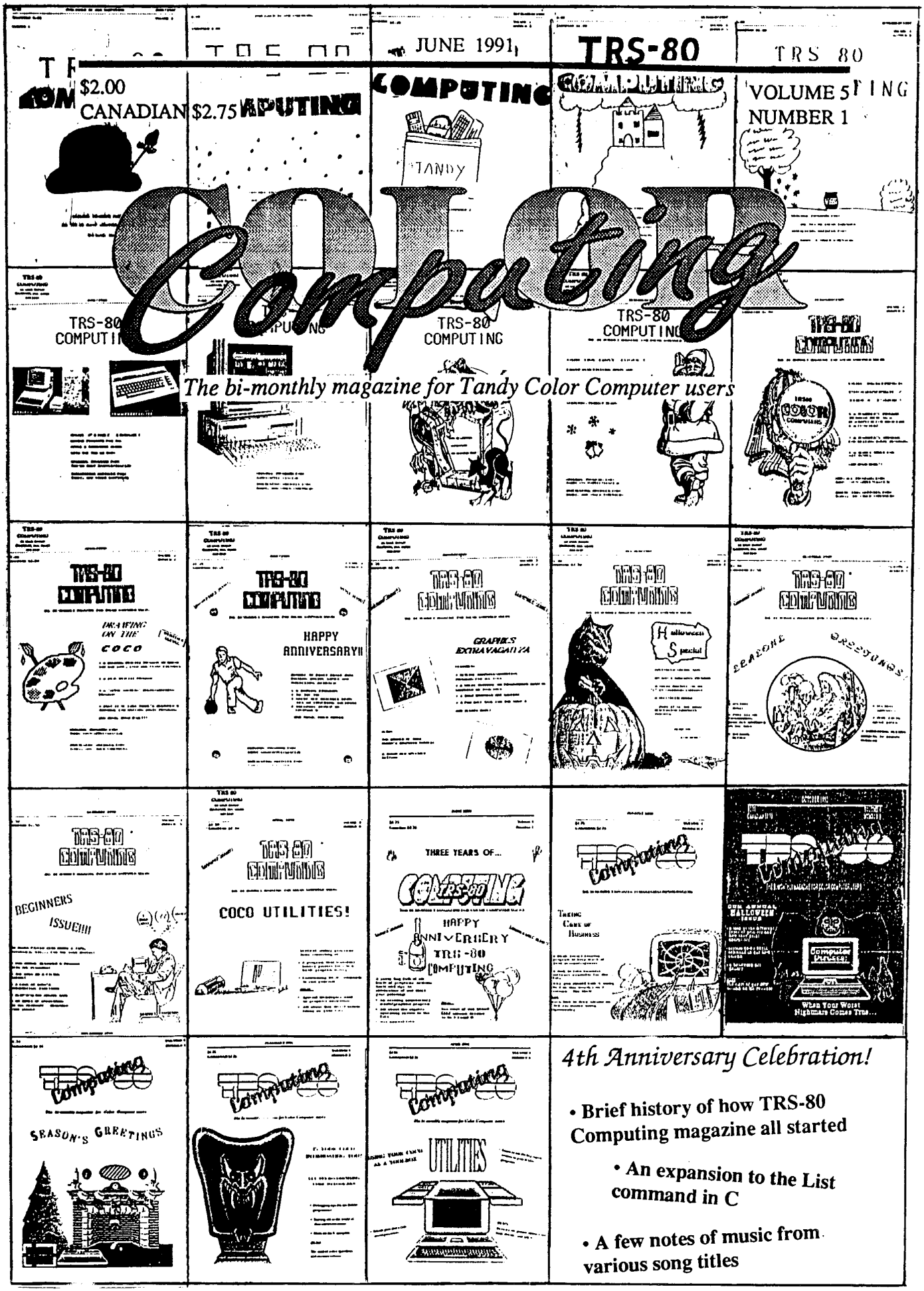


4th Anniversary Celebration!

- **Brief history of how TRS-80 Computing magazine all started**
- **An expansion to the List command in C**
- **A few notes of music from various song titles**

Dragon Slayer's Den Software

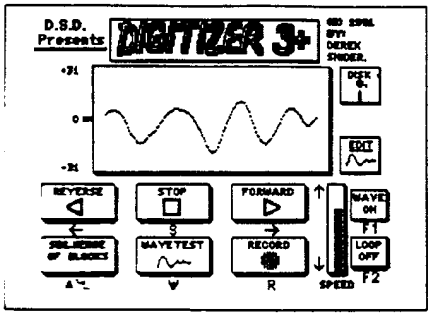
D.S.D. Software, 17 Annabeam Cr., North York, ON, M2N-4H6, Canada, FAX (416)229-4479 TEL (416)223-1729

Software for all your Tandy Color Computer needs!

NEW!

RAINBOW CERTIFICATION SEAL

THE DIGITIZER 3+!



A low-priced, high-quality audio digitizer for your 128K or 512K CoCo 3! Nowhere else will you find full 6-bit, MULTI-TASKING digitizer for such an AMAZING price! Actually see the sound wave as you sample or play back your samples!

- ○ DIGITIZER 3+ makes it SIMPLE to MULTI-TASK digitized sequences into your own BASIC and ML programs!
- ○ Built in WAVEFORM EDITOR lets you actually edit the waveform of the sound itself! Auto key repeat makes things a snap!
- ○ Built in BLOCK SEQUENCER allows you to program a sequence of up to 255 8K blocks in any order you please!
- ○ Other features such as block mixing, block copying, block smoothing and block reversing add more versatility!
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The Digitizer 3 - $12.99 U.S. (Add $2.00 shipping and handling) $14.99 Can. (Add $1.50 shipping and handling.)

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COLOR Computing

formerly TRS-80 Computing

June 1991
Volume 5
Number 1

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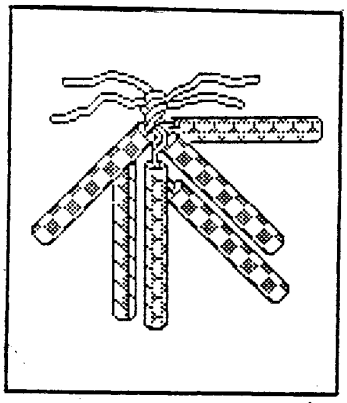

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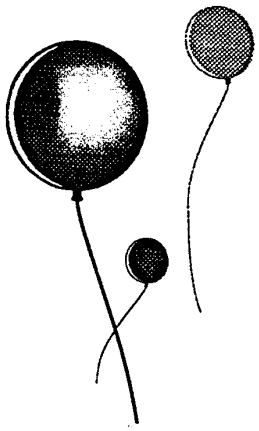

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SINCE 1987

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OF MICROWARE SYSTEMS
CORP. AND MOTOROLA, INC.

COVER DESIGN BY ROSS KRAMER

After a couple months of many problems, many decisions, and a lot of thinking, we finally got the push to get this issue prepared, printed, and mailed out to all of our loyal readers. We ran into numerous amounts of problems, in both the business itself and in our personal lives. Hopefully we will not have to experience these type of problems again. But, do keep in mind that we have no intentions of folding in the immediate future; if we were to cut down on the magazine it would become quarterly rather than bi-monthly. Right now though, in order for us to keep up with the pace, we will have to skip the August issue and go directly to work on the October issue (see the notice on page 23). I am hoping that everyone is willing to cooperate on this situation.

In case you haven't realized it already, we have a new rating system for all the software programs we review. This new system will help to ensure consumers just how good the product is.

Each program is judged in five categories ranking from one to five stars (the more stars the better).

