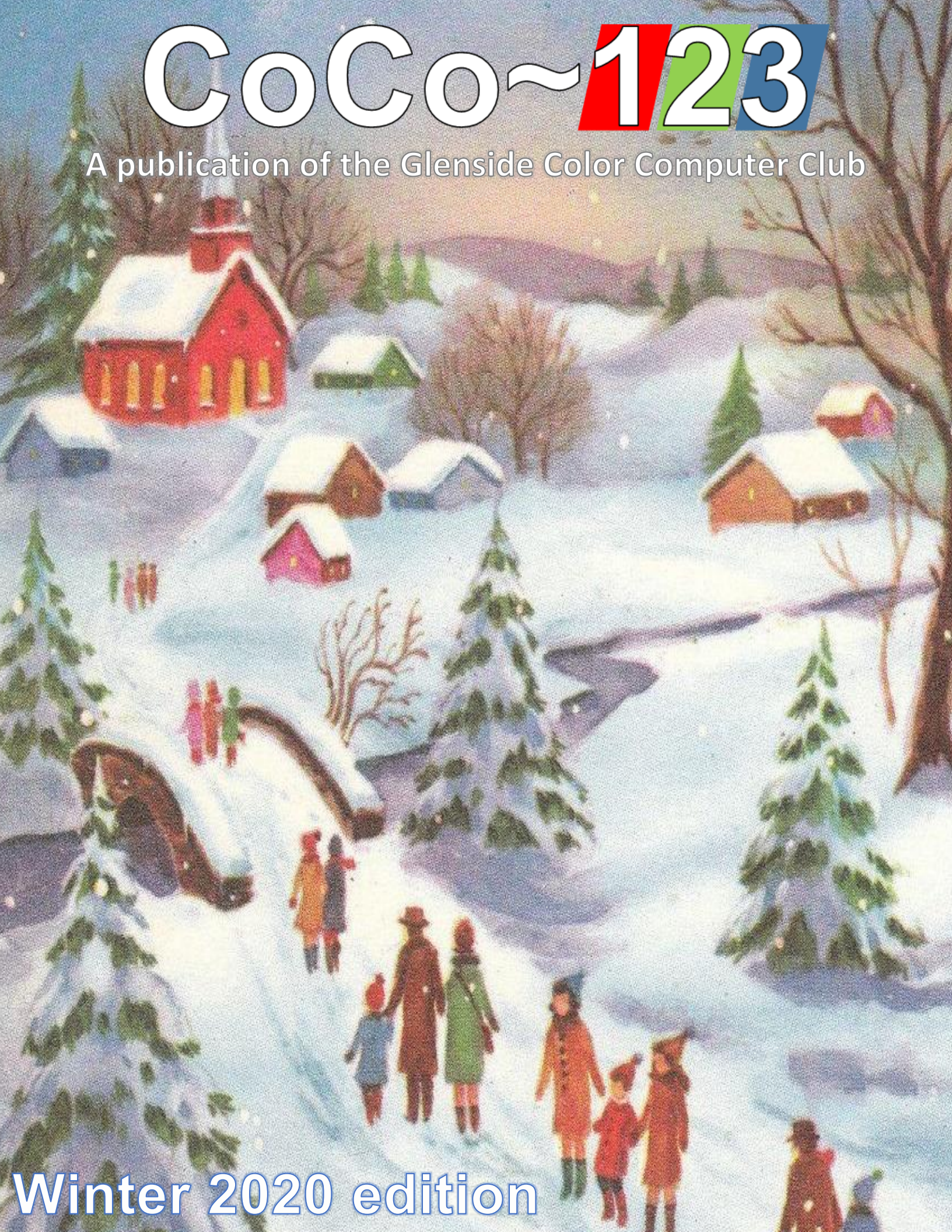


# CoCo~123

A publication of the Glenside Color Computer Club



Winter 2020 edition



<https://boysontech.com/marketplace>



<http://cloud9tech.com/>

**COCOMAN.BIZ**

maker of the switch-a-roo

<http://cocoman.biz>



<http://cocovga.com/>



<http://store.go4retro.com/>



The Zipster Zone

<https://thezipsterzone.com/>



<http://cococrew.org/>



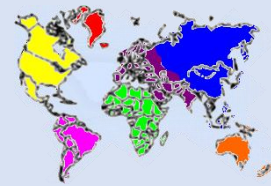
<http://cocotalk.live/>



<http://www.tindie.com/stores/fiscap0768/>



<http://lcurtisboyle.com/nitros9/nitros9.html>



Glenside Color Computer Club, Inc.  
Volume 40, Number 3

Chicago, Illinois  
Winter 2020

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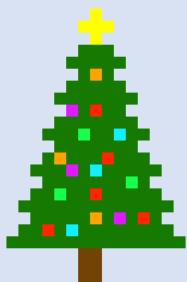
### G.C.C.C. Meetings

GCCC meetings are the 3<sup>rd</sup> Thursday of each month and are being held virtually via Blue Jeans until further notice. Upcoming meetings: December 17<sup>th</sup> 2020, January 21<sup>st</sup> 2021, February 18<sup>th</sup> 2021.

### G.C.C.C. OFFICERS

If you have questions about the association, contact one of the officers for the answers.

| <u>POSITION</u> | <u>NAME</u>  | <u>E-MAIL</u>  | <u>PRIMARY FUNCTION</u> |
|-----------------|--------------|--|-------------------------|
| President       | Jim Brain    | <a href="mailto:president@glensideccc.com">president@glensideccc.com</a>           | The buck stops here...  |
| Vice-President  | Terry Steege | <a href="mailto:vice-president@glensideccc.com">vice-president@glensideccc.com</a> | Meeting planning, etc.  |
| Treasurer       | Brian Goers  | <a href="mailto:treasurer@glensideccc.com">treasurer@glensideccc.com</a>           | Dues and Purchasing     |
| Secretary       | Rich Bair    | <a href="mailto:secretary@glensideccc.com">secretary@glensideccc.com</a>           | Records and Reporting   |



Jim Brain



Terry Steege



Brian Goers



Rich Bair



## CoCo~123 Information

CoCo~123 is the newsletter of the Glenside Color Computer Club. Your annual contribution of \$15.00 helps to keep our club going. Send your check to:

Brian Goers, Glenside Treasurer  
PayPal to [Brian7eg@gmail.com](mailto:Brian7eg@gmail.com)  
Email [treasurer@glensideccc.com](mailto:treasurer@glensideccc.com)

Our treasury provides newsletters and good times with fellow CoCo users at our Annual "Last" Chicago CoCoFEST! and our Annual Glenside Picnic.

Should you attend the Annual CoCoFEST! your annual contribution will be covered for that year.

## CoCo~123 Contributors

Special thanks to our contributors this issue: R. Allen Murphy, Rick Adams, Rick Ulland, Tim Lindner, Chet Simpson, Eric Canales

## TREASURY NOTES



### September

|                   |              |
|-------------------|--------------|
| Beginning Balance | \$ 14,011.82 |
| Deposits (PayPal) | \$ 45.00     |
| Interest          | \$ 0.57      |
| Ending balance    | \$ 14,057.39 |

### October

|                   |              |
|-------------------|--------------|
| Beginning Balance | \$ 14,057.39 |
| Deposits (PayPal) | \$ 45.00     |
| Interest          | \$ 0.60      |
| Ending balance    | \$ 14,102.99 |

### November

|                   |              |
|-------------------|--------------|
| Beginning Balance | \$ 14,102.99 |
| Deposits (PayPal) | \$ 0.00      |
| Interest          | \$ 0.58      |
| Ending balance    | \$ 14,103.57 |

Brian Goers, Treasurer  
Glenside Color Computer Club

## GCCC MEETINGS

The Glenside Color Computer Club meets the third Thursday of each month and are currently being held virtually through the BlueJeans video conference service.

<https://bluejeans.com/889394355>  
Visit our website at:  
<http://glensideccc.com>

## The CoCo~123 Dream Team

This publication is a joint effort of R. Allen Murphey, Tim Lindner, Paul Thayer, L. Curtis Boyle, and Salvador Garcia. Arranged and edited by Steve Strowbridge.

## From the Editor's Clipboard



2020 has been interesting to say the least! COVID-19 and real life caused the last newsletter to be about 2 months behind schedule, so my self-imposed penance was to make up for it on the next issue and end the year strong, hopefully, some of you may feel we've accomplished that goal.

Not only was the last issue late, but it was also improperly labeled, while being released "in the Fall", it was supposed to be referred to as the Summer issue. To maintain continuity to that faux pas, I'm naming this one the Winter issue, when it should be the Fall or Autumn one, it will be on time at least!

I've been lucky enough to recruit some talent and dedication to help bring this and future issues on time, and with increasing quality.

It is December, it's almost the end of the year, and I wanted to close the year with a great holiday themed cover, and do a hopefully admirable job covering a good cross-section of what happened this year in the community with a jam packed year-end news review.

I'm delighted in the team we've got working on this publication and I look forward to bigger and better issues in the future, which will rely on the continued contributions from people just like you!

Help us make CoCo~123 better each issue, send us submissions. Email your suggestions and contributions to [newsletter@glensideccc.com](mailto:newsletter@glensideccc.com)

## From the president's platen



I appreciate you taking an opportunity to peruse the latest Glenside newsletter in the midst of the holiday festivities. As the content illustrates, it has been a very productive year for the Color Computer, not only concerning new software and hardware but also the many written, audio, and video contributions sharing new insights on the platform. In my professional work environment, I've often stated that an understanding of machines of this era holds the key to excellence in today's hardware or software design efforts. And I believe machines like the CoCo were the last of the truly "fun" machines to own, one that you enjoyed for its own sake, not just as a means to an end.

In the past month, the Glenside leadership team has been busy finishing up some long gestating projects. With our thanks to Steve Bjork, who has managed the glensideccc.com domain name and web site for many years, we have migrated both the domain and web site to new providers and transferred ownership to the club directly. By the time you read this, the new Glenside web site will be operational at [www.glenside.com](http://www.glenside.com). Eric Canales has worked tirelessly for quite some time to retheme and update the web site and we thank him for his efforts. As part of this transition and to promote continuity as roles shift within the club leadership, we've created a set of official Glenside officer email accounts for primary roles within the club. Finally, since Glenside now has access to a more powerful Internet server, potential new opportunities present themselves, like re-creating the Glenside BBS (potentially even running on a virtual CoCo3 using OS9) or connecting to the club software library using a cloud instance of DriveWire. With 2020 fast disappearing in the rear-view mirror, I hope 2021 will allow us to fully explore some of these ideas.

Please drop by the Glenside End of Year Virtual Open House, being held via our normal BlueJeans conference link on Sunday, December 20<sup>th</sup>, starting at 6PM Central and lasting until the last 2 folks sign off, I would guess. If you do drop by to say hi, be prepared to tell us about your favorite CoCo related event or item you enjoyed in 2020. And drop by with a glass full of your favorite relaxation beverage and tell us all about how you kick back and enjoy life.

Recent progress bodes well for all of us to once again congregate in Chicago in 2021 for the 29th Annual Last CoCoFEST!, where we will also belatedly celebrate the 40th anniversary of the Tandy Color Computer. Tony Podraza and Terry Steege are co-managing this year's event, and Terry has amassed a nice slate of physical and virtual speakers for the convention. Though April is a bit early in the year given all that needs to happen between now and then, we remain hopeful restrictions will be sufficiently lifted by then and we can safely gather and enjoy demos and presentations. However, I have spoken with the new venue and secured an alternate date later in 2021, should the need arise



Jim Brain  
Glenside President 2020-2021  
[president@glensideccc.com](mailto:president@glensideccc.com)



## Secretary's Scroll



Greetings, time-travelers to the 1980s!

The big news from the last two membership meetings is that we elected a new president and vice-president for the GCCC. These new officers (Jim Brain as prez and Terry Steege as v.p.) have definitely hit the ground running, and I'm expecting a lot of good things to happen for the club over the next year.

The process of transferring our web site to a club-managed host is nearing completion. The site is undergoing a complete redesign, with the new version up for inspection and constructive criticism at the same URL as before. Jim Brain and Eric Canales have put a lot of time into this effort, so let them know your opinions of it.

The bylaws revision project has been on hold since Jim has been concentrating on the web site but expect progress in the next few months.

We mourn the loss of long-time club member George Schneeweiss. George joined the GCCC many years ago, was treasurer of the club for over a decade, hosted the September picnic on multiple occasions, and was an avid supporter of the CoCoFEST!s. He often bid on items at the FEST! auctions just for the sport of it since he usually had no real need for the particular object. Anyone who ever visited his house knows what I mean; he was a collector extraordinaire, with barns full of garage-sale merchandise.

The possibility that the pandemic may cause CoCoFEST! 2021 to be compromised or postponed was brought up at the November membership meeting, but because we cannot currently predict what the situation will be by next April no decisions were made. The topic is certain to be discussed in greater length at the upcoming December meeting, so attend and make your views known.

I wish you all a safe and happy holiday season.



Rich Bair, Secretary  
Glenside Color Computer Club  
[mgdoc1@sbcglobal.net](mailto:mgdoc1@sbcglobal.net)

## 2020 Webmaster Update



New website!

Hello, we've been hard at work for the last 6-8 months bringing a new and updated club website to everyone! I hope you can check it out at <https://www.glenside.com>. The old website is no longer available, but you can still access an archive of it at <https://www.glensideccc.com/glenside-com-2020-archive/>

There are many new features on this website. We have a shareable calendar hosted by Google, secure contact forms for the officers designed and provided by TandyList.com (thanks Randy Weaver!), and multi-user authentication allowing anyone who asks the ability to post on our website. You can contact me by phone or email if you need help getting logged in. My contact information is on the About Us page: <https://www.glensideccc.com/about-us/>

We also have updated CoCoFEST! 2021 information, so please check it out and get ready for this year's fest! We are also considering other web services for our members including the possibility of a BBS. Keep an eye out for many new changes coming down the line as we continue updating and improving the site and services!



Eric Canales  
GCCC Webmaster  
[webmaster@glensideccc.com](mailto:webmaster@glensideccc.com)



# PIPES

AVAILABLE NOW!



A fast paced puzzle game in which the player lays down a set of pipes on a tiled grid in order to keep the water flowing through the pipes as long as possible without overflowing.

\$8 Digital Download

\$18 CD Media



FOR THE TANDY COLOR COMPUTER 1, 2, 3 AND DRAGON WITH 16K AND ANALOG JOYSTICK

<https://nickmarentes.com>

## Exploring the CoCo Joysticks

By R. Allen Murphey

### 1908 TO 1977: THE EARLY JOYSTICKS

The humble joystick got its start as a control system for aircraft, possibly as early as 1908.

However, the recorded joystick invention traces back to 1923's U.S. Patent 1,597,416 for an "Electrical Distant-Control System" by Carlos B. Mirick for the United States Naval Labs.

This was a four-direction signal transmitter to remotely control devices using a stick.

A four-direction stick triggered four switch closures that controlled analog radio signals to a remote device.

Electronic joysticks are born, even if it cannot fully decide if it is analog or digital by including both circuits in its design.

In the 1960s, the rise of the radio-controlled model aircraft hobby resulted in the 1964 release of Kwik-Fly by Phill Kraft, a direct ancestor of the Color Computer joystick designs by Kraft Systems. [1]

In 1967, Ralph Baer, better known for his later invention of the Magnavox Odyssey, first brings joysticks into arcade games.

But these joysticks did not have fire buttons.

Arcade joysticks with fire buttons would arrive in 1969 when Sega added the first fire button for the arcade game Missile.

Next in 1973, Taito adopted a 4-way stick for Astro Race, while in 1976 Prinztronic/Acetrionic/Interton based their early game console on analog sticks.

Perhaps the most well-known development in joysticks came in 1977 with the release of the Atari VCS and its (in)famous digital stick.

The VCS digital switch design would be adopted by many others for years, becoming a de facto standard.

### 1980 THE COLOR COMPUTER ERA BEGINS

As more "serious" computers for education and business, the first Tandy/Radio Shack computers (the Models I-IV) did not include joystick ports.

However, 1980's release of the more home/hobbyist "Color Computer" would correct this in a big way by including a pair of analog joystick ports.

While it seemed foolish at the time for Tandy not to leverage the Atari VCS de facto standard which received a lot of adaptation such as paddles, a button board, and steering controllers, all of those and more were possible with the same Digital-to-Analog converter and comparator design used by the original Color Computer.

Also, given the close ties between the radio-controlled aircraft hobby and Radio Shack stores, it is easy to see how the Kraft Systems analog control stick design could become the standard for Tandy's new hobby computer.

The so-called "Black Beauty" joysticks were a popular add-on for the many games which also arrived for the Color Computer, and were clearly and cleverly described in even the original partially-completed *Getting Started with Color BASIC* book available in 1980.

Chapter 9 "Color the Screen" (pages 84-88) include a complete description of how to read the joysticks from Color BASIC, using custom BASIC keywords which were new and advanced for the time, even compared to BASIC languages being released years after.

To read the joystick in basic, you assigned the result of the JOYSTK() function to a variable, by calling JOYSTK() with a parameter from 0 to 3 describing which of the 4 axes you wanted to know.

Color BASIC would fill the variable with a number from 0 to 63 representing the current position of that axis.

The Axis parameter could be:

- 0 left horizontal
- 1 left vertical
- 2 right horizontal
- 3 right vertical

The variable value returned would fall into the following ranges.

Horizontal range: 0-63 with 32 in the middle

Vertical range: also 0-63 with 32 in the middle

Getting Started With Color BASIC also included two full joystick program listings. The first listing would simply display the values of all four axes to the screen as numbers.



## LISTING 1

```

10 CLS
20 PRINT@0,JOYSTK(0);
30 PRINT@5,JOYSTK(1);
40 PRINT@10,JOYSTK(2);
50 PRINT@15,JOYSTK(3);
60 GOTO 20

```

The second listing was built up in a series of interactive steps to develop a program using the joystick to paint colors on the screen.

## LISTING 2

```

10 CLS(0)
20 H = JOYSTK(0)
30 V = JOYSTK(1)
40 IF V > 31 THEN V = V - 32
50 C = JOYSTK(2)
60 IF C < 31 THEN C = 3
70 IF C > = 31 THEN C = 4
80 SET(H,V,C)
100 P = PEEK(65280)
110 IF P = 126 THEN 10
120 IF P = 254 THEN 10
130 GOTO 20

```

An interesting sidebar note alludes to how the button circuits are wired through the keyboard input port.

"If you press the buttons when you're not RUNNING the program you will get @ABCDEFGH or IJKLMNOP." p. 88

The assembly language version of the Color BASIC JOYSTK() function is excerpted in Listing 3 below.

```

;*****
; LISTING 3: JOYSTK() FUNCTION
; Color BASIC Unravelled II pp B16-B17 1999 Walter Zydhek
; JSR [$A00A] or JSR [JOYIN]
;*****

* JOYSTK
JOYSTK JSR >LB70E EVALUATE JOYSTICK ARGUMENT
  CMPB #3TWO JOYSTICKS MAXIMUM (HOR & VER FOR EACH)
  LBHI LB44A 'ILLEGAL FUNCTION CALL' IF >3
  TSTB SET FLAGS
  BNE LA9D4 GET NEW DATA ONLY IF JOYSTK(0)
  BSR GETJOY GET NEW DATA FOR ALL JOYSTICKS
LA9D4 LDX #POTVAL POINT X TO JOYSTICK DATA BUFFER
  LDB FPA0+3 WHICH JOYSTICK DID YOU WANT?
  LDB B,X PUT ITS DATA INTO ACCB
  JMP >LB4F3 CONVERT ACCB INTO FLOATING POINT NUMBER

*
* JOYSTK DATA AT:
* $15A $15B $15C $15D
* LEFT LEFT RIGHT RIGHT
* VERT HORIZ VERT HORIZ
** THIS IS A 6 BIT SOFTWARE A/D CONVERSION ROUTINE
GETJOY BSR LA974 TURN OFF AUDIO
  LDX #POTVAL+4 POINT X TO JOYSTICK DATA BUFFER
  LDB #3GET FOUR SETS OF DATA (4 JOYSTICKS)
LA9E5 LDA #10 10 TRIES TO GET STABLE READING
  STD ,--S STORE JOYSTICK NUMBER AND TRY NUMBER ON THE STACK
  BSR LA9A2 SET THE SELECT INPUTS ON ANALOG MULTIPLEXER
LA9EB LDD #$4080 ACCA IS A SHIFT COUNTER OF HOW MANY BITS TO CONVERT

```

```

* AND WILL BE $40 (6 BITS) FOR THE COLOR
* COMPUTER. ACCB CONTAINS A VALUE EQUAL TO 1/2
* THE CURRENT TRIAL DIFFERENCE. INITIALLY = $80 (2.5 VOLTS).
LA9EE STA , -S TEMP STORE SHIFT COUNTER ON STACK
ORB #2KEEP RS 232 SERIAL OUT MARKING
STB DASTORE IN D/A CONVERTER
EORB #2PUT R5232 OUTPUT BIT BACK TO ZERO
LDA PIA0HIGH BIT IS FROM COMPARATOR
BMI LA9FF BRANCH IF COMPARATOR OUTPUT IS HIGH
SUBB ,SSUBTRACT 1/2 THE CURRENT TRIAL DIFFERENCE
FCB SKP2 SKIP NEXT TWO BYTES
LA9FF ADDB ,SADD 1/2 OF THE CURRENT TRIAL DIFFERENCE
LDA ,S+ PULL SHIFT COUNTER OFF THE STACK
LSRASHIFT IT RIGHT ONCE
CMPA #1HAVE ALL THE SHIFTS BEEN DONE?
BNE LA9EE NO
LSRBYES - THE DATA IS IN THE TOP 6 BYTES OF ACCB
LSRBPUT IT INTO THE BOTTOM SIX
CMPB -1,XIS THIS VALUE EQUAL TO THE LAST TRY?
BEQ LAA12 YES - GO SAVE THE VALUE
DEC ,SNO-DECREMENT TRIES COUNTER
BNE LA9EB BRANCH IF YOU HAVEN'T TRIED 10 TIMES
* IF YOU FALL THROUGH HERE YOU HAVE TRIED TO GET THE SAME READING
* 10 TIMES AND NEVER GOTTEN A MATCH. AS A RESULT YOU JUST FALL
* THROUGH AND USE THE LAST VALUE READ IN.
LAA12 STB , -X SAVE THE DIGITIZED VALUE
LDD ,S++GET THE NUMBER OF THE JOYSTICK JUST DONE
DECB DECR JOYSTK NUMBER
BPL LA9E5 BRANCH IF THE LAST ONE DONE WASN'T NUMBER 0
RTS

```

```

;*****
; END OF JOYSTK
;*****

```

The core of the Color Computer controller port design is a digital-to-analog (DAC) circuit with a voltage comparator for sampling the voltage values of the potentiometers used for each axis of the two joysticks.

Joystick buttons were wired to the lowest keyboard lines of the first Peripheral Interface Adapter (PIA).

Retro Logic Lab covers the joystick hardware, circuit, and assembly code in detail in a fascinating Youtube video "How It Works In Detail - TRS-80/Kraft Deluxe Joystick Teardown, Circuit, and 6809 Assembly Code" [2]

While the DE-9 Atari VCS joystick became a de facto standard in the late 1970s and early 1980s, Atari themselves also experimented with the analog joystick on the Atari 5200 game console in 1982.

Unlike the TRS-80 Color Computer "Black Beauty" joysticks which are still favored by many CoCo gamers today, the Atari

5200 controllers left a lot to be desired by the gamers of the time, and still have an unlovely reputation.

But, Tandy was not done.

In 1983, the Color Computer 2 was introduced, along with the Deluxe Joystick and the Color Mouse.

The Deluxe Joystick featured a new "self-centering" or "free-floating" design adopted from United States Patent Number 4,490,710 "Control Stick Assembly" by Kraft Systems, Inc. of Vista California and filed November of 1982.

Leaving no stone unturned, Robert Lee Hawkins documented an "Atari Joystick Adapter" circuit in Color Computer Magazine February, 1984 starting on page 135.

This allows those de facto-standard Atari VCS digital joysticks to plug into the Color Computer and work with many existing Color Computer analog joystick games without change.

The introduction of the Color Mouse also underscored the versatility of the analog design, allowing "joystick ports" to become "controller ports" offering more options than just joysticks.

The default Color Computer design only offered six bits of resolution, or a numerical range of zero (0) to sixty-three (63) for each axis which is not enough to offer pixel-by-pixel positioning on high-resolution screens for graphics or user interfaces.

So the Color Mouse required tricks such as using a "key" to signal "high-resolution" mode and changing the scaling when detail positioning was needed.

To tackle this resolution issue Colorware introduced the CoCo Max graphics package in 1985 with a cartridge high-resolution joystick or mouse adapter offering much more detailed positioning.

Of course, Tandy was still not done yet.

In 1986, the Color Computer 3 brought in the next generation CoCo with another pin in the controller port allowing two buttons for all!

Tandy took advantage of that extra pin themselves with an upgraded Deluxe Joystick and Deluxe Mouse, both featuring two buttons.

