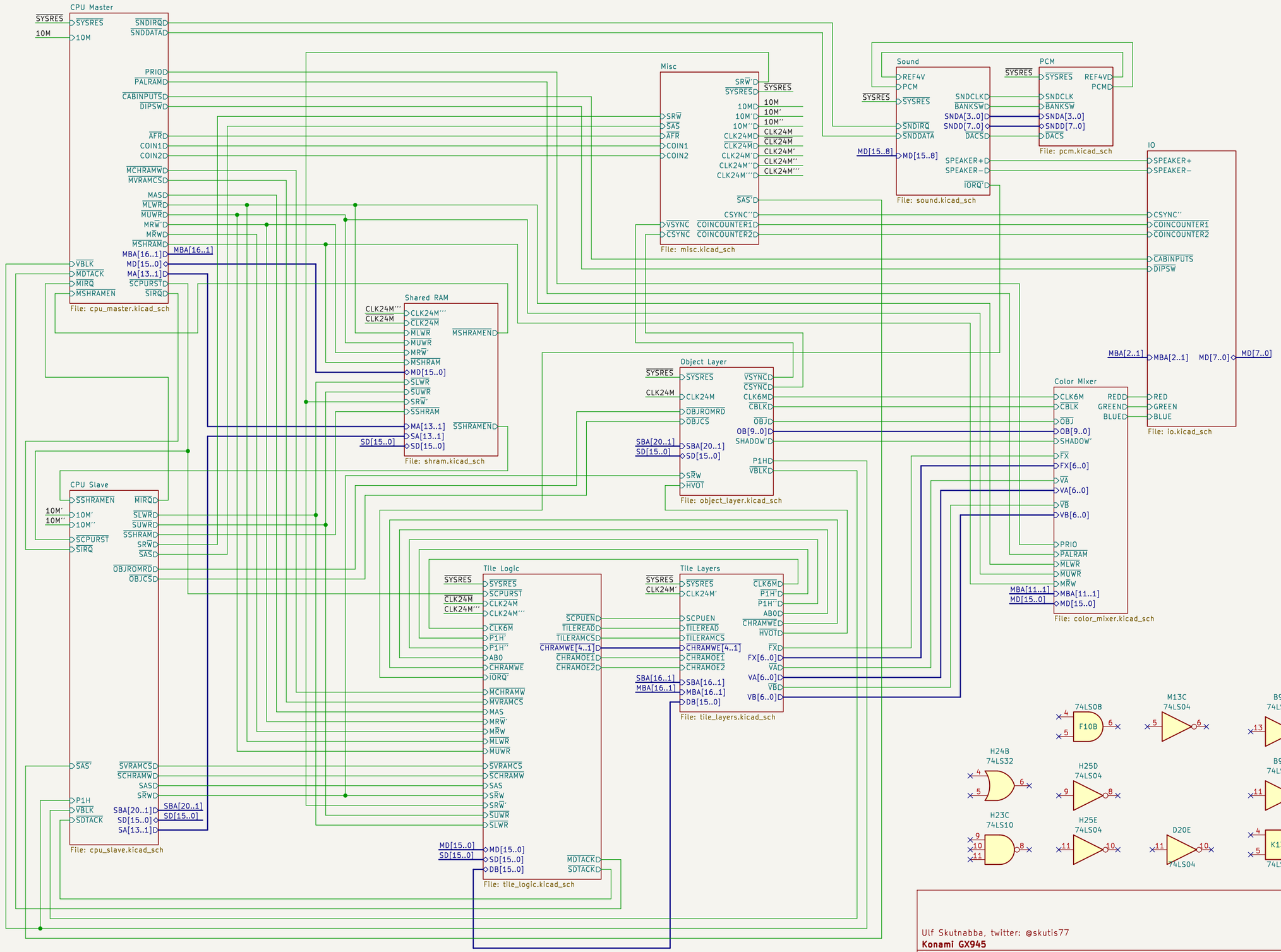

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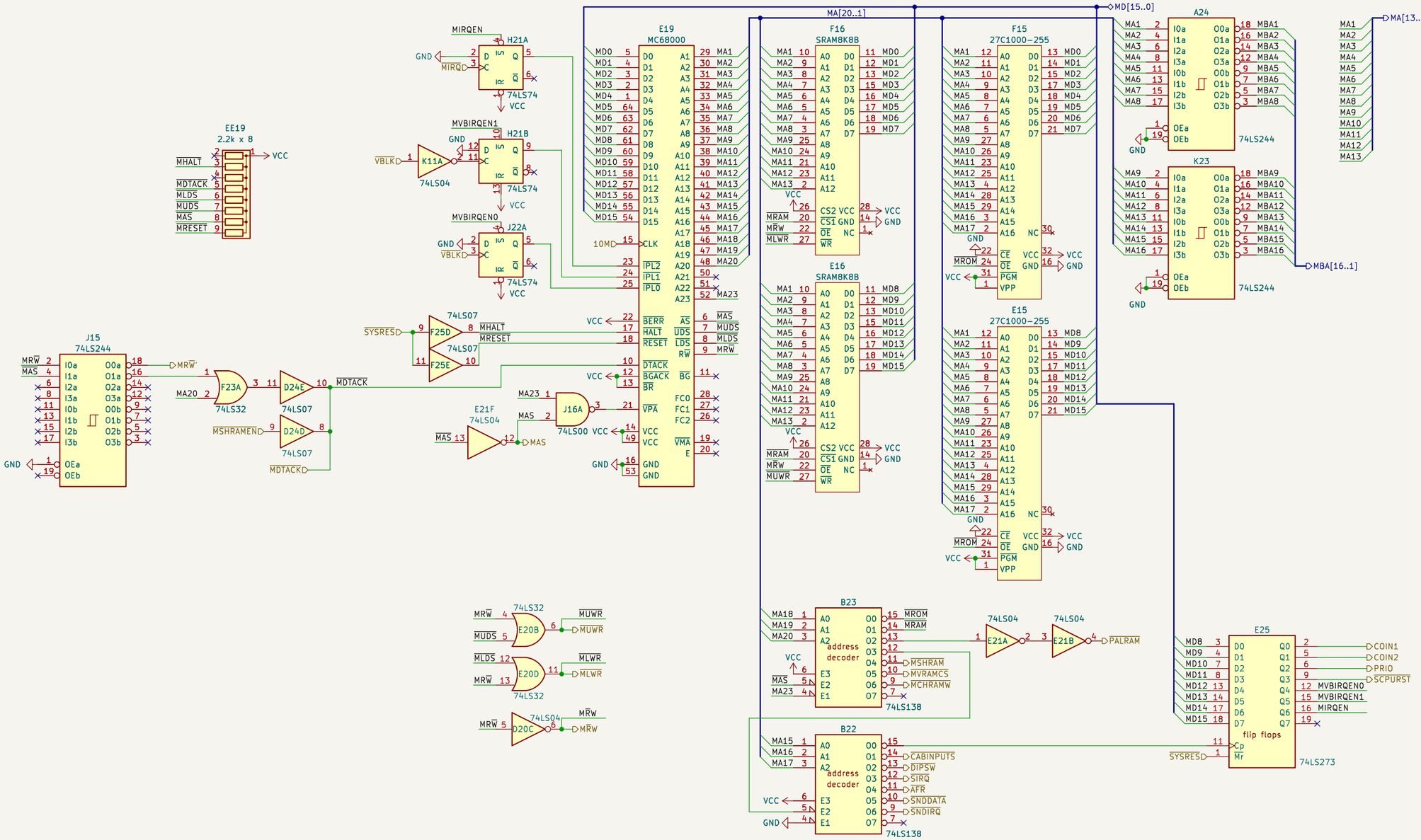
Konami GX945

