

TRS-80
COMPUTING
65 OAK ROAD
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828-7749

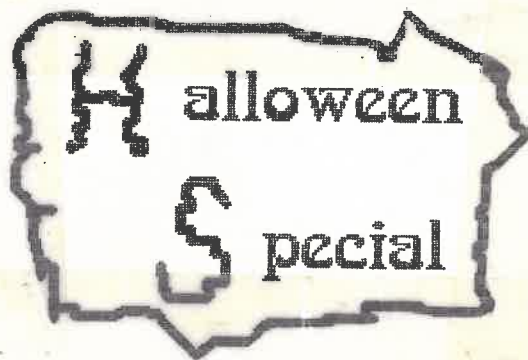
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NUMBER 3

TRS-80 COMPUTING

THE BI-MONTHLY MAGAZINE FOR COLOR COMPUTER USERS



- HALLOWEEN ARCADE GAME
- NO-GHOST GRAPHICS PROGRAM
- A GREAT ARTICLE ON THE "C" PROGRAMMING LANGUAGE
- A HALLOWEEN MUMMY
- PART II OF THE HIGH RESOLUTION GRAPHICS TUTORIAL

READ ON

FOR MORE!

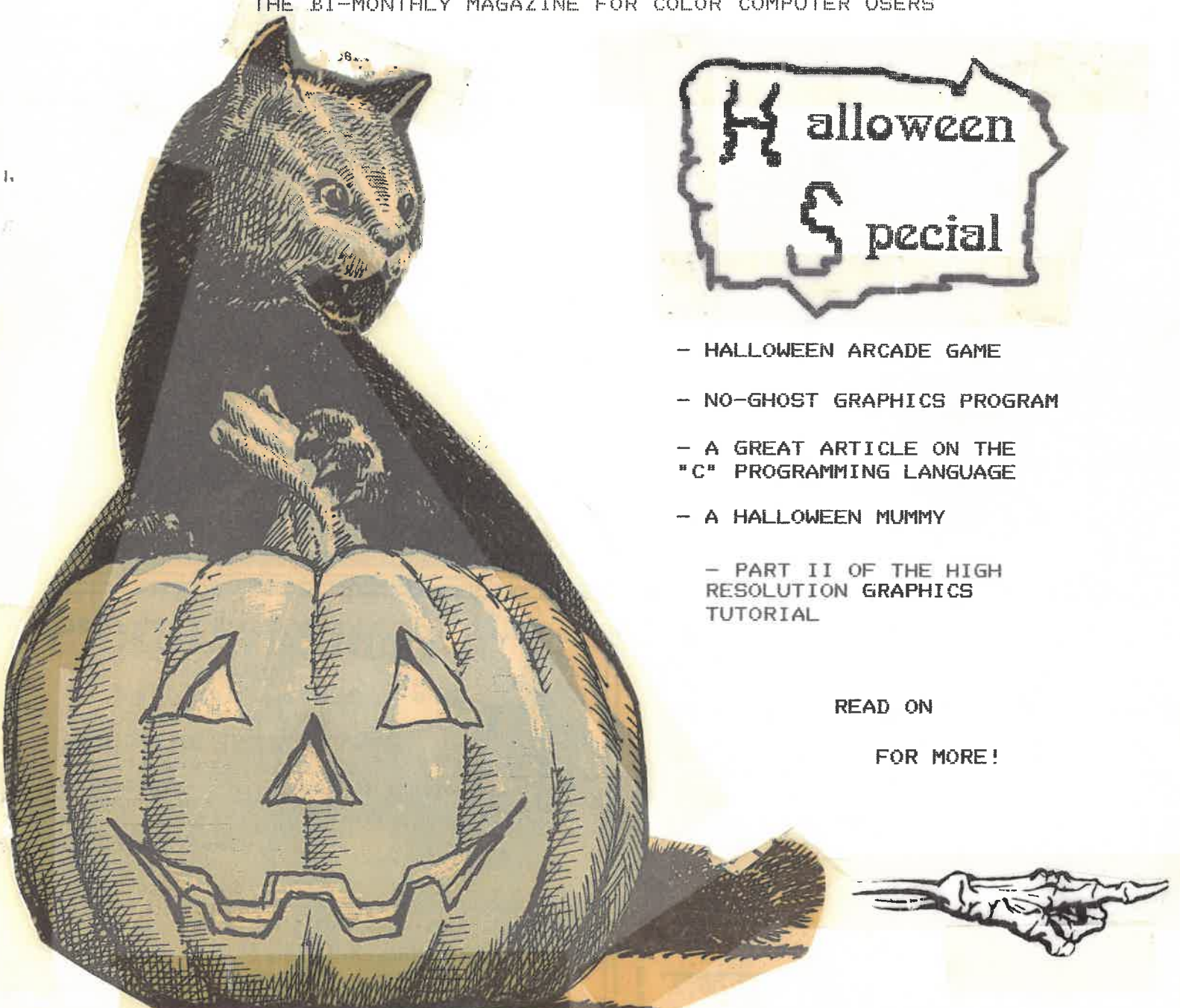



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TC STANDS FOR TRS-80 COMPUTING

TRS-80 COMPUTING
SINCE 1987

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NOTE: THE PROGRAM
LISTINGS IN THIS ISSUE
ARE LISTED IN A NEW
FORMAT. SEE PAGE 3
FOR INFORMATION.

HALLOWEEN MUMMY

Graphics Program

ECB
required

It's Halloween time again! Beware of the ghosts, goblins, and other spooks that you may encounter on October 31st! The program below draws out a well-detailed picture of a face of a "wrapped up" mummy on the PMODE 4 graphics screen. This is our first program using the new program listing format. See Joe Ahern's editor's note on the next page for more details.

THE LISTING: MUMMY

```
0 ? HALLOWEEN MUMMY
1 ? PROGRAMMED BY JOE AHERN
2 ? COPYRIGHT (C) 1989
3 ? BY TRS-80 COMPUTING
5 PMODE4,1
   PCLS5
8 SCREEN1,1
   COLOR0,5
10 DRAW"BM148,168;L40H1L10H4L8H10E20U14H2U4H8U8HL8H8U8R6U8EU4HUB"'LFT/EAR
12 DRAW"G8D8G4L6HU14R6E14U4E10R4E5R10ER18ER14ER6ER16FR10F12R4F10"'TOP
14 DRAW"D24G8D4F10GD6G12D8G4D10G2D4G2L16H10L16H8L8HL19H6"
16 DRAW"BM148,168;U6E4U10H8U6"
18 DRAW"BM104,88;E4R4E6R14FD8G6L24HU3"
   CIRCLE(116,90),3
   PAINT(116,90),0,0
20 DRAW"BM156,76;R8F2R14F2D8L28U6E2U4"
   CIRCLE(163,84),3
   PAINT(163,84),0,0
22 DRAW"BM132,98;E12F12D8L6H4L2G4L8U8"
   'NOSE
24 DRAW"BM120,108;F4R8F4R24E8R4FG12L8GL22H2L8H12R12"
26 DRAW"BM92,112;E4U26E4L4G4L18R10D6G4E4U6L10R18E4R12E8R20E8R54L28F8R12F4R2"
28 DRAW"BM76,68;R12E4R16E8L8HL16R16FR8ER20E8R52"
30 DRAW"BM76,52;R12E4R12E8L10H8F8R10F4R12F10"
   DRAW"BM132,28;F8R42L32F8R6F3"
32 DRAW"BM96,132;F36"
   DRAW"BM108,126;F40"
   DRAW"BM88,142;F26"
   DRAW"BM76,152;R21"
40 GOTO 40
```



HINT...

On real hot days, put your hand on the CoCo's air vents (top of computer). If it feels real warm, you can cool it down by putting a small fan in front of the computer!