Continuing on, Tandy also offered their own High-Resolution controller interface in 1987, which was also followed by Diecom's release of "The Rat" graphics and interface package.

The year 1987 also included another use for the venerable controller port through Gimmesoft's Maxsound software and cable which turned the Color Computer into a digital audio sampler, editor, and playback engine.

Adaptation, experimentation, and additional capabilities continue to be applied to the simple, clever joystick circuit of that original Color Computer.

In 2015, John "Sock Master" Kowalski, Robert Gault, and Nickolas Marentes brought us the Software Hi-Res Interface NEWJOY.ASM [3]

Using the original six-bit joystick interface from the 1980 Color Computer, they achieved the resolution available to a hardware high-resolution interface using software only.

Some of the original hardware high-resolution programs have subsequently been patched to use the NEWJOY driver

successfully, opening those software packages to those who can no longer find the rare hardware interfaces.

In 2016, John Linville expanded on Robert Lee Hawkins Atari adapter design to bring Sega Master Control and Sega Genesis gamepads to the CoCo, with three buttons plus "Start" or six-button configurations now usable through the original CoCo controller ports. [4]

Not far behind, Ed Snider's CoCoPSG memory/sound/game card for the CoCo adds additional DE-9 game ports which are also programmable to work with Atari VCS or Sega controllers. [5]

These ports are in addition to the original CoCo ports, allowing four controllers to be connected to the same Color Computer at once.

In 2019, David Ladd prototyped a PS/2 mouse to Color Computer adapter, allowing even more controller types.

One thing many of these "retro" joystick controllers have in common could be described as an utter contempt for the concept of ergonomics and an "iffy" track record on reliability.

The Atari VCS joystick and the CoCo Deluxe Joystick can both take their toll on your hands during heavy gameplay.

Activision's Decathlon game is well known for its share of destroyed VCS controllers, and there is a thriving enterprise in 3D-printing replacement arms for the many broken CoCo Deluxe Joystick arms out there.

In 2020, Neil Blanchard tackled the ergonomic and reliability issues by offering "The Gamester" which is a high-quality digital joystick constructed of genuine arcade joystick parts and a sturdy cabinet with replaceable cable design.

## 2020 JOYSTICK PROGRAMMING FOR MYSELF

I thought it would be neat to add joystick control to a game which was only keyboard controlled when originally sold.

A key constraint is that the BASIC ROM joystick functions would not be available to me, since I mapped a high-resolution game screen over the ROM memory area.

This meant I had to find a standalone replacement routine or do it myself.

Given the rich history of the CoCo and its controller ports, there is no shortage of choices of available code.

But I decided to tackle it myself which usually turns out to be the better learning opportunity for me.

It turns out the heart of the CoCo ROM routine is an algorithm called "Successive Approximation" which is very similar to a binary search.

If you have ever played a "Guess The Number" computer game where you are only told if your guess is "higher" or "lower" than the hidden number, then you have performed your own successive approximation.

The Retro Logic Lab video reference shows an excellent walk through of how successive approximation works with the CoCo ROM routine code.

However, I have heard a number of people grumble about how inefficient that CoCo ROM routine is.

After working through it, I have to agree.

While a successive approximation is the most efficient way to find the value given only the presence of a comparator and digital-to-analog controller, the CoCo ROM implementation has a funny wrapper around it.

In effect, for each axis tested, the CoCo ROM will try up to ten times in a row to read the same value.

If it cannot, then it gives up and just uses the last value read anyway.

By now you are probably asking the same question I did, "why do the other nine reads, each taking six successive approximations, for a total of 54 tests, when you will just use the last one as a default if needed?"

The obvious optimization here is obvious: just successively approximate once and be done in six tests instead of sixty.

So that's what I do.

During my research into the digital-to-analog conversion for sound, I found Hal Chamberlin's original Byte Magazine article

from 1977 for digital to analog sound with 6502 assembly code for a KIM-1.

That also led me to his 1985 book "Musical Applications of Microprocessors" and a wonderful coverage of successive approximation, including source code for a 6502 microprocessor which I converted to 6809 and adapted to the CoCo.

One adaptation was to shift the testing value up two bits, since the CoCo DAC uses only the upper six bits of the PIA port.

The other two bits are used for cassette input and serial output, which requires a little bit of Boolean AND/OR bit masking to avoid sending junk values to the printer or modem.

After sending the test value to the DAC, two more shifts to move the test value back down to the lower six bits.

The code in listing 4 will put 4 inverse video boxes on the screen, one for each joystick axis.

The box is an inverse "space" character, CoCo character value 32.

As you move the sticks, the character for each axis will change from an inverse @ sign (value 0) to an inverse ? mark (value 63).

Pressing the buttons will vary the 5th block on the screen through several inverse characters, JKNMO, representing which bit of the CoCo keyboard input line went low.

Some additional code needed to work with the CoCo joystick, such as a clear screen, and the multiplexor control to switch through all four axes is included in this test as well.

Finally, I have also included a hint where the Sega gamepad button checks go, but I am unable to include or test those now with the version of the Linville adapter that I have.



LISTING 4

```

;*****
;* Title: JOY.ASM
;*****
;* Author: R. Allen Murphey
;*
;* Description: CoCo DAC Joystick input
;*
;* Assembler: lwasml 1.4.2
;* lwasml -o JOY.BIN JOY.ASM
;*   decb dskinit JOY.DSK
;* OR
;*   decb kill JOY.DSK,JOY.BIN
;* decb copy JOY.BIN JOY.DSK,JOY.BIN -2
;* LOADM"JOY":EXEC
;*
;* Revision History:
;* Rev #      Date      Who      Comments
;* -----  -
;* 00      2020      RAM      Initial test code
;*****

;*****
;* EQUATES
;*****

PIA0AD:      equ    $FF00
PIA0AC:      equ    $FF01
PIA0BD:      equ    $FF02
PIA0BC:      equ    $FF03

PIA1AD:      equ    $FF20
PIA1AC:      equ    $FF21
PIA1BD:      equ    $FF22
PIA1BC:      equ    $FF23

;*****
; GLOBALS
;*****

TRLBIT:      rmb    1

;*****
; MAIN
;*****

                org    $7000
MAIN:
                jsr    CLS          ; clear screen
                jsr    SOUNDOFF     ; disable sound while we mess with MUX

```

```

LOOP:
    jsr    MUX1AOFF    ; turn off MUX select 1/A
    jsr    MUX2BOFF    ; turn off MUX select 2/B
    jsr    ADC0        ; get joystick axis reading
    sta    $0400       ; put on screen

    jsr    MUX1AON     ; switch to joystick axis 1
    jsr    MUX2BOFF    ; switch to joystick axis 1
    jsr    ADC0        ; get joystick axis reading
    sta    $0402       ; put on screen

    jsr    MUX1AOFF    ; switch to joystick axis 2
    jsr    MUX2BON     ; switch to joystick axis 2
    jsr    ADC0        ; get joystick axis reading
    sta    $0420       ; put on screen

    jsr    MUX1AON     ; switch to joystick axis 3
    jsr    MUX2BON     ; switch to joystick axis 3
    jsr    ADC0        ; get joystick axis reading
    sta    $0422       ; put on screen

    lda    #$FF
    sta    PIA0BD      ; turn off keyboard strobes
    lda    PIA0AD      ; read keyboard
    anda  #$0F        ; strip off top 4 bits
    sta    $0440       ; put on screen

                                ; TODO add SEGA serial port select here
                                ; POKE 65312,0 a pair of buttons which?
                                ; POKE 65312,2 the other pair which?

    jmp    LOOP

```

```

;*****
;* ADC Successive Approximation Search
;* from Musical Applications of Microprocessors pages 262-269
;* by Hal Chamberlin, (c) 1985 Hayden Books
;* 6502 Successive Approximation Figure 7-31 page 264
;* Adapted and modified for 6809 / Color Computer by R. Allen Murphey
;*****

```

```

ADC0:    lda    #$20        ; set 6th bit on for 6-bit dac
         sta    TRLBIT     ; save trial bit to memory
         clra              ; free up A register for whats next
ADC1:    ora    TRLBIT     ; get bit to try
         lsla             ; shift A left 1 bit
         lsla             ; shift A left another 1 bit
         ora    #%00000010 ; set serial marking bit
         sta    PIA1AD     ; write Trial Bit and Serial Mark to DAC
         anda  #%11111101 ; set serial marking bit
         lsra             ; shift A right 1 bit
         lsra             ; shift A right another bit
         ldb    PIA0AD     ; high bit of keyboard in is comparator
         bmi    ADC2       ; if high bit then add
         eora  TRLBIT     ; subtract current trial bit
ADC2:    lsr    TRLBIT     ; shift trial bit right 1 place
         bcc    ADC1       ; not done with test bits, go back
         rts

```

```

;*****
;* CLEARSCREEN
;*****

CLS:
    ldx    #$0400        ; start of screen
    ldd    #$6060        ; space space

CLEAR:
    std    ,X++         ; write D to X, increment X twice
    cmpx  #$0512        ; end of screen?
    bne   CLEAR         ; no, keep clearing
    rts

;*****
;* SOUNDOFF
;*****

SOUNDOFF:
    lda    PIA1BC        ; get current SNDEN
    anda  #%11110111    ; switch off bit 3
    sta    PIA1BC        ; disable SNDEN
    rts

;*****
;* SOUNDON
;*****

SOUNDON:
    lda    PIA1BC        ; get current SNDEN
    ora    #%00001000    ; switch on bit 3
    sta    PIA1BC        ; enable SNDEN
    rts

;*****
;* MUX1AOFF
;*****

MUX1AOFF:
    lda    PIA0AC        ; get current MUX 1/A
    anda  #%11110111    ; switch off bit 3
    sta    PIA0AC        ; MUX 1/A off
    rts

;*****
;* MUX1AON
;*****

MUX1AON:
    lda    PIA0AC        ; get current MUX 1/A
    ora    #%00001000    ; switch on bit 3
    sta    PIA0AC        ; MUX 1/A on
    rts

```

```

;*****
;* MUX2BOFF
;*****

MUX2BOFF:
    lda    PIA0BC        ; get current MUX 2/B
    anda  #%11110111    ; switch off bit 3
    sta    PIA0BC        ; MUX 2/B off
    rts

;*****
;* MUX2BON
;*****

MUX2BON:
    lda    PIA0BC        ; get current MUX 2/B
    ora    #%00001000    ; switch on bit 3
    sta    PIA0BC        ; MUX 2/B on
    rts

    end    MAIN

;*****
;* END OF JOY.ASM
;*****

```

The next bit of exploration for CoCo joysticks covers the Game Ports on Ed Snider's CoCoPSG card.

The CoCoPSG is built around a Yamaha YM2149 Software-controllable Sound Generator (SSG) which is an updated version of the General Instruments AY-3-8910 Programmable Sound Generator (PSG).

The SSG, and some models of PSG chips, include two I/O ports.

Ed Snider's documentation for the CoCoPSG includes the schematic of how the I/O ports of the YM2149 connect up to the Game Ports, and programming information needed to read digital Atari joysticks.

A careful read of the manual also includes the information needed to access the Game Port A and B "Select" signals needed to read the additional buttons of a Sega Genesis game pad.

I was able to program that and David Ladd tested and confirmed the button select was working for me.

Much like my previous test code, this example code simply "pokes" raw values to screen locations.

Since the direction controls are digital, you only see the extreme ends and center value.

The inverse @ sign for left or up, and the inverse ? mark for right and down.

There are two blocks showing the button bits status for when Game Port Select is high and low.

A careful read of the comments in the SSGSTICK subroutine will show where the buttons are read with and without select.



LISTING 5

```

;*****
;* Title: TESTSSG.ASM
;*****
;* Author: R. Allen Murphey
;*
;* Description: Support for Ed Snider's CoCoPSG Cart
;*
;* Documentation:
;* AY-3-8910 CHANNEL OPERATION
;* R1/R0 A Tone Generator Control 1-4095
;* R3/R2 B Tone Generator Control 1-4095
;* R5/R4 C Tone Generator Control 1-4095
;* R6 - Noise Generator Control 1-31
;* R7 - Mixer Control / I/O Enable
;* IOA|IOB|NOISEC|NOISEB|NOISEA|TONEC|TONE|TONEA
;* R8 A Amplitude Control
;* x|x|x|M|L3|L2|L1|L0
;* R9 B Amplitude Control
;* x|x|x|M|L3|L2|L1|L0
;* R10 C Amplitude Control
;* x|x|x|M|L3|L2|L1|L0
;* R12/R11 - Envelope Period Control 1-65535
;* R13 - Envelope Shape / Cycle Control
;* x|x|x|x|CONT|ATT|ALT|HOLD
;* R14 PORTA x|x|ALTBUTTON|FIRE|RIGHT|LEFT|DOWN|UP
;* R15 PORTB x|x|ALTBUTTON|FIRE|RIGHT|LEFT|DOWN|UP
;* If select, buttons are A/START
;* Else buttons are FIRE/B/C
;*
;* Assembler: lwasm 1.4.2
;* lwasm -o TESTSSG.BIN TESTSSG.ASM
;* decb dskinit TESTSSG.DSK
;* OR
;* decb kill TESTSSG.DSK,TESTSSG.BIN
;* decb copy TESTSSG.BIN TESTSSG.DSK,TESTSSG.BIN -2
;* LOADM"TESTSSG":EXEC

```



```

;*
;* Revision History:
;* Rev #      Date      Who      Comments
;* -----  -
;* 00      2020      RAM      Initial test code
;*****

```

```

skip2      equ    $8C          ; use CMPX # to skip next 2 bytes
SSGBANK0:  equ    $FF5A        ; FLASH or RAM in C000-DFFF
SSGBANK1:  equ    $FF5B        ; FLASH or RAM in E000-FDFF/FEFF
SSGCNTRL:  equ    $FF5D        ; Control Register
SSGYMREG:  equ    $FF5E        ; YM2149 Register Select
SSGYMDAT:  equ    $FF5F        ; YM2149 Data
SSGTONAL:  equ    $00
SSGTONAH:  equ    $01
SSGTONBL:  equ    $02
SSGTONBH:  equ    $03
SSGTONCL:  equ    $04
SSGTONCH:  equ    $05
SSGNOISE:  equ    $06
SSGMIXER:  equ    $07
SSGVOLA:   equ    $08
SSGVOLB:   equ    $09
SSGVOLC:   equ    $0A
SSGENVLO:  equ    $0B
SSGENVHI:  equ    $0C
SSGENVSH:  equ    $0D
SSGIOA:    equ    $0E
SSGIOB:    equ    $0F

```

```

;*****
;* TESTSSG
;*****

```

```

      org    $7000
TESTSSG:                ; SETUP
                        ; switch MPI to slot 1

      lda    $FF7F
      anda  #$F0
      sta    $FF7F

      jsr    CLS          ; clear screen
JOYLOOP:  jsr    SSGSTICK ; read gamepad values
      lda    SSGPORTA
      sta    $0400
      lda    SSGPORTA+1
      sta    $0402
      lda    SSGPORTB
      sta    $0440
      lda    SSGPORTB+1
      sta    $0442
      bra    JOYLOOP

```

```

;*****
;* CLS
;*****
CLS:
    ldx    #$0400
    ldd    #$6060
CLSLOOP:
    std    ,x++
    cmpx  #$0512
    bne   CLSLOOP
    rts

;*****
;* JOYSTICK TEST
;*****
SSGSTICK:
    lda    #SSGMIXER    ; bit 7 and 6 are IOA\ and IOB\ control
    sta    SSGYMREG    ; latch YM register 7 Mixer Control
    lda    SSGYMDAT    ; read what Mixer Control is set to
    anda  #%00111111  ; force bit 7 and 6 low to enable IOA/IOB
    sta    SSGYMDAT    ; write it back

                                ; Disable Game Port A and B Selects
    lda    SSGCNTRL    ; Read current SSG Control Setup
    anda  #%11111001  ; Turn off both Game Port Selects
    sta    SSGCNTRL    ; Write it back out

                                ; Read Game Port A without Select
    lda    #SSGIOA    ; YM Register 14 IOA
    sta    SSGYMREG    ; Latch Register 14
    lda    SSGYMDAT    ; Read YM IOA
    sta    SSGPORTA    ; Save it off for later processing

                                ; Enable Game Port Select A
    lda    SSGCNTRL    ; Read current SSG Control Setup
    anda  #%11111001  ; Turn off both Game Port Selects
    ora   #%00000010  ; Turn on only Game Port A Select
    sta    SSGCNTRL    ; Write it back out

                                ; Reread Game Port A with Select
    lda    #SSGIOA    ; YM Register 14 IOA
    sta    SSGYMREG    ; Latch Register 14
    lda    SSGYMDAT    ; Read YM IOA
    sta    SSGPORTA+1  ; Save it off for later processing

                                ; Enable Game Port B Select
    lda    SSGCNTRL    ; Read current SSG Control Setup
    anda  #%11111001  ; Turn off both Game Port Selects
    ora   #%00000100  ; Turn on only Game Port B Select
    sta    SSGCNTRL    ; Write it back out

; Read Game Port B with Select
    lda    #SSGIOB    ; YM Register 15 IOB
    sta    SSGYMREG    ; Latch Register 15
    lda    SSGYMDAT    ; Read YM IOB
    sta    SSGPORTB+1  ; Save it off for later processing

                                ; Disable Game Port A and B Selects
    lda    SSGCNTRL    ; Read current SSG Control Setup

```

```

anda  #%11111001  ; Turn off both Game Port Selects
sta   SSGCNTRL    ; Write it back out
                        ; Read Game Port B without Select
lda   #SSGIOB     ; YM Register 15 IOB
sta   SSGYMREG    ; Latch Register 15
lda   SSGYMDAT    ; Read YM IOB
sta   SSGPORTB    ; Save it off for later processing

lda   #SSGMIXER   ; bit 7 and 6 are IOA\  and IOB\  control
sta   SSGYMREG    ; latch YM register 7 Mixer Control
lda   SSGYMDAT    ; read what Mixer Control is set to
ora   #%11000000  ; force bit 7 and 6 high to disable IOA/IOB
sta   SSGYMDAT    ; write it back
rts

SSGPORTA:  rmb    2
SSGPORTB:  rmb    2

                END    TESTSSG
;*****
;* END OF TESTSSG.ASM
;*****

```

You should now have all the code you need to go forth and take control of the joysticks.

The possibilities abound!

I look forward to seeing the first 4-person game where everyone has SEGA Genesis controllers and all 4 buttons on each controller are used for something cool.

For example, the START button could be for each player to choose their character and pause in-game.

Buttons A, B, and C could each have different actions.

Could Gantelet, Dunjuz, or the Aliens game in development use these for 4-player-at-once action?



With a little bit of creative patching or design, it is very possible...and would be great fun at CoCoFEST!

Keep on CoCo'ing!

#### REFERENCES

- [1] <https://amablog.modelaircraft.org/amamuseum/2020/01/15/kwik-flislow-build-whos-phil-kraft/>
- [2] <https://www.youtube.com/watch?v=d-w2HE5ec1Y>
- [3] <https://nickmarentes.com/ProjectArchive/hires.html>
- [4] <https://retrotinker.blogspot.com/2016/06/sega-genesis-joypad-adaptor-for-coco3.html>
- [5] <https://thezipsterzone.com/2018/05/08/coco-psg/>

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### Joey Serial Switch



### Joey Joystick Switch



## Rick Adams - Raiders of the Lost Temple



Unretouched photo of Rick in his basement

Recently, while organizing some storage boxes in a forgotten corner of my basement, I found a box of documents from the years I developed games for Tandy and Activision. This treasure trove contained documents related to Temple of ROM, Shanghai, Omnistar, Bomb Threat and The Last Ninja. It was in a dusty far corner, at the very bottom of a stack of other boxes and hadn't been touched since we moved into my house 26 years ago.

The most important documents to me were the nine sheets of graph paper on which I had drawn out the maze for Temple of ROM, and the original instruction manual for the game. The original manual had a fantasy sword and sorcery theme, but Tandy changed this to a space exploration theme. I was glad to have the "real" manual back at last!

Sales figures for Temple of ROM were included, showing the game sold around 32,000 units.

The documents for The Last Ninja included the ridiculous timeline for development; I was to finish the project in four months. Well, that didn't happen, did it? What a happy nostalgic find this was!

### Temple of ROM archive:

- Correspondence
  - sales data
  - contract
- Development notes
  - instruction manual!
  - map diagram
  - font diagram
- Program listing
- Original game had one enemy
- Not all rooms had treasures, some had two
  - One per room, location based on room data
- Crown sped up cursor movement
- Crystal ball enabled bat warning
- Cursor was white square -> little flailing man
- I added video mode keys
- Precious ruby changed to jade cross
- ~32,000 units sold at \$1.50

### Sales data – units sold

|       |        |
|-------|--------|
| 1984  | 589    |
| 1985  | 28,041 |
| 1986  | 2,146  |
| 1987  | 1,512  |
| TOTAL | 32,288 |



May 23, 1983

Rick Adams  
1399 Springhill Road  
Petaluma, CA 94952  
(707) 778-0814

Software Evaluation  
1500 Tandy Center One  
Fort Worth, TX 76102

Dear Sir(s):

I am submitting an original arcade game for the Color Computer for evaluation. I am a senior programmer/analyst in the San Francisco Bay Area who also develops Color Computer software.

I am hoping that you will find the game acceptable for your Color Computer product line. Although the game is being sent to you via floppy disk, please note that it was designed to fit within an 8K game cartridge (8K ROM).

The game requires a 16K Color Computer. A floppy disk containing the game, and a one-page summary of game play, is enclosed.

Thank you for your consideration.

Sincerely,

Rick Adams

TEMPLE OF ROM  
(c) Copyright 1983  
By Rick Adams

LOADING AND STARTING GAME:  
— Insert disk, load and start game via LOAD/PRG\* and EXEC.  
— Interrupt animated title page by pressing either joystick button.  
— Select number of players by moving joystick left or right.  
— Push either joystick button to begin game play.

GAME PLAY:  
— Move joystick to explore rooms and corridors in search of treasure.  
— Screen scrolls in all directions.  
— Push button to fire in direction of movement. *fireballs*  
— Shoot spiders and bats before they bite you. (and their point value).  
— Touch treasures with the cursor to obtain them (and their point value).  
— Scoring is doubled while bat pursues player.  
— Obtaining some objects enables special abilities for a period of time.  
— The crystal ball warns of approaching bats via a double-"clip" sound.  
— The golden crown enables the player to move 25% faster.  
— The cursor flashes while the special ability is in effect.  
— "Transfer portals" are represented by a white dot inside a blue circle.  
— Entering a transfer portal teleports player to another portal far away.  
— Use of a portal disables all portals for a period of time.

SCORING:

|                |             |                                     |
|----------------|-------------|-------------------------------------|
| Spider         | 1000 points |                                     |
| Bat            | 1000 points | <i>Fireball</i>                     |
| Precious ruby  | 100 points  |                                     |
| Diamond ring   | 200 points  |                                     |
| Golden cup     | 500 points  |                                     |
| Crystal goblet | 1000 points |                                     |
| Crystal ball   | 1500 points | (enables advance warning of bats) — |
| Silver pitcher | 3000 points |                                     |
| Golden crown   | 5000 points | (enables fast cursor movement) —    |

REQUIREMENTS:  
16K, 32K, or 64K Color Computer.  
Disk system or ROM-disk system (if produced as 8K game cartridge)  
Standard Color BASIC or Extended Color BASIC.

AUTHOR INFORMATION:  
Rick Adams  
1399 Springhill Road  
Petaluma, CA, 94952  
(707) 778-0814

**Radio Shack**  
A Division of Tandy Corporation

COMPUTER MERCHANDISING 817-390-3155  
1500 ONE TANDY CENTER, FORT WORTH, TEXAS 76102

May 27, 1983

Rick Adams  
1399 Springhill Road  
Petaluma, CA 94952

Dear Mr. Adams:

Thank you for submitting your program, Temple of Rom, to Radio Shack for evaluation.


Thank you again for allowing us to look over your program. Your submission has been forwarded to the appropriate Product Line Manager, Barry Thompson, for review. He will contact you by letter within 60 days.

Sincerely

*Ed Juge*  
Ed Juge  
Director Computer Merchandising

RJ/kh

THE BIGGEST NAME IN LITTLE COMPUTERS

 **Tandy Corporation/ Radio Shack**  
Executive Offices 1800 One Tandy Center Post Office Box 17180 Fort Worth, Texas 76102 Telephone (817)390-3700

February 3, 1984

Mr. Rick Adams  
1399 Spring Hill Road  
Petaluma, California 94952

Re: Computer Software License Agreement  
"Temple of ROM", File R250/907

Dear Mr. Adams:

Enclosed are two copies of the noted agreement for your review. If it meets with your approval, please attach program specifications as Exhibit A, sign and return both copies to me for execution by our management. Upon completion, one fully executed original will be returned for your records.

Thank you for your cooperation.

