
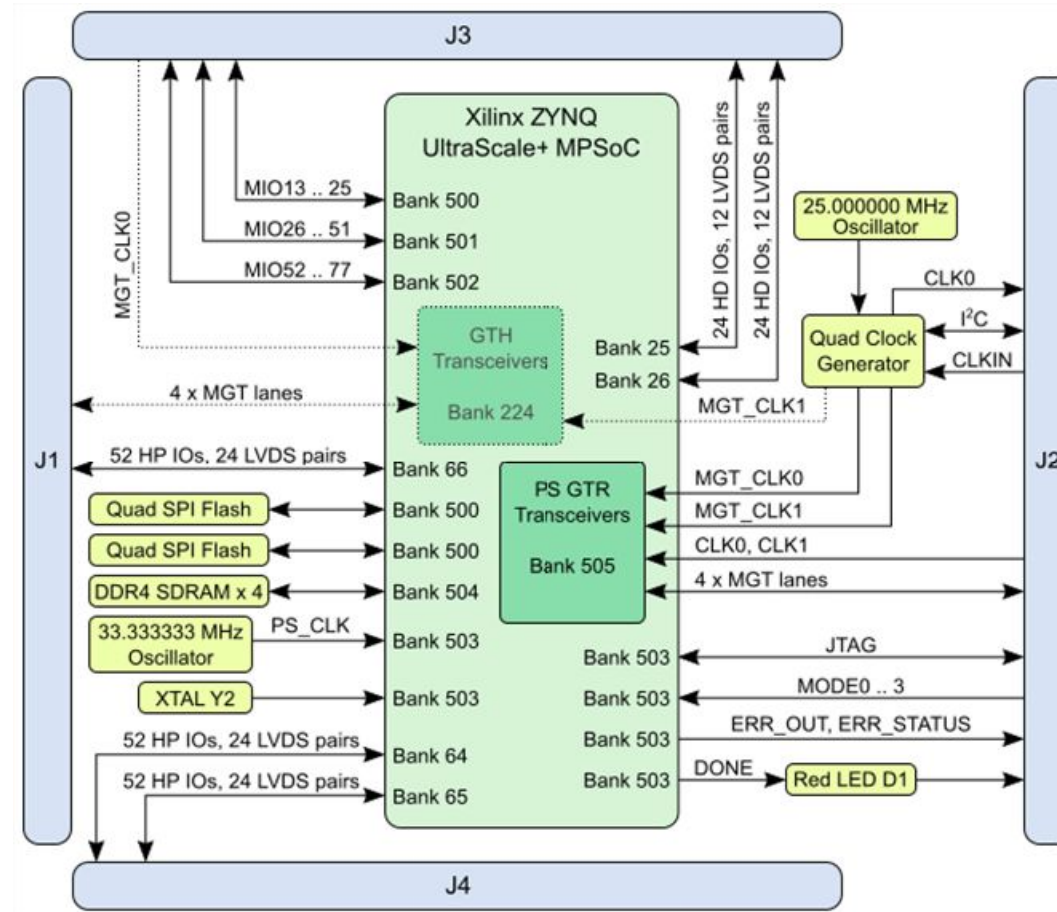



Regarding the usage of our schematics and alike documentation for Trenz module TE0803.

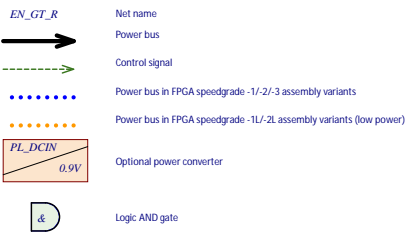
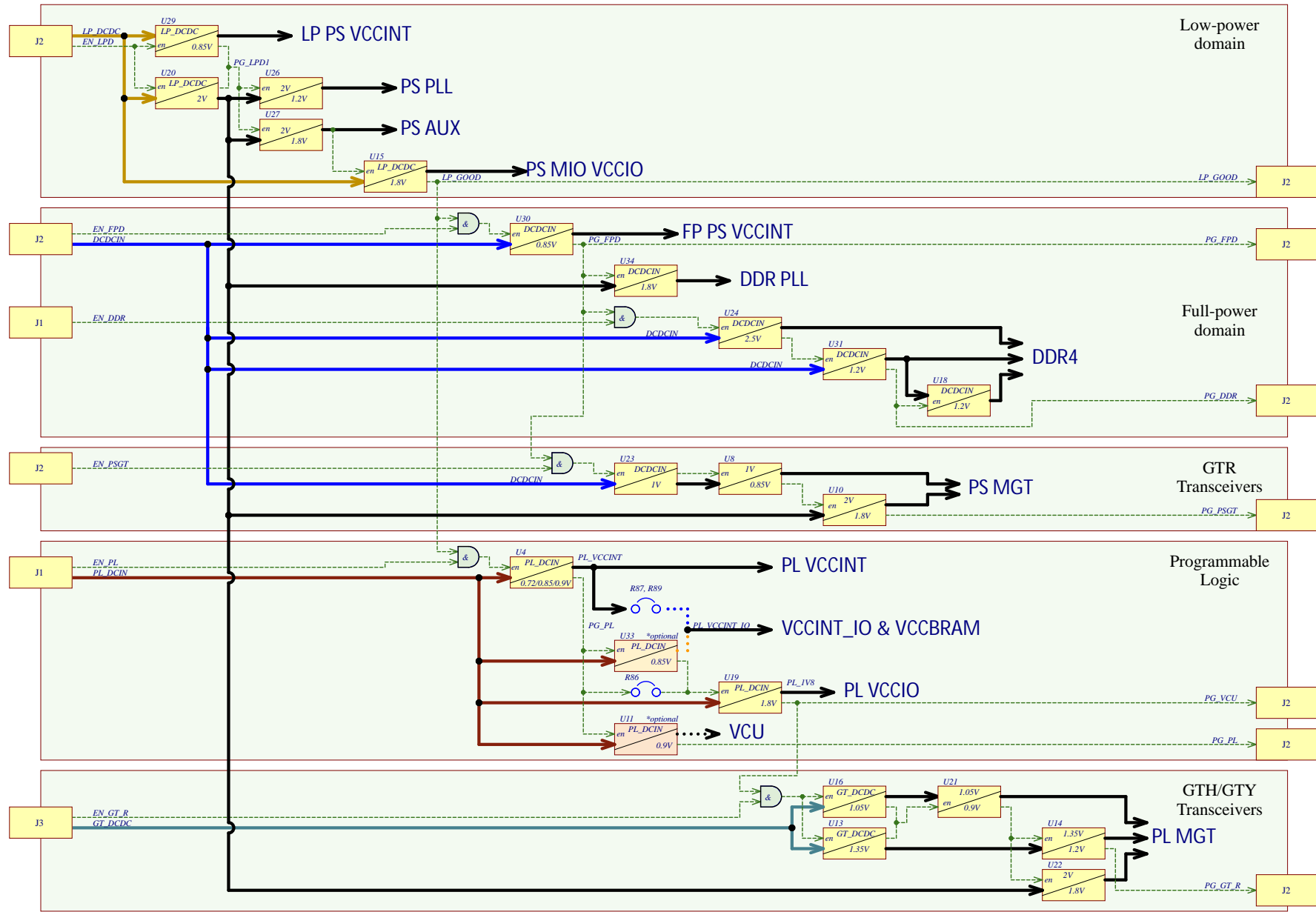
Project is protected under copyright and we strongly and strictly prohibit the reverse engineering or recreation, even if the design is just adapted or modified. TE0803 is protected under such right and in case of plagiarism we will have to do anything necessary in order to protect our assets.

Schematics and other handouts serve for informational purposes only!

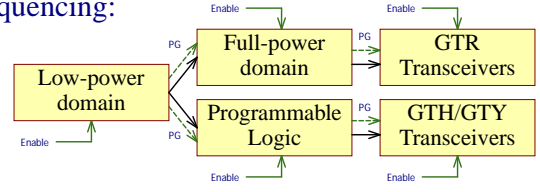
	Title: <b>TE0803</b>		
	A4	Number: <b>TE0803 4BE21-L</b>	Rev. <b>04</b>
	Date: <b>2021-01-19</b>	Copyright: <b>Trenz Electronic GmbH / TT</b>	Page <b>1</b> of <b>30</b>
	Filename: <b>Legal Notices Modules.SchDoc</b>		



		Title: TE0803 - System Overview	
		A4	Number: TE0803 4BE21-L
Date: 2021-01-19		Copyright: 2015 Trenz Electronic GmbH	
Filename: TE0803-Overview.SchDoc		Page 2 of 30	



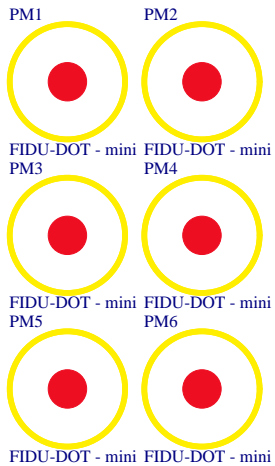
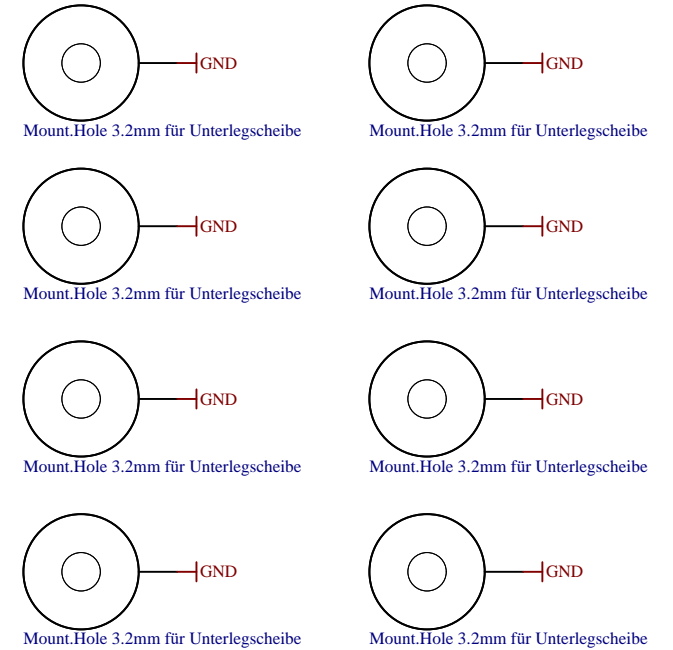
**Power-on sequencing:**



Title: TE0803 - Power Diagram		
A3	Number: TE0803 4BE21-L	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

Serial  
Serial  
Serialnumber 6,3 x 6.3mm

Assembly variant 4BE21-L  
Created by  
Modified by  
Modified at  
SVN Revision 11196



Title: TE0803		
A4	Number: TE0803 4BE21-L	Rev. 04
Date: 2021-01-19	Copyright: Trenz Electronic GmbH / TT	Page4 of 30
Filename: TE0803.SchDoc		

1

2

3

4

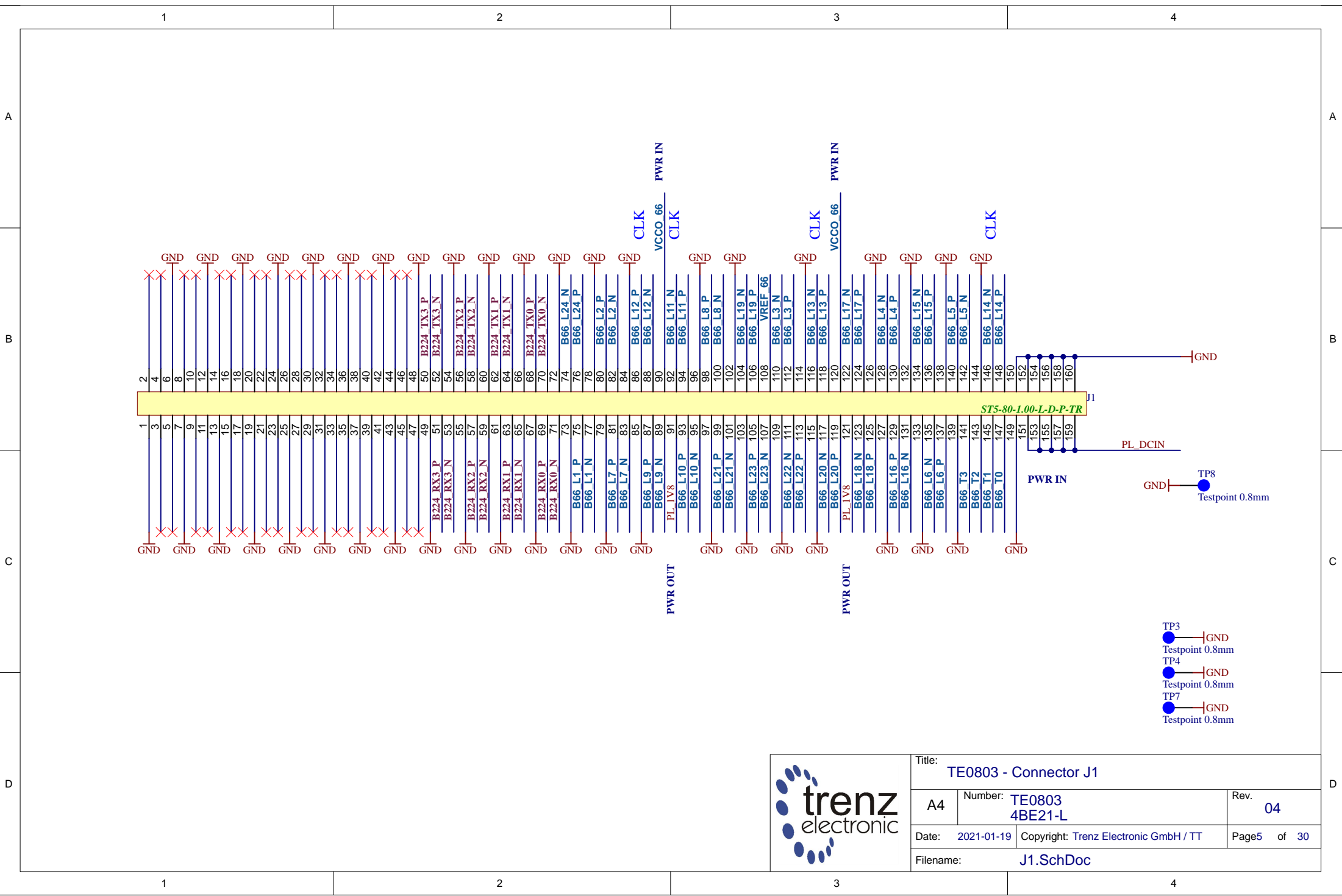
1


2

3

4





	Title: TE0803 - Connector J1		
	A4	Number: TE0803 4BE21-L	Rev. 04
	Date: 2021-01-19	Copyright: Trenz Electronic GmbH / TT	Page5 of 30
	Filename: J1.SchDoc		

