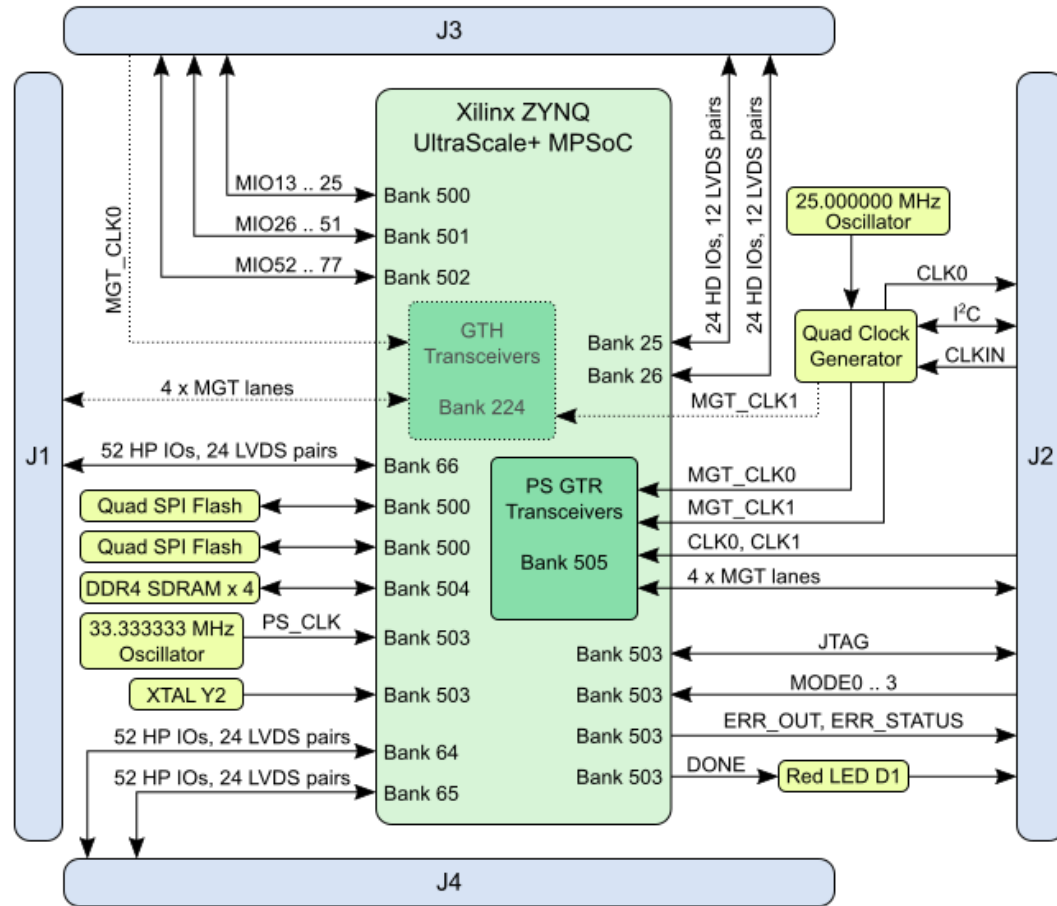



Regarding the usage of our schematics and alike documentation for Trenz module TE0803.

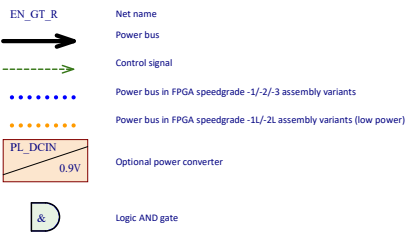
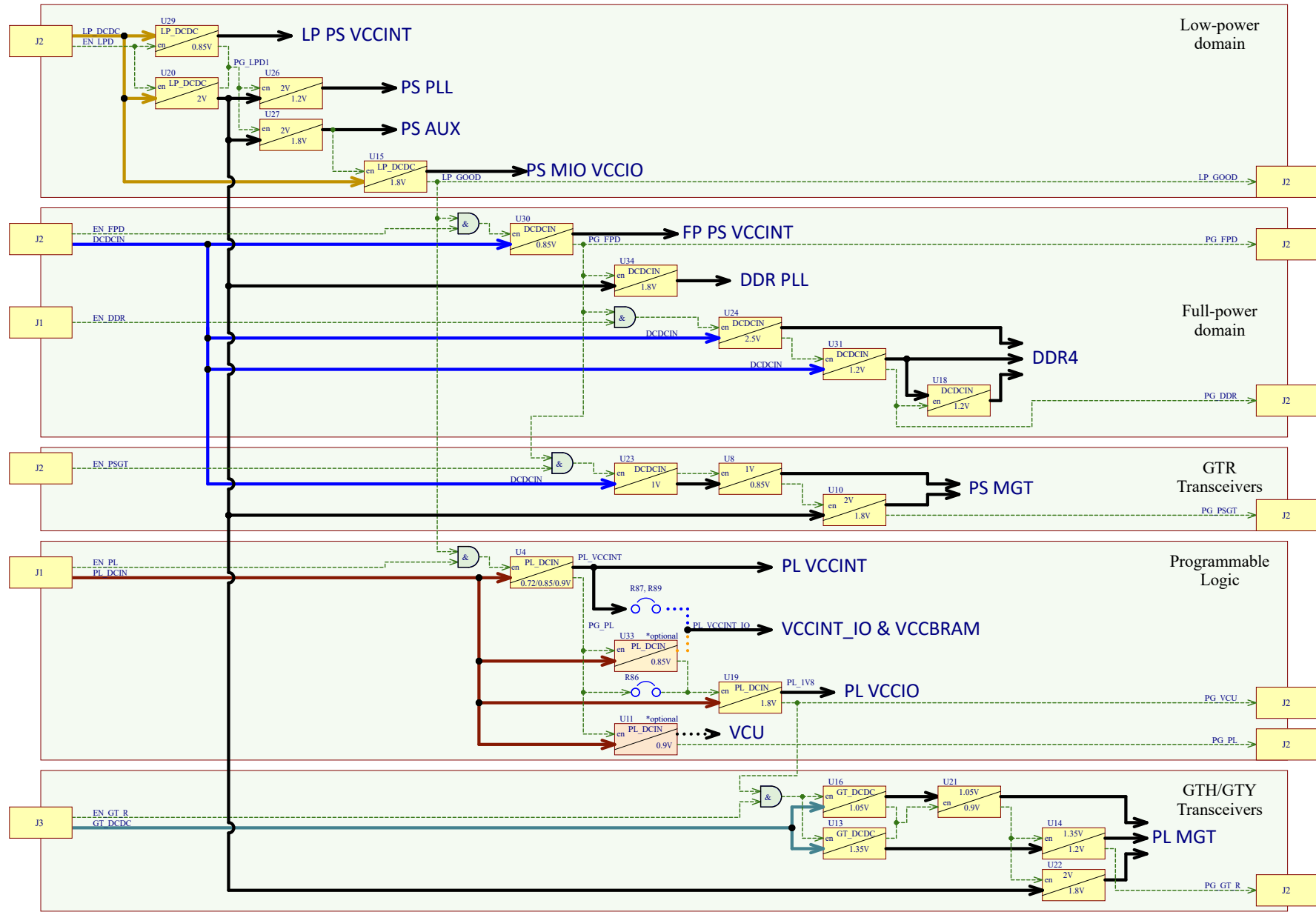
Project is protected under copyright and we strongly and strictly prohibit the reverse engineering or recreation, even if the design is just adapted or modified. TE0803 is protected under such right and in case of plagiarism we will have to do anything necessary in order to protect our assets.

Schematics and other handouts serve for informational purposes only!

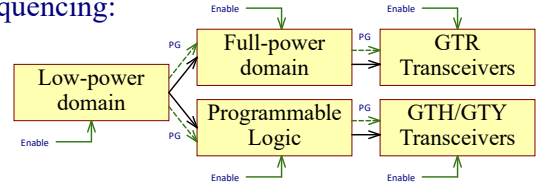
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	A4	Number: TE0803 5DE11-A	Rev. 04
	Date: 2021-01-19	Copyright: Trenz Electronic GmbH / TT	Page 1 of 30
	Filename: Legal Notices Modules.SchDoc		



	Title: TE0803 - System Overview		
	A4	Number: TE0803 5DE11-A	Rev. 04
	Date: 2021-01-19	Copyright: 2015 Trenz Electronic GmbH	Page 2 of 30
	Filename: TE0803-Overview.SchDoc		



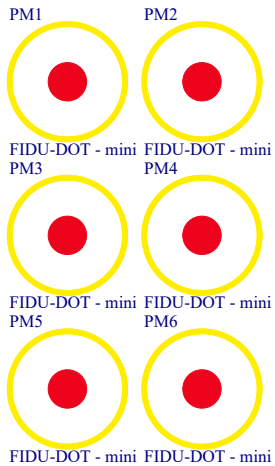
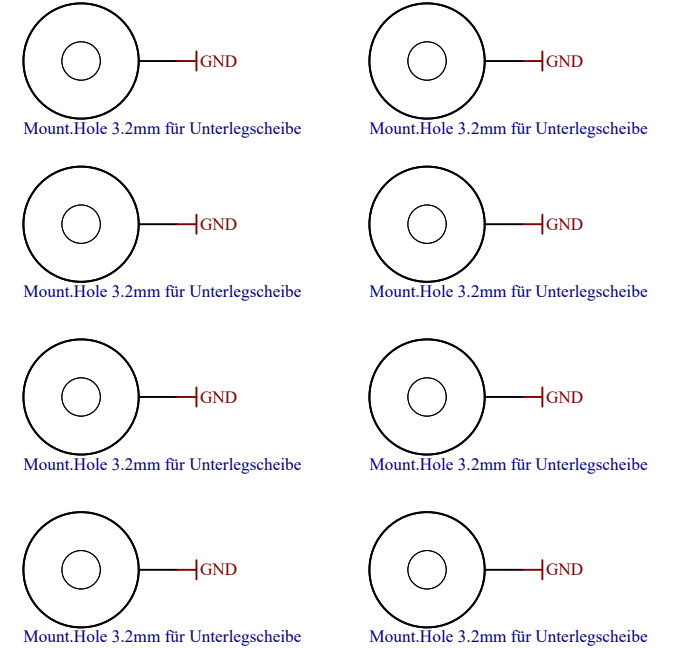
Power-on sequencing:



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A3	Number: TE0803 5DE11-A	Rev. 04
Datum: 2021-01-19	Copyright: Trenz Electronic GmbH / TT	Page 3 of 30
Filename: Power_Diagram.SchDoc		

U_J1 J1.SchDoc	U_B_PS_GT B_PS_GT.SchDoc	U_LN Legal Notices Modules.SchDoc
U_J2 J2.SchDoc	U_PS_DDR PS_DDR.SchDoc	U_ZU_POWER ZU_POWER.SchDoc
U_J3 J3.SchDoc	U_B_MIO B_MIO.SchDoc	U_ZU_PS_POWER ZU_PS_POWER.SchDoc
U_J4 J4.SchDoc	U_B_HD B_HD.SchDoc	U_POWER POWER.SchDoc
U_DDR4-TERM DDR4-TERM.SchDoc	U_Clock Clock.SchDoc	U_POWER_1 POWER_1.SchDoc
U_B64 B64.SchDoc	U_CONFIG CONFIG.SchDoc	U_POWER_2 POWER_2.SchDoc
U_B65 B65.SchDoc	U_DDR4-RAM DDR4-RAM.SchDoc	U_POWER_4 POWER_4.SchDoc
U_B66 B66.SchDoc	U_DDR4-RAM_2 DDR4-RAM_2.SchDoc	U_REV_CH Revision Changes.SchDoc
U_B_GT B_GT.SchDoc	U_DDR4-RAM_3 DDR4-RAM_3.SchDoc	U_OVERVIEW TE0803-Overview.SchDoc
U_PD Power Diagram.SchDoc	U_DDR4-RAM_4 DDR4-RAM_4.SchDoc	

Special notes:



MECH1

TE Address Overlay

LOGO ADDRESS

LOGO1


TE Logo PRINT Layer

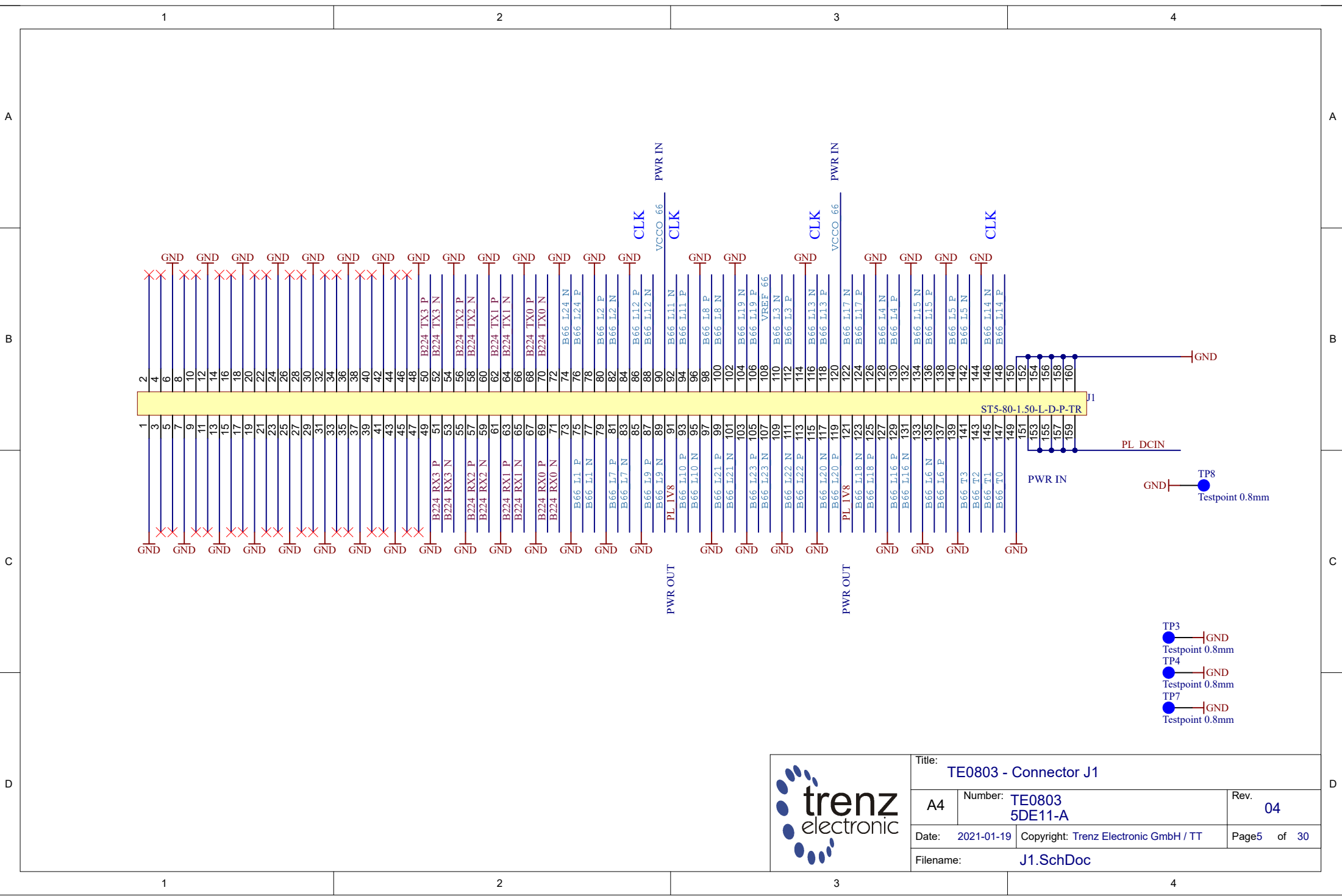
LOGO PRINT


~~Serial1~~
Serialnumber 6,3 x 6,3mm

Serial2
Serial
Serialnumber 6,3 x 6,3mm
AD only

Assembly variant	5DE11-A
Created by	
Modified by	
Modified at	
SVN Revision	15880

