

V1.2 S-8 Console Computer Design

Foreword

This document is designed for people who want to make their own S-8 emulator.

General Specs

- 8 Bit computer
- Colors are represented by 1 hex digit which allows for 16 different colors
- 2176 bytes RAM (reserved for ROMs)
- 16 usable 8 bit registers called S registers.
- 1 PC 16 Bit (Program counter)
- Screen 64x64
- DT 16 bit (counted ones per frame)
- 6 keys in total
- Font reg used for font colors

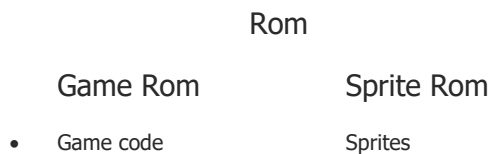
- Loop_point 8 bit (the frontend will stop ticking ones the pc reaches loop_point)

Instructions would be 2 bytes like chip-8

Emulator specifics

- Frontend: SDL2
- Backend: custom library rust code

Rom layout



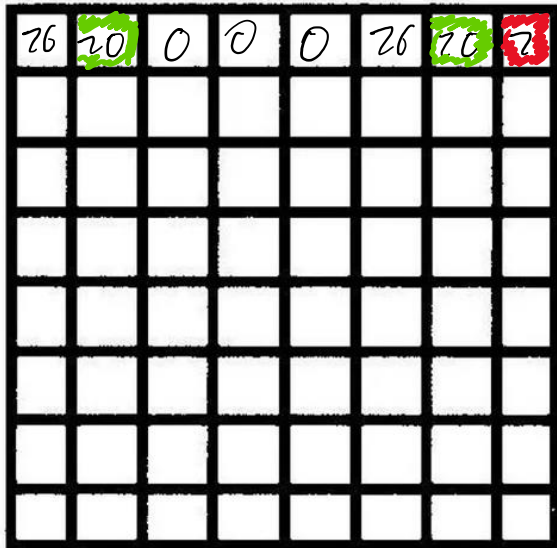
Memory Map

Name	Reserved space	Region in memory
Font Rom	1120 bytes	1024-2176
Sprite Rom	512 bytes	512-1024
Game Rom	512 bytes	0-512

The s-8 console needs 3 rom files, a sprite rom file, game rom file and a font rom file, the font rom file must be 1120 bytes long.

Sprite Structure

Sprites are a fixed size 8x8



FA000FA7

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every Hex digit
corresponds to a color

8 x 8 GRID

Considering this every sprite would be 32 bytes per sprite

If the sprite rom has a size of 512 bytes we would have space for 16 sprites.

Color mapping

Hex digit	Rgb
0	0, 0, 0
1	244, 67, 54
2	156, 39, 176
3	103, 58, 183
4	63, 81, 181
5	33, 150, 243
6	3, 169, 244
7	0, 188, 212
8	0, 150, 139
9	76, 175, 80
A	139, 195, 74
B	205, 220, 57
C	255, 235, 59
D	255, 193, 7

Hex digit

Rgb

E	255, 87, 34
F	255, 255, 255

Font mapping

note: fonts are represented in the same way as sprites

index

Font letter

0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9

index	Font letter
10	a
11	b
12	c
13	d
14	e
15	f
16	g
17	h
18	i
19	j
20	k
21	l
22	m
23	n
24	o
25	p
26	q
27	r

index	Font letter
28	s
29	t
30	u
31	v
32	w
33	x
34	y
35	z

Opcodes/Instruction set

X and Y are registers

SX = Register at X

N is a literal hexadecimal value

Name	Hex Code	Purpose
NOP	0000	Do nothing
CLS	000C	Clear Screen
JUMP	1NNN	Jump to NNN

Name	Hex Code	Purpose
EQ	2XNN	SX = NN
ADD	3XNN	SX += NN
SUB	4XNN	SX -= NN
REQ	50XY	SX = SY
RADD	51XY	SX += SY
RSUB	52XY	SX -= SY
RMUL	53XY	SX *= SY
RDIV	54XY	SX /= SY
SKIEQ	55XY	Skip if SX == SY
SKINEQ	56XY	Skip if SX != SY
SKIG	57XY	Skip if SX > SY
SKIGAS	58XY	Skip if SX < SY and SX+8 > SY
SKIGAS8	59XY	Skip if SX < SY+8 and SX+8 > SY+8
SKIGAS8	5AXY	Skip if SX < SY+8 and SX+8 > SY+8 or Skip if SX < SY and SX+8 > SY or SX == SY
FRN	600N	Set font reg to N

Name	Hex Code	Purpose
FRX16	610X	Set font reg to SX%16
RNG	700X	SX = random hex digit
LEQ	710X	Loop_point = SX%16
LEQNN	800N	Loop_point = N
SKIRP	900X	Skip if key index at SX is pressed
SKIRNP	910X	Skip if key index at SX is not pressed
SKINNEG	ANXY	Skip N amount if x != y
DSPRITE	DNXY	Draw the n'th sprite at (SX, SY)
DNUM	EZXY	Draw SZ as a decimal at SX SY
DFONT	FZXY	Draw the SZ font at with the color at the font reg