

Ulf Skutnabba, twitter: @skutis77

Konami GX687 / GX785

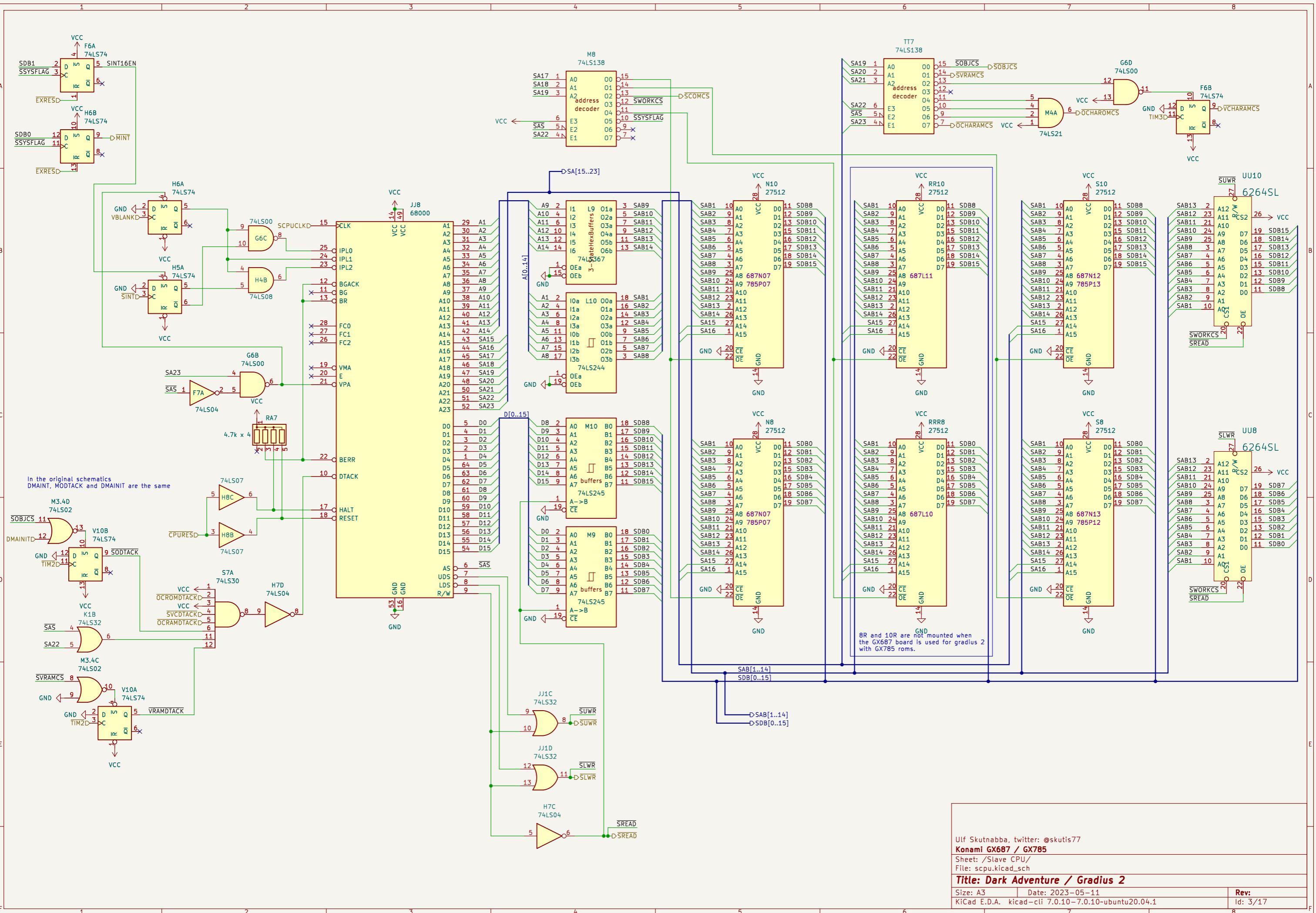
Sheet: /Main CPU/

File: mcpu.kicad_sch

Title: Dark Adventure / Gradius 2

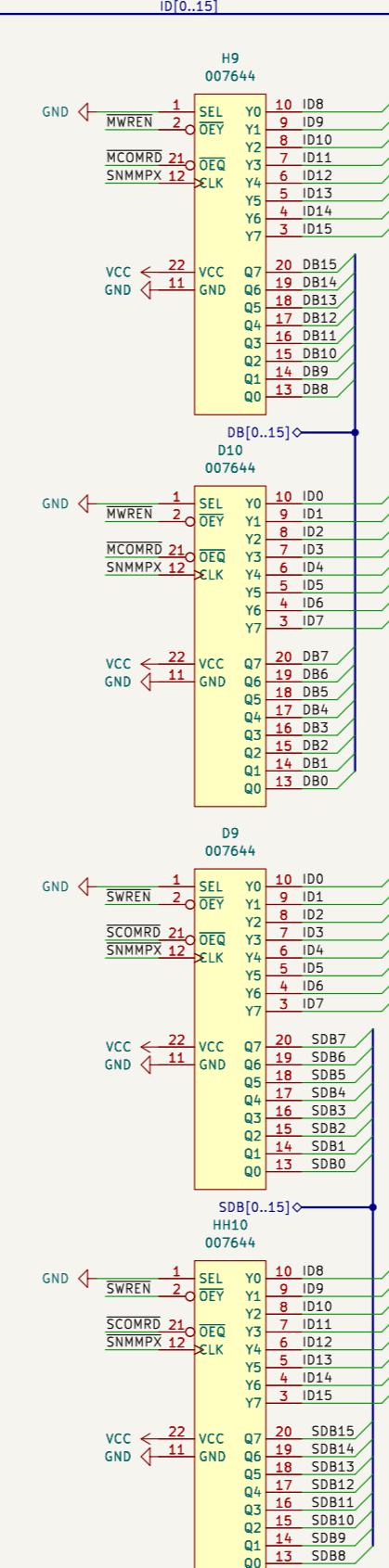
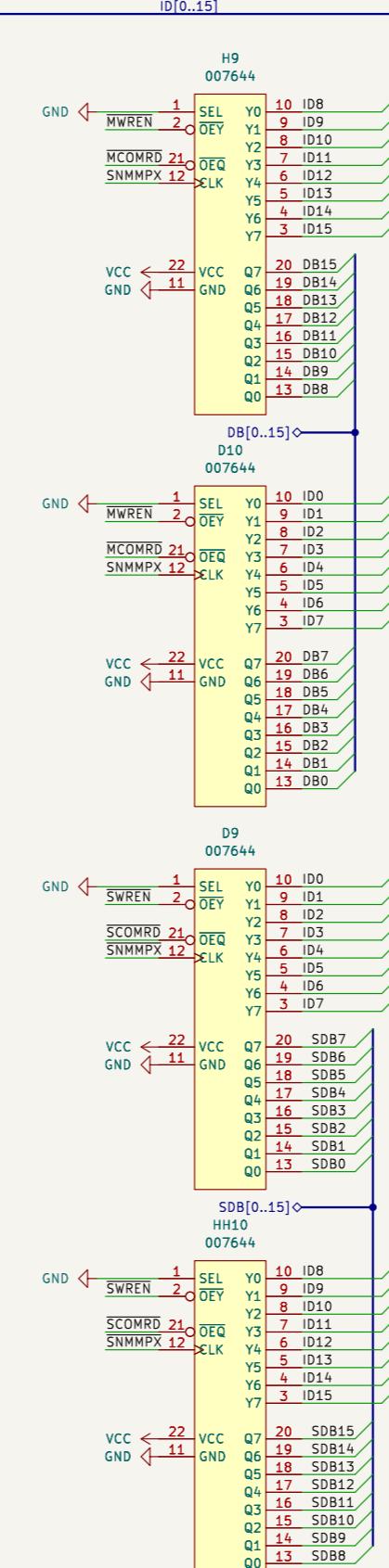
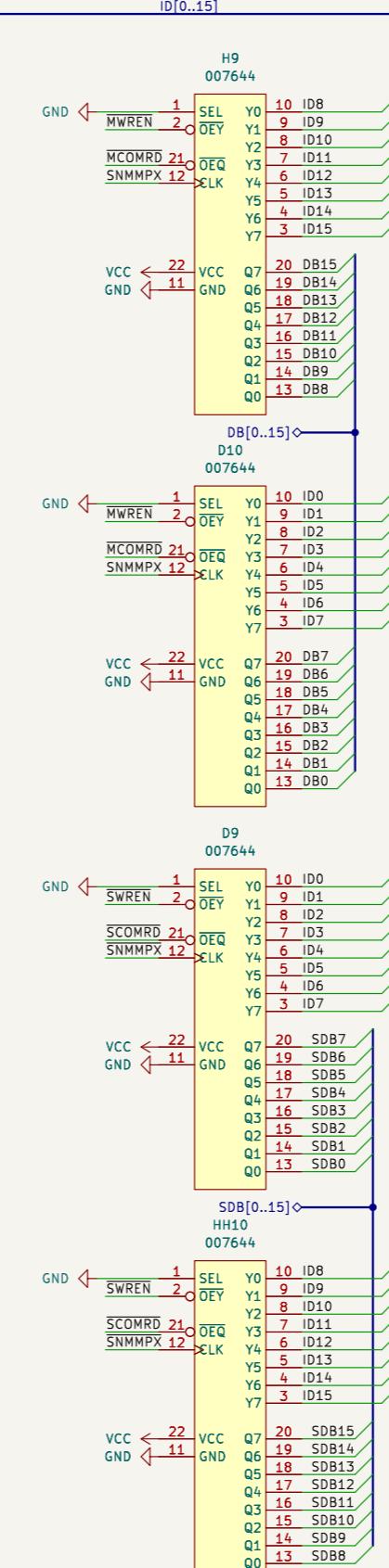
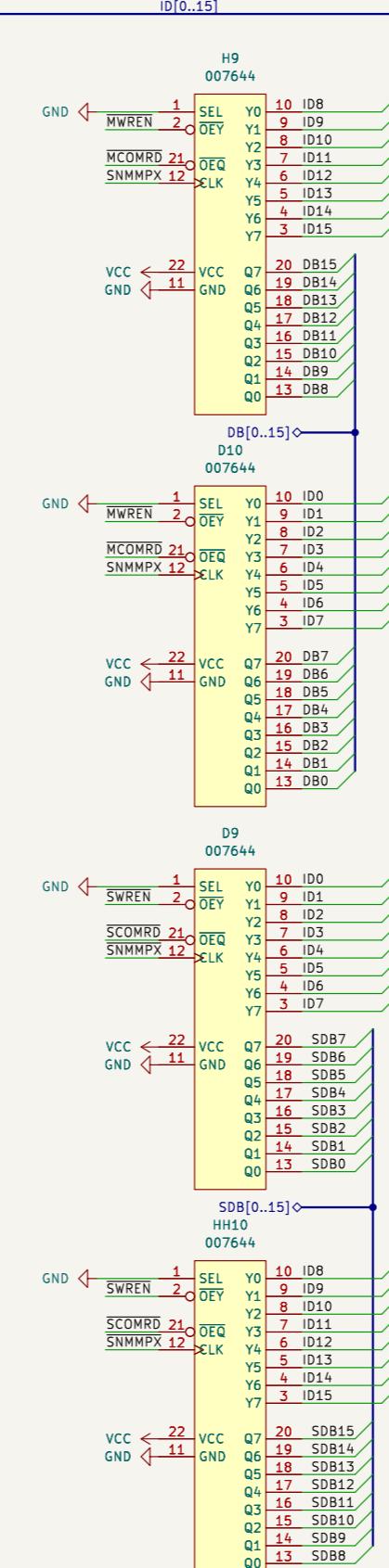
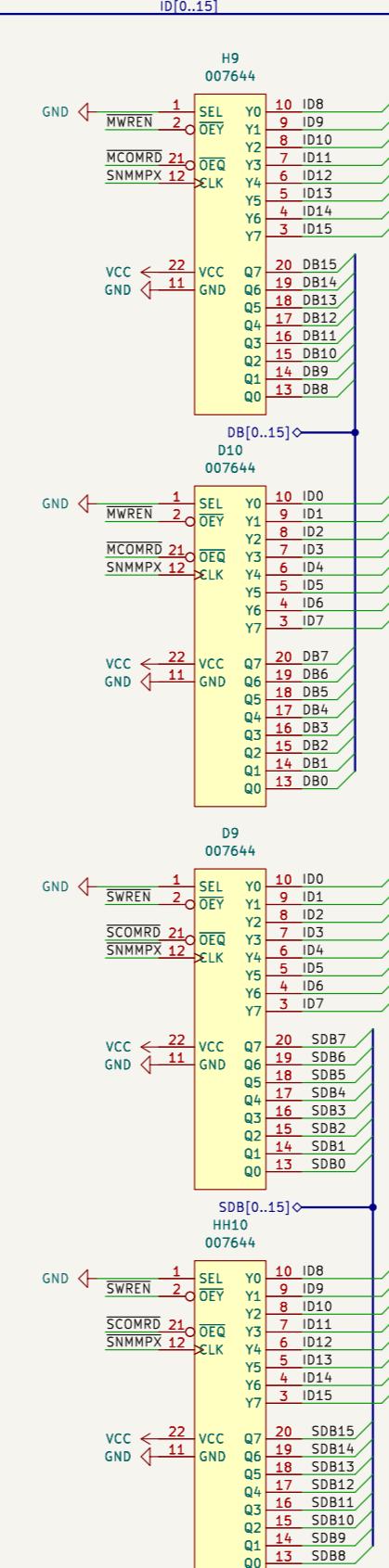
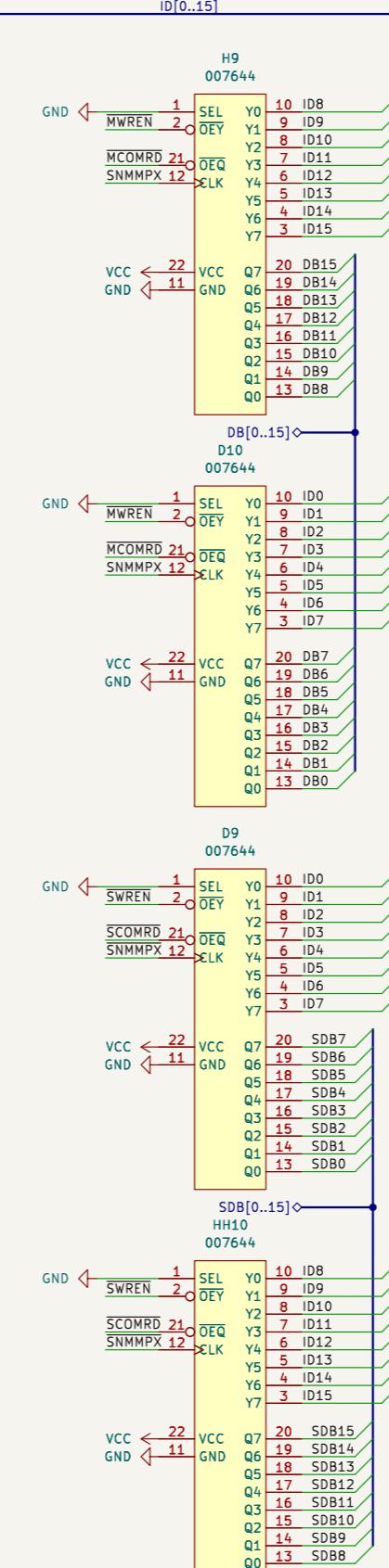
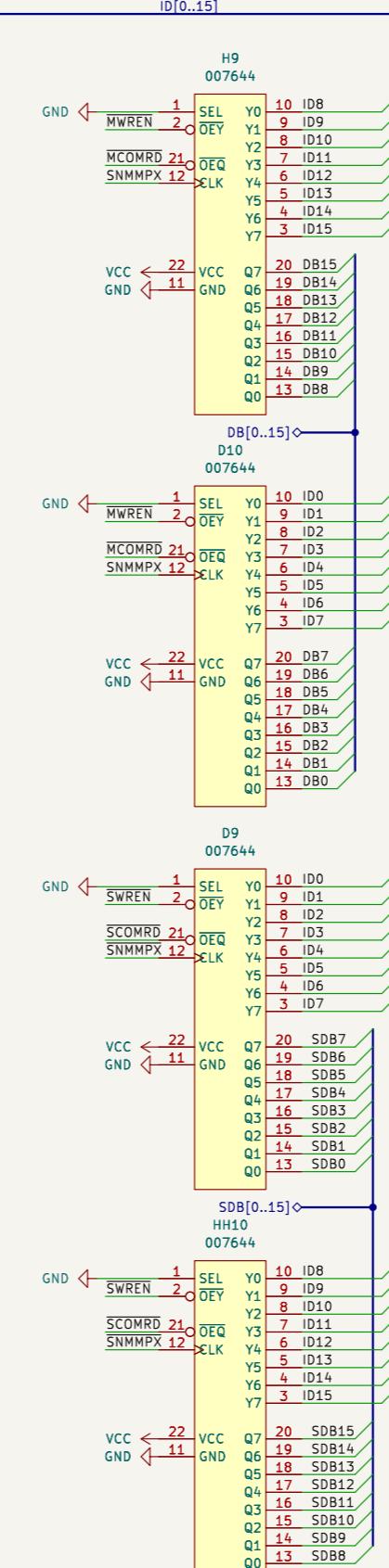
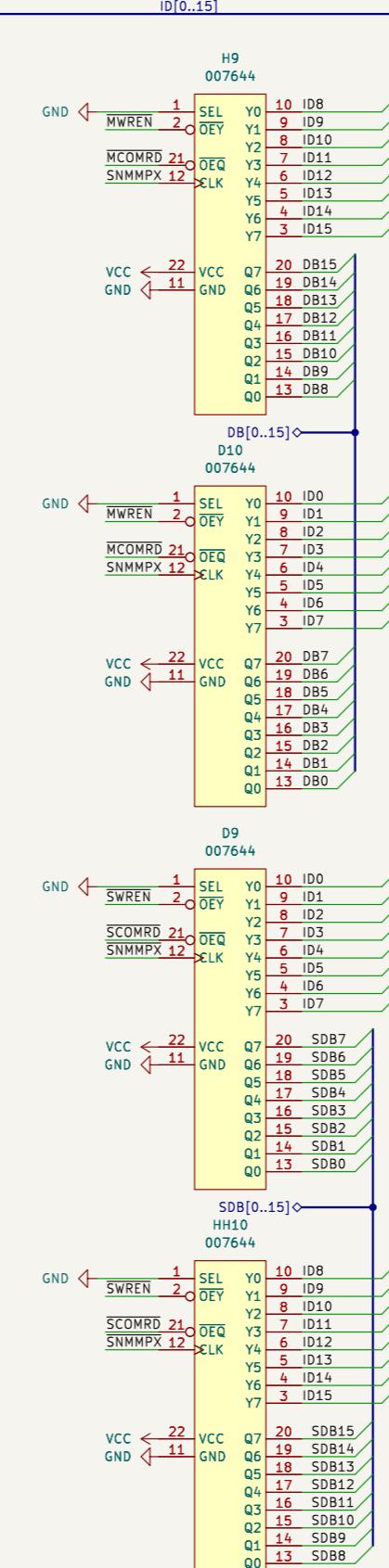
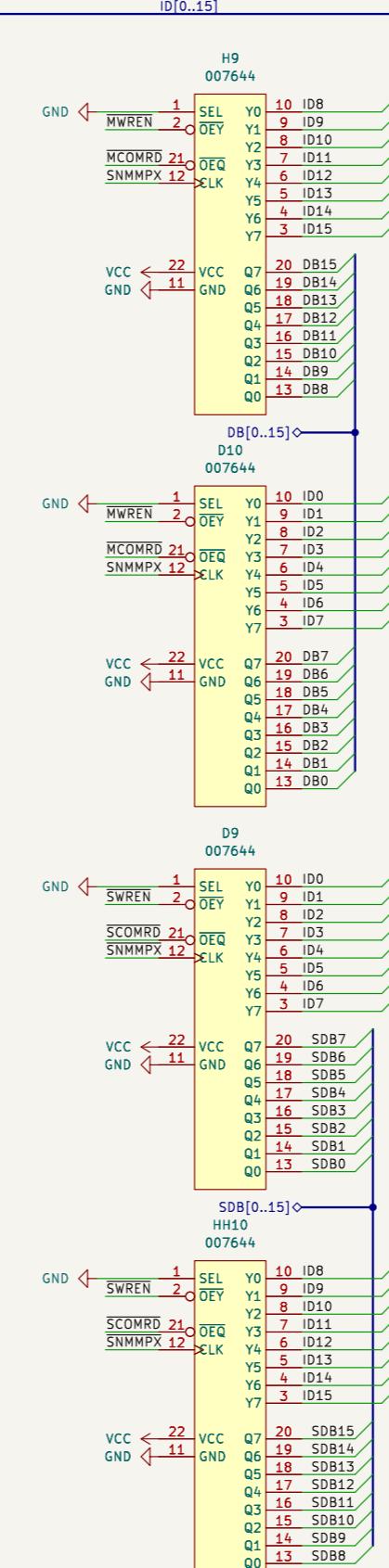
