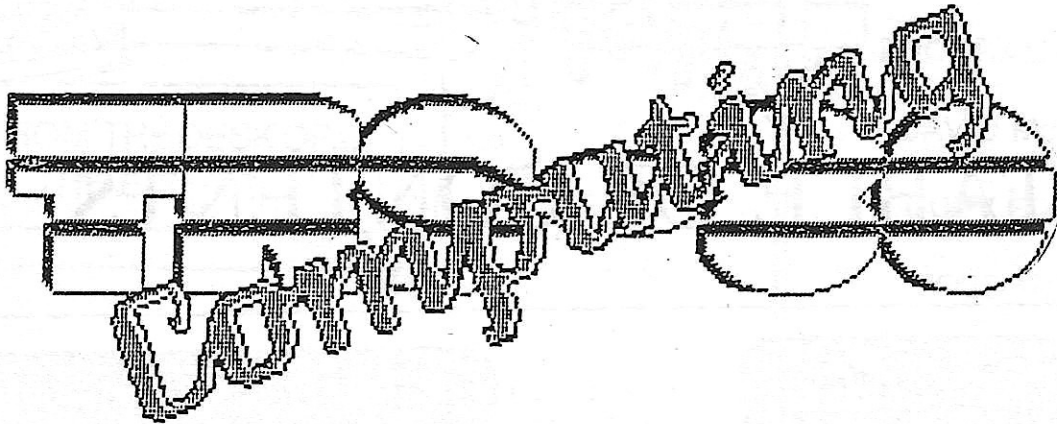


FEBRUARY 1991

\$1.75
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VOLUME 4
NUMBER 5



The bi-monthly magazine for Color Computer users



IS YOUR COCO
INTIMIDATING YOU?

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COME TO YOUR AID!

- Debugging tips for the BASIC programmer
- Starting off in the world of data communications
- More on the C compiler

ALSO:

The start of a new questions
and answers column

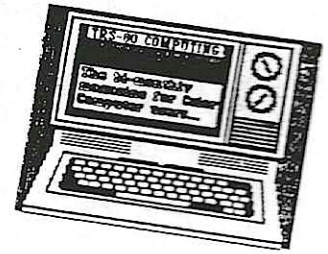


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Here we are again at the beginning of yet another year. A new year at TRS-80 Computing always symbolizes many changes -- both in the contents and the quality of the magazine. We have two new writers who have begun with this issue, one who will be discussing advanced topics in BASIC, and another who will be guiding us through the "world of telecommunications" and modems. We also have two new columns -- a question and answers column and a column that lists and explains the many CoCo clubs around the United States (this will be published in every other issue).

Our aim in each issue is to keep as closely related as possible to the editorial topic, or theme. Sometimes doing this is not an easy task. Since we have to plan our topics a year in advance, things are always bound to change and not work out as expected. So continue to bear with us, and we will continue to do our best in putting out each issue as outlined in the editorial calendar. Speaking about the editorial calendar, we've printed the topics and deadlines for the remaining five issues for this year on page 17 of this issue.

Now for the bad news. Because of increased costs in printing (you'll notice that the print quality of this issue is much better than the last three issues), and the recent raise on the postage rates, we will be raising the cover price to \$2.00 beginning with the April issue. There is just a slight raise in the subscription rates (see the note in this issue).

Before I go, I would just like everyone to know that in regards to the change in the title from TRS-80 Computing to Color Computing, it looks as though that will be going into effect in the June (fourth year anniversary) issue. However, this could change, and you'll know for sure in April. Until then, keep on CoCoing!

- Joe Ahern

**TRS-80 COMPUTING
SINCE 1987**

**EDITOR-IN-CHIEF
& PUBLISHER:**

JOSEPH W. AHERN

PROGRAM EDITOR:

DAVID McNALLY

COPY EDITOR:

ROSS KRAMER

CONTRIBUTING EDITORS:

**ANTON MILARDOVIC
LEO BREHM
BOB VAN DER POEL
THOMAS SINCLAIR
BOB WENZLER
MICHAEL HOLTRY**

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**COVER DESIGN
BY
ROSS KRAMER**

BATMAN

*Program written by
Bob Wenzler, Contributing Editor*

This program is written for the 128k CoCo 3. It draws a replica of the Batman logo by using a series of circles and partial circles in the HSCREEN graphics mode. The hi-resolution picture should come up black and gold on a green background, but may be different if another program has been run through that changes the screen colors.

(Editor's Note: The actual program listing is copyrighted by TRS-80 Computing. The Batman logo itself is a trademark and copyrighted 1964, 1989 by DC Comics Inc.)

THE LISTING: BATMAN

```

5 ' BATMAN!
10 ' PROGRAM WRITTEN BY BOB WENZ
LER
20 ' THE BATMAN LOGO IS A REGIST
ERED TRADEMARK OF DC COMICS INC.
30 HSCREEN 2
40 HCIRCLE (160,96),160,,.4
50 HCIRCLE (160,96),152,,.4
60 HPAINT (1,96),1,1
70 HCIRCLE (160,96),125,,.4
80 HPAINT (12,96),14,1
90 HCIRCLE (160,96),110,,.4,.81,
.17
100 HCIRCLE (160,96),110,,.4,.35
,.71
110 HCIRCLE (130,65),20,,.5,.21,
.75
120 HCIRCLE (126,63),25,,.5,.00,
.20
130 HCIRCLE (190,65),20,,.5,.75,
.21
140 HCIRCLE (194,63),25,,.5,.25,
.50
150 HLINE (151,63)-(151,55),PSET
160 HLINE -(155,60),PSET
170 HLINE (169,63)-(169,55),PSET
180 HLINE -(165,60),PSET
190 HLINE -(155,60),PSET
200 HCIRCLE (117,122),25,,.5,.30
,.62
210 HCIRCLE (113,135),25,,1.1,.6
3,.85
220 HCIRCLE (139,135),25,,1.1,.6
7,.90
230 HCIRCLE (206,122),25,,.5,.88
,.20
240 HCIRCLE (209,135),25,,1.1,.6
7,.85
250 HCIRCLE (183,135),25,,1.1,.6
2,.85
260 HLINE (156,117)-(161,135),PS
ET
270 HLINE (166,117)-(161,135),PS
ET
280 HPAINT (45,96),1,1
290 HPAINT (160,96),14,1
300 GOTO 300

```

END OF PROGRAM

AVOIDING COMMON ERRORS IN BASIC

by Joe Ahern, Publisher

Attempting to avoid errors while programming in any computer language is not easy to do. Not unless you are writing a very simple program, such as one that prints your name on the screen for example. Ninety-nine percent of the time you will get some type of error message after first RUNNING your program for the first time.

