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VCF University

	Friday April 14	Saturday April 15	Sunday April 16
7:30 am	DOORS OPEN		
8:00 am		EXHIBITS OPEN	
8:00 am - 9:00 am	Modern Tools for Commodore 64 Sprite Animation – *Byron Stout*	Quantel's Paintbox: The Computer that changed what we see – *Adrian Wilson*	An Introduction to Teletext – *Christian Berger (virtual)*
9:00 am			EXHIBITS OPEN
9:10 am - 10:10 am	Verifiable Credentials: Intro and discussion – *Maki Kato*	#FujiNet - Latest Editions – *Thomas Cherryhomes*	What can vintage computing tell us about the next generation of engineers? – *Byron Stout*
10:20 am - 11:20 am	The Ghost of NABU Past – *Leo Binkowski (virtual)*	I Was There for the Revolution: Lessons and Reflections from 35 years in EdTech – *Jerry Crisci*	40 Years of Apple Lisa - Now with Source Code! – *Jason Perkins*
11:30 am - 12:30 pm	Novasaur TTL Retrocomputer – *Alastair Hewitt*	Computer Literacy in the 70's and 80's – *Liza Loop*	20 things to do with a computer thanks to Seymour Papert & Marvin Minsky – *Cynthia Solomon, Brian Silverman (virtual)*
12:40 pm - 1:40 pm	Toy CPU – *Jim Hall (virtual)*	The Early Years of Online Education – *Margaret Morabito (virtual)*	Flying to the Moon: A view from the Apollo Guidance Computer – *Frank O'Brien*
1:00 - 2:00:		Univac 1219 Demo at VCF Museum	
1:50 pm - 2:50 pm	Emulating the NABU PC – *Brian Johnson*	From C64 DTV to Tilt Five: A lifelong passion for gaming inventions – *Jeri Ellsworth*	The Unseen World of PowerPC – *Michael Casedevall*
3:00 pm - 4:00 pm	Streamer Roundtable Bil Herd (Hackaday) Adrian Black (Adrian's Digital Basement) David Lovett (Usagi Electric) Fran Blanche (Fran's Lab) Jeri Ellsworth (C64 DTV)	Streamer Roundtable Bil Herd (Hackaday/Coriolis Effect) Dave Murray (The 8-Bit Guy) Michael Stanhope (Mike's Mac Shack) Steve Matarazzo (Mac84) Sean Malseed (Action Retro)	Computer Literacy 2023: What you need to know about computers today – *Liza Loop*
4:00 pm - 5:00 pm			EXHIBITS CLOSE - DOORS CLOSE
5:00 pm	EXHIBITS CLOSE - DOORS CLOSE		

Modern Tools for Commodore 64 Sprite Animation

Byron Stout

byron.stout@gmail.com

I used to use graph paper to design Sprites in the 1980's but now you don't have to. There are so many wonderful modern tools that can help you build amazing Sprites for your programs.

We'll talk about some of the free and paid tools that are available and then use the newest version of CBM PRG Studio to build a simple game with an animated character.

About Byron…

Healdton Oklahoma

(population 2,861)

Halfway between everything

That's not me in this picture,

But it happened just like this…

https://external-preview.redd.it/RhfX_IN3oP7orhnRfmOp5XIggMxKjhLGkjnnxhEFMCw.jpg?auto=webp&s=0a86b190e649b0cd2ab130b1c3d36f3b916f0ab6

GREEN TREE

EDGEWATER TECHNOLOGY

Manhattan Toy

USAble Life

Empire BlueCross

WINSTON BENEFITS

MERCK

icms®

MARTEN

usbank

STRATOSPHERE

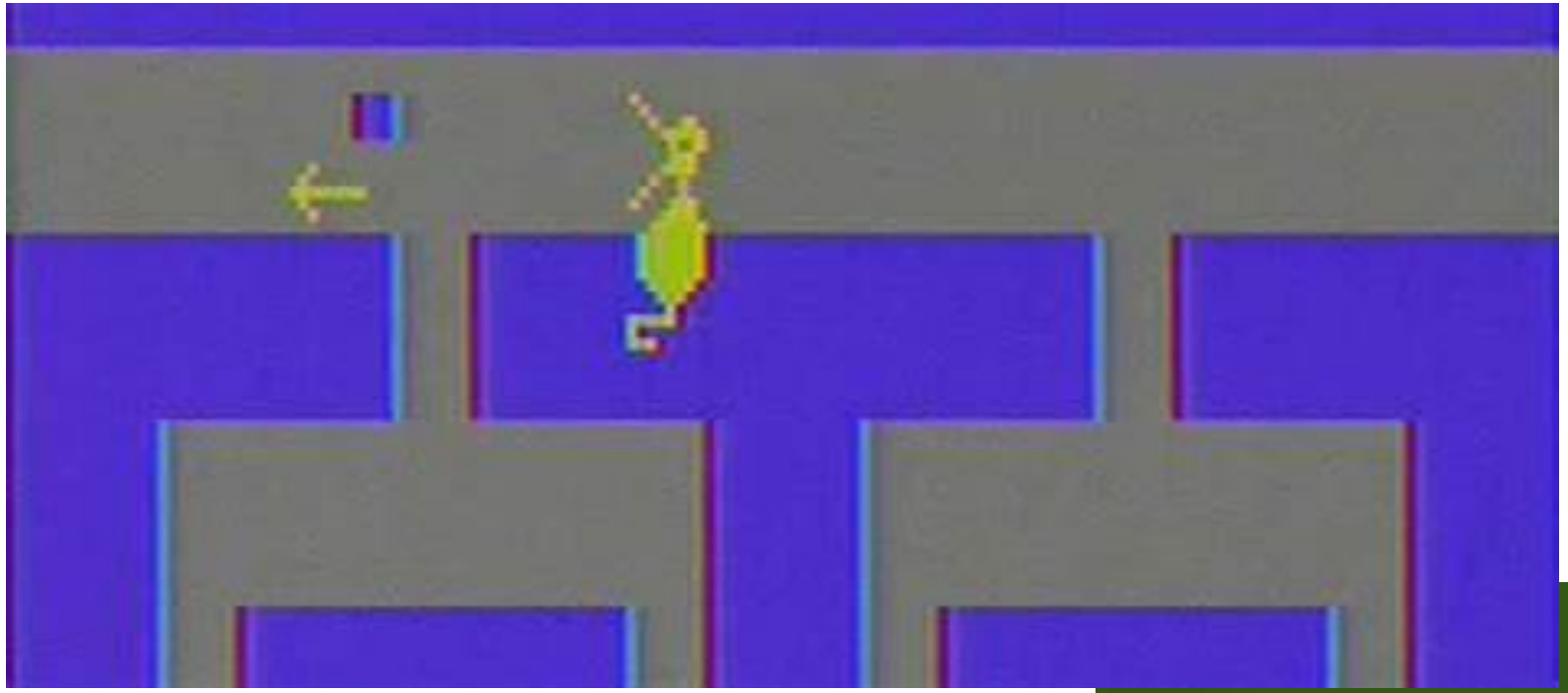
GRAND CASINO

I was PAID to USE

- DBase IV
- C++
- Borland Pascal
- Borland Delphi
- Visual Basic
- Microsoft Access VBA
- RPG
- COBOL
- Java
- Microsoft ASP
- JavaScript
- VB.NET / ASP.NET
- TSQL
- Microsoft C#
- Allaire ColdFusion
- PHP on LAMP

I learned for FREE

- BASIC
- HyperTalk
- Pilot
- Turbo Pascal
- 8086 Assembly
- 6502 Assembly
- Fortran
- LISP
- Ada
- Clarion
- Perl
- Python
- Ruby

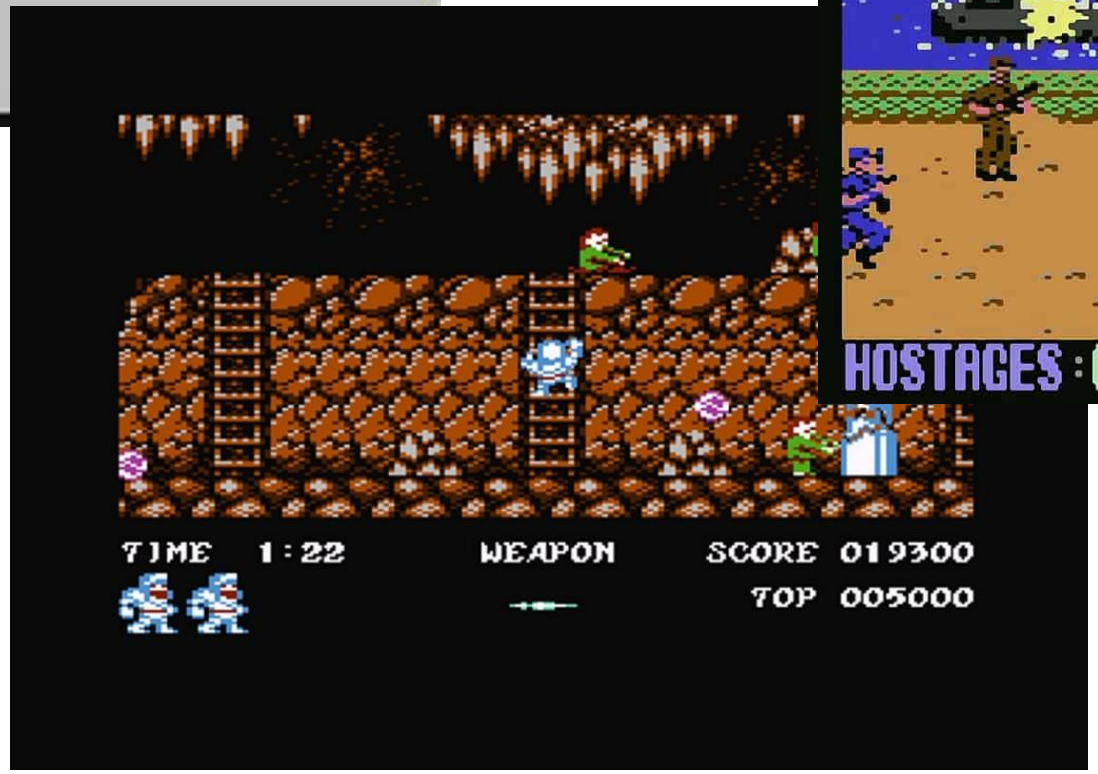


Player/Missile Graphics

My Computer Has Sprites!

