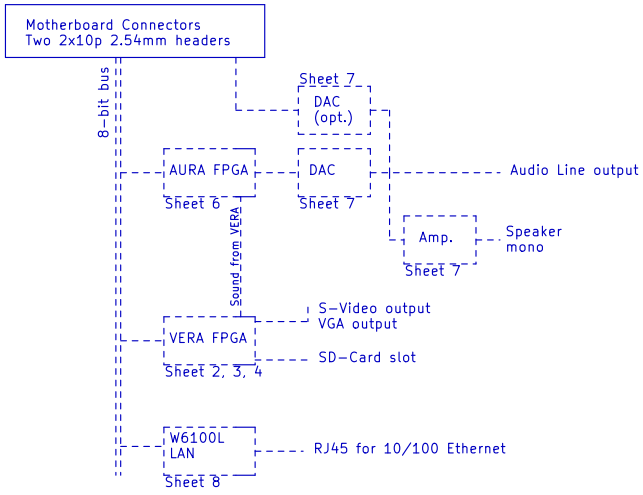
OpenX65 Video/Audio & Ethernet Board ("V/A-BO")

Block Diagram:



Revision History:

Rev. / Date	Description
rev01 / 28.4.2023	Initial design, PCB 100x100mm 2-layers. VERA with VGA and S-Video outputs. AURA with line-out and amp/speaker, 2 DAC. LAN by W6100L

Sheets:

Video VERA FPGA
2
Soubor: vabo-sheet-02.kicad_sch

Video Outputs
3
Soubor: vabo-sheet-03.kicad_sch

VERA SPI-Flash, SDC
4
Soubor: vabo-sheet-04.kicad_sch

Motherboard Connectors
5
Soubor: vabo-sheet-05.kicad_sch

Audio AURA FPGA
6
Soubor: vabo-sheet-06.kicad_sch

Audio DAC, Output
7
Soubor: vabo-sheet-07.kicad_sch

Ethernet
8
Soubor: vabo-sheet-08.kicad_sch

FID101 Fiducial
FID102 Fiducial
FID103 Fiducial

H101 MountingHole
H102 MountingHole
H103 MountingHole
H104 MountingHole

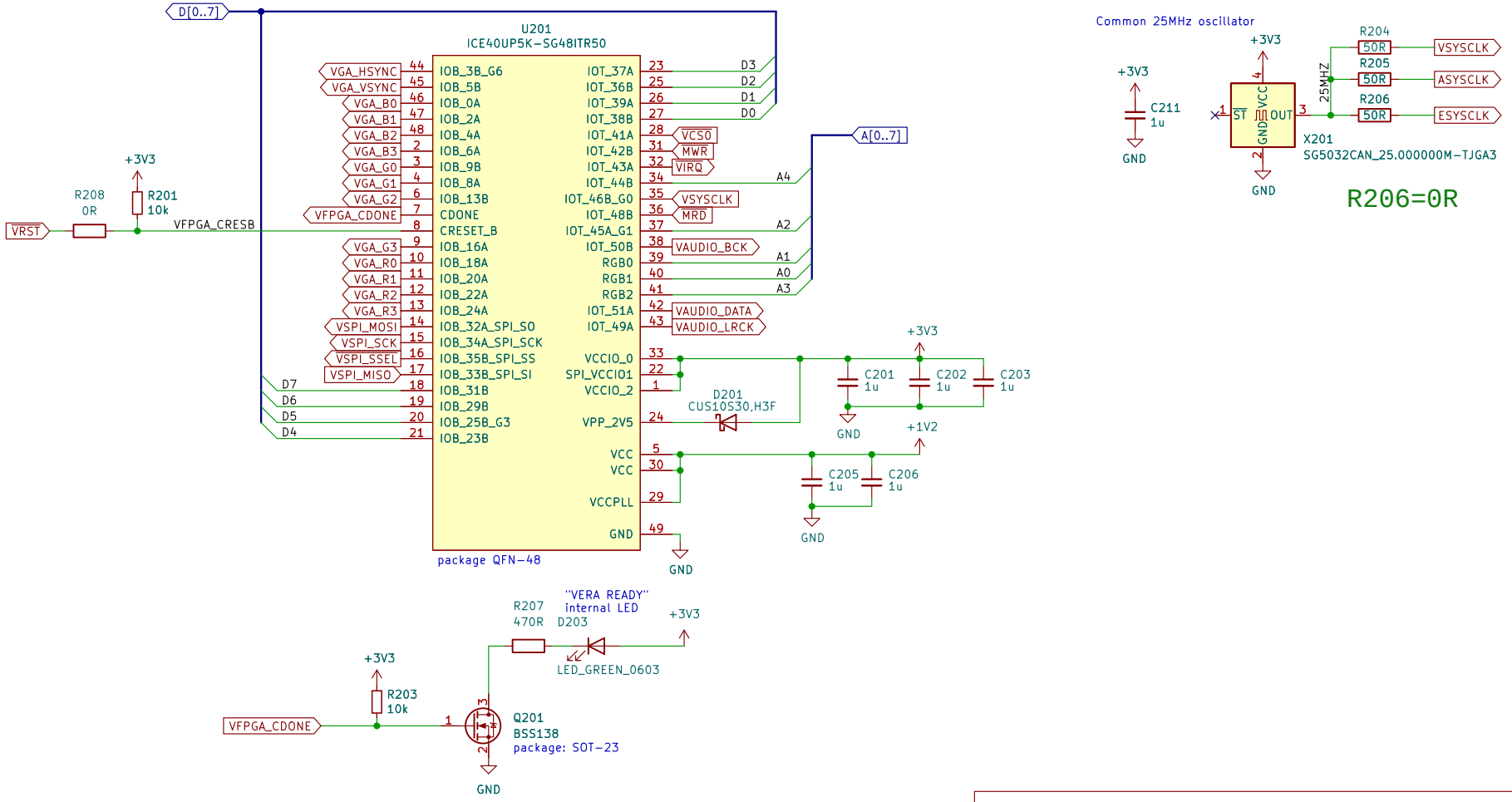
This schematic contains portions of work done by Frank van den Hoe
for the project VERA: https://github.com/fvdhoef/vera-module