Editor's Note

You may have noticed on the front cover (along with our halloween picture) that the cover price has risen from \$1.25 to \$1.50. One of the main reasons for the price increase is postage. You see, we mail your copy of TRS-80 Computing every other month in long envelopes (if you live outside the N.E. states), and through First Class Mail. Since the pages of the magazine has increased to almost 35, that means that the magazine weighs more. Before the magazine weighed only 5oz., and it costed us about \$1 to mail it to you. As of last month, it weighed up to 6 ounces and it costed us exactly \$1.25 to mail it. Yes \$1.25, that means that we made absolutely no profit on single issue buyers. (Those who bought a trial issue of the August issue last month made off well!)

So, because of increased weight of the magazine, and the postage cost increase, it forced us to raise the cover price to \$1.50. Although, this does not affect the subscription rates at all.

Another change in the magazine this month is the program listings of all the programs. Starting now we will be LLISTing all the programs in a 2 column format, and a more attractive, easy-to-read way. All the colons that separate each command, in each program line, are missing. So make sure that you remember to insert a colon after each command in every line (for a good example of the new listing format, see the MUMMY program on the preceding page).

This change in the way we list our programs, is sort of a test. If you, our readers, donot feel that this is an appropriate way to list programs on paper, then please let us know, and we will go right back to the regular 80-column format that we have been doing ever since we started. Just to show you that we at TRS-80 Computing ALWAYS have a concern for our readers.

Joe Ahern
Joe Ahern
Editor/Publisher
TRS-80 Computing

COMPUTER PENPALS

The following people are proud owners of Tandy Color Computers, and would like to have penpals to talk about their CoCo and exchange ideas. Please - NO PIRACY!

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SPECIALS

REPORTS - PROGRAMS - UTILITIES



THIS MONTH: MAKING CONVERSIONS PART I OF III

EXAMPLE # 1

To convert 10001010 to decimal:

1. Is bit 7 a 1? yes write ... 128
2. Is bit 6 a 1? no write ... 0
3. Is bit 5 a 1? no write ... 0
4. Is bit 4 a 1? no write ... 0
5. Is bit 3 a 1? yes write ... 8
6. Is bit 2 a 1? no write ... 0
7. Is bit 1 a 1? yes write ... 2
8. Is bit 0 a 1? no write ... 0

Now add the values written. 138
The decimal is 138.

EXAMPLE # 2

Convert 11111111 to decimal

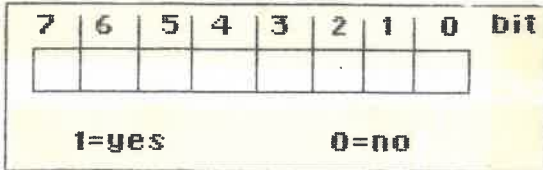
```

128
64
32
16
8
4
2
1
---
255
    
```

EXAMPLES TO TRY:

1. Convert 10000001 to decimal
2. Convert 00000101 to decimal
3. Convert 1110110 to decimal
4. Convert 01010100 to decimal
- * 5. Convert 0100110111001000 to decimal

* (Remember the left most 0 (zero) is 2^{15} which is 32768. The right most zero is 2^0 which is 1).



TO CHANGE BINARY TO DECIMAL

Look at the numbered bits. The above diagram assumes that there are eight bits. To change binary to decimal raise 2 to the bit power. (Got that?)

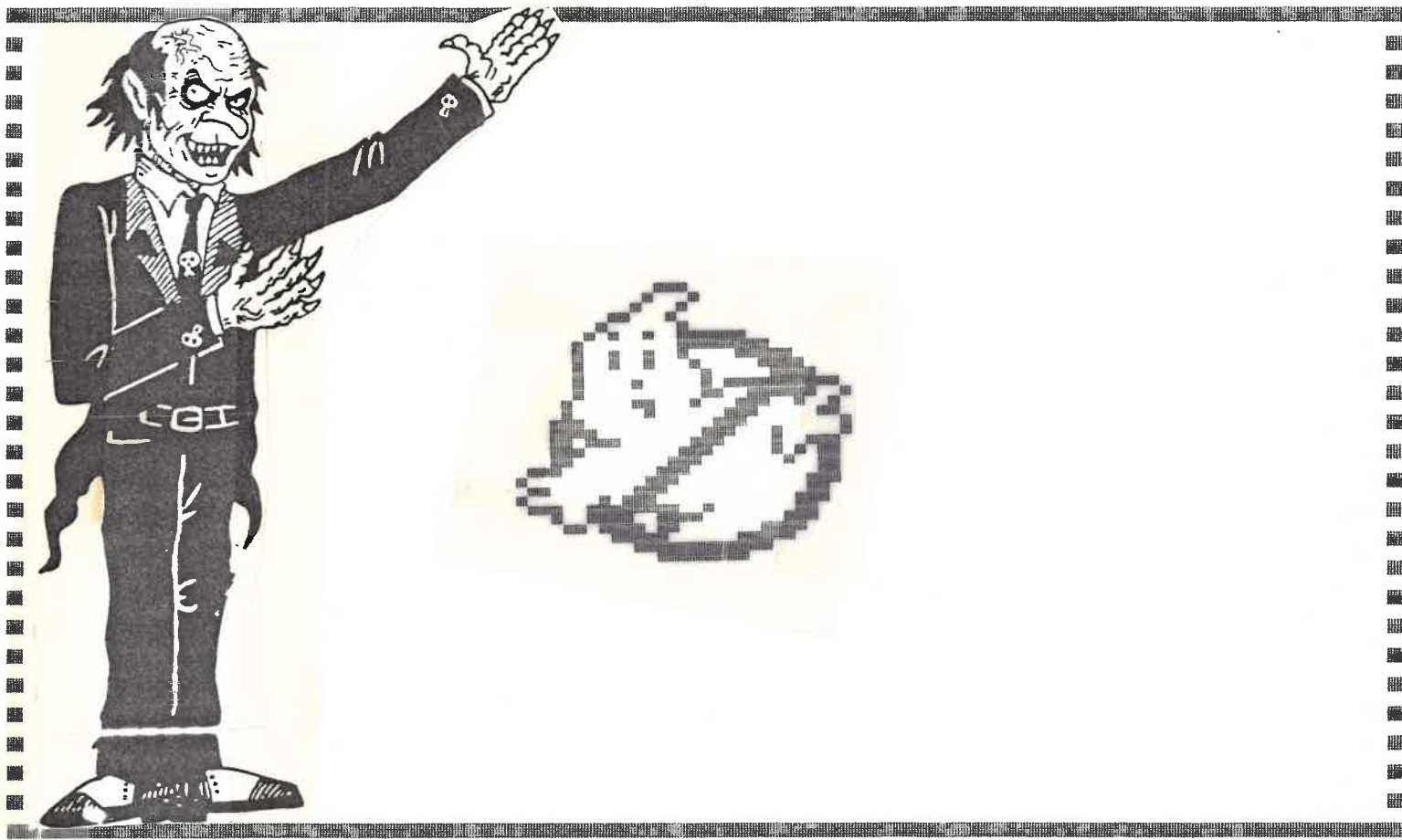
- bit 0 = $2^0 = 1$
- bit 1 = $2^1 = 2$
- bit 2 = $2^2 = 4$
- bit 3 = $2^3 = 8$
- bit 4 = $2^4 = 16$
- bit 5 = $2^5 = 32$
- bit 6 = $2^6 = 64$
- bit 7 = $2^7 = 128$

Now look at the binary number for each bit which is either a 0 or 1. If the bit contains a 1 the bit is a yes, and you write down the number. But if the bit contains a 0, the bit is a no, and you don't write it down. Now add the numbers written which is the decimal equivalent.

3, 246
 2, 5
 1, 1912
 4, 84
 1, 129

ANSWERS:

THE PROGRAMMER



O C T O B E R

THIS MONTH'S PROGRAM
NO GHOST!



