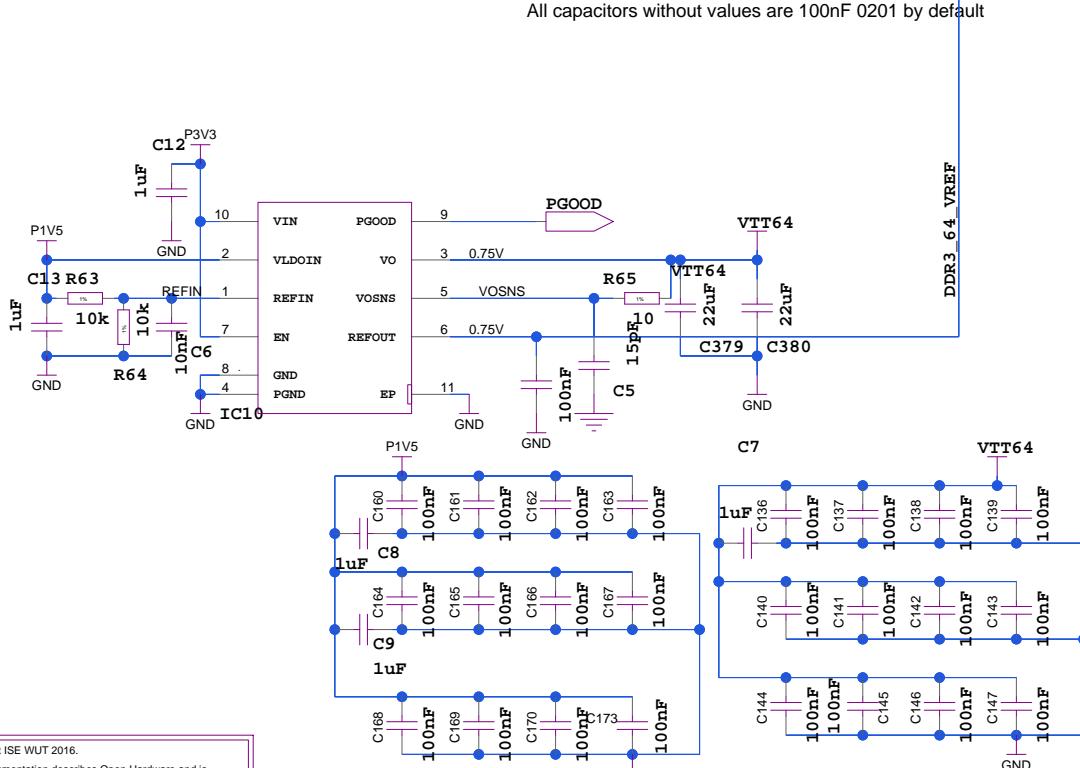
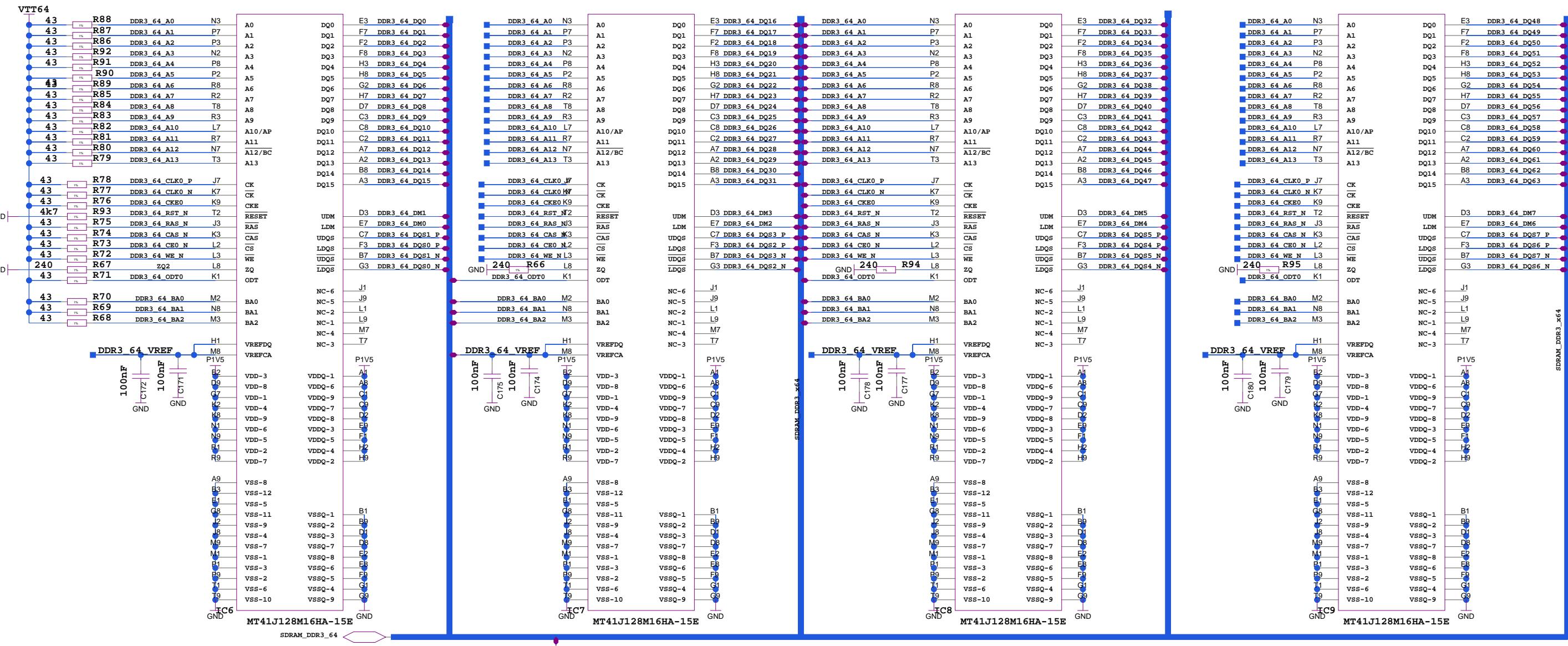


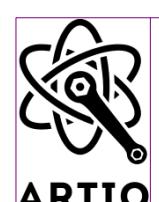
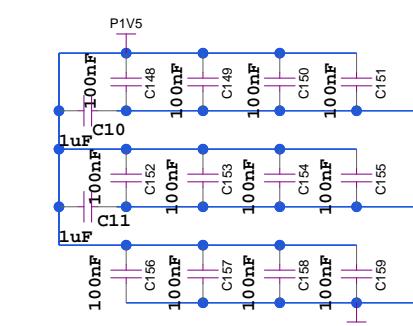
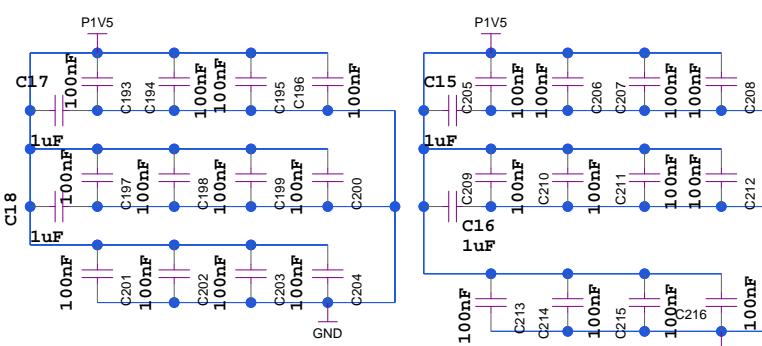
# Metlino\_MCH

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ARTIQ

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SDRAM\_DDR3\_4x16

TITLE

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v0.95

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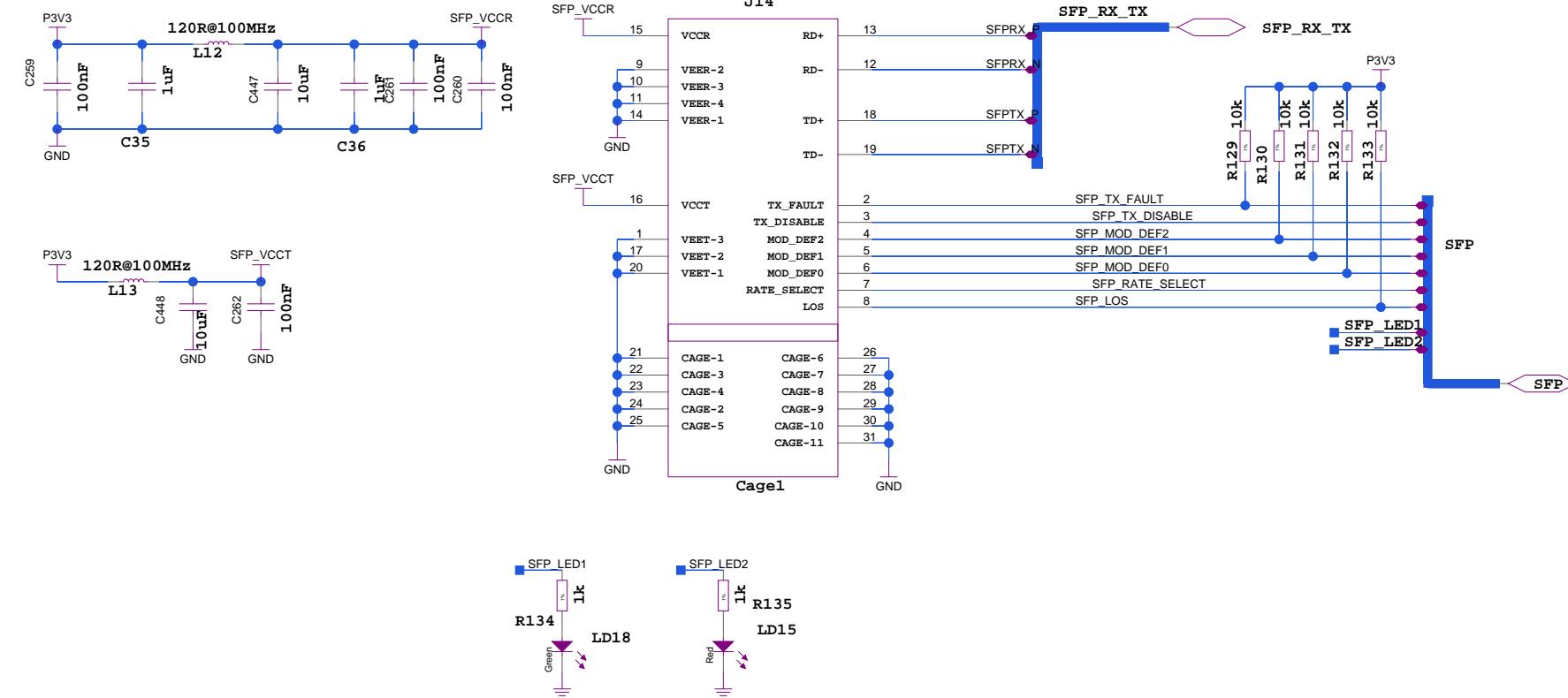
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**ARTIQ Sinara**

**SFP**

SIZE DWG NO

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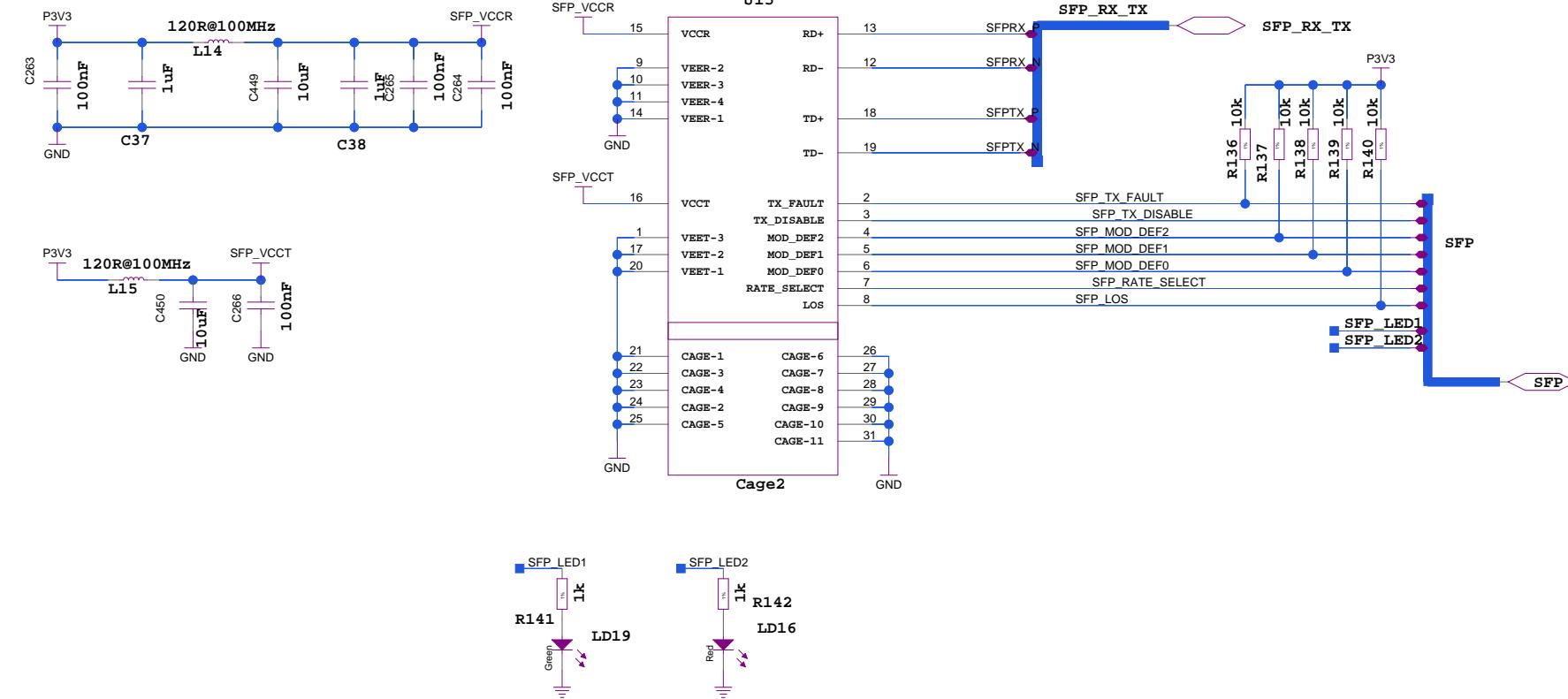
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**SFP**

