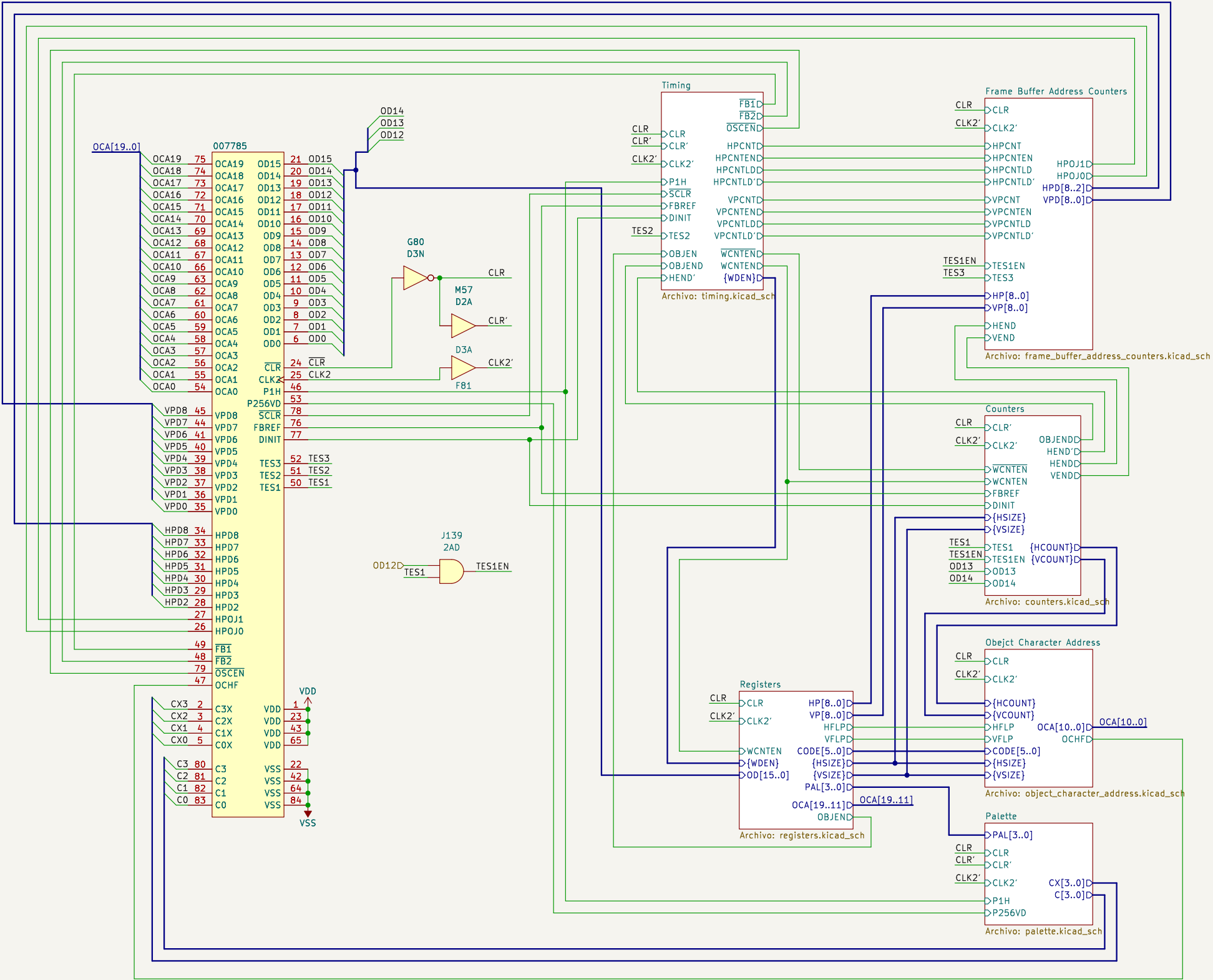The 007786 scans for valid object data:
- Object (sprite) code,
- palette,
- position and
- attributes

It translates it into:
- Individual object character (tiles) color code,
- Palette values
- object character address

This is copied into the frame buffers with the 007786.

1. SCLR (OSCANCLR) starts the object scanning process.
2. OSCEN is activated when each of the four words to be scanned
   are to be read. The 007783 increments the address.

The 007786 uses an OKI 79V000 gate cell array with
3289 unit cells.

