VeraModule

VERA FPGA

File: vera-fpga.sch

BusDecoder

BUS DECODER

File: busdecoder.sch

Vera FPGA flash

VERA SPI FLASH
SD CARD INTERFACE

File: vera-fpga-flash.sch

CartridgeInterface

CARTRIDGE INTERFACE

File: cartridgeInterface.sch

PowerSupply

POWER SUPPLY

File: powersupply.sch

VGA Analog

VGA ANALOG

File: vga-analog.sch

FIDUCIAL TOP

FID3 Fiducial
FID4 Fiducial

FIDUCIAL BOTTOM

FID2 Fiducial
FID1 Fiducial

LOGO1 VERA X16 LOGO
LOGO2 ATARI READY
LOGO3 KiCAD DESIGN
LOGO4 ATARI DUO BUS
LOGO5 ESP32_BOBOARD
LBL1

Gianluca Renzi
RetroBit Lab

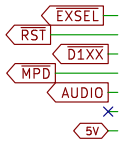
Sheet: /
File: VERA-MODULE-RBL.sch

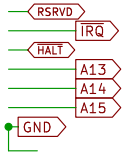
Title: VERA FPGA Audio & Video Board

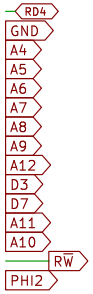
Size: A4	Date: 2025-10-17	**Rev: 1.0**
KiCad E.D.A. 9.0.5		Id: 1/7

ATARI 130XE ECI & CARTRIDGE INTERFACE

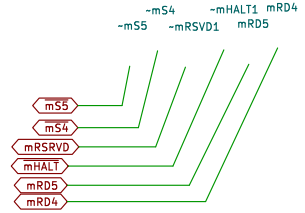
All 8-Bit signals must be shifted from 5V to 3.3V and vice versa