NO GHOST

by David McNally

16K COLOR BASIC
HARDWARE REQUIRED: NONE

Since we're all sick and tired of the no-smoking symbol, and it is October, I decided to change it a little bit. (How many no-ghost signs have you seen lately?) After keying in the listing, RUN it and you'll see what I mean.

NOTE: For best effects, darken the screen a little by turning the brightness knob on your television set (if you're using one) and RUN the program in the pitch dark. DON'T FORGET TO ADD COLONS!

THE LISTING: NO-GHOST

```
10 CLS0
   FOR L=19 TO 25
12 SET(L,1,5)
   NEXT L
14 SET(18,2,5)
   SET(26,2,5)
16 SET(17,3,5)
   SET(25,3,5)
18 SET(15,4,5)
   SET(16,4,5)
   SET(24,4,5)
20 SET(14,5,5)
   SET(17,5,5)
   SET(21,5,5)
21 FOR L=31 TO 33
   SET(L,9,4)
   NEXT L
   SET(25,5,5)
23 FOR L=32 TO 34
   SET(L,8,4)
   NEXT L
24 SET(13,6,5)
   FOR L=26 TO 36
26 SET(L,6,4)
   NEXT L
   SET(25,6,5)
28 SET(12,7,5)
   SET(17,7,5)
   SET(21,7,5)
29 FOR L=33 TO 35
   SET(L,7,4)
   NEXT L
30 SET(25,7,5)
   FOR L=35 TO 37
   SET(L,7,4)
31 SET(28,11,5)
   NEXT L
34 SET(12,8,5)
   SET(17,8,5)
   SET(21,8,5)
36 SET(26,8,5)
   SET(37,8,4)
   SET(38,8,4)
38 SET(12,9,5)
   SET(19,9,5)
   SET(27,9,5)
40 SET(38,9,4)
   SET(39,9,4)
42 SET(12,10,5)
   SET(27,10,5)
44 FOR L=29 TO 37
   SET(L,10,5)
   NEXT L
46 FOR L=38 TO 40
   SET(L,10,4)
   NEXT L
48 SET(12,11,5)
   SET(19,11,5)
   SET(20,11,5)
50 SET(21,11,5)
   SET(27,11,5)
52 SET(29,11,5)
   SET(30,11,5)
   SET(31,11,5)
54 FOR L=38 TO 41
   SET(L,11,4)
   NEXT L
56 SET(21,12,5)
   SET(12,12,5)
58 FOR L=28 TO 30
   SET(L,12,4)
   NEXT L
60 FOR L=39 TO 43
   SET(L,12,5)
   NEXT L
62 SET(11,13,4)
   SET(12,13,5)
64 SET(13,13,5)
   SET(27,13,4)
66 SET(28,13,4)
   SET(29,13,4)
   SET(44,13,5)
68 SET(10,14,4)
   SET(11,14,4)
   SET(12,14,4)
70 SET(13,14,4)
   SET(14,14,5)
   SET(26,14,4)
72 SET(27,14,4)
   SET(28,14,4)
   SET(43,14,5)
74 FOR L=10 TO 12
   SET(L,15,4)
   NEXT L
76 FOR L=14 TO 16
   SET(L,15,5)
   NEXT L
78 FOR L=25 TO 27
   SET(L,15,4)
   NEXT L
80 FOR L=41 TO 43
   SET(L,15,5)
   NEXT L
82 FOR L=10 TO 13
   SET(L,16,4)
   NEXT L
84 FOR L=24 TO 26
   SET(L,16,4)
   NEXT L
86 SET(36,16,5)
   SET(44,16,5)
88 FOR L=10 TO 12
   SET(L,17,4)
   NEXT L
90 FOR L=23 TO 25
   SET(L,17,4)
   NEXT L
92 SET(36,17,5)
   FOR L=39 TO 43
94 SET(L,17,5)
   NEXT L
96 FOR L=8 TO 11
   SET(L,18,5)
   NEXT L
98 FOR L=22 TO 24
   SET(L,18,4)
   NEXT L
100 SET(36,18,5)
   SET(38,18,5)
102 SET(41,18,4)
   SET(42,18,4)
104 SET(7,19,5)
   FOR L=21 TO 23
106 SET(L,19,4)
   NEXT L
   SET(37,19,5)
108 SET(41,19,4)
   SET(42,19,4)
110 FOR L=8 TO 10
   SET(L,20,5)
   NEXT L
112 FOR L=19 TO 22
   SET(L,20,4)
   NEXT L
114 FOR L=40 TO 41
   SET(L,20,4)
   NEXT L
116 SET(7,21,5)
   SET(15,21,5)
   FOR L=18 TO 21
118 SET(L,21,4)
   NEXT L
   FOR L=40 TO 41
120 SET(L,21,4)
   NEXT L
122 FOR L=8 TO 11
   SET(L,22,5)
   NEXT L
124 FOR L=15 TO 22
   SET(L,22,5)
   NEXT L
126 SET(26,22,5)
128 FOR L=39 TO 41
   SET(L,22,4)
   NEXT L
130 SET(11,23,5)
   SET(14,23,5)
   SET(15,23,5)
132 SET(16,23,5)
   FOR L=20 TO 25
   SET(L,23,5)
134 NEXT L
   FOR L=37 TO 40
   SET(L,23,4)
```

REMEMBER!!

**THIS PROGRAM IS LISTED
IN THE NEW FORMAT.
DON'T FORGET THE COLONS**

```
136 NEXT L
138 FOR L=12 TO 13
    SET(L,24,5)
    NEXT L
140 FOR L=15 TO 17
    SET(L,24,4)
    NEXT L
142 FOR L=20 TO 22
    SET(L,24,5)
    NEXT L
144 FOR L=35 TO 38
    SET(L,24,4)
    NEXT L
146 FOR L=15 TO 19
    SET(L,25,4)
    NEXT L
148 FOR L=33 TO 36
    SET(L,25,4)
    NEXT L
150 FOR L=19 TO 34
    SET(L,26,4)
    NEXT L
152 FOR L=21 TO 32
    SET(L,27,4)
    NEXT L
154 GOTO 154
```

- END OF PROGRAM -



Volunteers Needed!!

We're looking for volunteers to help us make TRS-80 Computing, the bi-monthly magazine for Color Computer users. If anyone would like to be in charge of creating different sections, pick the section you would like to do, and give us a call, or write to us (first-come-first-serve). Please include your first & last name, what section you'd like to do, and for how long (1 issue or permanently). We will then give you guidelines and your assignments. REMEMBER: ALL SUBMISSIONS BECOME THE PROPERTY OF TRS-80 COMPUTING. IT MAY BE EDITED, COPYRIGHTED, AND NO COPIES SHOULD BE GIVEN OUT. ALL WORK IS TOTALLY VOLUNTARY. ALL SUBMISSIONS MUST BE SENT ON DISK OR TAPE (SORRY WE CANNOT KEY IN ANY LISTINGS) AND COMPENSATION MAYBE GIVEN TO SOME CONTRIBUTING EDITORS.

We are looking for people to help us with the following sections of our December/1989 issue (deadline for submissions is November 6th; please call or write before submitting).

- * COLOR LOGO
- * THE PROGRAMMER
- * PRODUCT REVIEWS
- * ARTICLES
- * ONE-LINERS/HINTS & TIPS
- * PRINTER SECTION
- * DECEMBER MUSIC SECTION

If you have any furthur questions, always feel free to write or call. Thanks!

- David McNally
Program Manager





SHOOT DOWN THAT PUMPKIN by Albert Noah

16K ECB
GAME
JOYSTICK REQUIRED

This program was written to enthuse those who like playing video games. Being Halloween time, this is referred to as a halloween arcade game. When you RUN it, you will be asked if you want instructions. After that, you input what computer you have for a high speed poke (if you don't want the high speed poke, select 3 - NO POKE). The object of the game is to shoot down as many pumpkins in the time allotted. To aim the target in the middle of the screen, move your right joystick in the opposite direction of the pumpkin's movement. Once the pumpkin is in the center of the target, hit the fire button to shoot. Your score will be based on how many pumpkins you shoot down. Have fun!