Sincerely yours,

*Donald A. Williams*  
Donald A. Williams  
Staff Attorney

RAW:mm  
encl.  
cc: L. Gradziel

84-2107



**Tandy Corporation/Radio Shack**

Executive Offices 1800 One Tandy Center Post Office Box 17180 Fort Worth, Texas 76102 Telephone (817)390-3700

March 19, 1984

Mr. Rick Adams  
1399 Spring Hill Road  
Petaluma, California 94952

Re: Computer Software License Agreement  
"Temple of ROM", File R250/907

Dear Mr. Adams:

Enclosed is one fully executed original of the noted agreement for your records.

Sincerely yours,

*Ronald A. Williams*

Ronald A. Williams  
Staff Attorney

RAW:mm  
encl.  
cc:w/encl. M. Yamagata  
L. Gradziel  
J. Gray

84-2444

Temple of ROM original instruction manual

--- Exhibit 'A' ---  
Temple of Rom  
Program Specifications

Table of Contents

1. Introduction
2. Loading game
3. Starting game play
4. Game play
  - 4.1. Transfer portals
  - 4.2. Treasures
  - 4.3. Score table
  - 4.4. Monsters
    - 4.4.1. Spiders
    - 4.4.2. Fireballs
    - 4.4.3. Bats
5. Strategy

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1. Introduction

Centuries ago, the rightful occupants of the Temple of Rom were displaced by a conquering army sent by an evil empire. The rooms of the ancient temple were used to store the empire's ill-gotten treasure, and infested with many dangerous creatures who were charged with the task of guarding these treasures from any intruders.

Now, the descendants of the original occupants of the Temple have vowed to re-take their ancestral home, the Temple of Rom. They have hired you, as a fearless and adventurous mercenary, to infiltrate the dark corridors of the temple, steal as many treasures as you can, and destroy these evil creatures.

The odds seem insurmountable. You find your way blocked by poisonous bats and fearsome spiders. Worst of all, some treasures are protected by enchanted, hovering fireballs of flame, which shoot through the air toward your body the instant they sense your presence.

But you are reassured by the surge of power from your laser pistol, as you use your weapon to down one adversary after another. And, thanks to some advice from your employers in exile, you know some secrets about the Temple of Rom that the evil empire does not...

2. Loading game

If game is supplied as a Program Pak:  
make sure that computer is off.  
insert Program Pak.  
turn on computer.

If game is supplied as a cassette tape:  
turn on computer.  
CLEAR D, 2000  
ready tape in cassette tape player.  
LOADM  
EXEC

The animated title display will begin.

The Temple walls should be blue against a black background in the animated title display. If the Temple walls are red, press the RESET button until they are blue.

3. Starting game play

Press any joystick button, at any time, to interrupt the animated title display.

Choose one or two players with the right joystick: move the joystick to the left for one player game, or move the

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joystick to the right for two player game.

When the desired number of players has been displayed, press any joystick button to start game play.

4. Game play

Use the joystick to move your animated player figure in any direction. Press your joystick button to fire your laser in your direction of movement. The screen scrolls in all directions. Only a small portion of the Temple is visible on the screen at any one time.

Find and obtain treasures. Avoid and destroy monsters. When the player has been destroyed three times, the game is over.

For two player games, separate Temple configurations are maintained for each player.

4.1. Transfer portals

The conquering agents of the evil empire were puzzled to find five locations within the Temple at which a circle was inscribed on the floor, with a glowing crystal gem of unknown composition set at the center.

What possible purpose these five inscribed circles could have, they could not discover. They thought to remove the gems, but found that they could not, and after numerous attempts to do so, simply left them alone.

But you know them to be "transfer portals", a means by which the original occupants of the Temple were able to travel great distances instantaneously.

Enter a transfer portal to be teleported to one of the other four portals. The destination transfer portal is chosen at random.

Transfer portals are represented within the Temple as blue circles with a white dot in the center.

Use of a portal disables all of the portals for a period of time. A disabled portal is displayed as a blue circle without a white center dot. The white dot reappears when all portals are re-enabled.

Luckily for you, bats and other monsters can't use the transfer portals, as they do not know their true purpose.

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4.2. Treasures

Obtain treasures by touching them with the animated player figure. When a treasure is obtained, its point value is added to the player's score. But if you shoot a treasure, it shatters and is destroyed (for zero points!).

Both the crystal ball and the golden crown have other magical properties of which the evil empire is unaware.

Obtaining the crystal ball renders the player invisible for a period of time. The animated player figure flashes while the player is invisible. Bats, spiders and fireballs can't see you while you are invisible.

Obtaining the golden crown enables a higher-powered laser for a period of time. The high-powered laser causes a larger explosion when it hits something.

All of the Temple's treasures and monsters are regenerated when the last treasure is taken.

4.3. Score table

|      |                |                              |
|------|----------------|------------------------------|
| 5000 | Golden Crown   | (enables high-powered laser) |
| 3000 | Silver Pitcher |                              |
| 1500 | Crystal Ball   | (renders player invisible)   |
| 1000 | Crystal Goblet |                              |
| 500  | Golden Cup     |                              |
| 200  | Diamond Ring   |                              |
| 100  | Ruby           |                              |
| 1000 | Sentinel Bat   |                              |
| 1000 | Fireball       |                              |
| 1000 | Spider         |                              |

4.4. Monsters

Spiders, bats, and fireballs that you may meet in the Temple are deadly. Shoot them before they destroy you.

If a bat destroys you, your position will be unchanged for your next turn. If a spider or fireball destroys you, your next turn will begin at the center of the Temple, where your game began.

4.4.1.

Spiders

Some rooms in the Temple contain poisonous spiders. Shoot them before they bite you.

if it is so large that not all of the room appears on the screen at any one time.

Similarly, be warned that some rooms contain more than one monster. Don't be fooled into relaxing your guard just because you have destroyed one monster. Another may be in hot pursuit!

4.4.2. Fireballs

Some rooms are guarded by fireballs. Fireballs are faster than bats. If one engulfs you, you are cooked! Use the laser to disrupt fireballs and destroy them.

4.4.3. Bats

Watch out for patrolling sentinel bats. They have absolutely no sense of humor. Once a sentinel bat finds you, it won't give up. It will chase you relentlessly until either you or it are destroyed.

Bats can go through walls, but you cannot. Bats cannot go through transfer portals, but you can.

You earn double points for treasures taken while you are being chased by the bat. This double-scoring will be indicated by a double-"blip" sound when the treasure is obtained, instead of the usual single "blip".

The bats' bite is also deadly. Shoot them before they bite you.

5. Strategy

Once a bat finds you, confuse him for as long as possible. Touch a crystal ball to become invisible, or escape through a transfer portal. If you're lucky, the bat will take quite some time to find you, while you take advantage of the double-scoring bonus to gobble up as many treasures as you can.

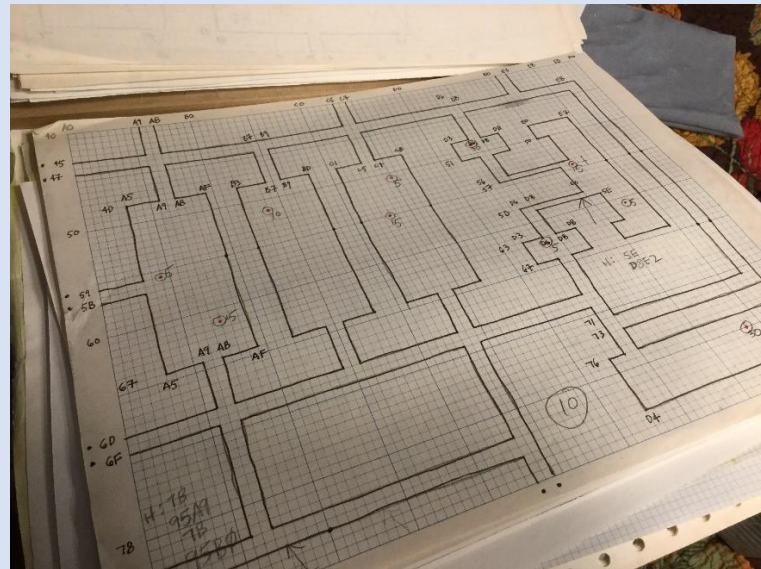
Some sections of the Temple contain more of the higher-scoring treasures than others. Obviously, it would be to your advantage to find these sections so that you can explore them first.

When entering a room, slow down and fire your laser quite a bit. Perhaps you will find a spider within; you gain nothing by running into his grass. On the other hand, a monster may try to attack you and instead run right into your fire, and wouldn't that be a shame?

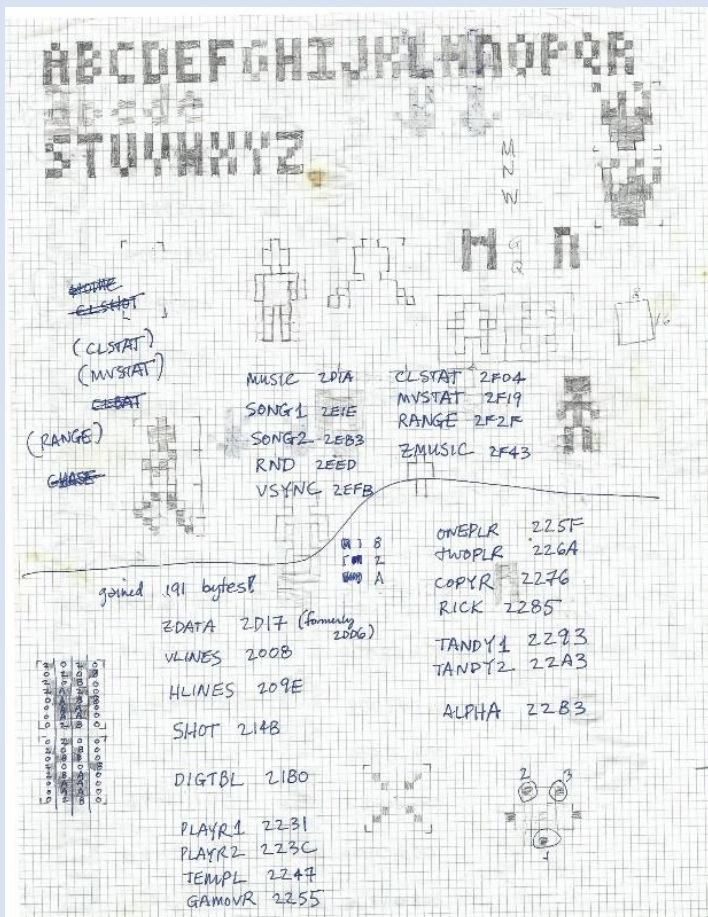
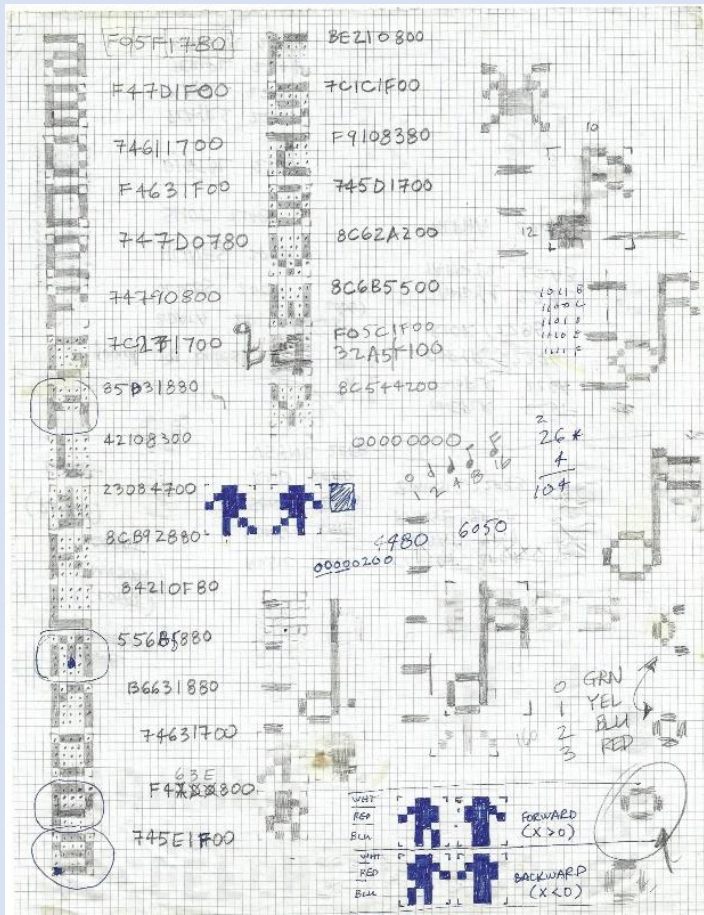
Become familiar with the layout of the Temple rooms and corridors. Be systematic in your efforts to clear the Temple of all treasures and monsters. Otherwise, you may wander around quite a while in the nearly-empty Temple searching for that last treasure.

Some rooms contain many treasures, some contain only one, and some are empty. Don't assume that you have cleared the room of treasures simply because you have found only one. Make sure that you explore the entire room, especially

One of the many hand drawn map diagrams on graph paper



Font and character diagrams



Shanghai:



Shanghai archives:

- Correspondence
  - Milestone payments
  - Contract
- Title Diagram
- Magazine review

Omnistar:



Unearthed Omnistar relics:

- development notes
- network diagram
- font diagram
- program listing

Omnistar features:

- Cool 5x7 OCR font
- DTMF keyclick sound
- More elaborate game

Handwritten notes on graph paper:

ABCDEFGHIJKLMNOPQRSTUVWXYZ

30 0  
9 28  
-25 17  
-25 -18  
9 -29

1401  
1110

35 24

X = GAME  
CLOADM  
EXEC

1 hit on wizard  
2 hits!

A  
B

2000  
2030

C new range, inc

Handwritten notes on graph paper:

! " # \$ % & ' ( ) \* +  
/ 0 1 2 3 4 5 6  
7 8 9 : ; < = > ? @

AFTER Z:

AAZ  
AA76

LL corner of @  
LL corner of ]

shift CLEAR  
shift ←  
shift ↑

AA57  
AA54  
AA

0 000 000  
000 000

↑

left to do:

Handwritten notes on graph paper:

Diagram of a cluster of five hexagons.

Diagram of a pentagon with vertices labeled: (0, 15), (14, 4), (9, 12), (-8, 12), (-14, 4).

Handwritten notes on yellow paper:

double energy  
lose energy  
gain energy

- acquire program
- release program
- access other system
- use program

~~list programs acquired~~  
list programs in system  
show system map  
change security level  
disrupt subsystem  
delete program?

show satellite status

SATELLITE LOCATIONS  
"LAST SEEN" LOCATION  
YOUR LOCATION  
SECURITY LEVEL  
ALERT STATUS  
ENERGY LEVEL  
EVENTS

Null stuff.  
activations  
down msgs  
danger w/ attack  
energy low  
termination  
"last seen" location

system traffic

cmd link

mv. list    pers. status

text format chars:  
HOME (w/o clear)  
some sort of graphics? SI/SO to alt char set?  
change character spacing (horiz) to zero?  
" " " (vert) " " ?

need X-list for searching. (for intruder)

PROGRAM NAME (5-CHAR) JOEL

ENMEG double energy  
 ENMIN lose energy  
 ENMAX gain energy

LOAD acquire program  
 SAVE save program

ENTER access other system  
 MAP display system map  
 change security level  
 disrupt subsystem

ERASE delete program  
 SSTAT satellite status report  
 NSTAT network status report  
 MKRK declare "home"  
 GMARK transfer to home  
 GOSAT access satellite  
 DCRCK crack password

announce location  
 disable security module  
 EXIT exit omnistar network  
 UNLOC remove restriction on program access  
 LOCK restrict access to program

line clear  
 slope  
 wait  
 (text?)

1-9 number to register  
 NSEW co-ord change  
 UD pen up/down  
 W wait  
 T text follows (terminated by .)  
 C co-ords back to center

USEDUWWSSSEENU

LOAD  
 SAVE  
 RUN (?)  
 ENTER

CRACK  
 LOCK  
 UNLOCK  
 STATUS

ZAP? BLAZE  
 BLAST?  
 SHOCK?  
 STING?

POWER? ENERGY? FUEL?  
 MAP?  
 MAX, MIN?  
 MARK, HOME  
 HIDE  
 FIND  
 EXIT

26  
 26  
 52

EVENTS:  
 KEYBOARD:  
 ACQUIRE PROGRAM  
 RELEASE PROGRAM  
 USE PROGRAM  
 RANDOM:

```

  graph TD
    Start(( )) --> GetKey[get key]
    GetKey --> KeyPressed{if key pressed}
    KeyPressed --> DoCommand[do command]
    DoCommand --> TriggerEvent{did command trigger event?}
    TriggerEvent --> DoEvent1[do event]
    TriggerEvent --> RandomEvent{time for a random event?}
    RandomEvent --> DoEvent2[do event]
    DoEvent1 --> Start
    DoEvent2 --> Start
  
```

## The Last Ninja:



## The Last Ninja archive:

- contract
  - development schedule
- 4-month timeline

| <u>SCHEDULE D</u> |  |                 |
|-------------------|--|-----------------|
| <u>Date</u>       | <u>Event</u>   | <u>Fee</u>      |
| 1. 2/19/88        | Contract execution                                       | \$1,000         |
| 2. 2/26/88        | Technical, Product Specification and Production Schedule |                 |
| 3. 3/14/88        | Background Graphics Demo                                 |                 |
| 4. 3/28/88        | Background Graphics and Animation Routine                | \$3,000         |
| 5. 4/18/88        | First Playable Program                                   | \$3,000         |
| 6. 5/9/88         | Graphics Completion                                      |                 |
| 7. 5/23/88        | First Playable with Sound Effects                        | \$3,000         |
| 8. 6/6/88         | First version with Title Screen, Sound Effects and Music |                 |
| 9. 6/20/88        | Developer's Final  | \$4,000         |
| 10. 7/8/88        | Activision/Tandy Acceptance                              | \$4,000         |
|                   | On-Time Completion Bonus                                 | \$5,000         |
|                   | <b>TOTAL</b>   | <b>\$23,000</b> |

Rick Adams 02/11/88

- 15 -

## Editor's Note:

There's a lot of history with Rick Adams and Tandy, we're lucky to have experienced a few of his classics back in the day like Temple of ROM, and Shanghai.

A few of his project never made it to market, but lucky for us, updated versions like Temple of ROM II, Bomb Threat, and Omnistar are now available for digital download to run on real Color Computers and emulators on his web store: <https://rickadams.itch.io/> you can also check out source code samples and other goodies on Rick's GitHub site <https://github.com/vggdrasilradio/> thank you Rick for all you've done and continue to do for the CoCo and its community.

# Digger III

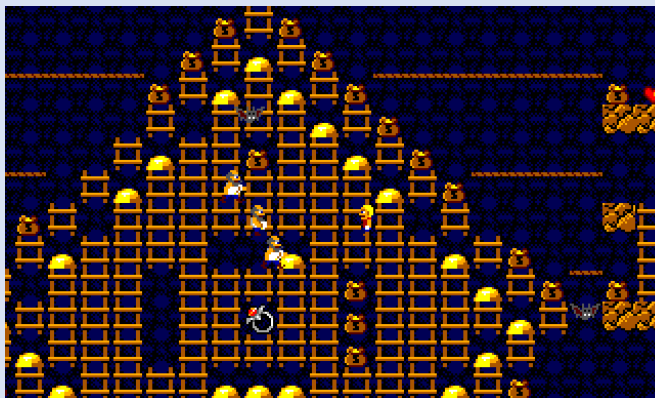
## The Saint's Ascension



The long-awaited follow-up to Digger II and the Gold Runner 2000 Challenge, Digger III is an arcade style platformer with high resolution graphics, smooth detailed animation, and over 30 levels of exciting action-packed game play. With the release of Digger III, HyperTech Gaming continues the legacy of Hyper-Tech Software originally formed by Eric Crichlow, Mike Haaland, and Chet Simpson to bring high quality software to the Color Computer and beyond.

### Run, Climb, Fall, Dig, and Escape!

Take on the role of the man known only as *The Saint* as you infiltrate the hidden underground lair of the Gomer Clan to take back what is rightfully yours. Snatch back gold, jewelry, and other treasures while avoiding the Gomers as they patrol the caverns protecting their booty. Avoid bubbling lava, radioactive monsters, rabid bats, and deadly traps while digging holes to trap and kill Gomers. Collect all the treasure in each cavern to advance to the next level and pray you reach the exit to the surface.



#### Requirements

Tandy Color Computer III with 512k and disk Drive. Joystick optional but recommended.

Digger III is *absolutely FREE* and can be downloaded from <https://hypertechgaming.itch.io/digger3>

# Getting to know your MultiPack Interface

Rick Ulland

What does an MPI do, and why does that require it to be upgraded? Totally unrelated.

What it do:

Back in the day, small computer systems addressed everything as RAM. Great theory, but silicon was expensive in the eighties and a random subset of 16 address lines can be many logic gates. To support cheap external hardware, CoCo provides two signals denoting a preselected address range.

CTS \$C000 - \$FDFE read only ROM software

SCS \$FF40 - \$FF5F read/write hardware

The CoCo also accepts two related inputs from 'the' external device.

CART A valid external ROM is present, run it.

SLEN Iwannadrive (Disable CoCo's internal address decoding).

Connecting one external device is pretty simple. The device will need a few low order address lines, connect those and ignore the rest. Connect SCS to the chip select for your hardware, and/or CTS to the chip select for your ROM chip. Tie CART low to ask CoCo to run your ROM on startup. This lashup will 'ghost', or echo to every ignored address between your device and the top of the select range. But it's just you, no worries.

For multiple devices, we could just switch CTS and SCS to a specific slot, still allowing additional devices (that fully decode all 16 address bits) in others. Unless all of your expansion products use SCS/CTS select.

And that's what SLEN is for. Any external device can ask the SAM/GIME to kindly not put out the CTS and SCS signals. The addresses that would trigger those signals are still present on A0-A15, but no shortcuts.

When the MPI asserts this signal, it is assuming control of the SCS and CTS shortcuts to, and the CART response from, each slot. It does this job just fine on any model CoCo, nothing to see here.

Why it bad:

What we in Milwaukee call 'a little wiggle room'. The MPI needs room for itself, and as the new bus master, it can also reserve room for expansion beyond the CoCo's built in decoding. Old news first, we need to identify the CTS range \$C000-\$FDFE, which looks like this in binary:

C000 11000000 xxxxxxxx

FDFE 11111101 xxxxxxxx

Where all possible values in the xx positions will fall inside the range and can be ignored. For decoding work, we only have to consider a range of 8 bit numbers.

The end of SCS is more expensive, 12 significant bits to puzzle out FF40-FF5F. Why not cut one more bit off for expansion? Well, OKay. The MPI stops decoding at A5 so the SCS or read/write range is:

FF40 11111111 010xxxxx Start of SCS

FF9F 11111111 100xxxxx End of MPI range

This a problem for CoCo3, which wants \$FF9x for the GIME. The oldest PAL units were actively hostile, letting \$FF7x ghostwrite to related address \$FF9x. Luckily, the 'big' MPI have an easy fix, replace the socketed PAL chip.

Newer MPI are more subtle, they don't echo writes AFAIK but do leave two amps live on open mic night. This could have been a BFD, ASICs are not as easy to replace as PALs, even if there was a socket. But somebody spotted a workaround.

FF7F 11111111 01101111 actual MPI slot select

Address table bit 7 is only set when CTS is active, or we are in the no-no range &FF9x. So all we need to do is hijack the MPI's internal select signal 'ENBUS' and disable it when CTS isn't active and address bit 7 is high (one). As luck would have it, this hijacking can be done outside the ASIC chip with a simple trace cut.

But as luck would have it, (first NAND joke) this must done inside the wonderful world of active low signals. Logic gates compare the ones. Active low signals are not ones and cannot simply be OR'ed together. Instead of asking our original question 'is CTS set or SLEN set or bit A7 = 0? you have to ask 'is CTS not set and SLEN not set and bit A7 = not 0 ?

And then, a NAND gate flips the output to again be active low. So once a second input stage determines ENBUS is not set we can finally compare if ENBUS isn't not set, CTS is not not active or SLEN is not not active or address A7 is not not zero. Resulting in an output ENBUS\* signal with \$FF9x chopped off that we can supply to the rest of the MPI on other side of the trace cut.

I might have dropped a clause there someplace, but I'm kinda dizzy now...

-rick

## MAME Recap



2020 was a very busy year for me regarding MAME development. A lot of bug fixes, but also some new features.

Back in April I discovered cartridges less than 16k would fail to load.

Then in May I extended the floppy disk emulation to support Disto's no-halt mode. This allows OS-9 to read and write disks without losing wall clock time. Also, I found the joystick label shown in the MAME UI was wrong. It said 1 for the #2 button.

Later in May it was reported to me MAME's 6309 emulation was executing the opcode \$1120 as a Long Branch Always. But on the 6309 this opcode should trap to the Illegal operation vector. Rounding out the month of May I added the 2mb Disto RAM pack cartridge to the slot system. It makes a very nice RAM disk for use under OS-9. For the Dragon computer I reworked the built-in RS-232 port to use MAME expanded serial system. This allows it to communicate with the outside world. And finally, the last bug fix of May was to correct another ROM cartridge loading system error.