Block Diagram
FOR X65.EU DESIGNED BY JSYKORA.INFO
Sheet: /
File: openX65-vabo.kicad_sch

Title: OpenX65 – Video/Audio & Ethernet Board

Size: A4	Date: 2023-04-28	**Rev: rev01**
KiCad E.D.A. kicad 6.0.11-3.fc36		Id: 1/8

"VERA" FPGA – Video Embedded Retro Adapter



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for the project VERA: https://github.com/fvdhoef/vera-module

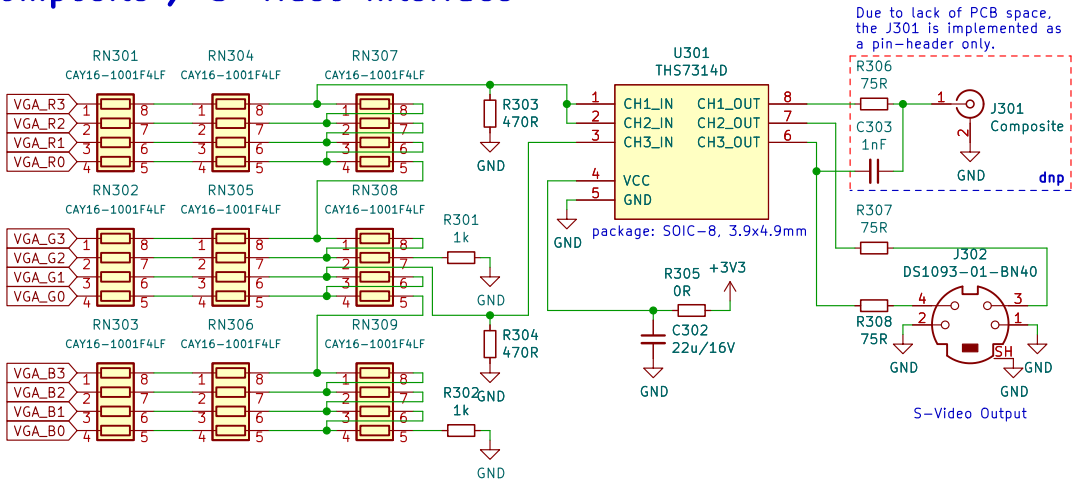
VERA FPGA design by Frank van den Hoe
FOR X65.EU DESIGNED BY JSYKORA.INFO

