Sheet: VeraModule

VERA FPGA

File: vera-fpga.sch

Sheet: BusDecoder

BUS DECODER

File: busdecoder.sch

Sheet: Vera FPGA flash

VERA SPI FLASH
SD CARD INTERFACE

File: vera-fpga-flash.sch

Sheet: CartridgeInterface

CARTRIDGE INTERFACE

File: cartridgeInterface.sch

Sheet: PowerSupply

POWER SUPPLY

File: powersupply.sch

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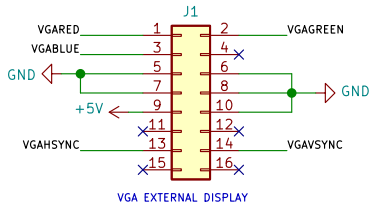
RetroBit Lab

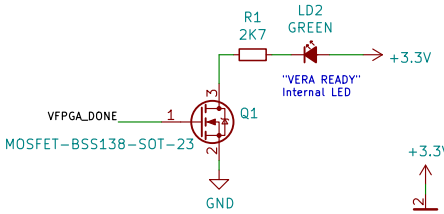
Sheet: /
File: VERA-MODULE-RBL.sch

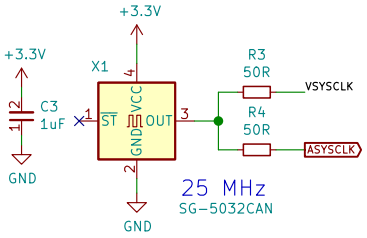
Title: VERA FPGA Audio & Video Board

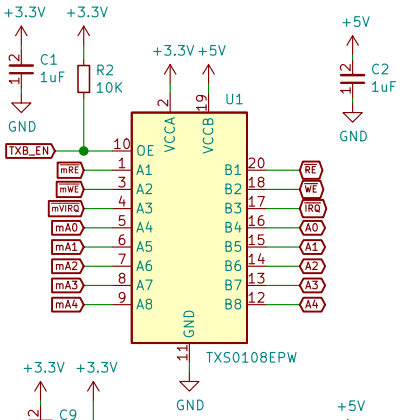
Size: A4	Date: 2025-09-03	**Rev: 1.0**
KiCad E.D.A. kicad 5.1.9+dfsg1-1+deb11u1		Id: 1/6

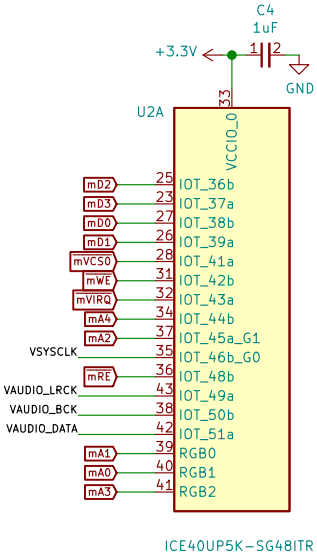
All 8-Bit signals must be shifted from 5V to 3.3V and vice versa