THE LISTING: PUMPKIN

```

1 ' PUMPKIN
2 ' BY ALBERT NOAH
3 ' COPYRIGHT (C) 1989
4 ' BY TRS-80 COMPUTING
10 GOTO 640
20 PCLEAR 4
30 PMODE 3,1
40 DIMA(34,20)
50 PCLS
60 SCREEN 1,1
70 PSET(9,7,3)
   PSET(10,7,3)
   PSET(9,8,3)
   PSET(6,9,3)
   PSET(6,9,3)
   PSET(7,9,3)
   PSET(8,9,3)
   PSET(9,9,3)
   PSET(10,9,3)
   PSET(11,9,3)
   PSET(12,9,3)
   PSET(5,10,3)
   PSET(6,10,3)
   PSET(9,10,3)
   PSET(12,10,3)
80 PSET(13,10,3)
   PSET(4,11,3)
   PSET(5,11,3)
   PSET(6,11,3)
   PSET(8,11,3)
   PSET(9,11,3)
   PSET(10,11,3)
   PSET(12,11,3)
   PSET(13,11,3)
   PSET(14,11,3)
90 PSET(4,12,3)
   PSET(5,12,3)
   PSET(6,12,3)
   PSET(7,12,3)
   PSET(8,12,3)
   PSET(9,13,3)
   PSET(10,12,3)
   PSET(11,12,3)
   PSET(12,12,3)
   PSET(13,12,3)
   PSET(14,12,3)
100 PSET(4,13,3)
   PSET(7,13,3)
   PSET(8,13,3)
   PSET(9,13,3)
   PSET(10,13,3)
   PSET(11,13,3)
   PSET(12,13,3)
   PSET(14,13,3)
   PSET(4,14,3)
   PSET(14,14,3)
110 PSET(6,15,3)
   PSET(13,15,3)
   PSET(6,16,3)
   PSET(7,16,3)
   PSET(8,16,3)
   PSET(9,16,3)
   PSET(10,16,3)
   PSET(11,16,3)
   PSET(12,16,3)
120 PSET(6,13,3)
130 ' PRESET(4,8,1)
   PRESET(28,8,1)
   PRESET(15,8,1)
   PRESET(19,8,1)
140 ' PRESET(4,14,1)
   PRESET(28,14,1)
150 GET(0,0)-(34,20),A,G
160 PCLS
170 R=1
   T=0
   TT=0
   S=0
   MV=1
180 X=0
   Y=0

```

REMEMBER!!
THIS PROGRAM IS LISTED
IN THE NEW FORMAT.
DON'T FORGET THE COLONS



```

190 X=RND(200)-100
    Y=RND(180)-90
200 A=0
    B=0
210 PSET(128,86,0)
    PSET(128,106,0)
    PSET(108,96,0)
    PSET(148,96,0)
    PSET(128,85,0)
    PSET(128,107,0)
    PSET(106,96,0)
    PSET(150,96,0)
220 X=X+INT((32-A)/12)
    Y=Y+INT((32-B)/12)
230 T=T+1
    IFT>84GOTO430
240 IFY>75THENY=75
250 IFY<-75THENY=-75
260 IFX<-112THENX=-112
270 IFX>108THENX=108
280 PUT(113+X,86+Y)-(147+X,106+Y),A
    ,PSET
290 IFPEEK(65280)=126ORPEEK(65280)=
254GOTO340
300 X=X+RND(5)-3
    Y=Y+RND(3)-2
310 MV=-MV
    IFMV=1GOTO230
320 A=JOYSTK(0)
    B=JOYSTK(1)
330 IFPEEK(65280)<>126 ANDPEEK(6528
0)<>254GOTO210
340 S=S+1
    SOUND50,2
350 LINE(64,192)-(128,96),PSET
    LINE(192,192)-(128,96),PSET
360 LINE(64,192)-(128,96),PRESET
    LINE(192,192)-(128,96),PRESET
370 IFX>-10ANDX<10ANDY>-5ANDY<5GOTO
390
380 GOTO210
390 FORI=15TO30STEP5
    CIRCLE(128,96),1,4,.4
    NEXTI
400 FORI=15TO30STEP5
    SOUND(200-I*2),1
    CIRCLE(128,96),1,1,.4
    NEXTI
410 H=H+1
420 FORTM=1TO500
    NEXTTM
430 PCLS
440 CLS
450 PRINTTAB(6)"AFTER ";R;"PUMPKINS
"
    PRINT
460 PRINTTAB(5)"SHOTS      = ";S
470 PRINTTAB(5)"HITS      = ";H
480 IFT<=84GOTO500
490 PRINT"TOO MUCH TIME. HE GOT AW
AY"
    G=G+1

```

```

500 PRINTTAB(5)"GOT AWAY = ";G
510 TT=TT+T
    PRINTTAB(5)"SCORE      = ";INT((
250*R-TT)*SQR(TT/250*R)*SQR(H/(S+1)
))
520 IFTT>1008GOTO630
530 PRINT
    PRINTTAB(5)"TIME REMAINING"
540 PRINT"MINUTES";TAB(16);"SECONDS
"
    M=INT((1008-TT)/168)
    SC=INT(((1008-TT)-M*168)/2.8)
550 PRINTTAB(2);M;TAB(18);SC
    PRINT
560 PRINT
    PRINT"PRESS THE FIRING BUTTON T
O CONT."
570 M=PEEK(65280)
    IFM<>126ANDM<>254GOTO570
580 PMODE3,1
590 PCLS
600 SCREEN1,1
610 T=0
    R=R+1
620 GOTO180
630 PRINT"TIME HAS EXPIRED"
    POKE 65495,0
    POKE65496,0
    END
640 '
650 CLS
660 PRINTTAB(10)"INSTRUCTIONS"
    PRINT
670 PRINT"THE OBJECT OF THE GAME IS
TO"
680 PRINT"SHOOT AS MANY PUMPKINS AS
YOU"
690 PRINT"CAN IN THE TIME THAT IS G
IVEN."
700 PRINT"YOU WILL BE ALLOWED 30 SE
CONDS"
710 PRINT"PER PUMPKIN AND A TOTAL O
F 6"
720 PRINT"MINUTES OF FLYING TIME.
YOUR"
730 PRINT"SCORE WILL BE BASED ON NO
. OF"
740 PRINT"PUMPKINS SHOT DOWN AND AC
CURACY."
750 PRINT
    INPUT" PRESS (ENTER) TO CONT"
;Z$
760 CLS
770 PRINT"1) COCO 2 HIGH SPEED POKE
    2) COCO 3 HIGH SPEED POKE
    3) NO POKE"
780 PRINT
    INPUT"WHICH
";A
790 IF A=1 THEN POKE 65494,0
    GOTO 20
800 IF A=2 THEN POKE 65497,0
    GOTO20
810 GOTO 20

```



Color Computer Super Directory

by Kevin A. Armallay

Not just a great CoCo program...

A learning tool for BASIC as well

Back in Elementary CoCo School, you learned that if you wanted to print out a directory of a disk on the printer, you could type `POKE 111,254:DIR`. Well, whaddya know? It looks just like the one that prints onscreen. How nifty. How can I shift the directory printout to get two across? Well, the answer is simple: you don't. At least not until now, you don't. Color Computer Super Directory is my new program geared at getting the most directory entries per piece of paper.

The Program

Color Computer Super Directory prints out my rendition of how a printed-out directory should look (see figure 1.). It contains all of the information that you are likely to use from a directory. The elements in the directory are: disk name, filenames, extentions, file sizes, and free granule information. The disk name is any label, name, or other description given to that particular disk. File names and extentions are the full filename and extention of each file, separated by the aesthetically pleasing period (.) as opposed to the more common but less noticeable slash (/). File sizes are the number of granules used by each file on the disk. The information on file sizes is exactly the same as the last column in the standard directory. The free granule information is included, so that you can tell when a disk that is used often is beginning to run out of data space.