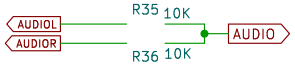


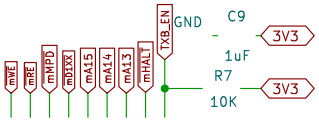


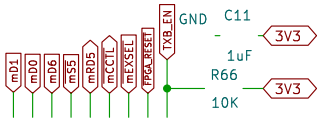
UNCONNECTED IN THIS PROJECT

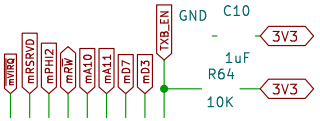


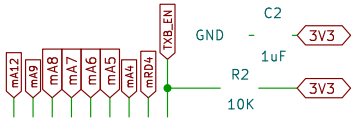
AUDIO MIXER INSIDE ATARI

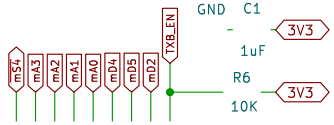


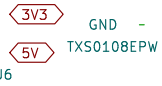


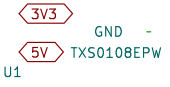


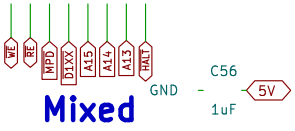






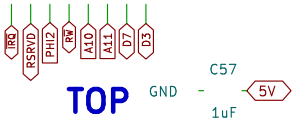




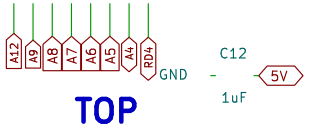


Mixed

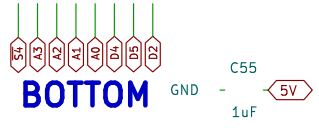
BOTTOM



TOP



TOP



BOTTOM

BUS LOGIC LEVEL SHIFTERS

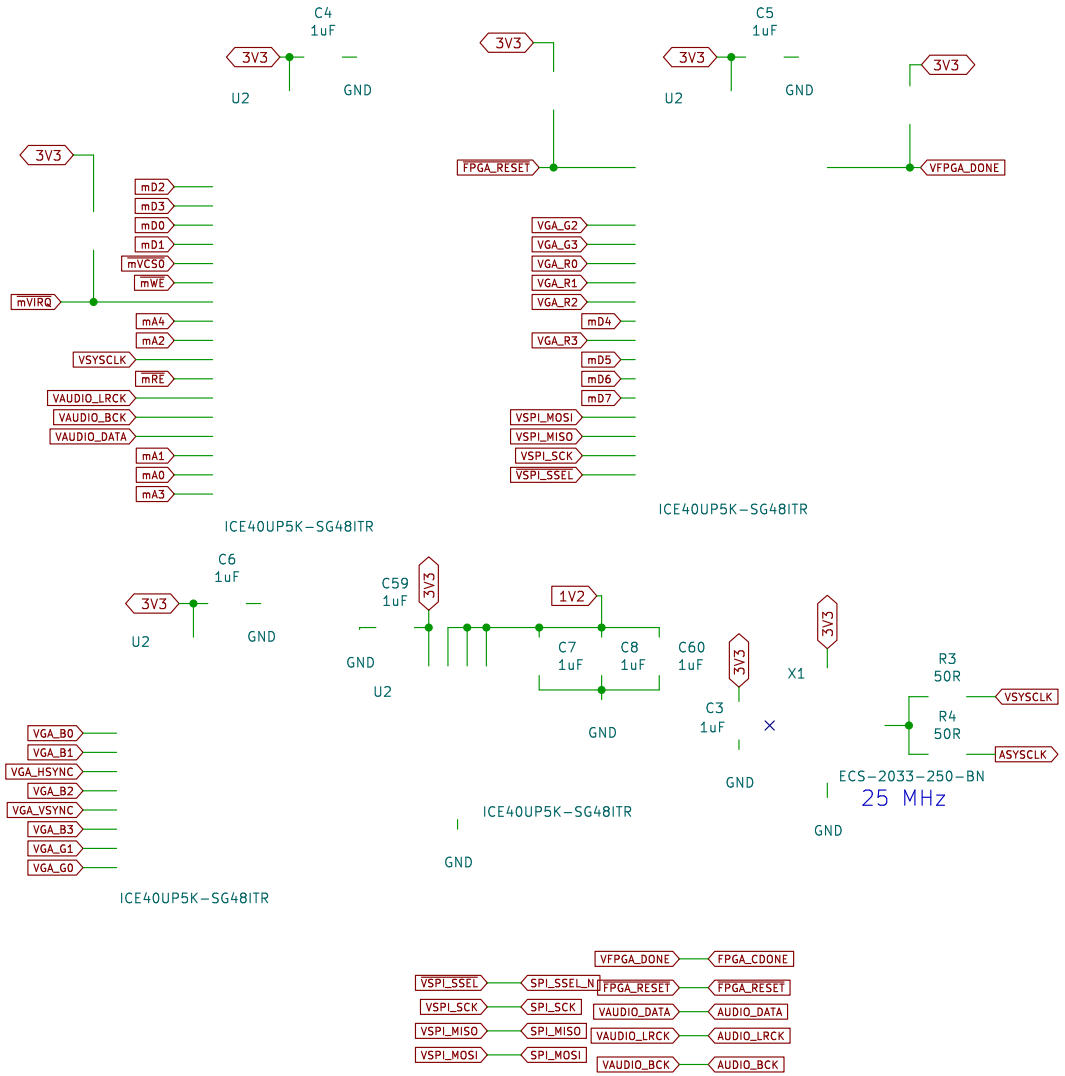
Gianluca Renzi
RetroBit Lab

Sheet: /CartridgeInterface/
File: cartridgeInterface.sch

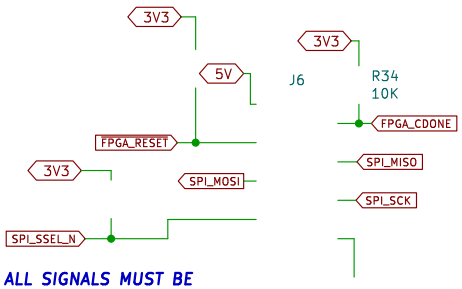
Title: CARTRIDGE INTEFACE AND BUS LEVEL SHIFTERS