Sheet: /Video VERA FPGA/
File: vabo-sheet-02.kicad_sch

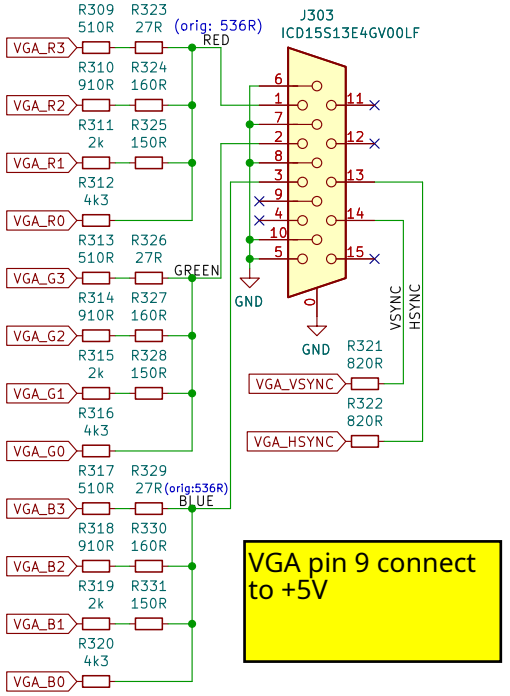
Title: OpenX65 – Video/Audio & Ethernet Board

Size: A4	Date: 2023-04-28	**Rev: rev01**
KiCad E.D.A. kicad 6.0.11-3.fc36		Id: 2/8

Composite / S-video interface



VGA interface



VGA pin 9 connect to +5V

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for the project VERA: https://github.com/fvdhoef/vera-module

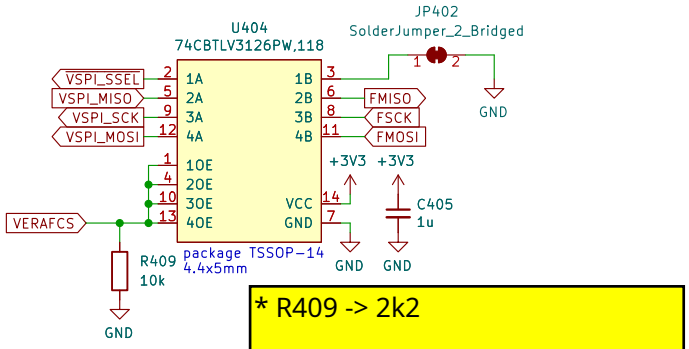
Video outputs from VERA
FOR X65.EU DESIGNED BY JSYKORA.INFO

Sheet: /Video Outputs/
File: vabo-sheet-03.kicad_sch

Title: OpenX65 – Video/Audio & Ethernet Board

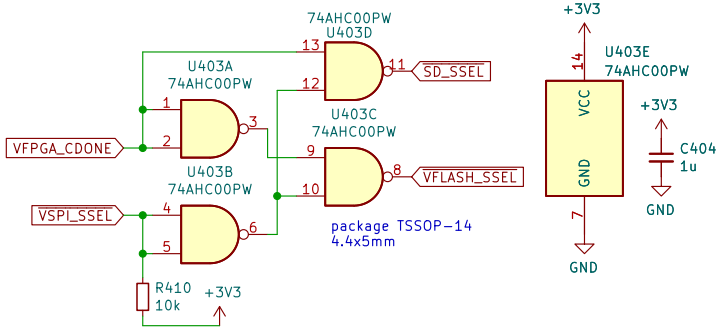
Size: A4	Date: 2023-04-28	**Rev: rev01**
KiCad E.D.A. kicad 6.0.11-3.fc36		Id: 3/8

FTDI/ICD access multiplexer to VERA SPI flash memory



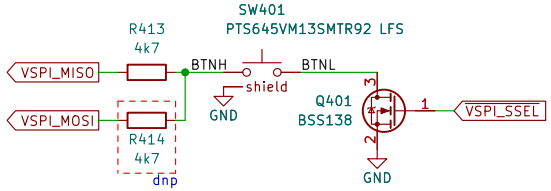
* R409 -> 2k2

VERA SPI pins multiplexing

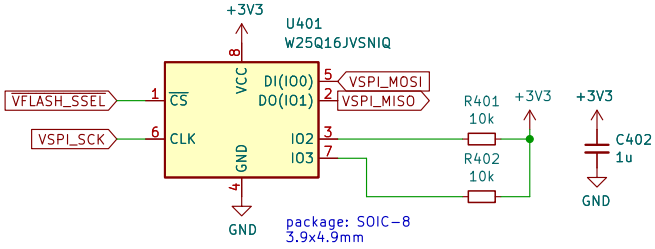


Inputs		Outputs		
VFPGA_CDONE	VSPI_SSEL	SD_SSEL	VFLASH_SSEL	Description
0	0	1	0	FPGA configuring from the SPI-Flash, or FTDI/ICD accessing.
0	1	1	1	FPGA empty/in-reset
1	0	0	1	FPGA loaded; User Design r/w to SDC
1	1	1	1	FPGA loaded; idle

