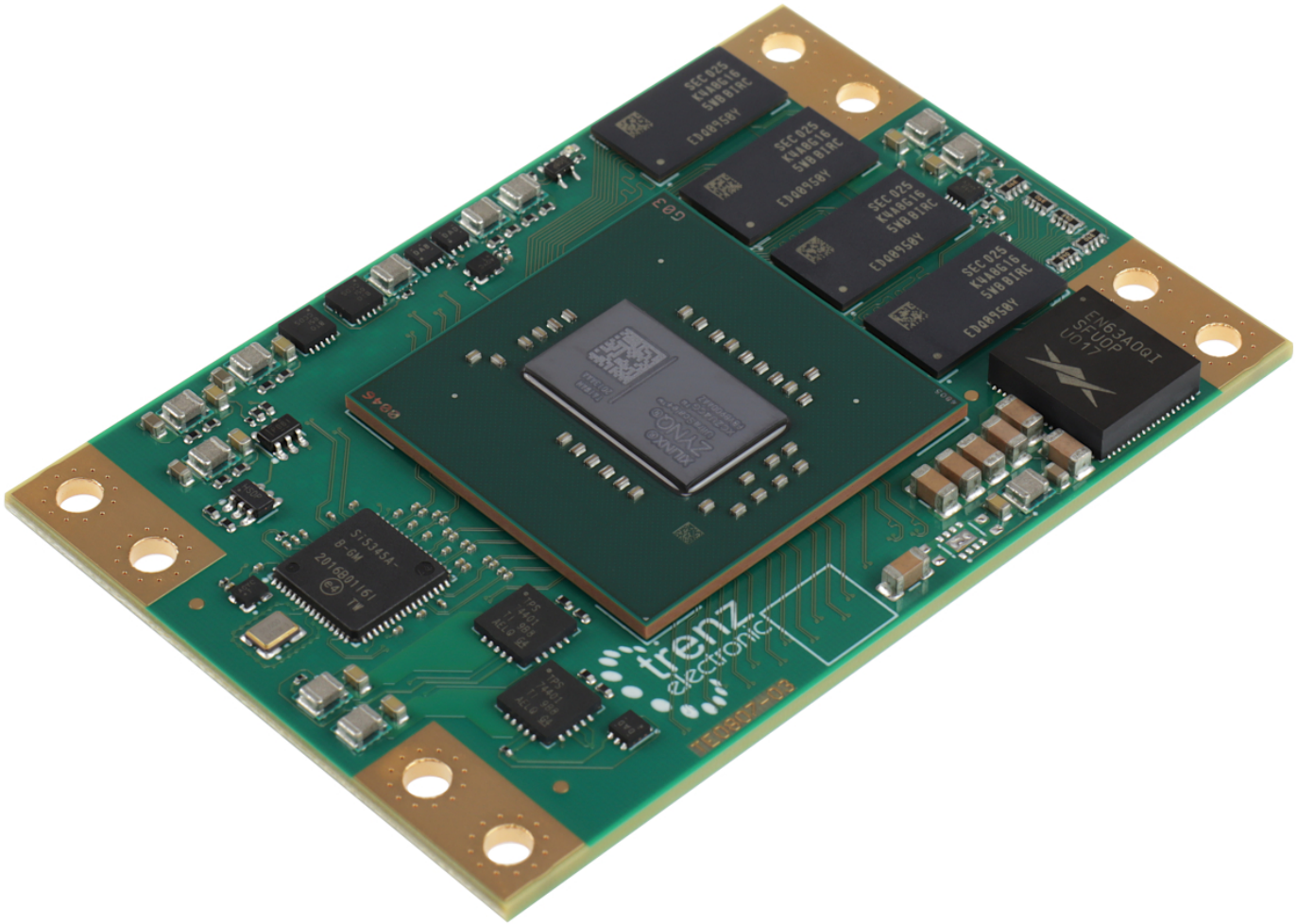

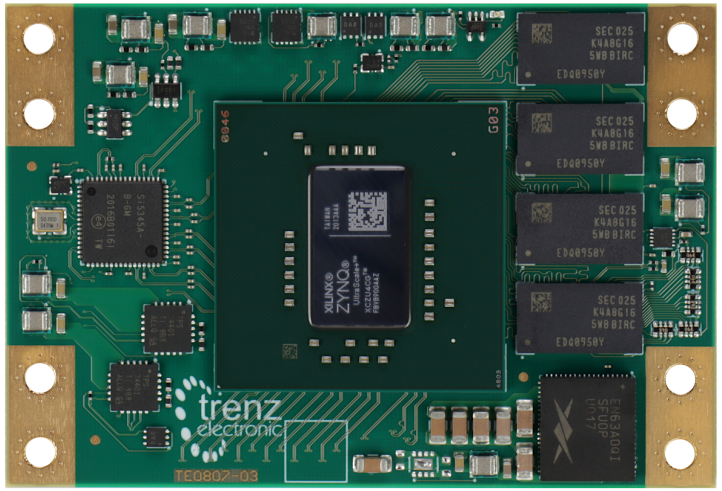

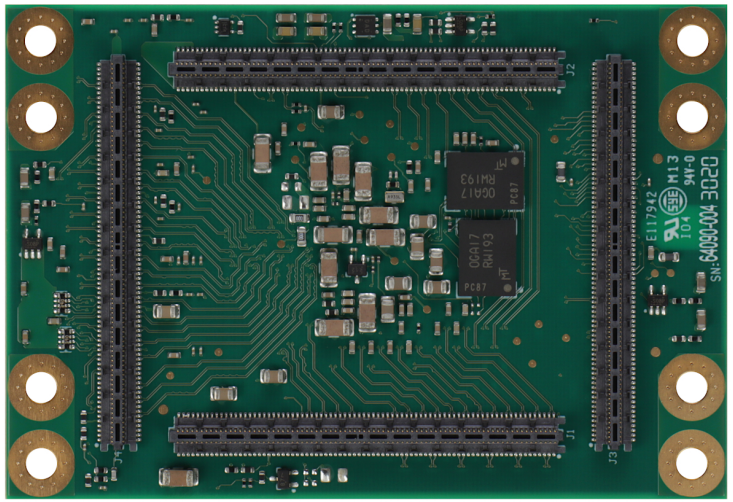

Regarding the usage of our schematics and alike documentation for Trenz module TE0807.

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.