There are a wide variety of computer languages, but most users who are novices in computer programming usually start off in good 'ol BASIC. If you are a beginner at programming on the CoCo, then here are some common errors (or "bugs") to avoid in BASIC:

- (1) You are missing quotes at the end (or the middle) of a long program line
- (2) Too many quotation marks
- (3) Forgetting the keyword PRINT, especially when the PRINT statement is in the middle of a multiple statement line
- (4) Forgetting the colon (:) that separates statements in a multiple statement line (especially after a PRINT statement that ends with ";" or ",")
- (5) Forgot the line number
- (6) Parenthesis do not match. This error most often occurs in algebraic operations. An example would be the equation: ((X+Y+Z)/2). It's always important that there is one right parenthesis for each left parenthesis.
- (7) You've mistaken the letter "O" for "0", or vice-versa.
- (8) You've typed the BASIC statements in lowercase letters (reverse-video). The BASIC interpreter on the CoCo recognizes statements in capital letters only.
- (9) Forgot to press <ENTER> after typing in a line.
- (10) You used the <SHIFT> key with a character when it wasn't necessary, and didn't use it when it was necessary. For example, you want to type the dollar sign symbol in front of the number 5, to read \$5. But, you forgot to hit the <SHIFT> key along with the 5, and you get 45 instead.

(The following is a press release downloaded from Delphi last month.)

(CONTINUED ON NEXT PAGE)

IMS INTRODUCES MM/1 KIT

Interactive Media Systems, Inc. of Davidson, North Carolina is pleased to announce the availability of the MM/1 multimedia computer system in kit form. This is a limited offer and will immediately expire upon completion of FCC certification for the MM/1 computer system.

The MM/1 has been shipping to industrial users and developers since April, 1990. In preparation for shipping completed systems to home users, Interactive Media Systems, Inc. has submitted its MM/1 system to an FCC-approved laboratory for testing.

The MM/1 kit is being offered in the Extended configuration only. This includes the MM/1 Extended 2-board set along with a 1.44 MB disk drive and the MM/1 Parts Packet. The packet includes nylon spacers, chips, and other sundry parts. The system includes three serial ports, two parallel ports, PC keyboard port, RGB-A video, and 1 Megabyte of memory. The MM/1 kit can be expanded just like the MM/1 Extended can be. It also includes a 15 MHz Signetics 68070 CPU that has an on-board serial port, DMA controller, and 100k baud network interface. The MM/1 also includes support for SCSI devices, stereo sound ports, and a joystick port which can be used for data acquisition.

The MM/1 also includes the Signetics 664470 VSC graphics chip that works in conjunction with a Brooktree palette controller to provide a palette of 16.7 million colors and real-time decoding of Run Length Encoded graphics.

The MM/1 kit comes with OS-9/68000, Network File Manager, PC File Manager that reads and writes IBM PC disks, tape backup support, C compiler, BASIC, text editor, uucp communications along with two terminal programs, dozens of utilities, and more.

The price for the MM/1 kit is \$875, including the two-board set and Parts Packet. As a convenience to IMS customers, the actual MM/1 slim-line case, power supply, and back plate can be purchased for an additional \$100. This power supply is FCC and UL approved for use in the United States. It is also approved by CSA for use in Canada.

The kit requires no special knowledge or tools for completion.

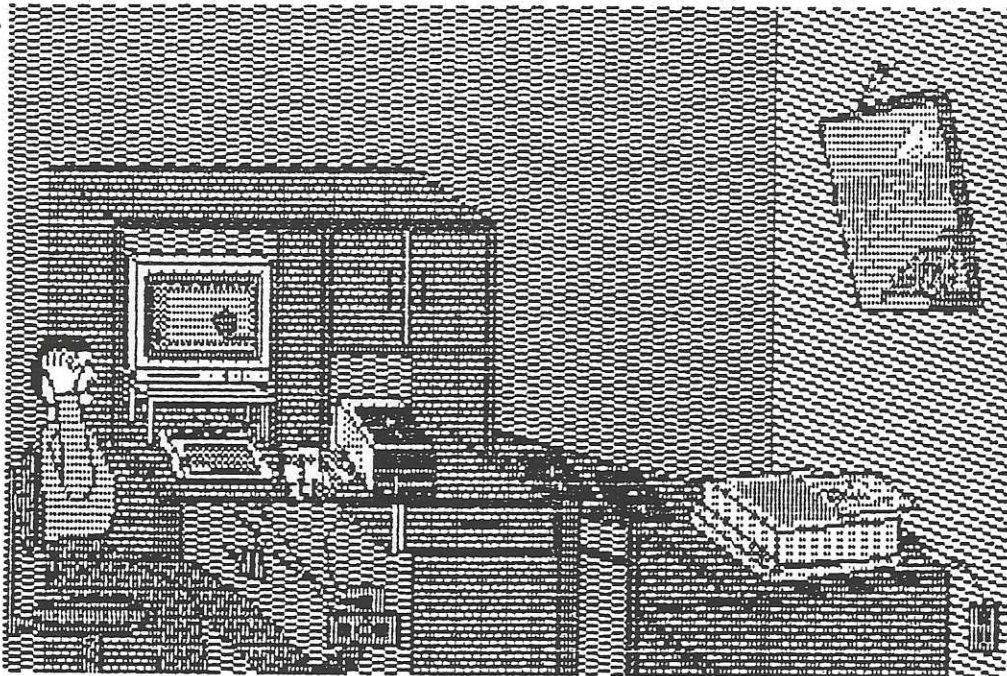
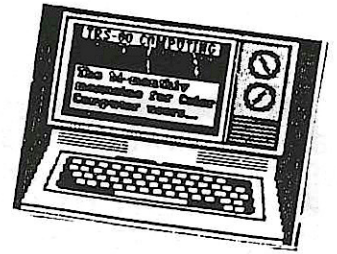
For an additional \$150 you can receive a 3 MB version of the MM/1 computer system which almost doubles system throughput. IMS is offering custom enhancements at attractive prices. This offer is the best value IMS will make on the MM/1 and will not be repeated to consumers once FCC approval has been completed.