VERA push-button Piggy-back on MISO line

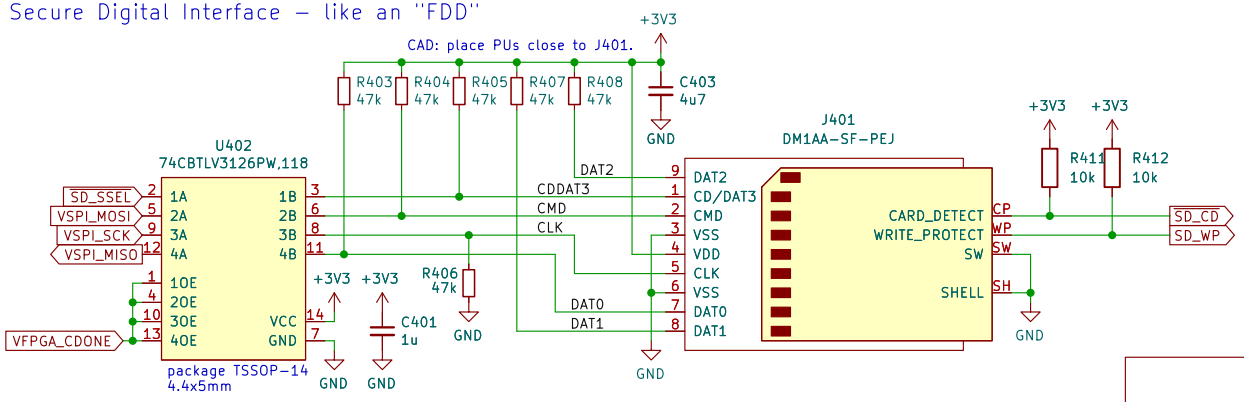


SPI flash for VERA Bitstream



* add PD to VSPI_SCK
(strictly not necessary - dnp)

Secure Digital Interface – like an "FDD"



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for the project VERA: https://github.com/fvdhoef/vera-module

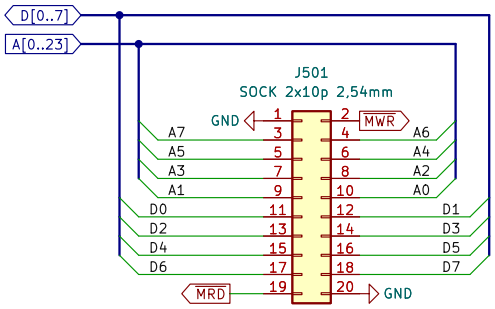
VERA SPI multiplexing, SDC interface
FOR X65.EU DESIGNED BY JSYKORA.INFO

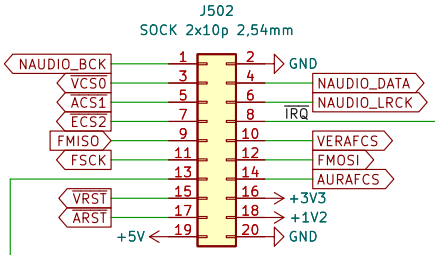
Sheet: /VERA SPI-Flash, SDC/
File: vabo-sheet-04.kicad_sch

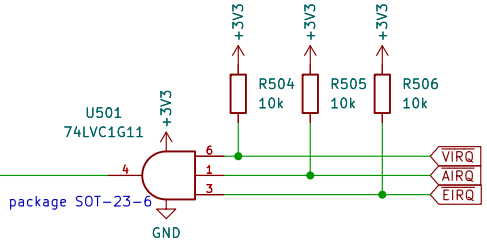
Title: OpenX65 – Video/Audio & Ethernet Board

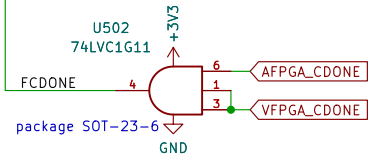
Size: A4	Date: 2023-04-28	**Rev: rev01**
KiCad E.D.A. kicad 6.0.11-3.fc36		Id: 4/8