Using the Program

Anyone who can turn the computer on can use this program. All you do is key in the listing, save it as `SUPERDIR`, then `RUN"SUPERDIR."` When the program loads up completely, you will be asked for the name of the disk. As stated earlier, the name of the disk is any code, name, or other useful information crucial in identifying the disk. When typing the name, try to keep the entry only as long as the printed line. If you go beyond this, you will have to abbreviate your entry somehow. If you do not, the computer will only take the first 25 characters of the entry.

After entering the identification, the computer will ask you whether what you typed was correct. At this time you can review the entry and assure yourself of its accuracy. If the entry is wrong, press the `<N>` key. You will be given a chance to retype the entry. If the entry was correct, you would have pressed `<Y>`. After that is done, the computer will print `READING DIRECTORY... PLEASE WAIT...` on the screen in flashing, inverse text (white letters on blue for composite monitors), while it reads the disk directory. After that is done, the computer prompts you to press the `<ENTER>` key when the printer is ready. Then, as the computer flashes the `PRINTING` message, it prints out the directory. Lastly, the disk drive will become active and the computer will read the free granule information from the disk and print it.

When all of the printing is done, a new screen will appear prompting you to press the <R> key to print another directory (of another disk), or any other key to end the program. If you press <R>, the program will restart. If you choose to end, the computer will do a cold-start via the POKE 113,0:DLOAD statement, which doubles as a "reset" statement.

I originally wrote this program with the intent of making it for the CoCo 3 only, but since it's such a simple program, I decided to port it over to the other CoCo's, too. Some of the screen outputs and messages are presented differently than explained here, but that's merely due to hardware ability. The cold-start routine on the CoCo's 1 and 2 is different, too: POKE 113,0:EXEC 40999.

Reading the Directory

Reading the directory is simple. Just look down the columns, headed by FILENAME.EXT and SZ. The SZ column is the column containing information on the file size. The file size is expressed in granules. The rest of the printout is self-explanatory.



Personal Pet Peeves

One of my personal pet peeves is how many programmers save space and time writing generic routines for printing information (e.g. 100 PRINT "TRY AGAIN... YOU HAVE ";X;"MEN LEFT.>"). No matter how many men that are left, it will always say the word MEN. I am a stickler for proper language and I have added a few IF-THEN's to find out how many granules are left, then printing the correct noun form. Color Computer Super Directory will never print "01 free granules remaining."

Another of my pet peeves is the fact that numbers are not aligned at the right in BASIC, not even with PRINT USING statements. I have also, in the same breath, put a fix in for that (lines 260-290). The best way to translate it into easily understandable English is to say: IF THE NUMBER IS LESS THAN 10, PRECEDE IT WITH A ZERO (0), OTHERWISE JUST PRINT THE NUMBER. That is the reason for the "0#" in line 280. This prints a zero, then the number, so all numbers under 10 are aligned at the invisible decimal point at the right of the number. If it bothers you seeing numbers in the 01 02 03... format, just change the program and put a space where the zero is.

Conclusion

If nothing else, I hope that you have learned from this program, even if you don't want to use it or don't have a disk drive. It was fun writing the program and I would like to see more programmers' work using similar subroutines for numeration and correct noun/verb agreement. Please, no more: "there are 1 dogs in the yard," use a little English sense: "there is 1 dog in the yard." Your programs will be appreciated much more.

EDITOR'S NOTE: The program listing for this program will begin on the next page. Also, questions or comments regarding this program may be directed to the author at: 586 Webster Avenue, Penndel, PA 19047. Enclose a SASE when requesting a reply.

COLOR COMPUTER SUPER DIRECTORY
COCO 1 & 2 VERSION

REMEMBER!
THIS PROGRAM IS LISTED
IN THE NEW FORMAT.
DON'T FORGET THE COLONS



THE LISTING: SUPERDIR

```

10 ' COLOR COMPUTER SUPER
    DIRECTORY V1.3
20 ' COPYRIGHT (C) 1989 BY KEV
    IN ARMALAY
30 '
40 '
50 '
60 CLS
    POKE &HD7C0,0
    POKE &HDB16,20
    POKE 63506,33
    POKE 150,18
70 CLEAR 5000
    DIM N$(68),E$(68),A$(68),Y
$(68),R$(68),G(68),B(68),S(68)
,O(68),W(68),P(68)
90 PRINT@65,"COLOR COMPUTER SU
PER DIRECTORY"
100 PRINT@128,"DISK NAME
"
    PRINT@192,STRING$(25,175);

    PRINT@160,"";
    LINE INPUT DN$
    PRINT@185,""
    DN$=LEFT$(DN$,25)
110 PRINT@484,"IS THIS CORRECT
? (Y/N)";
120 A$=INKEY$
    IF A$="" THEN 120 ELSE IF
A$="N" OR A$="n" THEN 90
130 PRINT@480,"reading directo
ry, please wait.";
140 GOSUB 360
150 PRINT@480,STRING$(31,32);
160 PRINT@482,"ready printer,
press enter.";
170 A$=INKEY$
    IF A$(<>CHR$(13)) THEN 170
180 PRINT@480,STRING$(31,32);
190 PRINT@491,"printing";
200 PRINT #-2," Directory of
";DN$
    PRINT #-2
    QQ$=" FILENAME.EXT SZ "

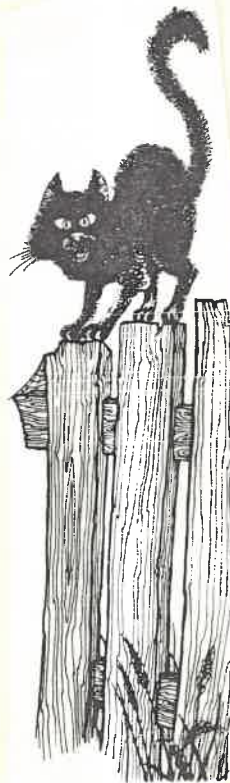
    FOR MN=1 TO 4
    PRINT #-2,QQ$;
    NEXT MN
210 PRINT #-2,STRING$(80,"*")
    PRINT#-2
220 FOR X=1 TO N1
230 PRINT #-2," ";N$(X);".";E
$(X);" ";
    PRINT #-2,USING"###";G(X);
    PRINT #-2," ";
240 NEXT X

```

```

250 PRINT #-2
    PRINT #-2
260 AZ=FREE(0)
270 IF AZ=1 THEN PRINT#-2," 0
1 free granule remaining."
    GOTO 300
280 IF AZ<10 THEN PRINT#-2,"
";
    PRINT #-2,USING"0#";AZ;
    PRINT #-2," free granules
remaining."
    GOTO 300
290 PRINT #-2," ";
    PRINT #-2, USING"##";AZ;
    PRINT #-2," free granules
remaining."
300 CLS
    PRINT@195,"PRESS [R] TO PR
INT ANOTHER"
310 PRINT@239,"OR"
320 PRINT@262,"ANY OTHER KEY T
O END."
330 A$=INKEY$
    IF A$="" THEN 330 ELSE IF
A$="R" OR A$="r" THEN RUN
340 POKE 113,0
    EXEC 40999
350 GOTO 350
360 FOR S=3 TO 11
370 DSKI$0,17,2,F$,X$
380 DSKI$0,17,S,A$,B$
390 X$=A$+LEFT$(B$,112)
400 GOSUB 430
410 NEXT S
420 RETURN
430 FOR F=1 TO 8
    F0=32*F
440 N1$=MID$(X$,F0-31,8) 'FILE
450 IF LEFT$(N1$,1)=CHR$(255)
THEN RETURN 'NO MORE FILES TO
READ
460 IF LEFT$(N1$,1)=CHR$(0) TH
EN 560 'THIS ONE HAS BEEN KILL
ED
470 N1=N1+1
480 N$(N1)=N1$
490 E$(N1)=MID$(X$,F0-23,3) 'E
XT
500 X=ASC(MID$(X$,F0-18,1))
    'FIRST GRANULE
510 IF X>9 THEN R$(N1)=STR$(X)
    ELSE R$(N1)=" "+STR$(X)
520 Z1=ASC(MID$(X$,F0-17,1))
530 Z2=ASC(MID$(X$,F0-16,1))
540 Z3=256*Z1+Z2.