The MM/1 kit has sold extremely well to current Interactive Media Systems, Inc. customers.

(Editor's Note: Because Interactive Media Systems has not yet shipped out the MM/I's, we were unable to print the hardware review that was planned for this issue. Hopefully there will be some type of review on either the MM/I kit or the MM/I computer itself, in a future issue of TRS-80 Computing.)



THE PROGRAMMER



THE PROGRAMMER

FEBRUARY '91

THIS MONTH...

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USING A 2-DIMENSIONAL PLANE

PREVENTING SCREEN
WRAP - AROUND
*by David McClady, Program
Editor*

This year's annual beginners program is a utility that prevents word wrap-around on the CoCo's screen. The prevention of word wrap-around makes it much easier to read text off the screen (see Figure 1). The program uses BASIC string commands such as MID\$, RIGHT\$, and LEFT\$. The utility works by simply placing all text that you want to have formatted in the variable A\$ in line 10 of the program. In order to make it easier to follow along I have placed a description of each line number to the right of the program listing. Happy Programming!

FIGURE 1

AS YOU CAN SEE, SCREEN WRAP-AROUND
MAKES IT MORE DIFFICULT TO READ
ON A 32 CPL SCREEN.

THE LISTING: PVNTWRAP

```
1 CLEAR 500
```

CLEARs STRING SPACE FOR 500
CHARACTERS

```
5 CLS
```

CLEARs SCREEN

```
10 A$="USE ANY SENTENCE OR  
PHRASE HERE. DO NOT USE  
SENTENCES THAT HAVE NO SPACES OR  
THIS ROUTINE WILL NOT WORK."
```

DEFINES THE STRING TO USE IN
THE ROUTINE

```
15 REM *****
```

```
20 REM A$=STRING L=LEFT MARGIN
```

```
25 REM N= # OF CHAR. PER LINE
```

```
30 REM *****
```

REMARK LINES

```
35 L=2:N=30
```

LEFT MARGIN=2 CHAR. PER LINE=30

```
45 Z=LEN(A$)
```

STORE THE LENGTH OF A\$ IN Z

```
50 T=N
```

STORE N IN T

```
55 IF MID$(A$,T,1)<>" " THEN  
T=T-1:GOTO 55
```

LOOKS AT THE Tth CHARACTER IN
A\$. IF IT'S A SPACE THEN CONTINUE
THE PROGRAM. OTHERWISE
SUBTRACT ONE FROM T AND RECHECK
FOR A SPACE.


```

60 L$=LEFT$(A$,T)

65 PRINTTAB(L)L$

70 Z2=Z-T

75 R$=RIGHT$(A$,Z2)

80 IF LEFT$(R$,1)=" " THEN
R$=RIGHT$(R$,T-1):T=T-1:GOTO 80

85 IF LEN(R$)>N THEN
Z=Z2:A$=R$:T=N:GOTO 55 ELSE
PRINTTAB(Z)R$;

90 END

```

TAKE THE LEFT T CHARACTERS OF A\$ AND STORE THEM IN L\$ (TAKES ALL WORDS UP TO THE SPACE CLOSEST TO THE 30th (Tth) CHARACTER)

PRINTS THE TEXT IN L\$ AT THE SPECIFIED MARGIN.

STORE THE REMAINING NUMBER OF CHARACTERS FROM A\$ IN Z2

STORE REMAINING CHARACTERS LEFT IN A\$ IN R\$

CHECKS TO SEE IF R\$ STARTS WITH A SPACE. IF SO, IT REMOVES THE SPACE FROM R\$ AND RECHECKS. OTHERWISE THE PROGRAM CONTINUES

CHECK TO SEE IF THERE ARE MORE THAN N CHARACTERS IN R\$. IF SO, MAKE Z=Z2; A\$=R\$; T=N; REDO ROUTINE FROM LINE 55

ENDS THE PROGRAM

Dear Reader.

I would like to take the opportunity to thank not only all of our contributing editors who have helped us through the year, but also our readers and advertisers. It takes many long hours of hard work to put together a magazine with which the CoCo Community can benefit. Without all of your support TRS-80 Computing would not be where it is today.

Now that we are starting a new year, we need you now more than ever to help support your favorite computer. We need programmers that are willing to submit their best materials whenever possible.

We here at TRS-80 Computing are always open to new ideas. So if you have any, we would be glad to hear from you. Thanks again for all of your support. We hope that the new year will be a successful one.

David McNally
Program Editor

**WORKING
WITH
ROTATION
PART 1
2-D PLANE**

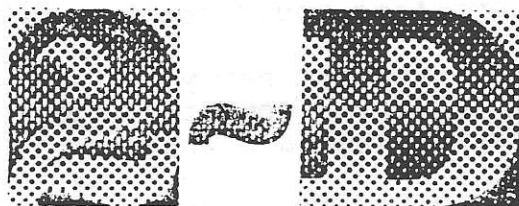
by David McNally, Program Editor

The easiest way to rotate an object is by changing the degrees of all the angles by small amounts, and then redrawing the figure. Since a circle is the easiest object to work with when talking about degrees, we will use it as our foundation.