1. GRAPHICS- This is our opinion of how detailed the graphics are in the program. If the program does not have any graphics, the word NONE will be used.
2. FRIENDLINESS- This refers to how easy the program is to use. Programs that can be used without reading the instructions will get a high rating in FRIENDLINESS.
3. MANUAL- This will indicate whether or not the documentation is well written and how easy (or hard) it is to comprehend what the author is saying.
4. VALUE- This will tell you if the program is worth the price.

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SPECIALS (COCO POEM/NOTES)

WHAT WOULD I DO IF MY COCO BLEW?

Poem written by Bob Wenzler

What would I do
If my CoCo blew?
Would there be any of me
For people to see?

The rest of time
Would be a grind.
No more games to play,
The screen blank to stay.

In the store I drop,
On the counter
the computer plops.
"I want this fixed.
And make it quick!"

At home the time I spend,
Boredom I would fend.
(Try to name Santa's reindeer,
Christmas not even near.)

After a couple of weeks
of saying (BLEEP)!
I get my CoCo back
with hardly any flack.

A NOTE TO OUR READERS

Just for your information when purchasing CoCo products from third party developers, the company, Computer Island, is not going out of business as implied, but will be dealing mostly with schools. They have some great Preschool thru High School education programs which are currently still available. They may still be reached at 227 Hampton Green, Staten Island, NY 10312.

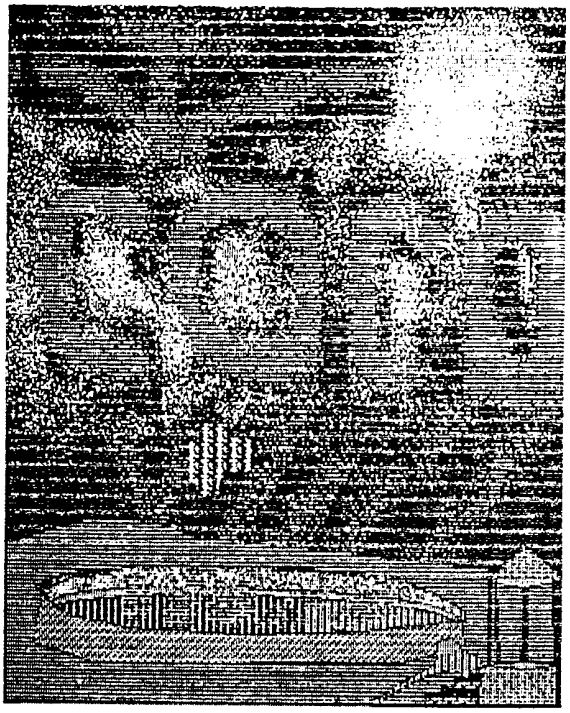
2nd ANNUAL
ATLANTA COCOFEST
OCTOBER 4-6 1991

Once again CoCoPRO! will be holding their 2nd Annual Atlanta CoCoFEST on October 5-6 at the Holiday Inn Northlake in Atlanta, Georgia. Along with the "Southern hospitality" of the Atlanta Computer Society you can also enjoy:

* Informative seminars from the "gurus" of CoCo, OS-9, and OSk
* Exhibitions and special show prices from your favorite vendors
* Introductions of innovative NEW products for CoCo/OS-9, and OSk

You can save $5 by ordering tickets now at the presale price of $12 for One-day, or $15 for a Full-show pass. For further information contact Dave Myers at 313-481-3283, or write to CoCoPRO! at 1334 Byron, Ypsilanti, MI 48198.

The Programmer



July 4th, CoCo Fireworks Party!!!!!!!!!!!

THE PROGRAMMER JUNE '91

This month...

1. FOURTH OF JULY FIREWORKS
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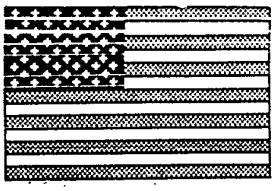
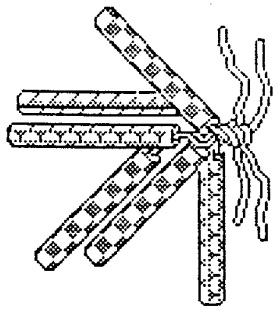
2. A FEW NOTES OF MUSIC
(page 8)



FOURTH OF JULY FIREWORKS

by Don Agent



We have approached that time of year again - the glorious fun of Independence Day (or most popularly known as the Fourth of July). A day that most Americans look forward to every year with the parades, marching bands, cookouts/barbeques, and always the late-night gala of the fireworks. This program, entitled "Fourth of July Fireworks", has an opening billboard featuring a moving multicolored border. The main program itself makes generous use of the CIRCLE and RANDOM commands and utiltizes a high resolution, silver screen. After a dazzling display of aerial fireworks of different sizes and colors (accompanied by smaller bursts of color and sound from firecrackers), the program ends with a display of the American flag. Thereafter, the program repeats itself, but always with a different show of fireworks as these displays are created in a random fashion. Happy 4th of July to all!

THE LISTING: JULY4TH

```
0 REM 4TH OF JULY FIREWORKS
10 REM COPYRIGHT (C) 1991
15 REM BY COLOR COMPUTING
20 CLS:CLEAR
30 R=RND(TIMER)
40 FOR V=1024 TO 1055
50 R=RND(255)
60 IF R<144 THEN 50
70 POKE V,R
80 NEXT V
90 FOR V=1504 TO 1535
100 R=RND(255)
110 IF R<144 THEN 100
120 POKE V,R
130 NEXT V
140 FOR V=1056 TO 1472 STEP 32
150 R=RND(255)
160 IF R<144 THEN 150
170 POKE V,R
180 NEXT V
190 FOR V=1087 TO 1503 STEP 32
200 R=RND(255)
210 IF R<144 THEN 200
220 POKE V,R
230 NEXT V
240 PRINT@234,"4TH OF JULY";
250 FOR T=1 TO 1500:NEXT T
260 CLS0
270 PRINT@231,"F I R E W O R K S
";
280 SCREEN 0,1
290 FOR T=1 TO 1500:NEXT T
300 PMODE 3,1
310 SCREEN 1,1
320 PCLS3
330 FOR V=1 TO 7
340 IF F=1 GOTO 360
350 GOTO 550
360 A=RND(150)+50
370 B=RND(140)+20
380 Z=RND(2)
390 C=RND(8)
400 IF C=3 THEN 390
410 IF C=7 THEN 390
420 G=RND(TIMER)
430 G=RND(3)
440 FOR R=5 TO 60 STEP 5
450 IF Z=1 THEN C=RND(8)
460 IF C=3 THEN 450
470 IF C=7 THEN 450
480 CIRCLE(A,B),R,C
490 NEXT R
500 IF G=3 THEN GOSUB 820
510 IF G=2 GOSUB 910
520 FOR R=5 TO 60 STEP 5
530 CIRCLE(A,B),65-R,3
540 NEXT R
550 Q=RND(2)
560 FOR D=1 TO 255 STEP 10
570 IF Q=2 GOTO 600
```

```
580 SOUND D,1
590 IF Q=1 GOTO 610
600 SOUND 255-D,1
610 NEXT D
620 IF Q=1 THEN SOUND 1,8
630 E=RND(200)
640 IF Q=2 THEN SOUND E,8
650 PCLS3
660 F=1
670 NEXT V
680 PCLS
690 A=10
700 FOR X=1 TO 7
710 A=A+20
720 LINE(20,A)-(220,10+A),PSET,B
F
730 NEXT X
740 COLOR 3,5
750 LINE(20,90)-(90,30),PSET,BF
760 FOR H=25 TO 95 STEP 9
770 FOR V=37 TO 87 STEP 9
780 CIRCLE(H,V),3,5
790 NEXT V,H
800 FOR T=1 TO 3000:NEXT T:PCLS3
810 GOTO 20
820 FOR R=5 TO 30 STEP 5
830 CIRCLE(210-A,190-B),R,5
840 SOUND 5,1
850 C=RND(8)
860 IF C=3 THEN 850
870 CIRCLE(A+60,B+50),R-5,C
880 SOUND 5,1
890 NEXT R
900 RETURN
910 FOR J=1 TO 20
920 Y=RND(10)
930 W=RND(200)
940 U=RND(190)
950 C=RND(8)
960 IF C=3 THEN 950
970 IF C=7 THEN 950
980 CIRCLE(W,U),Y,C
990 SOUND 89,1:SOUND 10,1
1000 NEXT J
1010 RETURN
```

END OF PROGRAM

Programming Puzzle

Enter the words "QUEEN", "LENGTH", and "REMEMBER". Print each word with all E's removed.

