

UpTime

The newsletter for:
RS-DOS, OS9, OSK,
CoCos, and 68xxx's.

Volume 1, Issue 7

March 1993

Editorial

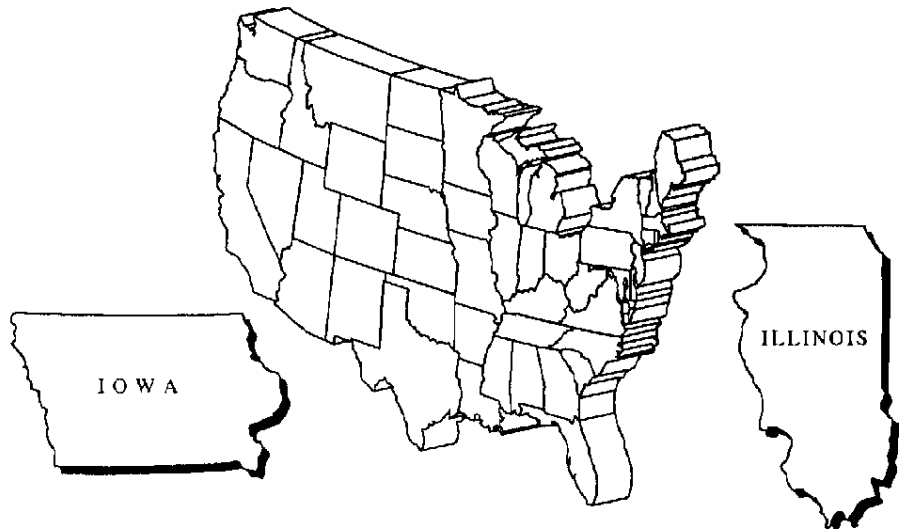
I always dislike reducing the size of the newsletter, but the recent loss of *CoCoPro!* has made it necessary to reduce UpTime to eight pages for the time being. We are, of course, always looking for new advertisers, and I encourage you to submit *your own* ad if you have any programs that you have ever considered publishing. For only \$15 you can take out your own quarter page ad. We also offer typesetting services for those who do not have access to a laser printer or other typesetting device.

The coming months bring not one, but *two* different CoCo Fests to the community. Whether you are on the east or west coast, or somewhere in between, chances are you are not too far from one of the locations. Considerable international interest has also been raised and many travelers from the 'far shores' are expected at the Fests. For more information, see the *Upcoming Events* column.

-Jordan Tsvetkoff

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The Tandy Hi-Res Interface with RS-DOS

OS-9 users can access the high resolution joystick adaptor via MultiVue or even straight OS-9 Level II. Tandy did not see fit to offer a software package for the build-in ROM system. This deficiency was addressed by three articles in *Rainbow*, but none of them were completely adequate for a CoCo 3 system.

The first article by Steve Bjork predates the CoCo 3 and is for PMODE screens only. The second by Duane M. Perkins had code for the CoCo 3 but with a serious defect: the code would lock up at high joystick values. The last by William Barden, Jr. had a great explanation of the adaptor mechanism including a circuit diagram but used the original Perkins

code.

Necessary requirements to create the adaptor code are knowledge of electronics, access to an oscilloscope, and a thorough understanding of the CoCo 3 analogue to digital convertor (DAC) and interrupt systems. It is not likely that most readers would have access to all of the above so there is a real need for good public domain software.

The normal method of reading the joysticks makes use of the DAC. However, the DAC in any CoCo has only six steps of resolution, each twice as large as the preceding one. The resultant resolution using all combinations of the six steps is 2 raised to the 6th power, i.e. 64. This is not adequate for even the PMODE screens which require 256 by 192 resolution. We made do with accessing every fourth pixel in the x direction and third in the y, but there is no way we could tolerate making do with every tenth pixel on a 640 by

Hi-Res cont'd, page 2

UpTime

Editor: Jordan Tsvetkoff

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Purpose: To provide information about products, services, and activities relating to the **Tandy Color Computer** and **OSK/68xxx-based machines**.