We know from Geometry that the sum of the measures of the three interior angles of a triangle is 180 degrees. Therefore, we can then divide by three to find the measure of each angle of an equiangular triangle. Then, using SIN and COS, we can plot these three points within the circle. This will give us the start and endpoints of the three sides of the triangle. Finally, we can connect the points to form our triangle.

In order to rotate the triangle, all we have to do is change the degrees, recompute the points as described above, and draw the new triangle. The size of the triangle can be changed by making the radius of the circle smaller or larger.

Type in the program listing and save it on tape or disk, then type RUN and press <ENTER>. When the triangle appears, you can rotate it by pressing the <1>, <2>, <3>, and <4> keys. Pressing the <1> key to move it left, the <2> key to move it right, the <3> key to enlarge it, and the <4> key to reduce the triangle.



THE LISTING: TRIANGLE

```

0 ' TRIANGLE ROTATION
1 ' PROGRAMMED BY DAVID MCNALLY
2 REM COPYRIGHT (C) 1991, TRS-80
  COMPUTING
3 REM **CLEAR 8 GRAPHICS PAGES**
4 PCLEAR 8
6 REM ***SHOW PAGE 1***
8 PMODE 4,1:PCLS:SCREEN 1,1
10 REM **SET VARIABLES**
12 X=120:Y=96:R=40:F=60:V=57.295
  77951
14 L=INT(360/3)
16 REM *DRAW ORIGINAL TRIANGLE*
18 FOR T=0 TO 360 STEP L
20 GOSUB 84:REM COMPUTE POINTS
22 Z=Z+1:NEXT T

```



```

24 GOSUB 92:REM DRAW TRIANGLE
26 REM ** CHECK FOR KEY PRESS **
28 M$=INKEY$:IF M$="" THEN 28
30 IF M$="1" THEN 42
32 IF M$="2" THEN 58
34 IF M$="3" THEN 72
36 IF M$="4" THEN 78
38 GOTO 28
40 REM ** ROTATE LEFT **
42 F=F-2:IF F<0 THEN F=360
44 Z=1:FOR T=0 TO 360 STEP L
46 GOSUB 84:Z=Z+1:NEXT T
48 PMODE 4,5:PCLS:REM SWITCH TO
SPARE GRAPHICS PAGE
50 GOSUB 92
52 GOSUB 88:REM COPY SPARE PG TO
MAIN PG
54 GOTO 28
56 REM ** ROTATE RIGHT **
58 F=F+2:IF F>360 THEN F=2
60 Z=1:FOR T=0 TO 360 STEP L:GOS
UB 84:Z=Z+1:NEXT T
62 PMODE 4,5:PCLS:REM SWITCH TO
SPARE GRAPHICS PAGE

```

```

64 GOSUB 92:REM DRAW TRIANGLE
66 GOSUB 88:REM COPY SPARE PG TO
MAIN PG
68 GOTO 28
70 REM ** ADD TO RADIUS TO
ENLARGE TRIANGLE **
72 R=R+2:IF R>96 THEN R=96
74 GOTO 44
76 REM ** SUBTRACT FROM RADIUS
TO SHRINK TRIANGLE **
78 R=R-2:IF R<10 THEN R=10
80 GOTO 44
82 REM ***COMPUTE POINTS***
84 X(Z)=R*COS((90+T+F)/V)+X:Y(Z)
=-R*SIN((90+T+F)/V)+Y:RETURN
86 REM ***COPY SPARE PAGE TO
MAIN PAGE***
88 PCOPY 5 TO 1:PCOPY 6 TO 2:PCO
PY 7 TO 3:PCOPY 8 TO 4:RETURN
90 REM ***DRAW TRIANGLE***
92 LINE(X(1),Y(1))-(X(2),Y(2)),P
SET:LINE -(X(3),Y(3)),PSET:LINE
-(X(1),Y(1)),PSET:RETURN
100 END

```

END OF PROGRAM

Great OS-9 Software

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⇨ NOTICE ⇩

**TRS-80 COMPUTING'S
SUBSCRIPTION RATES WILL BE
GOING UP EFFECTIVE WITH
THE APRIL '91 ISSUE. THE
NEW RATES ARE:**

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- 6 issues (1 year) - \$13.00
- 12 issues (2 years) - \$20.00

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USING ADVANCED TOPICS IN BASIC

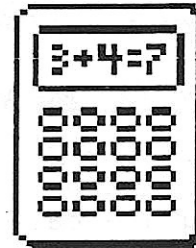
by Ray Kornele

This is the first installment in a series of articles on advanced BASIC for the CoCo. I will write to both Standard BASIC and Extended BASIC.

First, you will not get any fantastic new commands. I will simply show how to use commands which intermediate programmers already know. You will learn some new ways to use these powerful functions. Most of the new concepts you will learn will be involved with math functions and taking advantage of the computer's ability to do number crunching.

Here is the listing for the first program, an arcsin subroutine called ASIN. It uses SIN to find arcsin.

```
9999 END
10000 RA=1.57079633:WR=S
10010 IF ABS(S)>1 GOTO 10060
10020 IF ABS(S-SIN(WR))<1E-9
    THEN RETURN
10030 WR=WR+(S-SIN(WR))/SIN(RA-
    WR)
10040 WD=WR*90/RA
10050 GOTO10020
10060 PRINT"S IS TOO LARGE"
    :RETURN
```



This routine makes successive approximations, each of which is much closer to the desired value using Newton's approximation. We want $S - \sin(WR)$ to be close to zero.

Line 9999 prevents RG errors.

Line 10000, RA is the radian value of a right angle.

As an angle varies from $-RA$ to RA , the sin varies from -1 to 1 , so I made the angle equal its own sine as an initial guess.

Line 10010, if the value of S is out of the range of sin, go to report.

Line 10020, if \sin of angle($\sin(WR)$) is within .000000001 of input value (S), then return.