1

2

3

4

A

A

B

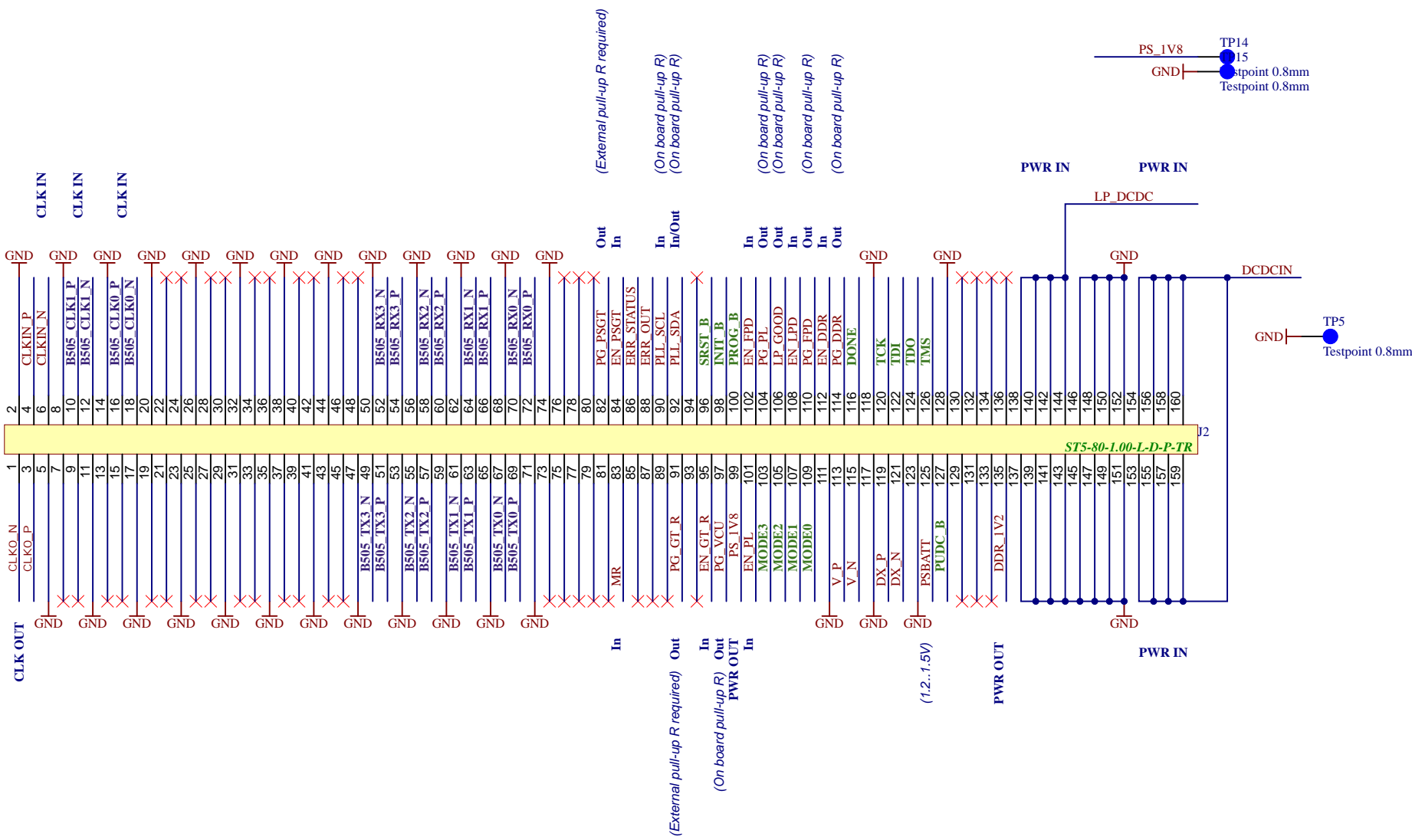
B

C

C

D

D



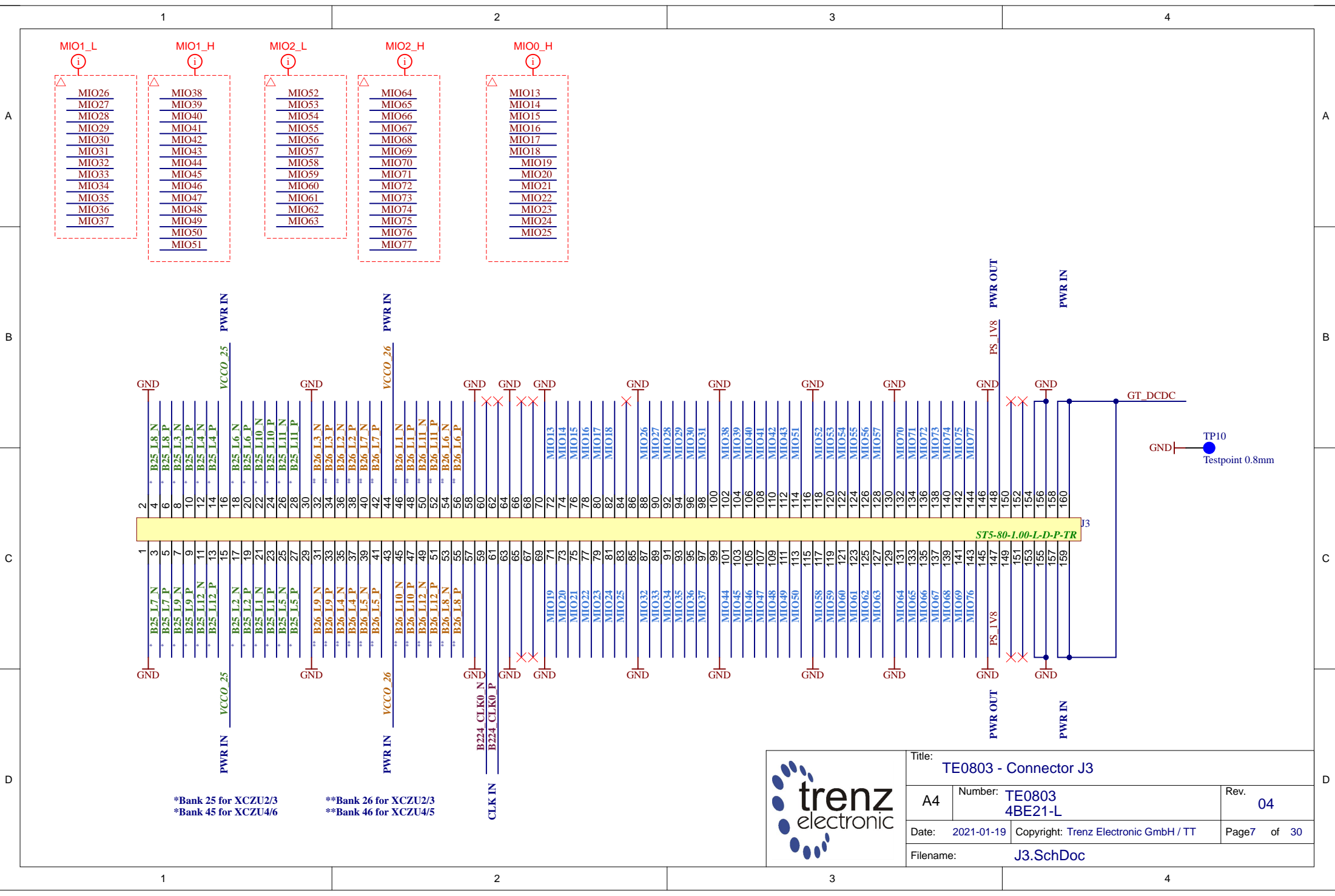
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A4	Number: TE0803 4BE21-L	Rev. 04
Date: 2021-01-19	Copyright: Trenz Electronic GmbH / TT	Page 6 of 30
Filename: J2.SchDoc		

1

2

3

4



- MIO1\_L**
  - MIO26
  - MIO27
  - MIO28
  - MIO29
  - MIO30
  - MIO31
  - MIO32
  - MIO33
  - MIO34
  - MIO35
  - MIO36
  - MIO37
- MIO1\_H**
  - MIO38
  - MIO39
  - MIO40
  - MIO41
  - MIO42
  - MIO43
  - MIO44
  - MIO45
  - MIO46
  - MIO47
  - MIO48
  - MIO49
  - MIO50
  - MIO51
- MIO2\_L**
  - MIO52
  - MIO53
  - MIO54
  - MIO55
  - MIO56
  - MIO57
  - MIO58
  - MIO59
  - MIO60
  - MIO61
  - MIO62
  - MIO63
- MIO2\_H**
  - MIO64
  - MIO65
  - MIO66
  - MIO67
  - MIO68
  - MIO69
  - MIO70
  - MIO71
  - MIO72
  - MIO73
  - MIO74
  - MIO75
  - MIO76
  - MIO77
- MIO0\_H**
  - MIO13
  - MIO14
  - MIO15
  - MIO16
  - MIO17
  - MIO18
  - MIO19
  - MIO20
  - MIO21
  - MIO22
  - MIO23
  - MIO24
  - MIO25

\*Bank 25 for XCZU2/3  
 \*Bank 45 for XCZU4/6  
 \*\*Bank 26 for XCZU2/3  
 \*\*Bank 46 for XCZU4/5



Title: TE0803 - Connector J3		
A4	Number: TE0803 4BE21-L	Rev. 04
Date: 2021-01-19	Copyright: Trenz Electronic GmbH / TT	Page7 of 30
Filename: J3.SchDoc		