Submissions: Submissions of any form can be sent to *UpTime Submissions*, **JWT Enterprises**, 5755 Lockwood Blvd., Youngstown, OH, 44512. Please note that article/editorial submissions are preferred, although short program listings will also be considered. If reimbursement is requested, please indicate in writing with the initial submission.

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You will be billed for the second installment of \$7.50. Canadian orders, \$9.00 installments. Foreign orders, \$11.00 installments.

Hi-Res cont'd from page 1

192 HSCREEN.

The high resolution adaptor exchanges accuracy of voltage measurement for accuracy in measuring time. The basis for this swap of units is that a capacitor presented with a constant current acquires voltage at a constant rate. The result when graphed is a saw tooth waveform. The maximum voltage is 3.67 instead of the CoCo 5VDC because we must include a voltage drop caused by the current regulating diodes in the adaptor circuit.

The time required for a full ramp of voltage is about 5.5 msec. If this is enough time for software to count to 640, the adaptor will work. In fact, there is just barely enough time. The circuit is not capable of producing a waveform of less than about .6 volts leaving a net voltage change of 3v. This leaves 4.5 msec/640 counts or 7 µsec per count. Set our CoCo 3 to 2 MHz and that gives us 14 clock cycles with which to create our counting code. Either Tandy's design engineers did not envision a CoCo 3 or they like playing it close!

The fastest counting loop that can handle the full 640 is shown below:

```
LOOP LEAX 1, X X=X+1 (5)
  LDA $FFC0 test DAC for V
  match (3)
  BPL LOOP loop if no
  match (3)
** Total of 12 cycles,
requires reg.DP
** set for direct page
addressing.
```

Hi-Res cont'd, page 4

UPCOMING EVENTS

Middle America's Fest
March 27th (10-6pm) and 28th
(10-3pm), 1993
Ramada Inn, Des Moines, Iowa

Sponsored by:
Mid Iowa & Country CoCo

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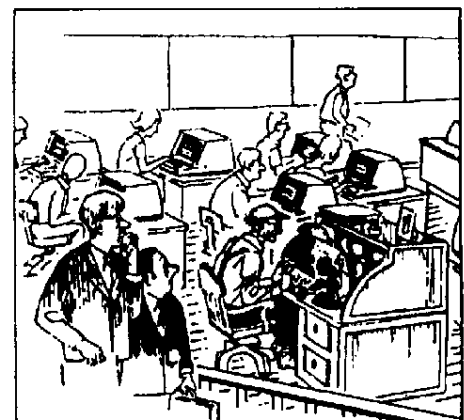
* * *

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It started life as a simple terminal for farmers to use, but grew into an inexpensive yet powerful home computer. This book relates the history of the CoCo through the pages of various CoCo magazines and provides "survival" information (current vendors, publications, support, repairs, etc.). Many long-time and knowledgeable CoCo advocates contributed- Alfredo Santos, Marty Goodman, Art Flexsor... to many to list here! SIZE: 5.5"x8.5", approx.. 160 pages. Softbound; \$20; Hardbound \$30
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Chicago May
1st and 2nd!

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VER: 4.8.0

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ColorComputer-3

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The Ultimate MIDI Music Notation Editor for the
MM/1 and OSK machines

UltiMusE/K

VER: 10.0.0

UpTime

Hi-Res cont'd from page 2

Wow, that is only two clock cycles to spare! The big problem with this code (which was used by Perkins) is that the only exit from the loop is a DAC voltage match. A joystick outputs 5 volts maximum much higher than the 3.67 top voltage of the adaptor. The loop needs to be made unconditionally self-terminating but there are not enough cycles available to add the needed code.

If this situation seems vaguely familiar, you are correct. The CoCo has exactly the same problem doing disk I/O. For disk work, the problem is solved with a Non-Maskable Interrupt (NMI) generated by the disk controller. We need an interrupt to unconditionally kick us out of our counting loop. Happily, the CoCo 3 has just what we need- the timer interrupt.

In Listing 1, I have chosen to use the FIRQ timer interrupt. The timer is set for just under the time required for a full voltage oscilloscope. The scope was also used to measure the minimum time required to fully discharge the ramp capacitor. This must be provided to prevent miscounts if the routine is called several times in rapid succession.