PROGRAMMING PUZZLE SOLUTION

(FROM APRIL 1991 ISSUE)

```
5 CLEAR 500
10 FOR X=1 TO 100
20 A$=A$+CHR$(RND(95)+31)
30 NEXT X
40 FOR Y=1 TO 100
50 C=ASC(MID$(A$,Y,1))
60 IF (C)64 AND C(91) OR (C)96 AND
C(123) THEN L=L+1 ELSE IF (C)47 AND
C(58) THEN N=N+1 ELSE M=M+1
70 NEXT Y
80 PRINT "THERE ARE";L;"LETTERS, ";
N;"NUMBERS, AND"
90 PRINT M;"MISCELLANEOUS
CHARACTERS."
```


Great OS-9 Software

***VED*, OS-9 Text Editor.....$24.95**

The best editor for OS-9 just got better. Version 2.0 of this best seller now includes 36 definable macros, case-switcher, and even more speed. See the review in Mar/Apr Clipboard. Works with 128 or 512K.

Upgrades to version 2.0 (with new 28 page manual) are $12.00 with proof of purchase.

***VPRINT*, OS-9 Text Formatter.....$29.95**

An unbelievably powerful formatter. Features include complete proportional font support, multiple columns, footnoting, indexing, table of contents. And much more. Comes with 120 page manual, demo files and extensive macro file. (512K memory recommended.)

***Ultra Label Maker 9*.....$19.95**

Turns your printer into a printing press for labels. WYSIWYG previewing. Supports ALL printers. Useful and lots of fun. One of Rush Caley's "top 10." (Requires 512K CoCo3) CoCo2/3 version $14.95.

***Magazine Index System 9*.....$19.95**

Now you can find those references fast. Comes with extensive CoCo magazine data files. File compatible with our RS-DOS version. Another one of Rush Caley's "top 10." (Requires 512K CoCo3.) CoCo2/3 version $14.95.

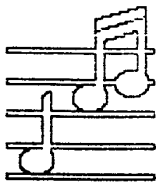
Sorry, no credit cards--enclose check or money order plus $2.00 S/H. Complete catalogue available--send $1.00 (free with order). Most orders shipped next day!

Bob van der Pool Software

P.O. Box 57, Wynndel, B.C. Canada V0B 2N0 or P.O. Box 355, Porthill, ID USA 83853-0355

A FEW NOTES OF MUSIC

by David McNally



Below is a program which plays notes from three different song titles using BASIC's built-in SOUND command. The songs are easily recognized and are heard often around this time of year. They were composed entirely by Deluxe Music Machine Plus (a music maker program sold by TRS-80 Computing Software) and converted into BASIC using the DMM+ CONVERT program. Happy 4th Anniversary to Color (TRS-80) Computing magazine!

THE LISTING: FEWNOTES

```
0 REM 100% OF THIS PROGRAM
1 REM HAS BEEN CREATED BY
2 REM DELUXE MUSIC MACHINE+
3 REM COPYRIGHT (C) 1991
4 REM BY COLOR COMPUTING
5 DIM G(153),Q(153)
10 FOR Y=1 TO 152
15 READ G(Y),Q(Y)
20 IF G(Y)=0 AND Q(Y)<>0 THEN FO
R T=1 TO Q(Y):NEXT T:NEXT Y
25 SOUND G(Y),Q(Y)
30 NEXT Y
35 CLS:END
40 DATA108,4,147,4,159,4,170,8,1
70,2,170,2,176,4,125,4
45 DATA125,4,159,8,108,4,108,4,1
40,4,147,4,159,4,170,4
50 DATA159,4,159,4,147,4,125,4,1
08,8,108,4,108,4,147,4
55 DATA159,4,170,4,170,4,170,4,1
76,4,125,4,125,4,159,8
60 DATA108,2,108,2,108,4,140,4,1
47,4,159,4,170,4,159,4
65 DATA147,12,0,200,89,4,125,4,1
33,4,147,16,147,4,89,4
70 DATA125,4,133,4,147,16,147,4,
89,4,125,4,133,4,147,8
75 DATA125,8,89,8,125,8,108,16,1
08,8,125,4,108,4,89,8
80 DATA89,4,89,4,108,8,147,4,147
,4,147,4,133,8,133,4
85 DATA133,8,125,4,133,4,147,8,1
25,8,89,8,108,8,89,16
90 DATA0,200,176,4,176,4,159,4,1
76,4,185,4,176,4,159,8
95 DATA159,4,147,8,147,4,159,4,1
47,8,147,4,176,4,176,4
100 DATA159,4,176,4,185,4,176,4,
159,8,147,8,159,4,147,4
105 DATA133,8,133,4,176,8,176,4,
159,4,176,4,185,4,176,4
110 DATA159,8,159,4,147,8,147,4,
159,4,147,8,147,4,176,4
115 DATA176,4,159,4,176,4,185,4,
176,4,159,8,147,8,159,4
120 DATA147,4,133,8,133,4,133,6,
133,2,159,4,176,4,197,12
125 DATA185,8,185,2,197,4,185,4,
176,8,176,4,176,4,159,4
130 DATA176,4,185,4,176,4,159,8,
147,8,159,4,147,4,133,8
135 DATA133,4
```

END OF PROGRAM

N*Johnson SOFTWARE

Who is N*Johnson Software?

N*Johnson software began when the owner, Nick Johnson,wrote a program that he felt ought to be shared with the rest of the CoCo world. Since then, N*Johnson Software has grown, adding new products to the list of inventory.

N*BANNER 1.12:

This is yet another banner printing program for the CoCo, written by Nick Johnson. It does have some out-of-the-ordinary capabilities, however; such as printing with multiple lines, use of different block codes, and support of almost **every** printer! It includes font view, information display, adjustable block codes, support of width 32, 40, and 80, CMP, RGB, and MONO monitors, saving, loading, printing (obviously) and ASCII import. It evens comes with a configure program as well as a starter program that tells the basics for first-time users who don't like to read the manual.

Requires a 128K CoCo-3.

N*BANNER 1.12.....$9.95

UTIL-DISK:

Have you ever needed "that utility" for "that job"? Now N*Johnson Software has introduced UTIL-DISK to ease your computing. It includes 26 utilities that range from 6MS to 40TRACKS to FSTDRIVE (our personal favorite- it gets rid of 90% of the waiting that **still** remains in DECB 1.1 required for old drives), BASICMT, WIDTH64, 2COLDEMO, even a data file compress / decompressor. Most of these amazing utilities are written in 100% machine language, with the start, end, and exec addresses written in the manual, providing you with lightning fast execution- just LOADM & EXEC. Even if you don't **need** all of these utilities, you can still enjoy all of the benefits that they bring to you!

Many programs require 128K CoCo-3; the disk modification ones, however, require only DECB 1.1 or 2.1.