Sheet: /

File: grad3.kicad_sch

Title: Gradius 3

Size: A3	Date: 2024-04-11	**Rev:**
KiCad E.D.A. 8.0.9		Id: 1/12


MIRQEN
H21A
MVBIRQEN1
H21B
MVBIRQEN0
J22A
74LS74
74LS04
K11A
VBLK
EE19
2.2k x 8
MHALT
MDTACK
MLDS
MUDS
MAS
MRESET
VCC
GND
E19
MC68000
10M
MA[20..1]
MD[15..0]
MA[13..1]
MBA[16..1]
F16
SRAM8K8B
E16
F15
27C1000-255
E15
A24
K23
74LS244
J15
MRW'
MDTACK
MSHRAMEN
SYSRES
74LS07
F25D
F25E
F23A
D24E
D24D
74LS32
E21F
J16A
74LS00
MUWR
MLWR
D20C
E20B
E20D
B23
B22
74LS138
E21A
E21B
PALRAM
E25
74LS273
flip flops
COIN1
COIN2
PRIO
SCPURST
MVBIRQEN0
MVBIRQEN1
MIRQEN
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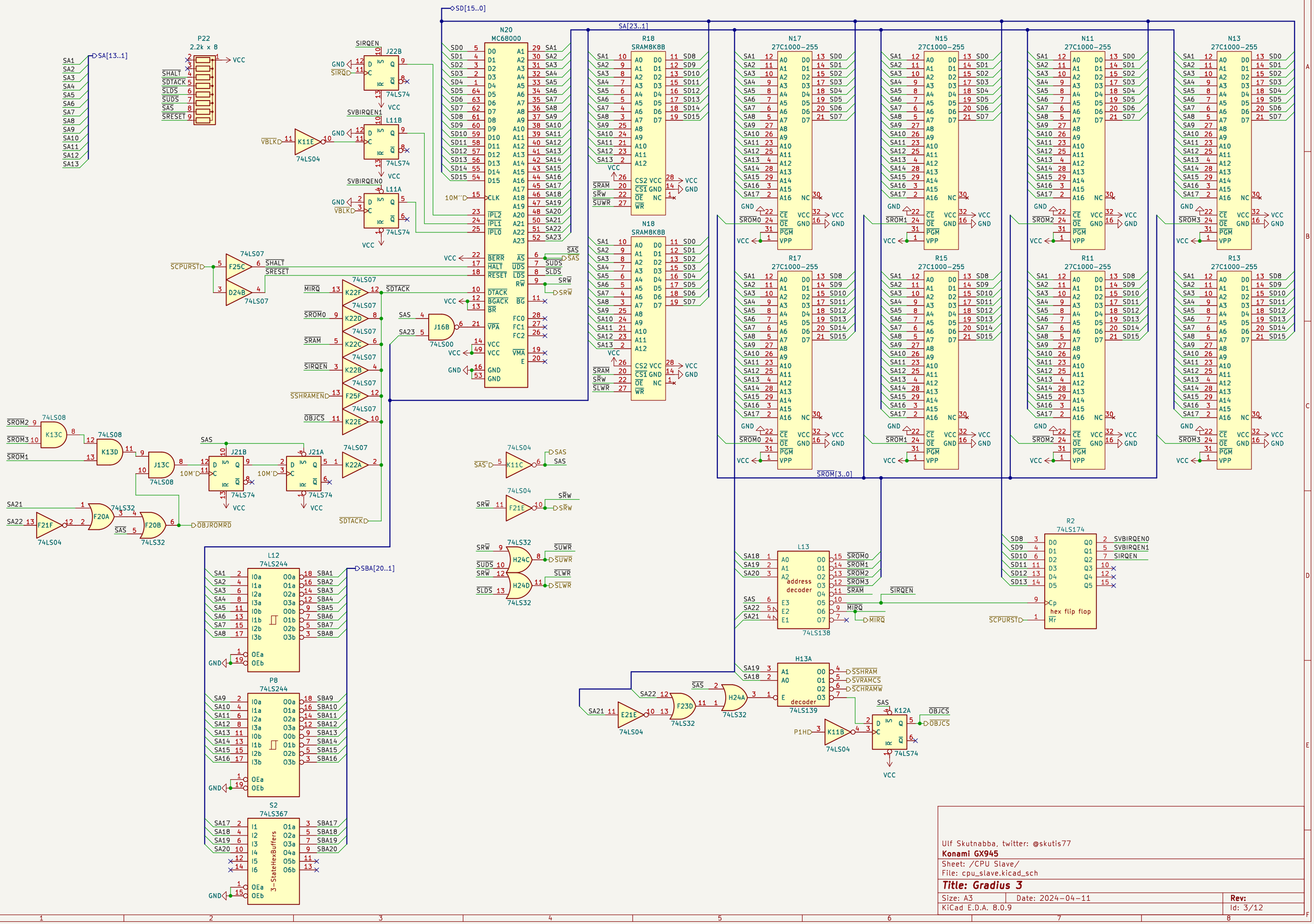
Konami GX945
Sheet: /CPU Master/
File: cpu_master.kicad_sch
Title: Gradius 3
Size: A3
Date: 2024-04-11
Rev:
KiCad E.D.A. 8.0.9
Id: 2/12



