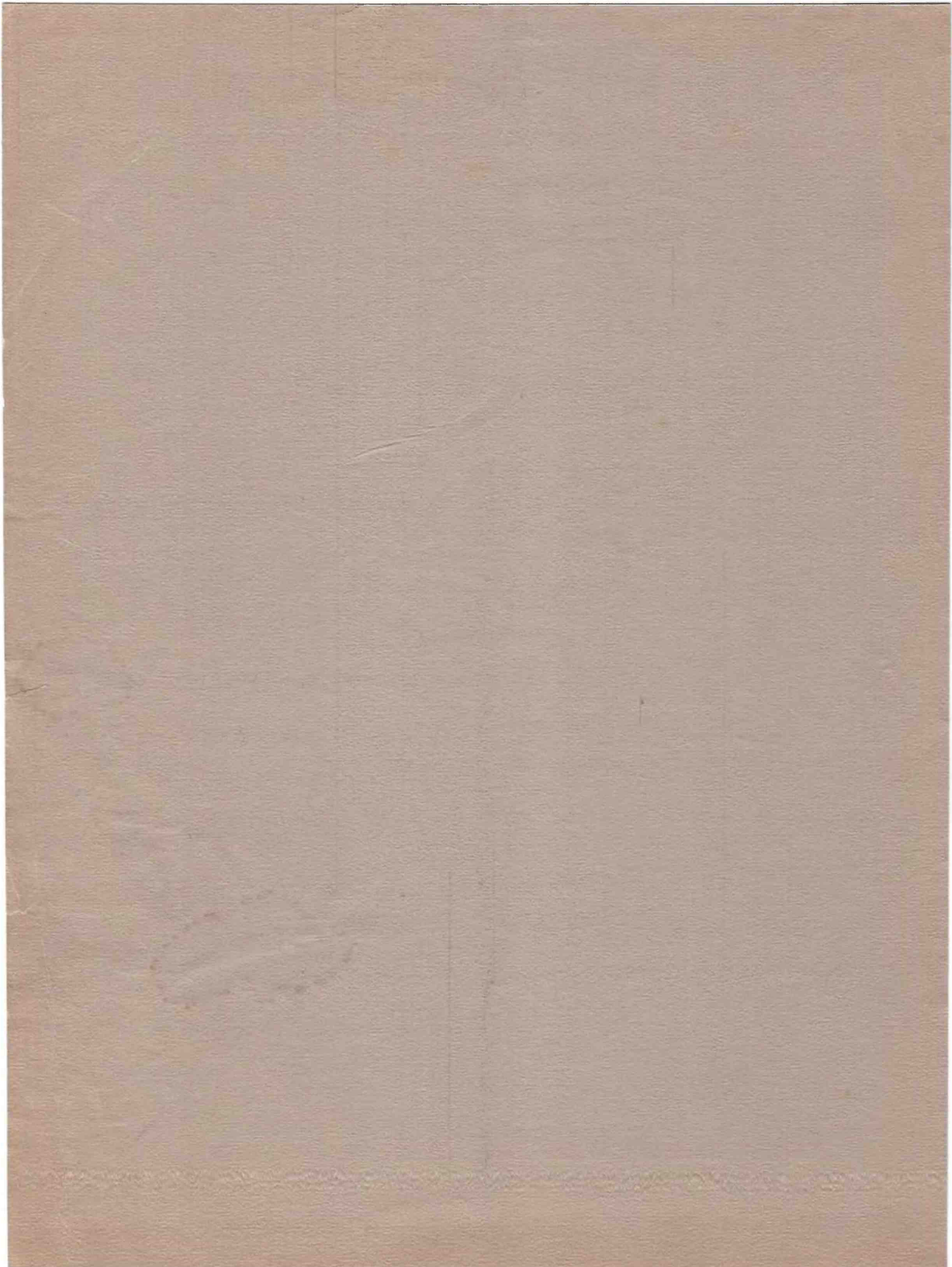
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2nd
Anniversary
Issue

JANUARY / FEBURARY 1984



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Note: On any order which you send in direct, be sure to include your membership number. If you send your order to us, make your check payable to us. If it says send order to us, PLEASE do not not try to order them direct.

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# Secretarial Report

by Don H. Garrett

It is nearing the new year and I hope the past year has been pleasant for you. We have had a pleasant, rewarding, and informative year, to say the least. With more companies changing their prices, offering discounts, acknowledging our presence, and being more open to us. We are receiving more Articles, Reviews, Programs, Products to review, and discounts than we have ever received before. For example, Adventure International just sent us five programs to review, Sugar Software raised their discount (temporarily, but let's try to make it permanent by purchasing their programs), we have 120 pages in this newsletter, and our newsletter now has six regular columns, FLEXside, MID\$, CoCo Music, Hot New Info in the world of Magazines, Depth of Field, and Color Computer Clubs & BBS's. I do not know how long they will continue to be "Regular".

I have a very disappointing fact, and that is that even with 120 pages I still did not have enough room to put all of the information in it that I was going to put in. Such as, Financial Report (which the Treasurer said is not quite ready), Rumours, 1983 Reviews, Articles, & Programs List, Three programs (by Club members), and the DISK Basic CoCo Commands by Ron, the President. Look for these and more in the next issue.

Speaking of the next issue, I need some more columnists. I need a columnist for the following column titles: OS-9ers and CoCo Kids & Parents. The last one may be a little difficult to handle, since it will take a lot of researching.

Ok, enough about the newsletter, on to the voting results. I am sorry to say this, but only 1% of the membership voted this time. I know that the cards said November 10th on them, a typesetting mistake, when they were supposed to say December 10th. I

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figured the membership would understand that they still had a month to vote in. Look at all of the past vote deadlines. Well, if we ever have a typesetting problem again, here is the prescribed deadlines for the vote cards:

| Issue Voted From | Deadlines     |
|------------------|---------------|
| JAN/FEB          | February 10th |
| MAR/APR          | April 10th    |
| MAY/JUNE         | June 10th     |
| JULY/AUG         | August 10th   |
| SEPT/OCT         | October 10th  |
| NOV/DEC          | December 10th |

I will now take time to list some of the comments on the vote cards this time: My magazines are getting here later & later, Just what is my member #<sup>2</sup>, I send my best wishes and heartfelt thanks to those who are willing to assume the responsibilities and put in the hours of work, Use "MID\$", would cost club additional money to advertise for other companies, when is ICC<sup>3</sup>, Inc. going to start acting responsible, I think the MEM AFTER RUNNING should be a good addition, I have not received my<sup>4</sup> new (renewal) membership packet yet.

Here are the answers to four of the above comments.

1 The magazine arrives to you by mail and depending on how fast they are is how fast you receive it. However, this issue is 2 weeks late because of bad weather.

2 Your membership number is this-The Binary equivalent of the 4 digit number on your newsletter label. The 4 digit number is your BBS LOG ON number.

3 I think we are acting responsible for the amount of people running this club, it takes more than just us, it takes you, also.

4 The renewal packets have been here waiting on tapes. We just received the tapes, so you should receive your renewal packet within the month of January.

Well, I will end it here with a Happy Valentine's Day and Presidents Days,

# EDITORIAL

by Ron Garrett

What's ahead? Everyone is talking about what's ahead for CoCo. We will talk about what is ahead for our club.

Our Canadian branch seems to be doing quite well, and I'm hoping that we can open branches of our club in England, Australia, Germany and Japan in 1984. We will also try to have a Canadian BBS, on line 24hrs a day in 84, & we hope to finally get OUR BBS into the Compuserve system. We'll be reworking our own BBS somewhat in order to put the classified ad's from the newsletter in the merchandise section of the BBS. And finally (on the BBS) we are looking for ways to speed up the mail search routine. Oops, just one more thing. (I promise) We seem to be having difficulties in updating the BBS fast enough, so starting in Jan, 84 we will give new members a "temporary" log-on number & password that they can use to access the BBS with until we get it updated to their #. We will then mail them a permanent password and log-on number.

The club's expenses are still running more than our income. It seems the main reasons are 1. the large increase in ad rates by the Rainbow and other magazines, 2. the lack of advertiser support for our own newsletter, & 3. we have too many discounts which we give the membership, which is not given to the club. Therefore we are having to reduce the club ad in the Rainbow to a half page eliminate all other advertising, and (sorry about this one) cut the discount given on Rainbow to 10%. In 1984 we will be reducing our ad rates to try to attract at least a few advertisers. It now cost more than \$2,000 to print the newsletter, and advertisers are only paying about 5 to 8% of

this. You will see a change in the "new member kit" in 84 also, as we will be removing the cassette case and replacing it with something smaller (another tape, perhaps?) so we can mail it out in an envelope instead of a box. This would allow us to save on the container (the box cost \$1.) and also the postage to send it.

We have just appointed our parts librarian as technical advisor, so if you are having a problem with your computers hardware, he will answer your questions. Call after 6PM CST at 214-657-7800 if he can't answer your question, I will put it in the newsletter so someone out there may be able to tell you what you want to know.

Do any of you have a public domain program which is not in the library? If so, I'm sure Mr. Paul Schallowitz would like to hear from you. Write and tell him or send him a copy of it.

Continued on Page 120

---

## Items To Be Voted On

1. Since the club advertised through June, 1983 that 1/4 page of free advertising per issue, of unspecified type, was a membership privilege, and since this offer might reasonably have been interpreted by some to include display advertising, it is proposed that the 1/4 page free display advertising privilege remain available to those who enrolled before July 1, 1983 until the expiration of their current 1-year membership terms.

A=Yes B=No

2. Should the club raise the membership fee to \$35. to go monthly with the newsletter? If so, would you be willing to pay the extra \$5 to get the newsletter monthly?

a. A=Yes B=No b. A=Yes B=No

PAGE 5

# FLEXside

by Susan Bouchard

Topics for discussion will be broken into four parts: Saving/Storing Data, Disk Problem/Solution, FHL FLEX DOS and a few capabilities (extras) of FLEX.

## Part I - Saving/Storing Data

The following is a brief and non-technical explanation as to the method R/S DOS and FHL FLEX DOS saves and stores information (in ex. - disk files, programs, data, etc.) on the disk.

Any information stored to disk must be able to arrange such information in a logical and efficient manner. The R/S DOS DSKINI command does just that!

When DSKINI is entered, it will format the disk. If the disk was unformatted, you would be unable to store or load information via disk. DSKINI sets the disk up, telling it where to save such information by creating a master directory. In effect, the DSKINI command is similar to a subroutine or utility. It creates the master DIR, which indicates, (indexes) where information will be stored on the disk. In short, it allows you to save and load information in a very efficient manner, performing certain functions automatically.

Radio Shack DOS saves information in forms of sectors (each sector containing 256 of user accessible bytes) but STORES the information in "chuncks" or granules (each granule containing 2,044 of user accessible bytes). The granule is the smallest unit of information that may be stored to disk by the Operating System. In the 80-C, the granule contains nine sectors (2,304 user accessible bytes) or

one half of a track.

The structure, or makings, of the RS DOS disk consists of the following:

Bytes = 256 bytes per sector  
Sectors = 9 sectors per granule  
Granules = 2 granules per track  
Tracks = 35 tracks per disk  
(excluding track 17, reserved for the directory)  
Directory = Contains information the Operating System (system controls) requires to catalog and locate files, and how much space (bytes) each file takes up on the disk.

Since Track 17 is put aside for the DIR, that leaves 34 tracks available for your files leaving 68 granules on the standard 80C.

The smallest file you can store on a disk is one granule (equivalent to 9 sectors... half of a track). If the file you save contains 280 bytes, the file would use all of the 9 sectors or half of the track to store the file. Thus, the maximum number of files the R/S DOS disk could store would be 68 (i.e. - 68 granules per disk). The above method of saving files is a waste of disk space and limits the number of files you can put on the disk.

FHL FLEX DOS stores information on the disk in sectors and has no limitations as to the size of a file. The file may be as small as 1 sector!!

NEWDISK command in FLEX initializes a diskette and performs various "chores". A FLEX disk is capable of storing bytes in sectors... there being 252 user accessible data bytes and about 612 sectors per SS/DD 35 track



disk.

The utilities (commands - .CMD) provided with FLEX perform such tasks as the saving, loading, copying, renaming, deleting, listing, etc., of disk files.

There is an extensive CATalog command in FLEX DOS for examining the disk's file directory.

The CATalog command is used to display the FLEX disk file names in the directory on each disk. Upon entering the proper syntax (parameters) the user is able to select and display specific files on one or all drives. This means it would be possible to list files with specific file names or extensions and also able to list such information from one or all drives (in ex. - list files whose names begin with "F" or "FL", list only those files whose extensions begin with "T" or "C" or list files whose names start with "F" accompanied with the extension starting with "T"... the above files could then be displayed from one or all drives).

To recap the above, it is safe to say FLEX DOS stores data more efficiently than R/S DOS. FLEX DOS is able to store in sectors, thus allowing the user to save more than 68 files per disk as is the case with R/S DOS.

## Part II - Disk Problem/Solution

The Resistor Array RA-2 (also referred to as Terminator Resistor Pack) is for drive number 26-3022 only. In the last column we discussed how, if you have more than one disk drive, drive 26-3022 should always be placed as the last drive in the series.

The above discovery occurred quite by accident. Earlier this

year, problems with the drives seemed to be getting worse as time went on. Upon inspection of the drive, it was noticed one drive had an extra something the 'other' drive did not have. If you look at drive 0, #26-3022, opposite side of the drive belt and stepper motor) you will see the Terminator Resistor Pack. The resistor is white in color and located on the lower right side of the drive. I'm glad to say since placing drive 0 and 1 in correct order, the problems have been eliminated.

## Part III - FHL FLEX DOS

FHL FLEX consists of three main parts - DOS, the File-Management System and the Utility Command Set. The Utility Command Set was discussed in an earlier column. We will now focus on the DOS and FMS parts of FLEX.

The File-Management System controls all files that go to the disk. It works hand in hand with the DOS and disk drive (in ex. - read information from a disk, write information to a disk or maintain the information in a well organized manner).

The Disk Operating System must be able to communicate with the systems hardware (i.e.- the keyboard, display, printer, disk I/O, etc.), Input/Output routines and the FMS.

I realize the above explanations of DOS and FMS parts of FLEX are quite brief. Information and the understanding of FLEX has been difficult for me to grasp.

If there are readers out there that would like to further explain the three main parts of FHL FLEX, I'd appreciate and welcome the help.

## Part IV - FHL FLEX Capabilities

FHL FLEX is capable of running high-quality and sophisticated software. The software was originally designed and offered primarily for computers oriented towards business, scientific and professional applications, etc.. With FLEX being offered to the 80-C, we can also run this software. Below is a general list of software:

Basic Compilers,  
Business Programs,  
Assemblers and Text Editors,  
Word Processing,  
Machine Language debugging programs,  
Disk system diagnostic packages and several utilities.

For a further listing of available software see FHL Catalog of available hardware & software. Also, FLEX supports high level languages (Basic 09, Pascal, C, Cobol, etc.). FHL FLEX also supports the standard 5 1/4" SS/DD 35 track drives, 5 1/4" DS/DD 35 track drives as well as 40 track drives and 8" drives, either SS/DD 80 tracks or DS/DD 80 track drives.

Support for the R/S DOS has been improving and surprisingly meeting the public's demands. This is due primarily to insight on the part of various vendors offering 80-C software. They realized that the 80-C had a very promising future, if appropriate software were made available. However, please remember that FLEX software is universally accepted and well established in the world of computers and has been on the market as early as 1977. Also, the software is top quality and was designed purposely for professional and non-professional applications.

Enough said for this time...

PAGE 8

until the next column, enjoy the holidays!!

Sue

## Disk Problem Solved !!!

I shall put forth a theory to explain why Susan's #1 drive runs when drive #0 is turned off. First, let us look at what normally turns the drive motors on. Interface connector pin 16 is the "Drive Motor Enable" signal. When this signal line's logic-level goes true (low), all of the drive motors are turned on, no matter which drive is selected. When the logic level goes false (high), the drive motors stop.

When drive #0 is turned off the five-volt power supply drops to zero. This results in the "Drive Motor Enable" signal going low, turning on drive #1. This does not mean that you have a problem.

You need to check your drives, to see which one has the "TERMINATOR RESISTOR PACK" in it. This pack, which is located in a socket designated "RA2", should be in the last drive on the cable. The rest of your drives should not have anything in RA2. RA2-14 connects the "DRIVE MOTOR ENABLE" line to the 5-volt supply. If you turn this drive on first and off last you will not have the other drive motor(s) on for no reason.

Sincerely,

Bobby Joe Harrison

---

## Correction

As a user of FLEX and XBASIC, I would like to point out that the speed comparison between TSC's XBASIC and MICROSOFT's BASIC (Radio Shack) was not truly fair in your September/October Newsletter. It's hard to be

Continued on Page 51



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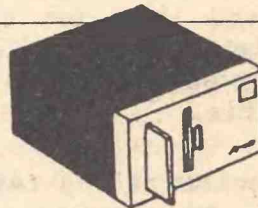
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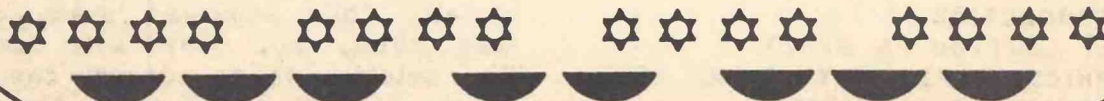
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# MIDS

by Gary Smith, Hawg Wild Software™

This is being written on the evening I recieved my November/ December 1983 Issue due to publishing deadlines. That means I am assuming a second column will be accepted before I have any feedback from the first one. Since, I still have no earthly Idea what you want to find when you check in on my little piece. I will just have to wing it again.

The first thing I want to do, is make it clear I want your feedback, comments, and suggestions. That is one of my ground rules. I hope you will cooperate.

The address for them is as follows:  
MIDS  
HAWG WILD SOFTWARE™  
P.O. box 7668  
Little Rock, Ar 72217  
or send them to: c/o the ICCO, INC.  
Newsletter™. I will make an effort to include as much reader input as possible.

We looked at the 64k CoCo last issue. Equal time says we should take a look at POCO as well. By POCO.I mean the Model MC-10® Micro Color Computer™.

What has the gang in Ft. Worth put inside this less expensive, bone white box? If you guess about the same goodies that come in the Color Computer™, or CoCo, as we all call it, you are a little right and a lot wrong.

The similarities are as follows:

- \*MOVABLE KEYS (NOT MEMBRANE LIKE MANY LOWER COST MACHINES)
- \*RS-232 PORT FOR MODEMS, PRINTERS, AND SUCH
- \*SOUND
- \*CASSETTE INTERFACE
- \*COLORS
- \*TV CONNECTION
- \*RESET (BUTTON ON BACK)
- \*GRAPHICS CAPABILITY (LOW RES)
- \*MICROSOFT COLOR BASIC™

PAGE 10

The biggest difference on first glance is that BASIC keywords are entered with two keystrokes (CONTROL/Specific Key) instead of spelling out such BASIC commands as INPUT, PRINT, GOSUB... etc. This cuts down on program input time considerably, once you get used to it. At first, the habit of typing in each keyword is hard to overcome, but you soon adjust to the two stroke rythm. Then you appreciate the convenience.

Next you will notice that the graphics characters are also represented on fifteen keys, clustered mostly to the left side of the keyboard. While graphics are limited and all low resolution, a lot can be done with these fifteen (15) choices. They have been chosen well. Graphics are also keyed with but two keystrokes (SHIFT/Specific Key).

If you are getting the impression this was designed as a great first-timers intro machine you are right, but don't sell POCO short. There is muscle here, too.

That muscle arrives in the form of Motorola's 6803™, a member of the 6800 family we have come to know and love. The 6803 is a busy 8-BIT Micro Computer Unit, as Motorola calls it. It has 2K of on chip ROM, 128 BYTES of RAM, Serial Communications Interface, 3 Function Programmable Timer, and Parallel I/O all driven by a 1.0 MHZ Clock. It is worthy of the 6800 family name.

Although they both use MICROSOFT™ COLOR BASIC because of the different tokenization of keywords, CoCo and POCO programs are not directly cassette compatible. First, you can forget about Extended BASIC working at all. CoCo programs seem to LOAD into POCO, but they will not RUN. The solution is to convert the tokens to the correct set used by the MC-10®

The program to do this, neatly, was provided by Dan Downard in the October 1983 issue of RAINBOW Magazine. Since I won't try to plagiarize Dan's work here, if you are interested, drop a line to RAINBOW, P.O. Box 209, Prospect, KY 40059. I assure you Lonnie Falk will be happy to sell you a back issue while supplies last.

Changes and upgrades (Authorized and Bootleg) are going to be a bit tougher. The PC Board is tacked to a RF Shield, and all the Logic Chips are soldered in place. Should you decide to take a look, be advised, the keyboard is connected to the mother board with two ribbon cables. **BE CAREFUL!!**

There is only 3K of RAM in the POCO box, but an expansion slot lets you go to 20K. As in the CoCo, RAM is dynamic. When you pull the plug you lose the memory, so, a minimum workable system should include a cassette recorder. This means you can get into some real computing for about \$150-\$200 plus a TV and a membership in the International Color Computer Club, Inc. That's not to shabby of a deal at all.

Best Regards - Gary Smith © 1983  
HAWG WILD SOFTWARE™

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My Obiendient Child

I'm a busy wife and mother with lots of things to do. Yet I sit at my computer whenever I am feeling blue.

Why do I do it?  
It's simple as 1+1 is 2.  
My CoCo does exactly what I tell it,  
my children seldom do!




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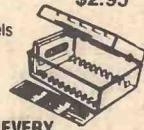
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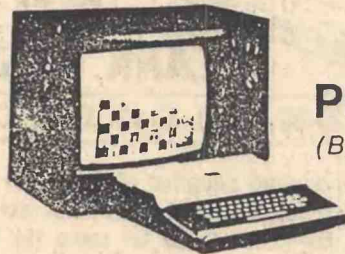
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# ◦ CoCo MUSIC ◦ formerly TRS-80 MUSIC

by Patrick M. O'Shaughnessy  
37 Nestlingwood Drive  
Long Valley, N.J. 07853

A year has gone by already and I must say that I have had a good time talking to some of you and writing this column.

Since I have a very long listing this issue, I will keep this part short. This listing is for Color Computer harmony. Now you probably remember last year when I said that harmony on this computer is impossible. (Who said nothing is impossible?!!) Thanks to Leo Christopherson of Tacoma, Washington, a machine language program for harmony was developed. He explains his routine in "Basic Computing" July 1983. I suggest you get a copy of this and read Mr. Christopherson's column. He explains it better than I can how the program works. There are two songs I have harmonized in this listing. By the way, they are classical songs. The first one is: Prelude in C minor by Chopin, Second is: Theme from Finlandia by Sibelius.

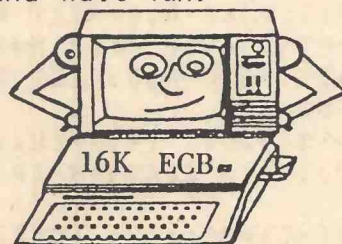
## NOTES ON ENTERING SONG:

CSAVE the listing before RUNning!

You must add the number of periods requested in LINES 270,290,310,330,350 and 370 before running!

If you run into any problem, please write.

Thanks and have fun!



1 'COCO HARMONY  
2 'FOR ICC, INC. BY:  
3 'PATRICK M. O'SHAUGHNESSY

```
4 'MACHINE LANGUAGE ROUTINE BY:
5 'LEO CHRISTOPHERSON TACOMA WA.
6 'THIS COPY WILL NOT RUN AS
7 'WRITTEN. THE AMOUNT OF
8 'PERIODS THAT ARE NEEDED MUST
9 'BE ADDED IN LINES 270-370
10 CLS3:PRINT@200,"COCO HARMONY";
```

```
11 PRINT@258,"BY PATRICK M. O'SHAUGHNESSY";
```

```
100 GOSUB 270
110 GOSUB 1110
120 POKE 248,A1:POKE 249,A2:EXEC MUSIC
130 POKE 248,B1:POKE 249,B2:EXEC MUSIC
140 POKE 248,C1:POKE 249,C2:EXEC MUSIC
150 POKE 248,C1:POKE 249,C2:EXEC MUSIC
160 POKE 248,D1:POKE 249,D2:EXEC MUSIC
170 POKE 248,D1:POKE 249,D2:EXEC MUSIC
180 POKE 248,E1:POKE 249,E2:EXEC MUSIC
190 PLAY "03T2L1DC"
200 PRINT"THE END":END
210 '*****
220 '**PUT IN THE NUMBER OF **
230 '**PERIODS REQUESTED. **
240 '**DO NOT RUN WITHOUT **
250 '**DOING SO! **
260 '*****
270 S$$=".....156 PERIODS....."
280 MUSIC=PEEK(VARPTR(SS$)+2)*256
+PEEK(VARPTR(SS$)+3)
290 PART$(1)="....25 PERIODS...."
```

```
300 A1=PEEK(VARPTR(PART$(1))+2):
A2=PEEK(VARPTR(PART$(1))+3)
310 PART$(2)="....37 PERIODS...."
```

```
320 B1=PEEK(VARPTR(PART$(2))+2):B
2=PEEK(VARPTR(PART$(2))+3)
330 PART$(3)="....61 PERIODS...."
```

```
340 C1=PEEK(VARPTR(PART$(3))+2):C
2=PEEK(VARPTR(PART$(3))+3)
350 PART$(4)="....37 PERIODS...."
```

```

360 D1=PEEK(VARPTR(PART$(4))+2):D
2=PEEK(VARPTR(PART$(4))+3)
370 PART$(5)="....52 PERIODS...."

380 E1=PEEK(VARPTR(PART$(5))+2):E
2=PEEK(VARPTR(PART$(5))+3)
390 RETURN
400 '*****
410 '**BELOW IS THE M/L WHICH*
420 '**PRODUCES THE HARMONY **
430 '*****
440 DATA 222,248,51,93,19,134,254
,180,255,3,183,255
450 DATA 3,127,255,32,134,247,180
,255,1,183
460 DATA 255,1,134,247,180,255,3,
183,255,3
470 DATA 134,8,186,255,35,183,255
,35,79,198
480 DATA 1,31,1,151,245,151,247,4
8,31,38
490 DATA 47,51,67,166,196,129,255
,38,17,134
500 DATA 247,180,255,35,183,255,3
5,135,1,186
510 DATA 255,3,183,255,3,57,129,2
54,38,10
520 DATA 174,65,48,31,38,252,51,6
6,32,219
530 DATA 174,196,236,65,151,244,2
15,246,10,244
540 DATA 38,23,204,120,1,216,245,
39,5,187
550 DATA 255,32,32,4,176,255,32,6
4,183,255
560 DATA 32,166,65,221,244,10,246
,38,174,204
570 DATA 120,1,216,247,39,5,187,2
55,32,32
580 DATA 4,176,255,32,64,183,255,
32,166,66
590 DATA 221,246,32,149
600 '*****
610 '**BELOW ARE THE SONGS **
620 '**WHICH I HAVE INPUTED**
630 '*****
640 DATA 128,41,52,128,39,52
650 DATA 96,42,55,64,47,56
660 DATA 128,53,63,128,53,63
670 DATA 128,47,59,96,53,71
680 DATA 255
690 DATA 64,60,71,128,63,71
700 DATA 128,56,67,128,50,71
710 DATA 96,42,62,64,47,63
720 DATA 128,50,63,128,63,56
730 DATA 128,42,55,96,33,44

```

```

740 DATA 64,36,43,128,41,41
750 DATA 255
760 DATA 128,25,45,128,25,39
770 DATA 96,27,36,64,44,44
780 DATA 128,27,41,128,30,41
790 DATA 128,27,44,96,32,41
800 DATA 64,36,36,125,42,55
810 DATA 128,30,41,128,39,53
820 DATA 96,42,55,64,46,46
830 DATA 128,53,63,128,53,63
840 DATA 128,47,59,96,53,67
850 DATA 64,56,56,128,63,63
860 DATA 255
870 DATA 64,50,128,64,56,84
880 DATA 64,50,128,192,47,84
890 DATA 64,50,128,64,56,95
900 DATA 64,50,95,96,63,95
910 DATA 32,56,95,64,56,84
920 DATA 192,50,128,64,50,128
930 DATA 255
940 DATA 64,42,62,64,42,62
950 DATA 64,47,67,192,37,49
960 DATA 64,50,75,64,50,75
970 DATA 64,50,84,96,50,84
980 DATA 32,57,102,64,56,84
990 DATA 196,47,56,64,47,56
1000 DATA 64,47,56,64,50,59
1010 DATA 64,56,95,196,50,84
1020 DATA 128,67,96
1030 DATA 255
1040 '*****
1050 '**BELOW IS THE PART OF**
1060 '**THE PROGRAM WHICH **
1070 '**SETS UP THE M/L ROUT**
1080 '**AND THE NOTES IN **
1090 '**MEMORY. **
1100 '*****
1110 RESTORE: FORN=MUSIC TO MUSIC
+155: READD:POKE N,D:NEXTN
1120 AO=A1*256+A2: FORN=AO TO AO+2
4: READD:POKE N,D:NEXTN
1130 BO=B1*256+B2: FOR N=BO TO BO
+36: READD:POKE N,D:NEXT N
1140 CO=C1*256+C2: FOR N=CO TO CO
+60: READD:POKE N,D:NEXT N
1150 DO=D1*256+D2: FOR N=DO TO DO
+36: READD:POKE N,D:NEXT N
1160 EO=E1*256+E2: FOR N=EO TO EO
+51: READD:POKE N,D:NEXT N
1170 RETURN
1180 TEST$="....": T1=PEEK(VARPTR(
TEST$)+2): T2=PEEK(VARPTR(TEST$)+
3)
1190 TEST=T1*256+T2: POKE248,T1:P
OKE 249,T2

```



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# AMORT

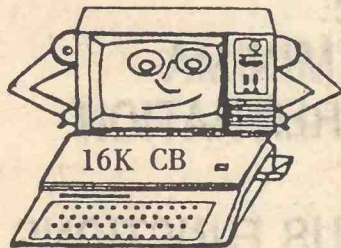
by Gerald M. Casey

This is an amortization program with a few added features over the usual types available. So don't pass it over without a quick review. It does the following:

- 1) You can perform just a simple amortization.
- 2) You can include extra payments you've made and insert them in the correct month position.
- 3) You can input the type of interest calculation your loan may fall under. eg. twice a year as apposed to the normal 12 times per year.
- 4) You can have screen display or printed copy.

The beauty of this program is the flexibility and the ability to see how extra payments in random installments or perhaps making larger payments throughout can effect the term of the loan and the interest paid. It works very well on mortgage payments, especially if the payment schedule is flexible and allows extra payments which most do even if only on the anniversary date.

I hope this program is of use to you.



```
1 ' G.M. CASEY
2 ' 109 PRINCE RUPERT BLVD.,
3 ' PRINCE RUPERT
4 ' BRITISH COLUMBIA
5 ' CANADA V8J3Z2
6 ' COPYRIGHT (C) 1983
10 CLS
20 PRINT:PRINTTAB(3)"Loan amortiz
ation program":PRINT:PRINT:PRINT
30 INPUT"TOTAL amount OF LOAN";X
40 PRINT:INPUT"WHAT RATE OF inter
est";I
50 I=I/100
PAGE 16
```

```
60 PRINT:INPUT"TIMES PER YEAR int
erest IS          CALCULATED/COMPOUND
ED ";N
70 PRINT:INPUT"TERM OF AMORTIZATI
ON IN years ? ";T
80 'PA=PAYMENT,PR=PRINCIPLE PAID,
IN=INTEREST PAID,BA=BALANCE OWING

90 'CALCULATE PAYMENT
100 Y=1+I/N
110 YNT=Y(N*T)
120 PA=X*YNT/(YNT-1)*I/12:PA=INT(
PA*100+.49)/100
130 CLS:PRINT"YOUR MONTHLY PAYMEN
T WILL BE      $";PA
140 PRINT:PRINT:PRINT"IF YOU HAVE
BEEN MAKING PAYMENT AT A VALUE O
THER THAN $";PA:PRINT"ENTER THIS
NEW AMOUNT NOW.":PRINT"otherwise
just press enter."
150 INPUT"$";PB$:IF VAL(PB$)<>0 T
HEN PA=VAL(PB$):PA=INT(PA*100+.49
)/100
160 'CHOICES
170 CLS:PRINTTAB(4)"you may:"
180 PRINT:PRINTTAB(1)"1-HAVE A CO
MPLETE AMORTIZATION."
190 PRINT:PRINTTAB(1)"2-CALCULATE
PAYMENT FOR A      DIFFERENT LO
AN."
200 PRINT:PRINTTAB(1)"3-END PROGR
AM.":GOSUB950
210 PRINT:PRINT"CHOOSE A NUMBER (
1 TO 3) ";:INPUTZ:IFZ<1 ORZ>3 THE
N210
220 ONZ GOT0250,10,230
230 CLS:PRINT@233,"end of program
.":END
240 'ASK RE EXTRA PAYMENTS
250 PRINT:CLS:PRINT@224,"WERE EXT
RA PAYMENTS MADE AT ANY TIME? Y/
N ";:INPUTB$:PRINT
260 IFB$="N"THEN290
270 IFB$<>"Y" THEN250
280 GOSUB1220
290 CLS
300 ' PRINTER SCREEN OR QUIT
310 PRINT"YOU MAY HAVE YOUR AMORT
IZATION":PRINT
320 PRINTTAB(1)"1-ON THE SCREEN."

330 PRINT:PRINTTAB(1)"2-ON THE PR
INTER."
340 PRINT:PRINTTAB(1)"3-PROGRAM T
```

```

ERMINATED.":GOSUB950
350 PRINT:INPUT" CHOOSE A NUMBER
(1 TO 3) ";Z:IFZ<1 ORZ>3 THEN290
360 ONZ GOTO 370,390,230
370 TYPE=0:CLS:PRINT"AMORTIZATION
FOR A LOAN OF $";X:PRINT:PR
INT"OVER ";T;" YEARS":PRINT:PRINT
"AT MONTHLY PAYMENTS OF $";PA:PRI
NT
380 PRINT"INTEREST CALCULATED ";N
;" TIMES PER YEAR.":PRINT:PRINT"
AT A RATE OF ";100*I;"%":GOTO430
390 CLS:TYPE=1:PRINT@224,"TURN PR
INTER ON NOW!!!":PRINT:PRINT"pres
s any key when ready.":INPUTA$
400 '***LOAN DATA***
410 CLS:PRINT#-2,CHR$(31)"AMORTIZ
ATION FOR LOAN OF $";X:PRINT#-2,C
HR$(30):PRINT#-2,"OVER";T;" YEARS
":PRINT#-2:PRINT#-2,"AT MONTHLY P
AYMENTS OF $";PA:PRINT#-2
420 PRINT#-2,"INTEREST IS CALCULA
TED ";N;"TIMES PER YEAR.":PRINT#-
2:PRINT#-2,"AT A RATE OF ";100*I;
"%":PRINT#-2:PRINT#-2
430 IF TYPE=0 THEN PRINT"PRESS AN
Y KEY TO CONTINUE";:GOSUB1350
440 '***MAIN PRINTOUT LOOP***
450 BA=INT(X*100+.49)/100:BK=BA
460 D=1
470 '***PAGE HEADING***
480 IF TYPE=0 THEN GOSUB1170:GOTO
500
490 PRINT#-2,"NUMBER";TAB(12)"PAY
MENT";TAB(25)"INTEREST";TAB(40)"P
RINCIPAL";TAB(52)"BAL. OWING";"
BAL. (BANK)":GOSUB1370
500 IT=0:PT=0:C=0:W=0
510 '***NEXT PAYMENT STARTS***
520 C=C+1
530 IF(-1)D=-1 THEN GOSUB940
540 '***CHECK FOR EXTRA PAYMENT**
*
550 IFF=0 THEN600
560 FORG=1TOF
570 IFN(G)=C-1 THEN GOSUB970
580 NEXTG
590 '***W COUNTS TO 12 PAYMENTS F
OR BANK BALANCE CALCULATION***
600 W=W+1
610 IFW>12/N THENW=1
620 IFW=1 THEN IB=BK*I/N:IB=INT(I
B*100+.49)/100:BK=BK+IB
630 IN=BA*I/12:IFN<>12 THEN IN=IB
*N/12
640 II=INT(IN*100+0.49)/100

```

```

650 PR=PA-II
660 BA=BA-PR:BA=INT(BA*100+.49)/1
00
670 IT=IT+II:PT=PT+PA
680 BK=BK-PA:BK=INT(BK*100+.49)/1
00
690 IFTYPE=0 THEN GOSUB1190:GOTO7
40
700 PRINT#-2,TAB(3)C;TAB(11)"$";P
A;TAB(25)"$";II;TAB(40)"$";PR;TAB
(52)"$";BA;
710 IFN<>12 THENPRINT#-2," $";BK:
GOTO730
720 PRINT#-2,"*****"
730 PRINT#-2
740 XX=INT(BA*(1+I/12)*100+.49)/1
00:IFPA*1.1>XX THENPA=XX:GOTO810
750 IFBA<=0 THEN850
760 D=D+1
770 IFC=60*(INT(C/60))=0THEN GOSU
B1070
780 '***RETURN FOR NEXT PAYMENT**
*
790 GOTO520
800 '***LAST PAYMENT***
810 II=INT(BA*I/12*100+.49)/100:P
R=PA-II:PR=INT(PR*100)/100:BA=BA-
PR:BA=INT(BA*100)/100:IT=IT+II:PT
=PT+PA
820 C=C+1:D=D+1
830 IFTYPE=0 THEN PRINT"FINAL PAY
MENT $";PA:GOSUB1190:PRINT:PRINT"
TOTAL INTEREST PAID $";IT:PRINT:P
RINT"TOTAL PAYMENTS MADE $";PT:GO
TO890
840 PRINT#-2,"FINAL PAYMENT $";PA
;TAB(25)"$";II;TAB(40)"$";PR;TAB(
52)"$";BA
850 PRINT#-2:PRINT#-2,CHR$(31)"TO
TAL INTEREST PAID $";IT
860 PRINT#-2,CHR$(30):PRINT#-2,CH
R$(31)"TOTAL PAYMENTS MADE $";PT:
PRINT#-2,CHR$(30)
870 '****
880 GOTO230
890 PRINT:PRINT"PRESS < e > TO EN
D";
900 A$=INKEY$:IFAS$="" THEN900
910 IFAS$="E"THEN CLS:GOTO230
920 RUN
930 '***DIVIDING LINES***
940 IFTYPE=0 THEN950
950 PRINTSTRING$(32,"*");:RETURN
960 '***CALCULATE NEW BALANCE***
970 BA=BA-P(G):BA=INT(BA*100)/100
:PT=PT+P(G)

```

```

980 BK=BK-P(G):BA=INT(BA*100+.49)
/100:BK=INT(BK*100+.49)/100
990 IFTYPE=1 THEN PRINT#-2,"EXTRA
PAYMENT ($";P(G);")";:GOTO1020
1000 PRINT"EXTRA PAYMENT ($";P(G)
;")";
1010 IFTYPE=0 THEN1050
1020 PRINT#-2,TAB(55)"$";BA;:IFN<
>12 THEN PRINT#-2,"$";BK
1030 PRINT#-2:PRINT#-2
1040 RETURN
1050 PRINT"$";BA:RETURN
1060 '***NEXT 5 YEAR CHECK***
1070 '
1080 PRINT:PRINT"PRESS 'y' OR 'n'
TO SEE NEXT 5 YEARS";
1090 B$=INKEY$:IFB$=""THEN1090
1100 IFB$="Y" THEN1130
1110 IFB$<>"N" THEN PRINT:PRINT:P
RINT"PRESS 'Y' OR 'N' ":GOTO1080
1120 IFB$<>"Y" THEN CLS:GOTO230
1130 IFAS="GO"THEN PRINT#-2:RETUR
N
1140 GOSUB1170:RETURN
1150 END
1160 '***SCREEN PRINTOUT***
1170 CLS:PRINT"NUM";TAB(5)"intere
st";TAB(16)"PRINCIPLE";TAB(26)"ba
l"
1180 RETURN
1190 PRINTC;TAB(3)"$";II;TAB(12)"
$";PR;TAB(22)"$";BA
1200 IFD=6 THEND=0:IFTYPE=0 THEN
GOSUB1340:GOSUB1170
1210 RETURN
1220 '***GET EXTRA PAYMENT DATA**
*
1230 CLS
1240 INPUT"HOW MANY EXTRA PAYMENT
S HAVE BEEN MADE ";F:GOSUB950:
DIMN(F),P(F)
1250 FORG=1TOF
1260 PRINT:PRINT"HOW MANY 'regula
r' PAYMENTS WEREMADE BEFORE EXTRA
PAYMENT NUMBER";G;:INPUTN(G):GOS
UB950
1270 INPUT"WHAT WAS THE amount OF
THE EXTRAPAYMENT? $";P(G):P(G)=I
NT(P(G)*100+.49)/100
1280 NEXTG
1290 RETURN
1300 PRINT#-2
1310 PRINT:PRINT"TO SEE THE NEXT
FIVE YEARS PRESS <ENTER>":PRINT"t
o exit press break";:INPUT"";B$
1320 RETURN

```

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```

1330 END
1340 PRINT"TO CONTINUE PRESS ANY
KEY ";
1350 NN$=INKEY$:IFNN$=""THEN1350
1360 RETURN
1370 PRINT#-2,STRING$(80,"*"):PRI
NT#-2:RETURN

```

MEMORY AFTER RUNNING 22823- 17954  
= 4881

Continued from Page 14

```

1200 POKE TEST,253: POKE TEST+3,2
55:GOSUB 270
1210 INPUT A,B: POKE TEST+1,A:POK
E TEST+2,B
1220 POKE MUSIC+132,10: EXEC MUSI
C:POKE MUSIC+132,120:GOTO 1210

```

MEM AFTER RUNNING 22823-19347=3488



INTRODUCING!

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WITH FOUR SCREENS

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Battle spiders! Blast your way through the descending blocks! Defeat the enemy tanks! Trap the menacing cycles! Increasing levels of difficulty make each a real challenge! KRON is a fast ML program with multi-colors, Hi-Res, and many great sounds. It displays the top five scores plus has a pause feature and display mode.

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PLEASE ADD \$2.00 EACH ORDER, POSTAGE/HANDLING

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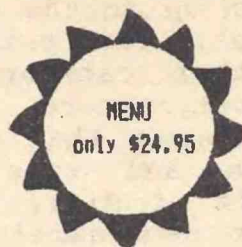


**STILL DOING THINGS THE HARD WAY?  
SUNSHINE SOFTWARE HAS THE ANSWER!**

**"MENU" Master Disk Utility:  
32K min.**

Allows you to see up to 42 filenames of your directory at one time and NEVER scrolls off the screen. Select any file by moving a cursor with your arrow keys. The cursor indicates the filetype. Then, with a SINGLE KEY, you can:

RUN a Basic program.  
LOADM and EXECute a Machine Language program.  
(Even ML programs that load on top of "MENU".)  
COPY any file to any drive.  
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Change drives instantly.



**WITHOUT TYPING COMMANDS OR FILENAMES!**

You can also:

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Every owner of "MENU" agrees that "MENU" is a program they use so often, they've put a copy on EVERY disk they own!

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# CoCo Commands

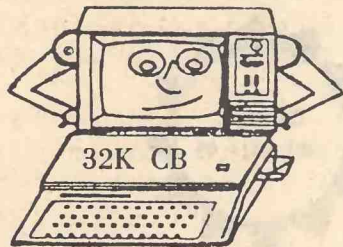
by Ron Garrett

Two newsletters ago we had the CoCo commands from A-I. Except, we forgot to do one thing, that was to separate the BASIC, ECB, and Disk Basic from each other. Well, we rewrote the programs and have included the whole list from A-Z on the CoCo commands. They have been broken up in the above mentioned format. The programs will run in that category of computer. However, there is a line in each program that automatically loads and runs the next program off of disk. These programs do not necessarily require the disk to run, because you can delete that line. All of the programs do require 32K except for the extended commands program number 3. The memory list is from use on a disk system, but the memory used should be the same amount.

You may wish to break the program up so that it will fit in a 16K machine, note a lot more programs, and you are free to do so, but do not forget to put the required part at the bottom of the program in your program.

Thank you and have fun using these programs.

## BASIC



```
1 ' Copyright (C) 1983
2 ' Ron Garrett
3 ' 2101 East Main St.
4 ' Henderson, Texas 75652
10 CLS:PRINT" *** OPERATOR ABS
   ***"
20 PRINT:PRINT"THE COMMAND ABS IS
PAGE 20
```

```
SHORT FOR the absolute va
lue of":PRINT"REGARDLESS OF SIGN
(A POSITIVE OR NEGATIVE NUMBER).
"
```

```
30 PRINT:PRINT"TO SHOW YOU HOW TH
IS WORKS, ENTER A NUMBER WITH
A POSITIVE SIGN (JUST A NUMBER)
";:INPUTA
```

```
40 INPUT"NOW ENTER A NEGATIVE NUM
BER EG. PUT A - IN FRONT OF T
HE NUMBER, LIKE -12";B
```

```
50 PRINT:PRINT"THE ABSOLUTE VALUE
OF";A:PRINT"TIMES ";B;"EQUALS";A
BS(A*B)
```

```
60 GOSUB 2030
```

```
70 GOSUB 2060
```

```
80 PRINT:PRINT"<AND> IS A MATHEMA
TICAL OPERATORFOR BINARY NUMBERS.
```

```
IN THE BINARY NUMBERING SYS
TEM YOU HAVE ONLY 1'S AND 0'S
, I CAN'T TOTALLY EXPLAIN THE BI
NARY"
```

```
90 PRINT"SYSTEM, BUT HERE IS AN E
XAMPLE: BASE 10 BINAR
Y"
```

```
100 PRINT" 1 00
01 2 001
0 3 0011
12 1100
15 1111
```

```
110 GOSUB 2030
```

```
120 GOSUB 2060
```

```
130 PRINT:PRINT"THE ONES AND ZERO
S ARE CALLED BITS, 4 OF THEM TO
GETHER ARE CALLED A NIBBLE AND
REPRESENT ONE HEXIDECIMAL NUMB
ER. 8 OF THEM TOGETHER (CALLED
A BYTE) IS WHAT THE COMPUTER U
SES."
```

```
140 PRINT"TO MAKE THINGS SIMPLER,
WE ARE GOING TO USE THE 8 BIT B
YTE IN THESE REPRESENTATIONS. (M
EANING THE NUMBERS WILL ALWAYS BE
8 BITS LONG. (WE WILL ADD 0'S
)")
```

```
150 GOSUB 2030:GOSUB 2060
```

```
160 PRINT:PRINT"TO <AND> TWO BINA
RY NUMBERS WE MEAN THAT IF TH
E BIT IN THE FIRST NUMBER <AND>
THE BIT IN THE SECOND NUMBER AR
E SET (1) THEN THE SAME BIT IN
THE ANSWER WILL BE SET. EG:"
```

```
170 PRINT:PRINT" 10010011 (
147)":PRINT" AND 01101101 (109)
":PRINT" =0000001 (1)"
```

```

180 GOSUB 2030:GOSUB 2060
190 PRINT:PRINT"THUS WE CAN DETER
MINE IF A BIT IS SET OR NOT BY U
SING THE LOGICAL OPERATOR <A
ND>."
200 PRINT:PRINT"ONE GOOD USE YOU
CAN PUT THIS TO IS TO SEE IF YO
UR PRINTER IS READY.":PRINT"EG: I
F (PEEK(65314) AND 1)=1 THEN C
LS:PRINT@232,";CHR$(34);"PRINTER
NOT READY";CHR$(34)
210 GOSUB 2030:GOSUB 2070
220 PRINT"ASC IS SHORT FOR ASCII
WHICH IS PRONOUNCED AS-KEY AND ST
ANDS FOR AMERICAN STANDARD CODE fo
r INFORMATION INTERCHANGE"
230 PRINT:PRINT"BASICALLY WHAT AL
L THIS MEANS IS THAT THERE ARE
SPECIFIC NUMBERS ASSIGNED TO
LETTERS NUMBERS, SYMBOLS, ET
C. SO THAT COMPUTERS CAN OPERATE
ON THEM."
240 GOSUB 2030:GOSUB 2070
250 PRINT"FOR INSTANCE THE ASCII
CODE FOR THE LETTER A IS 65, B
IS 66 AND SO ON. THIS IS GREAT,
BUT LET'S SEE WHAT WE CAN USE
IT FOR."
260 PRINT:PRINT"LET'S SAY THAT YO
U HAVE WRITTEN A PROGRAM AND NEED
TO ACCEPT A KEY PUSH, BUT ONLY
ON KEYS A THRU F.
270 GOSUB 2030:GOSUB 2070
280 PRINT"YOU COULD DO IT THIS WA
Y.":PRINT"100 A$=INKEY$":PRINT"11
0 IF ASC(A$)<65 OR ASC(A$)>70 THE
N 100
290 PRINT:PRINT"THIS WOULD ALLOW
ONLY A THRU F TO BE INPUT."
300 PRINT:PRINT"YOU CAN ALSO USE
THIS FUNCTION TO GET INPUT FROM
KEYS WHICH WILL NOT PRINT ON T
HE SCREEN SUCH AS THE ARROW KE
YS"
310 GOSUB 2030:GOSUB 2070
320 PRINT"HERE IS AN EXAMPLE OF A
PROGRAM THAT USES THE ARROW KEYS
TO MOVE A DOT AROUND ON THE GRAPH
ICS SCREEN"
330 PRINT:PRINT"5 X=128:Y=96":PRI
NT"10 A$=INKEY$:IF A$=";STRING$(2
,34);" THEN 10":PRINT"20 A=ASC(A$
):IF A=94 THEN Y=Y-1":PRINT"30 IF
A=10 THEN Y=Y+1":PRINT"40 IF A=9
THEN X=X+1":PRINT"50 IF A=8 THEN
X=X-1":PRINT"60 SET(X,Y,5):GOTO

```