1

2

3

4

A

A

B

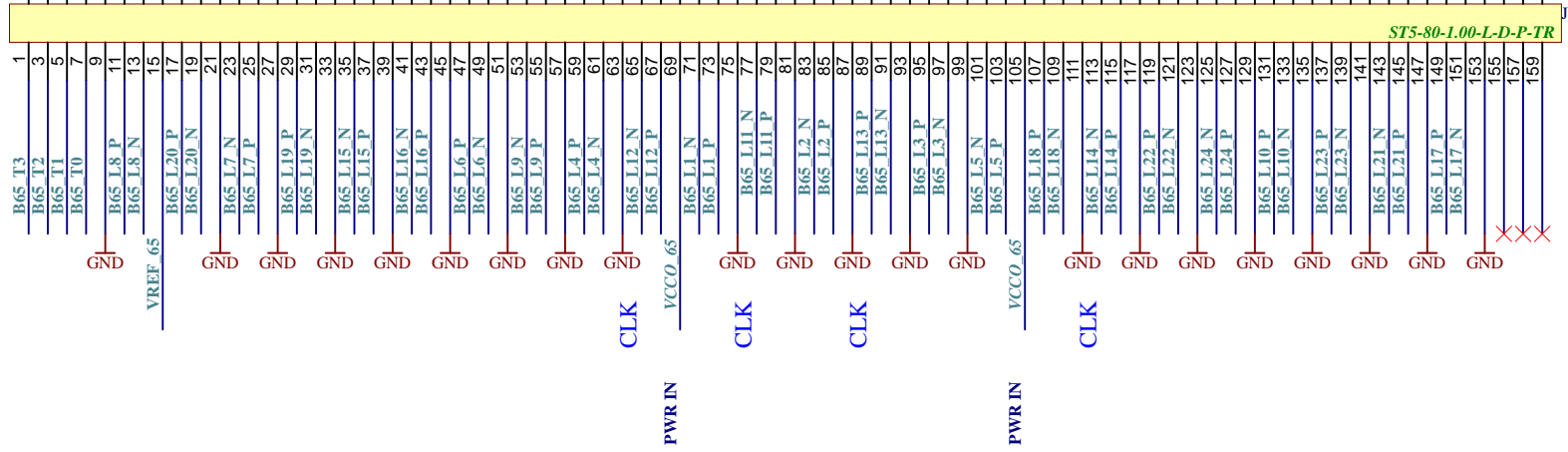
B

C

C

D

D



ST5-80-1.00-L-D-P-TR



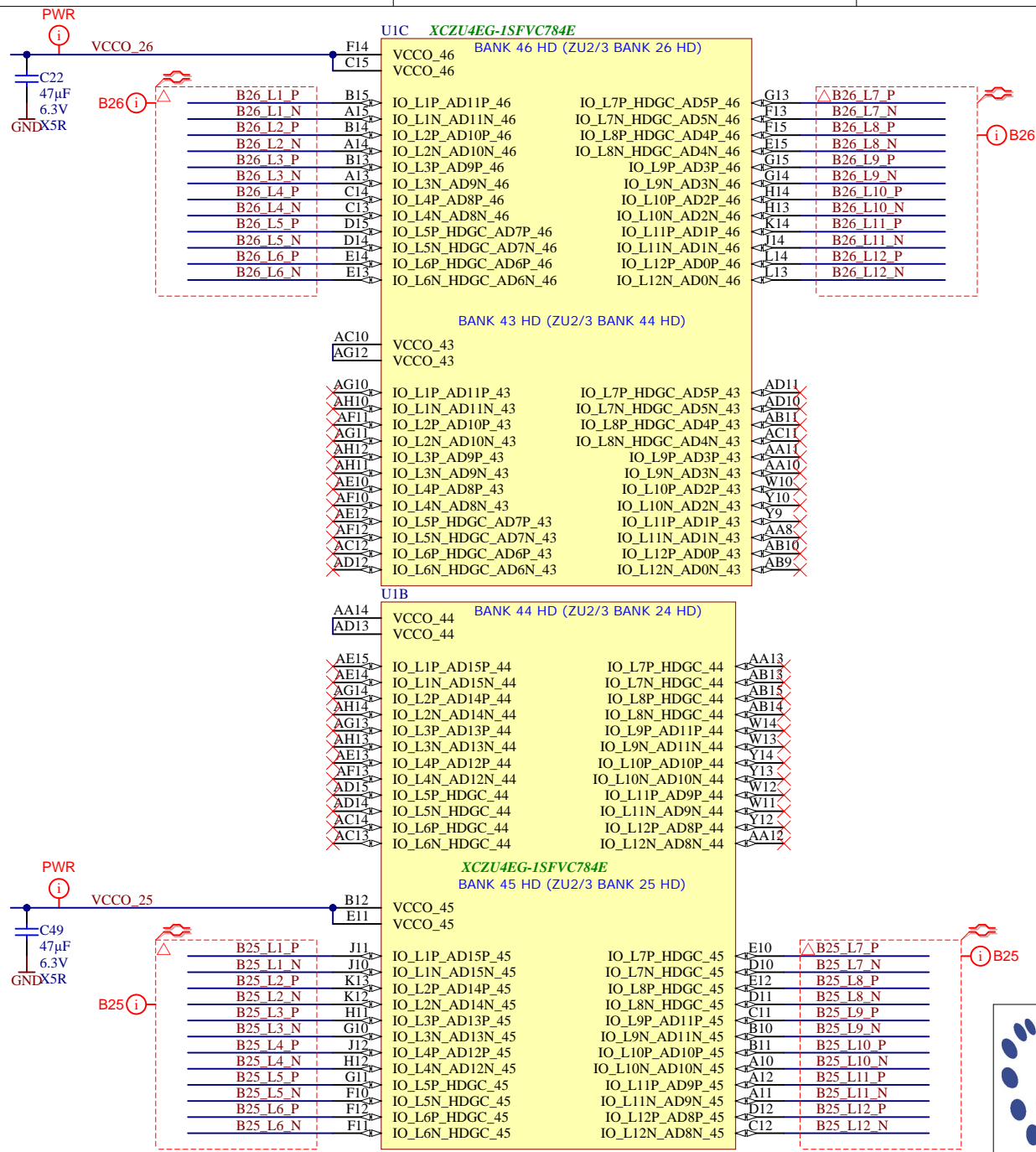
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A4	Number: TE0803 4BE21-L	Rev. 04
Date: 2021-01-19	Copyright: Trenz Electronic GmbH / TT	Page8 of 30
Filename: J4.SchDoc		

1

2

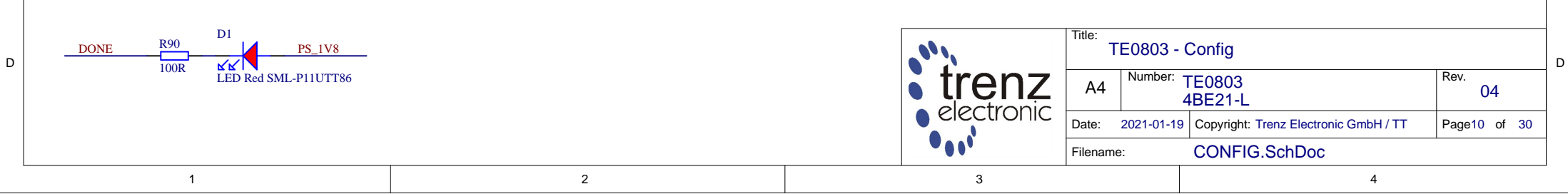
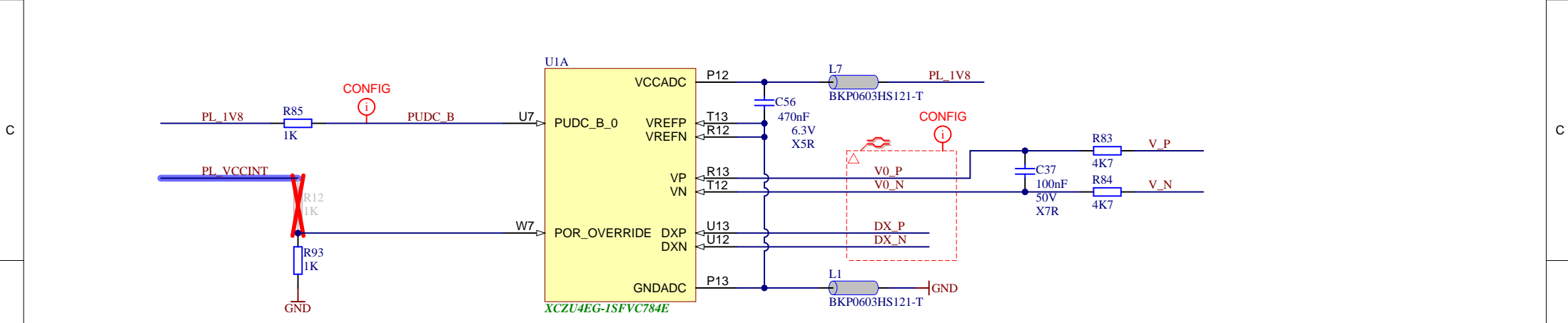
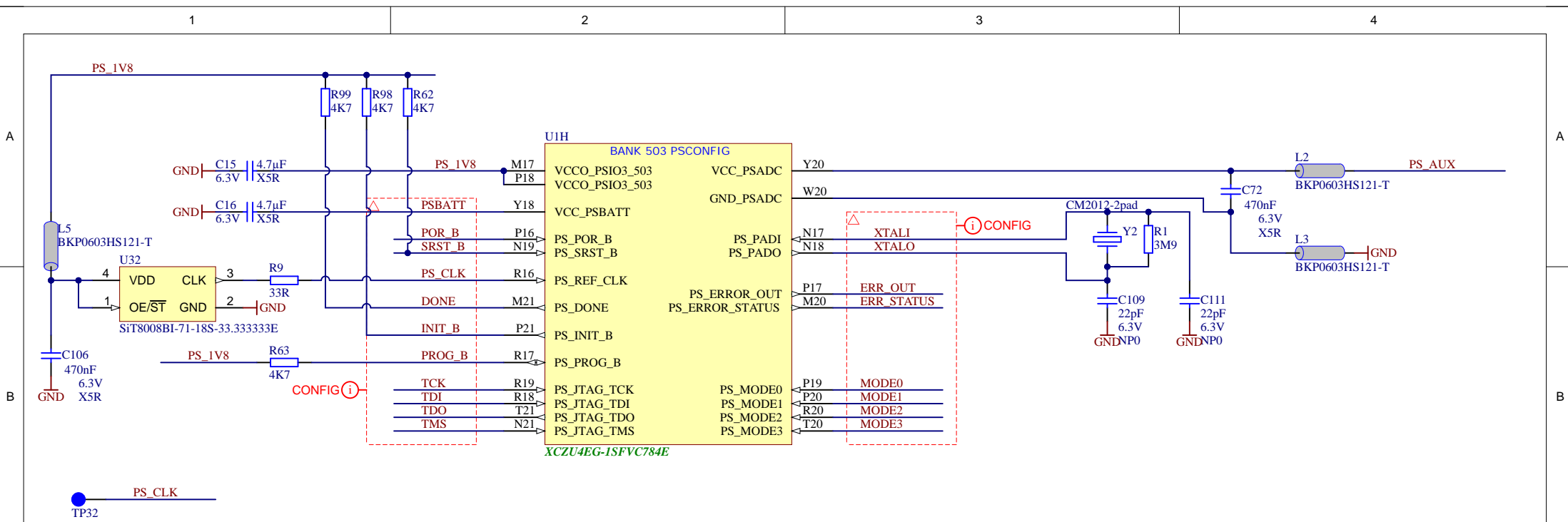
3

4

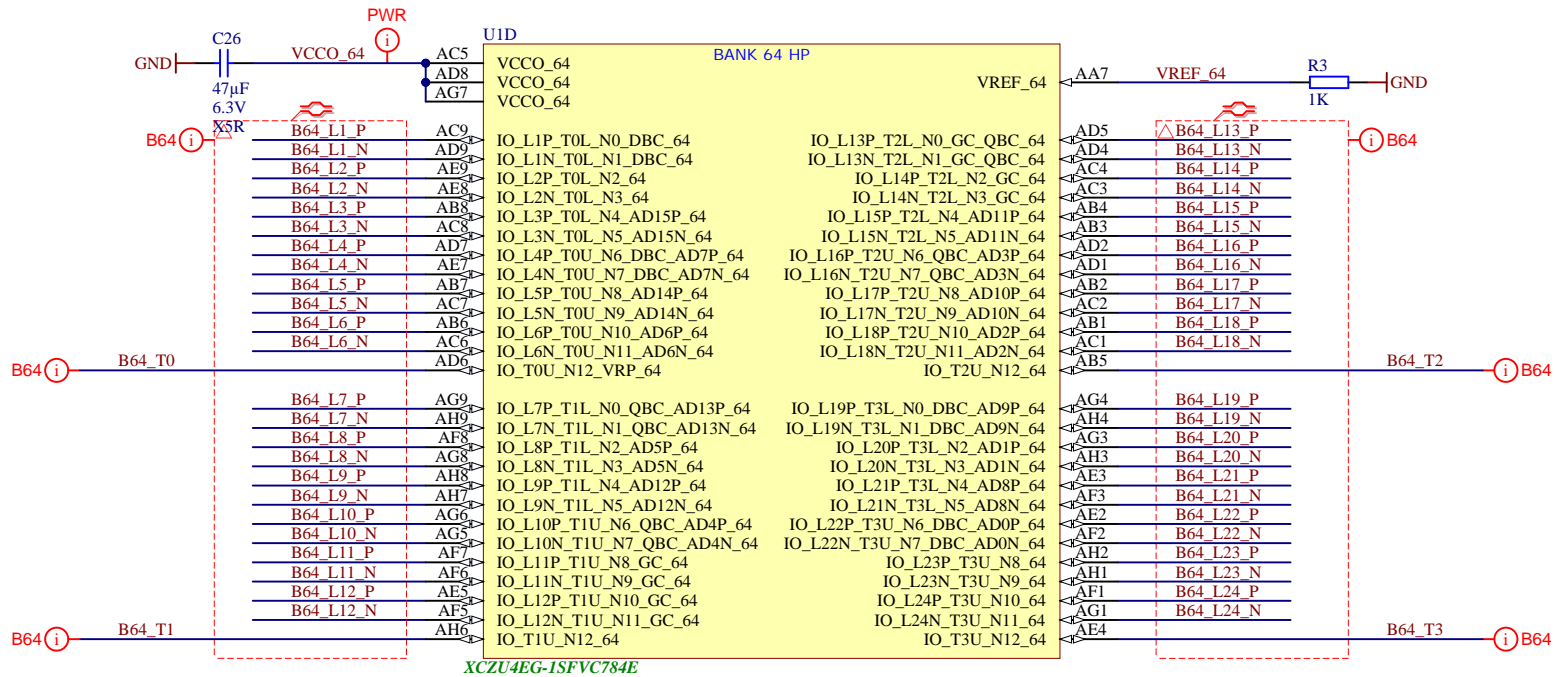


Title: <b>TE0803 - HD Banks</b>		
A4	Number: <b>TE0803 4BE21-L</b>	Rev. <b>04</b>
Date: <b>2021-01-19</b>	Copyright: <b>Trenz Electronic GmbH / TT</b>	Page <b>9</b> of <b>30</b>
Filename: <b>B_HD.SchDoc</b>		

