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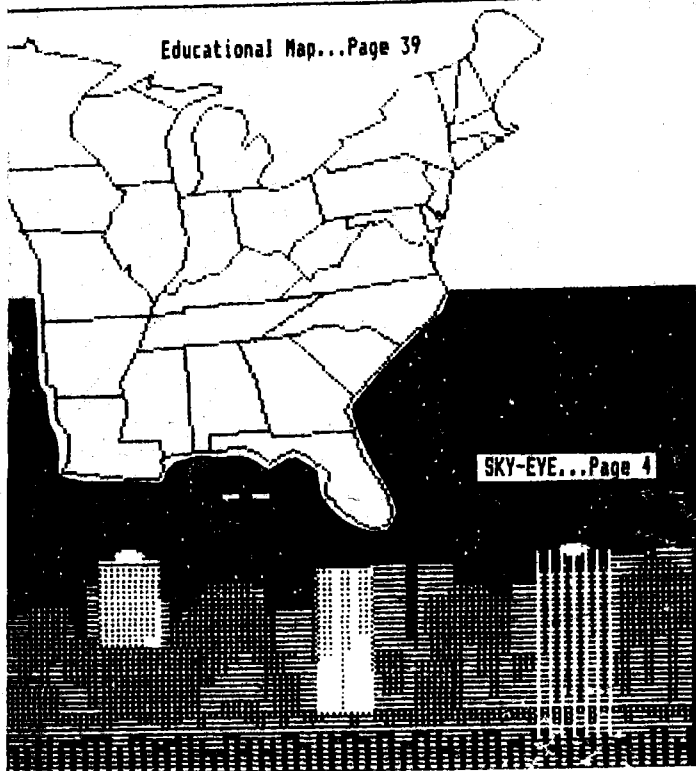
the RAINBOW

5803 Timber Ridge Drive • Prospect, KY 40059

VOL. I NUMBER 3 1105-11

The Monthly Magazine for Color Computer Users

Educational Map...Page 39



SKY-EYE...Page 4

Editor's Notes...

PRINT #-2,

I think that the best single thing about being able to combine the computer and publishing business is that we get to "meet." Now, I understand that we have "met" none of us by this writing, and if we had one another on the street we wouldn't even know it, but we have "met" one another all the same. You may notice that we do not write any articles about the various software warehouses and the people who run them. That's not because we don't admire them -- one and all -- it is simply because we think that rather we devote our space to software you can use -- programs, reviews, hints and tips -- than to tell you how So-and-So Software came to be formed. Well, I think there are a lot of

UNDER the RAINBOW

SKY-EYE Game
Do Your Taxes
Easier Animation
Disc Directory

Build A Desk
Educational Map
FRP Game Aids
Reviews

And...MUCH MORE!!

And...An EXCLUSIVE First Look At!

SPECTACULATOR!!

See Page 43

great people out there, and I hope you'll let me lend your ear for a few moments for some observations about them...and the Color Computer business in general.

Ron Krebs of Mark Data Products and I were talking just the other day about one interesting point concerning the Color Computer: That is that darn few of the people who are writing software for CoCo are the same as those who wrote for the Model I (or the Apple, for that matter). The "big" names in micros -- people like Scott Adams, Dennis Kistz, Bill Barden -- are pretty much missing from the CoCo world.

They've been replaced by people like Ron, and Tom Mix, Joe Bennett, Howard Cohen, Dennis Lewandowski,

(Continued on Page 11)

LETTERS TO RAINBOW



ELECTRIC NEWS

Editor:

I live in a country where the current is 220 volts/50 Hz. I have no difficulty stepping down to 110, but I'm stuck with 50 Hz. Before I left the U.S., I called Radio Shack and asked them if I could step down to 50 Hz. Their reply: It couldn't be done, I'd have to buy a European machine.

I thought I'd try it anyway, and I'm happy to say my CC is humming along with no difficulties, eating up its 110/50. (By the way, I force-cool my CC, I figure all the heat can't help it.)

Now the question: Would CC discs work on 50 Hz? How about Model I discs with the Exatron Interface?

Robert Morris
AnEmbassy Yaounde (USICA)
Department of State
Washington 20520

ROMPACK HELP

Editor:

What a timely surprise! After I installed my ECB ROM, the December issue of the RAINBOW arrived. My family enjoyed playing "Here Come The Vipers."

I usually enter AUDIO ON before I CSAVE a program so that I can "hear" the data being written. This alerts me when I don't press the record button.

Re ROMPACK BACKUP: I have found a much safer way that at least works with SPACE ASSAULT. Tape over the left ROM pin, insert the ROMPAK, then power up. You'll be in BASIC and then you can run the backup program.

An interesting variation to game packs is to load the taped-over cart, POKE to high-speed the computer, and then EXEC 49152. You may need 200ns memory to do this.

Cameron Price
Rockland, Ont.

RANDOM NUMBERS

Editor:

First of all, the RAINBOW is the only computer publication I read from cover to cover. Congratulations and keep up the good work.

About the Game Aids program. Random numbers are a lot easier to get than the method Mr. Urban has described.

In the example $X=INT(RND(0)*10)$ to get a random number between 0 and 9, use $X=RND(10)-1$. As mentioned in the REM-DE-LEET program article, the more code there is, the longer it takes to process a program.

Douglas Elkins
Portland, ME

Editor:

I found the Game Aids article very interesting, but there is an error in the dice-throwing algorithm which I would like to correct. You presented the sequence for throwing three dice as:

$$X=RND(18)$$

However, this does not give the same result as throwing three dice. Your routine yields a number between 3 and 18, with any number having equal probability (which for the purpose it is being used is fine), but in a throw of three dice, while a number between 3 and 18 is produced, all do not have an equal probability of occurrence.

Rather, there is only one combination that will produce a 3 or an 18 (three 1's or three 6's) but there are 27 combinations that can form a 10 or 11 (for ten, 3, 1, 6; 4, 1, 5; 2, 2, 6; etc.). Altogether, there are 216 combinations of three dice. Therefore, the probability of throwing a 3 or an 18 is 1 in 216 (.0046%) whereas the chance for a 10 or 11 is 27 of 216 (or .125%). This

makes a big difference in how the game runs if one has to throw an 18 as in Line 505. The easy way to correctly throw the dice is:

$$X=RND(6)+RND(6)+RND(6)$$

Of course, if equal probabilities between 3 and 18 are desired, the program runs fine as published.

Charles Styer
Tifton, GA

Editor:

You cannot simulate the roll of three dice by a random number between 3 and 18. The frequency distribution would be way off.

To simplify this, take the roll of two dice. The average frequency of 36 rolls would be:

Number	Frequency
2	1
3	2
4	3
5	4
6	5
7	6
8	5
9	4
10	3
11	2
12	1

A random number between 2 through 12 would give each the same average number.

Charles C. Worstell
Auburn, WA

NEEDS PROGRAMS

Editor:

I am especially interested in mortgage amortization and income tax programs. Also, do you know of any programs that would allow me to file such things as receipts?

Olaf Johnson
Otis Orchards, WI

DOESN'T LIKE JUMPS

Editor:

Why do your articles have to skip forwards and backwards at random. Its like trying to work Rubik's Cube.

Reading is usually linear. BYTE sets a good example with no jumps in any direction.

Craig Cline
Cambridge, MA

(Eds. Note: We think the jumps make the pages look neater and, of course, can't fill empty pages with ads because we don't have quite (!) as many as does BYTE. We try to eliminate forward jumps, but...how many of you does this bother? We'll try to work on it.)

HIGH SPEED

Editor:

I recently asked for some help in getting my CC to run at high speed. You may recall I had no luck installing 2.0 MHz "B" series 6821 PIAs and 6809 MPU chips -- and in fact the fast 6809E made things worse.

Since then I managed to borrow a good scope and get Motorola's spec sheets on the 6809E, 6821 and -- most important -- the 6883 SAM chips.

The following may help others who have unsuccessfully gone the swap-the-chips route.

The only thing I found with the scope was very long and out of spec rise and fall times on the clock signals. To fix this I removed the two capacitors I had asked about in my letter. (These are designated C73 and C75 on the CoCo schematic). I still would like to know why they were put in in the first place.

With the capacitors removed, the clock signals squared up nicely and the computer ran in the high speed mode. It does with EITHER the 2.0 MHz chip or the original 1.0 MHz.

One reason for the ability to run at 1.8 MHz with 1.0 MHz rated chips is explained in the 6883 spec sheets. The command POKE 65495, "any number" puts the SAM in a two-speed mode. The speed is address-dependent. When addresses \$0000 to \$7FFF or \$FF00 to \$FF1F are selected, the clock rate is switched to the "standard" .89 MHz.

When other addresses are selected, the clock automatically switches to the faster rate. In this mode, the clock is always switching between the two speeds, depending on what address is put on the address buss. The speed increase that we see is due to the great amount of time that the computer is in the high speed address areas -- where the BASIC ROMs and control functions are located.

The way the CoCo is memory mapped, all of RAM memory and the keyboard/joystick 6821 PIA are at the slow speed addresses. Changing the PIA chips will do no good. The same for RAM chips.

There are many possible solutions for a particular machine not working at 1.8 MHz, including a "slow" ROM but from what I found, I would try removing the capacitors first -- especially if a machine will run internally and only refuse to respond to the keyboard and joystick. Removing the capacitors costs nothing -- in fact, just try unsoldering one end of each.

The next thing would be to try a 2.0 MHz 68809E or try swapping 6809E's with a machine that works and then try capacitor removal if necessary.

I would still like to hear of other solutions.

Rick Krankoski
Elk Grove Village, IL

LIKES RAINBOW

Editor:

When I subscribed to the RAINBOW I wasn't sure it would be worth the money. Now, after reading Wayne Green's editorial in the January, 1982, edition of 80-Micro about their coverage of the Color Computer, I am very happy I did.

Even though I didn't know about their editorial, when I received the RAINBOW and 80-Micro on the same day, I read RAINBOW first!!

Another note: Nelson Software has finally released their super color terminal program after many months. I don't know how many companies do this, but they seem to advertise their products and then develop the software. I don't know if RAINBOW checks their advertisers but I know this company does this. Their word

processing program with disk I/O -- which has been advertised since October -- is still being developed.

James Gresham
Augusta, GA

(Ed. Note: We never knowingly allow advertising of products which are not available for sale and have been working on a program to insure you that you can be certain of this. No advertisements for this firm have appeared in the RAINBOW.)

ANOTHER SPEEDUP

Editor:

Maybe you are aware of yet another speedup of the CoCo.

Running the program FOR X=1 TO 10000:NEXT:PRINT "END":END takes 22 seconds in normal mode and 16 with the "regular" speedup of POKE 65495,0.

When you POKE 65497,0 the runtime is reduced to 11 seconds. You POKE 65496,0 to recover.

The only drawback to this is that you lose complete control of the keyboard and screen until the second POKE, therefore it is good only for long calculations where you do not need the screen.

This speedup reduced the time it took to run CHROMASETTE's ROTATE program from about 15 minutes to about seven minutes.

By the way, can anyone tell me how you can get an automatic wraparound at 68 or 72 characters instead of the built-in 80 (printer) or 132 (CoCo)?

Edgar Poulin
Sherbrooke, Que.

"CANNED" ROUTINES

Editor:

Will someone explain (or, better, illustrate) how to implement the "canned" routines found in the back of "Going Ahead With Color Basic"?

I have some knowledge of assembly language principles, but I can't get enough together to get these routines to work.

Ralph Coleman
Churchville, NY

Feature Game...

AYE, AYE, AYE . . . MY SKY EYE

That dynamic trio -- Illustrated Memory Banks, Drury High School and the RAINBOW -- bring you another exciting game for fun and frolic this month. Its called SKY-EYE and is the creation of Fred B. Scerbo, vice president and software author for IMB and another Drury High student, Robert Dobbert.

If you recall SNAIL INVADERS from the February issue, then you will remember the saga of Dale "Snail" Haggerty, who helped Scerbo with the graphics for that game. Not to be outdone, Dobbert, 16, got busy with SKY-EYE. He comments: "Making this was more fun than high school math!"

Among other things, SKY-EYE features an animated title card which uses the text screen while the graphics screen paints the high-res game field. It also has a very rapid joystick control.

As with all software in the RAINBOW, you are authorized to make two copies of SKY-EYE for your personal use only. No part of this program may be reproduced or adapted for use with any other program.

Because it uses a speedup routine, do not try to run it until all program lines are entered. When you save it to tape, type POKE 65494,0: CSAVE "SKY-EYE" <ENTER>. If your computer hangs up on the PLAY and SOUND commands, eliminate all the POKES in the program (lines 1, 87, 89, 91, 94 and 107). Note this program also gives four colors in PMODE 4,1.

The plot: SKY-EYE floats above the Big Apple, protecting its people from shooting stars which threaten the city. Use the right joystick to move SKY-EYE back and forth. The fire button will cause SKY-EYE to detonate.

If five shooting stars hit the city, it will be destroyed. Each destroyed shooting star earns 25 points.

* * * * *

By the way, are there any other students out there writing programs? We would like to consider them for possible listing in the RAINBOW.

* * * * *

The SKY-EYE Listing:

```

1 CLS0: CLEAR1200: POKE65495,0: DIM
A(14), P(13), P$(16): FORB=32TO22
4STEP16:A((B/16)-1)=B:NEXTB
2 M$(2)="6": N1=-16: N3=256: FORK=1
TO16: N1=N1+16: N3=N3-16: M$(1)=STR
$(N1): M$(3)=STR$(N3)
3 P$(K)="C0R"+M$(1)+"C5R"+M$(2)+
"C0R4C5R"+M$(2)+"C0R"+M$(3)+"UL"
+M$(3)+"C5L"+M$(2)+"C0L4C5L"+M$(
2)+"C0L"+M$(1): NEXTK
4 SR=3: C=3: P$=CHR$(128): FORI=2TO
14: FORJ=4TO13: SET(J,I,C): NEXTJ: N
EXTI
5 FORK=0TO11STEP11: FORJ=18TO23: S
ET(J+K,2,C): NEXTJ: FORJ=17TO24: S
ET(J+K,3,C): NEXTJ: FORI=4TO14: FORJ
=16TO25: SET(J+K,I,C): NEXTJ: NEXTK
6 FORK=0TO7STEP7: FORJ=39TO58: FOR
I=2TO7: SET(J,I+K,C): NEXTI: NEXTJ:
FORI=3TO6: SET(59,I+K,C): NEXTI: FOR
I=4TO5: SET(60,I+K,C): NEXTI: NEX
K
7 PRINT0257,P$;: FORY=1TO28: READA
: PRINTCHR$(A);: NEXT
8 DATA105,108,108,117,115,116,11
4,97,116,101,100,128,128,128,109
,101,109,111,114,121,128,128,128
,98,97,110,107,115
9 PRINT0329,P$;: FORY=1TO12: READA
: PRINTCHR$(A);: NEXT
10 DATA98,111,110,117,115,128,12
8,128,103,97,109,101