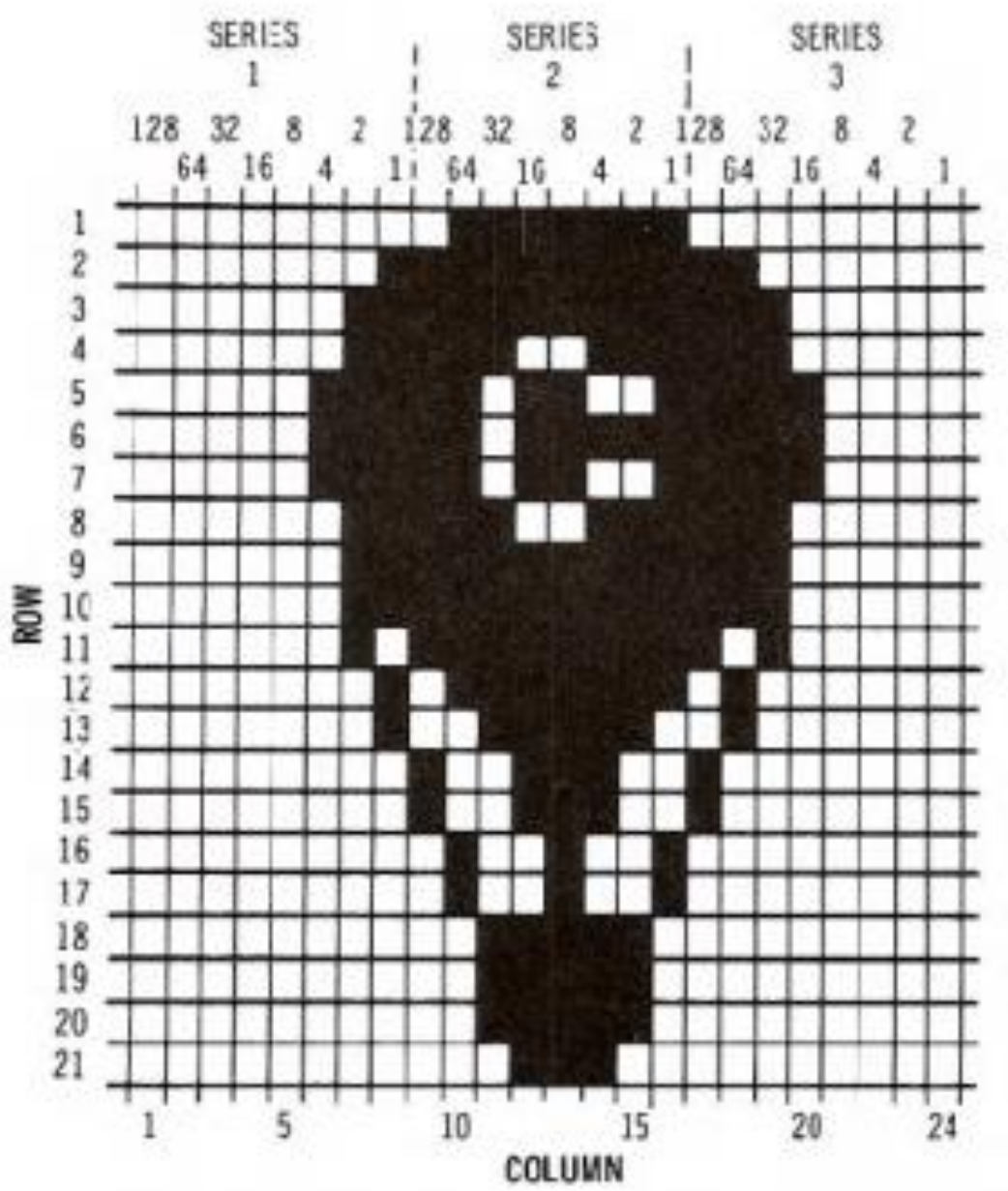
- Hardware based (VIC-II chip)
- Managed Object Blocks
- Support for 8 visible sprites
  (or more if you're clever…)
- Layering
- Transparency
- High Res Mode (24 x 21)
- Multi-Color Mode (12 x 21)
- X and Y axis expansion
- Sprite to Sprite Collision detection
- Sprite to Background Collision detection

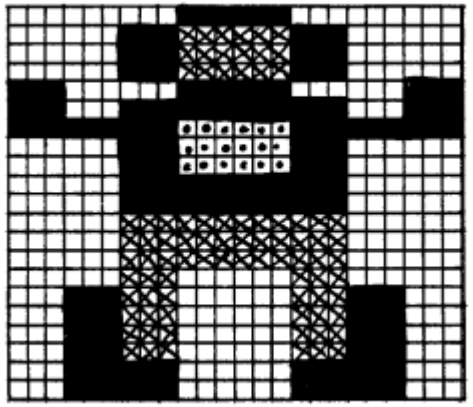
The Commodore 64 is a Kick Ass Game Machine!



Commodore

Sprites are Full of Numbers...





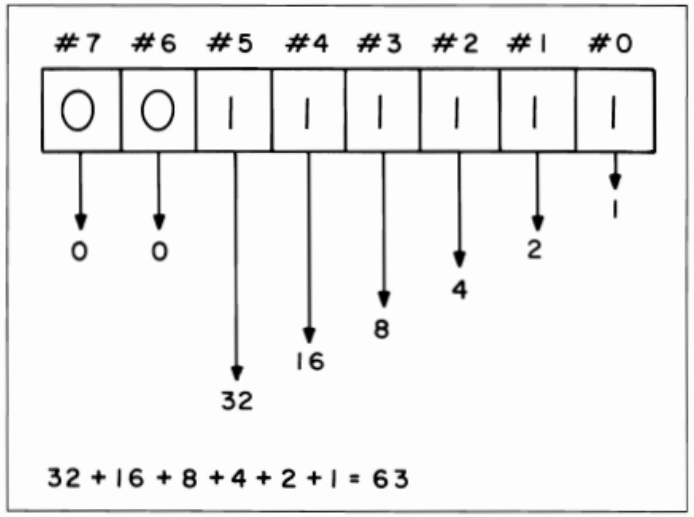


Figure 13-11

```
1001 data 3,255,0,15,255,240,10
1002 data 166,64,10,86,80,10,85
1003 data 160,1,85,80,2,234,128
1004 data 10,234,160,42,235,168,170
1005 data 235,170,171,255,234,91,125
1006 data 229,87,255,213,87,255,213
1007 data 95,255,245,15,255,240,15
1008 data 195,240,15,195,240,42,0
1009 data 168,42,0,168,170,0,170
```

VIC CHIP REGISTER MAP

53248 ($D000) Starting (Base) Address

Register # Dec	Hex	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0	
0	0	S0X7							S0X0	SPRITE 0 X Component
1	1	S0Y7							S0Y0	SPRITE 0 Y Component
2	2	S1X7							S1X0	SPRITE 1 X
3	3	S1Y7							S1Y0	SPRITE 1 Y
4	4	S2X7							S2X0	SPRITE 2 X
5	5	S2Y7							S2Y0	SPRITE 2 Y
6	6	S3X7							S3X0	SPRITE 3 X
7	7	S3Y7							S3Y0	SPRITE 3 Y
8	8	S4X7							S4X0	SPRITE 4 X
9	9	S4Y7							S4Y0	SPRITE 4 Y
10	A	S5X7							S5X0	SPRITE 5 X
11	B	S5Y7							S5Y0	SPRITE 5 Y
12	C	S6X7							S6X0	SPRITE 6 X
13	D	S6Y7							S6Y0	SPRITE 6 Y
14	E	S7X7							S7X0	SPRITE 7 X Component
15	F	S7Y7							S7Y0	SPRITE 7 Y Component
16	10	S7X8	S6X8	S5X8	S4X8	S3X8	S2X8	S1X8	S0X8	MSB of X COORD.
17	11	RC8	ECM	BMM	BLNK	RSEL	YSCL2	YSCL1	YSCL0	Y SCROLL MODE
18	12	RC7	RC6	RC5	RC4	RC3	RC2	RC1	RC0	RASTER
19	13	LPX7							LPX0	LIGHT PEN X
20	14	LPY7							LPY0	LIGHT PEN Y

And Magic VIC Register Values...

SPRITE REGISTERS

V = 53248	SPRITE #7	SPRITE #6	SPRITE #5	SPRITE #4	SPRITE #3	SPRITE #2	SPRITE #1	SPRITE #0
DECIMAL PLACE VALUE EQUIVALENTS	128	64	32	16	8	4	2	1
SPRITE ENABLE REGISTER	V+21,128	V+21,64	V+21,32	V+21,16	V+21,8	V+21,4	V+21,2	V+21,1
SPRITE POINTER	2047	2046	2045	2044	2043	2042	2041	2040
SUGGESTED MEMORY AREA*	199	198	197	196	195	194	193	192
SPRITE COLOR	V+46,C	V+45,C	V+44,C	V+43,C	V+42,C	V+41,C	V+40,C	V+39,C
X-POSITION	V+14,X	V+12,X	V+10,X	V+8,X	V+6,X	V+4,X	V+2,X	V+0,X
Y-POSITION	V+15,Y	V+13,Y	V+11,Y	V+9,Y	V+7,Y	V+5,Y	V+3,Y	V+1,Y
MOST SIGNIFICANT BIT (FOR RIGHT X)	V+16,128	V+16,64	V+16,32	V+16,16	V+16,8	V+16,4	V+16,2	V+16,1
HORIZONTAL EXPANSION	V+29,128	V+29,64	V+29,32	V+29,16	V+29,8	V+29,4	V+29,2	V+29,1
VERTICAL EXPANSION	V+23,128	V+23,64	V+23,32	V+23,16	V+23,8	V+23,4	V+23,2	V+23,1
MULTI-COLOR MODE	V+28,128	V+28,64	V+28,32	V+28,16	V+28,8	V+28,4	V+28,2	V+28,1
SPRITE/BACKGROUND PRIORITY (SPRITE PASS BEHIND)	V+27,128	V+27,64	V+27,32	V+27,16	V+27,8	V+27,4	V+27,2	V+27,1