But one of the big May projects was to add a new driver for the MCX-128. This is Darren Atkinson added hardware for the MC-10. The other large May project was adding DragonDos support to Imgtool. This is the tool that allows you to read and write disk images for classic systems.

In June I added the analog input system to the LUA scripting engine. This allows anyone to script Color Computer Joystick movements.

In October I added a Stereo Composer cartridge. This device is very similar to the Orchestra 90 cartridge built by Speech Systems.

Then in November it was requested that I modify the way interrupts are handled in the CoCo driver and use the "merged Input" functionality. This allows signals to be ANDed or ORed together without writing extra code. I also fix a small debugger issue for the TMS7000 microcontroller. This is the chip used in the Speech/Sound Pak. I found a typo in the Dragon Alpha emulation that caused Disk I/O not to work. Then I added another new CoCo cartridge: The Symphony 12. This allows you to add four Programable Sound Generators to your Color Computer.

Later in November I fixed a bug with the Tandy hi-res joystick interface that kept OS-9 from allowing the mouse to be moved all the way to the right-hand side of the monitor. To top off the month, I fixed the Speech/Sound Pak emulation so the Pegasus and the Phantom Riders game would recognize its existence.

Overall a very productive year.



tim lindner



# Adventures in Recapping

Salvador Garcia

## The Tragic Discovery

My Windows 10 Development machine had been acting funny and it seemed that after an MS update, it got worse, so I took the plunge and reinstalled Windows. After the new install everything seemed to work fine, but Windows did not recognize my video card which was an NVIDIA Quadra. I couldn't remember the model, so I opened up the case to get that info. Lo and behold, on the motherboard (MB), I saw three electrolytic caps not looking good. Two had this dried goop and one was ever so slightly inflated. I knew that this would mean trouble down the road, so I decided to replace them. And so, the adventure began.



## Easy as Pie

I've done recapping before. It is a trial of patience, but I had always been successful.

I first took a good look at the caps to get their specs. Two were 2700 $\mu$ F @ 6.3v and the third was 1500 $\mu$ F at the same voltage. I already had the latter and just ordered the 2700 $\mu$ F. I didn't immediately find caps at 6.3v, so I ordered the next highest which as 25v.

The computer sat there patiently until the caps arrived. And quite a shocker when they did because they were at least twice the circumference of the original caps. I wasn't going to be able to squeeze these huge components in the allotted space.

I went back and searched more diligently until I found these caps at 6.3v. Again, the computer sat there silently awaiting their arrival. When they arrived, I noticed that they were still fatter than the original, but thinner than the previous batch I ordered. I could work with these!

I calculated at most 10 minutes to desolder the three caps and put in the new ones. I got out my trusty soldering iron and got to work. After I knew the tip was hot, I touched it to the cap's solder pad. Uh... nothing happened. I tried it again, this time applying the hot tip for a longer time. After so many decades, one gets the "touch" which lets me know when the solder has melted, but this time around I did not feel any "touch".

I rocked the cap and soon it started to come loose. Finally, I removed the first cap, but not because the solder melted, rather because the leads going into the cap broke. One broke flush with the PCB and the other broke inside the cap, leaving a long post protruding from the MB. But the solder did not melt. No way was I going to attempt this same technique with the other caps.

My solution: Ask people that know more than I do. I went to Facebook and asked in the Vintage Computers group. Since my computer dates back to 2008, I could argue that it was vintage!

Someone there mentioned that some MB manufacturers used tin which has a higher melting point than your typical 60/40 lead solder. Sigh. Others offered suggestions, such as adding fresh solder and using flux. I tried these two techniques, but to no avail. My 25 and 30 Watt soldering irons weren't going to get this job done. Again, my computer sat there silently awaiting some epiphany on my part.

## The Heavy Gun

I have been meaning to get a soldering station. I hadn't needed one, so I had been holding off. I have been following and participating in discussions about soldering stations on the CoCo list and wanted to get a nice one. Looks like the time had come. After doing some research, I found a Weller 1010 at the local Microcenter (for those of you who have been to a CoCoFEST! I am sure you know that store!). It was at \$137 USD, but on sale for \$99.



Image pilfered from weller-tools.com.

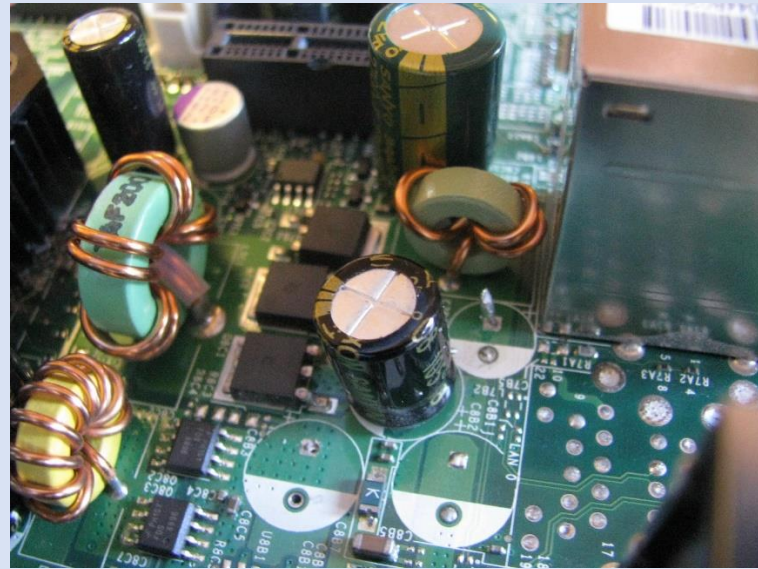
After hooking it up and (gasp!) reading the thick instruction manual (it was only about 7 pages of instructions, heavy on the images, but it came in a plethora of languages) , I was ready to take the station on its maiden voyage, hoping that it wouldn't do a Titanic on me. The read out told me that the tip heated to 750 °F (398 °C). Still the solder was not melting. I raised the temperature to 850 °F (454 °C) and the solder melted! I was able to remove one of the 2700µF caps and clear both through holes. I was excited. Now I had to remove the left over leads from the cap that I tore out and the other 2700µF cap. I managed to melt enough of the solder to get the third cap out. With a solder sucker I was able to clear one of the through holes, but that was as far as I got.



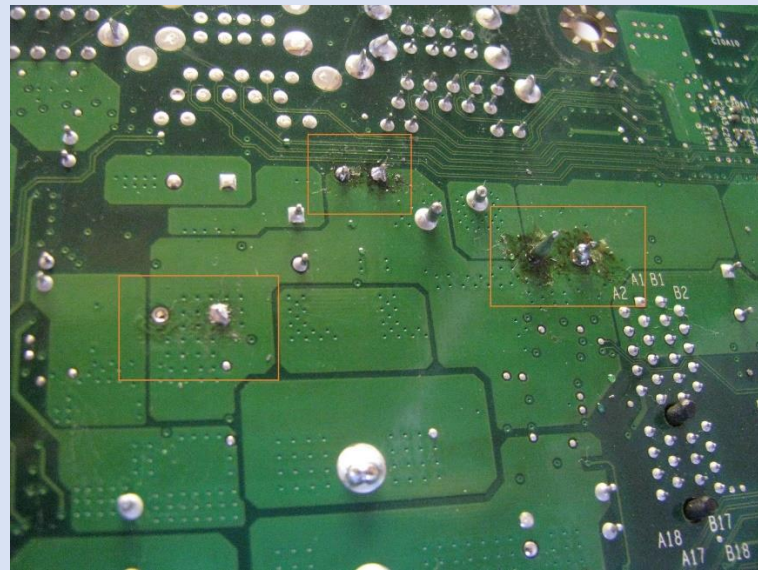
Image from Amazon.

I was not able to melt the solder on the left-over leads, nor was I able to clear the remaining through holes. Since one of the caps had been successfully removed, I decided to put in the new cap. This went well.

Now would have been a good time to panic, except I had a secret weapon: The CoCo List. I asked there and posted two pics of the MB so far and got lots of feedback (thanks guys!)



The fat green cap in the back is the one I had already replaced. You can see a post sticking out at the cap location just in front of the choke. You can see the cleared through hole of the third cap located at the front left. (The front right cap was never there, so I wasn't worried about it.)



The three orange rectangles indicate the location of the three caps. Note the flux goop that was left-over.

Some of the feedback:

*"I'd suggest a variation on what you mentioned with a "fabric pin" (commonly called a straight pin, I think) I have had success in similar situations holding the straight pin with a needle-nose pliers, grasping the pin with the thinnest part of the pliers so as not to siphon off too much heat, and heating the pin while pushing on it and pressing it into the hole. You want to grasp the pin well away from its point, again to avoid siphoning off too much heat into the pliers, holding the soldering iron tip against the end of the straight pin, while you push the point into the hole with the pliers. Possibly cutting off the point of the straight pin might be helpful, though I have not found this to be necessary." – Arthur Flexser*

Note: He called it a "fabric pin" because I didn't know what they were called and initially used that term.

*"That is a hot air rework station job, and you will likely need to heat at 375 to 400 °C in order to get in, do it and get back out before charring the board. The problem is that in many cases, the board was used as a heat sink to help cool the capacitors when the ripple current, particularly in switch mode supplies runs to many amps. IBM boards are some of the worst offenders, in that I charred the board getting the caps out because they had a large expanse of heavier copper fanning out on both sides of the board. Since it was my board, I said its junk and bought another board." – Gene Heskett*

Hot air rework station? OK, I did some research to see how much that would cost. I found this article titled "The 5 Best Hot Air Rework Stations": <https://tinyurl.com/ybs5jlu6>

While the cost for some was not astronomical, I was unfamiliar with this technology and didn't want to take a chance, so I decided to hold off any further purchases.

*"The problem is evident from looking at the photos. Your board has huge sections of ground plane around the capacitor pins that are sinking the heat away as you're trying to desolder them. The key is patience. The soldering iron will have to stay on the pin for a much longer time because the copper ground plane must be heated up sufficiently enough to get the pad up to the temperature where the solder will melt. If you're really having a hard time with it, one trick would be to cut the pad free from the ground plane by circumscribing it with something like an Exacto knife being sure to cut through the copper ground plane to the fiberglass board below. This will detach the huge 'heat sink' from the capacitor pad allowing it to be easily removed. After replacing the capacitor, remove some of the solder mask on each side of the cut, drop a piece of small diameter copper wire into the valley created by the cut, and flow solder over it reattaching the heat sink/ground-plane to the capacitor pin.*

*Also, the rosin from the solder is not permanently staining your board. When the job is all finished, use some flux remover to get it off. If you're using "no-clean" solder then that's not even necessary as the flux poses no long-term danger by staying on the board (doesn't look pretty but won't hurt anything)."*

- Dave Philipsen

*"If the board was designed with the intention that the ground planes would sink heat away from the electrolytic capacitors then it should have also been designed with additional heat sinking or cooling around the actual body of the capacitor. Relying solely upon the ground plane for that would probably be a design mistake." - Dave Philipsen*

*"Another thing to keep in mind: the board was assembled, and the capacitors were soldered in place to the large ground planes without physical damage to the board or the capacitors. The same amount of heat that was originally applied to the board to install the capacitors may also need to be applied to un-install them. If they could be installed without physical damage, then they can be un-installed without physically damaging the board too." - Dave Philipsen*

Cutting into the ground planes was my last recourse. Nothing good ever came from combining me with an Exacto knife!

*"Based on the photos, this is a multi-layer IBM clone PCB with possible internal ground and power planes.*

*The problem is that the heat is being dispersed onto the ground (or power) plane and not enough heat is being applied to the solder.*

*This kind of rework requires more than a 70W soldering iron.*

*You will need a rework station with a heat gun and possibly a variable convection type oven. A conventional oven could damage components on the PCB or melt some of the plastic parts. You will also need a soldering iron that is capable of reaching 900 °F and use a proper solder tip. Most consumer soldering irons usually reach 600 °F-650 °F.*

*I also recommend NOT to [use] sharp knives or force the leads out of the PCB. This could damage the internal connections on the PCB.*

*The dark (baked) flux can easily be removed with a good flux remover." – Richard Lorbieski*

900 °F (482 °C)? That's hot! But then, my new soldering iron was reaching temperatures of 880 °F (471 °C), so I figured that was hot enough. I also appreciated the note about what not to use. Thank goodness I was right in that and have never used sharp objects in this fashion.

*“The problem is not with the copper thickness or number of layers. Most IBM retro motherboards (1990 era) are 6 or more layers. The three most common problems that occur with DIP multi-layer rework:*

- 1) Failure to get the lead(s) out of the thru hole ground/power plane.*
- 2) Old solder clogged inside the thru-hole of via.*
- 3) Damage to the thru-hole plating (most catastrophic).*

*I discourage the use of sharp objects or using brute force can lead to damage the plating and thus cut the connection between internal and surface pads of the PCB.” – Richard Lorbieski*

Yes to number 1 and 2. Thankfully, no to #3.

*“I’ve got to admit, without tools I would probably just stick a new cap to the board with hot-snot and tack it to the remains of the old leads.... [Hot glue is not conductive and sets so fast you can hold your part a bit off the board to insulate it from the traces you have just glued it on top of.]” – Rick Ulland*

This idea crossed my mind after the first attempts. My wife also recommended it. What kept me from doing this was twofold:

The cap was already larger than the original and piggybacking on the leads would have required more open area than I comfortably had.

Not knowing electronic in-depth, but knowing that 1GHz+ frequencies existed, I didn’t know if the extra long leads might cause an antenna effect. (OK, threefold.) Aside from that one lead post sticking out I didn’t have any leads where to piggyback the caps.

Also, I believe someone mentioned that the hot glue would help keep the cap from moving. With various fans nearby, these could generate vibrations which could move the cap in ways that I would not want.

Success!

I decided to try it again. I got the Weller up to 880 °F (471 °C) and called in reinforcements (i.e. my wife). While she held the motherboard in place, I applied flux and the iron’s tip to the solder pad and attempted to clear the clogged through holes and remove the remaining stuck leads. We took turns in using the iron and holding the motherboard and eventually the solder melted, and we were able to remove the solder and the leads. I let the soldering station rest since I didn’t know how unhealthy a steady temperature of 880 °F (471 °C) was for the Weller station.

After the through holes were cleared, I put in the new caps without any difficulty.

I wanted to remove the flux goop so I did some research and found that many used acetone to remove it. Since I didn’t have any flux remover, but I did have nail polish remover, I used that and an old toothbrush. Just to be clear, I don’t use that brush anymore!

After carefully brushing the MB, the flux goop slowly began to come off and eventually all of it was gone. I hooked everything back up and powered up. The BIOS splash screen displayed, eventually followed by the ominous Windows 10 splash screen.

There was some added discussion at the CoCo List as to how to handle the acetone as this is a flammable substance and capable of blowing up the house, but that story is for another time.

My sincere appreciation goes out to everyone that provided help and motivation to keep going. I have enough experience to know that motherboards can be damaged easily, and I felt unsure what to do next at various times. Having the supportive feedback from the Facebook group and CoCo List helped. I was happy that I gave this computer a new lease on life. After successfully replacing those three capacitors, I ordered 4 more GB of RAM to bring it to its max capacity of 8 GB (yeah, it is **that** old).



## CoCo News 2020 year-end review!

Curated by L. Curtis Boyle

Cherry picked by:

R. Allen Murphey

Tim Lindner & Salvador Garcia

### January

**John Laury** did a 1-hour video showing him fixing a RAM chip with a busted pin and installing a CocoVGA.

<https://youtu.be/8i8lunuckKwg>

**Jim Gerrie** did a port of an adventure game, "The Night of the Vampire Bunnies", which was originally written by 10-year-old Jason Dyer back in the 1980's:

<https://youtu.be/wWYw8odROFE>

**Ben Drakes** has a video promo of his new game, called only "Project A" for now: <https://youtu.be/nzGFpjR3J9M>

### Joey Serial Switch

Jason Reighard, of <http://cocoman.biz> released a new 3-way serial switch known as the Joey Serial Switch

<https://www.facebook.com/groups/2359462640/permalink/10157815048357641>



### MIDI Maestro

Jim Brain (Retro Innovations) is the no longer secret manufacturer of the MIDI board that Brian Schubring has mentioned on our show. And he has schematics and some prototype photos to show what it looks like:

<https://www.facebook.com/groups/2359462640/permalink/10157812384677641/>



**Jerry Stratton** has made a Rainbow BASIC program preflight tool, that helps catch other errors beyond his original RCHECK program (which is based on RainbowCheck+ from Rainbow, which did rudimentary checksumming of each BASIC line):

<http://www.hoboes.com/Mimsy/hacks/coco/rainbow-magazine-basic-program-preflight-tool/>

### DLOAD Server

TJBCris has video showing how the DLOAD command on the Coco 1/2 works, and with a server program for it on his Model 16:

<https://youtu.be/-RJNheNrPB4>



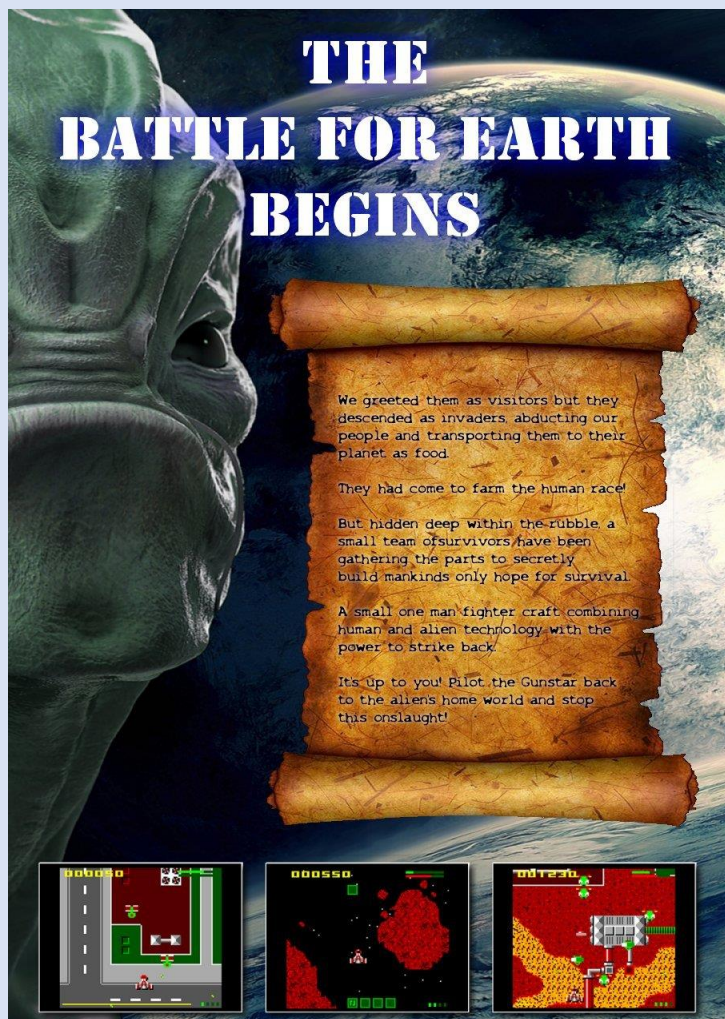
**Ed Snider** has a video talking about his image converter to the VG6 (128x96x16 color) mode on the CocoVGA:

<https://youtu.be/h3Hcmeek6MY>

## February

**Nick Marentes** releases Gun Star for the Color Computer 3, requiring 512K and a Hitachi 6309 CPU replacement. The game will also run in emulators for those who don't have a 6309 in their CoCo.

<https://nickmarentes.com/ProjectArchive/gunstar.html>



## CoCo World Map

Steve Strowbridge has caught up on the world map of Coco/Dragon users, which now has just about 315 entries worldwide: <http://map.cocotalk.live>



**Henry Reitveld** has posted a video showing how to create physical disks from .WAV files for the Coco and Dragon:

<https://youtu.be/ZIRskBWM2xM>

Henry also showed a video of a "Coco Cat Headroom" (based on Max Headroom) that was published in Rainbow in 1987, and uses the speech sound cartridge with some PMODE 4 graphics: <https://youtu.be/jEluReHyz1Q>

**Diego Barizo** released a video in Spanish showing how to use VCC for Coco 3 emulation. He also shows some of the real hardware (Coco 3, floppy drives, multi-pak: <https://youtu.be/0VgKo8ht5f0> check out all of Diego's other CoCo offerings at <http://yaccs.info/>

**Jim Gerrie** has released Mini Solo Chess for the Coco, with a video showing it here: [https://youtu.be/n5IS\\_lzNcuE](https://youtu.be/n5IS_lzNcuE) And also Alpha Force: <https://youtu.be/oh1oA1zTf7E>

**Brian Palmer** posted a link to Geronimus Vanden's video showing that an MC-10 will, when running a loop doing a PEEK(2) (after doing a POKE 0,0), will react to your hand moving close to the MC-10 itself (like a theramin does). John Laury tried this on his own real MC-10 - and it does work. He speculates that it has to do with the RF shielding in the MC-10: Original: <https://youtu.be/o6zssRDSjuE> John Laury:

<https://www.facebook.com/groups/2359462640/permalink/10157939309847641/>

**Nathan Lyke** made a video showing how to do a 64k RAM UPGRADE on a Coco 1:

<https://www.facebook.com/groups/dragon32/permalink/2539138523012468/>

## XRoar Linked to Dragon Archive

Simon Hardy announced that the direct link from the World of Dragon Archive to play Dragon software in XRoar is working. See the link in his Facebook post, pick a software company, then a program, and click "Play Now" on the far-right side (currently Cassette games work, I think cartridge ones still have an issue):

<https://www.facebook.com/groups/dragon32/permalink/2539138523012468/>

<http://archive.worldofdragon.org/browse/>

## Dock Master

Diego Barizo just released Dock Master:

<http://yaccs.info/PROGRAMAS/DOCK/dock.html>



## The CoCo Collector – New YouTube Series

The first episode of Coco Collector (by Boisy Pitre) (episode 0), is about the 64K Coco (from Fall 1983):

<https://youtu.be/8SqOAWQZr6w>

**Todd Wallace** (LordDragon) has released the first version of SysInfo program for the Coco 3: Hardware Detection Program Demo For Tandy Color Computer 3

<https://youtu.be/EDI1GafjxYU>

To download:

<https://tektodd.com/wp-content/CoCo-Downloads/sysinfo.zip>

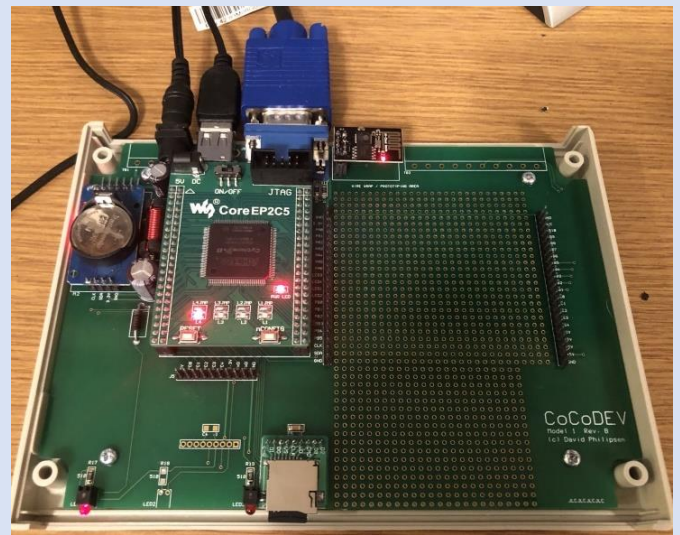
**James Jones** has written a blog post called "Towards a BASIC09 style", which gives some tips on writing BASIC09 programs, both in general and for legibility.

<https://www.facebook.com/notes/james-jones/towards-a-basic09-style/10157067791432014/>

**Dave Philipsen** has posted both a preliminary WIKI entry for his CocoDev hardware, and a video demonstrating it. CocoDEV is an FPGA based piece of hardware that implements the 6809, but is not meant to be fully Coco compatible. Rather, it is meant to be similar to a Coco and can be programmed the same way. He already has the Tandy BASIC ROM's and NitrOS9 level 2 with hard text windows working on it. Sounds to be the same spirit as The 8 Bit Guys C64 project.

