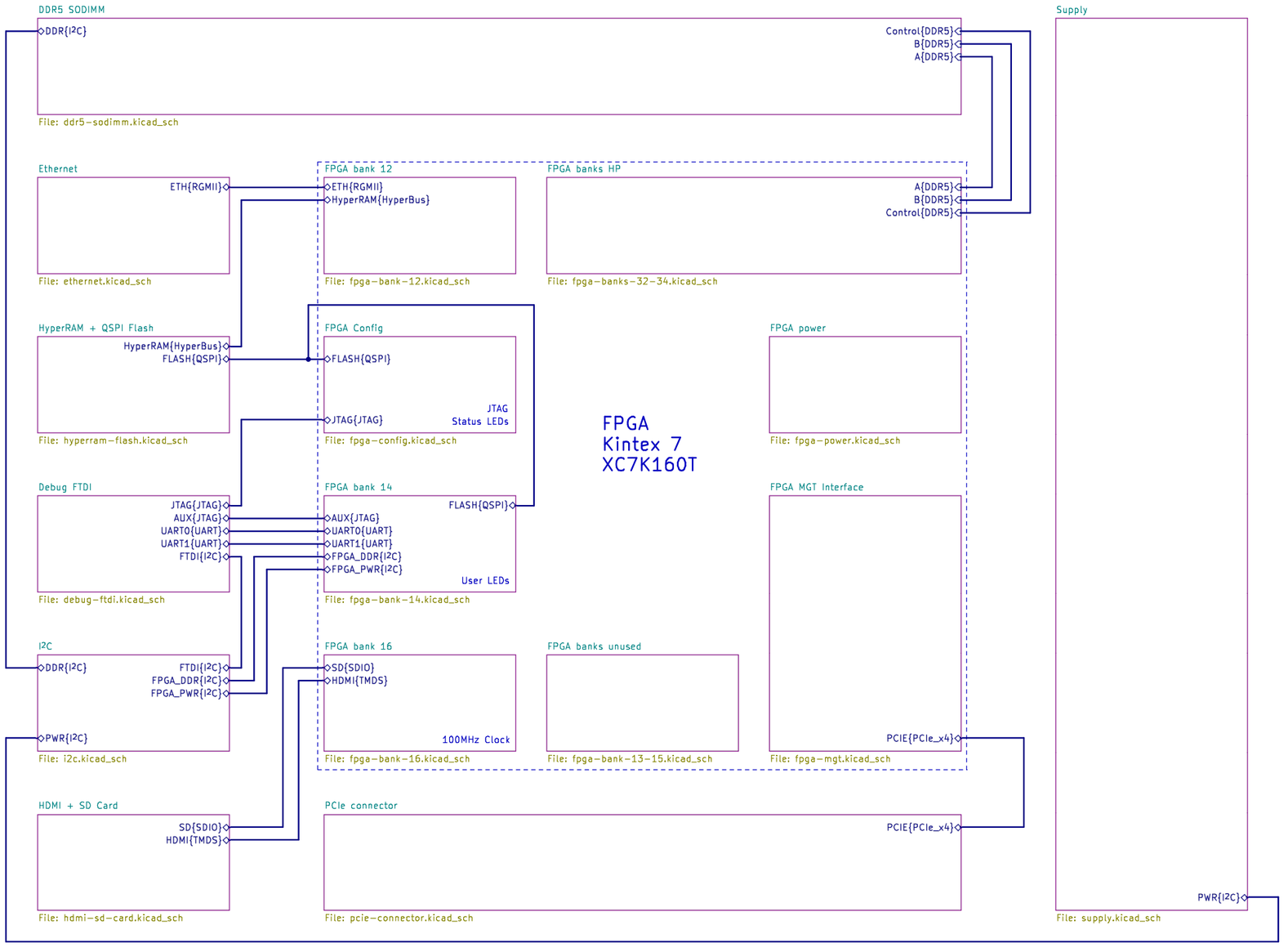
SO-DIMM DDR5 Tester



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Mechanical

H1

Horizontal lightguide 1x3 H2 960-27-12-D-AB-0 Lightpipe_Mentor_1296.2013

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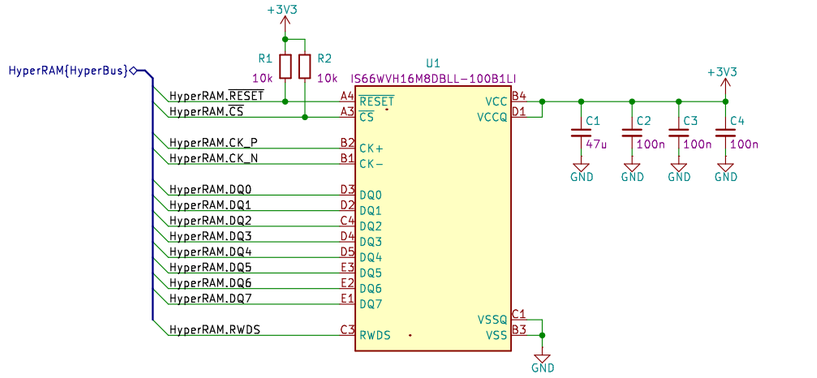
Sheet: /
File: sodimm-ddr5-tester.kicad_sch

Title: SO-DIMM DDR5 Tester

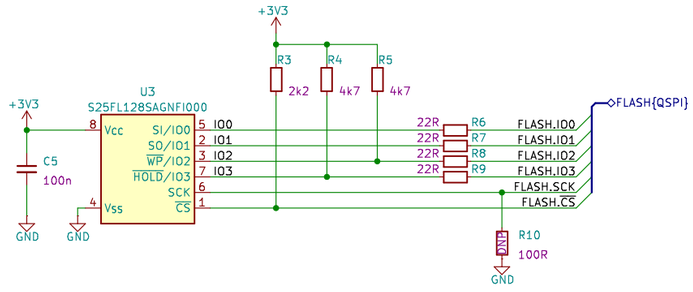
Size: A3	Date: 2024-01-18	**Rev: 1.1.1**
KiCad E.D.A. kicad 6.0.11-2627ca5db0~126~ubuntu22.04.1		Id: 1/17

HyperRAM



(Q)SPI flash

Master SPI Quad (x4) configuration scheme
Follows Figure 2–14 7 Series FPGAs Configuration User Guide
UG470 (v1.13.1)



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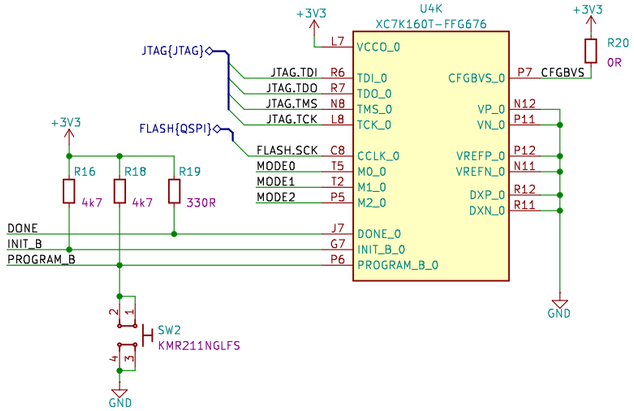
Sheet: /HyperRAM + QSPI Flash/
File: hyperram-flash.kicad_sch

Title: SO-DIMM DDR5 Tester

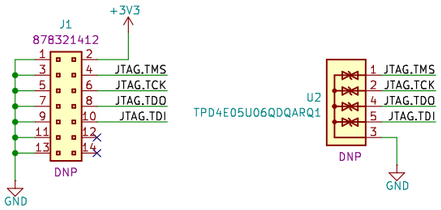
Size: A3	Date: 2024-01-18	**Rev: 1.1.1**
KiCad E.D.A. kicad 6.0.11-2627ca5db0~126~ubuntu22.04.1		Id: 2/17