			Title: TE0803	
			A4	Number: TE0803 5DE11-A
Date: 2021-01-19		Copyright: Trenz Electronic GmbH / TT		Page 4 of 30
Filename: TE0803.SchDoc				



		Title: TE0803 - Connector J1	
		A4	Number: TE0803 5DE11-A
Date: 2021-01-19		Copyright: Trenz Electronic GmbH / TT	
Filename: J1.SchDoc		Page5 of 30	

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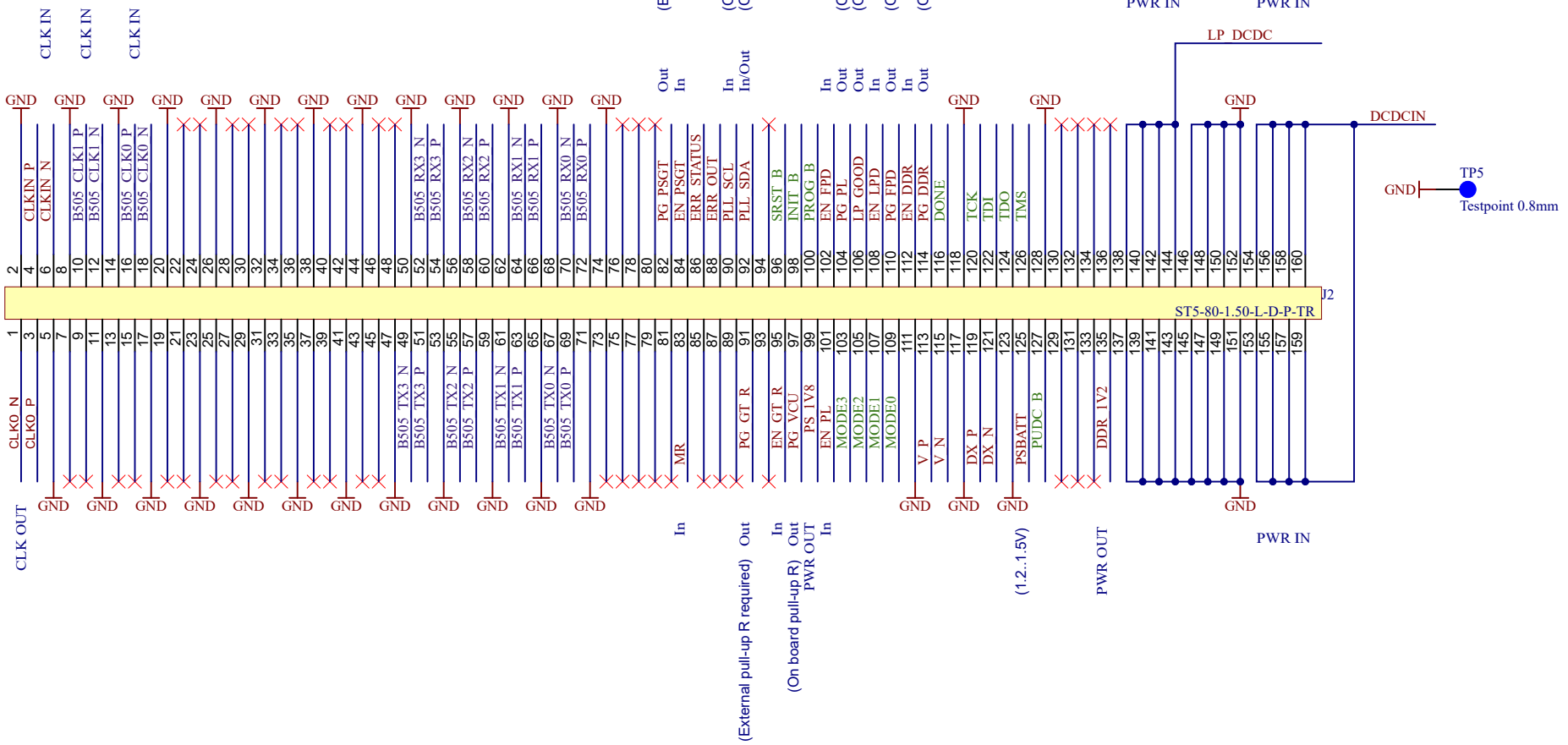
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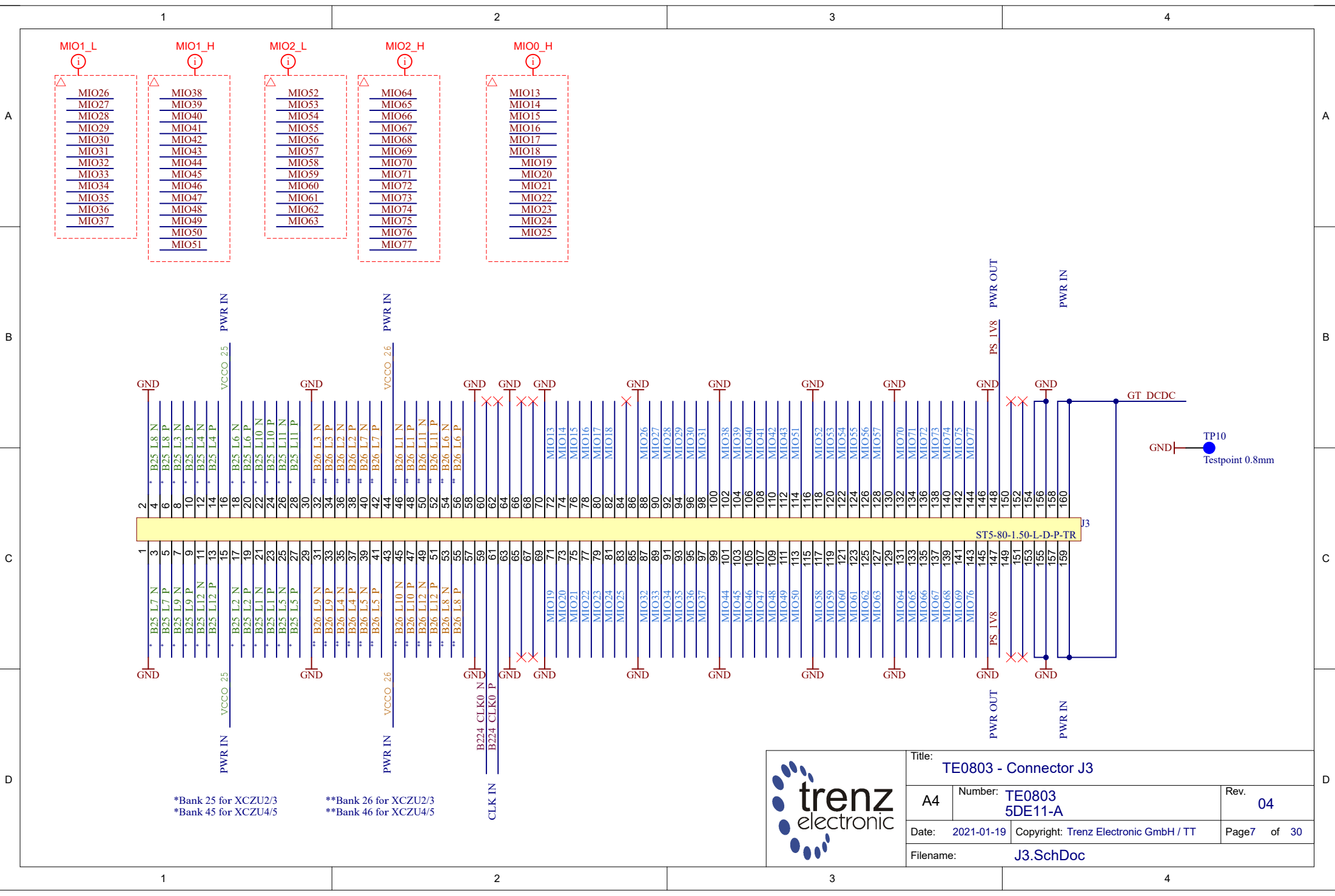
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Date: 2021-01-19	Copyright: Trenz Electronic GmbH / TT	Page 6 of 30
Filename: J2.SchDoc		

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*Bank 25 for XCZU2/3
*Bank 45 for XCZU4/5

**Bank 26 for XCZU2/3
**Bank 46 for XCZU4/5



Title: TE0803 - Connector J3		
A4	Number: TE0803 5DE11-A	Rev. 04
Date: 2021-01-19	Copyright: Trenz Electronic GmbH / TT	Page 7 of 30
Filename: J3.SchDoc		