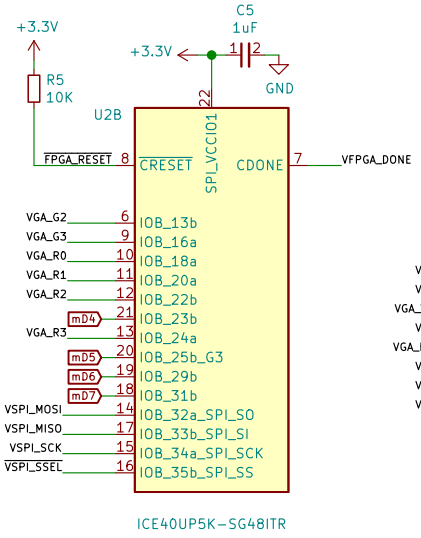


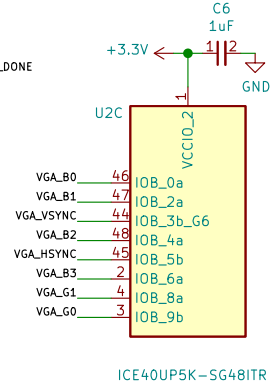


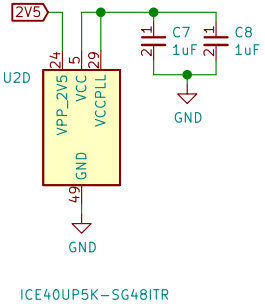


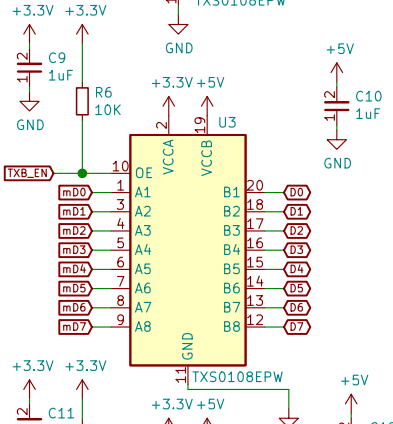


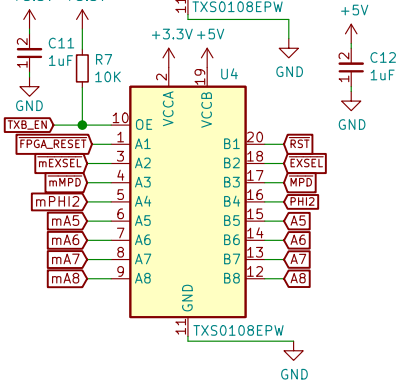


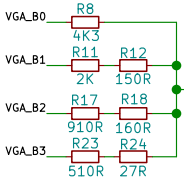


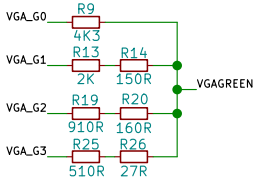


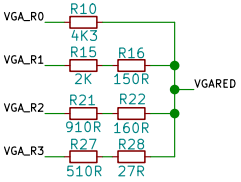


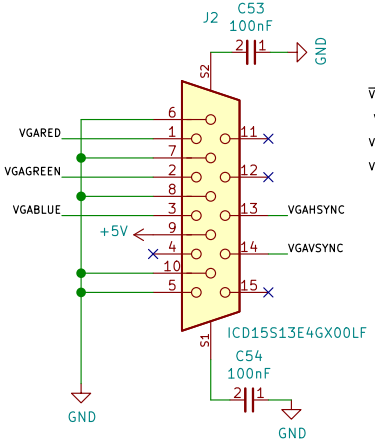