FPGA BANK 0

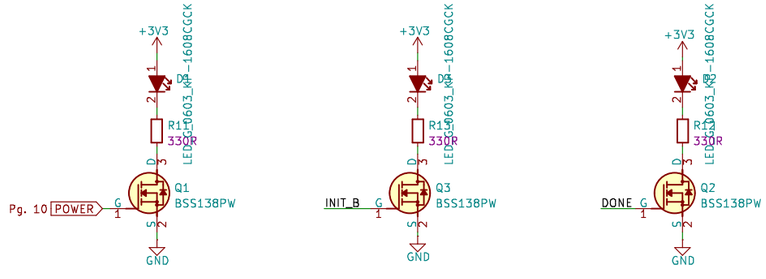


JTAG Connector

Compatible with Xilinx Platform Cable

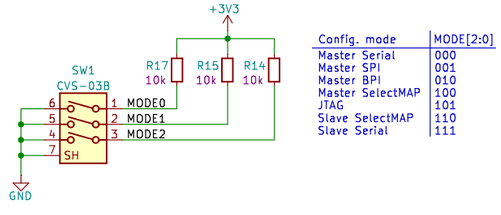


STATUS LEDs



Configuration Modes

For details, see UG470 p. 21



Config. mode	MODE[2:0]
Master Serial	000
Master SPI	001
Master BPI	010
Master SelectMAP	100
JTAG	101
Slave SelectMAP	110
Slave Serial	111

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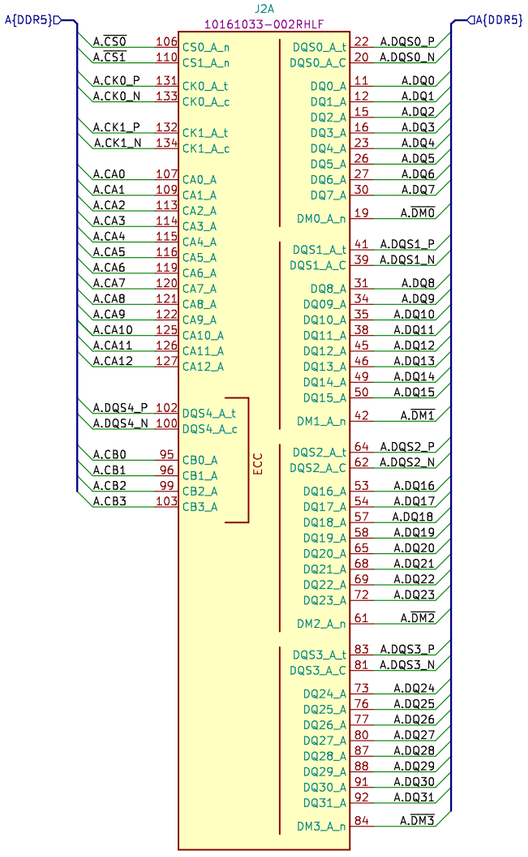
Sheet: /FPGA Config/
File: fpga-config.kicad_sch

Title: SO-DIMM DDR5 Tester

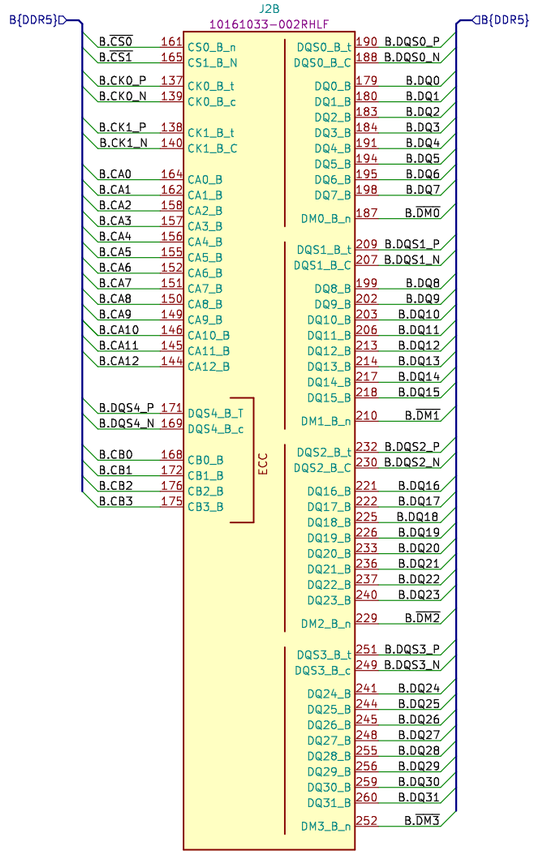
Size: A3	Date: 2024-01-18	**Rev: 1.1.1**
KiCad E.D.A. kicad 6.0.11-2627ca5db0~126~ubuntu22.04.1		Id: 3/17

DDR5 SODIM connector

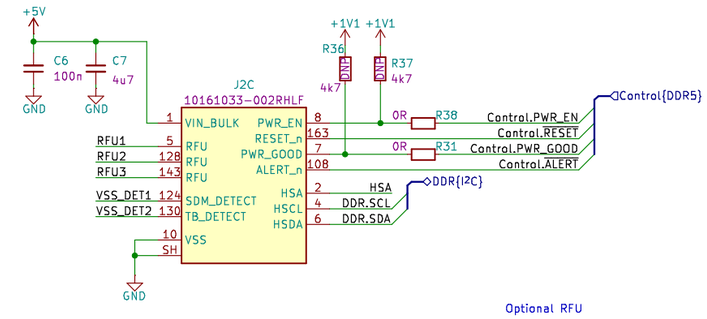
Subchannel A



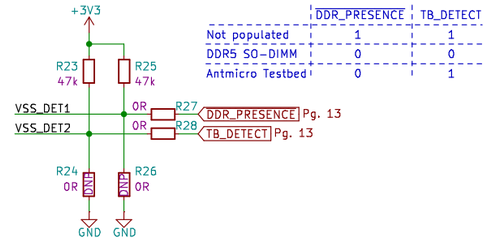
Subchannel B



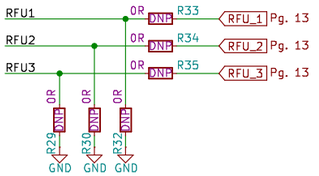
Power and control



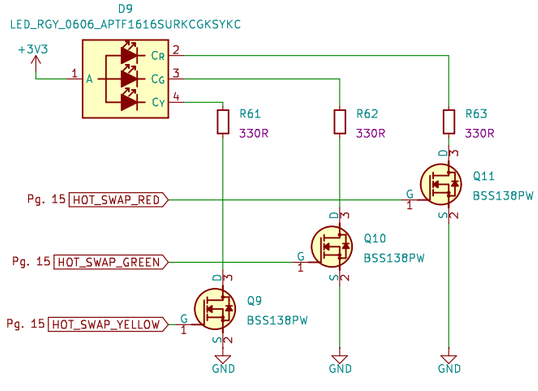
SO-DIMM type detect



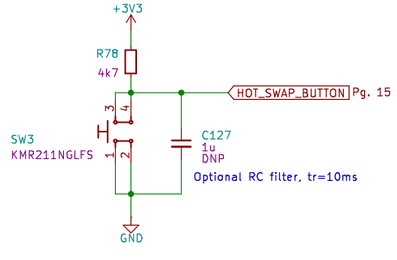
Optional RFU



HOT SWAP status LED

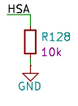


HOT SWAP eject button

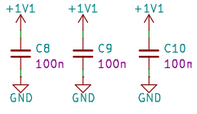


Serial adress select

Default 000



Plane decoupling



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Sheet: /DDR5 SODIMM/
File: ddr5-sodimm.kicad_sch

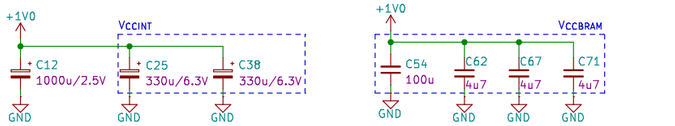
Title: SO-DIMM DDR5 Tester

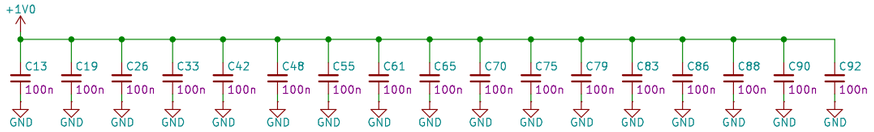
Size: A3	Date: 2024-01-18	**Rev: 1.1.1**
KiCad E.D.A. kicad 6.0.11-2627ca5db0~126~ubuntu22.04.1		Id: 4/17