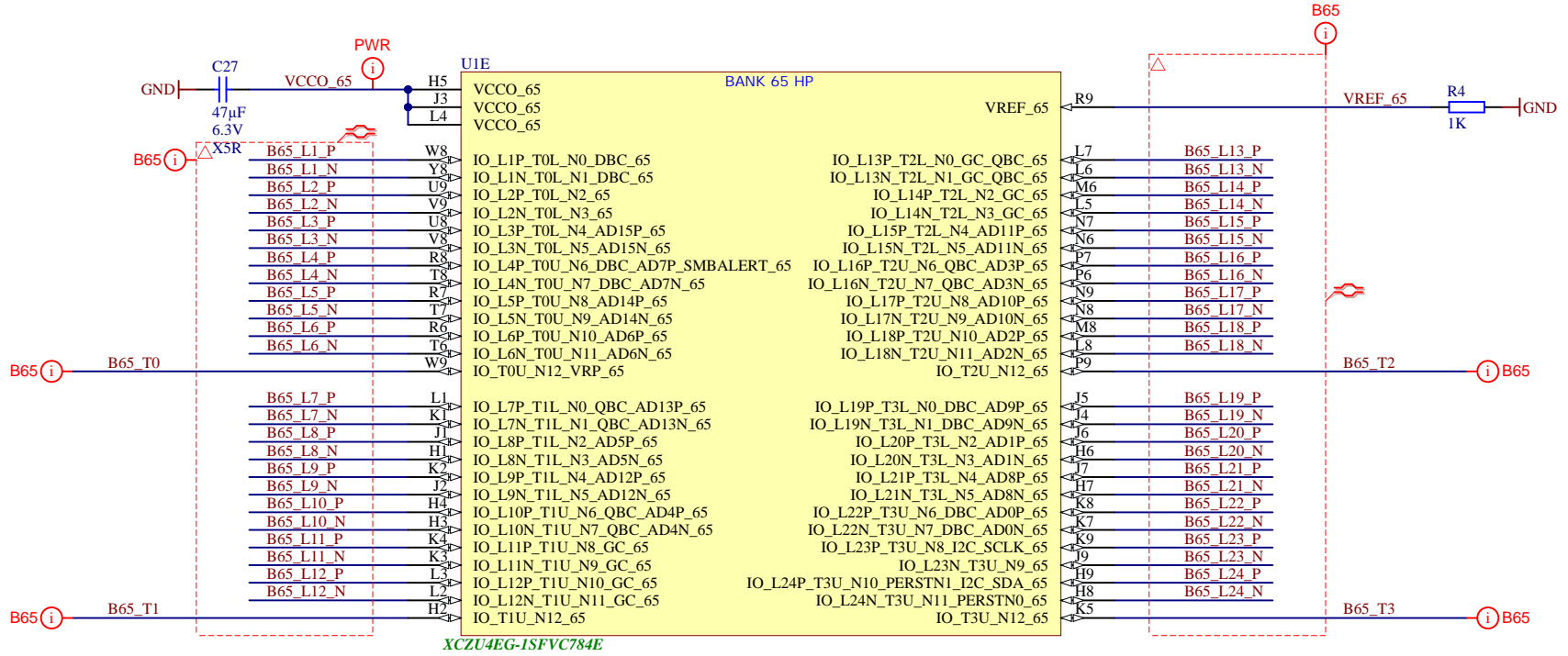




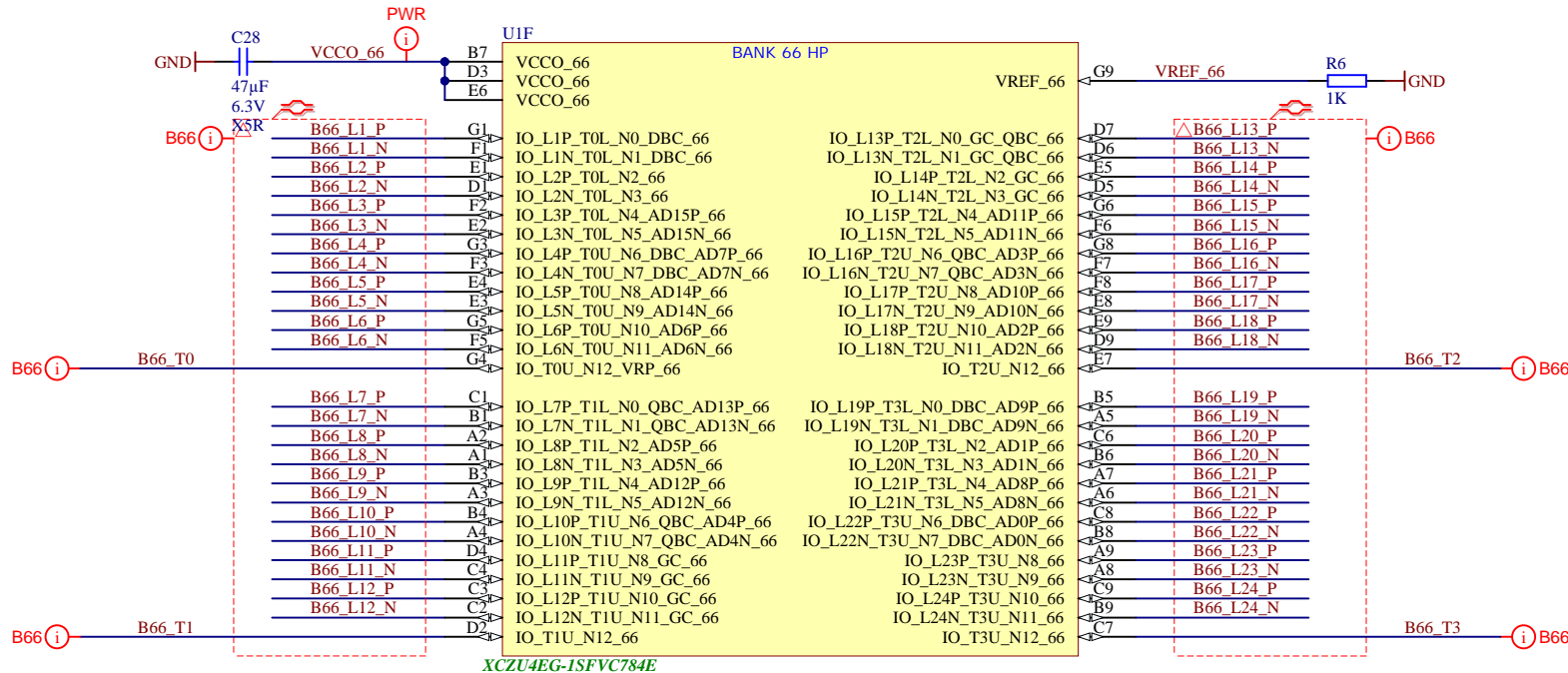
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A4	Number: TE0803 4BE21-L	Rev. 04
Date: 2021-01-19	Copyright: Trenz Electronic GmbH / TT	Page 10 of 30
Filename: CONFIG.SchDoc		



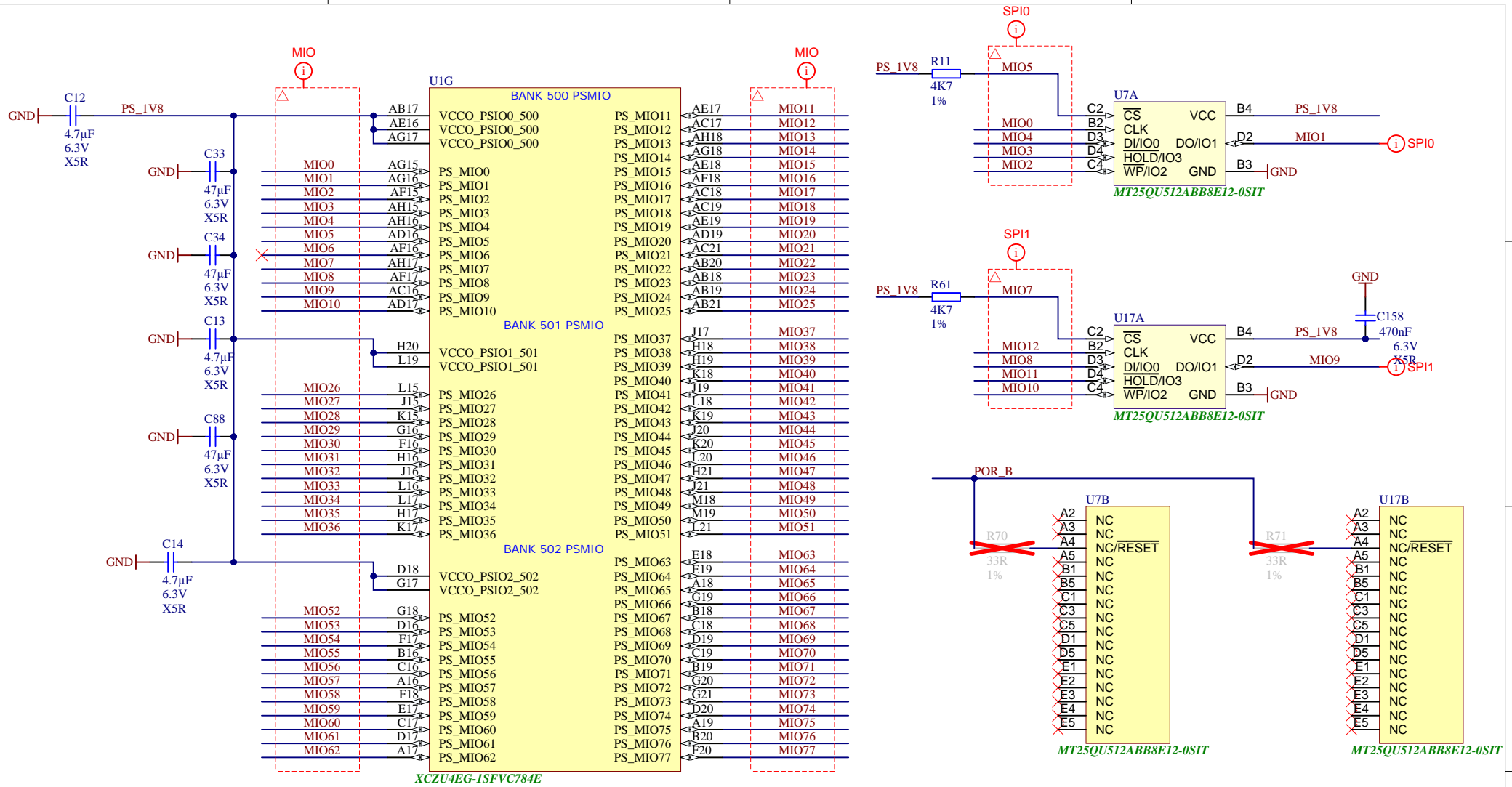
Title: <b>TE0803 - B64</b>		
A4	Number: <b>TE0803 4BE21-L</b>	Rev. <b>04</b>
Date: <b>2021-01-19</b>	Copyright: <b>Trenz Electronic GmbH / TT</b>	Page <b>11</b> of <b>30</b>
Filename: <b>B64.SchDoc</b>		



Title: TE0803 - B65			
A4	Number: TE0803 4BE21-L	Rev. 04	
Date: 2021-01-19	Copyright: Trenz Electronic GmbH / TT	Page 12 of 30	
Filename: B65.SchDoc			



	Title: TE0803 - B66		
	A4	Number: TE0803 4BE21-L	Rev. 04
	Date: 2021-01-19	Copyright: Trenz Electronic GmbH / TT	Page13 of 30
	Filename: B66.SchDoc		



			Title: <b>TE0803 - MIO Banks</b>	
			A4	Number: <b>TE0803 4BE21-L</b>
Date: <b>2021-01-19</b>		Copyright: <b>Trenz Electronic GmbH / TT</b>		Page <b>14</b> of <b>30</b>
Filename: <b>B_MIO.SchDoc</b>				