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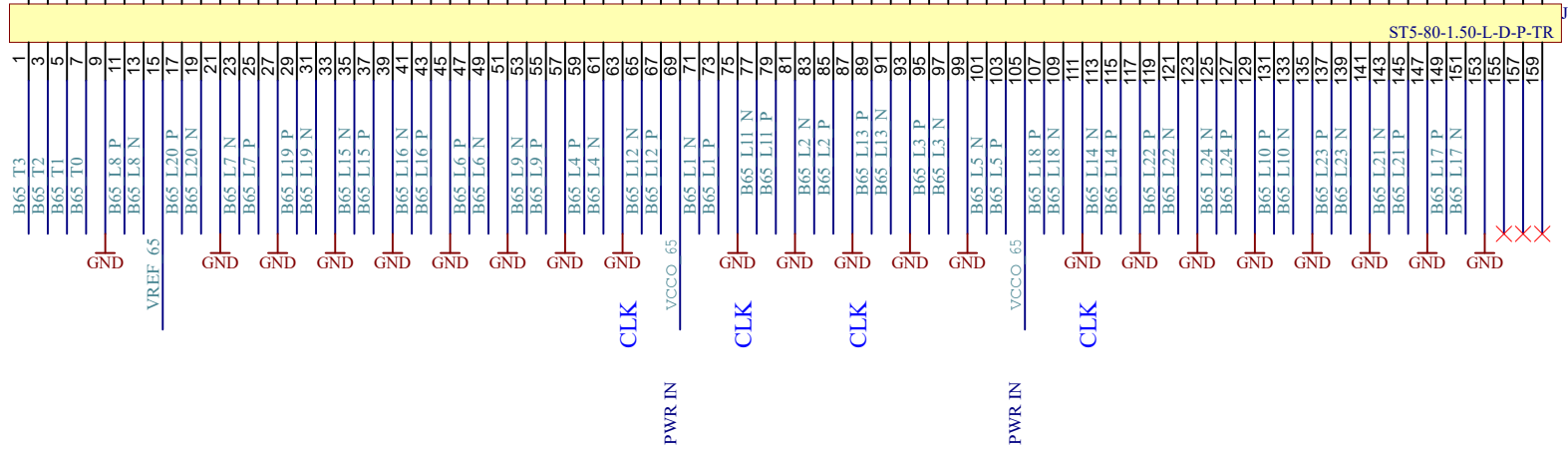
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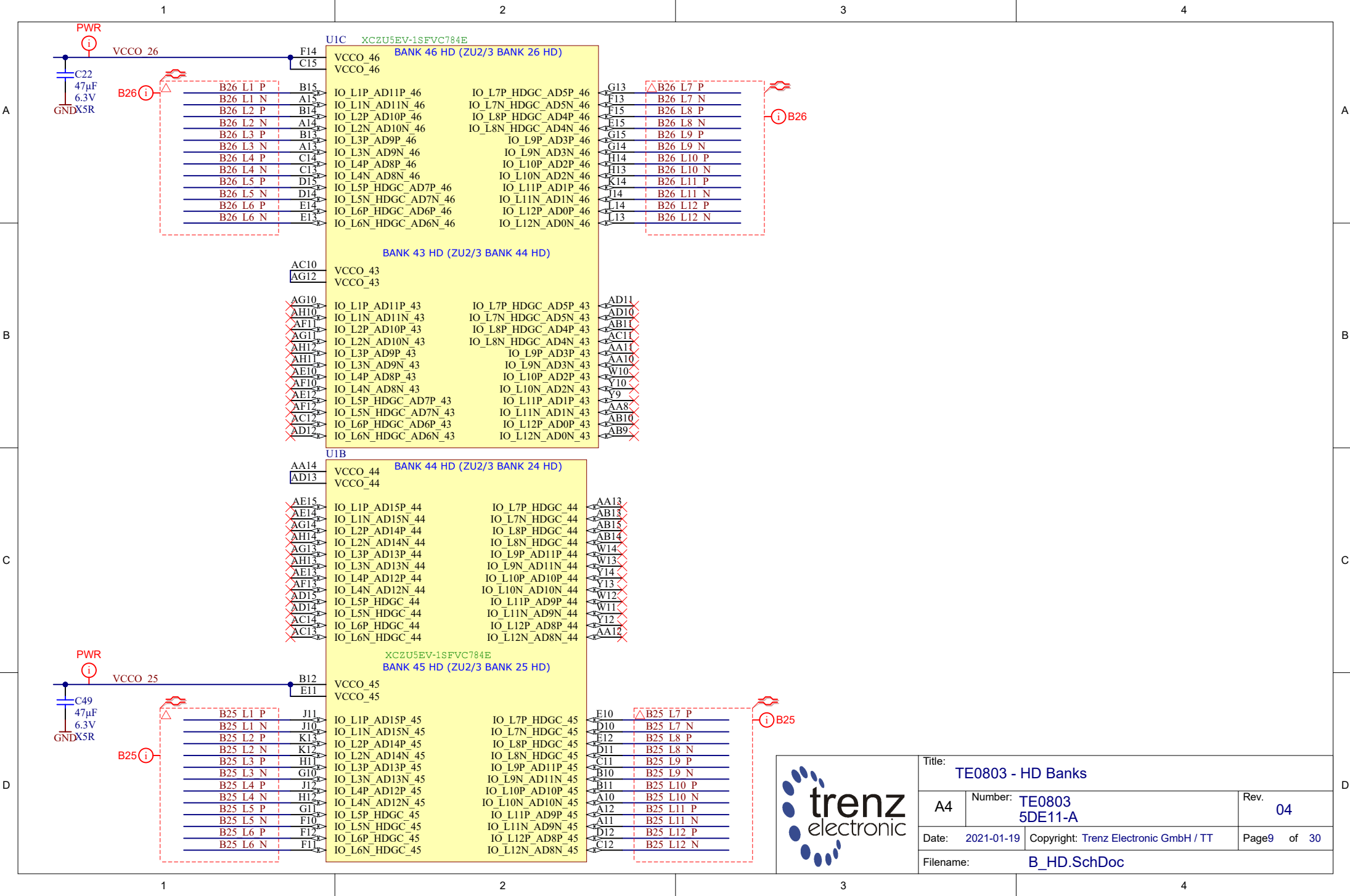
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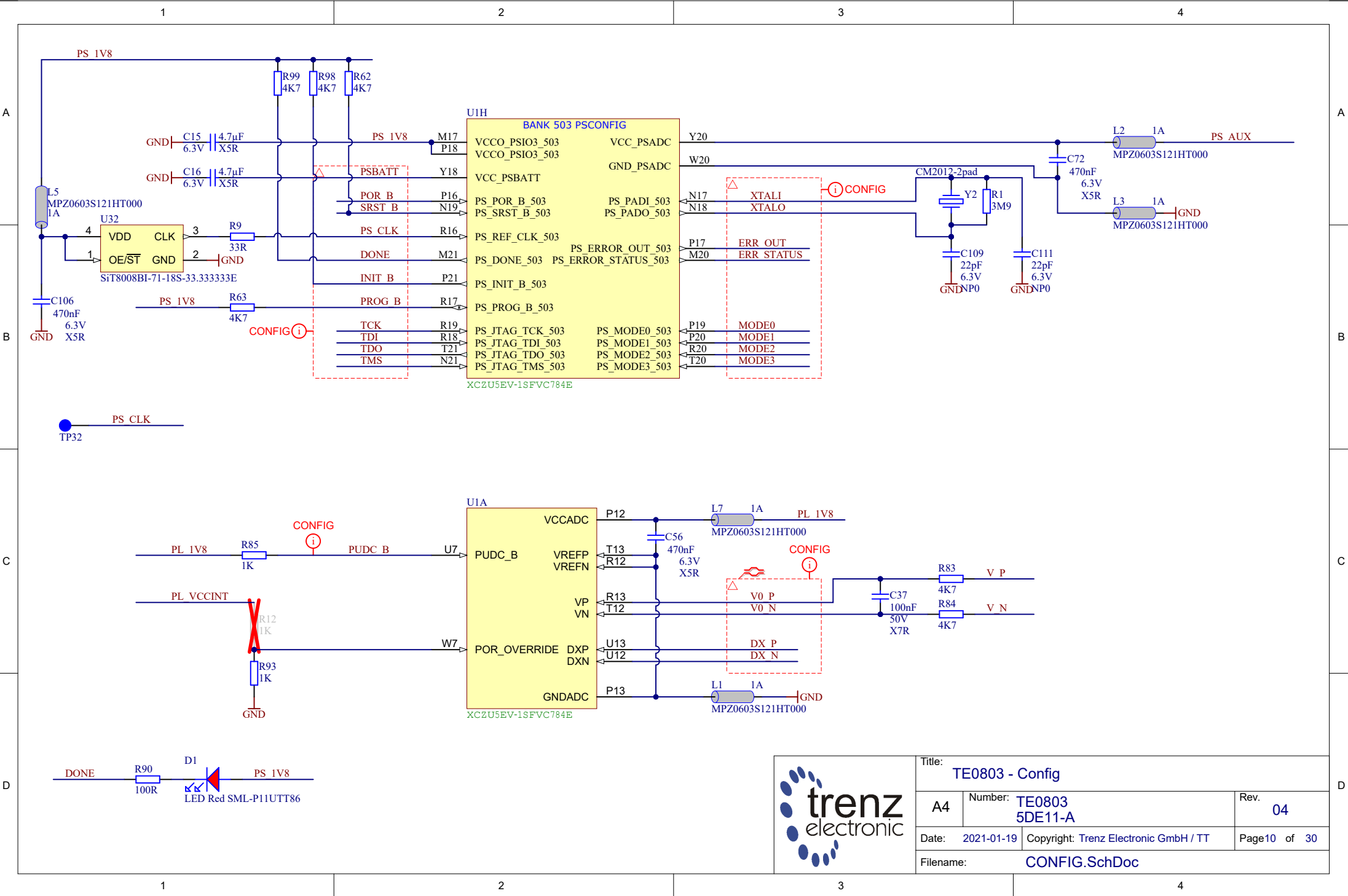
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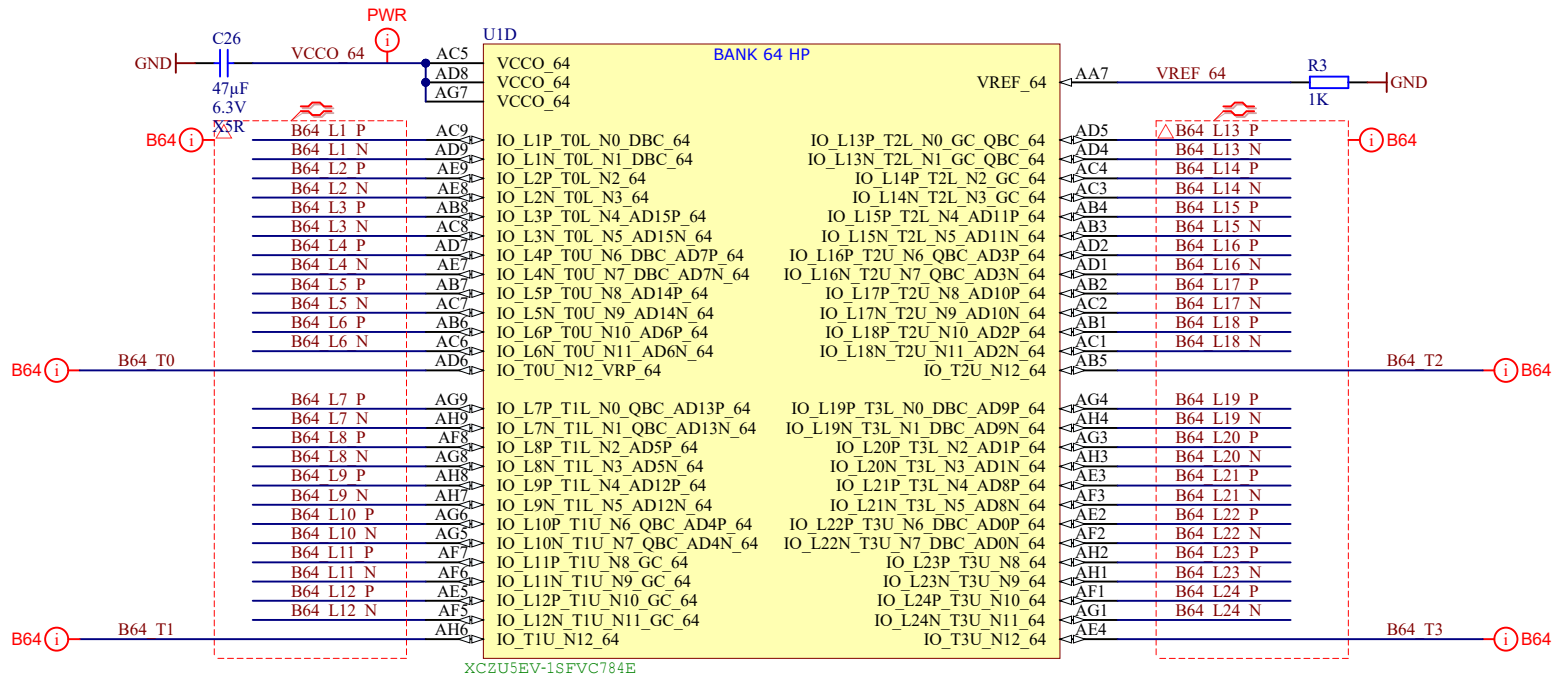
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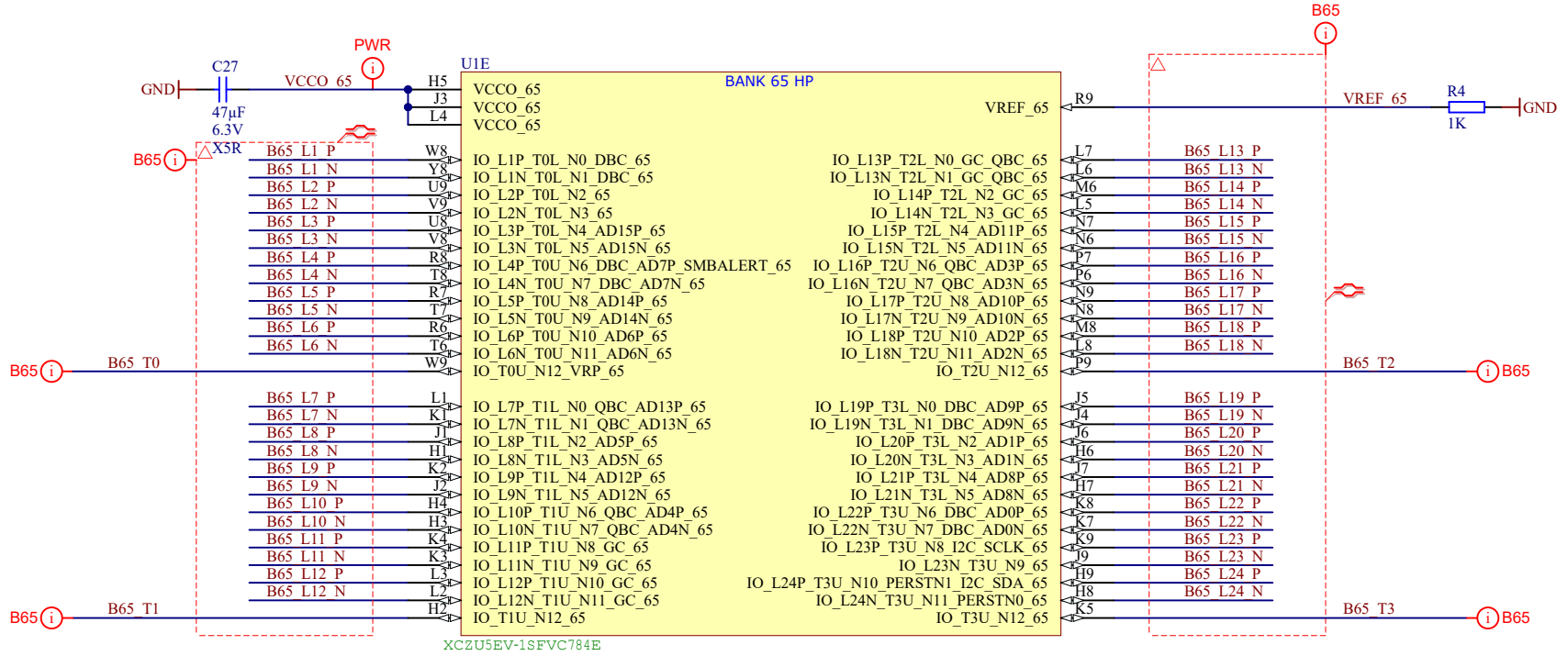
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Date: 2021-01-19	Copyright: Trenz Electronic GmbH / TT	Page 9 of 30
Filename: B_HD.SchDoc		