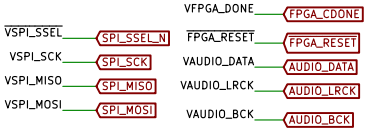












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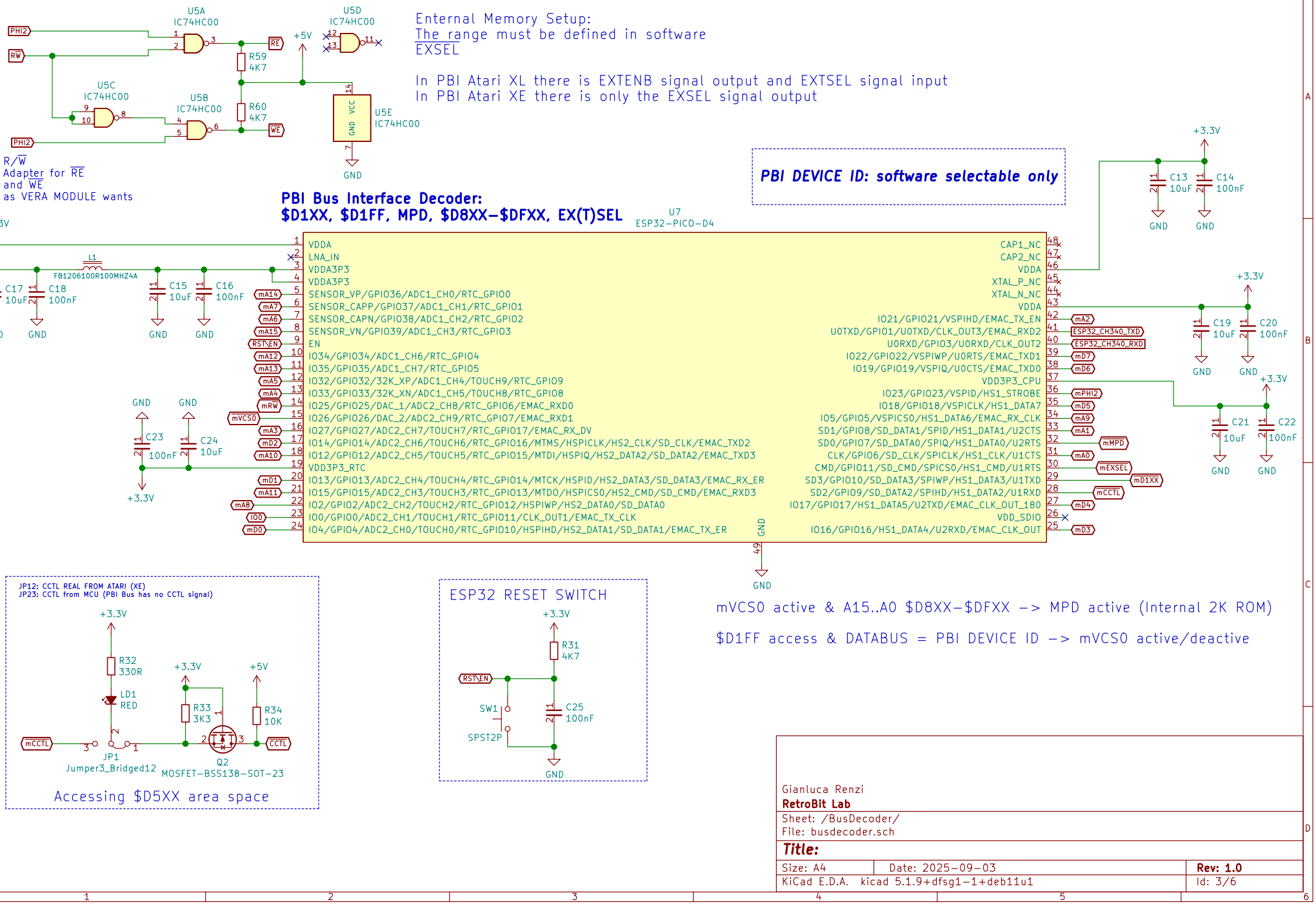
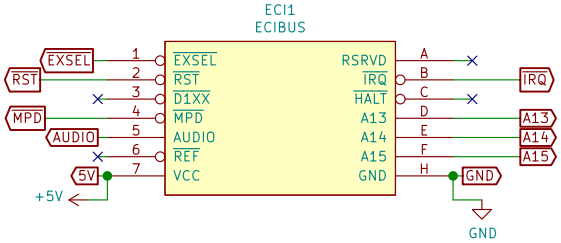
Sheet: /VeraModule/
File: vera-fpga.sch

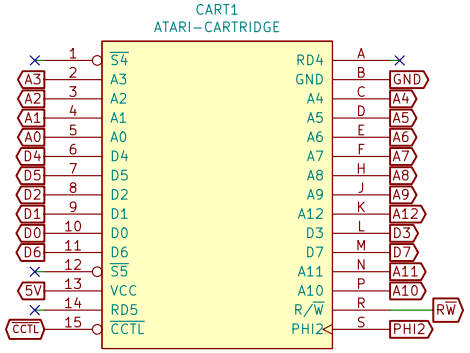
Title:

Size: A4	Date: 2025-09-03	**Rev: 1.0**
KiCad E.D.A. kicad 5.1.9+dfsg1-1+deb11u1		Id: 2/6