A

B

C

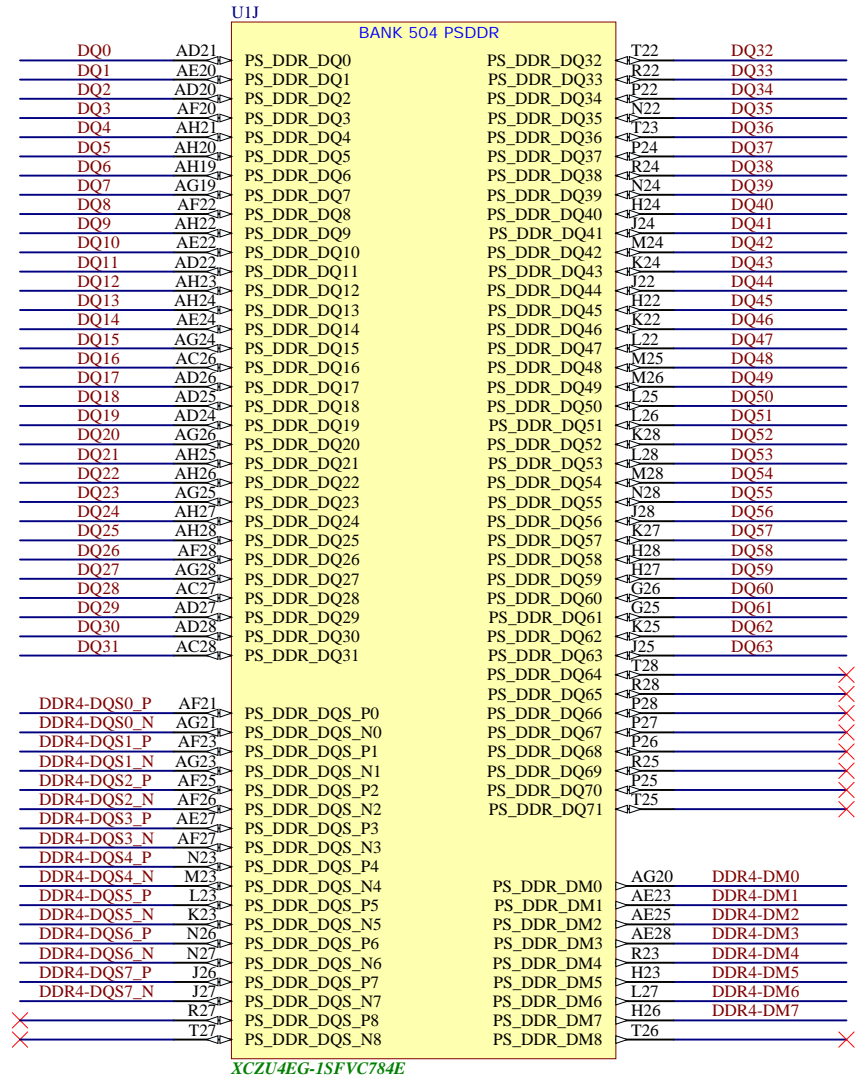
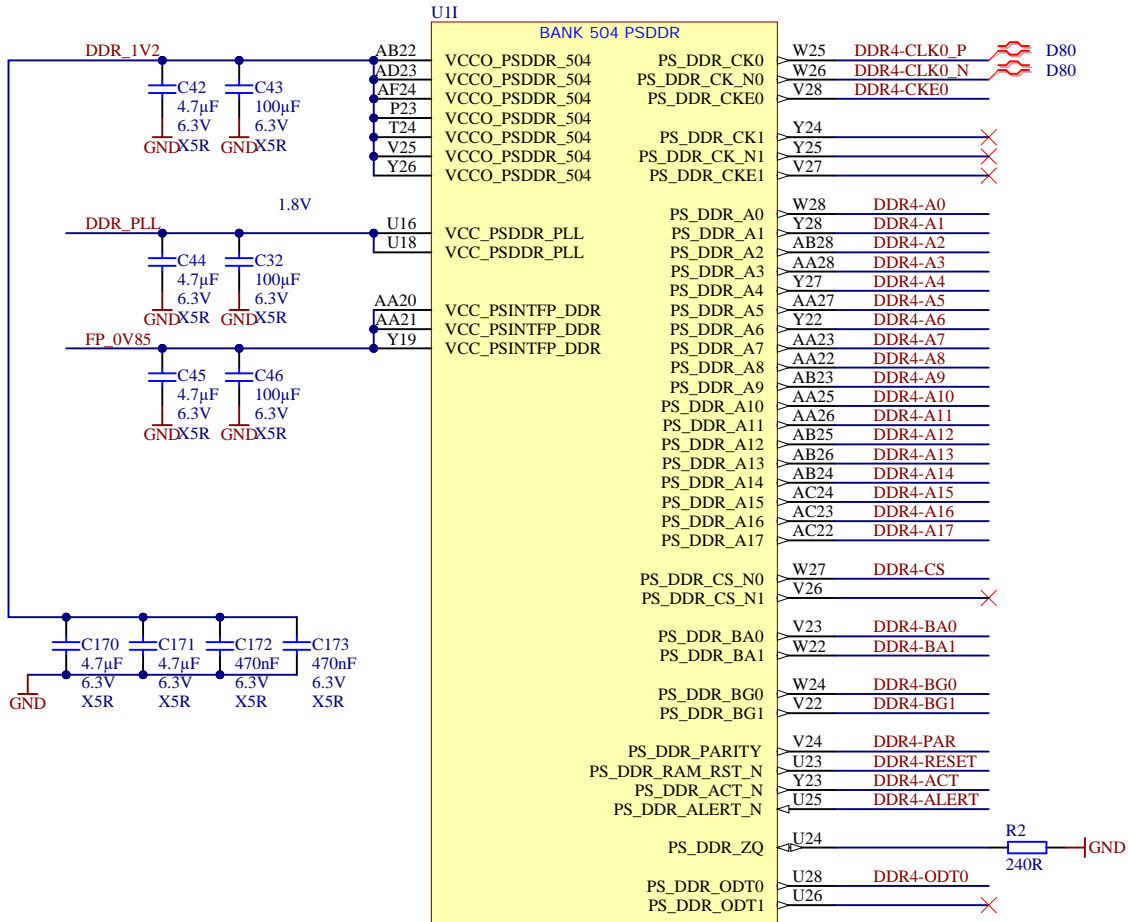
D

A

B

C

D



Title: TE0803 - PS_DDR		
A4	Number: TE0803 4BE21-L	Rev. 04
Date: 2021-01-19	Copyright: Trenz Electronic GmbH / TT	Page 15 of 30
Filename: PS_DDR.SchDoc		

1

2

3

4

A

A

B

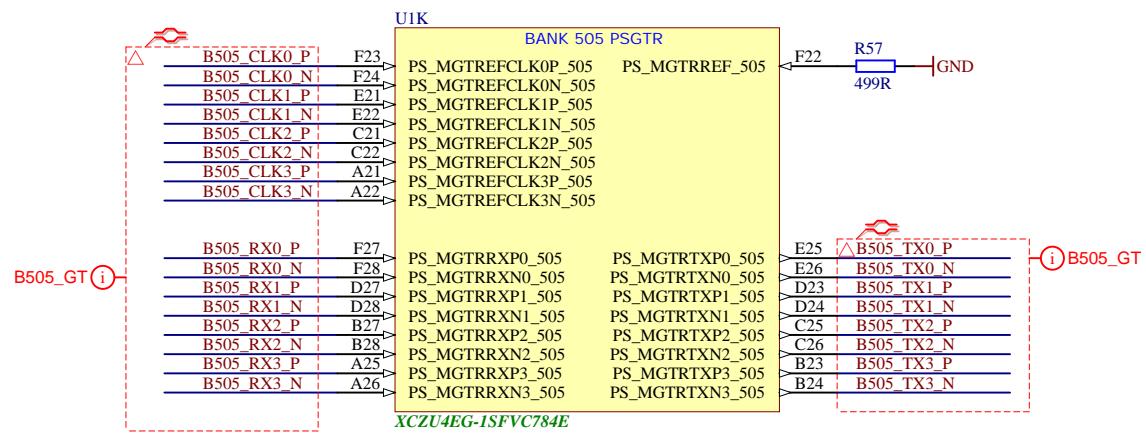
B


C

C

D

D



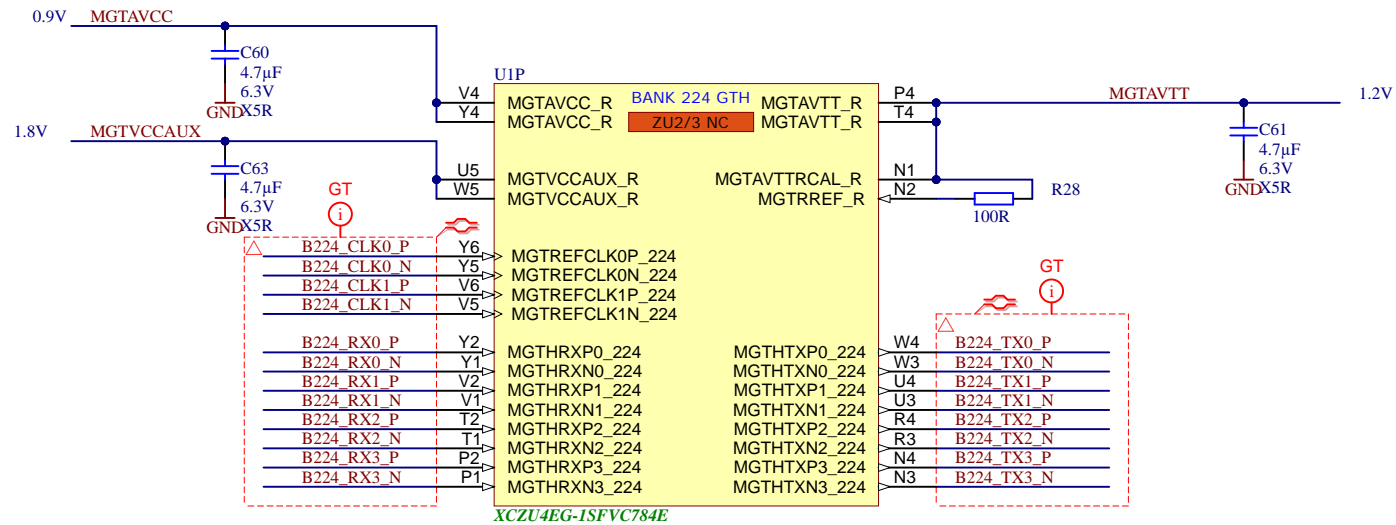
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		A4	Number: TE0803 4BE21-L
Date: 2021-01-19		Copyright: Trenz Electronic GmbH / TT	
Date: 2021-01-19		Page 16 of 30	
Filename: B_PS_GT.SchDoc			


1

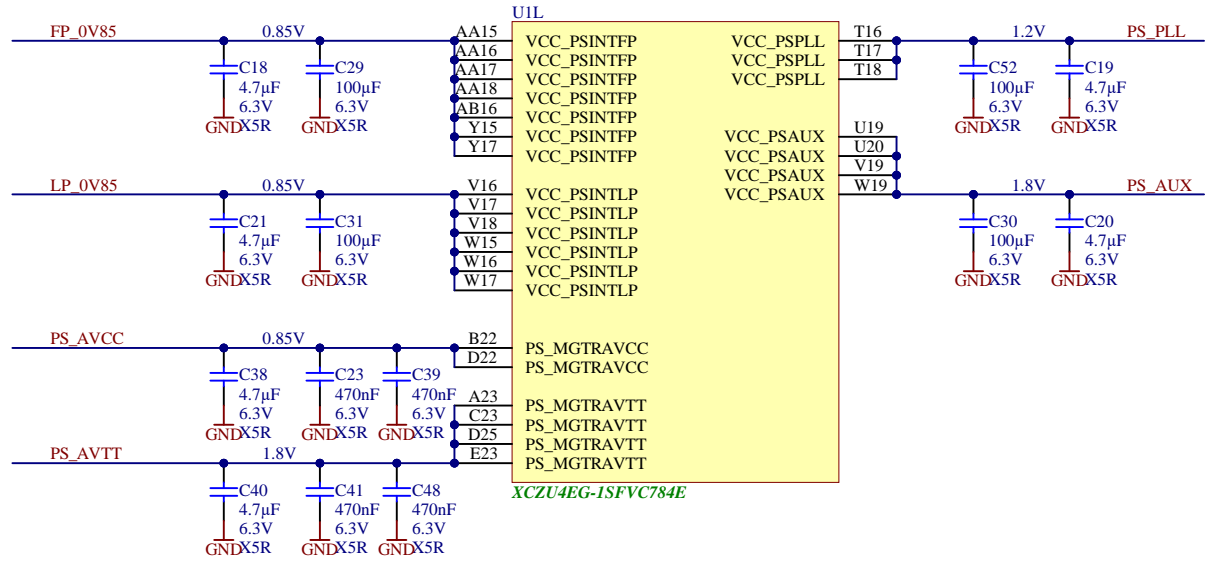
2

3

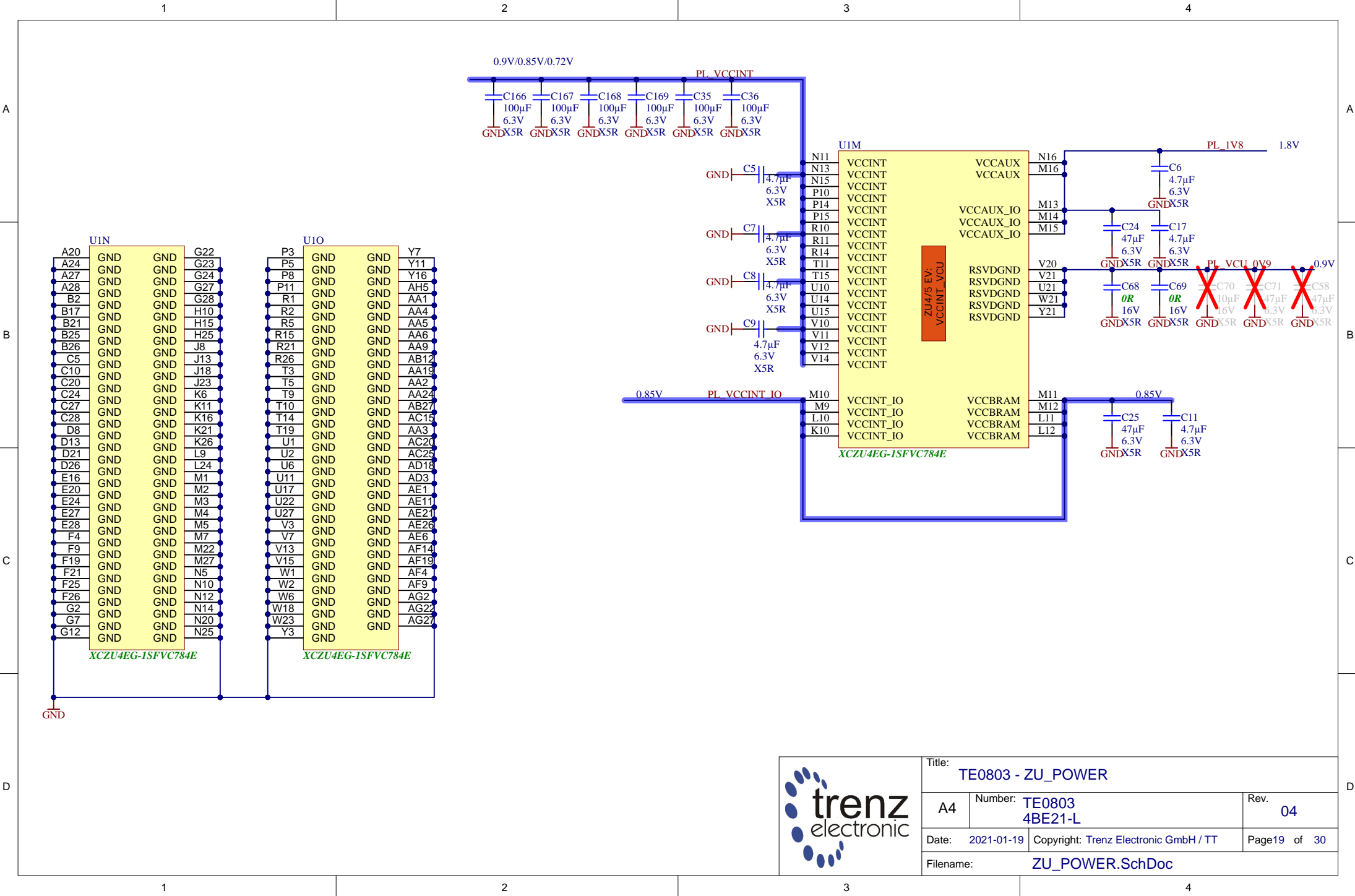
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		Title: TE0803 - B224GTH	
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Date: 2021-01-19		Copyright: Trenz Electronic GmbH / TT	
Filename: B_GT.SchDoc		Page 17 of 30	