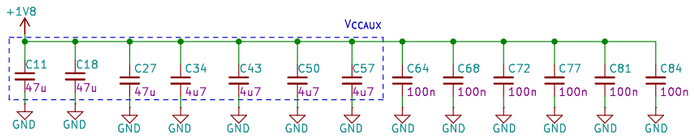
FPGA Power rails

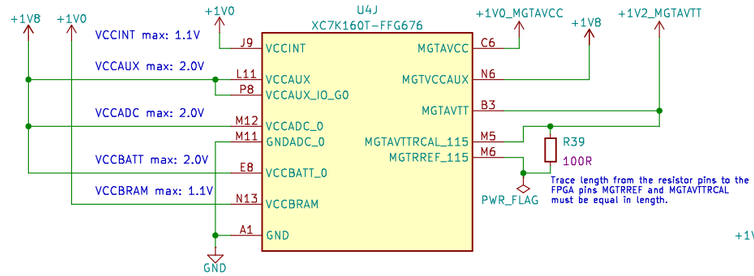
Bank marked by dahed line
referenced from 7 Series FPGAs
PCB Design Guide UG483
(FFG+FBG Package worst case)

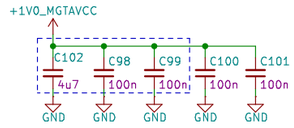
MGT decoupling marked by dahed line
referenced from 7 Series FPGAs
PCB Design Guide UG482
(FFG+FBG Package worst case)

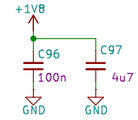


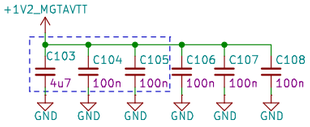


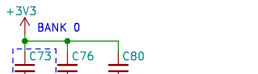


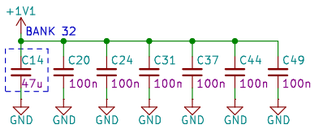


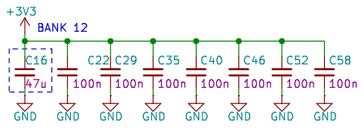


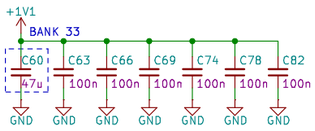


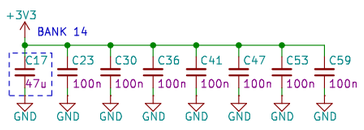


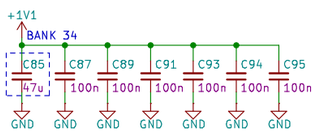


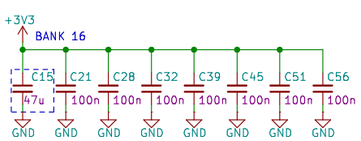












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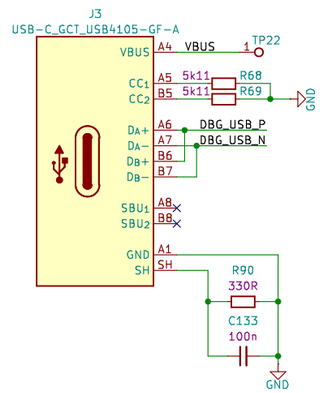
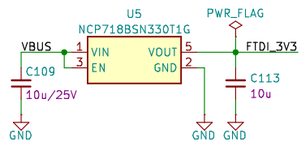
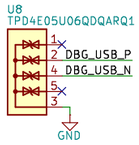
Title: SO-DIMM DDR5 Tester

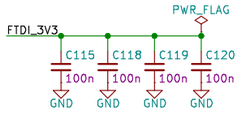
Size: A3	Date: 2024-01-18	**Rev: 1.1.1**
KiCad E.D.A. kicad 6.0.11-2627ca5db0~126~ubuntu22.04.1		Id: 5/17