U5A
IC74HC00
U5D
IC74HC00
U5C
IC74HC00
U5B
IC74HC00
U5E
IC74HC00
PHI2
RW
RE
WE
R59
4K7
R60
4K7
+5V
GND
R/W
Adapter for RE
and WE
as VERA MODULE wants
Enternal Memory Setup:
The range must be defined in software
EXSEL
In PBI Atari XL there is EXTENB signal output and EXTSEL signal input
In PBI Atari XE there is only the EXSEL signal output
PBI DEVICE ID: software selectable only
PBI Bus Interface Decoder:
$D1XX, $D1FF, MPD, $D8XX–$DFXX, EX(T)SEL
U7
ESP32-PICO-D4
+3.3V
L1
FB1206100R100MHZ4A
C17 10uF
C18 100nF
C15 10uF
C16 100nF
C23 100nF
C24 10uF
C13 10uF
C14 100nF
C19 10uF
C20 100nF
C21 10uF
C22 100nF
VDDA
LNA_IN
VDDA3P3
VDDA3P3
SENSOR_VP/GPIO36/ADC1_CH0/RTC_GPIO0
SENSOR_CAPP/GPIO37/ADC1_CH1/RTC_GPIO1
SENSOR_CAPN/GPIO38/ADC1_CH2/RTC_GPIO2
SENSOR_VN/GPIO39/ADC1_CH3/RTC_GPIO3
EN
IO34/GPIO34/ADC1_CH6/RTC_GPIO4
IO35/GPIO35/ADC1_CH7/RTC_GPIO5
IO32/GPIO32/32K_XP/ADC1_CH4/TOUCH9/RTC_GPIO9
IO33/GPIO33/32K_XN/ADC1_CH5/TOUCH8/RTC_GPIO8
IO25/GPIO25/DAC_1/ADC2_CH8/RTC_GPIO6/EMAC_RXD0
IO26/GPIO26/DAC_2/ADC2_CH9/RTC_GPIO7/EMAC_RXD1
IO27/GPIO27/ADC2_CH7/TOUCH7/RTC_GPIO17/EMAC_RX_DV
IO14/GPIO14/ADC2_CH6/TOUCH6/RTC_GPIO16/MTMS/HSPICLK/HS2_CLK/SD_CLK/EMAC_TXD2
IO12/GPIO12/ADC2_CH5/TOUCH5/RTC_GPIO15/MTDI/HSPIQ/HS2_DATA2/SD_DATA2/EMAC_TXD3
VDD3P3_RTC
IO13/GPIO13/ADC2_CH4/TOUCH4/RTC_GPIO14/MTCK/HSPID/HS2_DATA3/SD_DATA3/EMAC_RX_ER
IO15/GPIO15/ADC2_CH3/TOUCH3/RTC_GPIO13/MTDO/HSPICS0/HS2_CMD/SD_CMD/EMAC_RXD3
IO2/GPIO2/ADC2_CH2/TOUCH2/RTC_GPIO12/HSPIWP/HS2_DATA0/SD_DATA0
IO0/GPIO0/ADC2_CH1/TOUCH1/RTC_GPIO11/CLK_OUT1/EMAC_TX_CLK
IO4/GPIO4/ADC2_CH0/TOUCH0/RTC_GPIO10/HSPIHD/HS2_DATA1/SD_DATA1/EMAC_TX_ER
CAP1_NC
CAP2_NC
VDDA
XTAL_P_NC
XTAL_N_NC
VDDA
IO21/GPIO21/VSPIHD/EMAC_TX_EN
U0TXD/GPIO1/U0TXD/CLK_OUT3/EMAC_RXD2
U0RXD/GPIO3/U0RXD/CLK_OUT2
IO22/GPIO22/VSPIWP/U0RTS/EMAC_TXD1
IO19/GPIO19/VSPIQ/U0CTS/EMAC_TXD0
VDD3P3_CPU
IO23/GPIO23/VSPID/HS1_STROBE
IO18/GPIO18/VSPICLK/HS1_DATA7
IO5/GPIO5/VSPICS0/HS1_DATA6/EMAC_RX_CLK
SD1/GPIO8/SD_DATA1/SPID/HS1_DATA1/U2CTS
SD0/GPIO7/SD_DATA0/SPIQ/HS1_DATA0/U2RTS
CLK/GPIO6/SD_CLK/SPICLK/HS1_CLK/U1CTS
CMD/GPIO11/SD_CMD/SPICS0/HS1_CMD/U1RTS
SD3/GPIO10/SD_DATA3/SPIWP/HS1_DATA3/U1TXD
SD2/GPIO9/SD_DATA2/SPIHD/HS1_DATA2/U1RXD
IO17/GPIO17/HS1_DATA5/U2TXD/EMAC_CLK_OUT_180
VDD_SDIO
IO16/GPIO16/HS1_DATA4/U2RXD/EMAC_CLK_OUT
mA14
mA7
mA6
mA15
RST\EN
mA12
mA13
mA5
mA4
mRW
mVCS0
mA3
mD2
mA10
mD1
mA11
mA8
IO0
mD0
mA2
ESP32_CH340_TXD
ESP32_CH340_RXD
mD7
mD6
mPHI2
mD5
mA9
mA1
mMPD
mA0
mEXSEL
mD1XX
mCCTL
mD4
mD3
JP12: CCTL REAL FROM ATARI (XE)
JP23: CCTL from MCU (PBI Bus has no CCTL signal)
R32
330R
LD1
RED
R33
3K3
R34
10K
JP1
Jumper3_Bridged12
Q2
MOSFET-BSS138-SOT-23
CCTL
Accessing $D5XX area space
ESP32 RESET SWITCH
R31
4K7
SW1
SPST2P
C25
100nF
mVCS0 active & A15..A0 $D8XX–$DFXX –> MPD active (Internal 2K ROM)
$D1FF access & DATABUS = PBI DEVICE ID –> mVCS0 active/deactive
Gianluca Renzi
RetroBit Lab
Sheet: /BusDecoder/
File: busdecoder.sch
Title:
Size: A4
Date: 2025-09-03
Rev: 1.0
KiCad E.D.A. kicad 5.1.9+dfsg1-1+deb11u1
Id: 3/6