Line 10030, Newton's approximation subtracts $f(x)/f'(x)$ from x to obtain a closer approximation. $f(x)$ is $S - \sin(WR)$ and $f'(x)$, the first derivative (calculus) is $-\cos(x)$, which equals $-\sin(RA - WR)$. Therefore, the subtraction becomes $+(S - \sin(WR))/\sin(RA - WR)$.

Line 10040, converts WR to degrees as WD.

Line 10050, loop to test.

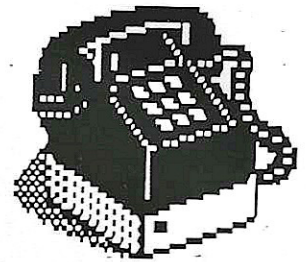
Line 10060, Error message.

If you desire more information you can write to me at: P.O. Box 69, San Jacinto, CA 92383

STARTING OFF...

TELECOMMUNICATIONS

BY MICHAEL HOLZMAN, CONTRIBUTING EDITOR



(Editor's Note: This article is the start of a new column relating to telecommunications. Depending on magazine space, this will continue as a bi-monthly column, or become a series of articles in future issues.)

So you have finally decided to enter the world of Telecommunication. Telecomputing is available to almost anyone in the world. All you need is a computer with communications software, a modem, and a phone line. I can tell you from personal experience that the new terminal programs for the Color Computer line are a lot more user friendly than when I first got into computers back in the early 1980's. I am confident that the start of a new column on telecommunications will help people who are new to this area of computers!

Here are a few special words that you will encounter as you go online:

BBS- is an acronym for Bulletin Board System.

SYSTEM- is your computer and all it's software and peripherals, or the computer that you are calling.

MENU- is a list of available options or commands. Commands are anything that you use to instruct your computer to do a specific task. Options and Selections are choices on a Menu.

PROMPT- is a signal from the computer that you are logged onto, that tells you that it is waiting for instructions on how to proceed. Menus are usually followed by a prompt. A Selection may be an item on which a command acts. A Response is an answer to a question or prompt from a computer system.

INPUT- is usually the text that you enter to compose a description or message.

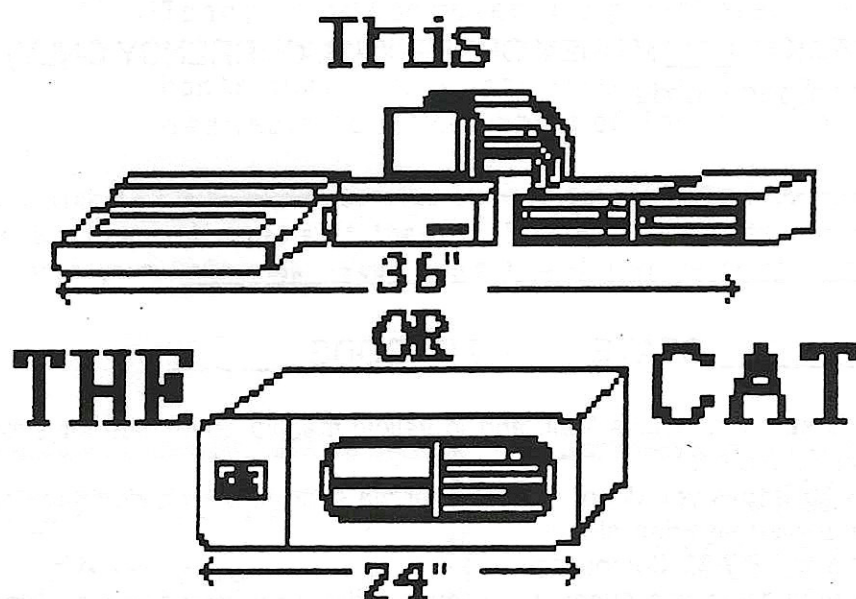
RETURN- on our CoCo it is labeled ENTER, so anytime a BBS or information service asks you to hit return, use this key.

Getting Started

Well, after you have hooked your new modem up correctly, and loaded your communication program (also called term or terminal program), you are now ready to go on-line. Ask a fellow CoCo Nut who has a modem for the phone numbers of a couple of local BBS's. You might even be able to get a copy of one of the several available public domain term programs-- Mikeyterm, Gregyterm, or Ultimaterm. These are all good programs, but the best is Ultimaterm. It is very user-friendly! You will need to go into these programs and set the parameters (a set of instructions that tells the modem what speed you want to use, and how many start and stop bits to use

with each byte sent out). Most BBS's use either 8-N-1 or 7-E-1 settings as their parameters. If one setting doesn't work, then change the settings to the other. Usually on a BBS you will also have the duplex parameter set to full. About the only time that you use half duplex is when you are communicating with another CoCo. After you have set all the variables in the parameter area of your term program, save them on tape or disk. Now enter ATDT and the number of the local BBS, and wait for your modem to connect with the computer system on the other end (also referred to as the remote computer or system). On some systems you will need to hit the <ENTER> key once or twice before anything happens. You will be asked for your name and password (and on some systems, a User Number). Either type NEW or hit <ENTER> once. At this point you will be asked to give a little information about yourself (such as name, address, phone number, kind of computer, and what you want to use). All this is needed for is for the Sysop (system operator) to have security of some type for his BBS. You will then be online and enjoying all the information and programs available to the modem user.

This is just a quick run down of getting online. I will go into depth in the forth coming columns. So experiment a little with your new modem, and if you have any questions, please send a SASE to Michael Holtry, 695 Park Avenue #215, Idaho Falls, Idaho 83402. Keep on Modeming!



Now available for \$399.95+s&h.
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TRS-80 COMPUTING SUBSCRIPTION FORM

TRS-80 COMPUTING, a bi-monthly magazine for Color Computer users, has up to 35 pages filled with programs, great articles, product reviews, graphics, hints & tips, etc. Different issues features games, graphics, utilities, business, beginner's guides, and always our end-of-the-year holiday issue. Just to show you that every other month brings you a variety for your Tandy Color Computer. So subscribe to TRS-80 Computing today! (trial issues can be bought for \$1.75 each.)