TE0807 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!

trenz electronic	Title: TE0807 – Legal Notices Modules		
	A4	Number: TE0807 7DI84-A	Rev. 04
	Date: 19.06.2024	Copyright: Trenz Electronic GmbH	Page 1 of 32
	Filename: Legal Notices Modules.SchDoc		

REV	DATE	Description	
-01	-	Initial revision	-
-02	-	1) Added EEPROM U11 (24AA025E48T-I/OT). 2) Added optional resistors R39 / R40 for QSPI flash (default: not populated). 3) Fixed VCU connection (added additional DCDC and capacitors), recommendation from AMD. 4) Changed obsolete DDR4 chips (NT5AD256M16B2-GN -> K4A8G165WB-BIRC). 5) Added net "PG_VCU" to J2 (pin97). 6) Full update LIB.	-
-03	2020-06	1) Fixed ADC connection. 2) Fixed DDR4 connection (support B-die DDR4 chips). 3) Fixed DDR4 connection (alert_n pin connection). 4) Added U16. 5) Added testpoints. 6) Full update LIB.	VT
-04	2024-05	1) Changed DCDC (U4) from EN63A0QI to MPQ8633 and adapted according circuit. 2) Changed DCDC (U13) from TPS82085SIL/MUN3CAD03-SE to MPM3860GQW-Z and adapted according circuit. 3) Changed DCDC (U15 , U19 , U20 , U21 , U22 , U23 , U24 , U29 , U30 , U31 , U38) from TPS82085SIL/MUN3CAD03-SE to MPM3834CGPA and adapted according circuit. 4) Changed voltage rail from 1.35 V to 1.45 V via adaption voltage divider resistor R28 and R30 and changed voltage rail name PL_GT_1V35 to PL_GT_1V45 . 5) Changed voltage rail from 1.05 V to 1.15 V via adaption voltage divider resistors R33 and R35 and changed voltage rail name PL_GT_1V05 to PL_GT_1V15 . 6) Changed PLL (U5) from Si5345A-B to Si5345A-D-GM. 7) Changed inverted buffer SN74LVC1G06DRL to not inverted buffer SN74LVC1G07DRL (U16A / U16B). 8) Added diode D3 between U41 pin 3 net MR and voltage rail LP_DCDC . 9) Added capacitors C213 ... C215 for VTT voltage rail VTT . 10) Replaced DDR4 memory chips to use bigger chip sizes. 11) Connected DDR4-TEN signals together for U2A , U3A , U9A , and U12A and pulled them low via 499 Ohm resistor R103 . Added testpoint TP3 for signal DDR4-TEN. 12) Added remote sense option (default: not fitted): 12.1) R13 for U29 . 12.2) R90 for U30 . 12.3) R106 for U31 . 13) Added decoupling capacitors: 13.1) C136 , C149 for U1B . 13.2) C155 for U1C . 13.3) C151 for U1E . 13.4) C152 for U1D . 13.5) C205 ... C212 , C217 , and C234 for U1N . 13.6) C226 ... C228 for U6 . 13.7) C233 for U8 . 13.8) C232 for U10 . 13.9) C156 for U11 . 13.10) C225 for U14 . 13.11) C150 for U16B . 13.12) C216 , C219 , and C220 ... C223 for U18 . 13.13) C230 for U26 . 13.14) C231 for U27 . 13.15) C224 for U28 . 13.16) C218 for U34 . 13.17) C201 for U39 . 13.18) C202 for U40 . 13.19) C229 for U41 . 13.20) C203 for U42 . 13.21) C204 for U44 . 14) Added pull-up resistors for HOLD (R92) and WP (R93) signals for Flash U7A .	ED/MR

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Title: TE0807 – Revision_Changes_1			
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Filename: Revision_Changes.SchDoc			

REV	DATE	Description (continued...)	
-04	2024-05	15) Added pull-up resistors for HOLD (R100) and WP (R102) signals for Flash U17A. 16) Added pull-up resistor (R107) (default: not fitted) and pull-down resistor (R109) (default: fitted) for signal POR_OVERRIDE (U1A). 17) Changed 10 nF capacitor (C112) from 16 V, 0402 to 10 V, 0201. 18) Changed 100 nF capacitor (C37, C79, C95, C96, C130, C131, C133) from 6.3 V, X5R, 0201 to 50 V, X7R, 0402. 19) Changed capacitor (C12, C13, C14, C15, C16, C18, C19, C20, C21, C42, C44, C45, C170, C171) from 4.7 µF to 10 µF. 20) Changed 10 µF capacitor (C65, C66, C67) from 16 V, 0603 to 6.3 V, 0402. 21) Changed 100 µF capacitor (C29, C30, C31, C32, C35, C36, C43, C46, C52, C166, C167, C168, C169) from 6.3 V, 1206 to 4 V, 0805. 22) Changed 47 µF capacitor (C22, C23, C24, C25, C26, C27, C28, C33, C34, C68, C69, C70, C74, C76, C77, C78, C80, C81, C82, C83, C84, C85, C86, C87, C88, C110, C154, C198, C199, C200, C205) from 0805 to 0603. 23) Changed ferrid bead (L1, L2, L3, L4, L5, L7) from BKP0603HS121-T to MPZ0603S121HT000. 24) Changed resistor (R41, R58) from 2 kOhm to 2.49 kOhm. 25) Changed resistor (R74) from 4.7 kOhm, 0201 to 10 kOhm, 0402. 26) Added testpoints TP4, TP6...TP9, TP11, TP13, TP14, TP19...TP22, TP34... TP67. 27) Added Trenz address on PCB. 28) Added CE-, UKCA- RoHS-, and WEEE-logo. 29) Updated components from library. 30) Changed signal trace length. 31) Updated documentation.	ED/MR

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Title: TE0807 – Revision_Changes_2		
A4	Number: TE0807 7DI84-A	Rev. 04
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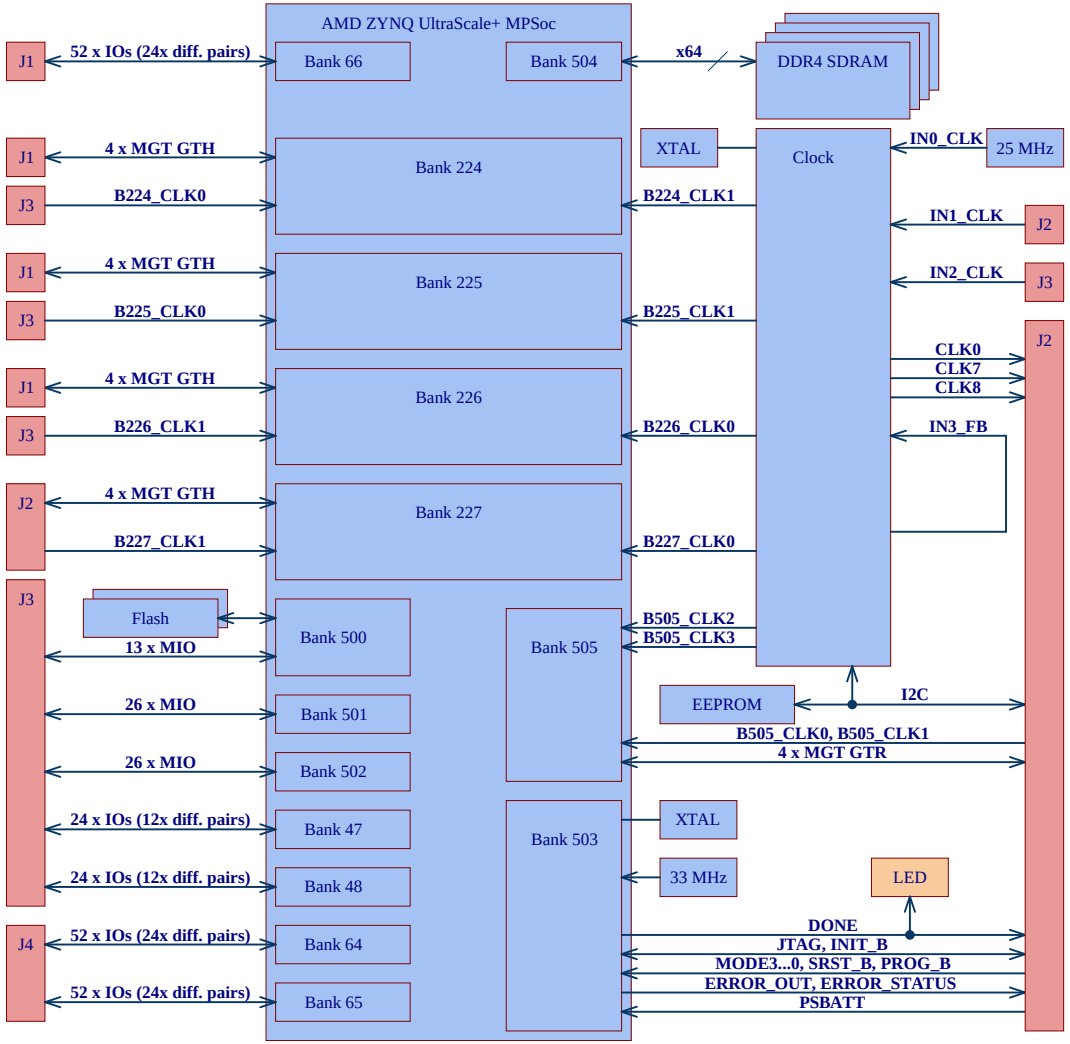
Filename: Revision_Changes_2.SchDoc		