UTIL DISK.....$7.95

HIDESCRN 1.0

This utility does exactly what it says it does- it **hides screens**, CoCo-3 Hi-res graphics screens, to be precise. By simply loading and setting 2 DEFUSRs from BASIC, you get two new USR

(continued next column)

(cont'd from previous column)

calls that allow you to hide (usr0) and recall (usr1) HSCREEN 1,2,3, or 4 graphics screens on the CoCo-3. Includes a graphics demo program to show off it's many virtues. 256 or 512K is strongly recommended for this program, as you can only hide one screen with 128K.

HIDESCRN.....$6.95

To Order:

Send **check** or **money order** for the amount listed after the description (no shipping or handling charges) along with the description and quantity of each item to:

N*Johnson Software
5830A Reinke Dr.
Crestview, FL 32536.

If you have specific questions about a piece of software, feel free to write us about it at the above address.

This Month's hint

WIDTH 32:POKE &HE034,72

We don't have a clue what this does, but it **is** interesting!

"Long Live the CoCo"

IN THE BEGINNING

A SHORT HISTORY OF TRS-80 COMPUTING MAGAZINE

By David McNally / Joe Ahern

It all began in the fifth grade when we were introduced to the Radio Shack Color Computer. Once a week we (along with the rest of the class) were allowed to go to the computer room and use Color Logo. We soon learned how to master all those impossible shapes they had us draw. We had such a good time using the computers that both of us talked our parents into getting one.

It was hard learning BASIC because up to now we had only used Color Logo. Both of us tried learning to program by spending hours reading through and typing the sample programs from the included books. After sharing each other's knowledge, we could do simple programming (even at this time we thought we knew it all).

Within a years time, Joe had saved up enough money to buy a DMP-105 printer from Radio Shack. This, along with a computer cassette recorder and a blank cassette tape, was just enough equipment to make an attempt to start the small CoCo magazine we have here today. Shortly after, Joe came to school one day in the early part of June '87 with the first issue of TRS-80 Computing. He said he had been working on it for a few weeks and asked me if I would like to continue with the venture. I loved the idea, so we teamed up and started working on improvements. And so TRS-80 Computing was born. Our first issue looked like some natives had put it together. At this time we had no word processor and still a minimum knowledge of BASIC. Everything had to be printed using that nasty old PRINT#-2 statement. Some things we even drew in using magic markers (our first order form was done this way). We even cut lettering from newspapers for the logo on the front cover.

Our first few customers were teachers at the junior high school we were attending at the time (as a matter of fact, some of these teachers are still loyal subscribers today). We had about four or five customers for the longest time and printed monthly. After six consecutive months of printing the magazine, it started to become time consuming and was interfering too much with our school work. Besides, it wasn't really worth the effort for just a few people. As a result, we stopped for a few months and figured if we were to continue it would be published annually. However, with the purchase of many new development programs such as CoCo Graphics Designer, CoCoMAX, MAX-10, and a versatile word processor, we figured that with some time, effort, and a lot of planning, we could re-start the magazine so-to-speak, with a new format, a bi-monthly frequency, and a rise in the prices.

At this time we started giving more promotion to the magazine and tried spreading the word by using flyers. Our best customers were still our teachers and relatives. We still didn't give up though, and eventually, by sending out several letters to CoCoists across the United States and Canada, got our first contributing editors to the magazine. There were also some who were willing to occasionally submit programs/articles, which helped out a lot and allowed us more time to work on giving the magazine a better look. We got away from the markers and got word processors while still

trying to build our knowledge of BASIC. You can actually tell by looking at our first issues that we didn't know BASIC all that well; a keen eye would be able to spot our programming improvements as the years progressed.

Still not getting much response (although we hadn't yet had enough money to advertise much farther than local neighbors) we began to include Commodore and Apple material in hopes to improve business by covering a more broad area. This did help somewhat, but we eventually gave it up and went back to an all-CoCo magazine. During this time we were able to raise enough money to place a small (21 words) Classified advertisement in the November '89 issue of Computer Shopper. It didn't take two weeks and we started getting responses until we ended up with about 25 subscribers. A few months later we put the same advertisement into Computer Shopper and got another 20 or so subscribers. By this time more people had heard of us and business was booming.

We then placed a small display advertisement into the Mar/Apr 1990 (last issue) of CoCo Clipboard. At the end of last year we placed another Classified advertisement into Computer Shopper and sent out 1000 of our flyers direct mail in conjuction with OSPRO! of Ypsilanti, Michigan. We found the direct mail advertising method to be the most effective because it brought in many more readers and contributors. Lately we've been going light on advertising and placing small ads in the 68000/OS-9 based magazines and messages onto BBSs across the United States.

Now, with the arrival of our fourth year anniversary issue, is the long awaited change in the title of our magazine. Skimming through the pages you'll see a Specials section, BASIC programs, columns on telecommunications, OS-9, assembly language, etc., a Q/A page, many advertisements, and more. Compare that with our premier issue and you'll see that we've come a long way in four years!

FROM THE DESK OF THE EDITOR (continued from page 3)

5. OVERALL- This is the program's overall rating. It is an average of the first four topics.

Another thing I would like to add - in regards to submitting articles to the magazine, it would be of great assistance to us if you keep in mind the following two guidelines when typing the articles into your word processor:

1. Hard copies should be sent with all submissions if possible. There should be a one inch top margin and 1/2 inch bottom margin on the first page and 1/4 inch top margin and 1/2 inch bottom margin on all other pages.
2. There should be <u>two</u> spaces after a colon, semi-colon, question mark, exclamation point, and a period. There should be <u>one</u> space after a comma, dash and before and after parenthesis. Indent <u>five</u> spaces at the beginning of each paragraph.

And finally, here is the big change you've all been waiting for - the change in the title from TRS-80 Computing to Color Computing (I think I first made mention of this back in December of last year.) The transition did take a while but it was worth the effort. You'll also probably notice a few other changes/improvements with this issue. Long Live the CoCo!!

Joe Ahern

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USING ADVANCED TOPICS IN BASIC

Column written by Ray Kornele

In my first article I referred to the Newton method of approximation. The function for a new approximation with increased accuracy is X2=X1-(Y1/DY1) where Y1 is the function of X1 and DY1 is the derivative (Calculus) of Y1. This is alright if you have a function which you can derive but, there is also a method for approximating a derivative with great accuracy. Here is how it works.

The derivative (Dy) of a function is equal to its slope... the change of y for a change of one unit on x. However, if your function is not a straight line (type y=a+bx) the slope changes from one point to the next. The derivation for a function calls for finding y at x+dx (where dx represents a small change of x) and subtracting y at x then dividing the result by dx. That is, find the change of y from x to x+dx and divide by dx. Then, you reduce dx to "approaching zero" (mathematician's jargon for super small; actually, they use zero, but don't say it). The approximation uses y at x+dx minus y at x-dx and divides by 2dx. For example, find y for x+.000001, subtract y for x-.000001, then divide by two times .000001, or .000002. The equation looks like this;

DY=(Y(X+.000001)-Y(X-.000001))/.000002.

Written in CoCo ECB this would read:

```
DEF FN DY(X)=(FNY(X+.000001)-FNY(X-.000001)/.000002
```

Where FNY(X) is defined as:

```
DEF FN Y(X)= (your function)
```

To effectively use this method it is best to write your function to equal zero. Then you can use FNY(X) as a test for your function. Let's try one.