<http://www.davebiz.com/wiki/CoCoDEV>

<https://youtu.be/-XeEjgOm-gM>

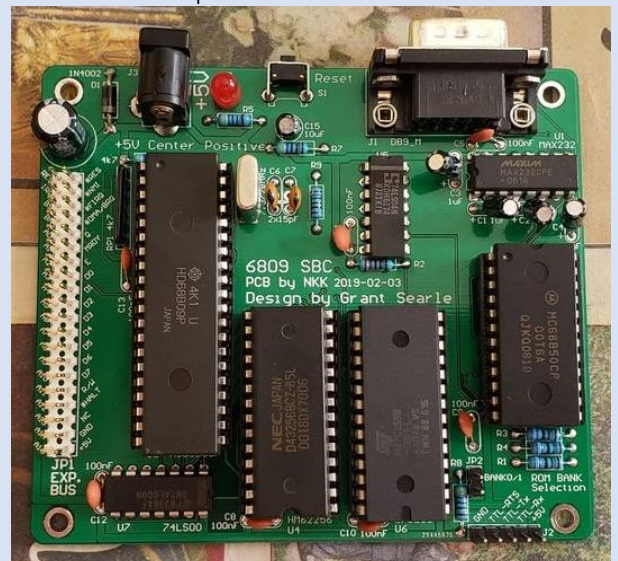


(CoCoDev)

**Jim Gerrie** has a blog up about programming for both the 2020 Basic 10 Liner contest, and the Asimov awards, and about porting some of his vast MC-10 work to the Coco 1/2 and Dragon:

<https://jimgerrie.blogspot.com/2020/02/2020-basic-10-liner-entries-and-asimov.html>

**John Linville** shared a photo of his populated 6809 SBC board (designed by Grant Searle). This is a small, 6 chip 1.84 MHz 6809 computer based on the ROM from the Coco 2 (with functions not supported on the SBC removed - ie graphics, cassette, joystick support), that has 16K ROM, 32K RAM, and a 115.2 Kbaud serial port:



<https://www.facebook.com/groups/2359462640/permalink/10157960748452641/>

Link to Grant's original description:

<http://searle.x10host.com/6809/Simple6809.html>

Jim Brain at Retro Innovations has posted an article talking about the possibility of DMA on the Coco 1/2 on his site:

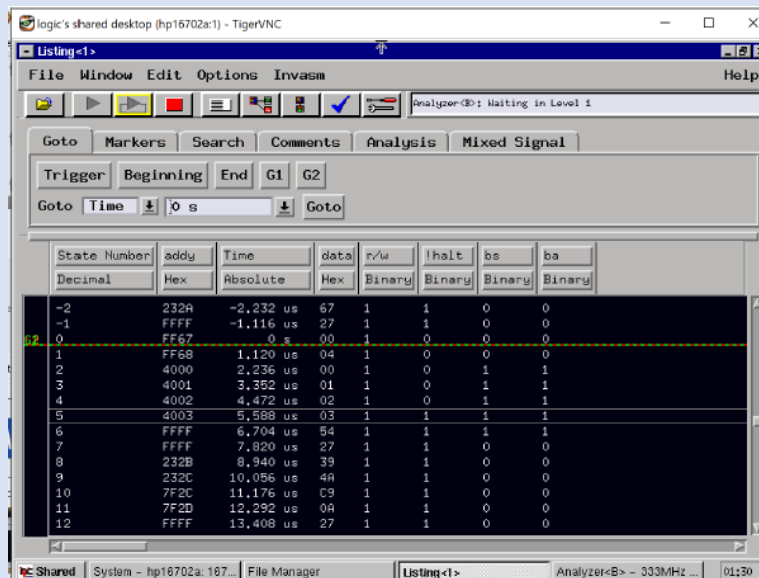
<http://www.go4retro.com/2020/02/26/direct-memory-access-possibilities-on-the-tandy-color-computer/>  
<http://www.go4retro.com/2020/02/28/coco-dma-early-efforts/>

## March

### PhantomRAM

Jim Brain has his next article in using DMA from the cartridge slot on a Coco 1/2, which has working code. He has it able to transfer memory between the Coco and RAM on the card, in both directions, and I/O port style access.

<http://www.go4retro.com/2020/03/12/coco-dma-invisible-ram/>



### CoCo 1/2 Scrolling

Ciaran Anscomb (author of XRoar) has a blog up for a game concept for the Coco 1/2 and Dragons, that uses some tricks on the VDG and SAM chips to achieve smooth vertical scrolling.

<http://www.6809.org.uk/dev/tm002/>

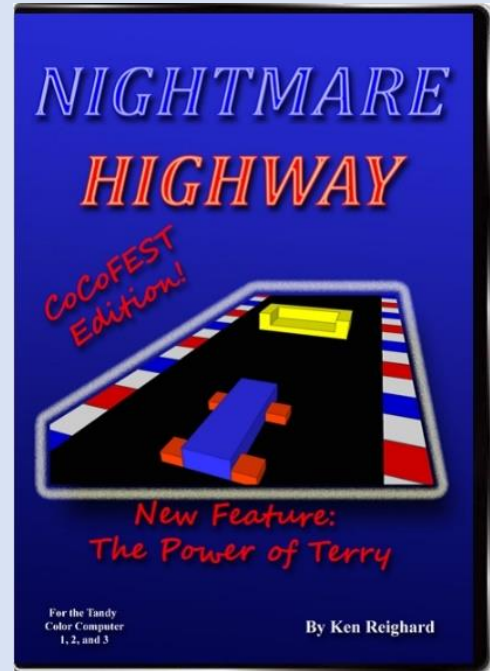


### Nightmare Highway CoCoFEST! Edition

Ken Reighard is selling the DVD-ROM version of Nightmare Highway, special CocoFest edition (includes "the power of Terry", which adds some new gameplay elements), even though CocoFest has been postponed:

<https://www.facebook.com/groups/2359462640/permalink/10158025437942641/>

<https://kenscococorner.itch.io/nightmare-highway-cocofest-edition>



### Xroar Linked to Color Computer Archive

Guillaume Major, speaking of XRoar Online, has now got experimental links for Coco 1/2 cartridge images on the Color Computer Archive, that you can immediately launch on XRoar Online (Show Downland 1.1, click on the "Play now!" button, and select right joystick=keyboard (arrows and left ctrl)):

<https://colorcomputerarchive.com/coco/Cartridges/>



Ron Klein posted some details on how to use the debugger in Ciaran Anscombe's XRoar emulator, which requires some addition companion applications be installed first.

<https://www.facebook.com/groups/2359462640/permalink/10158017641002641/>



After testing by **Brian Schubring** passed with flying colours, Jim Brain @ Retro Innovations has the MIDI Maestro card available for pre-order. It has MIDI In, Out and Through connectors, and is compatible with various MIDI supporting software already available for the Coco, like Lyra (Coco 1/2), Ultimuse III (Coco 3/(Nitr)OS-9, and Coco MIDI Pro. Price is \$60.00, and it is expected to be released at CocoFest on April 18th. <https://store.go4retro.com/tandy/midi-maestro/>

**Jim Brain** has his next article in using DMA from the cartridge slot on a Coco 1/2, which has working code. He has it able to transfer memory between the Coco and RAM on the card, in both directions, and I/O port style access.

<http://www.go4retro.com/2020/03/12/coco-dma-invisible-ram/>

**Dave Veary** aka MrDave6309, has been doing some hacking on his Coco, to the VDG this time:

<https://youtu.be/ZTau3m63GjQ>

He got his Coco 2 on the internet via his Raspberry Pi controller (which is also running his keyboard):

<https://youtu.be/twmN56GtmE0>

He also did a quick tutorial on hand coding machine language subroutines into BASIC programs:

<https://youtu.be/-omEvR8tdeU>

**Jim Brain** has an update on his "quest for DMA" blogs:

<http://www.go4retro.com/2020/03/23/coco-dma-missing-without-a-trace/>

**Darren Ottery** put up a video demoing some stuff he has been doing with Coco MIDI Pro:

<https://www.facebook.com/groups/2359462640/permalink/10158053574347641/>

**David Ladd** has detailed on Facebook and Discord a hack to the original 12V 26-3029 Radio Shack floppy controllers that allows the use of high density (1.2 and 1.44 MB) floppy disks.

<https://www.facebook.com/groups/2359462640/permalink/10158050751572641/>

**The Home Computer Museum in the Netherlands** did a live stream showing the entire museum (almost an hour), and the Coco pops in for a bit here:

<https://youtu.be/tuVgoEJQ1Sw?t=2248>

The Color Computer 3 makes an appearance at 47:30 (note: we have 64 colors, not 256)

**Allen Huffman** has a blog post up on "How random is RND in Color BASIC?"

<http://subethasoftware.com/2020/03/27/how-random-is-rnd-in-color-basic/>

## April

### SuperBASIC for CoCo

Jerry Stratton has release SuperBasic for the Coco, which allows using a modern looking scripting language to create the equivalent BASIC code:

<https://www.hoboes.com/Mimsy/hacks/coco/superbasic-trs-80-color-computer/>

Allen Huffman has a good summary and sample code on his blog:

<https://subethasoftware.com/2020/03/18/jerry-strattons-superbasic-for-the-coco/>

### SDisk Sources for OS-9

David Wiens posted (with permission) D. P. Johnson's original source code & manuals for the SDisk and SDisk 3 (Coco 1/2 and Coco 3 respectively) drivers for OS-9. These were advance floppy drivers that supported sector sizes from 128 to 1024 bytes, single & double density, up to 80 tracks

<https://www.facebook.com/groups/1929079184021683/permalink/2546348015628127/>

**OS-9™ SOFTWARE  
FOR COCO**

**SDISK** — Standard disk driver module allows the use of 35, 40, or 80 track single and double sided drives with CoCo OS-9 plus you gain the ability to read/write/format the standard OS-9 single and double density disk formats used on other OS-9 systems. **\$29.95**

**BOOTFIX** — To make bootable double-sided disks **\$9.95**

**SDISK + BOOTFIX** — when ordered together **\$35.95**

**FILTER KIT #1** — Eleven utilities used as filters (with pipes) to give you "wild card" directory lists, copies, deletes, moves, lists, pagination, etc. **\$29.95**

**HACKER'S KIT #1** — Disassembler and memory dump/fill utilities allow you to disassemble OS-9 assembly code from disk or memory. **\$24.95**

Send SASE for current catalog.  
Terms: Prepaid check, MO, Visa, Mastercard or COD.  
Add \$1 S&H, (COD \$3 extra).

**D.P. Johnson, 7655 S.W. Cedarcrest St.  
Portland, OR 97223 (503) 244-8152**  
(We appreciate your calling between 9-11 AM Pacific Time.)

OS-9 is a trademark of Microware and Motorola Inc.

**Henry Reitveld** put up a video showing his VHD image patched to work with the Sidekick menu, from VCC.

<https://youtu.be/vrJPo8D7pZA>

**Allen Huffman** has a really interesting article on his blog for speeding up multiple IF/THEN statements:

<https://subethasoftware.com/2020/04/09/if-and-or-then-versus-if-then-if/>

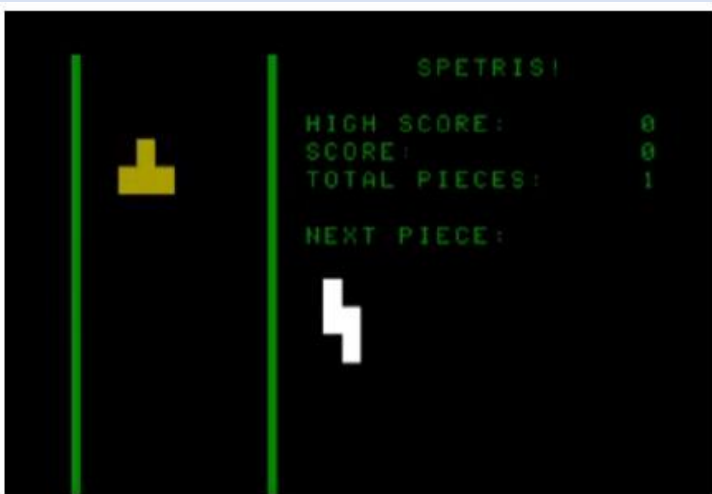
## Dignified BASIC

Fred Rique has his take on a modern language that converts down to Extended BASIC (similar in concept to Jerry Stratton's SuperBasic that we covered recently) called Coco Basic Dignified: <https://www.facebook.com/groups/2359462640/permalink/10158109213282641/>

| Dignified   | Classic  |
|---|--|
| <pre>This program is just a test, it has no real purpose declare mode:m, pos:x, pos:y define [pause] [if inkey\$="" then {B}] define [enter] [a\$=chr\$(13)], [space] [a\$=" "] define [joybtn] [peek\$(hfff00)-1] keep #2 ## use key# 81 to no transparency (faster)  cls print "USE joystick TO MOVE THE CIRCLE" print "JOYSTICK button TO STAMP" print "space TO SEE THE TIMING" print "enter TO RESET" print "any key TO CONTINUE" [pause]  [start] cls pclear 4 print\$ 32*7+8, "R E N D E R I N G" &gt;size=30 &gt;page=1 dim c(size,size) dim b(size,size) pmode page:1:pcls color 0:circle(size/2,size/2),size/2: get (0,0)-(size,size) pcls 1 for f=1 to 10 step 2   color rnd(2)-1   line(f+25,0)-(abs(f+25-250),191),pset   line(0,f+19)-(250,abs(f+19-191)),pset next #2 get(128,10)-(128+size,10+size),b,g #1 get(128,10)-(128+size,10+size),b pcopy 1 to 3:pcopy 2 to 4 posx=128:posy=10:mode=1 cls loop! a\$=inkey\$ if [enter] then {start} timer = 0 pmode page:mode if [joybtn]255 or [joybtn]127 then   #2 put(posx,posy)-(posx+size,posy+size),b,pset   #1 put(posx,posy)-(posx+size,posy+size),b,m,g</pre> | <pre>10 Converted with Coco Basic Dignified 20 Beta version 30 This program is just a test, it has no real purpose 40 CLS 50 PRINT "USE joystick TO MOVE THE CIRCLE" 60 PRINT "JOYSTICK button TO STAMP" 70 PRINT "space TO SEE THE TIMING" 80 PRINT "enter TO RESET" 90 PRINT "any key TO CONTINUE" 100 IF INKEY\$="" THEN 100 110 CLS 120 PCLEAR 4 130 PRINT\$ 32*7+8, "R E N D E R I N G" 140 ZZ=30 ZZ+1 150 DIM C(ZZ,ZZ):DIM B(ZZ,ZZ) 160 PMODE ZV,1:PCLS 170 COLOR 0: CIRCLE(ZZ/2,ZZ/2),ZZ/2: GET (0,0)-(ZZ,ZZ),C,G 180 PCLS 1 190 FOR F=1 TO 10 STEP 2:COLOR RND(2)-1:LINE(F+25,0)-(ABS( 200 GET(128,10)-(128+ZZ,10+ZZ),B,G 210 PCOPY 1 TO 3:PCOPY 2 TO 4 220 X=128:Y=10:M=1 230 CLS 240 AS=INKEY\$ 250 IF AS=CHR\$(13) THEN 110 260 TIMER=0 270 PMODE ZV,M 280 IF PEEK\$(hfff00)+255 OR PEEK\$(hfff00)=127 THEN PUT(X,Y) 290 X=JOYSTK(0)+4:Y=JOYSTK(1)+3 300 GET(X,Y)-(X+ZZ,Y+ZZ),B,G 310 PUT(X,Y)-(X+ZZ,Y+ZZ),C,G 320 PCOPY M TO(3+1)-M:PCOPY M+1 TO((3+1)-M)+1 330 SCREEN 1,1 340 M=(3+1)-M 350 IF AS="" THEN T=TIMER:GOSUB 370 360 GOTO 240 370 PRINT "THE FRAME TIME WAS:" 380 PRINT T/60:"SECONDS" 390 PRINT 400 PRINT "PRESS ANY KEY TO CONTINUE" 410 PRINT 420 IF INKEY\$="" THEN 420 430 RETURN</pre> |

## Spetris

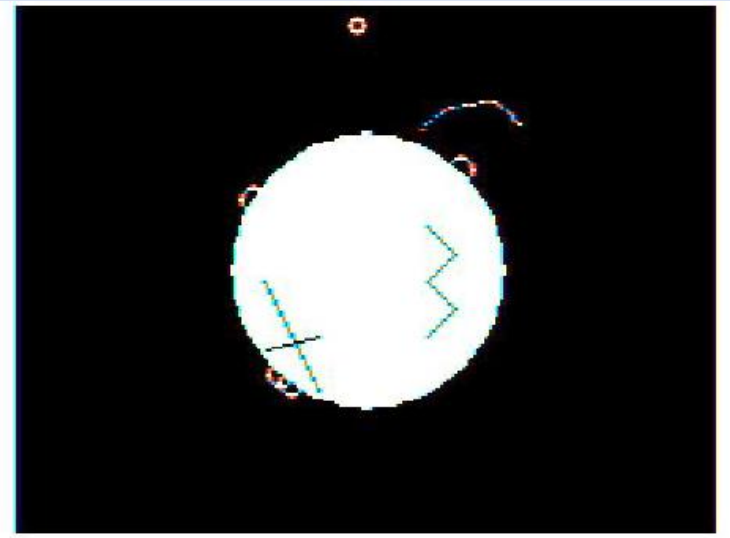
Eric Sperano has been learning 6809 assembly, and has a Tetris clone called Spetris! that is the result of his endeavors so far. He has a video up demonstrating it, as well as sourcecode on his github page: <https://www.facebook.com/groups/2359462640/permalink/10158119246892641/>



Michael Pittsley has a complete playthrough video of Walt Disney's "Goofy Covers Government" educational game on the Coco: <https://youtu.be/jlrmWTGGYGg>

## Xenocide

Alison DeNu released a little Coco 1/2/3 game this week that I haven't had a chance to look at, called Xenocide, available for download: <https://www.facebook.com/groups/2359462640/permalink/10158117390642641/>



## CoCo Keys2USB Kit

Paul Fiscarelli's Tindie store entry for his CoCo Keys2USB kit, that he demoed during our virtual CocoFest last week, is now up and you can order: <https://www.tindie.com/products/fiscap0768/coco-keys2usb-kit/>



Guillaume Major has released an update to Coco SDC Explorer, that now supports executing BASIC ASCII files, as long as the extension is .BAS. Available on the Color Computer Archive. <https://colorcomputerarchive.com>

April 18<sup>th</sup> 2020, CoCoTALK! hosts an un-official "virtual" CoCoFEST! on the same day the 29<sup>th</sup> Annual "Last" Chicago CoCoFEST! was supposed to take place. With over 5 hours of presentations and discussions, this literally is the next best thing to being there in person.

<https://www.youtube.com/watch?v=t4qkR11JyqU>



### Temple of ROM Level Editing

Rick Adams has his Temple of ROM level builder online, where one can design their own levels using Photoshop (or something compatible): <http://templeofrom.com/build/level>

#### Temple of ROM level builder

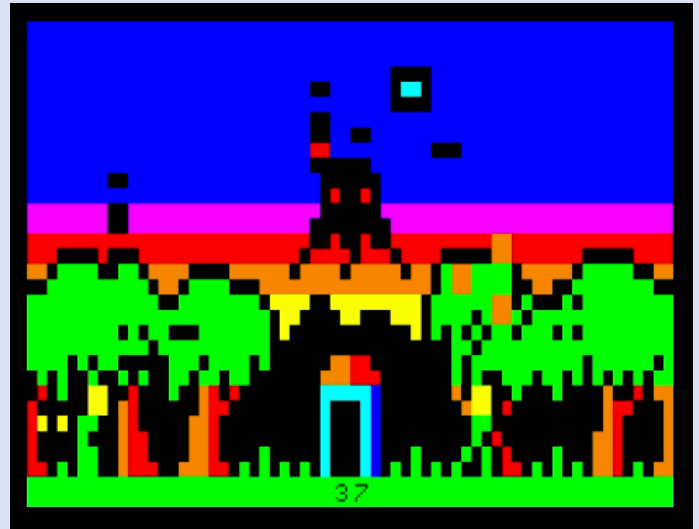
Browse... No file selected.

Sample Photoshop file (Alter and save as .GIF file, then upload above)

- Include all Photoshop layers
- Colors can only be the exact ones in the sample file
- Walls can only be vertical or horizontal lines
- White dots of icons, and walls, have to align with grid
- Must be one, and only one entry point
- White dot of monster icons must have a wall to the left, right, above and below the white dot
- Don't alter the size of the image or the alignment of the grid
- Portals will randomly send the player to another portal
- On upload, a link to your custom copy of Temple of ROM will be provided
- Mount the disk file, then LOADM "TEMPLE.BIN":EXEC to run the game

### The Outhouse

Erico Monteiro has released his "The Outhouse" for modern PC's, base on the sights and sound of the Coco 1/2 (and, of course, the game Outhouse). Trailer video here and ordering (\$5.00 or more if wish to "tip" Erico) here: <https://ericomont.itch.io/the-outhouse>



Henry Reitveld has a video up showing using a modified DC Modem pack connecting to the net using a WiFi modem: <https://www.youtube.com/watch?v=z5cOVfmA-cw>

Boisy's first "real" episode 1 of The Coco Collector is on YouTube, in which he shows his Coco 1 with an HJL keyboard. [https://youtu.be/s\\_DJdQViQH0](https://youtu.be/s_DJdQViQH0)

Ben Drakes shows his 8th place entry in the 10 line programming contest, Divide by Zero <https://youtu.be/bPXwrX4GtRg>

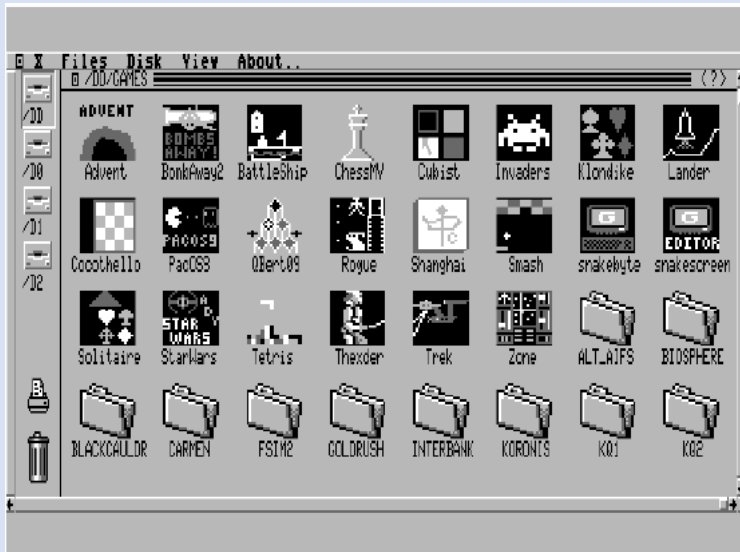
### May

Tormod Volden has posted the latest CMOC release (0.1.65) for Windows without requiring the Cygwin environment: <http://toolshed.sourceforge.net/cmoc/>

Terry Steege has even posted a video showing how to install VCC (2.0.1e) and EOU, for those who want to try it without a Coco 3. And it's dead silent, so as not to bug your spouse and/or pets: <https://youtu.be/JU8SIC-4Smw>

## NitrosOS-9 Ease of Use Beta 5

"NitrosOS-9 Ease of Use Edition, Beta 5" was released.  
<http://www.lcurtisboyle.com/nitros9/nitros9.html>



## YA-DOS 0.5a and b

Ron Klein has a demo video for the new 0.5a version of YA-DOS, and a hard drive image is available for download. YA-DOS is a 16K DOS ROM with built in Drivewire support and other goodies, created by Brett Gordon:

[https://www.youtube.com/watch?v=riNy1nAO\\_GI](https://www.youtube.com/watch?v=riNy1nAO_GI)  
<https://github.com/mrgw454/CCHDD>



R. Allen Murphey has a new blog post about him learning how Coco 3 graphics work for the game conversion of AX-2 Uchu Yusosen Nostromo game from the NEC PC-6001:  
[https://exileinparadise.com/nostromo:hitting\\_the\\_books](https://exileinparadise.com/nostromo:hitting_the_books)

## GIME-X Beta Begins

Ed Snider released two videos concerning the upcoming GIME-X Coco 3 upgrade (of which beta boards are being sent to developers very soon):

Basic Installation:

<https://youtu.be/Ba3fBYJXwVE>

Main Board overview:

<https://youtu.be/Q8rA0fkvKeU>



Sheldon MacDonald showed off some sample 3D prints of the final case designs for his Coco Gamepads:

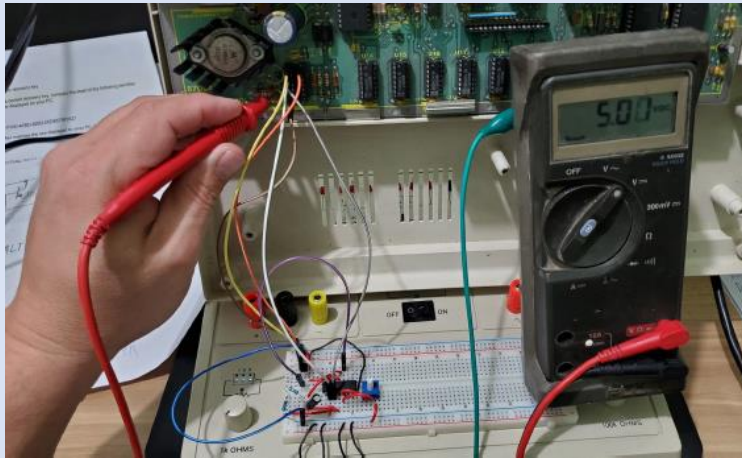
<https://www.facebook.com/groups/2359462640/permalink/10158235628302641/>



## Mr. Dash SALT Replacement

Terry Trapp has an update on his replacing the SALT chip project:

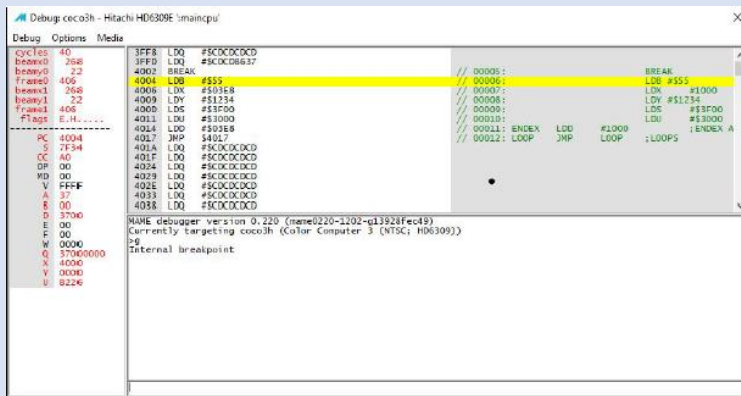
<https://www.facebook.com/groups/2359462640/permalink/10158249875927641>



## More helpful MAME Debugging

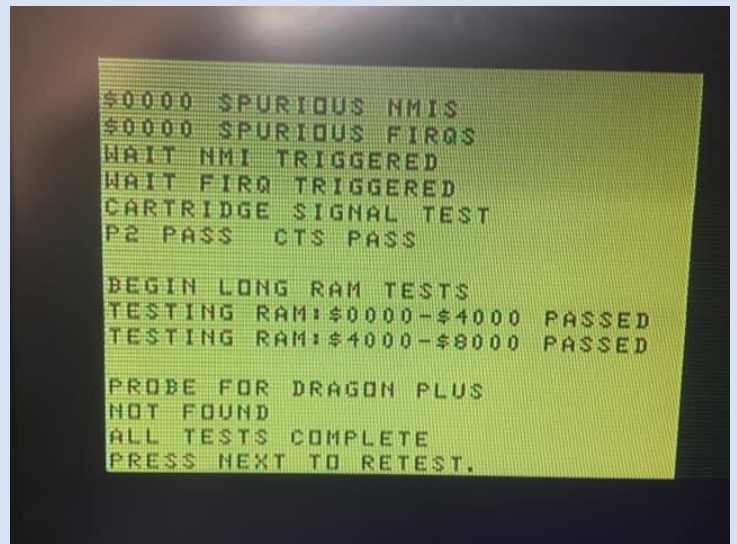
Eric Canales created a tool for running MAME in it's debug mode for the Coco, that lets you merge in your own assembly source code into the debugger (so instead of just seeing a raw disassembly while running, you get to see your labels, comments, etc.):

<https://www.facebook.com/groups/2359462640/permalink/10158270853957641/>



**Richard Harding** posted on the Dragon Facebook group about the Diagnostic Dragon board by Phil Harvey-Smith that we showed last month. He is very impressed with how it helped him fix a bad Dragon, and shows a screenshot of some of the stuff it checks for:

<https://www.facebook.com/groups/dragon32/permalink/2608357592757227/>



(Phil Harvey Smith's diagnostic board)

**TJBChris** posted a video showing OS-9 Level II booting from OS9 from ROM (from the Cloud9 ROM kit):

[https://youtu.be/Sa\\_4xPc22eE](https://youtu.be/Sa_4xPc22eE)

**Canadian Retro Things** has had a couple of videos released:

Using an iPad to load cassette programs, and a technique he came up with with then started not working reliably:

<https://youtu.be/4zPgcG6fqAU>

Going over his retro collection (which includes both a Coco 2 and an MC-10)

<https://youtu.be/m1PMwtOIWWg>

**Stevie Strowbridge** posted a couple of "how to" videos, one for using a Wifi Card in the CocoSDC for development:

<https://www.youtube.com/watch?v=rq7rR9lzi38>

And another for using PyDrivewire, DWTerm and BBSing online: <https://www.youtube.com/watch?v=coAa2qeFJoE>

And a couple of videos for the CocoPi3:

How to set up the CocoPi3:

<https://youtu.be/nQInXzExOqQ>

Setting up a CocoPi3 to become a full game console:

<https://youtu.be/sPvzXV0HqoQ>

**Frank Hogg** published on Facebook, his remembered history of creating the Tomcat computer (TC-9 & TC-70):

<https://www.facebook.com/groups/2359462640/permalink/10158274266977641/>

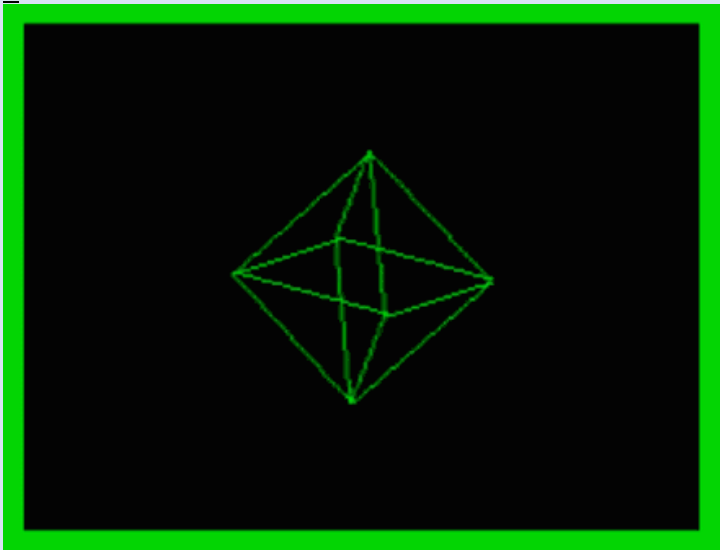


**Pere Serrat** has a full gameplay video now of his Coco 1/2/3/4/5/6/7/8/9/10 port of the AGD game "Foggy's Quest" running on the Wordpak2+ card (which adds sprite support, more colors, etc. though the V9958 chip). It looks quite impressive!  
<https://youtu.be/XITAVNvrf0Q>



**Noriko Miyagami** has put up a video playthrough of the Adventure International Coco port of "Dog Star Adventure" by Lance Micklus, that was published in Soft Side magazine as a type in game. She also describes the history behind the game (she uses a port that Jim Gerrie did):  
<https://youtu.be/Rocix7kTt9w>

**Erik Gavriluk** has released his new version of the 3D DISPLAY program from Hot Coco magazine. It features the original version, the optimized version (which is at least twice as fast, supports rotation on multiple axis simultaneously, and a Coco 3 version. Details here:  
<https://github.com/milliluk/display/blob/master/README.md>



**Stevie Strowbridge** put up a video showing him (finally!) hooking up his MC-10 to his MCX1-128, and showing how much memory it gives to it's enhanced BASIC, and also showing off it's Emcee server capabilities (similar to Drivewire): [https://youtu.be/OOSR2nZgi\\_s](https://youtu.be/OOSR2nZgi_s)

## June

**Tim Halloran** put up a video on how to take a Coco 2 keyboard apart, and clean it: <https://youtu.be/u1S9KExR9jU>

**Guillaume Major** has done some updates to the Color Computer Archive (including fixing a bug that cropped up when they were testing things). In addition to having added graphical tags for things like "Semi Graphics program", "Coco 3", "6309", "Sound Speech cartridge supported", etc., you can now search by those tags as well, via drop down menus:  
<https://colorcomputerarchive.com/search>

**James Jones** runs some BASIC09 performance tests with surprising results  
<https://www.facebook.com/groups/1929079184021683/permalink/2597277030535225/>

## GIME-X 8MB

Ed Snider has announced that the GIME-X will also have an optional 8 MB RAM upgrade, set up similarly as Paul Barton's NoCan 3 was back in the 1990's. This means that 6 MB RAM disk drivers are already done and tested that are compatible with it. (And, like Paul, it can be expanded beyond 8 MB as well). Scroll down in the comments to zoom in the picture Ed provided of it fully installed in a Coco 3.  
<https://www.facebook.com/groups/2359462640/permalink/10158318768477641/>



Allen Huffman finds evidence that a Coco with Audio Spectrum Analyzer was used for the Knight Rider TV show display in KITT (for some of the cars that went "on tour" (And Chad Edward commented that he got to see it himself, and talked to William Daniels (the voice of KITT), and that he had confirmed that many Tandy programs were used):

<https://youtu.be/twWVvMtnHi0?t=569>



Christopher Hyzer (TJB Chris on YouTube) has released a video on how to replace the "3 mugateers" photo that shows up during a CTRL-ALT-RESET cold reboot.

<https://youtu.be/Ezjx75N-m68>

### OPL3 / CCT Player for NitrOS-9

Todd Wallace (Lord Dragon) has released both a video, and software images, showing his new OPL3 / CCT player for NitrOS-9 that works with the OPL3 sound chip in the MegaMiniMPI from Zippster (Ed Snider) (He is also using his IBM CGA font in the demo video):

<https://www.facebook.com/groups/2359462640/permalink/10158330794107641/>

### CoCoSDC Second Source

BoysonTech has announced availability of their version of the CoCoSDC (currently board only on June 22 - ones with cases will be available by mid-July):

<https://www.facebook.com/groups/2359462640/permalink/10158362863532641/>

<https://boysontech.com/marketplace/>



### 10-Liners

Davy Mitchell (Daftspaniel on Github) posted a link to his disk image which contains multiple Coco games in BASIC that are 10 lines or less (as well as Ingress Island and Pig). NOTE: some games require Extended BASIC):

<https://www.facebook.com/groups/2359462640/permalink/10158336836097641/>

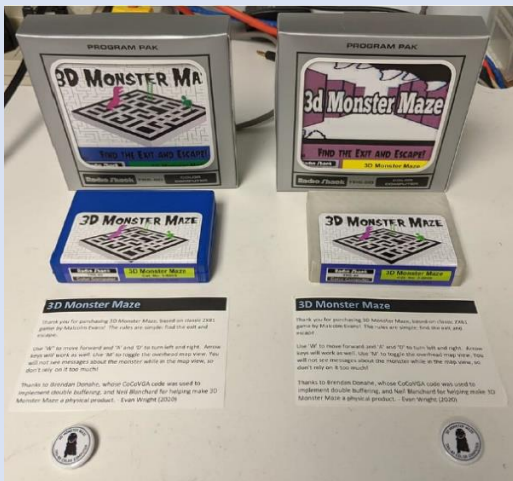
<https://github.com/daftspaniel/daftspanielcoco3/tree/master/DiskImages>

### 3D Monster Maze

Neil Blanchard has a new cartridge game by Evan Wright called 3D Monster Maze, which is a Coco 1/2 version of the game of the same name that originally appears on the Sinclair ZX-81. The Coco 1/2/3 version features color and other enhancements as well. Also \$30.00 and the cartridges are available in both deep blue and a new translucent color, with box and manual sheet. There appears to be two versions of the instruction manual art as well.

[https://www.facebook.com/groups/1606095809633762/permalink/2636658969910769/?sale\\_post\\_id=2636658969910769](https://www.facebook.com/groups/1606095809633762/permalink/2636658969910769/?sale_post_id=2636658969910769)

Evan also upload a video of the final version in action: <https://youtu.be/4uqWLRzsd2U>



Email [Neil@cococrew.org](mailto:Neil@cococrew.org) for pricing and availability

**Ciaran Anscomb** has released a new version of XRoar (0.36): <http://www.6809.org.uk/xroar/>

**ChibiAkumas** on YouTube is starting a video tutorial series on programming the 6809 (in his case, he wants to eventually program for the Vectrex, but it also works on the Dragon and Coco, and the Fujitsu FM-7): <https://youtu.be/UlyODgmVREY>

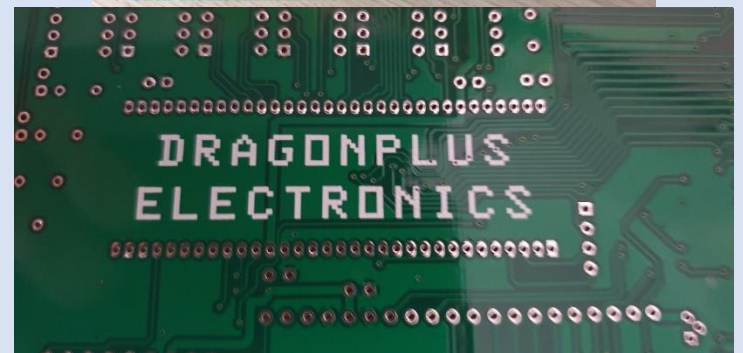


**John Whitworth** shows his Dragon MSX 2+ prototype board he just received, and inserted a SCART socket:

<https://www.facebook.com/groups/dragon32/permalink/2642744715985181/>

He also has a video up to show the graphics, along with music that Pere Serrat wrote for it:

<https://www.facebook.com/groups/dragon32/permalink/2643514192574900/>

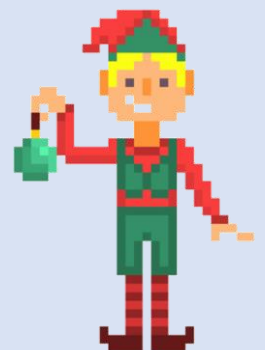


**Ed Snider** put up an article of a modification he did for Stevie for the MC-10 - a memory upgrade that also fixes the video circuit to allow >4K for video RAM (and thus allows PMODE 3 and PMODE 4 to work). His is an improvement over some of the originals, like Dennis Kitz's from the September 1983 issue of Color Computer Magazine, and uses less chips. Ed has plans to extend this mod for 32K of RAM plus the higher graphics modes supported.

<https://thezipsterzone.com/2020/06/12/mc-10-8k-internal-mod/>

**Allen Huffman's** new blog post is a bit different this week - he found an old handwritten disassembly that he had written decades ago, and then decides to try and figure out what it was doing:

<https://subethasoftware.com/2020/06/04/coco-notebook-mystery-6809-assembly/>





**Ed Snider** has a test CocoMECH keyboard using black keys:  
<https://www.facebook.com/groups/2359462640/permalink/10158358030137641/>



**Bart van den Akker** of the Home Computer Museum in the Netherlands had his original Coco 2 (which would be the white Coco 1 to North Americans) as the Computer of the Day for June 16:

<https://www.facebook.com/groups/2359462640/permalink/10158354120977641/>

**Todd Wallace** has released his new DIR utility for NitrOS-9 that works similar to DIR in MS-DOS (his screenshot is even using his CGA PC font), and you can download it from his site:

<https://www.facebook.com/groups/2359462640/permalink/10158353911262641/>

**Boisy Pitre** has released The Coco Collector Episode 3 - which shows a Coco 3 that used to belong to Marty Goodman, so of course it has mods: [https://youtu.be/4\\_v9WPeUvww](https://youtu.be/4_v9WPeUvww)

**The Trash Talk (TRS-80) podcast** has game programming contest, that includes the Coco. Deadline is November 30. There are hardware prizes to be won:  
<http://www.tr80.org.uk/2020competition.html>

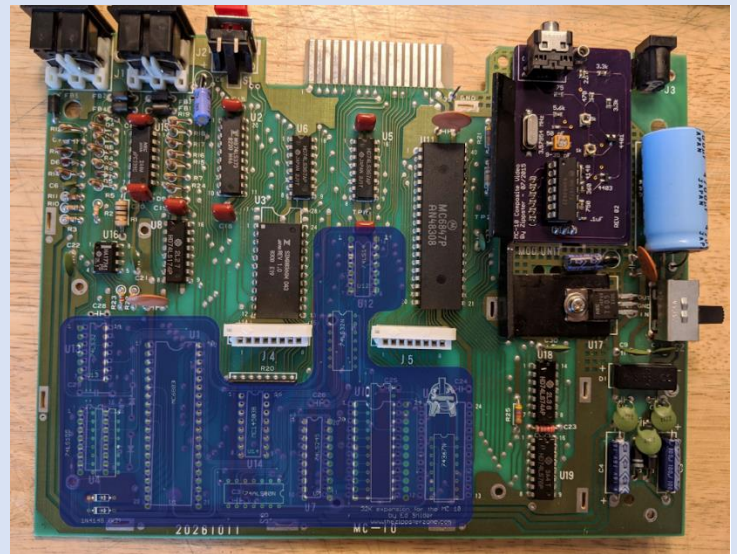
**Tim Halloran** has a video demonstrating him powering his Coco 2 - from USB: <https://youtu.be/qfa4Db2OwE8>

**Ciaran** has released an updated Coco version of the Dragon game ROTABB's -  
[http://www.6809.org.uk/tmp/da/coco\\_ports/](http://www.6809.org.uk/tmp/da/coco_ports/)



**Ed Snider** has some photos of his 32K RAM MC-10 board in the making which allows the higher resolution graphics modes.

<https://www.facebook.com/groups/731424100317748/permalink/2969740209819448/>



**Nick Marentes** has a video out to promote his Rally-SG game for all Coco's and the Dragon's (with at least 64K), which is getting released in August: <https://youtu.be/9lUiuw07Zly4>

## July

**Bill Garretson** has a video of a Fireworks program he wrote for the Coco 1/2.

<https://www.facebook.com/groups/2359462640/permalink/10158410702962641/>



Nick Marentes releases a new CoCo game Rally-SG based on the Arcade game Rally-X and using a very nice 8 color Semi-graphics mode, hence the "SG" in the title.  
<https://nickmarentes.com/ProjectArchive/rallysg.html>

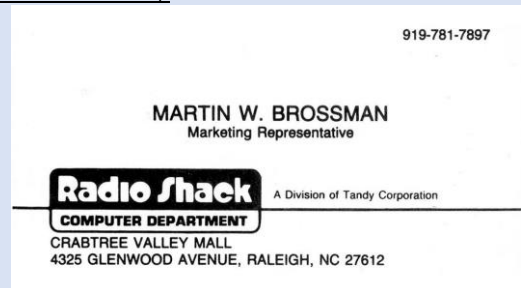


Pere Serrat shared a video showing his more advanced version of the AGD engine, now using the Wordpak2+ for additional sound effects and music:  
<https://youtu.be/zYMfmzttu3w>

Eric Sperano has written a little launch program for his SDC, but it actually boots a graphic screen to allow you to select between NitrOS9, Fuzix, SDC Explorer and DECB, and report your basic system specs. It's still a work in progress, but it looks really good:  
<https://www.facebook.com/groups/2359462640/permalink/10158430713227641/>



Martin Brossman posted some photos from when he worked at Radio Shack in the 1980's, and also mentioned that helped start a Coco club in his area:  
<https://www.facebook.com/groups/2359462640/permalink/10158429775042641/>



**Alison DeNu** has been recovering multiple programs that she wrote in the past for the Coco from old audio cassettes, and has been sharing them on Facebook:

<https://www.facebook.com/groups/2359462640/permalink/10158419718652641/>

**Jim McClellan** posted how he got his DMP-105 working again, including the trick of replacing the ink sponge:

<https://www.facebook.com/groups/2359462640/permalink/10158421898857641/>

**Sheldon MacDonald** is working on an RSDOS disk imaging tool for windows, and has some screenshots of his progress, and the features it supports:

<https://www.facebook.com/groups/2359462640/permalink/10158440446867641/>

**Greg Dionne** posted a link to his GitHub account for MC-10 (6803/6847) assembly language programming. It includes a powerpoint slide show, as well as multiple small assembly source listings to try:

<https://github.com/gregdionne/tasm6801/tree/master/tutorial>

"**8bitsinthebasement**" on YouTube has a video about his Coco 2, including a look under the hood and some overdue upgrades (his even has "Colour" spelled correctly, and is the SCART version!). He also does some upgrades: 16K to 64K, and adding Extended BASIC: <https://youtu.be/VZnCd0ZGNBE>

**Paul Shoemaker** has a very good full deck set of card graphics (with full face cards in 16 colors), that he has released a couple of video demos on Facebook, for use in upcoming card games. The latest one:

<https://www.facebook.com/groups/2359462640/permalink/10158448701372641/>



## August

**James Jones** is working on a book to help teach users BASIC09, coming from Disk BASIC. He is looking for some feedback and suggestions on how to approach the book. If you are interested in this, please give him some comments:

<https://www.facebook.com/groups/2359462640/permalink/10158476611857641/>

[https://docs.google.com/document/d/1DFWC0XAv6NENnqXc3AZGy\\_Gl6TcZDfPcHGAB34woQwg/edit](https://docs.google.com/document/d/1DFWC0XAv6NENnqXc3AZGy_Gl6TcZDfPcHGAB34woQwg/edit)

**Chet Simpson** has released the first public Beta of Digger III. This does have some minor known bugs, and only has the first 10 levels (and has hard mode disabled), but will give people with 512K (or higher) Coco 3's a chance to try the game out. It supports keyboard or joystick controls, features 4-way hardware scrolling graphics and digitized sound effects, and is one of the most impressive Coco 3 games out. The final version will add hard mode support, and 40 levels.

<https://www.facebook.com/groups/2359462640/permalink/10158495328987641/>

**Paul Thayer** now has Timber Man available for paid download at itch.io:

Announcement:

<https://www.facebook.com/groups/2359462640/permalink/10158493670122641/>

Download link (\$5.00 USD) - includes the DSK image and full color PDF manual:

<https://pthayer100.itch.io/timber-man>



**Boisy** has released The Coco Collector Part 4, which is about the Canadian French version of the Coco 2. In a twist, he actually does the episode in French, too!

<https://youtu.be/cU4vOGXS3eE>

**Guillaume Major** has released an update to the "complete Coco SDC image", which now has 600+ new disk images of applications, games, demos, educational, etc. compared to the previous version.

<https://colorcomputerarchive.com/repo/Disks/Coco%20SDC/Image/>

**Ed Snider** just posted a video of his 8MB prototype board for the GIME-X:



**Bill Pierce** has released version 2.0.1f of VCC. This fixes the composite artifact colors to be much closer to what a real Coco displays: <https://github.com/VCCE/VCC/releases>

And **James Ross** put up a comparison of the new composite colors from the older versions and the new one:

[https://www.facebook.com/photo/?fbid=10221468934546889](https://www.facebook.com/photo/?fbid=10221468934546889&set=p.10221468934546889)

**Bill Nobel** has released his new SDC2 utility, which is a more user friendly utility for accessing SDC disk images from NitrOS-9, using full word English commands, built in help and also works with ANY device descriptor name (it checks to make sure it is an SDC based device), which allows naming descriptors whatever you want. This will be included in EOU Beta 6, but you can get it now for standard NitrOS-9 and EOU Beta 5:

<https://www.facebook.com/groups/1929079184021683/permalink/2661221124140815/>

He also has uploaded a short video showing it in action:

[https://www.facebook.com/groups/2359462640/?post\\_id=10158552162027641](https://www.facebook.com/groups/2359462640/?post_id=10158552162027641)

**Robert Sieg** has been experimenting with a program to dither colors on the MC-10, with some pretty good results:

[https://www.facebook.com/groups/731424100317748/?post\\_id=3152145568245577](https://www.facebook.com/groups/731424100317748/?post_id=3152145568245577)

**Sheldon MacDonald** has released his first beta release of his RSDOS Windows utility. It has some known bugs, but he wants people to test it and report any bugs to him so that he can fix them:

[https://www.facebook.com/groups/2359462640/?post\\_id=10158561425997641](https://www.facebook.com/groups/2359462640/?post_id=10158561425997641)

## September

September 19<sup>th</sup>, 2020 **CoCoTALK!** hosts the first ever Glenside Color Computer Club "virtual" picnic. These usually take place in person, but, due to COVID-19, a virtual gathering was held.