```

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```

11 PRINT@399,CHR$(98)+CHR$(121);
12 PRINT@447,P$;:FORV=1TO32:READ
A:PRINTCHR$(A);:NEXT:GOTO43
13 DATA102,114,101,100,128,115,9
9,101,114,98,111,128,128,97,110,
100,128,128,114,111,98,101,114,1
16,128,100,111,98,98,101,114,116
14 IFM1=0THEN26ELSEIFM1=1THEN27E
LSEIFM1=2THEN28ELSEIFM1=3THEN29E
LSEIFM1=>4THEN30
15 L1=M2:GOSUB31:MC$=LL$:IFM2=>1
0THENM3=M3+1
16 IFM2=>10THENM2=0
17 L1=M3:GOSUB31:MD$=LL$:IFM3=>1
0THENM4=M4+1
18 IFM3=>10THENM3=0
19 L1=M4:GOSUB31:ME$=LL$:IFM4=>1
0THENM5=M5+1
20 IFM4=>10THENM4=0
21 L1=M5:GOSUB31:MF$=LL$:IFM5=>1
0THENM6=M6+1
22 IFM5=>10THENM5=0
23 IFM6=>10THENM6=0
24 L1=M6:GOSUB31:MG$=LL$
25 RETURN
26 MA$=J$:MB$=J$:GOTO15
27 MA$=B$:MB$=E$:GOTO15
28 MA$=E$:MB$=J$:GOTO15
29 MA$=G$:MB$=E$:GOTO15
30 MA$=J$:MB$=J$:M1=0:M2=M2+1:GO
TO15
31 IFL1=0THEN32ELSEIFL1=1THEN33E
LSEIFL1=2THEN34ELSEIFL1=3THEN35E
LSEIFL1=4THEN36ELSEIFL1=5THEN37E
LSEIFL1=6THEN38ELSEIFL1=7THEN39E
LSEIFL1=8THEN40ELSEIFL1=9THEN41E
LSEIFL1=>10THEN42
32 LL$=J$:RETURN
33 LL$=A$:RETURN
34 LL$=P$:RETURN
35 LL$=C$:RETURN
36 LL$=D$:RETURN
37 LL$=E$:RETURN
38 LL$=F$:RETURN
39 LL$=G$:RETURN
40 LL$=H$:RETURN
41 LL$=I$:RETURN
42 LL$=J$:RETURN
43 PMODE3,1:PCLS(5):SCREEN0,0
44 A$="BR3NU4R2":B$="BR2U2R3U2N
L3PD4NL3":C$="BR2R3U2NL2U2NL3BD4
":D$="BR2BU2NU2R3U2D4":E$="BR2R3
U2L3U2R3BD4":F$="BR2U4NR3D2R3D2N
L3":G$="BR2BU3UR3D4":H$="BR2U4R3
D2NL3D2NL3":I$="BR2BU2NR3U2R3D4"
:J$="BR2U4R3D4NL3":Q$="C5BRNU4RU
4RD4RU4RD4RU4RNL4D2NL4D2L6C0
45 PCLS(5):PMODE3,1:PCLS(5):SCRE
EN0,0
46 LINE(0,160)-(256,192),PSET,BF
47 PMODE4,1:SCREEN0,0:FORI=2TO25
6STEP16:LINE(I,126-RND(30))-(I+1
1,180),PSET,BF:NEXT:PMODE3,1:SCR
EEN0,0
48 DRAW"SBPM0,134:C2R4U6R2U4R3D2

```

```

RD2RD2R4U6R6D6R6U13R9D13R3U3R3U3
R2U2RU2R7D2RD2RD2RD7R8U13E2R6F2D
13R9U8E2R2E2R2F2R2F2D9R5U15R11D1
5R3U14R2E3R2F3R2D14R2D14L180"
49 PAINT(20,136),2,2
50 PMODE4,1:SCREEN0,0:FORI=2TO25
6STEP4:LINE(I,156-RND(30))-(I+2,
180),PSET,BF:NEXT:PMODE3,1:SCREE
N0,0
51 CLS0:FORV=3TO9STEP3:FORH=0TO7
:SET(H,V,5):NEXTH,V
52 FORH=3TO6:SET(0,H,5):SET(1,H,
5):NEXTH:FORH=6TO9:SET(6,H,5):SE
T(7,H,5):NEXTH
53 FORH=3TO9:SET(10,H,5):SET(11,
H,5):NEXTH
54 FORH=12TO17:SET(H,6,5):NEXT
55 FORV=3TO6:SET(18,V,5):SET(17,
V,5):NEXT
56 FORV=7TO9:SET(14,V,5):SET(15,
V,5):NEXT
57 FORH=16TO18:SET(H,9,5):NEXT:G
OTO61
58 FORV=3TO6:SET(22+L,V,5):SET(2
3+L,V,5):NEXT
59 FORV=3TO9:SET(28+L,V,5):SET(2
9+L,V,5):NEXT
60 FORV=6TO9STEP3:FORH=22TO29:SE
T(H+L,V,5):NEXTH,V:RETURN
61 GOSUB58:FORH=33TO36:SET(H,6,5
):NEXT
62 GOTO64
63 FORV=3TO9STEP3:FORH=40TO45:SE
T(H+L,V,5):NEXTH,V:FORV=3TO9:SET
(41+L,V,5):SET(40+L,V,5):NEXTV:R
ETURN
64 GOSUB63:L=26:GOSUB58:L=18:GOS
UB63
65 FORI=0TO63:SET(I,31,7):NEXTI:
FORL=0TO24STEP8:FORI=0TO224STEP3
2:PRINT@257+L+I,STRING$(5,142+LL
)+CHR$(138+LL);:NEXTI:LL=LL+16:N
EXTL:GOSUB66:GOSUB66:GOTO67
66 FORXW=1TO4:PRINT@192+EW,CHR$(
128)+CHR$(204)+CHR$(204)+CHR$(12
8)+CHR$(204)+CHR$(204);:EW=EW+1:
NEXT:RETURN
67 COLOR2,3:LINE(0,155)-(256,162
),PRESET,BF
68 LINE(12,145)-(38,162),PRESET,
BF:LINE(55,130)-(86,162),PRESET,
BF:LINE(94,150)-(106,162),PRESET
,BF:LINE(113,140)-(120,162),PRES
ET,BF:LINE(160,136)-(172,162),PR
ESET,BF
69 GOSUB66:PMODE4,1:SCREEN0,0:FO
RI=2TO256STEP4:LINE(I,162-RND(6)
)-(I+3,180),PSET,BF:NEXT:PMODE3,
1:SCREEN0,0
70 LINE(0,0)-(256,176),PRESET,B
71 FORI=0TO256STEP4:LINE(I,170-R
ND(8))-(I+4,176),PRESET,B:NEXT
72 GOSUB66:FORI=70TO176STEP2:LIN
E(0,I)-(256,I),PRESET:NEXT

```

(Continued on Page 6)

SKY-EYE (Cont'd from Pg. 5)

```

73 H=0:PMODE4,1:SCREEN0,0:FORI=1
TO8STEP2:H=H+1:CIRCLE(22-H,18),I
,5,.9,.8,.4:NEXT
74 GOSUB66:FORI=1TO150:PSET(RND(
256),RND(110)):NEXT:SCREEN0,0
75 FORI=2TO26STEP4:LINE(200+I,97
)-(200+I,164),PSET:NEXT
76 GOSUB66:FORI=2TO54STEP2:LINE(
128,100+I)-(146,100+I),PSET:NEXT
77 FORI=131TO143STEP3:LINE(I,102
)-(I,154),PSET:NEXT
78 FORI=98TO128STEP2:LINE(54,I)-
(74,I),PSET:NEXT
79 FORK=0TO150STEP150:FORI=1TO5:
CIRCLE(64+K,96),I,5,.5,1:NEXTI:N
EXTK
80 GOSUB106:CLS0:SCREEN1,1
81 COLOR5,0
82 E=RND(9)+2
83 H=RND(2):IF H=1 THEN BD=(+4)
ELSEIF H=2THEN BD=(-4)
84 GOSUB101:D=D+10:F=F+BD:SCREEN
1,1:IFD>110THEN91
85 GOSUB101
86 LINE(A(E),0)-(A(E)+F,D),PSET:
IFW=0THEN90
87 POKE65494,0:PLAY"V31T255O26BC
":POKE65495,0:FORJ=5TO11STEP3:CI
RCL((Y*16)-9,75),J,5,.9:NEXTJ:F
ORJ=5TO12:CIRCLE((Y*16)-9,75),J,
0,.9:NEXTJ:W=0
88 IFPOINT(A(E)+F,D)=5THEN90
89 FORP=1TO3:GOSUB105:POKE65494,
0:PLAY"V31L255O2BC":POKE65495,0:
NEXTP:COLOR0,0:LINE(A(E),0)-(A(E
)+F,D),PRESET:COLOR5,0:D=0:F=0:M
1=M1+1:GOSUB106:GOTO82
90 GOTO84
91 DRAW"S4BM0,75;C0R255UL255":CO
LOR0,0:LINE(A(E),0)-(A(E)+F,D),P
RESET:COLOR5,0:D=110:FORYY=6TO30
STEP8:CIRCLE(A(E)+F,D),YY,1,.8:N
EXTYY:FORYY=2TO30:CIRCLE(A(E)+F,
D),YY,0,.8:NEXTYY:POKE65494,0:PL
AY"T255L30V31O1DCDC":POKE65495,0
:GOSUB101:D=0:F=0
92 EC=EC+1:CIRCLE(100+(25*EC),18
4),5,0,.7:IFEC=5THEN107ELSE82
93 FORI=1TO212STEP8
94 PLAY"V31O1L55C":PUT(219-I,30)
-(256-I,44),H,PSET
95 PSET(63,90-Q,0):PSET(64,90-Q,
0):Q=Q+13:IFQ=>82THENQ=0:PSET(64
,90-Q,5):PSET(63,90-Q,5)
96 PSET(63,90-Q,5):PSET(64,90-Q,
5)
97 IFI=>209THEN LINE(219-I,30)-(
256-I,44),PRESET,BF
98 NEXTI
99 GOTO93
100 GOTO100
101 Z=JOYSTK(0)+4:Y=INT(Z/4):DRA
W"S4BM0,75;"+P$(Y):COLOR5,0:IFW=

```

```

1THENRETURN

```

```

102 IFPEEK(65280)=126THEN103ELSE
IFPEEK(65280)=254THEN103ELSERETU
RN

```

```

103 IFW=1THENRETURN

```

```

104 W=1:RETURN

```

```

105 PMODE3,1:SCREEN1,1:FORI=1TO5
0:NEXTI:PMODE4,1:SCREEN1,1:RETUR
N

```

```

106 GOSUB14:DRAW"S8BM20,188;"+Q$
+M$+Q$+M$+Q$:DRAWME$+Q$+MD$+Q$
:DRAWMC$+Q$+MA$+Q$+MB$:RETURN

```

```

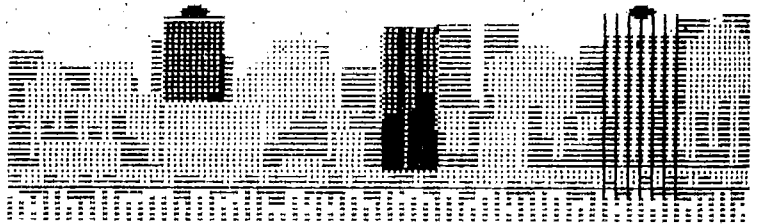
107 PMODE3,1:POKE65494,0:SOUND22
0,5:POKE65495,0:FORI=2TO192STEP6
:SCREEN1,1:CIRCLE(126,92),I,,.7:
SCREEN1,0:CIRCLE(126,92),I+3,,.7
:NEXT:POKE65494,0:FORI=1TO20:PLA
Y"O1L10PC":NEXT:RUN

```

```

108 "SKY-EYE" BY FRED B. SCERBO
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EXCITING NEWS FOR COLOR COMPUTER USERS

FLEX, OS-9 and the Radio Shack Disk System ALL on the SAME Color Computer

Would you believe that you can run FLEX, OS-9 and Radio Shack disk software on the same Color Computer, and all you have to do is change the disk? That's right, just change the disk. If you have a 32K Color Computer with the Radio Shack disk system, all you need to do is make a trivial modification to access the hidden 32K, as described in the Feb. issue of COLOR COMPUTER NEWS and the March issue of '68' Micro. You can get FLEX from us right now. OS-9 will be ready by summer. Please note that this will only work with the Radio Shack disk system and 32K/64K memory chips that RS calls 32K. Maybe they put 64K's in yours, too. If you don't have a copy of the article, send a SASE and we'll send it to you.

Using this system to run FLEX and OS-9 has many advantages. First, it gives you 48K from zero right up to FLEX. This means that ALL FLEX compatible software will run with NO MODIFICATIONS and NO PATCHES! There are no memory conflicts because we moved the screen up above FLEX which leaves the lower 48K free for user programs.

What you end up with is 48K for user programs, 8K for FLEX and another 8K above FLEX for the screens and stuff. We are working on a multi screen format so you can page backward to see what scrolled by and a Hi-Res screen that will enable us to have 24 lines by 42 character display. That's better than an Apple!

We also implemented a full function keyboard, with a control key and escape key. All ASCII codes can now be generated from the Color Computer keyboard!

We also added some bells and whistles to Radio Shack's Disk system when you're running FLEX or OS-9. We are supporting single or double sided, single or double density, 35, 40 and 80 track drives. If you use double sided drives, the maximum is three drives because we use the drive 3 select for side select. When you are running the Radio Shack disk, it will work with the double sided drives but it will only use one side and only 35 tracks. Using 80 track drives is okay, but will not be compatible with standard Radio Shack software. You can also set each drive's stepping rate and drive type. (SS or DS - SD or DD)

In case you don't understand how this works, I'll give you a brief explanation. The Color Computer was designed so that the roms in the system could be turned off under software control. In a normal Color Computer this would only make it go away. However, if you put a program in memory to do something first (like boot in FLEX or OS-9), when you turn off the roms, you will have a full 64K RAM System with which to run your program (FLEX or OS-9). When the roms are turned off, it is as if you had removed them from the computer. They are gone!

Now, we need the other half of the 64K ram chips to work, and this seems to be the case most of the time, as the article states. Of course, you could also put 64K chips in.

We decided that this was the best way to run FLEX and OS-9 on the Color Computer because it does remove the roms from the memory map and leaves the full 48K for user programs. If you just put in memory for FLEX and use the Basic hooks for I/O, all you have is a little over 30K for user programs. In addition, very few FLEX programs will run without being modified and some won't run very well, if at all (our DATAMAN+ for example). Let me state it again. ALL FLEX COMPATIBLE PROGRAMS WILL RUN WITHOUT MODIFICATION!!! and the same goes for OS-9!

It is also the ONLY way OS-9 will run because 30K is just not enough.

Some neat utilities are included.

MOVEROM moves Color Basic from ROM to RAM. Because it's moved to RAM you can not only access it from FLEX, you can run it and even change it!! You can load Color Computer cassette software and save it to FLEX disk. Single Drive Copy, Format and Setup commands are also included.

If you don't have a Color Computer, we can sell you one complete with 64K ram, 24K rom, Single RS disk drive and FLEX for only \$1,490, set up and ready to go.

FLEX with Edit, Asmb and installation disk is \$199.