Supported Voltage Ranges:

Power Rail	Direction	Range	Tolerance	Description	Note
PL_DCIN	IN	3.3 V	+/- 3 %	Micromodule Power	Programmable Logic
LP_DCDC	IN	3.3 V	+/- 3 %	Micromodule Power	Low-Power Domain
GT_DCDC	IN	3.3 V	+/- 3 %	Micromodule Power	GTH/GTY Transceiver
DCDCIN	IN	3.3 V	+/- 5 %	Micromodule Power	Full-Power Domain and GTR
VCCO_64	IN	1.0 V - 1.8 V	+/- 3 %	HP IO Bank 64	-
VCCO_65	IN	1.0 V - 1.8 V	+/- 3 %	HP IO Bank 65	-
VCCO_66	IN	1.0 V - 1.8 V	+/- 3 %	HP IO Bank 66	-
VCCO_47	IN	1.2 V - 3.3 V	+/- 3 %	HD IO Bank 47	-
VCCO_48	IN	1.2 V - 3.3 V	+/- 3 %	HD IO Bank 48	-
PSBATT	IN	1.2 V - 1.5 V	-	RTC / BBRAM	-
PLL_3V3	IN	3.3 V	+/- 5 %	PLL Core Power	-
PL_1V8	OUT	1.8 V	+/- 3 %	Power for Carrier	Programmable Logic
PS_1V8	OUT	1.8 V	+/- 3 %	Power for Carrier	Processing System
SI_PLL_1V8	OUT	1.8 V	+/- 3 %	Power for Carrier	Clock Supply
DDR_1V2	OUT	1.2 V	+/- 3 %	Power for Carrier	PS DDR I/O Supply

I2C Address:

Device	I2C ADDR	Note
PLL U5	0x69	-
EEPROM U11	0x50	-

Legend:

- B2B Connector
- LED Interface
- On-board Components

TE0807 | ZU_POWER | POWER | POWER_3
DDR4-TERM | ZU_GT_2 | ZU_PS_POWER | POWER_2 | POWER_4

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Title: TE0807 – Overview		
A4	Number: TE0807 7DI84-A	Rev. 04
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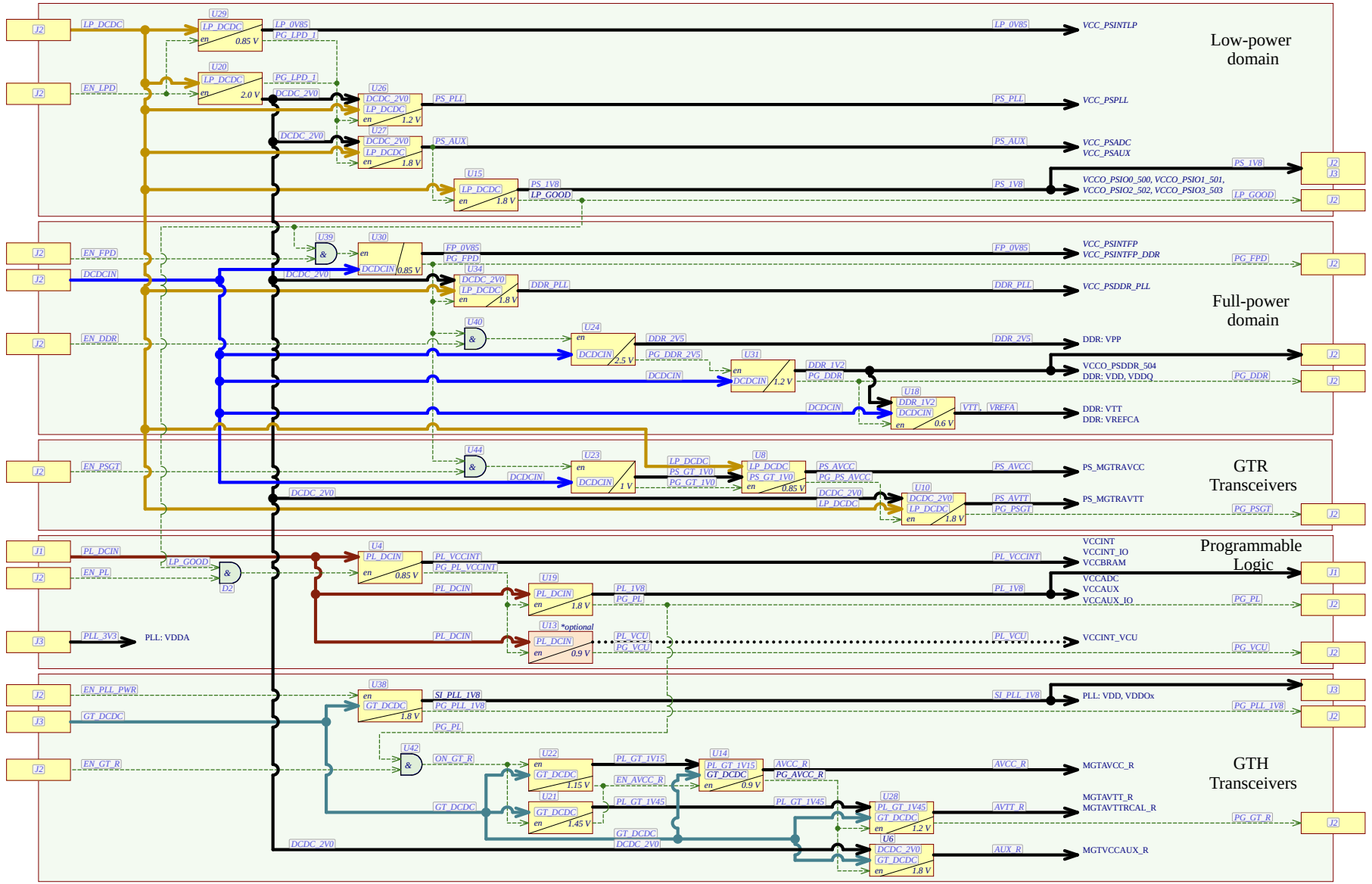
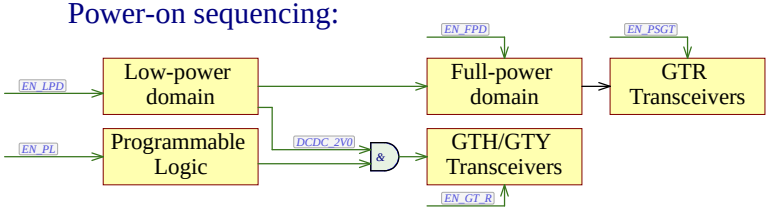