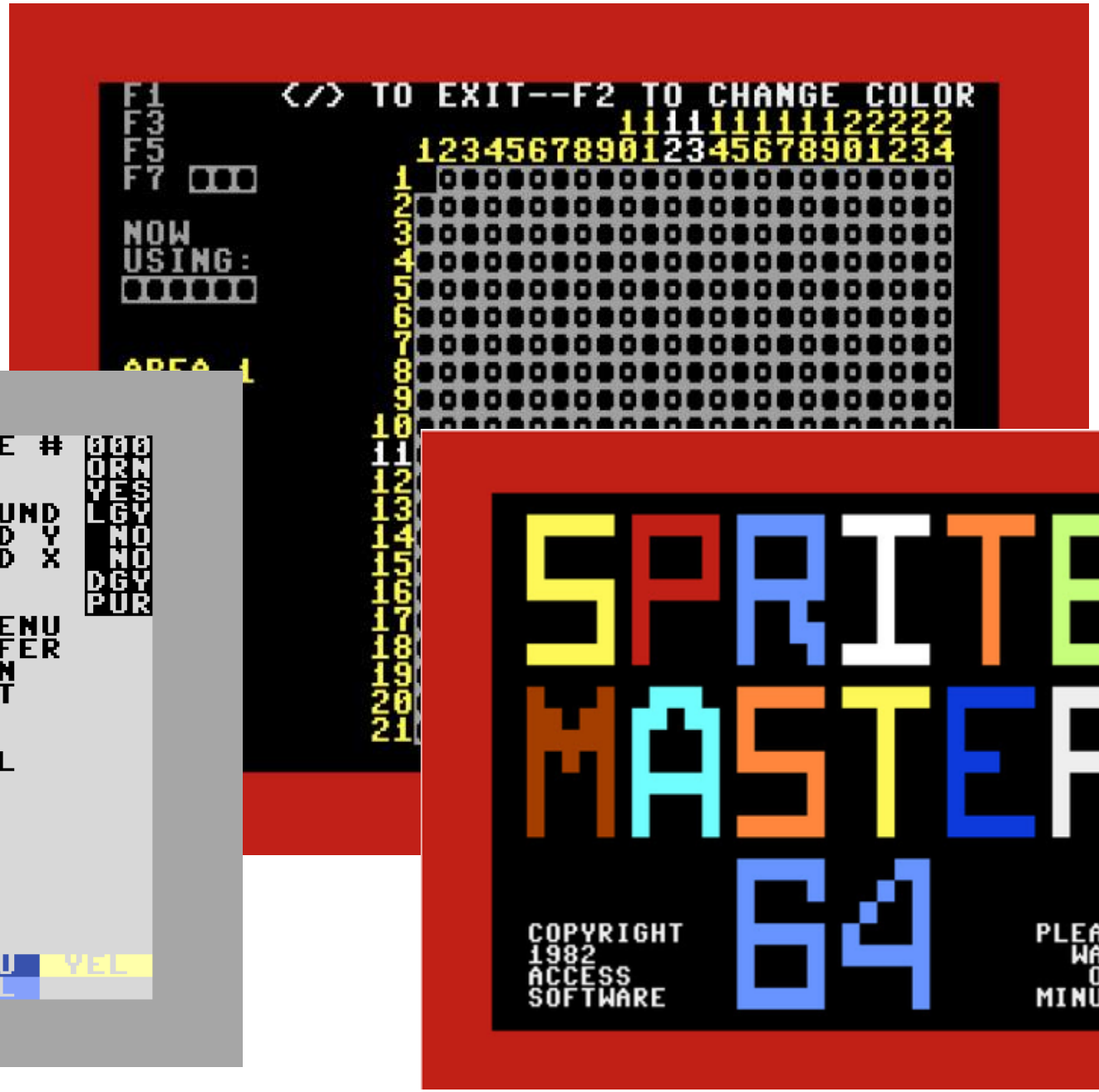
* MEMORY AREA 192 means (192*64)+0 through (192*64)+62

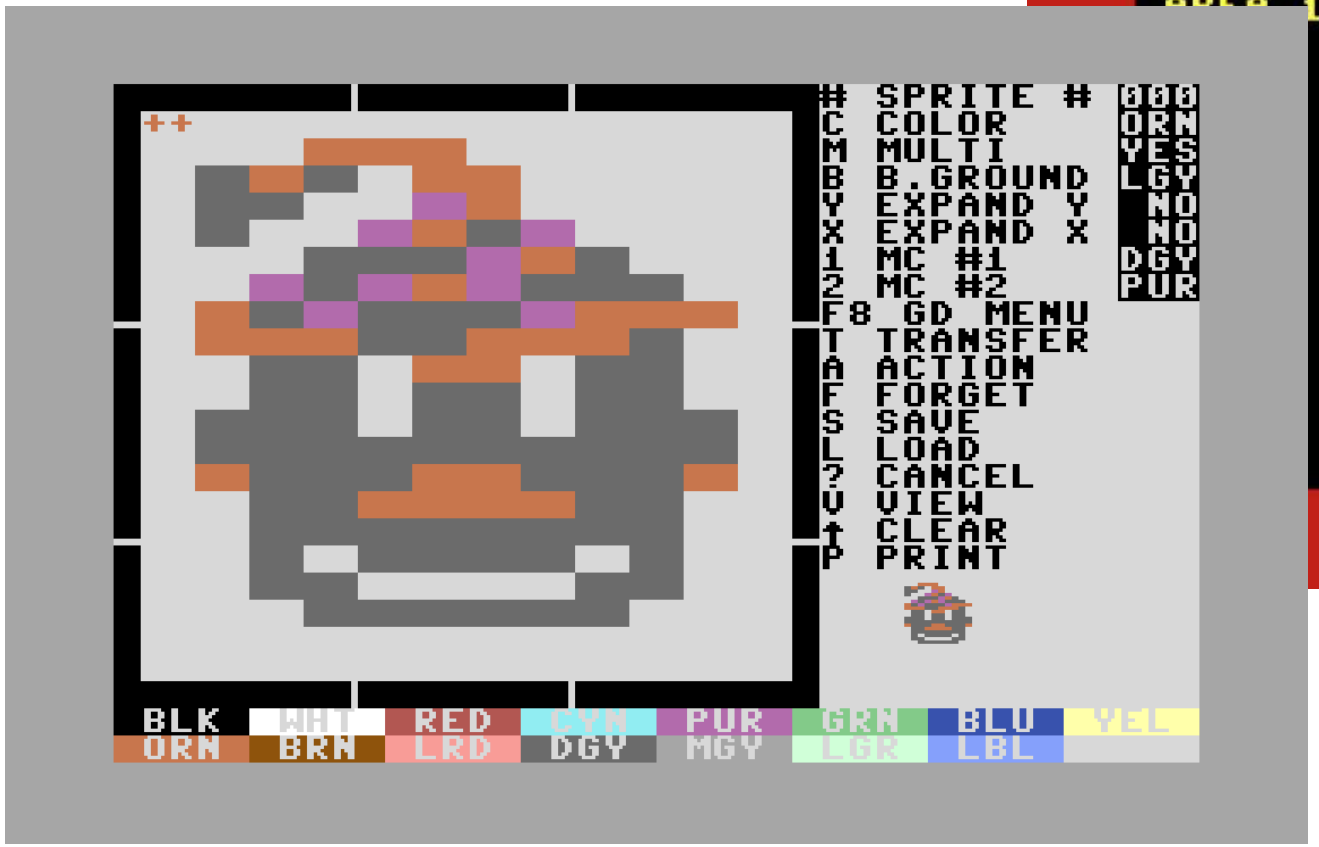
MULTI-COLOR 1	POKE V+37,C
MULTI-COLOR 2	POKE V+38,C

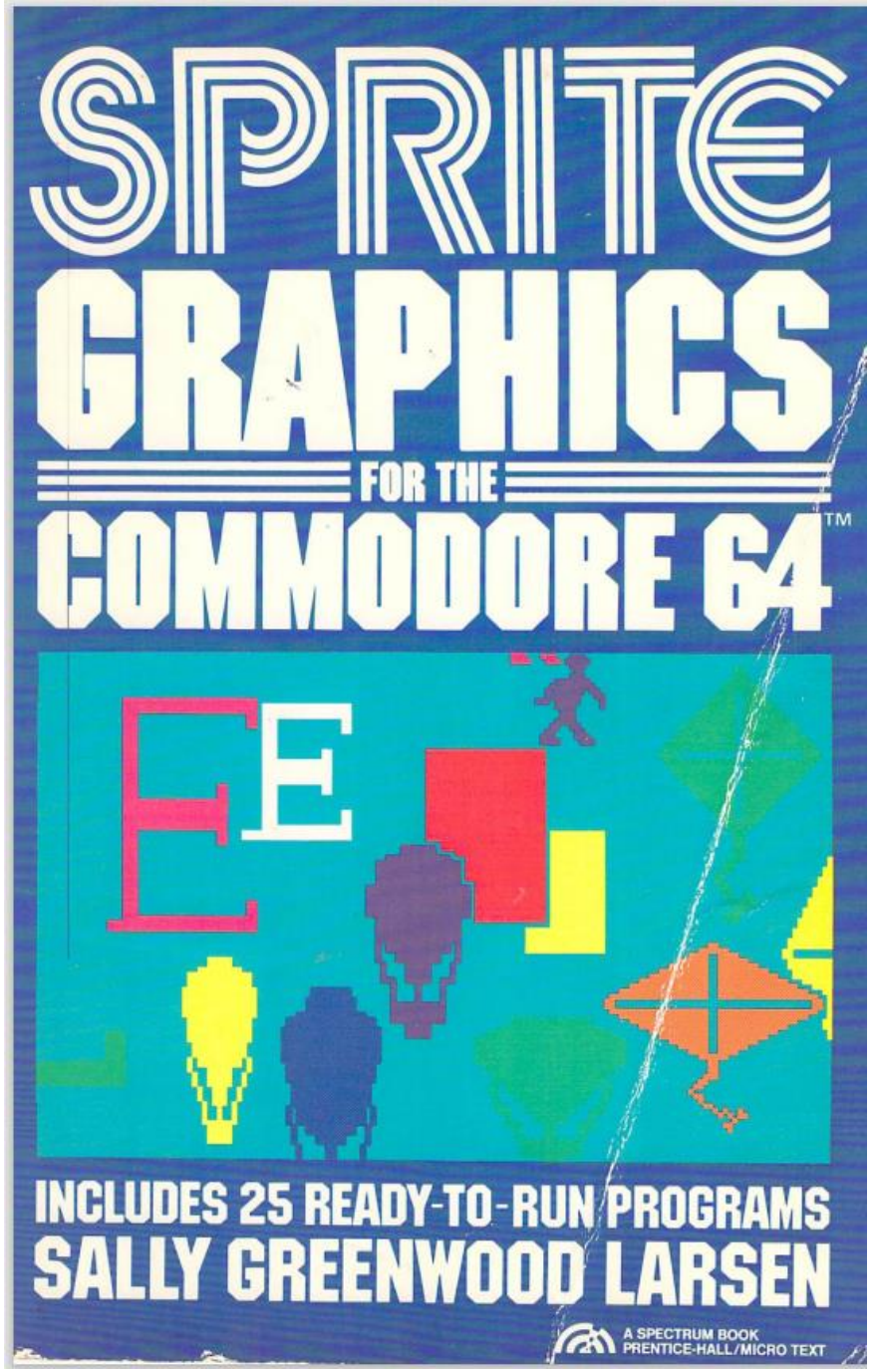
These two colors will apply to all Sprites designated as multi-colored.