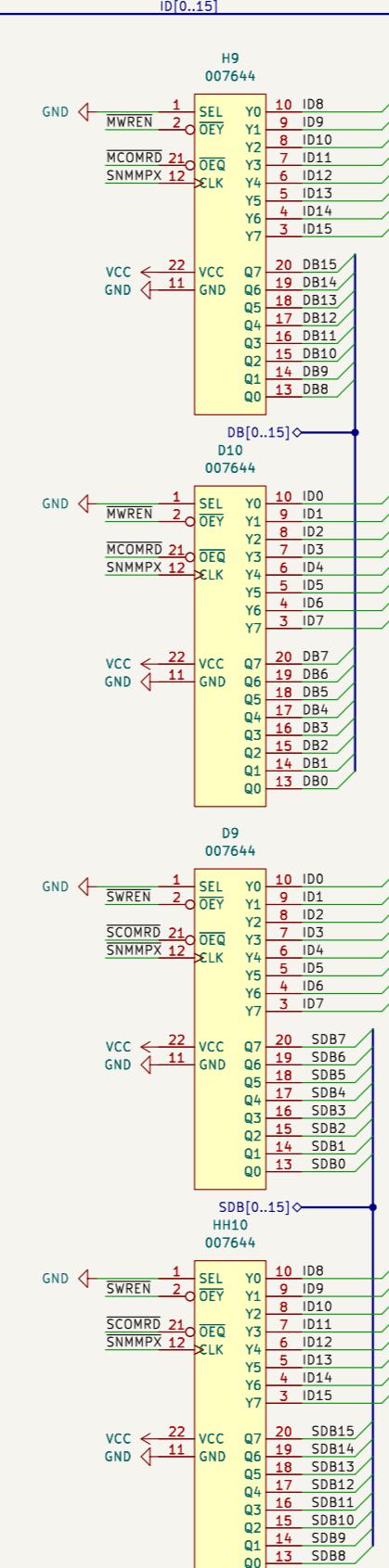
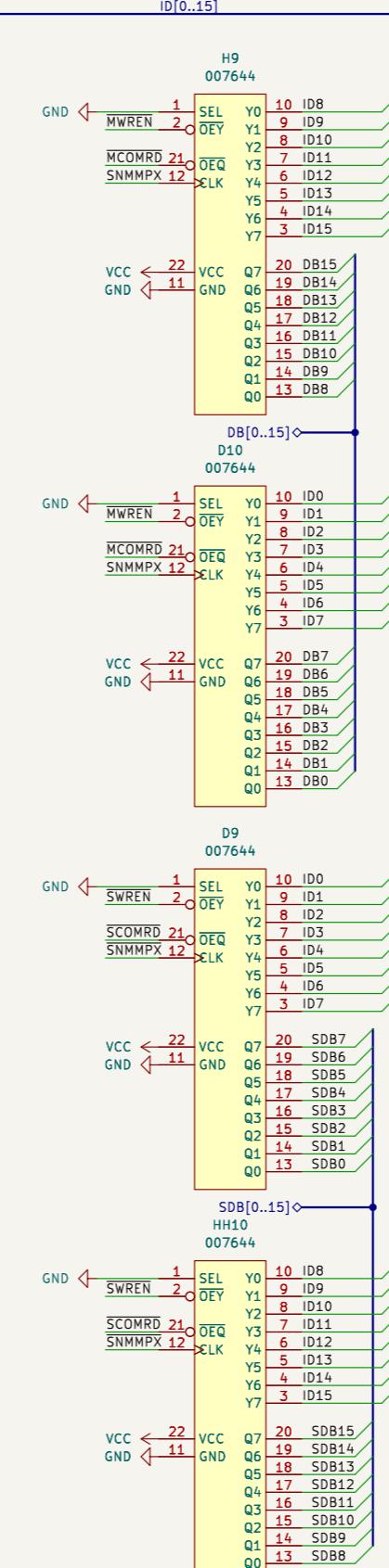
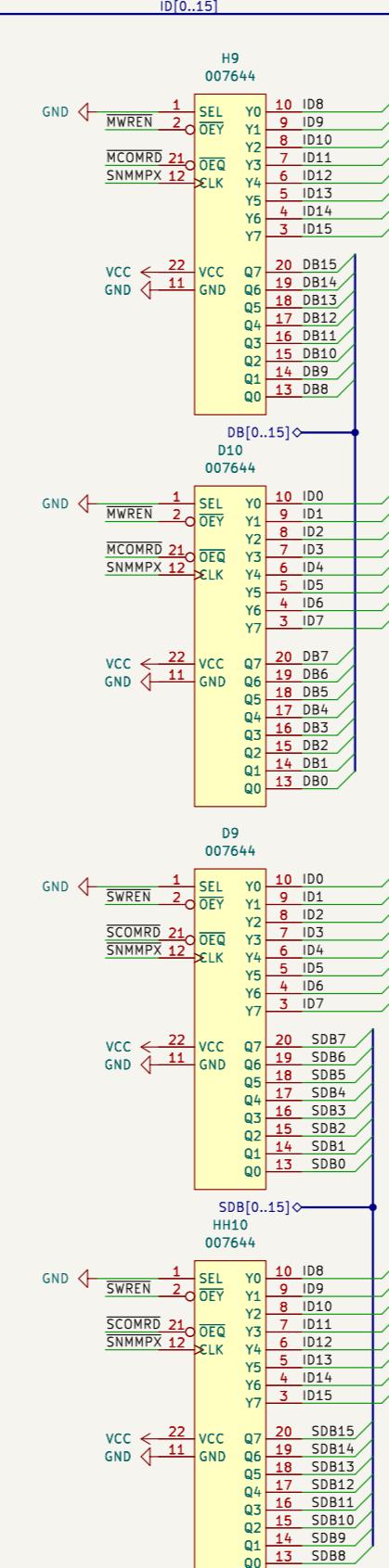
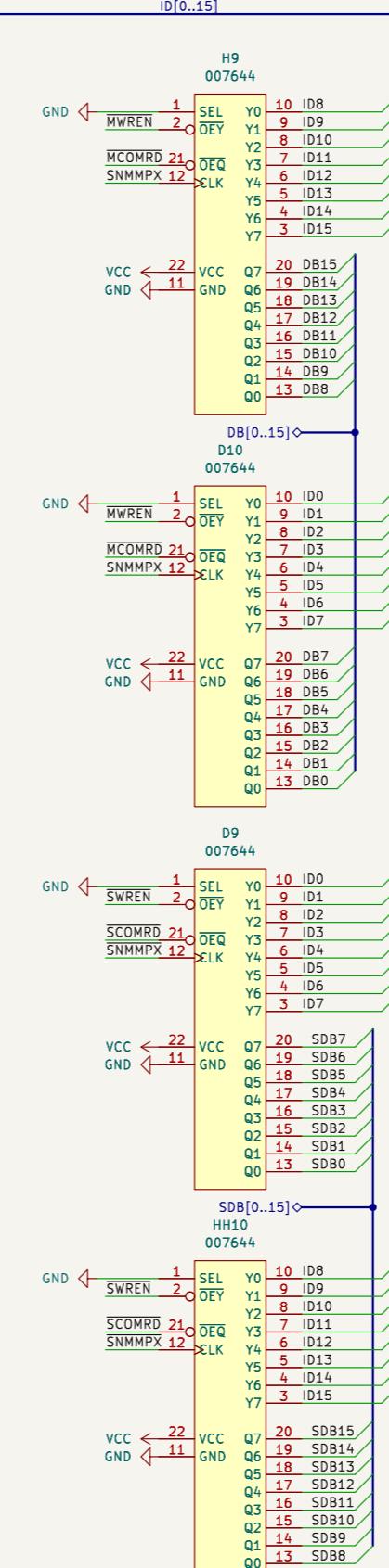
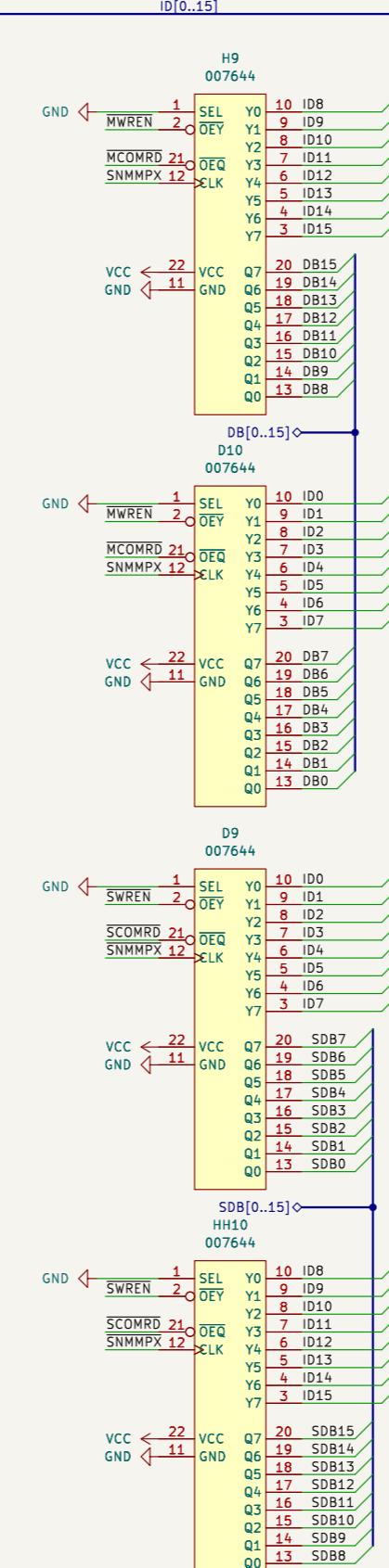
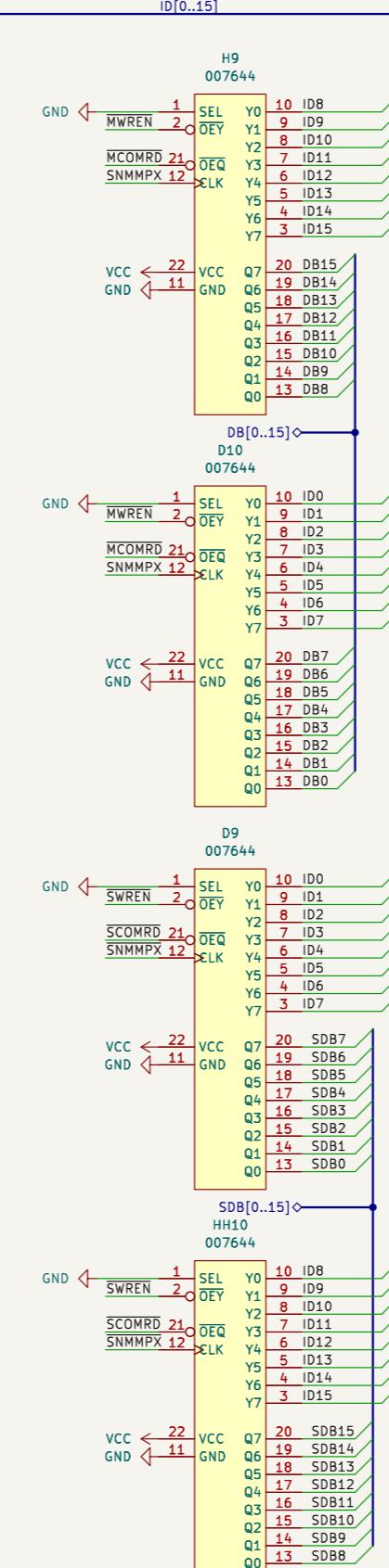
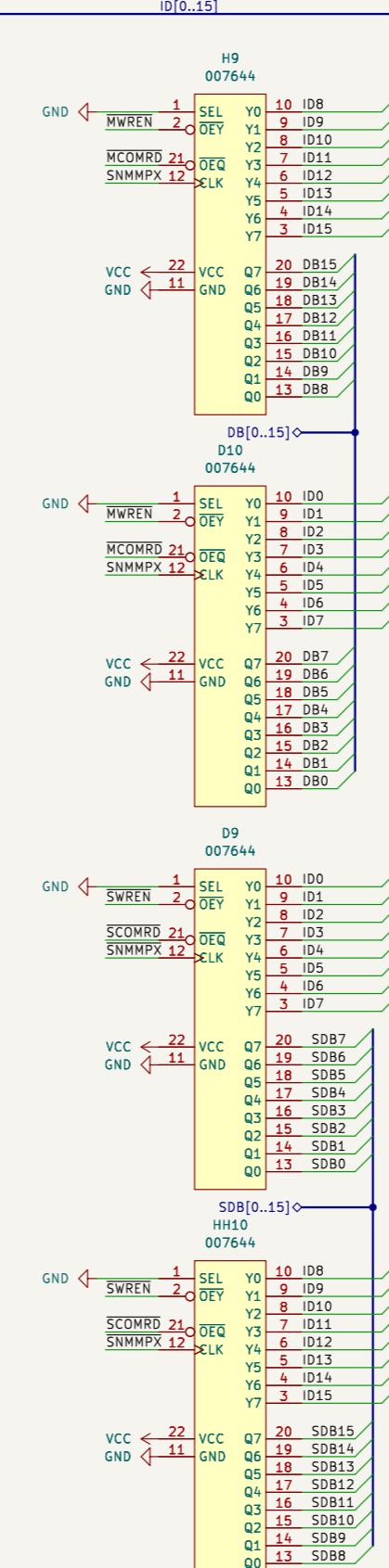
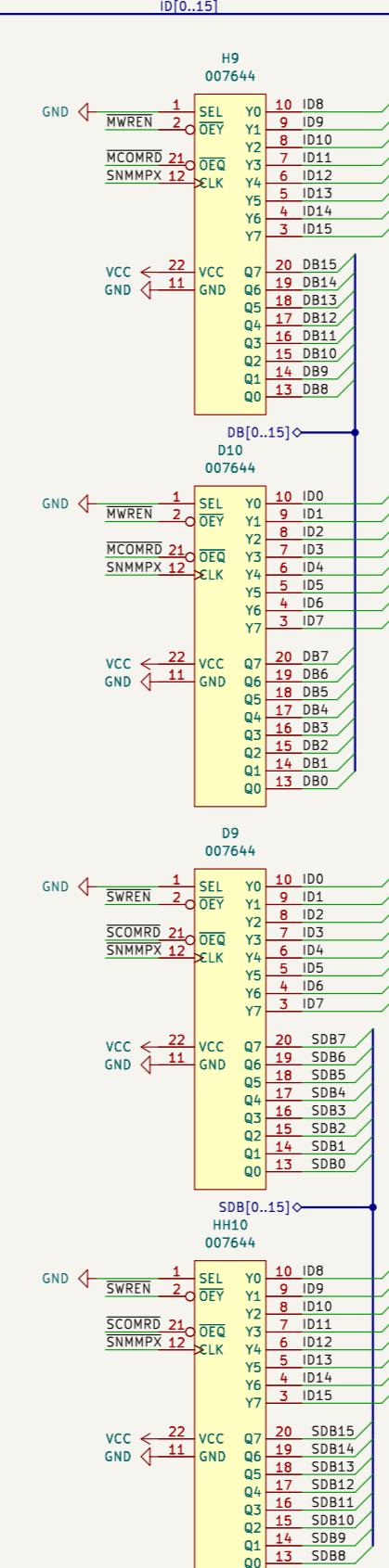
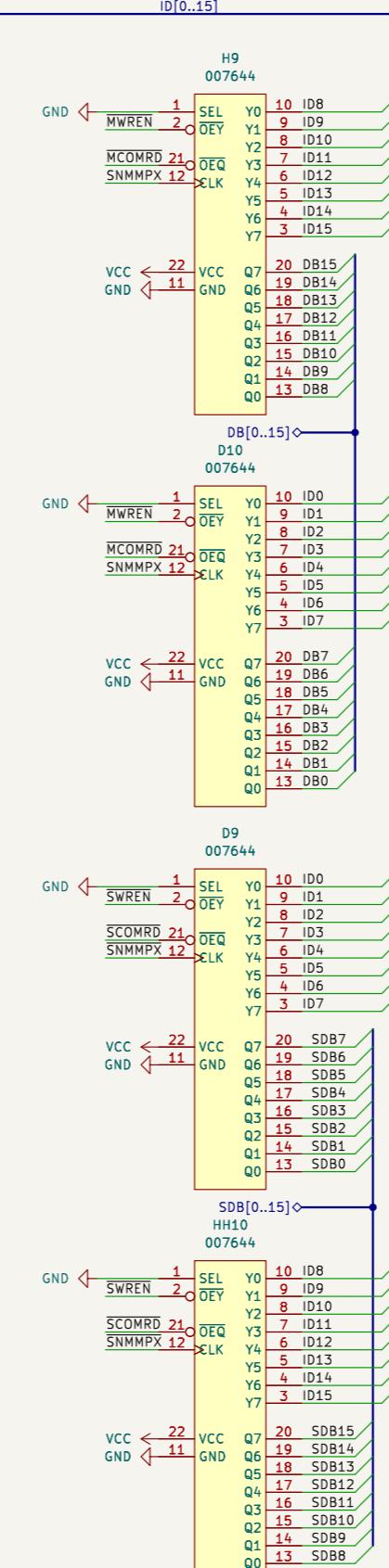
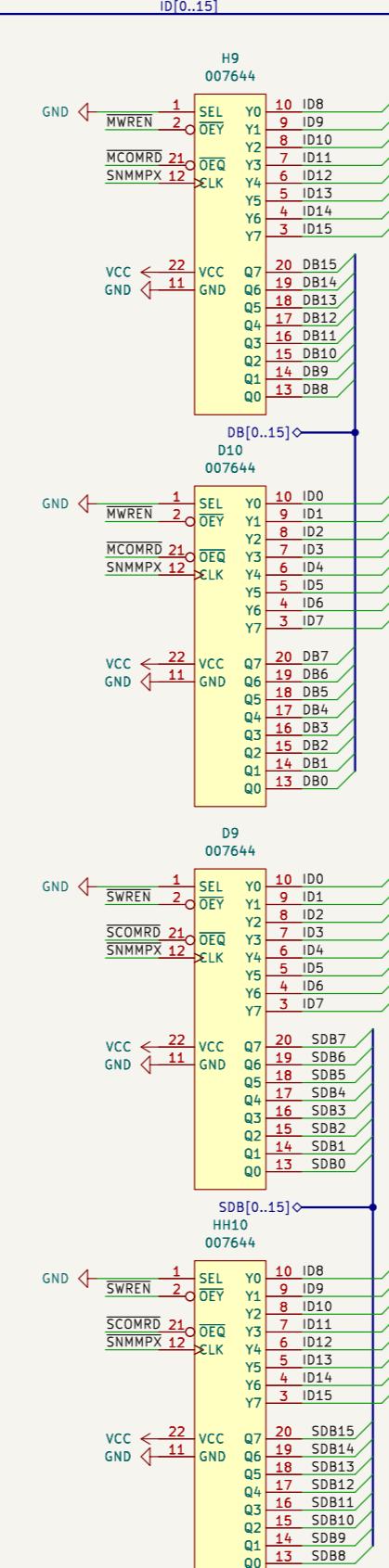
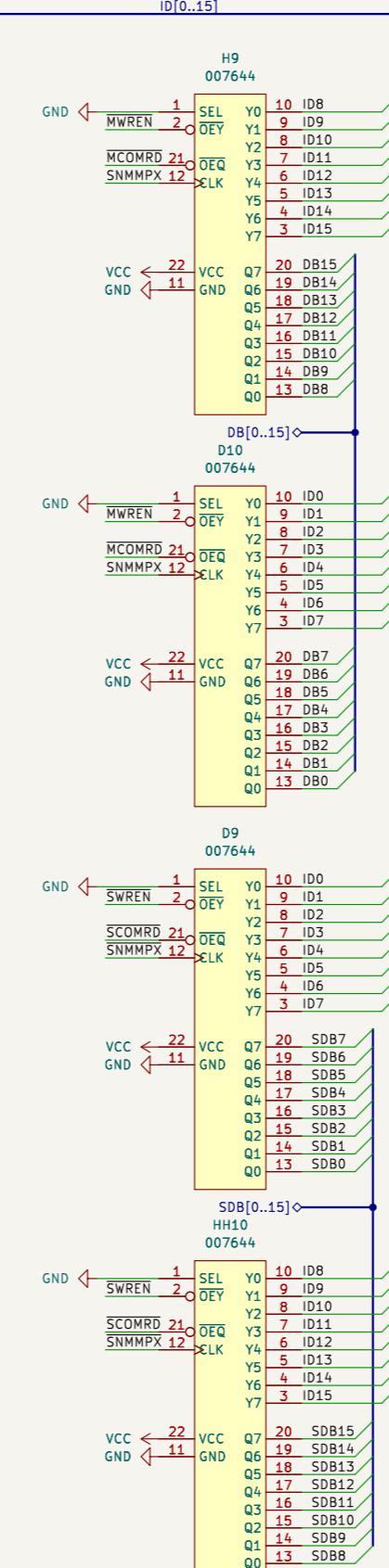
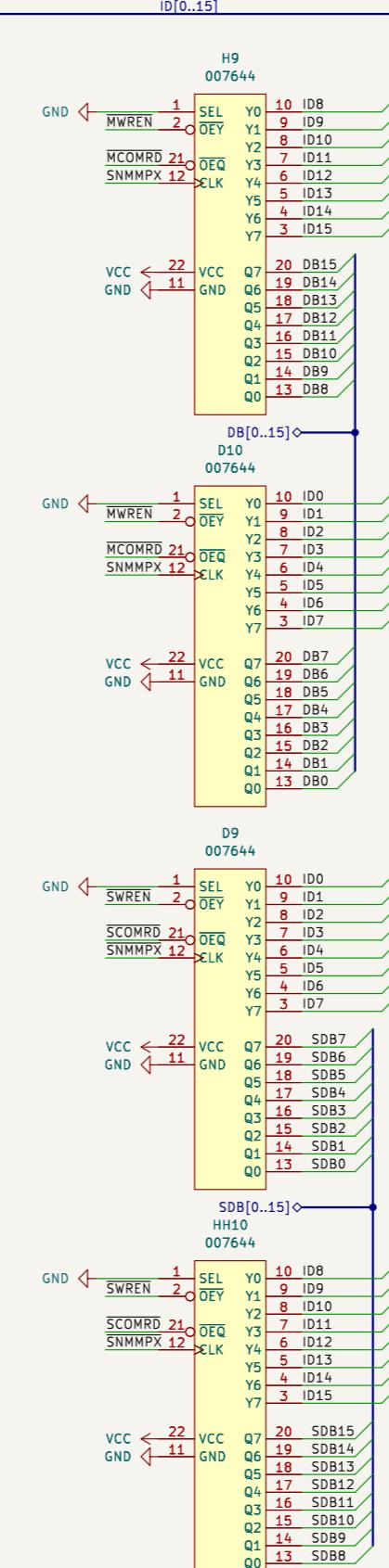
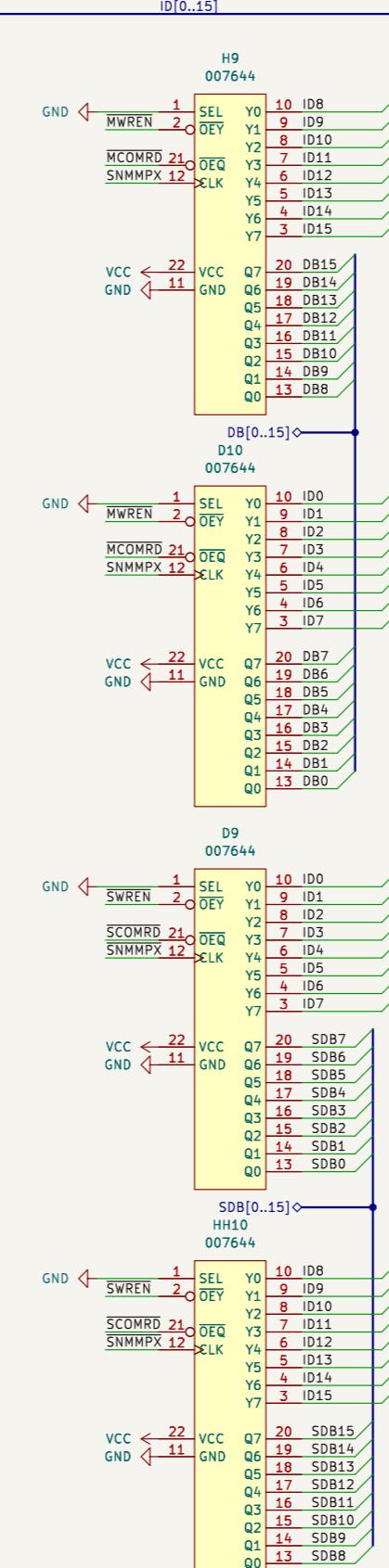