Size: A4	Date: 2025-10-17	**Rev: 1.0**
KiCad E.D.A. 9.0.5		Id: 2/7

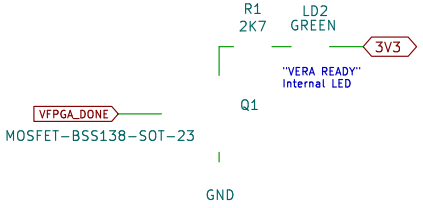
FPGA VERA LOGIC VIDEO & AUDIO CARD



iceprog programmer USB FTDI / SPI



VERA FPGA PROGRAMMED OK



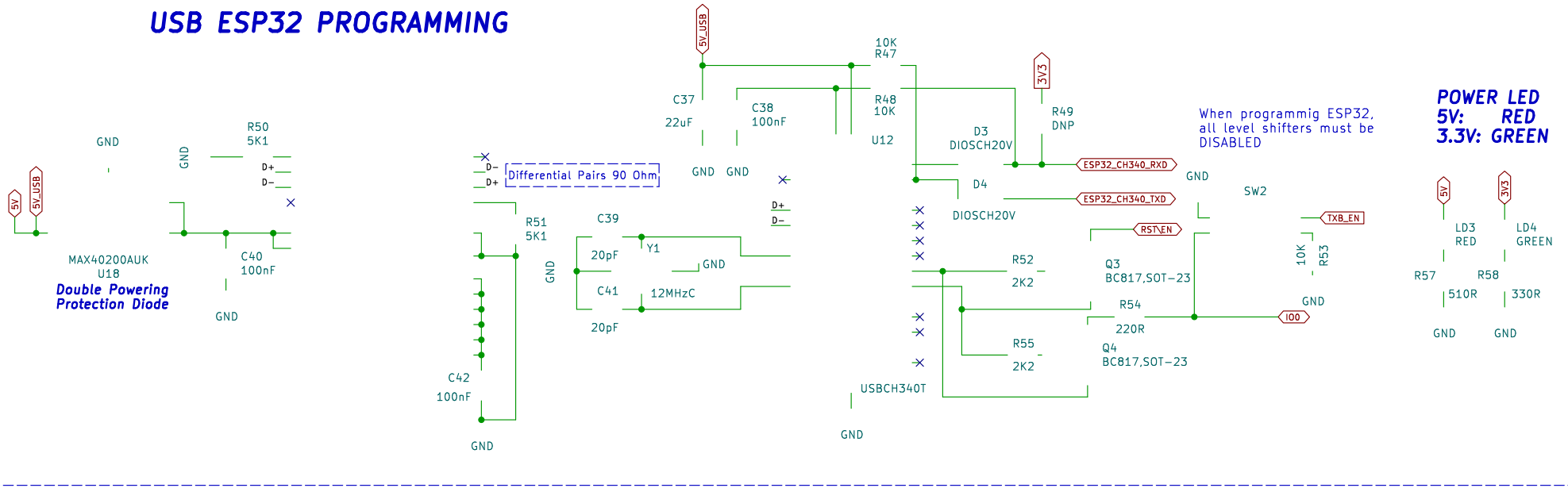
Gianluca Renzi
RetroBit Lab

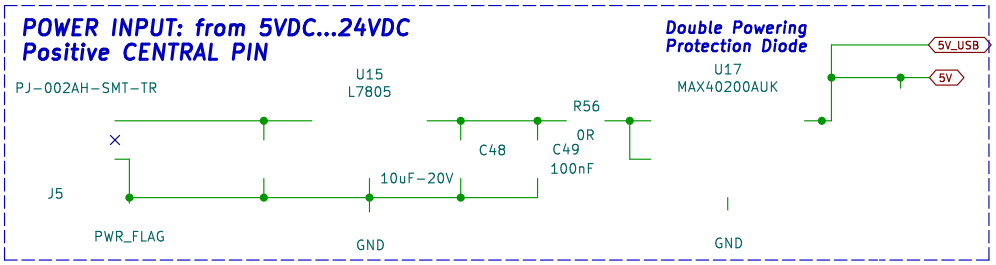
Sheet: /VeraModule/
File: vera-fpga.sch

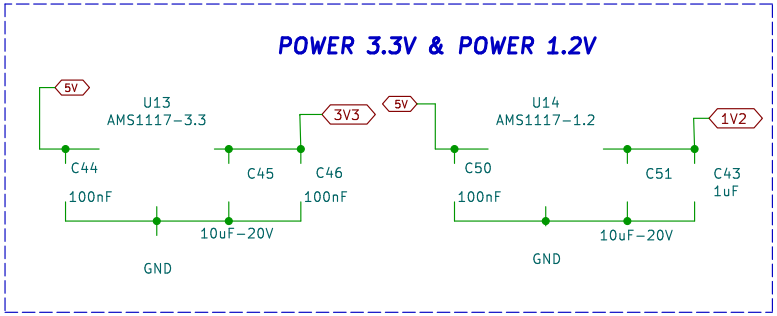