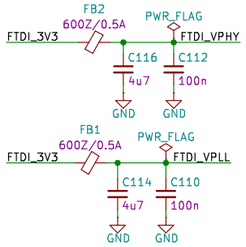
Debug FTDI

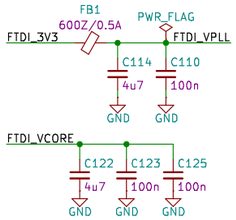


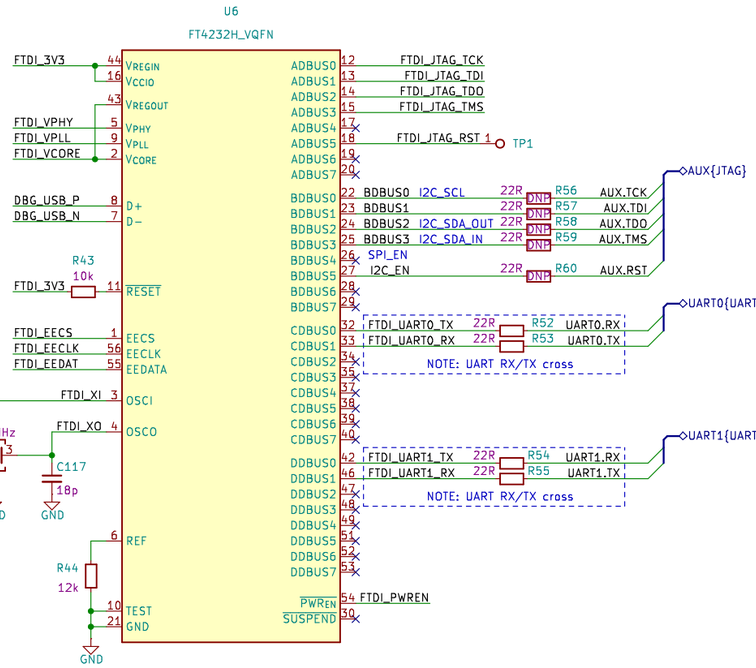


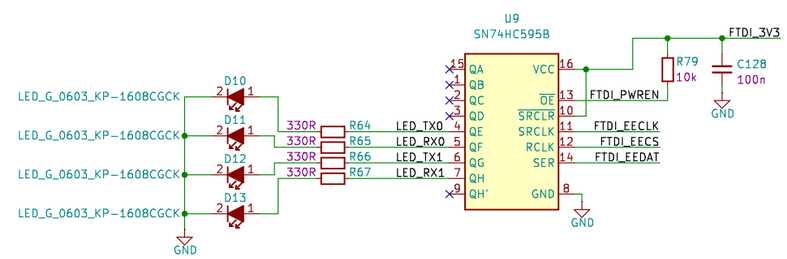


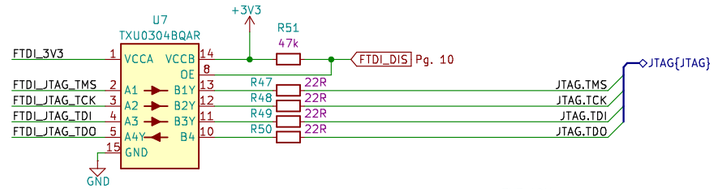


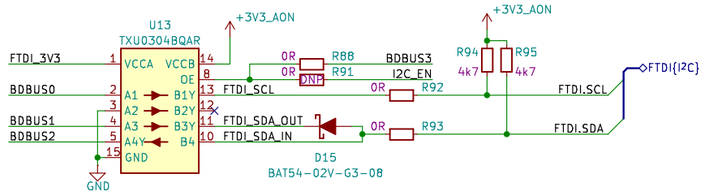


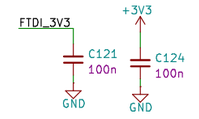


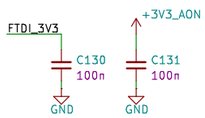












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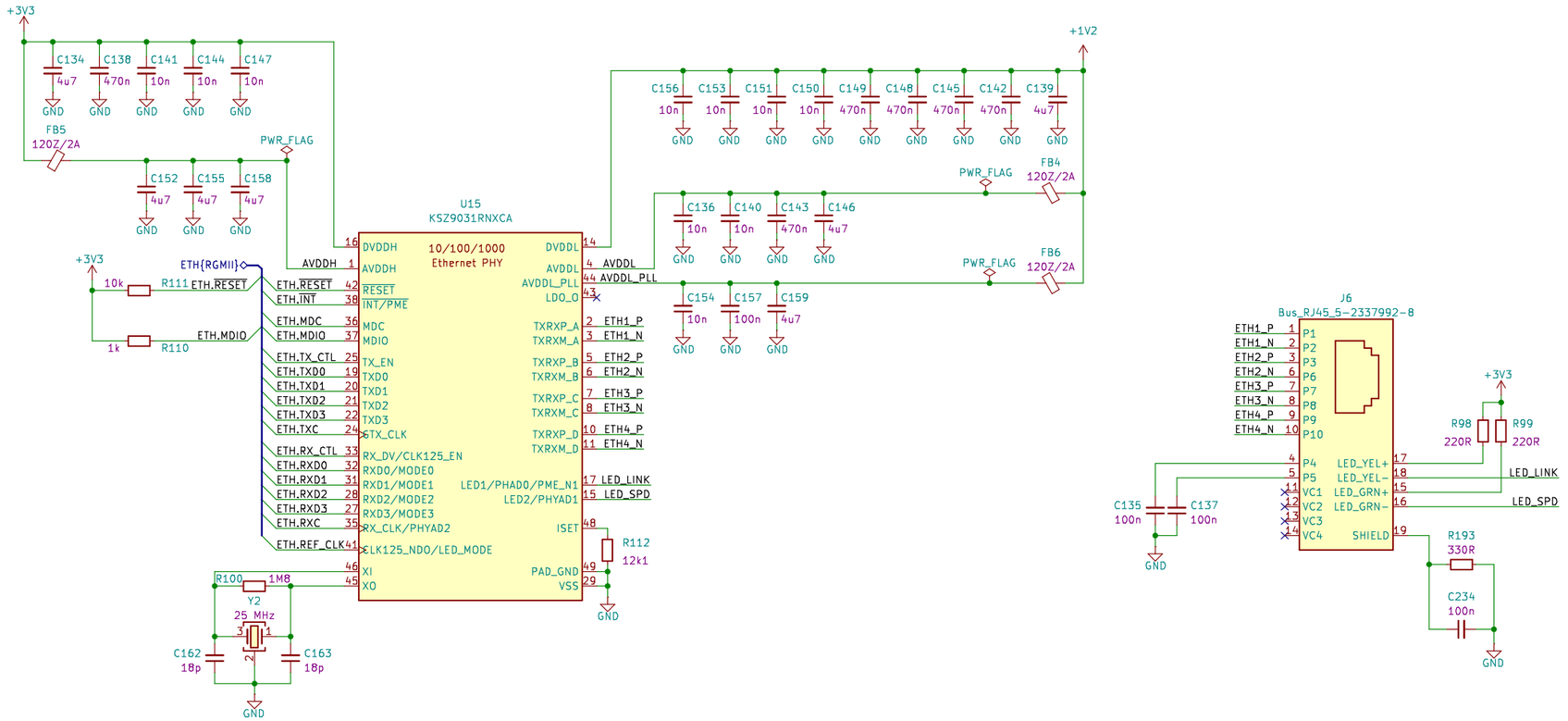
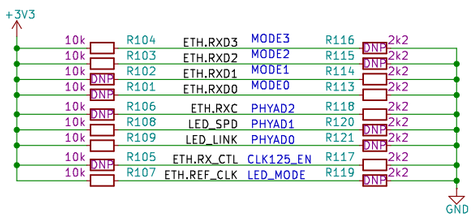
Sheet: /Debug FTDI/ File: debug-ftdi.kicad_sch	
Title: SO-DIMM DDR5 Tester	
Size: A3	Date: 2024-01-18
KiCad E.D.A. kicad 6.0.11-2627ca5db0~126~ubuntu22.04.1	**Rev: 1.1.1** Id: 6/17

Gigabit Ethernet

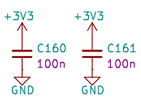


Bootstrap configuration



MODE[3:0] : 1100 (RGMII mode – Advertise 1000BASE-T full-duplex only)
PHYAD[4:0]: 00011
CLK125_EN: 0, disabled
LED_MODE: 1, Single-LED mode

Reference plane decoupling



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Sheet: /Ethernet/
File: ethernet.kicad_sch

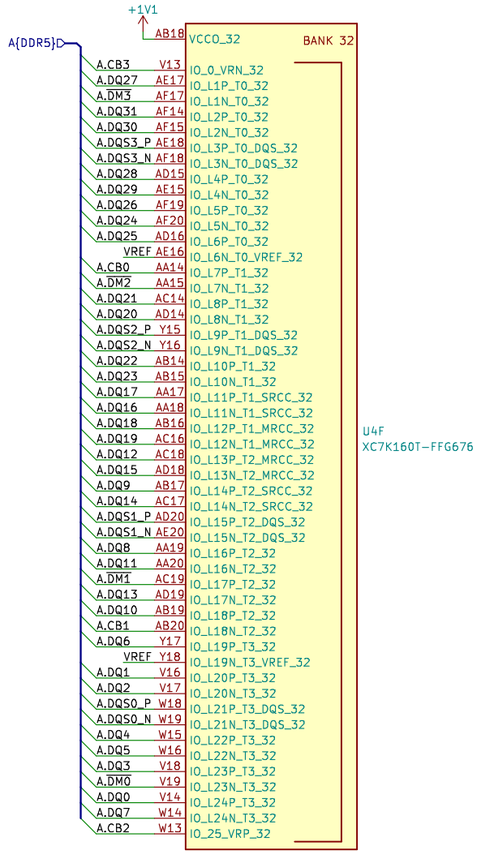
Title: SO-DIMM DDR5 Tester

Size: A3	Date: 2024-01-18	**Rev: 1.1.1**
KiCad E.D.A. kicad 6.0.11-2627ca5db0~126~ubuntu22.04.1		Id: 8/17