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```

50 TI=W+EA+D+OI
60 PRINT "TOTAL INCOME" TI
70 INPUT "TAX REFUNDS";TR
80 INPUT "EMPLOYEE BUSINESS EXPENSE";ER
90 AG=TI+TR-ER
100 PRINT "ADJUSTED GROSS INCOME" AG
105 OP=AG*.01;TP=AG*.03
107 OP=INT((OP+.005)*100)/100;TP=INT((TP+.005)*100)/100
110 INPUT "HALF (BUT NOT MORE THAN $150) OF MEDICAL INSURANCE PREMIUMS YOU PAID";MI
120 INPUT "COST OF MEDICINE AND DRUGS";ME
130 MA=ME-OP
135 IF MA<0 THEN MA=0
140 INPUT "BALANCE OF MEDICAL INSURANCE PREMIUMS";BI
150 INPUT "OTHER MEDICAL EXPENSES";OM
160 MZ=MA+BI+OM;MY=MZ-TP
170 IF MY<0 THEN MY=0
180 MD=MY+MI
190 INPUT "STATE TAXES";ST
200 INPUT "LOCAL TAXES";LT
210 INPUT "REAL ESTATE TAXES";RE
220 INPUT "SALES TAXES (FROM TABLE)";UT
230 INPUT "EXTRA SALES TAXES (CAR)";ES
240 TD=ST+LT+RE+UT+ES

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250 INPUT "HOME MORTGAGE";IH
260 INPUT "CONSUMER CREDIT INTEREST";IC
270 INPUT "AUTO INTEREST";AI
280 ID=IH+IC+AI
290 INPUT "CASH CONTRIBUTIONS";C
300 INPUT "NON-CASH CONTRIBUTION";NC
310 CD=CC+NC
350 INPUT "MISC. DEDUCTIONS";VD
360 FD=MD+TD+ID+CD+VD
370 INPUT "NUMBER OF EXEMPTIONS";SB
380 SY=SB*1000
390 QQ=AG-FD-SY
430 PRINT " NOW, GO TO THE TAX TABLE AND FIND THE TAX ON"QQ
432 INPUT " ENTER IT HERE";IT
440 INPUT " AMOUNT WITHHELD";AW
450 JJ=IT-AW
460 PRINT:PRINT " YOU GET A REFUND OF"JJ
470 PRINT:INPUT "FOR A RUNDOWN, HIT <ENTER>";BB
480 CLS
490 PRINT "YOUR INCOME";TAB(22)AG
500 PRINT "LESS DEDUCTIONS OF:"
510 PRINT " MEDICAL";TAB(14)MD
520 PRINT " TAXES";TAB(14)TD
530 PRINT " INTEREST";TAB(14)ID
540 PRINT " CONTRIBS";TAB(14)CD

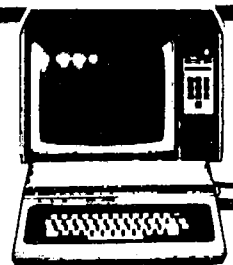
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(Continued on Page 10)

CO-RESIDENT EDITOR/ASSEMBLER (CORES9)

CORES9 is a complete full function editor/assembler package that will allow you to create, edit and assemble 6809 machine language programs for the color computer. It features a powerful full function text editor and supports the entire 6809 instruction set with all addressing modes, forward and reverse label references, will output object code directly to memory or "CLOADM" compatible tapes and much more.

Price \$39.95



TEXT EDITOR

This program is a line/character oriented text editor for the color computer, that will enable you to create and edit text files for Basic programs, letters, text data files, or almost anything you might want to put on paper. It features functions for adding, inserting, deleting, moving and copying text lines or paragraphs; powerful string search and replace commands, single and automatic line numbers and line editing with 9 sub commands to insert, delete, change, add and remove individual or multiple characters. Tape commands allow you to save, load, append, and skip tape files; also it is compatible with Basic ASCII tape formats. A MUST HAVE PROGRAM!!

ONLY \$19.95

SYSTEM MONITOR (TRSMON)

Trsmon is a 2K system monitor program that will allow you to explore the workings of the color computer. It features 9 debugging commands, tape load and save compatible with Basic "CLOADM", up/down load via RS232 port, terminal package that allows the color computer to be used as a terminal at baud rates up to 9600 baud and a printer driver to direct display output to the printer for memory dumps, disassemblies etc. The program is position independent so it can be moved anywhere within the system memory. A very powerful tool at a very reasonable price.

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TAX (Cont'd from Pg. 9)

550 PRINT " MISC." ;TAB(14)VD
 560 PRINT "TOTAL DEDUCTS" ;TAB(22)FD
 570 PRINT "LESS EXEMPTIONS" ;TAB(22)SY
 580 PRINT "TAXABLE AMOUNT" ;TAB(22)QQ
 590 PRINT " TAX OWED" ;TAB(22)IT
 600 PRINT " LESS WITHHOLDING" ;TAB(22)AW
 610 PRINT "R E F U N D" ;TAB(22)JJ
 690 INPUT "PRINT THIS OUT" ;YN\$
 695 IF YN\$="N" OR YN\$="NO" THEN END
 700 PRINT#-2,CHR\$(15)" TAX SUMMARY"
 710 PRINT#-2,"YOUR INCOME" ;TAB(22)AG
 720 PRINT#-2,"--LESS DEDUCTIONS OF:"
 730 PRINT#-2," MEDICAL" ;TAB(14)MD
 740 PRINT#-2," TAXES" ;TAB(14)TD
 750 PRINT#-2," INTEREST" ;TAB(14)ID
 760 PRINT#-2," CONTRIBS" ;TAB(14)CD
 770 PRINT#-2," MISC." ;TAB(14)VD
 780 PRINT#-2,"TOTAL DEDUCTS" ;TAB(22)FD
 790 PRINT#-2,"EXEMPTIONS" ;TAB(22)SY
 800 PRINT#-2,"TAXABLE AMOUNT" ;TAB(22)QQ
 810 PRINT#-2," TAX OWED" ;TAB(22)IT

820 PRINT#-2," LESS WITHHOLDING" ;TAB(22)AW
 830 PRINT#-2," R E F U N D" ;TAB(22)JJ
 840 END -----

the RAINBOW
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 Prospect, KY 40059

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Lawrence C. Falk -- Editor

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Subscriptions to the RAINBOW are \$12 per year in the United States. Canadian and Mexican rates are \$15 per year. Surface mail to other countries is \$26, air mail to other countries is \$44, due to postage costs alone.

Limited back issues available for \$2 each, plus \$2.50 for shipping and handling.

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The RAINBOW is published every month of the year.

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Dave Hooper, Kathy Goebel, John Waclo, Bill Dye, Wayne Diercks, Gary Davis, Tom Rosenbaum and Fred Scerbo. Add a dash of the people who have been active in 6809 before CoCo made it really popular, like Sue Searby, Frank Hogg and Bill Vergona, and you have a whole new breed of people whose names you will come to know in the near future.

Those people, and some who have led the conversion to CoCo like Bob Rosen, Frank Brandon, Syd Kahn, Dave Lagerquist and Roger Olsen, make up the Color Computer world right now. These people, and a bunch of others space doesn't permit me to name, are the new Adams' and Bardens of Color Computing. A year from now, their names on a program will sell it to you just as surely as Adams' does on a Model III Adventure today.

I was thinking about this just the other day when I received a letter from Steve Blyn, who has just started a software business. He has some nice programs for children and I was mentioning them to a friend here in Kentucky. The friend replied, "Who's this? Is that Dorsett Educational?" Dorsett, of course, supplies a great deal of Apple educational software.

As I replied to the friend, I couldn't help but think there is no real good reason why Steve and Cheryl Blyn won't be bigger than Dorsett some day. After all, they have a better computer to use in programming their talents.

We've been fortunate enough to meet a lot of fine people so far in this enterprise. Not just the people who write programs, but the people who sell them, and the people who buy them -- and the RAINBOW. We really enjoy hearing from you and we hope you'll call on us for help, information or advice whenever you think we might be of assistance.

* * * * *

You may notice an advertisement in this month's issue for Color Computer News. Its the only other publication devoted exclusively to the Color Computer. Frankly, we feel there is adequate room in the CoCo world for both the RAINBOW and for CCN. And we know Bill Sias, the editor, agrees. An ad for the RAINBOW will also appear in CCN. Its my opinion that both of us are trying to put out a

good product that merits your support and will be helpful to you.

* * * * *

Credit where credit is due department this month appropriately goes to intrepid Dave Lagerquist of Chromasette for the name CoCo. You'll notice we use it pretty liberally in the RAINBOW. For one thing, it seems to fit. And for another, it saves us some space.

* * * * *

You'll notice we're even fatter and a little fancier again this month. We hope you enjoy the additional information we are now able to provide -- thanks to advertising which holds the cost of printing and mailing down.

Speaking of mailing, we DO mail the RAINBOW each month on or a little after the first of the month that is printed on page one. It may take a couple of weeks for bulk mail to get your issue to you. If you've not received your copy by the 20th, send us a card and we'll hustle another out to you by first class mail.

Until April...Geoffery Chaucer's favorite month. Would anyone like to submit a program called "Canterbury Adventure?"

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MAKE YOUR REMS STAND OUT

By Gary A. Davis

In order to maintain and enhance programs, it is important for them to be well commented and documented. This is especially true for long or complex programs. In BASIC, comments may be deleted from "execute" versions if necessary for speed and memory efficiency.

Here we will show you a method we at Sugar Software use to add emphasis to CoCo comments (REM statements) when they are printed on an Epson printer. The REMs are modified so that they print in the wide font.

Wide REMs are useful for the start of your subroutines. Other printers which have a double-wide font for additional emphasis may be used with this program with the proper modification.

The program described here scans the BASIC lines, looking for those which begin with REM or the apostrophe (another version of the REM which I call the comment). If the character following the REM or comment is a space, the space is replaced by a CHR\$(14). In the Epson's character set, this is the

signal to "begin elongation." The remainder of the line will be printed in double-wide characters. At the end of the line, the Epson turns off elongation without requiring any other control character.

If your printer does not behave this way (LP VII and VIII do not -- ed.), the required printer control character to turn off elongation may have to be placed at the end of the REM statement or at the start of a following REM statement.

In order for this utility to be the most effective, it is written in three ways. All three programs do the same thing in the same way. If you are trying to get "into" Machine Language, I hope this format will help you understand some of the things which are being done.

The first program is written in BASIC and can be typed in at the end of your own BASIC program, executed and then deleted. The second is written in 6809 Assembly Language and does exactly the same thing. The BASIC version was written to be compared with the Assembly version. Variable names match with the registers used. Statements are simple so that they can correspond with the Assembly Language version.

There are a few reasons to choose the Assembly Language version. First, it is extremely fast -- almost instantaneous. Second, when you are ready to use it, you must only CLOADM and EXEC it. The Assembly version is position independent. This means that it can be loaded into any memory location and will execute without modification.

The version here is assembled at address Hex 0600, which is convenient for Extended BASIC since these programs generally exist at Hex C00 (PCLEAR 1) or higher.

For Color BASIC or Disk BASIC, Hex 0600 should not be used, so load at the high end of memory. To do this, protect the area using a CLEAR 200,k*1024-54. The 200 is for string space; use whatever you require. The "k" is the amount of memory you have (4, 16 or 32). The 54 is the number of bytes in the object code. The code can be POKed into memory starting at k*1024-54. To CLOADM the object that was originally CSAVEd at Hex 0600, issue a CLOADM "programname", (k*1024-54)-1536.

The algorithm the program uses locates the first statement of the BASIC program. Locations 25 and 26

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This program employs three useful subroutines in the Color Basic ROM. They are:

- Hex A928 - To clear the screen
- Hex BDCC - Displays the decimal value in the D register
- Hex B9AC - Displays a space

The final program is a BASIC loader to create the assembly (machine language) version. You can change the load point from Hex 0600 to some other if necessary. Another alternative is to "offset" load using the second operand of the CLOADM command as mentioned above. Don't forget to protect the area first with the CLEAR command when loading to high memory. After POKEing the program into memory with the loader, you can then save it with the Extended Basic CSAVEM command.

There are many modifications you could make to this program. One of the most practical -- especially for those who do not have a printer -- would be to replace the printer control code with one of the color graphic symbols (for example, a 255 for the orange rectangle). This would be useful when scrolling through a listing to find a "marked"

(Continued on Page 14)

ML Rabbit

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REMS (Cont'd from Pg. 13)

section or sections.

For your convenience, a tape is available from Sugar Software (2153 Leah Lane, Reynoldsburg, OH, 43068) for \$7 containing: 1) A CLOADM image, 2) the BASIC program, 3) the BASIC loader and, 4) Assembly source.

The listings:

```

10 ' BIG CMNT
20 '
30 ' Gary A. Davis
40 '(C) 1981 By Sugar Software
50 ' 2153 Leah Lane
60 ' Reynoldsburg, Oh. 43068
70 '
80 CLS
90 X=25
100 ' Main Loop
110 X=PEEK(X)*256+PEEK(X+1)
120 IF X<>0 GOTO 140
130 END
140 A=PEEK(X+4)
150 B=5
160 IF A=130 GOTO 220
170 IF A<>58 GOTO 110
180 A=PEEK(X+5)
190 IF A<>131 GOTO 110
200 B=B+1
210 ' REM Found
220 IF PEEK(B+X)<>32 GOTO 110
230 ' Replace
240 POKE B+X,14
250 D=PEEK(X+2)*256+PEEK(X+3)
260 PRINT D;
270 GOTO 110

```

```

0600
0600
0600 BDA92B
0603 BE0019
0606
0606 AE00
0608 2601
060A 39
060B
060B A604
060D C605
060F B182
0611 270B
0613 B13A
0615 26EF
0617 A605
0619 B183
061B 26E9
061D 5C
061E A685
0620 B120
0622 26E2
0624 B60E
0626 A785
0628 EC02
062A 3410
062C BDBDCC
062F BDB9AC
0632 3510
0634 20D0

```

```

10 '
20 ' BIG CMNT
30 ' LOADER
40 '
50 ' Gary A. Davis
60 '(C) 1982 By Sugar Software
100 LD=1536: Load=&H600
110 FOR X=LD TO LD+53: For each
120 READ BYTE: Get a byte
130 POKE X,BYTE: Store byte
140 NEXT X
150 '
160 'Object code
170 '
180 DATA 189,169,40,142,0
190 DATA 25,174,0,38,1
200 DATA 57,166,4,198,5
210 DATA 129,130,39,11,129
220 DATA 58,38,239,166,5
230 DATA 129,131,38,233,92
240 DATA 166,133,129,32,38
250 DATA 226,134,14,167,133
260 DATA 236,2,52,16,189
270 DATA 189,204,189,185,172
280 DATA 53,16,32,208

```

```

*****
BIG CMNT
Gary A. Davis
(C) 1982 by Sugar Software
*****
ORG $600 Assem origin
JSR $A92B Clear screen
LDX #25 X->1st stmt
Main Loop
LIN110 LDX ,X X->Next stmt
BNE LIN140 Still more
RTS End
LIN140 LDA 4,X Get token
LDB #5 B=Offset
CMPA #130 Is it REM?
BEQ LIN220 BR if yes
CMPA #58 Is it ","?
BNE LIN110 BR if no
LDA 5,X A=Code
CMPA #131 Is is ""?
BNE LIN110 BR if no
INCB Offset+1
LIN220 LDA B,X A=1st char
CMPA #32 Is it space
BNE LIN110 BR if no
LDA #14 A=Strt wide
STA B,X Replace
LDD 2,X D=Line#
PSHS X Save X
JSR $BDCC Print line#
JSR $B9AC Print " "
PULS X Restore X
BRA LIN110 Continue

```

K-K-K-K-KILOBYTE

We've received a couple of letters and notes asking for information about the meaning of 4K (and 16K) program designations.