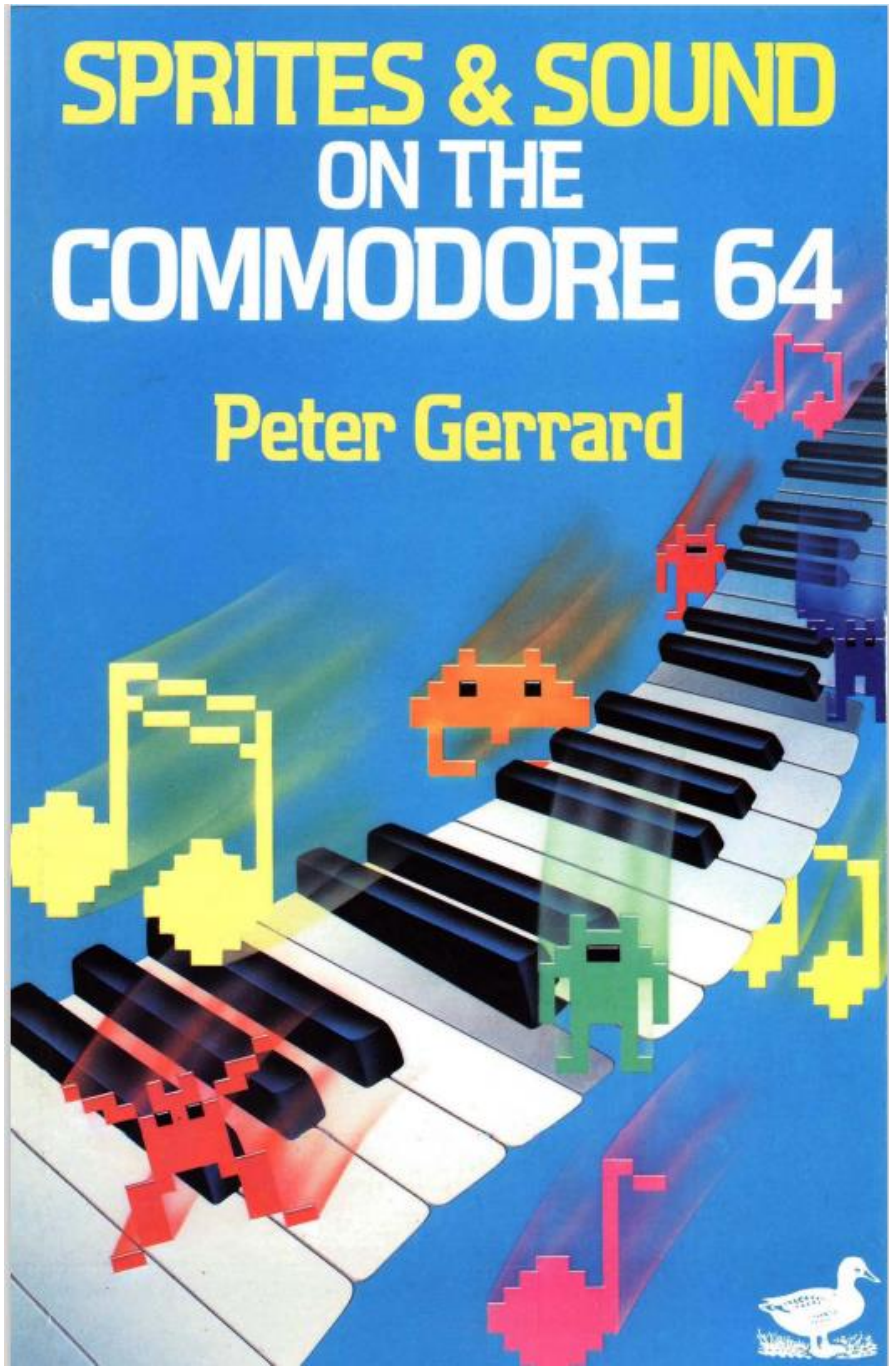
SCREEN BACKGROUND	POKE 53281,C
SCREEN BORDER	POKE 53280,C

On Machine Sprite Editors





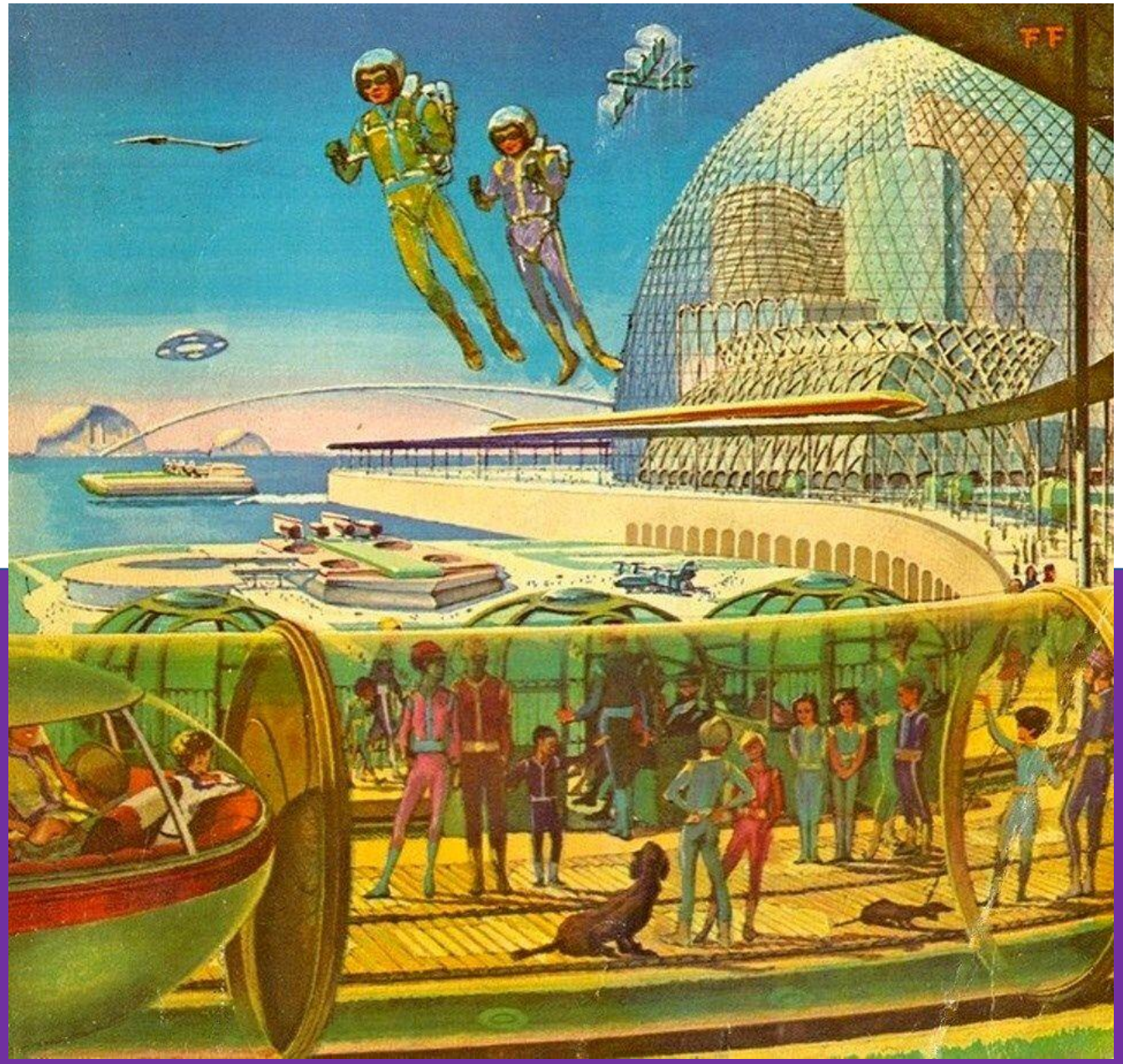

SPRITE
GRAPHICS
FOR THE
COMMODORE 64™
INCLUDES 25 READY-TO-RUN PROGRAMS
SALLY GREENWOOD LARSEN
A SPECTRUM BOOK
PRENTICE-HALL/MICRO TEXT


SPRITES & SOUND
ON THE
COMMODORE 64
Peter Gerrard

Since we Live in the Future

What you can use Today

- Paper
- Excel
- SpriteMate
  (and other browser tools)
- SpritePad Pro
  (and stand-alone tools)
- CBM PRG Studio
  (and other IDE's)



Vintage Future – Fred Freeman

Look inside

Commodore 64 Sketch and Design: A workbook for designing sprites, custom characters, and screens on the C64 Paperback – May 15, 2020

by Tony Lavoie (Author)