OCA[19..0]

007785

OCA19	75	OCA19	OD15	21	OD15
OCA18	74	OCA18	OD14	20	OD14
OCA17	73	OCA17	OD13	19	OD13
OCA16	72	OCA16	OD12	18	OD12
OCA15	71	OCA15	OD11	17	OD11
OCA14	70	OCA14	OD10	16	OD10
OCA13	69	OCA13	OD9	15	OD9
OCA12	68	OCA12	OD8	14	OD8
OCA11	67	OCA11	OD7	13	OD7
OCA10	66	OCA10	OD6	12	OD6
OCA9	63	OCA9	OD5	11	OD5
OCA8	62	OCA8	OD4	10	OD4
OCA7	61	OCA7	OD3	9	OD3
OCA6	60	OCA6	OD2	8	OD2
OCA5	59	OCA5	OD1	7	OD1
OCA4	58	OCA4	OD0	6	OD0
OCA3	57	OCA3			
OCA2	56	OCA2	CLR	24	CLR
OCA1	55	OCA1	CLK2	25	CLK2
OCA0	54	OCA0	P1H	46	
VPD8	45	VPD8	P256VD	53	
VPD7	44	VPD7	SCLR	78	
VPD6	41	VPD6	FBREF	76	
VPD5	40	VPD5	DINIT	77	
VPD4	39	VPD4	TES3	52	TES3
VPD3	38	VPD3	TES2	51	TES2
VPD2	37	VPD2	TES1	50	TES1
VPD1	36	VPD1			
VPD0	35	VPD0			
HPD8	34	HPD8			
HPD7	33	HPD7			
HPD6	32	HPD6			
HPD5	31	HPD5			
HPD4	30	HPD4			
HPD3	29	HPD3			
HPD2	28	HPD2			
	27	HPOJ1			
	26	HPOJ0			
	49	FB1			
	48	FB2			
	79	OSCEN			
	47	OCHF			

VDD
CX3	2	C3X	VDD	1
CX2	3	C2X	VDD	23
CX1	4	C1X	VDD	43
CX0	5	C0X	VDD	65
C3	80	C3	VSS	22
C2	81	C2	VSS	42
C1	82	C1	VSS	64
C0	83	C0	VSS	84
VSS

OD14
OD13
OD12

G80
D3N
CLR

M57
D2A
CLR'

D3A
CLK2'
F81

J139
2AD
OD12D — TES1 — TES1EN

Timing
CLR
CLR'
CLK2'
CLR
CLR'
CLK2'
FB1D
FB2D
OSCEND
HPCNTD
HPCNTEND
HPCNTLDD
HPCNTLD'D
VPCNTD
VPCNTEND
VPCNTLDD
VPCNTLD'D
P1H
SCLR
FBREF
DINIT
TES2   TES2
OBJEN
OBJEND
HEND'
WCNTEND
WCNTEND
{WDEN}D
TES1EN
TES3
Archivo: timing.kicad_sch

Frame Buffer Address Counters
CLR
CLK2'
CLR
CLK2'
HPCNT
HPCNTEN
HPCNTLD
HPCNTLD'
VPCNT
VPCNTEN
VPCNTLD
VPCNTLD'
HPOJ1D
HPOJ0D
HPD[8..2]D
VPD[8..0]D
TES1EN
TES3
HP[8..0]
VP[8..0]
HEND
VEND
Archivo: frame_buffer_address_counters.kicad_sch

Counters
CLR
CLK2'
CLR'
CLK2'
OBJENDD
HEND'D
HENDD
VENDD
WCNTEN
WCNTEN
FBREF
DINIT
{HSIZE}
{VSIZE}
TES1
TES1EN
OD13
OD14
TES1
TES1EN
OD13
OD14
{HCOUNT}D
{VCOUNT}D
Archivo: counters.kicad_sch

Object Character Address
CLR
CLK2'
CLR
CLK2'
{HCOUNT}
{VCOUNT}
HFLP
VFLP
CODE[5..0]
{HSIZE}
{VSIZE}
OCA[10..0]   OCA[10..0]
OCHFD
Archivo: object_character_address.kicad_sch