```

10"
340 GOSUB 2030:GOSUB 2070
350 PRINT"LET'S PUT THIS PROGRAM
TO USE AND SEE HOW IT WORKS":PR
INT:PRINT:PRINT"HIT THE Q (FOR QU
IT) KEY TO GET OUT OF THIS MODE A
ND CONTINUE THE PROGRAM"
360 GOSUB 2030
370 CLS:X=32:Y=15
380 A$=INKEY$:IF A$="" THEN 380
390 A=ASC(A$):IF A=94 THEN Y=Y-1:
IF Y<0 THEN Y=0
400 IF A=10 THEN Y=Y+1:IF Y>31 TH
EN Y=31
410 IF A=9 THEN X=X+1:IF X>63 THE
N X=63
420 IF A=8 THEN X=X-1:IF X<0 THEN
X=0
430 IF A=81 THEN 450
440 SET(X,Y,5):GOTO 380
450 GOSUB 2080
460 PRINT:PRINT"THIS COMMAND ROUT
ES THE OUTPUT OF THE TAPE PLAYER
TO THE TV'S SPEAKER, ALLOWING Y
OU TO PLAY MUSIC OR SPEAK WHILE
PRESENTING A GRAPHIC OR TEXT DIS
PLAY."
470 PRINT"YOU CAN ALSO USE THIS C
OMMAND ALONG WITH THE PLAY COMM
AND TO OBTAIN 2 OR 3 PART HARMON
Y FOR YOUR COMPUTER GENERATED MU
SIC"
480 GOSUB 2030:GOSUB 2080
490 PRINT"OTHER USES FOR THIS COM
MAND ARE 1. TYPE AUDIO ON BEFORE
A CSAVE TO VERIFY THE SA
VE.":PRINT"2. TYPE MOTOR ON:AUDIO
ON TO FIND A BLANK SPACE B
ETWEEN TWO PROGRAMS ON TAPE
SO YOU WON'T GET AN I/O ERROR
"
500 PRINT" WHEN YOU CLOAD A PRO
GRAM.":PRINT"3. PLAY YOUR FAVORIT
E RECORDING OF MUSIC THRU THE
TV.
510 GOSUB 2030:GOSUB 2090
520 PRINT"THESE COMMANDS ALLOW YO
U TO LOAD AND SAVE PROGRAMS T
O TAPE THE C IN CLOAD STANDS FOR
THE CASSETTE, SO YOU PRONOUNCE
IT CASSETTE LOAD INSTEAD OF CL
OAD."
530 PRINT"TO USE THESE COMMANDS,
SIMPLY INSERT A TAPE (WITH A PR
OGRAM ON IT) IN THE TAPE PLAYER
AND TYPE CLOAD, THE MACHINE WI

```

LL TURN ON THE MOTOR, LOAD IN THE PROGRAM AND TURN THE MOTOR OFF."

540 GOSUB 2030:GOSUB 2090  
550 PRINT"IF THE PROGRAM IS IN MACHINE LANGUAGE, YOU MUST ADD A N M TO THE COMMAND, EG: CLOADM."

560 PRINT"IF YOU WANT A SPECIFIC PROGRAM FROM THE TAPE YOU CAN SPECIFY THE FILENAME OF THE PROGRAM."

570 PRINT"LET'S SAY YOU HAVE A TAPE WITH 10 PROGRAMS ON IT, ONE OF THE PROGRAMS IS CALLED 'INVADERS'. TO LOAD IT, YOU TYPE:

CLOAD";CHR\$(34);"INVADERS";CHR\$(34)

580 GOSUB 2030:GOSUB 2090

590 PRINT"BE SURE TO ENCLOSE THE NAME OF THE PROGRAM IN QUOTES.":PRINT:PRINT"YOU SAVE PROGRAMS THE SAME WAY. IF YOU HAVE WRITTEN A PROGRAM AND WANT TO SAVE IT TO TAPE,"

600 PRINT"ALL YOU HAVE TO DO IS TYPE: CSAVE";CHR\$(34);"program name";CHR\$(34)

610 PRINT"THE PROGRAM NAME CANNOT BE MORE THAN 8 CHARACTERS AND YOU MUST ENCLOSE IT IN QUOTES."

620 GOSUB 2030:GOSUB 2090

630 PRINT"IF YOU ARE SAVING A MACHINE LANGUAGE PROGRAM, YOU MUST ALSO INCLUDE THE BEGINNING, END AND EXECUTION ADDRESSES OF THE PROGRAM. "

640 PRINT"ALWAYS BE SURE YOUR TAPE PLAYER-RECORDER IS IN THE PROPER MODE (EITHER RECORD OR PLAY) AND IS READY BEFORE USING ONE OF THE ABOVE COMMANDS, AS CSAVING A PROGRAM WHEN THE RECORDER IS IN THE PLAY POSITION does not save the program!";

650 GOSUB 2030:GOSUB 2090

660 PRINT"YOU CAN CSAVE YOUR PROGRAM IN ASCII INSTEAD OF BINARY, BY THE ADDITION OF AN <A> TO THE CSAVE COMMAND."

670 PRINT"LET ME EXPLAIN THIS FURTHER. THE COMPUTER ENCODES ALL OF THE COMMANDS AND OPERATORS IN TO 1 OR 2 BYTE CODES. THE COMPUTER WILL NORMALLY CSAVE THESE CODES AND NOT THE WORDS THEMSELVES

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."

680 GOSUB 2030:GOSUB 2090  
690 PRINT"IF YOU TYPE CSAVE";CHR\$(34);"PROGRAM";CHR\$(34);",A"

700 PRINT:PRINT"THIS WILL SAVE THE PROGRAM, LETTER BY LETTER TO THE TAPE.":PRINT:PRINT"ONE OF THE REASONS FOR DOING THIS IS TO MAKE THE PROGRAM TRANSPORTABLE BETWEEN COMPUTERS (OTHER THAN A COLOR COMPUTER)."

710 GOSUB 2030:GOSUB 2100

720 PRINT"YOU MIGHT SAY THAT CHR\$ IS THE OPPOSITE OF THE ASC COMMAND.":PRINT"IT GIVES YOU THE CHARACTER THAT REPRESENTS THE ASCII VALUE."

730 PRINT"EG: IF YOU TYPE PRINT CHR\$(65) THE COMPUTER WILL PRINT AN A ON THE SCREEN."

740 PRINT:INPUT"WANT TO TRY IT";Z\$:IF LEFT\$(Z\$,1)="N" THEN 770

750 CLS:PRINT@224:INPUT"ENTER A NUMBER BETWEEN 32 & 255";Z

760 CLS:PRINT@228,"THE ASCII CODE";Z;"=";CHR\$(Z):PRINT:INPUT"WANT TO TRY AGAIN";Z\$:IF LEFT\$(Z\$,1)="Y" THEN 750

770 GOSUB 2100

780 PRINT"DEMO:":PRINT"THIS IS THE PROGRAM":PRINT"10 FOR X=33 TO 255:PRINTCHR\$(X) 20 NEXT X"

790 PRINT:FOR X=33 TO 255:PRINTCHR\$(X);:NEXT

800 GOSUB 2030:GOSUB 2100

810 PRINT"DO YOU KNOW WHY WE STARTED AT 33 AND NOT 1 OR 0?":PRINT"THE ASCII CODES FROM 0 TO 31 ARE CONTROL CODES AND WOULD NOT BE PRINTED ON THE SCREEN."

820 PRINT"HERE ARE SOME EXAMPLES:":PRINT"ASCII DOES"

830 PRINT"10 LINEFEED":PRINT"12 TOP OF FORM 13 CARRIAGE RETURN"

840 PRINT"ASK YOUR TEACHER FOR A FULL LISTING OF THE ASCII CODES."

850 GOSUB 2030:GOSUB 2110

860 PRINT"THIS COMMAND CLOSES AND OPENS A CASSETTE FILE. YOU CAN WRITE DATA TO THE CASSETTE WITH THE SHORT PROGRAM:"

870 PRINT"10 OPEN ";CHR\$(34);"0";CHR\$(34);",#-1,";CHR\$(34);"DATA"



```

880 PRINT"20 INPUT";CHR$(34);"ENT
ER DATA";CHR$(34);";A$"
890 PRINT"30 PRINT#-1,A$"
900 PRINT"40 IF A$=";CHR$(34);"EN
D";CHR$(34);" THEN 60"
910 PRINT"50 GOTO 20":PRINT"60 CL
OSE:END"
920 GOSUB 2030:GOSUB 2110
930 PRINT"WE WILL GO FURTHER INTO
THIS WITH THE OPEN COMMAND.
WHAT THE CLOSE COMMAND DO
ES IS WRITE A CLOSING HEADER TO
THE TAPE, SO WHEN YOU ARE READI
NG IT BACK INTO THE COMPUTER, T
HE COMPUTER WILL KNOW WHEN IT HA
S"
940 PRINT"REACHED THE END OF THE
FILE. OTHERWISE IT WOULD CONTI
NUALLY SEARCH THE TAPE FOR MORE
DATA."
950 GOSUB 2030:GOSUB 2120
960 PRINT"CLS IS SHORT FOR CLEAR
SCREEN. ON THE COLOR COMPUTER TH
IS ALSO RETURNS THE CURSOR TO THE
TOP OF THE SCREEN."
970 PRINT"SINCE THIS IS A COLOR C
OMPUTER YOU CAN ALSO SPECIFY THE
COLOR YOU WANT THE SCREEN CLEAR
ED TO. EG: CLS4 OR CLS0. THERE AR
E 9 DIFFERENT COLORS YOU CAN US
E 0 TO 8, IF YOU USE A NUMBER
HIGHER THAN 8 THE COMPUTER WI
LL"
980 PRINT"DO A CLS1 AND PRINT MIC
ROSOFT"
990 GOSUB 2030:GOSUB 2130
1000 PRINT"THE CLEAR COMMAND IS U
SED IN 3 WAYS. JUST TYPING CLEAR
, CLEARS ALL VARIABLES. CLEAR 200
WILL RESERVE 200 BYTES FOR VAR
IVABLE STORAGE. (200 BYTES IS WHA
T THE COMPUTER RESERVES ON POWERU
P)."
1010 PRINT"CLEAR 200,15000 WILL R
ESERVE 200 BYTES STARTING AT L
OCATION 15000 FOR A MACHINE LANG
UAGE PROGRAM OR ROUTINE AND IS
USED SO THAT YOU WON'T WRITE OV
ER THE ROUTINE WITH YOUR BASIC
PROGRAM.";
1020 GOSUB 2030:GOSUB 2130
1030 PRINT"YOU MAY COME UP WITH A
NON OS ERROR(OUT OF STRING SPACE) O
NCE IN A WHILE. WHEN YOU DO, YOU
NEED TO USE THE CLEAR COMMAND TO
CLEAR MORE STRING SPACE."

```

```

1040 PRINT"BE SURE TO PUT THIS CO
MMAND AT THE START OF YOUR PROGR
AM, AS A CLEAR COMMAND WILL CLEAR
ALL OF YOUR VARIABLES ANY WAY YO
U USE IT. EG. IF YOU HAVE:
1050 GOSUB 2030:GOSUB 2130
1060 PRINT"10 INPUT";CHR$(34);"EN
TER FILENAME";CHR$(34);";A$":PRIN
T"20 CLEAR 500"
1070 PRINT:PRINT"THE FILENAME YOU
ENTERED IN LINE10 WILL BE ERASED
AND A$ WILL EQUAL NOTHING."
1080 GOSUB 2030:GOSUB 2140
1090 PRINT"CONT SHORT FOR CONTIN
UE ALLOWS YOU TO CONTINUE A PROGR
AM AFTER YOU HIT BREAK OR AFTER T
HE PROGRAM ENCOUNTERS A STOP
COMMAND.":PRINT
1100 PRINT"THIS COMMAND IS ENTERED
DIRECTLYFROM THE KEYBOARD, AND
ALLOWS YOU TO KEEP ALL VARIABLE
VALUES INTACT."
1110 GOSUB 2030:GOSUB 2140
1120 PRINT"I SOMETIMES USE STOP L
INES ON GRAPHICS PROGRAMS TO FI
ND A PLACE DRAWING A SPECIFIC
LINE, BY ADDING LINES IN BETWEE
N THE PROGRAM LINES WITH THE STO
P COMMAND. I CAN THEN JUST KE
EP TYPING CONT UNTIL I FIND THE
"
1130 PRINT"LINE I AM LOOKING FOR.
":PRINT"IF YOU USE THIS METHOD, B
E SURE TO GO BACK AND REMOVE ALL
OF THESTOP COMMANDS YOU INSERTED
AFTERYOU HAVE FINISHED YOUR EDITI
NG."
1140 GOSUB 2030:GOSUB 2150
1150 PRINT"DATA....BOY IS THIS A
GOOD ONE! THIS ALLOWS YOU TO STOR
E DATA ON SEPERATE DATA LINES A
ND READ IT WHENEVER YOU NEED IT.
MANY TIMES THIS MAKES CHANGING
THE DATA EASIER AND IS MUCH EAS
IER TO WRITE. ALSO YOU CAN HAVE"
1160 PRINT"A PARTICULAR FUNCTION,
LIKE PRINT, PRINT OUT A LOT
OF DATA WITHOUT HAVING TO WRITE
THE WORDPRINT FOR EACH LINE."
1170 GOSUB 2030:GOSUB 2150
1180 PRINT"HERE IS AN EXAMPLE OF
HOW YOU MIGHT USE THE DATA COMM
AND:"
1190 PRINT"10 FOR X=1 TO 10:READ
A$":PRINT"20 PRINT A$:NEXT X

```

1200 PRINT"30 DATA ONE,TWO,THREE,  
FOUR,FIVE,SIX,SEVEN,EIGHT,NINE,TE  
N

1210 PRINT:PRINT"YOU WILL NOTICE  
THAT YOU DO NOT HAVE TO ENCLOSE Y  
OUR DATA ELEMENTS IN QUOTES  
, UNLESS YOU ARE USING SPACES OR  
PUNCTUATION"

1220 GOSUB 2030:GOSUB 2150

1230 PRINT"ONE OF THE MAJOR USES  
OF THE DATA COMMAND IS IN COMP  
ARISON. YOU CAN WRITE A PROGRAM  
THAT ASK QUESTIONS AND HAVE TH  
E PROGRAM SEARCH DATA STATEM  
ENTS FOR COMPARISON."

1240 PRINT"YOU CAN EVEN PUT THE Q  
UESTIONS AND THE ANSWERS IN DATA  
STATE- MENTS."

1250 PRINT"DATA STATEMENTS ARE EV  
EN MORE USEFUL IN EXTENDED BASI  
C WHEN YOU HAVE LONG DRAW OR PL  
AY ROUTINES.";

1260 GOSUB 2030:GOSUB 2160

1270 PRINT"DIM SHORT FOR DIMINSI  
ON. ALLOWS YOU TO USE ONE V  
ARIABLE NAME WITH DIFFERENT DIMI  
NSIONS TO STORE DATA."

1280 PRINT"ASSUME YOU WANTED TO S  
TORE 100 OR SO NAMES AND ADDRESS  
ES. YOU WOULD RUN OUT OF VAR  
IABLES IF YOU ASSIGNED A DIFFERE  
NT ONE TO EACH NAME, ADDRESS & PH  
ONE"

1290 PRINT"BUT WITH THE DIM COMMA  
ND, YOU ONLY NEED ONE VARIABLE.  
"

1300 GOSUB 2030:GOSUB 2160

1310 PRINT"THE COMMAND IS USED LI  
KE THIS:":PRINT:PRINT"10 DIM A\$(1  
00,4)":PRINT"20 FOR X=1 TO 100"

1320 PRINT"30 INPUT";CHR\$(34);"EN  
TER NAME";CHR\$(34);";A\$(X,1)"

1330 PRINT"40 INPUT";CHR\$(34);"EN  
TER STREET";CHR\$(34);";A\$(X,2)"

1340 PRINT"50 INPUT";CHR\$(34);"EN  
TER CITY";CHR\$(34);";A\$(X,3)"

1350 PRINT"60 INPUT";CHR\$(34);"EN  
TER PH.#";CHR\$(34);";A\$(X,4)"

1360 PRINT"70 NEXT X"

1370 PRINT:PRINT"THIS ALLOWS ALL  
100 NAMES INTO THE VARIABLE A\$,  
WITH A\$(1,1) BEING THE 1ST NAME  
-";

1380 GOSUB 2030:GOSUB 2160

1390 PRINT"CAN YOU SHOW US HOW WE  
COULD REDUCE THE PREVIOUS PRO

GRAM TO JUST 5 PROGRAM LINES  
BY THE USE OF A DATA STATEMENT?"  
1400 PRINT:PRINT"ARE YOU WONDERIN  
G WHY WE NEED THE DIM COMMAND,  
WHY CAN'T WE JUST USE A\$(100,4)  
WITHOUT THE DIM? WELL, THIS TAK  
ES A LOT OF MEMORY, AND IF YOU W  
ERE NOT USING SUBSCRIBED VAR  
IABLES THEN IT WOULD BE WASTED MEM  
ORY.

1410 GOSUB 2030:GOSUB 2160

1420 PRINT"THE COMPUTER DOES ALLO  
W YOU TO USE SUBSCRIBED VARIABLE  
S UP TO A POINT, THE POINT IS 9.  
YOU CAN HAVE A\$(9) WITHOUT THE DI  
M STATEMENT."

1430 PRINT"DOUBLE OR MULTI DIMINS  
IONED VARIABLES ARE NOT ALLOW  
ED WITH- OUT THE DIM STATEMENT.

1440 PRINT"AS YOU CAN SEE, PROGRA  
MS CAN BE MUCH SHORTER AND EASIER  
BY THE USE OF SUBSCRIBED VARIA  
BLES"

1450 GOSUB 2030:GOSUB 2160

1460 PRINT"IF YOU HAD ENTERED ALL  
100 NAMES AND ADDRESSES AND PHONE  
NUMBERS INTO THE PROGRAM WE LIST  
ED, YOU COULD PRINT THEM ALL OUT  
WITH THIS SHORT ROUTINE:"

1470 PRINT"10 FOR X=1 TO 100:FOR  
Y=1 TO 4 20 PRINT A\$(X,Y):NEXT Y  
,X"

1480 PRINT:PRINT"LOOK! JUST 2 LIN  
ES FOR 100 NAMES WITH ADDRESSES AN  
D PHONE #'S THIS IS A POWERFUL  
COMMAND!"

1490 GOSUB 2030:CLS:PRINT" \*\*\* BA  
SIC COMMAND END \*\*\*":PRINT

1500 PRINT"END.. REQUIRES NO EXPL  
ANATION. THIS COMMAND SIMPLY STO  
PS THE PROGRAM."

1510 PRINT:PRINT" \*\*\* BASIC COMMA  
ND EXEC \*\*\*":PRINT"SHORT FOR EXEC  
UTE, THIS COMMAND TURNS CONTROL O  
F THE COMPUTER OVER TO A MACHIN  
E LANGUAGE PROGRAM. EXEC 100  
00 STARTS EXECUTION AT MEMOR  
Y LOCATION 10000."

1520 GOSUB 2030:CLS:PRINT" \*\*\* BA  
SIC COMMAND ELSE \*\*\*":PRINT

1530 PRINT" SEE IF/THEN/ELSE COMM  
AND"

1540 GOSUB 2030:GOSUB 2170

1550 PRINT"EOF --- SHORT FOR END  
OF FILE. THIS COMMAND ALLOWS YOU  
TO CHECK TO SEE IF YOU HAVE REACH

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ED THE END OF YOUR DATA FILE (FROM THE CASSETTE). WHY?"
1560 PRINT"IF YOU ARE ENTERING DATA FROM THE CASSETTE AND YOU REACH THE END OF YOUR DATA AND ARE STILL TRYING TO GET MORE, YOU GET AN ERROR, AND THIS STOPS YOUR PROGRAM EXECUTION."
1570 GOSUB 2030:GOSUB 2170
1580 PRINT"HERE IS A SAMPLE PROGRAM:"PRINT
1590 PRINT"10 OPEN"CHR$(34);"I";CHR$(34);",#-1,";CHR$(34);"DATA";CHR$(34)
1600 PRINT"20 INPUT#-1,A$:PRINTA$

1610 PRINT"30 IF EOF(-1)=0 THEN 20"
1620 PRINT"40 CLOSE#1:END
1630 PRINT:PRINT"THIS KEEPS YOU FROM TRYING TO INPUT PAST THE END OF THE FILE"
1640 GOSUB 2030:GOSUB 2180
1650 PRINT"THE SERIES OF COMMANDS :":PRINT"FOR/NEXT/STEP FORMS LOOPS IN A PROGRAM SO THAT YOU CAN PERFORM THE SAME FUNCTION SEVERAL TIMES WITHOUT HAVING TO WRITE THE COMMAND OVER AND OVER."
1660 PRINT"FOR EXAMPLE, IF YOU WANTED TO PRINTOUT THE 100 NAMES AND ADDRESSES IN THE PROGRAM WE HAD IN THE DIM COMMANDS."
1670 PRINT"WITHOUT THE FOR/NEXT LOOP YOU WOULD HAVE TO TYPE:"
1680 GOSUB 2030:GOSUB 2180
1690 PRINT"PRINT A$(1,1):PRINT A$(1,2)... A TOTAL OF 400 PRINT STATEMENTS.BUT BY USING A FOR/NEXT LOOP, YOU NEED ONLY 1 PRINT STATEMENT."
1700 PRINT"WHEN YOU SPECIFY: FOR X=1 TO 100YOU ARE TELLING THE COMPUTER THAT YOU ARE FORMING A LOOP AND THAT THE FIRST NUMBER FOR X IS 1 AND THAT WHEN THE VALUE OF X IS EQUAL TO 100 THEN THE LOOP ISFINISHED. EACH TIME THE COMPUTER";
1710 GOSUB 2030:GOSUB 2180
1720 PRINT"ENCOUNTERS A NEXT STATEMENT (IN THIS CASE A NEXT X) IT WILL RETURN TO THE LINE WHERE YOU HAVE THE FOR X=1 TO 100"
1730 PRINT"AND INCREASE THE VALUE OF X BY 1. IF YOU HAVE SPECIFIE

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D A STEP EG: FOR X=1 TO 100 STEP 2 THEN THE VALUE OF X IS INCREASEDBY THE VALUE OF STEP. IN THE EXAMPLE ABOVE (STEP 2) THE VALUEWOULD BE INCREASED BY 2"
1740 GOSUB 2030:GOSUB 2180
1750 PRINT"YOU MAY ALSO SPECIFY A STEP OF LESS THAN ONE, LIKE:":PRINT"10 FOR X=1 TO 100 STEP .2":PRINT"OR IF YOU WANT TO GO FROM 100 TO 1, YOU MUST SPECIFY A STEP AND IT MUST BE A NEGATIVE NUMBER"
1760 PRINT"FOR X=100 TO 1 STEP-1
1770 PRINT:PRINT"THIS WOULD START X OFF AT 100 AND DECREASE THE VALUE OF X UNTIL IT REACHED 1"
1780 GOSUB 2030:GOSUB 2190
1790 PRINT"LET'S EXAMINE GOTO FIRST.":PRINT"THIS COMMAND ALLOWS YOU TO GO TO A SPECIFIC LINE NUMBER IN YOUR PROGRAM, AND REQUIRES LITTLE IN THE WAY OF AN EXPLANATION. IT ISUSED MAINLY WITH IF/THEN STATEMENTS TO SKIP CERTAIN LINES IN"
1800 PRINT"A PROGRAM THAT WILL NOT BE USED.EG:"
1810 GOSUB 2030:GOSUB 2180
1820 PRINT"10 PRINT";CHR$(34);"1.PRINT";CHR$(34)
1830 PRINT" ";CHR$(34);"2.INPUT";CHR$(34)
1840 PRINT" ";CHR$(34);"3.INPUT FROM TAPE";CHR$(34)
1850 PRINT"20 INPUTA:IF A=1 THEN GOTO 100 30 IF A=2 THEN GOTO 200 40 IF A=3 THEN GOTO 400"

1860 PRINT:PRINT"YOU CAN SEE HOW THIS WORKS."
1870 GOSUB 2030:GOSUB 2180
1880 PRINT"GOSUB WORKS LIKE GOTO EXCEPT THE COMPUTER REMEMBERS THE LINE NUMBER WHERE IT ENCOUNTERED THE COMMAND GOSUB, AND WHEN IT ENCOUNTERS THE COMMAND RETURN, IT WILL GO BACK TO THE LINE"
1890 PRINT"FOLLOWING THE LINE WHERE YOU HADTHE GOSUB COMMAND, OR TO THE NEXT STATEMENT IN THE LINE IF YOU HAVE MORE THAN ONE STATEMENTIN THE LINE CONTAINING THE GOSUBCOMMAND."

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1900 GOSUB 2030:GOSUB 2180
1910 PRINT"THIS MAKES IT EASY TO
HAVE SUB-ROUTINES TO DO A SP
ECIFIC THING AND ONLY HAVE TO W
RITE IT ONCE. FOR INSTANCE IF YOU
HAVE A PROGRAM WITH A LOT OF IN
PUTS"

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1920 PRINT"IN IT, OR A DELAY, OR
ANYTHING WHICH IS USED A LOT YOU
CAN WRITE IT JUST ONCE WITH
A HIGH LINE NUMBER LIKE 50000 AN
D SEND THE COMPUTER TO IT FROM AN
Y"

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1930 GOSUB 2030:GOSUB 2180
1940 PRINT"LINE IN YOUR PROGRAM A
ND IT WILL RETURN TO THE LINE YOU
SENT IT FROM, NO MATTER WHICH ON
E IT IS."
1950 PRINT:PRINT"SAMPLE PROGRAM:"

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```

1960 GOSUB 2030:GOSUB 2180
1970 PRINT"10 INPUT A$":PRINT"20
IF A$="";CHR$(34);"END";CHR$(34)"
THEN END"
1980 PRINT"30 GOSUB 50:GOTO 10
1990 PRINT"50 PRINT#-2,A$:RETURN
2000 PRINT:PRINT"AS YOU CAN SEE,
WITH THIS PROGRAM WE ARE US
ING BOTH A GOSUB AND GOTO COM
MANDS"
2010 GOSUB 2030
2020 RUN"BASIC2"
2030 PRINT:PRINT"HIT ANY KEY TO C
ONTINUE";
2040 A$=INKEY$:IF A$="" THEN 2040

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2050 CLS:RETURN
2060 PRINT" *** LOGICAL OPERATOR
AND ***":RETURN
2070 PRINT" *** LOGICAL OPERATOR
ASC ***":PRINT:RETURN
2080 CLS:PRINT" *** AUDIO ON/OFF
COMMAND ***":PRINT:RETURN
2090 CLS:PRINT" *** CLOAD/CSAVE C
OMMANDS ***":PRINT:RETURN
2100 CLS:PRINT" *** LOGICAL OPERA
TOR CHR$ ***":PRINT:RETURN
2110 CLS:PRINT" *** BASIC COMMAND
CLOSE ***":PRINT:RETURN
2120 CLS:PRINT" *** BASIC COMMAND
CLS ***":PRINT:RETURN
2130 CLS:PRINT" *** BASIC COMMAND
CLEAR ***":PRINT:RETURN
2140 CLS:PRINT" *** BASIC COMMAND
CONT ***":PRINT:RETURN
2150 CLS:PRINT" *** BASIC COMMAND

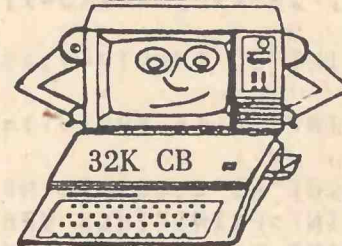
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DATA ***":PRINT:RETURN
2160 CLS:PRINT" *** BASIC COMMAND
DIM ***":PRINT:RETURN
2170 CLS:PRINT" *** BASIC COMMAND
EOF ***":PRINT:RETURN
2180 CLS:PRINT" *BASIC COMMANDS F
OR/NEXT/STEP*":PRINT:RETURN
2190 CLS:PRINT" * BASIC COMMANDS
GOTO/GOSUB *":PRINT:RETURN

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AFTER RUNNING MEMORY = 5084  
MEMORY REQUIRED = 17739



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10 CLS:GOSUB 2720
20 PRINT"THESE MAY BE THE MOST PO
WERFUL COMMANDS AVAILABLE ON THE
COLOR COMPUTER. THEY LET YOU TES
T FOR A TRUE OR FALSE."
30 PRINT"EG: IF the dog caught th
e rabbit THEN stop chasing it
ELSE continue the chase."
40 PRINT"IN THIS EXAMPLE, THE STA
TEMENT :THE DOG CAUGHT THE RABBI
T: IS BEING ANALYZED TO SEE IF
IT IS TRUE OR FALSE"
50 GOSUB 2690:GOSUB 2720
60 PRINT"IF IT WERE TRUE, THEN TH
E ACTION TAKEN WAS TO STOP CHASING
IT. THE ELSE COMMAND LETS YOU
TAKE OTHER ACTION IF THE STATEME
NT IS FALSE, IN OUR EXAMPLE IT
WAS TO CONTINUE CHASING THE RABBI
T."
70 PRINT:PRINT"NOW LET'S APPLY TH
IS TO OUR COMPUTER. WE ARE GO
ING TO WRITE A SHORT PROGRAM TO I
LLUSTRATE HOW TO USE THE IF/THE
N COMMANDS"
80 GOSUB 2690:GOSUB 2720
90 PRINT"10 A$="CHR$(34);"RABBIT"

100 PRINT"20 PRINT"CHR$(34);"CAN
YOU NAME AN ANIMAL WITH LONG EARS
, THAT HOPS AND MULTIPLIES";CHR$(
34)
110 PRINT"30 INPUTB$
120 PRINT"40 IF A$=B$ THEN PRINT"
;CHR$(34);"HEY, YOUR RIGHT! IT IS
A";CHR$(34);"A$ ELSE PRINT";CHR$

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(34);"SORRY YOUR WRONG. IT'S A ";
CHR$(34);"A$"
130 PRINT:PRINT"IF THE PERSON TYP
ES IN RABBIT THEN A$ WILL EQUAL
B$ AND THE STATEMENT IS TRUE."

140 GOSUB 2690:GOSUB 2720
150 PRINT"IF THE PERSON TYPED IN
HARE OR BUNNY, THE STATEMENT MAY
BE TRUE, BUT SINCE IT DOESN'
T MATCH RABBIT, IT'S FALSE,
SO YOU MUST BE CAREFUL HOW YOU
ENTER THINGS AS JUST ONE LET
TER OR NUMBER DIFFERENCE WILL BE
"
160 PRINT"REPORTED AS FALSE."
170 PRINT:PRINT"SEE IF YOU CAN FI
ND OTHER WAYS TO USE IF/THEN/ELS
E COMMANDS."
180 GOSUB 2690:GOSUB 2730
190 PRINT"INKEY$ PRONOUNCED INKEY
-STRING. THIS COMMAND ALLOWS YOU
TO RUN A PROGRAM AND CHECK THE K
EYBOARD FOR A KEYPUSH WHEN EVER YO
U WANT WITHOUT INTERUPTION OF THE
PROGRAM. IT DOESN'T STOP AND
WAIT FOR THE INPUT."
200 PRINT"AT THE BOTTOM OF THIS S
CREEN YOU SEE [HIT ANY KEY TO CONT
INUE]. WE ARE USING THE INKEY$ F
UNCTION";
210 PRINT"TO DO THIS. BUT WE ARE
NOT DOING ANYTHING ELSE WHILE WE W
AIT."
220 GOSUB 2690:GOSUB 2730
230 PRINT"WE COULD BE DOING OTHER
THINGS WHILE WE WAIT FOR YOU TO
READ THIS, LIKE SCROLL THE HEA
DER.":PRINT:PRINT"OBSERVE"
240 FOR X=1024 TO 1055
250 IF X=1055 THEN P=PEEK(1024) E
LSE P=PEEK(X+1)
260 A$=INKEY$:IF A$<>"" THEN 290
270 POKE X,P:NEXT X
280 GOTO 240
290 CLS:GOSUB 2730
300 PRINT"WANT TO KNOW HOW WE DID
THIS?":PRINT:PRINT"LOOK AT THE P
ROGRAM":PRINT
310 PRINT"10 FOR X=1024 TO 1055":
PRINT"20 IF X=1055 THEN P=PEEK(10
24) ELSE P=PEEK(X+1)
320 PRINT"30 A$=INKEY$:IF A$<>";S
TRING$(2,34);"THEN 50"
330 PRINT"40 POKE X,P:NEXT X:GOTO
10"

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340 PRINT"50 CONTINUE PROGRAM"
350 GOSUB 2690:GOSUB 2730
360 PRINT"INKEY$ DOES NOT PRINT W
HAT YOU INPUT ON THE SCREEN (UNL
ESS YOU TELL IT TO) SO THE INKEY$
IS A GOOD FUNCTION TO USE WHEN
YOU ARE ENTERING YOUR SECRET CO
DE OR PASSWORD IN FRONT OF FRIE
NDS."
370 PRINT"THE INKEY$ ALSO SERVES
ANOTHER FUNCTION AS IT WILL TAKE
ANY- THING YOU INPUT FROM THE
KEY- BOARD, ARROW KEYS, CLEAR E
TC."
380 GOSUB 2690:GOSUB 2730
390 PRINT"SO YOU COULD WRITE A PR
OGRAM TO ACCEPT INPUT FROM THE KE
YBOARD AND SEND THEM DIRECTLY TO
THE PRINTER. IF YOU DID WRITE
THAT PROGRAM, HITTING THE DOWN A
RROW WOULD MAKE THE PAPER ADVANCE
(LINEFEED) AND HITTING THE CL
EAR"
400 PRINT"KEY WOULD SEND A TOP OF
FORM CODE TO THE PRINTER, ADV
ANCING IT TO THE NEXT PAGE."
410 GOSUB 2690:GOSUB 2730
420 PRINT"AS YOU CAN SEE, THE INK
EY$ COMMAND HAS A LOT OF USE
S. IT DOES HAVE IT'S LIMITAT
IONS TOO. FOR INSTANCE, YOU CAN
'T INPUT DATA INTO A NUMERIC
VARIABLE WITH THE INKEY$."
430 PRINT"THE VARIABLE CAN BE CON
VERTED INTO A NUMERIC VARIABLE
THOUGH. ALSO, SINCE IT DOESN'T PR
INT TO THE SCREEN, YOU MAY FIND I
T DIFFICULT TO REMEMBER JUST
WHAT YOU HAVE ENTERED AND WHAT YO
U HAVEN'T.";
440 GOSUB 2690:GOSUB 2740
450 PRINT"INPUT TELLS THE COMPUTE
R THAT THERE IS DATA COMING FRO
M THE KEYBOARD, TO STOP AND WAI
T FOR IT. IT ALSO PRINTS A ? AN
D A CURSOR."
460 PRINT"IT WILL ACCEPT THE DATA
INTO THE VARIABLE YOU HAVE ASSIGN
ED TO THE INPUT ONLY WHEN YOU H
IT THE ENTER KEY. SO CORRECTIONS
CAN BE MADE BEFORE ENTERING."
470 GOSUB 2690:GOSUB 2740
480 PRINT"THE DATA DOES NOT HAVE
TO COME FROM THE KEYBOARD THOUGH
, IT CAN COME FROM THE CASSETT
E.":PRINT"IF YOU WANT THE INPUT F

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ROM THE CASSETTE INSTEAD OF THE
KEYBOARDYOUR COMMAND WOULD BE:"
490 PRINT"INPUT#-1,A$":PRINT"THE
#-1 TELLS THECOMPUTER THAT THE IN
PUT IS FROM TAPE."
500 PRINT"ACTUALLY AN INPUT FROM
THE KEY- BOARD SHOULD BE: INPUT#0
,A$ IF THERE IS NO #XX THEN T
HE COMPUTER ASSUMES THAT IT'S
0.";
510 GOSUB 2690:GOSUB 2740
520 PRINT"WHY #-1 AND NOT #1? ":P
RINT"THE BUFFERS #1 THRU #9 ARE S
ET ASIDE FOR DISK BUFFERS AND TH
E POWERS THAT BE (RADIO SHACK)
THINK THAT -1 IS EASIER TO
REMEMBER THAN #10 OR #254."
530 PRINT:PRINT"I HAVE REFERED TO
NUMERIC VARIABLES, THERE A
RE ALSO STRING VARIABLES. T
HE INPUT COMMAND SEPERATES TH
E TWO SO IF YOU WANT A NUMBER,
YOU WON'T ACCIDENTLY GET A STRIN
G(LETTER)";
540 GOSUB 2690:GOSUB 2740
550 PRINT"THE $ AFTER A VARIABLE
TELLS THE COMPUTER IT'S A STRI
NG (LIKE A NAME) SO: INPUT A
$ MEANS THAT THE COMPUTER WI
LL ACCEPT ANYTHING ENTERED, BU
T WILL TREAT IT LIKE A NAME, A
ND YOU CAN'T MULTIPLY JOE * JOHN
."
560 PRINT"ON THE OTHER HAND IF YO
U HAVE INPUT A THE COMPUTER IS
THEN EXPECTING A NUMBER AND IF
YOU ACCIDENTLY ENTER A LETTER,
YOU WILL GET ?REDO AND THE COMP
UTER WILL STILL BE WAITING FOR A
#";
570 GOSUB 2690:GOSUB 2740
580 PRINT"INPUT ALLOWS YOU TO USE
A PROMPTON THE SCREEN ALSO, AND
LONG VARIABLE NAMES (2 SIGNIFI
CANT)"
590 PRINT"SO YOU CAN HAVE:":PRINT
:PRINT"INPUT";CHR$(34);"ENTER NAM
E ";CHR$(34);";NAME$":PRINT
600 PRINT"WHEN THE COMMAND IS ENC
OUNTERED AND THE COMPUTER IS AWAI
TING INPUT, IT LOOKS LIKE THIS
:"
610 INPUT"ENTER NAME";A$
620 CLS:GOSUB 2750
630 PRINT"INT SHORT FOR INTEGER.
"

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640 PRINT"THIS TRUNCATES ALL DEC
IMALS AND RETURNS THE WHOLE NU
MBER ONLY. IT DOES NOT ROUND
OFF ANYTHING, SO INT(6.01)=6 A
ND INT(6.99999) STILL EQUALS 6
."
650 PRINT"THE INT COMMAND IS VERY
USEFUL IN CONTROLING LONG DECIM
ALS THATYOU DON'T WANT, AND TO BE
SURE THAT YOU GET THE WHOLE NUM
BERS ONLY."
660 GOSUB 2690:GOSUB 2760
670 PRINT"THE JOYSTK FUNCTION RET
URNS A NUMBER BETWEEN 0 AND 63
FROM THE JOYSTICK SPECIFIED."
680 PRINT"THERE ARE ONLY 2 JOYSTI
CKS, BUT EACH CAN BE MOVED ON 2 D
IFFERENTPLANES EG. PLANE 1= UP &
DOWN PLANE 2= LEFT AND RIGHT."
690 PRINT"THEREFORE WE MUST INPUT
THEM AS IF THERE WERE 4. (0 TO 3
). I BET YOU CAN THINK OF 10
0'S OF WAYS TO USE THE JOYSTICKS.
"
700 GOSUB 2690:GOSUB 2760
710 PRINT"WE CAN MAKE A DRAWING P
ROGRAM:"
720 PRINT"10 A=JOYSTK(0):B=JOYSTK
(1)"
730 PRINT"20 SET(A,(B/2),8)
740 PRINT"30 GOTO 10"
750 PRINT:PRINT"WHAT TO SEE HOW T
HIS WORKS?"
760 PRINT:PRINT"ENTER Q TO EXIT D
RAWING PROGRAM"
770 GOSUB 2690:IF A$="Y" THEN 780
ELSE CLS:GOTO 830
780 CLSO
790 A=JOYSTK(0):B=JOYSTK(1)
800 SET(A,(B/2),8)
810 A$=INKEY$:IF A$="Q" THEN 830
820 GOTO 790
830 GOSUB 2770
840 PRINT"LEFT$ - PRONOUNCED LEFT
-STRING IS A COMMAND THAT ALLOWS
YOU TO SEPERATE A CERTAIN PORTIO
N OF THE STRING (YOU SPECIFY) O
N THE LEFT HAND SIDE."
850 PRINT"SUPPOSE WE HAVE STORED
ON TAPE A HUNDRED NAMES, ADDRESS
ES AND THE DATE THEY WERE PUT ON
TAPE."
860 PRINT"NOW, FURTHER SUPPOSE TH
AT WE WANT TO SEPERATE THOSE T
HAT WERE ENTERED ON THE 10TH
MONTH."

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870 GOSUB 2690:GOSUB 2770
880 PRINT"IF WE INPUT THESE FROM
THE TAPE AND WE HAVE ASSIGNED THE
DATES AS THE VARIABLE FOR THE D
ATE. WE CAN MATCH THOSE WHO WER
E ENTERED IN OCTOBER LIKE THI
S:"
890 PRINT"10 OPEN";CHR$(34);"I";C
HR$(34);",#-1,";CHR$(34);"NAME";C
HR$(34)
900 PRINT"20 FOR X=1 TO 100
910 PRINT"30 INPUT#-1,N$,AD$,DATE
$
920 PRINT"40 IF LEFT$(DATE$,2)=";
CHR$(34);"10";CHR$(34)" THEN PRIN
T N$,AD$,DATE$"
930 PRINT"50 NEXT X
940 GOSUB 2690:GOSUB 2770
950 PRINT"THIS WOULD SELECTIVELY
PRINT ONLY THOSE WHO WERE ENTE
RED ON THE 10TH MONTH."
960 PRINT:PRINT"I USE THE LEFT$ F
UNCTION A LOT IN MY INPUTS, SO W
HEN YOU ARE ASK TO ANSWER YES O
R NO, IT DOESN'T MATTER IF YO
U TYPE YES OR Y OR YEA, THE ANSW
ER IS STILLACCEPTED AS YES AS LON
G AS THE FIRST LETTER IS A Y."
970 GOSUB 2690:GOSUB 2770
980 PRINT"I DO IT LIKE THIS.."
990 PRINT"1000 INPUT";CHR$(34);"W
ANT A PRINTOUT";CHR$(34);"A$
1000 PRINT"1020 A$=LEFT$(A$,1):RE
TURN
1010 PRINT:PRINT"THIS WOULD BE A
SUBROUTINE THAT COULD BE CALLED F
ROM ANY LINE IN THE PROGRAM, WE
'LL SAY 20 AND THE PROGRAM WOU
LD RETURN TO LINE 30. SO 30 WOULD
BE:"
1020 PRINT:PRINT"30 IF A$=";CHR$(
34);"Y";CHR$(34);" THEN GOSUB XXX
X
1030 GOSUB 2690:GOSUB 2780
1040 PRINT"LEN -- SHORT FOR LENGT
H (MEANING LENGTH OF THE
STRING)"
1050 PRINT"THIS COMMAND ALLOWS YO
U TO FIND THE LENGTH OF A STRING.
EG: A=LEN(A$)"
1060 PRINT"WHY WOULD YOU WANT TO
FIND THE LENGTH OF A STRING?"
1070 PRINT"WELL, THERE ARE MANY R
EASONS WE WILL ILLUSTRATE JUST
ONE."
1080 GOSUB 2690:GOSUB 2780

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1090 PRINT"10 INPUT";CHR$(34);"EN
TER YOUR NAME";CHR$(34);"A$"
1100 PRINT"20 A=LEN(A$)"
1110 PRINT"30 FOR X=1 TO A"
1120 PRINT"40 B$=MID$(A$,X,1):IF
B$=CHR$(32) THEN 60
1130 PRINT"50 NEXT X
1140 PRINT"60 B$=LEFT$(A$,X):C$=R
IGHT$(A$,A-X)
1150 PRINT"70 PRINT C$";CHR$(34)
;",";CHR$(34);"B$"
1160 PRINT:PRINT"WHAT DOES THIS P
ROGRAM DO?"
1170 GOSUB 2690:GOSUB 2780
1180 PRINT"LET ME SHOW YOU:"PRIN
T"PLEASE ENTER YOUR NAME: (FIRST
AND LAST ONLY)":INPUTA$
1190 A=LEN(A$):FOR X=1 TO A
1200 B$=MID$(A$,X,1):IF B$=CHR$(3
2) THEN 1220 ELSE NEXT X
1210 PRINT"SORRY, I NEED A SPACE"
:GOTO 1180
1220 B$=LEFT$(A$,X):C$=RIGHT$(A$,
A-X)
1230 PRINT:PRINTC$;",";B$
1240 PRINT:PRINT"WE HAVE JUST PUT
YOUR LAST NAME FIRST. WITH A LIT
TLE PRACTICE WE COULD DO A WHOL
E SERIES OF NAMES LIKE THIS."
1250 GOSUB 2690:GOSUB 2790
1260 PRINT"THE LIST COMMAND LETS
YOU LIST ON THE SCREEN, ALL OR P
ART OF YOUR BASIC PROGRAM."
1270 PRINT"THIS COMMAND IS ALWAYS
ENTERED DIRECTLY FROM THE KEYBO
ARD. JUST TYPING LIST, WILL L
IST THE ENTIRE PROGRAM. TYPING LI
ST-100 WILL LIST PROGRAM LINES 0
TO 100LIST 100-150 WILL LIST PROG
RAM LINES STARTING AT 100 AND EN
DING";
1280 PRINT"AT PROGRAM LINE 150. T
YPING LIST 100- WILL LIST LI
NES 100 TO THE END OF THE PROGRA
M";
1290 GOSUB 2690:GOSUB 2800
1300 PRINT"THE LLIST COMMAND DOES
EXACTLY THE SAME AS THE LIST CO
MMAND, EXECPT THAT IT IS LISTED
ON THE PRINTER INSTEAD OF THE SC
REEN."
1310 GOSUB 2690:GOSUB 2810
1320 PRINT"THE MOTOR ON OR MOTOR
OFF TURNS THE CASSETTE MOTO
R ON OR OFF. THIS COMMAND IS USE
FUL WHEN YOU WANT TO MOVE A T

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APE TO A BLANK SPOT BETWEEN PROGRAMS OR TO PLAY MUSIC OR VOICE THROUGH THE TV. VIA THE COMPUTER."  
 1330 GOSUB 2690:GOSUB 2820  
 1340 PRINT"MID\$ (PRONOUNCED MID STRING)":PRINT"THIS FUNCTION IS VERY SIMILAR TO LEFT\$, EXCEPT IT LETS YOU FIND THINGS IN THE MIDDLE OF THE STRING."  
 1350 PRINT:PRINT"A\$=";CHR\$(34);"THIS IS A TEST";CHR\$(34)  
 1360 PRINT:PRINT"TO GET THE [IS] OUT OF A\$ IN THE EXAMPLE, YOU WOULD TYPE: B\$=MID\$(A\$,5,2)"  
 1370 GOSUB 2690:GOSUB 2820  
 1380 PRINT" B\$=MID\$(A\$,5,2)":PRINT  
 1390 PRINT"WE ARE USING B\$ TO STORE OUR ANSWER, A\$ IS THE STRING WE ARE WORKING ON. THE 5 IS THE STARTING POINT AND THE 2 IS THE NUMBER OF CHARACTERS WE WANT."  
 1400 PRINT:PRINT"NOW A\$ CONTAINED : THIS IS A TEST"  
 1410 PRINT"IF WE NUMBER IT 12345678901"  
 1420 PRINT"YOU WILL NOTICE THAT THE 5TH & 6TH CHARACTERS ARE THE [IS]"  
 1430 GOSUB 2690:GOSUB 2820  
 1440 PRINT"ONE OF THE MAIN USES OF MID\$ IS TO FIND SOMETHING IN THE MIDDLE OF THE STRING. WE USED LEFT\$ A WHILE BACK TO SEPERATE THE MONTH (10) OUT OF A DATE: 10/XX/XX. WE CAN USE MID\$ TO  
 1450 PRINT"FIND THE DAY OF THE MONTH OUT OF THE DATE 10/29/83. IT MAY TAKE A LITTLE MORE BECAUSE THE LENGTH MAY NOT ALWAYS BE THE SAME. EG. 5/2/83 IS SHORTER."  
 1460 GOSUB 2690:GOSUB 2820  
 1470 PRINT"10 A=LEN(A\$)":PRINT"20 FOR X=1 TO A":PRINT"30 B\$=MID\$(A\$,X,1)":PRINT"40 IF B\$=CHR\$(47) THEN C=X:GOTO60";  
 1480 PRINT"50 NEXT X":PRINT"60 B\$=MID\$(A\$,X+1,2)":PRINT"70 B=VAL(B\$)"  
 1490 PRINT:PRINT"IN THIS PROGRAM, WE ARE FIRST FINDING THE LENGTH OF THE STRING IN LINE 10."  
 1500 GOSUB 2690:GOSUB 2820

1510 PRINT"THE LENGTH OF THE STRING TELLS US THE UPPER LIMIT OF X, OR HOW MANY CHARACTERS TO SEARCH THROUGH."  
 1520 PRINT"WHEN B\$ EQUALS A / WE EXIT THE LOOP, BECAUSE WE KNOW THAT THE NEXT 1 OR 2 CHARACTERS AFTER THE / ARE THE DAY. SO IN LINE 60 WE"  
 1530 PRINT"GET THE NEXT 2 CHARACTERS. NOW WE MAY HAVE A 10 OR WE MAY HAVE A 5/ BUT IT DOESN'T MATTER.";  
 1540 PRINT"BECAUSE WE ARE THEN USING THE VAL [SHORT FOR VALUE] FUNCTION"  
 1550 GOSUB 2690:GOSUB 2820  
 1560 PRINT"TO CHANGE THE STRING B\$ INTO A NUMERIC VARIABLE B. SO IF B\$=10 THEN THE VALUE OF B WILL BE 10 AND IF B\$=5/, SINCE THE / DOES NOT HAVE A NUMERIC VALUE IT IS IGNORED AND B WILL EQUAL 5."  
 1570 PRINT:PRINT"B WILL NOW BE EQUAL TO THE DAY OF THE MONTH":PRINT:PRINT"CAN YOU THINK OF OTHER USES FOR THE MID\$ FUNCTION?"  
 1580 GOSUB 2690:CLS:PRINT" \*\*\* BASIC COMMAND MEM \*\*\*":PRINT  
 1590 PRINT"MEM SHORT FOR MEMORY WILL LET YOU KNOW HOW MUCH FREE MEMORY YOU HAVE LEFT FOR YOUR BASIC PROGRAMS, IN BYTES."  
 1600 PRINT:PRINT"ALL YOU HAVE TO DO TO USE IT IS TYPE: PRINT MEM OR ON THE COLOR COMPUTER ?MEM"  
 1610 PRINT:PRINT"HIT ANY KEY TO CONTINUE"  
 1620 GOSUB 2690:GOSUB 2830  
 1630 PRINT"THIS COMMAND ERASES YOUR BASIC PROGRAM AND CLEARS ALL VARIABLES"  
 1640 PRINT:PRINT" \*\*\* BASIC COMMAND AND NEXT \*\*\*"  
 1650 PRINT:PRINT"SEE THE FOR/NEXT /ELSE COMMANDS"  
 1660 GOSUB 2690:GOSUB 2840  
 1670 PRINT"NOT IS A LOGICAL OPERATOR. IT REVERSES THE NUMBER, BIT BY BIT. IF YOU PRINT NOT5 YOU WILL GET A -6."  
 1680 PRINT"THIS OPERATOR IS USEFUL IN EXTENDED BASIC IN THE GRAPHICS MODE FOR INVERTING THE G



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RAPHICS DISPLAY."
1690 GOSUB 2690:GOSUB 2850
1700 PRINT"OPEN  ALLOWS YOU TO OP
EN FILES  ON THE TAPE PLAYER FOR
EITHER  INPUT OR OUTPUT."
1710 PRINT:PRINT"THE SYNTAX FOR O
PEN FOR OUTPUT: 100 OPEN ";CHR$(3
4);"0";CHR$(34);",#-1,";CHR$(34);
"PROGRAM";CHR$(34)
1720 PRINT:PRINT"THE SYNTAX FOR O
PEN FOR INPUT: 100 OPEN ";CHR$(3
4);"I";CHR$(34);",#-1,";CHR$(34);
"PROGRAM";CHR$(34)
1730 GOSUB 2690:GOSUB 2850
1740 PRINT"WHAT THE COMMAND DOES
IS:      ON OUTPUT, WRITES AN OP
ENING   HEADER ON THE TAPE AND T
HE      PROGRAM NAME."
1750 PRINT:PRINT"ON INPUT, STARTS
LOOKING ON THE TAPE FOR AN OPENI
NG HEADER AND  IF IT FINDS IT, SE
TS THE   COMPUTER TO ACCEPT
DATA FROM  THE TAPE."
1760 GOSUB 2690:GOSUB 2860
1770 PRINT"THIS COMMAND IS USED W
ITH     GOTO OR GOSUB TO SAVE A
LOT     OF TYPING."
1780 PRINT"IF YOU HAD A MENU WITH
SAY 10  OPTIONS ON IT, WITHOUT
THIS   COMMAND YOU WOULD HAVE T
O TYPE 10 LINES TO TELL THE COMP
UTER   WHERE IN THE PROGRAM TO GO
."
1790 PRINT"WITH THIS PROGRAM YOU
ONLY NEED 1 LINE."
1800 GOSUB 2690:GOSUB 2860
1810 PRINT"100 ON X GOSUB 200,300
,400,500
1820 PRINT:PRINT"IN OUR EXAMPLE A
BOVE WE HAVE 4  ELEMENTS. IF X=1
THEN LINE 200  IS SELECTED, IF X=
2 THEN LINE 300 IS SELECTED, ET
C., ETC."
1830 PRINT:PRINT"WITHOUT THIS COM
MAND YOU WOULD  HAVE TO HAVE A SE
T LIKE THIS:"
1840 GOSUB 2690:GOSUB 2860
1850 PRINT"100 IF X=1 THEN GOSUB
200"
1860 PRINT"110 IF X=2 THEN GOSUB
300"
1870 PRINT"120 IF X=3 THEN GOSUB
400"
1880 PRINT"130 IF X=4 THEN GOSUB
500"
1890 PRINT:PRINT"SEE HOW MUCH EAS

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IER IT WAS WITH "
1900 PRINT"100 ON X GOSUB 200,300
,400,500
1910 PRINT:PRINT"CAN YOU IMAGINE
HOW MUCH EASIER IT IS WHEN YOU HA
VE 10 LINES?"
1920 GOSUB 2690:GOSUB 2870
1930 PRINT"ANOTHER MATHEMATICAL O
PERATOR  FOR BINARY NUMBERS. WIT
H THIS  ONE, IF THE BIT IS SET I
N THE  FIRST NUMBER, OR THE BIT
IS SET IN THE SECOND NUMBER, THEN
THE  BIT WILL BE SET IN THE ANSW
ER."
1940 PRINT"EG:"
1950 PRINT"   FIRST #  11100011
(227)"
1960 PRINT"   2ND #   00111001
(57)"
1970 PRINT"   ANSWER  11111011
(251)"
1980 GOSUB 2690:GOSUB 2870
1990 PRINT"MAKE A LIST DESCRIBING
3 USES  YOU COULD MAKE OF THIS
OPERATOR"
2000 PRINT:PRINT"ANOTHER USE FOR
OR IS WITH THE  IF/THEN/ELSE COMM
ANDS. IT IS   USED LIKE THIS:"
2010 PRINT:PRINT"100 IF A=1 OR A=
2 THEN GOTO 200"
2020 GOSUB 2690:GOSUB 2880
2030 PRINT"THERE ARE 16384 MEMORY
LOCATIONSIN A 16K COMPUTER, 3276
8 IN A   32K AND 65536 IN A 64K."
2040 PRINT"THE COMMAND PEEK, LET'
S YOU LOOKAT ANY ONE OF THESE LOC
ATIONS.  EVERY LOCATION IN THE CO
MPUTER  WILL CONTAIN A NUMBER BET
WEEN   0 AND 255, SOME OF THEM MA
Y      REPRESENT A LETTER IN THE A
SCII SET, BUT TO THE COMPUTER, TH
ERE IS ONLY NUMBERS."
2050 GOSUB 2690:GOSUB 2880
2060 PRINT"IT IS USEFUL SOMETIMES
TO SEE  EXACTLY WHAT IS IN A ME
MORY   LOCATION. A PRINT PEEK(X
XX)   WILL TELL YOU."
2070 PRINT"HERE ARE SOME USES FOR
THIS  COMMAND:"
2080 PRINT"1. FIND THE STOP,START
& EXEC  ADDRESSES OF A MACHI
NE     LANGUAGE PROGRAM."
2090 PRINT"2. SEE IF THE JOYSTICK
BUTTON  IS BEING PUSHED."
2100 GOSUB 2690:GOSUB 2880

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2110 PRINT"THESE ARE JUST HUNDREDS OF WAYS TO USE PEEK. IF CONJUNCTION WITH THE COMMAND POKE, YOU CAN STORE DATA (PAGE NUMBERS?) (LINES PER PAGE?) IN SPECIFIC MEMORY LOCATIONS AND READ THEM BACK WITH THE PEEK COMMAND."
2120 PRINT:PRINT"YOUR TEACHER WILL WANT YOU TO FIND A USE FOR THIS COMMAND. SEE IF YOU CAN FIND A GOOD ONE."
2130 GOSUB 2690:GOSUB 2890
2140 PRINT"POKE IS THE OPPOSITE OF PEEK.. POKE ALLOWS YOU TO POKE A NUMBER INTO A SPECIFIC MEMORY LOCATION."
2150 PRINT:PRINT"EG: IF YOU DON'T LIKE THE GREEN SCREEN."
"
2160 PRINT:PRINT"TYPE POKE 359,57:SCREEN0,1":PRINT:PRINT"YOU WILL NOW HAVE A PINK SCREEN"
2170 GOSUB 2690:GOSUB 2890
2180 PRINT"YOU CAN USE POKE TO:"
2190 PRINT"1. CHANGE PRINTER BAUD RATE
2. CHANGE PRINTER WIDTH
3. CHANGE THE VALUE OF A MEMORY LOCATION IN RAM"
NY
"
2200 PRINT:PRINT"CAN YOU FIND A SPECIFIC USE FOR THE POKE COMMAND? CAN YOU WRITE A PROGRAM USING PEEK & POKE?"
2210 GOSUB 2690:GOSUB 2900
2220 PRINT"WITH COLOR BASIC YOU HAVE WHAT IS CALLED (LOW RESOLUTION COLOR GRAPHICS) WITH 64 POINTS WIDE AND 32 POINTS HIGH. IF YOU ARE USING THESE GRAPHICS, YOU CAN"
2230 PRINT"FIND OUT IF A POINT IS SET OR RESET, AND WHAT COLOR IT IS WITH THE POINT COMMAND. IT IS USED LIKE THIS:"
2240 PRINT"100 A=POINT(12,12) "
2250 GOSUB 2690:GOSUB 2900
2260 PRINT"YOU CAN ALSO USE VARIABLES: 100 A=POINT(X,Y)"
2270 PRINT:PRINT"IF YOU ARE WRITING A GAME SAY, YOU CAN USE THIS FUNCTION TO SEE IF YOUR BOMB OR BULLET HAS HIT ITS TARGET."
2280 GOSUB 2690:GOSUB 2910
2290 PRINT"PRINT IS USED SEVERAL WAYS. WE WILL LOOK AT PRINT, ?, PRINT@ PRINT#-1, PRINT#-2, ETC."

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"
2300 PRINT"YOU HAVE PROBABLY NOTICED BY NOW THAT YOU CAN INTERCHANGE THE WORD PRINT WITH THE ? ON THE COLOR COMPUTER. THIS IS TO SAVE A LOT OF TYPING TIME."
2310 PRINT:PRINT"THE COMMAND PRINT, PRINTS A SPECIFIC MESSAGE ON THE TV SCREEN."
2320 GOSUB 2690:GOSUB 2910
2330 PRINT"THE SYNTAX FOR PRINT IS:"
2340 PRINT"PRINT ";CHR$(34);"MY NAME";CHR$(34)
2350 PRINT"OR PRINT A$, OR PRINT 123 OR PRINT A, ETC."
2360 PRINT:PRINT"PRINT@ .... THIS PRINTS AT A SPECIFIC LOCATION ON THE SCREEN"
2370 PRINT"TYPING PRINT@224,";CHR$(34);"MY NAME";CHR$(34)
2380 PRINT:PRINT"WILL PUT THE WORDS [MY NAME] AT SCREEN LOCATION N 224":PRINT"(ABOUT THE CENTER OF THE SCREEN)";
2390 GOSUB 2690:GOSUB 2910
2400 PRINT"THE PRINT@ SYNTAX IS:"
"
2410 PRINT"PRINT@XX,"
2420 PRINT"YOU ARE TELLING THE COMPUTER TO PRINT, AT A CERTAIN LOCATION AND WHAT THE LOCATION IS. (THE COMMA AFTER THE LOCATION IS NECESSARY.)"
2430 PRINT:PRINT"THERE ARE SEVERAL PLACES YOU CAN PRINT TO. ACTUALLY TO PRINT TO THE SCREEN, YOU SHOULD HAVE A PRINT#0, AND YOU CAN USE PRINT IN THIS WAY.:"
2440 GOSUB 2690:GOSUB 2910
2450 PRINT"THE COMPUTER ASSUMES A 0 WHICH IS THE TV SCREEN IF YOU DON'T SPECIFY ANYTHING. HOWEVER IT IS NICE TO KNOW THAT THE COMPUTER WILL ACCEPT A PRINT#0 AS YOU CAN OFFER A CHOICE OF PRINT OUTS IN YOUR PROGRAM, AND STILL USE"
2460 PRINT"ONLY ONE ROUTINE FOR THE PRINTOUT. EG:
2470 GOSUB 2690:GOSUB 2910
2480 PRINT"10 PRINT"CHR$(34);" 1.
PRINT TO SCREEN 2.
PRINT TO PRINTER 3. P
PRINT TO TAPE"
2490 PRINT"20 INPUT A:IF A=1 THEN

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B=0      30 IF A=2 THEN B=-2
          40 IF A=3 THEN B=-1"
2500 PRINT"50 PRINT#B,";CHR$(34);
"TEST";CHR$(34)
2510 PRINT:PRINT"THIS PROGRAM ILL
ISTRATES THE USE YOU CAN MAKE OF T
HE PRINT#0, AS YOU ONLY HAVE ONE
PRINT STATE- MENT FOR A CHOICE O
F 3 PRINTOUTS";
2520 GOSUB 2690:GOSUB 2910
2530 PRINT"PRINT TAB(X);
2540 PRINT:PRINT"TAB LETS YOU PRI
NT AT A          CERTAIN PLACE ON
A LINE.          THIS LETS YOU LINE
UP ROWS          AND COLUMNS."
2550 PRINT:PRINT"10 FOR X=1 TO 10
"
2560 PRINT"20 PRINT X;TAB(15);X+5
"
2570 PRINT"30 NEXT X
2580 PRINT:PRINT"LET'S SEE WHAT I
T DOES."
2590 GOSUB 2690:GOSUB 2910
2600 FOR X=1 TO 10:PRINTX;TAB(15)
;X+5:NEXT X
2610 PRINT"SEE HOW IT WORKS?"
2620 GOSUB 2690:GOSUB 2910
2630 PRINT"SEVERAL COMMANDS CAN B
E USED          TOGETHER. LIKE: PRINT#-
2,TAB(5) TO PRINT AT THE 5TH COLU
MN ON          THE PRINTER INSTEAD OF TH
E          SCREEN."
2640 PRINT"YOU CAN ALSO USE ?#-2,
INSTEAD          OF THE PRINT#-2. THE CO
MPUTER          WILL CONVERT THE ? TO PR
INT."
2650 PRINT:PRINT"IF YOU HAVE EXTE
NDED BASIC, BE SURE TO LOOK AT P
RINT USING."
2660 PRINT:PRINT"HIT ANY KEY TO C
ONTINUE"
2670 A$=INKEY$:IF A$="" THEN 2670

2680 RUN"BASIC3"
2690 PRINT:PRINT"HIT ANY KEY TO C
ONTINUE";
2700 A$=INKEY$:IF A$="" THEN 2700

2710 CLS:RETURN
2720 PRINT"* BASIC COMMANDS IF/TH
EN/ELSE *":PRINT:RETURN
2730 PRINT" *** BASIC COMMAND IN
KEY$ ***":PRINT:RETURN
2740 PRINT" *** BASIC COMMAND I
NPUT ***":PRINT:RETURN
2750 PRINT" *** BASIC OPERATOR

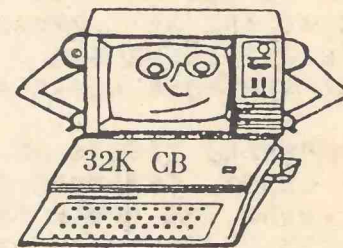
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INT ***":PRINT:RETURN
2760 PRINT" ***** JOYSTK **
*****":PRINT:RETURN
2770 PRINT" *** BASIC FUNCTION LE
FT$ ***":PRINT:RETURN
2780 PRINT" *** BASIC FUNCTION L
EN ***":PRINT:RETURN
2790 PRINT" *** BASIC COMMAND LI
ST ***":PRINT:RETURN
2800 PRINT" *** BASIC COMMAND LLI
ST ***":PRINT:RETURN
2810 PRINT" * BASIC COMMAND MOTOR
ON/OFF *":PRINT:RETURN
2820 PRINT" *** BASIC FUNCTION M
ID$ ***":PRINT:RETURN
2830 PRINT" *** BASIC COMMAND N
EW ***":PRINT:RETURN
2840 PRINT" *** BASIC OPERATOR
NOT ***":PRINT:RETURN
2850 PRINT" *** BASIC COMMAND O
PEN ***":PRINT:RETURN
2860 PRINT" *** BASIC COMMAND O
N ***":PRINT:RETURN
2870 PRINT" *** LOGICAL OPERATOR
OR ***":PRINT:RETURN
2880 PRINT" *** BASIC COMMAND P
EEK ***":PRINT:RETURN
2890 PRINT" *** BASIC COMMAND P
OKE ***":PRINT:RETURN
2900 PRINT" *** BASIC COMMAND PO
INT ***":PRINT:RETURN
2910 PRINT" *** BASIC COMMAND PR
INT ***":PRINT:RETURN

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AFTER RUNNING MEMORY = 1783  
MEMORY REQUIRED = 21040



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10 GOSUB 840
20 PRINT"THE READ COMMAND IS USED
IN CONJUNCTION WITH A DATA S
TATE- MENT."
30 PRINT"IT IS USED LIKE THIS:"
40 PRINT:PRINT"10 FOR X=1 TO 5:RE
AD A$
50 PRINT"20 PRINT A$:NEXT X
60 PRINT"30 DATA ONE,TWO,THREE,FO
UR,FIVE"
70 PRINT:PRINT:FOR X=1 TO 5:READA
$:PRINTA$;" ";:NEXT X:PRINT