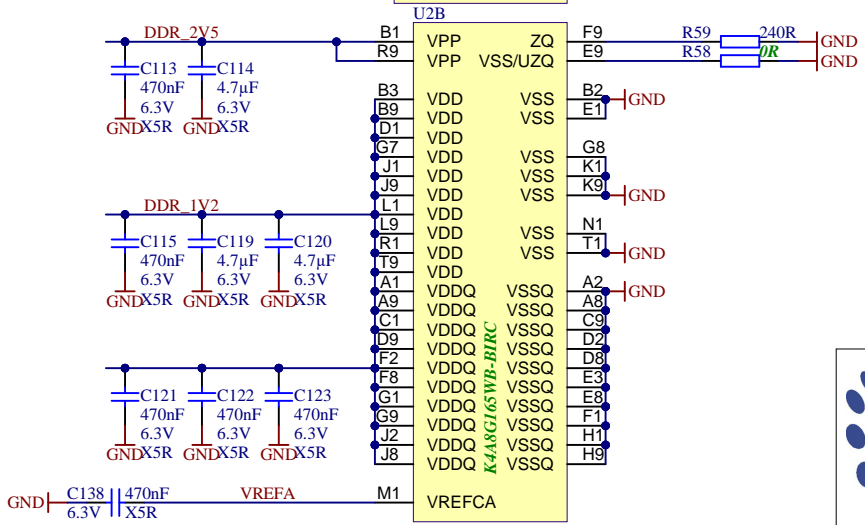
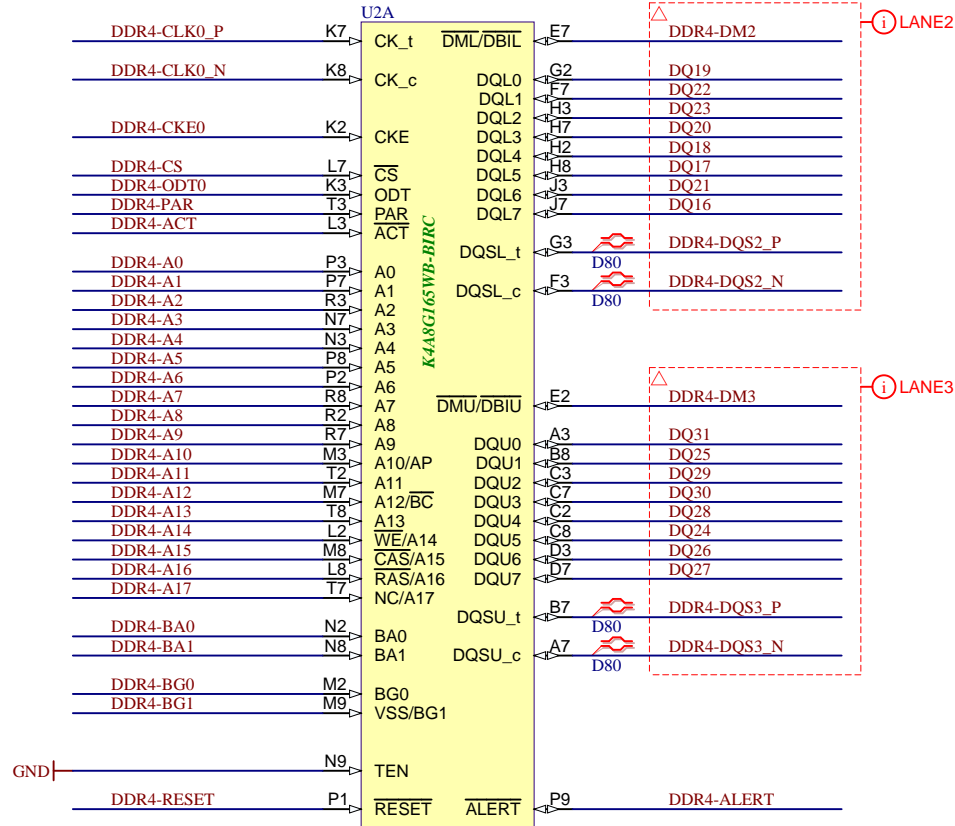


Title: TE0803 - ZU_PS_POWER		
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Date: 2021-01-19	Copyright: Trenz Electronic GmbH / TT	Page 18 of 30
Filename: ZU_PS_POWER.SchDoc		

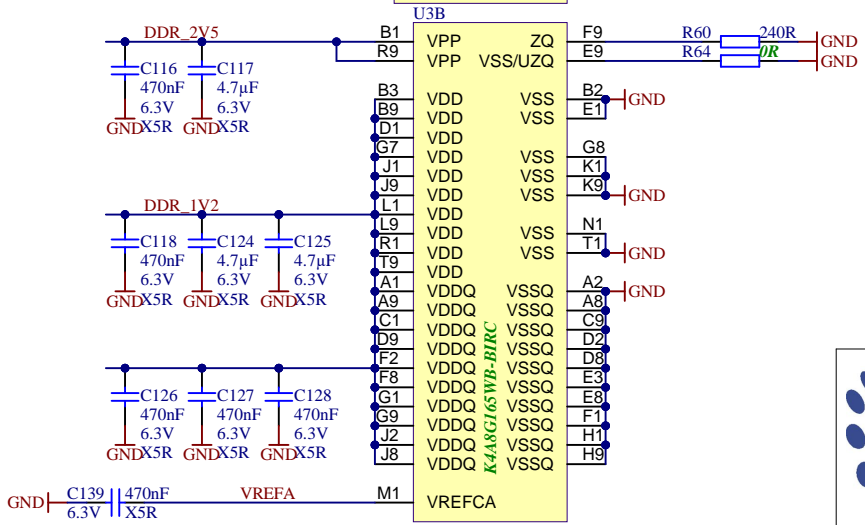
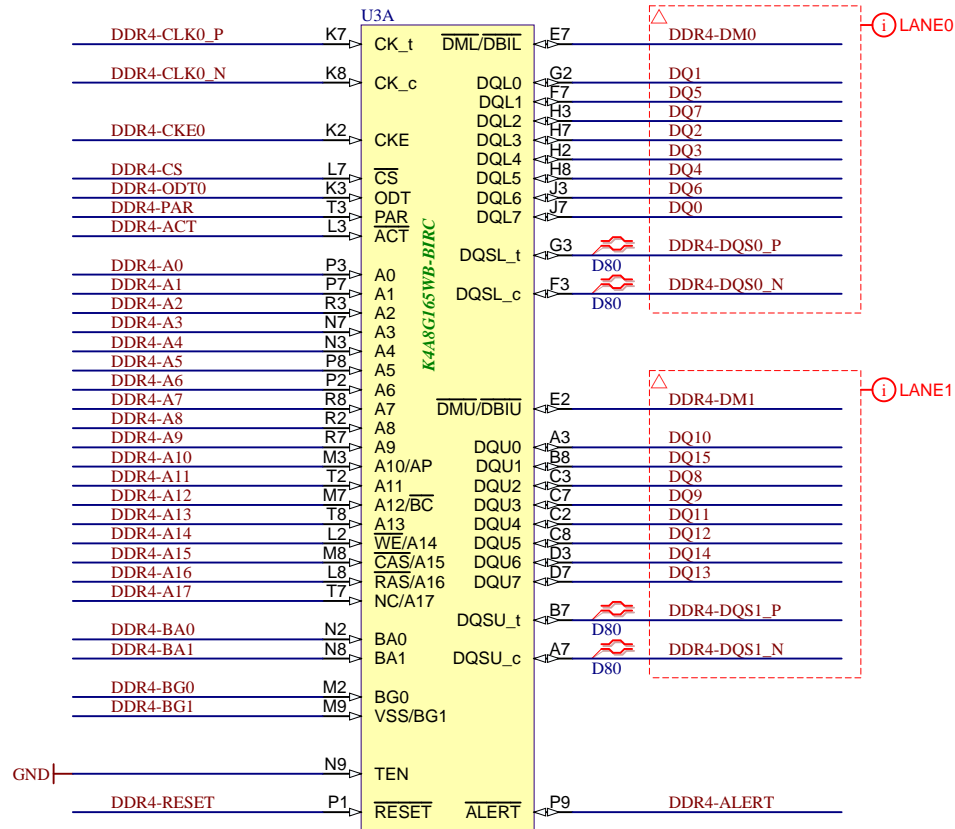


Title: TE0803 - ZU_POWER		
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Date: 2021-01-19	Copyright: Trenz Electronic GmbH / TT	Page 19 of 30
Filename: ZU_POWER.SchDoc		

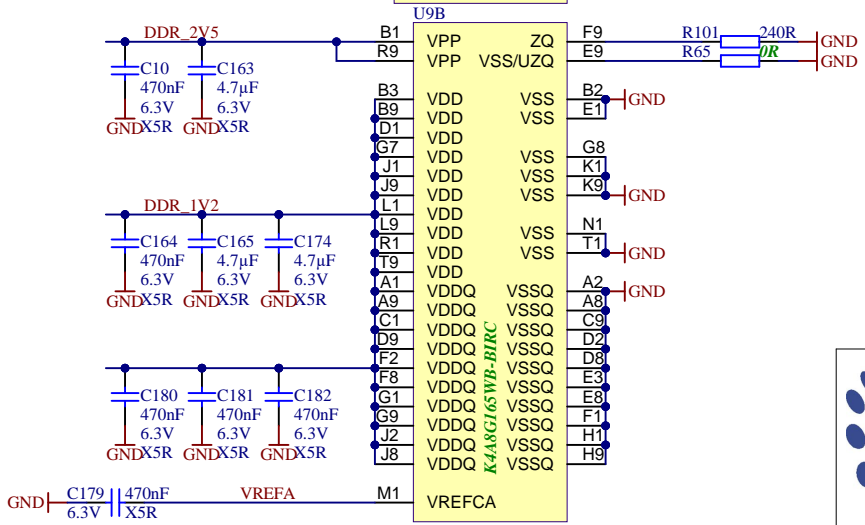
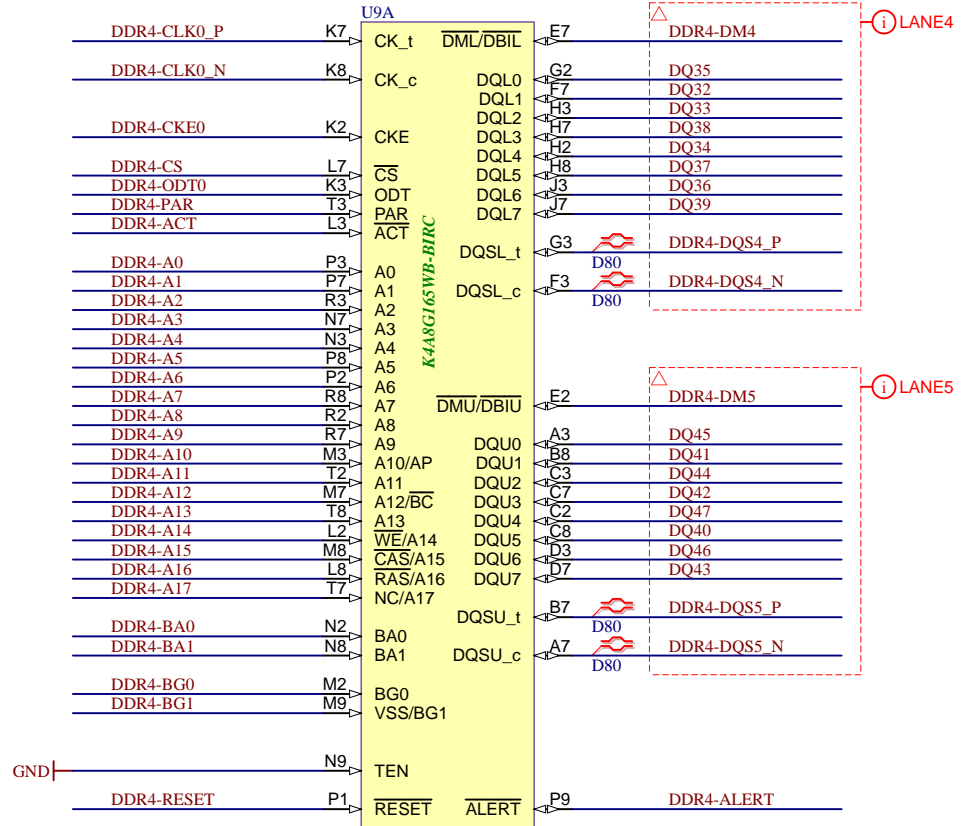