In short, some of you have asked whether you can run a 4K program on a 16K CoCo. The answer is "yes."

As far as program length is concerned, you can run any program which is LESS or EQUAL to the memory limit of your own Color Computer. All CoCo's can run 4K programs. Any CoCo with 16K can run programs 16K and below. A 32K machine will run any program which is 32K or smaller (even a 4K program).

CoCo must have Extended Color Basic to run Extended Basic programs, but an Extended machine CAN run plain old Color Basic as well as Extended.

Hope this helps.



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Construction...

BUILD A DESK FOR COCO

By Joseph E. Bennett

Here you are. You've spent a couple thousand dollars or so on your CoCo, disc drives, a line printer and a modem and set the whole thing up on the dining room table. Or, worse yet, you've got all this advanced gadgetry resting on a precarious perch with little room to spare.

Well, what CAN you do?

One solution is to go out and spend even more money for a custom desk for your equipment. But, if you are like me, you'd rather spend that money on more peripherals.

A solution to your problem may be to build the desk yourself. It isn't as difficult as you might think. The total cost should be less than \$40, depending on how you choose to finish the top and legs.

If you're still with us, the first step is to gather the materials you need. The following list of tools is only a suggested minimum needed for the job:

- * A crosscut hand saw or power jigsaw
- * A flathead screwdriver
- * A coarse wood rasp
- * A drill and drill bits for screws

Plus, you will need these materials:

- 1 Small container Elmer's Glue
- 1 Box of #8x2 1/2" flathead slotted wood screws
- 4 #10x3/4" flathead slotted wood screws or nuts and bolts as needed for braces
- 1 Pack assorted grades of sandpaper
- 1 8'x4' sheet of 5/8" particle board
- 3 2x4's 66" long for bracing and support
- 4 2x4's 46 3/4" long for bracing and support
- 4 2x4's 30" long for legs
- 1 Quart Latex paint (optional if you wish another finish)
- 1 Can clear Acrylic laquer spray
- 1 2" (or larger) Paint brush
- 1 18" Angle braces

Now, here's how we make this beast...

STEP 1

Cut particle board to dimensions

shown in figure 1. Be sure to follow the layout.

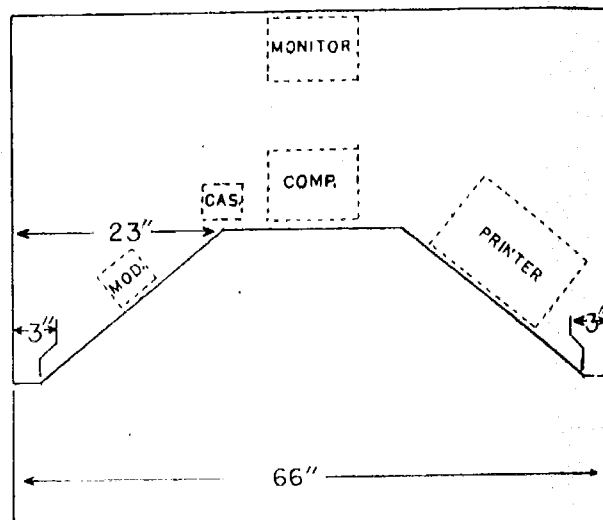


FIG. 1

STEP 2

Construct frame and leg assembly by using two of the 66" long braces and the two 46 3/4" long braces. Assemble into a rectangular frame, using drill to drill screw holes. Glue each joint (before assembly) for added strength. Refer to figure 2 for detail.

STEP 3

Mount four 30" legs to frame, as shown in figure 2, using glue and screws.

STEP 4

Mount 66" rear brace across rear legs at a height of 8" from bottom of legs, using screws and glue.

STEP 5

Mount two 46 3/4" side braces from rear legs to front legs at a height of 8" from bottom of legs using screws and glue.

STEP 6

Check for stability and let set for one hour if glue is used.

STEP 7

Place desk top on frame assembly so that rear of desk and rear of frame are flush and sides are even. Using screws, mount desk top to frame at 16 locations as per figure 2.

STEP 8

Mount angle braces beneath side wings of desktop. You will need to

and the braces to fit flush on the desk top and legs. Use short screws or bolt to desk top.

STEP 9

Using sawdust and white glue, mix paste and fill screwtops to flush with the surface. Let dry.

STEP 10

Using wood rasp, round edges and corners of desk top. Sand all surfaces smooth.

STEP 11

Paint with two coats Latex. Let dry between coats. When completely dry, spray top with clear Acrylic.

The desk dimensions can be altered to fit your own needs, as can your choice of finishes. A friend of mine went so far as to put a Formica top on his desk.

An added feature you might wish to consider is to mark all cable locations from your equipment and to cut holes in the desk. This will add a lot to a clutter-free top. You can

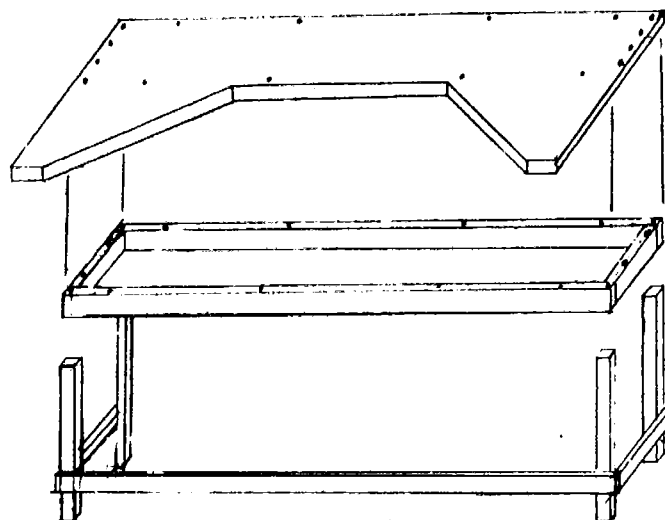


FIG. 2

even cut a paperfeed hole for the printer and store the paper below the desk.

Good luck with this project, and send any questions to me care of the RAINBOW.

CORRECTIONS

Programs listed in the RAINBOW are carefully checked for accuracy. Each program is run on CoCo before it is listed out to the printer, and then the program is immediately listed. We do this in an effort to be as certain as possible the program runs as described.

Some errors may creep in during the layout and printing process. We will correct any as soon as possible after they are called to our attention.

In DISC INDEX, exclamation points show up in lines 130, 242 and 365. The first "!" should be DSKI#, the second FREE and the third KILL.

Incidentally, somehow CoCo changed these commands to "!"'s while running the program, but before listing. The program ran correctly when the commands were substituted in running by the program.

If anyone knows how this might have happened, we would be interested in hearing about it.

In SNAIL INVADERS, Line 303, the end of the line should read "+GB\$"

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Software Review...

COLOR DEMO TELLS 'EM WHAT COCO IS

How many times have you had some friend walk up to your favorite machine and ask you "just what DOES this thing do?"

Arnold Pouch of Superior Graphic Software (406 Little Mountain Road, Waynesville, NC, 28786, \$24.95) has the answer. And, frankly, its quite a show.

TALKING GRAPHIC DEMO doesn't play games nor does it perform any special helpful tasks (like balancing a checkbook). But, from its Wizard of Oz-like talking opening, it keeps everyone interested for 12 minutes while it explains just what the CoCo can do and how it works.

Anyone who has ever tried to show his CoCo off to a friend, neighbor, spouse or child has experienced the frustration of looking through tapes, CLOADing them, rewinding and the like. This one program allows you to sit back, relax and listen as CoCo starts off in a deep voice explaining..."I AM A COLOR COMPUTER!"

By the time its over, with random

lines drawn, colors moving all over the screen and songs being played you've done a good job of explaining it all. Without any work.

This is, frankly, better than anything the people who sell the machines have. Pouch says that your CoCo "deserves" this program.

We agree.

Software Review...

FLY THE GAUNTLET

GAUNTLET is a fast-moving arcade game in Machine Language which has a great deal of potential.

In fact, if you can overcome your initial disappointment in its block (low-res) graphics, it is a good game to play and a difficult game to win.

Available from Britt Monk, CDP (P.O. Box 802, Elyria, OH, 44036 for \$10) GAUNTLET really does have a lot to offer.

You start out on one side of the Universe and have a given amount of time to penetrate as far as you can, zapping aliens and avoiding meteors as you go. Not only can you control

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here the ship will go horizontally on the screen, but you can also control how quickly it will move by using the joystick. The responses are made instantly, giving excellent control.

A readout at the bottom of the screen gives time left in the mission, amount of distance traveled and the score. You get points for trapping aliens and for transversing the screen. In other words, the faster you go, the more points you score. But as you go faster, it is more difficult to avoid the aliens and meteors. There's a score analysis at the end of each game.

Our main complaint is the low-res graphics. This could be a much better game were the space ship, aliens (which are kind of cute, if dangerous-looking), stars and meteors more finely detailed. Still, once you accept the graphics, GAUNTLET can be a challenging game to play.

Software Review...

BRICKOUT/WORD GUESS

BRICKOUT and WORD GUESS are offered on one cassette Twinpack by Rainbow Connection Software (3514 6th Place NW, Rochester, MN, 55901, for \$11.95).

Both programs are written for the 4K CoCo and both are not only very fast but excellent examples of what can be done with limited memory.

WORD GUESS is a word guessing game which allows you to select the words that will be used. Author Wayne Diercks gives simple instructions on how to modify the program to include your own list of words.

Each letter is represented by a star, and you must guess the letters that make up the word. The computer fills in the letters you guess correctly in the proper place, and displays the incorrect letters at the top of the screen. The quicker you guess the right word, the higher your total score.

BRICKOUT is in the popular BREAK-AWAY tradition and, while in low-res as is necessary with 4K, gives all the necessary bells and whistles that make this game a good one. You can put "English" on the ball with the paddle, freeze action for a respite, decide when to "start" one of the balls and select both paddle size and

speed of play. There is also an autopilot feature that will allow you to sit back and watch the game play itself.

BRICKOUT can be played with joysticks or from the keyboard.

As a special offer to RAINBOW subscribers, Diercks will make this (and all other twinpacks) available at a \$2 discount. Merely mention RAINBOW when ordering.

WHEREZITAT???

Below, through the good offices of Bob Rosen of Connection-80 of Woodhaven, N.Y., are some start, end and execute addresses for several Machine Language programs.

These addresses can be used to relocate the Machine Language programs to other portions of the memory.

Say, for instance, you have a 32K system and want the M.L. programs "out of the way" of BASIC. By relocating the program, you free up a great deal of RAM for program use.

Generally speaking, you can add 16,000 to the addresses and they will relocate. This, however, is not always so...it depends on what area of RAM you end up in after the relocation. If your CoCo hangs up, try another address.

You cannot relocate M.L. programs without knowing the start, end and execute addresses, since they are a part of the command you need to use to save a M.L. program to tape.

The most simple procedure to relocate is to load the program in, but do not type EXEC. Then save the program back to tape, using the new addresses. However, you can also offset load these programs, and then save them back to tape with the new addresses -- which you can determine from this list by adding the offset. Programs shown are in the order necessary to the command: start address, end address and execute address.

VIDEOTEX &H1149, &H1988, &H1149
 8-BIT DRIVER &H3F80, &H3FEA,
 &H3F80
 SCREEN PRINT &H3080, &H3FF8,
 &H3600
 MASTER CONTROL &H3600, &H3FFC,
 &H3600
 CBUG &H0600, &HHDFF, &H0609

YOU AND YOUR TWO-TIMIN' CPU

By Wayne A. Diercks

Lately, a great deal of attention has been given to the double-speed command (POKE 65495,0) available with the CoCo. Little has been said, however, about how it works, its consequences and -- most importantly -- how to use it correctly.

First, an explanation of how double-speed works is in order. The CoCo was designed to run at a microprocessor (CPU) rate of 895 KHz (commonly called 1 Meg), which makes it an average speed personal computer. However, by simply typing POKE 65495,0 (or placing this as a command within a program), the CPU will run at double the clock rate (2 Meg) during most of its cycle. This effectively doubles the computer's speed. The command POKE 65494,0 will restore the clock rate to normal again.

This, then, brings us to the most important aspect of the double-speed command: How to use it in a program. One common method is to declare double-speed in the first line such as:

```
10 POKE 65495,0
```

Then, if double-speed will not work on your particular machine, simply delete the line and the program will operate at normal speed. This is, however, a much better way to make the program work as written on all computers with up to three user selectable speeds. This can best be shown by the following code, asking the user for the speed desired.

```
100 S1=65494:S2=S1:S3=S1: SET ALL  
THREE SPEEDS TO NORMAL
```

```
110 INPUT "SPEED (1-3)"; SP: ASK  
USER TO SET SPEED DESIRED
```

```
120 IF SP>1 THEN S2=S1+S1: SET  
S2 TO DOUBLESPEED POKE ADDRESS
```

```
130 IF SP>2 THEN S3=S1+1: SET  
S3 TO POKE DOUBLESPEED POKE
```

```
ADDRESS IF 3 IS SELECTED
```

You now have speed 1, 2 and 3 represented in the form of normal and double-speed address locations. Now in the high-speed mode subroutine or portion of your program, insert the command:

POKE S1,0 - Before all sound commands and before leaving the subroutine or high speed part of the program. This slows down to normal speed no matter what speed is selected.

POKE S2,0 - At the beginning of the subroutine or high speed part of the program and after all sound, keyboard and joystick reads in order to speed up for calculations, comparisons and screen prints if speed 2 or 3 was selected.

POKE S3,0 - Before all keyboard and joystick reads so they are read at double-speed only when speed 3 was selected.

This is THE most efficient way of doing the most double-speed on all machines and should become the standard of double-speed programming for CoCo.

So, you may ask, "Why not always run at double speed?" As always, there are complications to overcome. Most early models (serial numbers below 20,000) contained slower MC6809E microprocessors and 6821 peripheral interface adaptors (PIAs). These will rarely run reliably (if at all) at double-speed. Later models

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contain the faster MC68B09E and MC68B21 chips.

Although most of the slower CPUs will run most of the time at the faster rate, they will occasionally "lock up" that requires a reset. They may also dump the program. We recommend you save your program to tape frequently when running double-speed.

The PIA chips are used in all Input/Output operations except for screen display. Hence, the slower PIAs will not work reliably on any operation involving the cassette, RS232 (printer, modem), expansion (program packs, disc drives), joystick or keyboard ports and all sound to the speaker. Although they may function intermittently at double-speed while reading the keyboard or joystick, they nearly always "bomb" in the other operations.

Fortunately, there is little need for double-speed sound and it is best

to avoid them altogether. However, just the mere presence of the disc

controller in the expansion slot (even when idle) will automatically execute a read of this port, restricting the use of double-speed on disc software.

It is also worth noting that each time a speed change is executed, the computer POKes an 88 into address 135. This is the address read by the INKEY\$ command to determine the last key pressed and it will return an "X" upon its next appearance in the program.

Employing the double-speed technique along with other memory- and time-saving aids enabled us to make Rainbow Connection Software's three-speed BRICKOUT game, written entirely in 4K Color BASIC, one of the fastest and most complete available. It is but another tribute to the power and advanced design of the amazing CoCo.