```

```

80 DATA ONE,TWO,THREE,FOUR,FIVE
90 GOSUB 810:GOSUB 850
100 PRINT"REM AND ' CAN BE INTERC
HANGED  REM IS SHORT FOR REMEMBE
R AND  ' IS SHORT FOR REM."
110 PRINT"YOU MAY NOT THINK THIS
IS VERY IMPORTANT, BUT IF YOU HA
VE EVER TRIED TO DEBUG A PROGRAM
THAT  SOMEONE ELSE HAS WRITTEN."
120 PRINT"YOU WILL LEARN TO LOVE
THE REM  COMMAND. ONE WORD ABOUT
IT  THOUGH."
130 PRINT"MAKE YOUR GOTO'S AND GO
SUBS GO  TO THE LINE AFTER THE RE
M'S"
140 GOSUB 810:GOSUB 860
150 PRINT"THIS COMMAND EXECUTES Y
OUR  PROGRAM."
160 PRINT:PRINT" *** BASIC COMMAN
D RESTORE ***"
170 PRINT"RESETS THE POINTER TO T
HE START OF YOUR DATA STATEMENTS.
"
180 PRINT:PRINT" *** BASIC COMMAN
D RETURN ***"
190 PRINT"RETURNS THE COMPUTER BA
C TO THE LINE AFTER THE GOSUB THA
T SENT  IT TO THIS ROUTINE"
200 GOSUB 810:GOSUB 870
210 PRINT"USE THIS COMMAND WITH T
HE LOW  RESOLUTION GRAPHICS TO R
ESET  A POINT TO 0 (BLACK)"
220 PRINT"MOST OF THE TIME YOU WI
LL CLEAR THE SCREEN TO BLACK FOR
YOUR  GRAPHICS, SO WE CALL THIS
RESET"
230 PRINT"TO SEE WHAT SET/RESET D
OES LOOK AT THE SET COMMAND"
240 GOSUB 810:GOSUB 880
250 PRINT"REMEMBER LEFT$ AND MID$
?"
260 PRINT"WELL, RIGHT$ IS THE OPP
OSITE OF LEFT$.  REMEMBER THE DATE
? WE  FOUND THE MONTH AND THE D
AY  WITH LEFT$ AND MID$, NOW W
E  FIND THE YEAR WITH RIGHT$."
270 PRINT"PROGRAM:":PRINT"10 DATE
$=";CHR$(34);"10/12/83";CHR$(34)
280 PRINT"20 B$=RIGHT$(A$,2)"
290 PRINT:PRINT"SIMPLE ISN'T IT?"
300 GOSUB 810:GOSUB 890
310 PRINT"RND, SHORT FOR RANDOM N
UMBER,  GENERATES A RANDOM NUMBE
R  BETWEEN 1 AND THE NUMBER

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```

WHICH  YOU SPECIFY."
320 PRINT"PROGRAM:":PRINT"10 FOR
X=1 TO 100:A=RND(100)"
330 PRINT"20 PRINT@395,X;A":PRINT
"30 FOR C=1 TO 100:NEXT C,X
340 FOR X=1 TO 100:A=RND(100):PRI
NT@395,X;A;
350 FOR C=1 TO 100:NEXT C,X
360 GOSUB 810:GOSUB 890
370 PRINT"AS YOU COULD SEE THE NU
MBER ON  THE LEFT WAS THE VALUE O
F X BUT THE NUMBER ON THE RIGHT W
AS JUSTRANDOM NUMBERS BETWEEN 1 A
ND 100"
380 PRINT"WHAT'S THAT YOU SAY? YO
U WANT A NUMBER BETWEEN 0 AND 1?
WHY  SURE!"
390 PRINT"IF YOU USE RND(0) YOU W
ILL GET  A RANDOM NUMBER DECIMAL
BETWEEN 0 AND 1 (9 DIGITS LONG!)"
400 GOSUB 810:GOSUB 890
410 PRINT"NOW THAT WE KNOW WHAT R
ND IS,  JUST WHAT CAN WE DO WITH
IT?"
420 PRINT"WE COULD USE IT TO WRIT
E A  NUMBER GUESSING GAME, OR
A  MATH GAME, OR WE COULD US
E IT  TO SEND THE COMPUTER TO A
SUBROUTINE ONCE IN A WHILE.
"
430 PRINT:PRINT"YOUR ASSIGNMENT:
WRITE THE 3  PROGRAMS TO DO THE
ABOVE."
440 GOSUB 810:GOSUB 900
450 PRINT"SET/RESET LETS YOU PUT
GRAPHICS ON THE SCREEN ALONG WITH
PRINTEDTEXT. YOU CAN ALSO HAVE V
ERY  FAST GRAPHICS IN THE LOW R
ES  MODE."
460 PRINT:PRINT"DEMO PROGRAM:":PR
INT"10 CLSO:FOR X=0 TO 63":PRINT"
20 SET(X,0,5):SET(X,31,4)":PRINT"
30 NEXT X"
470 FOR X=0 TO 63:SET(X,0,5):SET(
X,31,4):NEXTX
480 GOSUB 810:GOSUB 910
490 PRINT"THE SGN IS SHORT FOR SI
GN AND  WILL RETURN THE SIGN OF
A  NUMBER. IF THE NUMBER IS
NEGATIVE IT WILL RETURN A
-1  IF POSITIVE IT WILL RETURN
A 1"
500 PRINT"USE IT WHENEVER YOU WAN
T TO  ACCEPT ONE SET OF NUMBER
S  AND REJECT THE OPPOSITE."

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```

510 GOSUB 810:GOSUB 920
520 PRINT"THE SKIPF COMMAND ALLOW
S YOU TO SKIP PROGRAMS ON A TAPE.
    IT WILL NOT SKIP TO THE P
ROGRAM YOU SPECIFY, BUT WILL SKIP
OVER THE PROGRAM YOU SPECIFY, SO
IF YOU WANT TO GOTO THE 10TH "
530 PRINT"PROGRAM ON THE TAPE, YO
U MUST TYPE SKIPF";CHR$(34);"NA
ME OF 9TH PROGRAM";CHR$(34)
540 PRINT:PRINT"THIS COMMAND IS U
SEFUL TO SKIP OVER PROGRAMS ON T
HE TAPE TO THE END, SO YOU CAN
ADD A PROGRAM TO IT.";
550 GOSUB 810:GOSUB 930
560 PRINT"THE SIN OPERATOR RETURN
S THE SINE OF AN ANGLE IN RADI
ANS":PRINT"EG: PRINT SIN(1.5)
    OR A=SIN(1.5)"
570 PRINT"TO CONVERT TO DEGREES M
ULTIPLY BY 57.29577951"
580 GOSUB 810:GOSUB 940
590 PRINT"SOUND: EVER PLAY YOUR R
OM?"
600 PRINT"PROGRAM:"
610 PRINT"10 FOR X=40960 TO 41000

620 PRINT"20 P=PEEK(X):IF P<1 THE
N P=1"
630 PRINT"30 R=INT(P/50)+1
640 PRINT"40 SOUND P,R
650 PRINT"50 NEXT X
660 FOR X=40960 TO 41000:P=PEEK(X
):IF P<1 THEN P=1
670 R=INT(P/50)+1:SOUND P,R:NEXTX

680 PRINT:PRINT"NOT VERY PRETTY I
S IT?"
690 PRINT"THE SOUND COMMAND LETS
YOU SOUND A TONE 1 TO 255 FO
R A DURATION OF 1 TO 255."
700 GOSUB 810:GOSUB 940
710 PRINT"SOUND CAN BE MADE INTO
A PRETTY SONG IF YOU WORK AT IT."

720 GOSUB 810:GOSUB 950
730 PRINT"STOP....DOES JUST THAT.
    IT STOPS PROGRAM EXECUTION,
    BUT UNLIKE END, YOU CAN TYPE
CONT AND CONTINUE THE PROGRAM A
FTER IT ENCOUNTERS A STOP COMMAN
D."
740 PRINT:PRINT"YOU DON'T LOOSE T
HE VALUES IN YOUR VARIABLES EIT
HER."
750 GOSUB 810:GOSUB 960

```

```

760 PRINT"STR$ LETS YOU CONVERT
YOUR NUMERIC VARIABLE INTO A
STRING."
770 PRINT"WHY DO YOU WANT TO CHAN
GE A VARIABLE TO A STRING?"
780 PRINT"TRY PRINTING A NUMERIC
VARIABLE SEVERAL TIMES LIKE:"PRI
NT"PRINT A;A;A YOU WILL NOTICE A
SPACE BETWEEN THEM, AND THAT'S
GOOD MOST OF THE TIME."
790 PRINT"BUT THERE ARE TIMES YOU
MAY WANTTO BUTT THEM TOGETHER, L
IKE WITH A DATE."
791 PRINT"VAL, SHORT FOR VALUE. C
ONVERTS A STRING TO A NUMERIC VA
RIABLE. EG: A=VAL(A$)."
792 PRINT" OR IF VAL(A$)=XX TH
EN XX"
800 END
810 PRINT:PRINT"HIT ANY KEY TO CO
NTINUE";
820 A$=INKEY$:IF A$="" THEN 820
830 RETURN
840 CLS:PRINT" *** BASIC COMMAND
READ ***":PRINT:RETURN
850 CLS:PRINT" *** BASIC COMMAND
REM ***":PRINT:RETURN
860 CLS:PRINT" *** BASIC COMMAND
RUN ***":PRINT:RETURN
870 CLS:PRINT" *** BASIC COMMAND
RESET ***":PRINT:RETURN
880 CLS:PRINT" *** BASIC COMMAND
RIGHT$ ***":PRINT:RETURN
890 CLS:PRINT" *** BASIC COMMAND
RND ***":PRINT:RETURN
900 CLS:PRINT" *** BASIC COMMAND
SET ***":PRINT:RETURN
910 CLS:PRINT" *** BASIC COMMAND
SGN ":PRINT:RETURN
920 CLS:PRINT" *** BASIC COMMAND
SKIPF ***":PRINT:RETURN
930 CLS:PRINT" *** BASIC OPERATOR
`SIN ***":PRINT:RETURN
940 CLS:PRINT" *** BASIC COMMAND
SOUND ***":PRINT:RETURN
950 CLS:PRINT" *** BASIC COMMAND
STOP *** ":PRINT:RETURN
960 CLS:PRINT" *** BASIC COMMAND
STR$ *** ":PRINT:RETURN
970 CLS:PRINT" *** BASIC COMMAND
VAL ***":PRINT:RETURN

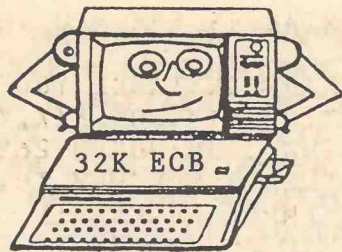
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AFTER RUNNING MEMORY = 17243  
MEMORY REQUIRED = 5580

# Extended

Continued on  
the next page

# EXTENDED Color Basic



```
10 GOSUB 2670
20 PRINT"ATN IS SHORT FOR ARCTAN
   GENT (WHICH IS SHORT FOR [THE
   ANGLE WHOSE TANGENT IS])."
30 PRINT"REMEMBER THAT THE COLOR
   COMPUTER COMPUTES IN RADIANS, NOT
   DEGREES. SO IF YOU WANT DEGREES, MU
   LTIPLY THE ANGLE BY 57.2957787"
40 PRINT:PRINT"ATN RETURNS THE AN
   GLE IF YOU KNOW THE TANGENT. (
   REMEMBER ITS IN RADIANS.) EG: ?AT
   N(1.29)."
```

```
50 GOSUB 2630:GOSUB 2680
60 PRINT"CIRCLE IS A COMPLEX COMM
   AND WITH MANY VARIABLES THAT
   YOU CAN USE. (YOU DON'T HAVE T
   O REMEMBER ALL OF THEM TO USE
   THE CIRCLE COMMAND). "
```

```
70 PRINT"THE SYNTAX FOR CIRCLE IS
   :":PRINT:PRINT"100 CIRCLE(128,96)
   ,50,5,1,.2,.8":PRINT:PRINT"WE WIL
   L GO THRU THESE ONE AT A TIME AN
   D SHOW YOU HOW THEY ARE (OR CAN
   BE) USED."
```

```
80 GOSUB 2630:GOSUB 2680
90 PRINT"CIRCLE(128,96),50
100 PRINT:PRINT"THIS IS THE FEWES
   T NUMBER OF VARIABLES YOU CAN
   HAVE AND STILL USE THE CIRCLE COMM
   AND.":PRINT"THE PART INSIDE THE (
   ) ARE THE SCREEN LOCATIONS FOR T
   HE CENTER OF THE CIRCLE."
```

```
110 GOSUB 2630:GOSUB 2680
120 PRINT"THE SCREEN IS SET UP WI
   TH X (HORIZONTAL) AND Y (VERT
   ICAL) CO-ORDINATES. THE HORIZON
   TAL (SCREEN WIDTH) IS DIVIDED
   UP INTO 256 DOTS (0 TO 255) AN
   D THE Y, VERTICAL (SCREEN HEIG
   HT) IS DIVIDED UP INTO 192 DOTS
   (0 TO 191)."
```

```
130 PRINT:PRINT"THE (128,96) IN O
   UR EXAMPLE IS THE CENTER OF THE
   SCREEN. THE 50 IN OUR EXAMP
   LE IS THE RADIUS OF THE CIRCLE
```

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```
.":
140 GOSUB 2630:GOSUB 2680
150 PRINT"SO, CIRCLE (128,96),50
   WILL DRAW A CIRCLE AT THE CEN
   TER OF THE SCREEN WITH A RADIUS
   OF 50 DOTS."
```

```
160 PRINT:PRINT"CIRCLE(128,96),50
   ,5":PRINT
170 PRINT"WE JUST ADDED A ,5 TO O
   UR CIRCLE COMMAND. THIS SPE
   CIFIES COLOR."
```

```
180 GOSUB 2630:GOSUB 2680
190 PRINT"CIRCLE(128,96),50,5,.5"
   :PRINT
200 PRINT"NOW WE HAVE A ,.5 ADDED
   TO OUR CIRCLE COMMAND. THIS IS
   THE HEIGHT/WIDTH RATIO. (WE C
   AN MAKE OVALS TOO!). IF YOU S
   PECIFY A NUMBER BETWEEN 0 AND 1 TH
   EN YOUR CIRCLE WILL BE WIDER TH
   AN IT IS HIGH, IF YOU SPECIFY A"
```

```
210 PRINT"NUMBER LARGER THAN 1 TH
   EN YOUR CIRCLE WILL BE TALLER TH
   AN IT IS WIDE. LET'S TRY IT."
```

```
220 PMODE4,1:PCLS:SCREEN1,1
230 CIRCLE(128,96),50
240 A$="CIRCLE CMD":GOSUB 2750
250 FOR DLY=0 TO 500:NEXT DLY
260 PMODE3,1:PCLS:SCREEN1,1
270 FOR Y=5 TO 8:CIRCLE(128,96),5
   0,Y
280 A$="COLOR "+STR$(Y)
290 GOSUB 2750:FOR DLY=0 TO 500:N
   EXT DLY
300 NEXT Y
310 GOSUB 2630:GOSUB 2680
320 PRINT"NOW WE KNOW HOW TO DRAW
   A CIRCLE. MAKE IT THE SIZE WE WANT
   AND PLACE IT ON THE SCREEN. W
   E EVEN KNOW HOW TO CHANGE IT'S CO
   LOR. NOW LET'S TRY OVALS.":PRINT
```

```
330 PRINT"FIRST:CIRCLE(128,96),50
   ,5,.5":PRINT
340 PRINT"THE ,.5 WILL MAKE IT TW
   ICE AS WIDE AS IT IS TALL.":PRI
   NT"LET'S LOOK AT IT."
```

```
350 PMODE4,1:PCLS:SCREEN1,1:A$="
   ,.5"
360 CIRCLE(128,96),50,5,.5:GOSUB
   2750
370 FOR DLY=1 TO 1000:NEXT DLY
380 FOR Y=.2 TO 1 STEP .1
```

```

390 PCLS:CIRCLE(128,96),50,5,Y:A$
=STR$(Y):GOSUB 2750
400 FOR DLY=1 TO 500:NEXT DLY
410 NEXT Y
420 FOR Y=1 TO 10:A=INT(LOG(Y)*10
):Z=28-A:PCLS:CIRCLE(128,96),Z,5,
Y
430 A$=STR$(Y):GOSUB 2750
440 FOR DLY=1 TO 500:NEXT DLY
450 NEXT Y
460 GOSUB 2680
470 PRINT"WE JUST SEEN A DEMONSTR
ATION OF THE HEIGHT/WIDTH RATIO F
UNCTION."
480 PRINT"BUT LET'S NOT STOP YET!
"
490 PRINT:PRINT"WE STILL HAVE MOR
E TO GO.          CIRCLE(128,96),50,
5,1,.25,.75"
500 PRINT:PRINT"WHAT'S THIS? .25
AND .75?"
510 PRINT"THESE ARE START AND STO
P POINTS.YOU SEE WE DON'T HAVE TO
DRAW  A COMPLETE CIRCLE, WE CAN
DRAW  PART OF ONE, AN ARC."
520 GOSUB 2630:GOSUB 2680
530 PRINT"THE START POINT 0 AND T
HE END  POINT 1. ARE AT THE 3 0'
CLOCK  POSITION. SO A .25 IS AT
THE    6 0'CLOCK, .5 IS AT 9 0'CL
OCK   AND .75 IS AT 12 0'CLOCK."
540 PRINT"WE DON'T HAVE TO HAVE T
HE    START POINT WITH A LOWER
NUMBER THAN THE END POINT THOUGH
."
550 PRINT"WE CAN START AT .75 AND
END  AT  .25"
560 GOSUB 2630:GOSUB 2680
570 PRINT"HERE IS A SAMPLE PROGRA
M:"
580 PRINT"10 PMODE4,1:PCLS:SCREEN
1,1":PRINT"20 FOR X=.1 TO 1 STEP
.1":PRINT"30 CIRCLE(128,96),50,5,
1,X,1":PRINT"40 NEXT X
590 PRINT:PRINT"WE WILL DRAW AN A
RC FROM          DIFFERENT START PO
INTS (X) TO    THE END POINT OF 1.
"
600 GOSUB 2630
610 PMODE4,1:PCLS:SCREEN1,1
620 FOR Y=.1 TO 1 STEP .1:PCLS:CI
RCLE(128,96),50,5,1,Y,1
630 A$=STR$(Y):GOSUB 2750
640 FOR DLY=1 TO 400:NEXT DLY
650 NEXT Y
660 GOSUB 2680

```

```

670 PRINT"WE HAVE SHOWN A VARIABL
E AS THE START POINT IN THE PREVI
OUS    EXAMPLE, HOWEVER YOU CAN
USE    VARIABLES FOR ALL THE VALU
ES."
680 PRINT"FOR INSTANCE YOU COULD
USE":PRINT:PRINT"CIRCLE(X,Y),A,B,
C,D,E":GOSUB 2630:GOSUB 2680
690 PRINT"LET'S SEE HOW THIS MIGH
T WORK.  SAMPLE PROGRAM:"
700 PRINT"10 FOR X=100 TO 200 STE
P 10":PRINT"20 FOR Y=80 TO 120 ST
EP 10":PRINT"30 FOR A=0 TO 50 STE
P 5"
710 PRINT"40 B=5:C=(A+1)/25:D=C/2
:E=1-(C/2)"
720 PRINT"50 CIRCLE(X,Y),A,B,C,D,
E":PRINT"60 NEXTA,Y:PCLS:NEXTX"
730 GOSUB 2630:PMODE4,1:PCLS:SCRE
EN1,1:A$="HIT <S> TO STOP":GOSUB
2750
740 FOR DLY=1 TO 100:NEXT DLY:PCL
S
750 FOR Y=100 TO 200 STEP 50:A$="
X="+STR$(Y):GOSUB 2750:FOR Z=80 T
O 120 STEP 20:A$="Y="+STR$(Z):GOS
UB 2750:FOR A=0 TO 50 STEP 5
760 B=5:C=ABS((A+1)/25):D=C/2:E=A
BS(1-(C/2))
770 K$=INKEY$:IF K$="S" THEN 790
780 CIRCLE(Y,Z),A,B,C,D,E:A$="A="
+STR$(A)+"  C="+STR$(C):GOSUB 275
0:NEXTA:PCLS:NEXTZ:PCLS:NEXTY
790 GOSUB 2680
800 PRINT"WOULD YOU LIKE TO ENTER
YOUR    OWN VARIABLES?  TRY IT.
"
810 PRINT:INPUT"ENTER THE HORIZON
TAL POSITION  BETWEEN 0 AND 255"
;Y:IF Y<1 OR Y>255 THEN Y=128
820 PRINT:INPUT"ENTER THE VERTICA
L POSITION    BETWEEN 1 AND 191"
;Z:IF Z<1 OR Z>191 THEN Z=96
830 PRINT:INPUT"ENTER THE RADIUS
YOU WANT YOUR  CIRCLE TO BE (0 TO
100)":A:IF A<1 OR A>100 THEN A=5
0
840 PRINT:INPUT"ENTER THE COLOR Y
OU WANT YOUR  CIRCLE, (0 TO 8)":
B:IF B<0 OR B>8 THEN B=5
850 PRINT:INPUT"ENTER THE HEIGHT/
WIDTH RATIO  (0 TO 1) OR (1 TO
60)":C:IF C=0 OR C>60 THEN C=1
860 PRINT:INPUT"ENTER YOUR STARTP
OINT (0 TO 1)":D:IF D>1 THEN D=0
870 PRINT:INPUT"ENTER YOUR ENDPoi

```

```

NT (0 TO 1)";E:IF E>1 OR E<0 THEN
  E=1
880 PMODE3,1:PCLS:SCREEN1,1
890 CIRCLE(Y,Z),A,B,C,D,E
900 A$="AGAIN?":GOSUB 2750
910 GOSUB 2640:IF A$="Y" THEN 810

920 GOSUB 2690
930 PRINT"THE COMMAND COLOR ALLOW
S YOU TO SET THE BACKGROUND & FOR
EGROUND COLORS YOU WANT. YOU CAN
STILL SPECIFY THE COLORS YOU WAN
T WITH THE DRAW,PAINT,ETC. COMMAND
S "
940 PRINT"WHAT YOU SET WITH THE C
OLOR COMMAND IS THE DEFAULT C
OLORS. THE SYNTAX IS: COLOR 3,2
OR COLOR X,Y THE FIRST NUMBER
AS THE X IS THE FOREGROUND A
ND THE Y IS THE BACKGROUND COLO
R."
950 GOSUB 2630:GOSUB 2690
960 PRINT"YOU ARE ALLOWED 4 COLOR
S PER SCREEN SET IN PMODES 1 A
ND 3. IF YOU ARE USING SCREEN1,
0 THEN YOU WOULD USE COLORS 1 TO
4 AND IF YOU ARE USING SCREEN1,1
THEN YOU WOULD USE COLORS 5 TO 8.
"
970 PRINT:PRINT"WITH THE CIRCLE C
OMMAND WE USED A WHILE BACK WE SP
ECIFIED A COLOR, EG: CIRCLE(X
,Y),Z,COLOR WELL, WE COULD ALSO
SET THE COLOR LIKE THIS:"
980 GOSUB 2630:GOSUB 2690
990 PRINT"10 PMODE3,1:COLOR 2,3:P
CLS 20 SCREEN1,0":PRINT"30 C
IRCLE(128,96),50"
1000 PRINT:PRINT"THIS WILL CREATE
A BLUE BACKGROUND WITH A
WHITE CIRCLE"
1010 PRINT:PRINT"SINCE DRAW,CIRCL
E AND PAINT ALLOWS YOU TO SPE
CIFY COLOR, THIS COMMAND SEEMS
USELESS, BUT THE LINE COMMAND DO
ES NOT LET YOU SET COLOR."
1020 GOSUB 2630:GOSUB 2690
1030 PRINT"ALSO, IF YOU WANTED AL
L OF YOUR GRAPHICS TO BE WHITE ON
A BLUE BACKGROUND, THE COLOR CO
MMAND MAKES THIS A LOT EASIER."
1040 GOSUB 2630:GOSUB 2700
1050 PRINT"COS.. SHORT FOR COSINE
, RETURNS THE COSINE OF AN ANGLE
IN RADIANS"
1060 PRINT:PRINT"IT'S USED LIKE T
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```

```

HIS:"
1070 PRINT:PRINT"PRINT COS(ANGLE)
OR A=COS(ANGLE)"
1080 PRINT:PRINT"WHAT IS A COSINE
?"
1090 GOSUB 2630:GOSUB 2700
1100 PRINT"IN GEOMETRY, THE RATIO
OF THE SIDE ADJACENT TO THE AN
GLE TO THE HYPOTENUSE OF A RIGH
T TRIANGLE"
1110 PRINT"THE COSINE OF AN ACUTE
ANGLE EQUALS THE SINE OF IT'S
COMPLEMENTARY ANGLE. (SE
E SIN)"
1120 PRINT"IN TRIGONOMETRY, THE C
OSINE OF AN ANGLE IS THE RATIO O
F THE ABSCISSA,X, TO THE DISTA
NCE R, WHEN THE ANGLE IS IN STAN
DARD ANGLE POSITION."
1130 GOSUB 2630:PMODE4,1:PCLS:SCR
EEN1,1
1140 LINE(20,140)-(150,140),PSET:
LINE-(20,40),PSET:LINE-(20,140),P
SET
1150 DRAW"BM15,30":GOSUB 3170:DRAW
"BM15,160":GOSUB 3180:DRAW"BM155,
140":GOSUB 3160
1160 DRAW"BM5,100":GOSUB 3190:DRA
W"BM85,160":GOSUB 3200:DRAW"BM90,
90":GOSUB 3210
1170 A$="COS A=E/F":GOSUB 2750
1180 FOR DLY=1 TO 500:NEXT DLY
1190 A$="COS B=D/F":GOSUB 2750
1200 GOSUB 2640:SCREEN0:GOSUB 264
0
1210 GOSUB 2700
1220 PRINT"IF YOU DON'T UNDERSTAN
D ANY OF THE ABOVE, DON'T WORRY,
YOU REALLY DON'T HAVE TO UND
ERSTAND IT TO USE IT."
1230 PRINT"YOU CAN GET A BETTER V
IEW OF THE COSINE FUNCTION WIT
H THIS PROGRAM."
1240 PRINT"10 PMODE4,1:PCLS:SCREE
N1,1 20 PI=3.14159:FOR X=-PI
TO 2*PI 30 P=(X+PI)*25:Q=COS(X)*
40":PRINT"40 PSET(P,128+Q,5)
50 NEXT X"
1250 GOSUB 2630
1260 PMODE4,1:PCLS:SCREEN1,1:LINE
(0,96)-(255,96),PSET
1270 PI=3.14159:FOR X=-PI TO 2*PI
STEP .1:Q=COS(X)*40:P=(X+PI)*25:
PSET(P,128+Q,5):NEXT X:GOSUB 2640

```

Continued on Page 40



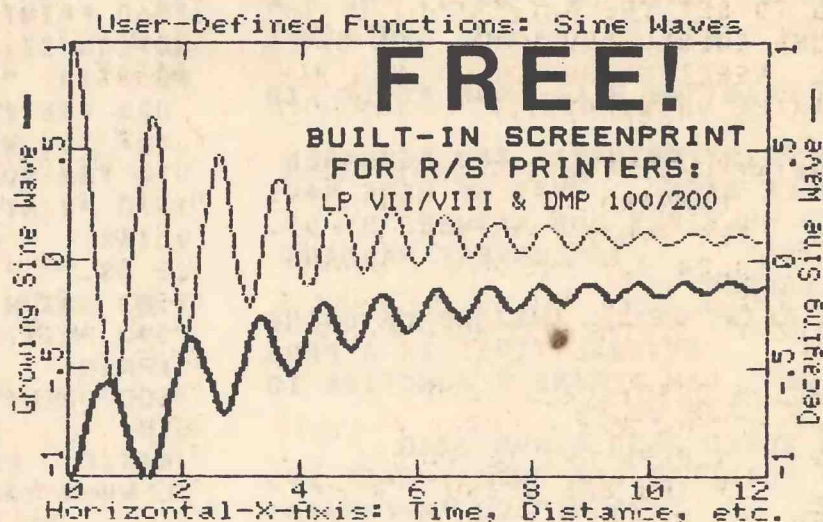
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1280 GOSUB 2640:GOSUB 2700
1290 PRINT"IF YOU WANT TO KNOW MORE ABOUT THE SINE/COSINE FUNCTIONS, ASK YOUR TEACHER OR CHECK A BOOK OUT OF THE LIBRARY ON TRIG OR GEOMETRY."
1300 GOSUB 2630:GOSUB 2710
1310 PRINT"DEF IS SHORT FOR DEFINE AND IS USED IN 2 WAYS. THE FIRST IS: DEF FN (DEFINE FUNCTION) ."
1320 PRINT"WE WILL LOOK AT IT FIRST."
1330 PRINT:PRINT"DO YOU REMEMBER A WHILE BACK THAT WE WERE HAVING TO MULTIPLY OUR ANSWERS BY 57.29577951 TO CONVERT RADIANS TO DEGREES?"
1340 PRINT"WELL, INSTEAD OF DOING THIS SEVERAL TIMES IN A PROGRAM WE CAN DEFINE A FUNCTION TO DO IT FOR US.";
1350 GOSUB 2630:GOSUB 2710
1360 PRINT"10 DEF FNR(X)=X*57.29577951 ":PRINT"100 AA=FNR(AA) ":PRINT
1370 PRINT"LETS TRY THIS OUT."
1380 DEF FNR(X)=X*57.29577951
1390 INPUT"ENTER A NUMBER";AA
1400 AA=FNR(AA):PRINT"WE ENTERED THE NUMBER INTO AA BUT NOW AA=" ;AA
1410 PRINT:INPUT"WANT TO TRY IT AGAIN";K$:IF LEFT$(K$,1)="Y" THEN
1390
1420 GOSUB 2710
1430 PRINT"WANT TO DEFINE YOUR OWN FUNCTION"
1440 PRINT"DEF FNR(X)=X*";:INPUTK

1450 DEF FNR(X)=X*K
1460 PRINT:PRINT"NOW LET'S SEE WHAT YOU HAVE DONE"
1470 INPUT"ENTER A NUMBER";AA
1480 PRINT"YOU ENTERED";AA;" BUT NOW WE USE AA=FNR(AA) AND YOUR ANSWER IS";
1490 AA=FNR(AA):PRINTAA
1500 PRINT"YOU CAN SEE HOW MUCH PROGRAMMINGTIME YOU CAN SAVE WITH THIS."
1510 GOSUB 2630:GOSUB 2710
1520 PRINT"NOW LET'S LOOK AT THE USER FUNCTIONS. THE COLOR COMPUTER ALLOWS YOU TO HAVE UP TO 9 USER CALLS"
```

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```
1530 PRINT"WHAT THIS MEANS IS THAT YOU CAN HAVE UP TO 9, MACHINE LANGUAGE SUBROUTINES THAT ARE ACCESSIBLE FROM YOUR BASIC PROGRAM."
1540 PRINT"MACHINE LANGUAGE ROUTINES ARE MUCH FASTER THAN BASIC AND THIS WILL SPEED YOUR PROGRAMS UP."
1550 GOSUB 2630:GOSUB 2710
1560 PRINT"THE SYNTAX FOR THIS FUNCTION IS:DEFUSR(O)=(LOCATION OF ROUTINE) ":PRINT"WHEN YOU WANT TO USE THE ROUTINEYOU TYPE Y=USR(O) . IF YOU WANT TO PASS PARAMETERS TO THE SUB-"
1570 PRINT"ROUTINE, YOU TYPE Y=USR(O(A$) OR WHATEVER YOUR VARIABLE IS."
1580 GOSUB 2630:GOSUB 2720
1590 PRINT"DEL.. SHORT FOR DELETE ":PRINT
1600 PRINT"YOU CAN USE DEL TO DELETE PROGRAM LINES FROM YOUR BASIC PROGRAM. IT IS MOST USEFUL WHEN YOU HAVE SEVERAL LINES TO DELETE."
1610 PRINT"LET'S ASSUME THAT YOU HAVE A PROGRAM WHICH HAS A REALLY NIFTY LITTLE ROUTINE IN IT AND YOU WOULD LIKE TO INCORPORATE IT INTO YOUR CURRENT PROGRAM."
1620 GOSUB 2630:GOSUB 2720
1630 PRINT"LET'S SAY THAT YOUR PROGRAM HAS LINE NUMBERS STARTING AT 10 AND ENDING AT 2080 BY 10'S, THIS GIVES US 208 LINES, AND THAT YOUR SUBROUTINE IS ON LINE NUMBERS 1530 TO 1810."
1640 PRINT"YOU COULD LIST 1530-1810 AND RETYPE THE ROUTINE, OR WITH THE DEL COMMAND YOU CAN TYPE DEL-1520 AND DEL 1820-"
1650 PRINT"THIS WOULD DELETE EVERYTHING EXCEPT YOUR ROUTINE AND YOU WOULDN'T HAVE TO TYPE ANYTHING.";
1660 GOSUB 2630:GOSUB 2720
1670 PRINT"OF COURSE YOU COULD TYPE IN THE LINE NUMBERS ONE AT A TIME AND HIT ENTER EACH TIME TO DELETE ALL THE LINE NUMBERS, BUT THIS REALLY WOULD TAKE SOME TIME."
1680 PRINT"I THINK YOU WILL FIND SEVERAL USES FOR THIS COMMAND A
```

```

FTER YOU HAVE WRITTEN SEVERAL PRO
GRAMS."
1690 GOSUB 2630:GOSUB 2730
1700 PRINT"THE DLOAD COMMAND (DOW
NLOAD) IS USED IN SCHOOLS AND
WHERE THE COLOR COMPUTER IS HO
OKED TO MAINFRAMES TO DOWNLOAD
A"
1710 PRINT"PROGRAM FROM THE OTHER
COMPUTER"
1720 PRINT:PRINT"PERSONALLY, I HA
VE FOUND NO USE FOR IT, BUT YOU M
AY BE USING IT IN YOUR SCHOOL."
1730 PRINT"IT IS USED SIMILAR TO
THE CLOAD COMMAND."
1740 GOSUB 2630:GOSUB 2740
1750 PRINT"THE DRAW COMMAND IS ON
E OF THE MOST POWERFUL GRAPHICS
COMMANDS WE HAVE ON THE COLOR COM
PUTER."
1760 PRINT"DRAW IS A COMPLEX COMM
AND THAT ACCEPTS MANY VARIABLES,
BUT THEY MUST BE IN THE FORM OF A
STRING."
1770 PRINT"THE STRING FOR THE DRA
W COMMAND MAY CONTAIN MOTION COMM
ANDS, MODES OR OPTIONS."
1780 GOSUB 2630:GOSUB 2740
1790 PRINT"MOTION COMMANDS":PRIN
T"M=MOVE THE DRAW POSITION":PRINT
"U=UP D=DOWN L=LEFT"
1800 PRINT"R=RIGHT E=45 DEGREE
ANGLE":PRINT"F=135 DEGREE ANG.
G=225 DEG. H=315 DEGREE ANG."
1810 PRINT"X=EXECUTE A SUBSTRING
& RETURN"
1820 PRINT:PRINT"MODES: C=COLOR"
1830 PRINT" A=ANGLE"
1840 PRINT" S=SCALE"
1850 PRINT"OPTIONS: N=NO UPDATE
B=BLANK"
1860 GOSUB 2630:GOSUB 2740
1870 PRINT"DRAW";CHR$(34);"BM128,
96;U5;R5;D5;L5";CHR$(34)
1880 PRINT:PRINT"IN OUR EXAMPLE A
BOVE WE ARE DRAWING A BOX (5
DOTS PER SIDE).THE FIRST PART IS
BM128,96 THIS IS <B>LANK <M>
OVE TO SCREEN LOCATION 128,
96"
1890 PRINT"(CENTER SCREEN) NEXT W
E HAVE U5, THIS MEANS GO UP 5
DOTS. R5, GO RIGHT 5 DOTS, D5=
DOWN 5 AND L5=GO LEFT 5. THIS DR
AWS A BOX."
1900 GOSUB 2630:PMODE4,1:PCLS:SCR

```

```

EEN1,1
1910 DRAW"BM128,96;U5R5D5L5"
1920 A$="DREW THIS."
1930 GOSUB 2750
1940 GOSUB 2640:GOSUB 2740
1950 PRINT"LET'S LOOK AT WHAT DIR
ECTION EACH OF THE DRAW COMMAN
DS TAKES US."
1960 GOSUB 2630
1970 PMODE4,1:PCLS:SCREEN1,1
1980 DRAW"BM128,96;NL50NU50NR50ND
50NH50NE50NG50NF50"
1990 DRAW"BM124,30":GOSUB 3360
2000 DRAW"BM200,100":GOSUB 3330
2010 DRAW"BM120,180":GOSUB 3190
2020 DRAW"BM60,100":GOSUB 3270
2030 DRAW"BM60,45":GOSUB 3230
2040 DRAW"BM190,45":GOSUB 3200
2050 DRAW"BM60,155":GOSUB 3220
2060 DRAW"BM190,155":GOSUB 3210
2070 GOSUB 2640:GOSUB 2740
2080 PRINT"DRAW";CHR$(34);"BM128,
96;U25;R25;D25;L25";CHR$(34)
2090 PRINT:PRINT"WE HAVE SHOWN TH
E BOX. WITH THE DRAW. LIKE THE LI
NE ABOVE.":PRINT"NOTE:IF YOU DON'
T SPECIFY A LENGTH FOR THE LI
NE THE COMPUTER WILL USE 1"
2100 PRINT:PRINT"NOW LET'S SET TH
E SQUARE ON EDGE. (A DIAMOND!
)"
2110 GOSUB 2630:GOSUB 2740
2120 PRINT"DRAW";CHR$(34);"BM128,1
50;E25;H25;G25;F25";CHR$(34)
2130 PRINT:PRINT"TAKE A LOOK."
2140 GOSUB 2630:PMODE4,1:PCLS:SCR
EEN1,1
2150 DRAW"BM128,150;E25H25G25F25"

2160 A$="LOOK SMALL?":GOSUB 2750:
GOSUB 2640
2170 GOSUB 2740:PRINT"YOU CAN MAK
E IT LARGER WITH THE ADDITION
OF JUST ONE LETTER S FOR SCALE.
"
2180 PRINT"DRAW";CHR$(34);"BM128,
150;S8;E25;H25;G25;F25";CHR$(34)
2190 PRINT"S3 WOULD BE 3/4THS SCA
LE. S4 MEANS 4/4THS OR 1 TO
1 SCALE THIS IS THE POWERUP SCAL
E."
2200 PRINT"YOU DON'T HAVE TO STOP
AT THAT THOUGH, YOU CAN GO ALL
THE WAY UP TO 62/4THS. OR ABOUT
15 TIMES NORMAL."