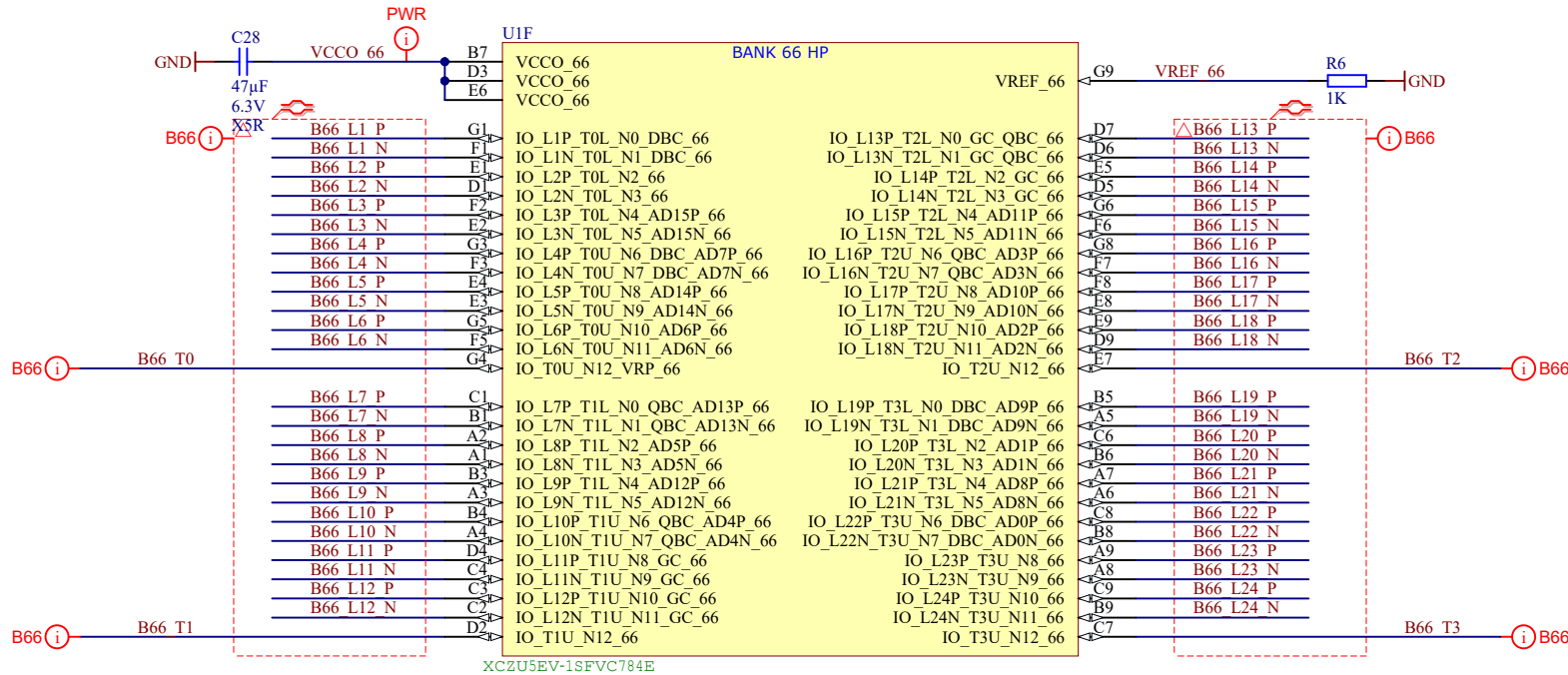
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Date: 2021-01-19	Copyright: Trenz Electronic GmbH / TT	Page 10 of 30
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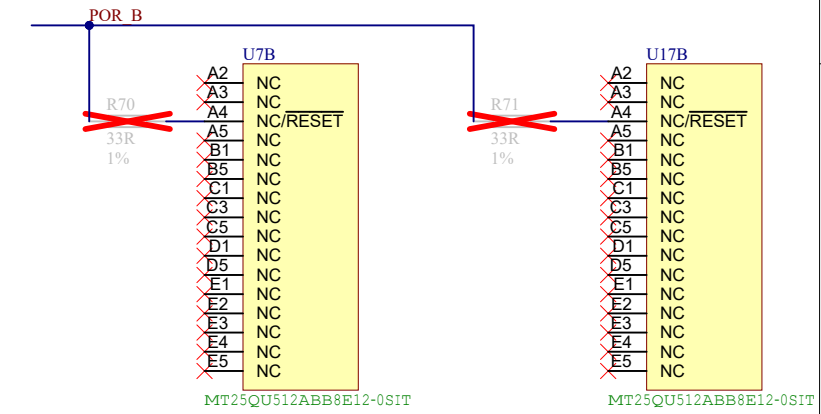
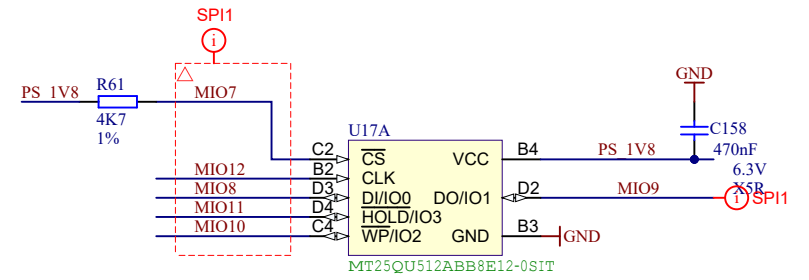
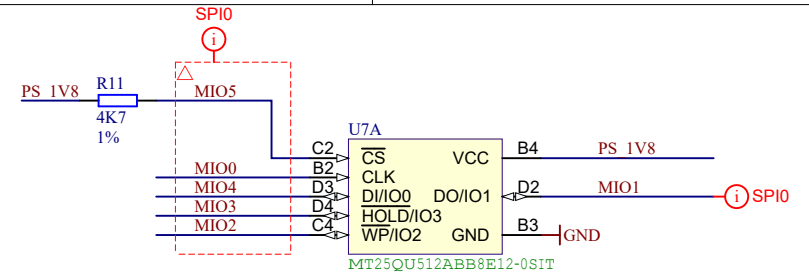
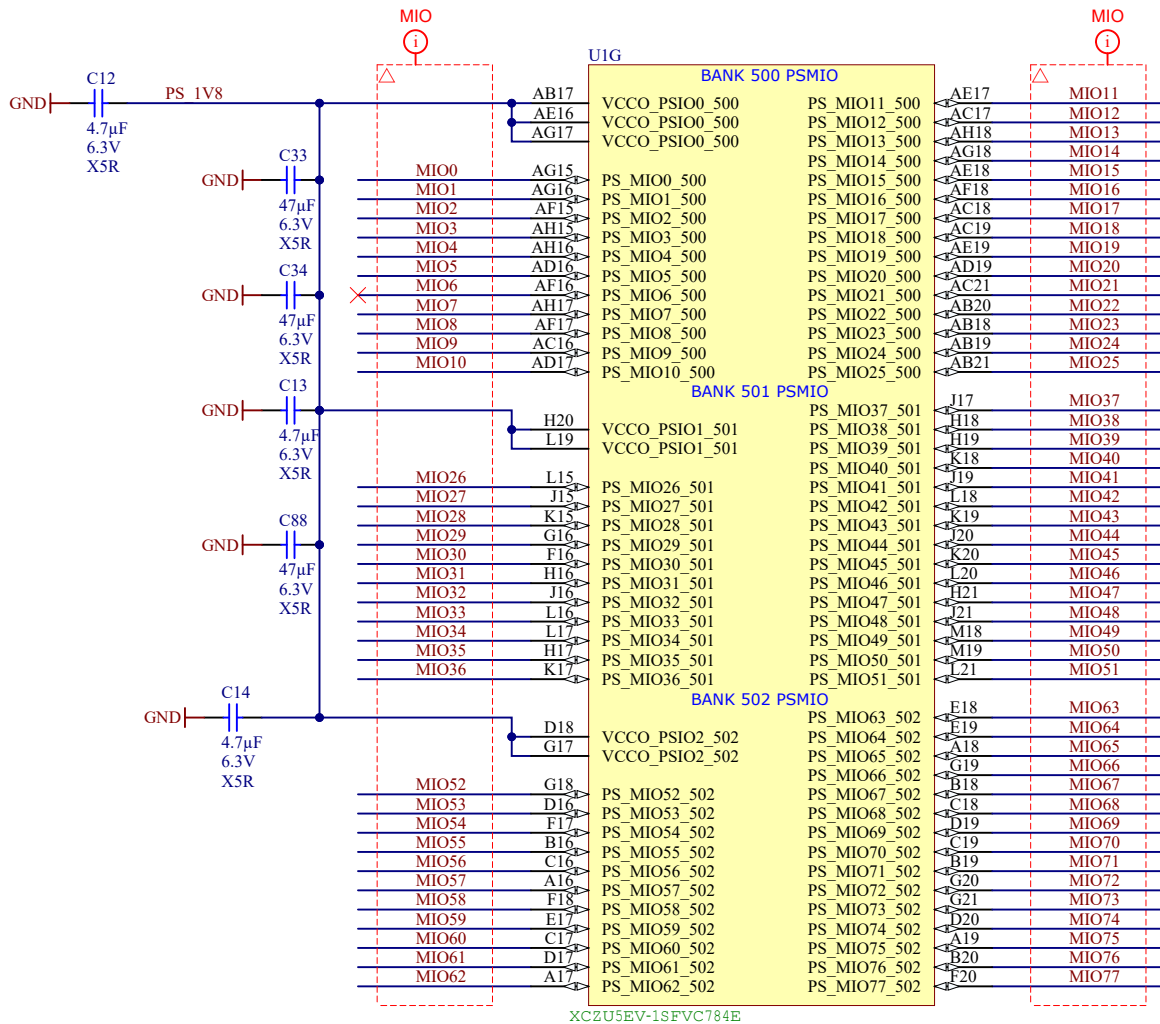
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Date: 2021-01-19	Copyright: Trenz Electronic GmbH / TT	Page 11 of 30
Filename: B64.SchDoc		



Title: TE0803 - B65		
A4	Number: TE0803 5DE11-A	Rev. 04
Date: 2021-01-19	Copyright: Trenz Electronic GmbH / TT	Page 12 of 30
Filename: B65.SchDoc		



Title: TE0803 - B66		
A4	Number: TE0803 5DE11-A	Rev. 04
Date: 2021-01-19	Copyright: Trenz Electronic GmbH / TT	Page 13 of 30
Filename: B66.SchDoc		



	Title: TE0803 - MIO Banks		
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	Date: 2021-01-19	Copyright: Trenz Electronic GmbH / TT	
	Page 14 of 30	Page 14 of 30	
Filename: B_MIO.SchDoc			

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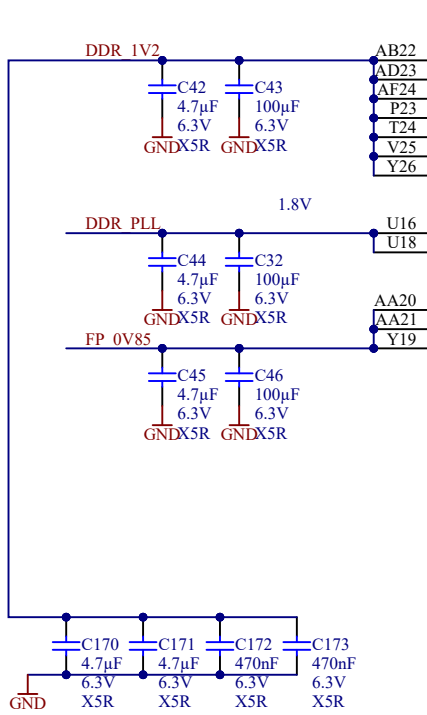
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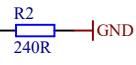
C

D



U1I		BANK 504 PSDDR	
VCCO_PSDDR_504	PS_DDR_CK0_504	W25	DDR4-CLK0 P
VCCO_PSDDR_504	PS_DDR_CK_N0_504	W26	DDR4-CLK0 N
VCCO_PSDDR_504	PS_DDR_CKE0_504	V28	DDR4-CKE0
VCCO_PSDDR_504	PS_DDR_CK1_504	Y24	
VCCO_PSDDR_504	PS_DDR_CK_N1_504	Y25	
VCCO_PSDDR_504	PS_DDR_CKE1_504	V27	
VCC_PSDDR_PLL	PS_DDR_A0_504	W28	DDR4-A0
VCC_PSDDR_PLL	PS_DDR_A1_504	Y28	DDR4-A1
VCC_PSDDR_PLL	PS_DDR_A2_504	AB28	DDR4-A2
VCC_PSDDR_PLL	PS_DDR_A3_504	AA28	DDR4-A3
VCC_PSDDR_PLL	PS_DDR_A4_504	Y27	DDR4-A4
VCC_PSDDR_PLL	PS_DDR_A5_504	AA27	DDR4-A5
VCC_PSDDR_PLL	PS_DDR_A6_504	Y22	DDR4-A6
VCC_PSDDR_PLL	PS_DDR_A7_504	AA23	DDR4-A7
VCC_PSDDR_PLL	PS_DDR_A8_504	AA22	DDR4-A8
VCC_PSDDR_PLL	PS_DDR_A9_504	AB23	DDR4-A9
VCC_PSDDR_PLL	PS_DDR_A10_504	AA25	DDR4-A10
VCC_PSDDR_PLL	PS_DDR_A11_504	AA26	DDR4-A11
VCC_PSDDR_PLL	PS_DDR_A12_504	AB25	DDR4-A12
VCC_PSDDR_PLL	PS_DDR_A13_504	AB26	DDR4-A13
VCC_PSDDR_PLL	PS_DDR_A14_504	AB24	DDR4-A14
VCC_PSDDR_PLL	PS_DDR_A15_504	AC24	DDR4-A15
VCC_PSDDR_PLL	PS_DDR_A16_504	AC23	DDR4-A16
VCC_PSDDR_PLL	PS_DDR_A17_504	AC22	DDR4-A17
PS_DDR_CS_N0_504		W27	DDR4-CS
PS_DDR_CS_N1_504		V26	
PS_DDR_BA0_504		V23	DDR4-BA0
PS_DDR_BA1_504		W22	DDR4-BA1
PS_DDR_BG0_504		W24	DDR4-BG0
PS_DDR_BG1_504		V22	DDR4-BG1
PS_DDR_PARITY_504		V24	DDR4-PAR
PS_DDR_RAM_RST_N_504		U23	DDR4-RESET
PS_DDR_ACT_N_504		Y23	DDR4-ACT
PS_DDR_ALERT_N_504		U25	DDR4-ALERT
PS_DDR_ZQ_504		U24	
PS_DDR_ODT0_504		U28	DDR4-ODT0
PS_DDR_ODT1_504		U26	