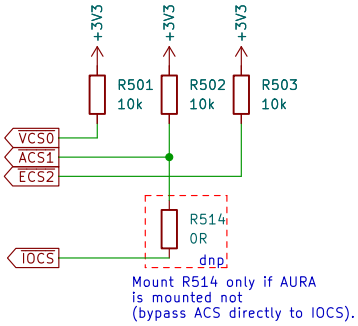
Connectors to the Motherboard

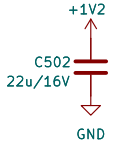




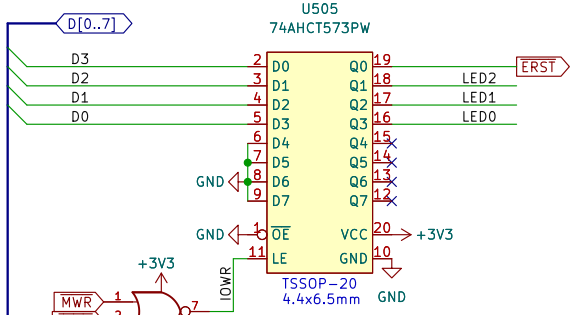


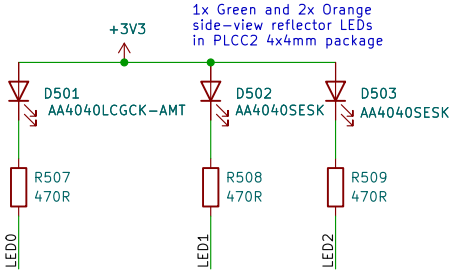


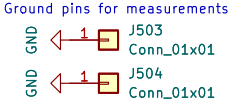




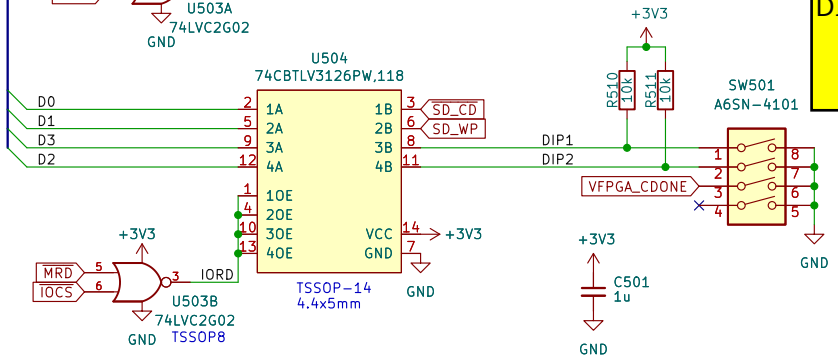
I/O: LEDs & DIP Switches







LED out works OK.
DIP in - does not?! reads always 0x00



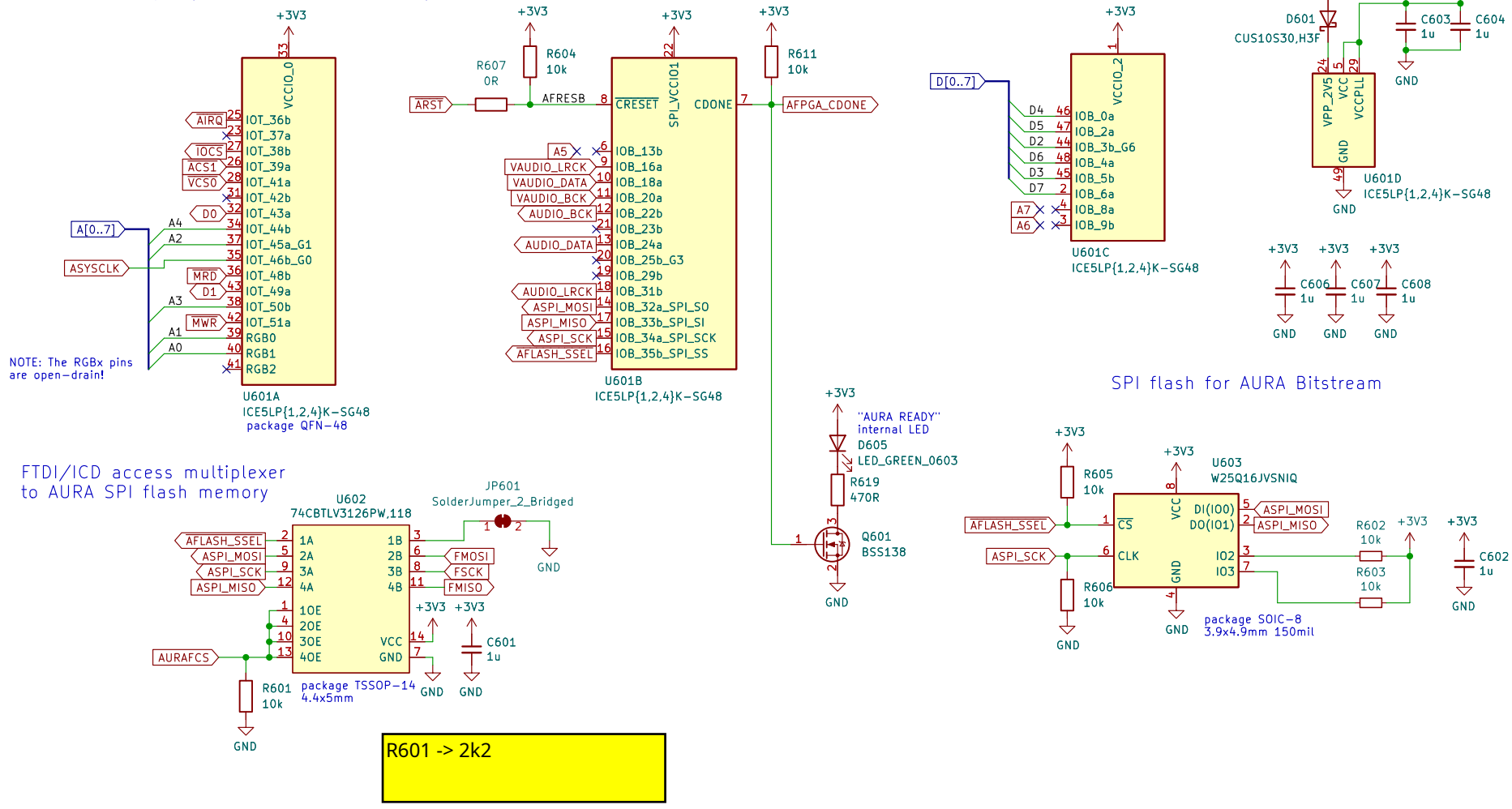
Motherboard Connectors, simple I/O
FOR X65.EU DESIGNED BY JSYKORA.INFO
Sheet: /Motherboard Connectors/
File: vabo-sheet-05.kicad_sch