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# Binary Numbers

by John B. Spataro

Binary numbers and codes are the basic language of all microprocessors. Knowledge of number systems is essential to understanding microprocessors.

The number system we are all familiar with is the decimal system. This system was originally devised by Hindu mathematicians in India about 400 A.D. After it was introduced to the European community about 1200 A.D., it soon acquired the title "decimal number system."

A basic distinguishing feature of any number system is its Base or Radix. The base indicates the number of characters or digits used to represent quantities in that number system. The decimal system has a base of 10 because we use the ten digits, 0 - 9, to represent quantities. When the base is questionable, we use a subscript to define the base. (i.e.  $487_{10}$  is derived from a number system with a base of ten.)

The binary number system has a base of two since only the digits or bits 0 and 1 are used in forming numbers. The number  $110101_2$  represents the decimal quantity 53 or  $53_{10}$ .

The decimal number system came about basically as a result of man having 10 fingers. The binary system, while simple, is inconvenient to use because we are not familiar with it. It has special benefits when it comes to constructing the hardware used in digital equipment. A binary bit can be implemented with components of a simple on/off nature, such as, a switch or relay contacts or a transistor that conducts or does not conduct.

Both the decimal and binary systems are positional or weighed number systems. This means that each digit or bit position in a number carries a particular weight in determining the

magnitude of that number. For example, you know that a decimal number has positional weights of units, tens, hundreds, thousands, etc. For example consider the number 7438, in which there are 8 ones, 3 tens, 4 hundreds, and 7 thousands. The number can be written as indicated below:

$$\begin{aligned}(7 \times 10^3) + (4 \times 10^2) + (3 \times 10^1) + (8 \times 10^0) = \\ 7000 + 400 + 30 + 8 = \\ 7438_{10}\end{aligned}$$

(REMEMBER- ANY NUMBER WITH AN EXPONENT OF ZERO IS EQUAL TO ONE)

To determine the value you multiply each digit by the weight of its position and add your results.

Binary numbers work the same way. Each bit position carries a specific weight. As in the decimal system the position weights are some power of the base of the number system. Consider the binary number  $110101_2$ .

This can be written as:

$$\begin{aligned}(1 \times 2^5) + (1 \times 2^4) + (0 \times 2^3) + (1 \times 2^2) + \\ (0 \times 2^1) + (1 \times 2^0) = \\ 32 + 16 + 0 + 4 + \\ 0 + 1 =\end{aligned}$$

$53_{10}$

The quantity represented by the number is determined by multiplying each bit by its position weight and obtaining the sum.

Fractional numbers follow the same system. For example 78.94 can be written as:

$$\begin{aligned}(7 \times 10^1) + (8 \times 10^0) + (9 \times 10^{-1}) + (4 \times 10^{-2}) \\ 70 + 8 + .9 + .04 = \\ 78.94_{10}\end{aligned}$$

In a fractional binary number the weight of the fractional positions are negative powers of 2 or  $2^{-1} =$

$1/2 = .5$ ,  $2^{-2} = 1/4 = .25$ ,  $2^{-3} = 1/8 = .125$ , etc.

The binary number 1101.101 is evaluated as shown below:

$$(1 \cdot 2^3) + (1 \cdot 2^2) + (0 \cdot 2^1) + (1 \cdot 2^0) + (1 \cdot 2^{-1}) + (0 \cdot 2^{-2}) + (1 \cdot 2^{-3}) =$$

$$8 + 4 + 0 + 1 + .5 + .00 + .125 = 13.625_{10}$$

All digital computers store and process information using the binary system. A single binary digit is called a 'bit' and is usually grouped with 8 bits which is called a 'byte'. Two bytes or 16 bits is called a word.

This would indicate that number systems to the base 8 (octal) and base 16 (Hexadecimal) would be convenient to work with. The Hexadecimal number is most often used because they are shorter, and hexadecimal has become the standard for the microprocessor industry.

To convert a Decimal number, to any other number system, divide the decimal number by the base of the other system, and the remainder from each division will form the number in the new number system beginning with the least significant digit.

Convert  $357_{10}$  to binary:

0 1 2 5 11 22 44 89 178 357  
 0 1 0 1 1 0 0 1 0 1

Start from right to left:  $357/2=178$  R=1

To convert to decimal, multiply the number by the base starting at the left, add next digit and multiply again.

For Binary, base 2, double the MSD of the binary number and add this value to the digit in the next lowest order. Example: Convert  $101100101_2$

|        |   |   |   |    |    |    |    |     |     |
|--------|---|---|---|----|----|----|----|-----|-----|
| Binary | 1 | 0 | 1 | 1  | 0  | 0  | 1  | 0   | 1   |
| Double |   | 2 | 4 | 10 | 22 | 44 | 88 | 178 | 356 |
| Sum    |   | 2 | 5 | 11 | 22 | 44 | 89 | 178 | 357 |

Although the computer handles Binary numbers with ease, people do not. To improve the situation we can write the instructions using Hexadecimal numbers. As the name implies hexadecimal has a base (radix) of 16. It has the digits 0 - 9 and the letters A - F.

The letters are used because it is necessary to represent 16 different values with a single digit. The letters A - F are used to represent the value of 10 - 15. Using letters in counting may appear awkward until you become familiar with the system. Table I illustrates the relationship between decimal, hexadecimal, and binary.

Decimal to hex (short for hexadecimal) conversion is accomplished in the same manner as decimal to binary, as shown below:

Convert decimal 47632 to Hexadecimal:  
 $47632/16 = 2977$  remainder 0 = 0 (LSD)  
 $2977/16 = 186$  remainder 1 = 1  
 $186/16 = 11$  remainder 10 = A  
 $11/16 = 0$  remainder 11 = B (MSD)

$$BA10_{16} = 47632_{10}$$

To convert from Hexadecimal to Binary is really quite simple.

Convert  $3D7_{16}$  to Binary, D=13

3            D            7  
 0011       1101       0111

Begin by setting each hex digit to its 4 bit binary equivalent. Then run all the bits together.

$$3D7_{16} = 001111010111_2 \text{ or } 0011 \ 1101 \ 0111$$

To change from binary to hexadecimal, break the binary number into groups of four bits starting at the right.

The ease with which we can convert between binary and hexadecimal explains the use of hexadecimal in assembly language programming.

# A/L Programming

by John B. Spataro

The instruction part of a microprocessor is a binary digit pattern. A program is a series of instructions that causes a computer to perform a particular task. Ultimately, every program is a set of binary numbers.

In a machine language, or object, program the first instruction might be: 10110110

Can you imagine remembering that code. We can improve the situation somewhat by using hexadecimal numbers. The instruction now becomes (You know how to convert it, don't you?) "B6". Now we will need a program to load the hexadecimal numbers, convert them to binary numbers, and place them in memory. This is usually part of a larger program called a 'monitor', which also provides tools for debugging and analysis.

An obvious improvement is to assign a name to each instruction code. The instruction code name is called a memory jogger or "MNEMONIC". All microprocessor manufacturers provide a set of mnemonics for the microprocessor instruction set. (They can not remember hexadecimal codes either.) There is nothing sacred about these mnemonics; however, they are standard for a given microprocessor and; therefore, understood by all users. If we use the standard 6809 instruction and register mnemonics, as defined by Motorola, our previous instruction becomes - "LDA" or Load Accumulator. The next line would be either the address in memory that holds the data or the data itself. This is now becoming an assembly language, or source, program.

Now how do we get the assembly language program into the computer? We have to translate it either into hexadecimal or binary numbers. Although it is possible to 'hand assemble' this is a task usually done by the microcomputer using an "assembler"

program. The assembler program will translate a 'source' program, written with mnemonics, into a machine or 'object' program which the microcomputer can execute. An assembler is a program, just as the hexadecimal loader is a program. Assemblers are more expensive, occupy more memory, and require a greater execution time. While users may wish to write their own loaders, few care to write their own assemblers. Furthermore, the assemblers have their own rules that you must learn. These include use of certain markers (such as spaces, commas, semi-colons, or colons) in appropriate places, correct spelling, the proper control of information and the correct placement of names and numbers. The rules are simple and quickly learned.

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# Disadvantages of A/L

by John B. Spataro

The assembler does not solve all the problems of programming. One problem is the tremendous gap between the microcomputer instruction set and the tasks which the microcomputer is to perform. Computer instructions tend to do things such as, add the contents of two registers, shift the contents of the Accumulator on bit, or place a new value in the program counter. The assembly language pro-

grammer must translate whatever the program is expected to do into a sequence of simple computer instructions. This can be a difficult and time consuming job. Furthermore, the programmer must have detailed knowledge of the particular microcomputer being used. He must know what registers and instructions the microcomputer has, how the instructions affect the various registers, what addressing

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methods the computer uses, and a mass of other information. None of this information is related to the task which the microcomputer must ultimately perform.

In addition, the assembly language programs are not portable and each microcomputer has its own assembly language which reflects its own architecture.

## ESP

by James T. Crawford

ESP is an abbreviation standing for Extra Sensory Perception. There is considerable argument in the scientific community over the actual existence of ESP. The Laboratory results have proved inconclusive at best, while in the world of the mass media ESP and related paranormal concepts receive ever increasing attention.

This program allow you to test for one of the kinds of ESP: precognitive ability, or the ability to predict the future. The computer will select one of the first five letters of the alphabet and you will have to guess the letter. Each series consists of 50 guesses.

You are given two options in this program. In one option you will be told immediately if your guess was right or wrong. In the other option you will not be told your results until the end of the 50 guesses.

You will be asked to record your results, and then enter them so that the computer can show you a graphic representation of your attempts.

This is a very simple program and can be easily modified, although I do not suggest increasing the number of guesses in a run. The ability to successfully predict future events seems to decrease the more it is used in a single setting. If you wanted to make this a more graphic program, you could substitute drawings of the

Rhine cards for the letters of the alphabet used, and have the user guess the correct card.

This program is meant for a 16K ECB.

Lines 10-540 Basic instructions to the User

Lines 550-630 Option is selected

Lines 640-680 User is asked to make their choice

Lines 690-740 Computer picks a letter

Lines 750-790 Guess increased. Computer sees if the run is completed

Lines 800-830 Computer tells user how many guesses were correct

Lines 840-880 Results are evaluated

Lines 890-940 User is given a chance for another trial

Lines 970-1010 User inputs guess for Option 2

Lines 1020-1070 Computer picks the letter

Lines 1080-1100 Computer sees if run is completed.

Lines 1110-1150 User is told if guess is correct or incorrect

Lines 1160-1190 User is told how many he had correct

Lines 1200-1230 Results are evaluated

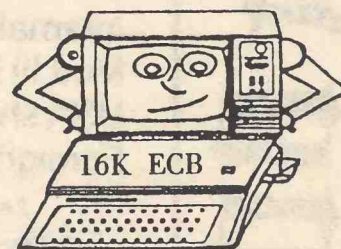
Lines 1240-1270 Instructions for use of the graph

Lines 1290-1770 The graph is constructed

Lines 1780-1820 Final statements are made

Lines 1850-2050 Graphic border is drawn for instructions

Lines 1830,1840,&2060 End the program



```
10 CLS
20 SOUND140,3:SOUND160,3:SOUND180
,3:SOUND200,3
30 PRINT@135,"esp test program"
40 PRINT @167,"by james t. crawfo
```



```

rd"
50 PRINT@230,"DURING THE PROGRAM,
WHEN"
60 PRINT@259,"YOU ARE READY TO MO
VE ON,"
70 PRINT@292,"PRESS ANY KEY TO CO
NTINUE"
80 GOSUB1850
90 A$=INKEY$:IF A$=""THEN90
100 SOUND140,2:SOUND160,2
110 CLS:GOSUB1850:PRINT@69,"INSTR
UCTIONS?(Y/N)":SOUND135,2:SOUND14
5,2:SOUND155,2:INPUTI$:IFI$="N"TH
EN 550 ELSE 130
120 T=0
130 CLS:PRINT@72,"THIS PROGRAM WI
LL HELP"
140 PRINT@99,"YOU TO DETERMINE IF
YOU HAVE"
150 PRINT@195,"eXTRAsENSORY pERCE
PTION"
160 PRINT@292,"THE COMPUTER WILL
USE"
170 PRINT@325,"5 LETTERS FOR THE
TEST."
180 GOSUB1850

```

Continued on Page 49

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**- SOFT AND HARD WARES FOR COLORFUL COMPUTING -**

Continued from Page 47

```
190 A$=INKEY$:IF A$=""THEN190
200 SOUND140,2:SOUND160,2
210 CLS
220 PRINT@37,"THE COMPUTER WILL PICK"
230 PRINT@66,"ONE OF FIVE LETTERS
---"
240 PRINT@98,"<A,B,C,D,E> AT RANDOM."
250 PRINT@164,"YOU WILL BE ASKED TO"
260 PRINT@194,"PICK WHAT LETTER YOU THINK"
270 PRINT@226,"THE COMPUTER SELECTED."
280 PRINT@324,"YOU WILL HAVE TWO OPTIONS"
290 PRINT@354,"TO CHOOSE FROM."
300 GOSUB1850
310 A$=INKEY$:IF A$=""THEN310
320 SOUND160,2:SOUND180,2
330 CLS
340 PRINT@36,"IN OPTION 1 YOU WILL"
350 PRINT@66,"NOT BE TOLD YOUR RESULTS"
360 PRINT@98,"UNTIL THE END OF THE TEST."
370 PRINT@134,"IN OPTION 2 YOU WILL"
380 PRINT@162,"BE TOLD IF YOUR GUESS"
390 PRINT@194,"WAS RIGHT OR WRONG AFTER"
400 PRINT@226,"EACH GUESS."
410 PRINT@324,"BY CHANCE YOU SHOULD"
420 PRINT@354,"GET ONE RIGHT OUT OF"
430 PRINT@386,"EVERY FIVE."
440 GOSUB1850
450 A$=INKEY$:IF A$=""THEN450
460 SOUND160,2:SOUND180,2
470 CLS
480 PRINT@36,"THERE WILL BE 50 GUESSES"
490 PRINT@66,"TO EACH SET."
500 PRINT@132,"JOT DOWN THE NUMBER":PRINT@162,"CORRECT AFTER EACH SET."
510 PRINT@293,"AFTER YOU FINISH THE":PRINT@322,"TEST, YOU CAN GRAPH YOUR":PRINT@354,"RESULTS."
520 GOSUB1850
530 A$=INKEY$:IF A$=""THEN530
```

```
540 SOUND180,2:SOUND200,2
550 CLS
560 PRINT@36,"CHOOSE YOUR OPTION:
"
570 PRINT @99,"1. RESULTS AT END OF TEST"
580 PRINT@131,"2. RESULTS AFTER EACH GUESS"
590 GOSUB1850
600 PRINT:PRINT:INPUT"PICK OPTION 1 OR 2";N
610 IF N>2 THEN GOTO 600
620 IF N=1 THEN GOTO 640
630 IF N=2 THEN GOTO 970
640 CLS:N=0:G=1
650 CLS
660 PRINT @4," GUESS NUMBER--";G
670 PRINT@68,"PICK FROM A,B,C,D,E
."
680 PRINT:PRINT:INPUT"CHOICE?A,B,C,D,E";A$
690 L=RND(5)
700 IF L=1 THEN C$="A"
710 IF L=2 THEN C$="B"
720 IF L=3 THEN C$="C"
730 IF L=4 THEN C$="D"
740 IF L=5 THEN C$="E"
750 G=G+1
760 IF G<=40 THEN GOTO 780
770 IF G=51 THEN GOTO 800
780 IF A$=C$ THEN N=N+1
790 GOTO 650
800 CLS
810 PRINT@36,"YOU HAD-"N"-RIGHT"
820 PRINT@100,"THIS IS A PERCENTAGE"
830 PRINT@130,"OF-"N/50*100"%"
840 GOSUB1850
850 IF N<10 THEN PRINT@324,"YOUR SCORE WAS BELOW":PRINT@353,"AVERAGE.":FOR X=1TO2000:NEXTX:GOTO890
860 IF N=10 THEN PRINT@324,"YOUR SCORE IS---":PRINT@353,"AVERAGE":FOR X=1TO2000:NEXTX:GOTO890
870 IF N>10 AND N<=16 THEN PRINT@324,"YOUR SCORE IS---":PRINT@353,"ENCOURAGING.":FOR X=1TO2000:NEXT X:GOTO890
880 IF N>16 THEN PRINT@324,"YOUR SCORE WAS":PRINT@353,"GOOD!!":FOR X=1TO2000:NEXTX:GOTO890
890 '
900 PRINT:PRINT:INPUT"TRY AGAIN?(Y/N)";A$
910 T=T+1
920 IF A$="Y" THEN GOTO 550
```

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```

930 IF A$="N" THEN GOTO 950
940 GOSUB1850
950 GOTO1240
960 GOTO1820
970 CLS:N=0:G=1
980 CLS
990 PRINT@4,"GUESS NUMBER-";G
1000 PRINT@68,"PICK FROM A,B,C,D,
E"
1010 PRINT:PRINT:INPUT"CHOICE?A,B
,C,D,E";A$
1020 L=RND(5)
1030 IF L=1 THEN C$="A"
1040 IF L=2 THEN C$="B"
1050 IF L=3 THEN C$="C"
1060 IF L=4 THEN C$="D"
1070 IF L=5 THEN C$="E"
1080 G=G+1
1090 IF G<50 THEN GOTO 1110
1100 IF G=51 THEN GOTO 1130
1110 IF A$=C$ THEN N=N+1:PRINT@41
6,"CORRECT.":FORX=1TO500:NEXTX:GO
TO 980
1120 IF A$<>C$THEN PRINT@416,"INC
ORRECT. IT WAS-";C$:FOR X=1TO500:
NEXTX:GOTO 980
1130 IF A$=C$ THEN N=N+1:PRINT@41
6,"CORRECT.":FORX=1TO500:NEXTX:GO
TO1160
1140 IF A$<>C$ THEN PRINT@416,"IN
CORRECT. IT WAS-";C$:FORX=1TO500:
NEXTX:GOTO1160
1150 GOTO980
1160 CLS
1170 PRINT@36,"YOU HAD-"N"-RIGHT.
"
1180 PRINT @66,"THIS IS A PERCENT
AGE OF-"N/50*100"%"
1190 GOSUB1850
1200 IF N<10 THEN PRINT@324,"YOUR
SCORE WAS BELOW":PRINT@353,"AVER
AGE.":FORX=1TO2000:NEXTX:GOTO890
1210 IF N=10 THEN PRINT@324,"YOUR
SCORE IS---":PRINT@353,"AVERAGE"
:FOR X=1TO2000:NEXTX:GOTO890
1220 IF N>10 AND N<=16 THEN PRINT
@324,"YOUR SCORE IS---":PRINT@353
,"ENCOURAGING.":FORX=1TO2000:NEXT
X:GOTO890
1230 IF N>16 THEN PRINT@324,"YOUR
SCORE WAS":PRINT@353,"GOOD!!!":F
ORX=1TO2000:NEXTX:GOTO890
1240 CLS:PRINT@36,"THE GRAPH WILL
SHOW":PRINT@66,"UP TO FIVE TRIAL
S."
1250 PRINT@132,"IF YOU DID FEWER

```

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```

THAN ":PRINT@162,"FIVE,ENTER 0 FO
R THE":PRINT@194,"REMAINING TRIAL
S."
1260 GOSUB 1850
1270 SOUND150,2:SOUND170,2:SOUND1
90,2
1280 A$=INKEY$:IF A$=""THEN1280
1290 CLS
1300 PRINT@352,"T5":PRINT@288,"T4
":PRINT@224,"T3":PRINT@160,"T2":P
RINT@96,"T1"
1310 PRINT@455,"10":PRINT@460,"20
":PRINT@465,"30":PRINT@470,"40":P
RINT@475,"50"
1320 FOR V=5TO27
1330 SET(5,V,3)
1340 NEXTV
1350 FOR H=5TO55
1360 SET(H,27,3)
1370 NEXTH
1380 PRINT@3,"TRIAL ONE SCORE-"
1390 INPUT N:IFN>50THEN1380
1400 N=N+5
1410 FOR H=5 TO N
1420 SET(H,7,3)
1430 NEXTH
1440 FOR X=1TO1000:NEXTX
1450 PRINT@32,""
1460 PRINT@3,"TRIAL TWO SCORE-"
1470 :INPUT N:IFN>50THEN1460
1480 N=N+5
1490 FOR H=5TON
1500 SET(H,11,3)
1510 NEXTH
1520 FOR X=1TO1000:NEXTX
1530 PRINT@32,""
1540 PRINT@3,"TRIAL THREE SCORE-"

1550 INPUT N:IF N>50 THEN 1540
1560 N=N+5
1570 FOR H=5 TO N
1580 SET(H,15,3)
1590 NEXT H
1600 FOR X=1TO1000:NEXTX
1610 PRINT@32,""
1620 PRINT@3,"TRIAL 4 SCORE-"
1630 INPUT N:IF N>50 THEN 1620
1640 N=N+5
1650 FOR H=5TON
1660 SET(H,19,3)
1670 NEXTH
1680 FOR X=1TO1000:NEXTX
1690 PRINT@32,""
1700 PRINT@3,"TRIAL FIVE SCORE-"
1710 INPUT N:IFN>50THEN1700
1720 N=N+5

```

```

1730 FOR H=5 TO N
1740 SET(H,23,3)
1750 NEXT H
1760 PRINT@32,"PRESS <ENTER> TO C
ONTINUE"
1770 A$=INKEY$:IF A$=""THEN1770
1780 CLS:PRINT@36,"*****ANALYSIS*
****"
1790 PRINT@100,"SCORES USUALLY GO
DOWN":PRINT@130,"THE MORE ONE TA
KES THE TESTS."
1800 PRINT @197,"IF YOU BELIEVE Y
OU":PRINT@226,"HAVE ESP, OR YOU J
UST WANT":PRINT@258,"TO KNOW MORE
ABOUT IT,CHECK":PRINT@290,"THE L
IBRARY TO FIND SOME OF":PRINT@322
,"THE MANY BOOK ON E.S.P."
1810 PRINT@418,"THANKS FOR TAKING
THE TEST"
1820 GOSUB1850
1830 END
1840 GOT01840
1850 FOR V=1024T01055
1860 R=RND(255)
1870 IF R<144 THEN 1860
1880 POKE V,R
1890 NEXT V
1900 FOR V=1504T01535
1910 R=RND(255)
1920 IF R<144 THEN 1910
1930 POKE V,R
1940 NEXT V
1950 FOR V=1056T01472STEP32
1960 R=RND(255)
1970 IF R<144THEN1960
1980 POKE V,R
1990 NEXTV
2000 FOR V=1087T01503STEP32
2010 R=RND(255)
2020 IF R<144THEN2010
2030 POKE V,R
2040 NEXTV
2050 RETURN
2060 GOT02060

```

```

START MEMORY OF 22823
MEM LEFT AFTER RUNNING IS 17506
TOTAL MEMORY USED IS 5317

```

Continued from Page 8

fair due to several system differences. COLOR COMPUTER NEWS did a compar-  
 ison in June using short loops with  
 simple math calculation using the num-  
 ber ten. I have made a number of  
 changes in their basic loops to give

a better overall picture of the real  
 situation.

It should be noted that, under FLEX  
 & TSC BASIC, for a constant to be  
 internally represented in floating point  
 format it must contain a decimal.  
 Refer Fig.A (pg98) to see how obvious  
 the time differences are. Note that,  
 under TSC BASIC, the fastest calcula-  
 tions use integer variables and integer  
 constants in an integer loop.

TSC XBASIC is faster, because MICRO-  
 SOFT on the computer does not let  
 you specify integers. By using TSC  
 XBASIC I can run circles around COLOR  
 DISK BASIC. I still need MICROSOFT  
 because the graphics commands are  
 great.

I have a couple of complaints about  
 both forms of basic. Neither will  
 let me define a string function such  
 as DEF FNA\$(B\$) = MID\$(B\$,5,10). It  
 would be much faster than a GOSUB,  
 plus it would save memory. Do you  
 know if BASIC09 will be able to per-  
 form this type of function?

The fact that only one variable can  
 be passed in the DEF Function is  
 severely limiting. Most mathematical  
 formulas require more than one var-  
 iable. The Model 3 and Model 4 will  
 pass at least 5 (or more). Where  
 can I get a BASIC that will let me  
 do these things? (Wish Radio Shack  
 would release a 6809 based Model  
 4 style computer.)

My computer has evolved from a 16K  
 (D board) tape based machine to a  
 64K-FLEX system with two 40-track  
 single-sided Tandon drives and one  
 double-sided 40-track CDC drive,  
 a Model-3-keyboard and a DMP400  
 printer.

By the way, I did all the modifi-  
 cations myself. If you still need some  
 help, I will take a shot at answering  
 some of the questions posed by mem-  
 bers.

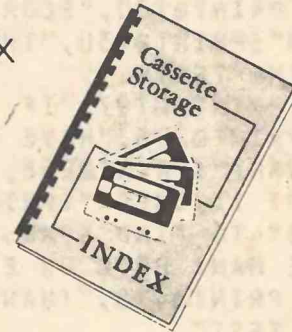
Continued on Page 98  
 PAGE 51

# CAN'T FIND YOUR PROGRAMS??

## Don't Be FRUSTRATED



The Cassette Storage Index can Simplify finding and loading your Programs



- 104 PAGES 5½ X 8½ INCHES – ROOM FOR 420 LISTINGS
- 2 SECTIONS – ALPHABETICAL AND BY TAPE NUMBER

### SECTION ONE

| ALPHABETICAL INDEX  |          |      |                   |
|---------------------|----------|------|-------------------|
| FILE NAME           | Tape No. | Side | Counter Start No. |
| Loan "Interest"     | 3        | 1    | 105               |
| Loan "Amortization" | 3        | 2    | 160               |
| Location "Items"    | 6        | 1    | 380               |
|                     |          |      |                   |
|                     |          |      |                   |
|                     |          |      |                   |
|                     |          |      |                   |
|                     |          |      |                   |
|                     |          |      |                   |
|                     |          |      |                   |

In this section you list your programs (fields) alphabetically along with tape number, tape side and counter start number. To load a program look up your field name. When located you have all the information you need to load your field.

### SECTION TWO

| FILE INFORMATION SHEET      |                     |                    |         | TAPE No.    |
|-----------------------------|---------------------|--------------------|---------|-------------|
|                             |                     |                    |         | 3           |
| File Name                   | Loan "Interest"     | Date Recorded      | 7/10/82 | Side        |
| Counter Start No.           | 105                 | Counter Finish No. | 108     | Description |
| pounded true interest       |                     |                    |         |             |
| File Name                   | Loan "Amortization" | Date Recorded      | 8/13/82 | Side        |
| Counter Start No.           | 160                 | Counter Finish No. | 166     | Description |
| principal and interest paid |                     |                    |         |             |
| File Name                   |                     | Date Recorded      |         |             |
| Counter Start No.           |                     | Counter Finish No. |         |             |

This section lists your programs (fields) by tape giving you a cross reference of your fields along with more complete field and recording information. In this section you enter the finish number as well as the start number of your fields so you know where to start recording a new field on the tape.

Also being used by Music and Video Cassette users.

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# Hot New Info in the world of the Magazines

by Don H. Garrett

This is going to be a regular column in our newsletter to bring you, our members and readers, the inside and up-to-date story in the world of the ever growing line of magazines and publications for the CoCo.

Let's see this month we have a lot of new and exhilarating information.

## RAINBOW

First, RAINBOW is up to 65,000 paid circulation with their rates going up to \$28 per year for U.S. subscriptions (to you members it is \$25.20 per year). They have opened up a west coast branch for advertising, which they now have three branches for advertising, Tacoma, WA; Prospect, KY; and Duxbury, MA. RAINBOW has grown to 340 pages (even though they shrunk to 324 this issue), which does make it the biggest Color Computer Magazine around. The best? I suppose you could say that, since it covers everything from Games & Education to Utilities & Business applications. They are adding column after column continuously, for instance a childrens learning column.

I would like to wish Lonnie Falk, Mrs. Falk, Jim Reed, Pat Hirsch, and the rest of the staff a Happy Valentines Day. I really don't think anyone can beat the RAINBOW in size, quality, or subscription circulation.

## CCM

Second, CCM (Color Computer Magazine) is doing very good for their first year in business at publishing a Color Computer related magazine. I really do not know what kind of subscription rate they have now, but it must be fairly large or they would not still be in business, right? Oh well, I would like to wish them continued

success and wish Kerry Leichtman, David Ezequelle, and all their staff a Happy Valentines Day. I do wish we were still receiving a discount from them to our club members. It would increase their business by a wide margin.

## CCN

CCN, Uh oh, here is the bad news. The first Color Computer related magazine printed is having problems and has ceased publication until further notice. Well, with RAINBOW, CCM, and Hot CoCo making a smash hit with every CoCo user someone had to lose out. I am sorry it is Color Computer News though, since they were the very first. According to a lady that I talked to, at CCN, they are going to fulfill all subscriptions presently out with their next publication (last was September) due no earlier than January. All subscriptions will be extended, according to Dianne Wright, whom I talked to at CCN on several occasions. I wonder what will eventually happen to them? You know they had just started publishing their second magazine titled Forum 68 also. Dianne said they had equipment problems and just couldn't keep the big presses working. I wonder if it had something to do with a shortage of funds or not? Anyway, Dianne and Bill and Arv you'll have a Happy Valentines Day and try to get everything back going again. We would hate to see you just fade into the sunset.

(\*Editor's Note: All CCN orders that were sent to the club can be returned to you if you want or we will hold them pending outcome of the CCN\*)

## Hot CoCo

Hot CoCo, here is the big news or

is it? Wayne Green has made another success with Hot CoCo, or so their subscription figures show. They state and I quote, "The total number of copies distributed for the November issue were: HOT CoCo 100,000", and then they went on to say, "The increased newsstand distribution ranges from 35,000-45,000 copies per month." Are these figures correct? Could they have possibly passed RAINBOW in only 6 or 7 publications against the three years of publication of RAINBOW? I don't know, but if they are RAINBOW may be in trouble, Oh not RAINBOW. March's HOT CoCo will focus on the MC-10 in its entirety. From COLOR BASIC Programs changed to MICRO COLOR BASIC to Reviews and technical data. Although they don't plan on forgetting the "big brother", the CoCo, either. They will have articles on interfacing the CoCo to the real world. Well, this would not be complete if I did not wish Beverly Porier and all the HOT CoCo staff a Happy Valentine's also.

## CCW

Color Computer Weekly is a complete question mark. I don't know what has happened to them. One time at an earlier time they did not send us any issues, not even our subscription copy, but then about 3-5 weeks later they started sending them again for about 4 weeks then quit again. The first time I thought they went out of business, but I was proved wrong. Now if I could be proved to be wrong again, by them sending the issues to us, I would appreciate it. Happy Valentines CCW.

## CMJ

Color Micro Journal, one of the newest but oldest publications to come out, is doing fairly good for their first five issues. If you wondering what I meant by newest but oldest, it is simple, the people who publish '68' Micro Journal branched a part of the '68' Micro Journal off to form Color Micro Journal because they thought our little computer required more

attention than they could give in '68' Micro Journal. If you are wondering what difference it makes if CMJ is coming from the '68' Micro Journal staff. Well, it is as they stated in their leaflet, "We ('68' Micro Journal) were the very first magazine to cover the Color Computer. Over the past three (3) years '68' Micro Journal has published more 'meat and potatoes' type of material than any other magazine for the Color Computer User." Now do you see why it is important? Color Micro Journal publishes a 32 page, 12" X 16" journal. Quite a big size. They have columns on OS-9, FLEX, Disks, and Computer Operating Systems. They also have programs, reviews, and news releases. I think they are going to be a great publication for the CoCo User. Happy Valentines Day CMJ and staff.

To end this off I hope everyone will write in and comment on this section or at least what is in it. Thanks, and Happy Valentines Day to all.



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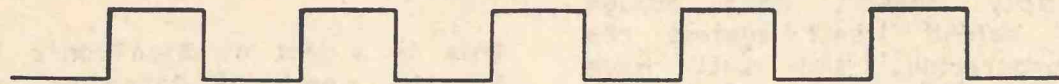
DAS!  
RIGHT!



# A HAPPY COCOING NEW YEAR

from

# SAVE-A-BYTE



OUR New Year's Resolution is to help you Save More in '84!!

- |                                                                                                                                                                                                          |                                       |                 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-----------------|
| 1. CoCo Battery Backup                                                                                                                                                                                   | <del>1983</del><br><del>\$99.00</del> | 1984<br>\$69.95 |
| <ul style="list-style-type: none"><li>• See Ad in Sept/Oct/Nov RAINBOW</li><li>• Reviewed by RAINBOW in Dec issue</li><li>• RAINBOW Certification Seal</li><li>• See Last Newsletter (page 57)</li></ul> |                                       |                 |
| 2. CoCo 2 Battery Backup (NEW)<br>(without battery)                                                                                                                                                      | ---                                   | \$59.95         |
| 3. ROM Pac PC Board & Cartridge<br>(for 27xx EPROMS)                                                                                                                                                     | <del>\$ 9.95</del>                    | \$ 4.95         |

- \*\*\*\*\*
- |                         |                    |         |
|-------------------------|--------------------|---------|
| 4. 64K RAM Chip Set (8) | <del>\$65.00</del> | \$45.95 |
|-------------------------|--------------------|---------|
- \*\*\*\*\*

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# MichTron

MichTron is our new corporate identity. Computer Shack is being sued by Tandy. Tandy has a trademark on the words "The Shack" and they say that Computer Shack cannot use the word Shack in its name. The way it looks right now is that Computer Shack simply doesn't have enough money to defend itself against the Tandy Corporation, and will have to change it's name.

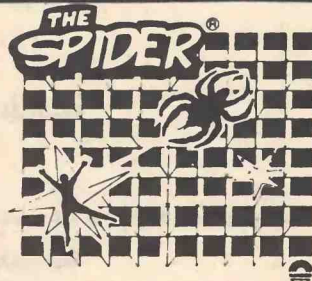
Since Computer Shack is getting an excellent reputation for fast delivery and excellent quality software for the Color Computer we decided to form a new company to market the Computer Shack COCO software and MichTron is it. Computer Shack will continue to publish software for the Model I/III/4.

Sometimes being an independent dealer has its advantages. We look at all

the programs on the market and after talking to many people we pick the best. We at MichTron feel the TELEWRITER 64 is the best word processor ELITE CALC is the best Calc Sheet and Spectrum's COLOR COM E is the best smart terminal. Therefore, this is what we carry and recommend. We want nothing but the best for our customers.

This is a list of MichTron's Top Ten for the month of December, some of which are reviewed in this newsletter.

- |                   |                   |
|-------------------|-------------------|
| #1 CASHMAN        | \$27.95T/\$29.95D |
| #2 DEMON SEED     | \$27.95T/\$29.95D |
| #3 TIME BANDIT    | \$27.95T/\$29.95D |
| #4 LUNAR PATROL   | \$24.95T/\$28.95D |
| #5 LANCER         | \$24.95T/\$28.95D |
| #6 FURY           | \$27.95T/\$29.95D |
| #7 OUTHUSE        | \$27.95T/\$29.95D |
| #8 CHOPPER STRIKE | \$27.95T/\$29.95D |
| #9 THE KING       | \$26.95T/\$29.95D |
| #10 MUDPIES       | \$27.95T/\$29.95D |



Travel the channels  
destroying the  
SPIDERS before  
they annihilate  
YOU!!!

ARCADE STYLE GAME  
[16K Color-Joystick-ML]  
Tape \$19.95

The Spider is an all-machine-language program with very good sound, excellent graphics and super action.

You zoom along through a vividly-colored tunnel that's loaded with exceptionally realistic spiders, attempting to align them with your laser scope and blast them before they get you. I found it quite difficult to hit them, as my point display disconcertingly reminded all who watched, but then it takes these wicked web-wenders awhile to annihilate you the allotted five times, as well. I found this to my liking, because I enjoyed the prolonged action. You use the right joystick to manipulate the cross-beam of your scope, and, of course, the fire button to activate your laser. The point system is adequately explained in the documentation, so I needn't go into that here, except to say that if you manage 500 points you'll receive an extra life to devote to battling these belicose little beasties.

There's one more point I'd like to add here, and that is that, even though it wasn't mentioned in the documentation, playing The Spider while wearing a pair of 3-D glasses gives one of the best dramatic-depth effects I've yet seen. You lose some of the vivid colors by doing so, but then you can always take them off whenever you want and go back to playing the straight game.

—Courtney Noe

## Gamester Software

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SAME DAY SHIPMENT!

# Depth of Field, PHOTO Programs

by Paul D. Kirkpatrick

This month's "Depth of Field" program will aid you in taking better pictures.

For those who are unfamiliar with the term "Depth of Field", it can be easily stated as being, "All that is in focus in front of and behind the main object (focal point) on which you focus the camera". This will vary depending on the focal length of the lens you are using. This can be found printed on the front of the lens.

This makes this program ideal for rangefinder cameras where you cannot visually see the effect you will get with a depth of field preview button. It should be noted that the program is for NORMAL LENSES ONLY.

The program was written in Non-Extended Basic. Line 70 uses EXEC 44539, which is a shortened way of saying, (70 X\$=INKEY\$: IF X\$="" then 70). Lines 90-140 ask for the letter that is within the range of your NORMAL LENS. Lines 160-200 then ask for the distance away of the main thing you focused on, and then lines 210-280 look at the variables that were entered in lines 140 and 200 and go to the proper lines for the correct chart printout.

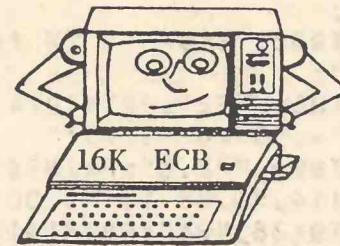
Between each chart printout is a GOTO 830 statement which asks for a yes or no (y or n) INPUT, which holds the chart on the screen until the INPUT is made.

The PRINT command is used in the program 135 times, which means 675 key strokes. A great shortcut is to use the question mark which is the same as PRINT in basic programming, and This will save 540 key strokes.

Once you have entered the program, just answer the questions and enjoy your photography just a little bit more.

Your CoCo/Photographic friend,  
Paul D. Kirkpatrick

PS: Copies of my "B/W Developer" program are available for \$13.00 (personal checks must clear prior to shipment) from:  
Paul D. Kirkpatrick  
5603 Linwood Court  
Seabrook, MD 20706



```
1 'DEPTH OF FIELD, ICCO, INC.
2 'BY PAUL D. KIRKPATRICK
3 '5603 LINWOOD COURT
4 'SEABROOK, MD 20706
5 'COPYRIGHT (C) 1983
10 CLEAR:CLS3
20 PRINT@73,"PHOTOGRAPHIC";
30 PRINT@136,"DEPTH OF FIELD";
40 PRINT@203,"COMPUTER";
50 PRINT@260,"BY PAUL D. KIRKPATRICK";
60 PRINT@357,"PRESS A KEY TO BEGIN";
70 EXEC44539
80 CLS
90 PRINT@67,"ENTER LETTER THAT MATCHES";
100 PRINT@97,"YOUR NORMAL LENS FOCAL LENGTH";
110 PRINT@169,"(A) 35-41 MM";
120 PRINT@233,"(B) 44-55 MM";
130 PRINT
140 INPUT AS
150 CLS
160 PRINT@72,"ENTER DISTANCE";
170 PRINT@102,"OF MAIN FOCAL POINT";
180 PRINT@136,"5, 10, 25 FEET";
```

```

190 PRINT
200 INPUT B$
210 IF A$="A" AND B$="5" THEN 290

220 IF A$="B" AND B$="5" THEN 380

230 IF A$="A" AND B$="10" THEN 48
0
240 IF A$="B" AND B$="10" THEN 56
0
250 IF A$="A" AND B$="25" THEN 66
0
260 IF A$="B" AND B$="25" THEN 74
0
270 IF A$<>"A" OR A$<>"B" THEN 90

280 IF B$<>"5" OR B$<>"10" OR B$<
>"25" THEN 160
290 CLS
300 PRINT@1,"F      FOCAL POINT
AREA IN";
310 PRINT@32,"STOP      IN FEET
FOCUS";
320 PRINT@64,"F2":PRINT@74,"5'":P
RINT@82,"4.50 TO 5.75'"
330 PRINT@96,"F2.8":PRINT@106,"5'
":PRINT@114,"4.25 TO 6.00'"
340 PRINT@128,"F4":PRINT@138,"5'
":PRINT@146,"4.00 TO 6.75'"
350 PRINT@160,"F5.6":PRINT@170,"5
'":PRINT@178,"3.75 TO 7.75'"
360 PRINT@192,"F8":PRINT@202,"5'
":PRINT@210,"3.50 TO 10.00'"
370 GOTO 830
380 CLS:PRINT@1,"F      FOCAL POINT
AREA IN"
390 PRINT@32,"STOP      IN FEET
FOCUS"
400 PRINT@64,"F2":PRINT@74,"5'":P
RINT@82,"4.85 TO 5.25'"
410 PRINT@96,"F2.8":PRINT@106,"5'
":PRINT@114,"4.75 TO 5.50'"
420 PRINT@128,"F4":PRINT@138,"5'
":PRINT@146,"4.50 TO 5.75'"
430 PRINT@160,"F5.6":PRINT@170,"5
'":PRINT@178,"4.25 TO 6.00'"
440 PRINT@192,"F8":PRINT@202,"5'
":PRINT@210,"4.00 TO 7.00'"
450 PRINT@224,"F11":PRINT@234,"5'
":PRINT@242,"3.75 TO 8.00'"
460 PRINT@256,"F16":PRINT@266,"5'
":PRINT@274,"3.50 TO 10.00'"
470 GOTO 830
480 CLS:PRINT@1,"F      FOCAL POINT
AREA IN"
490 PRINT@32,"STOP      IN FEET

```

```

FOCUS"
500 PRINT@64,"F2":PRINT@74,"10'":
PRINT@82,"8.00 TO 13.00'"
510 PRINT@96,"F2.8":PRINT@106,"10
'":PRINT@114,"7.50 TO 15.00'"
520 PRINT@128,"F4":PRINT@138,"10'
":PRINT@146,"6.75 TO 19.00'"
530 PRINT@160,"F5.6":PRINT@170,"1
0'":PRINT@178,"6.00 TO 30.00'"
540 PRINT@192,"F8":PRINT@202,"10'
":PRINT@210,"5.00 TO INF."
550 GOTO830
560 CLS:PRINT@1,"F      FOCAL POINT
AREA IN"
570 PRINT@32,"STOP      IN FEET
FOCUS"
580 PRINT@64,"F2":PRINT@73,"10'":
PRINT@82,"9.00 TO 11.00'"
590 PRINT@96,"F2.8":PRINT@105,"10
'":PRINT@114,"8.50 TO 12.00'"
600 PRINT@128,"F4":PRINT@137,"10'
":PRINT@146,"8.00 TO 13.00'"
610 PRINT@160,"F5.6":PRINT@169,"1
0'":PRINT@178,"7.50 TO 15.00'"
620 PRINT@192,"F8":PRINT@201,"10'
":PRINT@210,"6.75 TO 19.00'"
630 PRINT@224,"F11":PRINT@233,"10
'":PRINT@242,"6.00 TO 30.00'"
640 PRINT@256,"F16":PRINT@265,"10
'":PRINT@274,"5.00 TO INF."
650 GOTO830
660 CLS:PRINT@1,"F      FOCAL POINT
AREA IN"
670 PRINT@32,"STOP      IN FEET
FOCUS"
680 PRINT@64,"F2":PRINT@73,"25'":
PRINT@81,"15.00 TO 55.00'"
690 PRINT@96,"F2.8":PRINT@105,"25
'":PRINT@113,"13.50 TO 75.00'"
700 PRINT@128,"F4":PRINT@137,"25'
":PRINT@145,"11.50 TO INF."
710 PRINT@160,"F5.6":PRINT@169,"2
5'":PRINT@177,"9.50 TO INF."
720 PRINT@192,"F8":PRINT@201,"25'
":PRINT@209,"7.50 TO INF."
730 GOTO830
740 CLS:PRINT@1,"F      FOCAL POINT
AREA IN"
750 PRINT@32,"STOP      IN FEET
FOCUS"
760 PRINT@64,"F2":PRINT@73,"25'":
PRINT@81,"19.00 TO 37.50'"
770 PRINT@96,"F2.8":PRINT@105,"25
'":PRINT@113,"18.00 TO 45.00'"
780 PRINT@128,"F4":PRINT@137,"25'
":PRINT@145,"15.00 TO 52.00'"

```

```

790 PRINT@160,"F5.6":PRINT@169,"2
5'":PRINT@177,"13.00 TO 75.00'"
800 PRINT@192,"F8":PRINT@201,"25'
":PRINT@209,"11.00 TO INF."
810 PRINT@224,"F11":PRINT@233,"25
'":PRINT@241," 9.00 TO INF."
820 PRINT@256,"F16":PRINT@265,"25
'":PRINT@273," 7.50 TO INF."
830 PRINT@418,"MORE (Y OR N)"
840 INPUT Z$
850 IF Z$="Y" THEN 80 ELSE END

```

MEMORY BEFORE RUNNING 24871  
MEMORY AFTER RUNNING 21659

### Clubs

Michigan Color Computer Club, 310 S. Jefferson St., Sturgis, MI 49091  
(616) 651-4248. Person to contact is Clay Howe, Secretary/Treasurer.

The Rochester S-80 Computer Club, Inc., PO Box 15476, Rochester, NY 14615  
(315) 223-3380. Person to contact is Tom Szlucha, CoCo Coordinator.

Micro 80 Computer Club of Ottawa, 178 Monterey Drive, Nepean, ON K2H-7A8  
(613) 820-2170. Person to contact is Brian Russell, Secretary/Treasurer.

Silicon Valley Color Computer Club, P.O. Box 61593, Sunnyvale, CA 94088  
(408) 749-1947. Person to contact is Shawn Jipp, President.

Mocam CoCo Swap Club, Post Office Box 576, Shepherd, Texas 77371  
Person to contact is Cal Smith, Organizer.

Florida Color Computer Club, 4047 Bee Ridge Road, Sarasota, FL 33582  
(813) 921-7510. Person to contact is FAMILY COMPUTERS, Ernie Bontrager.

Color Computer Users Club, Fort Walton Beach, Florida  
(904) 244-5281. Person to contact is Bill Lamb.

Color Computer Owners Group, 9020 Hemingway, Redford, Michigan 48239  
Person to contact is Dallas Cox, Newsletter Editor. (313) 937-3442

Livingston Computer Club, Livingston, N.J.  
(201) 994-9051. Person to contact is Ben Grossman, President.

Arkansas Computer Club, P.O. Box 7668, Little Rock, AR 72217  
(501) 663-2061. Person to contact is Gary Smith.

Ohio Computer Club, 2153 Leah Lane, Reynoldsburg, OH 43068  
(614) 861-0565. Person to contact is Susan Davis.