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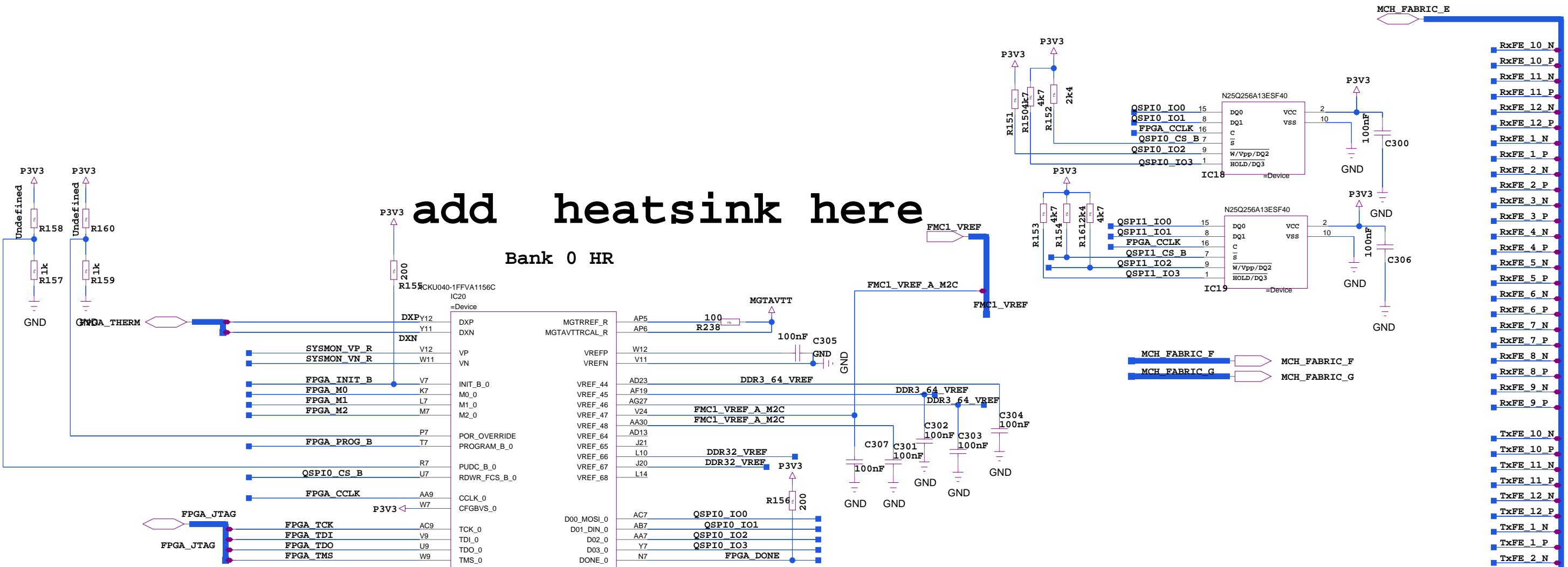
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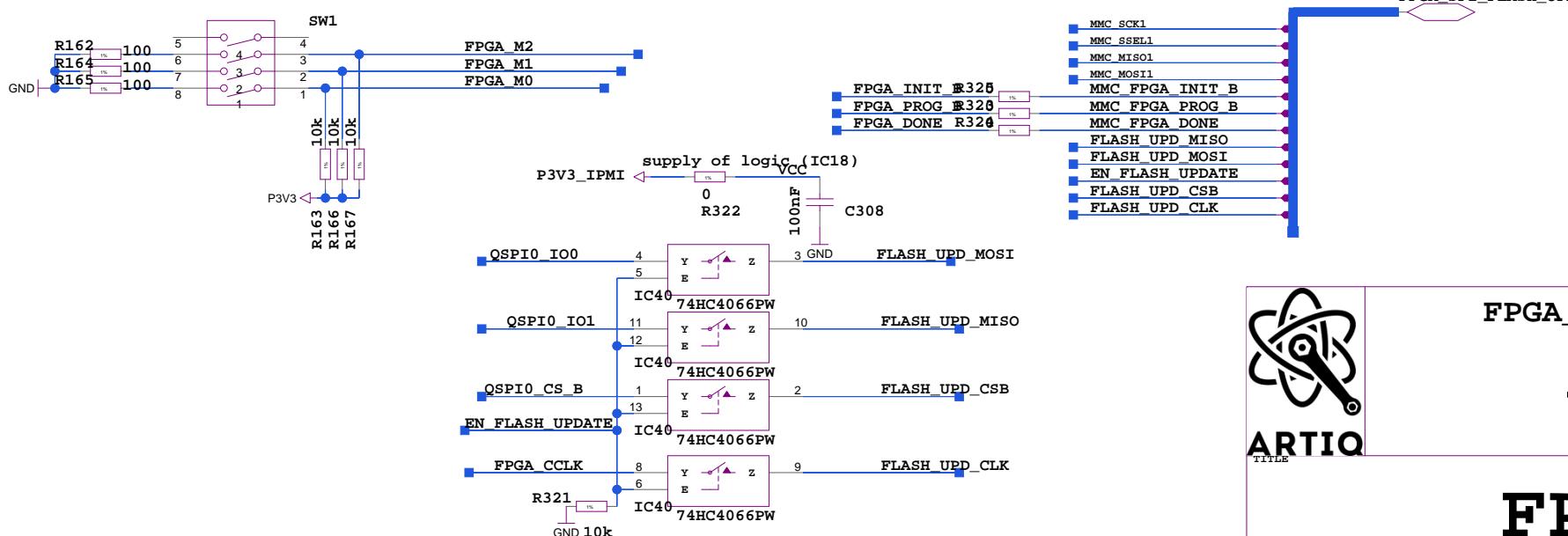
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SFP

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Layout: Place resistor and capacitor for VREF  
Underneath the FPGA via array  
right next to the via



FPGA\_XCKU040FFVA1156\_MCH

ARTIQ Sinara

FPGA Bank 0 CFG

A3

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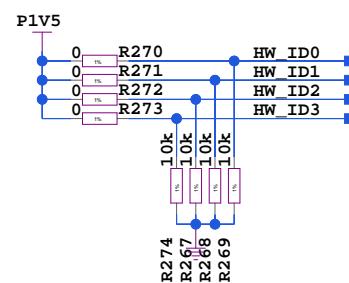
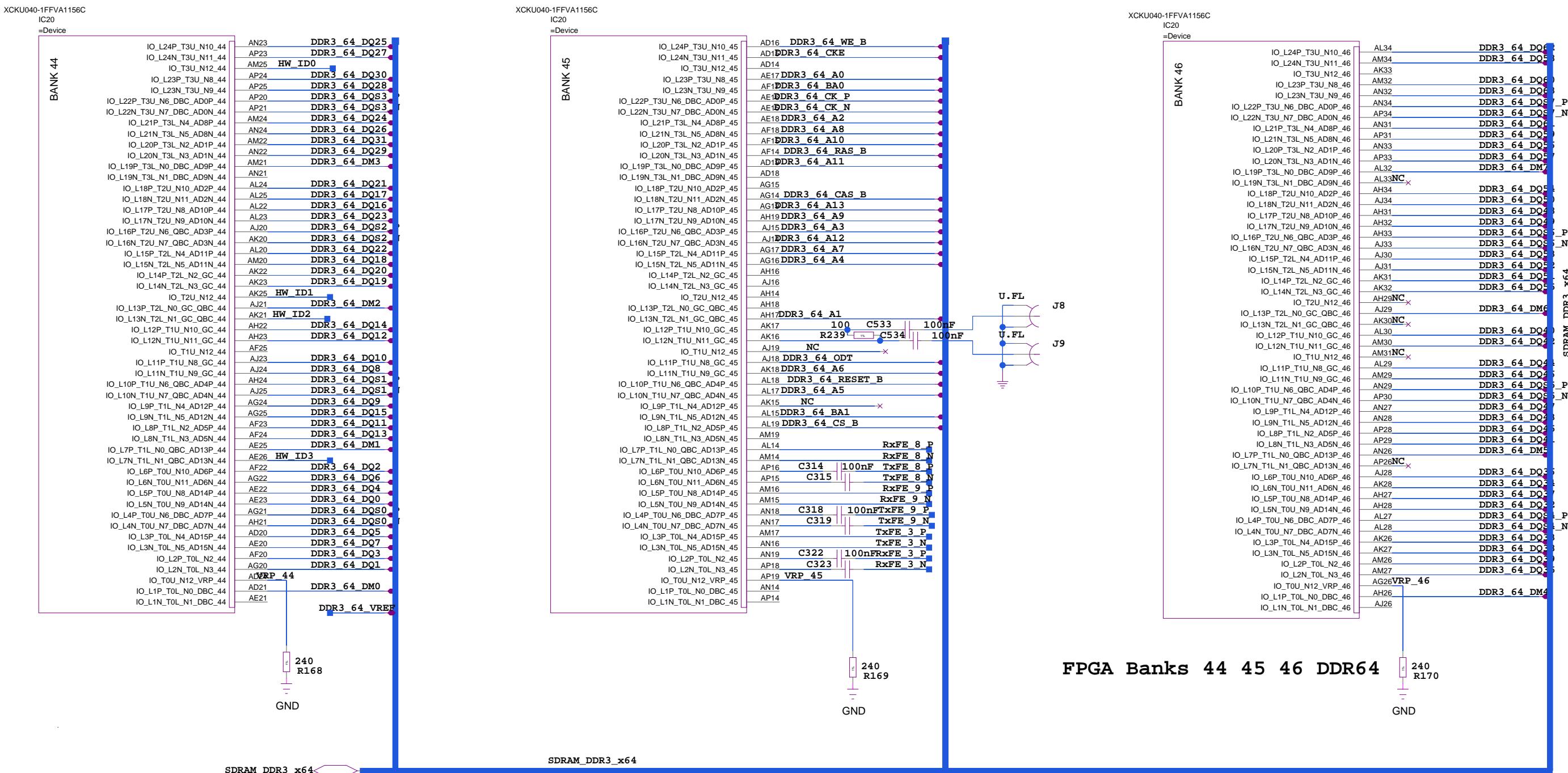
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# Bank 44 HP

# Bank 45 HP

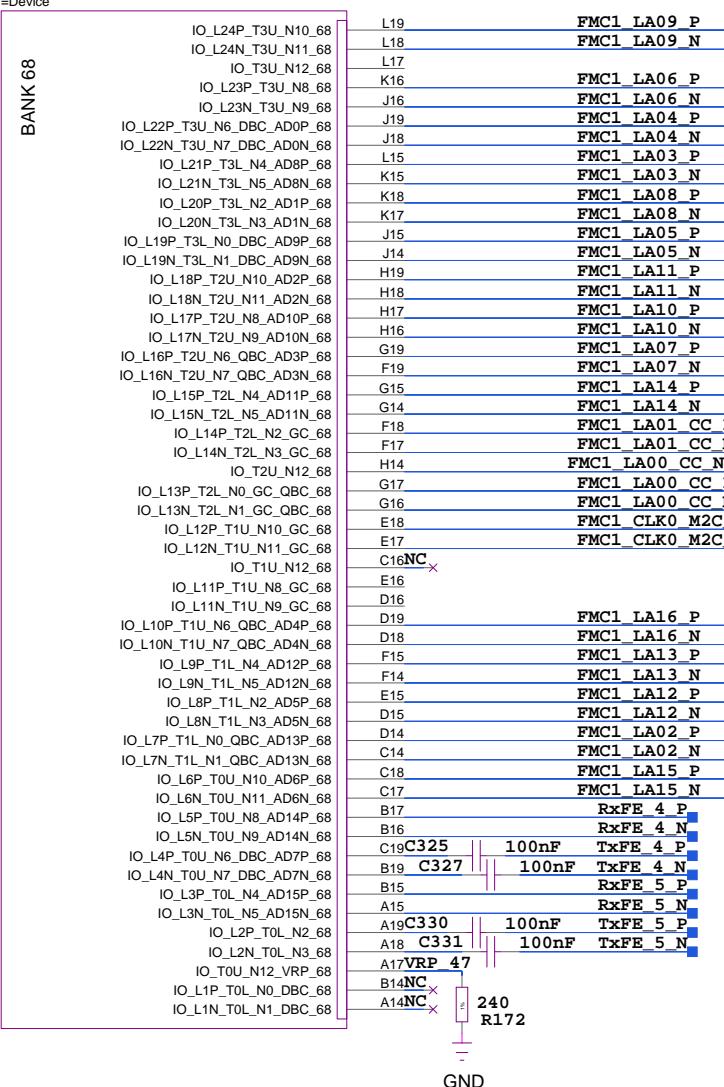
# Bank 46 HP



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XCKU040-1FFVA1156C  
IC20  
=Device