Power-on sequencing:



Net name
Power bus
Control signal
Optional power converter
Logic AND gate

Title: TE0807 – Power_Diagram			
A3	Nummer: TE0807 7DI84-A		Rev. 04
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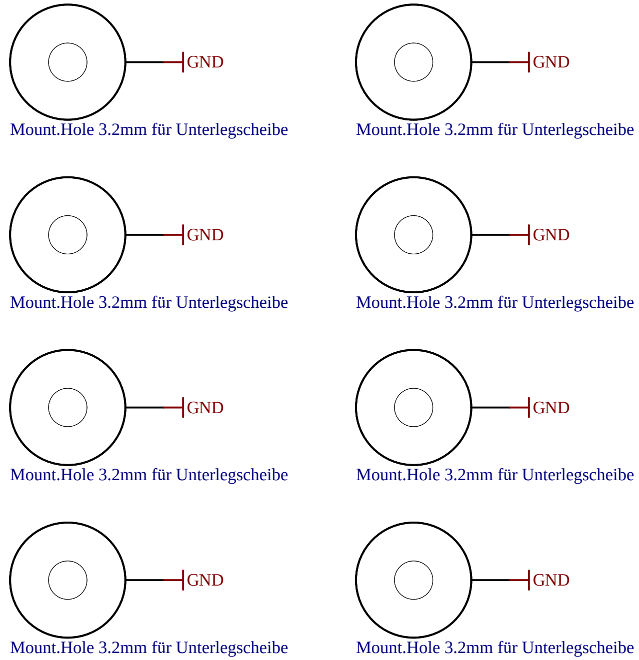
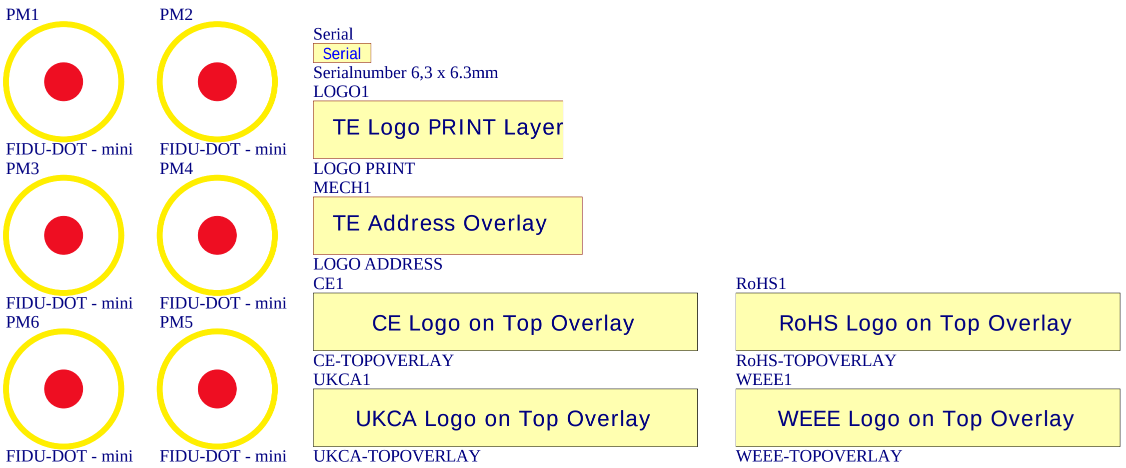
Filename: Power_Diagram.SchDoc			

Special notes:





Design drawn by:	ED/MR
Checked by:	MT
Assembly variant:	7DI84-A
Created by:	ED
Modified by:	ED
Modified at:	2024-05-01

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Title: TE0807		
A4	Number: TE0807 7DI84-A	Rev. 04
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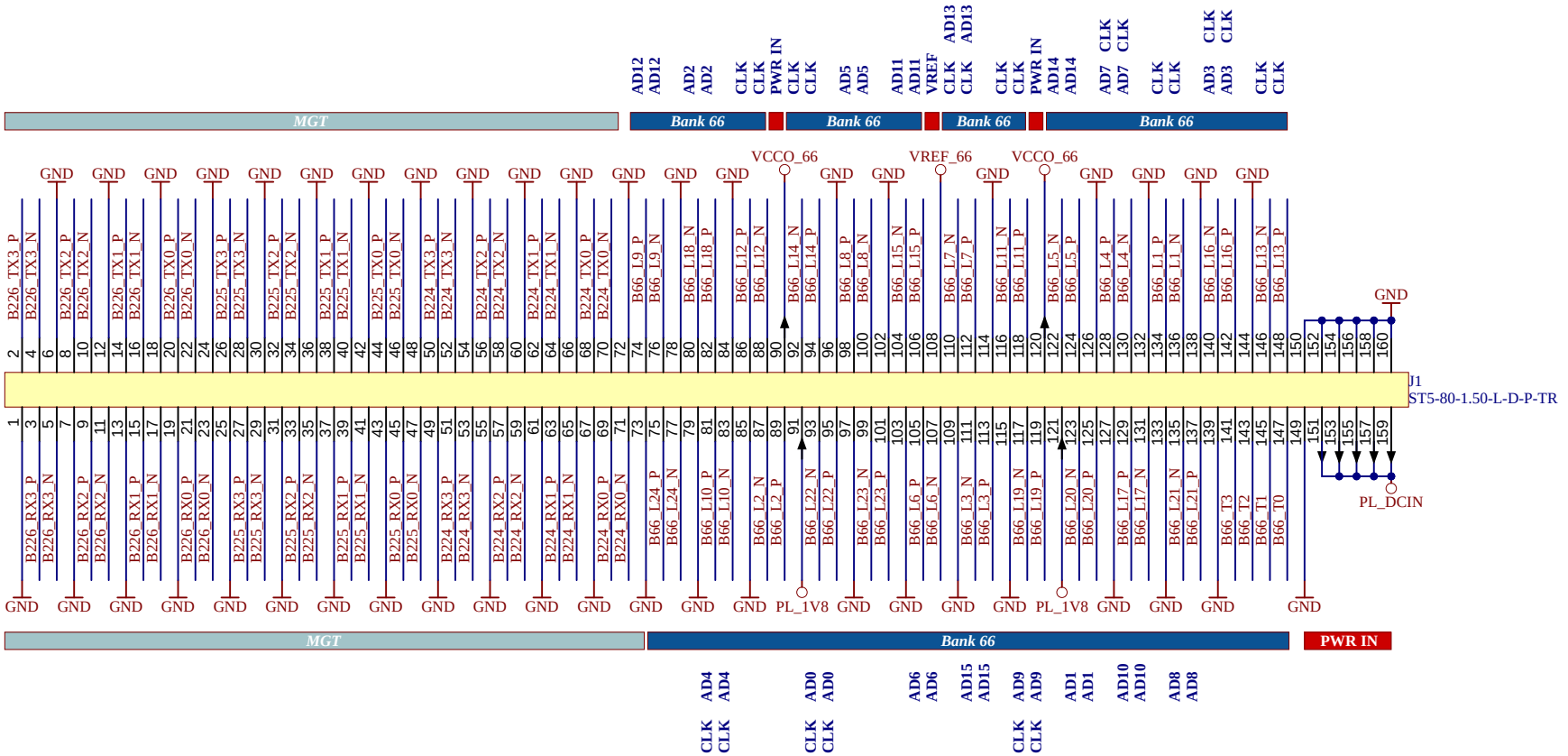
B224 GTH 4 Lanes
B225 GTH 4 Lanes
B226 GTH 4 Lanes
B66 52 IO, 24 LVDS Pairs

Consider AC coupling for MGT signals!