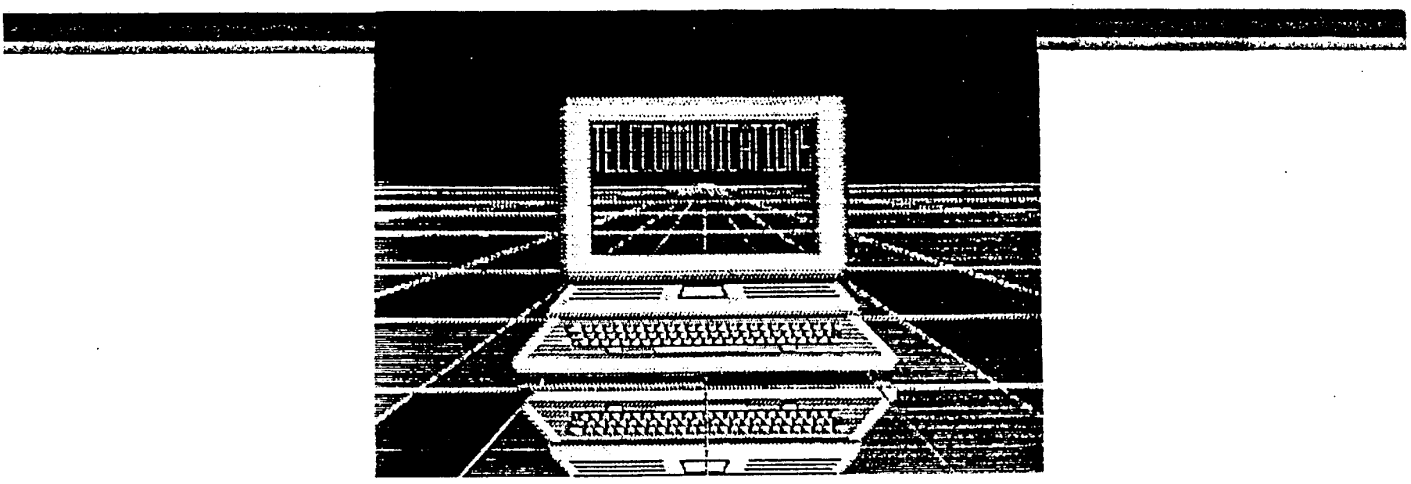
Suppose you want to solve the equation $X^2=4$.
First rewrite to $X^2-4=0$. Then type the following program.

```
10 CLS:X=1:T=0
20 DEF FN Y(X)=X^2-4
30 DEF FN DY(X)=(FN Y(X+.000001)
  -FN Y(X-.000001))/.000002
40 IF ABS(FN Y(X))>1E-6 THEN
X=X-(FN Y(X)/FN DY(X)):GOTO 40
50 PRINT "ONE SOLUTION IS";X
60 IF T=0 THEN X=-X:T=1:GOTO30
```

Line 10 clears the screen, sets the counter to zero, and sets x to non-zero (to prevent a ?/0 error).
Lines 20-30 define your function and derivative.
Line 40 tests for closeness and re-calculates if not close enough.
Line 50 prints a solution and line 60 sets up for another. Since many functions have a positive and a negative solution with the same magnitude, I have used "try the negative of the first" to find the second. In this case this is true so no recalculation is needed.

THE WORLD OF TELECOMMUNICATIONS

Column written by Michael Holtry



I hope that you found the last article of interest (or at least it straightened you out on exactly what bit, baud, and bps rate are)! I know that it cleared up alot of the confusion that people in our local CoCo Club were having with these terms. Well, here comes the next article in this series. I hope you find something in here that will be of use!

To start off, the 1200 bps modems that conforms to the Bell 212A standard (which includes most 1200 bps modems used in the U.S.) actually operate at 300 baud and use a modulation technique called phase modulation, which has a transmit rate of four bits per baud. So:

$$300 \text{ baud} \times 4 \text{ bits per baud} = 1200 \text{ bps}$$

or

$$\frac{300 \text{ baud}}{1/4 \text{ baud per bit}} = 1200 \text{ bps}$$

Similarly, 2400 bps modems that conform to the CCITT V.22 recommendation (virtually all of them) operate at a baud rate of 600 and also use a modulation technique that transmits four bits per baud:

$$600 \text{ baud} \times 4 \text{ bits per baud} = 2400 \text{ bps}$$

or

$$\frac{600 \text{ baud}}{1/4 \text{ baud per bit}} = 2400 \text{ bps}$$

Thus, a 1200-bps modem is not a 1200-baud modem, nor is a 2400-bps modem a 2400-baud modem.

Now let's take a look at 9600-bps modems. Most of these operate at 2400 baud, and again use a modulation technique that yields four bits per baud. Thus:

$$2400 \text{ baud} \times 4 \text{ bits per baud} = 9600 \text{ bps}$$

or

$$\frac{2400 \text{ baud}}{1/4 \text{ baud per bit}} = 9600 \text{ bps}$$

CHARACTERS PER SECOND (cps)

Characters per second is the number of characters (letters, numbers, spaces, and symbols) transmitted over a communications channel in one second. Cps is often the bottom line in rating data transmission speed and a more convenient way of thinking about data transfer than baud- or bit-rate.

Determining the number of characters transmitted per second is easy: simply divide the bps rate by the number of bits per character. You must of course take into account the fact that more than just the bits that make up the binary digit representing a character are transmitted when a character is sent from one computer system to another. In fact, up to 10 bits may be transmitted for each character during ASCII transfer, whether 7 or 8 data bits are used. This is because start and stop-bits are added to characters by a sending system in order to make up a character. In addition, a system usually adds a parity bit during 7-bit ASCII transmission. (The computer's serial port handles the addition of the extra bits, and all extra bits are stripped out at the receiving end.)

So, in asynchronous data communication, the number of bits per character is usually 10 (either 7 data bits, plus a parity bit, plus a start and stop bit, or 8 data bits plus a start bit and a stop bit). Thus:

$$\frac{\text{2400 bps}}{\text{10 bits per character}} = \text{240 characters per second}$$

COMMON SPEEDS

The most commonly used communication rates for dial-up systems (BBSs and online services like Delphi, CompuServe, and GEnie) are 300, 1200, and 2400 bps. A few older systems-- especially Telex systems-- communicate at 110 bps, but these are gradually going the way of the dinosaur. 4800 and 9600 bps modems are generally available, but few online services or BBSs accommodate them. This will be changing in the near future, however, with the cost of high-speed modem technology decreasing as the demand for it increases.

Modems with even higher bps rates are manufactured (19,200 and up) but these are not used with dial-up systems; the upper limit on asynchronous data via voice-grad telephone lines appears to be 9600 bps. The use of higher transmission rates requires special dedicated lines that are "conditioned" (i.e. shielded from outside interference) as well as expensive modulation and transmission equipment.

If you found this series of articles useful, you may want to pick up a copy of the book from which it was excerpted:

THE MODEM REFERENCE
by Michael A. Banks
Published by Brady Books/Simon & Schuster
ISBN # 0-13-586646-4 $21.95

In addition to explaining the technical aspects of modem operation,

communications software, data links, and other elements of computer communication, the book provides detailed, illustrated "tours" of major online services such as Unison, CompuServe, Delphi, Bix, Dow Jone News/Retrieval, MCI Mail, and others. It also contains information on using packet switching networks and BBSs, as well as dial-up numbers for various networks and BBSs.

You'll also find hands-on guides to buying, setting up, using, and troubleshooting computer communications hardware and software. (And the book "supports" all major microcomputer brands.)

Michael A. Banks
P.O. Box 312
Milford, OH 45150

Well the first thing that we must do is purchase a modem. If you are trying to decide on which brand to purchase, start by looking through all the different computer magazines at your local public library. There are loads of companies that offer good deals on whatever speed of modem you're aiming for. I have found some of the best priced mail order companies through Computer Shopper and Computer Buyer's Guide. Here is the name and number of a couple of mail-order companies that I have purchased several pieces of hardware from: Micro-Peripherals -- #1-800-423-8215 (ask about their line of Infotel modems); Computer Dir[illegible] #1-800-289-9473. So purchase or borrow a copy of these magazines an[illegible] through them. I picked up a fully Hayes compatible 2400 baud for 79.[illegible] (plus shipping and handling). It is an external modem with a speaker and many other good features. It has never gave me a minutes problem, and I have had it since December of 1990. Several of the local computer club members purchased one after seeing how well it worked. It also comes with a 7 year warranty, so how can you go wrong for the price! So get going on joining the telecommunication craze that has hit this country big time. See you online in the future!