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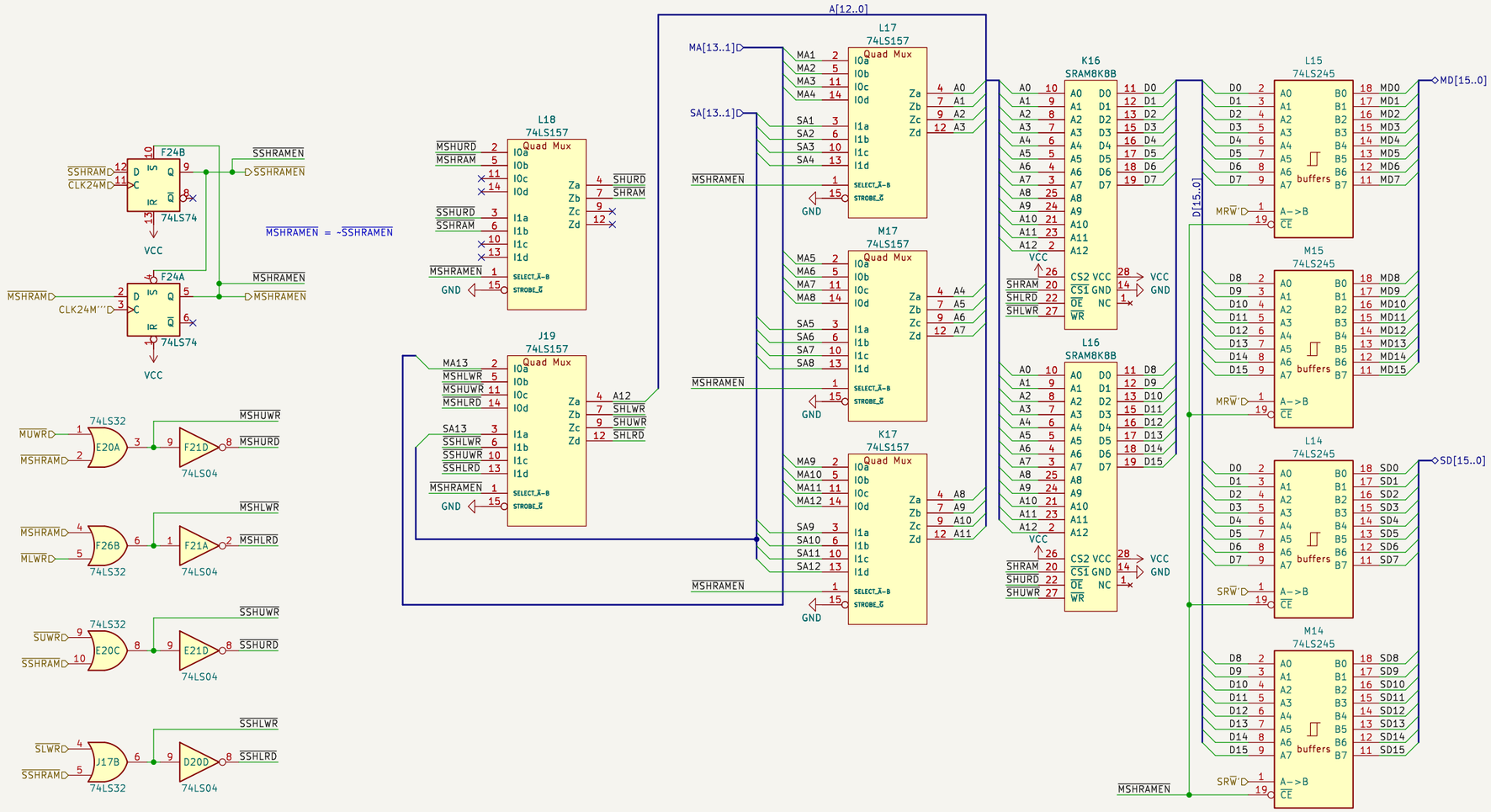
Sheet: /CPU Slave/

File: cpu_slave.kicad_sch

Title: Gradius 3

Size: A3	Date: 2024-04-11	**Rev:**
KiCad E.D.A. 8.0.9		Id: 3/12



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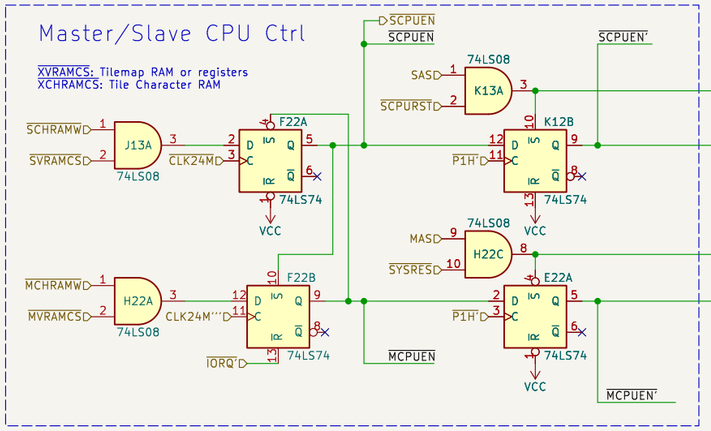
Sheet: /Shared RAM/
File: shram.kicad_sch

Title: Gradius 3

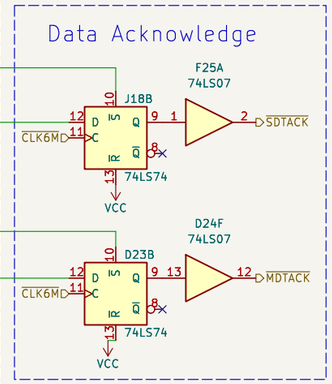
Size: A3	Date: 2024-04-11	**Rev:**
KiCad E.D.A. 8.0.9		Id: 4/12