Title: OpenX65 – Video/Audio & Ethernet Board

Size: A4	Date: 2023-04-28	**Rev: rev01**
KiCad E.D.A. kicad 6.0.11-3.fc36		Id: 5/8

"AURA" FPGA – Audio Retro Adapter

For X16 compatiblity, AURA will implement the YM2151 FM-Synthesis (the chip is long out of production).
One possible design is JT51 at https://github.com/jotego/jt51
which requires about 2K gates (i.e. ICE5LP2K-SG48 – to be validated)

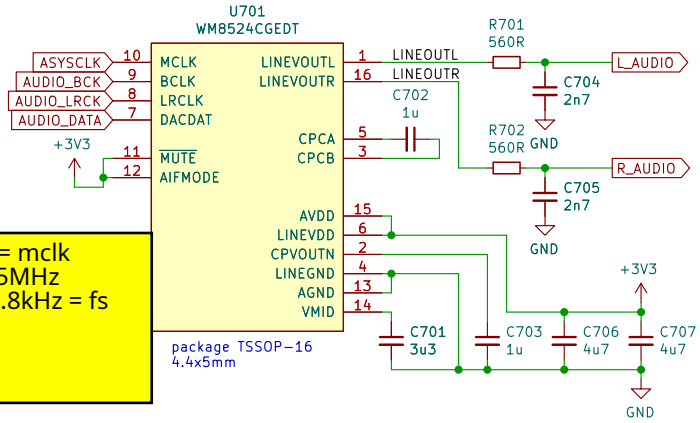


AURA FPGA
FOR X65.EU DESIGNED BY JSYKORA.INFO
Sheet: /Audio AURA FPGA/
File: vabo-sheet-06.kicad_sch