Well, that ends this series of articles! Next month I will start a new series of articles on modems and telecommunication. Bye, and keep on modeming!

COLOR Computing

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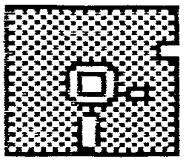


Software Review

DONALD DUCK'S PLAYGROUND

Donald Duck's Playground is an action packed learning game for young children. The game was designed by the SIERRA and Walt Disney Computer Software staff. The program uses familiar Walt Disney characters such as Donald Duck, Goofy, Mickey Mouse, and Minnie Mouse to create a fun atmosphere for learning. Among the skills that children must use are shape and color matching, logical thinking, and money counting.

There are three levels of play in the game. The higher the level is, the more difficult it is to build the playground; the equipment gets more expensive, therefore requiring the child to earn more money.

The object of the game is to help Donald build a playground for his nephews. This is accomplished by having Donald work around the local town to earn money in which to buy the playground equipment. One store he can work at is the toy store. Here, the child must pick up toys off a conveyer belt and place them on the shelf with the others of the same shape and color. Every once in a while a train comes by (you'll know when the train is coming by the train schedules displayed at the bottom of the screen) and you must pull down a shield to keep the toys from falling off the shelf.

Another place that Donald can work is at the airport. Here the child must get boxes off of a moving conveyer belt. On the side of each box is three letters. The child must then move Donald in front of the tramway car containing those same three letters and throw the box in. After every few minutes, the tramcar leaves and loads the packages onto the plane.

One of the most challenging places to work at is the railroad station. Here the child must flip a series of switches to change the train tracks so that the train travels to the correct destination. For younger children, this is a hard task because it requires the child to work fast in order not to miss the train.

The last place that Donald can work at is the grocery store. Here the child must help Donald catch fruit that is being thrown off of a delivery truck. When a piece off fruit is caught, the child then has to drop it in a box that has a picture of the same fruit.

After working for the money, the child can then spend it buying playground equipment. To do this, the child must walk into one of three stores and select the object(s) to buy from a catalog. After selecting, the child must pay for the item. The coins and bills are drawn and the child must move the correct amount onto the counter. If change is required, the child must make his/her own by pointing to the correct coins and bills that are in the cash register. The item will then be delivered to the playground.

The last step is to build the playground. The objects that were bought are at the playground, but are scattered all over the place. The child then has the option to place the playground equipment where he/she wants it. After everything is in place, the child then can move Donald's nephew around to play on the new items. New items can be bought at any time providing the child has enough money.

The program comes with one flippy disk, the front containing the OS-9 boot and the back containing the actual game. It also includes a 20 page manual containing directions and several activities relating to the program. I think that this is one of the best Walt Disney programs available. It is very easy to use and has sharp graphics!

GRAPHICS: *****
FRIENDLINESS: **** 1/2
MANUAL: **** 1/2
VALUE: *****
OVERALL: *****

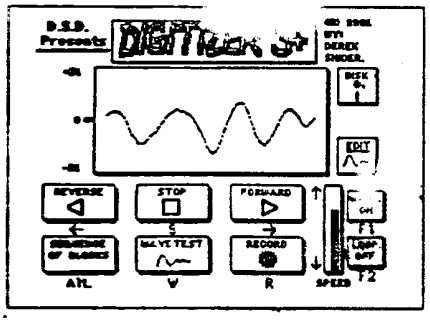
Editor's Note: Donald Duck, Goofy, Mickey Mouse, and Minnie Mouse are all registered trademarks of the Walt Disney Company. SIERRA and WALT DISNEY are registered trademarks of the respective companys.

Software Review

THE DIGITIZER 3+

The Digitizer 3+ is a low-priced high-quality audio digitizer for the 128K CoCo 3. Written in pure 6809 ML code, it allows you to digitize, sample, and sequence 6-bit sound on your CoCo 3. The program uses the CoCo's FIRQ interrupt to produce multitasking sound capabilities (this means that both the sound and a BASIC/ML programs can run smoothly at the same time). The Digitizer 3+ package includes 2 single-sided disks which contains the main program and 3 demos, a seven page easy-to-follow instruction manual, and a special cable (measuring approximately 6 feet in length) used for digitizing sound off a cassette tape. The cable has one end that plugs into the ear jack of your tape player and the other end that plugs into the left joystick port of your CoCo.

Simply type RUN "DIGI3+" and the program quickly loads into your CoCo's memory. After a view of the title screen, the main screen appears where you can make all your selections. At the main screen there is a number of options you have to choose from. You can play a recorded sound (forward or reverse), record/analyze digitized sound, adjust the speed of the sound (make it play lower or higher than the normal setting), turn the sound wave display on/off, turn the sound looping (for continuous play) on/off, and perform a wave test (this allows you to make all adjustments before the sound is digitized).



There is also a BLOCK SEQUENCER which allows you to program a sequence of up to 255 sound blocks in any order, and a WAVEFORM EDITOR that lets you edit the waveform of a sound. Considering this function does make use of the auto key repeat routine, it is still rather tedious to work with. Other features include block copying, block merging (mixing two sound blocks), and block smoothing (for clearer sound).

In the DISK menu you can save/load a sequence or block of sound. When saving/loading, the program informs you of the speed and the block # it is currently on.

Most features operate smoothly and are quite useful. Sound samples (taken from cassette tape) can be digitized for up to 8 seconds long on a 128K, and even longer on a 512K. The digitized sounds are very realistic and sound almost as though the actual tape is being played through the speaker of your TV/monitor. Compared to most other sound digitizers, this simple one is worth the price you are paying for.

(D.S.D. SOFTWARE, 17 ANNAPEARL CT., NORTH YORK, ON M2N-4H6, CANADA;TELEPHONE # 416-223-1729;$29.95 (+$3 S/H) U.S., $34.95 (+$2 S/H) CDN.)

- JOE AHERN

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COLOR COMPUTER ASSEMBLY LANGUAGE

Column written by Derek Snider

Color Computer Assembly Language

The TRS-80 Color Computer is probably the best and easiest computer on which to learn assembly language. The 6809 has probably the most straightforward instruction set among all the microprocessors. In fact, the 6809 has been known as the "assembly language programmer's ideal instruction set". Though a few handy commands that are in other microprocessors, such as copy block, and move block are not in the 6809 instruction set, it is quite complete.

Assembly language programming is far more complex than BASIC programming. This is simply because assembly language is so simple. Now this may be a confusing statement, but every BASIC command is a series of simple assembly language commands.

Though assembly language programming is complicated, it has many advantages over BASIC. For starters, it is many times faster than BASIC, and that is putting it mildly! Assembly language is really darn fast! Secondly, you have complete control over your CoCo in assembly language. You can make your own routines to do things that BASIC cannot do. Also, assembly language is much, much more impressive than BASIC. Your CoCo friends will be much more impressed by nifty assembly language routines, than the same old BASIC programs.

Over the next few issues, I will cover all the basics of assembly language programming, and give listings of assembly language routines that are simple enough to understand, but will dazzle you with their speed and power! Soon you will have collected a whole library of routines that can be used to make really great assembly language programs!

For anyone seriously interested in assembly language, I recommend buying TRS-80 Color Computer Assembly Language Programming, by William Barden Jr. I found this book to be very handy for looking up codes and commands, and how to use them. We will cover much of what is in this book, and hopefully surpass its limitations... Interrupts!