### Bank 68 HP

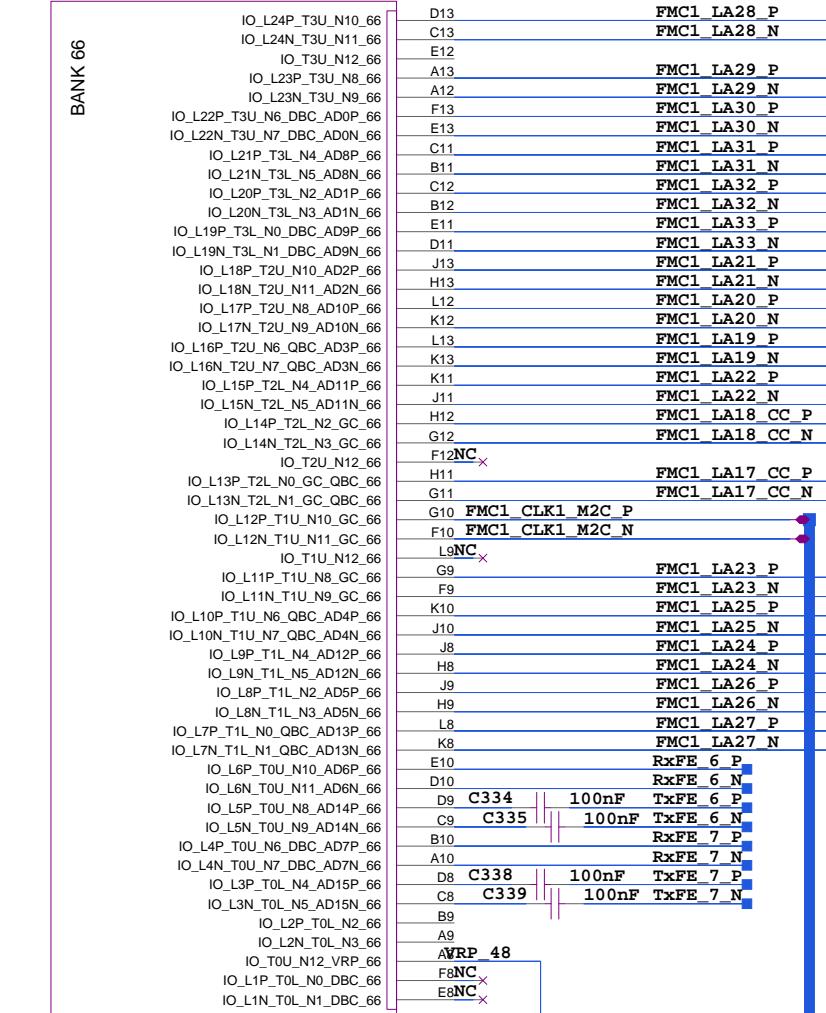


GND

FMC1\_CLK FMC1\_CLK

XCKU040-1FFVA1156C  
IC20  
=Device

### Bank 66 HP



FMC1\_LA

FMC1\_LA

FPGA\_XCKU040FFVA1156\_MCH



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FPGA Banks 47 48 HP FM

SIZE DWG NO

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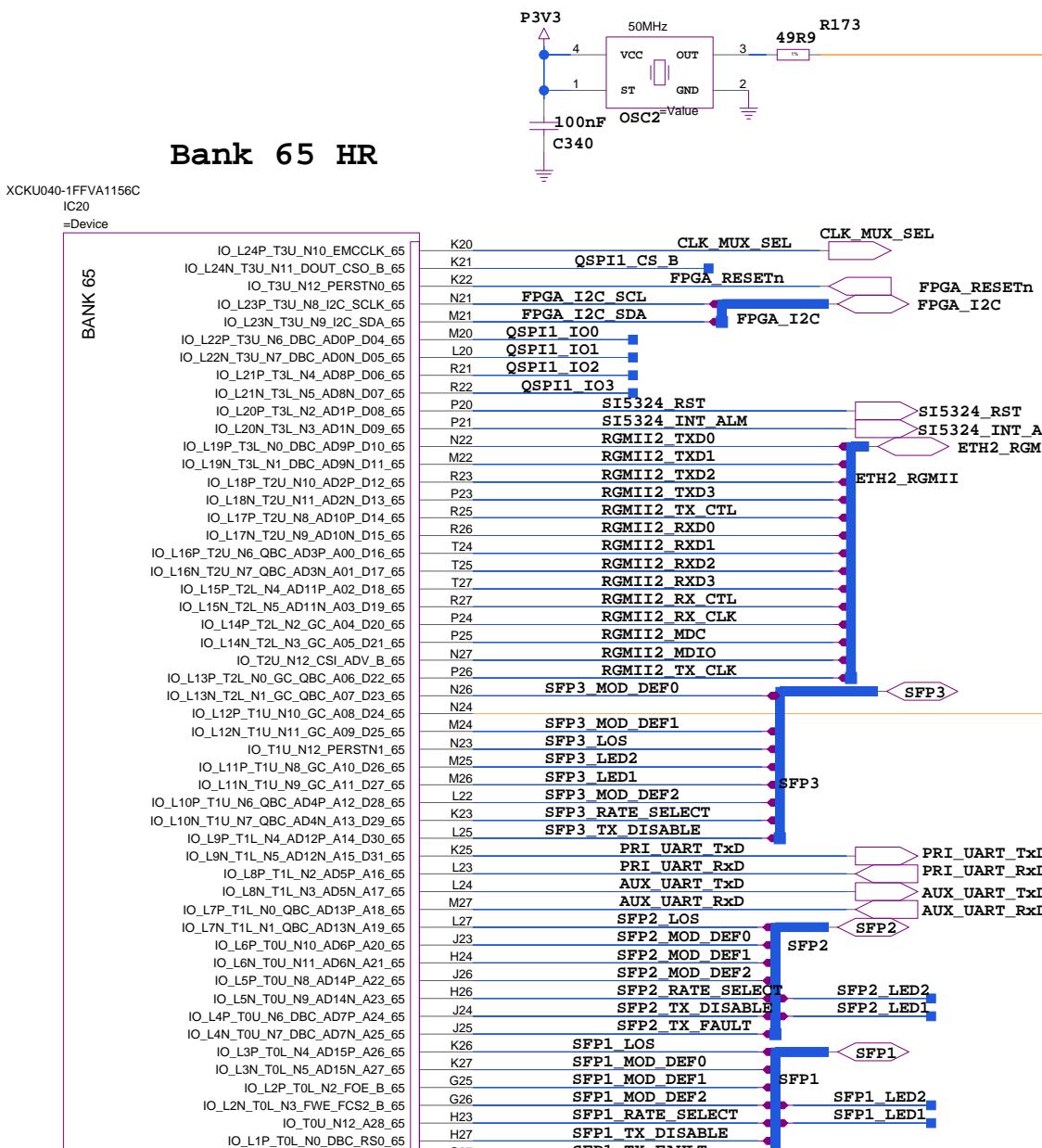
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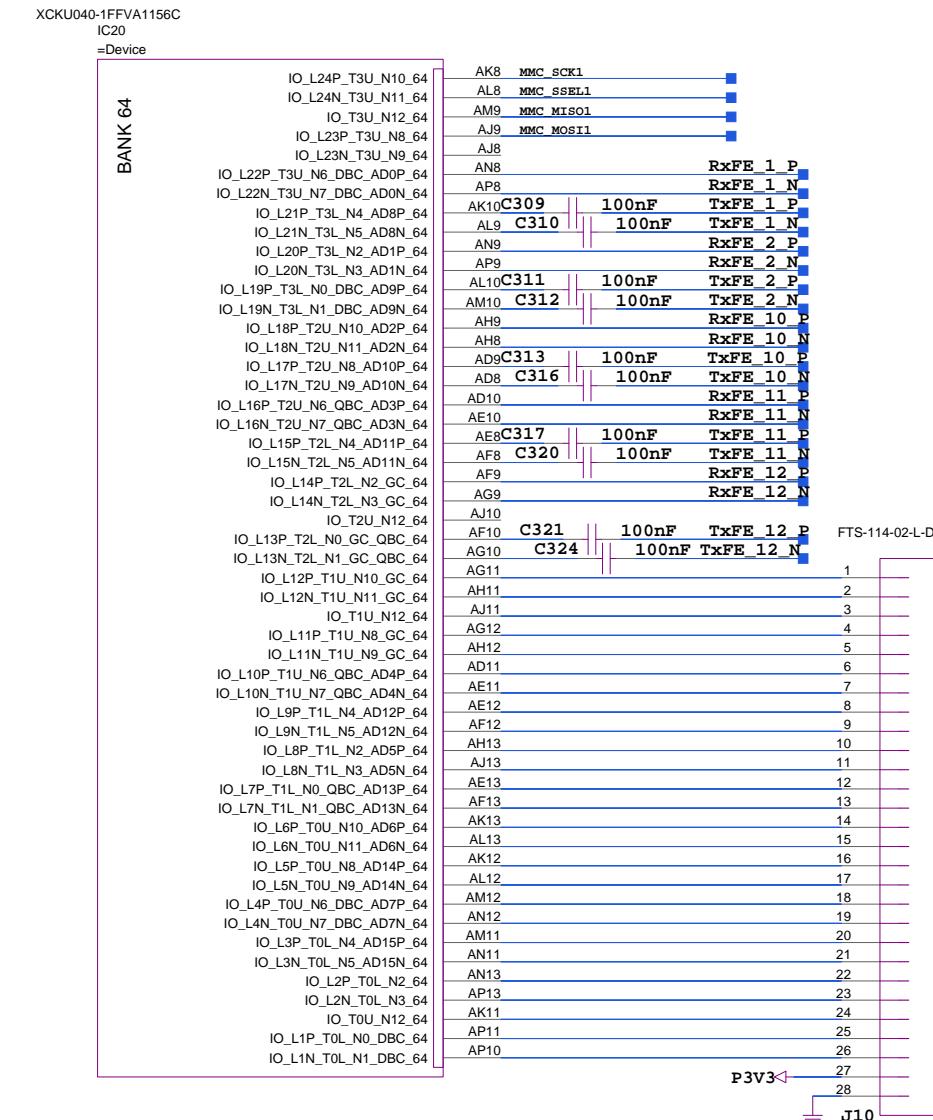
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**Bank 64 HR**



**FPGA\_XCKU040FFVA1156\_MCH**

**ARTIQ Sinara**

# FPGA Banks 64 65 HR

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SIZE DWG NO

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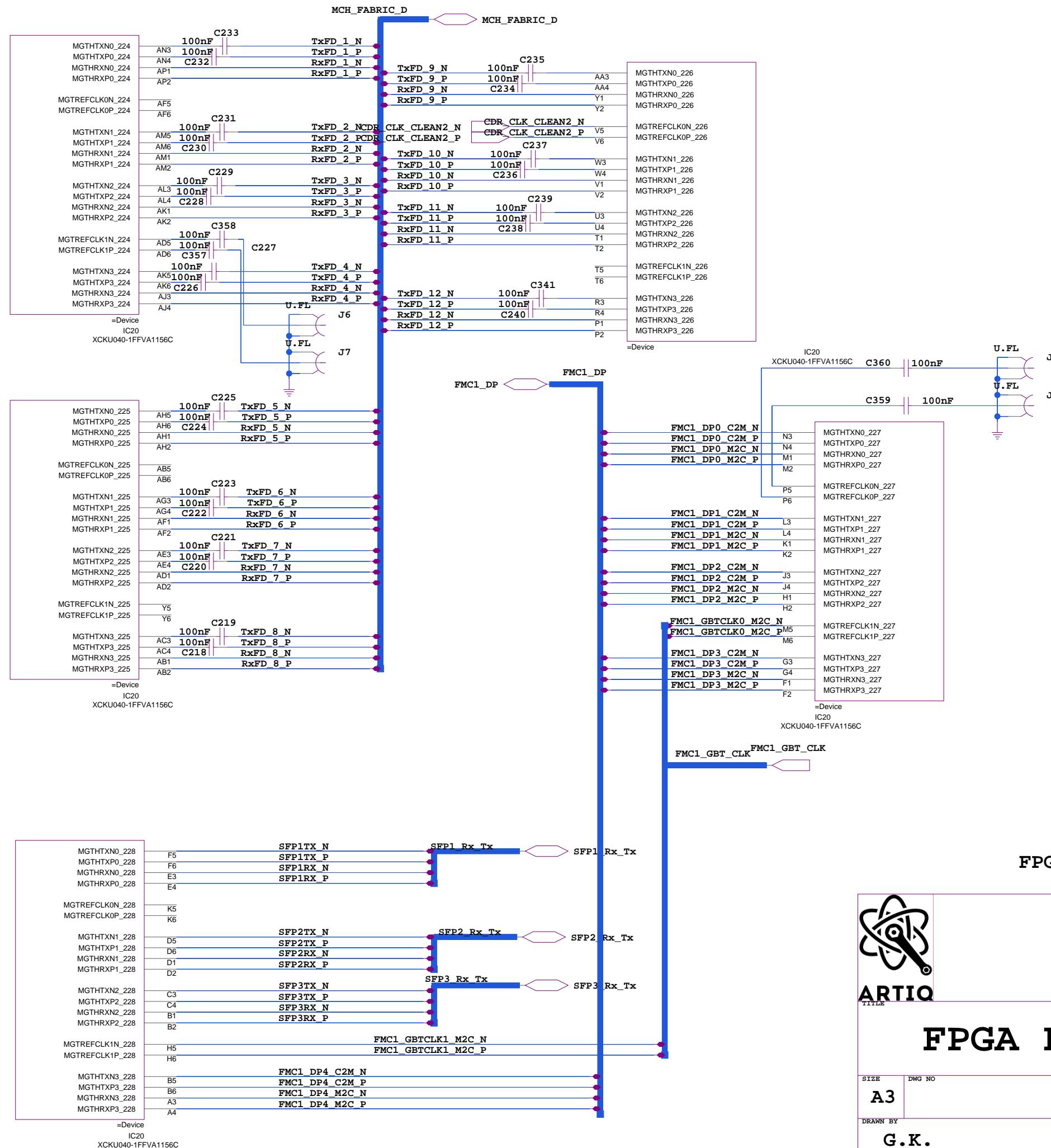
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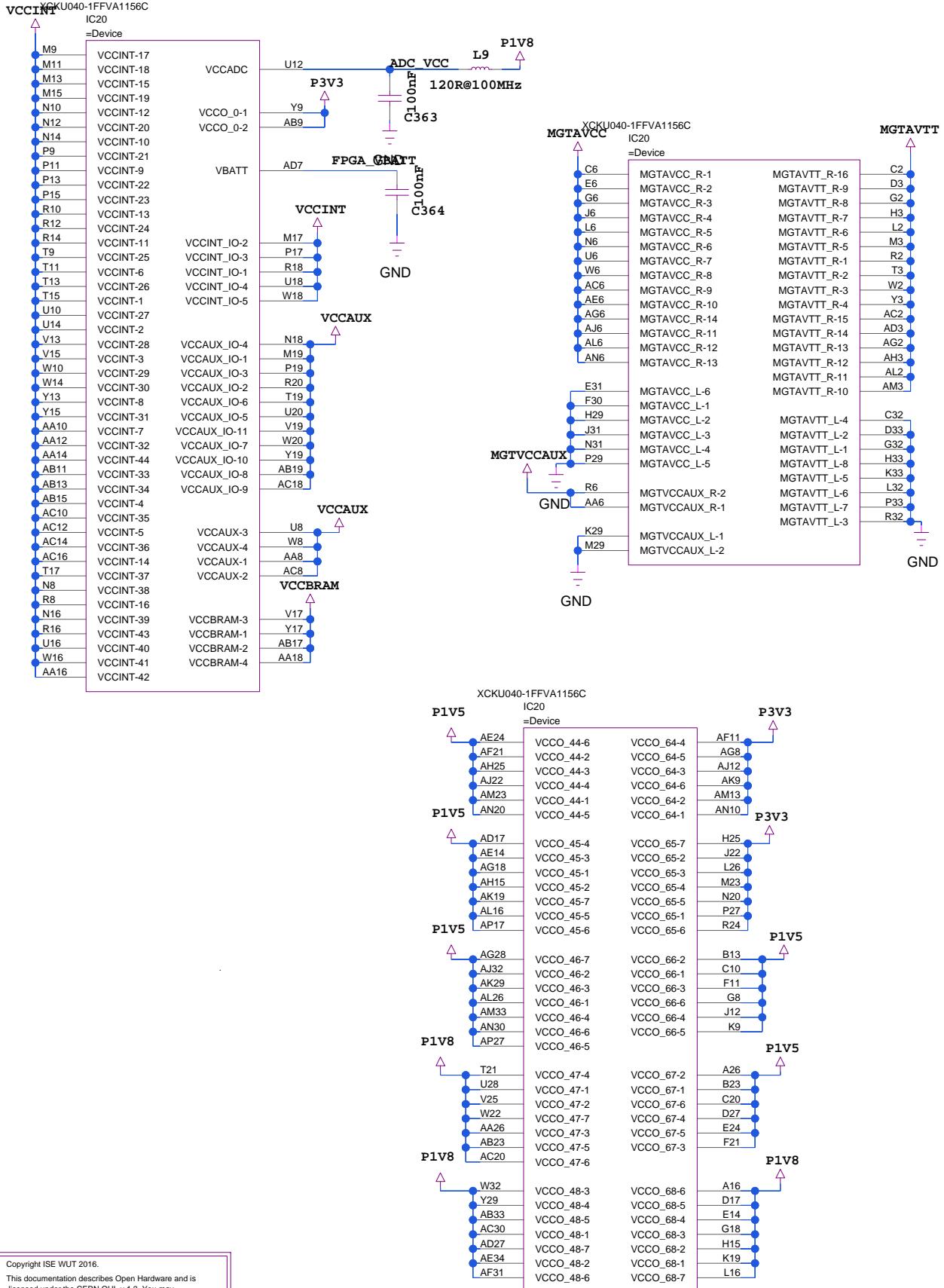