Master/Slave CPU Ctrl

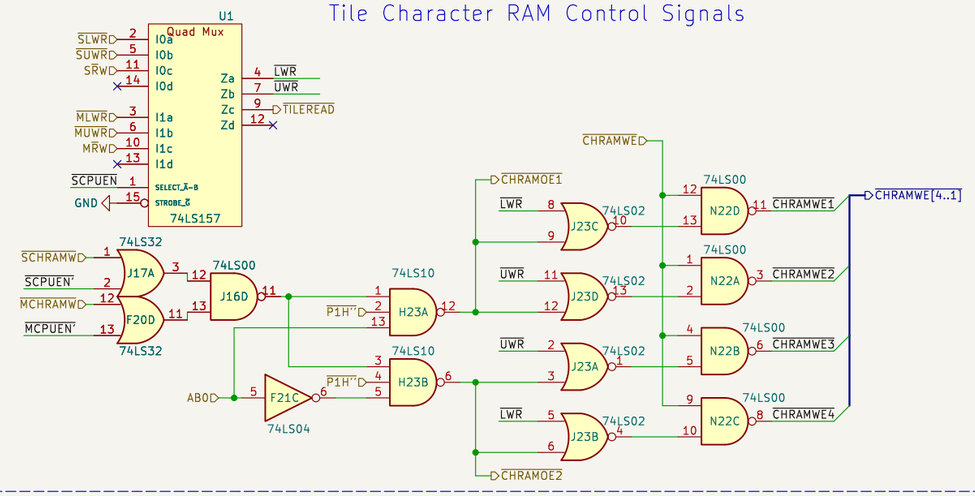
$\overline{XVRAMCS}$: Tilemap RAM or registers
$\overline{XCHRAMCS}$: Tile Character RAM



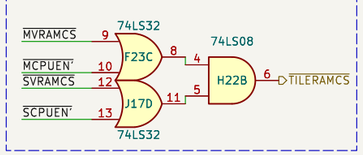
Data Acknowledge



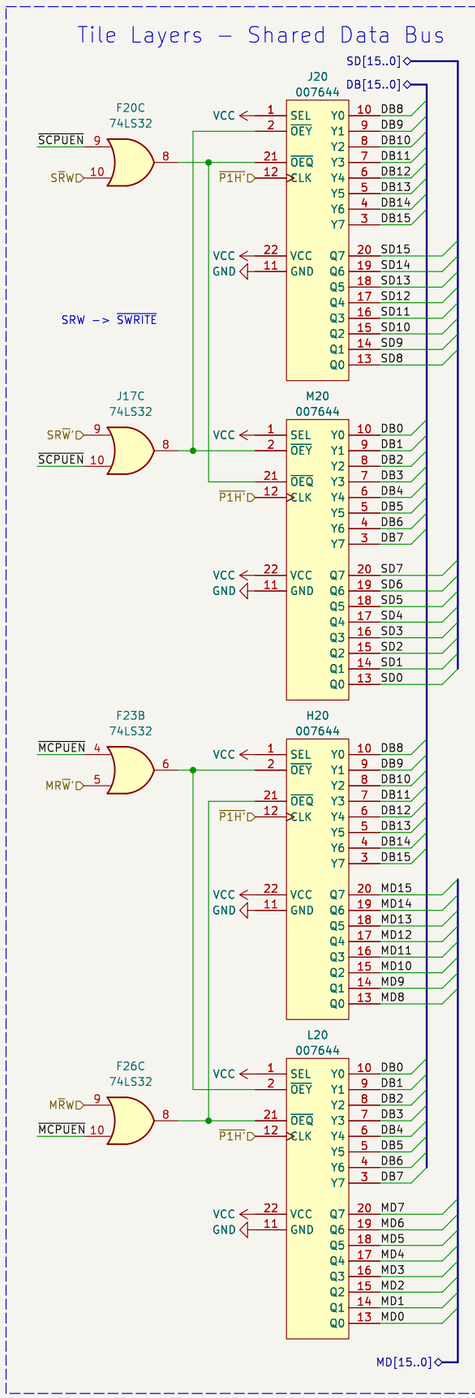
Tile Character RAM Control Signals



Tile RAM and Registers



Tile Layers – Shared Data Bus



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Sheet: /Tile Logic/
File: tile_logic.kicad_sch

Title: Gradius 3

Size: A3	Date: 2024-04-11	**Rev:**
KiCad E.D.A. 8.0.9		Id: 5/12

Character code RAM

TILERAMCS can write and read both to tilemap RAM and character RAM

Tilemaps RAM: Fix, Layer 1 and 2

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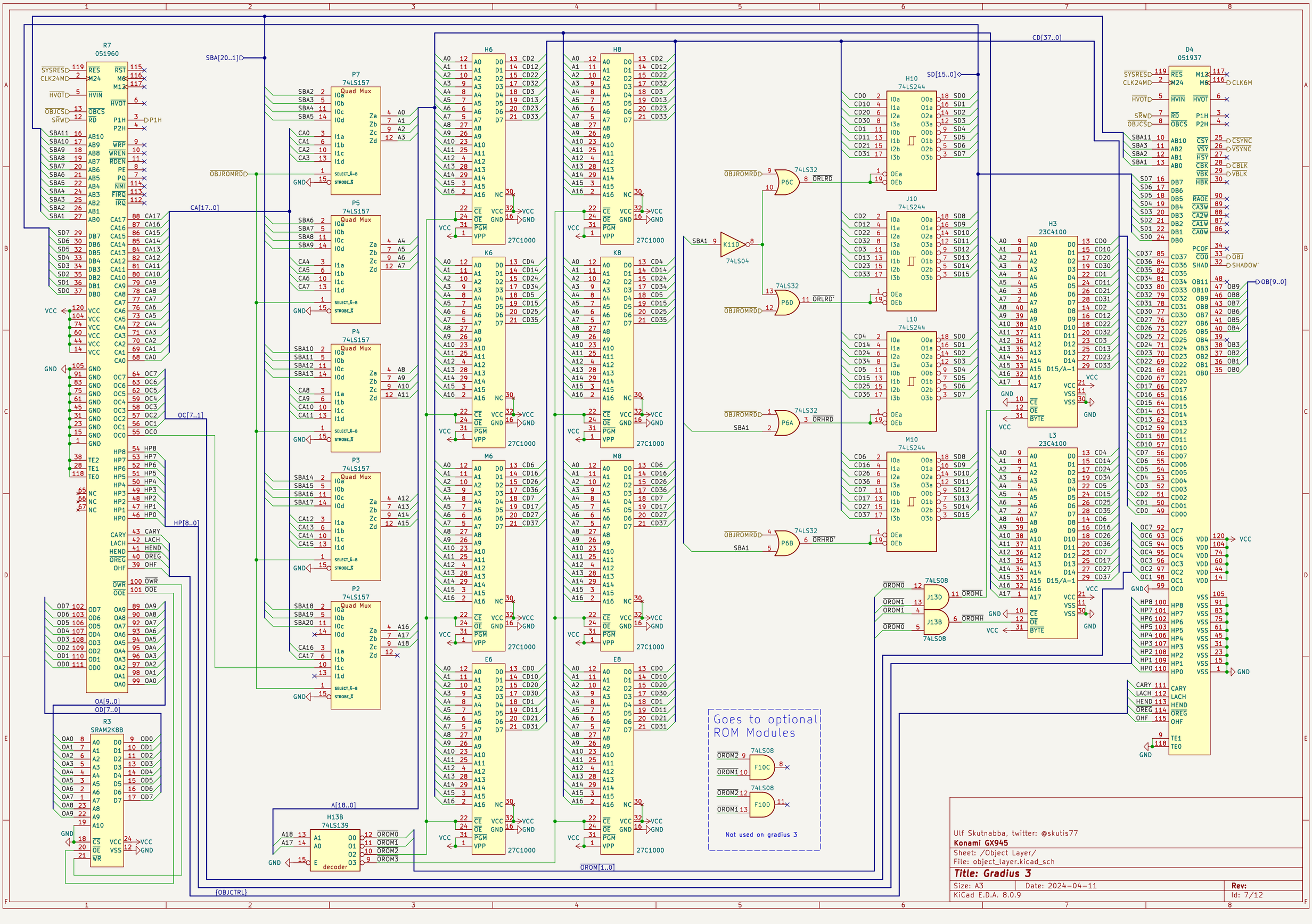
Sheet: /Tile Layers/