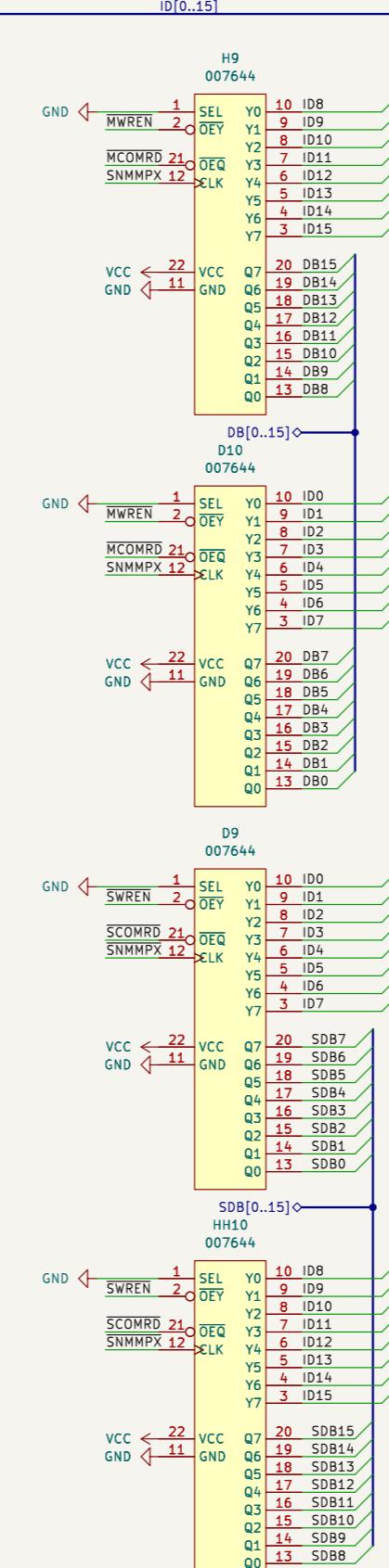
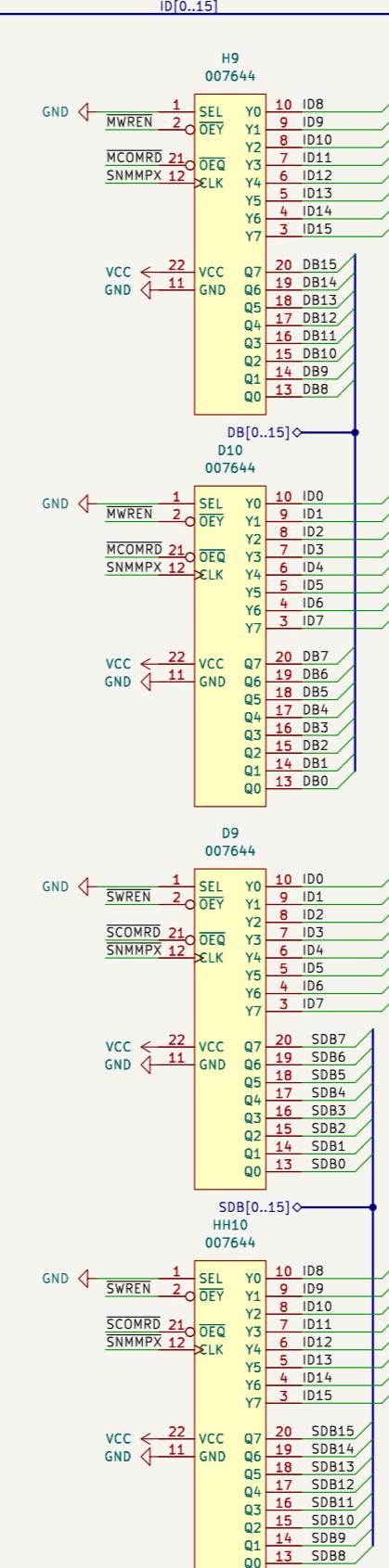
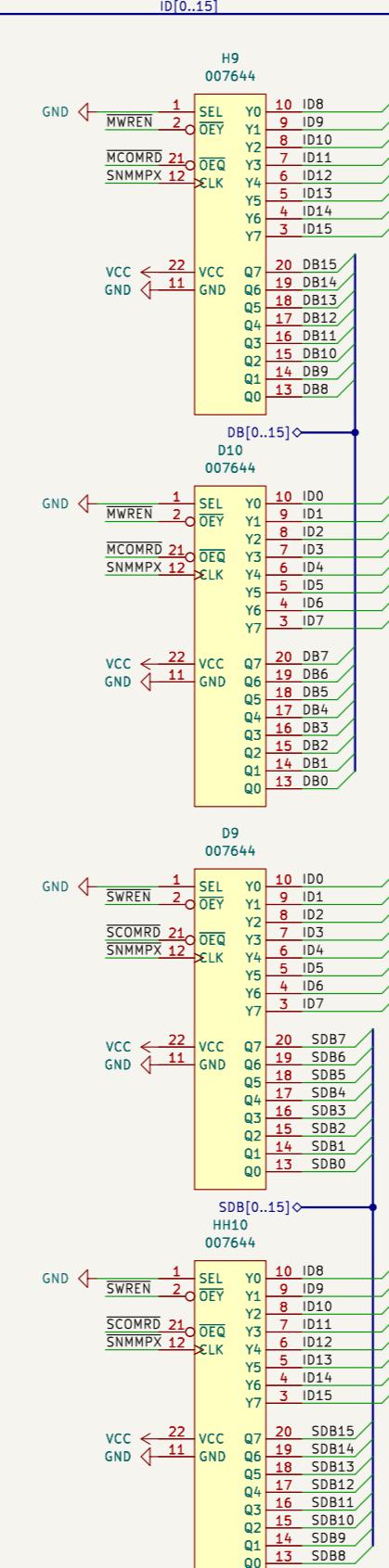
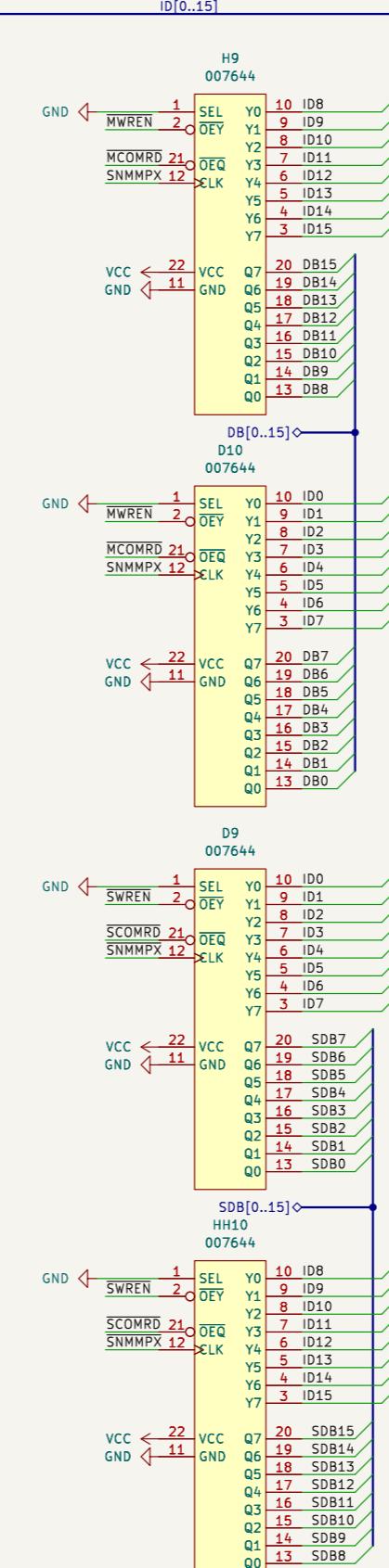
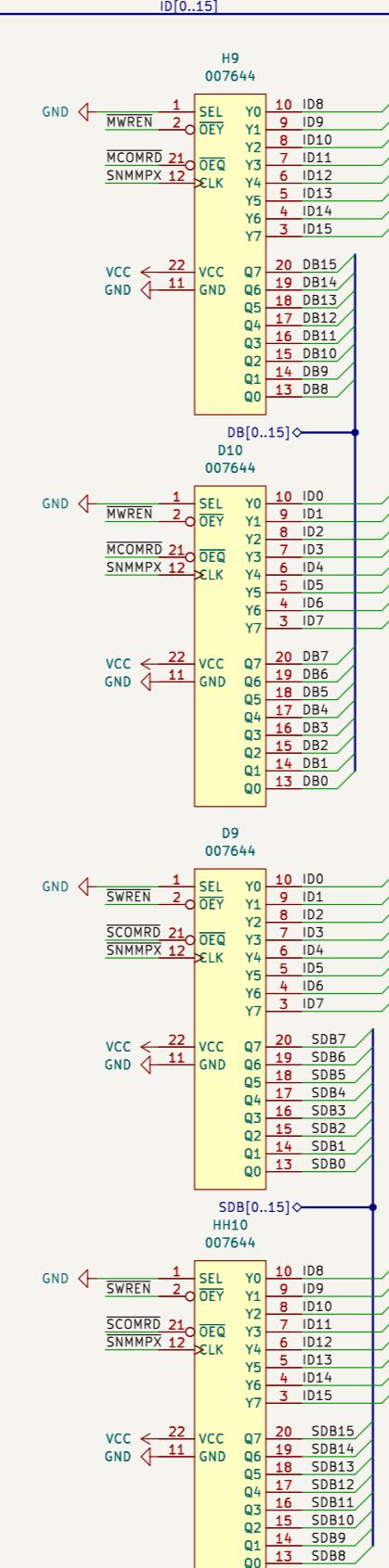
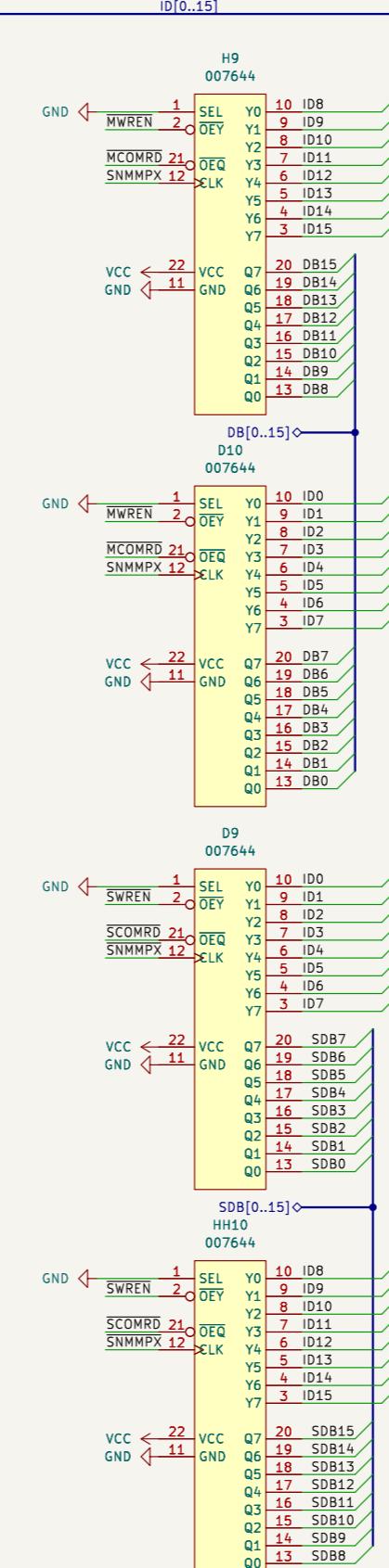
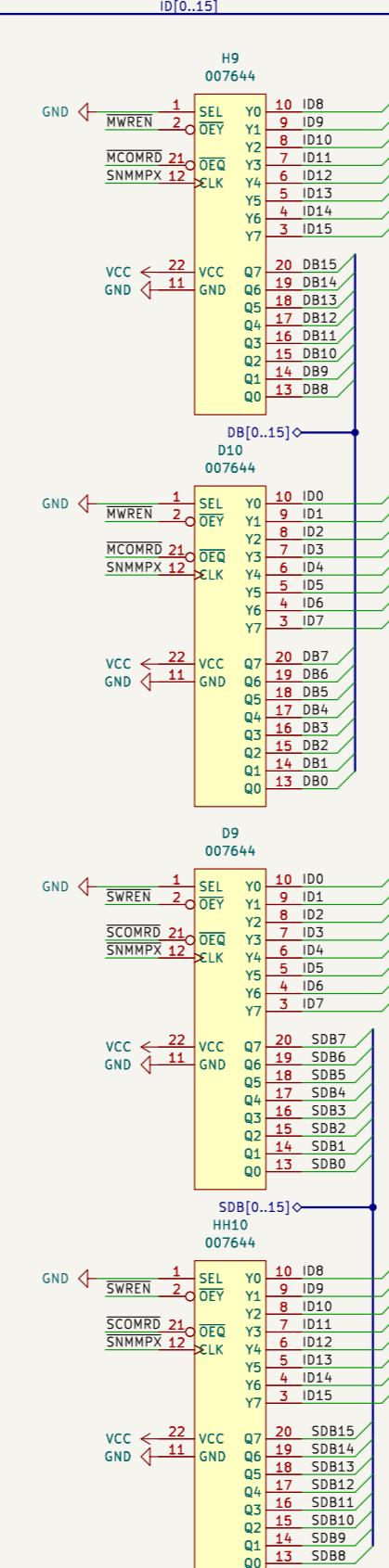
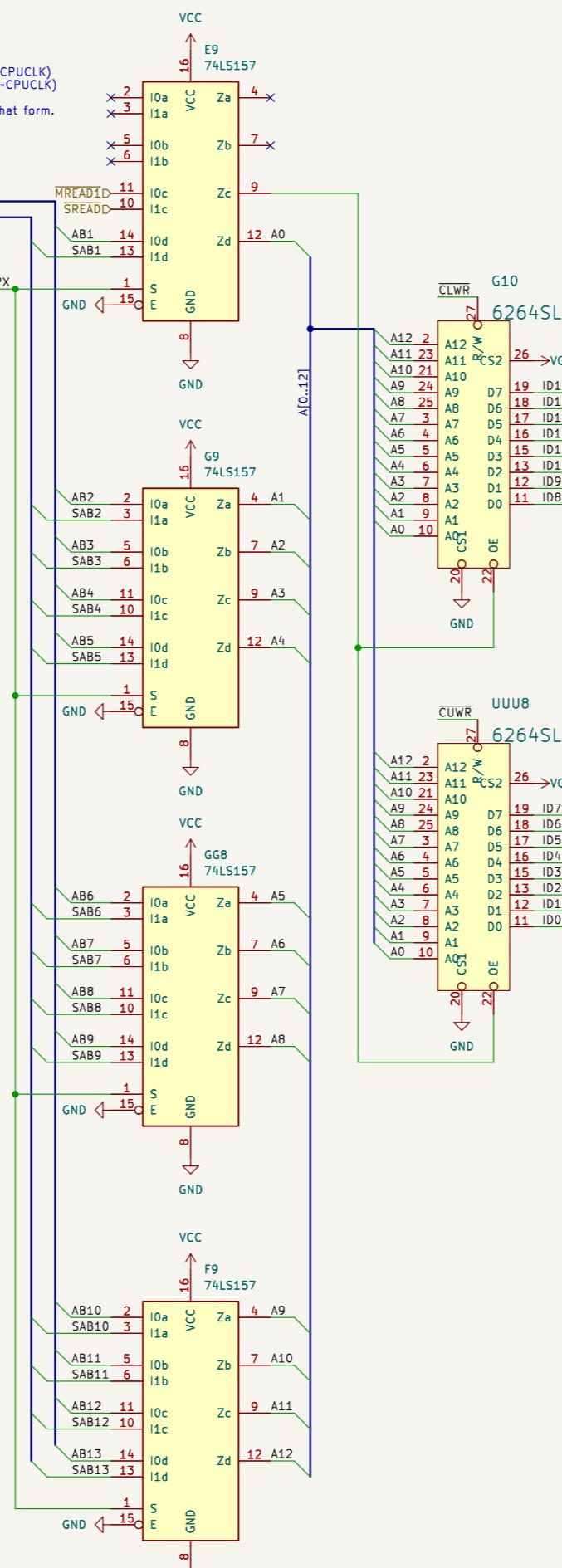
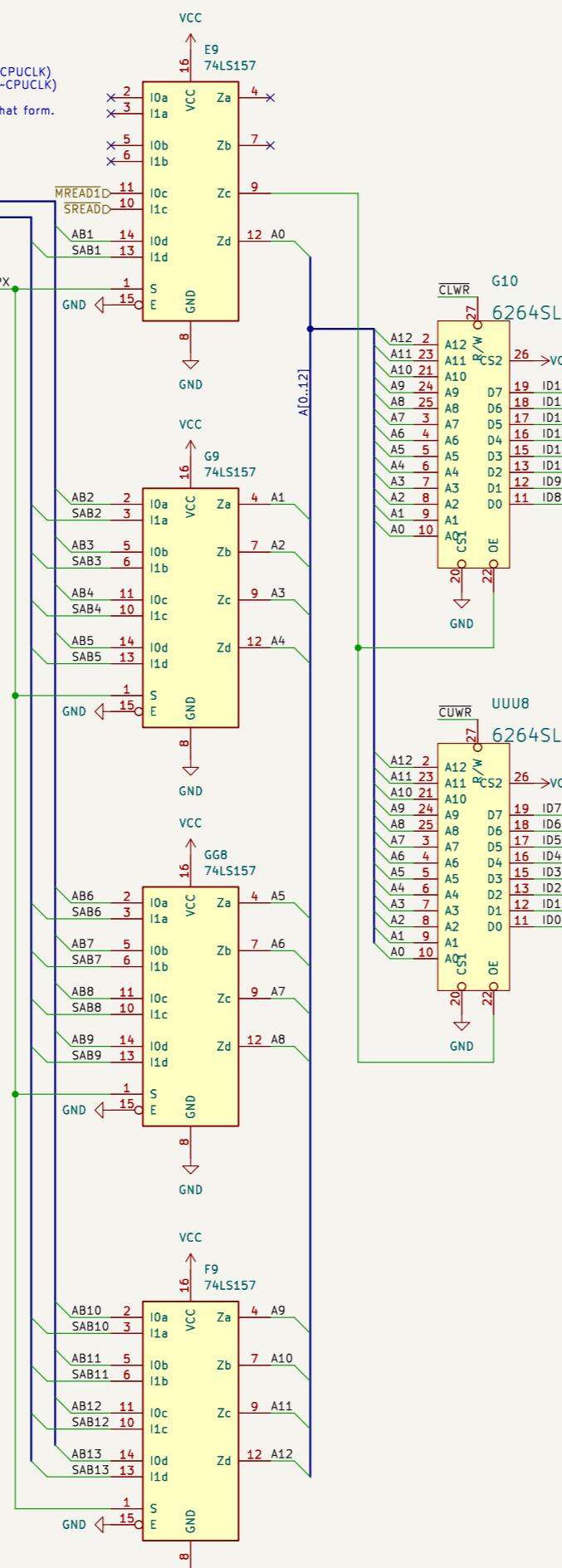
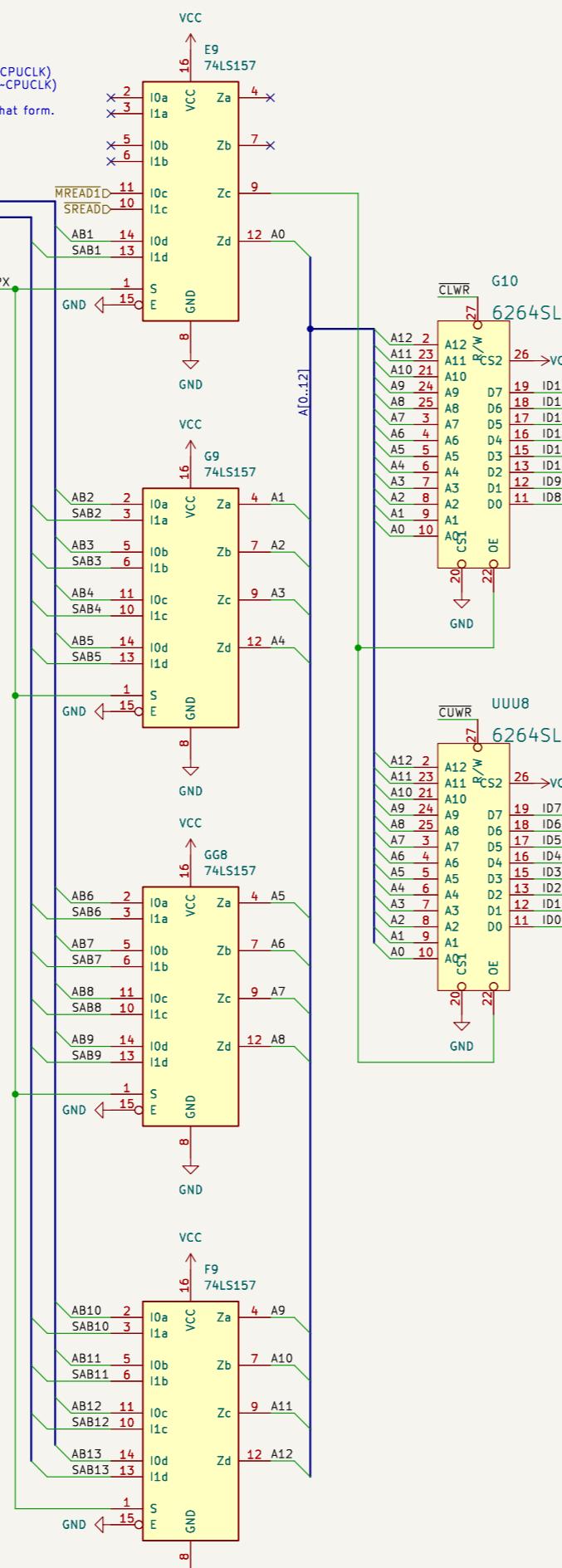
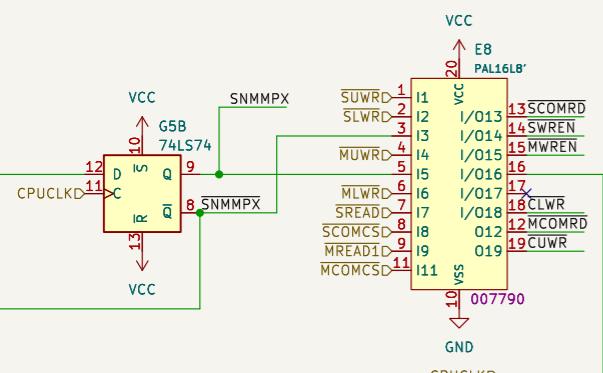
Size: A3 Date: 2023-05-11
KiCad E.D.A. kicad-cl 7.0.10-7.0.10-ubuntu20.04.1