4.5 out of 5 stars 54 ratings

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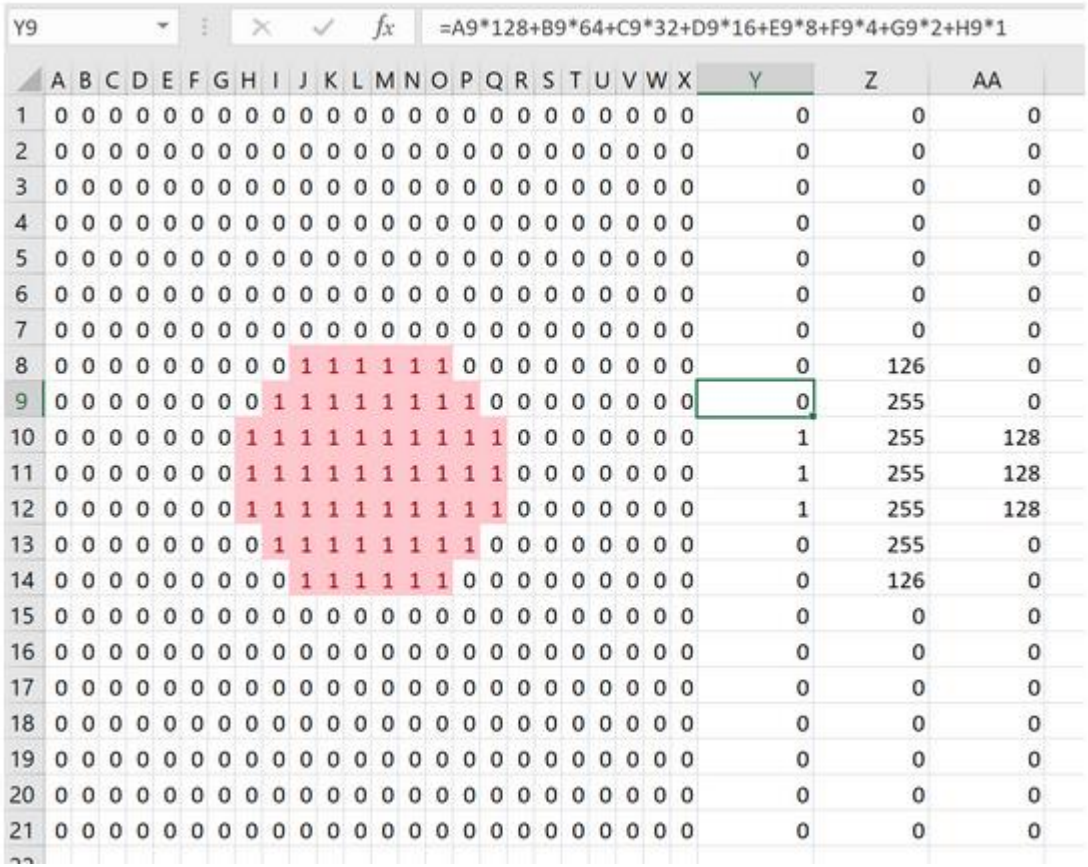
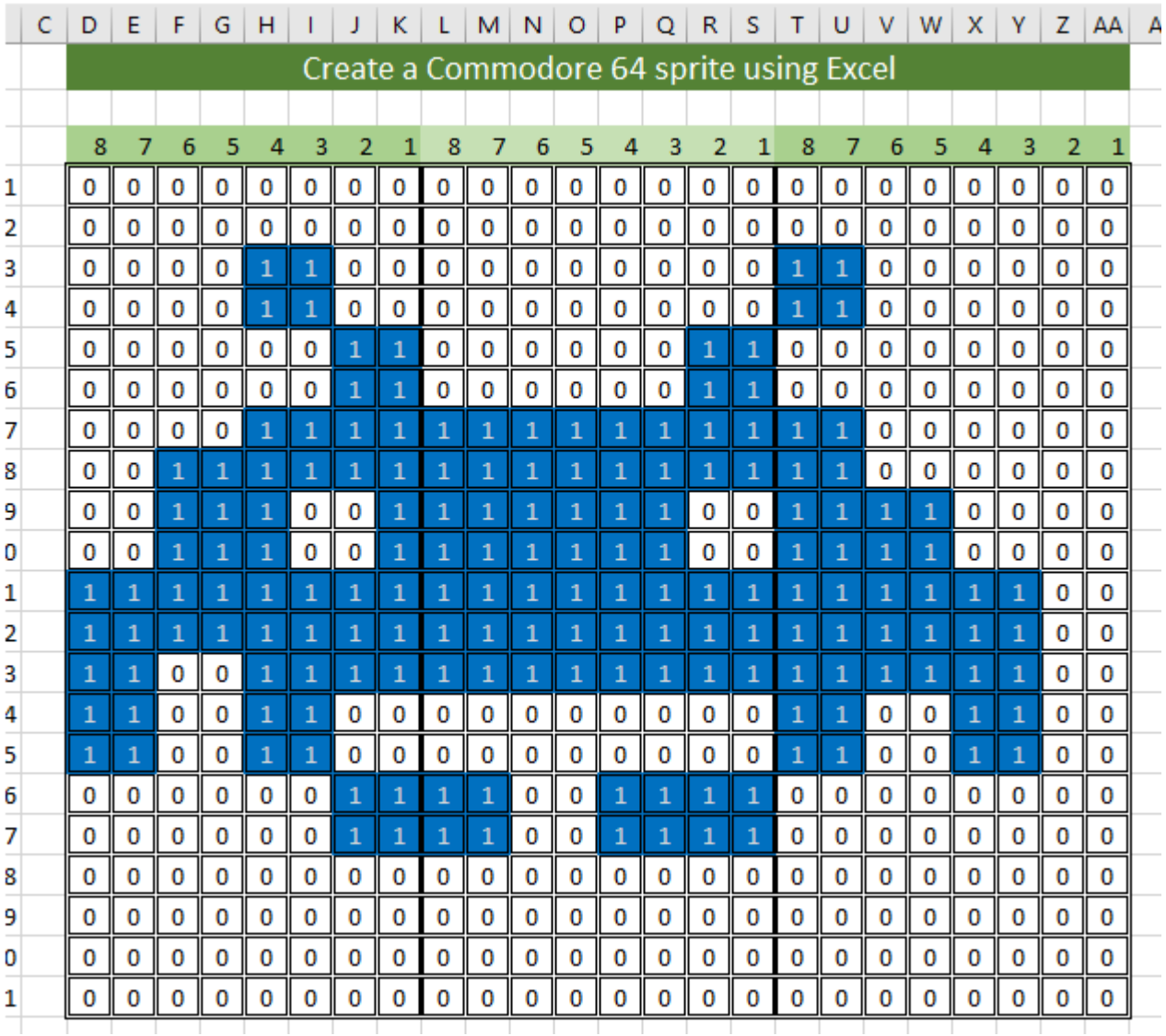
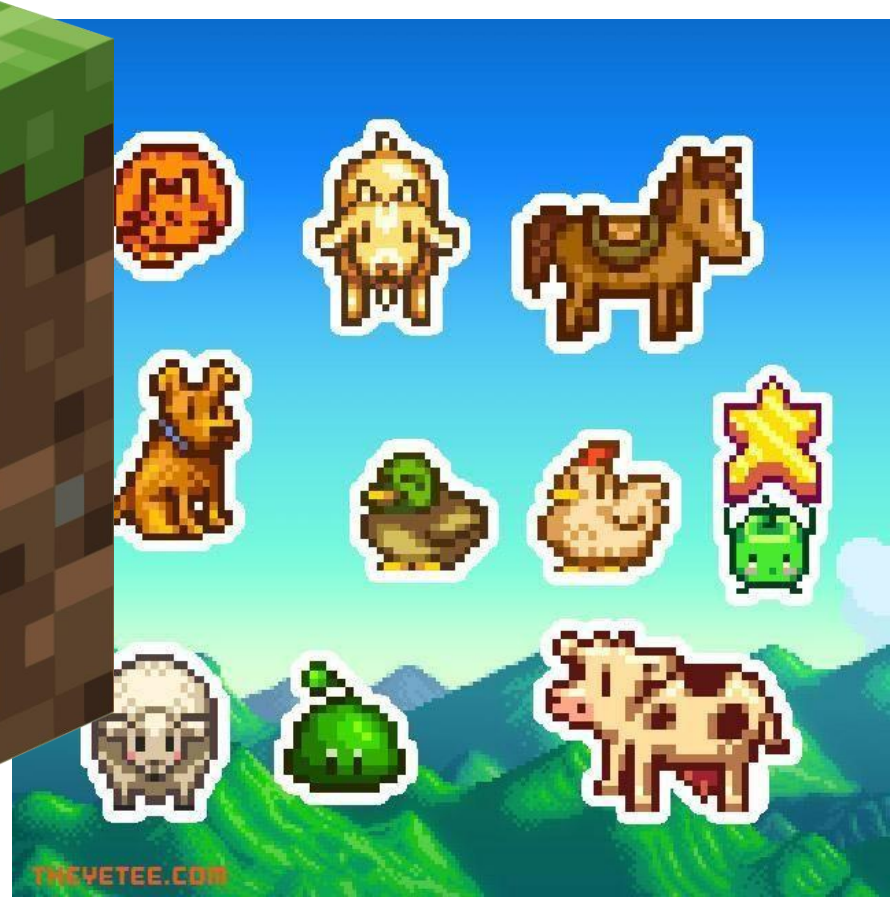


https://paulnotebook.net/2019/06/10/an-excel-sheet-to-generate-hi-res-sprite-data-for-the-commodore-64/



https://github.com/justforthefunofit/create-sprites-using-excel

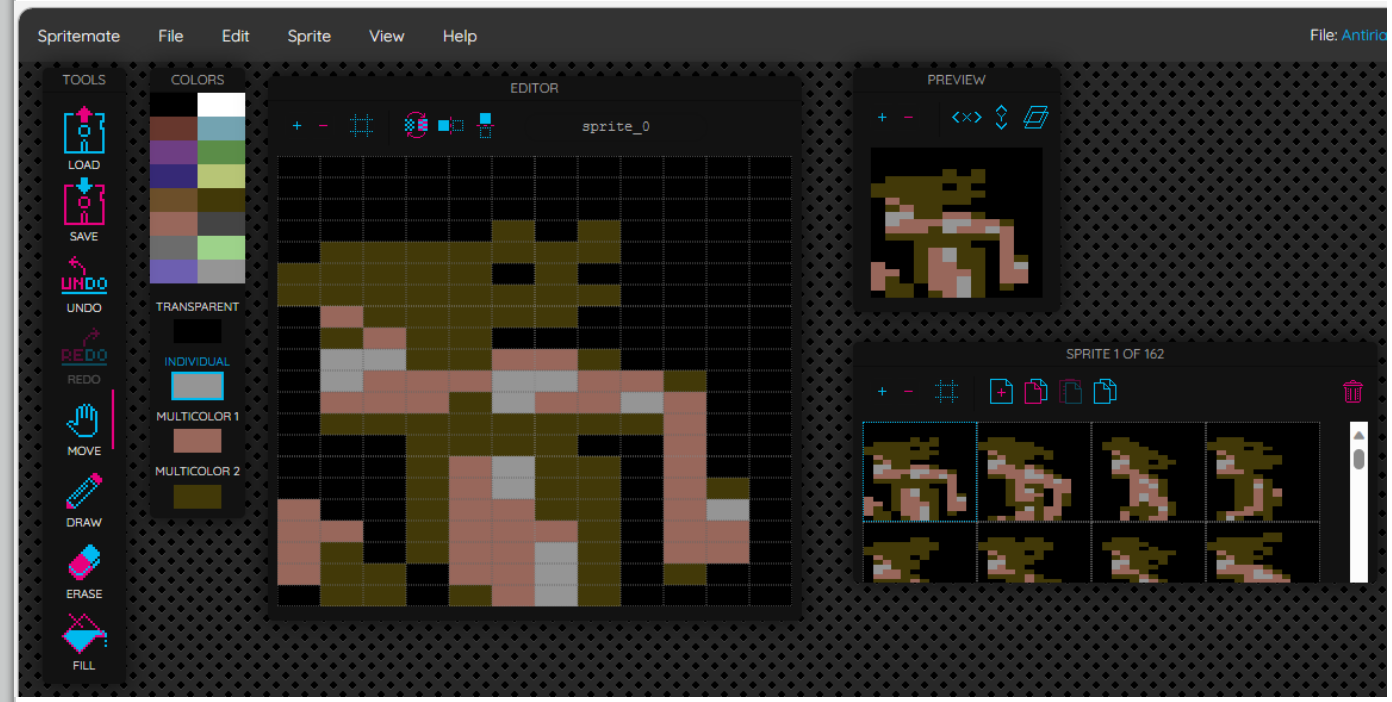
New Pixel Art games are Popular!