File: tile_layers.kicad_sch

Title: Gradius 3

Size: A3 | Date: 2024-04-11 | Rev:

KiCad E.D.A. 8.0.9 | Id: 6/12


R7
051960
SBA[20..1]
CA[17..0]
OBJROMRD
OC[7..1]
HP[8..0]
OA[9..0]
OD[7..0]
{OBJCTRL}
P7
74LS157
Quad Mux
P5
74LS157
Quad Mux
P4
74LS157
Quad Mux
P3
74LS157
Quad Mux
P2
74LS157
Quad Mux
H6
K6
M6
E6
H8
K8
M8
E8
27C1000
R3
SRAM2K8B
H13B
74LS139
decoder
A[18..0]
OROM[1..0]
H10
74LS244
J10
74LS244
L10
74LS244
M10
74LS244
SD[15..0]
CD[37..0]
P6C
74LS32
P6D
74LS32
P6A
74LS32
P6B
74LS32
K11D
74LS04
J13D
74LS08
J13B
74LS08
F10C
74LS08
F10D
74LS08
Goes to optional
ROM Modules
Not used on gradius 3
H3
23C4100
L3
23C4100
D4
051937
OB[9..0]
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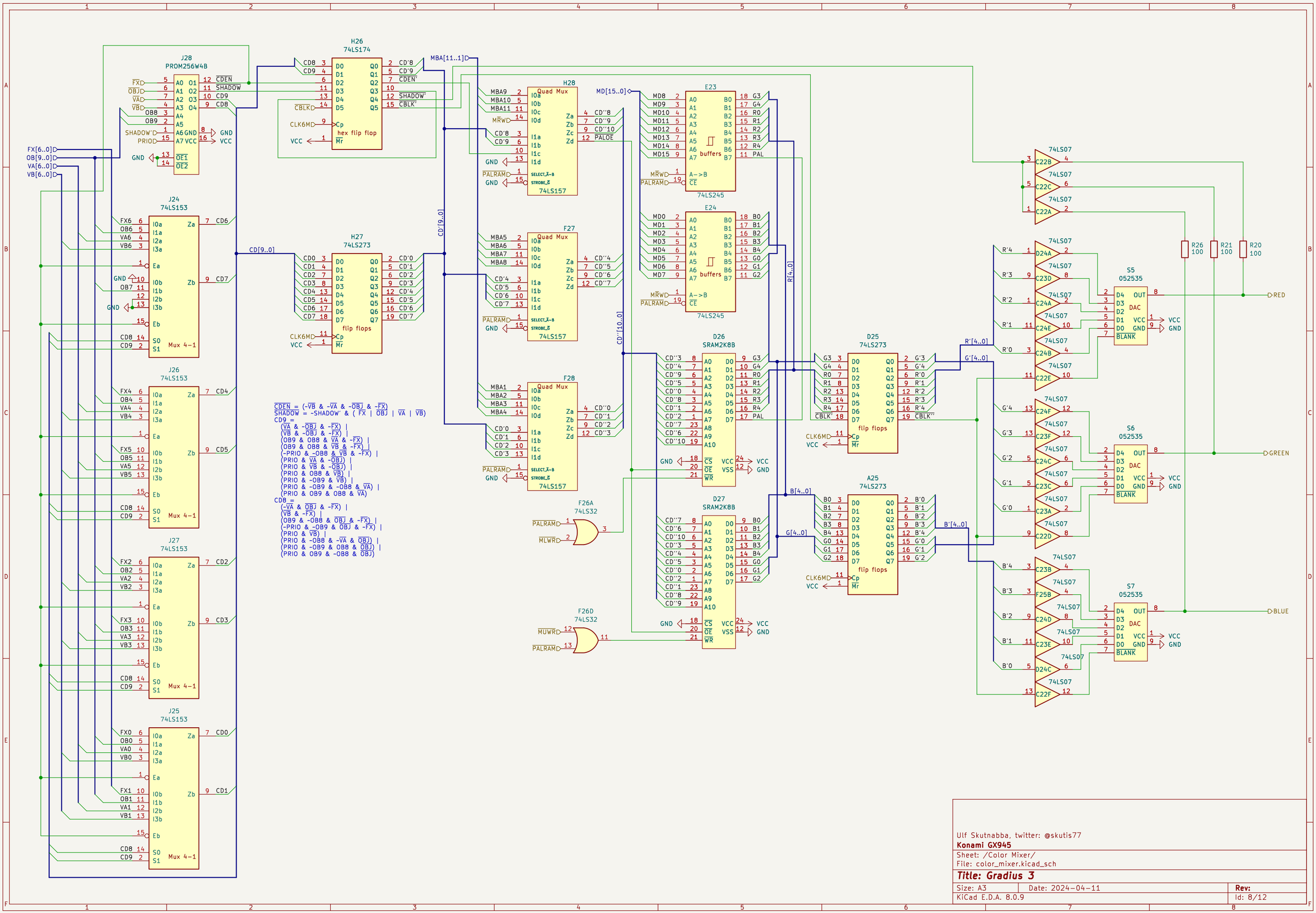
Konami GX945
Sheet: /Object Layer/
File: object_layer.kicad_sch
Title: Gradius 3
Size: A3
Date: 2024-04-11
KiCad E.D.A. 8.0.9
Rev:
Id: 7/12