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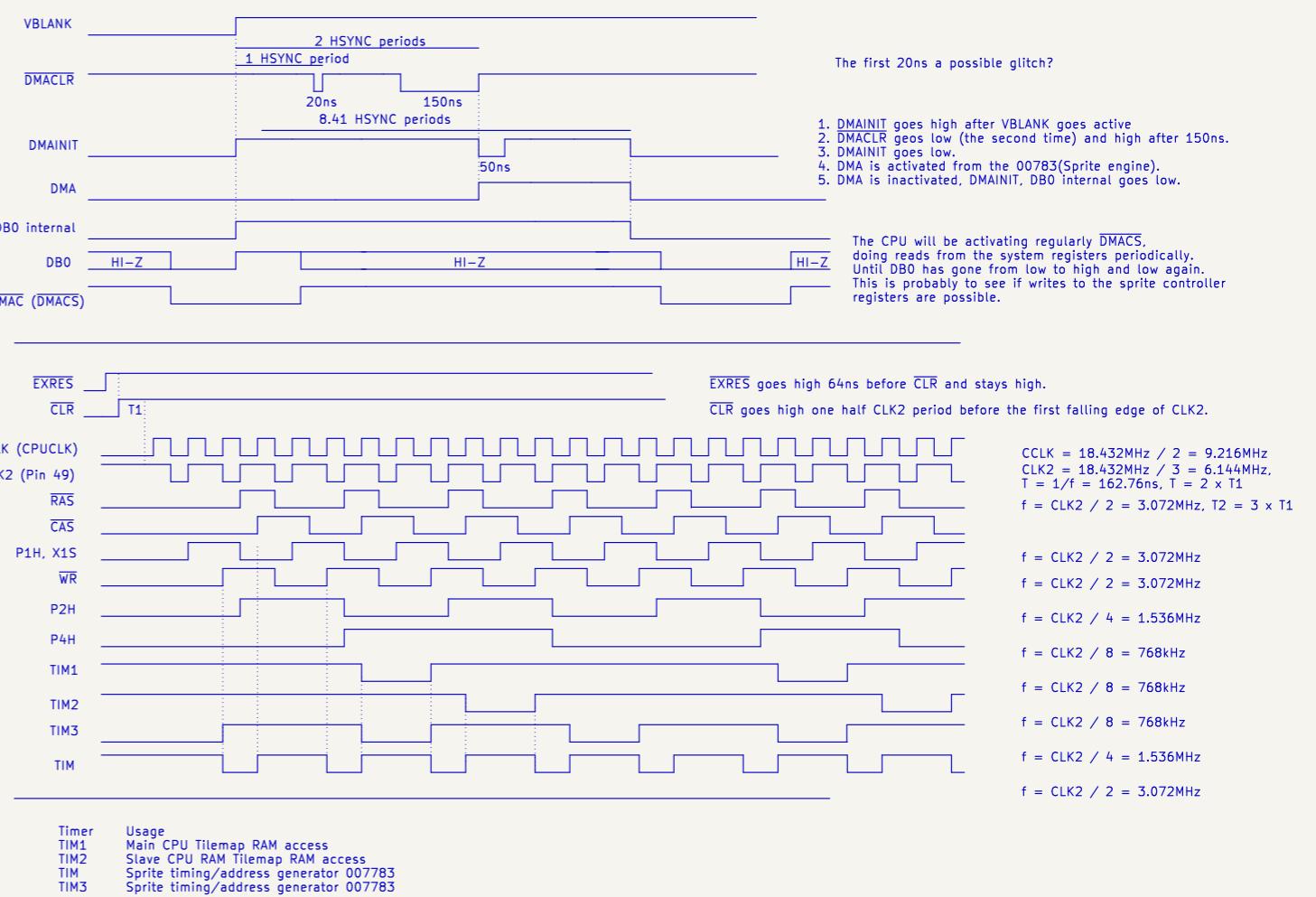
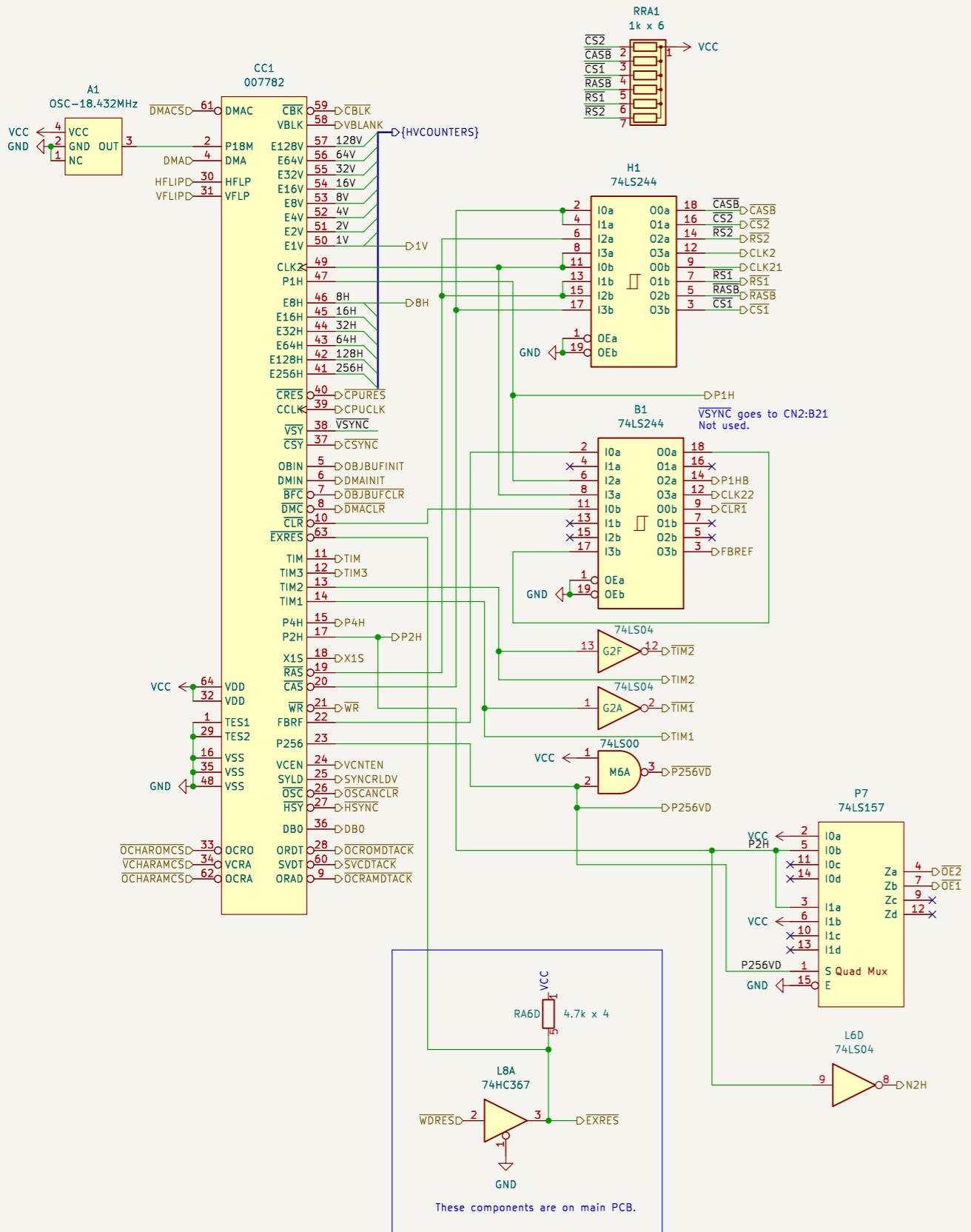