Title: VERA MODULE AND PROGRAMMING CONNECTOR

Size: A4	Date: 2025-10-17	**Rev: 1.0**
KiCad E.D.A. 9.0.5		Id: 3/7

USB ESP32 PROGRAMMING



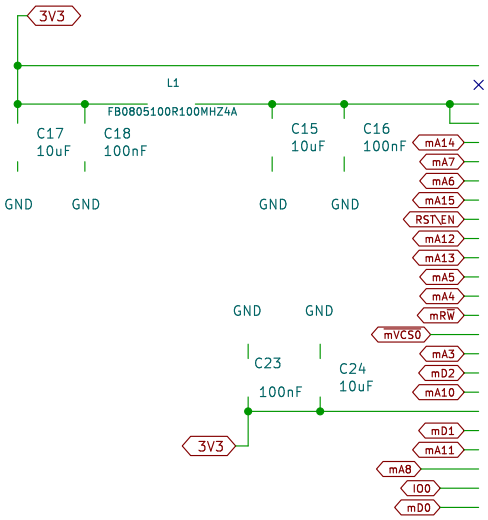


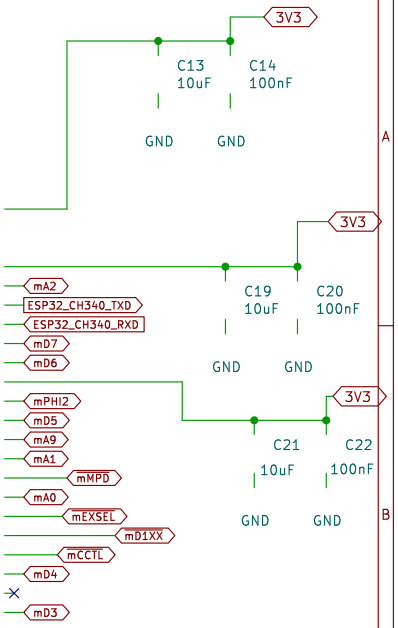


Gianluca Renzi **RetroBit Lab**		
Sheet: /PowerSupply/ File: powersupply.sch		
Title: POWERSUPPLY and USB		
Size: A4	Date: 2025-10-17	**Rev: 1.0**
KiCad E.D.A. 9.0.5		Id: 4/7