XC2U5EV-1SFVC784E



U1J		BANK 504 PSDDR	
DQ0	AD21	PS_DDR_DQ0_504	PS_DDR_DQ32_504
DQ1	AE20	PS_DDR_DQ1_504	PS_DDR_DQ33_504
DQ2	AD20	PS_DDR_DQ2_504	PS_DDR_DQ34_504
DQ3	AF20	PS_DDR_DQ3_504	PS_DDR_DQ35_504
DQ4	AH21	PS_DDR_DQ4_504	PS_DDR_DQ36_504
DQ5	AH20	PS_DDR_DQ5_504	PS_DDR_DQ37_504
DQ6	AH19	PS_DDR_DQ6_504	PS_DDR_DQ38_504
DQ7	AG19	PS_DDR_DQ7_504	PS_DDR_DQ39_504
DQ8	AF22	PS_DDR_DQ8_504	PS_DDR_DQ40_504
DQ9	AH22	PS_DDR_DQ9_504	PS_DDR_DQ41_504
DQ10	AE22	PS_DDR_DQ10_504	PS_DDR_DQ42_504
DQ11	AD23	PS_DDR_DQ11_504	PS_DDR_DQ43_504
DQ12	AH23	PS_DDR_DQ12_504	PS_DDR_DQ44_504
DQ13	AH24	PS_DDR_DQ13_504	PS_DDR_DQ45_504
DQ14	AE24	PS_DDR_DQ14_504	PS_DDR_DQ46_504
DQ15	AG24	PS_DDR_DQ15_504	PS_DDR_DQ47_504
DQ16	AC26	PS_DDR_DQ16_504	PS_DDR_DQ48_504
DQ17	AD26	PS_DDR_DQ17_504	PS_DDR_DQ49_504
DQ18	AD25	PS_DDR_DQ18_504	PS_DDR_DQ50_504
DQ19	AD24	PS_DDR_DQ19_504	PS_DDR_DQ51_504
DQ20	AG26	PS_DDR_DQ20_504	PS_DDR_DQ52_504
DQ21	AH25	PS_DDR_DQ21_504	PS_DDR_DQ53_504
DQ22	AH26	PS_DDR_DQ22_504	PS_DDR_DQ54_504
DQ23	AG25	PS_DDR_DQ23_504	PS_DDR_DQ55_504
DQ24	AH27	PS_DDR_DQ24_504	PS_DDR_DQ56_504
DQ25	AH28	PS_DDR_DQ25_504	PS_DDR_DQ57_504
DQ26	AF28	PS_DDR_DQ26_504	PS_DDR_DQ58_504
DQ27	AG28	PS_DDR_DQ27_504	PS_DDR_DQ59_504
DQ28	AC27	PS_DDR_DQ28_504	PS_DDR_DQ60_504
DQ29	AD27	PS_DDR_DQ29_504	PS_DDR_DQ61_504
DQ30	AD28	PS_DDR_DQ30_504	PS_DDR_DQ62_504
DQ31	AC28	PS_DDR_DQ31_504	PS_DDR_DQ63_504
DDR4-DQS0 P	AF21	PS_DDR_DQS_P0_504	PS_DDR_DQ64_504
DDR4-DQS0 N	AG21	PS_DDR_DQS_N0_504	PS_DDR_DQ65_504
DDR4-DQS1 P	AF23	PS_DDR_DQS_P1_504	PS_DDR_DQ66_504
DDR4-DQS1 N	AG23	PS_DDR_DQS_N1_504	PS_DDR_DQ67_504
DDR4-DQS2 P	AF25	PS_DDR_DQS_P2_504	PS_DDR_DQ68_504
DDR4-DQS2 N	AF26	PS_DDR_DQS_N2_504	PS_DDR_DQ69_504
DDR4-DQS3 P	AE27	PS_DDR_DQS_P3_504	PS_DDR_DQ70_504
DDR4-DQS3 N	AF27	PS_DDR_DQS_N3_504	PS_DDR_DQ71_504
DDR4-DQS4 P	N23	PS_DDR_DQS_P4_504	PS_DDR_DM0_504
DDR4-DQS4 N	M23	PS_DDR_DQS_N4_504	PS_DDR_DM1_504
DDR4-DQS5 P	L23	PS_DDR_DQS_P5_504	PS_DDR_DM2_504
DDR4-DQS5 N	K23	PS_DDR_DQS_N5_504	PS_DDR_DM3_504
DDR4-DQS6 P	N26	PS_DDR_DQS_P6_504	PS_DDR_DM4_504
DDR4-DQS6 N	N27	PS_DDR_DQS_N6_504	PS_DDR_DM5_504
DDR4-DQS7 P	J26	PS_DDR_DQS_P7_504	PS_DDR_DM6_504
DDR4-DQS7 N	J27	PS_DDR_DQS_N7_504	PS_DDR_DM7_504
	R27	PS_DDR_DQS_P8_504	PS_DDR_DM8_504
	T27	PS_DDR_DQS_N8_504	

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Title: TE0803 - PS_DDR		
A4	Number: TE0803 5DE11-A	Rev. 04
Date: 2021-01-19	Copyright: Trenz Electronic GmbH / TT	Page 15 of 30
Filename: PS_DDR.SchDoc		

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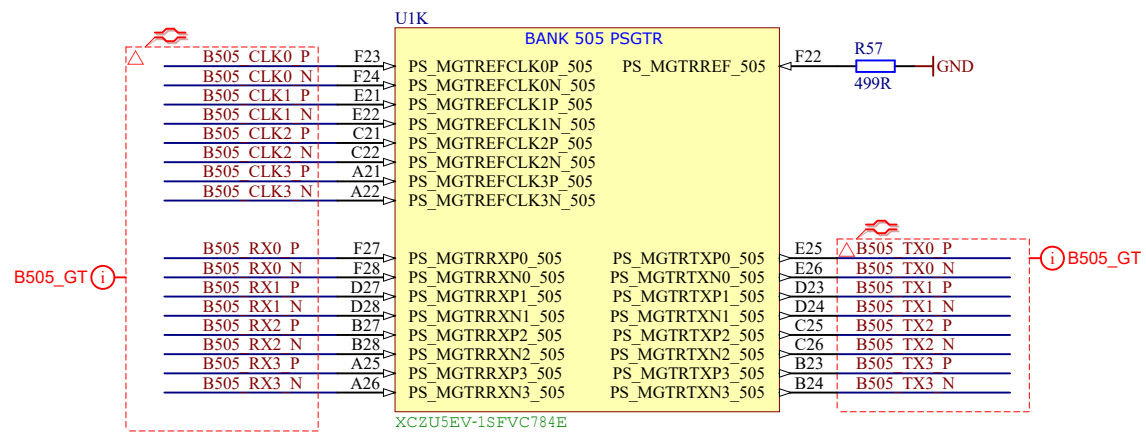
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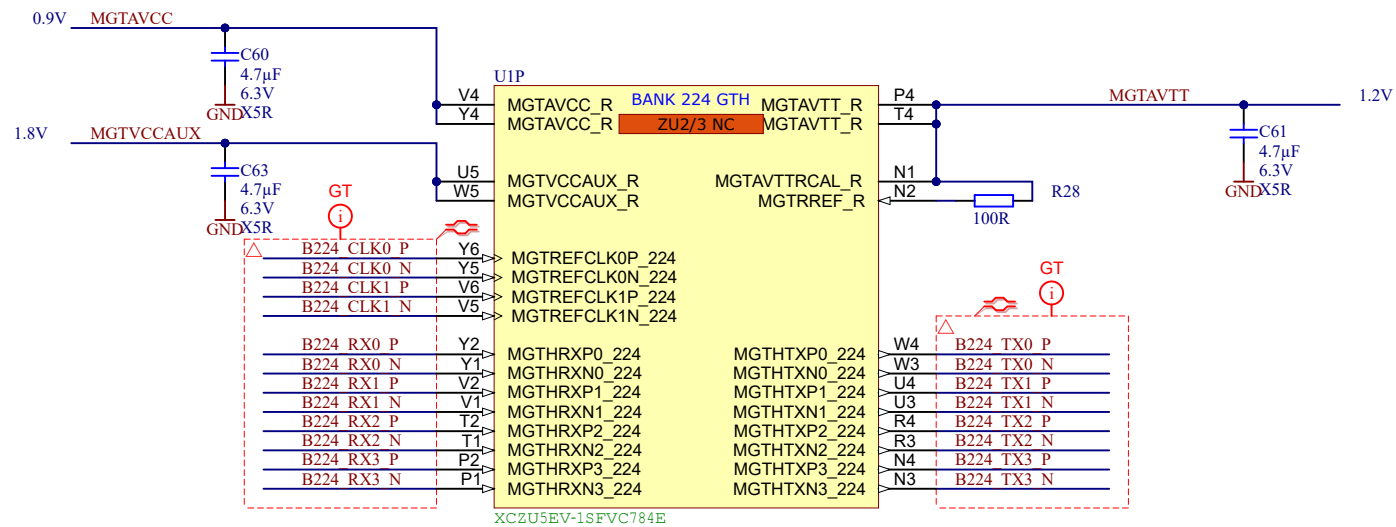
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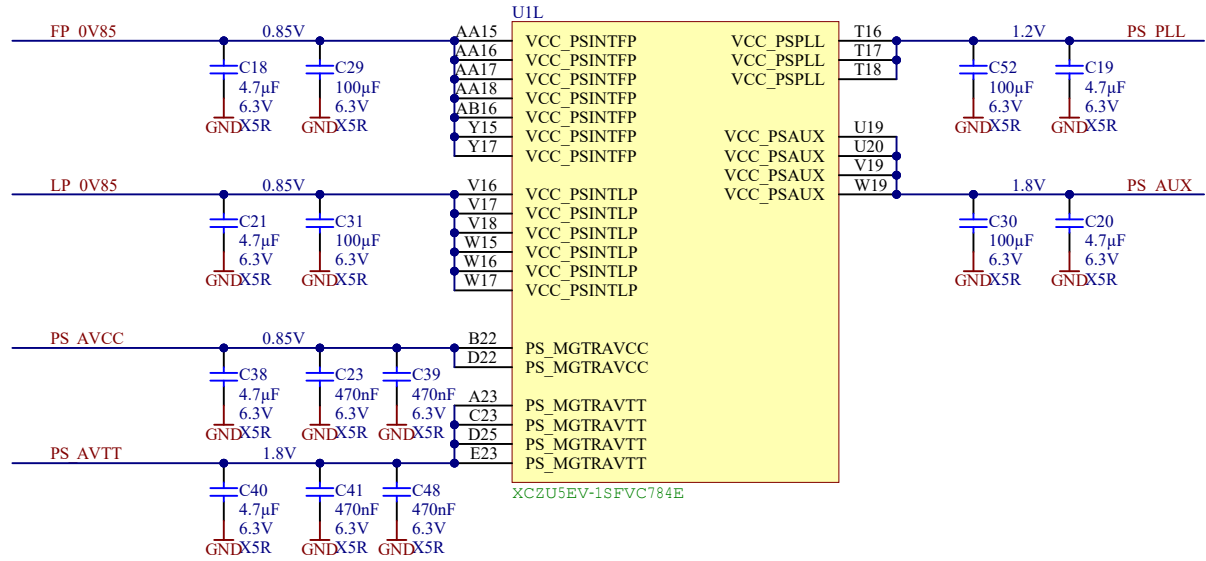
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	Date: 2021-01-19	Copyright: Trenz Electronic GmbH / TT	Page 17 of 30
	Filename: B_GT.SchDoc		



	Title: TE0803 - ZU_PS_POWER		
	A4	Number: TE0803 5DE11-A	Rev. 04
	Date: 2021-01-19	Copyright: Trenz Electronic GmbH / TT	Page 18 of 30
	Filename: ZU_PS_POWER.SchDoc		