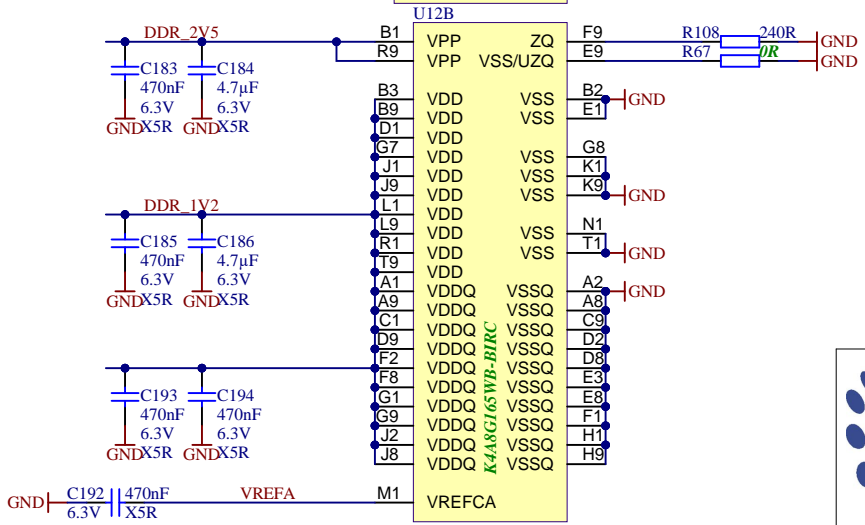
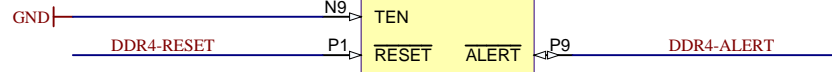
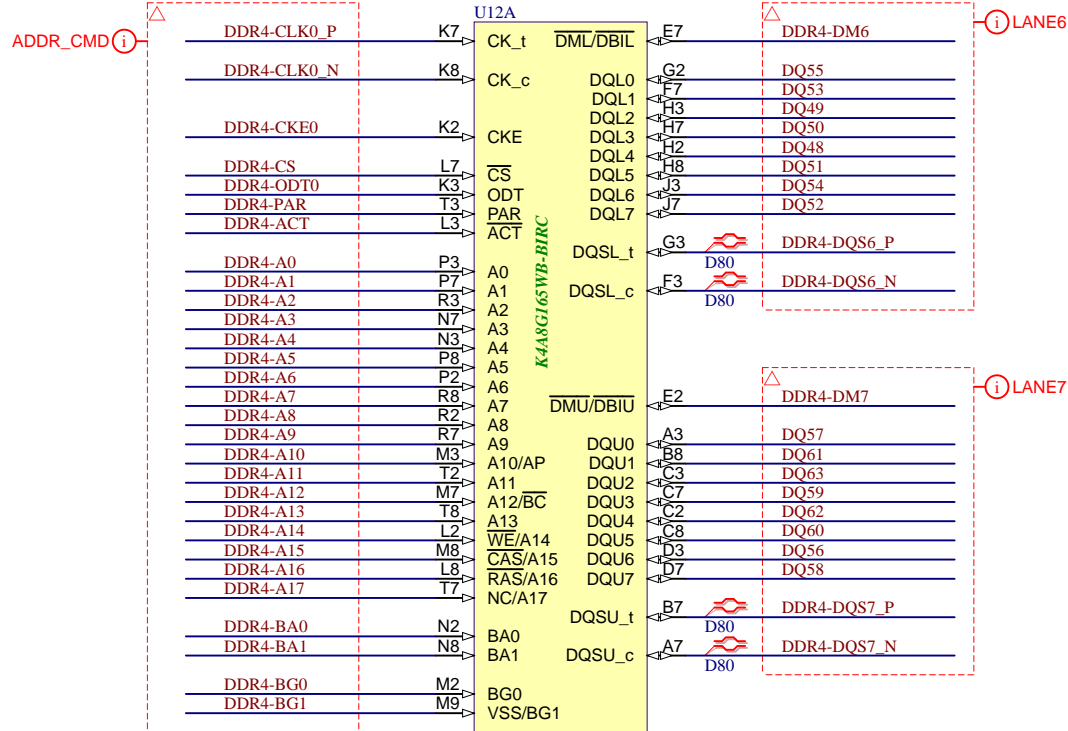
Title: TE0803 - DDR4_1_RAM		
A4	Number: TE0803 4BE21-L	Rev. 04
Date: 2021-01-19	Copyright: Trenz Electronic GmbH / TT	Page 20 of 30
Filename: DDR4-RAM.SchDoc		



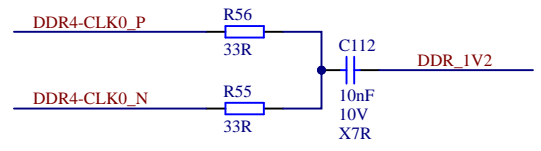
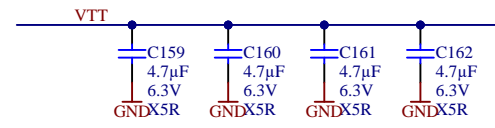
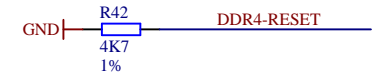
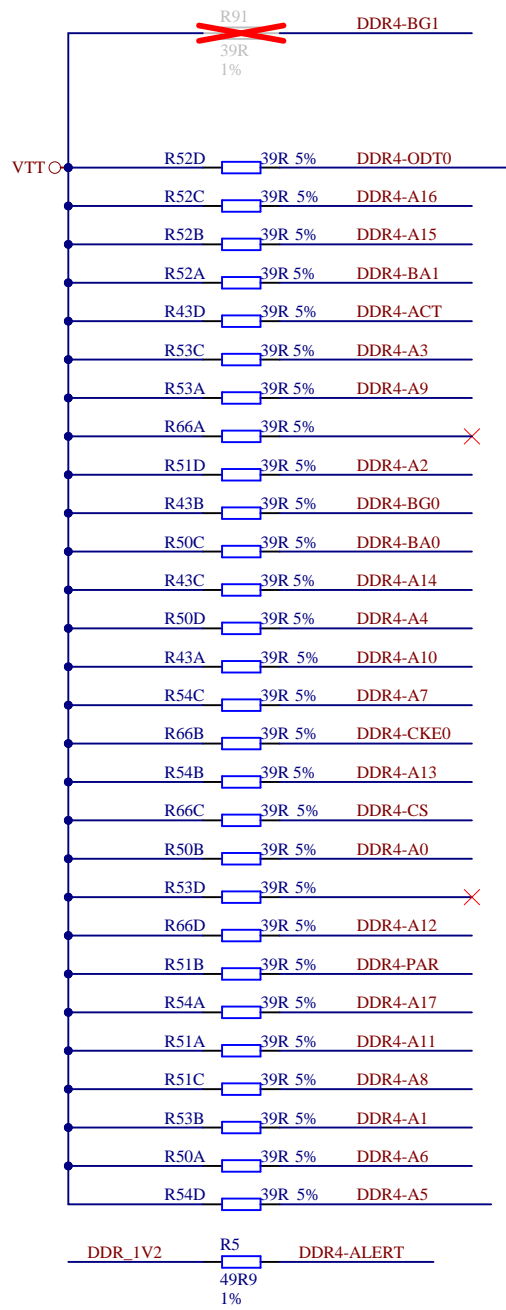
Title: TE0803 - DDR4_2_RAM		
A4	Number: TE0803 4BE21-L	Rev. 04
Date: 2021-01-19	Copyright: Trenz Electronic GmbH / TT	Page 21 of 30
Filename: DDR4-RAM_2.SchDoc		



Title: TE0803 - DDR4_3_RAM		
A4	Number: TE0803 4BE21-L	Rev. 04
Date: 2021-01-19	Copyright: Trenz Electronic GmbH / TT	Page22 of 30
Filename: DDR4-RAM_3.SchDoc		

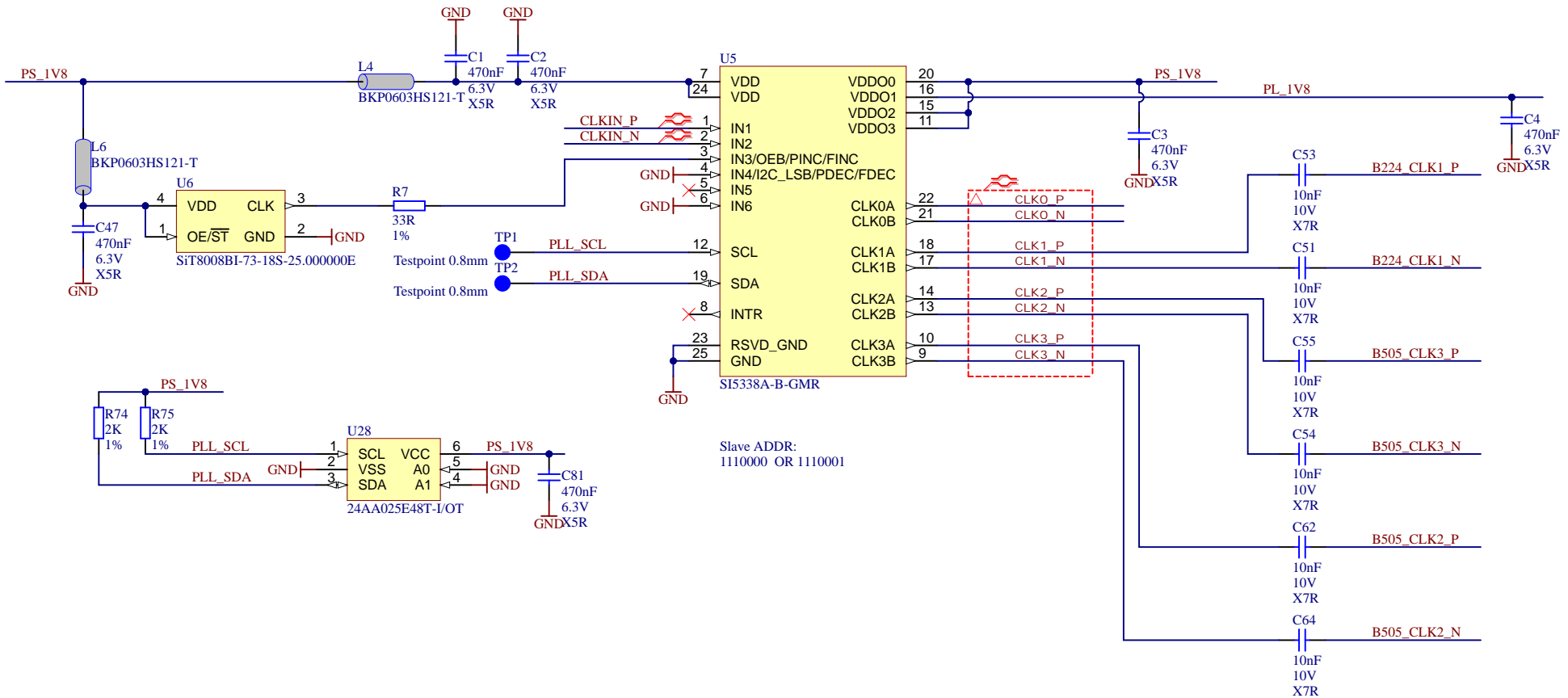



Title: TE0803 - DDR4_4_RAM		
A4	Number: TE0803 4BE21-L	Rev. 04
Date: 2021-01-19	Copyright: Trenz Electronic GmbH / TT	Page 23 of 30
Filename: DDR4-RAM_4.SchDoc		



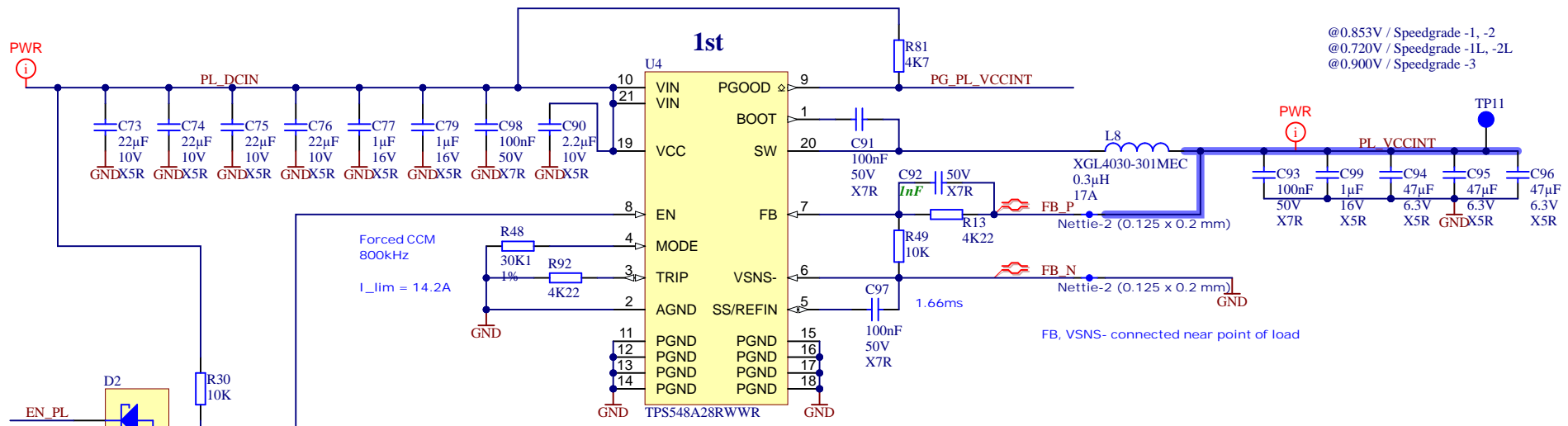
Title: TE0803 - DDR4_TERM		
A4	Number: TE0803 4BE21-L	Rev. 04
Date: 2021-01-19	Copyright: Trenz Electronic GmbH / TT	Page24 of 30
Filename: DDR4-TERM.SchDoc		