The assembled code can be loaded anywhere convenient in memory and when called at "load offset +4" returns X and Y values at load offset +0 and +2, respectively. The code is also self-compensating for 320 or 640 width screens. The calling software must include math to convert the Y joystick values from 0-639 to the correct range.

- Robert Gault

Secretary, CCOG Color
Computer Owners Group of
Detroit

LISTING 1:

```

00010 * TANDY HIGH RESOLUTION JOYSTICK ROUTINE
00020 * (C) NOV. 1992 BY ROBERT GAULT
00030
00040 * READS RIGHT JOYSTICK AND STORES X & Y VALUES AT OFFSET
00050 * 0 & 2: ROUTINE STARTS AT 4
00060
00070 * COCO3 FAST MODE ONLY: COMPENSATES FOR 320/640 FORMAT
00080 * SHOULD BE OFFSET LOADED TO DESIRED ADDRESS, PIC CODE
00090
00100      ORG          0
00110 XVAL      RMB          2
00120 YVAL      RMB          2
00130 START    PSWS        CC,DP
00140          SYNC          #550          HELPS KEEP JITTERING OUT OF RESULTS
00150          ORCC         #5FF          TURN OFF INTERRUPTS
00160          LDA          #5FF          SET DIRECT PAGE TO $FF00
00170          TFR          A,DP
00180          SFTDPC       #5FF          TELL THE ASSEMBLER
00190          LDA          #10F          SAVE ORIGINAL AND THE RESET FIRQ VECTOR
00200          STA          FRGHL,PCR
00210          LDX          #110
00220          STX          FRGHL+1,PCR
00230          LDA          #57F
00240          LEAX        FIRQ,PCR
00250          STA          $10F
00260          STX          $110
00270          LDD          #5205C        SETUP GIME FOR FIRQ TIMER MODE
00280          STA          $FF93
00290          STB          $FF90
00300          LDA          $FF23        SOUND CONTROL: SAVE AND TURN OFF
00310          STA          SOUND,PCR
00320          ANDA        #.NOT.B
00330          STA          $FF23
00340          LDA          $FFD1        MUX VALUES: SAVE AND SET FOR X JSTICK
00350          STA          PIADA,PCR
00360          ANDA        #.NOT.B
00370          STA          $FFD1
00380          LDA          $FF03
00390          STA          PIADB,PCR
00400          ANDA        #.NOT.B
00410          STA          $FF03
00420          BSR          READJS        READ JOYSTICK VALUE: X
00430          STX          XVAL,PCR      SAVE THE RAW ANSWER
00440          LDA          $FFD1        SETMUX FOR Y JSTICK
00450          ORA          #B
00460          STA          $FFD1
00470          BSR          READJS        READ JOYSTICK: Y
00480          STX          YVAL,PCR      SAVE ANSWER
00490          LDD          PIADA,PCR      RESTORE ORIGINAL MUX VALUES
00500          STA          $FFD1
00510          STB          $FF23
00520          LDA          SOUND,PCR      RESTORE ORIGINAL SOUND VALUES
00530          STA          $FF23
00540          LDD          #54C00        RESTORE "ORIGINAL" GIME VALUES: KILL TIMER
00550          STA          $FF90
00560          STB          $FF93
00570          TST          $FF93        IF YOUR PROGRAM HAS OTHER FIRQ, CHANGE REG. D
00580          LDA          FRGHL,PCR      CLEAR RESIDUAL INTERRUPT FLAG JUST IN CASE
00590          LDX          FRGHL+1,PCR    RESTORE FIRQ POINTER
00600          STA          $10F
00610          STX          $110
00620          LDA          $E6          HRES GRAPHICS MODE INDICATOR
00630          CMPA        #3            HAVE WE A 320 OR 640 SCREEN
00640          BHS          EO
00650          LDD          XVAL,PCR      IF 320, DIVIDE X VALUE BY 2
00660          LSRA
00670          RORB
00680          STD          XVAL,PCR
00690 PD      PULS          CC,DP,PC      RETURN TO CALLING PROGRAM
00700
00710 SOUND    RMB          1
00720 PIADA    RMB          1
00730 PIADB    RMB          1
00740 FRGHL    RMB          3
00750
00760 READJS   LDX          #0            CLEAR COUNTER
00770          LDD          #5205C        REG.A-DAC: REG.B-DISCHARGE COUNT
00780          STA          $FF20        TURN OFF RAMP IF IT WAS ON
00790 AD      DECB          WAT1        FOR FULL DISCHARGE
00800          BNE          AO
00810          LDD          #5256        REG.A-DAC: REG.B-TIMER VALUE
00820          TST          $FF93        CLEAR STRAY FLAG
00830          ANDCC       #5BF        START CUP FIRQ
00840          STB          $FF95        START TIMER
00850          CLR          $FF94
00860          STA          $FF20        START RAMP
00870 BD      LEAX          1,X          COUNT
00880          JFA          $FF00        TEST DAC FOR MATCH
00890          BEQ          BO          LOOP IF NO MATCH
00900 CD      ORCC         #530        KILL INTERRUPTS
00910          LDD          #5FE
00920          STB          $FF20        STOP RAMP
00930          CLR          CLR
00940          STD          $FF94        CLEAR TIMER VALUE
00950          TST          $FF93        CLEAR FIRQ FLAGS IF PRESENT
00960          TFR          X,D          OFFSET JS VALUE TO CORRECT RANGE
00970          SUBD         #180        OFFSET MIN RAMP VALUES
00980          BCC          DO
00990          LDD          #0            PREVENT NEGATIVE VALUES
01000 DD      TFR          D,X          RETURN FROM SUBROUTINE WITH VAL IN X
01010          RTS
01020
01030 FIRQ     LDA          $FF93        COPY FIRQ FLAGS: ALSO CLEAR THEM
01040          CMPA        #520        IS IT A TIMER FIRQ?
01050          BNE          FO          NO, THEN EXIT BACK TO COUNT LOOP
01060          LEAY        CO,PCR        RESET RETURN ADDRESS PAST COUNT LOOP
01070          STY          1,S          MODIFY STACK VALUE
01080          FO          FINISHED WITH INTERRUPT
01090
01100          END          START