Bank 47 HD	0..VCCO47
Bank 48 HD	0..VCCO48
Bank 64 HP	0..VCCO64
Bank 65 HP	0..VCCO65
Bank 66 HP	0..VCCO66

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Title: TE0807 – Connector J1		
A4	Number: TE0807 7DI84-A	Rev. 04
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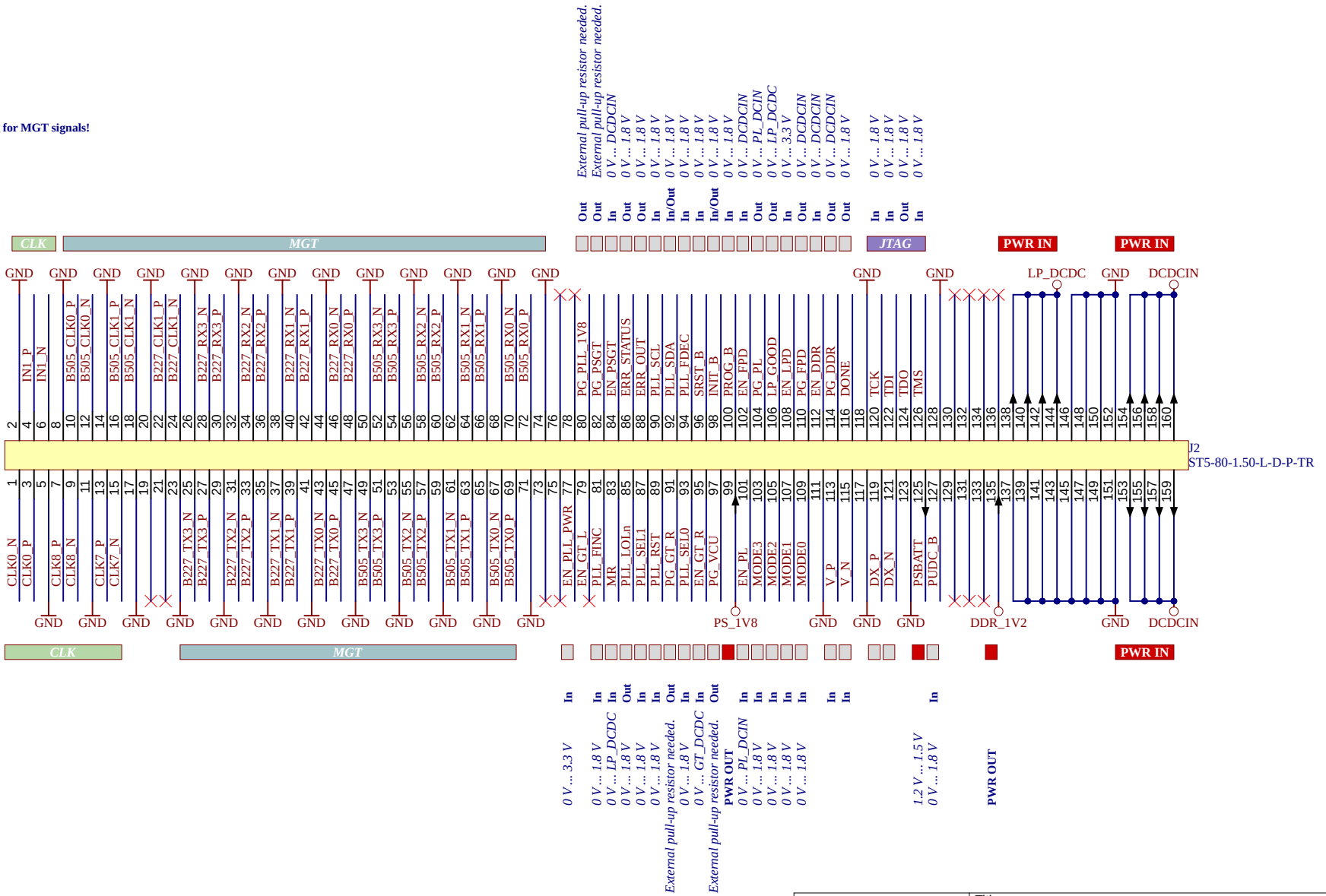
Filename: J1.SchDoc		

JTAG I2C
PLL CLK IN
3x PLL CLK OUT
B505 GTR 2 CLK IN
B505 GTR 4 Lanes
B227 GTH 4 Lanes
B227 GTH CLK IN

Consider AC coupling for MGT signals!



Bank 47 HD	0..VCCO47
Bank 48 HD	0..VCCO48
Bank 64 HP	0..VCCO64
Bank 65 HP	0..VCCO65
Bank 66 HP	0..VCCO66

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Title: TE0807 – Connector J2		
A4	Number: TE0807 7DI84-A	Rev. 04
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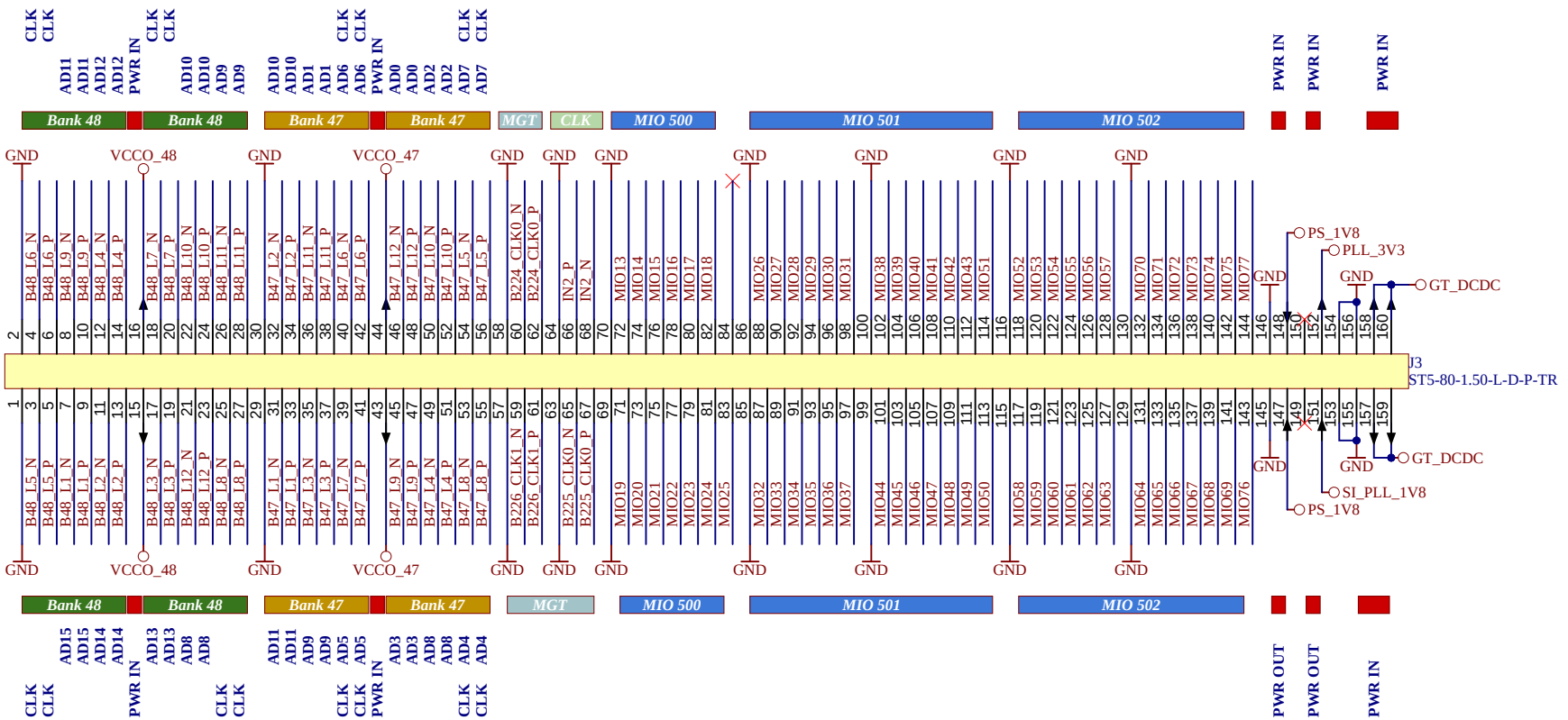
Filename: J2.SchDoc		