SpriteMate

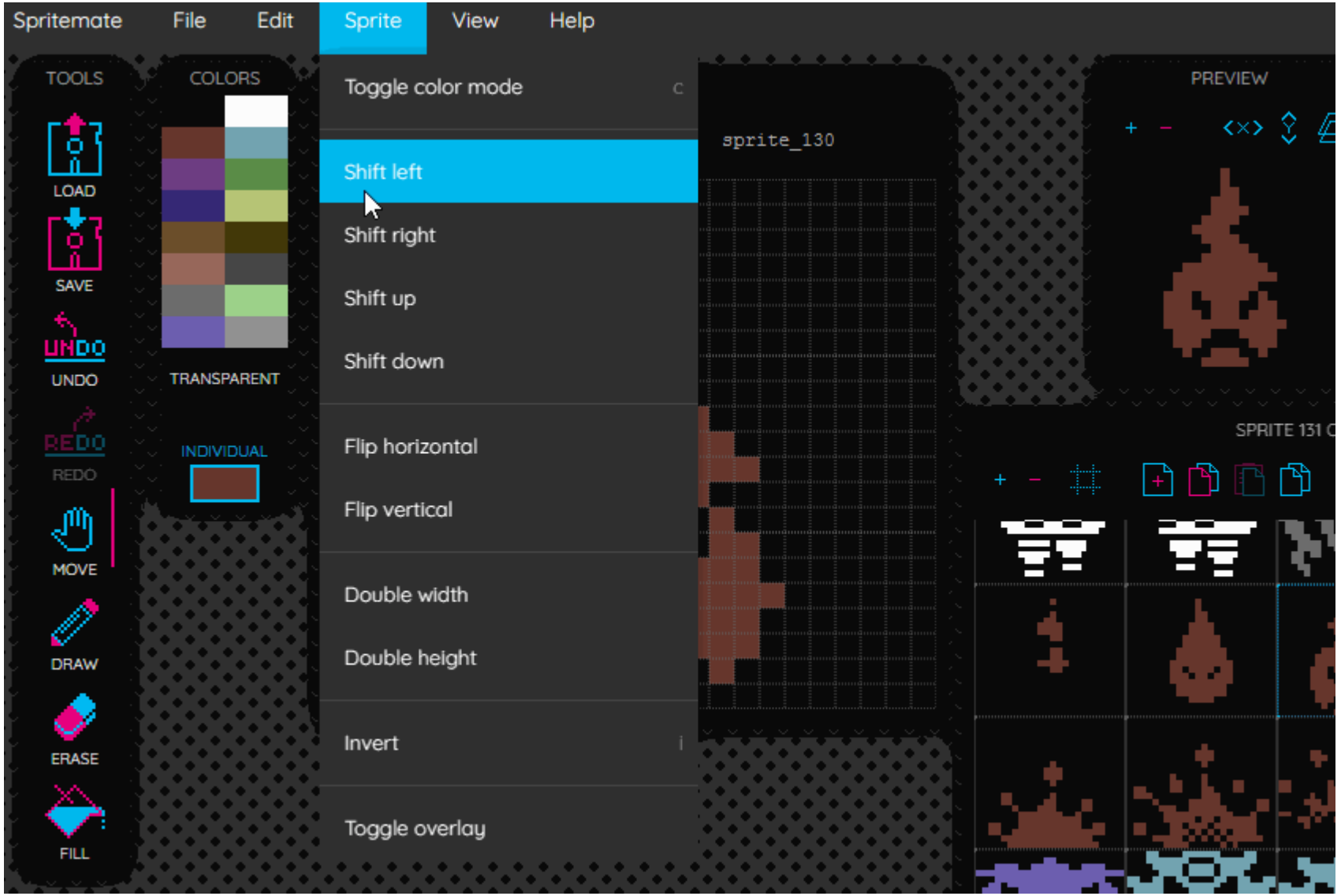
- Browser based
- C64 specific restrictions
  (unlike other PixelArt tools)
- Delete, fill, shift, and flip
- Stack layers and overlays
- Undo & redo
- Zoom In / Zoom Out

- Import SpriteMate file formats
  (or grandaddy SpritePad)
- Export to a variety of binary and code generation formats