### BBS's

|                      |                |         |        |             |
|----------------------|----------------|---------|--------|-------------|
| COLORADO COLOR BBS   | (303) 249-7866 | 24 hrs. | 7 days | up/download |
| FLORIDA COLOR-80 BBS | (813) 924-COCO | 24 hrs. | -----  | up/download |

# Color Computer Clubs & BBS'S

This is going to be a regular listing from now on. We will be listing all BBS numbers in every issue, but we will only list Color Computer Clubs one time. Note: the listing of any BBS or Club not affiliated with the ICCC, Inc. does not necessarily mean that the ICCC, Inc. supports them. It just means that they are a local club or BBS for a particular area that our members may have not known existed.

### MINER BY LARRY LANDWEHR

Like his father before him, Sid is a coal miner. Working hundreds of feet below ground it is Sid's job to blast the rock so that the coal seam is exposed. See if you can direct Sid to the most productive areas. How many lumps of coal can you collect before you run out of dynamite? Young and old alike will enjoy this hi-res all machine language game from the author of "IN ASSEMBLY LANGUAGE".

CAT# DM018 16k \$14.95 (CAN) \$12.95 (US)



### EXECCART BY PETER KARWOWSKI

EXECCART is a M/L program that allows you to copy ROMPAC programs to tape. They can then be loaded back into a 64K CoCo and examined or modified. You can run most of your ROMPAC's from disk without ever having to remove the disk controller. This saves tremendous wear and tear on the contacts. EXECCART may also be used to add a loader to your own programs to turn on 64K and to copy your BASIC ROMs into RAM so that you can make modifications.

CAT# DM009 64K \$17.95 (CAN) \$14.95 (US)



### THE SPOOLER BY PETER KARWOWSKI

Whenever you use your printer, your computer is totally dedicated to feeding it. This isn't such a problem when you just want to print out a couple of lines, but LLISTing a long program can be very boring. If you have better things to do than sit around waiting for the printer, then "THE SPOOLER" is just what you need. THE SPOOLER will work on ANY TRS-80 Color Computer from a 16K right up to 64K with disks. Extended BASIC is NOT required.

CAT# DM010 16K \$12.95 (CAN) \$10.95 (US)

## THE DATAMAN

### NEWERROR BY PETER KARWOWSKI

NEWERROR will provide four extra functions and abilities for your Color Computer.

1. Give you an audible error warning.
2. Provide full english error messages.
3. Add the ON ERROR GOTO command to BASIC
4. Allow simulated errors for debugging.

As an added bonus we include a second M/L program that you can add to your own BASIC programs to provide them with the ON ERROR GOTO feature. You may use this program even in programs you sell.

CAT# DM008 16K \$19.95 (CAN) \$16.95 (US)

### SCREEN BY JOHN MIRAK

Four much needed features are added to Basic with this new machine language utility program from Australia.

1. Automatic line numbering
2. Line by line program listing
3. Motor on/off from the keyboard.
4. Your choice of light or dark, orange, green or black screen with light or dark orange or green characters.

Works with Basic, Ext Basic & Disk Basic

CAT# DM015 16K \$12.95 (CAN) \$10.95 (US)

**ADD 3% SHIPPING & HANDLING  
PER ORDER-MINIMUM \$2.50**

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### SWISS ARMY KNIFE BY RALPH BLOCH

One of our most prolific authors (PRETTY PRINTER-P.U.F.F.-LIBRARY) has come up with another winner. As the namesake of this program has many blades so SAK has many functions. The disk owner will find it indispensable for diagnosing and fixing the many gremlins that attack a disk system. It will work on any number of tracks and can even read FLEX disks. By copying one sector at a time you can often save an otherwise uncopyable disk.

CAT# DM553 32K \$29.95 (CAN) \$25.50 (US)

### SUPER EDIT BY LARRY LANDWEHR

This powerful new utility program from the author of "IN ASSEMBLY LANGUAGE" adds many new editing commands to Basic. You can PRINT one screenful at a time, DELETE a line or lines, JOIN several lines together and hide your programs, or FIND strings and variables. Also included are commands to INSERT, COPY, MOVE & REPLACE one line or a block of lines. Super edit works with Extended Basic but Extended Basic is not required.

CAT# DM016 16k \$19.95 (CAN) \$16.95 (US)

**SEND \$3 FOR OUR NEW  
80+ PAGE CATALOGUE**

### BONES BY MARK MORAN

This original dice game is fun for the whole family. Play by yourself, against the computer or with your friends. Although simple enough for the youngest player the adults will find it addictive.

CAT# DM011 16K \$12.95 (CAN) \$10.95 (US)

Now you can 'Roll Them Bones' on the MC10. We have transferred this popular game without losing any of it's features.

CAT# DM101 4K \$12.95 (CAN) \$10.95 (US)



### MUSIC EDITOR BY PATRICIA SHELTON

This program will take regular sheet music and convert it to "play by number" music. You enter the words, notes and chords from the keyboard and the program will output, to the screen or printer, an easy to read version for C or G type organs. Your files can be edited and saved to disk or tape. Easily produce a songbook of your own favorite tunes.

CAT# DM012 16K \$12.95 (CAN) \$10.95 (US)



### HOME INVENTORY BY JEFF PYNE

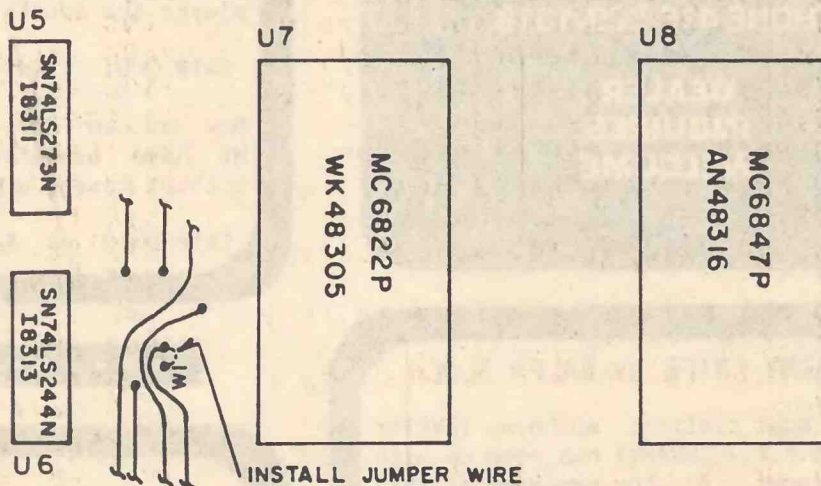
Home Inventory was written for the average home owner to simplify the tedious task of weeding through his possessions. This small database will save an organised list of brand names, serial numbers, values, dates of purchase etc. This could prove to be your most valuable program if you ever have to deal with an insurance company so be sure you have a copy of the programs output in a safe place in case of fire or theft. Ext Basic required-Printer optional

CAT# DM013 16K \$12.95 (CAN) \$10.95 (US)

DO IT YOURSELF AND  
GET TO KNOW YOUR CO CO!

# SPECTRUM PROJECTS

## CO - CO II 16 TO 64K TRANSFORMATION



(Proof Check)

? MEM <ENTER> = 8487 w/16K Ext. Basic

? MEM <ENTER> = 24871 w/64K Ext. Basic

POKE 25,6:NEW <ENTER> = 31015

CLEAR 0 <ENTER> = 31215

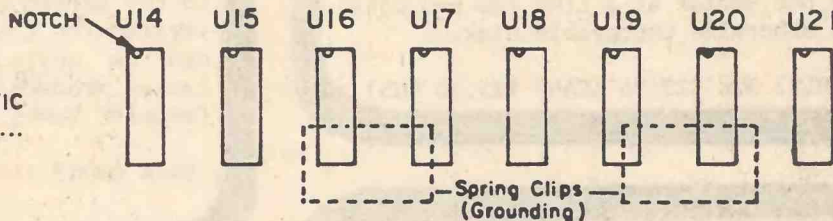
DRAWING NOT  
TO SCALE

### "8" MEMORY CHIPS

NOTE:

MEMORY CHIPS ARE "CMOS" A STATIC  
CHARGE WILL DESTROY THEM.....

*GROUND YOUR BODY!*



KEY BOARD

### COCO II UPGRADE GUIDELINES

- 1.) Remove the (6) screws from the bottom of the COCO including the one under the warranty label.
- 2.) Remove the keyboard, (be careful when disconnecting the ribbon contact from the board connector):
- 3.) Remove the (8) memory chips (16K) from sockets U14 through U21.
- 4.) Install a jumper wire between the two solder pads to the right of W1, Find W1 diagonally between U6 and U7 (See Above).
- 5.) Install eight (64K) memory chips in sockets U14 through U21, (Remember to put a grounded "Drain Wire" on your hand to avoid static discharge):
- 6.) Replace keyboard and carefully reconnect ribbon contact, replace (6) screws run proof check.

"CONGRATULATIONS"

You Did It!



Continued from Page 41

```
2210 GOSUB 2630:GOSUB 2740
2220 PRINT"TO SHOW THE DIFFERENT
SCALES WE ARE GOING TO INTRODU
CE A VARIABLE INTO THE DRAW C
OMMAND."
2230 PRINT"10 PMODE4,1:PCLS:SCREE
N1,1 20 FOR N=1 TO 10":PRINT
"30 K$=";CHR$(34);"BM128,150;S";C
HR$(34);"+STR$(N)";CHR$(34);"E25
;H25;G25;F25";CHR$(34)
2240 PRINT"40 DRAW K$:NEXT N"
2250 PRINT:PRINT"HIT A KEY TO SEE
IT."
2260 GOSUB 2640:PMODE4,1:PCLS:SCR
EEN1,1
2270 FOR N=1 TO 10:K$="BM128,150;
S"+STR$(N)";E25H25G25F25"
2280 DRAW K$:A$="N"+STR$(N):GOSU
B 2750
2290 NEXT N
2300 GOSUB 2640:GOSUB 2740
2310 PRINT"AT CERTAIN TIMES THE 4
5 DEGREE ANGLE AVAILABLE WITH E,
H,G & F ARE TOO MUCH, LIKE WHEN
DRAWING AN N ON THE SCREEN. YOU C
OULD DRAW IT BY:"
2320 PRINT"DRAW";CHR$(34);"BM128,
96;S4;U20;F20;U20";CHR$(34)
2330 PRINT:PRINT"BUT IT LOOKS FUN
NY, LIKE THIS.":FOR DLY=1 TO 1500
:NEXT DLY
2340 PMODE4,1:PCLS:SCREEN1,1:DRAW
"BM128,96;U20F20U20"
2350 A$="IT SHOULD":GOSUB 2750
2360 A$="LOOK LIKE":GOSUB 2750
2370 FOR DLY=1 TO 500:NEXT DLY:PC
LS
2380 DRAW"BM128,96;U20;M+10,+20;U
20"
2390 A$="LIKE THIS":GOSUB 2750
2400 GOSUB 2640:GOSUB 2740
2410 PRINT"WE DID IT THIS WAY."
2420 PRINT:PRINT"DRAW";CHR$(34);"
BM128,96;U20;M+10,+20;U20"
2430 PRINT:PRINT"THIS IS CALLED A
RELATIVE MOVE. <M>OVE +10 POINTS
(HORIZONTAL) , +20 POINTS (VERT
ICAL). THIS ALLOWS DRAWING
TO SPACES WHERE WE COULDN'T WI
TH THE"
2440 PRINT"45 DEGREE COMMANDS."
2450 GOSUB 2630:GOSUB 2740
2460 PRINT"WHAT COLOR DO YOU WANT
?":PRINT"WITH THE DRAW COMMAND YO
U CAN SPECIFY A COLOR. IF YOU W
ANT A BLUE ON SCREEN1,0 THEN ADD
A C3 TO YOUR DRAW STATEMENT."
2470 PRINT:PRINT"WANT TO ROTATE Y
OUR GRAPHICS? SPECIFY AN ANGLE.
A0=NO ROTATIONA1=90 DEG. A2=180
DEG. AND A3=270 DEG."
2480 PRINT:PRINT"LET'S DRAW SOMET
HING."
2490 GOSUB 2630:GOSUB 2740
2500 PRINT"10 DRAW";CHR$(34);"BM1
28,100;BR2NH2R8E2U4H2NL4E2U4H2L8G
2BD14BR16";CHR$(34)
2510 PMODE4,1:PCLS:SCREEN1,1
2520 FOR U=0 TO 3
2530 K$="A"+STR$(U):DRAW"BM128,96
;S8":DRAW K$
2540 GOSUB 3020
2550 FOR DLY=1 TO 300:NEXT DLY:PC
LS:NEXT U
2560 DRAW"A0":A$="HIT A KEY":GOSU
B 2750:GOSUB 2640
2570 GOSUB 2740
2580 PRINT"MORE OPTIONS?? YES!"
2590 PRINT"N MEANING NO UPDATE. T
HIS LETS YOU DRAW A LINE WITHOUT
MOVING THE DRAW POSITION. EG: I
F YOU HAD A U25, THE COMPUTER W
OULD DRAW A LINE 25 POINTS LONG
AND WOULD MOVE THE DRAW POSITIO
N"
2600 PRINT"UP BY 25 POINTS, SO YO
UR NEXT LINE WOULD START WHERE
THAT ONE STOPED. BUT IF YOU DON'T
WANT TO MOVE THE DRAW POSITION
, YOU JUST ADD AN N TO THE U25,
LIKE DRAW";CHR$(34);"NU25";CHR$(
34);
2610 GOSUB 2630
2620 RUN"EXT2"
2630 PRINT:PRINT"HIT ANY KEY TO C
ONTINUE";
2640 A$=INKEY$:IF A$="" THEN 2640

2650 RETURN
2660 CLS:PRINT" *** BASIC COMMAND
READ ***":PRINT:RETURN
2670 CLS:PRINT" *** EXTENDED OPER
ATOR ATN ***":PRINT:RETURN
2680 CLS:PRINT" ** EXTENDED COMMA
ND CIRCLE **":PRINT:RETURN
2690 CLS:PRINT" ** EXTENDED COMMA
ND COLOR **":PRINT:RETURN
2700 CLS:PRINT" ** EXTENDED OPERA
TOR COS **":PRINT:RETURN
2710 CLS:PRINT" ** EXTENDED COMMA
ND DEF **":PRINT:RETURN
```

```

2720 CLS:PRINT" ** EXTENDED COMMA
ND DEL **":PRINT:RETURN
2730 CLS:PRINT" ** EXTENDED COMMA
ND DLOAD **":PRINT:RETURN
2740 CLS:PRINT" ** EXTENDED COMMA
ND DRAW **":PRINT:RETURN
2750 L=LEN(A$):L1=110-((L/2)*12):
LINE(L1-12,165)-(L1+(16*L)+12,188
),PRESET,BF
2760 XL$=STR$(L1):DRAW"S4;BM"+XL$
+",185;"
2770 FOR X=1 TO L:M=ASC(MID$(A$,X
,1))
2780 M=M-31:IF M>38 THEN M=M-38:G
OTO 2810
2790 ON M GOSUB 2830,2840,2850,28
60,2870,2880,2890,2900,2910,2920,
2930,2940,2950,2960,2970,2980,299
0,3000,3010,3020,3030,3040,3050,3
060,3070,3080,3090,3100,3110,3120
,3130,3140,3150,3160,3170,3180,31
90,3200
2800 GOTO 2820
2810 ON M GOSUB 3210,3220,3230,32
40,3250,3260,3270,3280,3290,3300,
3310,3320,3330,3340,3350,3360,337
0,3380,3390,3400,3410,3420,3430,3
440,3450
2820 NEXT X
2830 DRAW"BR8":RETURN:'SPACE
2840 DRAW"BR5R2U2L2D2R2U15BR10BD1
5":RETURN:'!
2850 DRAW"BR4BU12U4BR4D4BD12BR8":
RETURN:''
2860 DRAW"BR4U5NL4NR8U6NU5NL4R4NR
4NU5D11BR8":RETURN:'#
2870 DRAW"BR2NH2R8E2U4H2L8H2U4E2R
8F2BL8NU2D14BR4NU16BR6":RETURN:'$

2880 DRAW"E12BL12D1R1U1L1BF12L1U1
R1D1BR4":RETURN:'%
2890 DRAW"BR12H12U2E2R6F2D2G10D2F
2R8NE3BR6":RETURN:'&
2900 DRAW"BR6BU12U4BR10BD16":RETU
RN:''
2910 DRAW"BR12H5U6E5BD16BR4":RETU
RN:'(
2920 DRAW"E5U6H5BR16BD16":RETURN:
')
2930 DRAW"BU8BR6NL6NH6NU6NE6NR6NF
6ND6NG6BR10BD8":RETURN:'*
2940 DRAW"BR6BU8NU5NL5NR5D5BD3BR1
0":RETURN:'+
2950 DRAW"BR4R2U2L2D2BR2NG2BR10":
RETURN:'\
2960 DRAW"BR3BU8R6BR7BD8":RETURN:

```

```

'-
2970 DRAW"BR3U2R2D2L2BR12":RETURN
:'.
2980 DRAW"U2E12U2BR4BD16":RETURN:
'/
2990 DRAW"BR2H2U12E2R8F2D12G2NL8B
R6":RETURN:'0
3000 DRAW"BR2R4NR4U16L2G2BD14BR14
":RETURN:'1
3010 DRAW"BR2NR10U2E10U2H2L8G2BR1
6BD14":RETURN:'2
3020 DRAW"BR2NH2R8E2U4H2NL4E2U4H2
L8G2BD14BR16":RETURN:'3
3030 DRAW"BR8U16G8R12BD8BR4":RETU
RN:'4
3040 DRAW"BU2F2R8E2U4H2L10U8R12BD
16BR4":RETURN:'5
3050 DRAW"BU2NU6F2R8E2U4H2L8U5E3R
6F3BD13BR4":RETURN:'6
3060 DRAW"BU16R12D4G12BR16":RETUR
N:'7
3070 DRAW"BU2NU4F2R8E2U4H2L8NG2H2
U4E2R8F2D4NG2BD10BR4":RETURN:'8
3080 DRAW"BU3F3R6E3U10H3L6G3D3F3R
9BR4BD7":RETURN:'9
3090 DRAW"BR7BU3R2U2L2D2BU7R2U2L2
D2BD10BR9":RETURN:''
3100 DRAW"BR5BU3U2R2D2NG3L2BU8U2R
2D2L2BD11BR11":RETURN:';
3110 DRAW"BR12BU2H6E6BD14BR4":RET
URN:'<
3120 DRAW"BU6NR10BU5R10BD11BR4":R
ETURN:'=
3130 DRAW"BU2E6H6BD14BR16":RETURN
:'>
3140 DRAW"BR5R2U2L2D2R1BU5U3E3U3H
2L6G3BD13BR16":RETURN:'?
3150 DRAW"BU2NU4F2R8E2U6L8G2E2R8U
6H2L8G2BD14BR16":RETURN:'@
3160 DRAW"U10NR12E6F6D10BR4":RETU
RN:'A
3170 DRAW"NU16R10E2U4H2NL10E2U4H2
L10BD16BR16":RETURN:'B
3180 DRAW"BU3BR12G3L6H3U10E3R6F3B
D13BR4":RETURN:'C
3190 DRAW"U16R9F3D10G3L9BR16":RET
URN:'D
3200 DRAW"NR12U8NR8U8R12BD16BR4":
RETURN:'E
3210 DRAW"U8NR8U8R12BD16BR4":RETU
RN:'F
3220 DRAW"BU5BR8R4D2G3L6H3U10E3R6
F3D1BD12BR4":RETURN:'G
3230 DRAW"U8NU8R10NU8D8BR6":RETUR
N:'H
3240 DRAW"BR2R4NR4U16NL4R4BR6BD16

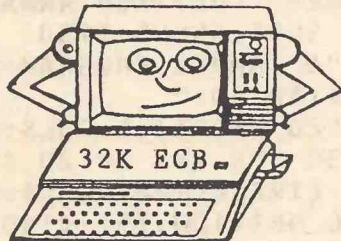
```

```

":RETURN:'I
3250 DRAW"BU3F3R3E3U13NL9R3BD16BR
4":RETURN:'J
3260 DRAW"U8NU8E2NF10E6BD16BR4":R
ETURN:'K
3270 DRAW"NU16R12BR4":RETURN:'L
3280 DRAW"U16F6E6D16BR4":RETURN:'
M
3290 DRAW"U16D2F12NU14D2BR4":RETU
RN:'N
3300 DRAW"BU2NF2U12E2R8F2D12G2NL8
BR6":RETURN:'O
3310 DRAW"U16R8F2D4G2L8BD8BR16":R
ETURN:'P
3320 DRAW"BU3NF3U10E3R6F3D10G3NL6
E1NH2NF3BD1BR6":RETURN:'Q
3330 DRAW"U16R8F2D4G2L8R2F8BR8":R
ETURN:'R
3340 DRAW"BU3F3R7E2U4H2L8H2U4E2R8
F2BD14BR4":RETURN:'S
3350 DRAW"BR8U16NL6R6BR4BD16":RET
URN:'T
3360 DRAW"BU3NU13F3R6E3NU13BD3BR4
":RETURN:'U
3370 DRAW"BU16D10F6E6U10BR4BD16":
RETURN:'V
3380 DRAW"NU16E6F6NU16BR4":RETURN
:'W
3390 DRAW"U2E12U2BL12D2F12D2BR4":
RETURN:'X
3400 DRAW"BR6U10NH6E6BD16BR4":RET
URN:'Y
3410 DRAW"NR12U2E12U2L12BR16BD16"
:RETURN:'Z
3420 DRAW"NR6U16R6BR6BD16":RETURN
:'[
3430 DRAW"BU16D2F12D2BR4":RETURN:
']
3440 DRAW"BU16BR2R6D16L6BR14":RET
URN:'J
3450 DRAW"BR6U16NG6F6BD10BR4":RET
URN:'

```

AFTER RUNNING MEMORY = 3823  
MEMORY REQUIRED = 19000



```

10 GOSUB 5100
20 PRINT"EDIT (I LOVE THIS ONE!)"
:PRINT"IF YOU HAVE WORKED WITHOUT
THE EXTENDED BASIC YOU KNOW THA

```

```

T IF YOU MADE A MISTAKE, FORGOT A
COLON OR SOMETHING YOU HAD TO
RETYPE THE ENTIRE LINE."
30 PRINT"THIS WAS IRATATING IF YO
U HAD A LONG LINE AND HAD ONLY
ONE LITTLE MISTAKE."
40 PRINT"THESE ARE SEVERAL COMMAN
DS WITH EDIT, LET'S TAKE THEM 1 A
T A TIME."
50 GOSUB 5000:GOSUB 5100
60 PRINT"IF YOU HAVE A MISTAKE ON
LINE 50, ALL YOU HAVE TO DO TO
GET INTO THE EDIT MODE IS TO T
YPE: EDIT 50."
70 PRINT"THIS WILL LIST LINE 50 A
ND PUT A CURSOR ON THE SCREEN ON
THE LINE."
80 PRINT"THE FIRST OPTION IS:":PR
INT"S (FOR SEARCH) THIS LET'S YOU
SAVE WEAR AND TEAR ON THE SPAC
E BAR. LET'S LOOK AT IT."
90 GOSUB 5000:GOSUB 5100
100 PRINT"50 FOR X=1 TO 1000 STEP
4;NEXTX"
110 PRINT"WE HAVE AN ERROR IN LIN
E 50, THERE IS A SIMICOLON AFT
ER THE 4 WHEN THERE IS SUPPOSED
TO BE A COLON. SO WE TYPE:"
120 PRINT:PRINT"EDIT 50"
130 PRINT"50 FOR X=1 TO 1000 STEP
4;NEXTX"
140 PRINT"WE COULD NOW GO DIRECTL
Y TO THE SIMICOLON BY TYPING S;"
150 PRINT"THE COMPUTER WOULD POSI
TION THE CURSOR OVER THE ;"
160 GOSUB 5000:GOSUB 5100
170 PRINT"THE <S>EARCH, SEARCHED
OUT THE FIRST OCCURANCE OF ;, IF
THERE HAD BEEN MORE THAN ONE ;
AND YOU WANTED THE SECOND ONE,
ALL YOU WOULD HAVE HAD TO DO IS
TYPE 2S;"
180 PRINT"THIS WOULD HAVE TOLD TH
E COMPUTER TO SEARCH FOR T
HE SECOND OCCURANCE OF THE ;
"
190 PRINT:PRINT"WHAT DO WE DO WHE
N WE GET TO THE ; ??"
200 GOSUB 5000:GOSUB 5100
210 PRINT"WHEN WE HAVE POSITIONED
THE CURSOR OVER THE OFFENDIN
G CHARACTER, WE TYPE: D FOR
DELETE (THIS REMOVES THE CHARACTE
R) AND I FOR INSERT, THE WE TY
PE THE CHARACTER WE WANT THERE.
"

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220 PRINT"IF WHAT YOU WANT IN THE
LINE IS THE SAME LENGTH AS WHAT
YOU WANT TO TAKE OUT, THE TYPE C F
OR CHANGE. YOU HAVE TO SPECIFY
THE NUMBER OF CHARACTERS YOU WANT
TO CHANGE. EG: 1C OR 4C."
230 GOSUB 5000:GOSUB 5100
240 PRINT"IF YOU USE THE C COMMAND
YOU DON'T NEED THE I COMMAND
, YOU JUST INSERT WHAT YOU WANT
."
250 PRINT"YOU DON'T HAVE TO DELETE
ANY- THING IN ORDER TO INSERT
SOME- THING EITHER."
260 PRINT"YOU CAN JUST GO TO THE
PLACE YOU WANT TO INSERT SOMETHING
AND TYPE I (FOR INSERT) AND TYPE
WHAT YOU WANT."
270 PRINT"TO GET OUT OF THE INSERT
MODE, HOLD THE SHIFT KEY DOWN
AND HIT THE UP ARROW."
280 GOSUB 5000:GOSUB 5100
290 PRINT"IF YOU ARE HALF THROUGH
MAKING A LOT OF CHANGES AND WANT
TO SEE WHAT YOU HAVE DONE SO FAR
, JUST HIT THE L (LIST) KEY AND THIS
WILL RE-LIST THE LINE."
300 PRINT"IF YOU DECIDE THAT THE
LINE WAS ALRIGHT BEFORE YOU STARTED
AND YOU REALLY DIDN'T NEED TO
EDIT IT, TYPE A (ABORT)."
310 GOSUB 5000:GOSUB 5100
320 PRINT"H, THIS STANDS FOR HACK
AND HACKS OFF THE LINE. YOU
MAY WANT TO GET RID OF MOST OF
A LINE LIKE THIS:"
330 PRINT"50 PRINT";CHR$(34);"THIS
IS A TEST TO SEE IF THIS IS A
VARIABLE PROGRAM";CHR$(34)
340 PRINT:PRINT"YOU MAY WANT TO
CHANGE THE LINE TO READ. THIS IS
A TEST OF THE TRS-80 COLOR
COMPUTER."
345 GOSUB 5000:GOSUB 5100
350 PRINT"TO DO SO, JUST PLACE THE
CURSOR OVER THE SPACE BETWEEN THE
WORD TEST AND TO AND HIT H. THIS
IS HACKS OFF THE REST OF THE
LINE AND AUTOMATICALLY PUTS YOU
IN THE INSERT MODE SO YOU CAN
RE-ENTER WHAT YOU WANTED."
360 PRINT:PRINT"SOUNDS EASY DOESN'T
IT?"
370 GOSUB 5000:GOSUB 5110
380 PRINT"EXP IS SHORT FOR EXPONENT."
PRINT"

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390 PRINT"EXP RETURNS THE NATURAL
EXPONENTIAL OF A NUMBER."
"
400 PRINT"THE NATURAL SYSTEM OF
EXPONENTS USES THE BASE 2.71828183
INSTEAD OF THE COMMON SYSTEMS
BASE 10."
410 PRINT"THIS IS THE INVERSE OF
LOG: THEREFORE X=EXP(LOG(X))"
"
420 GOSUB 5000:GOSUB 5120
430 PRINT"DON'T WANT ALL THOSE
DECIMALS FROM A DIVIDE? USE THIS
COMMAND TO FIX IT. EG:PRINT FIX(2
.718) WILL PRINT A 2. IT SIMPLY
CHOPS OFF ALL THE TRAILING
DECIMALS."
440 PRINT"LIKE THE INT COMMAND,
IT DOESN'T ROUND OFF NUMBERS,
IT SIMPLY CUTS OFF THE DECIMALS."
450 GOSUB 5000:GOSUB 5130
460 PRINT"GET AND PUT ALLOWS YOU
TO GET SPECIFIC ARRAYS OFF THE
GRAPHICS SCREEN AND PUT THEM
BACK, EITHER IN THE SAME PLACE,
OR ELSE WHERE ON THE GRAPHICS
SCREEN."
470 PRINT"THERE ARE LOGICAL
OPERATORS THAT YOU CAN INCLUDE
TO SET, RESET, INVERT, AND, OR
ETC."
480 PRINT:PRINT"DON'T KNOW WHAT
WE ARE TALKING ABOUT? LET'S GO
INTO IT."
490 GOSUB 5000:GOSUB 5130
500 PRINT"LET'S EXAMINE THE
SYNTAX:PRINT"GET(START)-(END),
VARIABLE,G START AND END ARE
X/Y POINTS ON THE GRAPHICS
SCREEN, VARIABLE IS THE VARIABLE
YOU PUT THE ARRAY INTO AND G
TELLS THE
"
510 PRINT"COMPUTER TO STORE THE
RECTANGLES CONTENTS WITH FULL
GRAPHIC DETAIL. (OPTIONAL)"
520 PRINT:PRINT"THE VARIABLE HAS
TO BE A PRE-DEFINED ARRAY."
530 GOSUB 5000:GOSUB 5130
540 PRINT"A SAMPLE PROGRAM:"
PRINT"10 DIM A(50,50)"
550 PRINT"20 PMODE4,1:PCLS:SCREEN
1,1 30 FOR X=1 TO 20 STEP 3"
PRINT"40 CIRCLE(128,96),X:NEXT X"
PRINT"50 GET(100,75)-(150,125),
A,G":PRINT"60 PCLS:PUT(0,0)-(50,50),
A,PSET"
560 PRINT"70 GOTO 70"

```

```

570 GOSUB 5000
580 PMODE4,1:PCLS:SCREEN1,1
590 DIM A(50,10)
600 FOR X=1 TO 20 STEP 3:CIRCLE(1
28,96),X:NEXT
610 GET(100,75)-(150,125),A,G
620 PCLS:PUT(0,0)-(50,50),A,PSET
630 GOSUB 5010
640 GOSUB 5130
650 PRINT"WE DON'T HAVE TO STOP T
HERE      THOUGH. JUST WATCH."
660 GOSUB 5000
670 PMODE4,1:PCLS:SCREEN1,1
680 X=RND(100)+100:Y=RND(50)+40
690 PCLS:PUT(X,Y)-(X+50,Y+50),A,P
SET
700 K=K+1:IF K=10 THEN 710 ELSE 6
80
710 GOSUB 5130
720 PRINT"WE CAN MOVE THE GRAPHIC
S AROUND QUITE SPEEDILY CAN'T WE.
"
730 PRINT:PRINT"AS YOU MAY HAVE S
EEN WITH OUR  EXAMPLE, THE SYNTA
X FOR PUT IS  PUT(START)-(END),VA
RIABLE,PSET  BUT WE CAN USE PRESE
T, AND, OR  AND NOT INSTEAD OF TH
E PSET."
740 PRINT"LET'S SAY THAT YOU HAVE
OTHER  GRAPHICS ON THE SCREEN T
HAT YOU DON'T WANT TO DISTURBE. Y
OU CAN USE THE NOT COMMAND TO DO
THIS."
750 GOSUB 5000:GOSUB 5130
760 PRINT"100 FOR X=50 TO 100 STE
P 5":PRINT"110 PUT(X,96)-(X+50,96
),A,NOT  120 PUT(X,96)-(X+50,96)
,A,NOT  130 NEXT X"
770 PRINT:PRINT"LETS TRY IT."
780 GOSUB 5000
781 PCLS:CIRCLE(128,95),20:PAINT(
128,96),5,5
782 GET(100,75)-(150,125),A,G
790 PMODE4,1:PCLS:SCREEN1,1
800 FOR X=1 TO 80 STEP 5:CIRCLE(1
28,96),X:NEXT
810 FOR X=50 TO 200 STEP 25:PUT(X
,75)-(X+50,125),A,NOT
820 FOR DLY=1 TO50:NEXT DLY
830 PUT(X,75)-(X+50,125),A,NOT
840 NEXT X
850 GOSUB 5010
860 GOSUB 5130
870 PRINT"AS YOU CAN SEE, THIS GI
VES THE  GRAPHICS A WALK BEHIND O
R WALK  IN FRONT OF EFFECT."

```

```

880 PRINT"WE CAN USE THE GET/PUT
NOT      FUNCTION TO INVERT THE E
NTIRE  SCREEN. (HINT: YOU DON'T
HAVE   TO DIM THE ARRAY FOR THE E
NTIRE  THING, YOU CAN CHEAT A LITT
LE    AND SAVE MEMORY.)
890 PRINT"10 DIM A(255,5)
900 PRINT"20 GET(0,0)-(255,191),A
,G
910 PRINT"30 PUT(0,0)-(255,191),A
,NOT  40 GOTO 40";
911 GOSUB 5000:SCREEN1
930 RUN"EXT22"
5000 PRINT:PRINT"HIT ANY KEY TO C
ONTINUE";
5010 A$=INKEY$:IF A$="" THEN 5010

5020 RETURN
5100 CLS:PRINT" ** EXTENDED COMMA
ND EDIT **":PRINT:RETURN
5110 CLS:PRINT" ** EXTENDED OPERA
TOR EXP **":PRINT:RETURN
5120 CLS:PRINT" ** EXTENDED OPERA
TOR FIX **":PRINT:RETURN
5130 CLS:PRINT" * EXTENDED COMMAN
DS GET/PUT *":PRINT:RETURN
5140 CLS:PRINT" ** EXTENDED COMMA
ND HEX$ **":PRINT:RETURN
5150 CLS:PRINT" ** EXTENDED FUNCT
ION INSTR **":PRINT:RETURN
5160 CLS:PRINT" ** EXTENDED COMMA
ND LET **":PRINT:RETURN
5170 CLS:PRINT" ** EXTENDED COMMA
ND LINE **":PRINT:RETURN
5180 CLS:PRINT" ** EXTENDED FUNCT
ION LOG **":PRINT:RETURN
5190 CLS:PRINT" ** EXTENDED COMMA
ND PAINT **":PRINT:RETURN
5200 CLS:PRINT" ** EXTENDED COMMA
ND PCLS **":PRINT:RETURN
6000 L=LEN(A$):L1=110-((L/2)*12):
LINE(L1-12,165)-(L1+(16*L)+12,188
),PRESET,BF
6010 XL$=STR$(L1):DRAW"S4;BM"+XL$
+",185;"
6020 FOR X=1 TO L:M=ASC(MID$(A$,X
,1))
6030 M=M-31:IF M>38 THEN M=M-38:G
OTO 6060
6040 ON M GOSUB 6080,6090,6100,61
10,6120,6130,6140,6150,6160,6170,
6180,6190,6200,6210,6220,6230,624
0,6250,6260,6270,6280,6290,6300,6
310,6320,6330,6340,6350,6360,6370
,6380,6390,6400,6410,6420,6430,64
40,6450

```

6050 GOTO 6070  
6060 ON M GOSUB 6460,6470,6480,64  
90,6500,6510,6520,6530,6540,6550,  
6560,6570,6580,6590,6600,6610,662  
0,6630,6640,6650,6660,6670,6680,6  
690,6700  
6070 NEXT X  
6080 DRAW"BR8":RETURN:'SPACE  
6090 DRAW"BR5R2U2L2D2R2U15BR10BD1  
5":RETURN:'!  
6100 DRAW"BR4BU12U4BR4D4BD12BR8":  
RETURN:'"  
6110 DRAW"BR4U5NL4NR8U6NU5NL4R4NR  
4NU5D11BR8":RETURN:'#  
6120 DRAW"BR2NH2R8E2U4H2L8H2U4E2R  
8F2BL8NU2D14BR4NU16BR6":RETURN:'\$  
  
6130 DRAW"E12BL12D1R1U1L1BF12L1U1  
R1D1BR4":RETURN:'%  
6140 DRAW"BR12H12U2E2R6F2D2G10D2F  
2R8NE3BR6":RETURN:'&  
6150 DRAW"BR6BU12U4BR10BD16":RETU  
RN:''  
6160 DRAW"BR12H5U6E5BD16BR4":RETU  
RN:'C  
6170 DRAW"E5U6H5BR16BD16":RETURN:  
' )  
6180 DRAW"BU8BR6NL6NH6NU6NE6NR6NF  
6ND6NG6BR10BD8":RETURN:'\*  
6190 DRAW"BR6BU8NU5NL5NR5D5BD3BR1  
0":RETURN:'+  
6200 DRAW"BR4R2U2L2D2BR2NG2BR10":  
RETURN:' ,  
6210 DRAW"BR3BU8R6BR7BD8":RETURN:  
' -  
6220 DRAW"BR3U2R2D2L2BR12":RETURN  
' .  
6230 DRAW"U2E12U2BR4BD16":RETURN:  
' /  
6240 DRAW"BR2H2U12E2R8F2D12G2NL8B  
R6":RETURN:'0  
6250 DRAW"BR2R4NR4U16L2G2BD14BR14  
":RETURN:'1  
6260 DRAW"BR2NR10U2E10U2H2L8G2BR1  
6BD14":RETURN:'2  
6270 DRAW"BR2NH2R8E2U4H2NL4E2U4H2  
L8G2BD14BR16":RETURN:'3  
6280 DRAW"BR8U16G8R12BD8BR4":RETU  
RN:'4  
6290 DRAW"BU2F2R8E2U4H2L10U8R12BD  
16BR4":RETURN:'5  
6300 DRAW"BU2NU6F2R8E2U4H2L8U5E3R  
6F3BD13BR4":RETURN:'6  
6310 DRAW"BU16R12D4G12BR16":RETUR  
N:'7  
6320 DRAW"BU2NU4F2R8E2U4H2L8NG2H2

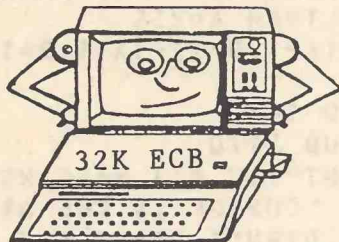
U4E2R8F2D4NG2BD10BR4":RETURN:'8  
6330 DRAW"BU3F3R6E3U10H3L6G3D3F3R  
9BR4BD7":RETURN:'9  
6340 DRAW"BR7BU3R2U2L2D2BU7R2U2L2  
D2BD10BR9":RETURN:' :  
6350 DRAW"BR5BU3U2R2D2NG3L2BU8U2R  
2D2L2BD11BR11":RETURN:' ;  
6360 DRAW"BR12BU2H6E6BD14BR4":RET  
URN:' <  
6370 DRAW"BU6NR10BU5R10BD11BR4":R  
ETURN:' =  
6380 DRAW"BU2E6H6BD14BR16":RETURN  
' >  
6390 DRAW"BR5R2U2L2D2R1BU5U3E3U3H  
2L6G3BD13BR16":RETURN:' ?  
6400 DRAW"BU2NU4F2R8E2U6L8G2E2R8U  
6H2L8G2BD14BR16":RETURN:' @  
6410 DRAW"U10NR12E6F6D10BR4":RETU  
RN:' A  
6420 DRAW"NU16R10E2U4H2NL10E2U4H2  
L10BD16BR16":RETURN:' B  
6430 DRAW"BU3BR12G3L6H3U10E3R6F3B  
D13BR4":RETURN:' C  
6440 DRAW"U16R9F3D10G3L9BR16":RET  
URN:' D  
6450 DRAW"NR12U8NR8U8R12BD16BR4":  
RETURN:' E  
6460 DRAW"U8NR8U8R12BD16BR4":RETU  
RN:' F  
6470 DRAW"BU5BR8R4D2G3L6H3U10E3R6  
F3D1BD12BR4":RETURN:' G  
6480 DRAW"U8NU8R10NU8D8BR6":RETUR  
N:' H  
6490 DRAW"BR2R4NR4U16NL4R4BR6BD16  
":RETURN:' I  
6500 DRAW"BU3F3R3E3U13NL9R3BD16BR  
4":RETURN:' J  
6510 DRAW"U8NU8E2NF10E6BD16BR4":R  
ETURN:' K  
6520 DRAW"NU16R12BR4":RETURN:' L  
6530 DRAW"U16F6E6D16BR4":RETURN:' M  
6540 DRAW"U16D2F12NU14D2BR4":RETU  
RN:' N  
6550 DRAW"BU2NF2U12E2R8F2D12G2NL8  
BR6":RETURN:' O  
6560 DRAW"U16R8F2D4G2L8BD8BR16":R  
ETURN:' P  
6570 DRAW"BU3NF3U10E3R6F3D10G3NL6  
E1NH2NF3BD1BR6":RETURN:' Q  
6580 DRAW"U16R8F2D4G2L8R2F8BR8":R  
ETURN:' R  
6590 DRAW"BU3F3R7E2U4H2L8H2U4E2R8  
F2BD14BR4":RETURN:' S  
6600 DRAW"BR8U16NL6R6BR4BD16":RET  
URN:' T

```

6610 DRAW"BU3NU13F3R6E3NU13BD3BR4
":RETURN:'U
6620 DRAW"BU16D10F6E6U10BR4BD16":
RETURN:'V
6630 DRAW"NU16E6F6NU16BR4":RETURN
:'W
6640 DRAW"U2E12U2BL12D2F12D2BR4":
RETURN:'X
6650 DRAW"BR6U10NH6E6BD16BR4":RET
URN:'Y
6660 DRAW"NR12U2E12U2L12BR16BD16"
:RETURN:'Z
6670 DRAW"NR6U16R6BR6BD16":RETURN
:'[
6680 DRAW"BU16D2F12D2BR4":RETURN:
']
6690 DRAW"BU16BR2R6D16L6BR14":RET
URN:'J
6700 DRAW"BR6U16NG6F6BD10BR4":RET
URN:'

```

AFTER RUNNING MEMORY = 10412  
MEMORY REQUIRED = 12411



```

920 CLEAR: DIM A(255,5):GET(0,0)-(
255,191),A,G
930 PUT (0,0)-(255,191),A,NOT
935 A$="HOW'S THAT?":GOSUB 6000
940 GOSUB 5010:GOSUB 5140
950 PRINT"HEX$ (SHORT FOR HEXIDEC
IMAL STRING) CONVERTS A DECIM
AL NUMBER (BASE 10) INTO
HEXIDECIMAL (BASE 16).\"
960 PRINT:PRINT"MANY PROGRAMERS,
ESPECIALLY THOSE WHO ARE MACH
INE LANGUAGE PROGRAMMER TYPES, L
IKE TO USE THE HEXIDECIMAL SYST
EM AS IT IS EASIER TO CONVERT TO
BINARY.\"
970 GOSUB 5000:GOSUB 5150
980 PRINT"REMEMBER BACK IN NON-EX
TENDED WE HAD TO USE FOR/NEXT L
OOPS WITH AN IF/THEN STATEMENT
TO FIND THE / IN A DATE, SO W
E COULD EXTRACT THE DAY WITH
MID$\"
990 PRINT"WITH THE INSTR COMMAND,
YOU DON'T HAVE TO GO THROUGH
ALL THAT. EG: A$=10/25/83 NO

```

```

W TO FIND THE FIRST / WE TYPE:"
1000 PRINT"A=INSTR(A$,";CHR$(34);
"/";CHR$(34);")":PRINT"WHICH WILL
FIND THE / CHARACTER FOR US AND
PUT IT'S POSITION IN THE VARIABLE
A.\";
1010 GOSUB 5000:GOSUB 5150
1020 PRINT"NOW TO EXTRACT THE DAY
FROM A$ WE TYPE:B$=MID$(A$,A+1,
2)\"
1030 PRINT"WE CUT ABOUT 5 PROGRAM
LINES DOWN TO 1 OR 2. BUT THE
VALUE OF INSTR COMMAND DOESN'T
STOP THERE.\"
1040 PRINT:PRINT"SUPPOSE THAT YOU
HAD A WHOLE LIST OF NAMES ON
A FILE AND YOU WANTED A MANS
NAME, BUT THAT YOU ONLY KNEW
HIS LAST NAME STARTED WITH HA
NGS\"
1050 GOSUB 5000:GOSUB 5150
1060 PRINT"(HIS FULL NAME IS HANG
SLEBEN) \"
1070 PRINT"WE CAN USE THE INSTR F
UNCTION TO SEARCH FOR ANY NAME
WHICH CONTAINS HANGS, AND WE
MAY GET MORE THAN ONE, BUT YOU WO
ULD PROBABLY KNOW THE FULL NAM
E WHEN YOU SEEN IT.\"
1080 PRINT"THE PROGRAM WOULD PROB
ABLY LOOK SOMETHING LIKE THIS.\"
1090 GOSUB 5000:GOSUB 5150
1100 PRINT"10 FOR X=1 TO 1000
1110 PRINT"20 INPUT#-1,A$
1120 PRINT"30 IF INSTR(A$,\";CHR$(
34);\"HANGS\";CHR$(34);\")<>0 THEN P
RINT A$
1130 PRINT"40 NEXT X
1140 PRINT:PRINT"AS YOU CAN SEE,
INSTR WILL FIND ONE STRING THAT I
S INSIDE ANOTHER. YOU WILL
FIND IT VERY USEFUL.\"
1150 GOSUB 5000:GOSUB 5160
1160 PRINT"LINE, AS YOU HAVE PROB
ABLY GUESSED, DRAWS A LINE O
N THE GRAPHICS SCREEN.\"
1170 PRINT"THE SYNTAX FOR LINE IS
: \"
1180 PRINT"LINE(X,Y)-(X1,Y1),PSET
\"
1190 PRINT"X AND Y ARE LOCATIONS
ON THE HORIZONTAL AND VERTICAL
AXIS OF THE GRAPHICS SCREEN,
THE PSET TELLS THE COMPUTER T
O SET THE POINTS ON THE LINE.\"
1195 GOSUB 5000:GOSUB 5170

```

```

1200 PRINT"IF YOU HAD SPECIFIED P
RESET      INSTEAD OF PSET, THEN Y
OU WOULD HAVE TOLD THE COMPUTER T
O RESET THE POINTS ON THE LINE TO
0."
1210 PRINT"SO THE LINE COMMAND WO
ULD LOOK  SOMETHING LIKE THIS IN
A PROGRAMLINE(12,33)-(80,39),PSET
."
1220 PRINT"OR LINE(12,33)-(80,39)
,PRESET"
1230 PRINT:PRINT"LET'S WRITE A SH
ORT DRAWING      PROGRAM USING LIN
E, GET/PUT      PEEK AND OTHERS."
1235 GOSUB 5000:GOSUB 5170
1240 PRINT"10 PMODE4,1:PCLS:SCREE
N1,1      20 DIM A(3,3):K=1":PRIN
T"30 PSET(128,96,5)":PRINT"40 GET
(127,95)-(129,97),A,G      50 A=12
8:B=96:PCLS"
1250 PRINT"60 PUT(A-1,B-1)-(A+1,B
+1),A,NOT 70 A$=INKEY$:IF A$="L"
THEN LINE-(A,B),PSET"
1260 PRINT"80 IF A$="M" THEN LINE
(A,B)-(A,B),PRESET":PRINT"90 IF A
$=CHR$(12) THEN PCLS      100 IF V
AL(A$)<>0 THEN K=VAL(A$)";
1270 PRINT"FOR MORE LISTING HIT A
KEY";:GOSUB 5010:GOSUB 5170
1280 PRINT"110 IF PEEK(341)=247 T
HEN B=B-K:IF B<1 THEN B=1
1290 PRINT"120 IF PEEK(342)=247 T
HEN B=B+K:IF B>190 THEN B=190
1300 PRINT"130 IF PEEK(343)=247 T
HEN A=A-K:IF A<1 THEN A=1
1310 PRINT"140 IF PEEK(344)=247 T
HEN A=A+K:IF B>254 THEN A=254
1320 PRINT"150 PUT(A-1,B-1)-(A+1,
B+1),A,NOT";
1330 PRINT"160 GOTO 60"
1340 GOSUB 5000:GOSUB 5170
1350 PRINT"TO USE THIS PROGRAM:":
PRINT"1. MOVE CURSOR WITH THE ARR
OW      KEYS TO WHERE YOU WANT TO
START THE LINE, HIT THE M"
1360 PRINT"2. MOVE THE CURSOR TO
WHERE      YOU WANT THE LINE TO
END      HIT THE L KEY. "
1370 PRINT"3. IF THE CURSOR MOVES
TOO FAST      OR TOO SLOW FOR YOU,
ENTER A      NUMBER 1 TO 9 TO SPEE
D IT UP      OR SLOW IT DOWN."
1380 PRINT"4. HIT THE CLEAR KEY T
O CLEAR      THE SCREEN.";
1390 GOSUB 5000
1400 PMODE4,1:PCLS:SCREEN1,1