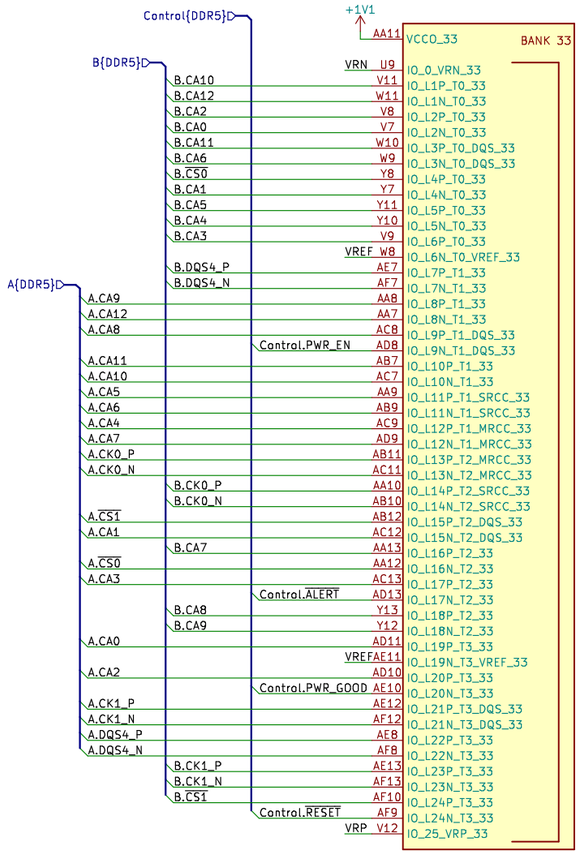
HP Banks

VCCO (HP banks) max: 2.0V

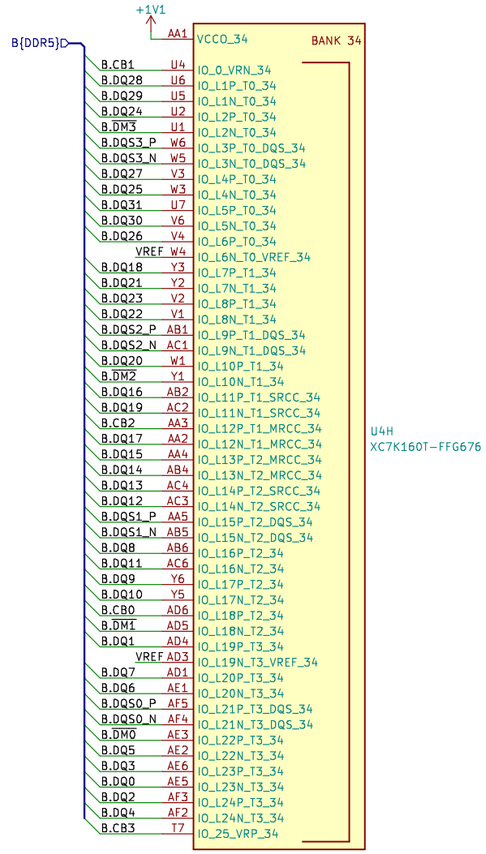
BANK 32



BANK 33

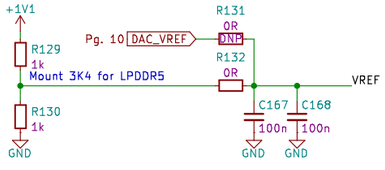


BANK 34

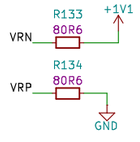


Pinout D.1.1

VREF



Reference termination



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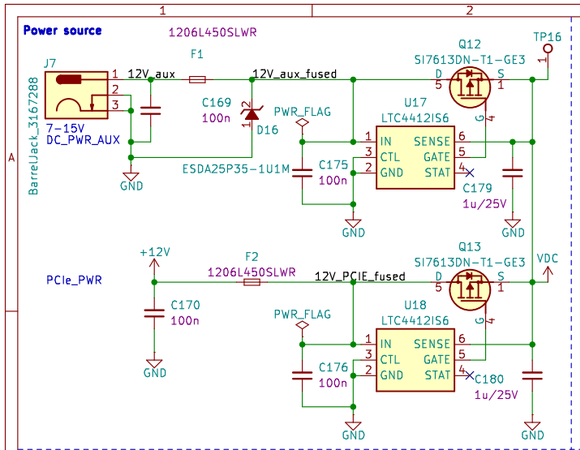
Sheet: /FPGA banks HP/
File: fpga-banks-32-34.kicad_sch

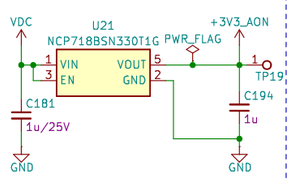
Title: SO-DIMM DDR5 Tester

Size: A3	Date: 2024-01-18	**Rev: 1.1.1**
KiCad E.D.A.	kicad 6.0.11-2627ca5db0~126~ubuntu22.04.1	Id: 9/17