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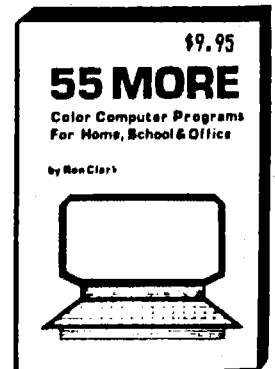
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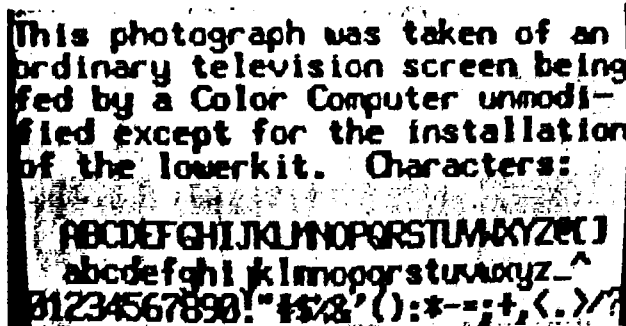
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MOTION PICTURE PROGRAMMING (MPP)

A completely new method for programming superior graphic programs has come from the mountains of North Carolina.

It may well be the best thing to come out of the hills since moonshine, because Motion Picture Programming (MPP) -- as developed by Arnold Pouch of Superior Graphic Software -- does away with the long tedious hours we all know are required to produce detailed graphic pictures from a program using the standard commands such as DRAW, LINE, CIRCLE, COLOR, SCREEN, PSET, PCLS, PAINT and the like.

Seldom will any of these commands be found in a program developed by the new MPP method. Instead, MPP uses a new way to divide the graphic programming process into three distinct operations.

The first operation uses a modified "drawer" program from CHROMASETTE's August, 1981, issue to produce a graphic picture. If you don't already subscribe, single issue cassette tapes are \$5 from CHROMASETTE (P.O. Box 1087, Santa Barbara, CA, 93102).

The "drawer" will take a little practice before you become skilled in its use. But soon, you will be able to produce graphics in as much detail as you want. And, if you have any artistic talents, the results can be very satisfying.

When your graphic picture is drawn to your satisfaction, your picture will be in memory locations 1536 through 7679 (or graphic pages 1-4). Still using your "drawer," you now switch to graphics page five, or five and six combined on a 16K machine (up to page eight if you have 32K). It is on these pages that you draw what are termed graphic motion modifiers, such as moving parts for your picture, graphic letters and numbers, flashing lights, moving hands -- anything that your imagination can come up with that you will want to use later to enhance your graphic picture and give it motion.

As an example, suppose you wished to draw a face, and have one eye blink. You would draw the face with the eye fully open on pages 1-4 and then go to page 5 and draw a series

of eyes, the first with the lid quarter way shut, the second with the lid half shut, the third with the lid three-quarters shut and the fourth with it fully shut. These additional "eyes" are graphic motion modifiers and you can call them to the main screen as you wish through GETs and PUTs in your BASIC program.

In addition, you can "pack" many graphic motion modifiers as you wish on a page. Merely by referencing their coordinates (an easy process with CHROMASETTE's "drawer" program) you can do all sorts of animation.


Using CHROMASETTE's "drawer," you find the X-Y locations of each item on your screen and make a list of where to GET them and where to PUT them when your program calls for it.

You still have not written a program, but all of your detailed graphic work is finished -- and it was fun doing it.

Before we leave step one, you will need to CSAVEM "picture", 1536

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0751, 44553. (If your motion modifiers used only five pages, change the 10751 to 9215.) That produces a machine language binary tape of your picture.

Now, in step two, you can write your program in BASIC language to GET and PUT your motion modifiers into your graphic picture as much as you want.

Since the modifier will always exist on graphic page five (or more), you need not waste memory by dimensioning each and every GET and PUT item.

One DIM for your largest block will serve all blocks since you can use only one at a time.

In order to see what you are doing while writing and debugging your basic program, try using these tools:

```
--- PCLEAR 6: CLOADM "picture"
ENTER> (Loads your picture and motion modifiers. Don't try to EXECute or RUN it. You will have a pipeout.)
```

```
--- ### PMODE 3,1: SCREEN 1,0
This will start off your BASIC program and make your picture visible. Never use a PCLS in any of your MPP programs. Here, ### refers to your BASIC program line number.)
```

```
--- 10000 PMODE 3,1: SCREEN 1,0:
GOTO 10000 <RUN 10000> (To see your picture).
```

```
--- 20000 PMODE 3,3: SCREEN 1,0:
GOTO 20000 <RUN 20000> (To see your motion modifiers).
```

The graphics page numbers will change depending on how many graphic pages your picture and motion modifiers used.

When your BASIC program is to your liking, CSAVE "program" to tape.

Step three now combines your machine language picture tape with your BASIC program tape to produce a single MPP tape which, when completed, will CLOADM: EXEC and automatically load your binary picture into its proper pages, automatically load your BASIC program to its proper place in memory and <AUTO START> RUN it. In case you have forgotten how to combine machine language and BASIC on one tape, we will list details next month -- with other necessary programming to complete MPP.

The following month we will give you a simple graphic picture which you can copy with your "drawer" and a

basic program to give it action.

Meanwhile, plan out your own action graphic ideas and practice producing MPP pictures and their motion modifiers with your "drawer."

Superior Graphic Software has available an excellent example of MPP in its "Craps Game" program. See advertisement this issue which you might want to look at if you want good ideas of MPP in action.

Software Review

THIS'LL DRIVE YOU BERSERK

BERSERK is a first class arcade game that, if you even like this sort of thing a little bit, will HAVE to be included in your library.

Authored by Ron Krebs of Mark Data Products (\$24.95, 23802 Barquilla, Mission Viejo, CA, 92691), BERSERK proves what we've been saying all along -- that CoCo is one heck of a machine, especially when put in the hands of an exceptional programmer.

This is something different in the game world. In BERSERK, you operate a person who can move about in a series of rooms, defending himself against some ape-like creatures. He's armed with a laser pistol for defense -- but the ape-men also have the ability to fire.

If all this wasn't difficult enough, the walls of the rooms are electrified. Touch one and its curtains! Fortunately, there are three men available for each game.

Ah. There's also a bouncing thing that looks very much like a refugee from PacMan. Except you can't kill him. Better run away...but watch out for the walls and the ape-men.

Actually, the ape-men are said to be robots, but it doesn't look that way to us. No matter. This game is first class. As you flee from one room to another, the rooms "scroll", and each one is different. The colors are different, too, and the sounds are great.

So are the figures. Your hero looks like a man and when he moves, his legs move just like he's walking. He raises his arm to shoot the laser pistol. The robots, too, are finely detailed. And the same goes for Evil Orville's substitute.

This one rates an A+!

RAINFLOW

Frankly, there is more software and hardware appearing for our good friend CoCo than you can shake a stick at. There are even some books coming to market, now, for those of you who want to be able to type in a large variety of programs.

Some of the news includes...

We understand that a couple of the "established" bigger software folks are hard at work producing new software for CoCo under contract to Tandy. That could be one of the reasons a few firms have not announced anything new in recent months. Its not that they've quit working, its just that they're under contract.

We got a letter the other day asking about disc software, and why more isn't available. Its moving to market -- we hear that almost everyone has some sort of disc program going. If you plan to get a disc, better order it. Deliveries are running a bit slow at last report.

Speaking of deliveries, things are a bit slow on CoCo itself. The reason is simple: Unprecedented demand at Christmas time! We have it on excellent authority that work on more is going on apace.

Could someone have misread the signs on Tandy's new Model 16 and interpreted it as a replacement for CoCo? Perhaps. It will use Motorola's 16/32-bit cousin to our favorite 6809.

Tandy's Color Scripsit is now available in some area -- on a ROM Pak. We hear it uses the normal 32-character screen, but "flips" to an empty screen to give a 64-character "display." Expect to see a review next month.

One of those things a bunch of people say they want: A graphic flight simulator. We hear Tom Mix Software will have one soon. Watch our ads!

Here's one for you drawing enthusiasts: Computerware's new 3-D Drawing Board. The Encinitas, CA firm also has two other new offerings -- MAZERACE and STORM. The latter is said to have 135 levels of play.

Another disc system is available from CER-COMP of Las Vegas. It will run with any type drive. It is said to include three systems in one package -- a free-standing disc system, a fully supported external access system and a system which interfaces with BASIC and Extended Color Basic. It takes up less than 1K of RAM and can even be used in a 4K machine. Watch for the review.

ELECTRONIC SPECIALISTS is marketing a "Super Isolator" which will protect CoCo, disc drives and the like from electrical noise, hash and spikes. The Natick, MA, firm's product has three electrical outlets.

Some of the first books to be written especially for CoCo users are now available from CONNECTION-80 of Woodhaven, NY. The lower case kit for the CoCo is also available from CONNECTION-80.

Newest CoCo software firm? Maybe its COMPUTER ISLAND of Staten Island, NY, which is featuring games for children and some learning programs as well. All is tested on actual kids, we understand.

CCWRITER of TRANSFORMATION TECHNOLOGIES is now officially available on disc. Tape owners can upgrade for \$5 from the Bloomingdale, IL, company. TRANS TECH is also expanding its line with some data base, mailing list and checkbook reconciliation software -- all on disc or tape.

We hear MARK DATA PRODUCTS has a new, super game in the works. It'll be hard to beat BERSERK, but we'll wait and see.

Has anyone received any order from SEEBREE'S COMPUTING? We'd like to know.

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TWO TO GET YOU TO THE MOON

The "Lunar Lander" program seems to be a staple of every software library and the quickly growing volume of software for CoCo seems to be no exception.

Here we look at two (really, three) lunar lander programs available from Tom Mix Software, 3424 College N.E., Grand Rapids, MI, 49505 for \$15.95 and American Small Business Computers, 118 S. Mill St., Pryor, OK, 74361 for \$14.95.

The Tom Mix package actually contains two programs, MOON LANDER and MOON LANDER 2. LANDER 2 operates very similarly to the "plain" version, except it has attitude controls and a tougher terrain. With those exceptions -- and a turning lander on the display -- the programs are essentially the same, although having two gives you a whole lot of options and should easily satisfy even the most enthusiastic of lunar lander players.

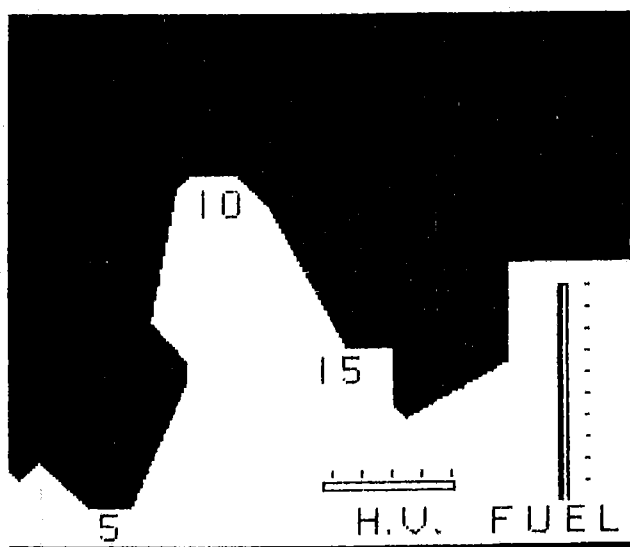
We like the fine detail in the Mix LUNAR LANDER. The landscapes are good, there are graphic on-screen fuel and speed readouts and a warning when the fuel is low. Best of all, there is both long-range and short-range display -- which means when you get close to touchdown the screen switches to a close-up version that makes it a little easier to see what you're doing. And makes it more realistic, too.

The sound is also good in the Mix versions and the final readout gives you all the vital information on what you did. Its a challenging game (in both versions) and a lot of fun to play. Each program gives you a choice of three landing sites, and lets up to four players participate in each "game" -- with a display of how each player did at the end. Gravity ratio is also user-selectable.

The American version, on the other hand, is a bit more static -- with only one possible landing site and no on-screen display to tell you how you are doing. It was, frankly, much easier to "win" this game, although losing was more frustrating, too, because with no on-screen readouts it can appear that you make a soft touchdown when, in fact, you are going too fast. This final part of the program is pretty much a matter of guesswork.

While the American program does provide something the Mix does not -- random meteors you have to avoid in your descent -- it lacks the short-range radar which is, to our mind, an essential to the game.

Neither program is a bad buy and both are vastly superior to the "scrolling readout" kind of lander program you can type in from a book. Still, for our money, we prefer the Mix program, although the lunar lander addict will probably want to purchase both.



Lunar Landscape By Tom Mix Software

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and requires absolutely no hardware modifications

TELEWRITER

Telewriter is a powerful word processor designed specifically for the Color Computer. It can handle almost any serious writing job and it is extremely easy to use. It has all the advanced features you need to create, edit, store, format and print any kind of text. With Telewriter you can quickly produce perfect, finished copy for letters, reports, term papers, articles, technical documentation, stories, novels, screenplays, newsletters. It is also a flexible and efficient way to take notes or organize ideas and plans.

51 × 24 DISPLAY

The Color Computer is an incredibly powerful and versatile computer, but for text editing it has some major drawbacks. The small 32 character by 16 line screen format shows you too little of the text and, combined with its lack of lower case letters, bears little resemblance to the way text really looks on the page. Reverse video in place of lower case just adds confusion.

Telewriter eliminates these shortcomings with **no hardware modifications required**. By using software alone, Telewriter creates a new character set that has **real lower case letters**, and puts 24 lines of 51 characters on the screen. That's more on-screen characters than Apple II, Atari or TRS-80 Model III. That's more than double the Color Computer's standard display.

FULL SCREEN EDITOR

The Telewriter editor is designed for maximum ease of use. The commands are single key (or single key plus control key), fast, and easy to remember. There is no need to switch between insert modes and delete modes and cursor movement modes.

You simply type. What you type is inserted into the text at the cursor, on the screen. What you see on the screen is always the current state of your text. You can move quickly through the text with one key cursor movement in all 4 directions, or press the shift key simultaneously for fast, auto-repeat. You can jump to the top or bottom of the text, the beginning or end of a line, move forward or backward a page at a time, or scroll quickly up or down. When you type past the end of a line, the wordwrap feature moves you cleanly to the next.

You can copy, move or delete any size block of text, search repeatedly for any pattern of characters, then instantly delete it or replace it with another. Telewriter gives you a tab key, tells you how much space you have left in memory, and warns you when the buffer is full.

FORMAT FEATURES

When it comes time to print out the finished manuscript, Telewriter lets you specify: left, right, top, and bottom margins; line spacing and lines per page. These parameters can be set before printing or they can be dynamically modified during printing with simple format codes in the text.

Telewriter will automatically number pages (if you want) and automatically center lines. It can chain print any number of text files from cassette without user intervention. You can tell it to start a new page anywhere in the text, pause at the bottom of the page, and set the Baud rate to any value (so you can run your printer at top speed).

You can print all or any part of the text buffer, abort the printing at any point, and there is a "Typewriter" feature which allows you to type straight to your printer. Because

Telewriter lets you output numeric control codes directly (either from the menu or during printing), it works with any printer. There's even a special driver for the Epson MX-80 that lets you simply select any of its 12 fonts and do underlining with a single underline character.

CASSETTE HANDLER

Telewriter makes cassette as simple to use as possible. It will search in the forward direction til it finds the first valid file, so there's no need to keep retying a load command when you are lost in your tape. You can save all or any part of the text buffer, and you can append pre-existing files to what you have in the buffer already. You can abort an append or filesearch without harming the program or the text in the buffer.