Title: OpenX65 – Video/Audio & Ethernet Board

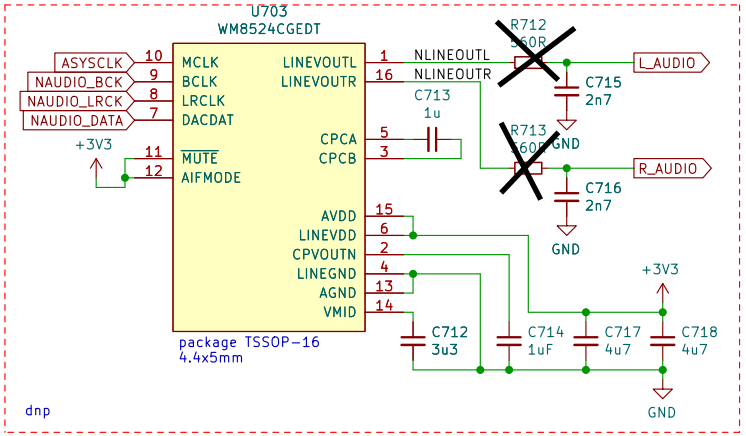
Size: A4	Date: 2023-04-28	**Rev: rev01**
KiCad E.D.A. kicad 6.0.11-3.fc36		Id: 6/8

Audio DAC (PCM/PSG in VERA, FM in AURA)

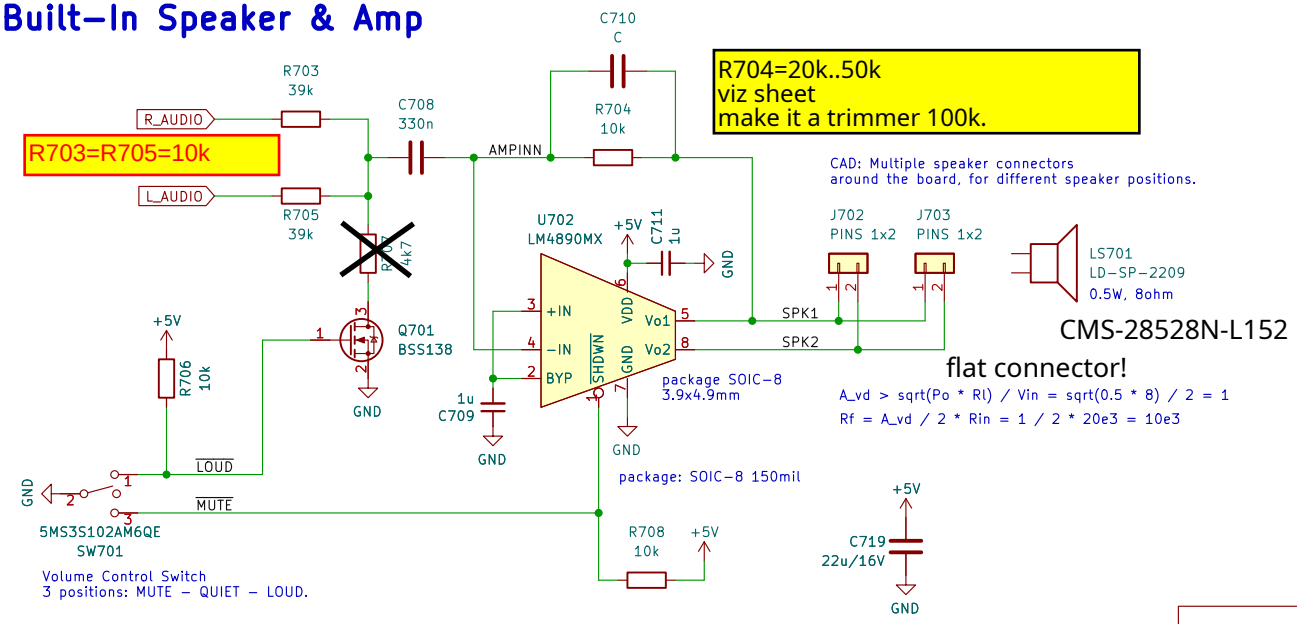


ASYSCLK=25MHz = mclk
AUDIO_BCLK=12.5MHz
AUDIO_LRCLK=48.8kHz = fs
=> mclk = 512*fs

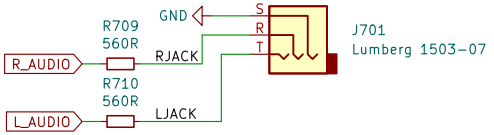
Audio DAC (Sound from NORA) – optional.