Registers
CLR
CLK2'
CLR
CLK2'
HP[8..0]D
VP[8..0]D
HFLPD
VFLPD
CODE[5..0]D
{HSIZE}D
{VSIZE}D
PAL[3..0]D
OCA[19..11]D   OCA[19..11]
OBJEND
WCNTEN
{WDEN}
OD[15..0]
Archivo: registers.kicad_sch

Palette
PAL[3..0]
CLR
CLR'
CLK2'
CLR
CLR'
CLK2'
P1H
P256VD
CX[3..0]D
C[3..0]D
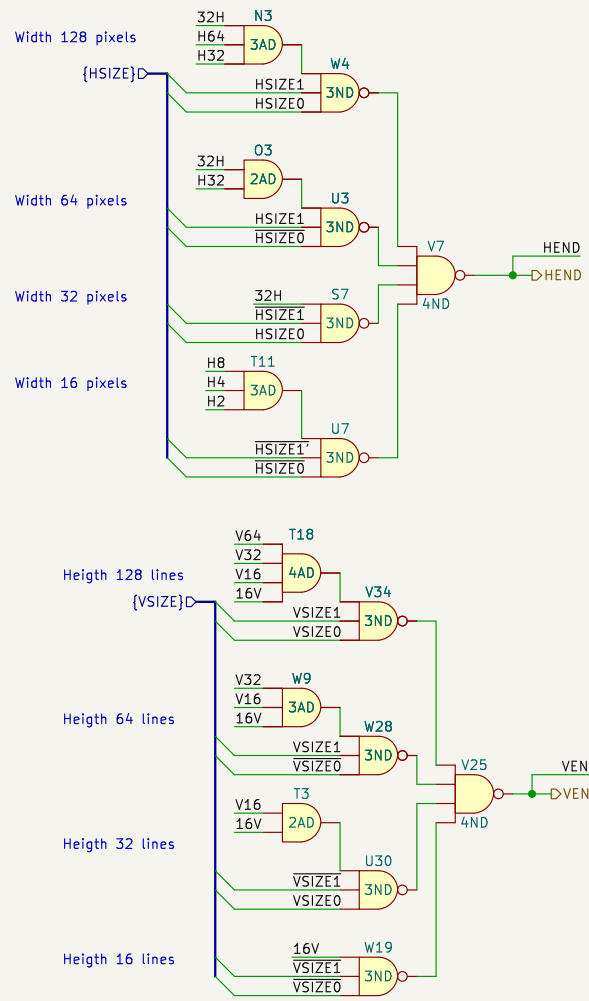Archivo: palette.kicad_sch
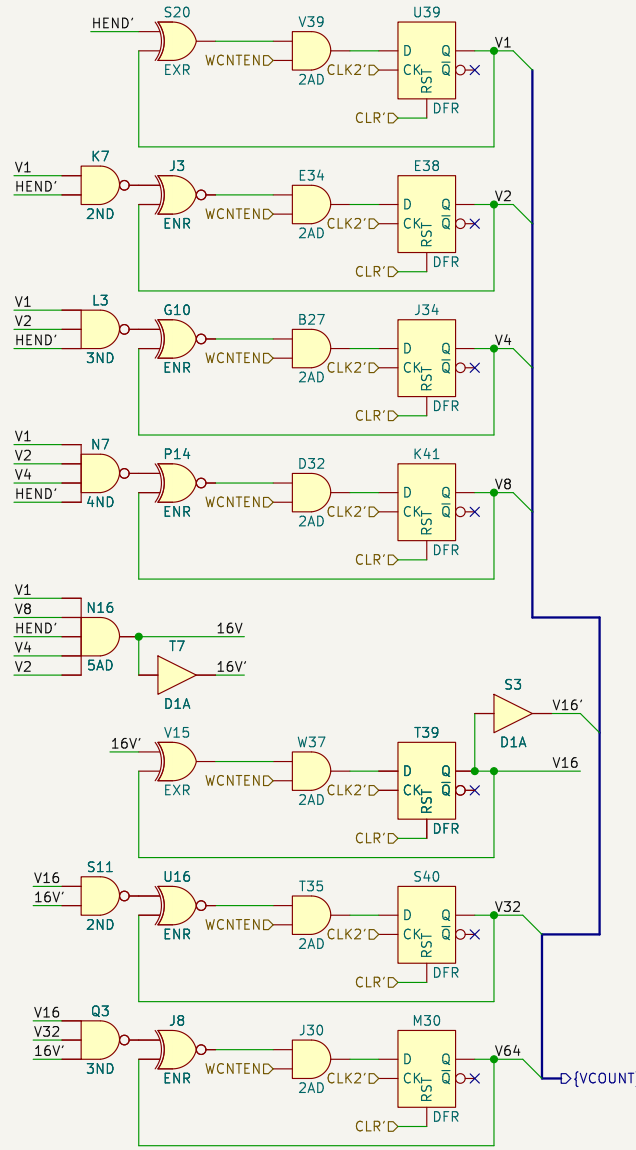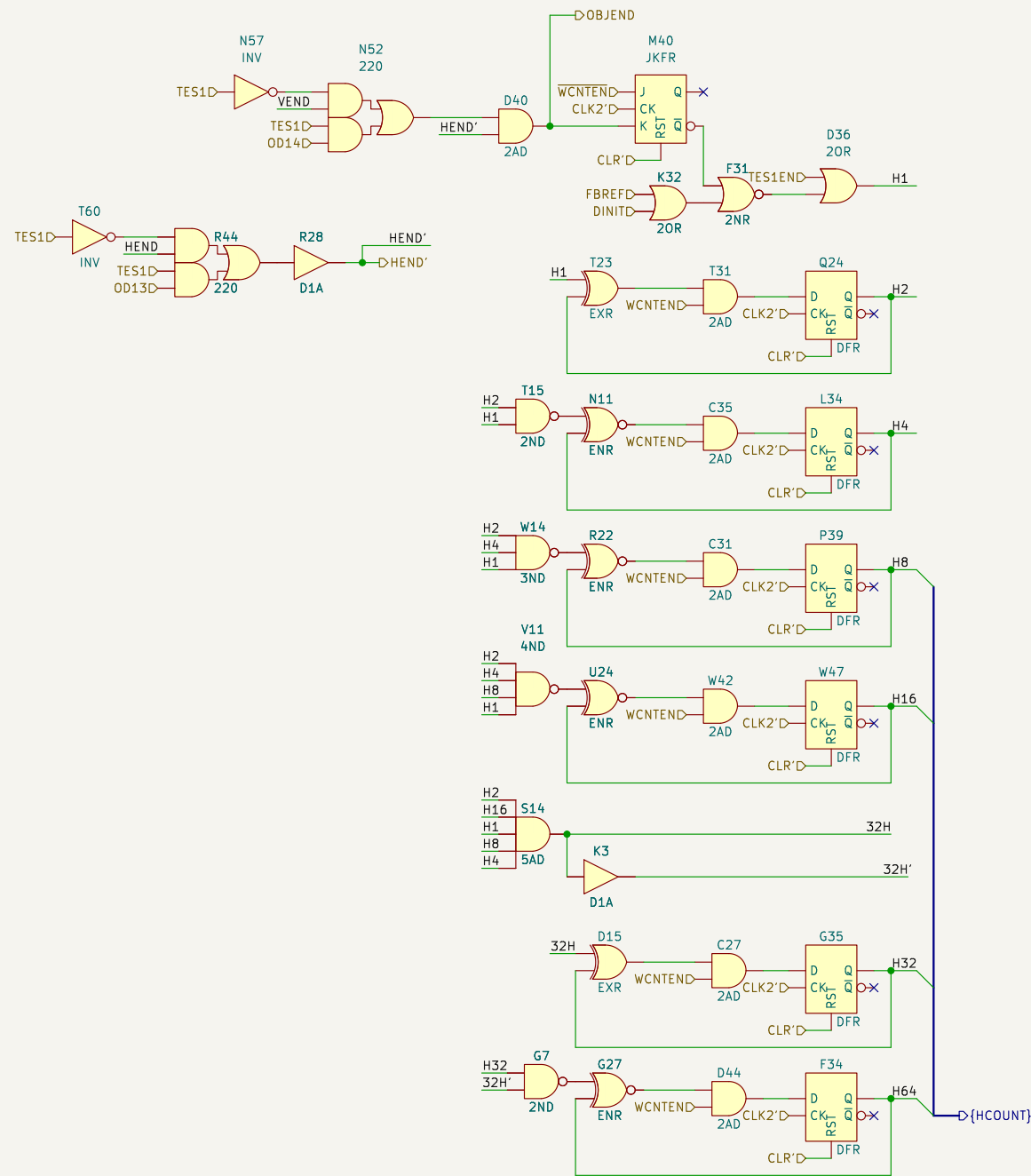
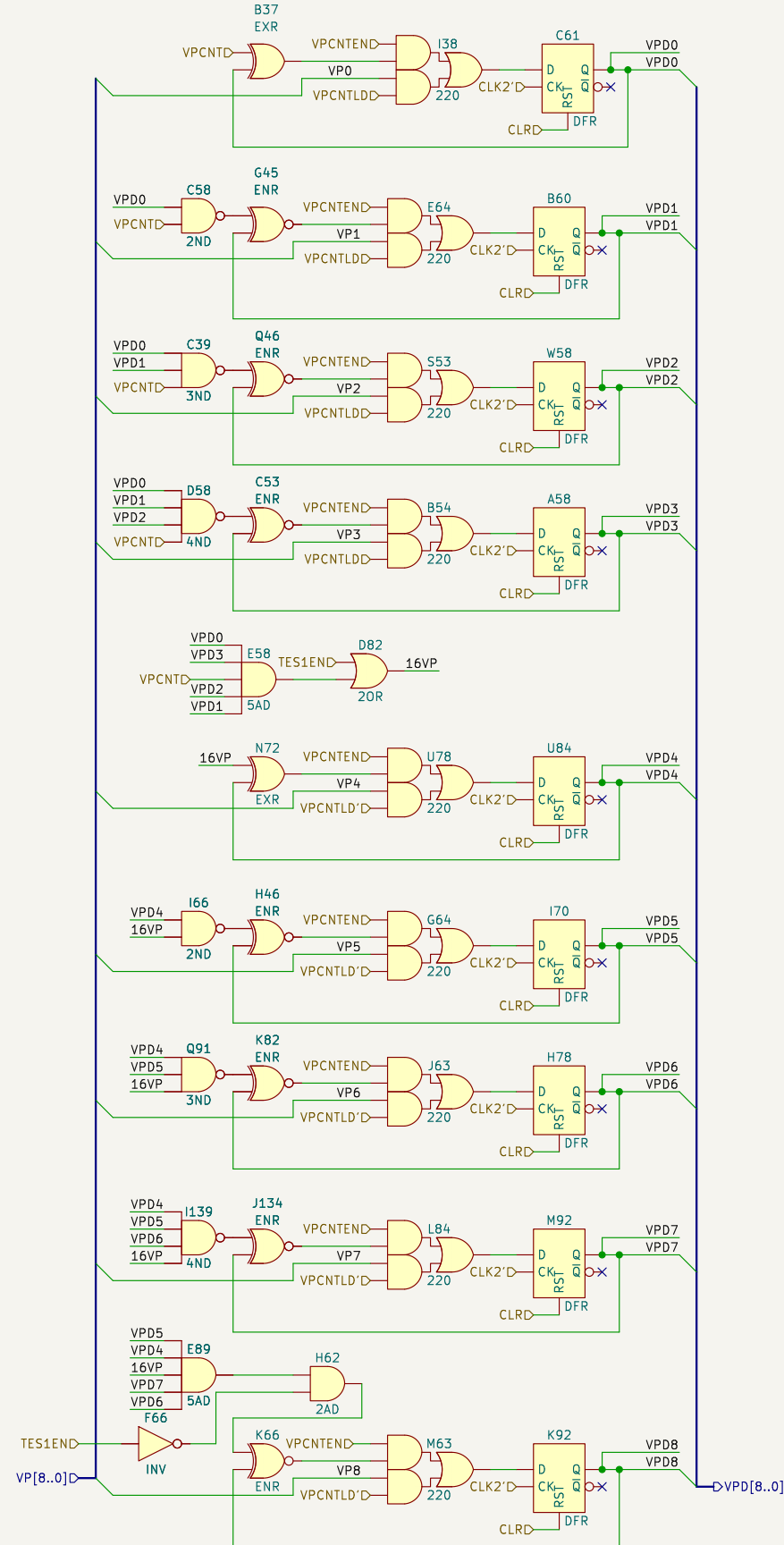Ulf Skutnabba, twitter: @skutis77