```



```

550 GOSUB 580
560 NEXT F
570 RETURN
580 G=0
590 G=G+1
600 B=ASC(MID$(F$,X+1,1))
610 IF B>=70 THEN 650
620 X=B
630 IF X>9 THEN R$(N1)=R$(N1)+
STR$(X) ELSE R$(N1)=R$(N1)+" "
+STR$(X)
640 GOTO 590
650 G(N1)=G
660 B(N1)=2304*(G-1)+256*(B-19
3)+Z3 'TOTAL BYTES
670 S(N1)=B-192
    O(N1)=Z3
    W(N1)=2304*G-B(N1)
680 TG=TG+G
690 RETURN
700 CLS
    RUN
710 ' SPECIAL THANKS TO A. L.
    MCGARRITY FOR HIS READ
    AND GRANULE COUNT RO
UTINES

```

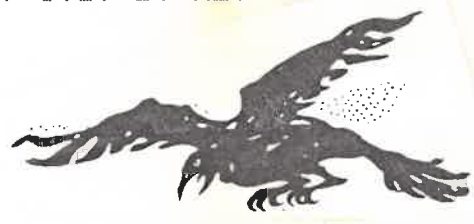
COLOR COMPUTER SUPER DIRECTORY
COCO 3 VERSION

THE LISTING: SUPERDIR (COCO3)

```

10 ' COLOR COMPUTER SUPER
    DIRECTORY V2.3
20 ' COPYRIGHT (C) 1989 BY KEV
    IN ARMALAY
30 '
40 '
50 '
60 WIDTH 40
    CLS3
    ATTR0,4
    CLS
    POKE &HD7C0,0
    POKE &HDB16,20
    POKE 63506,33
    POKE 150,18
70 CLEAR 5000
    DIM N$(68),E$(68),A$(68),Y
$(68),R$(68),G(68),B(68),S(68)
,O(68),W(68),P(68)
80 ON BRK GOTO 700
90 CLS
    LOCATE 4,2
    PRINT"Color Computer Super
    Directory"
100 LOCATE 1,11
    PRINT"DISK NAME
    ";
    ATTR 0,4,U
    PRINT STRING$(25,32);

```



```

LOCATE 13,11
LINE INPUT DN$
ATTR 0,4
LOCATE 39,11
PRINT" ";
DN$=LEFT$(DN$,25)
110 LOCATE 8,22
PRINT"IS THIS CORRECT? (Y/
N)";
120 A$=INKEY$
    IF A$="" THEN 120 ELSE IF
A$="N" OR A$="n" THEN 90
130 LOCATE 2,22
    ATTR 3,2,B
    PRINT"Reading directory...
    Please wait.";
    ATTR 0,4
140 GOSUB 360
150 LOCATE 0,22
    PRINT STRING$(39,32);
160 LOCATE 3,22
    ATTR 3,2,B
    PRINT"Ready printer and pr
    ess [ENTER].";
    ATTR0,4
170 A$=INKEY$
    IF A$<>CHR$(13) THEN 170
180 LOCATE 0,22
    PRINT STRING$(39,32);
190 LOCATE 15,22
    ATTR 3,2,B
    PRINT"PRINTING";
    ATTR 0,4
200 PRINT #-2," Directory of
    ";DN$
    PRINT #-2
    QQ$=" FILENAME.EXT SZ "
    FOR MN=1 TO 4
    PRINT #-2,QQ#;
    NEXT MN
210 PRINT #-2,STRING$(80,"*")
    PRINT#-2
220 FOR X=1 TO N1
230 PRINT #-2," ";N$(X);".";E
$(X);" ";
    PRINT #-2,USING"##";G(X);
    PRINT #-2," ";
240 NEXT X
250 PRINT #-2
    PRINT #-2
260 AZ=FREE(0)
270 IF AZ=1 THEN PRINT#-2," 0
1 free granule remaining."
    GOTO 300
280 IF AZ<10 THEN PRINT#-2,"
    ";
    PRINT #-2,USING"0#";AZ;
    PRINT #-2," free granules
    remaining."
    GOTO 300

```

```

290 PRINT #-2, " ";
PRINT #-2, USING"##";AZ;
PRINT #-2, " free granules
remaining."
300 CLS
LOCATE 6,9
PRINT"Press [R] to print a
nother"
310 LOCATE 18,11
PRINT"or"
320 LOCATE 9,13
PRINT"Any other key to end
.";
330 A#=INKEY#
IF A#="" THEN 330 ELSE IF
A#="R" OR A#="r" THEN RUN
340 POKE 113,0
DLOAD
350 GOTO 350
360 FOR S=3 TO 11
370 DSKEI#0,17,2,F#,X#
380 DSKEI#0,17,S,A#,B#
390 >#=#A#+LEFT$(B#,112)
400 GOSUB 430
410 NEXT S
420 RETURN
430 FOR F=1 TO 8
F0=32*F
440 N1#=MID$(X#,F0-31,8) 'FILE
450 IF LEFT$(N1#,1)=CHR$(255)
THEN RETURN 'NO MORE FILES TO
READ
460 IF LEFT$(N1#,1)=CHR$(0) TH
EN 560 'THIS ONE HAS BEEN KILL
ED
470 N1=N1+1
480 N$(N1)=N1#
490 E$(N1)=MID$(X#,F0-23,3) 'E
XT
500 X=ASC(MID$(X#,F0-18,1))
'FIRST GRANULE
510 IF X>9 THEN R$(N1)=STR$(X)
ELSE R$(N1)=" "+STR$(X)
520 Z1=ASC(MID$(X#,F0-17,1))
530 Z2=ASC(MID$(X#,F0-16,1))
540 Z3=256*Z1+Z2
550 GOSUB 580
560 NEXT F
570 RETURN
580 G=0
590 G=G+1
600 B=ASC(MID$(F#,X+1,1))
610 IF B>=70 THEN 650
620 X=B
630 IF X>9 THEN R$(N1)=R$(N1)+
STR$(X) ELSE R$(N1)=R$(N1)+" "
+STR$(X)
640 GOTO 590
650 G(N1)=G
660 B(N1)=2304*(G-1)+256*(B-19
3)+Z3 'TOTAL BYTES

```



```

670 S(N1)=B-192
O(N1)=Z3
W(N1)=2304*G-B(N1)
680 TG=TG+G
690 RETURN
700 CLS
RUN
710 ' SPECIAL THANKS TO A. L.
MCGARRITY FOR HIS READ
AND GRANULE COUNT RO
UTINES

```



The Facts About Disks! By David McNally

Did you know that every disk you own is a double sided disk? Most people don't know that, but the fact is that even if the disk is a single sided disk you can double side it.

What's the difference you ask? Well a single sided disk is made for a drive that has only one read/write head. If you put a notch on the other side of the disk, you can use both sides of the disk to save data.

A double sided disk is made for a drive that has two read/write heads, one on the lower part and one on the upper part. A drive with double heads requires a double sided disk.

Most companys use this knowledge to their advantage, knowing that most people think that you HAVE TO buy a double sided disk in order to use both sides. As you may have noticed, the prices are higher for a double sided disk. The fact is a double sided disk is not required in order to use both sides of it on a single headed drive. (By the way MOST drives don't have double heads.) Keep this in mind when you buy disks, it will save you money!