```

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```

1410 CLEAR:DIMA(3,3):K=1
1420 PSET (128,96,5)
1430 GET(127,95)-(129,97),A,G
1440 A=128:B=96:PCLS:A$="Q TO QUI
T":GOSUB 6000
1450 PUT(A-1,B-1)-(A+1,B+1),A,NOT
1460 A$=INKEY$:IF A$="L" THEN LIN
E-(A,B),PSET
1470 IF A$="M" THEN LINE(A,B)-(A,
B),PRESET
1480 IF A$=CHR$(12) THEN PCLS:A$=
"Q TO QUIT":GOSUB 6000
1490 IF VAL(A$)<>0 THEN K=VAL(A$)
1495 IF A$="Q" THEN 1560
1500 IF PEEK(341)=247 THEN B=B-K:
IF B<1 THEN B=1
1510 IF PEEK(342)=247 THEN B=B+K:
IF B>190 THEN B=190
1520 IF PEEK(343)=247 THEN A=A-K:
IF A<1 THEN A=1
1530 IF PEEK(344)=247 THEN A=A+K:
IF A>254 THEN A=254
1540 PUT(A-1,B-1)-(A+1,B+1),A,NOT
1550 GOTO 1450
1560 GOSUB 5170
1570 PRINT"YOU MAY HAVE NOTICED T
HAT THE      CURSOR IN THE DRAWING P
ROGRAM      DIDN'T ERASE ANY OF YOUR
LINES."
1580 PRINT:PRINT"WE ARN'T THROUGH
WITH LINE YET      THOUGH. WE HAVE M
ORE OPTIONS TO LOOK AT, B AND F."
1590 PRINT"LINE(10,20)-(20,40),PS
ET,B
1600 PRINT"THE B STANDS FOR BOX A
ND WILL      DRAW A SQUARE ON THE SC
REEN      WITH THE UPPER LEFT CORN
ER      AT THE FIRST (X,Y) LOCATI
ON"
1610 GOSUB 5000:GOSUB 5170
1620 PRINT"AND THE SECOND (X,Y) L
OCATION      IS THE LOWER RIGHT HAND
CORNER      OF THE BOX."
1630 PRINT"HERES THE PRORAM:"
1640 PRINT"10 FOR X=10 TO 100 STE
P 10      20 LINE(X,80)-(X+20,100
),PSET,B 30 NEXT X"
1650 GOSUB 5000:PMODE4,1:PCLS:SCR
EEN1,1
1660 FOR X=10 TO 100 STEP 10
1670 LINE(X,80)-(X+20,100),PSET,B

```

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# SOFTWARE REVIEWS

## FURY

by Michael Plog, Ph.D.

The game of FURY by Tim Purves is essentially an air shoot-em-up arcade game. Communist attack your country with airplanes, helicopters, hot air balloons, and magnetic air mines. You, the lone defender, have to shoot down all the enemy you can, without running into anything or being killed.

The graphics of the game are good. The enemy aircraft are shown on the screen in decent detail. Action is fast and continuous, as should be expected from a high quality machine language program.

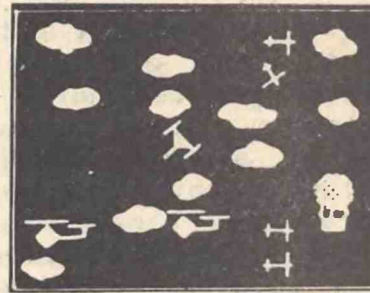
Taken on the whole; however, the game has little to offer. One big pitch is that the computer "talks" during the play. The speech is not as good as Radio Shack's SKI program. I only heard one phrase, not too clearly, which I think said, "Your shot, Player One." The speech from the game was more of a hinderance than a help to the player. You have to wait until the speech stops before shooting the enemy. The speech is not bad at all for a first effort; however, I expect Mr. Purves will improve the sound quality in his subsequent programs.

The play of the game itself is a little dissappointing. It is a copy of the meteor type arcade games. The player's "ship" stays in the center of the screen, while targets come toward it. Players fire with the red button on the joystick. If this sounds familiar to you, it is probably because several other games on the market are about the same. This one really has nothing new to offer, except for the talking.

My negative comments should be put in context. I really have very little use for the run of the mill target practice games. If you like those kind of games, you may enjoy FURY.

If you have some already (such as Meteor, Cosmic, etc.), you will not find this different enough to warrant a purchase. If you have no such game, then this might be a good one to have.

This game is available from MichTron, (formerly Computer Shack), 1691 Eason, Pontiac, Michigan 48054 for \$27.95.



**COLOR  
FURY**

by Tim Purves



## Demon Seed

by Frederick Boyd

It seems that more and more software is being delivered in a copy protected format, so as not to allow illegal copies to be made. Demon Seed by MichTron is such a program. Unfortunately, this also dis-allows the legitimate purchaser from making his legally entitled backup copy. More on that later.

After inserting the disk, the only version I tested, the user need only type <RUN "DEMON">. A short BASIC boot program then alters the computer operating system to allow it to read the encrypted machine language disk. Then, stand back! The disk drive begins making odd, tapping noises as though there was someone inside tap dancing an audition for an amateur hour. Quite a racket. The reading process takes a never-ending twenty-four (24) seconds. When this machine code is in place, the user feels right at home.

Documentation is an integral part of any program. Game instructions for Demon Seed are as concise as any

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and are never again looked at. You have the option of using the keyboard or the joystick for control. Forget about the keyboard, the joysticks are the only way to make any sense. Oddly enough, the program will not function properly without the joystick plugged in, anyway.

"Demon" is obviously a take off on the popular arcade game "Phoenix". You are a moveable battle station at the bottom of the screen, not unlike Space Invaders. The fire button responds as a trigger allowing the player to fire at the descending attackers. One or two shots are allowed on the board at a time depending on the board, not machine gun style. The first board sends kamakazi bats to bomb the player. The wave flutters left and right, while a few of their number swoop down in formation to do their dirty deed. They are no trouble for an adept gunner to dodge and shoot down. Great Graphics! Flapping wings and irregular courses. The second board is the same except that only one shot is allowed on the board at a time. No problem for a sharp eye and quick finger.

The game really shines on the third and fourth boards. The gunner is confronted with four descending eggs which hatch into colorful bird-like demons which again dive bomb and attempt collisions. These birds are tough to kill. You must score a direct hit on the nose to down them. A hit on the wing only delays their dastardly pursuit until they grow a new one. Two shots allowed on the third board. Just when all hope seems lost, the 'shields' can be activated for temporary safety. This is one tough board. Great graphics, though. The fourth board is even more challenging since only one shot is allowed.

The fifth board is the climax of the game... the mother ship does battle. You must score a direct hit on the gargoyle inside the ship while avoiding the kamakazi bats, falling debris, and the mother ships descent, since

it terminates the game along with any remaining 'men'.

This game is one excellent piece of programming. A year ago, when the CoCo was just beginning to see quality software, "Demon Seed" would have been a landmark. This is not Donkey Kong or ZAXXON, but one of the near great games available today.

Every legitimate software purchaser is entitled to make backups of his programs for his own use. The copyright owner has the right to make a reasonable profit from his efforts. It is unfortunate that the trend seems to be copy protected software, but I can see their point. I made my backup using the fantastic program "OMNI-CLONE". It was designed for the specific purpose of copying 'Uncopyable' disks. I recommend it to every **HONEST** CoCo user. The Demon Seed disk takes 24 seconds to load compared to another popular machine code game I own which takes 40 from tape... not much difference. Demon Seed is the only file which may reside on the disk. For these reasons, the disk version hardly makes sense. I recommend that the buyer purchase the tape version.

Happy Demon Hunting!

Demon Seed is available from: MichTron (formerly Computer Shack), 1691 Eason, Pontiac, Michigan 48054 at \$27.95 on cassette or \$29.95 on Disk.

OMNI-CLONE is available from: Prickly-Pear Software, 9234 E. 30th Street, Tucson, Arizona 85710 at \$39.95 on Disk.



# MUDPIES

by Dan Curtin

When I first received this program for review, I couldn't believe the title. I thought that the software industry had really gotten hard up of things to create games about. When I got down to trying the game out, I found a challenging game built around a clever theme.

The game starts out with the main character, a kid named Arnold in a room full of mudpies and crazy clowns. The object of the game is to get him through the four rooms without getting zapped by the clowns. There are four main rooms that you can maneuver him through, each has items of food in them which he must eat in order to maintain the speed needed to ward off the clowns. As he goes through the rooms he must pick up the mudpies in order to hit any clowns which may be coming at him.

Arnold does not need to hit clowns to survive. I found that the easiest way to pick up points is to maneuver him away from the clowns to the nearest open door and try to avoid engaging them. If he does get hit by a clown, two men in white coats carry Arnold out on a stretcher. This feature is quite clever and "cute" and can be sped up by holding down the red button on the joystick in order to resume play.

I found this game to be quite challenging, since I was not able to get at some of the special features mentioned in the documentation. (I never was a whiz at these things anyway, but this one did hold my interest.) The graphics are good, although the rooms do not look that much different from each other. The clowns throw bowling pins around the room and move quite fast. The sound and sound effects add a lot to the play, also. All in all, this is a game one will find to be

quite different from the run of the mill "alien shoot 'em up", and I think kids would get a big kick out of it. Well worth the 29.95 price on the disk.

My only complaint is that the disk is copy protected, and there is no mention in the documentation on how to get a backup, or if one can be obtained. Since this game would be handled by kids more often than the adults, I think MichTron should include an extra copy for the price. This is a shortcoming that can easily be solved; however, and I hope it will. Keep them coming, MichTron!!

You can obtain a copy from MichTron (formerly Computer Shack), 1691 Eason, Pontiac, Michigan 48054.



## MUDPIES

by Jeff Sorenson & Philip McKenzie

# TIME BANDIT

by Mike Hall

"All of Space is your Garden, and all of Time is yours in which to harvest it. You are the Time Bandit!!" That is how the documentation starts out in this great new game from MichTron. It comes packaged with an eye-catching multicolored picture on the front. The documentation is very sufficient for a game of this type, so I was off and playing only a few minutes after I opened the package.

Time Bandit auto-starts after loading it from tape, and prompts you to press reset until the colors are correct. Then you are presented with the title page and prompted to press

"J" for joystick or "K" for keyboard controls. Once that is chosen, the game begins, and you are "phased in" to your little hut on the Time gates map. The Time gate is like a home base.

The object of Time Bandit is to wander around different maps collecting treasure and earning points while protecting your power supply. There are over 20 different maps, and each one has 16 different skill levels (1A through 4D), so there are over 300 separate challenges for your Time Bandit! Each map is about 3 or 4 T.V. screens wide, and each map scrolls on and off as you move about it. The maps are divided up into three major sections--Fantasy World, Western World, and Space World. The maps all have names like Mystic Maze, Black Dungeon, Tombstone Jail, Death Valley, Castle Greymoon, and the Insidious Grid. In order to get to these maps, you must get a key, go to a lock and unlock it with the key, and then pass through a gate. Once you are on a map, you have to repeat the above procedure to get back to the Time gates, where this pattern starts all over again. In the meantime a timer is ticking down in the upper right hand corner of the screen. You may have anywhere from 50 to 150 seconds to accomplish your mission (it depends on the level you are on). If you run out of time, your power starts going down very quickly, and you usually end up dying.

All of this would be difficult enough, but there is more. Scattered generously on all the screens are a bunch of "Evil Portals." And from these portals come a variety of "Evil Guardians", which include evil Smurphs, giant Eyes, white Ghosts, smiley Faces, and weird Space Creatures. You can shoot these things for 30 points. If you get hit by one, though, you lose 5 power points. You gain power back at a rate of one power point for every 100 regular points you score. A quick way to earn points is by grabbing the treasures on the

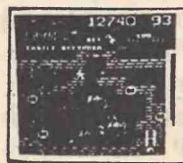
PAGE 74

screen. The treasures include a bag of gold, a crown, a ring, and a goblet. The first treasure you get is worth 100 points, the second one is worth 200, and so on. Some other obstacles in the game include one-way doors, and "warp" doors that take you from the bottom to the top of the screen, or vice versa.

The game ends when you run out of power points. You can tell when you are getting low, because the whole screen starts flashing when you drop below 10 power points. The instruction say that a secret message will be displayed if you can make it to level 4D. The farthest I have made it is to level 4A. The game gets more and more difficult with each level, and every 4 levels you have an extra key and lock to find before you can leave through the gate.

Overall, I would have to say that this is the best game I have seen for the CoCo in a long time. The graphics are very smooth, the sound effects are good, and the controls react very quickly. This game also has more bad guys to shoot at than any other game. There are over 10 of them, and they are all done in great detail. It also has the best variety of playing screens. It is well worth the price, and I would recommend it to any gamer who is looking for an original, fast paced, arcade game to add to his collection.

Time Bandit is available for \$27.95 on tape or \$29.95 on disk from: MichTron (formerly Computer Shack), 1691 Eason, Pontiac, Michigan 48054.



**FANTASY WORLD:** Conquer the halls of Doom, the Mystic Maze, the Underworld Arena, and other medieval places.

**WESTERN WORLD:** Visit the Lost Maverick Mine, Dead Man's Pass, (Visit? Escape!) Tombstone Jail, and many more!



**SPACE WORLD:** Explore Hyperspace, the bizarre Light Barriers, the Insidious Grid, Gamma Station, the Enterprise and others!

## TIME BANDIT

by Bill Dunley

# AUTOTERM

by Kerry Bankston

If you are looking for a Smart Terminal Emulator program that is extremely flexible and packed with powerful features, then AUTOTERM, touted as the world's smartest terminal emulator from PXE Computing, is the program to consider. This program is packed full of features that will make communicating with other computers almost effortless.

AUTOTERM is a ML program on tape or disk that comes with an attractive loose leaf bound manual with 81 pages of what I consider to be an excellent well written documentation manual, with many helpful hints, examples, table of contents and index sections. These examples and hints go a long way in helping the user in implementing the many features this program offers. AUTOTERM will work in a 16K, 32K, or 64K CoCo; however, 32K is the recommended starting size, since AUTOTERM is 12K long.

AUTOTERM offers easy and flexible operation using a menu operating format. The screen format is the same as CoCo's 32 character per line. A nice feature I liked is the top line of the screen which is always under control of AUTOTERM. The top line shows which operating mode you are in, a memory size indicator (text buffer size), and case flags for such things as upper or lowercase and save to memory (on or off). You set the text buffer size by a CLEAR command before loading AUTOTERM. To save text to memory, you simply turn the save to memory to on position by pressing CLEAR and UP Arrow (^) and to stop saving text, press CLEAR and UP Arrow (^) again. Losing your accumulated text is almost impossible, even performing RESET will not cause loss of text in memory. AUTOTERM can even be used for some simple word processing.

AUTOTERM can be used with any modem and fully supports DC Hayes & others.

It can be used with any printer that operates with the CoCo.

AUTOTERM has 3 operating modes that can be accessed with simple keyboard commands. The modes are TEXT PROCESSING MODE, INTELLIGENT TERMINAL MODE, and KEYSTROKE MULTIPLIER MODE.

In the TEXT PROCESSING MODE you can:

- Create and edit text/data with on screen editing (changing, deleting, inserting)

- Save or Load text/data to cassette

- Send text to printer with or without embedded printer codes

- Execute KSM (KEYSTROKE MULTIPLIERS)

- Make full range of user options such as screen word wrap, 3 different upper/lowercase displays, keybop & error beebop, and printer controls

In the INTELLIGENT TERMINAL MODE you can:

- Send and receive text/data

- Scan text/data while on line

- Edit text/data while on line

- Visual check text transmission speed

- Transmit a line at a time

- Checksum transmitted text or data for errors

- Send or receive BLOCK graphic or EXT. Basic pictures

- Save or load text/data to/from tape in ASCII, Binary or ML format.

- Execute KSMs and self test KSMs

- Make full range of user options such as Baud rates 110 to 1200, Duplex (Full or Half), Parity (Mark, Space, Odd, or Even), Stop Bits (1-125) and ASCII control key

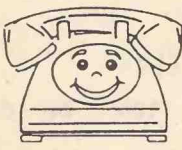
(Line break & backspace)

In the KEYSTROKE MULTIPLIERS MODE you can:

- Create & edit KSM definitions
- Save KSM definitions
- Load KSM definitions from tape
- Print KSM definitions to printer

The manual gives clear and easy to understand examples for use of KSMs and when the user implements KSMs during an On-Line session. He or she can virtually perform an entire session from dialing via modem, to signing on, interacting, and signing off all by one keystroke. You will almost have to see this feature to believe it. The many features and uses are too technical to explain in this review but take my word for it they are powerful.

In closing, AUTOTERM performed every bit as advertised, with excellent documentation. Hats off to the programs's author, Phil Zwart, and PXE Computing for a top rated emulator program. If you want a program that will turn your CoCo into the world's smartest terminal, then AUTOTERM is the the program to buy. At \$39.95 it is a steal. Order yours from: PXE Computing, 11 Vicksburg Lane, Richardson, Texas 75080. Disk version is \$49.95.



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**SMARTEST TERMINAL!**  
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| <p><b>EASY TO USE</b></p> <p>ON-SCREEN EDITING via cursor<br/>Full prompting and error checking<br/>Key Beep and Error Beebop Scroll<br/>Backward write on line Save/load<br/>lines write on line Maintain a disk<br/>copy of session Automatic graph-<br/>ics No split words on screen<br/>printer Print all or part of text<br/>Automatically adjusts to 64K Well<br/>written manual goes step-by-step<br/>and has many KSM examples<br/>Back cover is a cheat sheet</p> | <p><b>PLEASANTLY POWERFUL</b></p> <p>Total communications ability 128<br/>ASCII chars 1200 baud etc Send<br/>text graphics BASIC, ML Scan<br/>Edit cursor data while receiving<br/>more data Any modem Fully<br/>supports D.C Hayes and others<br/>Any printer page size margins<br/>etc Override narrow text width of<br/>received data Examine/change<br/>parameters KSMs and disk direc-<br/>tions at any time Handles files<br/>which are larger than memory</p> | <p><b>TRULY AUTOMATIC</b></p> <p>Create edit, print, save and load<br/>Keystroke Multipliers (KSMs)<br/>KSMs automate almost any activ-<br/>ity Dial via modem sign on<br/>interact sign-off Perform enter<br/>session Act as a message taker<br/>KSM may include parameter<br/>changes disk operations editing<br/>time delays looping, execution of<br/>other KSMs, waiting for par-<br/>ticular responses, branching<br/>based upon responses</p> |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

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EASY UPGRADE  
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# Ms. Gobbler

by Arthur J. Hotes

I was very surprised one day, to find a package in my mailbox from the International Color Computer Club, Inc. I hadn't sent for anything, so, when I opened it and found Ms. Gobbler by Spectral Associates, I was elated. The club had selected me to do a review on this piece of software. And although I'm in the business of selling software, I had never seen this one or don a review on anything, so this promised to be a new experience.

First of all, I'd like to say that I'm not much of a game player on the CoCo -- my family uses me to play against when they want someone "easy".

Upon CLOADing you are asked for 1 or 2 players -- so far so good, I managed that. Then it asks for your name -- it's getting harder -- I knew it wasn't going to be easy. Next you're asked for a skill level 0 - 15, this was easy for me -- I don't have any, so I entered a 0.

When the screen came up it was a classic Pac type screen with a few extra turns, corners and features. The graphics were excellent. Then the fun began, the ghosts started moving after me and almost immediately consumed my little pac-person. Did I mention I was "easy"? Well, this would not discourage me. I continued to play until I felt that it was time for the "Acid Test" -- my two teenagers. If anyone could test the value of game software it had to be them.

I became an impartial observer and my kids became Ms. Gobbler junkies. Sweaty palms prevailed and skill levels increased until they both were exhausted. I wish I could get them to do their chores with that much intensity!

This is a fast action game with good

graphics, color, changing screens and all the other things you would look for in a game. After many hours of playing time by the whole family, I feel that this is a sample of quality software from a professional company, Spectral Associates, 3418 South 90th Street, Tacoma, WA 98409, and is worthy of being in anyone's software library.

## Lunar Rover Patrol

by C.L. Piliपाuskas

You're on Apollo Mission XXV on the lunar surface. A new breed of space pioneer, charged with the task of exploring the moon with NASA's latest lunar rover. Your course has been mapped out previously by spy satellite. It's a rough and rugged terrain with many unexpected obstacles to impede your progress.

You start at your lunar base after a short fairwell fanfare, the lunar surface is covered with craters and boulders, but you easily jump the craters and blast the boulders to dust. Suddenly out of the sky appears a squadron of alien ships bent upon your destruction. You return their fire. You're concentrating so hard on destroying the enemy you fail to see that crater just ahead. Your rover crashes with an explosion, the wheels go flying...

I have just described the (slightly exaggerated) scenario of Spectral Associates' (3418 South 90th Street, Tacoma Washington 98409) latest offering of an arcade style game. Written by TD and BN Keeton, this program for a 32K Color Computer is modelled after the arcade game "Moon Patrol".

The game is written in high resolution multicolored graphics machine language and comes on a protected cassette tape(or disk). You control the rover's motion with the right joystick and fire with the fire button. Hitting

the BREAK key causes the program to pause and hitting SHIFT @ resumes play.

The most outstanding aspect of this game is it's excellent graphics. The moonscape changes and good ol' mother Earth can be seen in the sky. The sound is equally well done, but overly long at some points, and play won't resume until the song is over.

There are two "levels" of play: beginner and expert. The game always starts at the beginners level and, I assume, when this level is completed you go to the expert level (I have not quite made it all the way through the beginner level YET).

Another interesting twist to this game is the fact you are not only trying to accumulate points, but also racing against a clock. As you finish each predetermined leg of your journey, a scoring screen appears. You are told the number of points you have earned and you are awarded bonus points if your time has beaten the predetermined average time or if you set a new course record. The only negative aspect of this feature is it takes some time to generate all the information on the screen while you're itching to get back to the game.

The instruction sheet is more than adequate in describing the game play and scoring. A third of the manual is spent expressing Spectral Associates apologies for being forced to go to protected software and how to replace defective tapes and disks and how to exchange a tape for a disk.

The game is very enjoyable to play especially if you like a change from some of the more nerve bending and sweaty palm type games. My two resident arcade specialists (ages 10 & 13) found the game fun to play and not frustrating as some of the others I have in my library.

All in all, I would say this is a

good game to add to your collection. Easy enough in the beginning for the younger or less experienced players and challenging enough for you arcade players with blisters on your fire button finger.

C.L. Pilipauskas

## LUNAR ROVER PATROL



# Assembler Math

by John B. Spataro

Assembler Math is a hi-res tutorial that teaches the mechanics of converting between the Binary, Decimal and Hexadecimal numbering systems, and addition and subtraction of binary numbers. It comes with a 5" X 8" pamphlet, 12 pages long, with one page devoted to each of the following sections:

- Converting Decimal to Binary
- Converting Binary to Decimal
- Adding Binary Numbers
- Subtracting Binary Numbers
- Converting Binary to Hexadecimal
- Converting Hexadecimal to Decimal
- Converting Decimal to Hexadecimal

The remaining pages describe how to load and use the program which also includes a demonstration program.

Technically, the program is well written and works fine; however, it primarily provides practice problems, (Much as flash cards provide practice in addition and subtraction) and as such would be an excellent adjunct to computer programming training.

After running the program several times, and admiring the techniques used by the author, I asked one of my coworkers who was working on  
PAGE 78

a digital logic correspondence course to try it. It provides excellent practice problems and one soon reaches the point where it is no longer needed.

The question of whether or not you should buy this program is one that only you can answer. You can probably learn to do the conversions without this program or let the computer do it. There is a great deal more to assembly language programming other than the math. I would expect the greatest market for this program would be those people involved in teaching computer programming.

The program is available from Rainbow Connection Software, 3514 6th Place NW, Suite C, Rochester, MN 55901. It requires 32K Ext. Basic and sells for \$24.95 Cassette or \$27.95 Disk.

# WILD PARTY

by B & B Software

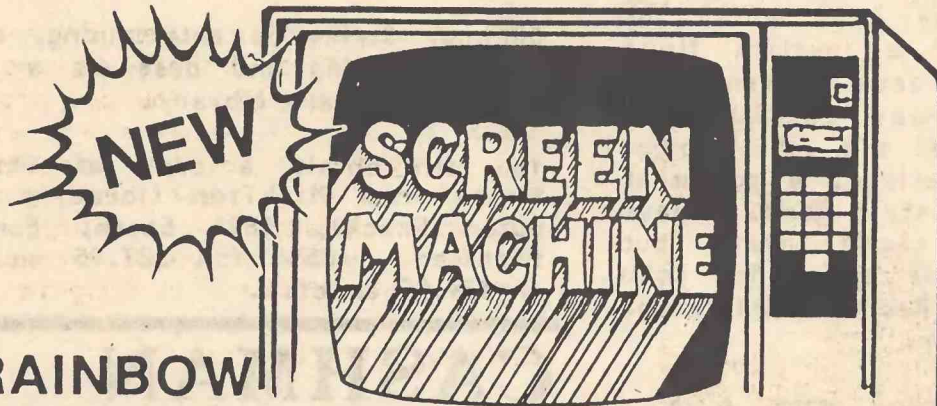
WILD PARTY is a risque party game that may be played by two to six couples. The play of the game consist of a sequence of events performed by a gal, by a guy, or by a couple. As the game proceeds, the computer describes each event and designates the participants by name. The events selected by the computer are designed to liven up the dulllest party, things like hugging or kissing or removing an article or two of clothing, plus some even wilder events which we won't describe because that would spoil the suspense.

Since WILD PARTY is described as a naughty, sexy game, you may be wondering how obscene the game really is. In terms of movie ratings, we consider WILD PARTY to be R-Rated, not X-Rated. Since WILD PARTY uses the computers RND function for the removal of clothing, it might happen that you are completely undressed, but very unlikely.

WILD PARTY can be obtained from B & B Software, P.O. Box 210, Jenkintown, PA 19046 for \$35.00.



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# Chopper Strike

by Bernard Roskoski

Chopper Strike is a well conceived, well written arcade game which involves the use of a joystick flown helicopter to both save "humans" and destroy various enemy obstacles. It is both enjoyable and challenging. The game is, I believe, a somewhat well known arcade style game. I have heard or read of similar games, but have not seen these either for CoCo or in the arcades. Rest assured though this one is a winner.

Chopper Strike opens with a good demo mode which depicts the basic requirements of the game. The graphics are good and the sound, while not overpowering, is satisfactory and functional. Your objective is to rescue "humans" while destroying gun emplacements, missiles, oil tanks, heat seeking missiles and guided missiles (if you can). The screen is split with a crosshair in the upper right hand corner, which, if you can remember to watch, will insure that your shots are true and accurate. The upper left corner keeps track of your score and remaining "Choppers". The scrolling landscape varies endlessly with some complex surprises. As your skill in flying the "chopper" increases and your shooting skill approaches that of a marksman, you can swoop down into intricate tunnels shooting targets and saving humans. To do anything less spells disaster. If you accidentally shoot a "human" you loose a "chopper". Of course, if you run into anything or get shot by the guns or missiles your ship is destroyed.

The game was played using a Kraft joystick with a center return. Under these conditions, the chopper responded well with no jerkiness. The game continues on until your ships are all destroyed. Each 10,000 points you make gains you a bonus ship. After two weeks of play, the arcade expert in the family got 30,000 points before succumbing to the inevitable. It is

PAGE 80

a tribute to the playability of the game and the skill of the programmer that no one got bored with this offering.

Chopper Strike is entertaining, somewhat addicting and deserves a place in your software library.

You can obtain a copy of Chopper Strike from MichTron (formerly Computer Shack), 1691 Eason, Pontiac, Michigan 40854 for \$27.95 on tape or \$29.95 on disk.

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# CASHMAN

by Stan Saunders

Of all the games that I have been fortunate enough to get for review, "Cashman" was a real pleasure! While most games at least hint at violence, this one is, in a word, FUN.

With Cashman, you can pick a level of play that will enable you to play without feeling inadequate or, for the accomplished gamester, you can pick a level of play that will give you a real challenge.

This game has so many features, I really don't know where to begin, but I will attempt to mention enough of them to give Bill Dunlevy and Doug Frayer, the authors of the game, credit for a job well done.

The game, as supplied on disk, starts automatically when you type 'RUN "CASHMAN"'. You are given a choice of which joystick to use, or you can choose to use both if two players are to be playing. The player with the right joystick controls the "Sailor" and the player with the left joystick controls the "Shiek". (I always choose the "Shiek", since he reminds me of my favorite cartoon character, Andy Capp).

The object of the game is to move around the screen collecting money, represented by a dollar sign. Depending upon which of the 40+ screens (yes, forty plus) you are on, you move by running along horizontal beams, by climbing ladders, chains, nets, etc..., or by leaping from one girder to another by pressing the fire button on the joystick. To make things interesting, the authors have included conveyors which double or half your speed, depending on the direction you are facing, and "flingers" which will toss you in the direction you are heading twice as far as a normal jump.

Other objects that are present on the screen are bomb carriage, bombs, eggs, 'byrds', 'kats', and zappers. The bombs are dropped from the bomb carriage and are not harmful, earning a player \$30 when your man runs over (disarming) the bomb; however, if not dealt with will turn into either 'kats' or eggs. The eggs can be collected by a player and can be thrown in a horizontal direction toward the other player, a 'kat', or a 'byrd'. If you hit a 'kat' with an egg it earns you \$150, or if you hit a 'byrd' it earns you \$250. Hitting your opponent's man with an egg will reduce his power to step by one. The eggs eventually turn into 'byrds'.

As mentioned before, this is a non-violent game, and falling off a ladder, girder, or whatever simply requires that you start your climb again. The game is terminated when a power strip displayed at the bottom of the screen, left side for the left joystick, or right side for the right joystick, reaches zero. Your powerstrip at the beginning of the game has ten units and is reduced by one each time you are struck by a 'kat', stepping on a

zapper, or getting hit with an egg flung by another player.

The 40+ different screens that Cashman offers are divided into screens 1-4 (Easy), 5-10 (Super-jump), 11-22 (Moderate), 23-27 (No-jumping), 28-39 (Experienced), and 40+ (Expert-"Puzzle"). The documentation states that only the BEST can handle the EXPERT screens. I must report that I am not an expert, and I did not view the screens beyond screen 40.

When a game is finished, your name and score will be recorded (provided it's high enough). You will become a member of the Cashman gang with a rank appropriate for your score, ranging from 'Katbait', 'Egghead', 'Bag-boy?', 'Fallguy', to 'CASHMAN!'.

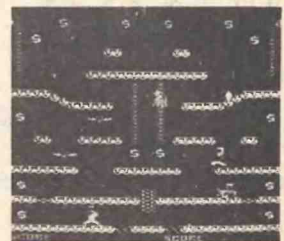
Other optional controls not mentioned above include a game restart: press the 'X' key, a game pause: press the 'P' key- (ENTER resumes), and an alternate color set: press the SPACEBAR.

Cashman requires 32K ECB and is available from MichTron (formerly Computer Shack) on tape for \$27.95, or on disk for \$29.95. I feel that I should mention that the disk version is copy-protected and I would advise you to put a write-protect tape on the disk to prevent inadvertently writing to the disk.

I feel that Cashman will become one of CoCo's favorite games, ranking right up there with Zaxxon and Donkey Kong. Again, Bill Dunlevy and Doug Frayer are to be congratulated for a job well done!

## CASHMAN

By Doug Frayer and Bill Dunlevy



# MUSICA

by Ronnie Powell

MUSICA is a software music program produced by Speech Systems, manufacturer of THE VOICE, THE COMPOSER, and THE STEREO COMPOSER. This program makes writing music almost as easy as composing on paper. It includes a well written manual, six musical demo selections, and a "play" program which allows a composition to be called up during any BASIC program.

The notes are displayed on standard musical treble and bass staves. Music is entered on these staves by positioning a cursor with either the arrow keys or a joystick and pressing ENTER. Entries can be made in any of four voices which permits playback of four part harmony.

The command keys enable the user to enter rests, sharps, and flats as well as change note length, timbre, tempo, and tone volume. In addition, notes can be inserted, deleted, or changed with the edit function.

Although the tape version of MUSICA will run on 16K with limited composition space, all but one of the musical demonstration files require 32K. User created music can be saved on tape or disk.

I would recommend MUSICA as a useful tool to the serious composer or a gratifying pasttime for the computer hobbyist.

You can obtain MUSICA from Speech Systems, 38W255 Deerpath Road, Batavia, Illinois 60510 for \$34.95 on cassette or \$39.95 on disk.

# VDOS

by Ronnie Powell

VDOS or Virtual Disk Operating System is a machine language program which allows storage of several BASIC or machine language programs in upper

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# What goes well with the Rainbow?



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*Rainbow On Tape* — the "meat" of *the Rainbow* at a price that's "small potatoes." Food for thought. To get your first heaping helping.

memory. VDOS was written by Dr. Laurence D. Preble, who wrote MINIDOS which appeared in the July issue of RAINBOW magazine. Since transferring a program between storage and working memory does not involve any mechanical device, saving or loading a program is much faster than cassette, and even faster than a disk.

After loading VDOS, the program self executes and prompts you to enter the highest memory location that VDOS will use. Normally half of your total memory will be used for storage, but entering the appropriate memory location allows you to adjust the ratio of working memory to storage memory. Maximum storage capacity will be about 54K with 64K of memory, 24K with 32K of memory, and 8K with 16K of memory. In a 16K machine, VDOS clears all of the high resolution graphic pages for more storage space, but you can use the PCLEAR command to restore these pages. The system works especially well with a 64K machine since the normally unused upper 32K of RAM is accessed for storage space.

Once you have entered the highest memory location that VDOS will use, the screen will display copyright information, instructions for obtaining the VDOS menu, and the highest useable address of working memory. You are now in BASIC and can type in, load, or save programs as usual. To get to VDOS, simply type VDOS and press <ENTER>. The VDOS Menu will appear with the following options

- 1 - DIRECTORY
- 2 - SAVE BASIC PROGRAM
- 3 - LOAD BASIC PROGRAM
- 4 - SAVE BINARY FILE
- 5 - LOAD BINARY FILE
- 6 - KILL BASIC PROGRAM
- 7 - KILL BINARY FILE
- 8 - EXIT TO BASIC

As an example, to save a machine language program in working memory to storage memory, you would select menu option number 4. You will be asked if it is all right to "USE DE-

FAULT ADDRESSES (Y/N)?" If you used a disk to load the program then answer "N", and you will be prompted to enter the START, END, and TRANSFER addresses. If you used a cassette to load the program then answer "Y", and the START, END, and TRANSFER addresses will be automatically saved in memory. Next you will be asked to enter the file name. Now your program is saved. Selecting DIRECTORY from the menu will display remaining storage space and list your stored programs by type (BASIC or BINARY), name, and size. Also, load and execute addresses are displayed for machine language programs.

VDUMP is an optional VDOS cassette utility. Without VDUMP, every time you power up your computer and load VDOS, you have to reload and save each program you want stored in memory. VDUMP, however, will save the entire contents of VDOS storage with one pass to tape and load it back later.

To save your VDOS stored programs, load VDUMP using CLOADM"VDUMP" and type EXEC once loaded. You will be asked if you want to "DUMP OR LOAD (D/L)?" Now load a blank tape in your cassette machine and place it in the record mode. Typing "D" will dump the entire contents of VDOS storage to tape. Next time you want to use VDOS, simply load the VDOS tape, the VDUMP tape, and your storage tape and you will be back in business.

VDOS and VDUMP come with well written documentation that not only covers complete operating instructions, but also covers almost any problem you might encounter. The programs perform as specified and are very useful. I would, however, like to see a built in merge utility and the capability of saving data files to storage memory added to VDOS.

I would recommend VDOS and the optional utility VDUMP as a system that

# The Color Computer TV GRAPHICS EDITOR

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```
LIST      +++SCREEN TWO+++
10 CIRCLE(126,96),56,1
20 PRINTQ12,"+++SCREEN TWO+++";
30 PRINTQ430,"Black or White";PRINTQ464,"
Background";
40 POKE32753,4:POKE32754,64:PRINTQ480,"Sel
ect 32 to 85 letters per line, 1 to 27 lin
es on screen. :POKE32753,5:POKE32754,51
50 PRINT"Works normally with most BASIC pr
ograms; Regular, Extended, or Disk."
60 POKE32753,6:POKE32754,42:PRINT"REAL low
er case. Graphics as you watch."
OK
RUN
```

Black or White  
Background  
Select 32 to 85 letters per line, 1 to 27 lines on screen.  
Works normally with most BASIC programs; Regular,  
Extended, or Disk.  
REAL lower case. Graphics as you watch.  
OK

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# HARDWARE REVIEW

## STAR GEMINI 10 PRINTER

by Paul D. Kirkpatrick

I have been thrilled with my Gemini 10 printer from virtually the first moment it arrived. It came packaged in a corrugated box with a plastic carrying handle which I opened carefully so I could use it for future transportation of the unit.

The printer is housed in an attractive beige case with a smoked gray transparent cover. On the right side are three control buttons, on line, form feed and line feed. Above the controls are four indicator lights. Three of them are green and are for Power, Ready, and on line. The fourth one is red and indicates paper out.

The unit comes with two manuals. One preliminary operation manual with 34 pages and the users manual with 214 pages. Together, they explain everything there is to know about the unit from unpacking to its maintenance.

The Gemini 10 has a built in self test that will yield a printout of the full set of characters it is able to print which includes the copyright symbol, cents sign, German and French accents, scientific notation, high-resolution graphics and more.

The printer can type Superscript, Subscript, Double Wide, Condensed, Italics, Proportional, Double Strike, Emphasized, Underline, Pica, Elite, Slash Zeros, Set Tabs, Change Line Feed, and Set Margins.

The printer control codes can be easily embedded into any word processor that can handle such a task, making this versatile printer really shine.

Codes are sent by using the <ESC> key and since the CoCo does not have this key, CHR\$(27) is used instead. An example of the use of the emphasized mode without a word processor

program would be: PRINT#-2,CHR\$(27);CHR\$(69), so with the use of CHR\$(X) you can set all print modes, set tabs vertical and horizontal, set margins, etc.

I purchased the parallel version and the Botek interface with baud rates up to 9600. The interface comes documented with the necessary POKES to change the baud rate which is normally 600 with the CoCo.

The Star Gemini 10 and the Gemini 15 (which handles 15 inch paper and can be bottom fed) can handle single sheets, roll paper and tractor fed fan fold paper.

It is available from a number of Dealers at a number of prices. I got mine from Sunlock Corporation, 4217 Carolina Ave., Richmond, VA 23222 for \$319.00 plus \$79.00 for the Botek interface & cable and \$11.00 shipping & handling for a total of \$409.00. Sunlock prefers to send their products C.O.D.

All in all, the Gemini 10 has been my best purchase since the CoCo itself.

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Continued from Page 83

will greatly enhance a cassette based system or perform as an extra drive for a disk system.

VDOS (\$49.95) and VDUMP (\$14.95) are available from Dr. Preble's Programs, 6540 Outer Loop, Louisville, KY 40228.

### THE UN-DISK



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Continued from Page 70

```
:FOR DLY=1 TO 500:NEXT DLY:PCLS
1680 NEXT X
1690 GOSUB 5170
1700 PRINT"OK, NOW LETS LOOK AT T
HAT F WE DREW A BOX, F STANDS
FOR FULL, SO LETS FILL IT UP
." :PRINT"CHANGE A LINE IN OUR PRO
GRAM TO READ:" :PRINT"LINE(X,80)-(
X+20,100),PSET,BF"
1710 GOSUB 5000
1720 PMODE4,1:PCLS:SCREEN1,1
1730 FOR X=10 TO 200 STEP 10
1740 LINE(X,80)-(X+20,100),PSET,B
F:FOR DLY=1 TO 500:NEXT DLY:PCLS
1750 NEXT X:GOSUB 5170
1760 PRINT"YOU CAN USE PRESET TO
CLEAR CERTAIN AREAS OF THE GR
APHICS SCREEN WITHOUT DOING A C
OMplete PCLS."
1770 PRINT:PRINT"FOR AN EXAMPLE:"
;
1780 GOSUB 5000
1790 PMODE4,1:PCLS:SCREEN1,1
1800 FOR X=0 TO 255 STEP 5:LINE(X
,0)-(X,191),PSET:NEXT X
1810 FOR X=0 TO 191 STEP 5:LINE(0
,X)-(255,X),PSET:NEXT X
1820 A$="CLEAR A":H=30:GOSUB 2000

1830 A$="SPOT FOR":H=60:GOSUB 200
0
1840 A$="THIS SET":H=90:GOSUB 200
0
1850 A$="OF WORDS":H=120:GOSUB 20
00
1860 A$="LIKE THIS!":H=150:GOSUB
2000
1870 A$="HIT A KEY":H=184:GOSUB 2
000
1880 GOSUB 5010
1890 GOSUB 5180:GOTO2050
2000 L=LEN(A$):L1=110-((L/2)*12):
LINE(L1-12,H-23)-(L1+(16*L)+12,H+
2),PRESET,BF
2010 XL$=STR$(L1):XM$=STR$(H)
2020 XN$="S4;BM"+XL$+" "+XM$+";"
2030 DRAW XN$
2040 GOSUB 6020:RETURN
2050 PRINT"LOG, SHORT FOR LOGARIT
HM."
2060 PRINT"RETURNS THE NATURAL LO
GARITHM OF A NUMBER, (BASE E)."
```

```
2070 PRINT"THE LOGARITHM OF A NUM
BER IS THEPOWER TO WHICH A GIVEN
BASE MUSTBE RAISED TO RESULT IN T
```

```
HE NUMBER. LOGS ARE USEFUL
IN "
2080 PRINT"SCIENTIFIC AND MATHEMA
TICAL PROBLEMS. IN THE LOG FU
NCTION, THE BASE IS E=2.71827182
8"
2090 PRINT"TO FIND THE LOGARITHM
OF A NUMBER WITH ANOTHER BAS
E, USE:"
2100 GOSUB 5000:GOSUB 5180
2110 PRINT"THE FORMULA:" :PRINT"LO
G,base b(X)=LOGe(X)/LOGe(B)":PRIN
T"EG:" :PRINT"LOG(100)/LOG(10) RET
URNS THE LOGARITHM OF 100 IN B
ASE 10"
2120 PRINT:PRINT"IN OTHER WORDS,
THE POWER TO WHICH 10 MUST BE
RAISED TO GET 100."
2130 PRINT:PRINT"LOG IS THE INVER
SE OF EXP. SO, X=LOG(EXP(X))
"
2140 GOSUB 5000:GOSUB 5190
2150 PRINT"PAINT(X,Y),A,B"
2160 PRINT:PRINT"THE X AND Y ARE
SCREEN POSITIONSTHE A IS THE COLO
R YOU WANT TO PAINT AND THE B IS
THE BORDER COLOR YOU WANT THE
PAINTING TO STOP ON."
2170 PRINT"LET'S SEE WHAT PAINT C
AN DO.":PRINT
2180 GOSUB 5000:GOSUB 5190
2190 PRINT"HERE IS THE PROGRAM:"
2200 PRINT"10 PMODE3,1:PCLS:SCREE
N1,0"
2210 PRINT"20 COLOR 3,2:CIRCLE(12
8,96),50 30 PAINT(128,96),1,3"
2220 GOSUB 5000
2230 COLOR 3,2:PMODE 3,1:PCLS:SCR
EEN1,0
2240 CIRCLE(128,96),50,2:PAINT(12
8,96),2,2
2250 A$="HIT ANY KEY":GOSUB 6000:
GOSUB 5010
2260 GOSUB 5190:PRINT"WE JUST DRE
W A CIRCLE ON THE SCREEN AND P
AINTED IT."
2270 PRINT:PRINT"YOU MUST BE IN O
NE OF THE 4 COLOR MODES, EG
. PMODE3 OR PMODE 1 TO GET COL
ORS FROM PAINT."
2280 GOSUB 5000:GOSUB 5200
2290 PRINT"PCLS WORKS ON THE GRAP
HICS SCREEN THE WAY THAT CLS
WORKS ON THE TEXT SCREEN, AND
LIKE THE CLS, YOU CAN SPECIFY
A COLOR."
```

```

2300 PRINT"WITH PCLS, YOU ONLY HA
VE 4      COLORS ON EACH SCREEN.
      ON SCREEN1,0 YOU HAVE "
2310 PRINT"GREEN, YELLOW, BLUE &
RED":PRINT"ON SCREEN1,1 GIVES YOU
:":PRINT"BUFF, CYAN, MAGENTA & OR
ANGE."
2320 PRINT:PRINT"FOR A DEMO:";
2330 GOSUB 5000
2340 FOR S=0 TO 1
2350 FOR Y=1 TO 4
2360 PMODE3,1:PCLSY:SCREEN1,S
2370 A$="S="+STR$(S)+"  X="+STR$(
(Y):GOSUB 6000
2380 FOR DLY=0 TO 500:NEXT DLY
2390 NEXT Y,S
2400 RUN"EXT3"
5000 PRINT:PRINT"HIT ANY KEY TO C
ONTINUE";
5010 A$=INKEY$:IF A$="" THEN 5010

```

```

5020 RETURN
5100 CLS:PRINT" ** EXTENDED COMMA
ND EDIT **":PRINT:RETURN
5110 CLS:PRINT" ** EXTENDED OPERA
TOR EXP **":PRINT:RETURN
5120 CLS:PRINT" ** EXTENDED OPERA
TOR FIX **":PRINT:RETURN
5130 CLS:PRINT" * EXTENDED COMMAN
DS GET/PUT *":PRINT:RETURN
5140 CLS:PRINT" ** EXTENDED COMMA
ND HEX$ **":PRINT:RETURN
5150 CLS:PRINT" ** EXTENDED FUNCT
ION INSTR **":PRINT:RETURN
5160 CLS:PRINT" ** EXTENDED COMMA
ND LET **":PRINT:RETURN
5170 CLS:PRINT" ** EXTENDED COMMA
ND LINE **":PRINT:RETURN
5180 CLS:PRINT" ** EXTENDED FUNCT
ION LOG **":PRINT:RETURN
5190 CLS:PRINT" ** EXTENDED COMMA
ND PAINT **":PRINT:RETURN
5200 CLS:PRINT" ** EXTENDED COMMA
ND PCLS **":PRINT:RETURN
6000 L=LEN(A$):L1=110-((L/2)*12):
LINE(L1-12,165)-(L1+(16*L)+12,188
),PRESET,BF
6010 XL$=STR$(L1):DRAW"S4;BM"+XL$
+",185;"
6020 FOR X=1 TO L:M=ASC(MID$(A$,X
,1))
6030 M=M-31:IF M>38 THEN M=M-38:G
OTO 6060
6040 ON M GOSUB 6080,6090,6100,61
10,6120,6130,6140,6150,6160,6170,
6180,6190,6200,6210,6220,6230,624
PAGE 88

```

```

0,6250,6260,6270,6280,6290,6300,6
310,6320,6330,6340,6350,6360,6370
,6380,6390,6400,6410,6420,6430,64
40,6450
6050 GOTO 6070
6060 ON M GOSUB 6460,6470,6480,64
90,6500,6510,6520,6530,6540,6550,
6560,6570,6580,6590,6600,6610,662
0,6630,6640,6650,6660,6670,6680,6
690,6700
6070 NEXT X
6080 DRAW"BR8":RETURN:'SPACE
6090 DRAW"BR5R2U2L2D2R2U15BR10BD1
5":RETURN:'!
6100 DRAW"BR4BU12U4BR4D4BD12BR8":
RETURN:'"
6110 DRAW"BR4U5NL4NR8U6NU5NL4R4NR
4NU5D11BR8":RETURN:'#
6120 DRAW"BR2NH2R8E2U4H2L8H2U4E2R
8F2BL8NU2D14BR4NU16BR6":RETURN:'$
6130 DRAW"E12BL12D1R1U1L1BF12L1U1
R1D1BR4":RETURN:'%
6140 DRAW"BR12H12U2E2R6F2D2G10D2F
2R8NE3BR6":RETURN:'&
6150 DRAW"BR6BU12U4BR10BD16":RETU
RN:''
6160 DRAW"BR12H5U6E5BD16BR4":RETU
RN:'(
6170 DRAW"E5U6H5BR16BD16":RETURN:
')
6180 DRAW"BU8BR6NL6NH6NU6NE6NR6NF
6ND6NG6BR10BD8":RETURN:'*
6190 DRAW"BR6BU8NU5NL5NR5D5BD3BR1
0":RETURN:'+
6200 DRAW"BR4R2U2L2D2BR2NG2BR10":
RETURN:',
6210 DRAW"BR3BU8R6BR7BD8":RETURN:
'-
6220 DRAW"BR3U2R2D2L2BR12":RETURN
:'-
6230 DRAW"U2E12U2BR4BD16":RETURN:
'/
6240 DRAW"BR2H2U12E2R8F2D12G2NL8B
R6":RETURN:'0
6250 DRAW"BR2R4NR4U16L2G2BD14BR14
":RETURN:'1
6260 DRAW"BR2NR10U2E10U2H2L8G2BR1
6BD14":RETURN:'2
6270 DRAW"BR2NH2R8E2U4H2NL4E2U4H2
L8G2BD14BR16":RETURN:'3
6280 DRAW"BR8U16G8R12BD8BR4":RETU
RN:'4
6290 DRAW"BU2F2R8E2U4H2L10U8R12BD
16BR4":RETURN:'5
6300 DRAW"BU2NU6F2R8E2U4H2L8U5E3R

```

```

6F3BD13BR4":RETURN:'6
6310 DRAW"BU16R12D4G12BR16":RETUR
N:'7
6320 DRAW"BU2NU4F2R8E2U4H2L8NG2H2
U4E2R8F2D4NG2BD10BR4":RETURN:'8
6330 DRAW"BU3F3R6E3U10H3L6G3D3F3R
9BR4BD7":RETURN:'9
6340 DRAW"BR7BU3R2U2L2D2BU7R2U2L2
D2BD10BR9":RETURN:';
6350 DRAW"BR5BU3U2R2D2NG3L2BU8U2R
2D2L2BD11BR11":RETURN:'<
6360 DRAW"BR12BU2H6E6BD14BR4":RET
URN:'=
6370 DRAW"BU6NR10BU5R10BD11BR4":R
ETURN:'>
6380 DRAW"BU2E6H6BD14BR16":RETURN
:'?
6390 DRAW"BR5R2U2L2D2R1BU5U3E3U3H
2L6G3BD13BR16":RETURN:'@
6400 DRAW"BU2NU4F2R8E2U6L8G2E2R8U
6H2L8G2BD14BR16":RETURN:'A
6410 DRAW"U10NR12E6F6D10BR4":RETU
RN:'B
6420 DRAW"NU16R10E2U4H2NL10E2U4H2
L10BD16BR16":RETURN:'C
6430 DRAW"BU3BR12G3L6H3U10E3R6F3B
D13BR4":RETURN:'D
6440 DRAW"U16R9F3D10G3L9BR16":RET
URN:'E
6450 DRAW"NR12U8NR8U8R12BD16BR4":
RETURN:'F
6460 DRAW"U8NR8U8R12BD16BR4":RETU
RN:'G
6470 DRAW"BU5BR8R4D2G3L6H3U10E3R6
F3D1BD12BR4":RETURN:'H
6480 DRAW"U8NU8R10NU8D8BR6":RETUR
N:'I
6490 DRAW"BR2R4NR4U16NL4R4BR6BD16
":RETURN:'J
6500 DRAW"BU3F3R3E3U13NL9R3BD16BR
4":RETURN:'K
6510 DRAW"U8NU8E2NF10E6BD16BR4":R
ETURN:'L
6520 DRAW"NU16R12BR4":RETURN:'M
6530 DRAW"U16F6E6D16BR4":RETURN:'N
6540 DRAW"U16D2F12NU14D2BR4":RETU
RN:'O
6550 DRAW"BU2NF2U12E2R8F2D12G2NL8
BR6":RETURN:'P
6560 DRAW"U16R8F2D4G2L8BD8BR16":R
ETURN:'Q
6570 DRAW"BU3NF3U10E3R6F3D10G3NL6
E1NH2NF3BD1BR6":RETURN:'R
6580 DRAW"U16R8F2D4G2L8R2F8BR8":R
ETURN:'S

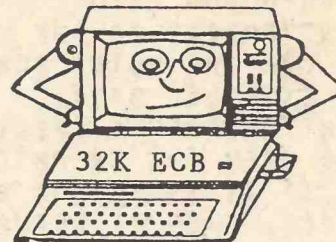
```

```

6590 DRAW"BU3F3R7E2U4H2L8H2U4E2R8
F2BD14BR4":RETURN:'T
6600 DRAW"BR8U16NL6R6BR4BD16":RET
URN:'U
6610 DRAW"BU3NU13F3R6E3NU13BD3BR4
":RETURN:'V
6620 DRAW"BU16D10F6E6U10BR4BD16":
RETURN:'W
6630 DRAW"NU16E6F6NU16BR4":RETURN
:'X
6640 DRAW"U2E12U2BL12D2F12D2BR4":
RETURN:'Y
6650 DRAW"BR6U10NH6E6BD16BR4":RET
URN:'Z
6660 DRAW"NR12U2E12U2L12BR16BD16"
:RETURN:'[
6670 DRAW"NR6U16R6BR6BD16":RETURN
:'\
6680 DRAW"BU16D2F12D2BR4":RETURN:
']
6690 DRAW"BU16BR2R6D16L6BR14":RET
URN:'^
6700 DRAW"BR6U16NG6F6BD10BR4":RET
URN:'_