<https://www.youtube.com/watch?v=99m-DrPnKh0>



**Todd Wallace** (Lord Dragon) has released a video showing his new OS9/NitrOS9 utility for formatting MSDOS disks on the Coco - up to 720K (so double density 5.25" or 3.5" disks):

<https://www.facebook.com/groups/2359462640/permalink/10158575072022641/>

**Charlie** (charlie2020 on Discord) has released version 1.3 of some OS9/NitrOS9 utilities that he wrote in BASIC09:

<http://jechar.ca/coco/Download/>

**Stevie Strowbridge** officially released his BASIC shoot em up Cosmic Aliens, and Rob Inman and David Ladd have started a port of it to RSB under NitrOS-9 as well:

<http://cosmicaliens.com>

**#SepTandy** is an annual event where retro YouTube channels feature Tandy computers all month long. 2020 was a huge CoCo year which brought a lot of great exposure to our computer and community. Each week L. Curtis Boyle brought some of these YouTube channels and videos to the weekly news segment of CoCoTALK! and we have managed to make new friends in the retro community this year, big score for the CoCo! Check out the content on YouTube:

[https://www.youtube.com/results?search\\_query=%23septandy](https://www.youtube.com/results?search_query=%23septandy)



"Mr. Lurchs Things" YouTube channel made a video showing his Coco 3 with upgrades (thanks to Nick Marotta for finding this one), and is part of the this year's "#SepTandy 2020" promotion between multiple YouTube pages. His upgrades include the 6309, SDC and 512K:

<https://youtu.be/LsCZu4Z2KBU>

Also part of #SeptTandy 2020 is **TheRetroChannel** showing his installing of a Coco 1 S-Video/composite mod on one of his Coco 1's, on YouTube: <https://youtu.be/PNnAg8qFdzM>

A 3rd "#SepTandy" video is from **Dinty's Hideaway** about the Coco is also out <https://youtu.be/Ubl84IyfPUQ>

A 4th "#SepTandy" video is from "**Adrian's Digital Basement**", where he does a deep clean/restore of a Coco 3

<https://youtu.be/wPtTv8yoBLC>

**DaveJustDave** on YouTube released an interview with Ken Williams (who, with his wife Roberta created Sierra), and the interview even covers the Coco a bit for their ports of Disney games for the Coco 1/2 from around 1984/1985, and then Kings Quest III and Leisure Suit Larry for the Coco 3 in 1988. Ken has a new book out mentioned as well, which sounds interesting (Coco is mentioned around 19:00 in - and that is where it is mentioned that for some of the more "gutless" machines, the interpreter had to be rewritten in assembly; including the Coco). Thanks to Rob Inman for finding this one:

<https://youtu.be/gdEYABhmVNo>

**AC's 8-Bit Zone**, as part of #SepTandy 2020, shows off his giant Coco collection, much of which was in his storage for years, before his re-opening of many boxes:

<https://youtu.be/k6z8J2K3o58>

And a second video, showing how he made the cable to hook his Coco 3 up to his Magnavox 85CM15 monitor:

<https://youtu.be/i73z0VZcMDU>

**VCFMW 15 went virtual**

<http://vcfmw.org/virtual.html>

**Chet Simpson** has put up an official "#SepTandy" demo video for Digger III, which is out this weekend!

<https://youtu.be/L4CvsAfSrcE>

And he released the game a couple of days early, in full, for free, downloadable on Facebook (512K Coco 3 required, joystick optional):

<https://www.facebook.com/groups/2359462640/permalink/10158595404992641/>

**Digger III** is now available

<https://hypertechgaming.itch.io/digger3>



An awesome interview on **Dinty's Hideaway** as part of #SepTandy: An interview with John Roach, who headed the computer part of Radio Shack during the creation of the Model 1, 2, 3 and Coco - Part 1:

<https://youtu.be/iNYvRX2z518>

Part 2 (remembering Charles Tandy):

<https://youtu.be/1BicepDZiX8>

**Ken Reighard** now has his Coco collection of games that he has written up on itch.io. Most are free, and his special CocoFest edition of Nightmare Highway is only \$5.00 (I think he does need to add another screenshot to each to actually show what the game looks like, not just the title page):

<https://cankenmakeit.itch.io>

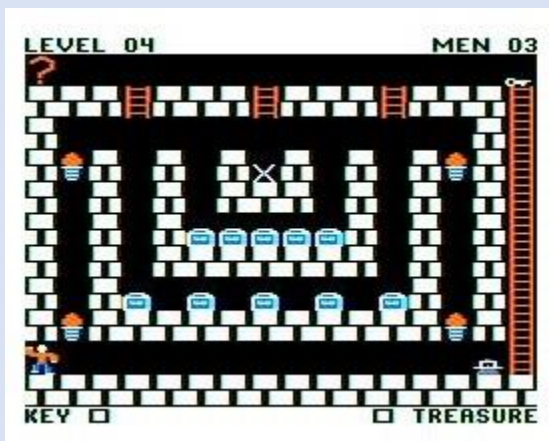
Paul Fiscarelli put up a couple of videos on Facebook demonstrating the current results of the sprite compiler he is working on for the Coco 3:

<https://www.facebook.com/groups/2359462640/permalink/10158626255567641/>



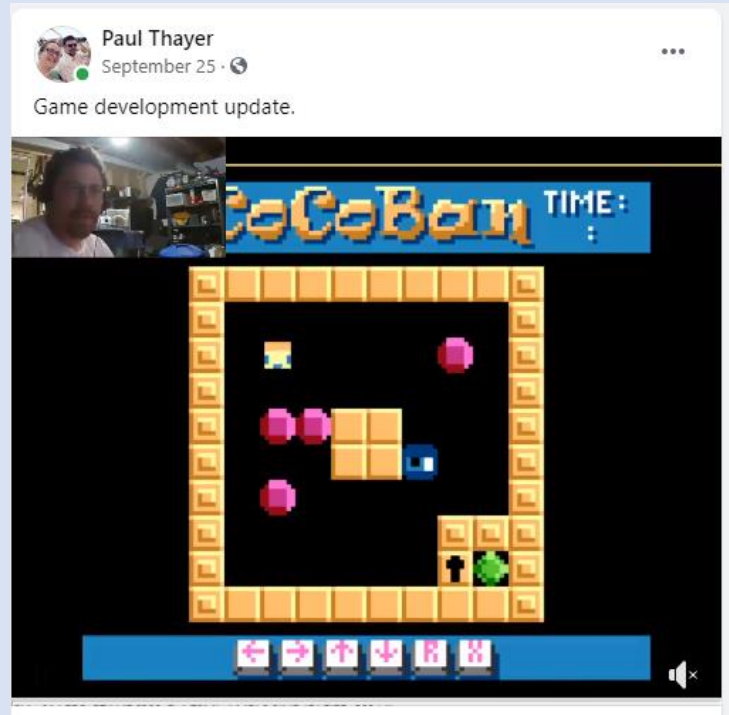
Richard Kelly has uploaded a new, faster, improved version of the Coco 1/2/3 platform game he wrote called Ladderman 2 (version 0.9W). He is looking for input on bug reports, feedback, etc. Download for free on Facebook, and screenshots in the comments:

<https://www.facebook.com/groups/2359462640/permalink/10158630873287641/>



Paul Thayer put up a VLOG of his current progress in his Coco 3 puzzle game, CocoBan (loosely based on Sokoban, but with a lot of extra gameplay elements, some show in this VLOG):

<https://www.facebook.com/groups/2359462640/permalink/10158629689597641/>



## October

Tim Lindner has a video up on YouTube on how to use a Coco to control a Teensy (Arduino compatible):

<https://youtu.be/RF1irLrpTtw>

As part of #SepTandy, Aaron Newcomb @ Retro Hack Shack put up a different kind of SepTandy video - covering the comic collaborations Radio Shack did with DC Comics back in the 1980's (I have one or two of these myself), including Superman and other major DC figures working with the "Whiz Kids", who used different TRS-80 model computers to help save the day. The Coco is featured in some of these:

[https://youtu.be/\\_6jmx9T-kis](https://youtu.be/_6jmx9T-kis)

Brian Schubring put up some videos on how to set up Drivewire 4 for VCC under Windows (including Windows 10):

<https://www.facebook.com/groups/1929079184021683/permalink/2690143171248610/>

Bill Pierce is working on a new version of MShell that will run on a hardware text screen, thus reducing it's RAM requirements. In the comments, he shows a mockup screen shot of what it may look like:

<https://www.facebook.com/groups/1929079184021683/permalink/2694155670847360/>

<https://www.facebook.com/photo.php?fbid=10219181748483178&set=p.10219181748483178&type=3>

James Rye posted a video called "Adventures in VCC #1", where he goes through the fun of adding 'paste' to VCC:

<https://youtu.be/4V6cnMHGB1Y>

**Dave Shadoff** has released the assembly source code for his Coco 1/2 game Star Spores (sold by Spectral Associates) on GitHub (Thanks to Ciaran Anscorb for providing the link). It even includes scans of hand written notes from back in it's time of development:  
[https://github.com/dshadoff/Star-Spores\\_CoCo](https://github.com/dshadoff/Star-Spores_CoCo)

**Jack Gurner** posted a photo of an interesting bit of Coco history - a membership certificate from the International Color Computer Club (which used to advertise in Rainbow):



**Allen Huffman** shared with the community that he is brainstorming the possibility of recreating the Color Computer keyboard. He has been chatting with various suppliers on Alibaba about this. The keyboard is not a CoCo keyboard, but rather a PC USB keyboard with the CoCo keys labeled. Are you interested in such a product? If so, please contact Allen on the Color Computer group on Facebook or on the CoCo List. The complete thread link below:  
<https://pairlist5.pair.net/pipermail/coco/2020-October/175960.html>

A 1 hour+ YouTube video by **ACs 8-bit Zone** discusses in detail a composite out mod for the CoCo 2:  
<https://youtu.be/tayGsz7Xs3A>

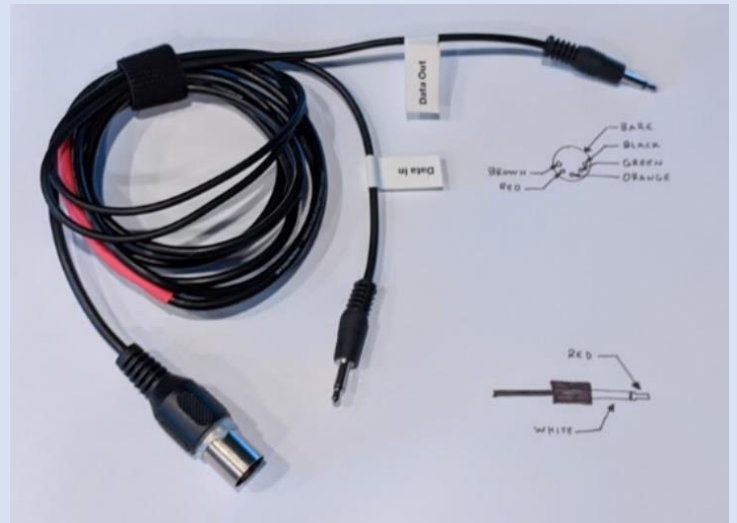
**Walter Zambotti** announced that a new version of Open VCC (OVCC) is now available. Version 1.4.0 now supports the Tandy Hi res interface.  
Video: <https://youtu.be/3XZWalBRwhA>  
Download: <https://github.com/WallyZambotti/OVCC>

**ACs 8-Bit Zone** posted another CoCo video. This video's topics discusses a method to transfer data from a real floppy disk on a CoCo to a virtual CoCo on the PC via DriveWire:  
<https://youtu.be/bFOGSQnscsc>

More DriveWire goodness! **8BitsInTheBasement** posted a video that talks about this fantastic application:  
<https://youtu.be/KISNyh8TsGc>

A question that come up frequently is how to connect a CoCo to a modern TV. Wagner's TechTalk on YouTube posted a video about this topic. Aside from the CoCo, it includes discussion about other vintage systems:  
<https://youtu.be/KWoK8YIA9cA>

**Joel Dare** shared the news that he built an audio cable for a digital audio recorder and shared the diagram.



**Richard Lorbieski** announced that his Paragon Joystick Adapter is now in stock. This adapter allows the use of Atari style joysticks to be used with the Color Computer. <https://boysontech.com/marketplace>



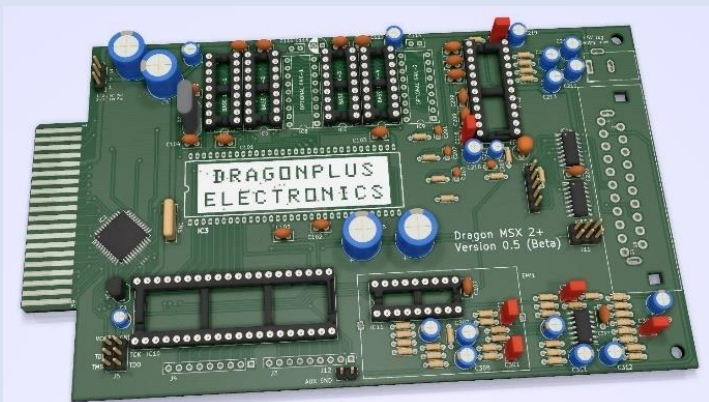
Keith posted another CoCo 3 assembly tutorial to his **ChibiAkumas** channel. The topic this time is 16 color bitmap drawing: <https://youtu.be/qk8jS4XAMKo>

**Carlos Camacho** announced that he is selling Color Computer Extended BASIC 1.1. ROMs on eBay to upgrade existing Cocos 1, 2 and TDP100: <https://tinyurl.com/yyn4oxv5>

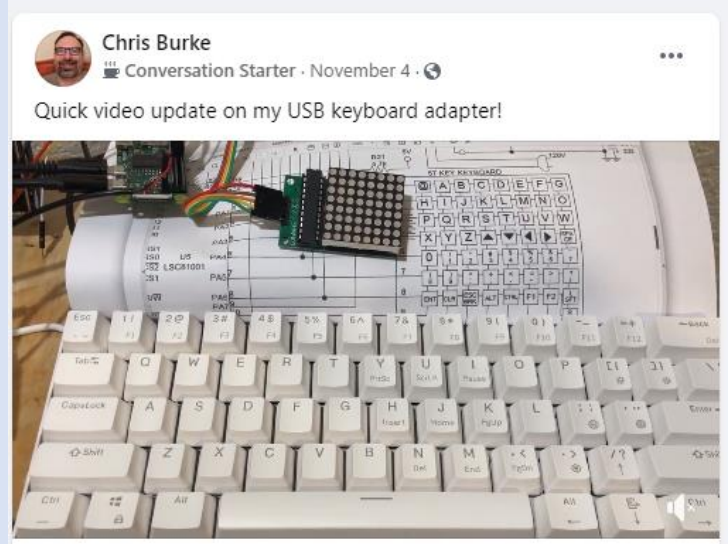
**Peter Cetinski** uploaded to github an archive of the Tandy Coco Tech bulletins: <https://tinyurl.com/y2gkz8rd>

**ACs 8-Bit Zone** posted another video. This he looks into repairing a CoCo that was sent to him: <https://youtu.be/tChs-TzTAJ0>

**John Whitworth** announced more MSX 2+ boards have been ordered. What board is this? Compatible with Oomajaflip, V9958 graphics chip, 128KB VRAM, expandible to 192KB, YM2149 sound chip, and a YM2413 FM Synthesis sound chip on board. More information here: <https://tinyurl.com/yxmpk5lb>



**Chris Burke** posted an update to the USB mouse adapter for the CoCo: <https://tinyurl.com/y4jt33m8>



**November:**

**Nick Marentes** releases his 3<sup>rd</sup> game this year, PIPES for the CoCo 1/2/3 and Dragon! <https://nickmarentes.com/ProjectArchive/pipes.html>





**Ciaran Anscomb** (sixxie on Discord) has notified us that his index of Dragon User magazine has now been completed.

There is a PDF version available for download here:  
<http://www.6809.org.uk/dragon/dragonuser-bib.pdf>

The BibTex database version is here:  
<https://gitlab.com/sixxie/dragonuser-bib>

He is also working on making a full KiCad file to make the entire Dragon 64 motherboard. Status here on the World of Dragon forums:

<https://archive.worldofdragon.org/phpBB3/viewtopic.php?f=9&t=10893>

Sign of the time. **Neil Blanchard** has a last call for his special run of 40th anniversary Coco masks.

Email [Neil@cococrew.org](mailto:Neil@cococrew.org) for more information.



**Dave Shadoff** (author of Star Spores) pointed out that there is now a free MC-10/Alice core for the MiSTer):

[https://github.com/MiSTer-devel/AliceMC10\\_MiSTer](https://github.com/MiSTer-devel/AliceMC10_MiSTer)



**Sheldon MacDonald**, after asking if people would like an assembly language programming series done by somebody just learning it themselves, has had so much positive feedback that his first three episodes of his "Exploring assembly" series are already out this week. He also redid a couple of his earliest effort with larger fonts & higher resolution to make them easier to read and follow along with:

<https://youtu.be/cyAMkehYI7Y>

(Setting up the work environment)

[https://youtu.be/tAnM7vJLt\\_s](https://youtu.be/tAnM7vJLt_s)

(processor loads/stores; memory variables)

<https://youtu.be/wKQsIKTKsp8>

(compares, subroutines and creating a mouse cursor on a semigraphics screen)

He also has DSK images available with source code, etc. so that you can follow along:

<http://www.smotion3d.net/downloads/asm%20tutorials/>

**Simon Jonassen** put up a video on Facebook demonstrating his 4-voice music player

<https://www.facebook.com/groups/2359462640/permalink/10158729659987641/>



**Ed Snider** announced the availability of Darren Atkinson's MCX-32 SD cartridge for the MC-10 computer. This cartridge provides an SD card-based file storage, 32KB or RAM, and 128KB of flash memory, that's sixteen 8KB banks.



Introductory video: <https://youtu.be/ro9u7WlwUeU>

User guide: <https://mcxwares.blogspot.com/>

And purchase here: <https://tinyurl.com/y57qpcjq>

**ACs 8-bit Zone** has debuted a video where he repairs a CoCo 2: <https://youtu.be/6KrBYmqeAY>

YouTube user **ChibiAkumas** posted an assembly language tutorial video for the Color Computer and Dragon. This lesson covers sound generation. <https://youtu.be/Ef51PYT2VbM>

**Denis Bisson** shared that he is working on a ROM based testing card. This is not a cartridge, rather it plugs into the Color BASIC ROM socket on the motherboard. It tests RAM and 6809 registers and outputs result through the serial port. Video: <https://youtu.be/zJWWcZIZkBM>  
Post on Facebook: <https://tinyurl.com/yxhbhr6a>

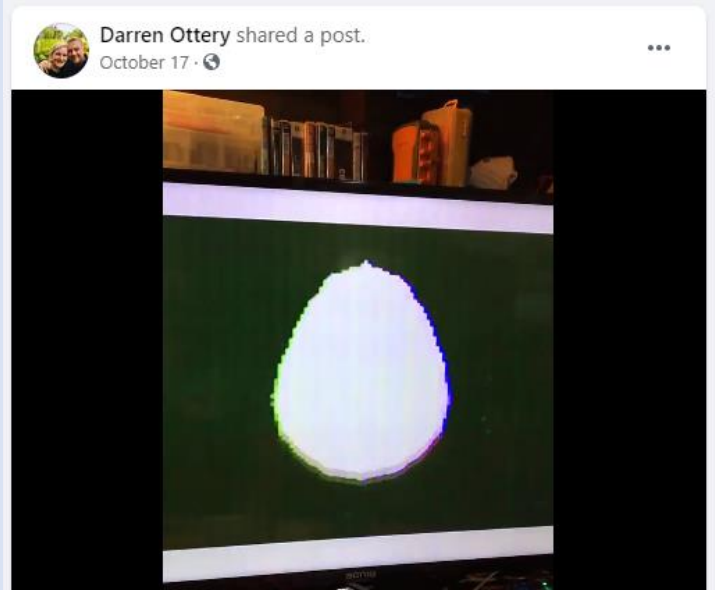


(RAM test program for CoCo using no RAM)

**Jim Brain's** RETRO Innovations is now selling the bare bone PCB for his Philharmonic-12, which is a clone of the original 1980's Symphony-12 from Speech Systems, capable of up to 4 percussion and 12 music voices simultaneously. Order: <https://tinyurl.com/y2hmo55d>

Do you want to learn more about "alternate" color sets? Do you need more input? Fear not, Allen Huffman has you covered! He published a blog post where he discusses these that can be done on the 32x16 hardware text screen on all CoCos: <https://tinyurl.com/y4afsbvI>

**Darren Ottery** shared a video on his Facebook post. He discusses a cool visual trick that can be done in BASIC. The video applies to the MC10 and MCX-128; however, he posted a comment that references another video for the CoCo. <https://tinyurl.com/y3c9wu2x>



**Ken Reighard** is making his Inter-Planetary Trash Collector game available. This is a BASIC game where the player spends his or her time joyfully collecting space junk. Into video: [https://youtu.be/RKbPMRy\\_wp8](https://youtu.be/RKbPMRy_wp8)  
Download: <https://tinyurl.com/yxffzkb9>

Interested in self-modifying BASIC code? Is this a mythical beast, or can it be achieved? Erico Patricio Monteiro started a discussion about this topic on Facebook. Read the thread here: <https://tinyurl.com/yyuxawIq>

**Bill Pierce** announced the availability of the new release of VCC, version 2.1.0B. Among the new features, we can now copy and paste code directly into the VCC screen. Note that this is an open-source project which means that the source code is also available. Get it here: <https://tinyurl.com/yxpmmcgn>

**Boisy Pitre** shared his new project with the community: Project Ghidorah. This consists of creating a token-ring-like network using CoCos connected via their serial port. Information: <https://tinyurl.com/y3oddr53>  
Video: <https://youtu.be/oOvTy0aJffw>  
Code: <https://github.com/boisy/ghidorah>

Do you have a stock 16K CoCo 2? Want to know how to make it better? The YouTube Retro Channel posted video discussing how to do this: <https://youtu.be/f6a0ZsV7OO8>

**Ciaran Anscorb** announced to L. Curtis Boyle that the index he was working on and is now available in a PDF file or . The index is for the Dragon User magazine:  
PDF: <http://www.6809.org.uk/dragon/dragonuser-bib.pdf>  
BibTex DB: <https://gitlab.com/sixxie/dragonuser-bib>

**ACs 8-Bit Zone** posted the second part of the video where a viewer's CoCo is being repaired:

<https://youtu.be/NBw-KohzGIk>

Looking for more CoCo goodness? Then let's all welcome a newcomer into the fold: <https://8bitcoco.com/>

**Jim Brain** of RETRO Innovations is offering the AT-3-8910 audio chip for \$2 USD (plus shipping). More info:

<https://tinyurl.com/y6ll33cm>

**Tony Cappelinni** shared a link to an article that talks about procedurally generated retrocomputer emulators that appeared on Hackaday:

<https://tinyurl.com/y3laq6ac>

**Richard Harding** mentioned that he shared a Norwegian and Italian version of the Dragon BASIC manual. Download on the following link (scroll down):

<https://tinyurl.com/yxgzjh99>

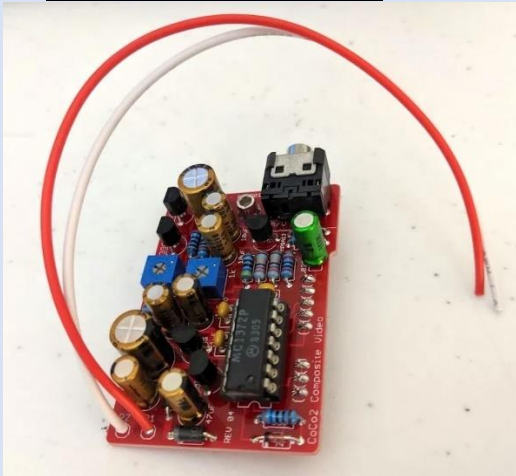
**John W. Linville** shared the news that the new CoCoCrew Podcast, episode 66, is now ready for our enjoyment. Go to the main CoCoCrew page to get it:

<http://cococrew.org/>

**Ed Snider** announced the availability of his composite mod for the CoCo 2. This product provides composite A/V out for the CoCo 2. The RF modulator is replaced by this mod. Sorry, not a PAL product.

More info: <https://tinyurl.com/y6kmnoaf>

Order here: <https://tinyurl.com/yxz2govj>



**Dave Shadoff** shared the news that there is now a free MC-10/Alice core for the MiSTer CoCo system:

<https://tinyurl.com/y28jn6bj>

**Rutherford Le Blang** shared a trick for the CoCoSDC where you can specify a specific virtual drive number (0 – 255) as part of a larger DECB VHD in one command:

<https://tinyurl.com/y2duutgw>

**John Linville** excitedly announced that the CoCo Crew Podcast has been downloaded 150,000 times! Way to go guys!

<https://tinyurl.com/y5mxqowb>

**Allen Huffman** announced that an updated version of the article "Compressing BASIC DATA with Base-64 – Part 1" is now available: <https://tinyurl.com/yxr2724e>

Do you have a Realistic CTR tape recorder? Has it seen better times? If so, this video on YouTube by ScottyAnimation might help. He provides repair tips to CTR owners:

<https://youtu.be/u3CfccYPIIO>

**ACs 8-Bit Zone** posted the third and final part of the video where he repairs a viewer's CoCo 2:

[https://youtu.be/t0jVmZdx\\_BI](https://youtu.be/t0jVmZdx_BI)

Anxious? Can't sleep at night? Suffering from withdrawal symptoms because you are not hearing the soothing sound of the CoCo 2 keyboard? TechSMR has you covered! Watch and listen to 10 long relaxing minutes of the CoCo 2 keyboard!

[https://youtu.be/E\\_wl0WBUyk](https://youtu.be/E_wl0WBUyk)

Need a little help making RF cables to connect your vintage computer to a TV? This video on YouTube by Mike's Tech Rescue discusses this using a CoCo1:

<https://youtu.be/ujlywepPwx0>

Interested in the techie details of a COM port? Interested in a cartridge with two COM ports? If so, this Facebook discussion started by Paul Barton will interest you:

<https://tinyurl.com/y5zaq5j5>

**Jim Gerrie** posted a blog article titled "Key Debounce Delay POKEs" for the MC-10: <https://tinyurl.com/y6cs9ofq>

The Color Computer Archive uploaded a ZIP file with a plethora of games contained in 83 DSK images, ready to play. The file is called CoCo Games Collecton (CoCo SDC).zip. It is located at the following link:

<https://colorcomputerarchive.com/repo/Disks/Coco%20SDC/Games/>

Youtuber You Make Robot posted a video demonstrating DRAGONUITAPE, the digital tape alternative. This allows loading CAS files stored in an SD card not the Dragon 32 computer.