		Title: TE0803 - CLOCK	
		A4	Number: TE0803 4BE21-L
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

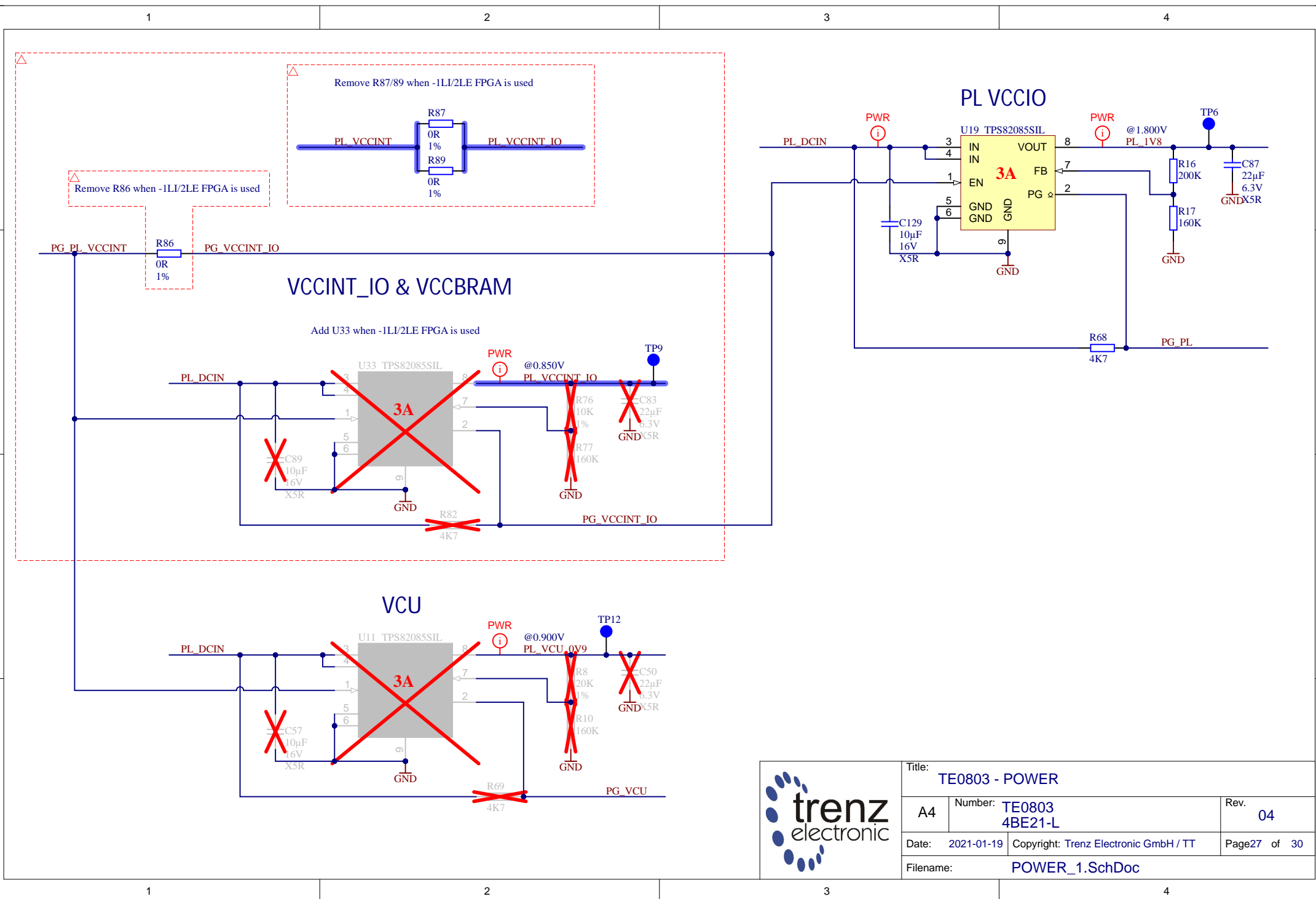
Forced CCM  
 800kHz  
 I\_lim = 14.2A

FB, VSNS- connected near point of load

FPGA Speed grade:		
-1L1 / -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  
 -- TPS548B28 (20A)  
 -- TPS54JA20 (12A)

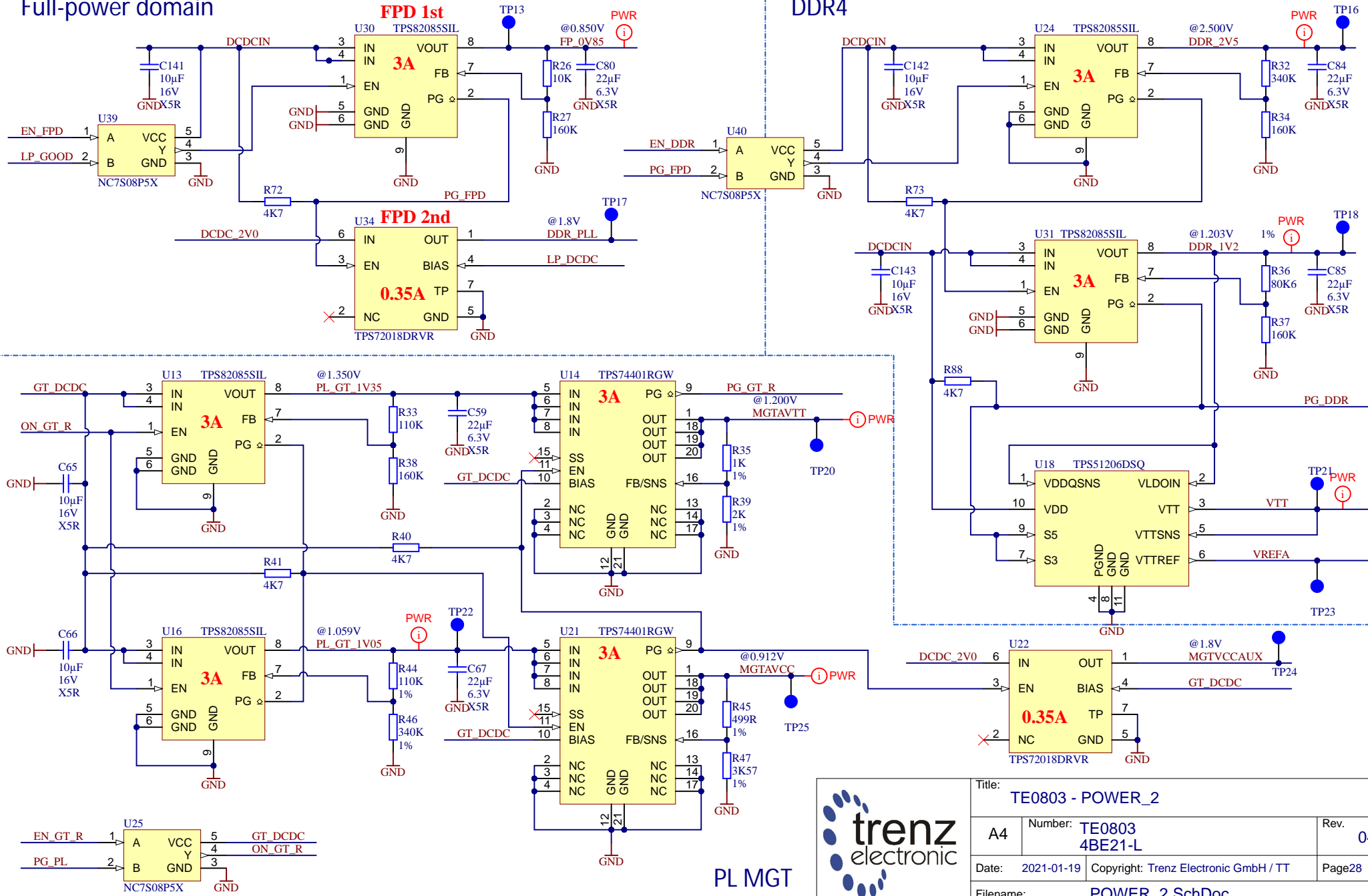
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	A4	Number: TE0803 4BE21-L
	Date: 2021-01-19	Rev. 04
	Copyright: Trenz Electronic GmbH / TT	Page 26 of 30
Filename: POWER.SchDoc		



Title: TE0803 - POWER		
A4	Number: TE0803 4BE21-L	Rev. 04
Date: 2021-01-19	Copyright: Trenz Electronic GmbH / TT	Page 27 of 30
Filename: POWER_1.SchDoc		

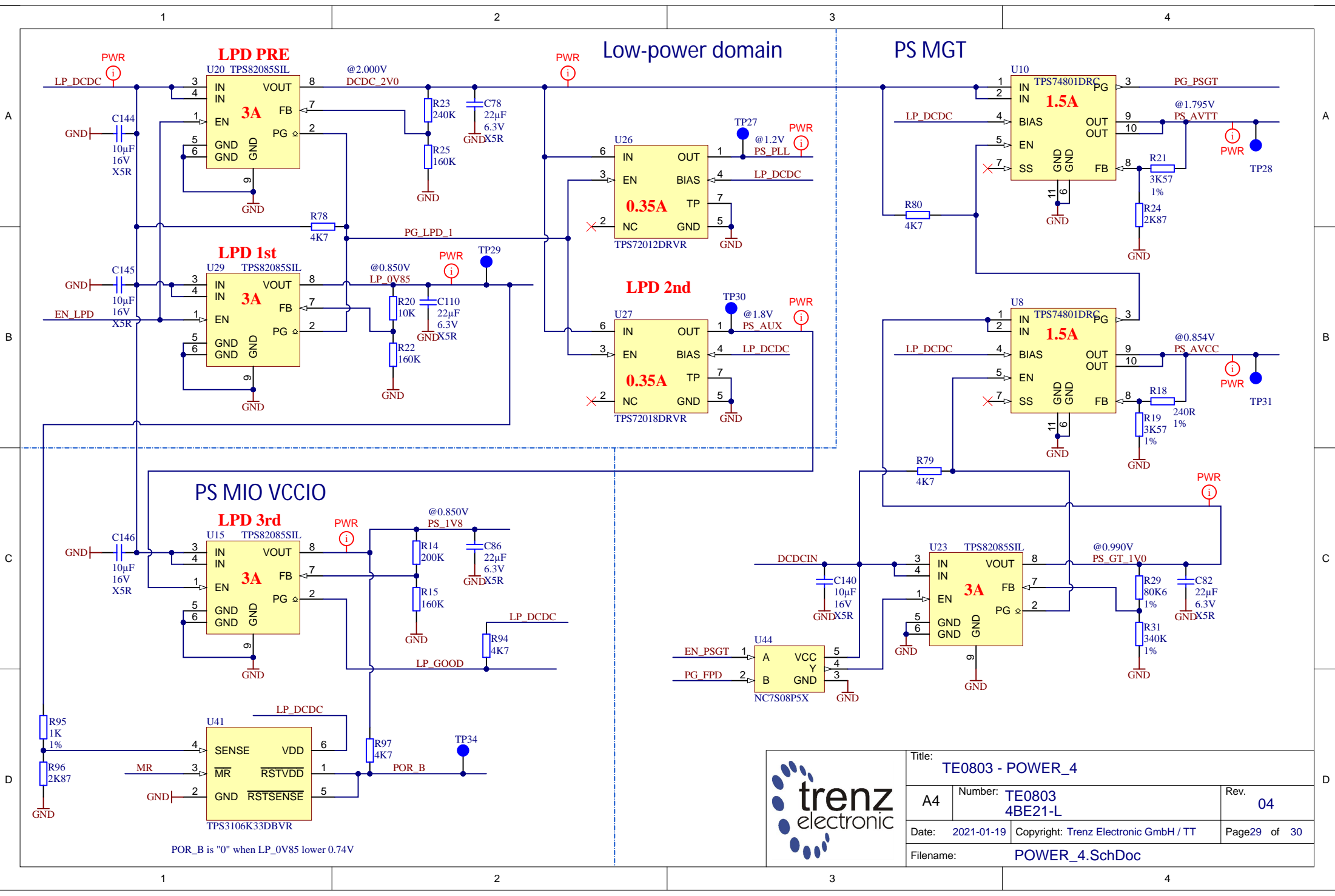
# Full-power domain

# DDR4



Title: <b>TE0803 - POWER_2</b>		
A4	Number: <b>TE0803 4BE21-L</b>	Rev. <b>04</b>
Date: <b>2021-01-19</b>	Copyright: <b>Trenz Electronic GmbH / TT</b>	Page <b>28</b> of <b>30</b>
Filename: <b>POWER_2.SchDoc</b>		

PL MGT




POR\_B is "0" when LP\_0V85 lower 0.74V



Title: TE0803 - POWER_4		
A4	Number: TE0803 4BE21-L	Rev. 04
Date: 2021-01-19	Copyright: Trenz Electronic GmbH / TT	Page 29 of 30
Filename: POWER_4.SchDoc		

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 tollerance 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 poiner 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

				Title: <b>TE0803 - Revision History</b>	
				A4	Number: <b>TE0803 4BE21-L</b>
Date: <b>2021-01-19</b>		Copyright: <b>Trenz Electronic GmbH</b>		Page <b>30</b> of <b>30</b>	
Drawn by: <b>VY</b>			Filename: <b>Revision Changes.SchDoc</b>		