J28
PROM256W4B
H26
74LS174
MBA[11..1]
H28
Quad Mux
MD[15..0]
E23
74LS245
E24
74LS245
H27
74LS273
CD[9..0]
F27
Quad Mux
F28
Quad Mux
CD''[9..0]
CD''[10..0]
D26
SRAM2K8B
D27
SRAM2K8B
D25
74LS273
A25
74LS273
R[4..0]
B[4..0]
G[4..0]
R'[4..0]
G'[4..0]
B'[4..0]
F26A
74LS32
F26D
74LS32
J24
74LS153
J26
74LS153
J27
74LS153
J25
74LS153
S5
052535
S6
052535
S7
052535
74LS07
R26
100
R21
100
R20
100
RED
GREEN
BLUE
FX[6..0]
OB[9..0]
VA[6..0]
VB[6..0]
CDEN = (~VB & ~VA & ~OBJ & ~FX)
SHADOW = ~SHADOW' & (FX | OBJ | VA | VB)
CD9 =
(VA & ~OBJ & ~FX) |
(VB & ~OBJ & ~FX) |
(OB9 & OB8 & VA & ~FX) |
(OB9 & OB8 & VB & ~FX) |
(~PRIO & ~OB8 & VB & ~FX) |
(PRIO & VA & ~OBJ) |
(PRIO & VB & ~OBJ) |
(PRIO & OB8 & VB) |
(PRIO & ~OB9 & VB) |
(PRIO & ~OB9 & ~OB8 & VA) |
(PRIO & OB9 & OB8 & VA)
CD8 =
(~VA & OBJ & ~FX) |
(VB & ~FX) |
(OB9 & ~OB8 & OBJ & ~FX) |
(~PRIO & ~OB9 & OBJ & ~FX) |
(PRIO & VB) |
(PRIO & ~OB8 & ~VA & OBJ) |
(PRIO & ~OB9 & OB8 & OBJ) |
(PRIO & OB9 & ~OB8 & OBJ)
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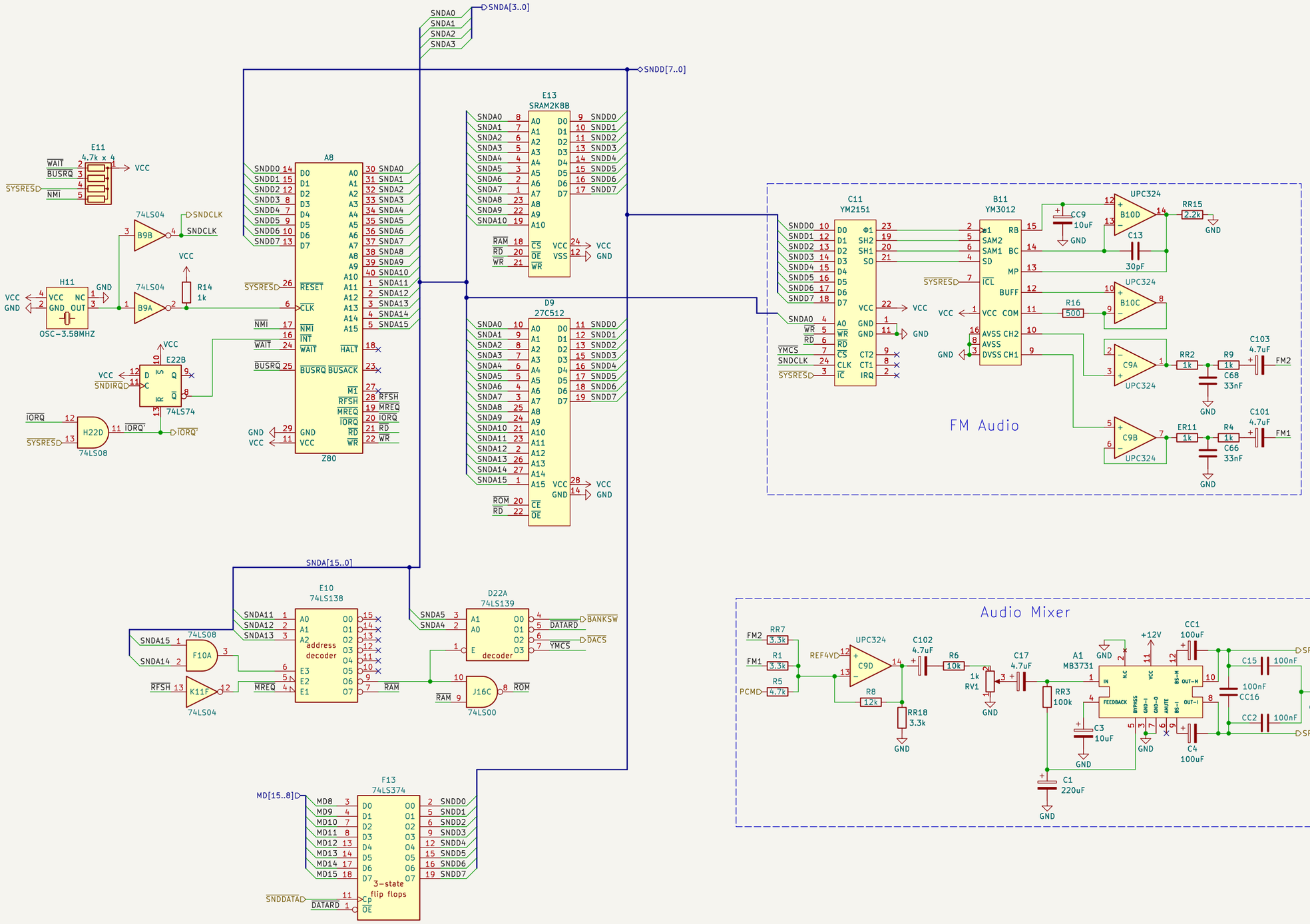
Konami GX945
Sheet: /Color Mixer/
File: color_mixer.kicad_sch
Title: Gradius 3
Size: A3
Date: 2024-04-11
Rev:
KiCad E.D.A. 8.0.9
Id: 8/12



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Konami GX945

Sheet: /Sound/

File: sound.kicad_sch

Title: Gradius 3

Size: A3	Date: 2024-04-11	**Rev:**
KiCad E.D.A. 8.0.9		Id: 9/12

B15 and B18 do not follow the standard Mask ROM behaviour. The BYTE mode select must be selected from factory and pin 31 is probably not connected.