B47 24 IO, 12 LVDS Pairs
B48 24 IO, 12 LVDS Pairs
B224 GTH CLK IN
B225 GTH CLK IN
B226 GTH CLK IN
65 MIO
PLL CLK IN



Bank 47 HD 0..VCCO47
Bank 48 HD 0..VCCO48
Bank 64 HP 0..VCCO64
Bank 65 HP 0..VCCO65
Bank 66 HP 0..VCCO66

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Title: TE0807 – Connector J3			
A4	Number: TE0807 7DI84-A		Rev. 04
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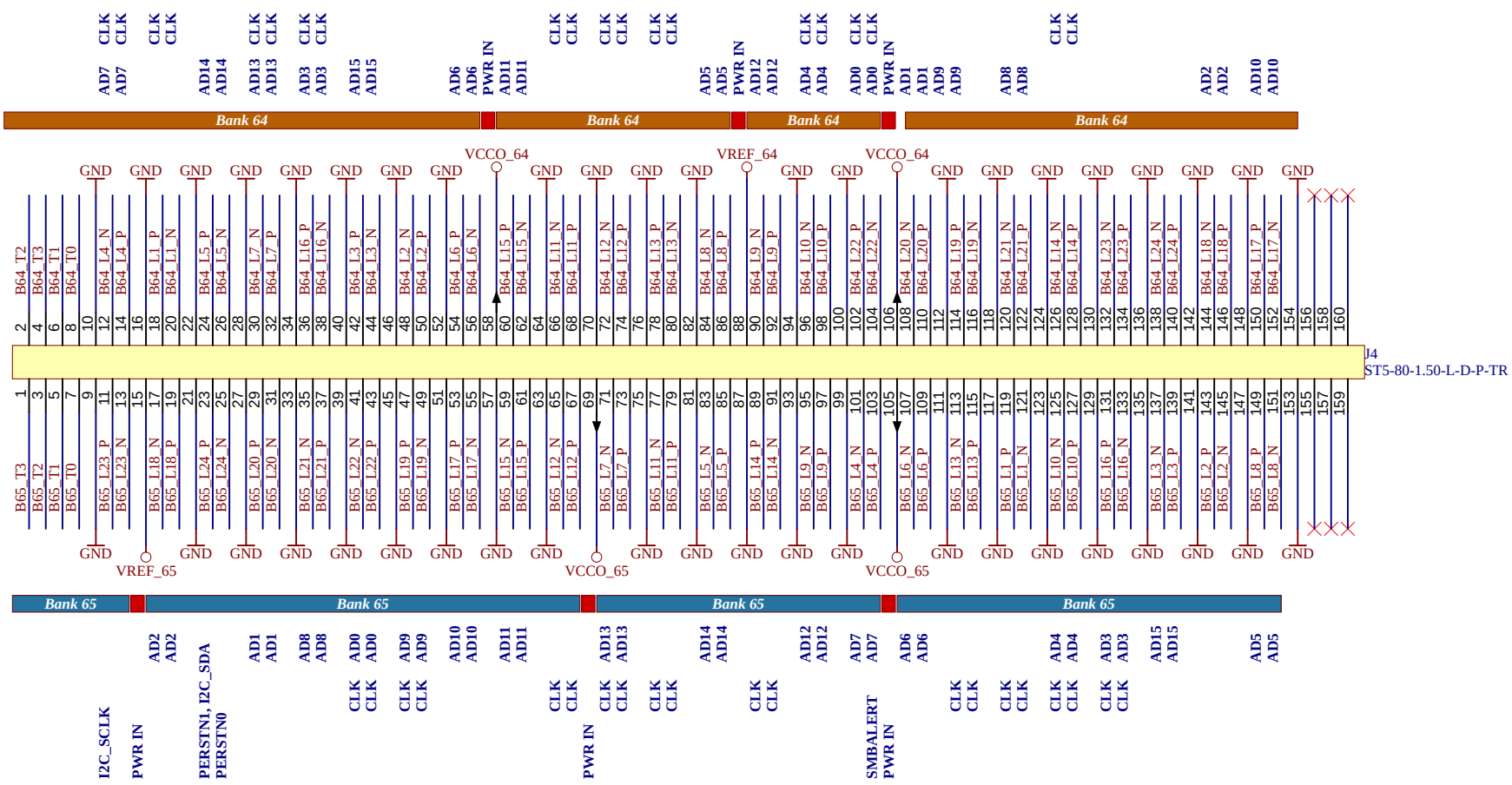
Filename: J3.SchDoc			

B64 52 IO, 24 LVDS Pairs
B65 52 IO, 24 LVDS Pairs



Bank 47 HD	0..VCCO47
Bank 48 HD	0..VCCO48
Bank 64 HP	0..VCCO64
Bank 65 HP	0..VCCO65
Bank 66 HP	0..VCCO66