$MCOMRD = \neg(MREAD1 \& \neg MCOMCS) = MREAD1 + MCOMCS$
 $SCOMRD = \neg(SREAD \& \neg SCOMCS)$
 $SWREN = \neg(SNMMPPX \& SREAD \& \neg SCOMCS)$
 $MWREN = \neg(SNMMPPX \& MREAD1 \& \neg MCOMCS)$
 $CLWR = \neg(SUWR \& \neg SNMMPPX \& SREAD \& \neg SCOMCS \& \neg CPUCLK + \neg SNMMPPX \& \neg MLWR \& \neg MREAD1 \& \neg MCOMCS \& \neg CPUCLK)$
 $CUWR = \neg(SUWR \& \neg SNMMPPX \& SREAD \& \neg SCOMCS \& \neg CPUCLK + \neg MUWR \& \neg SNMMPPX \& \neg MREAD1 \& \neg MCOMCS \& \neg CPUCLK)$

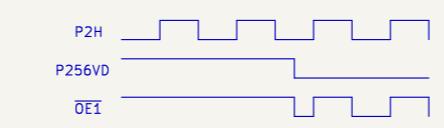
A All AND logic can be converted to OR form. But since AND logic and inverters are used in the PAL16LB device it is kept in that form. The equations follow verilog syntax. The active low signals are not inverted, the bar is there only to show activeness.