High Resolution Graphics Tutorial Part II
by Joe Ahern

Last month in Part I of the High Resolution Graphics Tutorial we were talking about computer graphics and how to "initialize" your Color Computer to display high-res graphics. This month I will be teaching you how to plot points on the CoCo by using these four (4) commands: PSET, PRESET, PPOINT, and LINE. Now keep in mind the following short program that was put together after you learned PMODE, PCLS, and SCREEN:

```
1 PMODE 3,1
2 PCLS
3 SCREEN 1,0
```

PSET

First of all, before I start getting into the PSET command, I would like to tell you the graphics matrix we will be using throughout this tutorial. It will be the 256x192 grid, and the worksheet for that is located on page 245 of your Getting Started With Extended Color BASIC book. OK, now for PSET. The PSET command is very similiar to the SET command in Color BASIC. It simply lets you set a dot or several dots, anywhere on the screen. The format for PSET is:



```
PSET (h,v,c)
```

"h" is the horizontal position on the grid (0 to 256), "v" is the vertical position on the grid (0 to 192), and "c" is the number used for the color of the dot. If you leave out "c", the current foreground color is used. Add this line to your program listed above:

```
4 PSET (0,0,2)
5 PSET (256,192,3)
6 GOTO 6
```

Now RUN the program. You see a yellow dot in the upper left-hand corner (location 0,0), and a blue dot in the lower right-hand corner (location 256,192). If you plot these points out on your 256x192 graphics worksheet, you can see how it was done. Press <BREAK> to exit the program. Now try omitting the colors from the PSET commands in lines 4 and 5. As you can see, both of these dots are red, the current foreground color.

PRESET

The PRESET command does just the opposite as PSET, and again is similiar to Color BASIC's RESET command. Instead of setting a dot, PRESET resets it, or makes it "invisible". Here is the format of PRESET:

```
PRESET (h,v)
```

"h" is the horizontal, and "v" is the vertical positions. Notice that you donot have to specify the color when using PRESET. To see how PRESET works, add the following to your program:

```
(delete line 6)
6 FOR T=1 TO 1050:NEXT T
7 PRESET(0,0):PRESET(256, 192)
20 GOTO 20
```


When RUNNING the program you see that the dots appear for about 2 seconds and then disappear. If you want to give the dots a "blink" effect, delete line 6, and have line 20 say: 20 GOTO 4.

PPOINT

PPOINT, a very handy command for computer game writers, is used to tell what color a graphics block is on the current graphics screen. Here is the format of PPOINT:

```
PPOINT (h,v)
```

(By now you must know what h,v stands for!) Type in the following short program (but don't RUN it!)

```
5 PMODE 3,1:PCLS
6 SCREEN 1,0
10 PSET (128,96,4)
```

Now, just by looking at line 10 we can see that there will be a red dot set on the center of the screen. Well, lets have the computer tell you that. Add this onto the program:

```
12 FOR H=0 TO 256
14 FOR V=0 TO 192
16 IF PPOINT(H,V)=4 THEN 20
18 NEXT V:NEXT H
20 PRINT "LOCATION ";H;",";V;" IS RED."
```

Now RUN it. In lines 12 and 14 it sets the computer to go through a FOR/NEXT loop and scan the entire screen for the little red dot. If it finds it, it goes to line 20.

NOTE: In line 16, the "=4" after IF PPOINT (H,V) means the color code for red, 4.

LINE

The LINE command is one of the popular Extended Color BASIC graphics commands. It draws out a line, or box if you wish, on the current graphics screen. The format for LINE is:

```
LINE (h1,v1)-(h2,v2),a,b
```

- * (h1,v1) is the line's horizontal and vertical starting point
- * (h2,v2) is the line's horizontal and vertical ending point
- * "a" can be either PSET or PRESET
- * "b" is either B (box) or BF (box-filled) (optional)

Try this program:

```
1 PMODE 3,1
2 PCLS
3 SCREEN 1,1
4 LINE (0,0)-(256,0),PSET
10 GOTO 10
```

Now RUN the program. The computer draws a straight line across the top of the screen. As you can see, this is what line 4 does:



```
4 LINE(0,0)-(256,0),PSET
```

Computer "sets" the line

Computer begins line at coordinate 0,0

Computer ends line at coordinate 256,0

Now, if you replaced the PSET at the end of line 4 with "PRESET" can you guess what happens? Yup, the computer doesn't set the line at all - it just stays invisible.

But say you didn't want just a line going across the top of the screen. You wanted four lines connecting, or a "box". Normally you'd think that you'd have to enter in four separate LINE commands to accomplish this. All you have to do is enter one line of your box in a LINE command and add a ",B" after your PSET or PRESET command in the LINE statement. To see what I mean, change line 4 in the program you typed in above to read this:

```
4 LINE (0,0)-(256,192),PSET,B
```

See the box? If you want to fill your box in with the current foreground color, make line 4 say:

```
4 LINE (0,0)-(256,192),PSET,BF
```

Now your box is filled with the current foreground color; in this case orange.

Next month we will continue the series, and have full coverage on Extended Color BASIC's DRAW command.

*** COMPUTER TRIVIA! ***

1. What is a collection of data structured into a file so access is possible only to the information of interest?
2. What is software used to control the system's peripherals, printers, disk drives, etc...?
3. In computer terms, it means another word for decode.

... ANSWERS FOR COMPUTER TRIVIA WILL BE FOUND ON THE LAST PAGE OF THIS ISSUE ...



TRS-80 COMPUTING
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A Look At "C"

by Anton P. Milardovic

In 15 years, the Color Computer's world of computing has undergone various changes. One of these changes is the availability of high-level programming languages.

For those of you who are like me, and started your programming on the "Old Grey Battleships" with the "Chicklet" keyboards, you know that back in the late 1970's you only had two languages to choose from: BASIC, which was built into the machine; and the ever-popular-back-then language on Radio Shack's ROM-PACKs, COLOR LOGO. However, LOGO is not a language with which you can write widely usable programs, so it looked like BASIC was in.

With the development of OS-9 in the early 1980's, a whole new world has been opened up to the CoCo Community. OS-9 has given us a choice of various higher-level languages, one of them being C.

I myself have never used C on the Color Computer, but I have used it on IBM's and UNIX based machines. According to the listings I see in the RAINBOW's OS-9 section, the formats and syntax are the same.

C is one of the most structured programming languages around. Unlike BASIC, C does not have a GOTO command. (Which, for spaghetti programmers like me, this poses a bit of a problem!) Also, like all other higher-level programming languages, there are no line numbers, so GOTO wouldn't be of any help anyway.

The programs follow a structure similar to the figure below. That is not to say that they all look like that, but this is just to give you an idea, for those of you who haven't seen many.

```
/* Title goes in here */ /*  
(These are REM lines) */
```

```
(all variables initialized for  
numeric or alphanumeric inputs,  
as well as size)
```

```
main()  
[  
    :  
    program here  
    :  
    [  
        indented  
        loop  
    ]  
]  
  
subroutines  
[  
    routine  
]
```

Fig. 1. Basic structure of a C program

As you may or may not know, a finished C program is not executable. What one has to do after the program is done is COMPILE it. What this process does, is compress the program into code, which will run up to 5 times as fast as similar programs written in BASIC.

Now some of you might think that this is what you need. However, I must warn you: it is a very fussy language. Syntax has to be precise! A missing bracket can give even the best debugger hours of trouble. An extra space between a set of parentheses can crash the program. Even with these drawbacks, with a little patience C programming can be very rewarding.



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3. (turn page)



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The Haunted Graveyard

16K ECB

A HALLOWEEN GRAPHICS SPECIAL

HARDWARE REQUIRED: NONE

Here's a good graphics program that was written in PMODE 3 using the LINE, CIRCLE, and PAINT commands. It draws a detailed picture of a "haunted" graveyard. This would be good to add to your halloween graphics collection!