BANK A

Mounted on all releases except (Japan, program code S, split)

B15
23C4100

BANK B

Not mounted on any releases

B18
23C4100

Mounted on Gradius III (Japan, program code S, split)

C14
27C1000

C18
27C1000

C16
27C1000

C20
27C1000

PCM ROM Data Bank Select

SNDD[7..0]

D21
74LS174

B21
74LS157
Quad Mux

C21
74LS174

74LS04

D22B
74LS139
decoder

BANKSW
SYSRES
SNDCLK4
SNDCLK2
DABNK0
DABNK1
DABNKA0
DABNKA1
DABNKB0
DABNKB1

SNDCLK 3.579545MHz
SNDCLK2 1.789773MHz
SNDCLK4 0.894886MHz

SNDA[3..0]
SNDA0
B9D
74LS04
B9C
74LS04
D23A
74LS74
SYSRES

C2
007232

AS[16..0]
DS[7..0]

D7
74LS273
flip flops

D10
4.7k x 8

Q[0..7]

EE6
4066

D8
KONAMI_007341

C9C
UPC324
REF4V
C63
4.7uF
PCM
R10
10k

D6
4066

DD7
KONAMI_007341

UPC324
B10B
B10A
R19
3.3k
CC21
4.7uF
RR17
3.3k
CC14
4.7uF
+12V
B7
4.7k x 4
B8
4.7k x 4
C64
4.7uF
REF4V

C104
4.7uF
C10
470pF
C100
4.7uF
C105
470pF
RR13
20k
R12
20k
007340
A3

GND B3

The values to the right are the capacitors on the PCB. C10X are not visible on the PCB. They are values set to ease debugging.

C104
C103
C102
C10
C101
C100
C65
C67
C105

B10E
B9E
UPC324

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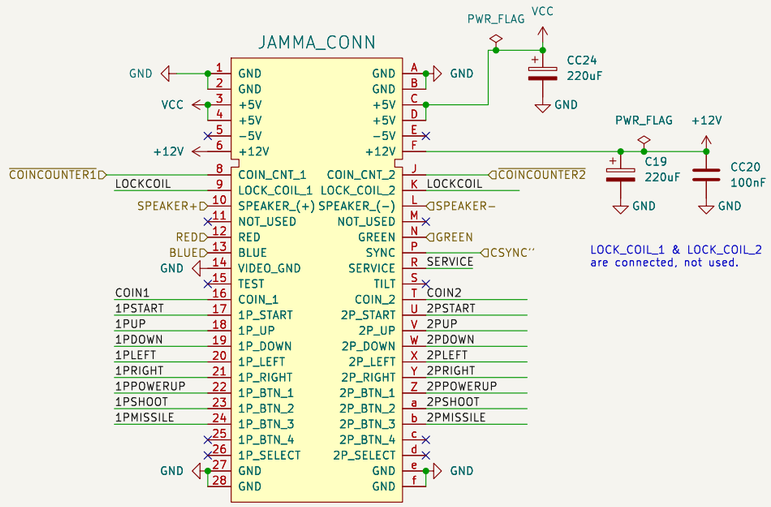
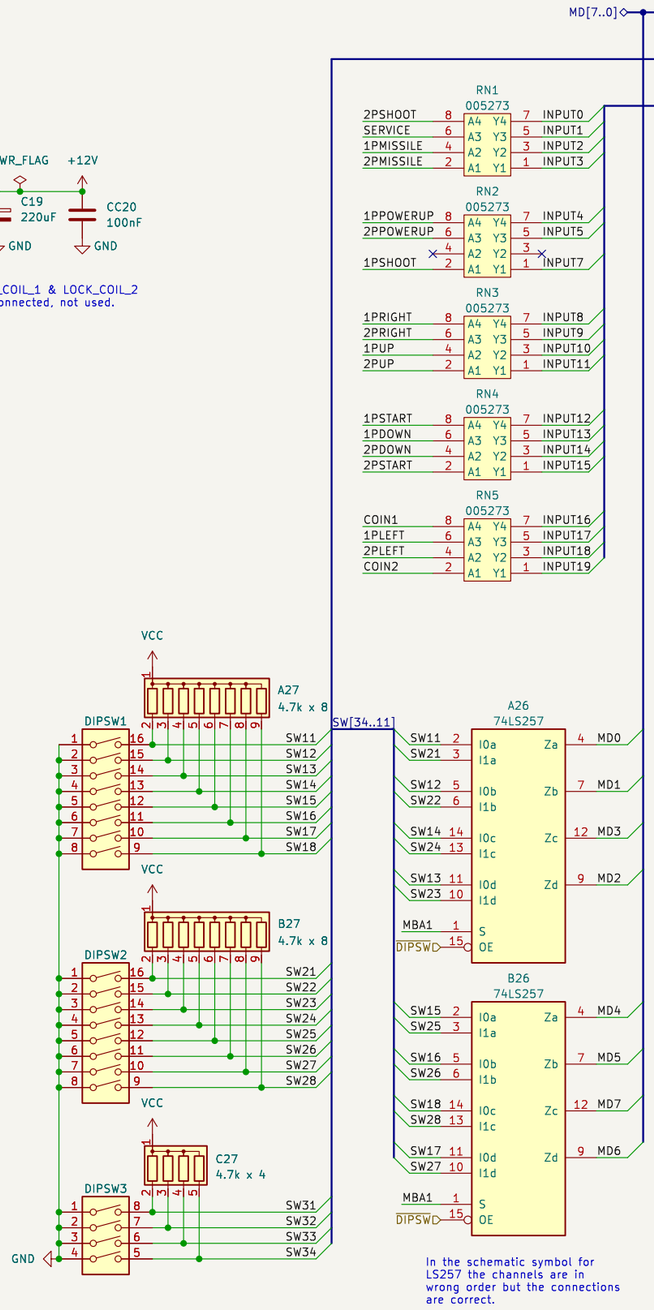
Konami GX945