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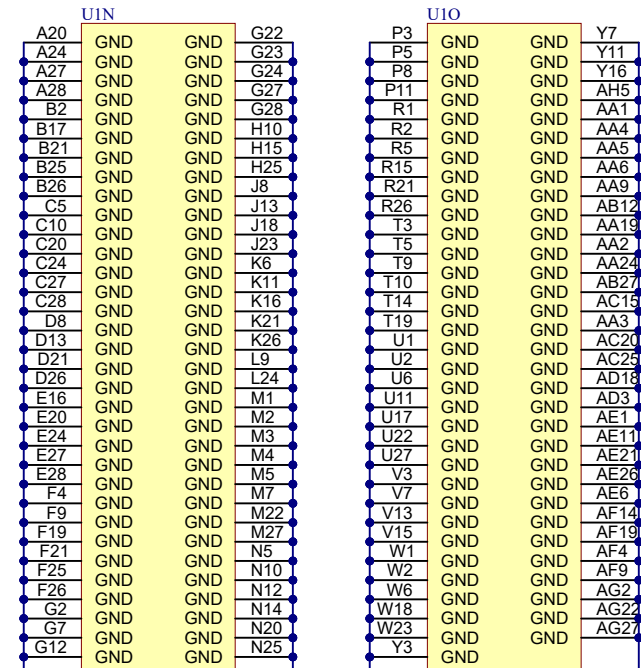
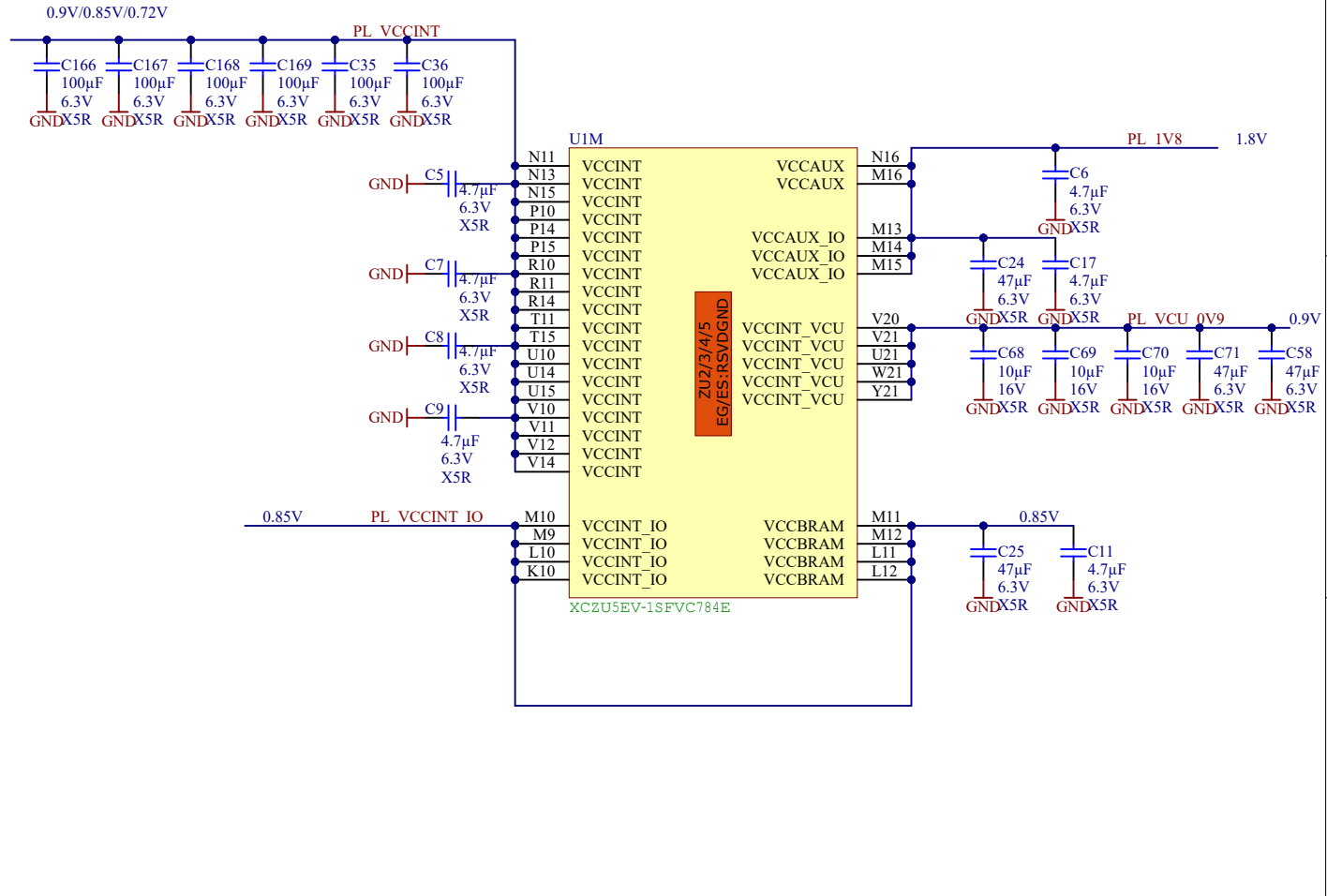
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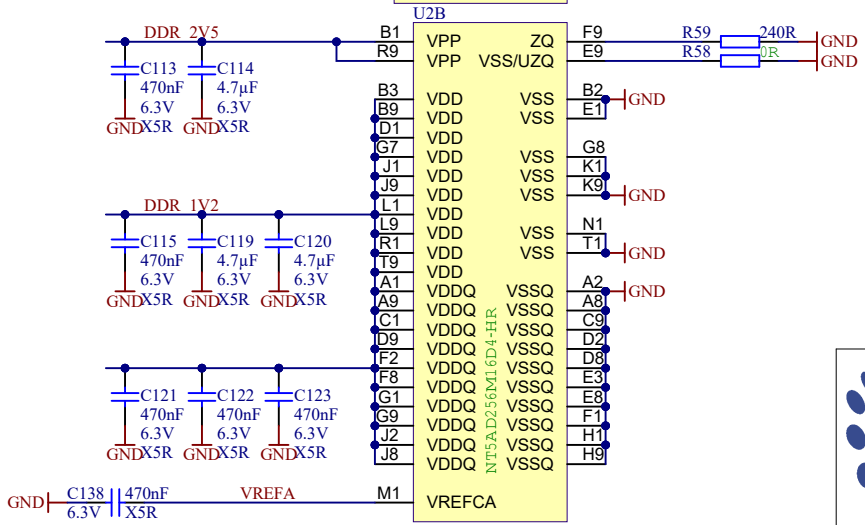
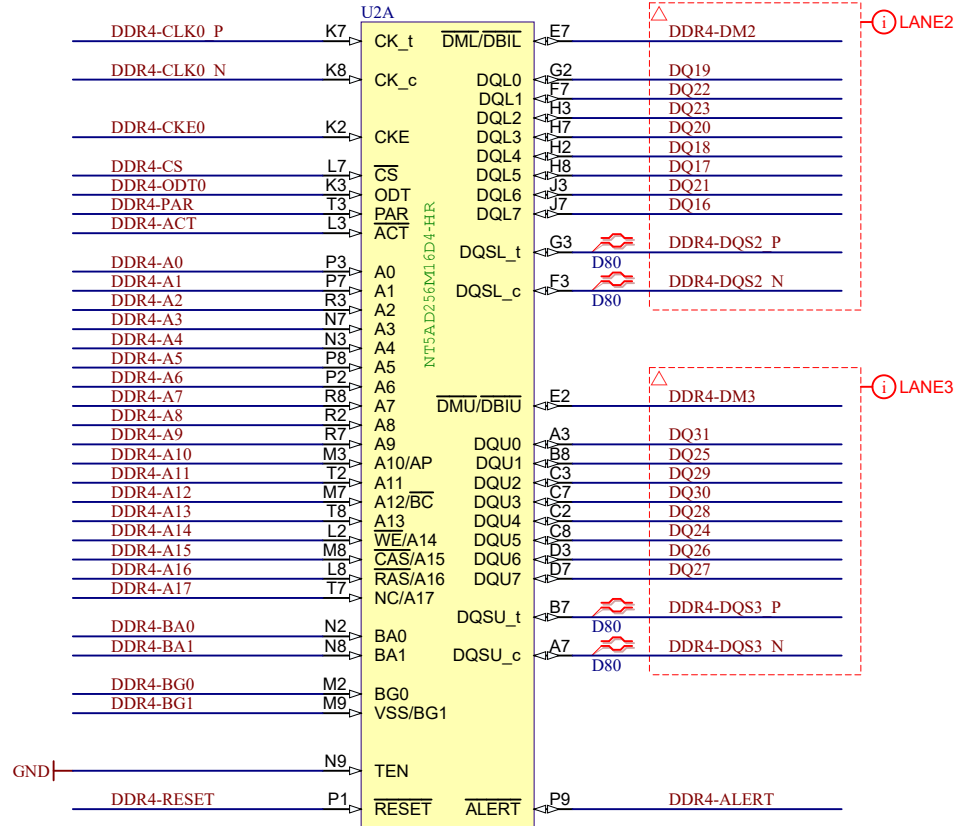

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Date: 2021-01-19	Copyright: Trenz Electronic GmbH / TT	Page 19 of 30
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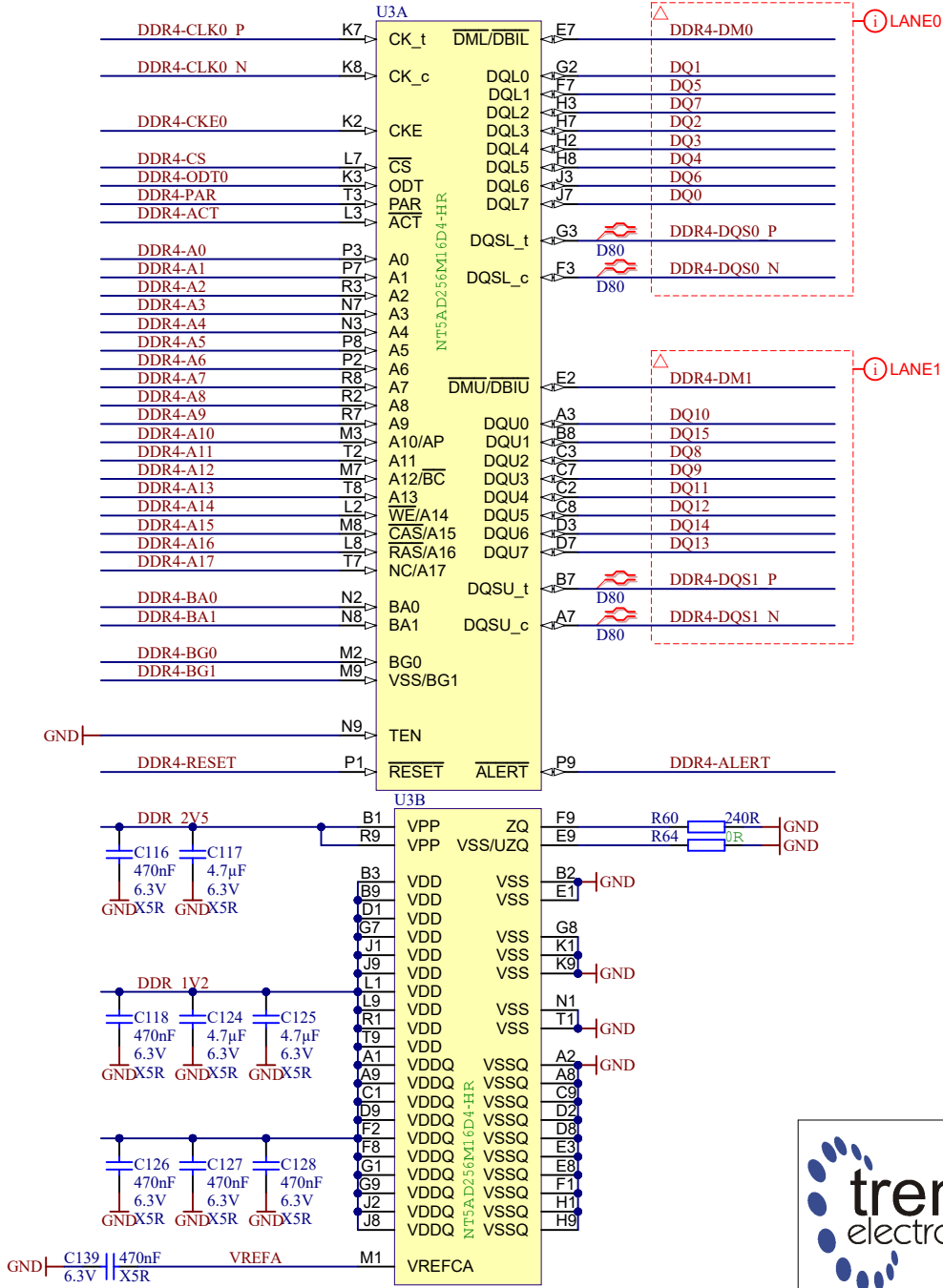
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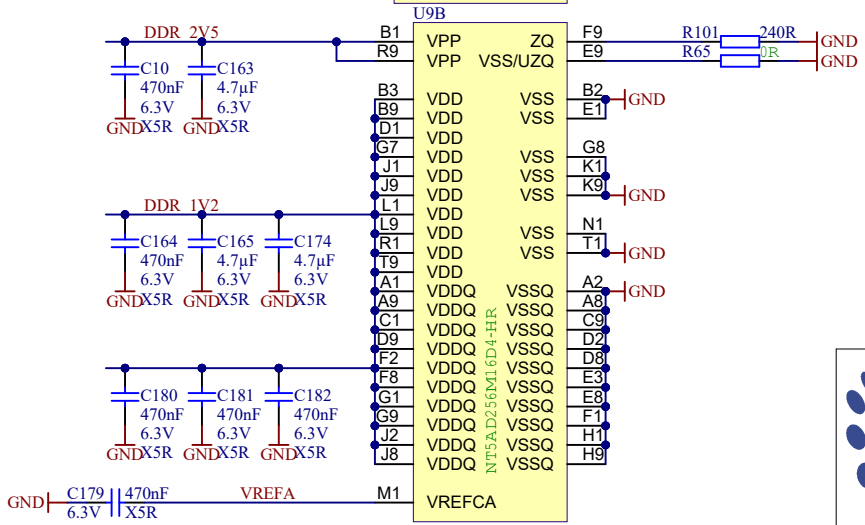
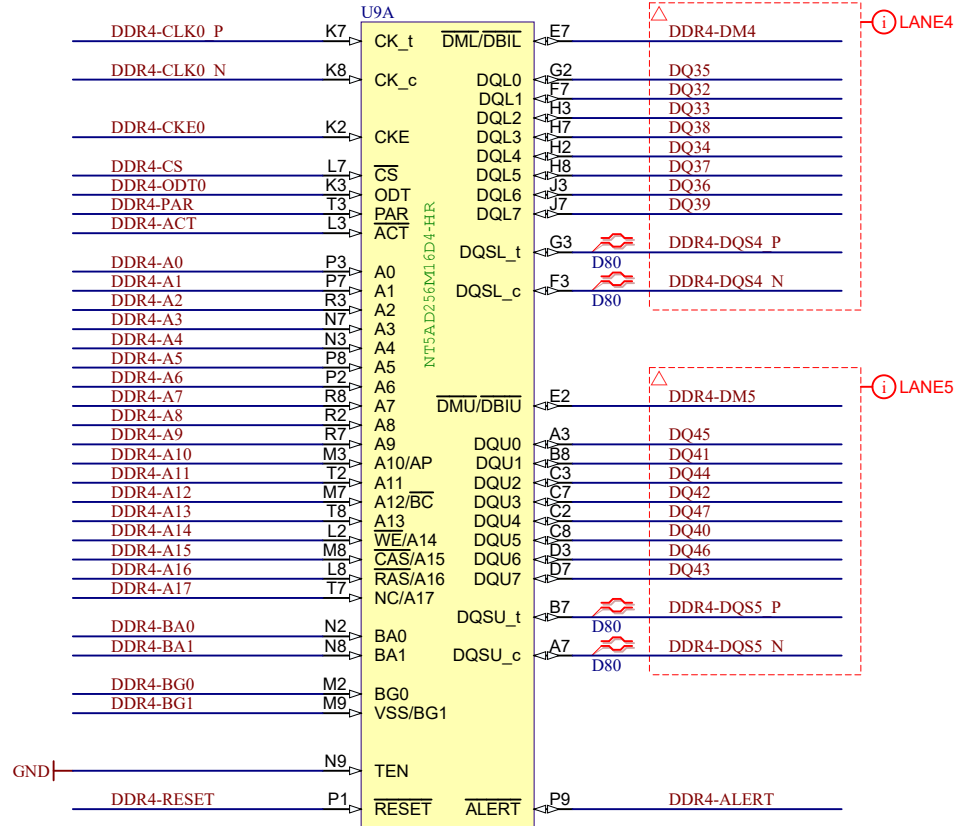