FPGA\_XCKU040FFVA1156\_MCH



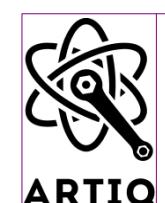
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FPGA Power

FPGA\_XCKU040FFVA1156\_MCH



# ARTIQ Sinara

# FPGA Power

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## FPGA\_XCKU040FFVA1156\_MCH



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FPGA GND NC

SIZE DWG NO

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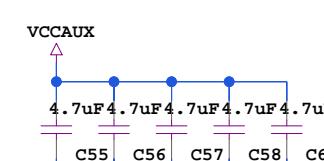
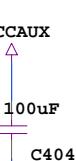
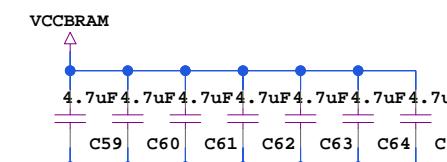
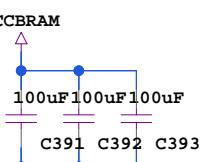
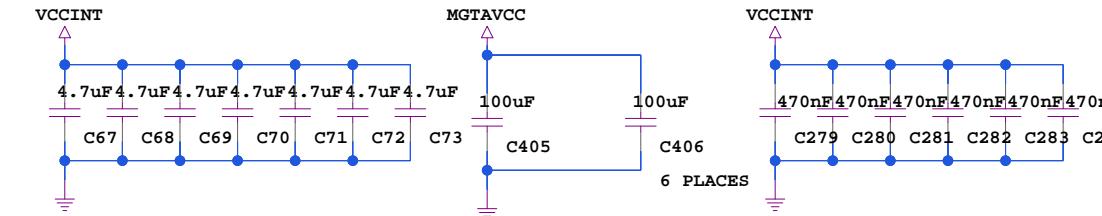
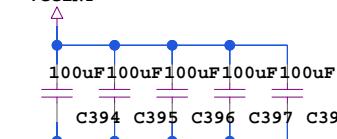
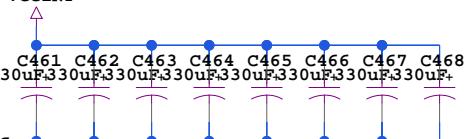
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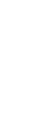
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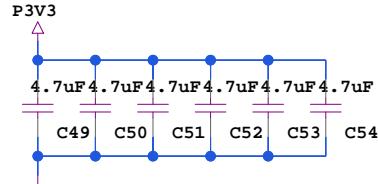
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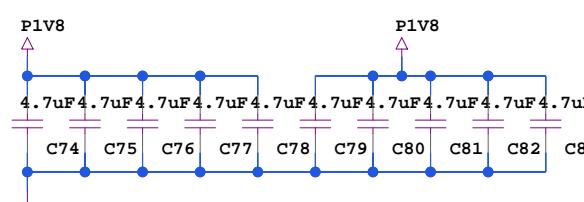
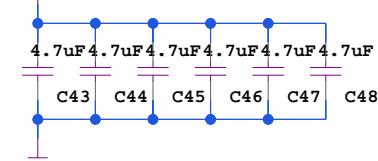
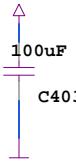
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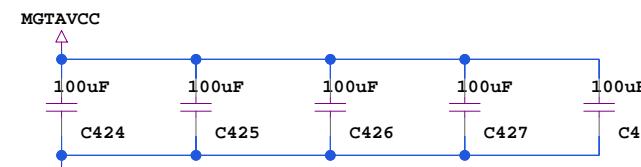
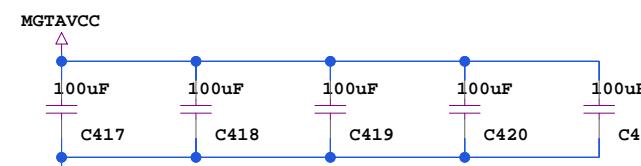
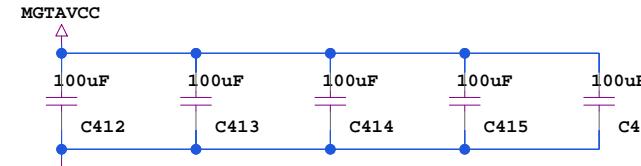
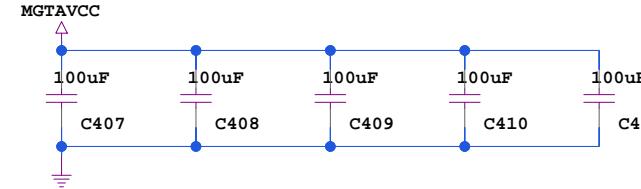
**VCCO\_0 / VCCO\_64 / VCCO\_65**



**VCCO\_44 / VCCO\_45 / VCCO\_46**



## VCCBRAM



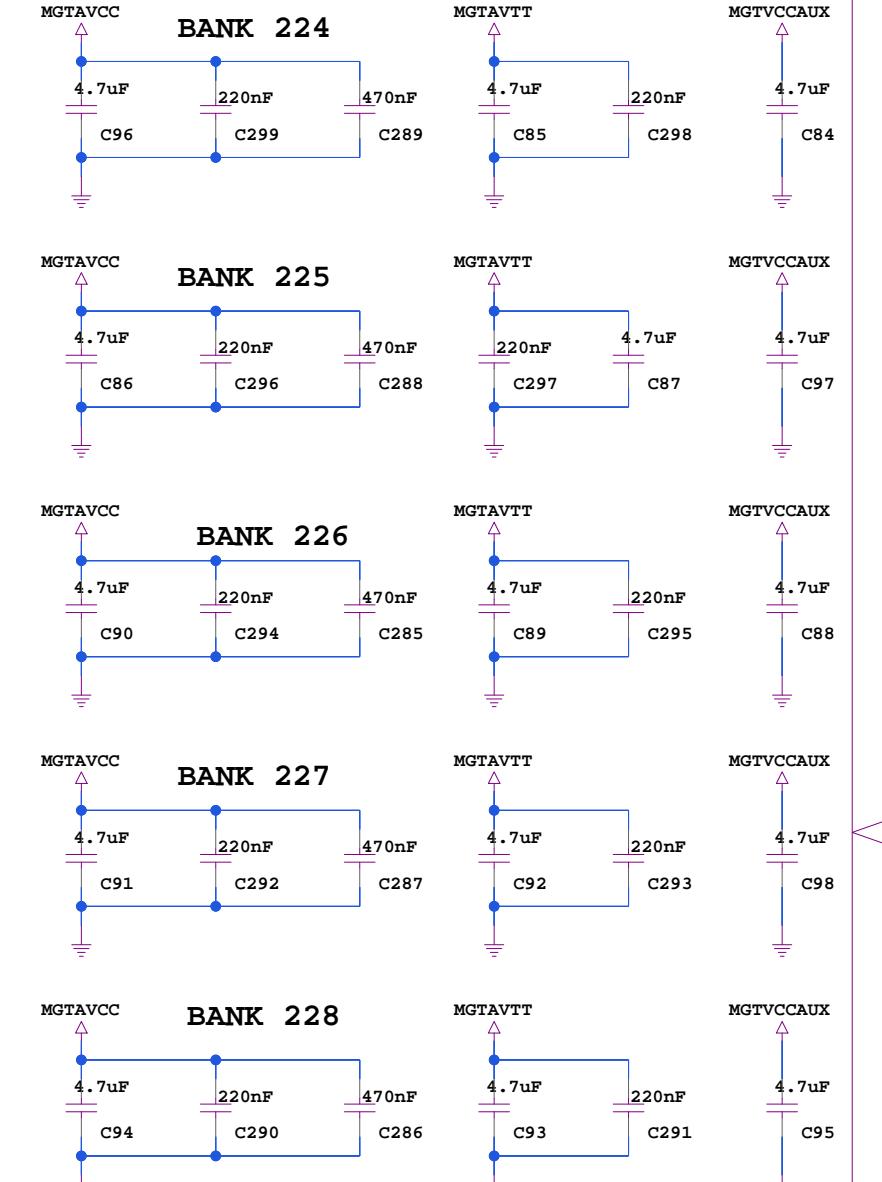
**BANK 224**

**BANK 225**

**BANK 226**

**BANK 227**

**BANK 228**



**FPGA\_XCKU040FFVA1156\_MCH**



**ARTIQ Sinara**

**FPGA Decoupling**

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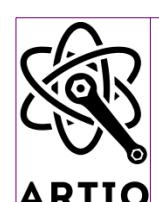
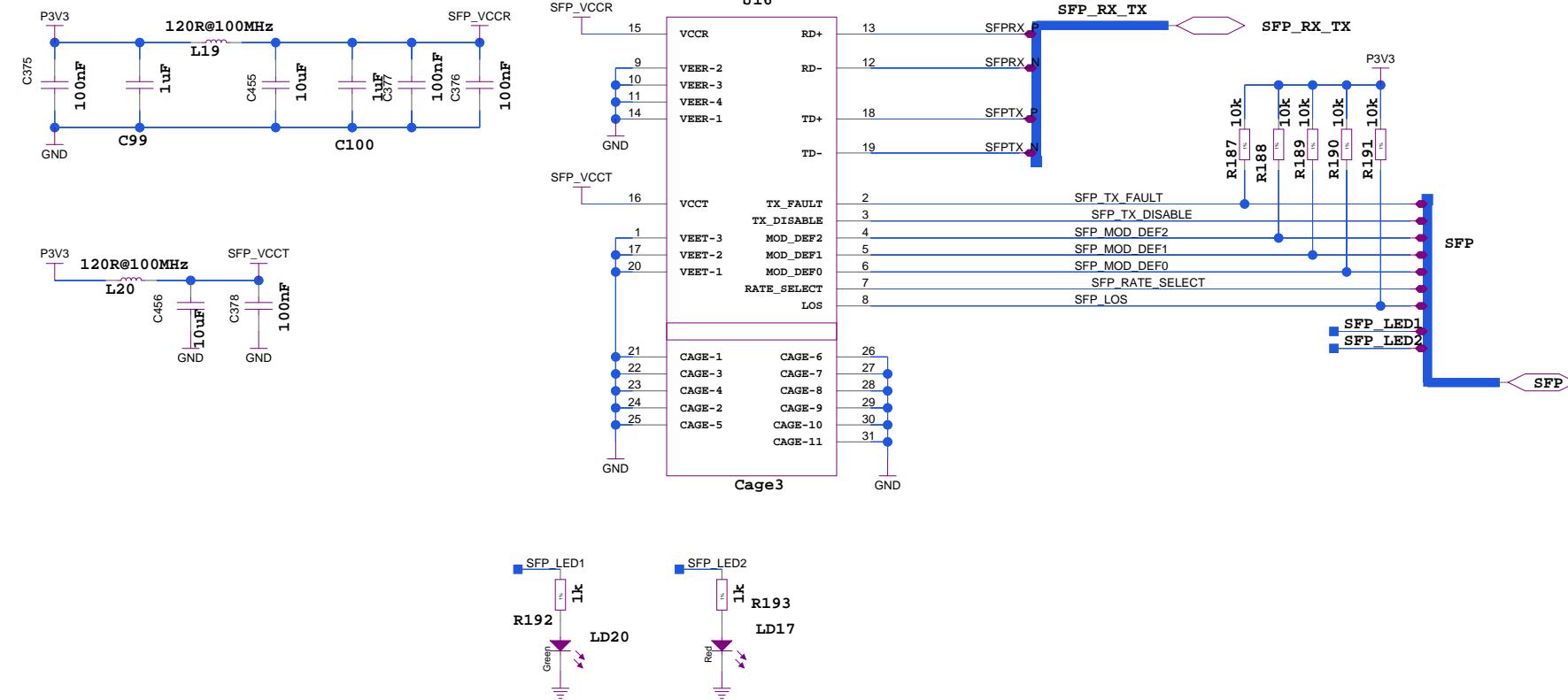
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**A3**