Sheet: /
File: 007785.kicad_sch
Title: Konami 007785
Size: A3   Date: 2023-12-22   Rev:
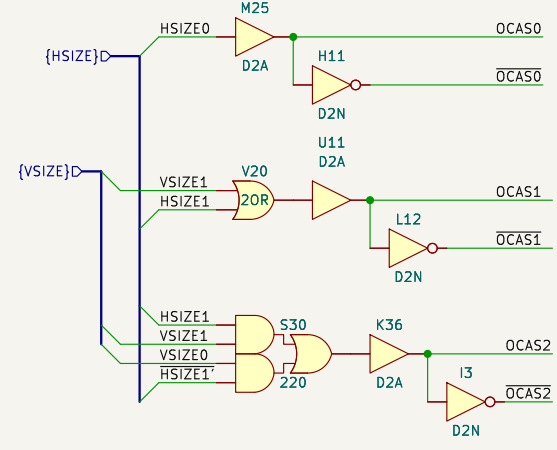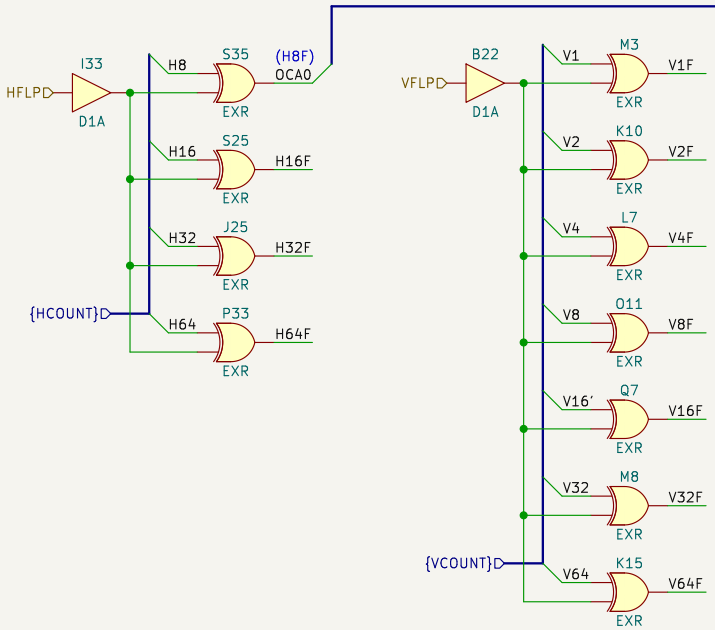KiCad E.D.A. kicad-cli 7.0.10-7.0.10-ubuntu20.04.1   Id: 1/7