```

AFTER RUNNING MEMORY = 11685  
MEMORY REQUIRED = 11138



```

10 GOSUB 2400
20 PRINT"PSET(X,Y,C) IS THE SYNTA
X FOR THE PSET COMMAND. OF COUR
SE THE X AND Y ARE THE SCREEN LOC
ATIONSAND THE C IS THE COLOR."
30 PRINT"IF YOU REMEMBER THE SET/
RESET COMMANDS FROM NON EXTENDE
D, YOU WILL FIND THAT THE PSE
T AND PRESET ARE THE SAME, EX
CEPT THAT THEY ARE ON THE HIGH RE
S GRAPHICS SCREEN."
40 PRINT"PSET, SETS JUST ONE OF T
HE 49,152 POINTS ON THE SCRE
EN."
50 GOSUB 2370:GOSUB 2400
60 PRINT"THIS MAKES HIGH RESOLUTI
ON GRAPHS AND CHARTS A BREEZ
E."
70 PRINT:PRINT"LINE DRAWINGS FROM
MATHEMATICAL EQUATIONS IN HIGH R
ESOLUTION."

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```

80 PRINT:PRINT"10 PMODE4,1:PCLS:SCREEN1,1
20 LINE(0,96)-(255,96),PSET
30 FOR X=0 TO 255 STEP 3
40 S=SIN(X)*50:PSET(X,96+S,5)
50 NEXT X"
90 GOSUB 2370
100 PMODE4,1:PCLS:SCREEN1,1
110 LINE(0,96)-(255,96),PSET
120 FOR X=0 TO 255 STEP 3
130 S=SIN(X)*50
140 PSET(X,96+S,5)
150 NEXT X
160 A$="HIT ANY KEY":GOSUB 2480
170 GOSUB 2380:GOSUB 2400
180 PRINT"PRESET RESETS THE POINT TO THE BACKGROUND COLOR."
190 PRINT:PRINT"10 PMODE4,1:PCLS1:SCREEN1,1
20 FOR X=0 TO 255 STEP 3
30 S=SIN(X)*50:PRESET(X,96+S,5)
40 NEXT X"
200 GOSUB 2370
210 PMODE4,1:PCLS1:SCREEN1,1
220 LINE(0,96)-(255,96),PRESET
230 FOR X=0 TO 255 STEP 3:S=SIN(X)*50:PRESET(X,96+S):NEXT X
240 A$="HIT ANY KEY":GOSUB 2480:GOSUB 2380:GOSUB 2410
250 PRINT"PPOINT IS THE HIGH RES VERSION OF THE POINT COMMAND OF NON-EXTENDED BASIC."
260 PRINT"IT TEST A SPECIFIC POINT ON THE HIGH RES GRAPHICS SCREEN TO SEE IF IT IS SET OR RESET. IF IT IS SET, THEN IT RETURNS THE COLOR OF THE POINT."
270 PRINT"IN THE 4 COLOR MODE, THE COMMAND RETURNS THE COLOR, AS IT WILL BE A COLOR, EVEN IF IT IS RESET."
280 GOSUB 2370:GOSUB 2410
290 PRINT"LIKE THE POINT COMMAND, YOU USE THIS COMMAND TO SEE IF YOUR BOMB OR BULLET HAS HIT ITS MARK. SAMPLE PROGRAM:"
300 PRINT"10 PMODE4,1:PCLS:SCREEN1,1
20 LINE(126,180)-(130,188),PSET,BF"
310 PRINT"30 X=RND(255):FOR Y=0 TO 190
40 PSET(X,Y,5):P=PPOINT(X,Y+1)
50 IF P=5 THEN FOR Z=0 TO 25
60 CIRCLE(X,Y),Z:NEXT"
320 GOSUB 2370
330 PMODE4,1:PCLS:SCREEN1,1:LINE(126,188)-(130,190),PSET,BF:X=RND(25)+110:FOR Y=0 TO 190:PSET(X,Y,5)

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340 P=PPOINT(X,Y+1):IF P=5 THEN FOR Z=0 TO 25:CIRCLE(X,Y),Z:NEXTZ:GOTO 370
350 NEXT Y
360 GOTO 330
370 GOSUB 2420
380 PRINT"THIS PCLEAR COMMAND LETS YOU CLEAR MORE (OR LESS) GRAPHICS PAGES. (THE COMPUTER PCLEAR 4 GRAPHICS PAGES ON POWER UP)."
390 PRINT"EACH GRAPHICS PAGE TAKES UP 1,536 BYTES OF MEMORY, SO THE MORE PAGES YOU PCLEAR THE LESS MEMORY YOU HAVE FOR YOUR PROGRAMS"
400 PRINT"IF YOU NEED MORE MEMORY FOR TEXT AND LESS FOR GRAPHICS THEN YOU CAN PCLEAR LESS THAN 4 PAGES. EG: PCLEAR1";
410 GOSUB 2370:GOSUB 2420
420 PRINT"NOTE:YOU MUST BE IN PMODE 0 IN ORDER TO DO A PCLEAR 1. THE COLOR COMPUTER WILL NOT ALLOW YOU TO PCLEAR DIRECTLY."
430 PRINT:PRINT"IF YOU PCLEAR 8 (8 IS THE MOST YOU CAN CLEAR) YOU HAVE 8 SCREENS WITH PMODES 0,4 WITH PMODE 1, AND YOU EVEN HAVE 2 DIFFERENT SCREENS IN PMODE 4"
440 GOSUB 2370:GOSUB 2420
450 PRINT"OK, SO NOW WE KNOW SOMETHING ABOUT IT, BUT HOW DO WE USE DIFFERENT GRAPHICS SCREENS?"
460 PRINT:PRINT"WELL, IF YOU USE PMODE3, YOU HAVE 2 DIFFERENT GRAPHICS SCREENS, AND YOU CAN BE DRAWING SOMETHING ON ONE SCREEN WHILE DISPLAYING THE OTHER ONE AND SWITCH SCREENS FOR FAST ACTION GRAPHICS."
470 GOSUB 2370:GOSUB 2420
480 PRINT"WE CAN'T DISPLAY IT HERE DUE TO LACK OF GRAPHICS MEMORY. IF YOU WANT TO SEE HOW THE SCREEN FUNCTION WORKS, CHECK"
490 PRINT"SAMPLE PROGRAM #8, (THE UNFOLDING BOX) IN THE BOOK, GOING AHEAD WITH EXTENDED COLOR BASIC."
500 GOSUB 2370:GOSUB 2430
510 PRINT"PCOPY WILL COPY ONE GRA

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PHICS PAGE TO ANOTHER. IF YOU
HAVE DREW A PICTURE ON PAGE 1
AND WANT A COPY OF YOUR PICTUR
E ON PAGE 4, THEN TYPE:"
520 PRINT"PCOPY 1 TO 4 AND YO
UR PICTURE WILL BE COPIED O
N THE GRAPHICS PAGE 4."
530 GOSUB 2370:GOSUB 2430
540 PRINT"DEMO:":PRINT"10 PMODE0,
1:PCLS:SCREEN1,1 20 FOR X=1
TO 100 STEP 10 30 LINE(O+X,
O+X)-(255-X,191-X),PSET":PRINT"40
NEXT X":PRINT"50 PMODE0,3:PCLS:S
CREEN1,1 60 PCOPY 1 TO 3":PR
INT"70 GOTO 70"
550 GOSUB 2370
560 PMODE0,1:PCLS:SCREEN1,1:FOR X
=1 TO 100 STEP 10:LINE(O+X,O+X)-(
255-X,191-X),PSET,B:NEXT X:A$="SC
REEN 0,1":GOSUB 2480
570 PMODE0,3:PCLS:SCREEN1,1:A$="S
CREEN 0,3":GOSUB 2480:PCOPY 1 TO
3:A$="PCOPY 1 TO 3":GOSUB 2480:GO
SUB 2380
580 GOSUB 2440
590 PRINT"PMODE LETS YOU SELECT W
HIGH GRAPHICS MODE YOU WANT,
(O-4) AND WHICH GRAPHICS PAGE Y
OU WANT TO START ON."
600 PRINT"THE HIGHER THE PMODE, T
HE HIGHERTHE RESOLUTION, AND THE
MORE GRAPHICS PAGES IT WILL RE
QUIRE."
610 PRINT"PMODE 0 REQUIRES ONLY 1
GRAPHICSPAGE, BUT GIVES YOU ONLY
A BLACK AND WHITE PICTURE W
ITH 128 WIDE BY 96 HIGH RESOLU
TION."
620 GOSUB 2370:GOSUB 2440
630 PRINT"PMODE 1 TAKES 2 GRAPHIC
S PAGES AND ONLY GIVES YOU THE 1
28 X 96 DOT RESOLUTION, BUT YOU C
AN HAVE 4 COLORS PER SCREEN,
WITH TWO SCREENS."
640 PRINT"PMODE 2 TAKES 2 GRAPHIC
S PAGES WITH JUST 2 COLORS (BLAC
K & WHITE) BUT GIVES YOU A 12
8 X 192 RESOLUTION."
650 PRINT"PMODE 3 TAKES 4 GRAPHIC
S PAGES, GIVES YOU 4 COLORS PER S
CREEN AND 128 X 192 PICTURE RES
OLUTION";
660 GOSUB 2370:GOSUB 2440
670 PRINT"PMODE 4 TAKES 4 GRAPHIC
S PAGES GIVES YOU JUST 2 COLORS
BUT HAS A FANTASTIC 256 X 192 PIC

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TURE RESOLUTION."
680 PRINT:PRINT"IF YOU DON'T KNOW
WHAT ALL THIS MEANS, IT'S OK, I'
LL SHOW YOU."
690 PRINT"WE WILL DRAW A CIRCLE U
SING EACH OF THE PMODE'S WITH
A DIAGONAL LINE THROUGH IT
SO YOU CAN TELL WHAT THE RESO
LUTIONIS.""
700 GOSUB 2370
710 A$="PMODE 0":PMODE0,1:GOSUB 7
70
720 A$="PMODE 1":PMODE1,1:GOSUB 7
70
730 A$="PMODE 2":PMODE2,1:GOSUB 7
70
740 A$="PMODE 3":PMODE3,1:GOSUB 7
70
750 A$="PMODE 4":PMODE4,1:GOSUB 7
70
760 GOSUB 2440:GOTO 780
770 PCLS:SCREEN1,1:CIRCLE(128,96)
,60:LINE(20,20)-(235,170),PSET:GO
SUB 2480:FOR X=1 TO 1000:NEXT X:R
ETURN
780 PRINT"DID YOU NOTICE HOW MUCH
SMOOTHER AND STRAIGHTER
THE CIRCLE AND LINE APPEARED
AS WE INCREASED THE PMODE?"
790 PRINT"IN PMODE 4 IT WAS ALMOS
T A PERFECT CIRCLE AND A STR
AINGT LINE. THIS IS BECAUSE WE
ARE USING MORE DOTS, CALLED PI
XELS TO DRAW THE LINE WITH."
800 PRINT"YOU PROBABLY NOTICED TH
AT SOME OF THE CIRCLES WERE IN C
OLOR AND SOME WERE BLACK & WHI
TE."
810 GOSUB 2370:GOSUB 2440
820 PRINT"THE SECOND VARIABLE USE
D IN THE PMODE COMMAND IS FOR THE
PAGE YOU WANT TO START YOUR GR
APHICS ON. EG: PMODE 3,1 TELLS TH
E COMPUTER THAT YOU WANT TO G
O TO PMODE 3 AND YOU WANT TO STAR
T ON GRAPHICS PAGE 1."
830 PRINT"SINCE PMODE 3 TAKES 4 G
RAPHICS PAGES, THE SCREEN WILL T
AKE UP PAGES 1 THRU 4. IF YOU HA
D SPECIFIED PMODE 3,3 THEN T
HE SCREEN WOULD USE PAGES 3 TO
7."
840 GOSUB 2370:GOSUB 2440
850 PRINT"NOTE: YOU COULD NOT USE
PMODE 3,3 WITHOUT
PCLEARING MORE OF

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THE GRAPHICS PAGES  
WITH THE PCLEAR  
COMMAND."

860 PRINT:PRINT"FOR A DETAILED EX  
PLANATION OF THE PMODE COMMAND,  
REFER TO THE EXTENDED BASIC  
MANUAL."

870 GOSUB 2370:GOSUB 2450

880 PRINT"PLAY, MUSIC THAT IS. TH  
E COLOR COMPUTER IS A REAL  
MUSICAL INSTRUMENT."

890 PRINT:PRINT"WE'LL LOOK AT THE  
COMMAND IN A MINUTE, FIRST LETS  
LISTEN TO WHAT THE COMPUTER C  
AN DO."

900 GOSUB 2370:GOSUB 2450

910 CLS:PRINT"TICO-TICO NO FUBA"

920 A\$="03P16L16C02BA+02AG+AB03DC  
02B03CE02G03CEGF+FE0C02B02AGFEDL4  
C"

930 B\$="02P16L16;ED+EFEL8AP16L16E  
D+E;FEL8G+P16L16;ED+EFE03D02BG+ED  
C+;L4C"

940 C\$="L16P16AG+GFA03L8DP16L16C0  
2AFEAL803CP16L16C02BAB01B02D+FBFB  
AG+EL803EP16"

950 D\$="L1602P16AG+GFA03L8DP16L16  
C02AFEAL803CP16L16C02BABEG+B03EDC  
02BA"

960 E\$="P8P8P1601BAG+G02CEG03CEGG  
+L8AFP16L1601BAG+GB02DFB03DGG+L8A  
E"

970 F\$="P16L1604C03CL804C03L16B02  
B03L8BL16A02A03AGFD02L8B"

980 G\$="L1603B02B03L8BL16A02A03L8  
AL16A02A03GE02CAGP801L16F+"

990 H\$="G02CEG03CEGG+L8AFP16L1601  
BAG+GB02DFB03DGG+L8AEP16L16"

1000 I\$="L1601BAG+"

1010 J\$="L16P8P1603ED+EFED+EAED+E  
FED+EG+EDEF04D03BG+EDC+L4C"

1020 PLAY"T3":PLAY A\$:PLAY B\$:PLA  
Y C\$:PLAY B\$

1030 PLAY D\$:PLAY E\$:PLAY F\$:PLAY  
G\$:PLAY H\$:PLAY A\$:PLAY I\$:PLAY  
H\$:PLAY A\$:PLAY J\$:PLAY"02"

1040 PLAY C\$:PLAY B\$:PLAY D\$:PLAY  
"P201T1L1A"

1050 GOSUB 2450

1060 PRINT"THE SYNTAX FOR PLAY IS  
:  
PLAY";CHR\$(34);"STRING"  
;CHR\$(34)

1070 PRINT:PRINT"STRING IS AN EXP  
RESSION (PUT IT QUOTATIONS) THAT  
SPECIFIES."

1080 PRINT"NOTE: A LETTER FROM A

PAGE 92

TO G OCTAVE: LETTER O FOLLOW  
ED BY A NUMBER BETWEEN  
1 & 5"

1090 PRINT"NOTE LENGHT: LETTER L  
FOLLOWED BY A NUMBE  
R 1-255 TEMPO: LETTER T FOLLOWED  
BY A NUMBER 1 TO 255"

1100 GOSUB 2370:GOSUB 2450

1110 PRINT"VOLUME: LETTER V FOLLO  
WED BY A NUMBER BETWEE  
N 1 & 31"

1120 PRINT"PAUSE: LETTER P FOLLOW  
ED BY A NUMBER BETWEEN 1  
& 255"

1130 PRINT:PRINT"HERE IS AN EXAMP  
LE:";PRINT"PLAY";CHR\$(34);"T3;02;  
V20;L4;A;B";CHR\$(34)

1140 PRINT:PRINT"WE ARE TELLING T  
HE COMPUTER TO PLAY THE NOTES A  
AND B AT A TEMPO OF 3 IN THE  
SECOND OCTAVE AT A VOLUME  
OF 20 AND A QUARTER NOTE LENGT  
H.";

1150 GOSUB 2370:GOSUB 2450

1160 PRINT"YOU CAN ALSO SPECIFY S  
HARPS AND FLATS. TO MAKE A SH  
ARP OF A NOTE, ADD A # TO THE N  
OTE, EG: PLAY";CHR\$(34);"A#";C  
HR\$(34)

1170 PRINT"FOR A FLAT, ADD A - (M  
INUS SIGN)"

1180 PRINT"NOTE: THE PLAY COMMAND  
DOES NOT RECOGNIZE THE NOT  
ATION B# OR C-."

1190 PRINT:PRINT"THE L (NOTE LENG  
TH) IS 1/NUMBER SO IF YOU SPECIFY  
L4, YOU HAVE A 1/4TH NOTE.";

1200 GOSUB 2370:GOSUB 2450

1210 PRINT"FOR DOTTED NOTES, (NOT  
ES THAT ARE SUPPOSED TO BE INCR  
EASED BY 1/2 THEIR NORMAL LENG  
TH, JUST ADD A DOT AFTER YOUR  
NOTE."

1220 PRINT:PRINT"NOW THAT YOU HAV  
E HEARD A SONG PLAYED ON THE COL  
OR COMPUTER AND KNOW HOW TO PR  
OGRAM A SONG, LET'S SEE WHAT YOU  
CAN DO."

1230 PRINT:PRINT"YOUR ASSIGNMENT  
, WRITE A SONG!"

1240 GOSUB 2370:GOSUB 2460

1250 PRINT"POS IS A FUNCTION THAT  
ALLOWS YOU TO TEST THE CURRENT  
CURSOR POSITION ON THE SCREEN O  
R PRINTER."

1260 PRINT"?POS(DEVICE NUMBER):?"

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1270 PRINT"DEVICE NUMBER WILL EITHER BE
      0 FOR THE SCREEN OR
      -2 FOR THE PRINTER."
1280 PRINT:PRINT"THIS FEATURE CAN BE USED TO
      PREVENT SPLIT WORDS ON THE
      SCREEN OR PRINTER."
"
1290 GOSUB 2370:GOSUB 2470
1300 PRINT"PRINT USING ENABLES THE COMPUTER TO PRINT STRINGS AND NUMBERS
      IN A CUSTOMIZED FORMAT. THIS IS ESPECIALLY USEFUL WHEN DEALING WITH
      DOLLAR VALUES OR ANY TYPE OF PRINTOUT THAT REQUIRES A CUSTOMIZED
      FORMAT."
1310 PRINT"THE SYNTAX FOR PRINT USING IS:
      ":PRINT"PRINT USING";CHR$(34);"FORMAT";CHR$(34);";ITEM-LIST"
1320 GOSUB 2370:GOSUB 2470
1330 PRINT"FORMAT IS A STRING EXPRESSION (IT MUST BE CONTAINED IN QUOTES)
      AND TELLS THE COMPUTER WHAT FORMAT TO USE IN PRINTING EACH OF THE
      ITEMS IN THE ITEM-LIST."
1340 PRINT"IT CONSISTS OF FIELD SPECIFIERS AND OTHER CHARACTERS, AND IS
      ONE OR ONE SET."
1350 PRINT"ITEM-LIST IS THE DATA TO BE FORMATED AND PRINTED."
1360 PRINT"NO LEADING OR TRAILING BLANKS WILL BE PRINTED EXCEPT AS
      SPECIFIED WITH YOUR FORMAT."
1370 GOSUB 2370:GOSUB 2470
1380 PRINT"LET'S LOOK AT THE ACTUAL USAGE OF PRINT USING. FIRST WITH
      NUMBERS."
1390 PRINT"YOU SET THE LENGTH OF YOUR NUMERIC FIELD WITH THE # SIGNS.":PRINT
1400 PRINT"PRINT USING";CHR$(34);"####";CHR$(34);";22.2"
1410 PRINTUSING"####";22.2
1420 PRINT:PRINT"FIRST OFF YOU WILL NOTICE THAT THE .2 (THE DECIMAL PORTION)
      OF THE NUMBER WAS NOT PRINTED.":GOSUB 2370:GOSUB 2470
1430 PRINT"THAT WAS BECAUSE WE DID NOT SPECIFY A DECIMAL IN OUR FORMAT.
      YOU WILL NOTICE ALSO THAT THE NUMBER WAS SPACED OUT FROM THE LEFT
      SIDE OF THE SCREEN BY 2 SPACES. OUR FORMAT DECLARED
      "
1440 PRINT"THAT WE WERE USING 4 S

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PACES, BUT OUR NUMBER WAS ONLY 2 DIGITS LONG, THEREFORE WE HAD 2 LEADING SPACES."
1450 GOSUB 2370:GOSUB 2470
1460 PRINT"TO GET A DECIMAL, WE USE:
      PRINT USING";CHR$(34);"###.##";CHR$(34);";22.2"
1470 PRINTUSING"###.##";22.2
1480 PRINT:PRINT"WE SPECIFIED 2 DECIMAL PLACES, SO THE COMPUTER WILL
      PRINT THE TWO DECIMAL PLACES. IF WE DID NOT HAVE A DECIMAL, THE
      COMPUTER WOULD PRINT .00 FOR THE DECIMAL."
1490 GOSUB 2370:GOSUB 2470
1500 PRINT"PRINT USING";CHR$(34);"###.##";CHR$(34);";1234.22"
1510 PRINTUSING"###.##";1234.22
1520 PRINT:PRINT"SEE THE % SIGN LEADING THE NUMBER? IT'S TELLING US
      THAT THE NUMBER IS LARGER THAN THE FIELD WE ALLOTTED FOR IT. IT
      STILL PRINTS THE NUMBER THOUGH."
1530 PRINT:PRINT"LET'S LOOK AT 'ROUNDING OFF'"
1540 GOSUB 2370:GOSUB 2470
1550 PRINT"PRINT USING";CHR$(34);"###.##";CHR$(34);";22.36789"
1560 PRINTUSING"###.##";22.36789
1570 PRINT:PRINT"ANY DECIMAL THAT WON'T FIT INTO OUR FORMAT IS AUTOMATICALLY
      ROUNDED OFF TO THE NEAREST NUMBER OR DECIMAL. IN THE ABOVE EXAMPLE,
      22.36789 IS CLOSER TO 22.37 THAN IT IS TO 22.36."
1580 PRINT"SO IT IS ROUNDED OFF TO 22.37."
1590 GOSUB 2370:GOSUB 2470
1600 PRINT"YOU CAN PLACE YOUR DECIMAL POINT ANYWHERE IN THE NUMERIC
      FIELD THAT YOU HAVE ESTABLISHED WITH THE # SIGNS. SO IF YOU WANT
      TO HAVE 6 DECIMALS, YOU WOULD USE ###.##### ETC."
1610 PRINT"WHEN WE DESCRIBED THE SYNTAX OF THE PRINT USING COMMAND, WE
      SAID PRINT USING FORMAT ITEM-LIST."
1620 PRINT"THE WORD LIST MEANS YOU CAN HAVE MORE THAN ONE NUMBER."
1630 GOSUB 2370:GOSUB 2470
1640 PRINT"PRINT USING";CHR$(34);"###.##";CHR$(34);";22.2,31.2,.89,987.13"

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1650 PRINT USING "###.## ";22.2,31
.2,.89,987.13
1660 PRINT:PRINT"USING COMMAS AS
DELIMITERS YOU CAN HAVE A LIST O
F NUMBERS TO BE PRINTED OUT USI
NG THE FORMAT YOU HAVE SPECIFIED.
NOTICE THAT WE ADDED 2 SPACES TO
OUR FORMAT SO THAT THE NUMBERS H
AVE SPACES BETWEEN THEM."
1670 GOSUB 2370:GOSUB 2470
1680 PRINT"IF WE HAVE NUMBERS GRE
ATER THAN 999, WE CAN ADD COMMAS
TO SEPERATE THE THOUSANDS F
ROM EACHOTHER THEREBY MAKING THE
NUMBER EASIER TO READ.":PRINT
1690 PRINT"PRINT USING";CHR$(34);
"#,###,###.##";CHR$(34);";1234567
.89"
1700 PRINT USING "#,###,###.##";123
4567.89
1710 GOSUB 2370:GOSUB 2470
1720 PRINT"WHEN YOU PLACE 2 ASTER
ISKS AT THE BEGINING OF YOUR NU
MERIC FIELD, ALL UNUSED POSITI
ONS TO THE LEFT OF THE DECIMAL W
ILL BE FILLED WITH ASTERISKS. THE
2 ASTERISKS WILL ALSO ESTABLI
SH"
1730 PRINT"TWO MORE POSITIONS IN
THE NUMERIC FIELD."
1740 PRINT:PRINT"PRINT USING";CHR
$(34);"*#####.##";CHR$(34);";1.22
"
1750 PRINT USING"*#####.##";1.22
1760 GOSUB 2370:GOSUB 2470
1770 PRINT"NOW LET'S LOOK AT HOW
WE CAN USEPRINT USING WITH MONEY.
":PRINT
1780 PRINT"PRINT USING";CHR$(34);
"$###.##";CHR$(34);";12.25"
1790 PRINT USING"$###.##";12.25
1800 PRINT:PRINT"PUTTING A SINGLE
$ SIGN AT THE BEGINNING OF YOUR
NUMERIC FIELD WILL PRINT A DOLLA
R SIGN. IN THIS CASE THE $ WIL
L ALWAYS BE AT THE SAME PLACE, L
EADING YOUR NUMBER."
1810 GOSUB 2370:GOSUB 2470
1820 PRINT"IF YOU WANT THE $ SIGN
TO BE RIGHT UP AGAINST YOUR N
UMBER, THEN PUT TWO $ SIGNS IN
YOUR FORMAT.":PRINT
1830 PRINT"PRINT USING";CHR$(34);
"$#$,###.##";CHR$(34);";12.25"
1840 PRINT USING"$#$,###.##";12.25

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1850 PRINT:PRINT"THE LEADING SPAC
ES ARE STILL PRINTED, BUT THE
$ SIGN IS BUTTED UP AGAINST
YOUR NUMBER."
1860 GOSUB 2370:GOSUB 2470
1870 PRINT"YOU CAN USE BOTH THE A
STERISKS AND THE $ SIGN (LIKE IN
PRINTINGCHECKS) TO FILL THE SPAC
ES PRECEDING YOUR NUMBER WIT
H ASTERISKS AND HAVE A $ SIG
N ON YOUR NUMBER."
1880 PRINT:PRINT"PRINT USING";CHR
$(34);"*#$,###,###.##";CHR$(34);
";11.22"
1890 PRINT USING"*#$,###,###.##";
11.22
1900 PRINT:PRINT"YOU ONLY NEED ON
E $ SIGN HERE."
1910 GOSUB 2370:GOSUB 2470
1920 PRINT"WHEN A + IS PLACED AT
THE BEGINING OF YOUR NUMERI
C FIELD (OR THE END OF IT) THE N
UMBER WILL BE SIGNED. EG, POSIT
IVE NUMBERS WILL HAVE A PLUS A
ND NEGATIVE NUMBERS WILL HAVE
A -."
1930 PRINT:PRINT"PRINT USING";CHR
$(34);"+###.## ";CHR$(34);";121,-
121"
1940 PRINT USING"+###.## ";121,-12
1
1950 PRINT:PRINT"YOU CAN ALSO HAV
E THE + TRAIL."
1960 GOSUB 2370:GOSUB 2470
1970 PRINT"PRINT USING";CHR$(34);
"###.##+";CHR$(34);";12.4"
1980 PRINT USING"###.##+";12.4
1990 PRINT:PRINT"PRINT USING";CHR
$(34);"###.##+";CHR$(34);";-12.4"
2000 PRINT USING"###.##+";-12.4
2010 PRINT:PRINT"PLACING A - SIGN
AT THE END OF YOUR NUMERIC FIEL
D CAUSES A - TO BE PRINTED AFTE
R ALL NEGATIVENUMBERS, A SPACE IS
PRINTED IF THE NUMBER IS POSITI
VE."
2020 GOSUB 2370:GOSUB 2470
2030 PRINT"IF YOU PUT FOUR UP ARR
OWS IN THE NUMERIC FIELD, THEN
THE NUMBER WILL BE PRINTED I
N THE EXPONENTIAL FORM.":PRINT
2040 PRINT"PRINT USING";CHR$(34);
"###.# ";CHR$(34);";12300"
2050 PRINT USING"###.# ";12300
2060 PRINT:PRINT"YOU CAN USE A ST

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# of the hill!

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Just for your  
 TRS-80<sup>®</sup> COLOR  
 TDP System-100  
 Dragon-32  
 MC-10

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RING VARIABLE AS YOUR FORMAT ALSO.
"
2070 GOSUB 2370:GOSUB 2470
2080 PRINT"US=";CHR$(34);"$#$,###
.##";CHR$(34)
2090 PRINT"PRINT USING$;12.13":PR
INT USING"$#$,###.##";12.13
2100 PRINT:PRINT"WE DIDN'T USE SP
ACES BETWEEN THE WORDS PRINT A
ND USING OR BETWEEN USING AND
US. UP UNTIL NOW WE HAVE BEEN SH
OWING THE SPACES BECAUSE IT IS
EASIER TO READ, BUT THEY ARE NO
T REQUIRED."
2110 GOSUB 2370:GOSUB 2470
2120 PRINT"YOU CAN ALSO USE PRINT
USING TO FORMAT THE PRINTOUT OF
STRINGS. TO SPECIFY THE FIELD LEN
GTH OF A STRING, YOU USE THE % S
IGN."
2130 PRINT:PRINT"PRINT USING";CHR
$(34);"% %";CHR$(34);";";CHR$(
34);"COMPUTER";CHR$(34)
2140 PRINT USING"% %";"COMPUTER
":PRINT
2150 PRINT"YOU SEE THE WORD COMPU
TER IS A BIT LONGER THAN THE FIE
LD WE SPECIFIED, THEREFORE ONL
Y THE LEFT PORTION OF THE WORD
WHICH FITS OUR FIELD IS PRINTED.
";
2160 GOSUB 2370:GOSUB 2470
2170 PRINT"YOU CAN COMBINE STRING
AND NUMERIC FIELDS TOGETHER
."
2180 PRINT"US="CHR$(34);"% %
$$.##";CHR$(34):PRINT"PRINT USIN
G US";CHR$(34);"DEBT";CHR$(34);";
12.32"
2190 PRINT USING"% % $$.##";"
DEBT";12.32
2200 PRINT:PRINT"HERE WE HAVE COM
BINED A FIELD FOR STRING DATA (
DEBT) AND FOR NUMERIC DATA TO BE
PRINTED AS MONEY. THE TOTAL LE
NGTH OF THE FIELD IS LIMITED ONL
Y BY THE 255 CHAR. LIMIT OF AN
INPUT."
2210 GOSUB 2370:GOSUB 2470
2220 PRINT"WHEN PRINTING A CHECK
OR MAKING A LIST OF NAMES, IT MAY
BE USEFUL TO GET JUST THE S
INGLE CHARACTER ON THE LEFT OF
A STRING. (HIS INITIALS)"
2230 PRINT"THE ! SIGN LET'S YOU D
O THIS IF THE ENTIRE NAME ISN'T C

```

```

ONTAINED IN ONE VARIABLE."
2240 PRINT:PRINT"FOR AN EXAMPLE:"
;
2250 GOSUB 2370:GOSUB 2470
2260 PRINT"US="CHR$(34);"!";CHR$(
34)
2270 PRINT"INPUT";CHR$(34);"ENTER
YOUR FIRST NAME";CHR$(34);FN$"
2280 PRINT"PRINT USING$;FN$"
2290 PRINT:PRINT"THE FIRST NAME M
UST BE IN A VARIABLE BY ITSEL
F, THE MIDDLE NAME (IF USED) MUS
T BE IN A VARIABLE BY ITSELF
AND THE LAST NAME MUST BE IN A SE
PERATE VARIABLE."
2300 GOSUB 2370:GOSUB 2470
2310 PRINT"WRITE THIS SHORT PROGR
AM AND YOU CAN EXPERIMENT WITH
THE PRINT USING COMMAND."
2320 PRINT"10 INPUT";CHR$(34);"EN
TER FORMAT";CHR$(34);";FM$"
2330 PRINT"20 INPUT";CHR$(34);"EN
TER NUMBER";CHR$(34);";N"
2340 PRINT"30 PRINT USINGFM$;N"
2350 PRINT"40 GOTO 10
2360 RUN"EXT4"
2370 PRINT:PRINT"HIT ANY KEY TO C
ONTINUE";
2380 A$=INKEY$:IF A$="" THEN 2380
2390 RETURN
2400 CLS:PRINT" *EXTENDED COMMAND
PSET/PRESET*":PRINT:RETURN
2410 CLS:PRINT" ** EXTENDED COMMA
ND PPOINT **":PRINT:RETURN
2420 CLS:PRINT" ** EXTENDED COMMA
ND PCLEAR **":PRINT:RETURN
2430 CLS:PRINT" ** EXTENDED COMMA
ND PCOPY **":PRINT:RETURN
2440 CLS:PRINT" ** EXTENDED COMMA
ND PMODE **":PRINT:RETURN
2450 CLS:PRINT" ** EXTENDED COMMA
ND PLAY **":PRINT:RETURN
2460 CLS:PRINT" ** EXTENDED COMMA
ND POS **":PRINT:RETURN
2470 CLS:PRINT" *EXTENDED COMMAND
PRINT USING*":PRINT:RETURN
2480 L=LEN(A$):L1=110-((L/2)*12):
LINE(L1-12,165)-(L1+(16*L)+12,188
),PRESET,BF
2490 XL$=STR$(L1):DRAW"S4;BM"+XL$
+",185;"
2500 FOR X=1 TO L:M=ASC(MID$(A$,X
,1))
2510 M=M-31:IF M>38 THEN M=M-38:G
OTO 2540

```

2520 ON M GOSUB 2560,2570,2580,25  
90,2600,2610,2620,2630,2640,2650,  
2660,2670,2680,2690,2700,2710,272  
0,2730,2740,2750,2760,2770,2780,2  
790,2800,2810,2820,2830,2840,2850  
,2860,2870,2880,2890,2900,2910,29  
20,2930  
2530 GOTO 2550  
2540 ON M GOSUB 2940,2950,2960,29  
70,2980,2990,3000,3010,3020,3030,  
3040,3050,3060,3070,3080,3090,310  
0,3110,3120,3130,3140,3150,3160,3  
170,3180  
2550 NEXT X  
2560 DRAW"BR8":RETURN:'SPACE  
2570 DRAW"BR5R2U2L2D2R1U15BR10BD1  
5":RETURN:'!  
2580 DRAW"BR4BU12U4BR4D4BD12BR8":  
RETURN:''  
2590 DRAW"BR4U5NL4NR8U6NU5NL4R4NR  
4NU5D11BR8":RETURN:'#  
2600 DRAW"BR2NH2R8E2U4H2L8H2U4E2R  
8F2BL8NU2D14BR4NU16BR6":RETURN:'\$  
  
2610 DRAW"E12BL12D1R1U1L1BF12L1U1  
R1D1BR4":RETURN:'%  
2620 DRAW"BR12H12U2E2R6F2D2G10D2F  
2R8NE3BR6":RETURN:'&  
2630 DRAW"BR6BU12U4BR10BD16":RETU  
RN:''  
2640 DRAW"BR12H5U6E5BD16BR4":RETU  
RN:'C  
2650 DRAW"E5U6H5BR16BD16":RETURN:  
' )  
2660 DRAW"BU8BR6NL6NH6NU6NE6NR6NF  
6ND6NG6BR10BD8":RETURN:'\*  
2670 DRAW"BR6BU8NU5NL5NR5D5BD3BR1  
0":RETURN:'+'  
2680 DRAW"BR4R2U2L2D2BR2NG2BR10":  
RETURN:' ,  
2690 DRAW"BR3BU8R6BR7BD8":RETURN:  
' -  
2700 DRAW"BR3U2R2D2L2BR12":RETURN  
' .  
2710 DRAW"U2E12U2BR4BD16":RETURN:  
' /  
2720 DRAW"BR2H2U12E2R8F2D12G2NL8B  
R6":RETURN:'0  
2730 DRAW"BR2R4NR4U16L2G2BD14BR14  
":RETURN:'1  
2740 DRAW"BR2NR10U2E10U2H2L8G2BR1  
6BD14":RETURN:'2  
2750 DRAW"BR2NH2R8E2U4H2NL4E2U4H2  
L8G2BD14BR16":RETURN:'3  
2760 DRAW"BR8U16G8R12BD8BR4":RETU  
RN:'4

2770 DRAW"BU2F2R8E2U4H2L10U8R12BD  
16BR4":RETURN:'5  
2780 DRAW"BU2NU6F2R8E2U4H2L10U5E3  
R6F3BD13BR4":RETURN:'6  
2790 DRAW"BU16R12D4G12BR16":RETUR  
N:'7  
2800 DRAW"BU2NU4F2R8E2U4H2L8NG2H2  
U4E2R8F2D4NG2BD10BR4":RETURN:'8  
2810 DRAW"BU3F3R6E3U10H3L6G3D3F3R  
9BR4BD7":RETURN:'9  
2820 DRAW"BR7BU3R2U2L2D2BU7R2U2L2  
D2BD10BR9":RETURN:':  
2830 DRAW"BR5BU3U2R2D2NG3L2BU8U2R  
2D2L2BD11BR11":RETURN:' ;  
2840 DRAW"BR12BU2H6E6BD14BR4":RET  
URN:'<  
2850 DRAW"BU6NR10BU5R10BD11BR4":R  
ETURN:'=  
2860 DRAW"BU2E6H6BD14BR16":RETURN  
'>  
2870 DRAW"BR5R2U2L2D2R1BU5U3E3U3H  
2L6G3BD13BR16":RETURN:'?  
2880 DRAW"BU2NU4F2R8E2U6L8G2E2R8U  
6H2L8G2BD14BR16":RETURN:'@  
2890 DRAW"U10NR12E6F6D10BR4":RETU  
RN:'A  
2900 DRAW"NU16R10E2U4H2NL10E2U4H2  
L10BD16BR16":RETURN:'B  
2910 DRAW"BU3BR12G3L6H3U10E3R6F3B  
D13BR4":RETURN:'C  
2920 DRAW"U16R9F3D10G3L9BR16":RET  
URN:'D  
2930 DRAW"NR12U8NR8U8R12BD16BR4":  
RETURN:'E  
2940 DRAW"U8NR8U8R12BD16BR4":RETU  
RN:'F  
2950 DRAW"BU5BR8R4D2G3L6H3U10E3R6  
F3D1BD12BR4":RETURN:'G  
2960 DRAW"U8NU8R10NU8D8BR6":RETUR  
N:'H  
2970 DRAW"BR2R4NR4U16NL4R4BR6BD16  
":RETURN:'I  
2980 DRAW"BU3F3R3E3U13NL9R3BD16BR  
4":RETURN:'J  
2990 DRAW"U8NU8E2NF10E6BD16BR4":R  
ETURN:'K  
3000 DRAW"NU16R12BR4":RETURN:'L  
3010 DRAW"U16F6E6D16BR4":RETURN:'  
M  
3020 DRAW"U16;M+12,+16;NU16BR4":R  
ETURN:'N  
3030 DRAW"BU2NF2U12E2R8F2D12G2NL8  
BR6":RETURN:'O  
3040 DRAW"U16R8F2D4G2L8BD8BR16":R  
ETURN:'P  
3050 DRAW"BU3NF3U10E3R6F3D10G3NL6

```

E1NH2NF3BD1BR6":RETURN:'Q
3060 DRAW"U16R8F2D4G2L8R2F8BR8":R
ETURN:'R
3070 DRAW"BU3F3R7E2U4H2L8H2U4E2R8
F2BD14BR4":RETURN:'S
3080 DRAW"BR8U16NL6R6BR4BD16":RET
URN:'T
3090 DRAW"BU3NU13F3R6E3NU13BD3BR4
":RETURN:'U
3100 DRAW"BU16D10F6E6U10BR4BD16":
RETURN:'V
3110 DRAW"NU16E6F6NU16BR4":RETURN
:'W
3120 DRAW"U2E12U2BL12D2F12D2BR4":
RETURN:'X
3130 DRAW"BR6U10NH6E6BD16BR4":RET
URN:'Y
3140 DRAW"NR12U2E12U2L12BR16BD16"
:RETURN:'Z
3150 DRAW"NR6U16R6BR6BD16":RETURN
:'[
3160 DRAW"BU16D2F12D2BR4":RETURN:
']
3170 DRAW"BU16BR2R6D16L6BR14":RET
URN:'J
3180 DRAW"BR6U16NG6F6BD10BR4":RET
URN:'

```

Continued from Page 51

| PROGRAM                    | LOOP TIME IN SEC |                 |                 |
|----------------------------|------------------|-----------------|-----------------|
|                            | <u>RSBASIC</u>   | <u>TSCBASIC</u> |                 |
|                            | <u>RS LOOP</u>   | <u>FP LOOP</u>  | <u>INT LOOP</u> |
| <u>INTEGER LOOP</u>        |                  |                 |                 |
| 10 FOR X%=1 TO 5000        |                  |                 |                 |
| 30 NEXT X%                 | ----             | ----            | 3.1             |
| <u>FLOATING POINT LOOP</u> |                  |                 |                 |
| 10 FOR X=1 TO 5000         |                  |                 |                 |
| 30 NEXT X                  | 11.1             | 9.6             | ----            |
| <u>ADDITION</u>            |                  |                 |                 |
| 20 A%=10+10                | ----             | 17.8            | 12.1            |
| 20 A=10+10                 | 43.5             | 19.5            | 13.8            |
| 20 A=10.+10.               | 44.1             | 20.5            | 14.8            |
| <u>SUBTRACTION</u>         |                  |                 |                 |
| 20 A%=10-10                | ----             | 17.8            | 12.8            |
| 20 A=10-10                 | 45.0             | 18.6            | 12.8            |
| 20 A=10.-10.               | 45.8             | 20.3            | 14.5            |
| <u>MULTIPLICATION</u>      |                  |                 |                 |
| 20 A%=10*10                | ----             | 18.4            | 12.8            |
| 20 A=10*10                 | 48.0             | 20.0            | 14.5            |
| 20 A=10.*10.               | 48.7             | 58.7            | 53.0            |
| <u>DIVISION</u>            |                  |                 |                 |
| 20 A%=10/10                | ----             | 23.0            | 17.4            |
| 20 A=10/10                 | 54.5             | 25.2            | 19.5            |
| 20 A=10./10.               | 55.2             | 60.0            | 54.0            |

\*TIMES TAKEN WITH WRISTWATCH CHRONOGRAPH  
\*\*RADIO SHACK WILL NOT SPECIFY INTEGER  
\*\*\*RADIO SHACK HAS 9 SIGNIFICANT DIGITS  
\*\*\*XBASIC (FLOATING POINT) HAS 16.8 SIGNIFICANT DIGITS  
% XBASIC (INTEGER)

FIG. A

Bobby Joe Harrison, 107 Oakhurst,  
El Dorado, AR 71730.

# Letters

Don,

I have several programs to send CW (Morse Code) on amateur radio. (Re-ceive is a more complicated job; if anyone is doing it with CoCo software alone, I would like to hear from them. Also you might find a percentage of your members are hams.)

These "send" programs use the cassette off-on plug to key the transmitter. Some authors have written that the CoCo relay is very light duty, not intended for this purpose. My relay sticks before long above 20 wpm.

Question: Has anyone heard of installing a heavier duty relay in the cassette off-on output? Could the club members experiment?

Justin B. Snyder, 403 North Ave.,  
Lake Bluff, Illinois 60044

Dear Sir,

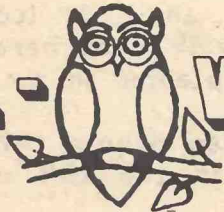
I want to do some modifications to my CoCo and Color T.V. set in order to improve the display. I read the article, Color Computer Display Interference July/August Newsletter Page 41, but my T.V., manufactured in February of 1983, does not have 75-300 Ohm switch. As I do not currently use the T.V. set for T.V. reception, it seems to me that the T.V. RF could be bypassed completely, giving me, in effect, a color monitor with sound.

However, as the CoCo produces an NTSC signal in the modulator to send to an NTSC T.V. set, it may not be as simple as it sounds. Someone in the club may be able to help me with this.

What I envisage, is to by-pass the CoCo modulator, unplug the

Continued on Page 100

# OWL-WARE



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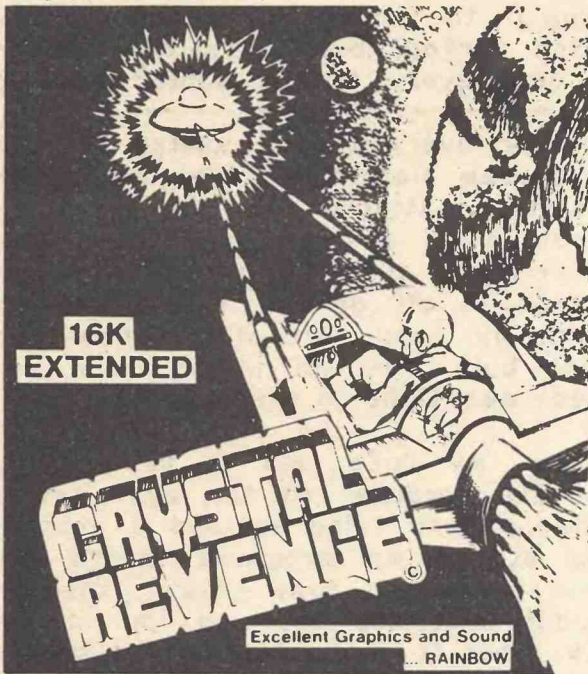
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DEALERS INQUIRIES INVITED

Continued from Page 98

coaxial cable that goes from the RF box to a board in the T.V. set, at the board end, and connect, with a coaxial cable, the computer to the T.V. set at the point where the RF coaxial was un-plugged. If anybody is able to translate that and is able to assist, I would greatly appreciate it.

I can be contacted at: Ray S. Preston, P.O. Box 122, Rarotonga, Cook Islands NEW ZEALAND

Dear Ron,

I've been a member for almost a year and enjoy very much receiving the club magazine. In fact I enjoy it so much I thing it would be nice to have an auxiliary ICCG, Inc. here in the Mesa, AZ area. As a proposal, I feel having a meeting every two months to discuss the contents of the magazine, ask questions, and review what needs to be voted on would be ideal. This should also be a good way to get people more active in the club, and get questions answered that otherwise would go unanswered. Could you send me information on your thoughts, and if you approve, on how best to do this. I'll be looking forward to your answer, thank you.

Bob Hauer, 1414 E. 3 Pl., Mesa, AZ 85203

EDITOR'S NOTE; The secretary talked about this last issue in his report. I think that this a very worthwhile subject to persue; therefore, we are voting on it in this newsletter.

NOTE: NOTE: NOTE: I found Russ's orginal letter and here is the exact quote from it:

"... Some of my friends have said I should buy an IBM PC and then I would have what I want. I don't know if that is true. I have a B80 Burroughs mini computer at my office. It has been there 5 years, never worked and never will. We are in

a law suit and it looks like my \$38,000.00 (with dual hard disc) will end up as a planter in my back yard."

I love it when people think the CoCo is better than the IBM or Burroughs computers.

Hey Ron,

Here's a problem I had that might save other members some time, money, and frustration.

When I first got my CoCo the desk I used was only big enough to hold my CoCo and my 19 inch TV and no room for my cassette recorder. So I placed it on top of the T.V. i immediately started getting I/O errors. I thought it was because I was using a Non-R.S. recorder so I laid out the bucks to get a CCR-81. My I/O problems cleared up some, but not enough to live with. I had, by then, become a member of the ICCG, Inc. and read Leslie Green's piece in the newsletter Volume 2,#4 page 20 about turning the recorder upside down. Which worked, but turning the recorder over every time I wanted to load

er over every time I wanted to load a program wasn't my idea of proper operation. Although it did solve my problems in a round about way. See everytime I turned the recorder over I took it off of the T.V. and held it in my hand. All of a sudden the light bulb went on in my head and shed some light on the problem.

I took my CoCo, put it in my lap, put the recorder on the desk (right side up) and tried to load a program and all of my programs loaded the first time. For some reason, the recorder will not work on top of the T.V., but it works fine sitting beside it. I now have a slightly bigger desk (which I moved from another room in the house) and my tapes load fine. I have not seen an I/O error in a few months.

# COCO & T.I. COLOR MONITOR

by Ed Margulies

This article explains how to free-up your CoCo's television for T.V. viewing by replacing it with a Color monitor. I own a Texas Instruments monitor and have developed a straight forward connector for it.

The T.I. Color monitor comes with a 5-pin DIN cable that branches off to a mini mic plug(for audio input on back of monitor), and an RCA type phono plug(for video input on back of monitor). The 5-pin DIN plug was meant to connect to the back of a T.I. home computer, and as you know, the Color Computer has no such connector for T.V. output. Rather than chopping up this cable, there is a simple way of connecting a DIN socket on the computer for quick plugging and unplugging when it's needed.

you may wonder why we don't just make an RCA/DIN plug adapter - this would be great, but the monitor is not looking for radio frequency like a television, so we have to bypass the RF modulator in the CoCo to get a direct audio & video signal (and separate them for the monitor as well).