THE LISTING: GRAVE

```
1 ? THE HAUNTED GRAVEYARD
2 ? COPYRIGHT (C) 1989
3 ? BY TRS-80 COMPUTING
5 PMODE 4,1
  PCLS1
  COLOR 0,1
  SCREEN 1,1
7 LINE(110,30)-(72,30),PSET
  LINE(112,32)-(122,32),PSET
  LINE(124,30)-(132,22),PSET
9 LINE(132,22)-(132,18),PSET
  LINE(132,18)-(126,14),PSET
  LINE(126,14)-(76,14),PSET
  LINE(76,14)-(64,22),PSET
  LINE(64,22)-(64,26),PSET
  LINE(66,28)-(72,28),PSET
11 LINE(64,32)-(68,36),PSET
  LINE(68,36)-(68,42),PSET
  LINE(54,44)-(32,44),PSET
13 LINE(34,46)-(20,46),PSET
  LINE(20,44)-(12,44),PSET
  LINE(10,42)-(10,32),PSET
  LINE(10,32)-(64,32),PSET
15 CIRCLE(60,24),25,0
17 LINE(254,78)-(196,78),PSET
  LINE(176,78)-(34,78),PSET
  LINE(34,74)-(34,78),PSET
  LINE(34,74)-(30,74),PSET
  LINE(30,74)-(0,88),PSET
  LINE(32,78)-(0,96),PSET
19 LINE(34,100)-(0,114),PSET
  LINE(46,98)-(254,98),PSET
  LINE(166,78)-(166,98),PSET
  LINE(204,78)-(204,98),PSET
  LINE(196,78)-(192,74),PSET
  LINE(192,74)-(180,74),PSET
  LINE(180,74)-(176,78),PSET
21 LINE(196,78)-(196,98),PSET
  LINE(176,78)-(176,98),PSET
  LINE(176,82)-(196,82),PSET
  LINE(200,76)-(192,68),PSET
  LINE(192,68)-(180,68),PSET
  LINE(180,68)-(172,76),PSET
  LINE(180,82)-(180,98),PSET
23 LINE(184,82)-(184,98),PSET
  LINE(188,82)-(188,98),PSET
  LINE(192,82)-(192,98),PSET
  LINE(202,102)-(158,168),PSET
  LINE(158,168)-(126,190),PSET
  LINE(158,168)-(188,148),PSET
25 LINE(188,148)-(254,128),PSET
  LINE(216,180)-(176,180),PSET
  LINE(212,180)-(212,174),PSET
  LINE(212,174)-(208,174),PSET
  LINE(208,174)-(208,170),PSET
  LINE(208,170)-(212,170),PSET
27 LINE(212,170)-(212,164),PSET
  LINE(212,164)-(216,164),PSET
  LINE(216,164)-(216,170),PSET
  LINE(216,170)-(220,170),PSET
  LINE(220,170)-(220,174),PSET
29 LINE(220,174)-(216,174),PSET
  LINE(216,174)-(216,180),PSET
  LINE(192,156)-(226,156),PSET
  LINE(226,156)-(226,150),PSET
  LINE(226,150)-(222,146),PSET
  LINE(222,146)-(214,150),PSET
  LINE(214,150)-(214,156),PSET
31 LINE(190,130)-(232,130),PSET
  LINE(218,130)-(224,122),PSET
  LINE(224,122)-(218,130),PSET
  LINE(212,118)-(242,118),PSET
  LINE(242,118)-(242,108),PSET
33 LINE(238,114)-(246,114),PSET
  LINE(166,100)-(90,138),PSET
  LINE(90,138)-(58,118),PSET
  LINE(58,116)-(48,116),PSET
35 LINE(72,144)-(0,176),PSET
  LINE(72,144)-(48,128),PSET
  LINE(32,126)-(48,126),PSET
  LINE(48,126)-(48,130),PSET
  LINE(48,130)-(30,130),PSET
  LINE(30,130)-(30,126),PSET
37 LINE(46,124)-(46,114),PSET
  LINE(32,124)-(32,114),PSET
  LINE(40,86)-(40,124),PSET
  LINE(48,108)-(30,108),PSET
  LINE(30,108)-(30,112),PSET
  LINE(30,112)-(48,112),PSET
  LINE(48,108)-(48,112),PSET
39 LINE(44,106)-(44,90),PSET
  LINE(36,106)-(36,90),PSET
  LINE(44,90)-(40,86),PSET
  LINE(36,90)-(40,86),PSET
41 LINE(142,110)-(112,110),PSET
  LINE(106,110)-(106,102),PSET
  LINE(110,106)-(102,106),PSET
  LINE(108,116)-(70,116),PSET
  LINE(78,116)-(78,108),PSET
43 LINE(78,108)-(70,108),PSET
  LINE(70,108)-(70,116),PSET
  LINE(12,130)-(12,150),PSET
  LINE(4,136)-(20,136),PSET
```


REMEMBER!!
THIS PROGRAM IS LISTED IN THE NEW FORMAT. DON'T FORGET THE COLONS

```

LINE(12,150)-(38,150),PSET
45 PAINT(34,110),0,0
47 PAINT(44,110),0,0
49 LINE(48,130)-(30,130),PSET
   LINE(224,122)-(232,130),PSET
   LINE(48,130)-(48,126),PSET
   LINE(48,126)-(30,126),PSET
51 PAINT(38,128),0,0
53 LINE(10,42)-(12,44),PSET
   LINE(18,44)-(22,46),PSET
   LINE(34,46)-(38,44),PSET
55 LINE(52,44)-(68,42),PSET
   PAINT(32,40),0,0
   PAINT(60,40),0,0
57 LINE(64,26)-(66,28),PSET
   LINE(70,28)-(72,30),PSET
   LINE(108,30)-(124,30),PSET
59 PAINT(100,20),0,0
   PAINT(72,24),0,0
   PAINT(214,172),0,0
65 GOTO 65

```

- END OF PROGRAM -

ATTENTION COCO OWNERS!

As a Christmas gift, we would like to give you a free copy of the October/89 issue of TRS-80 Computing On Disk. Please fill out the form below and send it back to us along with \$1.00 postage and you will receive it before Christmas Day (includes all programs, articles, reviews, etc... ALL MENU-DRIVEN!)

YES! Please send me 1 copy of the October/89 issue of TRS-80 Computing On Disk. I have enclosed \$1 for postage.

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CITY.....STATE...ZIP....

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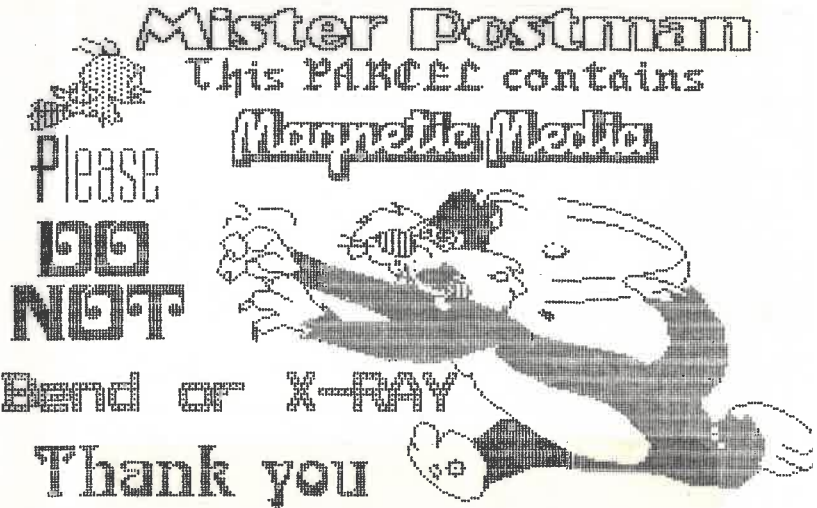


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SPREAD THE WORD ABOUT US!!

ANSWERS TO COMPUTER TRIVIA
(PAGE 17)

1. DATABASE
2. CONTROL PROGRAM
3. DECIPHER