ATARI 130XE ECI & CARTRIDGE INTERFACE





AUDIO MIXER INSIDE ATARI

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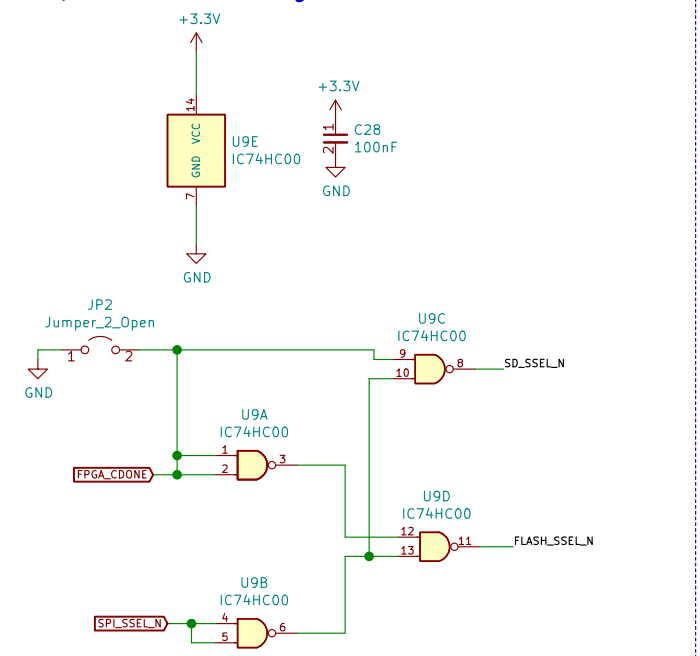
Sheet: /CartridgeInterface/
File: cartridgeInterface.sch

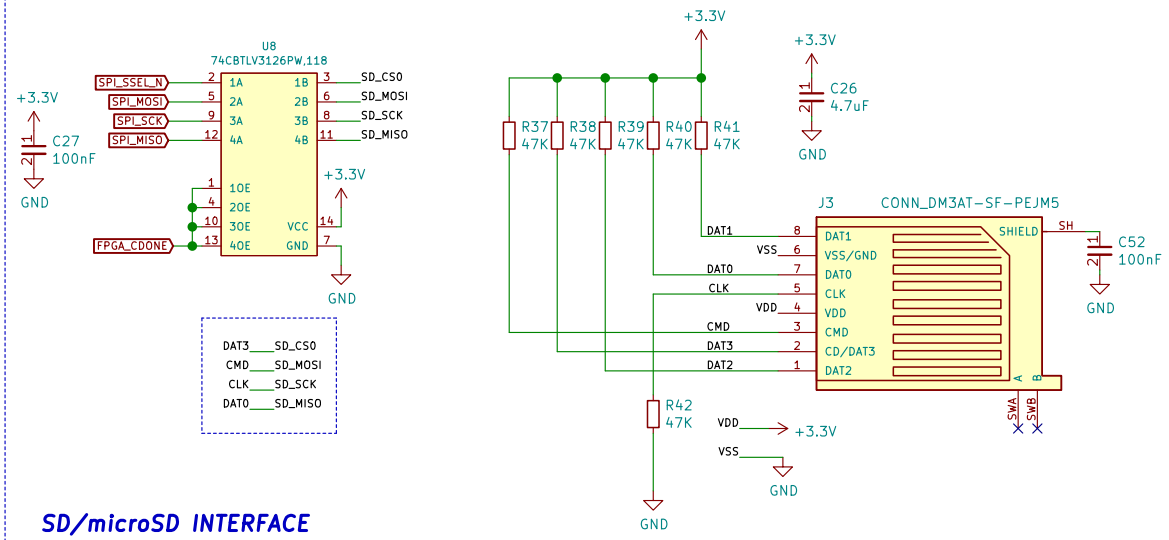
Title:

Size: A4	Date: 2025-09-03	**Rev: 1.0**
KiCad E.D.A. kicad 5.1.9+dfsg1-1+deb11u1		Id: 4/6

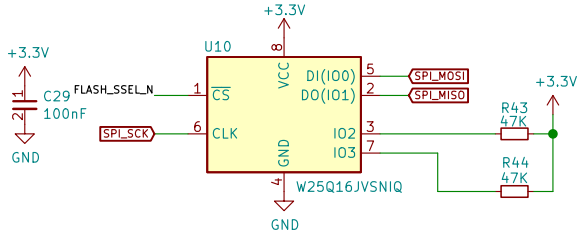
FPGA/SSD Flash Glue Logic



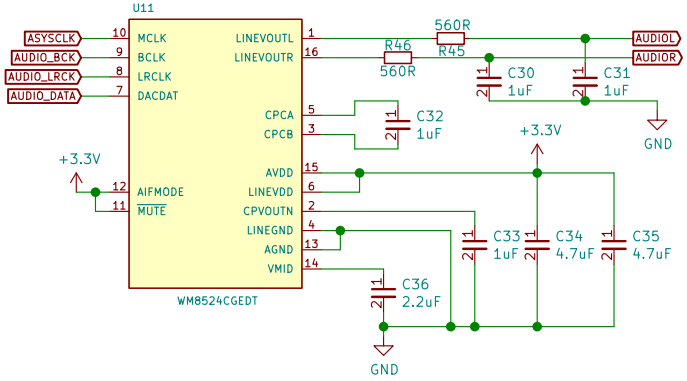
SD/microSD INTERFACE



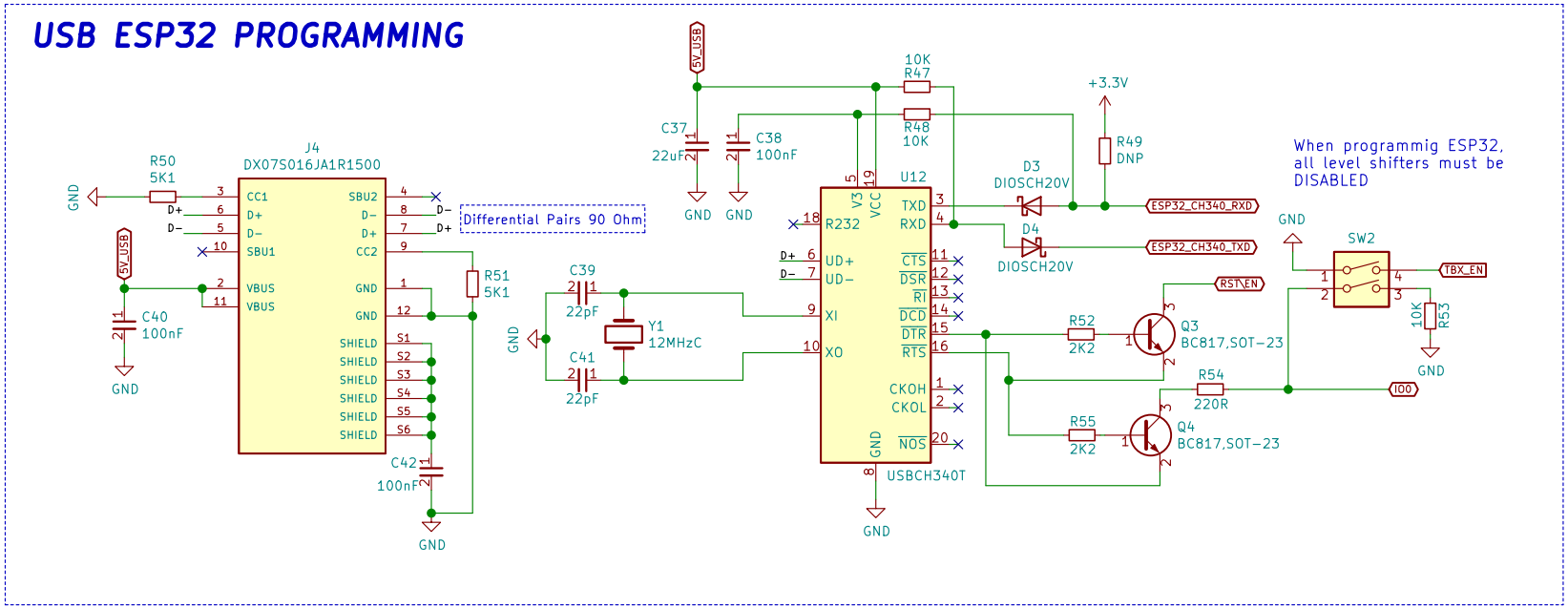
SPI 16MB FLASH

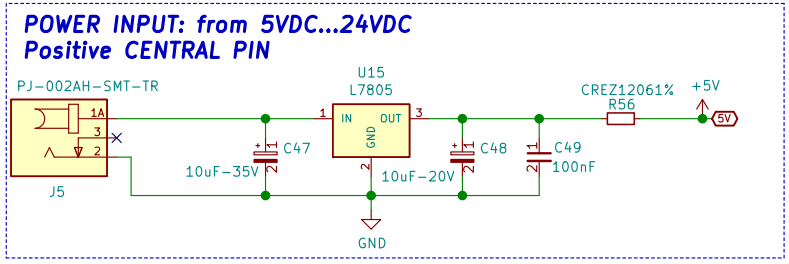


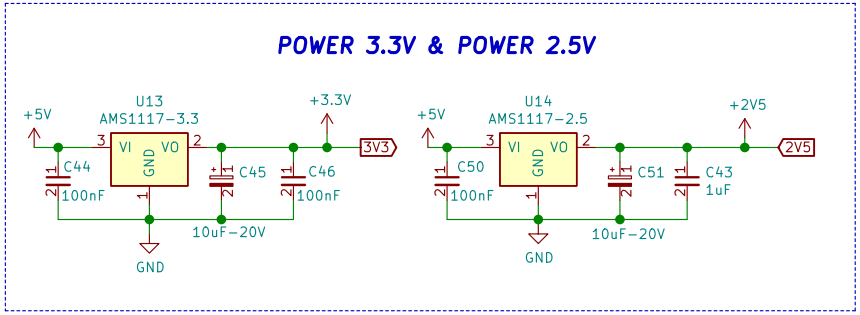
IC DAC/AUDIO 24BIT 192K 16TSSOP

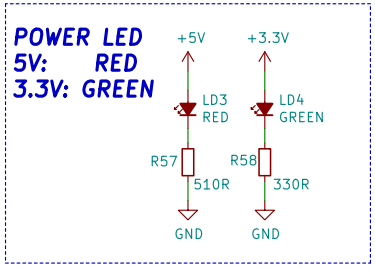


Gianluca Renzi **RetroBit Lab** Sheet: /Vera FPGA flash/ File: vera-fpga-flash.sch		
Title:		
Size: A4	Date: 2025-09-03	**Rev: 1.0**
KiCad E.D.A. kicad 5.1.9+dfsg1-1+deb11u1		Id: 5/6









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RetroBit Lab

Sheet: /PowerSupply/
File: powersupply.sch

Title:

Size: A4	Date: 2025-09-03	**Rev: 1.0**
KiCad E.D.A. kicad 5.1.9+dfsg1-1+deb11u1		Id: 6/6