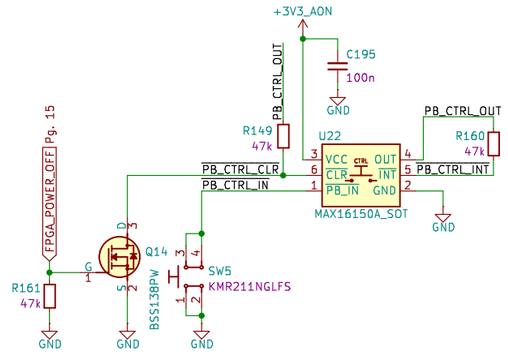
Power source



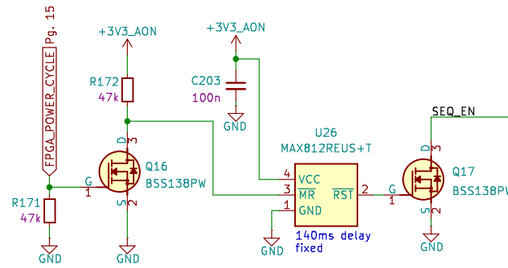
Always-ON +3V3 LDO



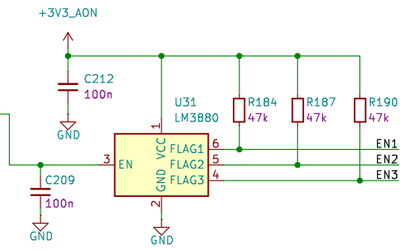
ON/OFF Button controller



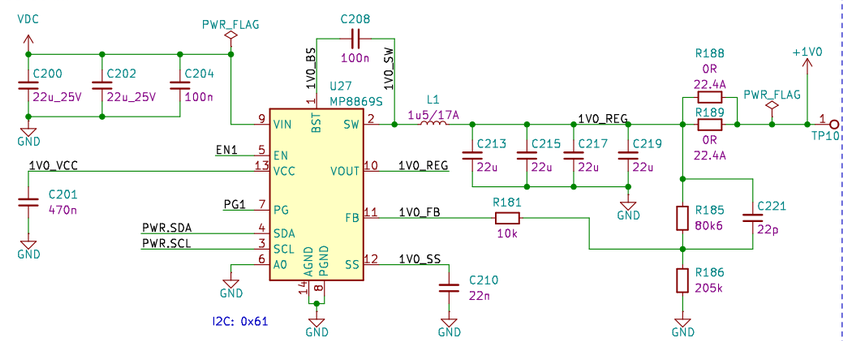
Power cycle



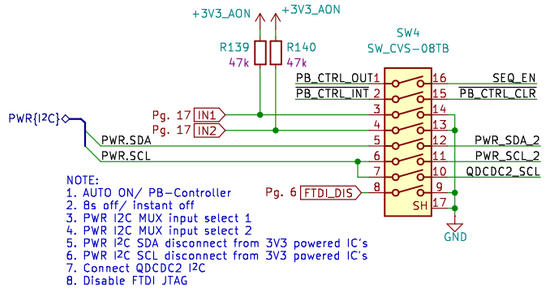
Power supply sequencer



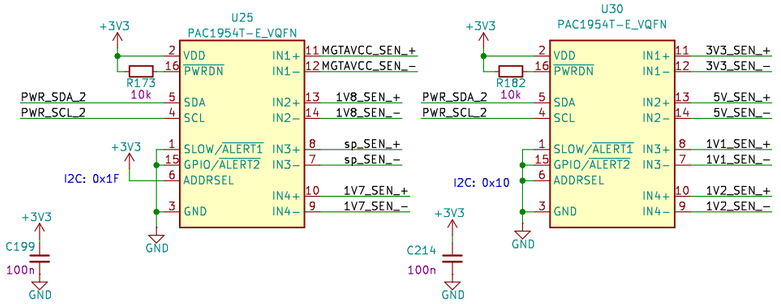
DC-DC INT



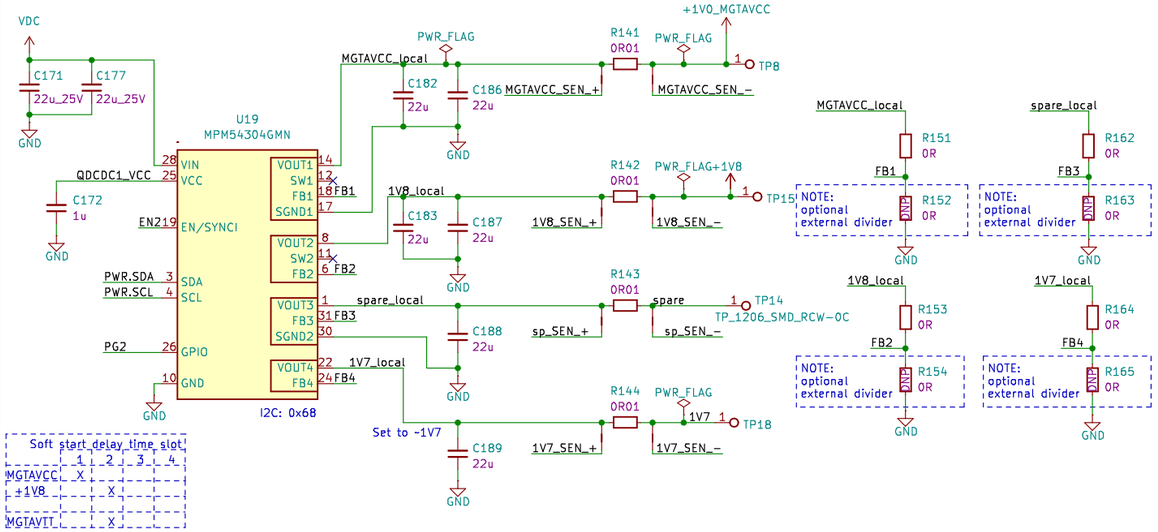
Config switch



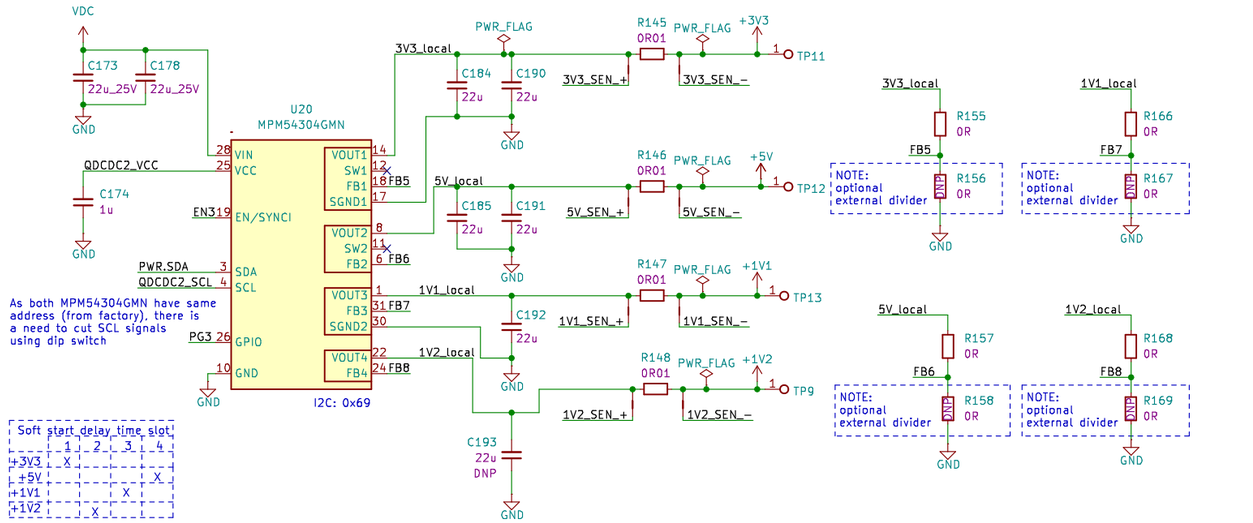
Power Monitors



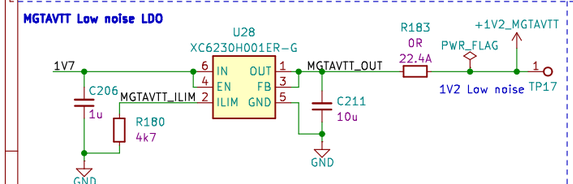
DC-DC AUX, MGT



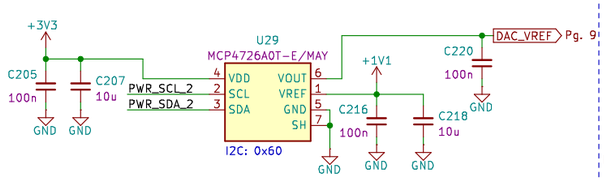
DC-DC IO



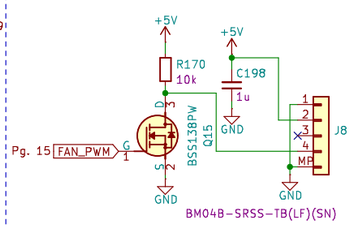
MGTAVTT Low noise LDO



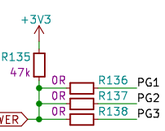
VREF DAC



FAN connector



Power good



Ground probe pads

TP21 TP_1206_SMD_RCW-0C

TP20 TP_1206_SMD_RCW-0C

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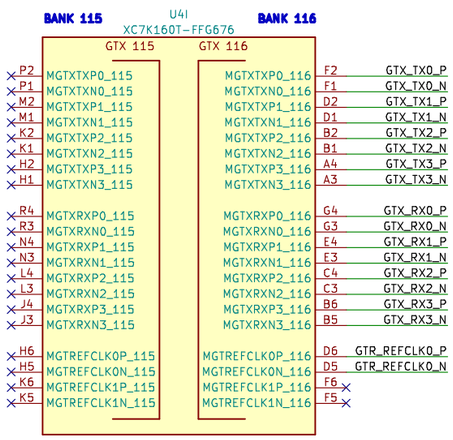
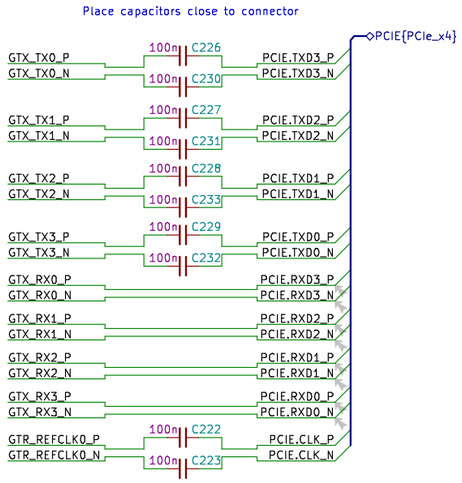
Sheet: /Supply/
File: supply.kicad_sch

Title: SO-DIMM DDR5 Tester

Size: A3	Date: 2024-01-18	**Rev: 1.1.1**
KiCad E.D.A. kicad 6.0.11-2627ca5db0~126~ubuntu22.04.1		Id: 10/17

MGT Interface





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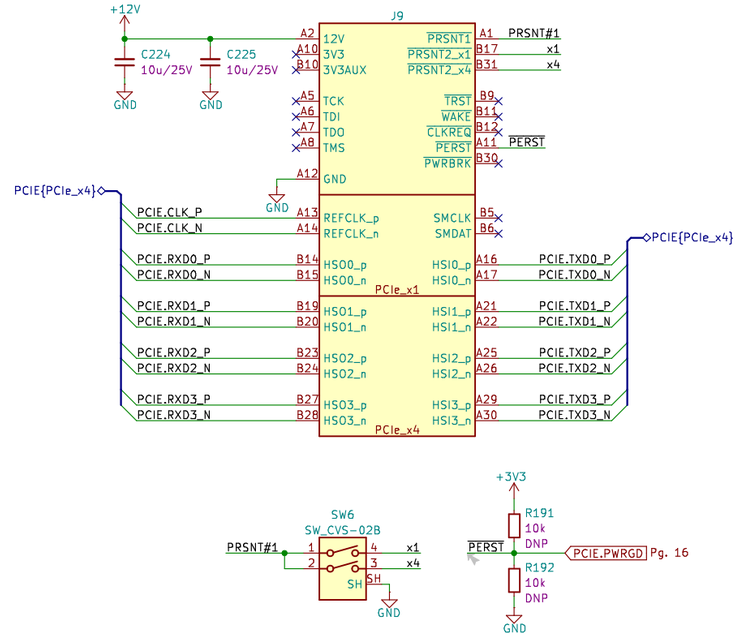
Sheet: /FPGA MGT Interface/
File: fpga-mgt.kicad_sch

Title: SO-DIMM DDR5 Tester

Size: A3	Date: 2024-01-18	**Rev: 1.1.1**
KiCad E.D.A. kicad 6.0.11-2627ca5db0~126~ubuntu22.04.1		Id: 11/17

PCIe



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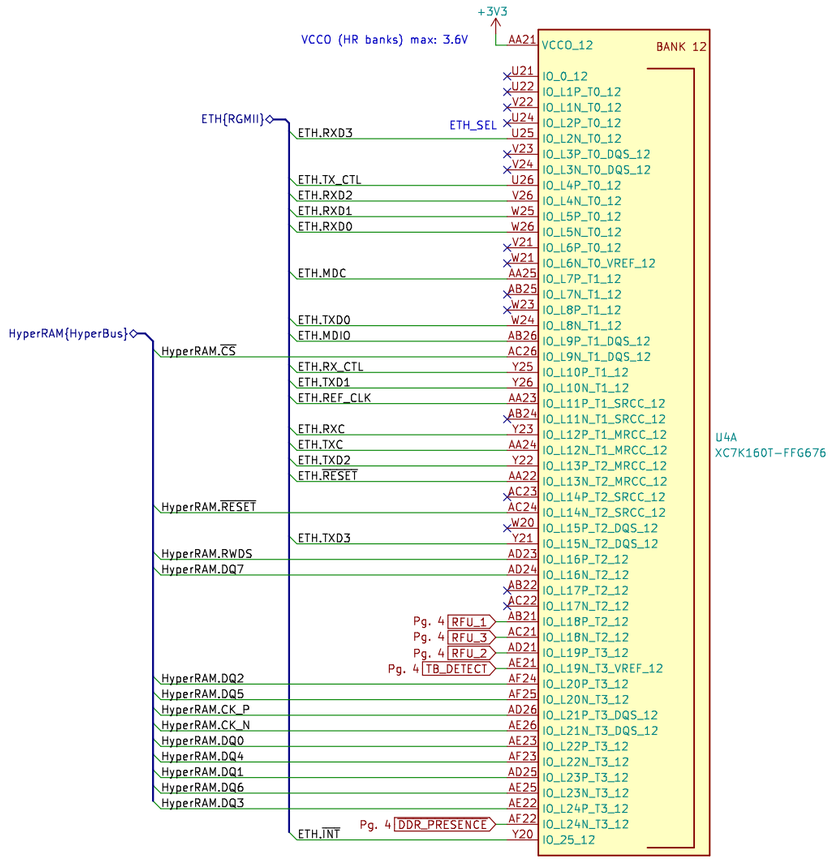
Sheet: /PCIe connector/
File: pcie-connector.kicad_sch