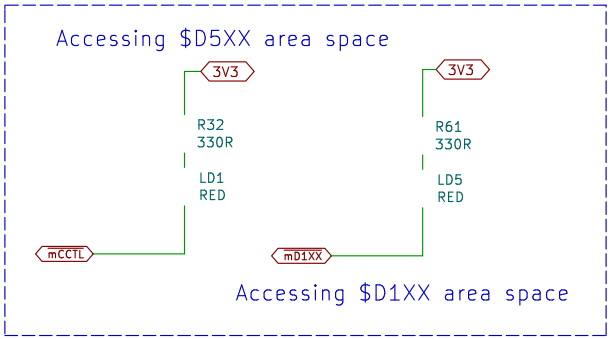
PBI Bus Interface Decoder:
$D1XX, $D1FF, MPD, $D8XX–$DFXX, EX(T)SEL

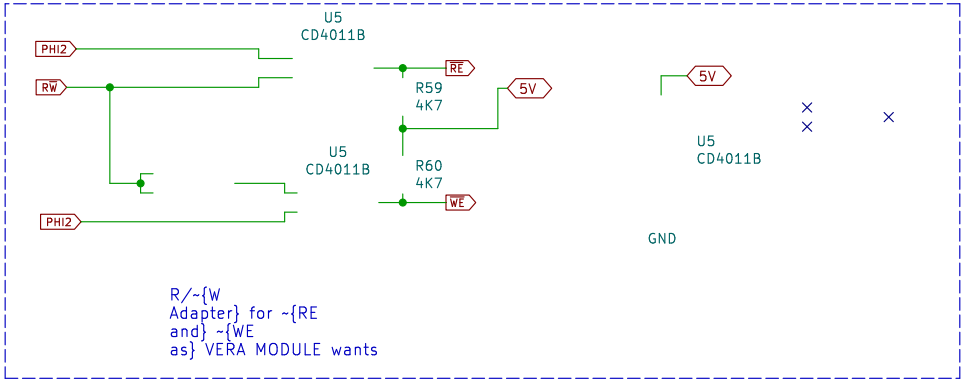
PBI DEVICE ID: software selectable only

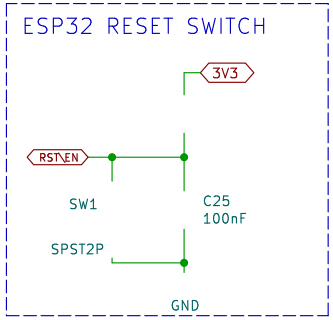




Those signals are valid in ATARI XE only







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

mVCS0 active & A15..A0 $D8XX–$DFXX –> MPD active (Internal 2K ROM)