Sheet: /PCM/
File: pcm.kicad_sch

Title: Gradius 3

Size: A3	Date: 2024-04-11	**Rev:**
KiCad E.D.A. 8.0.9		Id: 10/12





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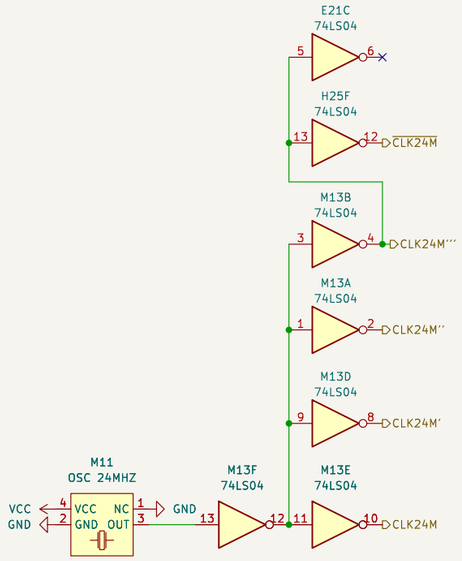
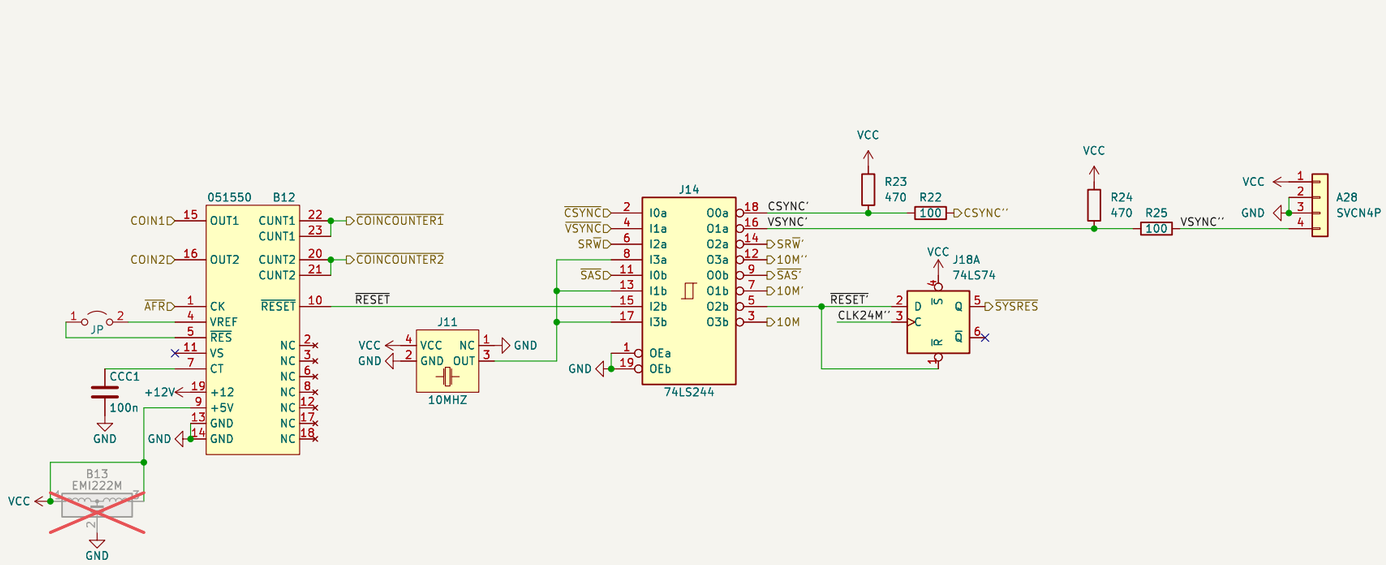
Konami GX945

Sheet: /IO/
File: io.kicad_sch

Title: Gradius 3

Size: A3	Date: 2024-04-11	**Rev:**
KiCad E.D.A. 8.0.9		Id: 11/12





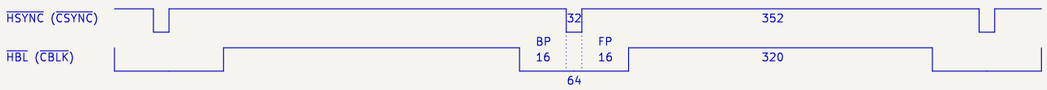
Horizontal and vertical synch timing diagrams

The pixel clock is derived from the 24MHz oscillator.
Pixel clock OVCK: f = 24MHz / 4 = 6MHz

The numbers in the HSYNC and HBL diagram are pixel clock cycles.
All edges are synchronised to the rising edge of the pixel clock.

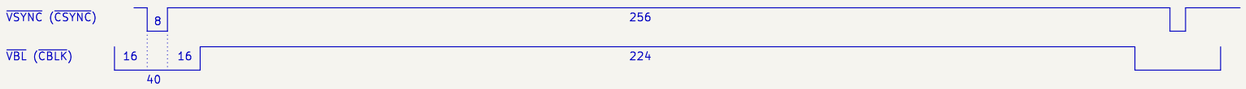
The signals have been measured at the output of the
graphic chips.

If horizontal blanking is measured at the RGB DACs, the blanking
is delayed 2 pixel clocks relative to composite sync. This
gives BP = 14 and FP = 18.



HSYNC and HBL
Frequency f = 6MHz / 384 = 15.625kHz.
Period T = 1/f = 64us.

The numbers in the VSYNC and VBL diagram are HSYNC cycles.
All edges are synchronised to the falling edge of HSYNC.



VSYNC and VBL:
Frequency f = 15.625kHz / 264 = 59.1856Hz
Period T = 1/f = 1 / 59.1856Hz = 16.896ms

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Konami GX945

Sheet: /Misc/
File: misc.kicad_sch

Title: Gradius 3

Size: A3	Date: 2024-04-11	**Rev:**
KiCad E.D.A. 8.0.9		Id: 12/12