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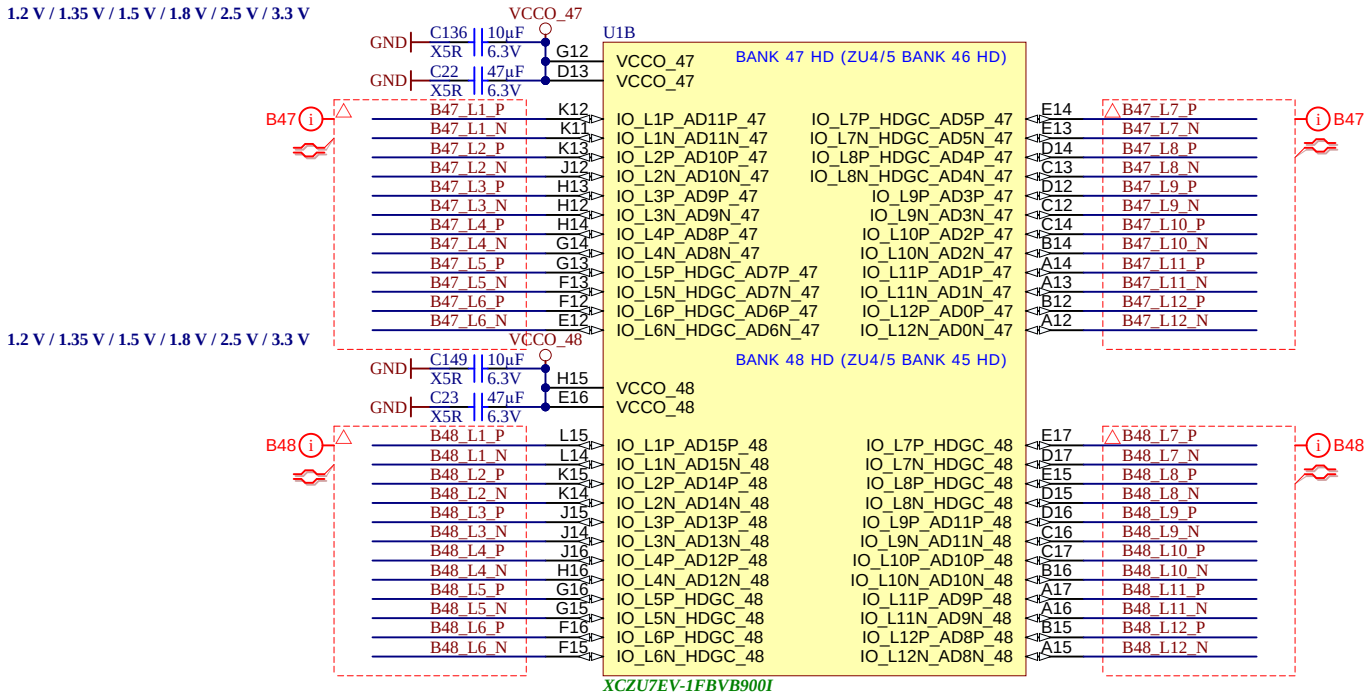
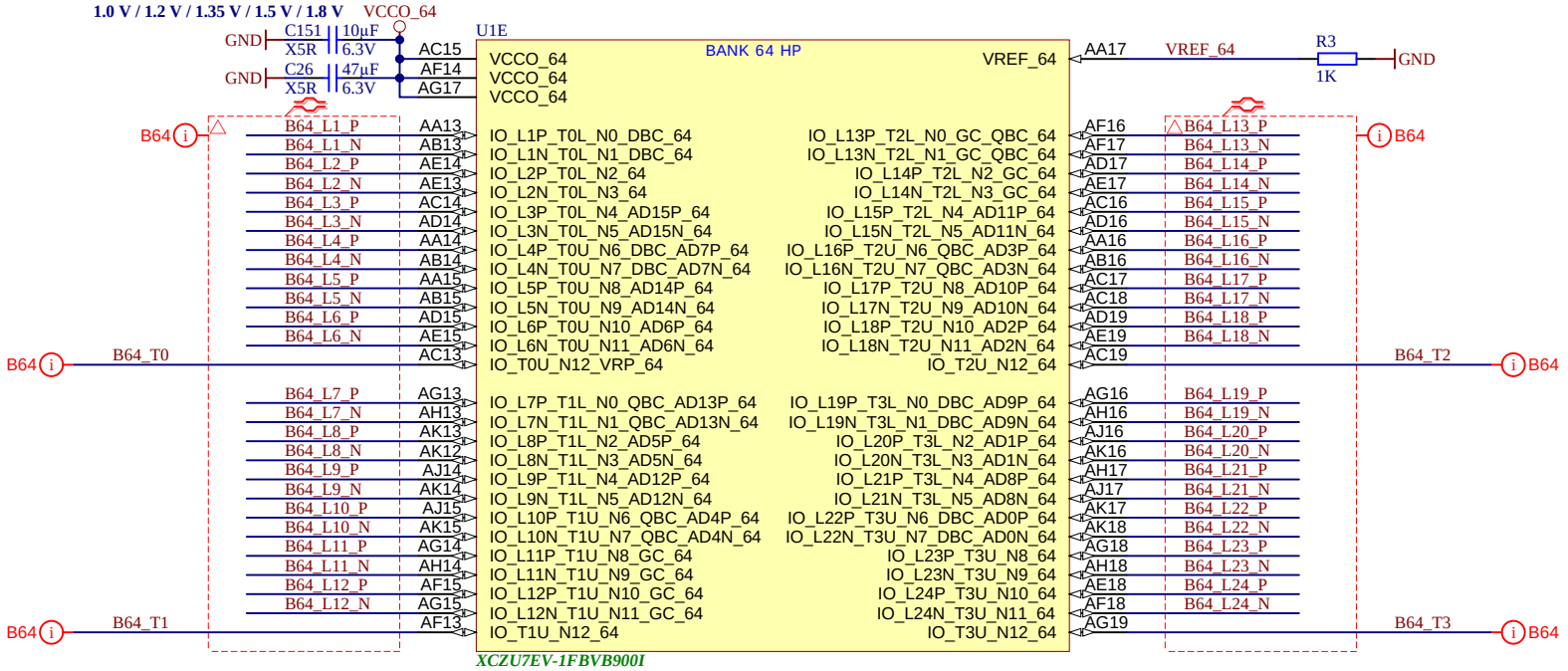
Title: TE0807 – Connector J4		
A4	Number: TE0807 7DI84-A	Rev. 04
Date: 19.06.2024	Copyright: Trenz Electronic GmbH	Page 10 of 32
Filename: J4.SchDoc		



trenz electronic	Title: TE0807 – HD Banks		
A4	Number: TE0807 7DI84-A		Rev. 04
Date: 19.06.2024	Copyright: Trenz Electronic GmbH		Page 11 of 32
Filename: B_HD.SchDoc			