Telewriter will maintain compatibility with popular Color Computer disk systems, but, since it makes using cassette almost painless, you can still have a powerful word processor without the major additional cost of a disk.

AVAILABLE NOW

Telewriter turns your Color Computer into the lowest cost hi-power word processor in the world today. It runs in 16K or 32K (32K recommended) and is so simple you can be writing with it almost immediately. It comes with complete documentation and is fully supported by Cognitec. Telewriter costs \$49.95 (California residents add 6% tax). To order or request more information write:

Cognitec
704 Nob Ave.
Del Mar, Ca. 92014

Or call (714) 755-1258 (weekdays, Saturdays, and early morning). We will gladly answer your questions.

oftware Review...

COLORTERM HAS GOOD DISPLAY

The major feature of COLORTERM is its screen display. It will show 21 lines of upper and lower case each of which is either 51 or 64 characters long.

The program (from Martin Consulting Ltd., 94 Macalester Bay, Winnipeg, Man., Canada, R3T 2X5 for \$34.95 U.S.) runs, for all practical purposes, in two modes -- either as a dumb terminal (like VIDEOTEX) or as a smart terminal such as COLORCOM-E. The only difference is whether you call all the advanced features into play or not.

As to the display, it performs as advertised. And, for those who regularly use BBS's and the like which do not format to the 32 character screen, this can be a real bonus. However, we feel the letters -- formed through the graphic screen of the CoCo -- are not quite as fine as those in the TELEWRITER word processing program. This may cause some problems in reading, but its not a big problem.

As to the other features, there are many and COLORTERM is a workmanlike program with several unique characteristics. As with many smart terminal programs, you can print out the contents of the memory buffer, set the parameters of each of the communications options (Baud Rate, Stop Bits, Parity, Etc.) and you can flip back and forth between BASIC and the program.

You can also save the memory buffer to tape for a later printout, flip the colors and, a very nice feature, ask for assistance from the program with the syntax of the commands. You also have full screen control of the cursor.

In addition, you are able to generate what author David Martin calls a "Macro Message." This would be any message that you use often, such as a logon procedure. Typing only a couple of keys allows you to complete the logon sequence.

You can also "jumble" your output to start sending in code if, for instance, you wished to store confidential files on a mainframe. Another code "unjumbles" the code when you want to use the files.

There is also a window command,

that allows you to protect part of the screen from scrolling. Autorepeat of keys is also available.

COLORTERM is in Machine Language and full instructions are given for saving it after options have been added. Since it also allows user definition of several function keys, this is very helpful.

We have been very impressed with the two terminal programs we have seen so far, COLORTERM and COLORCOM-E. We believe you will be, too.

The Utilityman...

POKING MEMORY WITH A DISC

By Jorge Mir
RAINBOW Utilityman

If you own a CoCo disc system, you have undoubtedly found that poking a 6 into memory location 25 to make additional RAM available for programs and data no longer works.

This is because the disc system uses RAM areas in Hex 0600 to 0988.

(Continued on Page 30)

** New!*

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DISK POKE (Cont'd from Pg. 29)

In addition, attempting to use RAM at Hex 0999 to ODFF also can create some problems.

To make additional RAM available with the disc system installed, type in the following:

```
POKE 25,&HOE: POKE 26,&H1:
POKE&HOE00,0
```

You can then load BASIC programs that start at &HOE01.

A more simple way to have BASIC programs start at &HOE01 is to incorporate a short routine in each of your programs that make the programs relocate themselves to &HOE01. The routine is listed below:

```
1 GOTO 5000
2 DATA BD,B3,ED,1F,02,7E,96,A7
10 *****
20 THIS AREA FOR YOUR PROGRAM
30 *****
5000 CLEAR200: FOR I=0 TO 7:READ E$
5010 POKE&HE01+I,VAL("&H"+E$): NEXT
5020 DEFUSRO=&HE01:X=USRO(&HE09)
5030 GOTO 10
```

Please note that if your program contains DATA statements, you should read data in step two first by adding the following step before you read data in the regular program:

```
## RESTORE:FOR X=0 TO 7:READ E$:NEXT
```

Of course, you can relocate the program lines anywhere you wish, just so long as the GOTO in Line 1 and the GOTO in Line 5030 match the numbers.

BACK ISSUE AVAILABILITY

Back issues of the RAINBOW are currently available for issues 1-5 and for issue 8. No back issues are available for numbers 6 and 7.

Back issues sell for \$2 each, the single copy cover price. In addition, there is a \$2.50 per order charge for postage and handling. This charge applies whether you order one back issue or all six now available.

For ease of reference, issues 1-5 are stapled together as one packet, all on white paper. These are special reprint. However, we will break the packets and ship whichever ones you wish. All back issues now available would be \$12, plus \$2.50 postage and handling -- a total of \$14.50. VISA and MasterCard accepted.

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Utility...

DISK DIRECTORY PRINTOUT

By Charles J. Roslund

This BASIC program provides a directory listing on a printer connected to CoCo. It will operate on any disk inserted in Drive 0.

Besides providing hard copy, this utility gives a little more information than does the screen display of the disc directory under the CoCo's DOS. A major feature is addition of the start, end and execute addresses of all Machine Language programs. Another, which is very handy, is the display of the number of free granules available. This, of course, is available with the FREE command, but it is nice to have it on the directory -- sort of two commands for the price of one!

The directory listing includes:

- File name and Extension
- Type File
- Format
- Granules Used
- Start, End and Execute Addresses
- Free Granules Remaining

The printer must be on before running the program. When you run it, you are prompted for a DISK NAME which will print above the directory listing.

The Listing:

```

10 * *** DIRECTORY LISTER ***
15 * *** BY C ROSLUND ***
20 CLEAR1500: DIM GR(68)
30 FT$(0) = "BASIC PROGRAM": FT$(1) = "BASIC DATA"
40 FT$(2) = "MACHINE LANGUAGE": FT$(3) = "SOURCE CODE"
50 AF$(0) = "BINARY": AF$(1) = "ASCII"
60 PRINT#-2: INPUT "DISK NAME": D$: PRINT#-2, TAB(30) D$: PRINT#-2
70 PRINT#-2, TAB(5) "NAME": TAB(21) "TYPE": TAB(38) "FORMAT": TAB(47) "GRANULES": TAB(59) "START, END, EXEC"
80 PRINT#-2, TAB(3) STRING$(12, "="): TAB(18) STRING$(16, "="): TAB(38) STRING$(6, "="): TAB(47) STRING$(8, "="): TAB(58) STRING$(17, "=")
90 DSKI$ 0, 17, 2, A$, P$: FP$ = LEFT$(A$, 68)
100 FOR I = 1 TO 68: GR(I-1) = ASC(MID$(FP$, I, 1)): NEXT I
110 FOR X = 3 TO 11

```

```

120 DSKI$ 0, 17, X, AA$, BB$
130 AA$ = AA$ + LEFT$(BB$, 120)
140 FOR N = 0 TO 7
150 NA$ = MID$(AA$, N*32+1, 8): EX$ = MID$(AA$, N*32+9, 3): GR = ASC(MID$(AA$, N*32+14, 1))
160 FG = GR
170 FT$ = MID$(AA$, N*32+12, 1): AF$ = MID$(AA$, N*32+13, 1)
180 IF LEFT$(NA$, 1) = CHR$(0) THEN
270
190 IF LEFT$(NA$, 1) = CHR$(255) THEN
280
200 AF = ASC(AF$) AND 1
210 FOR I = 1 TO 68
220 IF GR(GR) < 128 THEN GR = GR(GR): NEXT I
230 IF ASC(FT$) = 2 THEN
300
240 PRINT#-2, TAB(3) NA$ + ". " + EX$: TAB(18) FT$(ASC(FT$)): TAB(38) AF$(AF): TAB(49) I:
250 IF ASC(FT$) = 2 THEN PRINT#-2, TAB(58) "$": BP$ = "$": EP$ = "$": EA$ = "$"
260 PRINT#-2
270 NEXT N, X
280 PRINT#-2: PRINT#-2, TAB(15) "FREE GRANULES: " + !$(0)
290 GOTO 60
300 LG = GR(GR): LS = LG AND 31: LL = GR
310 LB = ASC(MID$(AA$, N*32+16, 1))
320 IF FG < 34 THEN TN = INT(FG/2) ELSE TN = INT(FG/2) + 1
330 SN = 1 + (FG AND 1) * 9
340 DSKI$ 0, TN, SN, A$, B$
350 BP$ = ASC(MID$(A$, 4, 1)) * 256 + ASC(MID$(A$, 5, 1))
360 BP$ = HEX$(BP): BP$ = STRING$(4 - LEN(BP$), "0") + BP$
370 EP$ = BP + ASC(MID$(A$, 2, 1)) * 256 + ASC(MID$(A$, 3, 1)) - 1
380 EP$ = HEX$(EP): EP$ = STRING$(4 - LEN(EP$), "0") + EP$
390 IF LL < 34 THEN TN = INT(LL/2) ELSE TN = INT(LL/2) + 1
400 SN = (LL AND 1) * 9 + LS
410 DSKI$ 0, TN, SN, A$, P$: A$ = A$ + LEFT$(B$, 127)
420 EA$ = ASC(MID$(A$, LB-1, 1)) * 256 + ASC(MID$(A$, LB, 1))
430 EA$ = HEX$(EA): EA$ = STRING$(4 - LEN(EA$), "0") + EA$
440 GOTO 240

```

MAKING COCO HELP AS AN FRP REFEREE

By John L. Urban

For most Fantasy Role-Playing Games, the referee must spend quite a bit of time both while the game is in progress and during his free time looking for ways to keep one step ahead of the players. That means that, usually, too much time is spent creating the scenario, researching and developing ideas and the like.

Meanwhile, the players meet once a week (or whatever) and flight, slash, destroy and plunder the referee's hard work -- usually taking an almost sadistic pleasure in doing so.

For most FRP games, modules can be purchased which aid the referee by cutting research time. But, the modules can be expensive, especially considering they can be used only once per group to retain "freshness."

When I first played as a referee, I knew there had to be a simple solution. One is obviously to get a computer. And a program.

One of the first things that must be done in a FRP is to create a

character. This is done in many different ways. Why not let the computer do it for you? In so doing, time spent in actually playing the game will increase. Also, any updates could be done after playing the game, saving more time, and the data could be stored to tape or disk -- or a printout could be made for each player. All told, the time savings could be tremendous.

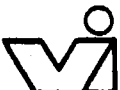
So, this month, I present a program which will do all these things. The program itself is 7190 bytes long, which will run easily on a 16K Extended machine. You may wish to PCLEAR 1 on powerup to be safe. It will run as is, but, not knowing the requirements of individual games, I have used only 25 variables which will create a bare minimum character for Advanced Dungeons and Dragons. To conserve memory, RE statements can be deleted without editing the INKEY\$ associated with the menu.

One word of caution: If you have no plans to get a disk (or a printer) then delete the disk and printer routines. If these are used without the particular devices connected, the program will hang up. Since CoCo has no error-trapping, the hang-up will result in loss of data.

As I stated, this is a bare minimum program. Variables used are NAM\$ (Name), ST (strength), PER\$ (percentile), ITEL (intelligence), WIS (wisdom), DEX (dexterity), CON (constitution), CHA (charisma), LEV (level), CLA\$ (class), EXP (experience points), PPD (paralyze), POP (polymorph) ROD (rod, staff or wand), BW (breath weapon), SPC (spell), AC (armor class), SEX\$ (sex of character), AGE (age of character), FT, IN (height in feet, inches), RAC\$ (race), DI\$ (hit dice), TI\$ (Title of character).


If you do any adding or deleting of variables in the program, make sure you adjust the data statements in line 6500. These are the data variables for the files. If they are changed in any way or order, it could have disastrous results.

I must confess to an oversight on my part. The routines in lines 30000 to 30001 are more in the line of true dice rolls rather than an accumulation of the total dice. I want to thank all of you who pointed out this



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error in my previous articles. The menu is self-explanatory. The Computer Created Stats (Option 1) is used to create character abilities. So, if a player chooses to roll his own character, or brings a character from another campaign, then skip this section.

The Player/Update/Review (Option 2) is the main part of the program. This must be used before any of the other options, except Option 1. Otherwise, empty files will be created.

This routine checks to see if any data is left unfilled. If the variables are empty, then you will be prompted for the data. These variables can be set to null by pressing <ENTER> at any time, but the program will ask for data to be input each time the routine is run. If any data is not entered correctly, or the character is to be updated, then any answer to the prompt "IS THIS INFORMATION CORRECT?" other than "yes" will clear all variables and display the first player update screen. With a little work, you can adjust this routine to update only those variables which you want changed.

The printer routine is formatted for 80-columns and the LP VII. You will have to make a few control code changes if your printer is different.

All routines are self-prompting and will return to the main menu when completed.

This program is still undergoing modification and updating. A finished program is expected to be available in June. A copy of this program can be obtained on a quality tape for \$10. Those who wish to upgrade to the finished program will be able to do so with proof of purchase and a nominal fee.

You can order the game from me at 1117 25th Street, San Diego, CA, 92154. I'll also welcome comments and suggestions about the series at the same address.

Until next month. And watch out for devlish dungeons.