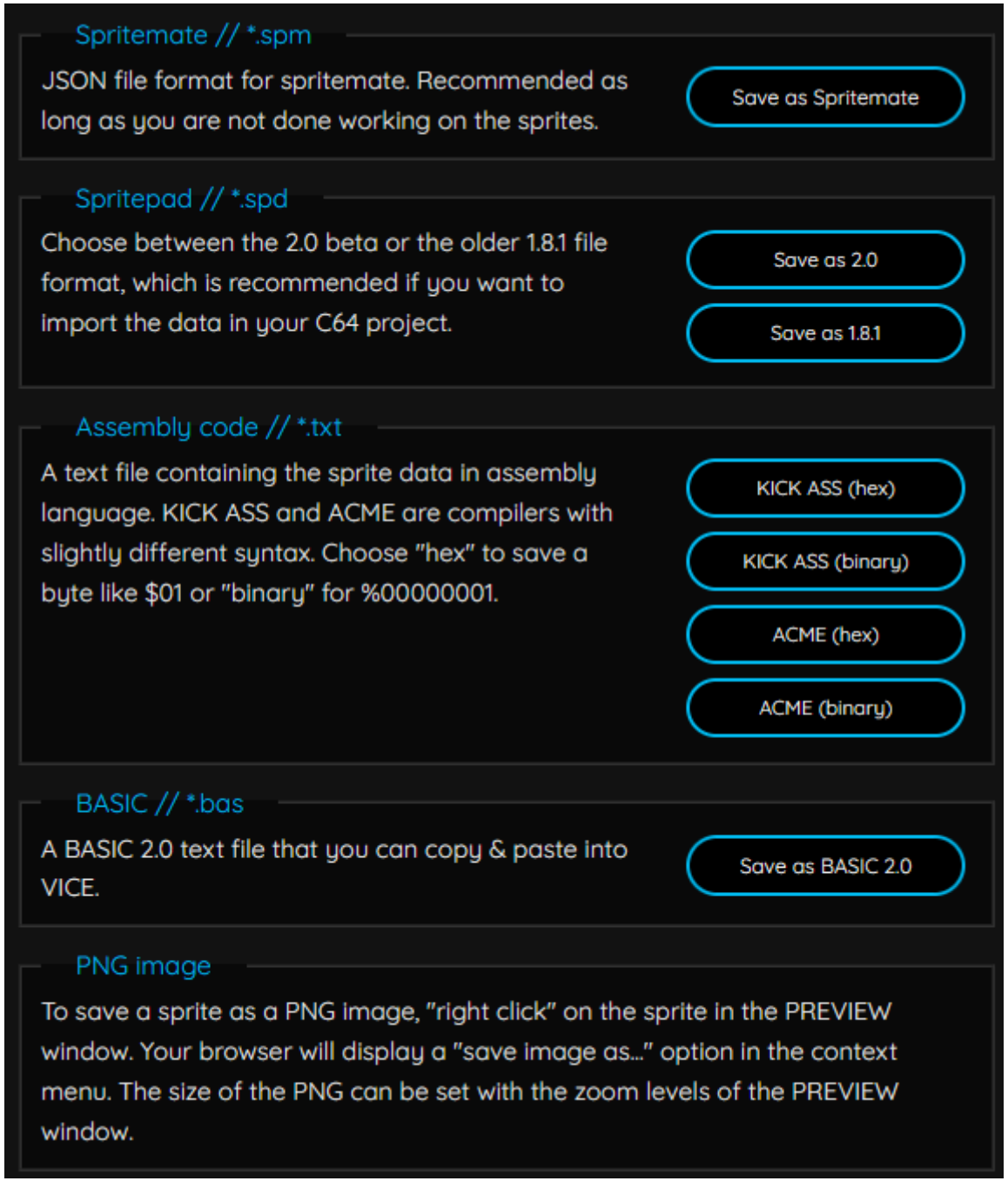


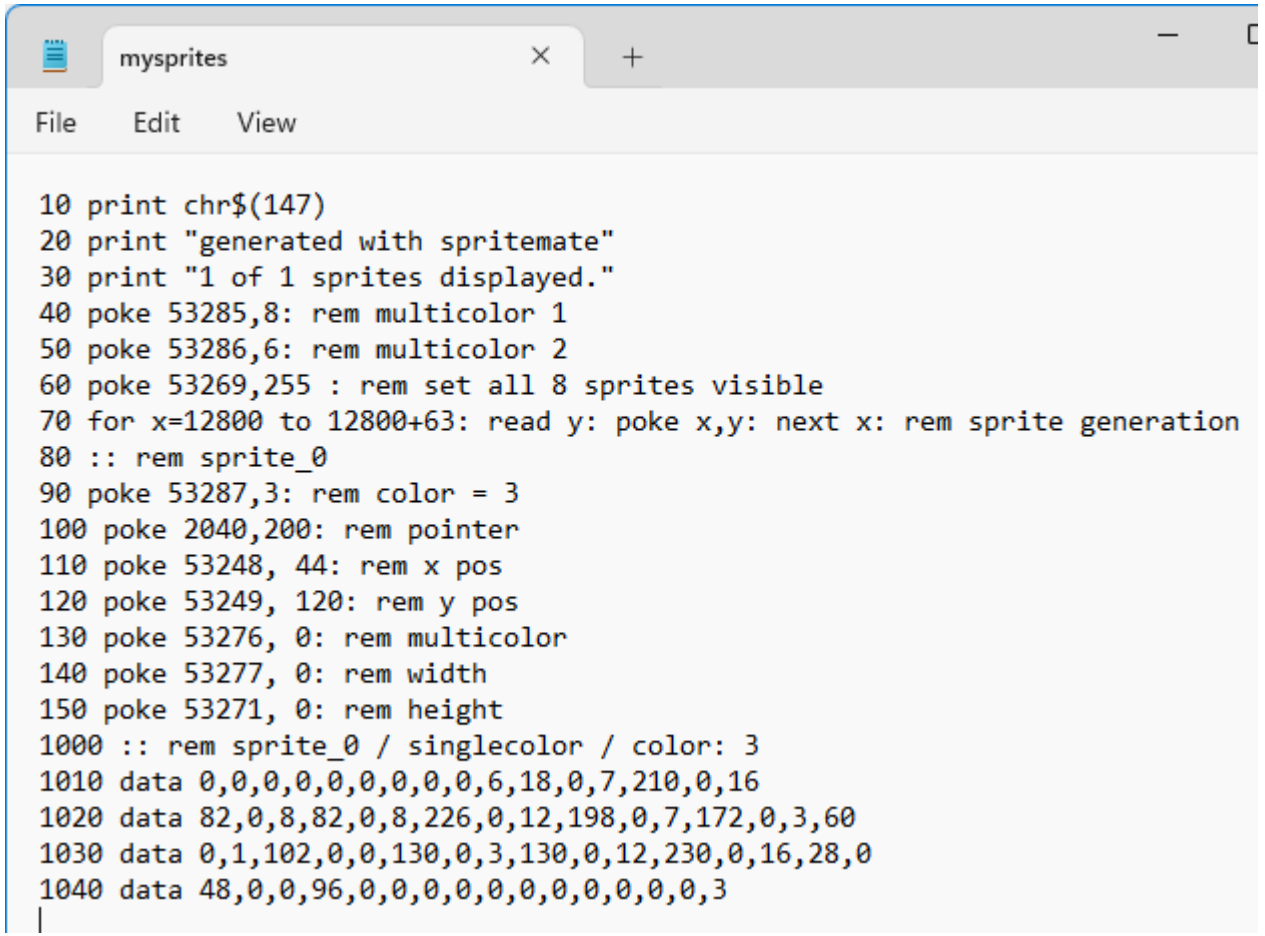
https://www.spritemate.com/

SpriteMate Manipulations



SpriteMate Export Options



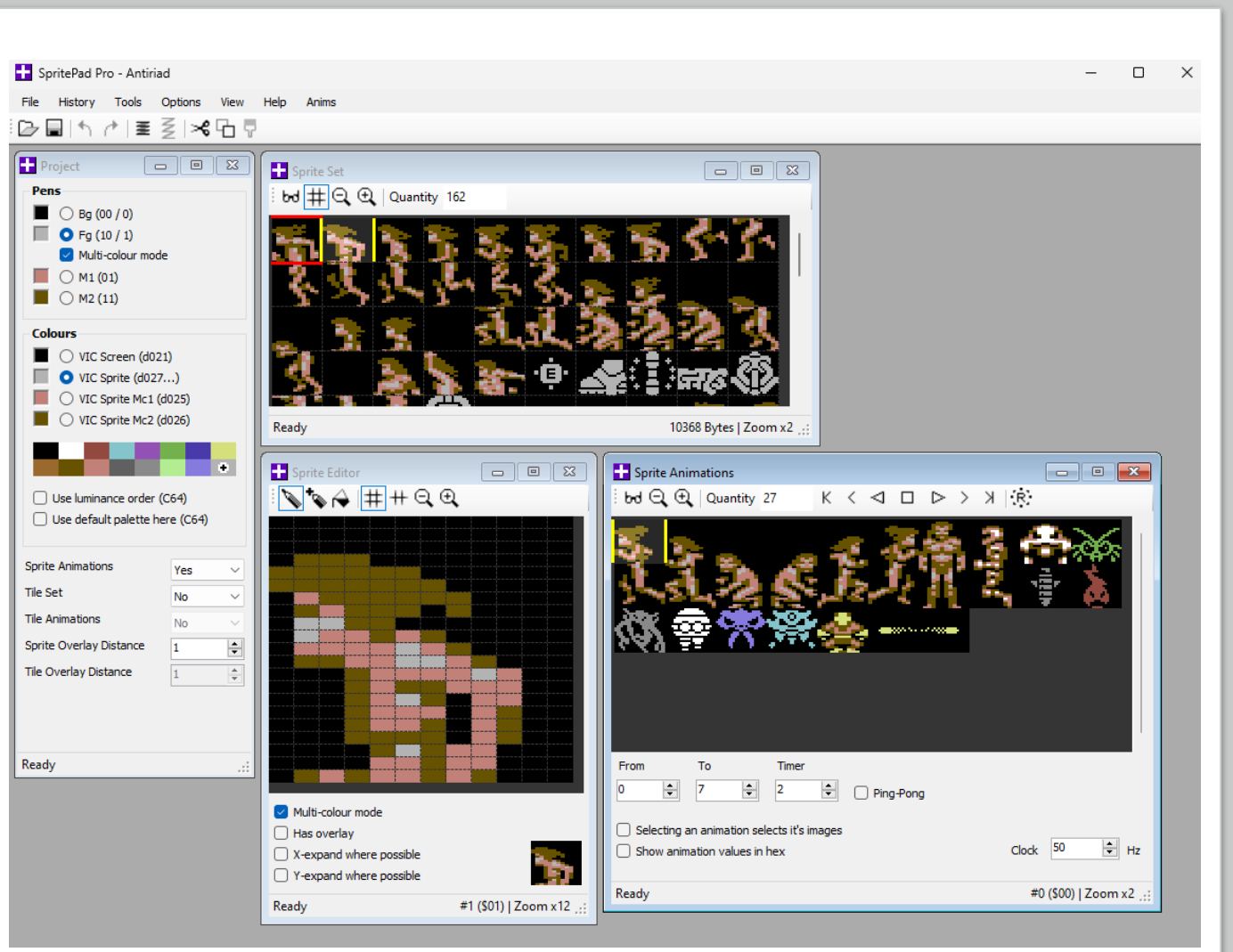


SpritePad PRO v3.20

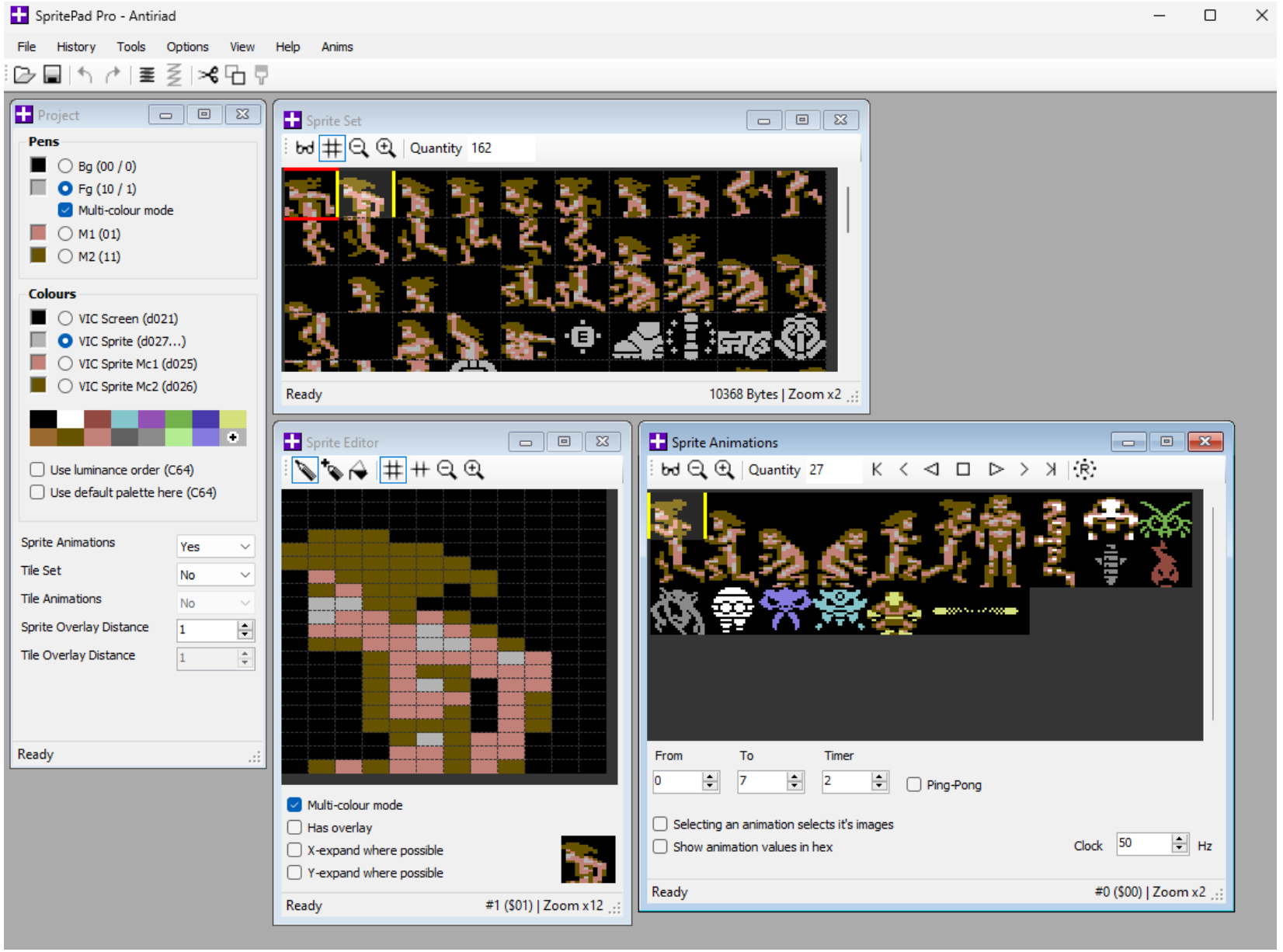
- Works on Windows
- First released in 2003
- Not Free - $7.99 US

- Full featured Image editing
- Animation editing
- Overlays
- Tile editing
- Tile animation
- Bitmap import/analysis

- Emulator Snapshot Ripper



https://subchristsoftware.itch.io/spritepad-c64-pro



SpritePad Pro v3.2 Demonstration

https://www.ajordison.co.uk
Arthur Jordison

- First Released 2011

  (last updated December 2022)
- Freeware
- Not Open Source
- Built on Microsoft.NET Framework
- Support for all Commodore 8-bit Machines

Why Use CBM PRG Studio?

- Git integration
- Sprite Editor
- Character Editor
- Screen Designer
- SID tool
- Screen Code Builder
- Memory Viewer
- Assembler/Disassembler

- Program Import/Export
- Code Formatting
- Renumbering Tool
- Auto Code Formatting
- BASIC Constants
- Renumbering
- Multiple Source Files
- MDI Interface