```

LISTING 2:

```

10 ' DEMO ROUTINE BY ROBERT GAULT TO INDICATE HOW HIGH RES ADAPTOR WORKS
20 LOADM"HRESRS",&H7000:' USE: WHATEVER NAME YOU SAVED THE ML ROUTINE UNDER
30 RGB:' OR CMP OR SET PALETTE AS DESIRED BUT MAKE COLORS 0-3 DIFFERENT
40 HSCREEN4:' ALSO TRY HSCREEN 1 OR 2; FOR 3 CHANGE ARROW COLOR
50 HBUFF1,80:HBUFF2,80:' LARGE ENOUGH FOR HSCREEN2 USE
60 HS="NM+11,+4":' PART OF DRAW STRING CALLED SEVERAL TIMES
70 BF=1:GOSUB200:GOSUB230:BF=2:GOSUB200:GOSUB210:' BF SELECTS BUFFER #
80 JS=&H7004:XVAL=&H7000:YVAL=&H7002
90 DEF FNA(X)=PEEK(X)*256+PEEK(X+1):' CONVERTS A 2 BYTE NUMBER TO BASIC INTEGER
100 FORX=0TO640STEP80:HLINE(X,0)-(X,191),PSET:NEXT:' DRAW GRID LINES
110 FORY=0TO192STEP32:HLINE(0,Y)-(639,Y),PSET:NEXT
120 X=1000:Y=X:' SETUP INITIAL CONDITIONS
130 '
140 FORT=0TO1STEP0:EXEC JS:' INFINITE LOOP: READ JOYSTICK
150 A=FNA(XVAL):B=.3*FNA(YVAL):' RECOVER X&Y VALUES
160 IFX>A-.5 AND X<A+.5 AND Y>B-.5 AND Y<B+.5 THEN 140:' TEST FOR NO CHANGE
170 IF Z<>0 THEN GOSUB210 ELSE Z=1:' DON'T RESTORE SCREEN ON FIRST PASS
180 X=A:Y=B:BF=1:GOSUB200:GOSUB220:NEXT T
190 '
200 HGET(X,Y)-(X+16,Y+7),BF:RETURN:' USED FOR BOTH BUFFER 1 & 2
210 HPUT(X,Y)-(X+16,Y+7),1:RETURN:' ORIGINAL SCREEN VALUES
220 HPUT(X,Y)-(X+16,Y+7),2,OR:RETURN:' ARROW ICON
230 HDRAW"C2;BM 0,0;NR7;D1;NR5;D1;NR3;D1;NR1;BM+2,-1;XH$;BM+0,-1;XH$;BM+2,+0;XH$;C1":RETURN:'CREATE ARROW ICON
240 '
250 This program simulates the cursor action present in OS-9 MultiVue. In
260 most cases, frequent calls to a cursor update subroutine should be OK
270 for BASIC programs. If greater speed is required, minor modifications
280 to the ml. program could incorporate the routine into the IRQ vector.
290 This would make joystick polling independent of the BASIC program.
300 For the gain to be significant, the ml. routine would also have to draw
310 the arrow icon; not that easy a task in the context of an RSDOS system.