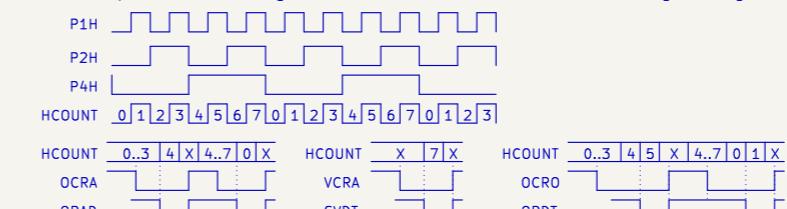
DMA Synchronization



Output enables active vs. part of frame buffer active



Chip select signals and Data Acknowledge signals



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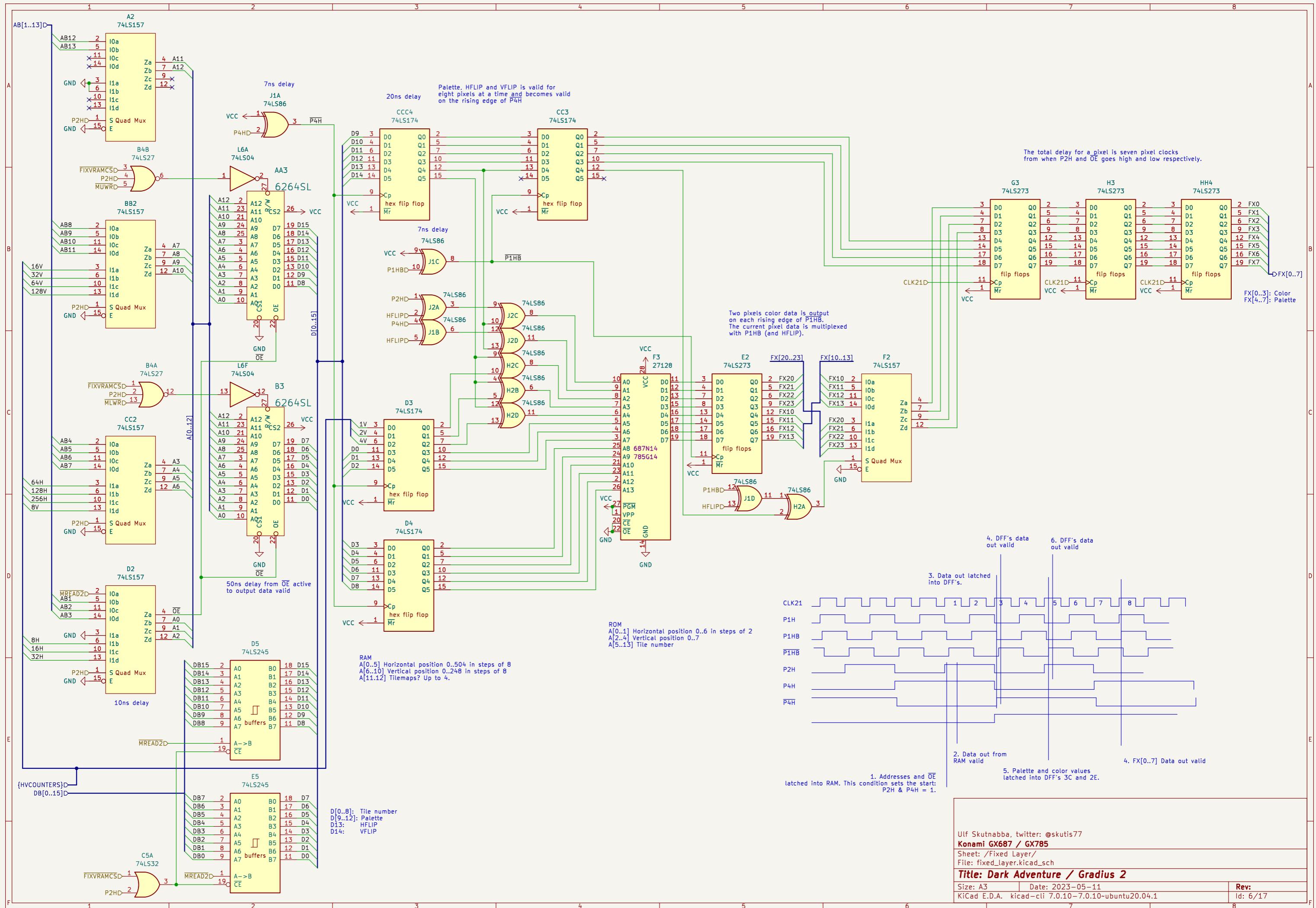
Sheet: /Timing/

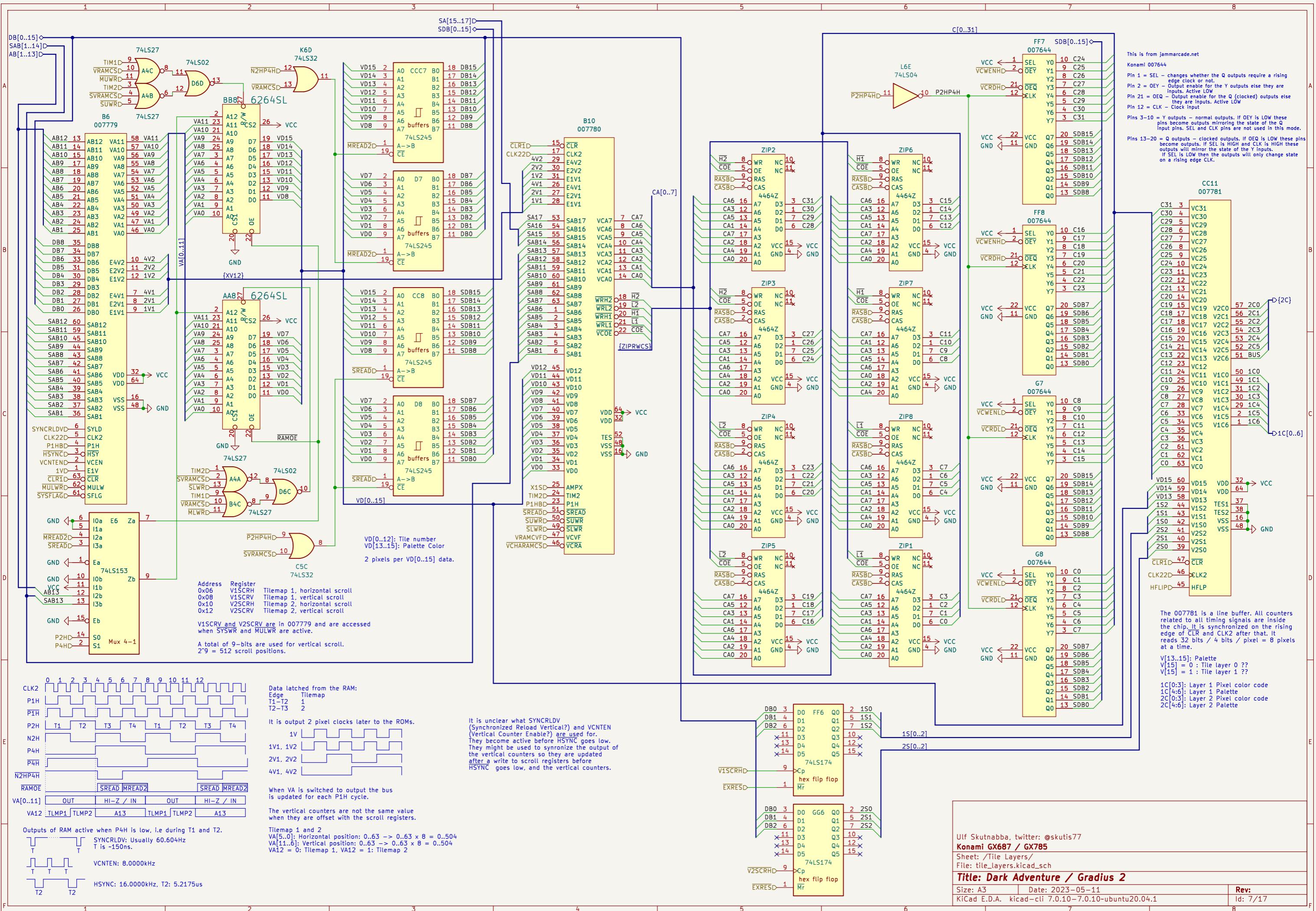
File: timing.kicad_sch

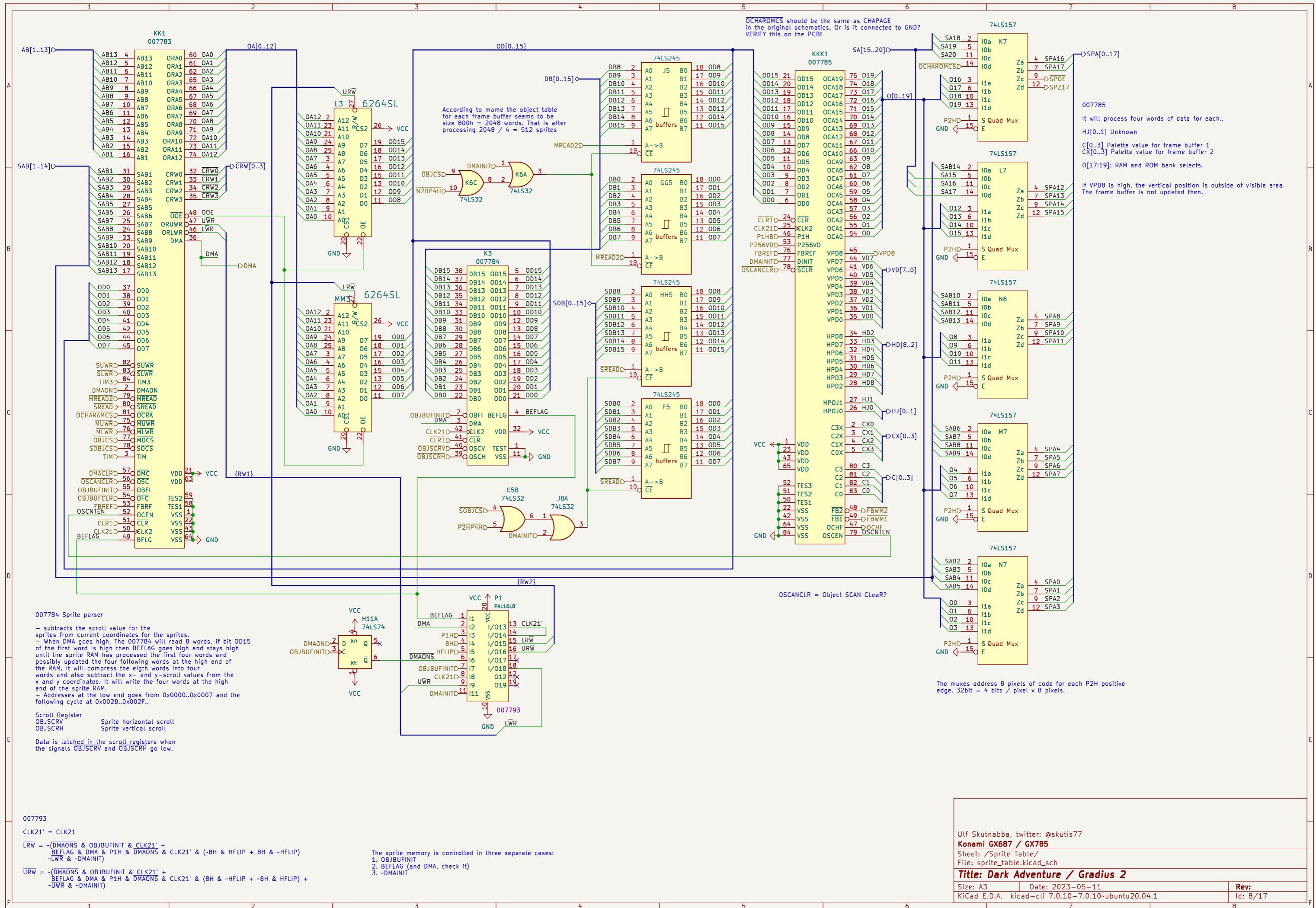
Title: Dark Adventure / Gradius 2

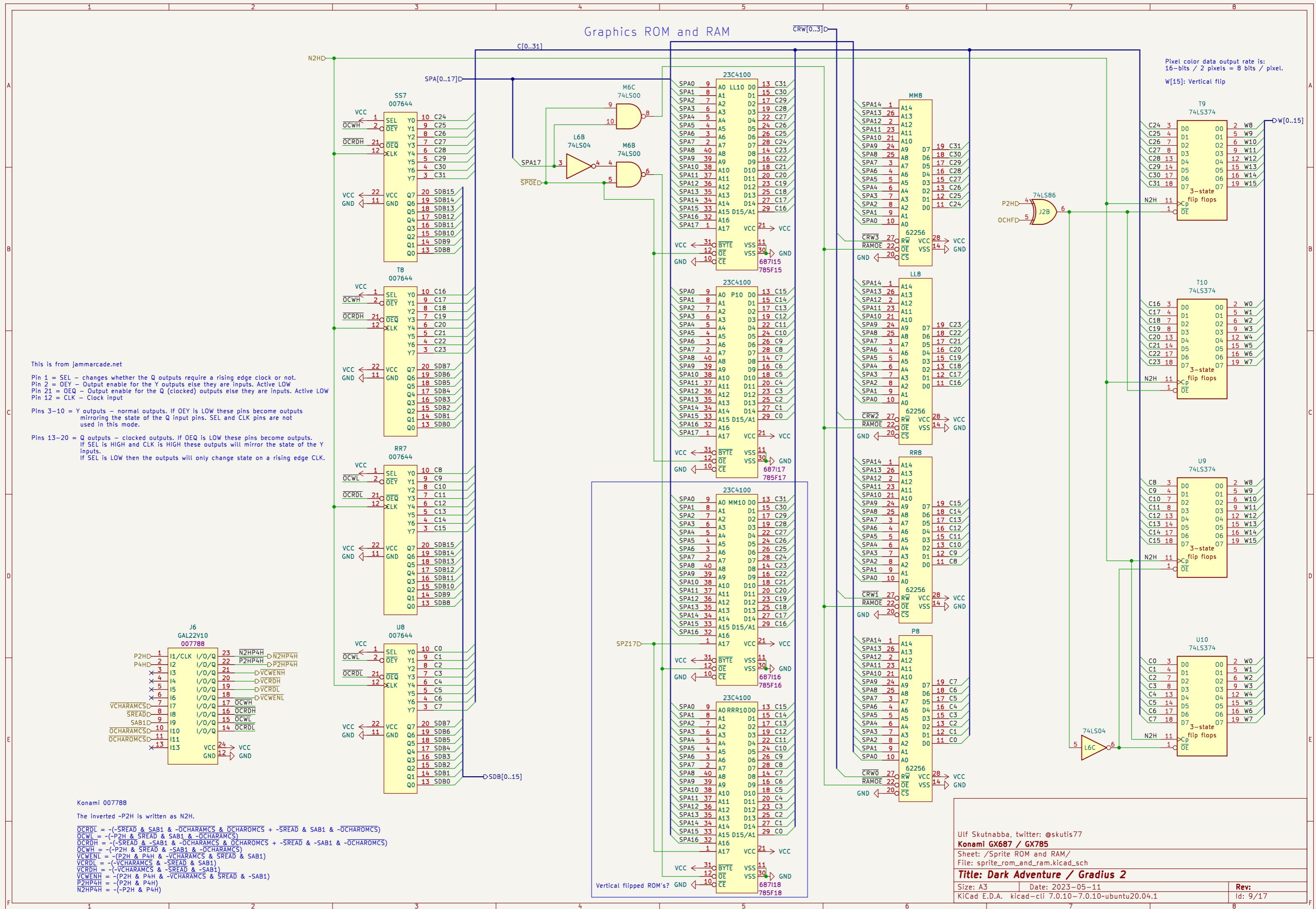
Size: A3 Date: 2023-05-11
 KiCad E.D.A. kicad-cl 7.0.10-7.0.10-ubuntu20.04.1