Title: SO-DIMM DDR5 Tester

Size: A3	Date: 2024-01-18	**Rev: 1.1.1**
KiCad E.D.A. kicad 6.0.11-2627ca5db0~126~ubuntu22.04.1		Id: 12/17

BANK 12



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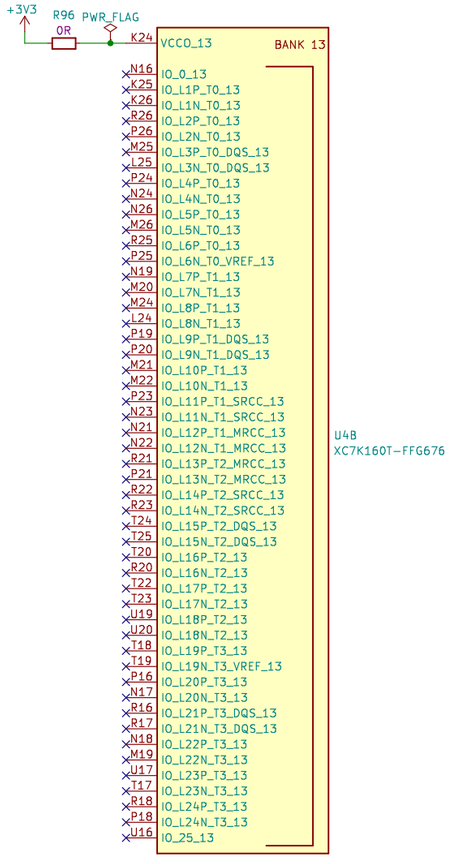
Sheet: /FPGA bank 12/
File: fpga-bank-12.kicad_sch

Title: SO-DIMM DDR5 Tester

Size: A3	Date: 2024-01-18	**Rev: 1.1.1**
KiCad E.D.A. kicad 6.0.11-2627ca5db0~126~ubuntu22.04.1		Id: 13/17

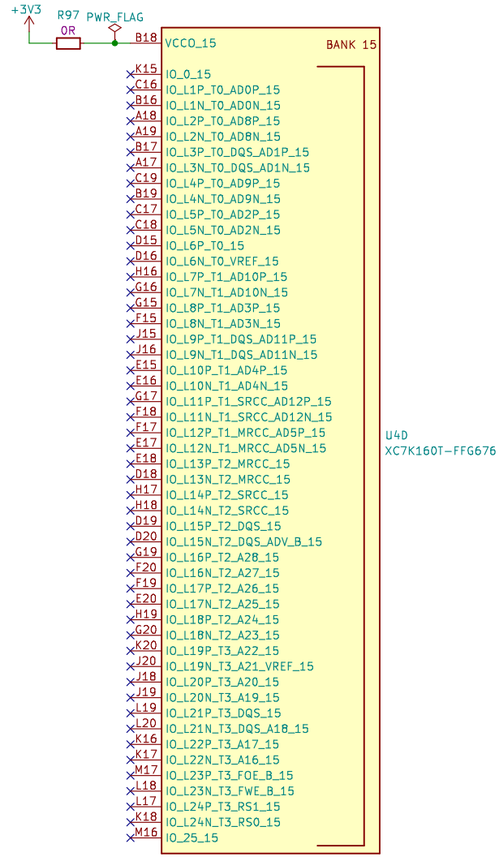
BANK 13

Connected to 3V3 for increased ESD protection



BANK 15

Connected to 3V3 for increased ESD protection



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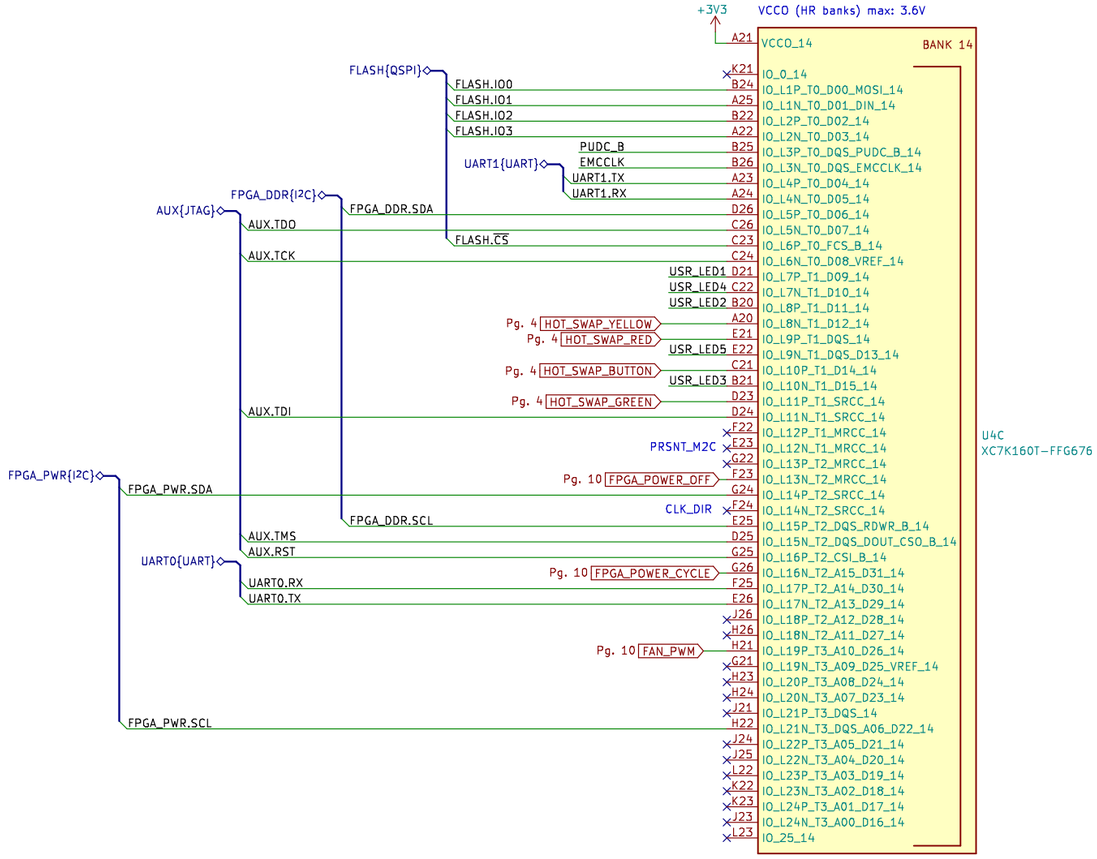
Sheet: /FPGA banks unused/
File: fpga-bank-13-15.kicad_sch

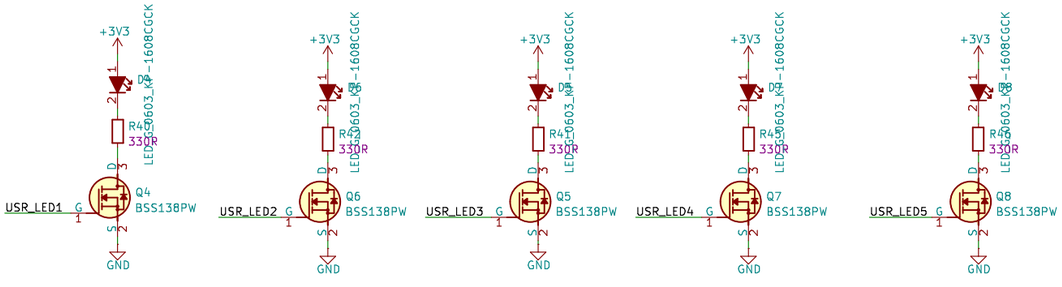
Title: SO-DIMM DDR5 Tester

Size: A3	Date: 2024-01-18	**Rev: 1.1.1**
KiCad E.D.A. kicad 6.0.11-2627ca5db0~126~ubuntu22.04.1		Id: 14/17