```

Middle America Fest!
For your "Color Computer"
March 27-28th, 1993

Presented by: "Mid Iowa & Country CoCo"

Saturday VIP Breakfast 8:30 AM RSVP 7 days
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 Saturday Show March 27, 10:00 AM to 6:00 PM
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The Place: The Travel Lodge Inn. Easy Highway access at I-35 & 0 interchange, Exit #124 (University) 3 blks East. With a "limited number" of rooms reserved at Fest rates. \$35.00 per room, up to four occupants. These are limited, so reserve your room early: 1-800-255-3050. Airport shuttle provided! (rooms only)

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This promises to be a well rounded Fest!
A Color Computer Fest you don't want to miss!

Tickets:	Till Mar 1	At door	Middle America Fest		
One day	\$10.00	\$12.00	Terry Simons/Treas	James Jones	
Two day	\$12.00	\$15.00	1328 48th St.	(515) 224-1444	
VIP Breakfast optional	- \$7.00		Des Moines, IA 50311		
			(515) 279-2576		

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 On DELPHI, username MRUPGRADE

News Release! News Release! News Release!

Here's the five W's:

Who: Glenside CoCo Club of Illinois
What: Second Annual "last" Chicago CoCoFest!
When: May 1st and 2nd, 1993
Where: Holiday Inn Elgin (a Holiday recreation center)
 345 West River Road (a city block from I-90 & Illinois 31S)
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Be sure to ask for the "Glenside" or "CoCoFest!" rates!

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- to provide vendor support to the CoCo community
- to provide community support to the CoCo vendors
- to provide educational support to new users
- **TO HAVE AN OUTRAGEOUSLY GOOD TIME!**

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And now the 'H' word, *how much?*

- admission will be \$10 at the door
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- advanced ticket sales, \$8 plus SASE or \$8 plus 50¢ P&H

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WPShe! - This is an impressive tool which allows those who do a lot of Word Processing on their Color Computer 3 to put all of their favorite tools under a single point and click environment. Requires OS-9 Level 2, system support from the WindInt module which comes with Multi-View and at least 256K of memory. Mouse and Printer are optional but desirous. Only \$22.00!!

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Icon Basic09


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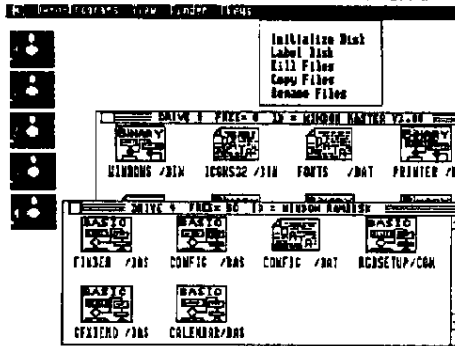
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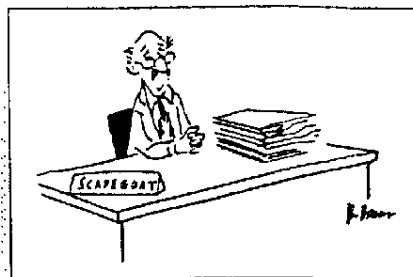
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