Video: <https://youtu.be/F2Is-S9vQd4>

Info: <http://dragonuitape.youmakerobots.com/>

**Mat Chy** announced that his game Doodle Jump is now available for download. The download is free of charge, but he graciously accepts donations:  
<https://matchygames.itch.io/jumpy>

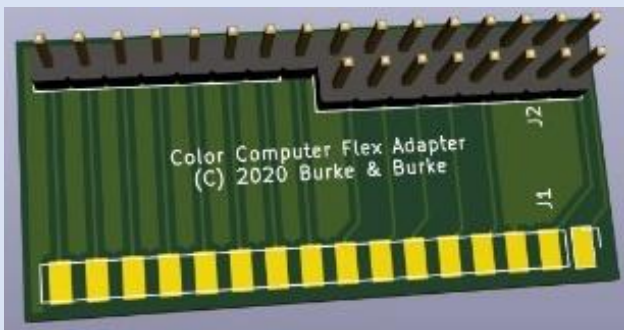


In memoriam: Richard Wadman, one of the Dragon's original designer, succumbed to the COVID-19 virus. The link is an 80s interview discussing the Christmas season:  
<https://youtu.be/305o5qCkkgI>

Can't get enough retro computing? Love to see others show what they have? Then this video is for you! YouTuber retrobits posted a 15-minute video where he presents various retro computers that he got. Spoiler: The video link below goes directly to the CoCo 3 segment, but it is easy enough to restart the video: <https://youtu.be/4www9npSTfg?t=114>

**ACs 8-Bit Zone** is back with another CoCo repair video! Don't miss these, they provide important information on CoCo trouble shooting: <https://youtu.be/IO78B li0QY>

Have you ever needed to connect some external device to the CoCo's keyboard connector that's on the motherboard? Chris Burke is working on an adapter board that breaks out the CoCo's KB connector. The wafer-thin device plugs into the CoCo's connector and has male headers that the tinkerer can use to connect his device. He is not making these explicitly for sale, but will sell his stock of the boards that he ordered. He says they should be available in December, so keep an eye out!



Can a Parallax Propeller be used to create a retro computer? If this interests you, then there is a video for that! Djamal.UK posted a video that discusses this:  
[https://youtu.be/afM\\_AVus3y4](https://youtu.be/afM_AVus3y4)

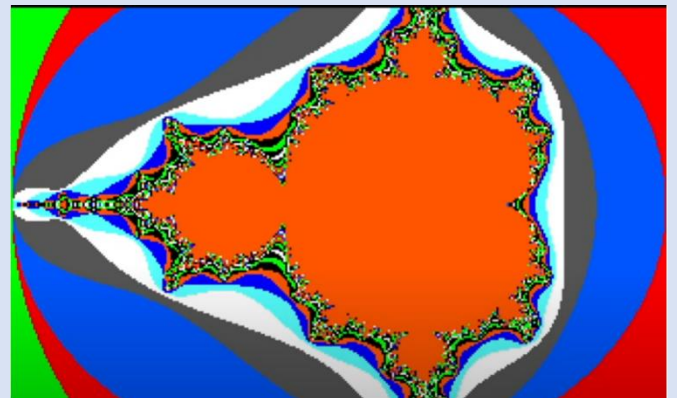
**Robert Sieg** has put up a color mixing chart for using the composite mode up on Facebook (no login or account needed):  
<https://tinyurl.com/y7z4z7cm>

**Dave Shadoff** announced the availability of the CoCo2/Dragon cores for the MiSTer for download. These support 64K RAM, 2 analog joysticks, cassette, sound, and cartridge support:  
<https://tinyurl.com/y93gp2gh>  
Video demo by NML32: <https://youtu.be/z8AjtybiLYM>

Are you interested in a complete Dragon motherboard? If so, you are in luck! Ciaran Anscomb is working on creating the entire Dragon MB using KiCad. But don't expect to gift these for Christmas 2020, he still has a long way to go! More info:  
<https://tinyurl.com/ycjrxqs8>

Have you ever burned that latest version of firmware into your 2764 EPROM? So happy, and anxious to power ON, only to find that the CoCo (or other computer) has a 24 pin socket? Aaaargh! No fear, ACs 8-Bit Zone is back with another video on how to make those 28 pin EPROMs work with a 24 pin socket. <https://youtu.be/NTbW1SEcX0A>

Are you a Mandelbrot junkie? Does watching the fractals ever change sooth your inner savage beast? If so, YouTuber juncachran posted a video of a BASIC program running on the CoCo 3 emulator VCC that generates a Mandelbrot set:  
<https://youtu.be/R8-s76CIYnM>



Do you take your color palettes seriously? If so, then this page is for you. Brian Joyce shares lots of information and charts on this topic: Courtesy of Brian Joyce.

<https://tinyurl.com/y9quu3j3>

| Composite (VCC Emulator v1.4.2 to v2.1.0a) |    |    |    |    |    |    |    | Composite (VCC Emulator v2.1.0b) |    |    |    |    |    |    |    |
|--|----|----|----|----|----|----|----|----------------------------------|----|----|----|----|----|----|----|
| 0  | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 0                                | 1  | 2  | 3  | 4  | 5  | 6  | 7  |
| 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 8                                | 9  | 10 | 11 | 12 | 13 | 14 | 15 |
| 16   | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 16                               | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 24   | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 24                               | 25 | 26 | 27 | 28 | 29 | 30 | 31 |
| 32   | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 32                               | 33 | 34 | 35 | 36 | 37 | 38 | 39 |
| 40   | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 40                               | 41 | 42 | 43 | 44 | 45 | 46 | 47 |
| 48   | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 48                               | 49 | 50 | 51 | 52 | 53 | 54 | 55 |
| 56   | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 56                               | 57 | 58 | 59 | 60 | 61 | 62 | 63 |

Jim Gerrie has a port of "Save Spock: Battle At Vulcan" available for the MC-10. It can be downloaded as a WAV file.

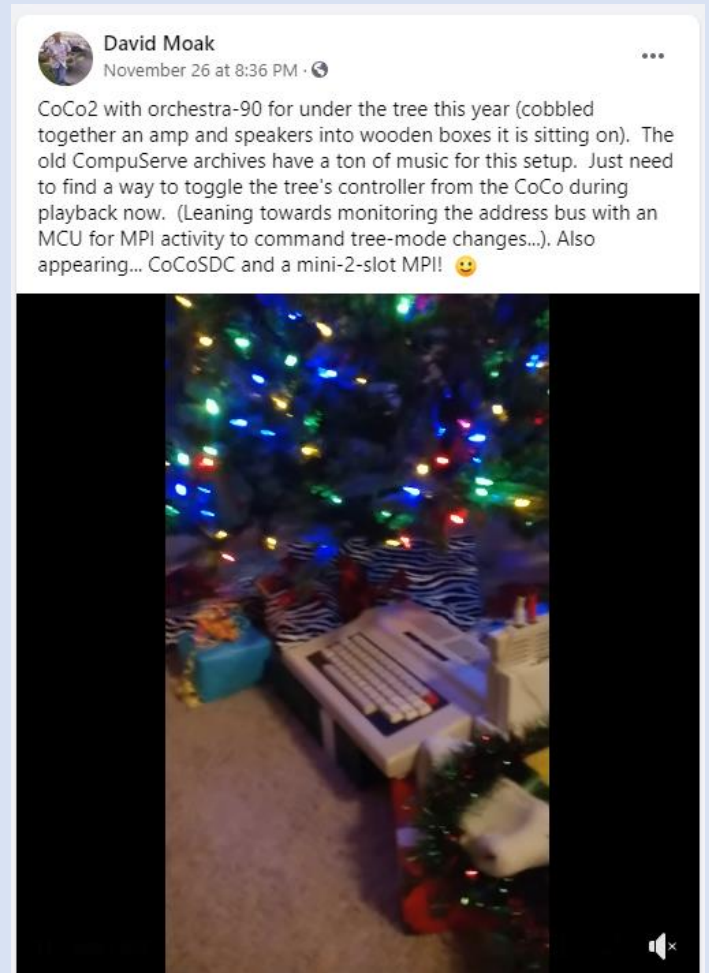


Video: <https://youtu.be/g-yynAliCOY>

Download: <https://tinyurl.com/ybnu72tz>

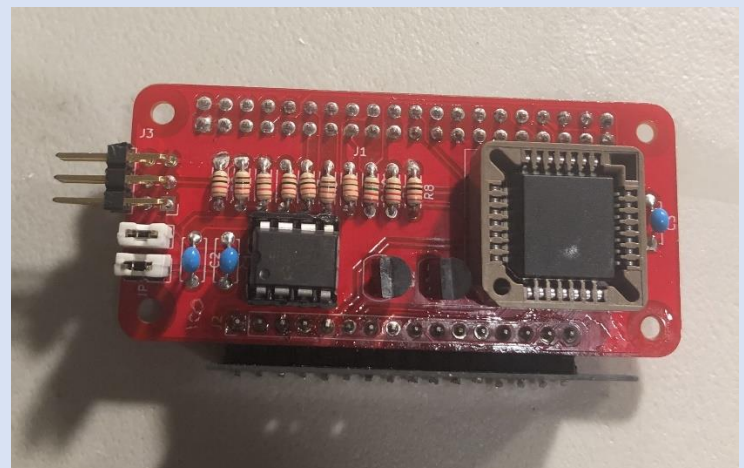
Ready for Christmas? Just one thing missing under the tree: A CoCo playing seasonal music through the Orchestra-90! David Moak posted this short 20-second video of just this!

<https://tinyurl.com/ybvp4vnr>



December

Chris Burke posted information on a project that he is working on. This is an adapter to allow the CoCo to use a wireless USB mouse and keyboard.



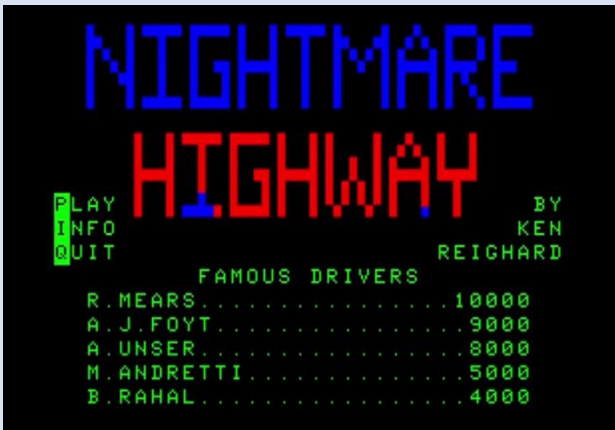
Paul Shoemaker provided an update on his progress working with “pseudo-SG6” blocks to create imagery. So far, he has put together a series of images that he will incorporate into a future game.



Ken Reighard announced that the game Nightmare HighwayCoCoFEST! Edition Digital copy is a buck off. Get it while supplies last!

Promo spot: <https://youtu.be/9O8SSqzO6ps>

Order: <https://tinyurl.com/y3wtoeku>



Allen Huffman publish another blog on his Sub-Etha Software Website titled “Color BASIC “DATA” quirk”:

<https://tinyurl.com/y8dsharh>

Ed Snider is now offering CocoSDC cases by themselves (in black, white, or marble) for \$20.00 (scroll until near the bottom): <https://tinyurl.com/y9gvfgkd>



Ben Manuel posted a video on YouTube that visually shows how a sorting algorithm works using code from the August 1988 Rainbow Magazine:

<https://youtu.be/dC4Yqg9GaA4>

Do you have a Radio Shack CCR-82 computer cassette recorder? Then this video is for you! It show the disassembly process of this device:

<https://youtu.be/1TdS8IK5Pmg>

L. Curtis Boyle announced that an update to the NitroS-9 Technical Reference and Window manuals have been updated. Additional content was added to the latter discussing EOU Beta 6. Link to the documentation:

<https://tinyurl.com/y643o9ga>

In Curtis’ own words:

*“I released the first public release of the new Technical Reference manual for NitroS-9. This includes a lot of previously undocumented system calls, 3rd party driver calls, corrections to the original manual, and highlights which ones are new to NitroS-9 (vs. the original OS-9 Level II), and new to EOU. This is the 2nd section of the original Tandy/Microware OS-9 Level II manual that has been updated, and is about 100 pages longer than the original with all the new stuff.”*

Jim Brain, GCCC president, announced that the Glenside Color Computer Club will be inaugurating a new Website Any Day Now. Eric Canales has been working on authoring the new site on WordPress and has a sneak peek available. If the site is not live when you read this, the sneak peek link follows:

<http://dev.glensideccc.com/>

The site has since gone live on the usual link, <http://glensideccc.com>

Antonio Carlos Jiménez Ely posted a link to the SDPak page.  
<http://www.sdpak.com/>

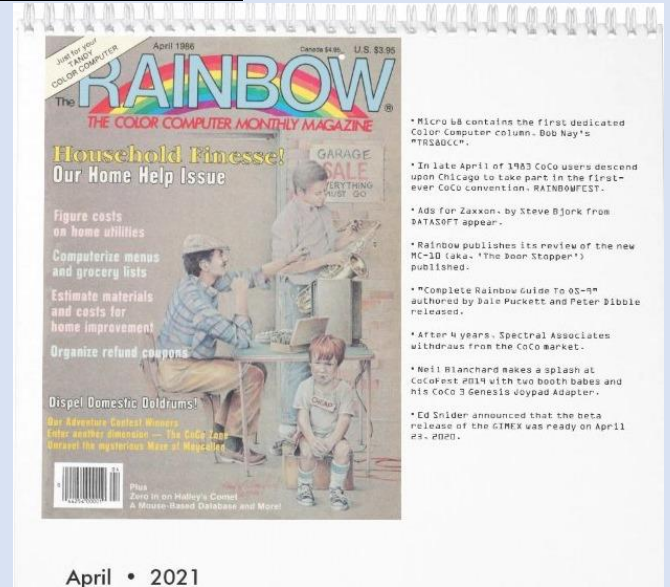


The SD-Pak project takes label designs from the original CoCo Cartridges, and some re-designed and imagined ones to make very cool looking labels for SD cards to go in your CoCoSDC. The idea, is to get very low-cost SD cards and set them up to auto boot like the old ROM packs, hence the name SD-PAK. Lots of images have been posted to Facebook recently.

Joel Dare shared a project that he's worked on with Salvador Garcia. This is for enthusiasts who want to proudly display their vintage computers on the wall. Joel designed shelves that are affixed to a wall. The computer is then placed on the shelf. He is offering the files needed to 3D print the shelves. More info and order here:  
<https://gumroad.com/l/retro-shelf>



Carlos Camacho has been busy! He created a CoCo calendar using Rainbow Magazine covers. As an added bonus, he included some fun news events from the community each month. Order yours today!  
<https://www.facebook.com/groups/2359462640/permalink/10158815403617641/>



Chet Simpson posted an update about his KAOS cross platform development system for older machines with bitmapped graphics (including Coco's, Fujitsu FM-7/FM-77, PC with EGA, Atari ST and Amiga):  
<https://www.facebook.com/groups/2359462640/permalink/10158790617862641/>

Jamie Cho found an interview with Craig Federighi, Sr. VP of Engineering for Apple, where he mentions that his first computers was a Coco, and that he thought that the 6809 was "decent processor" (it was also part of the first Mac prototypes, when Jef Raskin was still in charge of the project):  
<https://youtu.be/43sjym5ZS68?t=478>

Just in time for Christmas, Neil Blanchard is offering the updated cartridge game Flood It!, by Evan Wright, in a new green cartridge case, for \$30.00 ([Neil@cococrew.org](mailto:Neil@cococrew.org))



**Breaking News!** December 18<sup>th</sup> 2020  
CoCoSDC Explorer (SDCX) Has been updated to 1.10 and published to the [Color Computer Archive](https://colorcomputerarchive.com/repo/Disks/Utilities/Coco%20SDC%20Explorer%201.10%20(SDCX)%20(Guillaume%20Major).zip) by Guillaume Major  
[https://colorcomputerarchive.com/repo/Disks/Utilities/Coco%20SDC%20Explorer%201.10%20\(SDCX\)%20\(Guillaume%20Major\).zip](https://colorcomputerarchive.com/repo/Disks/Utilities/Coco%20SDC%20Explorer%201.10%20(SDCX)%20(Guillaume%20Major).zip)

## Calendar of Events



Glenside Color Computer Club, Inc. Business Meetings

Upcoming meetings: December 17<sup>th</sup> 2020, January 21<sup>st</sup> 2021, February 18<sup>th</sup> 2021

Check the calendar on [our site](#) for updates

Third Thursday of each month.  
7:30 PM to 9:30 PM Central Time

BlueJeans Video Conference - <https://bluejeans.com/889394355>

You can call in: Phone Dial-in  
+1.408.740.7256 (United States)  
+1.408.317.9253 (Alternate number) (Global Numbers)  
Meeting ID: 889 394 355

### Glenside Virtual Meetup

December 20<sup>th</sup> 7PM Eastern / 6PM Central / 5PM Mountain / 4PM Pacific  
Hosted on the club's BlueJeans service  
<https://bluejeans.com/889394355>

### The 29th Annual "Last" Chicago CoCoFEST!

Date: Scheduled for April 24<sup>th</sup> and 25<sup>th</sup> 2021  
Location: Holiday Inn Elk Grove, IL

<http://glensideccc.com>



Image courtesy of D. Bruce Moore

### Tandy Assembly

October 1<sup>st</sup> – 3<sup>rd</sup> 2021  
<http://tandyassembly.com>



## The Year in CoCo Media



**The CoCo Crew Podcast** was the first podcast dedicated to the CoCo starting in 2015. Their mission back then was to try and reignite the CoCo community and generate interest in attending CoCoFEST! as it seemed attendance was on a steady decline. Luckily, we had this initial catalyst to help jump start interest in the CoCo hobby, and in the years that followed, the community has been stronger and more vibrant than it has been in long time. 2020 brought 12 more great episodes, here are some highlights. You can download the individual episodes and read detailed show notes for each by visiting <http://cococrew.org>



Episode 56 – January – Interview with Dale Pucket.

Episode 57 – February – Interview with Phil Zwart.

Episode 58 – March – Interview with Carl England, Tech Talk with Mark McDougal part 1

Episode 59 – April – Interview with George Dorner – Tech Talk with Mark McDougal part 2

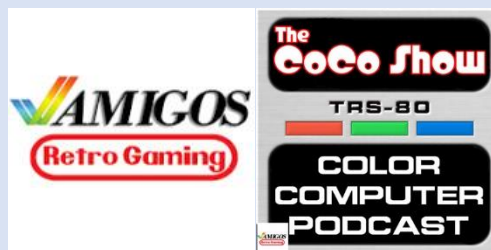
Episode 61 – June – Interview with Simon Jonassen & Paul Fiscarelli

Episode 62 – July – Interview with Fran Purcell – Tech segment regarding pseudo random numbers – Neil announces “The Gamester”

Episode 63 – August – Interview with Curtis Kaylor

Episode 64 – September – Interview with Nathaniel Lockhart

Episode 66 – November – Interview with Joe Scinta



### The CoCo Show – by the Amigos Retro Gaming Group

John, Aaron, and Brett make up ARG, and this year they started featuring Color Computer shows on their live Twitch Streams, YouTube channel, and audibly as The CoCo Show Podcast. There are many shows to enjoy in both audio and video form, mostly focusing on CoCo gaming. Check out a great group of guys who are a valued asset to the CoCo community.

YouTube Channel: <https://www.youtube.com/channel/UCtsK4QYe2tRdIxoZxwkX3Ww>

CoCo Show games playlists: <https://tinyurl.com/y9onm46x>

The CoCo Show YouTube playlist: <https://tinyurl.com/yddwv9l>

Twitch Channel: <https://www.twitch.tv/amigosretrogaming>

Podcast page: <https://anchor.fm/thecocoshow>

**CoCoTALK!** started in March of 2017 initially as a few weekends worth of talking about how excited we all were for the upcoming CoCoFEST! and what we were hoping to see and do. 3 years later, its evolved into an international “phenomenon” where the CoCo community come together each week in a global user group meeting and discuss all that’s going on in the thriving community every Saturday. The show can be watched live and interactive on YouTube, Facebook, and Twitch, and episodes can be replayed on YouTube. You can also catch the show as both audio and video podcasts. Check out everything you’ll never need to know about CoCoTALK! by visiting <http://cocotalk.live>



Entire playlist on YouTube: <https://www.youtube.com/playlist?list=PLDfh7JjQaSYC1p7sxFIm4i8HU7-Yj0ssB>  
“Essential Viewing” Playlist: <https://www.youtube.com/playlist?list=PLDfh7JjQaSYDZ1azQQskOjv8RiZsydDh->

- Episode 141 started 2020 off with a Community celebration highlighting many of 2019’s achievements
- Episode 144 featured an interview with Christopher Mayeux
- Episode 150 featured special guests, including Chris Hawks from HawkSoft
- Episode 151 featured an interview with Greg Zumwalt and the world premiere of Nick Marentes’ Gun Star
- Episode 152 was their 3-year anniversary special
- Episode 156 Virtual CoCoFEST!
- Episode 158 NitrOS9 Ease of Use Beta 5 release
- Episode 159 Bret Gordon’s YA-DOS and Ron Klein’s 3,000 disk image
- Episode 163 Latest update to the CoCo-Pi project
- Episode 164 Back to CoCo – info for anyone getting back into the CoCo hobby
- Episode 166 The premiere of Nick Marentes’ Rally-SG
- Episode 170 Special guest Glen Dahlgren
- Episode 171 Celebrating the CoCo’s 40<sup>th</sup> birthday
- Episode 173 Nick Marentes announced his newest CoCo game Pipes
- Episode 175 MIDITALK! A show dedicated to discussing and demonstrating MIDI on the CoCo
- Episode 178 The Glenside Color Computer Club virtual picnic
- Episode 187 Interview with Dave Shadoff
- Episode 188 MAME TALK! Tim Linder gives us updates on all the CoCo specific MAME work he’s done this year
- Episode 190 NitrOS9 Ease of use Beta 6 premier with live demos and Q&A section

Compiled by Steve Strowbridge

# CoCo Community Corner



## Source

Glenside Color Computer Club, host of CoCoFEST!

The TRS-80 Color Computer Facebook Group

The Color Computer Mailing List

The TRS-80 MC-10 Facebook Group

The Coco Crew Podcast

The Dragon 32/64 Communities

CoCoTALK! Weekly live Color Computer talk show

The Coco Community Discord server

The CoCo Show Podcast

Looking for more CoCo Links? Visit I'm a CoCo Nut!

## Link(s)

[Website](#) | [Classic splash page](#) | [Facebook](#)

[Facebook](#)

[Website](#)

[Facebook](#)

[Website](#) | [Facebook](#)

[Website](#) | [Facebook](#)

[Website](#) | [Facebook](#)

[Get Discord](#) | [Server Link](#)

[Website](#) | [YouTube](#)

[Website](#)

## (Closed Parentheses)

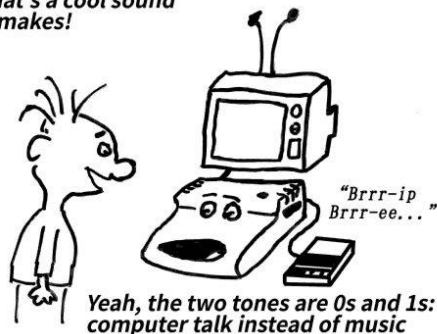
Thanks to D. Bruce Moore for Joey & CoCo strip #6 "You Didn't" and Salvador Garcia's first entry of CoCo Chronicles

# JOEY & COCO

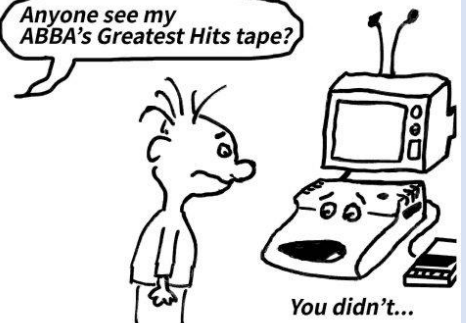
So I put in the tape,  
press Play & Record?



That's a cool sound  
it makes!



Anyone see my  
ABBA's Greatest Hits tape?



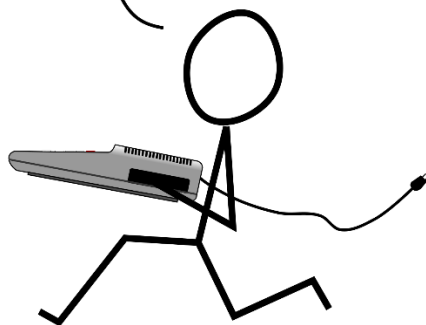
© 2019 D. Bruce Moore

## CoCo Chronicles

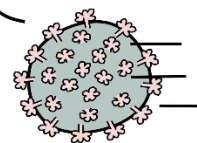
Salvador Garcia

PERSEVERE TO VICTORY

Never!



Surrender your  
CoCo!



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