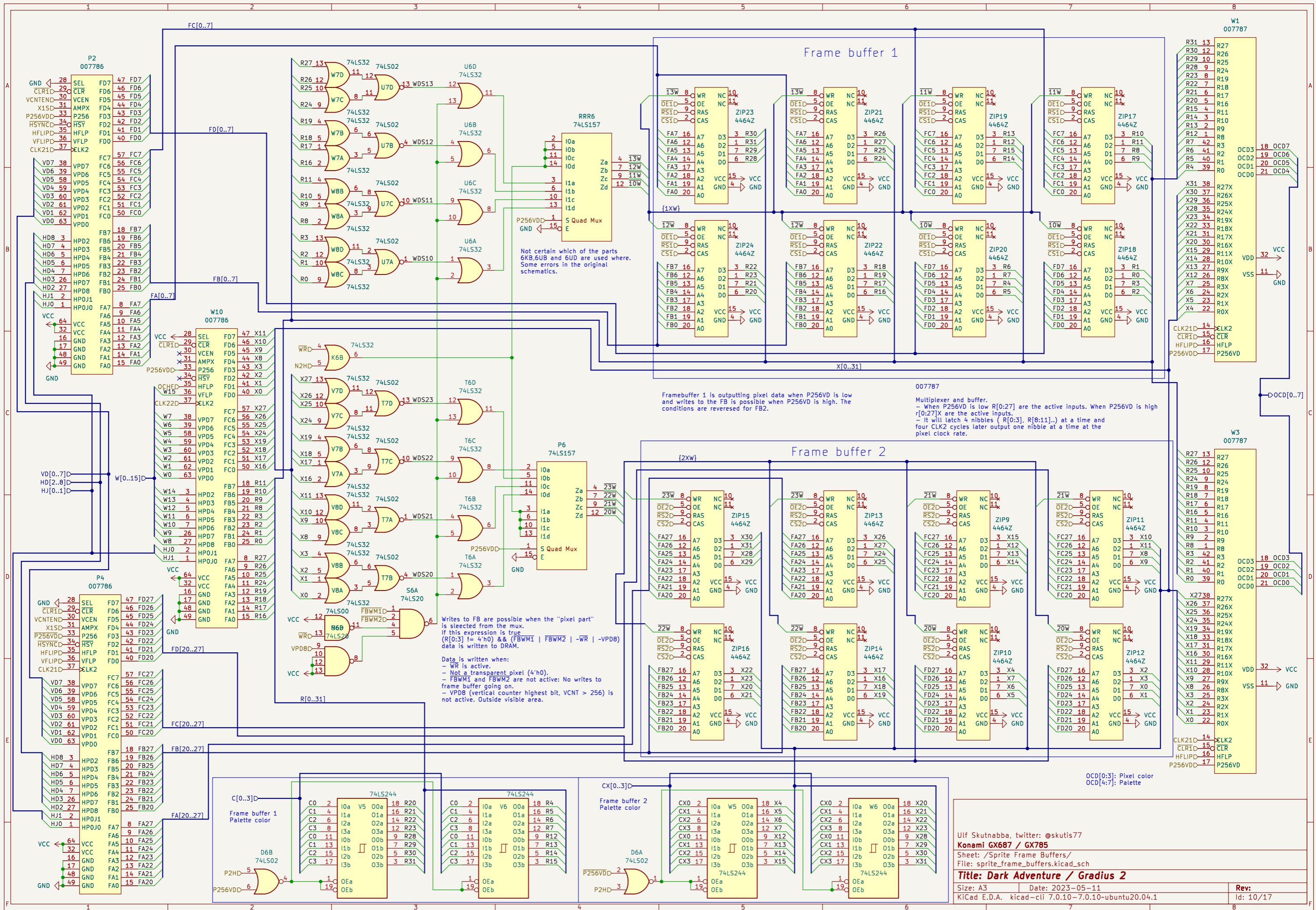
Rev: Id: 5/17

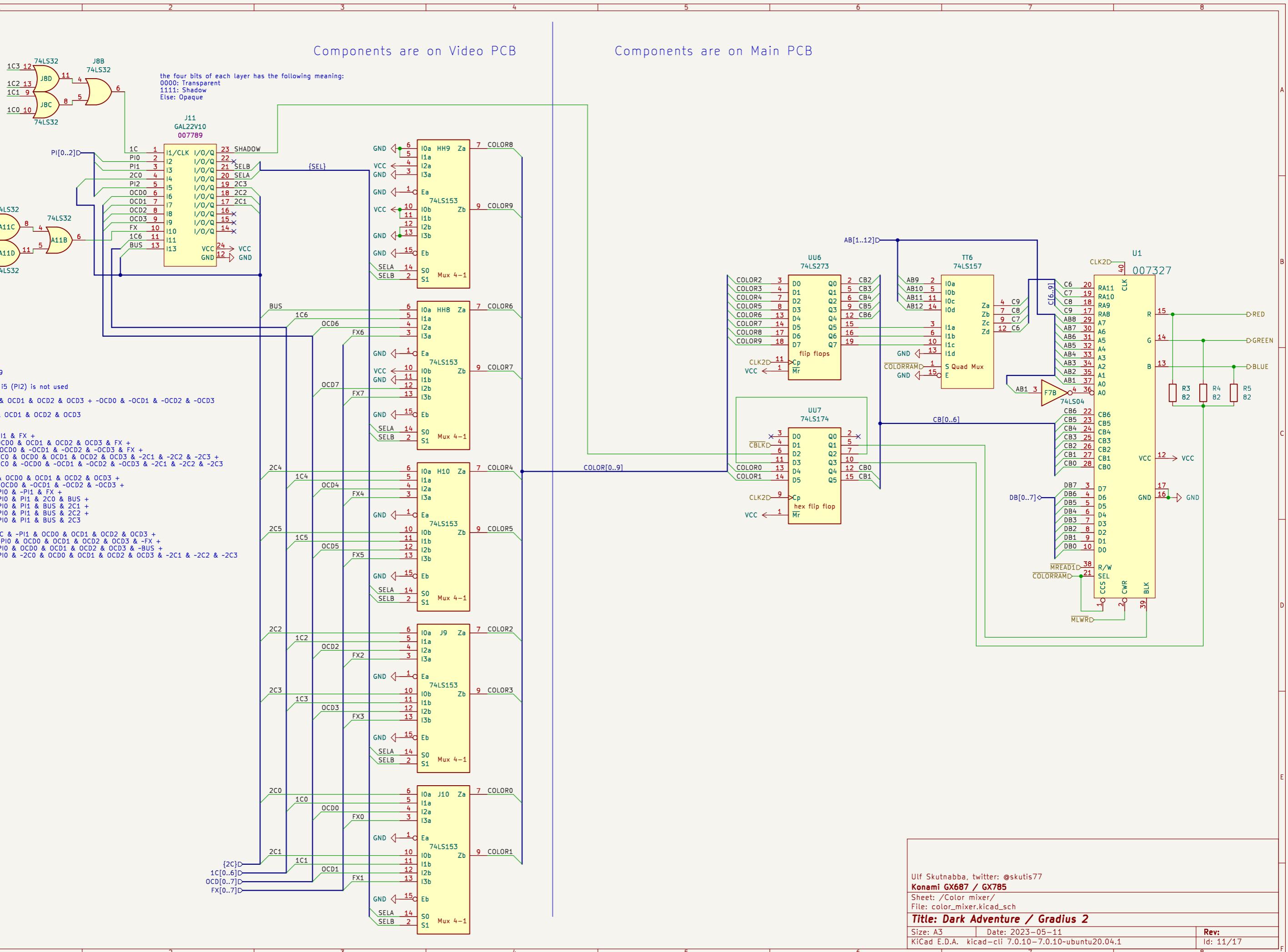












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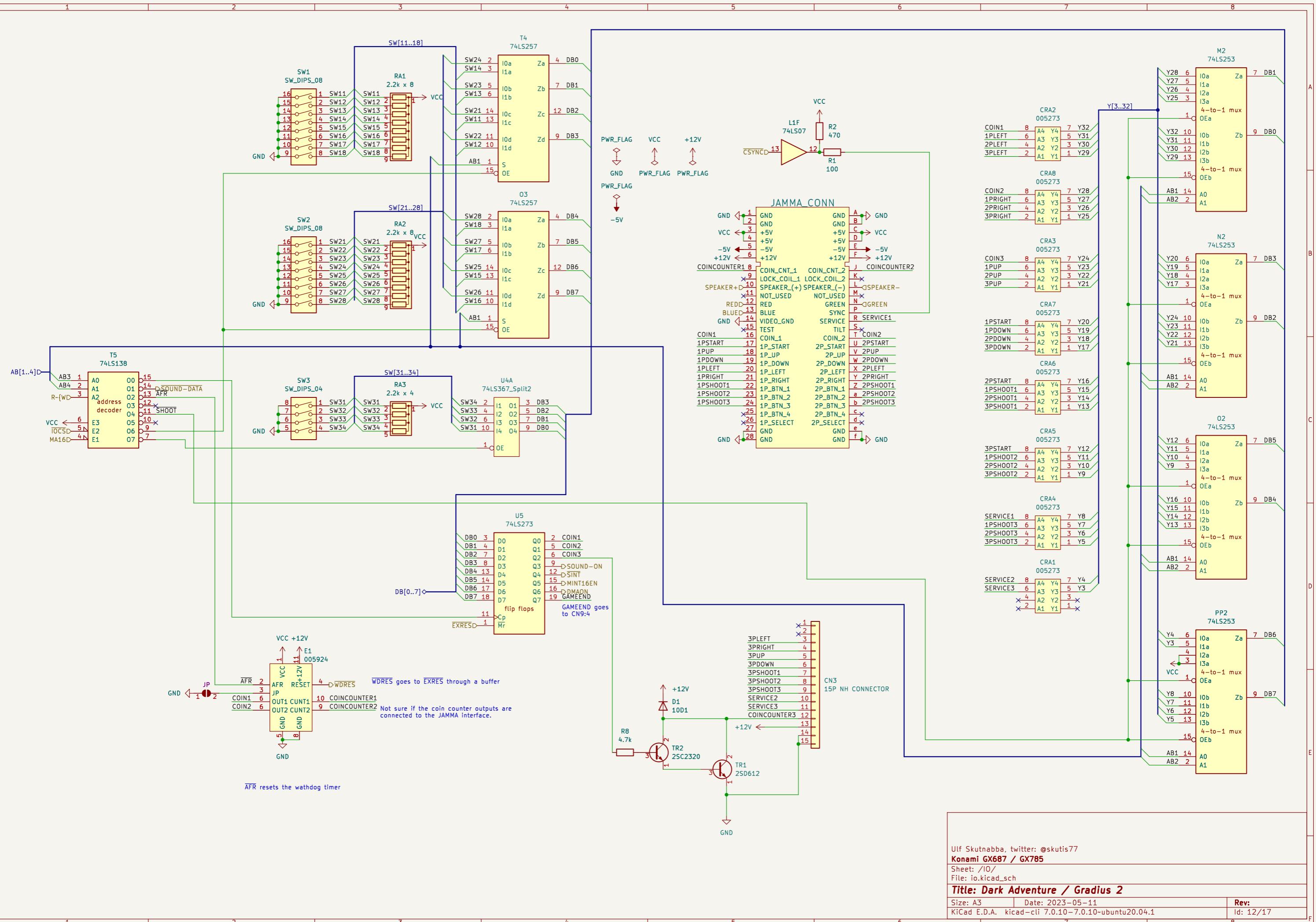
Sheet: /Color mixer/

File: color_mixer.kicad_sch

Title: Dark Adventure / Gradius 2

Size: A3 | Date: 2023-05-11
KiCad E.D.A. kicad-cl 7.0.10-7.0.10-ubuntu20.04.1

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Konami GX687 / GX85

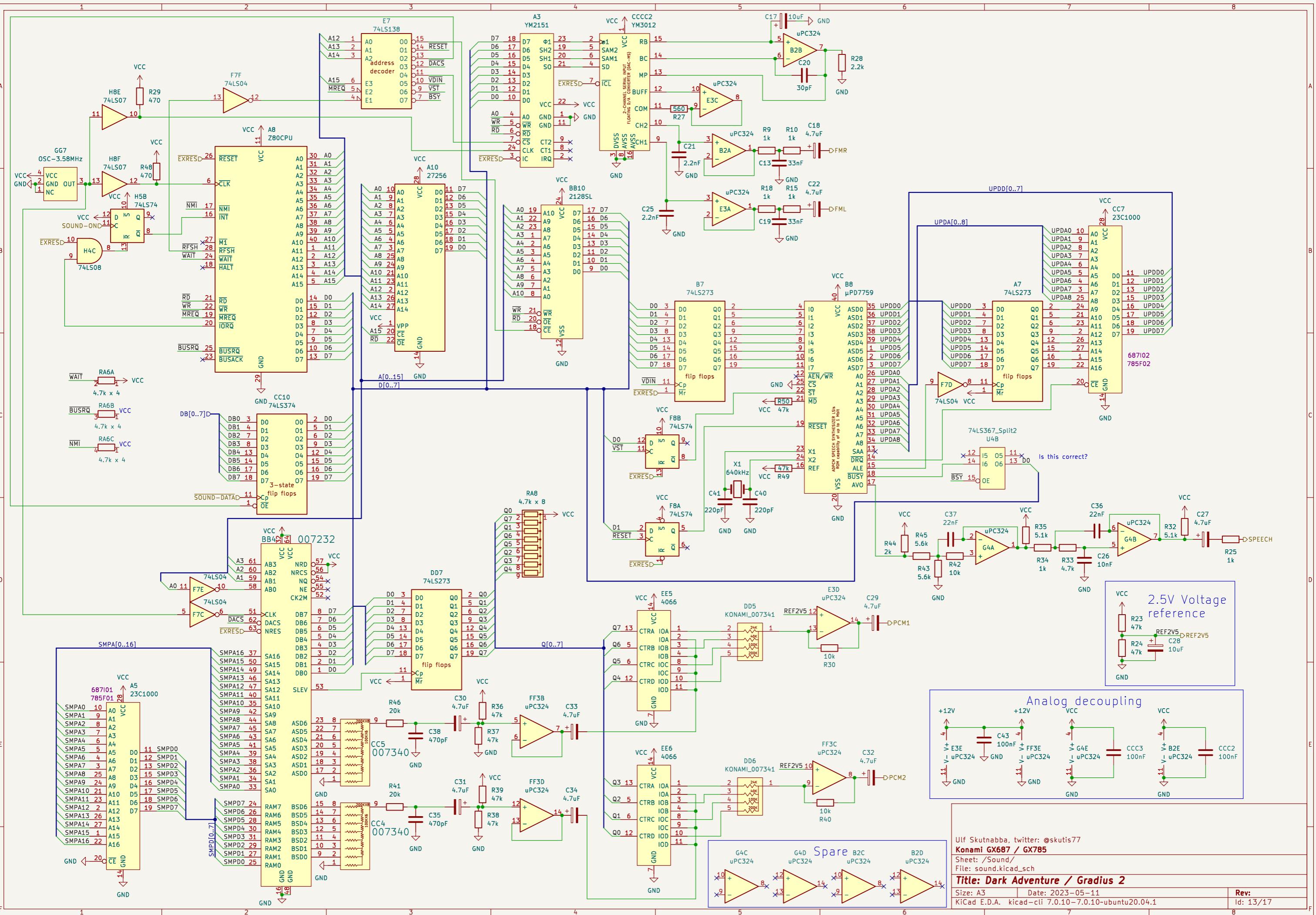
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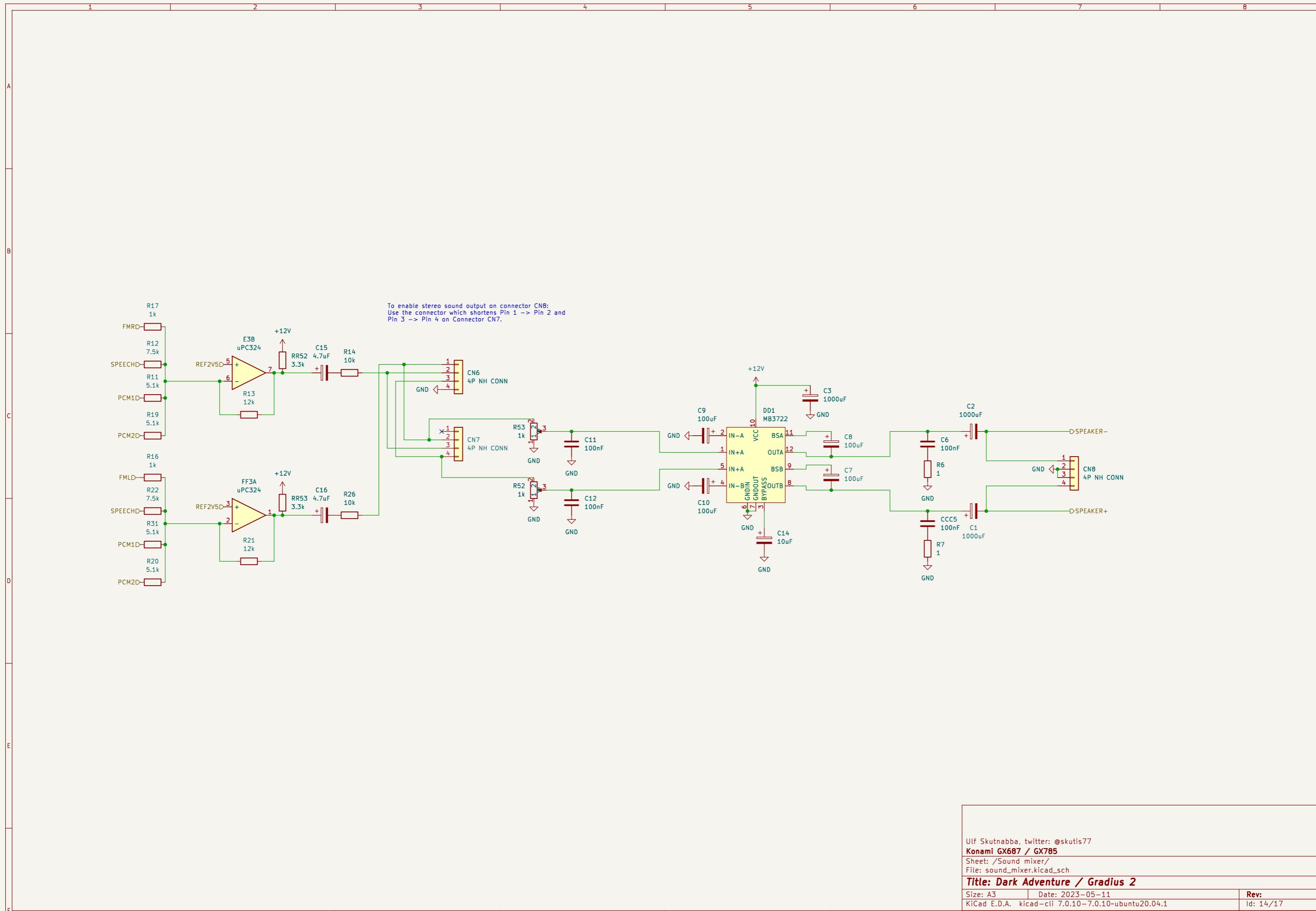
Title: Dark Adventure / Gradius 2