BANK 14



User LEDs



Probes

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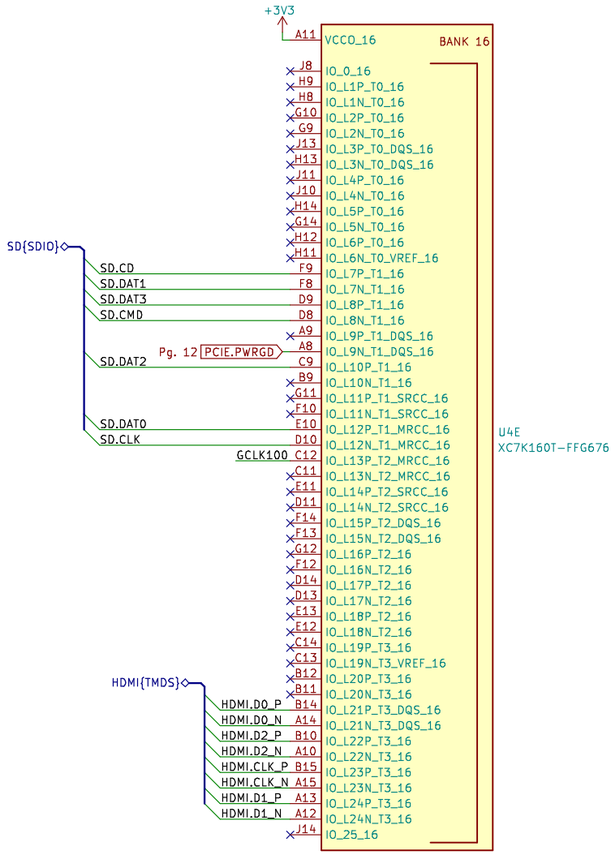
Sheet: /FPGA bank 14/
File: fpga-bank-14.kicad_sch

Title: SO-DIMM DDR5 Tester

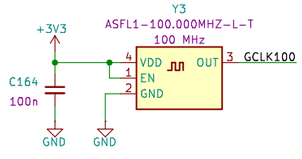
Size: A3	Date: 2024-01-18	**Rev: 1.1.1**
KiCad E.D.A. kicad 6.0.11-2627ca5db0~126~ubuntu22.04.1		Id: 15/17

BANK 16

VCCO (HR banks) max: 3.6V



Clock source



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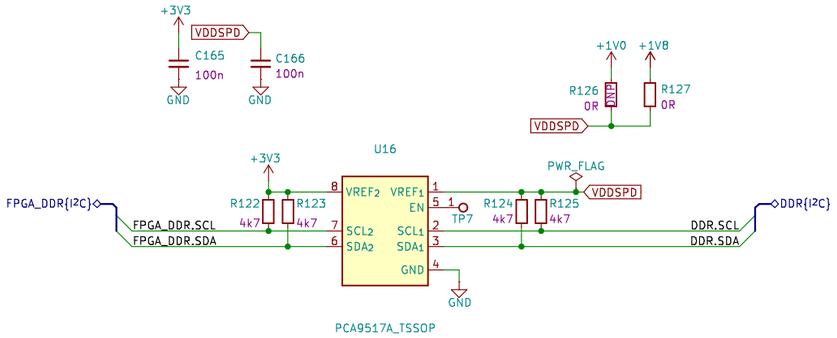
Sheet: /FPGA bank 16/
File: fpga-bank-16.kicad_sch

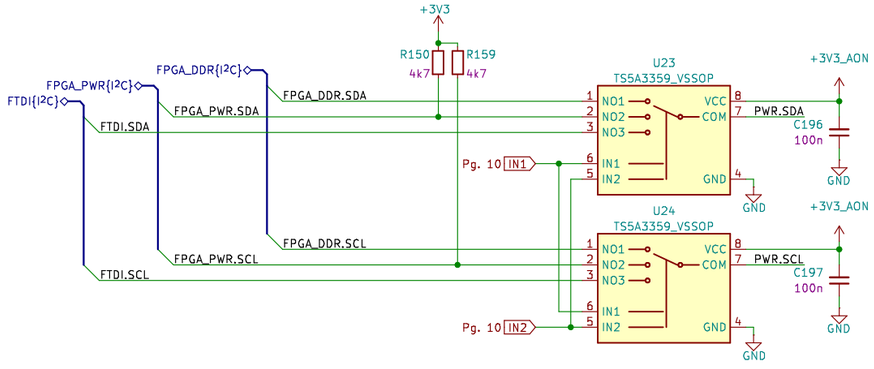
Title: SO-DIMM DDR5 Tester

Size: A3	Date: 2024-01-18	**Rev: 1.1.1**
KiCad E.D.A. kicad 6.0.11-2627ca5db0~126~ubuntu22.04.1		Id: 16/17

I2C logic translator



PWR I2C MUX



OR Mux bypass

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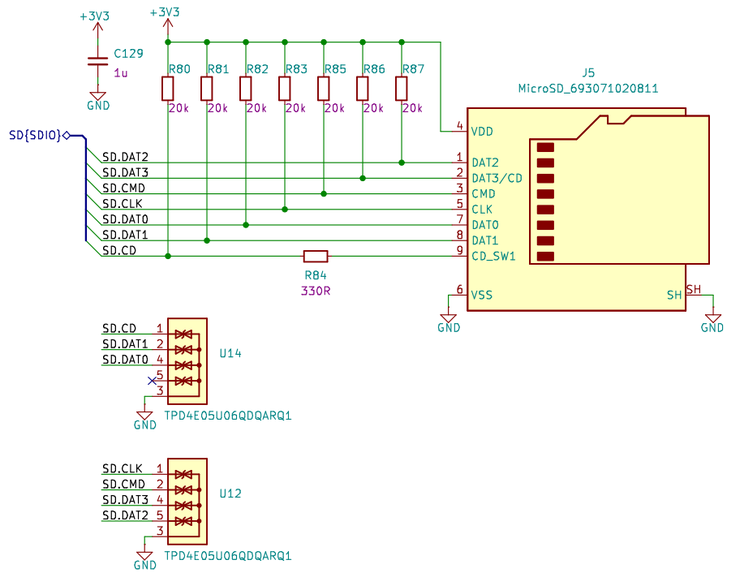
Sheet: /I2C/
File: i2c.kicad_sch

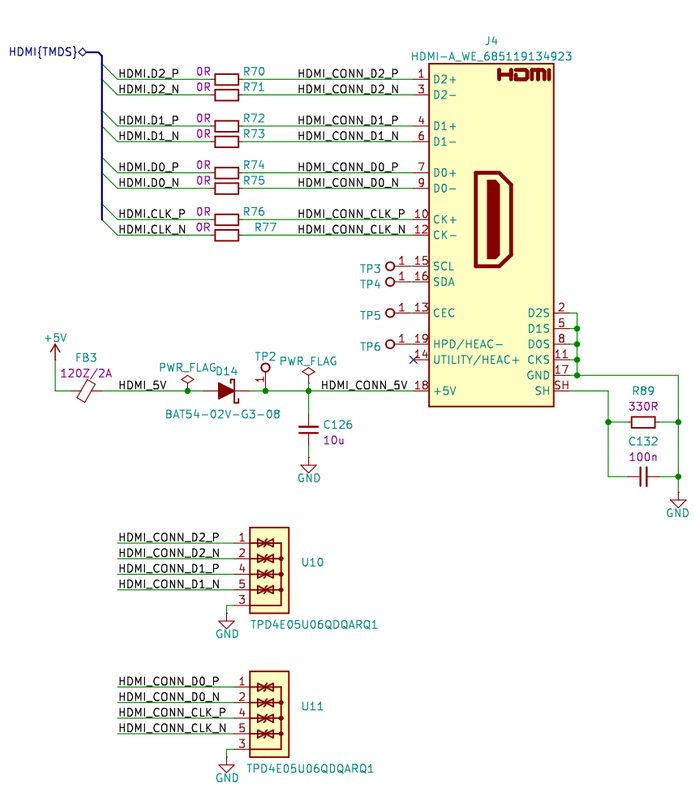
Title: SO-DIMM DDR5 Tester

Size: A3	Date: 2024-01-18	**Rev: 1.1.1**
KiCad E.D.A.	kicad 6.0.11-2627ca5db0~126~ubuntu22.04.1	Id: 17/17

SD card



HDMI



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Sheet: /HDMI + SD Card/
File: hdmi-sd-card.kicad_sch

Title: SO-DIMM DDR5 Tester

Size: A3	Date: 2024-01-18	**Rev: 1.1.1**
KiCad E.D.A. kicad 6.0.11-2627ca5db0~126~ubuntu22.04.1		Id: 17/17