6809 Commands

The 6809 has about 139 separate commands. Most of these are branches and jumps, (like BASIC GOSUB's and GOTO's), and the rest are mainly logical commands, (like AND, OR and NOT), as well as simple mathematical commands, (adds, subtracts, and a multiply). By the end of this tutorial, we will have learned the purpose of each command, and put most of them to use.

REGISTERS

In BASIC, we have variables, in assembler, we have to make our own. We also have a few REGISTERS in which we can temporarily store a value. There are two 8-bit registers, "A" and "B", which can hold one byte each, or an unsigned value from 0 to 255, or a signed value from -128 to +127. The registers "A" and "B" also are combined to make the 16-bit register "D".

There are also "X", "Y", "U" and "S", which are also 16-bit registers. "X" and "Y" are used most. 16-bit registers can hold two bytes, or an unsigned value from 0 to 65535, or a signed value from -32768 to +32767. There are also three other registers. "PC", the program counter register, (16-bit), "DP", the direct page register, (8-bit), and "CC" the condition code register, (8-bit). For now we will only be using "A", "B", "X" and "Y".

We will start with some commands we need to know. "LD" is the 6809 instruction for "LOAD". It is used to load a value, or the value in a memory location into a register. For example, "LDA #5" will load the decimal value of 5 into the "A" register. Similarly, "LDA 5" will load the value in memory location 5, into the "A" register.

Another instruction is "ST", which stands for "STORE". This is used to store the contents of a register into a memory location. "STA 100" will store the contents of the "A" register into memory location 100. You can also use "X" or "Y" to point to a memory location. For example, if the "X" register contains the value of 3000, an "STA ,X" will store the contents of "A" into memory location 3000.

"CMP" is the instruction for "compare". This will compare a register to a value or the value in a memory location. The result will affect the condition code register, ("CC"). For example, "CMPA #10" will compare the "A" register to the decimal value of 10. If the "A" register is equal to 10, then the "Z" or "zero code", ("EFHINZVC" are the bits of the "CC" register), is turned on, (Z=1). If the "A" register was not equal to 10, then "Z" would be turned off, (Z=0). We will discuss condition codes further, later on.

"BNE" stands for "Branch if Not Equal", this is just one of the many branches. A "BNE" will branch if the "Z" bit or the "CC" register is off, (Z=0). Similarly, "BEQ", which stands for "Branch if EQual", will branch if the "Z" bit is on, (Z=1). We will discuss the many other branches later on.

All right, now we are ready to try a sample program. Get out your EDTASM+ rom pak, or your Color Disk Edtasm, or your favorite assembler and type in the listing in FIG.1, (press I and [ENTER] to start.)

Now type "A TEXTFILL". This will assemble the program onto tape or disk, depending on your assembler. If you are wondering about the dollar signs, ($), they signify a hexadecimal number. In assembly, hexadecimal numbers are used almost all the time.

Okay, now exit to BASIC, or cold start your CoCo, and type CLOADM "TEXTFILL", or LOADM "TEXTFILL", and type EXEC, (or EXEC &H3F01). You will see the text screen clear. Now, if you POKE a value at memory location &H3F00, then type EXEC again, the screen will be filled with that character.

Also, you may have noticed how fast the screen filled. BASIC could have never filled the screen even close to that speed.

Now here we have replaced the cls(x) command, with one that not only can clear the screen in different colors, but with any character you please. And as I said, the program just works by changing memory locations. Now if you want to do the same thing with the PMODE 4 graphics screen, you only have to make two simple changes... Change the "LDX #$400", and the "CMPX #$600" to the addresses of that start of the graphics screen, and the end of the graphics screen, (plus one). If you are not using a disk drive controller, then you use "LDX #$600" and "CMPX #$1E00", (see FIG.2). If you are using a disk drive controller, then you use "LDX #$E00" and "CMPX #$2600", (see FIG.3). With these small changes, you've now replaced the PCLS command as well, and made it so that you can set the pattern to clear the screen!

Be tuned in next time, where we will jump ahead, and explore the vast realm of the CoCo and the 6809!

-Derek Snider

```
00100 * Sample program to fill 32 column
00110 * text screen with character in
00120 * memory location $3F00
00130
00140          ORG     $3F00   Start program at $3F00
00150 CHAR     FCB     #96     Store default value (96)
00160 BEGIN    LDA     CHAR    Load A with value at CHAR
00170          LDX     #$400   Load X with start of screen
00180 LOOP     STA     ,X+     Store A at location X
00190          CMPX    #$600   Compare X to $600
00200          BNE     LOOP    If not, go back to LOOP
00210          RTS             Return control to BASIC
00220          END     BEGIN   End.  Set EXEC address.
```

Fig.2 Program: PMODEFIL.ASM (Non-Disk Version)

```
00100 * Sample program to fill PMODE4
00110 * graphics screen with value in
00120 * memory location $3F00
00130
00140          ORG     $3F00   Start program at $3F00
00150 CHAR     FCB     #$FF    Store default value (255)
00160 BEGIN    LDA     CHAR    Load A with value at CHAR
00170          LDX     #$600   Load X with start of screen
00180 LOOP     STA     ,X+     Store A at location X
00190          CMPX    #$1E00  Compare X to $1E00
00200          BNE     LOOP    If not, go back to LOOP
00210          RTS             Return control to BASIC
00220          END     BEGIN   End.  Set EXEC address.
```

Fig.3 Program: PMODEFIL.ASM (Disk Version)

```
00100 * Sample program to fill PMODE4
00110 * graphics screen with value in
00120 * memory location $3F00
00130
00140          ORG     $3F00   Start program at $3F00
00150 CHAR     FCB     #$FF    Store default value (255)
00160 BEGIN    LDA     CHAR    Load A with value at CHAR
00170          LDX     #$E00   Load X with start of screen
00180 LOOP     STA     ,X+     Store A at location X
00190          CMPX    #$2600  Compare X to $2600
00200          BNE     LOOP    If not, go back to LOOP
00210          RTS             Return control to BASIC
00220          END     BEGIN   End.  Set EXEC address.
```

IMPORTANT NOTE TO OUR READERS

Due to such a prolonged delay in the publication of this issue, it leaves us no time to print the August issue without putting us another 2 months behind schedule. Therefore, we will be skipping the August issue and going directly to work on the October issue. We are going to try, however, to combine both issues together so that there will be material on both Business/Home Finance and Programming Languages. All subscribers will have one issue added onto their subscription in order to make up for this loss.

THE SHELL

A bi-monthly column devoted to the OS-9 operating system

A More Powerful LIST

by Bob van der Poel, Contributing Editor

This issue our column is going to be short on chatter and long on program. We've taken the skeleton LIST command from the last issue and added a whole series of bells and whistles. No, it isn't a word-processor--but it is a lot more than we started off with.

The idea behind this exercise is to get you writing your own 'C' programs, so don't just type in the listing--examine it and figure out how the various options and functions work. There are still some options and features which can be added to this program; the end of line routines do not do word wrap, you might want to set the lines per page and the margin sizes as options and you may also want user defined headers and footers. But that we're going to leave up to you.

NLIST will work just like the standard OS-9 LIST command, but a number of options can be set from the command line. Each option is a single character preceeded by a "-". So long as the options have no arguments you can combine a number of them after one "=". The options are:

-n This option will place a line number in front of each line. This can be very handy when you wish to match line numbers in a program with those displayed when errors in assembling/compiling a program occur.

-f This option will print the name of the file being printed at top of the listing. This can be very nice when printing a number of files.

-l When used, this option will convert the entire file to lowercase characters.

-u When used, this option will convert the entire file to uppercase characters.

-p This option will paginate the output with a 6 line top and bottom margin and a header line with the current page number and the filename on line

-m=n This sets the left margin to 'n' characters. The default setting is 0. The "=" is optional.

-w=n This sets the number of characters per line to 'n'. The default setting is 80. For proper pagination this value must match the width of your printer.