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**ARTIQ Sinara**

**SFP**

SIZE DWG NO

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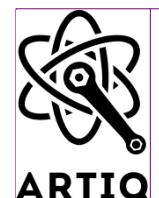
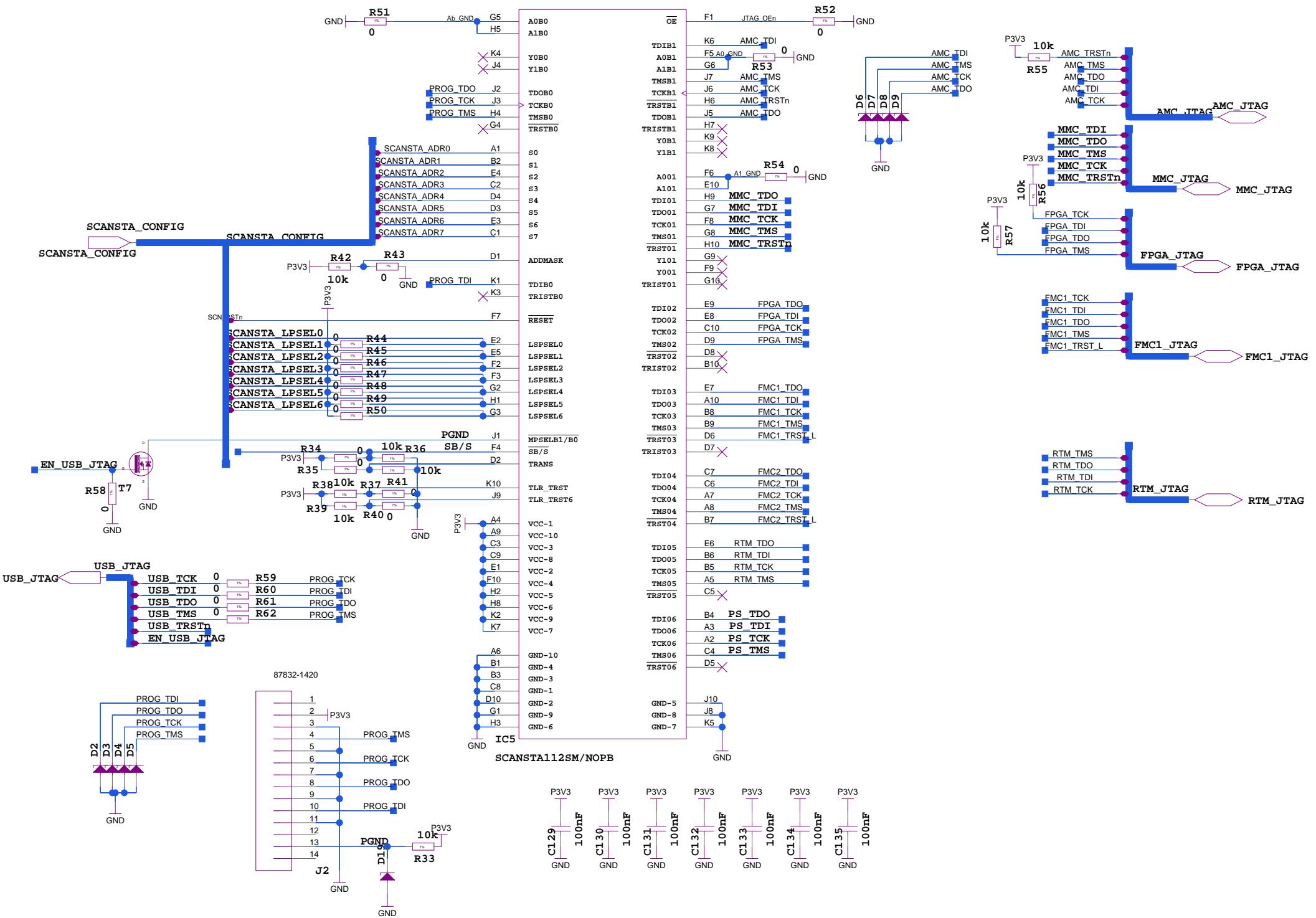
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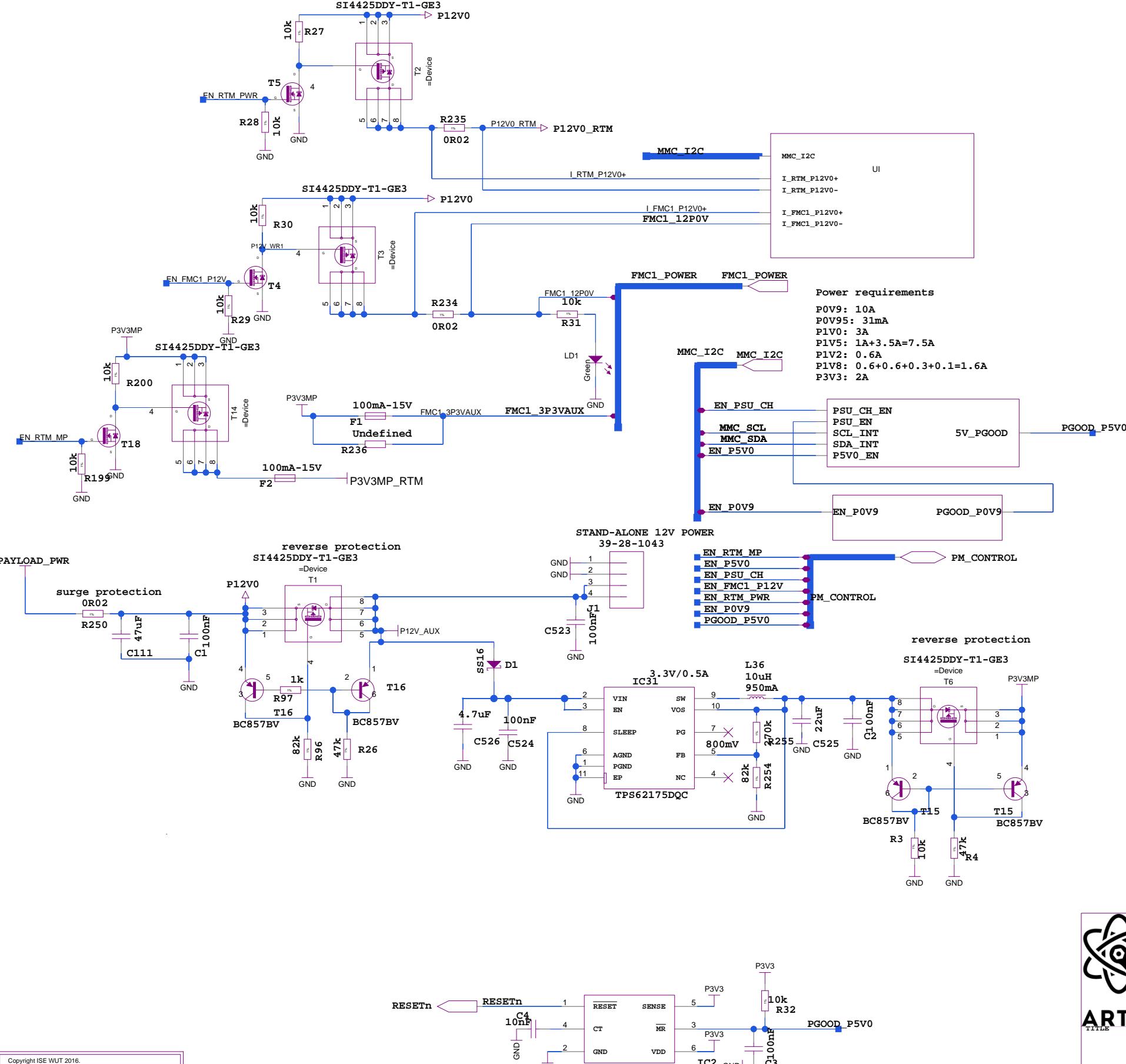
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ARTIQ Sinara

## JTAG\_Configuration

SIZE	DWG NO	REV
A3		v0.95
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G.K.	15	28



Symbol	Description	Min	Typ	Max	Units
<b>FPGA Logic</b>					
V <sub>CCINT</sub>	Internal supply voltage	0.922	0.950	0.979	V
V <sub>CCINT</sub>	For -1L (0.90V) devices: internal supply voltage	0.880	0.900	0.920	V
V <sub>CCINT</sub>	For -3 (1.0V only) devices: internal supply voltage	0.970	1.000	1.030	V
V <sub>CCINT</sub>	Internal supply voltage for the I/O banks	0.922	0.950	0.979	V
V <sub>CCINT</sub>	For -1L (0.90V) devices: internal supply voltage for the I/O banks	0.880	0.900	0.920	V
V <sub>CCRAM</sub>	Block RAM supply voltage	0.970	1.000	1.030	V
V <sub>CCAUX</sub>	Auxiliary supply voltage	1.746	1.800	1.854	V
V <sub>CCO</sub> <sup>(4)(5)</sup>	Supply voltage for HR I/O banks	1.140	-	3.400	V
V <sub>CCO</sub> <sup>(6)</sup>	Supply voltage for HP I/O banks	0.950	-	1.890	V
V <sub>CCO</sub> <sup>(8)</sup>	Auxiliary I/O supply voltage	1.746	1.800	1.854	V
V <sub>IN</sub> <sup>(7)</sup>	I/O input voltage	-0.200	-	V <sub>CCO</sub> + 0.200	V
V <sub>IN</sub> <sup>(7)</sup>	I/O input voltage when V <sub>CCO</sub> = 3.3V for V <sub>REF</sub> and differential I/O standards except TMDS_33 <sup>(9)</sup>	-	0.400	2.625	V
I <sub>H</sub> <sup>(9)</sup>	Maximum current through any pin in a powered or unpowered bank when forward biasing the clamp diode.	-	-	10.000	mA
V <sub>BATT</sub> <sup>(10)</sup>	Battery voltage	1.000	-	1.890	V
<b>GTH and GTY Transceivers</b>					
V <sub>MGTAVCC</sub> <sup>(11)</sup>	Analog supply voltage for the GTH and GTY transceivers <sup>(10)</sup>	0.970	1.000	1.030	V
V <sub>MGTAVTT</sub> <sup>(11)</sup>	Analog supply voltage for the GTH and GTY transmitter and receiver termination circuits	1.170	1.200	1.230	V
V <sub>MGTIVCAU</sub> <sup>(11)</sup>	Auxiliary analog QPLL voltage supply for the transceivers	1.750	1.800	1.850	V
<b>Symbol</b> <b>Description</b> <b>Min</b> <b>Typ</b> <b>Max</b> <b>Units</b>					
V <sub>CCMON</sub> <sup>(11)</sup>	Analog supply voltage for the resistor calibration circuit of the GTH and GTY transceiver columns	1.170	1.200	1.230	V
V <sub>CACD</sub>	SYSMON supply relative to GNDADC	1.746	1.800	1.854	V
V <sub>REF</sub>	Externally supplied reference voltage	1.200	1.250	1.300	V
<b>Temperature</b>					
T <sub>0</sub>	junction temperature operating range for commercial (C)	0	-	85	°C
T <sub>E</sub>	junction temperature operating range for extended (E) temperature devices	0	-	100	°C
T <sub>I</sub>	junction temperature operating range for industrial (I)	-40	-	100	°C

#### Power-On/Off Power Supply Sequencing

The recommended power on sequence is V<sub>CCINT</sub>/V<sub>CCINT</sub><sub>IO</sub>, V<sub>CCRAM</sub>, V<sub>CCAUX</sub>/V<sub>CCAUX</sub><sub>IO</sub>, and V<sub>CCO</sub> to achieve minimum current draw and ensure that the I/Os are 3-state at power-on. The recommended power down sequence is V<sub>CCO</sub>, V<sub>CCAUX</sub>/V<sub>CCAUX</sub><sub>IO</sub>, V<sub>CCRAM</sub>, V<sub>CCINT</sub>, and V<sub>CCINT</sub><sub>IO</sub>. If the same recommended voltage levels, they can be powered by the same supply and ramped simultaneously. V<sub>CCINT</sub><sub>IO</sub> must be connected to V<sub>CCINT</sub>. If V<sub>CCAU</sub>/V<sub>CCAUX</sub><sub>IO</sub> and V<sub>CCO</sub> have the same recommended voltage levels, they can be powered by the same supply and ramped simultaneously. V<sub>CCAU</sub>/V<sub>CCAUX</sub><sub>IO</sub> must be connected together. When the current minimums are met, the device powers up after V<sub>CCINT</sub>/V<sub>CCINT</sub><sub>IO</sub>, V<sub>CCRAM</sub>, V<sub>CCAUX</sub>/V<sub>CCAUX</sub><sub>IO</sub>, and V<sub>CCO</sub> supplies have all passed through their power-on reset threshold voltages. The device must not be configured until after V<sub>CCINT</sub> is applied.

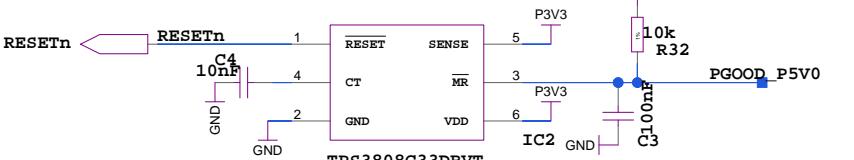
V<sub>CCADC</sub> and V<sub>REF</sub> can be powered at any time and have no power-up sequencing recommendations. The recommended power on sequence to achieve minimum current draw for the GTH or GTY transceivers is V<sub>CCINT</sub>, V<sub>MGTAVCC</sub>, V<sub>MGTAVTT</sub> OR V<sub>MGTAVCC</sub>, V<sub>CCINT</sub>, V<sub>MGTAVTT</sub>. There is no recommended sequencing for V<sub>CCMON</sub> and V<sub>CCMON</sub><sub>IO</sub>. V<sub>CCMON</sub> and V<sub>CCMON</sub><sub>IO</sub> must be connected together. When the current minimums are met, the device powers up after V<sub>CCINT</sub>/V<sub>CCINT</sub><sub>IO</sub>, V<sub>CCRAM</sub>, V<sub>CCAUX</sub>/V<sub>CCAUX</sub><sub>IO</sub>, and V<sub>CCO</sub> supplies have all passed through their power-on reset threshold voltages. The device must not be configured until after V<sub>CCINT</sub> is applied.

Power Supply			
Source	Voltage	Total (A)	
V <sub>CCINT</sub>	0,900	9,165	
V <sub>CCINT</sub> <sub>IO</sub>	0,900	0,620	
V <sub>CCRAM</sub>	0,950	0,031	
V <sub>CCAUX</sub>	1,800	0,660	
V <sub>CCAUX</sub> <sub>IO</sub>	1,800	0,546	
V <sub>CCO</sub> 3.3V	3,300	0,000	
V <sub>CCO</sub> 2.5V	2,500		
V <sub>CCO</sub> 1.8V	1,800	0,380	
V <sub>CCO</sub> 1.5V	1,500	0,936	
V <sub>CCO</sub> 1.35V	1,350		
V <sub>CCO</sub> 1.2V	1,200		
V <sub>CCO</sub> 1.0V	1,000		
MGT <sub>V</sub> CCAUX	1,800	0,081	
MGTAV <sub>CC</sub>	1,000	3,038	
MGTAV <sub>TT</sub>	1,200	0,592	
-	-	-	
V <sub>CCADC</sub>	1,800	0,014	