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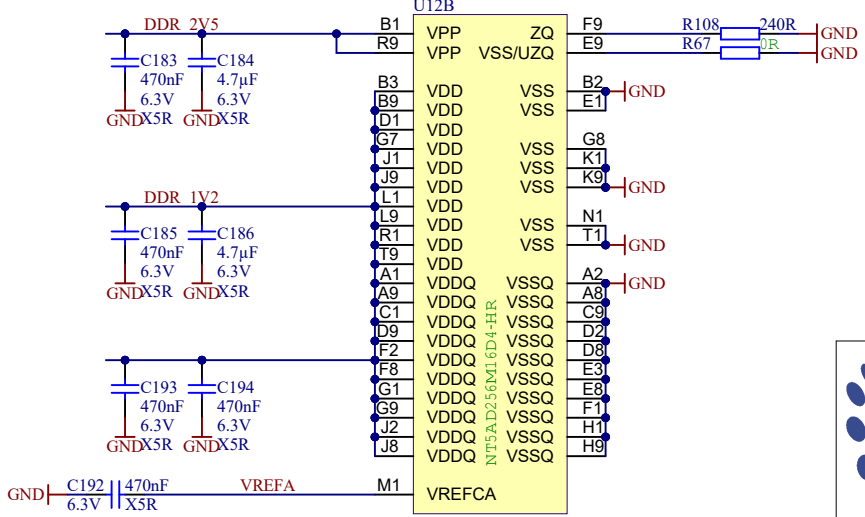
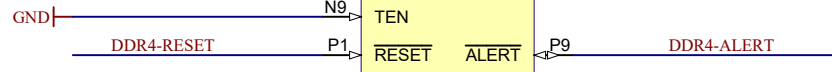
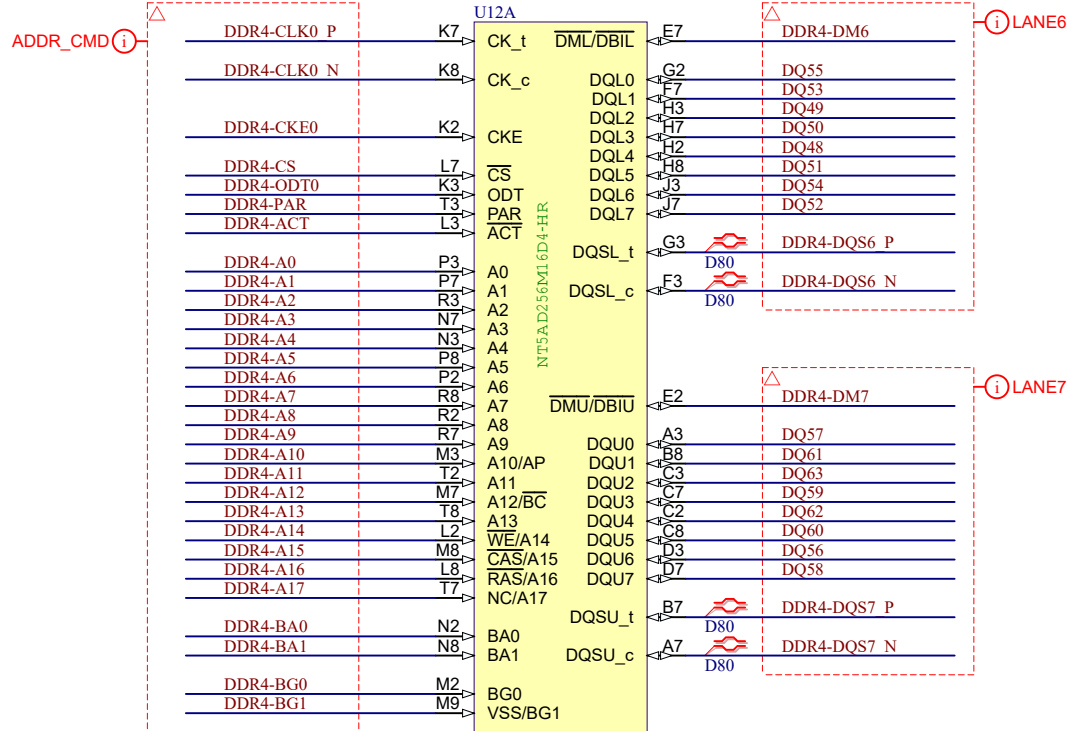

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Date: 2021-01-19	Copyright: Trenz Electronic GmbH / TT	Page 20 of 30
Filename: DDR4-RAM.SchDoc		



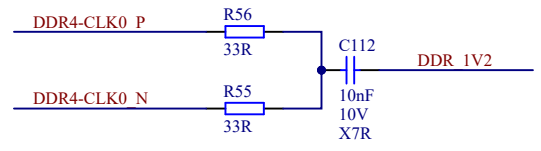
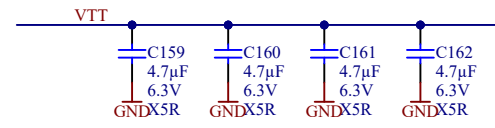
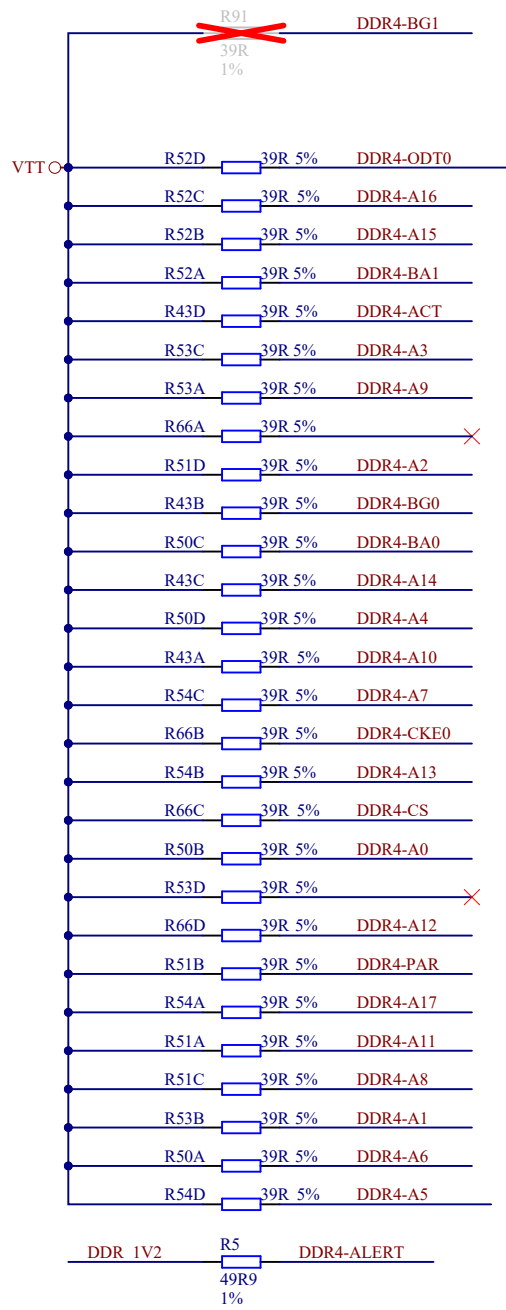
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Date: 2021-01-19	Copyright: Trenz Electronic GmbH / TT	Page21 of 30
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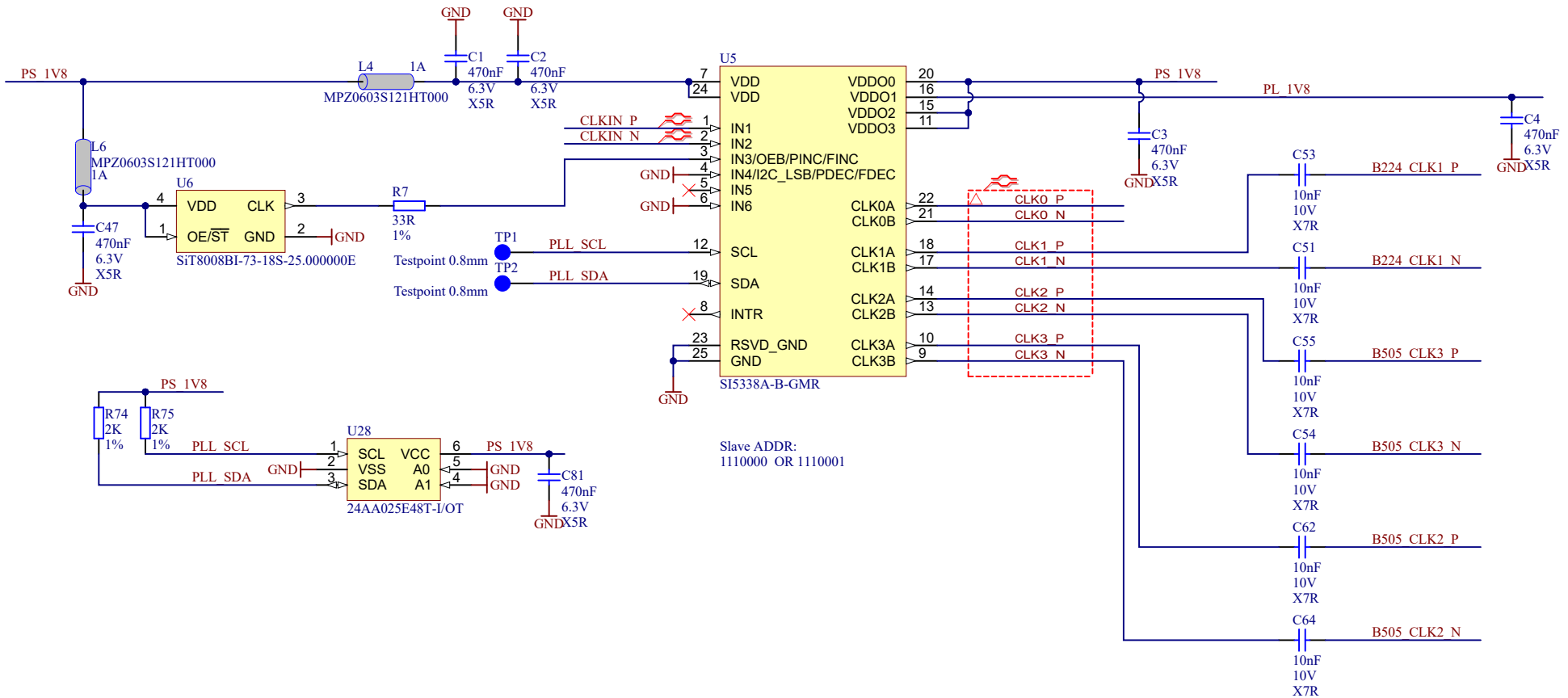
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A4	Number: TE0803 5DE11-A	Rev. 04
Date: 2021-01-19	Copyright: Trenz Electronic GmbH / TT	Page22 of 30
Filename: DDR4-RAM_3.SchDoc		


Title: TE0803 - DDR4_4_RAM		
A4	Number: TE0803 5DE11-A	Rev. 04
Date: 2021-01-19	Copyright: Trenz Electronic GmbH / TT	Page23 of 30
Filename: DDR4-RAM_4.SchDoc		



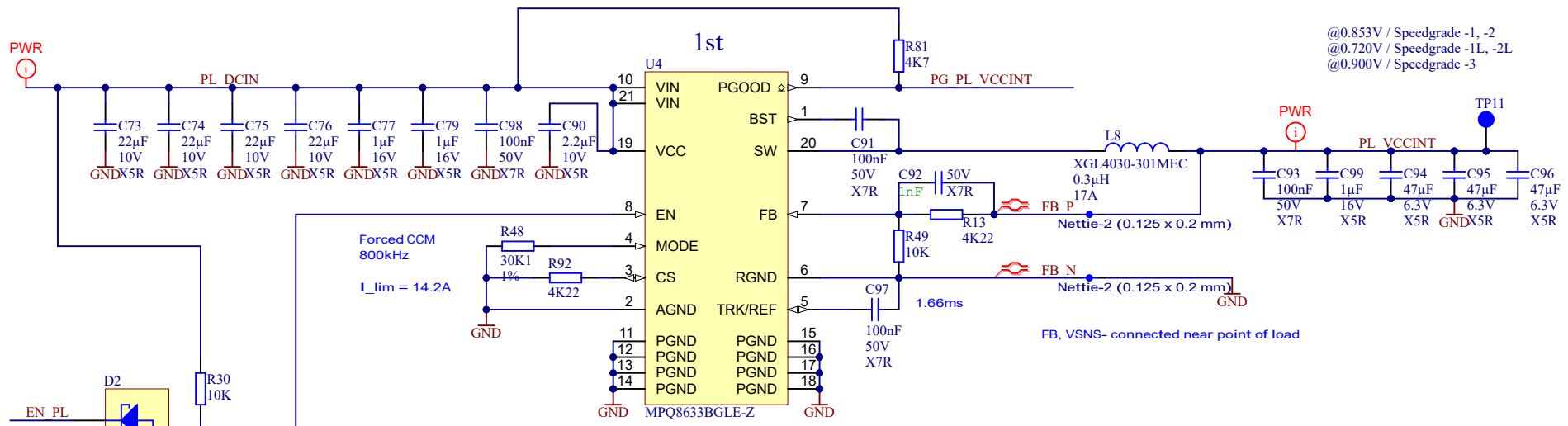
Title: TE0803 - DDR4_TERM		
A4	Number: TE0803 5DE11-A	Rev. 04
Date: 2021-01-19	Copyright: Trenz Electronic GmbH / TT	Page24 of 30
Filename: DDR4-TERM.SchDoc		



Slave ADDR:
1110000 OR 1110001

		Title: TE0803 - CLOCK	
		A4	Number: TE0803 5DE11-A
Date: 2021-01-19		Copyright: Trenz Electronic GmbH / TT	
Filename: Clock.SchDoc		Page 25 of 30	

PL VCCINT



@0.853V / Speedgrade -1, -2
 @0.720V / Speedgrade -1L, -2L
 @0.900V / Speedgrade -3

Forced CCM
 800kHz
 I_lim = 14.2A

FB, VSNS- connected near point of load

FPGA Speed grade:		
-1L / -2LE	R13 - 2K, R49 - 10K	PL_VCCINT = 0.720V
-1 / -2	R13 - 4K22, R49 - 10K	PL_VCCINT = 0.853V
-3E	R13 - 10K, R49 - 20K	PL_VCCINT = 0.900V

U4 pin compatible with
 -- TPS548A28 (15A)
 -- TPS548B28 (20A)
 -- TPS54JA20 (12A)
 -- MPQ8633B (20A)

U4 can be either TPS548A28RWW or MPQ8633BGL-E-Z which is up to Trenz Electronic GmbH.