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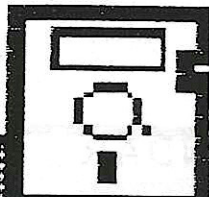
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THANK-YOU!

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COCO CLUBS

Below is a short list of some of the Tandy Color Computer clubs around the United States. If you live near any of these areas, please contact the club for more information on becoming a member. PLEASE -- do not engage in any software piracy!

IDAHO: SNAKE RIVER COLOR COMPUTER CLUB
ATTN: MICHAEL HOLTRY, VICE CHAIRPERSON
695 PARK AVENUE #216
IDAHO FALLS, ID 83402
- SRCCC discusses OS-9, BASIC, telecommunications, and BASIC09

WASHINGTON: PORT O' COCO
c/o DONALD ZIMMERMAN
3046 BANNER ROAD SE
PORT ORCHARD, WA 98366-8810
- Port O' CoCo focuses on any of the three models of the Tandy Color Computer, its peripherals and software. The club doesnot have a membership fee, but asks for a contribution of \$1 per meeting. Shareware programs are available to make copies of for your collection.

If you would like to have your CoCo club printed in the CoCo Clubs section, send in your club's name & address, the name of the Club President, and a few short sentences explaining about your CoCo club. Your request will then be printed in a future issue.

Programming

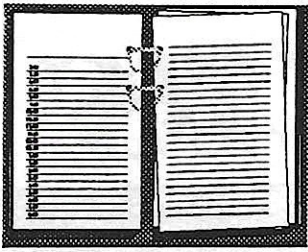
* Puzzle *

Write a program that asks for the dividend and divisor of a division problem. Rather than printing the answer, have the CoCo print the remainder.

ANSWER

PROGRAMMING PUZZLE (DECEMBER 1990)

```
5 INPUT "PRICE "A
10 B=A*0.06:C=INT((B*100)
+.5)/100
15 PRINT "S*C," is your
tax"
```

TRS-80 COMPUTING 1991 EDITORIAL CALENDAR

Our general editorial themes that will appear in the next five issues of TRS-80 Computing are summarized in the calendar below. All contributors should aim their material towards the topics of each issue.

NOTE: The deadlines are for both editorial submissions and advertisements.

APRIL

Utilities issue
DEADLINE: 3/15/91

JUNE

Anniversary/Music
DEADLINE: 5/17/91

AUGUST

Business/Home Finance
DEADLINE: 7/19/91

OCTOBER

Programming Languages
DEADLINE: 9/13/91

DECEMBER

Holiday Graphics
DEADLINE: 11/15/91

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TRS-80 COMPUTING

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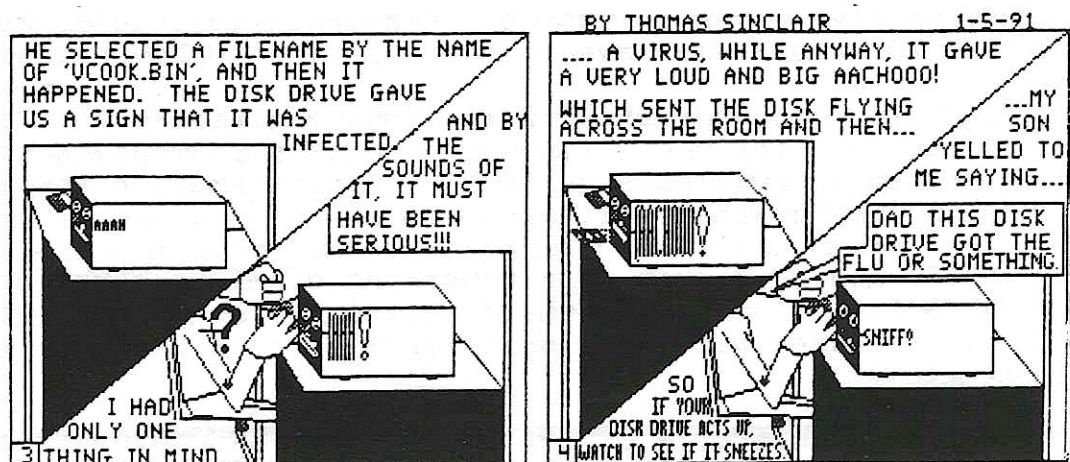
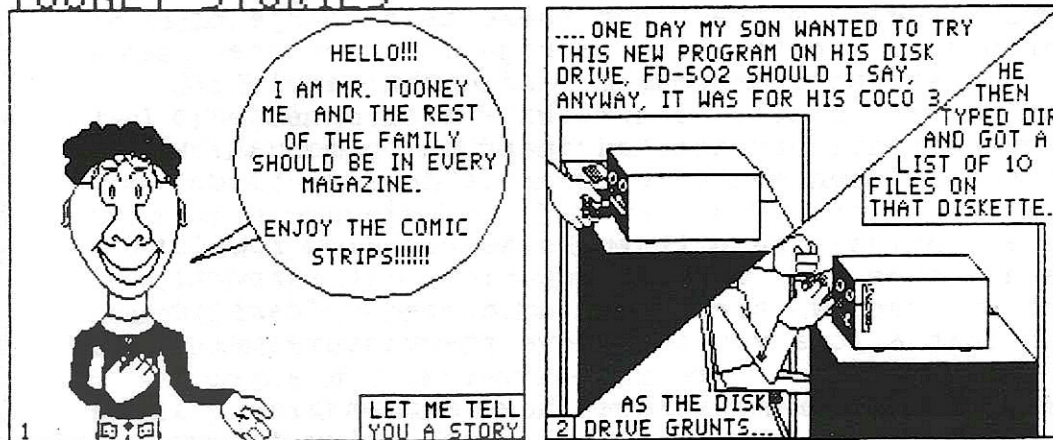
JUNE 1987 PREMIER	\$.60	OCTOBER 1989 HALLOWEEN	\$ 1.50
NOVEMBER 1987	\$.80	DECEMBER 1989 HOLIDAY	\$ 1.50
JUNE 1988	\$.80	FEBRUARY 1990 BEGINNERS	\$ 1.50
AUGUST 1988	\$.80	APRIL 1990 UTILITIES	\$ 1.50
DECEMBER 1988 HOLIDAY	\$ 1.00	JUNE 1990 ANNIVERSARY/GAMES	\$ 1.75
FEBRUARY 1989 BEGINNERS	\$ 1.00	AUGUST 1990 BUSINESS	\$ 1.75
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JUNE 1989 ANNIVERSARY/GAMES	\$ 1.25	DECEMBER 1990 HOLIDAY	\$ 1.75
AUGUST 1989 GRAPHICS	\$ 1.25	FEBRUARY 1991 BEGINNERS	\$ 1.75