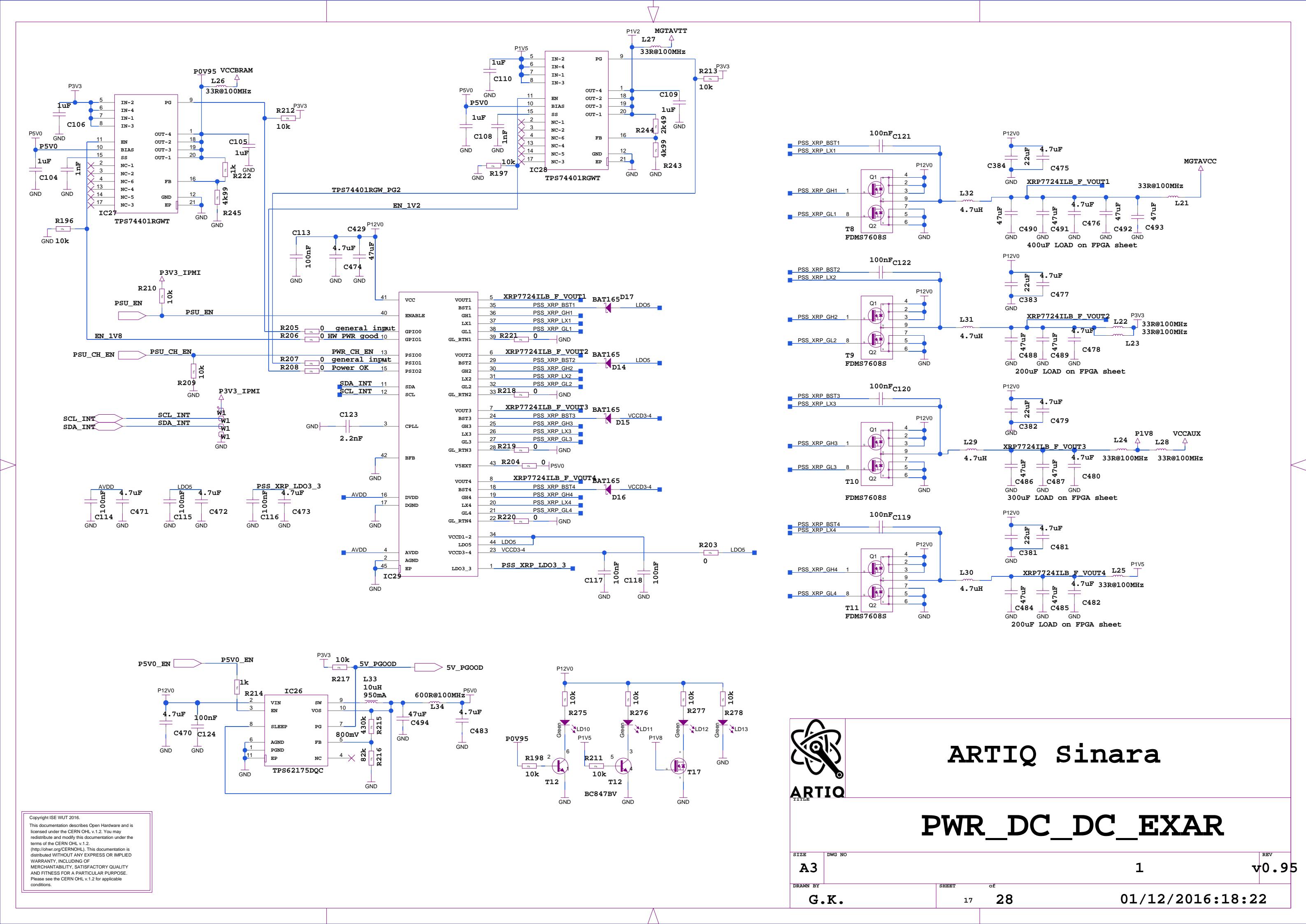


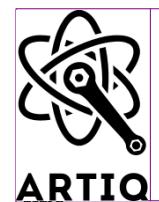
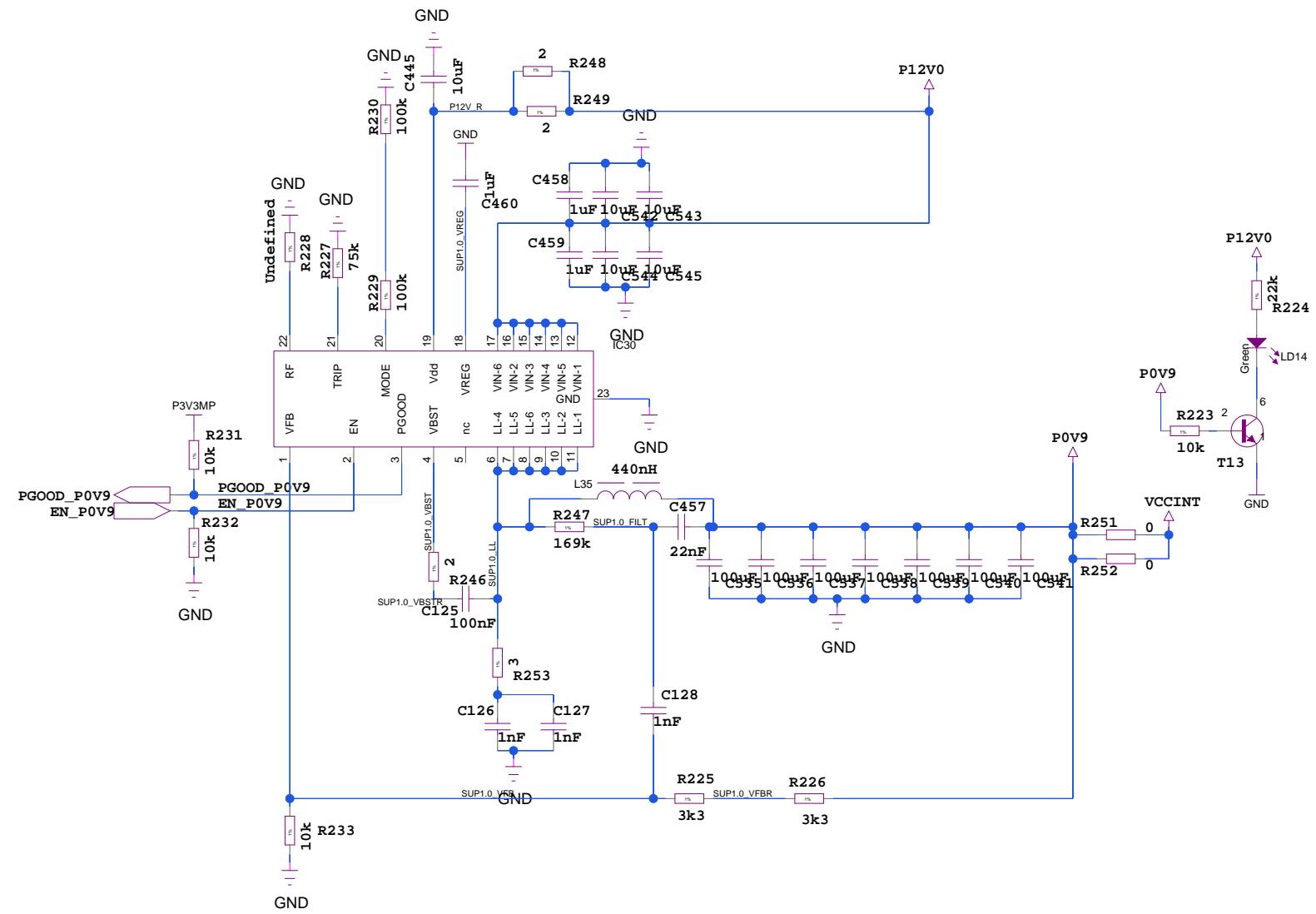
# ARTIQ Sinara

## POWER Management



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**PWR\_0V9**

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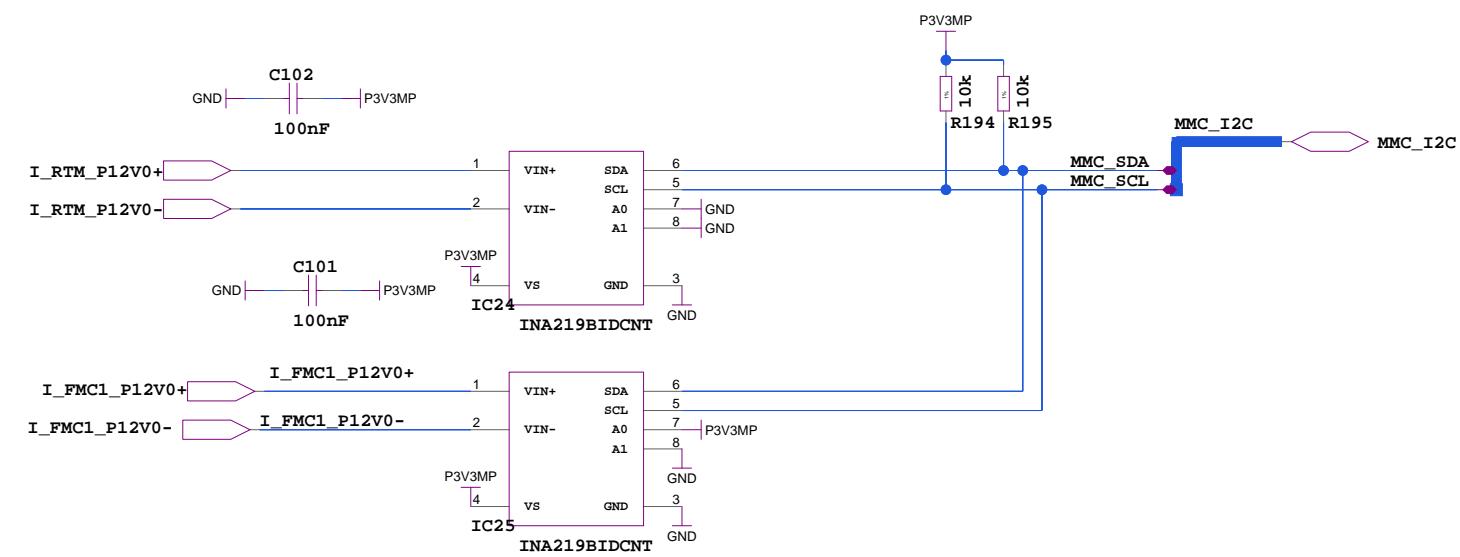
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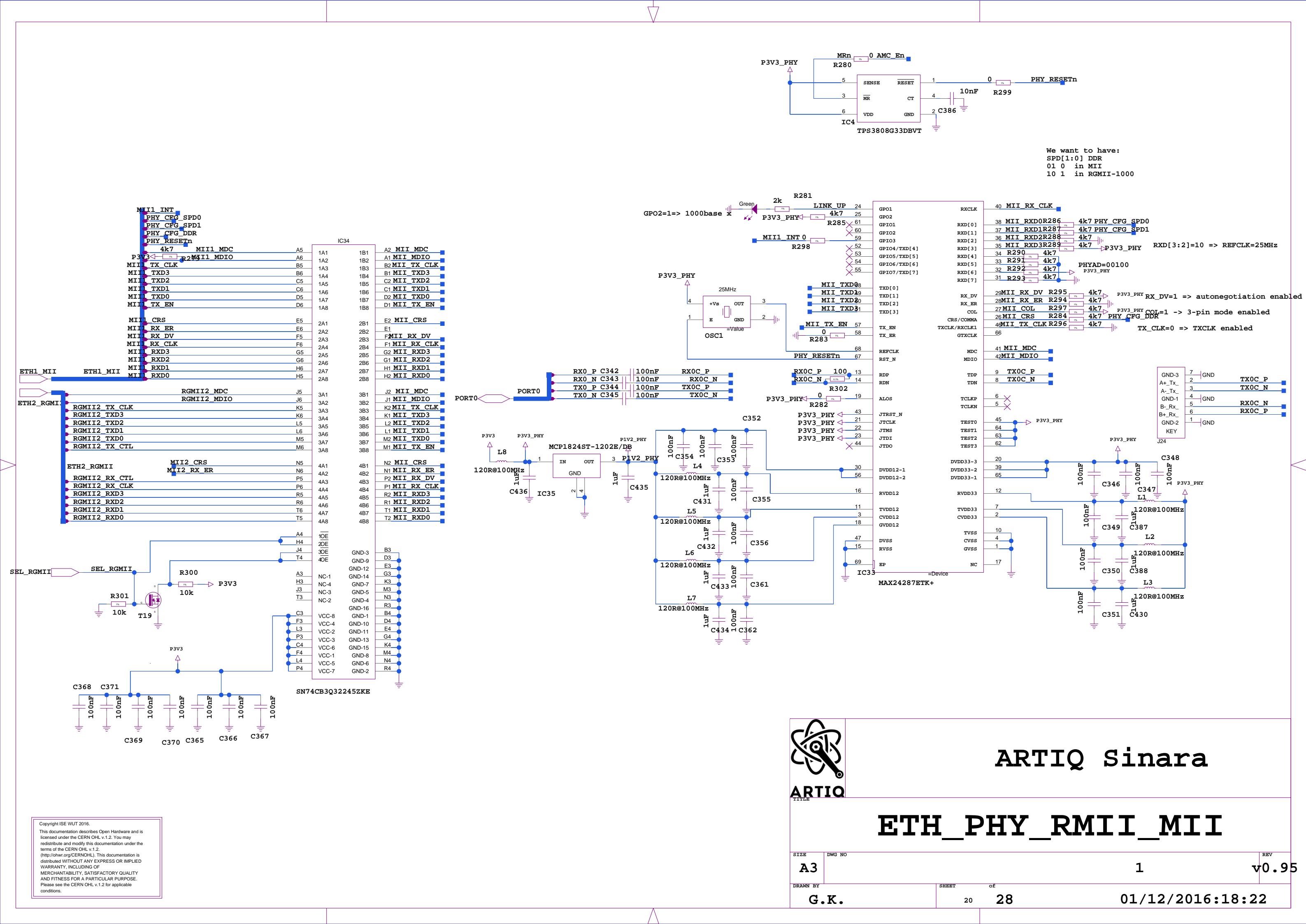