Object Character Addressing

Horizontal Position

Vertical Position

Object Character Select Address

Object (Sprite) tiles are called characters on the twin16 platform.

VSIZE1	VSIZE0	VSIZE	HSIZE1	HSIZE0	HSIZE	OCAS2	OCAS1	OCAS0			
0	0	16	0	0	16	0	0	0	0	16H16V	256
0	0	16	0	1	32	0	0	1	1	32H16V	512
0	0	16	1	0	64	0	1	0	2	64H16V	1024
0	0	16	1	1	128	0	1	1	3	128H16V	2048
0	1	32	0	0	16	0	0	1	1	16H32V	512
0	1	32	0	1	32	0	1	0	2	32H32V	1024
0	1	32	1	0	64	0	1	1	3	64H32V	2048
0	1	32	1	1	128	1	0	0	4	128H32V	4096
1	0	64	0	0	16	0	1	0	2	16H64V	1024
1	0	64	0	1	32	0	1	1	3	32H64V	2048
1	0	64	1	0	64	1	0	0	4	64H64V	4096
1	0	64	1	1	128	1	0	1	5	128H64V	8192
1	1	128	0	0	16	0	1	1	3	16H128V	2048
1	1	128	0	1	32	1	0	0	4	32H128V	4096
1	1	128	1	0	64	1	0	1	5	64H128V	8192
1	1	128	1	1	128	1	1	0	6	128H128V	16384

CODE[5..0]

OCA[10..0]

Word W0: Code
Word W1: HPOS
Word W2: VPOS
Word W3: Params and sprten

Horizontal counter is running while:
~FBREF & ~DINIT

HPCNTEN = ~HEND' & WCNTEN
HPCNTLD = HEND' | ~WCNTEN
HPCNTEN = ~HPCNTLD

Signals delayed four pixelclocks

VPCNTEN = WCNTEN, delayed four pixelclocks