$D1FF access & DATABUS = PBI DEVICE ID –> mVCS0 active/deactive

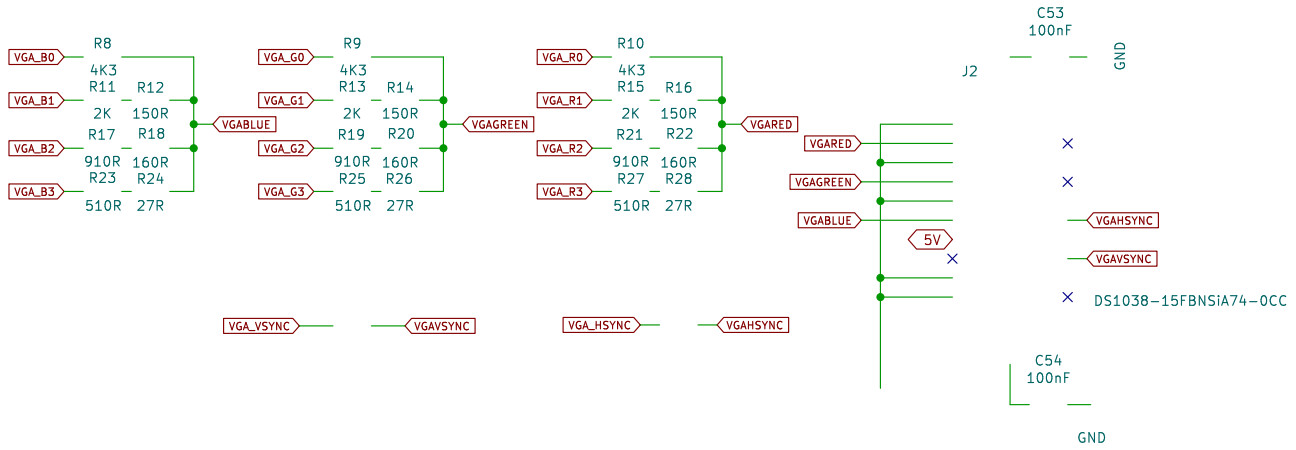
Gianluca Renzi
RetroBit Lab

Sheet: /BusDecoder/
File: busdecoder.sch

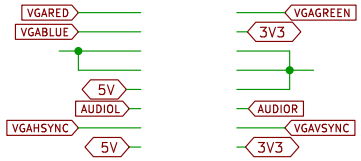
Title: BUS DECODER

Size: A4	Date: 2025-10-17	**Rev: 1.0**
KiCad E.D.A. 9.0.5		Id: 5/7

ANALOG VGA SIGNALS



EXTERNAL VIDEO CONNECTOR



EXTERNAL DISPLAY WITH AUDIO

Gianluca Renzi
RetroBit Lab

Sheet: /VGA Analog/
File: vga-analog.sch

Title: VGA ANALOG AND EXTERNAL VIDEO CONNECTOR

Size: A4	Date: 2025-10-17	**Rev: 1.0**
KiCad E.D.A. 9.0.5		Id: 6/7

FPGA/SSD Flash Glue Logic

3V3
C28
100nF
GND

When programming SPI FLASH for bitstream, the JP2 jumper must be closed. Should be open in a normal operational mode.

JP2
Jumper_2_Open
GND
FPGA_CDONE
SPI_SSEL_N
SD_SSEL_N
FLASH_SSEL_N

SD/microSD INTERFACE

3V3
C27
100nF
GND
SD_SSEL_N
SPI_MOSI
SPI_SCK
SPI_MISO
FPGA_CDONE
SD_CSO
SD_MOSI
SD_SCK
SD_MISO
R37 47K
R38 47K
R39 47K
R40 47K
R41 47K
C26
4.7uF
DAT1
VSS
DAT0
CLK
VDD
CMD
DAT3
DAT2
C52
100nF
DAT3 SD_CSO
CMD SD_MOSI
CLK SD_SCK
DAT0 SD_MISO
VDD
VSS

The microSD BUS will be available only when FPGA is ready and programmed

SPI 16MB FLASH

3V3
U10
C29
100nF
GND
FLASH_SSEL_N
SPI_SCK
SPI_MOSI
SPI_MISO
R43
47K
R44
47K
W25Q16JVSNIQ

IC DAC/AUDIO 24BIT 192K 16TSSOP

ASYSCLK
AUDIO_BCK
AUDIO_LRCK
AUDIO_DATA
3V3
560R
R46
R45
560R
AUDIOL
AUDIOR
C30
1uF
C31
1uF
C32
1uF
C33
1uF
C34
4.7uF
C35
4.7uF
C36
2.2uF
GND

AUDIO 3.5mm OUTPUT

AUDIOL
560R
R67
AUDIOR
560R
R68
GND

AUDIO SECTION

Gianluca Renzi
RetroBit Lab

Sheet: /Vera FPGA flash/
File: vera-fpga-flash.sch

Title: uSD Card, FPGA FLASH and AUDIO SECTION

Size: A4	Date: 2025-10-17	**Rev: 1.0**
KiCad E.D.A. 9.0.5		Id: 7/7