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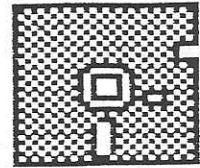
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Make all checks and money orders payable to : TRS-80 COMPUTING*

TOONEY STORIES





C O C O



PRODUCT REVIEWS

Software Review

DS-69 VIEW

When I first received DS69VIEW, I found myself actually saying, "Just another one of those binary picture display programs". To my surprise, DS69VIEW wasn't just an ordinary "slide show" program. DS69VIEW is used to display 16-level pictures created with the DS69A/B digitizer from Micro Works.

The program itself is free, but there is a charge of \$3.00 to cover postage costs. The package includes one "flippy" disk containing the program, and eight sample pictures (four on each side). The package also includes a three page professionally typesetted instruction manual, which isn't even necessary because the program is so easy to use.

The program includes such features as high/low resolution display modes and on-screen disk directories. It supports drives 0-3 and can read 40 tracks during a load. There is also an option that allows you to resave the pictures.

Like almost any program, it does have a down side. I found it very annoying having to remember to unplug the joysticks every time you use the program. If you forget to, it really messes things up. Also, if you should happen to get an I/O error, you have to totally reboot the program.

If you own a DS69A/B 16-level digitizer, this program is definitely for you. I would also like to mention that this program is available on the Delphi information service, along with many graphics files.

NOTE: This program is a reworking of Micro Works program C-SEE3.3, included with the digitizer. The program was created and released with permission from Micro Works.

(Steve Ricketts, P.O. Box 828, Sandy, OR. 97055; no charge, \$3 shipping/handling)

SUB-BATTLE SIMULATOR

Are you looking for a real-life simulation that allows you to become the commander of a World War II submarine? A game called Sub Battle Simulator will allow you to do so! Your objective in this game simulation is to become the captain of a WWII submarine, complete a mission, survive, and return safely to your port. There are three modes you have to choose from in which your action can take place: Target Practice against an enemy convoy, a Single Mission in a real combat setting, and Wartime Command over the course of an entire war.

The software package includes the game disk, a 36-page instruction manual, and 2 reference cards. The instruction manual is very comprehensible and illustrative. It gives you many clues, definitions, and important information on the weapons and specifications of your enemy ships. However, it does not tell you how to go about fighting the battles and winning the war. This is something in which you have to develop your own strategy in order to complete your goal. I do want to note that the instruction manual is not written specifically for the CoCo 3. Instead, the manual is written for many of the other popular computers, and the commands and controls may differ somewhat. Epyx does provide two reference cards which gives you loading instructions (which is simple, all you have to do is type DOS), keyboard commands, and the different functions that can be used in the four levels of play.

When starting the simulation, you are put into Target Practice Mode. From here you can either stay in this mode or choose one of the other two modes of action. There are almost 45 operations that you can perform with your submarine. Almost every single character on the keyboard is used — and it takes MANY hours of getting used to! I had to stick with the target practicing to adjust to all the different controls before going into any of the other modes.

Sub Battle Simulator is played in real time. Unless you want to really feel like your fighting a war, you could just sit around for hours doing absolutely nothing, and be waiting impatiently for an enemy ship or plane to come into view. Luckily there are two main features to help speed up the progress of your mission. There is the Navigator (available in the first two levels only) which takes you directly to your battle site, and Time Compression (available in all levels) which speeds up the time to allow you to reach the scene of battle more quickly. Time can be sped up as quick as every one second being equal to four hours.

A couple of other features included is an option to save/load a simulation, and being able to quit at any time.

The only "complaint" I have in regards to Sub Battle Simulator is the quality of the graphics. Considering the game is written in OS-9 Level 2 on the CoCo 3, you would think the graphics and animation would have more in the way of color and detail; that is not the case in this game, since the graphics look more like that on a CoCo 2.

Again, all the missions are based upon actual battles that occurred during World War II. In order to get the whole idea of the simulation, you have to play the game as if you are in a real life situation — and every move you make throughout your entire mission could affect your country, your crew, and your own life. This is what makes Sub Battle Simulator such a challenge!

(Epyx, Sunnvale, CA; distributed by Radio Shack stores nationwide (Cat. #26-3272); \$29.95)

- Joe Ahern

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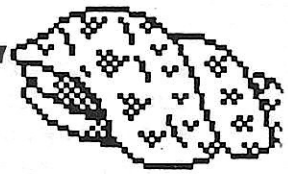
CoCoYahtzee – The well known “Dice Poker” game.
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I'll pay the shipping! All programs require at least 256K except CoCothello which will run in 128K. All are completely Mouse Controlled and require the WindInt module.

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(NC residents please include 5% sales tax.)



MORE ON THE C compiler

BY BOB VAN DER POEL,
Contributing Editor

In the last issue I gave a bit of a sales pitch for the C language. Since the theme this month is "getting started" it might be a good time to review the differences between an interpreted language like BASIC and a compiled language like C.