Built-In Speaker & Amp



3.5mm jack – AUDIO LINE output



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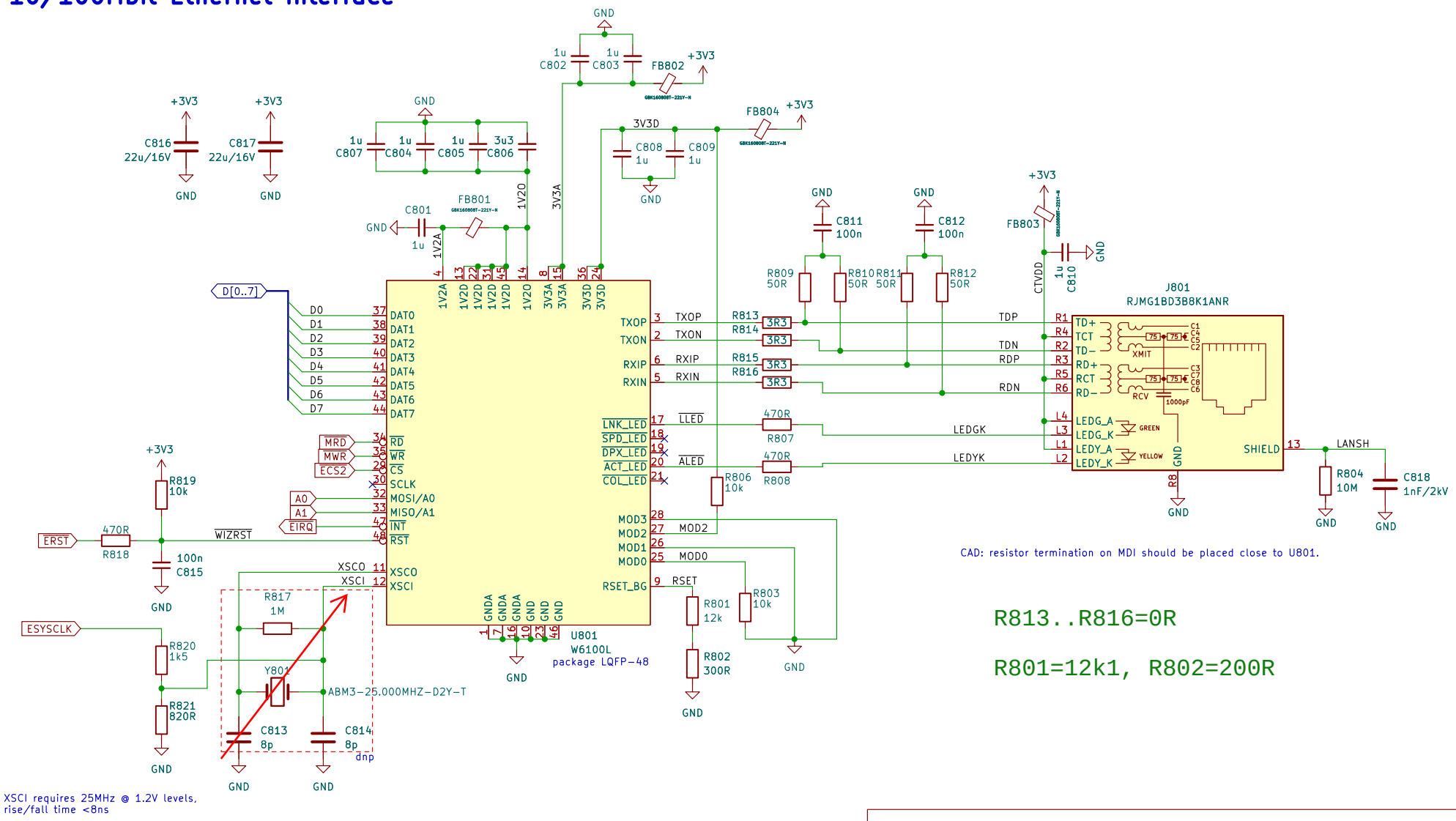
for the project VERA: https://github.com/fvdhoef/vera-module

Audio DAC, Speaker Amplifier, and Line Output
FOR X65.EU DESIGNED BY JSYKORA.INFO
Sheet: /Audio DAC, Output/
File: vabo-sheet-07.kicad_sch

Title: OpenX65 – Video/Audio & Ethernet Board

Size: A4	Date: 2023-04-28	**Rev: rev01**
KiCad E.D.A. kicad 6.0.11-3.fc36		Id: 7/8

10/100Mbit Ethernet Interface



Ethernet LAN Interface (Wiznet)

FOR X65.EU DESIGNED BY JSYKORA.INFO

Sheet: /Ethernet/

File: vabo-sheet-08.kicad_sch

Title: OpenX65 – Video/Audio & Ethernet Board

Size: A4	Date: 2023-04-28	**Rev: rev01**
KiCad E.D.A. kicad 6.0.11-3.fc36		Id: 8/8