Get a 5-pin DIN socket(chassis mount tupe - RS # 274-005) and affix it to the back of your CoCo's cover as pictured in Figure 1. I used my

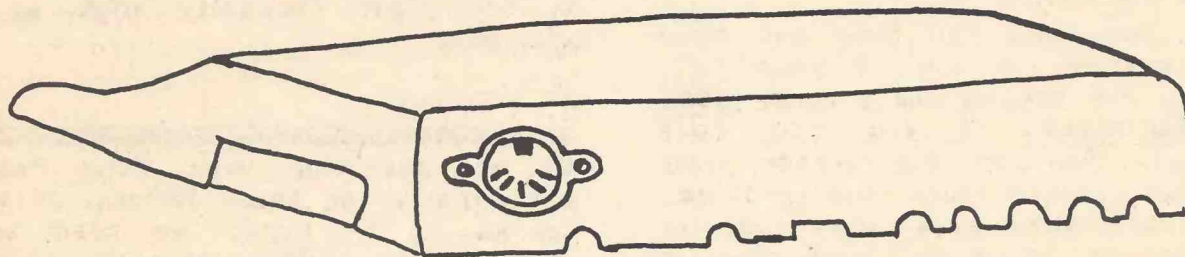
pencil soldering iron to burn a hole in the cover little by little until I had a perfect fit for fear that a drill bit would crack the plastic. Then I used the socket as a template to burn two tiny "starter" impressions for the socket bolt holes. I used a tiny brad as a "bit" for my drill for the socket bolt holes(the friction burned the tiny holes with no worry of cracking the cover). Go ahead and bolt the socket on as pictured in Figure 1.

Figure 2 shows where to solder on the three miniature alligator clips (really cheap at RS) with resin core solder and a small gun or pencil iron. The reason I am suggesting clips is so you can completely remove the cover and clips if you have to work on the insides of your computer for another project. I wrapped the loose leads around the closest cover screw post to keep the wires from flopping around and pulling away from the socket connecting pins.

Attach the clips as outlined in Figure 3. It's best to keep the clips as vertical as possible so they don't touch any other contacts. Once these connections are made, you can put the cover back on and plug your monitor directly into the DIN socket. I'm sure that experimentation will

## ○ Figure One ○

VIEW OF 5-PIN DIN SOCKET INSTALLED  
ON BACK OF COLOR COMPUTER COVER







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## Color Micro Journal

The Color Computer Monthly Magazine

\$1.95 per issue Vol. 1, Issue 2 October, 1983

### THIS 'N THAT

The **BIG NEWS** this month is that **OS-9** has finally arrived for the Color Computer. The **ASTOUNDING** part of the Radio Shack OS-9 Package, besides the price, is the **DOCUMENTATION**. You 'Old Time Radio Shack Followers' will not believe what you see. Jon Shirley has been telling us that the main reason for the "lack" of documentation with a lot of their products was the restrictions placed on releasing that information by **Microsoft**; I

### OS-9 on the COLOR COMPUTER

One of the "Operating Systems of the Future" is **now available** for the "little old Color Computer"; **OS-9**. Freely translated, OS-9 means "Operating System for the 6809" (OS-9 is now being written for the ~~68000~~, also). Since it is fairly obvious that UNIX and "UNIX-Type" Operating Systems will be running on just about every computer to come out in the next few years, a whole new language is beginning to appear on the horizon.

#### Color Computer OS-9; the Package

We had been running a preliminary release of OS-9 on the Color Computer for a few weeks, and received the "Official Radio Shack" version for Review a couple of days ago. To put it mildly, this package is **IMPRESSIVE!** For \$69.95 (Radio Shack Catalog Number ~~26-3030~~), you receive a 9 1/2" x 7 5/8" x 2" package containing 4

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# Graphs

by Lee Maddox

If a primary use of your home computer is to occupy the younger members of the family or to aide in their education, you might give this program from Computer Island a try.

I found, while viewing GRAPHS TUTOR, that it answered questions that my own children might ask while studying graphs. So many times we can answer the questions, but visual aids help so much in our explanation. With this program you see the information, and it is presented in a way that kids and oldfolk alike can easily understand.

The program gives a brief explanation of the major graph types and then gives random values to plot as examples. One of the most interesting aspects of the program is the ability to pick a short quiz to test your own knowledge of the subject. Versatility is a plus, if you don't do well on the test, you are able to go back, review, and begin again.

I must confess, at first I thought "this is a little simple", but honestly this program is for children. While showing the GRAPHS TUTOR to my kids I realized that not only were we learning, we were having fun. The graphics are good, the information is correct, and the versatility allows for enjoyment.

As an "oldtimer" once told me, "A day without new knowledge is a day wasted". We did not waste a day and had some fun as well. Try it, GRAPHS TUTOR, from Computer Island, 227 Hampton Green, Staten Island, N.Y. 10312 for \$19.95 and requires 32K Extended Color Basic.

I think you'll like it.



# News Products

National Research Group, Inc announced a new product called "Scan-Out". It is a RS-232 selector switch and a status indicator, all in one. Scan-Out connects your CoCo with other TRS-80\ peripheral devices. It will monitor the incoming and outgoing data (txd and rxd). This helps test for malfunctions. Their introductory price is \$24.95 and will work on all the Color Computers including CoCo 2 and Micro Color Computer.

\*\*\*\*\*



Automatic Micro announces 2 new products: HC-1 Home Commander and RC-100 Remote Control Relay Interface.

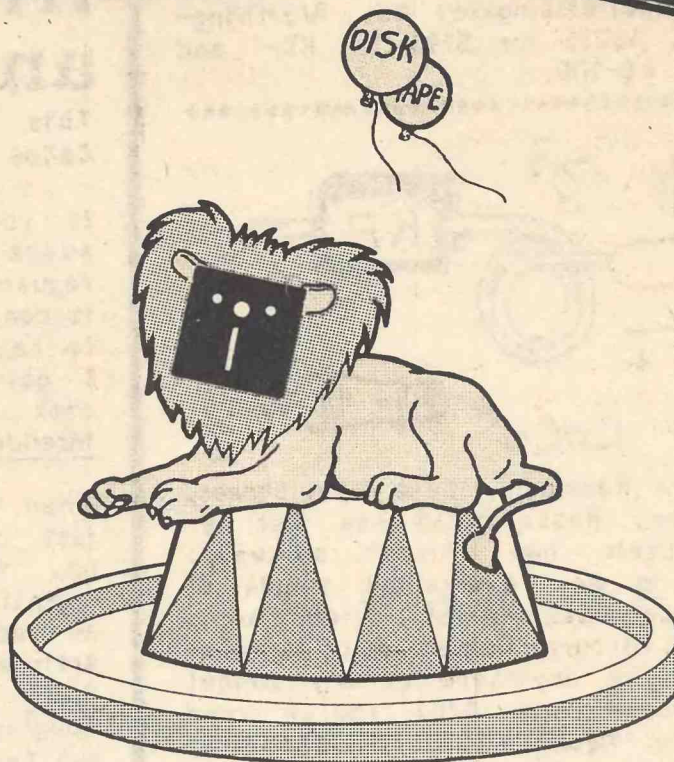
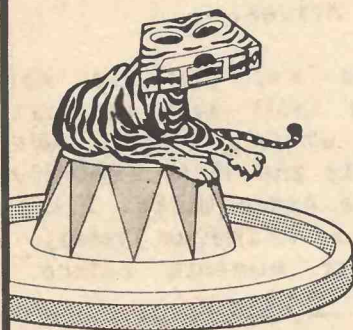
HC-1 can control virtually every electrical device in the home. An internal memory and real-time clock make the Home Commander to have stand-alone operation, leaving your equipment free to perform other functions. It features: Use of simple ASCII commands, Battery Backup, Auto-baud detection, Complete documentation, and controls up to 256 electrical devices. It designed to send the instructions over the AC house wiring to BSR modules connected to appliances or lighting throughout the house. HC-1 costs only \$195. each.

RC-100 is a 16 channel, port or memory addressable, remote relay controller which is S-100 compatible. It uses an 8035 CPU and 4 status/command registers to allow easy control. The RC-100 features: All I/O opto-isolated, 60 Hz counter register, Unaffected relay status by power outages, Complete documentation, and external 2716

Continued on Page 106

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**The Fine Print:** All issues from July 1981 available — ask for list. Programs are for the Extended BASIC model and occasionally for disks.



**Chromasette** MAGAZINE

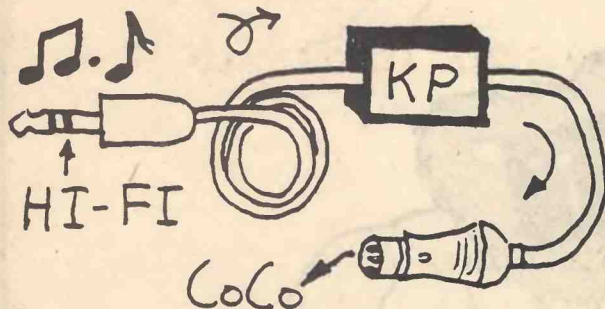
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Continued from Page 104  
or 2732 EPROMs.

Both units are fully assembled and fully tested prior to shipment and application software examples are included with the documentation.

They may be obtained from Automatic Micro, 2542 Billingsley Rd., Worthington, OH. 43085 for \$195 for HC-1 and \$495 for RC-100

\*\*\*\*\*



New Salem Research, West Main Street, New Salem, Mass. 01355 has just released their new "user" software. "KP-84" is now available! KP-84 is one of the most powerful video music systems (programmable color organ) you can buy anywhere at any price! And it only cost \$20. You've read about the Kaleidophone in RAINBOW, HOT CoCo, and November Color Computer Magazine (pg. 116) and that was only our simple demonstration software (KP-83). KP-84 has many enhancements, including high-resolution graphics, programmability, and much more. No special hardware is required. Use your cassette recorder, 32K version, or joysticks, others, to input the music. But for easiest use, a kaleidophone interface KP-4 is still desirable. For more information call 617-544-7688 any Monday, 10AM-3PM Eastern Standard Time. Requires 16K Basic, 16K ECB or 32K ECB.

\*\*\*\*\*

We wish to announce both our new address & BBS version 4.0 to all.

1) Silicon Rainbow Products, 1111 W. El Camino Real, Suite No. 109, Sunnyvale, California 94087

2) We now have version 4.0 of Our PAGE 106

COLOR-80 BBS online! It can be accessed via modem by calling (408) 733-6809 24hours a day. Features include uploading, downloading, messages, pictures, rumours, jokes, editorials, and more. Thanks Shawn Jipp.

\*\*\*\*\*

## Hints, Tips, and Facts

This is a note to other owners of CoCos with disk drives.

If you are like me, you are well aware that "thou shalt back up disks reguarly", but with a single disk it can be a hassle and it is expensive to have all those extra disks. I know I get lazy. And it never fails, a disk crashes just moments before I intended to back it up.

When a disk crashes it is usually just the directory that gets messed up. You can get at the data with complicated routines, but there is an easier way. There is an excellent article in the March 1983 issue of Color Computer Magazine written by Douglas Swank (page 16). He has written two short (15 lines of actual code, each) utilities that are super! One saves an extra copy of the directory and the other retrieves it and rewrites it to the original directory. I still backup my important disks but I rely on these utilities for my others and they have worked beautifully whenever I have crashed a disk.

EDITOR'S NOTE: The above mentioned programs only work if you make the copy before the disks crash. I would really like to see a utility that will restore your directory after the crash.

## VOTING RESULTS

SAD STORY -- 1% Of the members vote 74% Yes and 26% No on the 1/4 page free DISPLAY AD vote. With the low percentage of response it has been requested that we vote again. See pg5.

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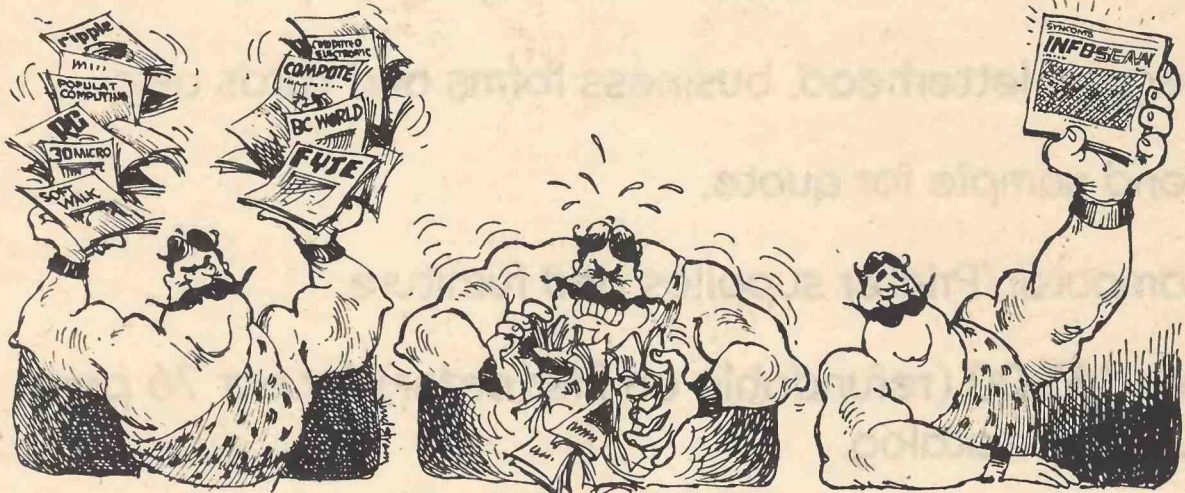
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## news release



### FREE COMPUTER MAGAZINE GUIDE AVAILABLE TO COMPUTER CLUB MEMBERS

ST. PAUL, MN -- If computer magazines like Popular Computing and Byte are supposed to explain the world of microcomputing, who will make sense of the computer magazines?

A free monthly computer guide called Infoscan, available to computer club members throughout the United States, intends to do just that. Published by Syncom, a South Dakota-based manufacturer of 5 1/4" magnetic diskettes, the guide for business and home computers users will index over 400 articles each month from leading computer magazines like Softalk, Nibble, Desktop Computing, and PC World. Among the subjects indexed in Infoscan's August 1983 issue: piracy and videotex systems, buying your second computer, beginner's luck for computer virgins, and perspectives on spreadsheet programs.

"We found a bewildering array of over 135 computer publications," says Syncom Retail Sales Manager Jim King. "There are now magazines for computer tots, computer farmers, computer professors, computers in medicine -- even a magazine for computer fitness. We felt a compact index like Infoscan would help microcomputer owners keep up-to-date with the latest computer software and resources.

"There are simply too many publications out there for a mere human to handle," says King. "Either you need to be a computer yourself -- or you need a copy of Infoscan."

Syncom, a division of Schwan's Sales Enterprises, is distributing Infoscan free through notices to computer clubs ranging from New York's International Apple Core to California's Super Brain Users Group. The guide is also available by direct mail to subscribers calling Syncom's toll-free number, 800-843-9862.

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See Review Dec.

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# Color Expo '83

by Susan Davis

In April 1983, Rainbow Magazine sponsored the FIRST Color Computer consumer show, RainbowFest. The "fest" was an unqualified success. With an estimated 6,000 in attendance.

Hoping to cash in on the success of this first show, Rainbow Magazine planned several more. Color Computer Magazine also planned its first show.

Color Computer Magazine did an excellent job promoting their Color Expo '83. It was held in Pasadena, CA. on November 4, 5 and 6. The Pasadena Convention Center was roomy, well lit, and well ventilated. Tano had a booth and demonstrated the 64K Dragon. Radio Shack supported the Expo, as did the local Color Computer Users Group. There was a well planned series of seminars, including one on software piracy. Many software houses had booths and introduced new products: Sugar Software, Tom Mix, Mark Data, Petrocci Freelance, Prickly Pear, Follett Library and the DATAMAN just to name a few. Radio Shack had a huge booth, and in addition to selling software, they sold hundreds of 16K CoCos for \$119 (standard) and \$149 (Extended Basic).

From the viewpoint of the attendee, the Expo was probably well worth the price of admission. Radio Shack sponsored several "classroom-workshops", the vendors had attractive booths and informative presentations, and the seminar topics and speakers were well chosen.

From the vendors' viewpoint, there were 2 major weak points. Security was quite lax. You can imagine the problems that can occur when such is the case. The most serious drawback of the Expo was the poor attendance. Official figures were 1,000 paid attendees, and this seems reasonably accurate. Many vendors were disappointed when their final sales from the Expo were tallied.

PAGE 110

I think that this will be reflected in vendor attendance at future shows.

In summary, Color Expo '83 was a fun and informative weekend for Color Computer Owners. Columbus, Ohio would be a good spot for the next one.



1983 CoCo Kid playing HangMan from Sugar Software.

## Subroutines

by Ron Garrett

```
49999 'GRAPH LABELER:SEND STRING
AS A$: MAX LENGTH 13 CHARACTERS
50000 L=LEN(A$):L1=110-((L/2)*12)
:LINE(L1-12,165)-(L1+(16*L)+12,18
8),PRESET,BF:XL$=STR$(L1):DRAW"S4
;BM"+XL$+",185;"
50010 FOR X=1 TO L:M=ASC(MID$(A$,
X,1))
50020 M=M-31:IF M>38 THEN M=M-38:
GOTO 50050
50030 ON M GOSUB 50070,50080,5009
0,50100,50110,50120,50130,50140,5
0150,50160,50170,50180,50190,5020
0,50210,50220,50230,50240,50250,5
0260,50270,50280,50290,50300,5031
0,50320,50330,50340,50350,50360,5
0370,50380,50390,50400,50410,5042
0,50430,50440
```

Continued on Page 112



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### CLOCK †



Grades 1-4. Helps children practice telling time. 4 skill levels: hour, quarter hour, 5 minute and 1 minute intervals. Options include reading hours and minutes separately on the large graphic clock with synchronized hands. After 10 correct answers a small mouse ascends to the tune of Hickory, Dickory, Dock.  
16K Cass \$24.95 32K Disk \$26.95

### MONEY †

Grade 2-4. Provides an opportunity to count coins. 5 skill levels range from counting only dimes, nickels and pennies to counting various combinations of all coins which can total more than one dollar. The program uses graphic coins. If a series of 3 problems are answered correctly a rocket ascends to the moon. If 1 or more are incorrect, the rocket crashes instead.  
16K Cass \$19.95 16K Disk \$21.95

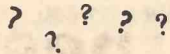
### BORROW †

Grades 2-4. Allows the student to reinforce subtraction skills. Problems appear in large graphic numerals. Small boxes above the numerals allow for regrouping procedures. 7 skill levels. A happy face appears on the screen for each correct answer. After 10 completed problems, a Pac-Man-type creature munches a numeral down.  
16K Cass \$19.95 32K Disk \$21.95

### CARRY †

Grades 2-4. A program designed to help students to practice addition. Uses same format as Borrow. 4 skill levels.  
16K Cass \$19.95 32K Disk \$21.95

### QUESTION



Grades 1-8. Asks questions with multiple choice or true and false answers. Fits any curriculum because you can input the questions and answers. Graphic reward is a blinking robot. Also designed for use with data tapes. Printer use optional.  
16K Cass \$19.95 32K Disk \$21.95

### MATHFACT †

Grade 1-5. Motivates students to learn their facts. All 4 math operations are in the program. Student selects the desired operation then the desired addend, subtrahend, factor or divisor, or then can request a mixed presentation within each operation. 2 skill levels, all drills timed and scored. If all facts are answered correctly, students can play a quick number game as a reward.  
16K Cass \$16.95 32K Disk \$18.95

### HANGWORD & SCRAMBLE

Grades 1-8. Presents 2 word games. Hangword is similar to the old favorite, Hangman. Blanks appear and students guess letters for the blanks. Wrong guesses build the graphic display of the word 'Sorry'. Scramble displays the word with the letters scrambled. Students guess the word and spell it correctly. Input own words with this program or purchase data tapes. See data tape listing. Printer use optional.  
16K Cass \$14.95 32K Disk \$16.95

### SPELLING

Grades 1-8. Very flexible as it allows you to input your own choice of words and store them on tape files. You may also purchase data tapes for this program. See data tape listing. Words flash on the screen from .1 to 10 seconds, then student types the word. The score is given after each entry and the student is rewarded with a graphic display of words and a song. Printer use optional.  
16K Cass \$16.95 32K Disk \$18.95

### KEYBOARD



Grades 1-6. Helps familiarize student with keyboard. A graphic keyboard enables user to locate keys quickly. Home keys are identified and proper fingering may be taught. Lessons are built around alphabet, finger, word and sentence drills. At the end a graphic reward is given. 32K version has lengthier timed drills. Both 16K and 32K versions can use data tapes for further practice. See data tape listings.  
16K Cass \$19.95 32K Cass \$24.95 32K Disk \$26.95

### ABC'S

Grades K-1. The child types the letters in the alphabet to the tune of the alphabet song. The reward is a graphic and sound display.  
16K Cass \$9.95 16K Disk \$11.95

### SKIP COUNTING

Grades 1-4. Helps the child learn to count by 1's, 2's, 5's, 10's, 100's, or any number desired. The user selects the parameters by giving the number to count by and the beginning and ending number of each sequence. The student can practice at whatever level needed, and each lesson has a graphic reward.  
16K Cass \$16.95

### DATA TAPE LISTINGS

Data Tapes may be used with other B5 programs. They cannot be used alone.

Use with Keyboard Program  
**KEYBOARD PHONIC DRILL** - Letter, word and sentence finger drills using common vowel and consonant combinations. \$8.95

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|       |                              |       | TOTAL ORDER _____           | _____ |

Continued from Page 110

50040 GOTO 50060  
50050 ON M GOSUB 50450,50460,5047  
0,50480,50490,50500,50510,50520,5  
0530,50540,50550,50560,50570,5058  
0,50590,50600,50610,50620,50630,5  
0640,50650,50660,50670,50680,5069  
0  
50060 NEXT X  
50070 DRAW"BR8":RETURN:'SPACE  
50080 DRAW"BR5R2U2L2D2R2U15BR10BD  
15":RETURN:'!  
50090 DRAW"BR4BU12U4BR4D4BD12BR8"  
:RETURN:'"  
50100 DRAW"BR4U5NL4NR8U6NU5NL4R4N  
R4NU5D11BR8":RETURN:'#  
50110 DRAW"BR2NH2R8E2U4H2L8H2U4E2  
R8F2BL8NU2D14BR4NU16BR6":RETURN:'  
\$  
50120 DRAW"E12BL12D1R1U1L1BF12L1U  
1R1D1BR4":RETURN:'%  
50130 DRAW"BR12H12U2E2R6F2D2G10D2  
F2R8NE3BR6":RETURN:'&  
50140 DRAW"BR6BU12U4BR10BD16":RET  
URN:''  
50150 DRAW"BR12H5U6E5BD16BR4":RET  
URN:'(  
50160 DRAW"E5U6H5BR16BD16":RETURN  
:')  
50170 DRAW"BU8BR6NL6NH6NU6NE6NR6N  
F6ND6NG6BR10BD8":RETURN:'\*  
50180 DRAW"BR6BU8NU5NL5NR5D5BD3BR  
10":RETURN:'+'  
50190 DRAW"BR4R2U2L2D2BR2NG2BR10"  
:RETURN:',  
50200 DRAW"BR3BU8R6BR7BD8":RETURN  
:'-  
50210 DRAW"BR3U2R2D2L2BR12":RETUR  
N:'.  
50220 DRAW"U2E12U2BR4BD16":RETURN  
:'/  
50230 DRAW"BR2H2U12E2R8F2D12G2NL8  
BR6":RETURN:'0  
50240 DRAW"BR2R4NR4U16L2G2BD14BR1  
4":RETURN:'1  
50250 DRAW"BR2NR10U2E10U2H2L8G2BR  
16BD14":RETURN:'2  
50260 DRAW"BR2NH2R8E2U4H2NL4E2U4H  
2L8G2BD14BR16":RETURN:'3  
50270 DRAW"BR8U16G8R12BD8BR4":RET  
URN:'4  
50280 DRAW"BU2F2R8E2U4H2L10U8R12B  
D16BR4":RETURN:'5  
50290 DRAW"BU2NU6F2R8E2U4H2L8U5E3  
R6F3BD13BR4":RETURN:'6  
50300 DRAW"BU16R12D4G12BR16":RETU  
RN:'7

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50310 DRAW"BU2NU4F2R8E2U4H2L8NG2H  
2U4E2R8F2D4NG2BD10BR4":RETURN:'8  
50320 DRAW"BU3F3R6E3U10H3L6G3D3F3  
R9BR4BD7":RETURN:'9  
50330 DRAW"BR7BU3R2U2L2D2BU7R2U2L  
2D2BD10BR9":RETURN:':  
50340 DRAW"BR5BU3U2R2D2NG3L2BU8U2  
R2D2L2BD11BR11":RETURN:';  
50350 DRAW"BR12BU2H6E6BD14BR4":RE  
TURN:'<  
50360 DRAW"BU6NR10BU5R10BD11BR4":  
RETURN:'=  
50370 DRAW"BU2E6H6BD14BR16":RETUR  
N:'>  
50380 DRAW"BR5R2U2L2D2R1BU5U3E3U3  
H2L6G3BD13BR16":RETURN:'?  
50390 DRAW"BU2NU4F2R8E2U6L8G2E2R8  
U6H2L8G2BD14BR16":RETURN:'@  
50400 DRAW"U10NR12E6F6D10BR4":RET  
URN:'A  
50410 DRAW"NU16R10E2U4H2NL10E2U4H  
2L10BD16BR16":RETURN:'B  
50420 DRAW"BU3BR12G3L6H3U10E3R6F3  
BD13BR4":RETURN:'C  
50430 DRAW"U16R9F3D10G3L9BR16":RE  
TURN:'D  
50440 DRAW"NR12U8NR8U8R12BD16BR4"  
:RETURN:'E  
50450 DRAW"U8NR8U8R12BD16BR4":RET  
URN:'F  
50460 DRAW"BU5BR8R4D2G3L6H3U10E3R  
6F3D1BD12BR4":RETURN:'G  
50470 DRAW"U8NU8R10NU8D8BR6":RETU  
RN:'H  
50480 DRAW"BR2R4NR4U16NL4R4BR6BD1  
6":RETURN:'I  
50490 DRAW"BU3F3R3E3U13NL9R3BD16B  
R4":RETURN:'J  
50500 DRAW"U8NU8E2NF10E6BD16BR4":  
RETURN:'K  
50510 DRAW"NU16R12BR4":RETURN:'L  
50520 DRAW"U16F6E6D16BR4":RETURN:  
'M  
50530 DRAW"U16D2F12NU14D2BR4":RET  
URN:'N  
50540 DRAW"BU2NF2U12E2R8F2D12G2NL  
8BR6":RETURN:'O  
50550 DRAW"U16R8F2D4G2L8BD8BR16":  
RETURN:'P  
50560 DRAW"BU3NF3U10E3R6F3D10G3NL  
6E1NH2NF3BD1BR6":RETURN:'Q  
50570 DRAW"U16R8F2D4G2L8R2F8BR8":  
RETURN:'R  
50580 DRAW"BU3F3R7E2U4H2L8H2U4E2R  
8F2BD14BR4":RETURN:'S

Continued on Page 120

# LEADER SALES CORPORATION

214 657-7800 P. O. Box 1220 • Rt. 5 -- Town East Road Henderson, Texas 75652  
After 6 pm  
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## CENTRONICS MODEL 588 PRINTER

Up to 132 characters per line  
Sprocket feed up to 14 7/8"  
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88 CPS - Dot matrix 5 x 7  
Serial I/O Port w/4-pin DIN plug  
Reconditioned commercial model  
\$149.95

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32K Disk basic  
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Upgrades to 64K  
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Please call for prices.

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32K Disk basic  
Master directory, up to 35 disks  
on single disk  
Directory back-up on your disk if  
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\$60.00  
"F" board adapters add \$4.95  
Insulation free w/upgrade  
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Club discount applies only on  
Centronics printers and software programs.  
Printers are shipped freight collect F.O.B. Henderson, Texas.  
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All prices plus shipping and handling.

# Classified Advertisements

\*\*\*PRINTOUTS\*\*\*

I have started a service offering printouts of BASIC programs. If you need or want a listing of your program and you don't have a printer, you can use mine. I will send you a printout of your program if you send me your cassette and \$2.50. Extra copies are 25 cents each. I use only high quality 20 pound laser edge paper. Your listing will be printed on my Epson RX-80 printer. Money Orders only please. Send to: Jeff Coil, 1411 Hillcrest, Grand Rapids, MI 49504.

1 Radio Shack Personal Finance (used 1 Hour) ----- \$18.50  
 1 Radio Shack "Spectaculator" (Used 1 Hour) ----- \$18.50  
 Money Order Preferred. Send to: Tony Winkler, 4376 Ewing Ave. North, Robbinsdale, MN 55422

\*\*\*\*\*  
 \$LAS VEGAS POKER\$ Very realistic cassette version of top notch poker game. Identical with newest CASINO machines - uses super HI RES graphics. Requires full 32K Extended Basic. Developed in CANADA. Sell for \$15 a copy or trade for other arcade quality games or? Sell Line Printer VII with dust cover and cable for \$185. Sell new Spectrum Projects Double Stick Interface. Also top-rated, self-centering super joystick (best on the market). Both for \$35 or trade (both) for Kraft joystick. Sell new ATARI joystick for \$10. I pay shipping. Contact Fred Naumann, Box 1081, Hailey, Idaho 83333.

"PoCo CoCo"  
 [MC-10®]

Five 'Snappy' Programs! For your Micro Color Computer! Send blank cassette and \$3 to: Ron Beall, P.O. Box 734, Ozona, TX 76943

FOR SALE - Radio Shack ROMpacks all in good working condition. Space Assault \$10, Color File \$20, Color Scripsit \$20, Bustout \$10, Personal Finance \$15, Color Computer Learning Lab \$25. Send orders to: Stan R. Seagle, 3376 East Market St., Warren, OH 44484. Will ship when personal check clears or send Money Order.

FOR SALE - Radio Shack Color File \$20, Radio Shack Personal Finance \$20, Radio Shack Color Computer Learning Lab-- 8 tapes and manual. \$25, Spectral Assoc. Magic Box \$10 (converts Mod. I or III programs for use on CoCo., Sinclair ZX-81 Complete with manual and programming books \$30, Soft Sector Marketing Master Control II \$10. All are original programs in excellent condition. Get all of the above for \$100 or buy them individually. Send orders to: Paul L. Kush, 17331 Walnut, P.O. Box 638, Yorba Linda California 92686 or call (213) 691-2169 for more information

ROMpacks for Sale - Music \$10, Personal Finance \$15, Color File \$10, Space Assault \$10, Art Gallery \$15, Football \$10, Galactic Attack \$10, Dinowars \$10, Project Nebula \$15, Polaris \$10, Pinball \$10, Quasar Commander \$10 and Basic Aid \$20.

ColorForth Tape (16/32K) \$20

Will sell individually or all for \$150. Seller will pay shipping. Contact: John Livernash, 1517 Foster Dr., Reno, NV 89509.

FOR SALE: Radio Shack Line Printer VII. Mint Condition. Ribbons, etc. are included along with shipping and insurance. \$200. For more information call: (815) 729-9543, Glenn B. Harvey, 724 Prestige, Joliet, IL 60435.

\*\* FOR SALE \* FOR SALE \*\*

RADIO SHACK Line Printer VII (One Year Old). I am upgrading to the new DMP-120 and do not need two printers! Looks and runs like new. Includes dust cover, cable, one partially used ribbon cartridge, shipping and insurance. Only \$200.00. Please call first if interested: Steve Ostrom, 12612 Cedar Lake Road, Minnetonka, MN 55343, 612-546-7608. I will ship immediately if you send a certified check or money order.

\*\*\*\*\*  
 FOR SALE OR TRADE (originals) Radio Shack VIDEOTEX, Radio Shack Project Nebula, Radio Shack Space Assault, Radio Shack Checkers, Radio Shack EDTASM+, and Eigen Systems CCEAD.

WANT TO BUY or TRADE for a Disk Editor/Assembler, CCforth, and PASCAL for the CoCo. Contact Virenda K. Jain, 105 Everett Street, Arlington, MA 02174.

FOR SALE-TELEWRITER-64 (Cognitex) \$43, WORKSAVER(Platinum Software) \$28, TYPING TUTOR (R.S.) \$23, THE KING (Tom Mix) \$19. All are in good condition and include Documentations. I will pay the postage. Write to: Mr. Luong Phuc Tho, 133-01 Sanford Avenue (#2D), Flushing, N.Y. 11355

SPECIAL CLOSEOUT

Two never released hi-res machine language 2-player joystick arcade games from Creative Computing.  
 1. PICNIC- Escape the evil spider and capture foods.  
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Both are an Incredible \$11.95 (Please add \$1.00 for S & H) Computer Island, 227 Hampton Green, Staten Island, NY 10312.

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From HAWG WILD Software (TM)  
FOOTBALL FORECASTER(c) with 1983 data  
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Coco Users-THIS OFFER IS  HOT! \*

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COLORFORTH(R), figFORTH for  
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conditions outlined.



including: Doodle Bug(\$26.95),  
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All COMPUTERWARE(R) add \$2.00 P&H.

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Premium grade data cassettes. All  
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First run prime IC's-no seconds!

4164P-3 150ns 64K x 1 DRAM \$7.50

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All programs for 16 K or greater  
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Edge connectors, .156" centers

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Contacts are user removable for  
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solder tail, solder eye, or wire  
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Connectors & IC's Postage & Hand.:  
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**Gary** Gary Smith, President

Original software for sale: ROM packs include Spectaculator, Personal Finance, Space Assault, and Chess. Tapes include Ghost Gobbler, Color Zap, Whirlybird Run, Lunar Rover, Master Control II. Name your own price. J.D. Ray, 5065 France Ave, N. Charleston, S.C. 29406.

\*\*\*\*\*WANTED\*\*\*\*\*

International Color Computer Club, Inc. Members wishing to trade computer program tapes (programs may be up to 32K in length and run on either ECB or Basic). I am interested in adventure game programs but I will consider others. Send list of what you are trading to Robert P. Wharran, 985--36th Ave., Vero Beach, FL 32960.

\*\*\*\*\*

LINE PRINTERS  
CENTRONICS 588 (used) serial 600 Baud, 88 CPS with 4 pin DIN plug. All prices F.O.B. Henderson TX. Terms: Cash, Check, or C.O.D. Texas Residents add 4% sales Tax. Send orders to: Leader Sales Corp., P.O. Box 1220, Henderson, Texas 75653-1220 or call (214) 657-7800 after 6:00 PM CST. The price is: \$149.95 regular or \$119.95 to club members and volume buyers.

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WANT DESCENDERS? GOT A RS VII PRINTER? We're talking some very serious stuff! We got Descenders, Ascenders, Justified Left and Right Margins with equal spacing between words on the same line, Underlining & Footnotes, Expanded Print, Automatic Headers/Footers. REALLY LOOKS GOOD!!and beats the price of a new printer. Money back if not satisfied. Works great with any word processor. Send \$11.95 to: Jim DeStafeno, 158 Edward Drive, Swedesboro, NJ 08085 or SASE for free info.

5 1/4" DISKETTES  
BOX OF 10 for \$16.00  
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Original Programs

Zaxxon=\$20, Planet Invasion=\$12, Color Zap=\$4, Astro Blast=\$12, Dunkey Monkey=\$10, Pac Attack=\$8, Sky Defense=\$5, Ms. Gobbler=\$15, Trapfall=\$15, Space Shuttle=\$15, Robottack=\$15, Color Invaders=\$8, and Tape to Disk=\$8.

Send \$1 Shipping to: Mike Anheluk 38465 Place Road, Fall Creek, Oregon 97438

\*\*\*\*\*  
\*\*\*FOR SALE\*\*\*

On Cassette  
Zaxxon=\$20, Colorpede=\$15, Donkey King=\$15, Lancer=\$15, Lunar Rover=\$15, Storm Arrows=\$12, Blothead=\$15, Offender=\$12, The Frog=\$15, StarFire=\$12, Astro Blast=\$12, Meteoroids=\$12, Pacdroid=\$10, Grabber=\$12, Trapfall=\$12, Whirly bird Run=\$12

I'll pay shipping. Send M.O. to James MacArthur, Rt. 1, Box 155, Gillett, WI 54124.

\*\*\*\*\*  
FOR Sale- Original Software (No copies) with original Documentation.

HomeBase (DBM) \$50 Req. 32K, 1 Disk, Sands of Egypt \$15 R/S Graphic Adv. On disk Only, Elect. Calig. \$12 DSL On disk, Alcatraz II \$5 On tape, Starship Cham. \$5 On tape, Katerpillar \$10 Tom Mix On tape.

Please send check (3-4 weeks) or Money Order (immediately) to: Joe Romito, 5717 Old Reid Road, Charlotte, NC 28210. I pay shipping.

I am interested in a program similar to R.S. "Personal Finance", for my 32K ECB 2-Disk CoCo System. Contact: Ron Haluzan, Rt. 2, Box 565 D, New Braunsfels Texas 78130.

\*\* MASTERGRAPH \*\*

MASTERGRAPH is the ultimate in a drawing tool. It is simple to use, and features single key acces to EXT. BASIC graphic commands. It allows 15 sizes of text in upper/lower case. It also saves pictures to tape, reverses colors, makes symmetric halves, & much more! Includes 3 sample pictures. 16K ECB & 1 joystick required. Send Cash, check, or money order for \$11.95 to: Michael Hall, 3019 Sylvester Drive, Hartland, WI 53029. Send a S.A.S.E. for full details.

===== I am in the process of developing several hardware projects for the CoCo, low cost plotter etc. I have spent many hours developing a low cost adapter to use the Atari joysticks with the CoCo. The package includes complete documentation, schematic/parts list for building your own unit using Radio Shack parts Price for members is \$9.95 ppd, the 5 pin Din plugs to connect to the rear of the unit are \$2.25 ppd.

SURPLUS HARDWARE SALE  
R/S PC-1 with printer \$150 ppd.  
R/S mod 1 Keyboard with video modulator and cassette \$250 NOT ppd. Servus Systems commercial duty 132 column formed character printer (upper case only) with stand \$275 plus shipping. Send orders for above to: Bryan McPhee, Box 61, New Lisbon, NJ 08064. Thanks!  
B/W B/W B/W B/W B/W B/W B/W B/W Attention Photographers:

16K Non-Ext. Basic Program to aid in Black/White Film processing of Tri-X, Plus-X, and Panatomic-X films using D-76, Microdol-X, or HC110 (Dil.B) Developer. For the CoCo on tape for \$13.00 Shipping & Handling is included. Personal checks must clear first. Send order to: Paul D. Kirkpatrick, 5603 Linwood Court, Seabrook, MD 20706.

=====  
 Line Printer VIII  
 For Sale-Line Printer 8. This printer is in excellent condition and comes with the special adapter to use roll paper, an owner's manual, and two ribbons. This printer uses fanfold paper - or single sheet paper (friction feed)!! DOES GRAPHICS, TOO! A must for the serious computer user. If interested, please call Michael S. Dixon @ (703) 751-2977; or write to me @ 3628 Trinity Drive, Alexandria, VA 22304. I am looking for \$759.00 for this printer, but maybe we can talk.  
 =====

: SOFTWARE SALE :

I am converting to disk and have the following for sale. All in as new condition: ROMpacks: R/S Spectaculator \$26, R/S ColorFile \$17. Cassettes: Cognitec Telewriter 64 \$34, PXE Autoterm Terminal \$26, R/S RAAKA-TU \$10, AARDVARK PYRAMID \$10, Snake Mountain SOLUTION \$8. MODEM: Signalman Color Modem \$75. Please include \$1 P&H and a S.A. S.E. for check return in case of prior sale. Send orders to: Melvin Halpern, 600 Manning Dr., Charlotte, N.C. 28209.  
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FOR SALE FOR SALE FOR SALE

All of the following software, ALL COMPANY ORIGINALS, which I purchased but am tired of: Doodle Bug--by Computerware GALAX ATTAX--by Spectral Ass. Planet Invasion--by Spectral Color Caterpillar--by Soft Sector Vampire Castle--by Aardvark Advanced Star Trench Warfare by IMB. Will sell all of them for \$100 or Each for \$18.00.

Call (803) 884-1911 or write to: Mitchell Cohen, 1028 Law Lane, Mt. Pleasant, S.C. 29464 To make immediate arrangements. I'll pay for the S&H.

For Sale - Clearance - New Inventory coming in. 16K Extended Basic Color Computer \$225 w/2 manuals. Color Computer cassette recorder \$29.99. Color Computer Learning Lab \$23.00. Pyramid cassette \$10. Wizard's Tower \$10. Trans Tek CC File \$5. CC Graphics (Don Inman) \$9. 101 Programming Tricks for CC \$6. 30 Computer Programs for Home Owner \$7. I will pay postage. Complete package \$275.00. I will be donating my remaining books to the ICCO, Inc. Library if I can sell the above. If a personal check is sent I will wait til check clears before mailing. To order: Judith M. Hoberman, 4330 Grace Avenue, Bronx, New York 10466.  
 =====

TAX83: A CoCo program to aid in your tax preparation. It will process your data, format and print schedules in a form acceptable for submission to the IRS. Provide data for the form 1040. It's use may be tax deductible. The following versions are available. Runs in Color Basic.

1. 32K. Schedules A,B,E,F,G,W, and credit for dependant care. Form 1040. \$14.95
  2. 32K. Same as above but includes SC forms 1001 and 1001ID \$17.95
  3. 16K. Schedules A,B,W, and credit for dependant care, Form 1040. \$11.95
- EFG. 16K. Schedules E,F, and G. \$7.95

Check or money order (include \$1.00 P&H) to: John M. Gregg, Dept I, 1008 Alton Circle, Florence, S.C. 29501.  
 =====

Thanks for the support last year. Best wishes for this year. Happy Valentine's Day to All.

I have a lot of Software I would like to sell, a partial list follows: \$17 each ROMpacks Color File, Quasar Commander, TAPES- Astroblast, Packet Man, Asteroids, Berzerk, Donkey King, Space Shuttle, Protectors, Many more, Make an offer.

Cave Hunter \$15. Telewriter \$15. Color Computer Learning Lab \$25. Color Bonanza (50 Programs) \$25. TRC Programmers Institute Magazine on tape (past Issues) \$5. TRC Programmers Program \$18. Back Issues of Rainbow, Color Computer News, 80 Micro, Creative Computing. \$1.80 if you buy several.

My address is Charles E. Porch, O.D., University Mall, 7171 N. Davis, Pensacola, Florida 32504 or call 904-944-4310 and leave a message & I'll call back.  
 =====

FOR SALE- Okidata 82A Printer with forms tractor. Like new-printed only about 100 pages. Interfaces to CC serial I/O port I'll include 10 foot CC cable. Save over \$100. Only \$350 - I'll ship U.P.S. Tom Conlon, 358 Windsor St., Cambridge, MA 02141. Call evenings 617-864-6898.  
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"Attention "Odd Couple" Fans!" If you love "The Odd Couple" then this program is for you! The Official Odd Couple Trivia Quiz! Graphics, hints, and more. User modifiable- add your own questions. Test your "expert" friends - great for parties. Will run on any 16K CoCo. Only **\$5.00!!** And I pay postage. How can you go wrong? Send check or money order to: David Bernstein, 162 - 03 88 St., Howard Beach, N.Y. 11414.  
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I have a TRS-80 Color Computer 32K Ext. Basic. I am interested in a disk system. I am looking for a used disk system in fairly good condition. Contact: Jim Bennington, 811 Early Forest Circle, Sandston, VA 23150.  
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FOR SALE OR TRADE (Originals)  
Radio Shack VIDEOTEX, Cognitex  
TELEWRITER, and Radio Shack  
COLOR SCRIPSIT.

WANTED\*\*\*\*\* Business Software

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The Green Dragon located in space  
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most complete line of Color Com-  
puter software & hardware in  
3 States (SC, NC, and GA).

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urday. Ask for Bill Sides, Mngr.  
and proud owner of a "C" Board  
CoCo # 715. He is as much into  
the CoCo as anyone else. Times  
are listed in EST.



Free T-Shirt to first 5 people  
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# LONG BEACH

The fun and excitement of RAINBOW-  
fest is coming your way and now there  
will be a RAINBOWfest near you!

For the 1983-84 season, we've scheduled  
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country. Each one will offer fun, excite-  
ment, new products, seminars and infor-  
mation for your CoCo! And for those who  
(perish the thought) don't like CoCo as  
much as you, we've scheduled each RAIN-  
BOWfest in an area that will provide fun  
and enjoyment for the whole family.  
Just look at this great lineup:

**Long Beach, California — February 17-  
19.** What a way to get away from the winter  
doldrums! And what better place than sun-  
ny Southern California with thousands of  
fellow CoCo owners! Fly with CoCo to the  
sun for the winter. Top flight seminars will  
draw on many local CoCo experts.

**RAINBOWfest—Long Beach**  
DATES: Feb 17—19, 1984  
HOTEL: Hyatt Regency, Long Beach  
ROOMS: \$59 per night single/double  
KEYNOTE: Bob Albrecht

Advance Ticket Deadline: Feb. 13, 1984

Walter Taxi service avail. from the hotel to the Queen Mary

It's a holiday weekend, too -- so take Mon-  
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Studios, Marineland, the Queen Mary and  
Hollywood!

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RAINBOWfest comes to the populous north-  
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Long Island.

**Chicago — June 22—24.** We'll play RAIN-  
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CoCo's very first show this spring. And  
right next to the world's largest indoor  
shopping mall.

Every show will be held at a Hyatt-  
Regency Hotel and all will be offering spe-  
cial rates for RAINBOWfest. Every show  
will open at 7—10 p.m. Friday, run 10

a.m.—6 p.m. Saturday and close with an 11  
a.m.—4 p.m. session Sunday. Each will  
have a CoCo Community Breakfast featur-  
ing an outstanding national speaker from  
the Color Computer World. And each exhibi-  
tion will be interspaced with a number of  
seminar sessions on all aspects of CoCo  
—from writing in machine language, to  
making your BASIC work better.

But most of all, there will be exhibitors.  
Lots of them. All ready to demonstrate  
products of every kind. Some with special  
programs and hardware items to intro-  
duce. Others with show specials.

Tickets can be secured directly from the  
Rainbow. We'll also send you a special res-  
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room rate.

Come to RAINBOWfest... help us all  
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**RAINBOWfest—New Brunswick, N.J.**  
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ROOMS: \$59 per night single/double  
KEYNOTE: To Be Announced

Advance Ticket Deadline: March 23, 1984

**RAINBOWfest—Chicago**  
DATES: June 22—24, 1984  
HOTEL: Hyatt Regency Woodfield  
ROOMS: \$46 per night single/double  
KEYNOTE: To Be Announced

Advance Ticket Deadline: June 18, 1984

February  
17-19

# RAINBOW- fest Long Beach



FREE RAINBOW  
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Member of the ICCC, Inc. \*World's Largest CoCo Club\*

YES, I'm coming to RAINBOWfest in

Please send me  Long Beach  New Brunswick  Chicago.

..... three day tickets at \$8 each total \_\_\_\_\_  
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Handling Charge \$1.00

TOTAL ENCLOSED (U.S. FUNDS ONLY, PLEASE) \$ \_\_\_\_\_

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STREET & NUMBER \_\_\_\_\_

CITY & STATE \_\_\_\_\_

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COMPANY \_\_\_\_\_

Orders sent less than two weeks prior to show opening will be held for you at the door.

VISA, MasterCard, American Express accepted.

My Account # \_\_\_\_\_ Ex. Date \_\_\_\_\_

Signature \_\_\_\_\_

## Seminar Program And Speakers

**Don Inman** Using And Teaching LOGO  
Don is one of the most respected names in the Color Computer field and an expert on graphic techniques in both BASIC and assembly language. His Using Graphics column appears monthly in the Rainbow.

**Phil Kitchen** Radio Shack Software Support  
Manager of Software Support for Radio Shack, Phil will explain how the Tandy third party software support program works and answer questions about how Radio Shack can be of assistance to authors.

**Paul Searby** Software Theft

**Martin Goodman**  
A panel discussion of one of the most important issues in the CoCo field with Mr. Searby of Computerware and Dr. Goodman of Cheshire Cat Software.

**Linda Nielsen** Women's Programs  
Linda, of Morator Bay Laboratory, and several others active in the CoCo area, will lead a discussion on women's involvement in computing in general and the Color Computer in particular. Theme of the program: It's Not A Man's World.

For women and men who view computers mainly as an annoyance, a special seminar is planned on the general topic How To Live With A Computer At Home

**Bill Nolan** Fantasy Gaming And CoCo  
DungeonMaster, programmer and Rainbow Columnist, Bill has developed a complete Dungeons and Dragons program for CoCo.

**Jim Reed** Writing For Rainbow  
Jim, Managing Editor of the Rainbow, will talk about how you can submit programs and articles to magazines for fun and profit.

**AND:** A special session on assembly language programming... and more to be announced later.

**PLUS . . . RAINBOWfest's "CoCo Community"**  
Breakfast featuring Bob Albrecht, Popular  
Author and RAINBOW columnist

Additional seminars are planned as well. Admission to all seminars is at no charge. See registration form for admission prices to exhibit area and breakfast.

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```

50590 DRAW"BR8U16NL6R6BR4BD16":RE
TURN:'T
50600 DRAW"BU3NU13F3R6E3NU13BD3BR
4":RETURN:'U
50610 DRAW"BU16D10F6E6U10BR4BD16"
:RETURN:'V
50620 DRAW"NU16E6F6NU16BR4":RETUR
N:'W
50630 DRAW"U2E12U2BL12D2F12D2BR4"
:RETURN:'X
50640 DRAW"BR6U10NH6E6BD16BR4":RE
TURN:'Y
50650 DRAW"NR12U2E12U2L12BR16BD16
":RETURN:'Z
50660 DRAW"NR6U16R6BR6BD16":RETUR
N:'[
50670 DRAW"BU16D2F12D2BR4":RETURN
:']
50680 DRAW"BU16BR2R6D16L6BR14":RE
TURN:'J
50690 DRAW"BR6U16NG6F6BD10BR4":RE
TURN:'
PROGRAM USES 2951 BYTES
    
```

THIS SUBROUTINE PREVENTS THE COMPUTER FROM TRYING TO PRINT TO THE PRINTER, IF THE PRINTER IS OFF OR DESELECTED.

```

48000 IF (PEEK(65314)AND 1)=1 THE
N PRINT"PRINTER NOT READY":PRINT"
HIT ENTER WHEN READY" ELSE RETURN
48010 Z$=INKEY$:IF Z$="" THEN 480
10
48020 GOTO 48000
    
```

Continued from Page 5

Getting back to what's ahead in 1984, look for MORE DISCOUNTS... A BIGGER (and BETTER) NEWSLETTER MORE SUPPORT, MORE PROGRAMS, and on the BBS, MORE DOWNLOADS faster access, and EASIER USE. To do all this we need MORE INPUT from YOU! Send in your programs, letters, articles, mod's etc., and share them with the WORLD.

Until next issue  
Ron Garrett

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STORE NAMES+ADDR. PAGE 24  
USING A\$(X,Y) A\$(100,10)

≈ A\$(X,1)

e.g. A\$(X,1) = NAME for X  
( ,2) = STREET "  
( ,3) = CITY "  
( ,4) = TEL. # "

for X=1 to 100  
etc

next X