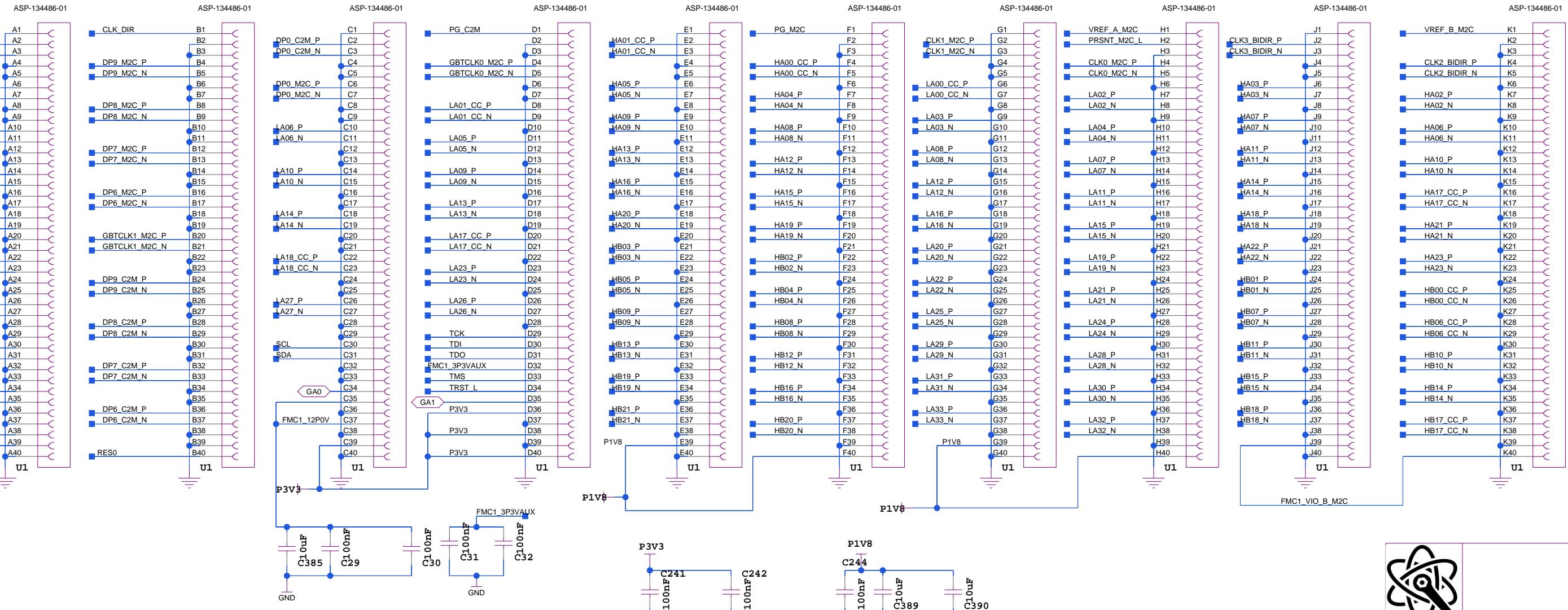
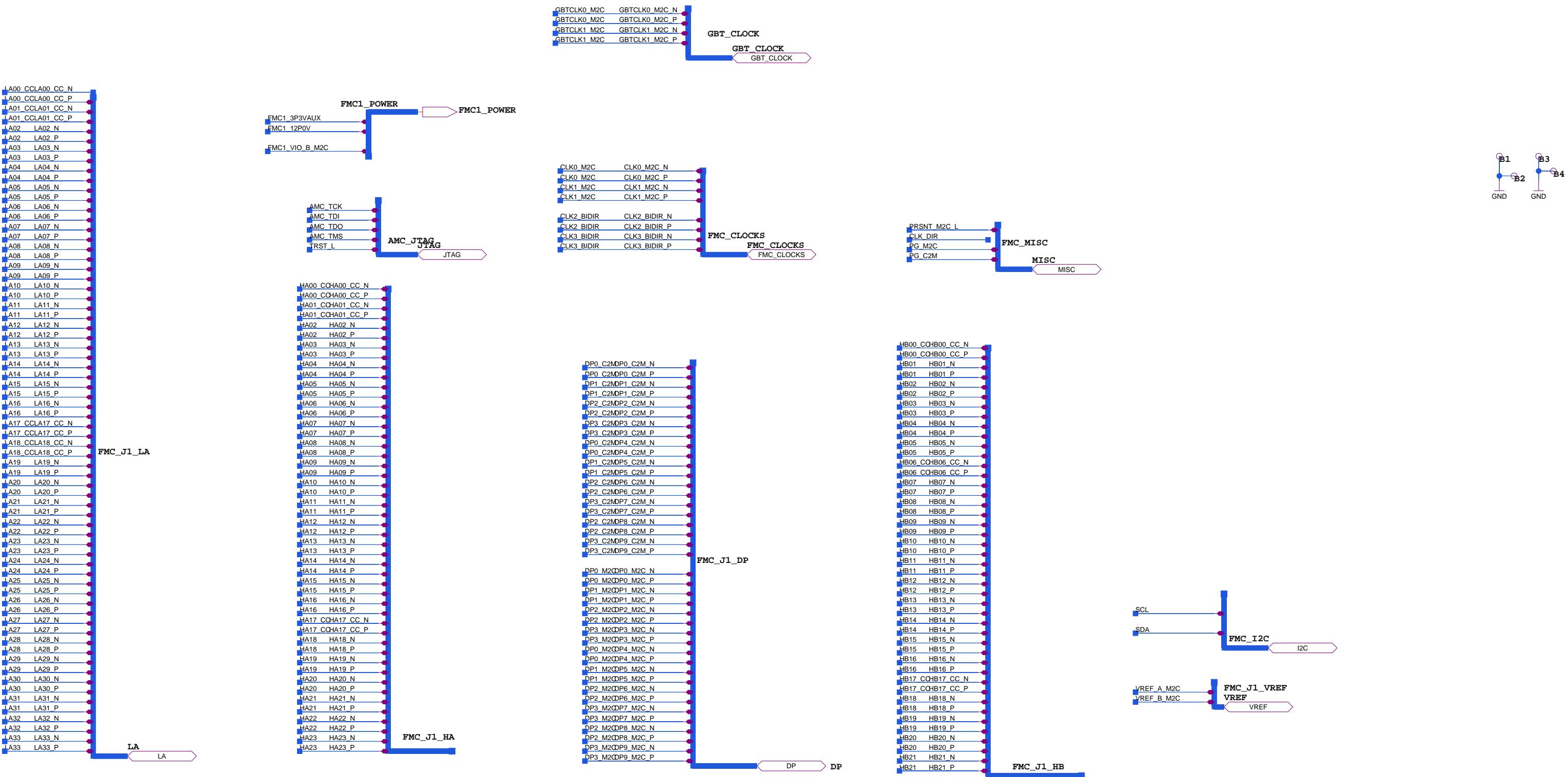
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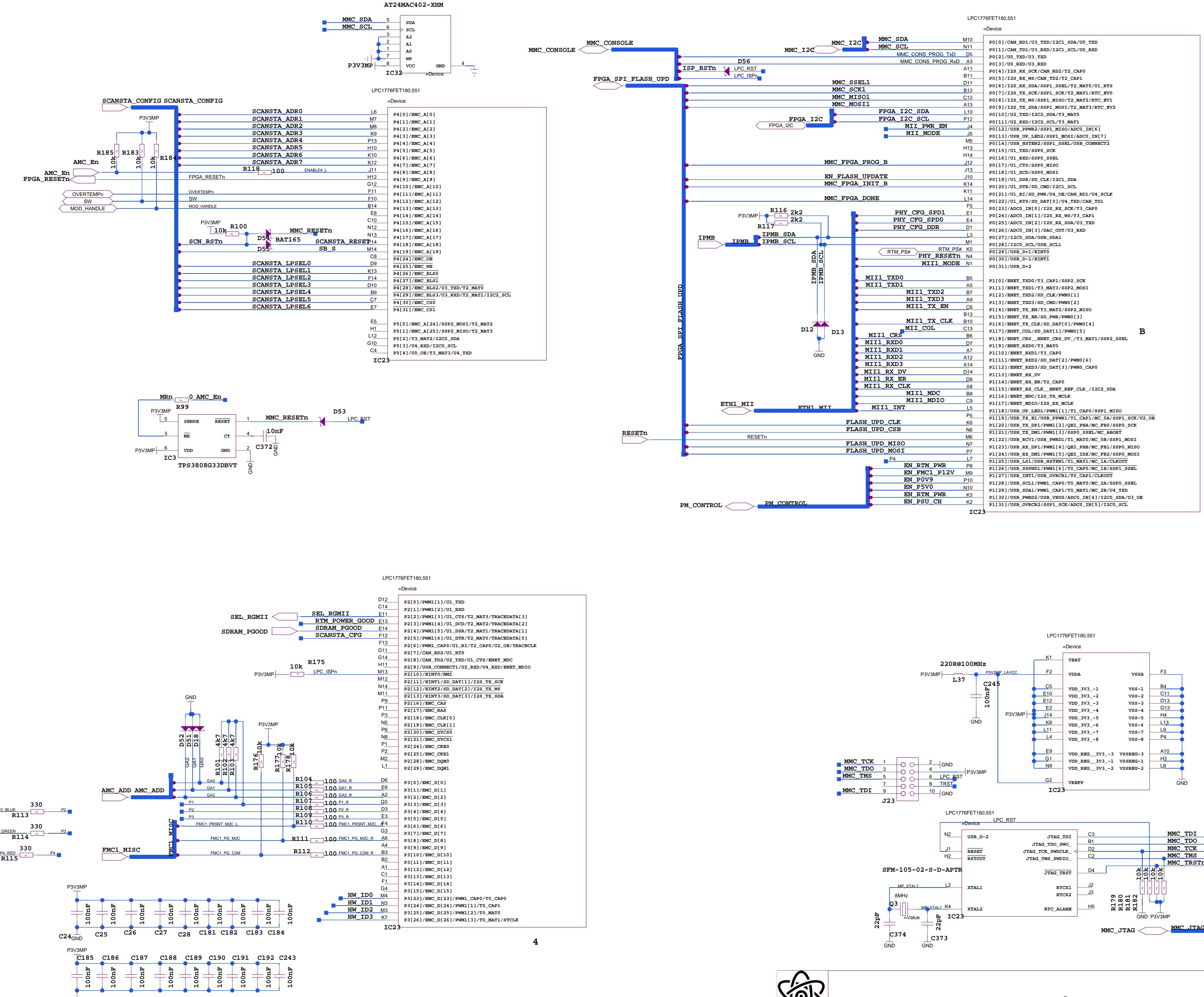




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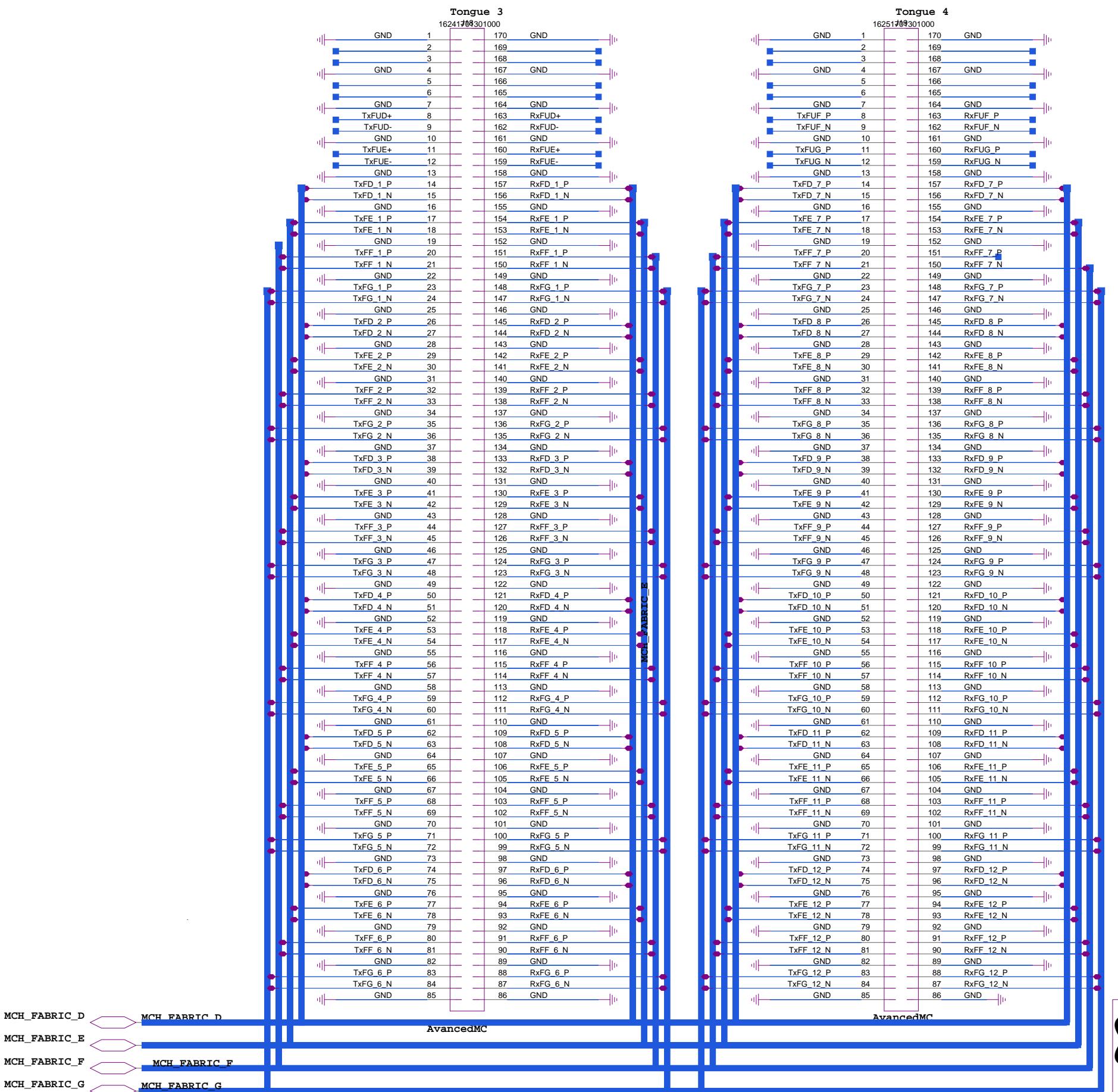
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# **ARTIQ Sinara**