The Listing:

```

1 FEM *****
2 REM * CHARACTER GENERATOR *
3 REM * VER. 3.0 *
4 REM * WRITTEN FEB, 1982 *
5 REM * BY *
6 REM * JOHN L. URBAN *
7 REM *****

```

```

20 CLEAR500
991 REM * MAIN MENU ROUTINE *
1000 CLS:PRINTTAB(12)"main menu"
:PRINT:PRINT"1. COMPUTER CREATED
STATS":PRINT"2. PLAYER CREATE/U
PDATE/REVIEW":PRINT"3. SAVE DATA
TO CASSETTE":PRINT"4. RETRIEVE
DATA FROM CASSETTE"
1010 PRINT"5. SAVE DATA TO DISK"
:PRINT"6. RETRIEVE DATA FROM DIS
K":PRINT"7. PRINTOUT CHARACTER D
ATA":PRINT"8. RUN ANOTHER CHARAC
TER":PRINT"9. END PROGRAM"
1020 PRINT:PRINT" PRESS NUMBER
OF YOUR CHOICE"
1940 REM * GET NUMBER *
2000 A$=INKEY$:IFA$=" THEN2000:E
LSE:IFA$<"0"ORA$>"9" THEN1000
2010 ON VAL(A$) GOSUB 30004,3009
,20999,21999,5000,6000,24000
2012 IF VAL(A$)=8 THEN 23000
2013 IF VAL(A$)=9 THENCLS:PRINT@
236,"THANK YOU":FORI=1TO1000:NEX
T:END
2020 GOTO1000
4991 REM * SAVE DATA TO DISK *
5000 CLS:PRINT@64,"PLEASE ENTER
FILE NAME:";:INPUTFIL$:FIL$=MID$(
FIL$,1,8):PRINT@224,"DISK OUTPU
T IN PROGRESS.....":OPEN"O",#
1,FIL$

```

(Continued on Page 34)

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FRP (Cont'd from Pg. 33)

```

5010 FORI=1TO25:READA$:PRINT#1,A
$:NEXT:RESTORE
5020 CLOSE#1:FORI=1TO500:NEXT:CLS:PRINT@224,"TASK COMPLETE..RETURNING TO MAIN MENU FOR FURTHER REQUESTS":FORI=1TO1000:NEXT:RETURN
5992 REM * RETRIEVE DATA FROM *
5994 REM * DISK *
6000 CLS:PRINT@224,"PLEASE INPUT FILE NAME TO BE RE-TRIEVED FROM DISK";:INPUTFIL$
6001 IF LEN(FIL$)>8 THEN FIL$=(MID$(FIL$,1,8))
6010 OPEN"I",#1,FIL$
6020 CLS:PRINT@224,"INPUT FROM DISK IN PROGRESS...":PRINT:PRINT"FILE NAME="+FIL$
6030 FORI=1TO25:READA$:INPUT#1,A$:NEXT:RESTORE
6040 GOTO5020
6500 DATA NAM$,ST,PER$,ITEL,WIS,DEX,CON,CHA,LEV,CLA$,EP,PPD,POP,ROD,BW,SPE,AC,SEX$,AGE,WOC,FT,IN,RAC$,DI$,TI$
20993 REM * SAVE TO CASSETTE *
20999 CLS
21000 PRINT@224,"SET UP CASSETTE TO RECORD DATA, THEN PRESS ANY KEY":AN$=INKEY$:IF AN$="" THEN 21000
21030 CLS:PRINT@64,"PLEASE ENTER FILE NAME:";:INPUTFIL$:FIL$=MID$(FIL$,1,8):PRINT@224,"CASSETTE OUTPUT IN PROGRESS...":OPEN"O",#-1,FIL$
21040 FORI=1TO25:READA$:PRINT#-1,A$:NEXT:RESTORE
21045 CLOSE#-1:FORI=1TO500:NEXT:CLS:PRINT@224,"TASK COMPLETE..RETURNING TO MAIN MENU FOR FURTHER REQUESTS":FORI=1TO1000:NEXT:RETURN
21993 REM * RETRIEVE DATA *
21994 REM * FROM CASSETTE... *
21999 CLS
22000 PRINT@224,"SET UP CASSETTE TO RETRIEVE":PRINT"DATA, THEN PRESS ANY KEY":AN$=INKEY$:IF AN$="" THEN 22000
22010 CLS:PRINT@224,"PLEASE INPUT FILE NAME TO BE RE-TRIEVED FROM CASSETTE";:INPUTFIL$
22020 IF LEN(FIL$)>8 THEN FIL$=(MID$(FIL$,1,8))
22040 CLS:PRINT@224,"INPUT FROM CASSETTE IN PROGRESS...":PRINT:PRINT"FILE NAME="+FIL$
22045 OPEN"I",#-1,FIL$
22050 FORI=1TO25:READA$:INPUT#-1,A$:NEXT:RESTORE
22055 GOTO21045

```

```

22992 REM * HERE WE CLEAR OUT *
22993 REM * ALL VARIABLES TO *
22994 REM * RUN ANOTHER CHAR- *
22995 REM * ACTER- *
23000 CLS:PRINT@224,"CLEARING VARIABLES, STAND BY...":CLEAR:FORI=1TO1000:NEXT:PRINT@224,"VARIABLES CLEARED, RETURNING...":FORI=1TO500:NEXT:GOTO1000
23993 REM * -PRINTER ROUTINE- *
24000 CLS
24005 PRINT@224,"MAKE SURE PRINTER IS ON-LINE":PRINT"PRESS ANY KEY TO WHEN READY...":A$=INKEY$:IF A$="" THEN 24005
24010 CLS:PRINT@224,"OUTPUTTING DATA TO PRINTER...":PRINT#-2,CHR$(10);"NAME:";NAM$;CHR$(10);PRINT#-2,"TITLE:";TI$;TAB(40)"LEVEL:";LEV;PRINT#-2,"EXPERIENCE POINTS:";EP;TAB(40)"HIT-DIGES:";DI$;PRINT#-2,"CLASS:";CLA$;TAB(40)"AGE:";AGE
24020 PRINT#-2,"WEIGHT:";WOC;TAB(40)"RACE:";RAC$;PRINT#-2,"ARMOR CLASS:";AC;TAB(40)"SEX:";SEX$;PRINT#-2,"WEIGHT:";WOC;TAB(40)"HEIGHT:";FT;"":IN;"":
24030 PRINT#-2,CHR$(10);"CHARACTER ABILITIES:";TAB(40)"SAVING THROWS:";IF PER$<>" THEN PRINT#-2,USING"STR: ##";ST;:PRINT#-2,PER$;:PRINT#-2,TAB(40)"PARALYZE:";PPD ELSE PRINT#-2,USING"STR: ##";ST;:PRINT#-2,TAB(45)"PARALYZE:"PPD
24040 PRINT#-2,USING"INT: ##";ITEL;:PRINT#-2,TAB(45)"POLYMORPH:";POP;PRINT#-2,USING"WIS: ##";WIS;:PRINT#-2,TAB(45)"ROD, STAFF OR WAND";ROD;PRINT#-2,USING"DEX ##";DEX;:PRINT#-2,TAB(45)"BREATH WEAPON:";BW
24050 PRINT#-2,USING"CON: ##";CON;:PRINT#-2,TAB(45)"SPELL:";SPE;PRINT#-2,USING"CHA: ##";CHA
24500 RETURN
29993 REM * COMPUTER STATS *
30000 X=0:FOR R=1 TO 3:X=RND(6)+X:NEXTR:RETURN
30001 X=RND(10)-1:RETURN
30004 CLS:LEV=1:PRINT:PRINT:PRINT"WHAT IS THE CHARACTER'S":INPUT"NAME";NAM$
30005 CLS:PRINTTAB(5)"COMPUTER CREATED STATS":PRINT
30010 GOSUB30000:ST=X:PER=0:GOSUB30000:ITEL=X:GOSUB30000:WIS=X:GOSUB30000:DEX=X:GOSUB30000:CON=X:GOSUB30000:CHA=X
30015 IF ST=18 THEN GOSUB30001:PER$=STR$(X):GOSUB30001:PER$="( "+PER$+STR$(X)+" )"

```

```

30020 IF ST<>18 THENPRINTUSING"STR ##";ST:ELSE:PRINTUSING"STR ##";ST;:PER$
30021 PRINTUSING"INT ##";ITEL:PRINTUSING"WIS ##";WIS:PRINTUSING"DEX ##";DEX:PRINTUSING"CON ##";CON:PRINTUSING"CHA ##";CHA
30025 PRINT:INPUT"IS THIS OK";AN$:IF LEFT$(AN$,1)<>"Y"THEN30005:ELSE:CLS:PRINT@160,"THANK YOU,"NAMS:PRINT@224,"RETURNING TO MAIN MENU FOR FUR-":PRINT"THEIR INPUT":FOR I=1 TO 1000:NEXTI
30026 RETURN
30093 REM * PLAYER STATS *
30099 CLS
30100 PRINT"PLAYER CREATED/UPDATED/REVIEW":PRINTTAB(11)"STATS(CONT)":PRINT
30110 IF NAM$<>" " THEN PRINT"NAM E:";NAM$:ELSE:PRINT"WHAT IS THE CHARACTER'S":INPUT"NAME";NAM$
30120 IF AGE<>0 THEN PRINT"AGE:";AGE:ELSE:INPUT"AGE";AGE
30130 IF RAC$<>" " THENPRINT"RACE:";RAC$:ELSE:INPUT"RACE";RAC$
30140 IF CLA$<>" " THENPRINT"CLAS S:";CLA$:ELSE:INPUT"CLASS";CLA$
30145 IF LEV<>0 THENPRINT"LEVEL:";LEV:ELSE:INPUT"LEVEL";LEV
30147 IF EP<>0 THENPRINT"EXPERIENCE POINTS";EP:ELSE:INPUT"EXPERI

```

```

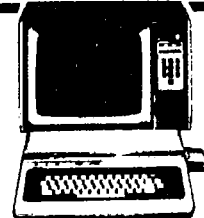
ENCE POINTS";EP
30150 IF ST<>0 THENPRINT"STRENGTH";ST:ELSE:INPUT"STRENGTH";ST
30155 IF ST<=17 THEN PRINTCHR$(32):GOTO 30170
30160 IF ST=18 AND PER$<>" " THEN PRINT PER$:ELSE:IF ST=18 AND PER$="" THEN INPUT PER$;PER$
30170 IF ITEL<>0 THENPRINT"INTELLIGENCE";ITEL:ELSE:INPUT"INTELLIGENCE";ITEL
30180 PRINT:PRINT:INPUT"IS THIS INFORMATION CORRECT";AN$:IF LEFT$(AN$,1)<>"Y" THEN CLEAR:GOTO30099
30190 CLS:PRINT"PLAYER CREATED/UPDATED/REVIEW":PRINTTAB(11)"STATS(CONT)":PRINT
30200 IF WIS<>0 THENPRINT"WISDOM";WIS:ELSE:INPUT"WISDOM";WIS
30210 IF DEX<>0 THENPRINT"DEXTERITY";DEX:ELSE:INPUT"DEXTERITY";DEX
30220 IF CON<>0 THENPRINT"CONSTITUTION";CON:ELSE:INPUT"CONSTITUTION";CON
30230 IF CHA<>0 THENPRINT"CHARISMA";CHA:ELSE:INPUT"CHARISMA";CHA
30240 PRINT:PRINT"SAVING THROWS:"
"

```

(Continued on Page 36)

COLOR COMPUTER DISK SYSTEM

A complete disk drive system for the color computer, featuring the Tall Grass Technology Double density, buffered disk controller. This system will support up to 4 5 1/4 in. disk drives with a maximum capacity of 3.2 Mega bytes of storage using double sided 80 track drives. This is a minimum of 4 times the capacity of the "Standard" color computer disk drive system.



DISK OPERATING SYSTEM (CCMD + 9)

This is a full featured "Basic" compatible disk operating system which does "NOT" require extended Basic and will even run on a 4K color computer. It includes a complete dynamic allocation system that leaves no wasted or unused space on the disk. It will automatically repack disk space when files are deleted to reduce file fragmentation and increase access time.

This system features three operating systems in one, the first is a free standing system which has 11 commands for loading, saving, removing, changing, checking, analyzing and executing files on disk. It can be configured to allow any mixed combinations of 35, 40 and 80 track drives.

The second system is a completely supported external access system for interfacing with virtually any program requiring the use of the disk system. It includes 10 functions for opening, closing, reading, writing sequential and random access files. There are also 13 subroutine functions and 7 I/O subroutines accessible to the programmer.

The third system is a Basic interface system which includes 6 direct execute Basic commands and 6 indirect commands which conform to the standard Basic tape & printer I/O commands and allow use of string and numeric variables for disk parameters. Up to 9 files can be active at once, all disk file memory allocation is done automatically at run time. Also, Basic has access to all the free standing DOS commands either directly or under program control.

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FRP (Cont'd from Pg. 35)

```

30250 IF PPD<>0 THENPRINT"PARALYZE:";PPD:ELSE:INPUT"PARALYZE";PPD
30260 IF POP<>0 THENPRINT"POLYMORPH:";POP:ELSE:INPUT"POLYMORPH";POP
30270 IF ROD<>0 THENPRINT"ROD,STAFF OR WAND:";ROD:ELSE:INPUT"ROD,STAFF OR WAND";ROD
30280 IF BW<>0 THENPRINT"BREATH WEAPON:";BW:ELSE:INPUT"BREATH WEAPON";BW
30290 IF SPE<>0 THENPRINT"SPELL:";SPE:ELSE:INPUT"SPELL";SPE
30300 PRINT:INPUT"IS THIS INFORMATION CORRECT";AN$:IF LEFT$(AN$,1)<>"Y" THEN CLEAR:GOTO30099
30310 CLS:PRINT" PALAYER CREATED /UPDATED/REVIEW":PRINTTAB(11)"STATS(CONT)":PRINT
30320 IF AC<>0 THENPRINT"ARMOR CLASS:";AC:ELSE:INPUT"ARMOR CLASS";AC
30330 IF SEX$<>" " THENPRINT"CHARACTER'S SEX:";SEX$:ELSE:INPUT"CHARACTER'S SEX";SEX$
30340 IF WOC<>0 THENPRINT"WEIGHT OF CHARACTER:";WOC:ELSE:INPUT"WEIGHT OF CHARACTER";WOC
30350 IF HT<>0 AND IN<>0 THENPRINT"HEIGHT(FT, IN):";FT;" ";IN;" "":ELSE:INPUT"HEIGHT(HT, IN)";FT,IN
30360 IF DIC$<>" " THENPRINT"HIT DICE:";DI$:ELSE:INPUT"HIT DICE(X, D8)";DI$
30370 IF TI$<>" " THENPRINT"TITLE OF CHARACTER:";TI$:ELSE:INPUT"TITLE OF CHARACTER";TI$
30380 PRINT:PRINT:INPUT"IS THIS INFORMATION CORRECT";AN$:IF LEFT$(AN$,1)<>"Y" THEN CLEAR:GOTO30099
30390 PRINT"THANK YOU,";NAM$:FOR I=1 TO 500:NEXTI:RETURN
    
```

Software Review...

CIRCUS ADVENTURE IS "FUN"

By Tracy Hirsch

This game was fun! I liked the places it took me to and if you pushed the wrong button, you went home.

The first time I used 110 turns and ate 23 hot dogs. The second time 123 turns and 36 hot dogs. Its pretty tricky.


CIRCUS ADVENTURE (by Computer Island, Dept. R, 227 Hampton Green, Staten Island, NY 10312, \$10) is advertised as a "program for kids" so we let eight-year-old Tracy play it. She liked it a lot.

For the 16K CoCo, Circus Adventure lets kids wander around a circus lot looking for the popcorn man. When they find him, they win. On the way, they visit tigers, high-wire artists and the like. Its in low-resolution graphics, but very cute and keeps the attention of younger ones. There is lots of music and color.

Another thing you can do is visit the hot dog stand -- as you can see, Tracy did several times.

A real nice feature is the inclusion of a cardboard "ticket" with the documentation. The kids can hand it to you when they want to play the game.

A nice program.



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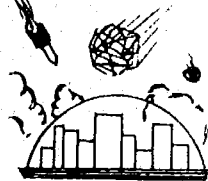
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Software Review...

PAC ATTACK A PACK OF FUN

I have a complaint about PAC ATTACK from Computerware (Dept. R, Box 668, Encinitas, CA, 92024, 19.95). And, if you acquire it, you will probably have the same one.

Shortly after its arrival, I installed PAC ATTACK in CoCo for a look-see. Two minutes of enjoyment passed before one of the other people who lives here noticed it and wanted to play. Lost time: Several hours when I really should be doing something else with the CoCo.

I have come into the house only to find the computer in use, with PAC ATTACK. Its an addictive game, and this version is so fine that all of its powers of addiction are at full force.

If you wish to see what PAC ATTACK is like, go to the local arcade. Its every bit as good as the "big" version, a lot less expensive and all sorts of fun.

Yes, those little creatures are there...and there are "energy dots." Then there is the PAC ATTACKer, who gobbles things up quite rapidly. The joystick control is excellent and very easy to use. There is on-screen scoring, too.

PAC ATTACK is first class in every way. Its a perfect version of this popular program and I can recommend it to you most highly.

Software Review...

RABBIT MAKES ML BACKUPS POSSIBLE

OK. We know its complicated to make backups of your Machine Language programs...but you say someone just gave your five-year-old a "Magnet Fun" game for his birthday and he's been getting dangerously close to your tape collection?