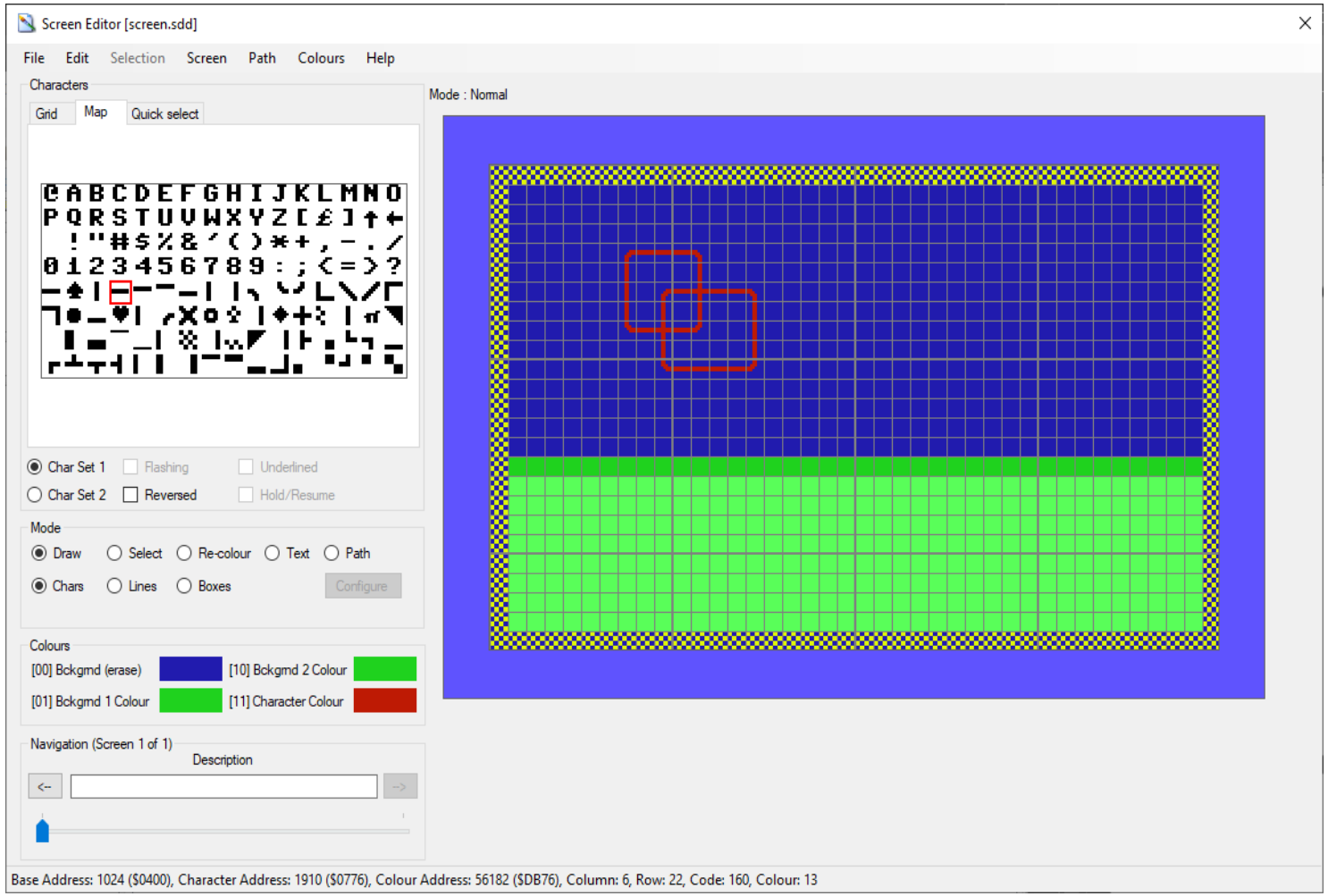
Code Editor Features

- Auto Numbering
- Auto Complete
- Closing Quotes and Parenthesis
- White space
- Block Comment / Indent
- Listing Comments / Comment Blocks
- Regions
- Screen Code Builder
- Renumbering tool
- Multiple Files

```
5 rem BASIC test program
10 print chr$(147)
15 print "{white}"
20 print "hello vcf west"
30 print

#region !- waiting to press a key
50    print "press <any key> to continue"
60    get a$: if a$ = "" then 60
70    print "{clear}"
#endregion#endregion

!-======================
!-Print some characters
!-======================
100 for i = 65 to 80
105       print tab(-64+i);
110       print chr$(i)
120 next i

130 end
```

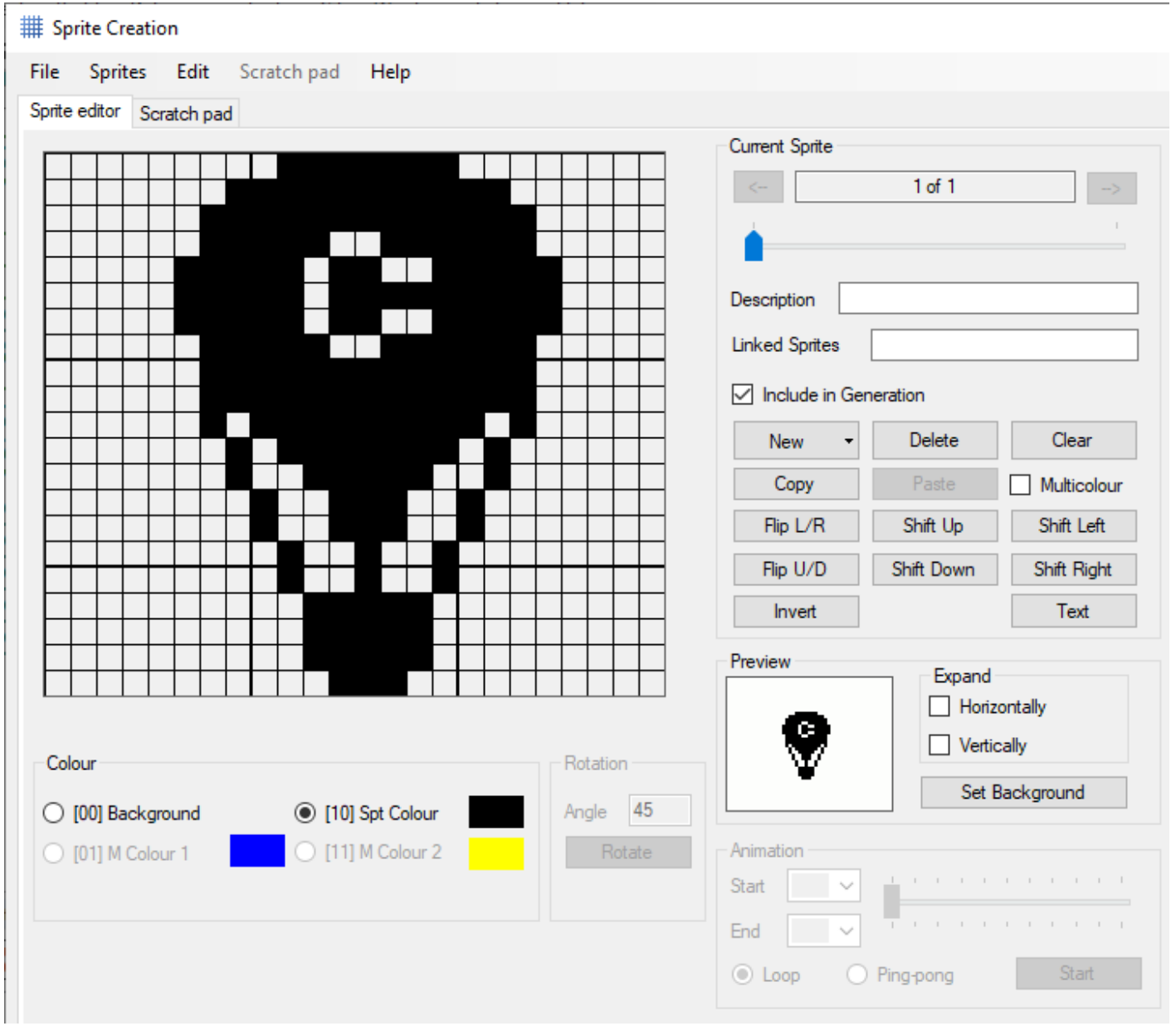
Screen Editor Features

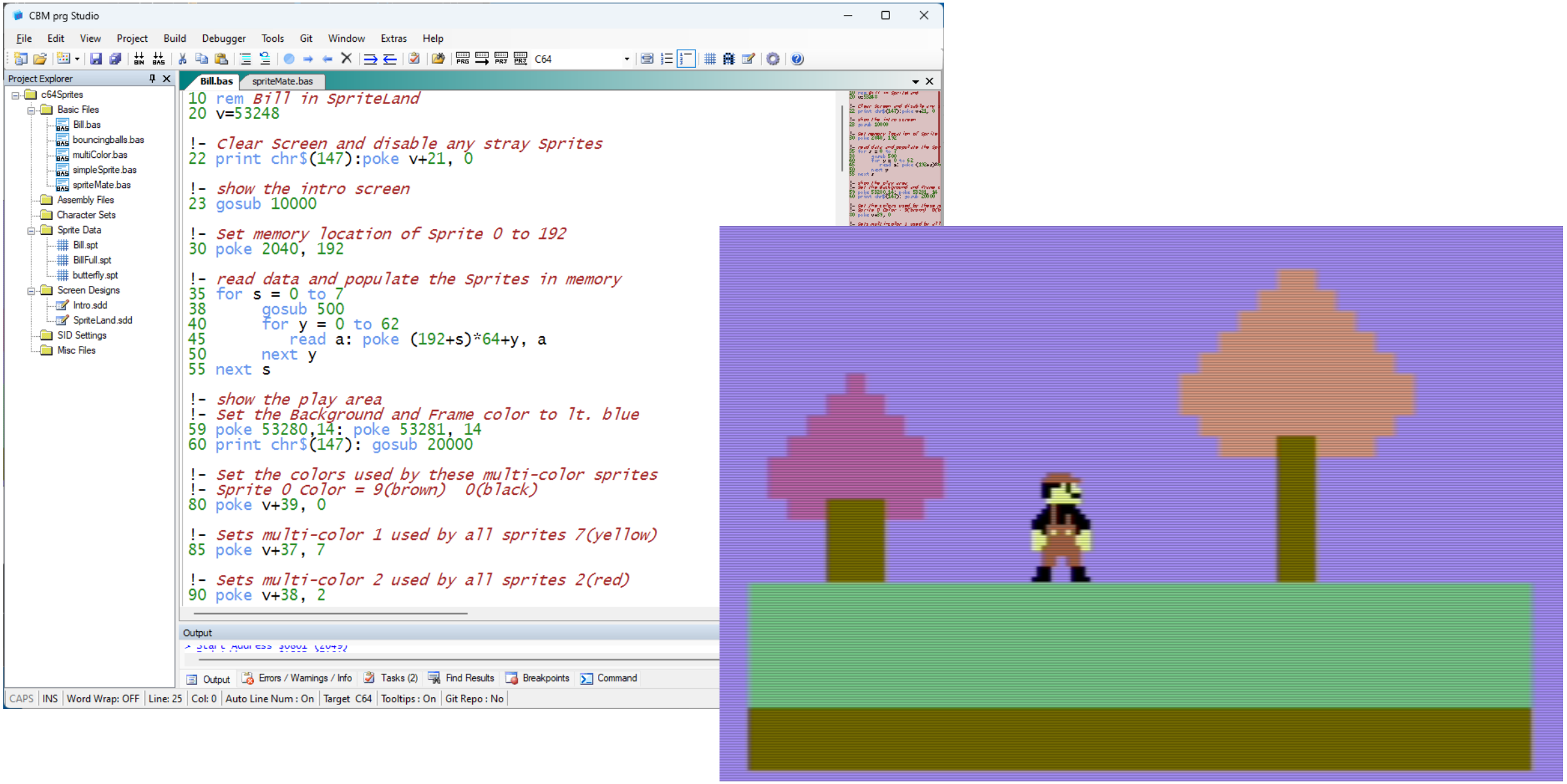
- Draw Mode
- Background / Character Colors
- Line and Box Mode
- Text Mode
- Grid / Map / Quick Select
- Export to Code



Sprite Editor Features

- Import From Source
- Flip Left / Right
- Flip Up / Down
- Shift Left / Right
- Shift Up / Down
- Scratch Pad
- Export To Source





CBM PRG Studio v4.0.1 Demonstration

Next Steps on Your Journey

DOWNLOAD THE TOOLS

CHECK OUT THE HELP FILES

SEARCH FOR SPRITE SHEETS AND LOOK AT SAMPLES

EXPERIMENT AND HAVE FUN

Thank You for Listening

Byron Stout

byron.stout@gmail.com