	Title: TE0803 - POWER	
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Filename: POWER.SchDoc		

1

2

3

4

A

A

B

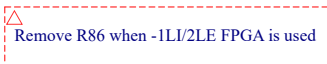
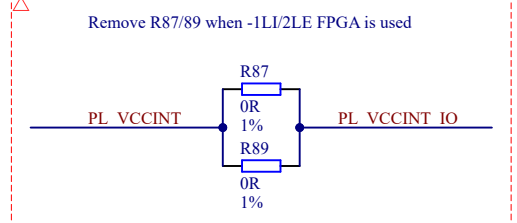
B

C

C

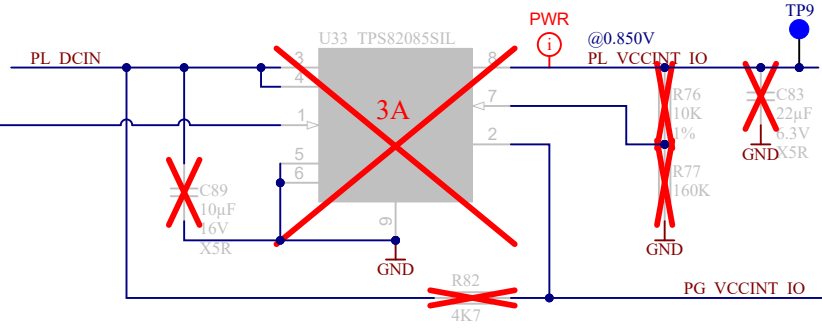
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D

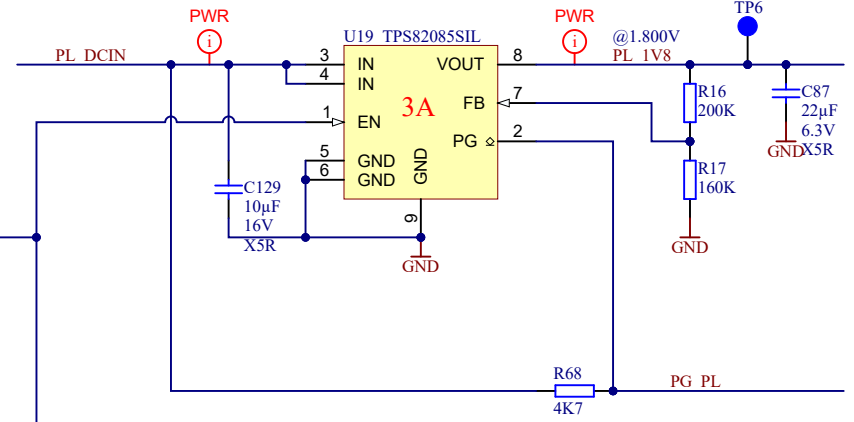


VCCINT_IO & VCCBRAM

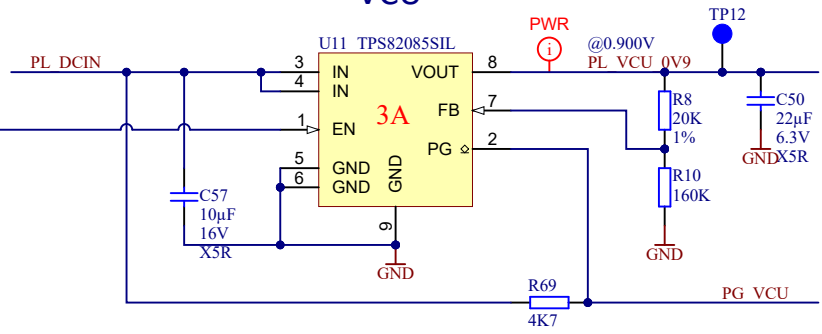
Add U33 when -1L1/2LE FPGA is used



PL VCCIO



VCU



Title: TE0803 - POWER		
A4	Number: TE0803 5DE11-A	Rev. 04
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1

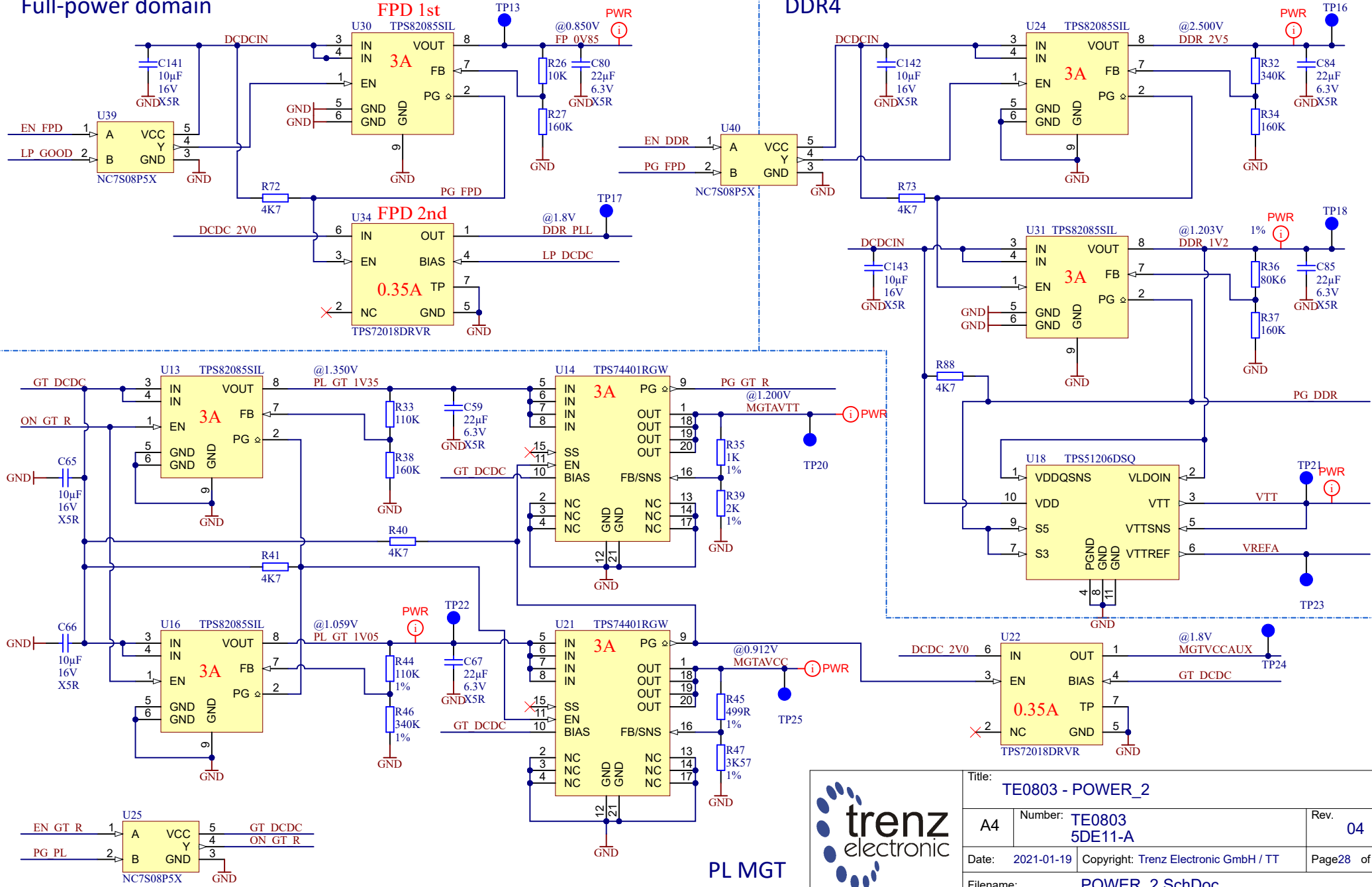
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3

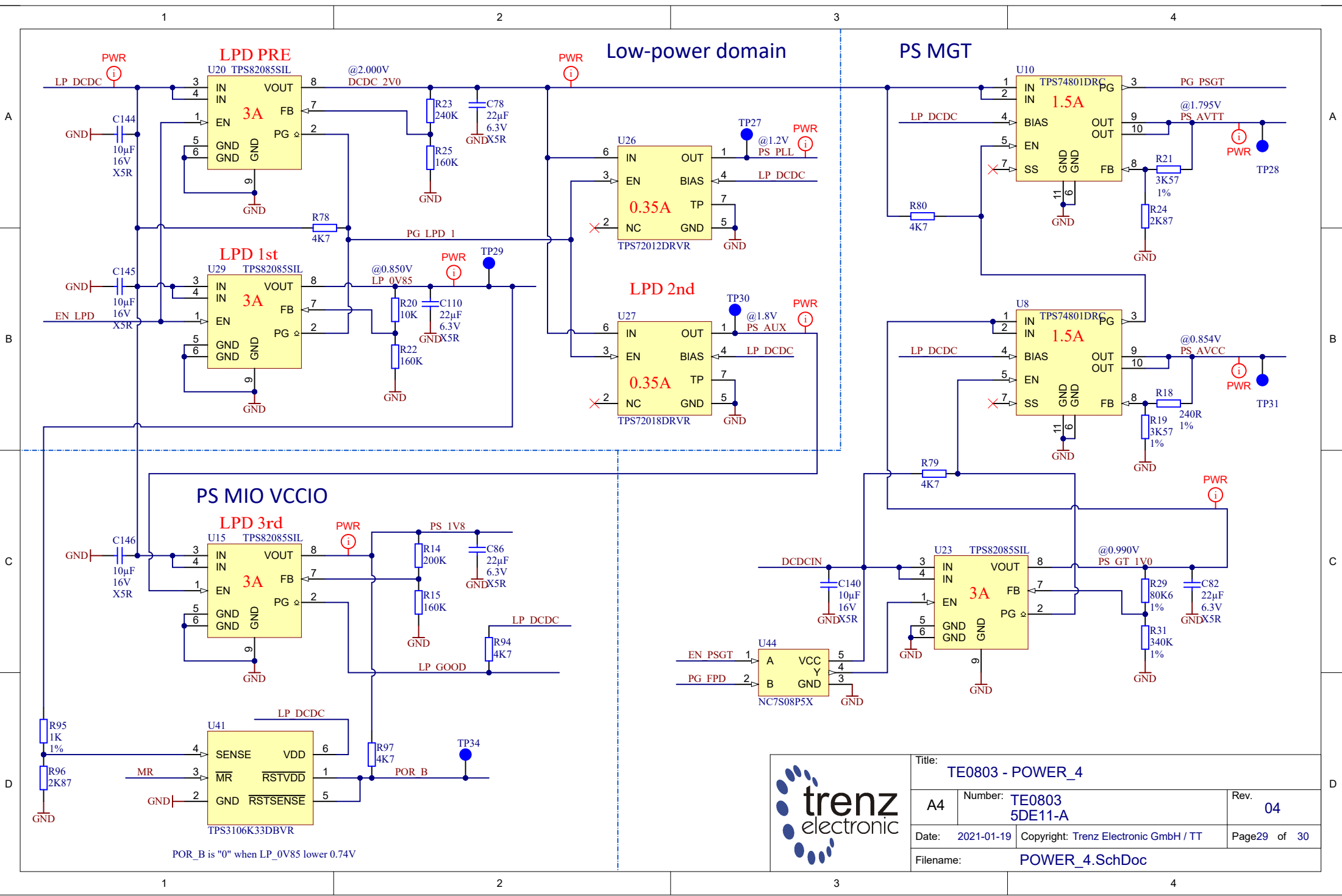
4

Full-power domain

DDR4



Title: TE0803 - POWER_2		
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Filename: POWER_2.SchDoc		




POR_B is "0" when LP_0V85 lower 0.74V



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REV	DATE	Description	
-01		Initial revision	VT
-01a	20.11.2017	1. VCU voltage set to 0.9V, R20 changed to 40K , PL_VCU_1V0 renamed to PL_VCU_0V9.	VT
-02	20.06.2018	1. Added LDO to DDR_PLL 2. All differential pairs wath length matched with tolerance 0.1mm (excluding package delays) 3. Added MAC EEPROM U28 4. VPS_MGTRAVCC set to 0.85V 5. Added pull-up resistors R68,R69	VT
-03	21.02.2019	1. Added support of DDP DDR4 2. Added support of Low power FPGA (-L1/L2). 3. Revised testpoints 4. Revised J1-J4 connectors net label style	VY
-04	15.12.2020	1. Revised PL_VCCINT power supply. EN63A0QI replaced by TPS548A28RWWR. PCB: revised routing and components placement; 2. Added support of wide SDRAM DDR4 packages. PCB: revised routing and components placement; 3. Added option to select POR_OVERRIDE level (R12 and R93) 4. VCCO pins if unused Bank 44 connected together. Same for unused Bank 24 (UG583 recomendation) 5. PCB: updated signal trace lengths. 6. PCB: updated silkscreen. Added company address, CE and WEEE symbols; 7. PCB: added module orientation rectangle pointer 8. Changed resistors value of R29, R31, R35, R39, R44-R47 (BOM optimization) 9. Removed traceability part (Obsolete component)	VY
-04	23.02.2022	10. Changed capacitor C92 for all variants from 100 nF to 1 nF.	ED
-04	08.06.2023	11. U4 can be either TPS548A28RWWR or MPQ8633BGLE-Z which is up to Trenz Electronic GmbH.	VY
-04	23.05.2025	12. L1 - L7 ferrit beads BKP0603HS121-T (EOL) replaced by MPZ0603S121HT000 for all variants.	VG

		Title: TE0803 - Revision History	
		A4	Number: TE0803 5DE11-A
Date: 2021-01-19		Copyright: Trenz Electronic GmbH	
Page 30 of 30		Filename: Revision Changes.SchDoc	
Drawn by: VY			