ML RABBIT (DSL Computer Products, P.O. Box 1113, Deanborn, MI, 48121, \$14.95) may be the salvation you hope for.

Painlessly, effortlessly and easily, ML RABBIT does what rabbits are known for best...making more rabbits. In this case, ML RABBIT will make more Machine Language programs than you can shake a carrot at.

The process is "automatic," in

that all you need do is load in ML RABBIT, load in the Machine Language program you wish to backup, and then load in a blank tape on which to make the copy. ML RABBIT prompts you to do what when.

ML RABBIT comes with the admonition that it is designed to backup your own tapes. At the risk of harping on a subject, let us add that this is what you should buy it to do. It answers a very real need -- to have a backup in case something happens to the original -- and should not be abused.

There's nothing fancy about this program. But it does do what it says and that's a real plus.

SUBMITTING MATERIAL TO RAINBOW

Contributions to the RAINBOW are welcome from everyone. We like to run a variety of programs which would be useful/fun/helpful to other CoCo owners.

Program submissions should be on tape or disc. We're sorry, but we do not have the time to key in programs. All programs should be supported by some editorial commentary, explaining the program and how it works.

Please do not submit programs or articles currently submitted to another publication.

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For TRS-80, and COLOR-80. These Adventures are written in BASIC, are full featured, fast action, full plotted adventures that take 30-50 hours to play. (Adventures are inter-active fantasies. It's like reading a book except that you are the main character as you give the computer commands like "Look in the Coffin" and "Light the torch.")

Adventures require 16K on COLOR-80 and TRS-80. They sell for \$14.95 each.

ESCAPE FROM MARS

(by Rodger Olsen)

This ADVENTURE takes place on the RED PLANET. You'll have to explore a Martian city and deal with possibly hostile aliens to survive this one. A good first adventure.

PYRAMID (by Rodger Olsen)

This is our most challenging ADVENTURE. It is a treasure hunt in a pyramid full of problems. Exciting and tough!

TREK ADVENTURE (by Bob Retelle)

This one takes place aboard a familiar starship. The crew has left for good reasons - but they forgot to take you, and now you are in deep trouble.

DEATH SHIP (by Rodger Olsen)

Our first and original ADVENTURE, this one takes place aboard a cruise ship - but it ain't the Love Boat.

VAMPIRE CASTLE (by Mike Bassman)

This is a contest between you and old Drac - and it's getting a little dark outside. \$14.95 each.

SPACE SHUTTLE

ONE OR TWO PLAYER HIGH RES GAME - Your mission is to dock with an orbiting space platform - but you may have to land on the planetary surface for refueling first. A real value in a high res real time game. \$6.95.

KILLERBOT - (Available in 4K) - Real time action at 20 levels of difficulty as you run, sneak, and dodge your way through a bloody field of Killer Robots. Get across or die! Joysticks or Keyboard controls. TRS-80 COLOR (ANY BASIC 4K or more.). \$9.95.

SLASHBALL (Available in 4K) - This one is best described as a thinkers arcade game. It rewards fast reflexes and clear thinking - like nothing you have ever seen before. It is one of our best family games for one or two players. \$9.95.

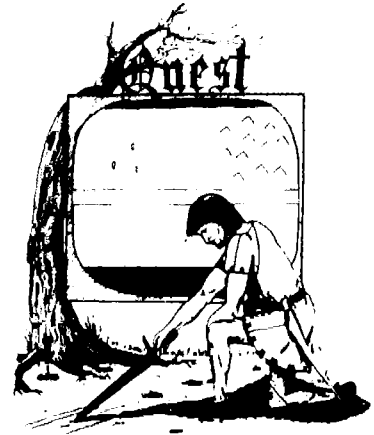
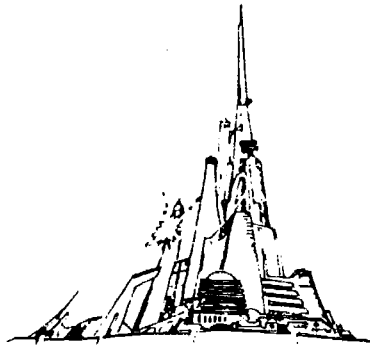
TIMETREK - A REAL TIME, REAL GRAPHICS STARTRECK. See your torpedoes hit and watch your instruments work in real time. No more unrealistic scrolling displays! \$14.95.

STARFIGHTER - This one man space war game pits you against spacecruisers, battlewagons, and one man fighters, you have the view from your cockpit window, a real time working instrument panel, and your wits. Another real time goody. \$9.95

BATTLEFLEET - This grown up version of Battleship is the toughest thinking game available on OS1 or 80 computers. There is no luck involved as you seek out the computers hidden fleet. A topographical toughie. \$9.95

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AN EDUCATIONAL U.S.

By Dave Hooper

The CoCo is a very sophisticated piece of equipment that CAN do more than just display games.

To prove this point, I am developing a new series of educational programs entitled GEO/STUDIES. These programs are being developed to teach the basic geography of several countries.

I hope you will think of them as a new series of games, as well. That's so you can enjoy them while improving your mind.

Part I, titled "Continental U.S.A." and Part II, "Australia," are completed. Europe is designated for Part III and Canada Part IV. These are on the (pardon the pun) drawing board.

A demonstration of Part I is listed below. This will draw maps of the continental United States used in the "Continental U.S.A." program.

The actual program displays a cursor which is controlled by the right joystick. A two-letter abbreviation of a state is then displayed on the screen. You position the cursor within the state's boundaries and press the fire button to score. Correct and incorrect answers are displayed at the end of the program.

Part II, "Australia," is a bit different from that after you complete the state identifications, you move on to the capital cities, where there is an audio supplement.

The GEO STUDIES series is a new dimension in education, combining the senses of touch, vision and hearing -- but most important, it is fun, too! This series requires 16K, Extended Basic and one joystick.

The listing:

```
5 REM' DEMO PROGRAM :GEO/STUDIES
7 REM' U.S.A.
8 REM' COPYRIGHT 1981
10 REM' BY DAVE HOOPER
33 PCLS
100 PMODE3,1:SCREEN1,0
133 PCLS
135 READX,Y
140 IFX=999THEN160
145 IFX=222THEN300
150 IFX<0THENX1=-X:Y1=Y:READX,Y:
LINE(X1,Y1)-(X,Y),PSET
155 IFX>0THENLINE-(X,Y),PSET:GOT
0135
```

```
160 PAINT(76,28),2,4:PAINT(76,64
),4,4:PAINT(76,96),2,4:PAINT(88,
156),2,4
165 PAINT(108,80),3,4:PAINT(108,
140),4,4:PAINT(117,30),2,4:PAINT
(132,48),2,4
170 PAINT(132,80),4,4:PAINT(132,
104),2,4:PAINT(132,116),3,4:PAIN
T(132,140),2,4
175 PAINT(168,88),3,4:PAINT(168,
112),2,4:PAINT(168,144),4,4:PAIN
T(192,64),4,4
180 PAINT(192,92),4,4:PAINT(192,
108),2,4:PAINT(205,79),4,4:PAINT
(207,64),2,4
185 PAINT(228,12),4,4:PAINT(218,
44),2,4:PAINT(216,52),4,4:PAINT(
210,28),4,4
190 PAINT(28,190),3,4:COLOR2,3:F
ORT=1T01000:NEXT:PCLS(3):GOTO135
300 CIRCLE(220,185),25,2,1,.5,.7
2:CIRCLE(136,20),44,2,1,.37,.498
305 PAINT(72,20),4,2:PAINT(68,48
),1,2:PAINT(60,108),2,2
310 PAINT(96,56),2,2:PAINT(128,3
2),1,2:PAINT(108,92),1,2
315 PAINT(108,128),4,2:PAINT(144
,96),4,2:PAINT(140,132),1,2
320 PAINT(174,40),2,2:PAINT(176,
60),4,2
325 PAINT(180,80),2,2
330 PAINT(184,104),1,2:PAINT(192
,124),4,2:PAINT(188,152),2,2
```

(Continued on Page 40)

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335 GOTO335
 5000 DATA-55,9,67,9,68,6,70,7,71
 ,11,83,13,100,17,87,28,96,28,100
 ,27,112,20,109,26,113,25,120,27,
 129,25,134,26,134,28,123,32,120,
 35,115,45,116,52,117,60,118,64,1
 20,67,123,66,125,64,127,60,125,4
 9,124,44,126,39
 5005 DATA129,35,133,33,141,35,14
 3,40,143,43,141,48,142,49,147,44
 ,149,46,150,50,151,54,149,56,147
 ,60,146,62,148,64,152,65,156,64,
 164,60,175,49,174,47,180,45,190,
 40,188,36,199,24,206,23,216,19,2
 20,15,221,11,220,7,221,4
 5010 DATA224,1,229,1,234,3,241,1
 0,243,12,242,16,236,20,228,30,22
 6,36,227,41,229,44,232,46,212,60
 ,209,77,203,72,208,80,204,92,205
 ,96,209,104,205,113,193,124,177,
 142,174,148,176,152,179,164,184,
 172,188
 5015 DATA180,189,185,189,187,187
 ,190,184,191,180,190,172,184,167
 ,178,168,170,160,163,156,161,148
 ,166,144,162,140,160,116,162,111
 ,164,112,168,110,171,103,171,78
 5020 DATA168,80,164,80,154,76,14
 8,76,137,73,135,71,90,59,62,60,5
 5,60,40,57,37,59,34,55,9
 5025 DATA-87,28,85,33,83,35,83,4
 3,91,51,93,54,97,62,101,64,100,6
 8,96,72,96,76,93,81,100,94,102,9
 2,102,96,107,101,110,106,104,124
 ,98,136,100,144,100,147,97,157,1
 11,157,112,164,-72,112,107,111,1
 20,110,120,108,144,107
 5030 DATA168,104,206,98,-104,124
 ,159,119,165,116,172,116,176,118
 ,183,117,193,124,-113,102,117,10
 3,120,98,124,99,130,96,132,96,14
 0,87,142,86,148,89,153,88,156,91
 ,161,97,163,99,166,95,173,94,176
 ,87,184,78,186,79
 5035 DATA189,77,195,85,201,87,20
 2,84,204,88,204,92,-60,55,93,54,
 -64,78,93,79,-76,140,98,140,-97,
 62,117,61,-123,66,147,64,-136,65
 ,140,87,-120,122,122,161,-119,66
 ,120,77,122,83,120,93,116,98,110
 ,106
 5040 DATA-128,161,128,155,148,15
 4,144,136,138,121,-148,154,149,1
 56,176,155,-144,121,168,104,-156
 ,120,177,142,-152,106,161,97,-16
 4,60,168,77,202,72,208,77,-176,7
 6,176,80,185,78,-156,90,158,85,1
 69,77,-103,25,120,35
 5045 DATA-169,57,170,59,197,53,2
 04,57,212,60,-204,57,202,61,204,
 64,206,67,202,72,201,73,203,82,2
 08,81,-205,23,211,43,211,54,213,

58,-218,18,226,36,-215,19,213,42
 ,210,43,-215,42,226,37,-211,49,2
 24,46,229,49,-221,47,224,52
 5050 DATA-233,46,234,45,234,44,2
 32,43,999,0
 5070 DATA-56,9,86,16,116,22,150,
 23,186,24,189,46,193,68,201,87,2
 05,93,208,108,210,132,213,132,21
 4,144,218,150,216,162,-193,184,1
 96,188,194,190,188,188,184,185,1
 80,180,172,169,168,164,164,162,1
 56,164,151,167,144,160,140,155,1
 34,148,119,146,119,150,102
 5075 DATA149,79,137,63,136,60,12
 8,56,124,45,118,28,84,35,59,46,2
 8,47,11,50,12,53,11,56,9,-86,16,
 74,67,58,65,35,59,58,65,54,86,82
 ,120,82,126,79,137,-74,67,92,70,
 109,71,108,79,119,80,116,108,87,
 106,86,112,83,112,82,120,-87,106
 ,92,70,-150,23,150,52,111
 5080 DATA49,109,71,-96,18,94,24,
 -114,150,116,108,144,110,160,110
 ,160,82,119,80,-150,82,150,46,18
 9,46,-150,67,192,68,-208,108,154
 ,110,154,114,174,114,174,128,176
 ,128,188,132,208,132,-154,114,15
 4,146,131,145,133,148,-46,28,48,
 28,56,36,60,36,68,37,81,38
 5085 DATA-201,87,160,87,222,0

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6, 9, 2
65, 54, 2
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Special Software Preview...

SPECTACULATOR IS SPECTACULAR

A game machine with VisiCalc? Of course not. But, as we've been saying for a long time now, the Color Computer is much more than a game machine.

There is something about the number-crunching ability of VisiCalc that seems to separate the Computer geeks from the Computer kids. And while SPECTACULATOR (soon to be available for \$39.95 at all Radio Shack stores and dealers) isn't quite identical, it's an excellent version of the original "electronic spreadsheet" program that will do wonders for your budgeting and forecasting needs.

SPECTACULATOR comes in a handsome package and includes a ROM disk and a 43-page instruction manual. The manual is excellent and shows how to get things up, what equipment you will need, how to make SPECTACULATOR do the stuff and gives two levels of "sample sessions" that make practical use of all the features. There is also a summary for reference.

For those who have seen or used VisiCalc, the one thing that is seen to be missing right away is the slash (/) command. Rather, SPECTACULATOR uses two-letter commands to enter in all the directions. Since we're familiar with VisiCalc, it took about 10 minutes to get used to the command structure. From there on, we think it was easier to use (and remember) than its older brother.

SPECTACULATOR is designed to do anything that may need to handle or compare numbers. It sets up a "spreadsheet," like those an accountant uses, and will carry that sheet out 99 columns by 99 rows. Most important, you can set up formulas for each position -- referencing it by its column and row designation -- and then have SPECTACULATOR calculate the relative value if you only give it a starting set of values.

SPECTACULATOR's method of operation is a little different than is VisiCalc, but it accomplishes much of the same thing. One of the things we particularly like is that it lets you tell it when to calculate. VisiCalc just does its calculations -- sometimes before you really want it to.

There is also a sophisticated HELP system available for all the commands so that, while the documentation is excellent, you do not have to page through the manual looking for the exact syntax for this or that.

There is full screen cursor control and a number of excellent features such as delete and insert rows and columns, save on tape, list to printer and display free memory. You can even change the size of a "window" -- to accommodate larger numbers. Alphanumeric labels can be entered, too.

All in all, we are very impressed with SPECTACULATOR. Its a winner!

GREG. WILSON, PO Box 504, Potts Point Australia 2011

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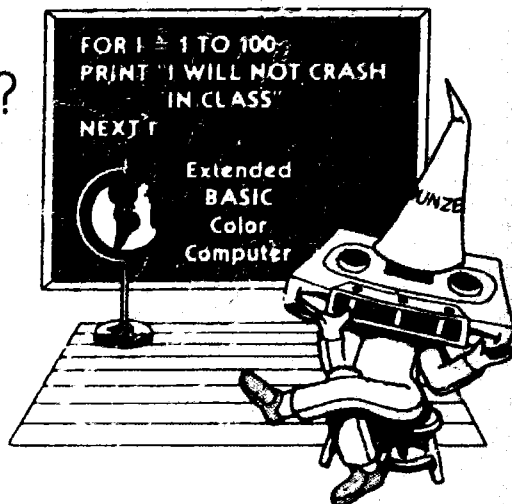
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