First, let's look at a very simple BASIC program:

```
10 CLS
20 PRINT "Hello World"
30 GOTO 20
```

After this program is entered into your computer and you type RUN the BASIC interpreter goes through the program, starting with the first line, and does as it is instructed. The interpreter contains all the routines it needs for the various commands--somewhere in the BASIC ROMs of your CoCo there is a routine which knows how to clear the screen, another one which can print a string, etc. As a matter of fact, there are probably a number of routines which have never been used by any of the programs you own!

Now, let's have a look at a equivalent C program:

```
main()
{
    cls();
    for(;;) printf("Hello world\n");
}
```

We won't worry about the possibly confusing syntax of this program--just take it as a given that the results will be the same as the BASIC example. What is different is the way the actual program is created.

To create a C program you have to go through a series of steps:

1. Using a text editor you create or edit a source file. This file consists of commands and statements which the C compiler understands.
2. You compile the program. This is a series of steps (all taken care of automatically by the compiler) which vary from one compiler to another, but the following description should give you the general idea:

(continued on next page)

a- A preprocessor expands any macros in the file, b- The expanded source file is converted to assembly language, c- The assembly language file is converted (assembled) to a machine language module, d- The machine language module is linked with the needed sections of the C library.

If there are any mistakes in your file (perhaps you left out a ";") error messages are printed, and it's back to step 1.

3. After all this is complete you can try running your program. If things don't work out as you expected you go back to step 1.

There are some key differences here--and these differences make C (and its cousins) more powerful, faster, and more difficult to use.

First of all, the C language itself does not contain code for commands like PRINT. Instead, there are routines in a library (simply, a collection of routines) which handle these chores. If your library contains a routine to generate a random number, but your program doesn't use it that code will NOT be included in your program. Only the routines which are needed are actually included in the link stage. If you compare the size of a C and a BASIC program you will see that the one written in C is usually quite a bit shorter--remember, to do this comparison correctly you have to include the twenty to forty thousand bytes of code which make up the BASIC interpreter!

Another plus of having all the commands (in C they are called "functions") in a library is that they can be changed, and added to. If you need a function to do something the original designers of your library didn't think of there is no real problem--just write the function yourself and add it to the library. If you find that there is a bug in one of the library routines you can rewrite that function and replace the offending one.

Second, notice that the original program is actually converted to machine language. This makes for dramatic changes in speed! Under RSB the following program took 30 seconds to run:

```
10 FOR T=1 TO 10000
20 A=A+2
30 NEXT T
```

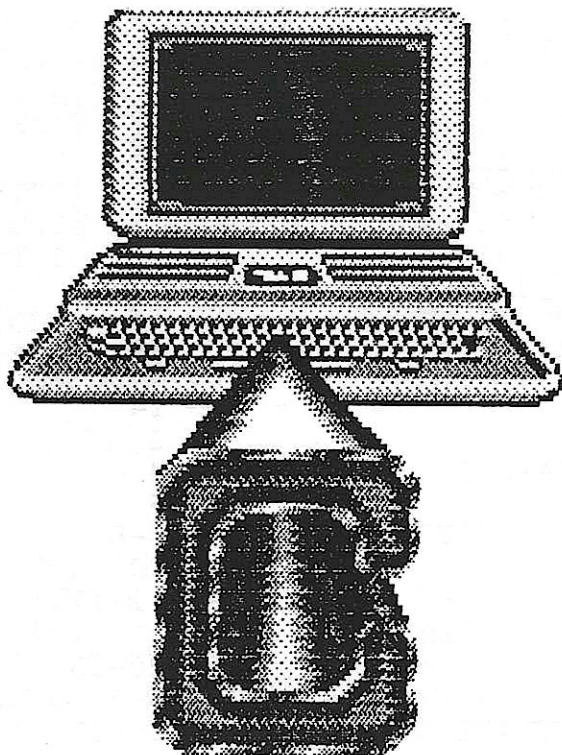
By comparison, this equivalent C program took about 7 seconds to run:

```
main()
{
    register int t;
    double a;
    for(t=0;t<10000;t++) a+=2;
}
```

I also wrote an equivalent Basic09 program--and it too took 7 seconds to run. However, when more complex things are done you will find that C runs a fair bit faster than Basic09.

If you are really alert you'll notice that I defined the loop counter "t" in the C program as an integer. If we were to be really fair in our comparisons we should define it as a double (the same as the variable "a"). This is because RSB (a version of CoCo Basic which runs under OS-9) does not have integer variables. But even when we use a double for the loop counter the C program still runs twice as fast as the BASIC one. And don't forget that a C double give a great deal more precision than BASIC's floating point variables.

My final point is one of maintenance and readability--in this category just about ANY language beats BASIC! BASIC programmers learned a long time ago that comments in their programs ate up valuable programming memory and caused their programs to run more slowly--so they leave them out! They also found out that by squeezing out all the unnecessary spaces in the program a few more valuable milli-seconds of execution time would be gained. Add in the problems of GOTO, and short variable names you end up with unreadable code--even to the author (just ask me!). On the other hand compiled programs ignore all those comments and extra spaces--so programmers tend to document what a certain section of code does. Whether or not the basic structure of C is easier to



understand than BASIC is of course debatable--but usage certainly makes the case for C.

As always, your comments on this column are welcome. I can be reached via this magazine or at:

P.O. Box 355
Porthill, ID
USA 83853

or

P.O. Box 57
Wynndel, BC
Canada V0B 2N0



ANNUAL INDEX FOR 1990

Below is our annual index of all the material that appeared in TRS-80 Computing for the 1990 year. All issues are indexed in order, from February 1990 to December 1990. Each index follows a certain format: the title is in the first column, the page it appears on is in the second column, and what it is (article, program, review, etc.) is in the third column. Please note the following abbreviations which you will come across when using the index:

ECB - Extended Color BASIC
PG. - page number
Adv. - advertisement

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20.	TRS-80 COMPUTING SOFTWARE	PG 9	Adv.
21.	WREATH & STAR DESIGNER	PG 11-12	CoCo 3 BASIC Program

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