# CPU LPC1776



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## MCH\_CON

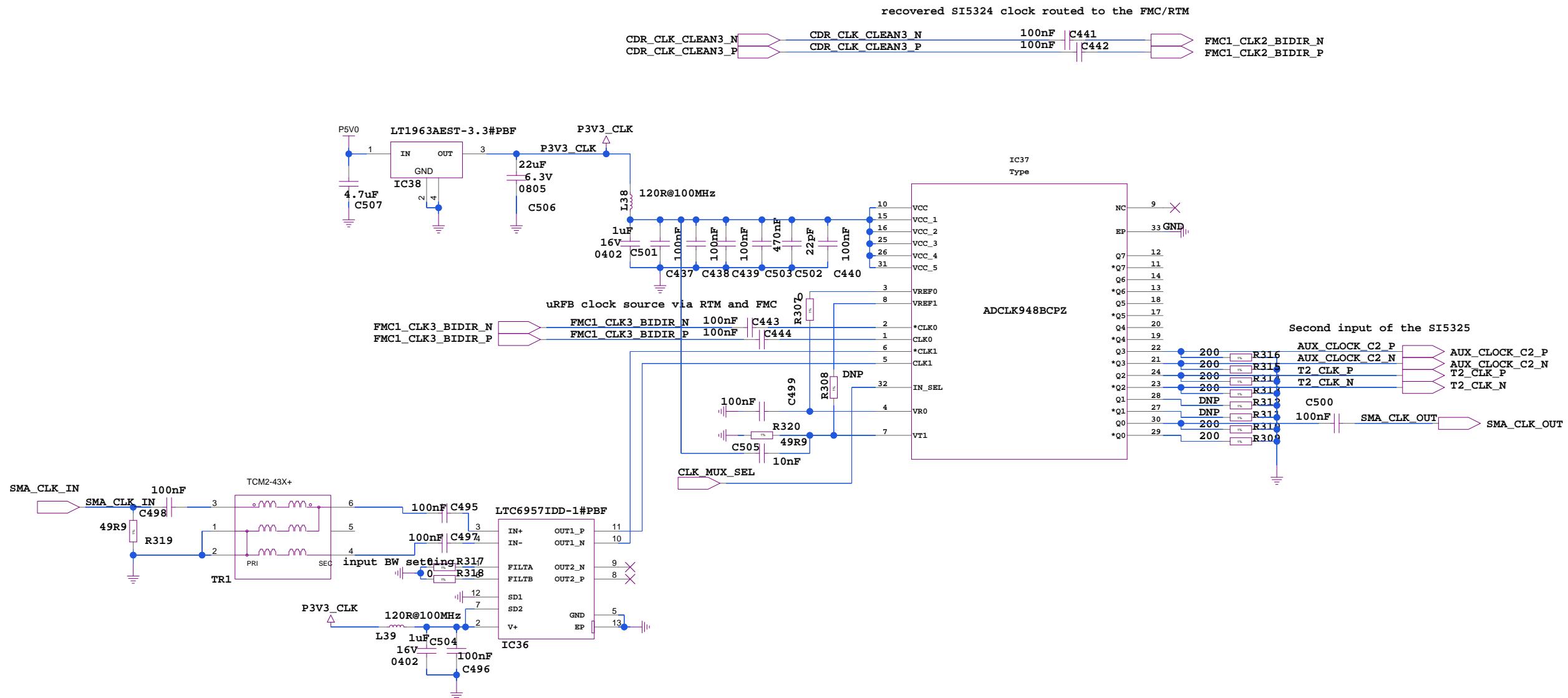
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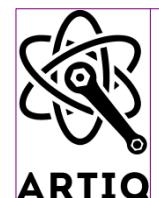
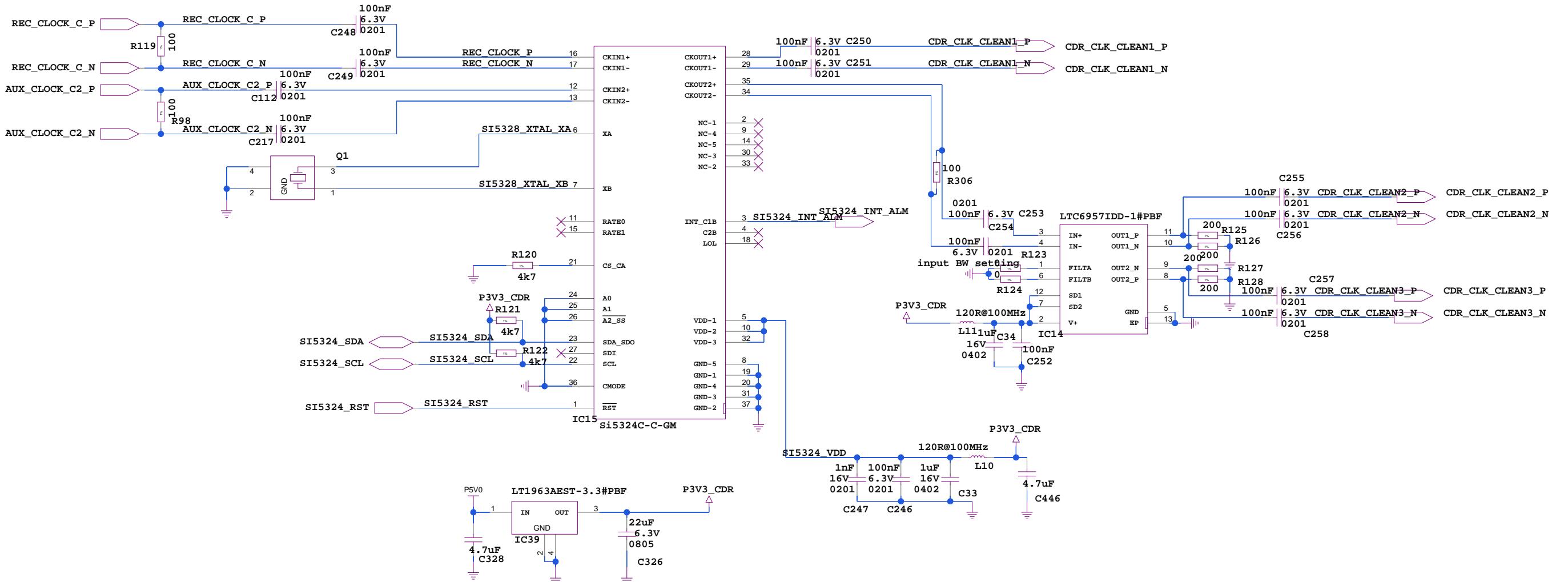
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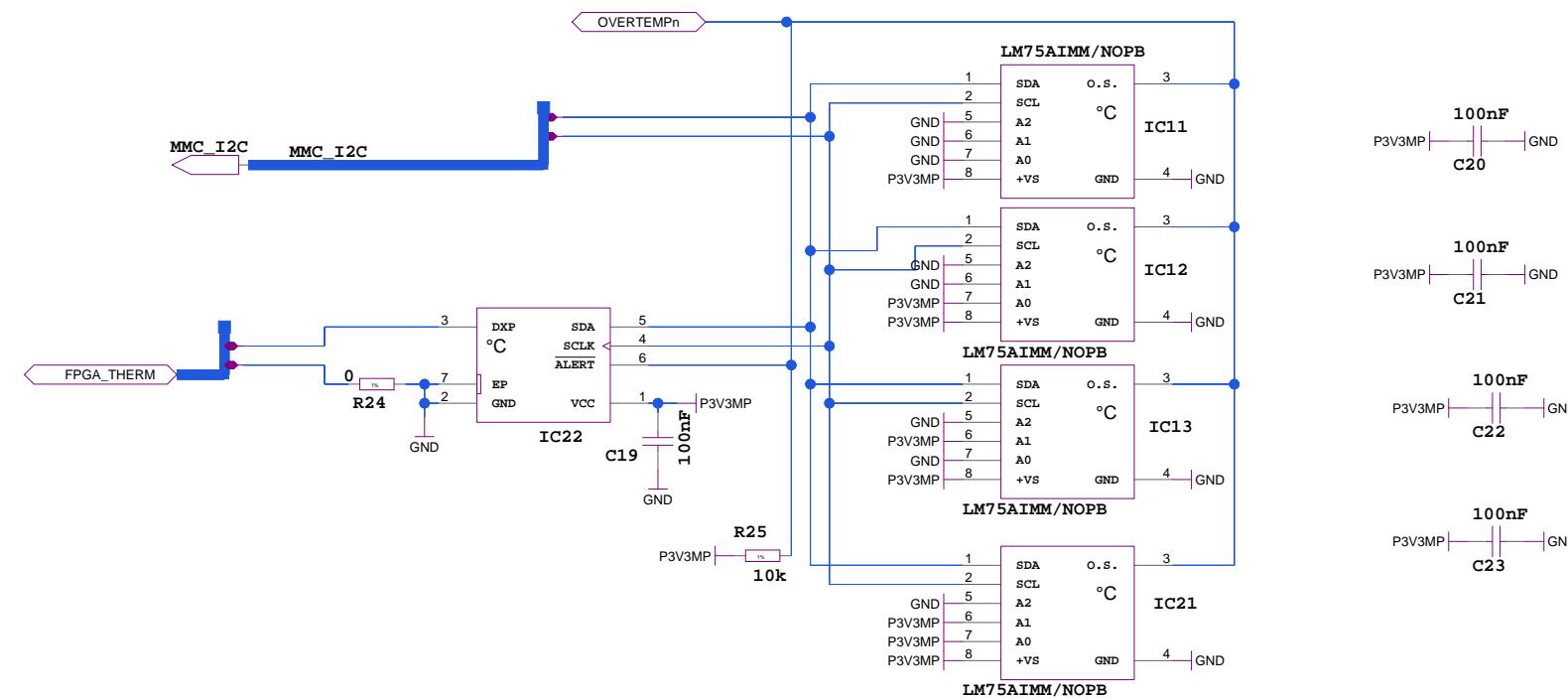
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## SI5324\_CLK\_RECOVERY

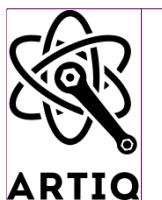
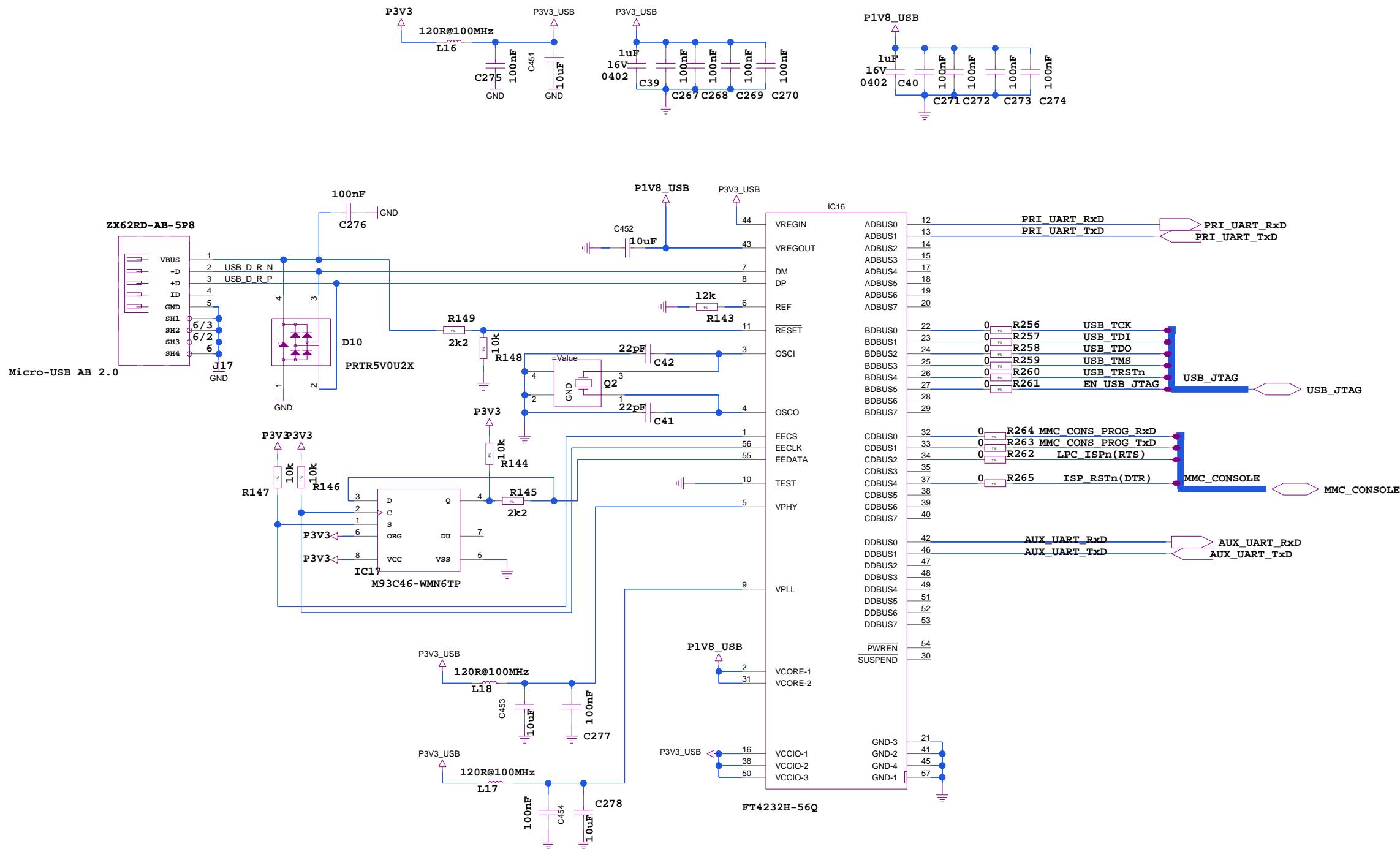
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# Thermometers

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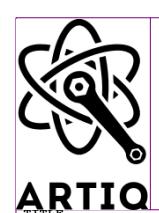
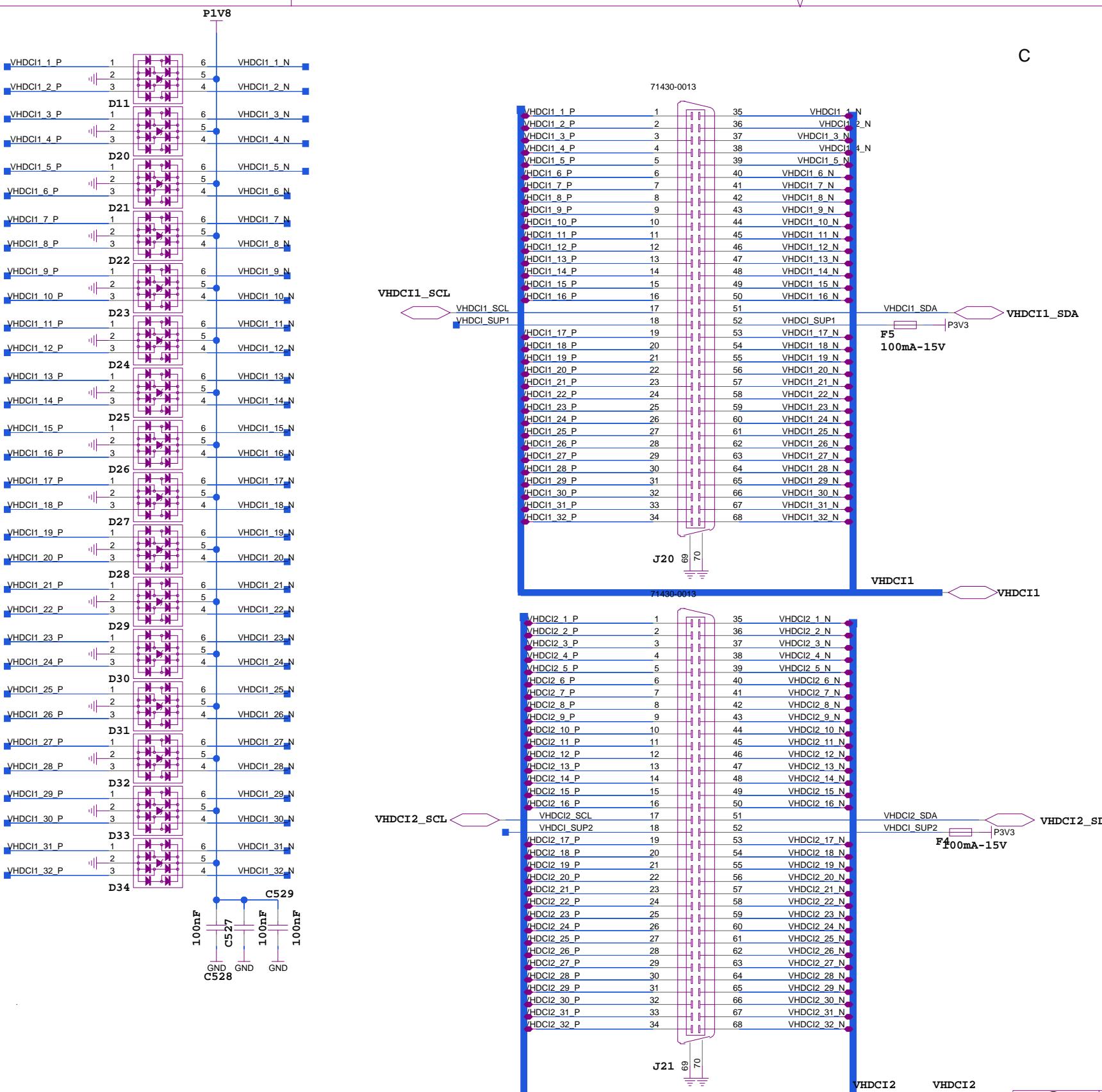
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# USB\_SERIAL\_QUAD

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