-z This causes NLIST to read the filenames from standard input instead of from the command line. It is mostly used with pipes. For example:

```
dir ! nlist -zp
```

-z=<path> This cause NLIST to read the filenames from the file <path>. The "=" is required.

In the next issue we will continue with ideas in 'C' programming and OS-9. If you have any comments or suggestions for future columns please drop me a note care of this magazine or at:

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Porthill. ID
USA 83853

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PO Box 57
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* The program listing for NLIST begins on page 27.

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```
/* NLIST, a replacement for the standard OS-9 command

   (C) Copyright 1991
   Bob van der Poel Software

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*/


#include <stdio.h>
#include <ctype.h>

/* Set the top/bottom margins and the lines per page */

#define TOPMAR 6
#define BOTMAR 60
#define LINEPG 66

#ifdef OSK
extern int errno;
#endif

/* Global variables */

char donums, ucase, lcase, paginate, fname;
int lnum, pline, pcol, pagenum, margin;
int width=79;

char *currfile;


main(argc,argv)
int argc;
char *argv[];
{
  FILE *zfile=0;
  register int t;
  register char c, *p;

  /* First time though the args we look for options */

  for(t=1;t<argc;t++){
    if(argv[t][0]=='-'){
      p=&argv[t][1];
      while(*p){
        switch(c=tolower(*p++)){
          case 'n': donums++;   break;
          case 'u': ucase++;    break;
          case 'l': lcase++;    break;
          case 'f': fname++;    break;
          case 'p': paginate++; break;

          case 'w':
            if(*p=='=') p++;
            width=atoi(p)-1;
            while(*p) p++;
            break;

          case 'm':
            if(*p=='=') p++;
            margin=atoi(p);
            while(*p) p++;
            break;

          case 'z':
            zfile=stdin;
            if(*p=='='){
              if((zfile=fopen(++p,"r"))==NULL){
                fprintf(stderr,"Nlist: Can't open %s\n",p)
                exit(errno);
              }
              while(*p) p++;
            }
            break;

          case '?': usage(); break;

          default:
            fprintf(stderr,"Unknown option '-%c'\n",c);
            usage();
        }
      }
    }
  }

  /* Process the file(s), either from the command line or
     from the path specified by the -z option.
  */

  if(zfile){
    char fbuf[100];
    while(currfile=fgets(fbuf,sizeof(fbuf),zfile)) dofile();
  }
  else{
    for(t=1;t<argc;t++){
      currfile=argv[t];

      if(*currfile=='-') continue;

      dofile();
    }
  }
}

/* Function to actually list a file to stdout. */

dofile()
{
  FILE *infile;
  register char c;

  /* Open the file . . . the filename is pointed to by the
     global variable 'currfile'
  */

  if((infile=fopen(currfile,"r"))==NULL){
    fprintf(stderr,"Can't open %s, error %d\n",currfile,errno);
  }
```

```
   else{
      pagenum=pageno=lnum=0;

      if(fname && !paginate) printf("FILE: %s\n\n",currfile);

      c='\n';     /* not printed, but needed for line numbering,
etc. */

      while(!feof(infile)){

         if(pline==0) newpage();    /* do top margin */

         if(c=='\n'){               /* start a new line */
            blanks(margin);
            pcol+=margin;
            if(donums){
               printf("%05d ",++lnum);
               pcol+=6;
            }
         }

         c=getc(infile);     /* next char in file to print */

         if(ucase) c=toupper(c);        /* do case conversion */
         else if(lcase) c=tolower(c);

         putchar(c);       /* to stdout */

         if(++pcol>=width) putchar(c='\n');  /* to line wrap */

         if(c=='\n'){    /* keep track of lines, new page */
            pline++;
            pcol=0;
            if(pline>=BOTMAR) newpage();
         }
      }
      fclose(infile);    /* done this file */

      if(pcol){          /* finish last line */
         putchar('\n');
         pline++;
      }

      newpage();     /* paginate for next file */
   }
}

/* This function will start a new page and handle top/bottom
margins. */

newpage()
{
   register int n;
   char pg[30];

   if(!paginate) return 0;   /* don't do pagination */

   if(pline < TOPMAR){
      while(pline < TOPMAR){  /* handle a top margin */
         if(pline==1){
            sprintf(pg,"Page %d",++pageno);
            blanks(margin);
            n=width-strlen(currfile)-strlen(pg)-margin;
            printf("%s",currfile);
            if(n>0){
               blanks(n);
               printf("%s",pg);
            }
         }
         putchar('\n');
         pline++;
      }
   }
   else{
      while(pline++ < LINEPG) putchar('\n');  /* to page bottom */
      pline=0;
   }
}

/* Send a series of blanks to stdout. Used for margins, headers */

blanks(n)
int n;
{
   while(n--) putchar(' ');
}

/* Print a usage message. Called by fatal errors and the
   ? command line option.
*/

usage()
{
   register int t;

   static char *opts[]={
      "n   number lines",
      "f   print filenames",
      "l   convert to lower case",
      "u   convert to upper case",
      "p   paginate output",
      "m=n left margin (0)",
      "w=n line width (80)",
      "z   get filenames from stdin",
      "z=<path> get filenames from <path>"
   };

   fprintf(stderr,"Usage: Nlist [<opts>] [<path> <opts>]\n");
   fprintf(stderr,"Function: List a file\n");
   fprintf(stderr,"Options:\n");
   for(t=0;t<sizeof(opts)/sizeof(opts[0]);t++){
      fprintf(stderr,"     -%s\n",opts[t]);
   }
   exit(0);
}
```

END OF PROGRAM

COCO QUERIES

Q. I would like to know if anyone out there in CoCo land is really good at getting Multi-Vue to work? In the past I've read several articles and typed in several program listings and I could not get any of these listings to work. For the most part the people writing these articles assumed the reader had prior knowledge as to how all this works. The documentation isn't all that good. If anyone is interested in corresponding with me let me know. Thanks!

Ernest Bazzinotti Jr.
93 Auckland St., #2
Dorchester, MA 02125

Q. Where can one purchase a 100-watt power supply for the CoCo?

Fred Wilson
556 Cherokee Drive
Waynesboro, GA 30830

Q. I have quite a few pictures that I have drawn using commercial graphics packages such as CoCoMAX II & III and ColorMAX Deluxe, but only can print them in black/white on my printer. Any help?

A. Yes, if you are able to locate the old Tandy CGP-220 printers -- they can be used to print (with the right driver) your color files. Also, the new Citizen GSX-140 does a really nice job with color when using a STAR NX-1000 Rainbow driver (a new driver is available for the 24-pin printer). I will also print your picture files (can do CM3, MGE, and PIX files) in color for the postage.

(- Terry Laraway, 41 NW Doncee Drive, Bremerton, WA 98310)

Q. I have an IBM/Epson printer with only a parallel port. Can I use it with my CoCo?

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*** Send in your questions regarding the Color Computer! All queries will be published, and left for another CoCoer to answer. If you know the answer to someone's question, please send your answer to us so that we may publish it in a future issue. Address all response to CoCo Queries c/o this magazine. Please note that all queries must be received by the 20th of the month prior to the month published.**

(EDITOR'S NOTE: BECAUSE THE AUGUST ISSUE WILL NOT BE PRINTED THIS YEAR, THE DEADLINE FOR THE OCTOBER ISSUE IS SEPTEMBER 20th.)

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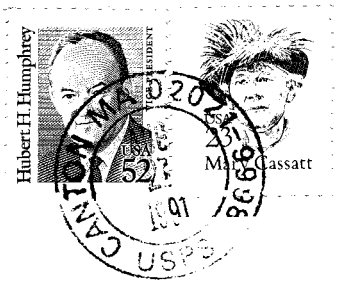

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