Size: A3 Date: 2023-05-11
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1 2 3 4 5 6 7 8



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Sheet: /Sound mixer/

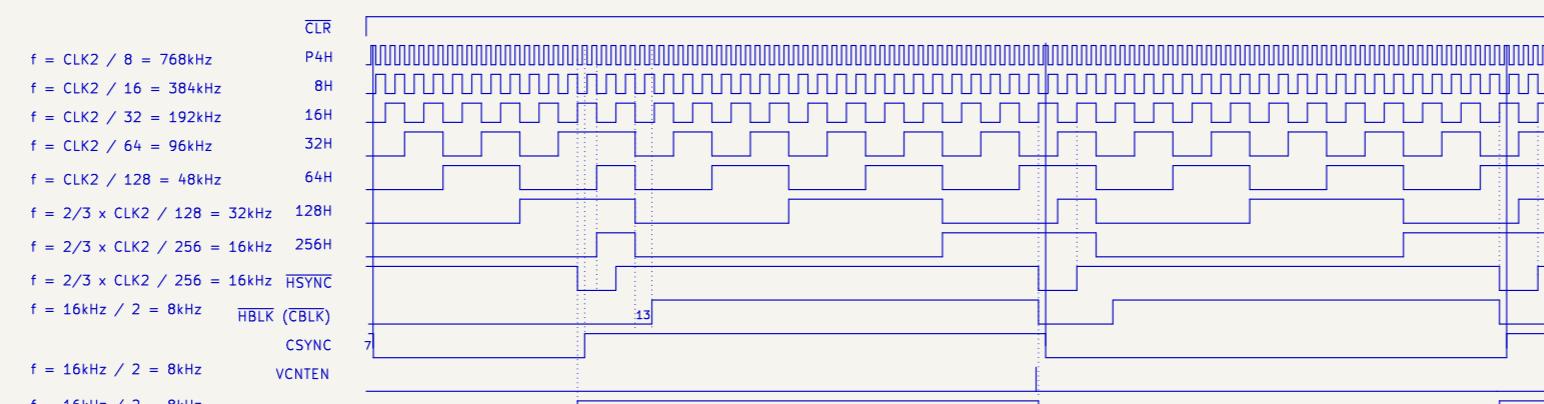
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Title: Dark Adventure / Gradius 2

Size: A3	Date: 2023-05-11
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1 2 3 4 5 6 7 8

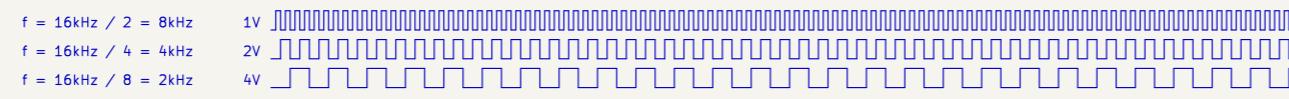
Horizontal signals



– The first VCNTEN is skipped after reset.
It goes low 140ns before HSYNC goes low,
and high again when HSYNC goes low.
VCNTEN is active right before every second falling edge of
HSYNC.

– CPURES goes high, and stays high, on the seventh falling edge
of HSYNC.

Vertical signals



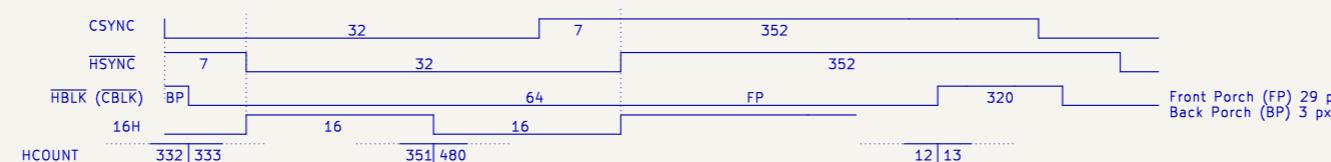
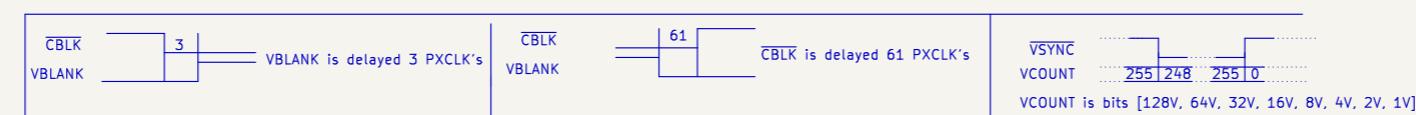
Every 16th pulse is long.
Every 8th pulse is long.
Every 4th pulse is long.
Every 2nd pulse is long.
High period is longer

VBLANK High: 7 x 16 x 2 = 224, Low: 5 x 4 x 2 = 40
SYNCRLDV goes low 140ns before FBREF goes low.
SYNCRLDV goes high again when FBREF goes low.

OBJBUFCLR goes low one pixel clock before the rising edge
of VBLANK and high again when VBLANK goes high.

60.606Hz, OSCANCLR goes low for 140ns ~ One pixel clock cycle.
P256VD goes high/low one
P4H cycle (8 pixels) after VSYNC goes high.

FBREF is measured at pin 22. At U186:3 FBREF is delayed by 22ns going high and 12ns going low.



The horizontal blanking part is shown of the composite blanking signals.

HCOUNT is bits [256H, 128H, 64H, 32H, 16H, 8H, P4H, P2H, P1H]

HSYNC = 6.144MHz / 384 = 16kHz

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Sheet: /Timing diagrams/

File: timing_diagrams.kicad_sch

Title: Dark Adventure / Gradius 2

Size: A3 Date: 2023-05-11
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A

B

C

D

E

F

A

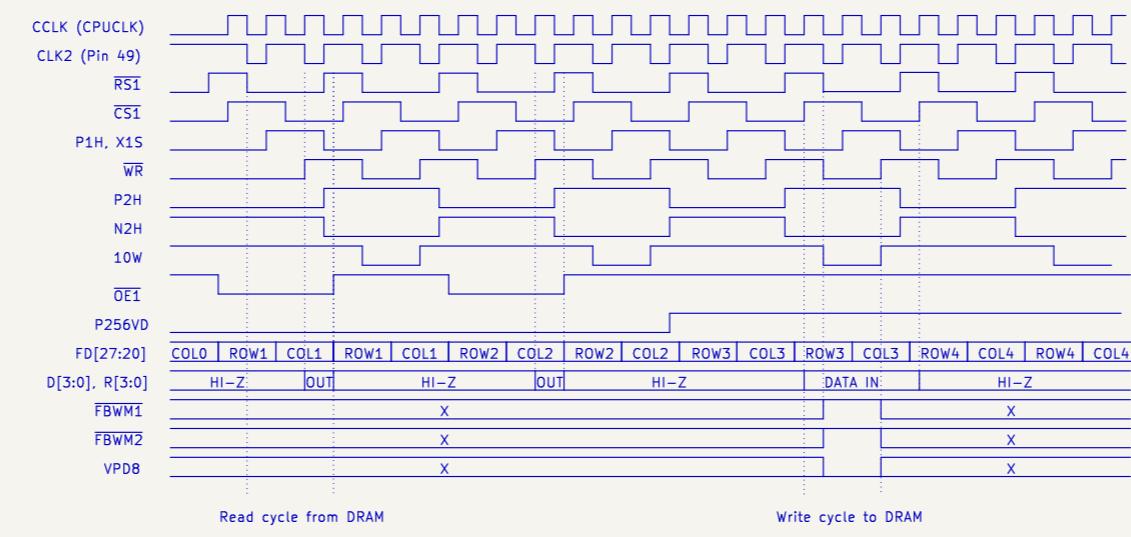
B

C

D

E

F



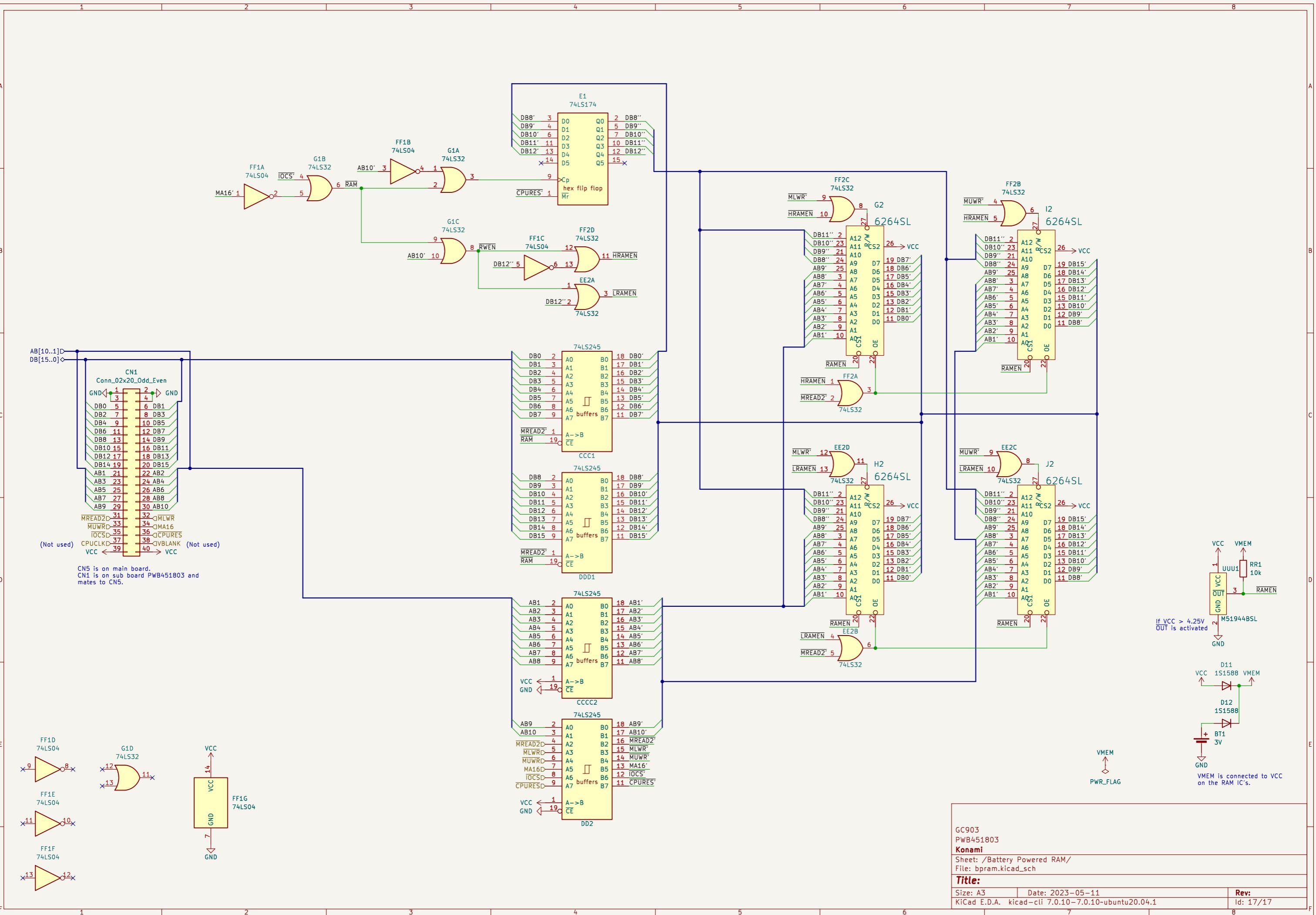
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Sheet: /Sprite timing diagrams/

File: sprite_timing_diagrams.kicad_sch

Title: Dark Adventure / Gradius 2Size: A3 | Date: 2023-05-11
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Id: 16/17



GC903
PWB451803
Konami
Sheet: /Battery Powered RAM/
File: bpram.kicad_sch

Title:

Size: A3 Date: 2023-05-11
KiCad E.D.A. kicad-cl 7.0.10-7.0.10-ubuntu20.04.1

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