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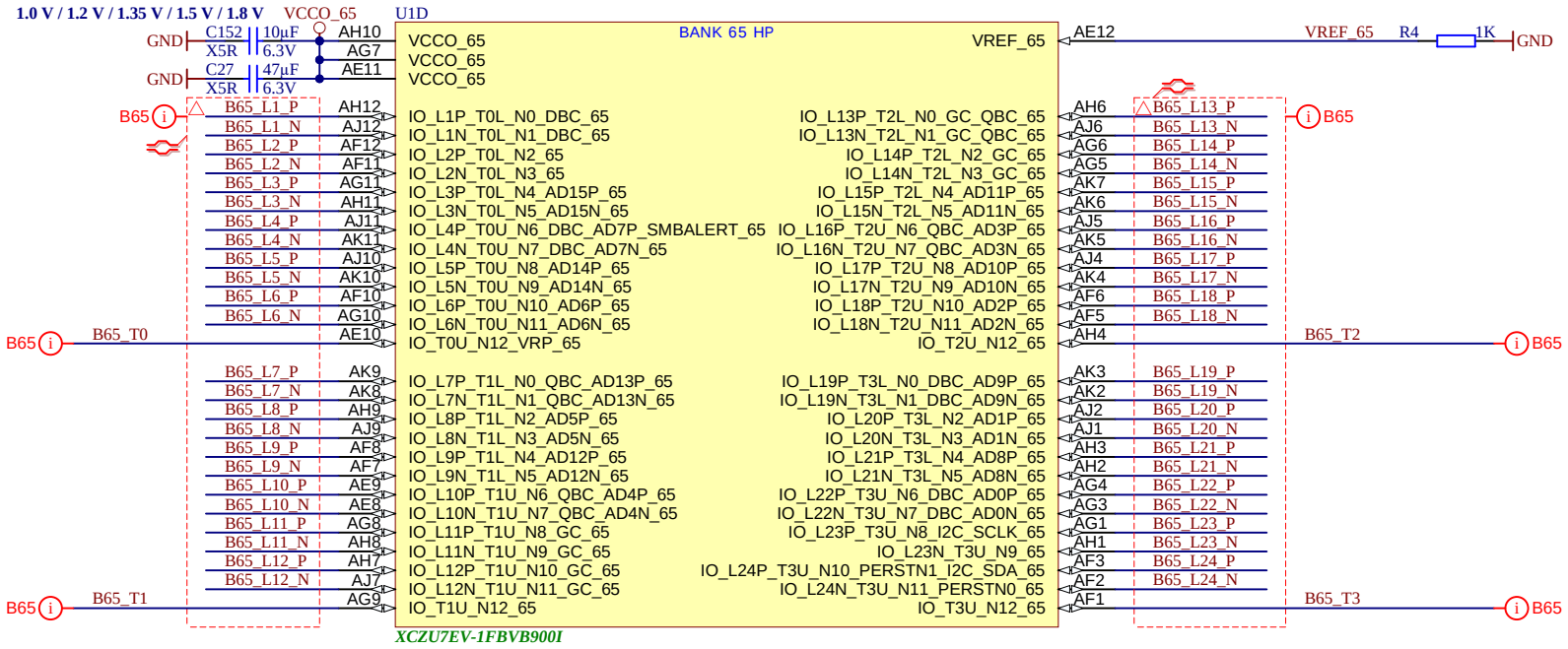
Date: 19.06.2024	Copyright: Trenz Electronic GmbH		Page 12 of 32
Filename: B64.SchDoc			



trenz electronic	Title: TE0807 – B65		
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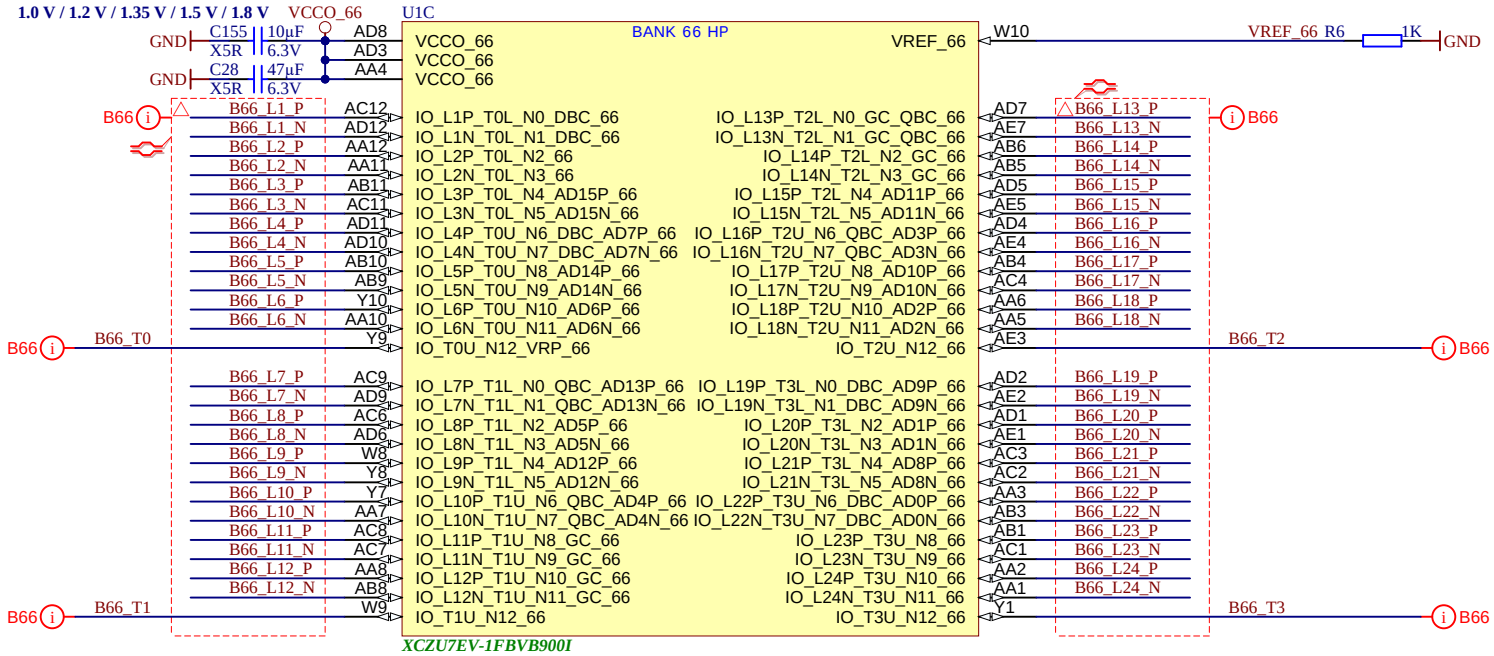
Date: 19.06.2024	Copyright: Trenz Electronic GmbH		Page 13 of 32
Filename: B65.SchDoc			



trenz electronic	Title: TE0807 – B66		
	A4	Number: TE0807 7DI84-A	Rev. 04
	Date: 19.06.2024	Copyright: Trenz Electronic GmbH	Page 14 of 32
	Filename: B66.SchDoc		

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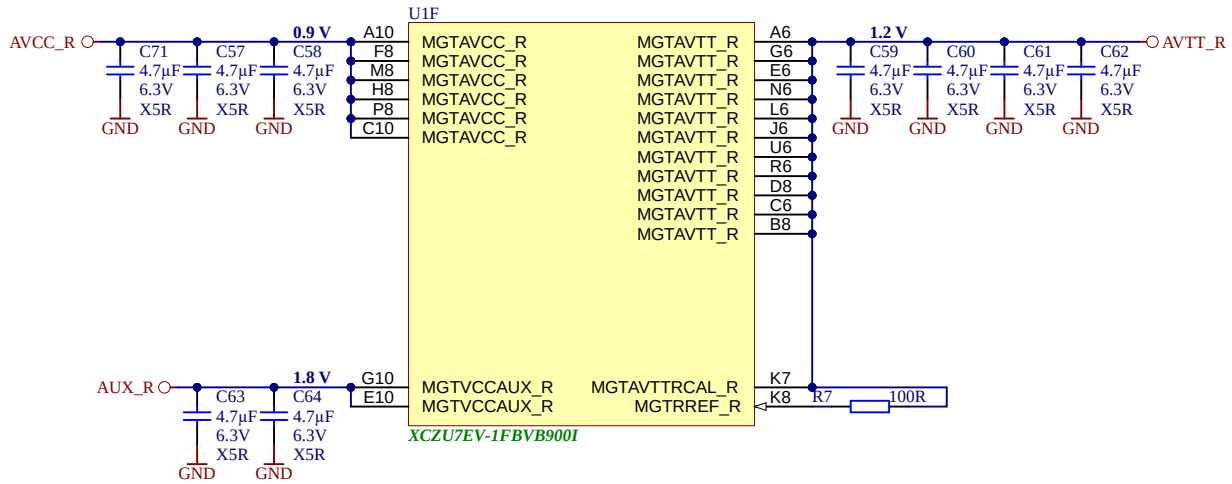
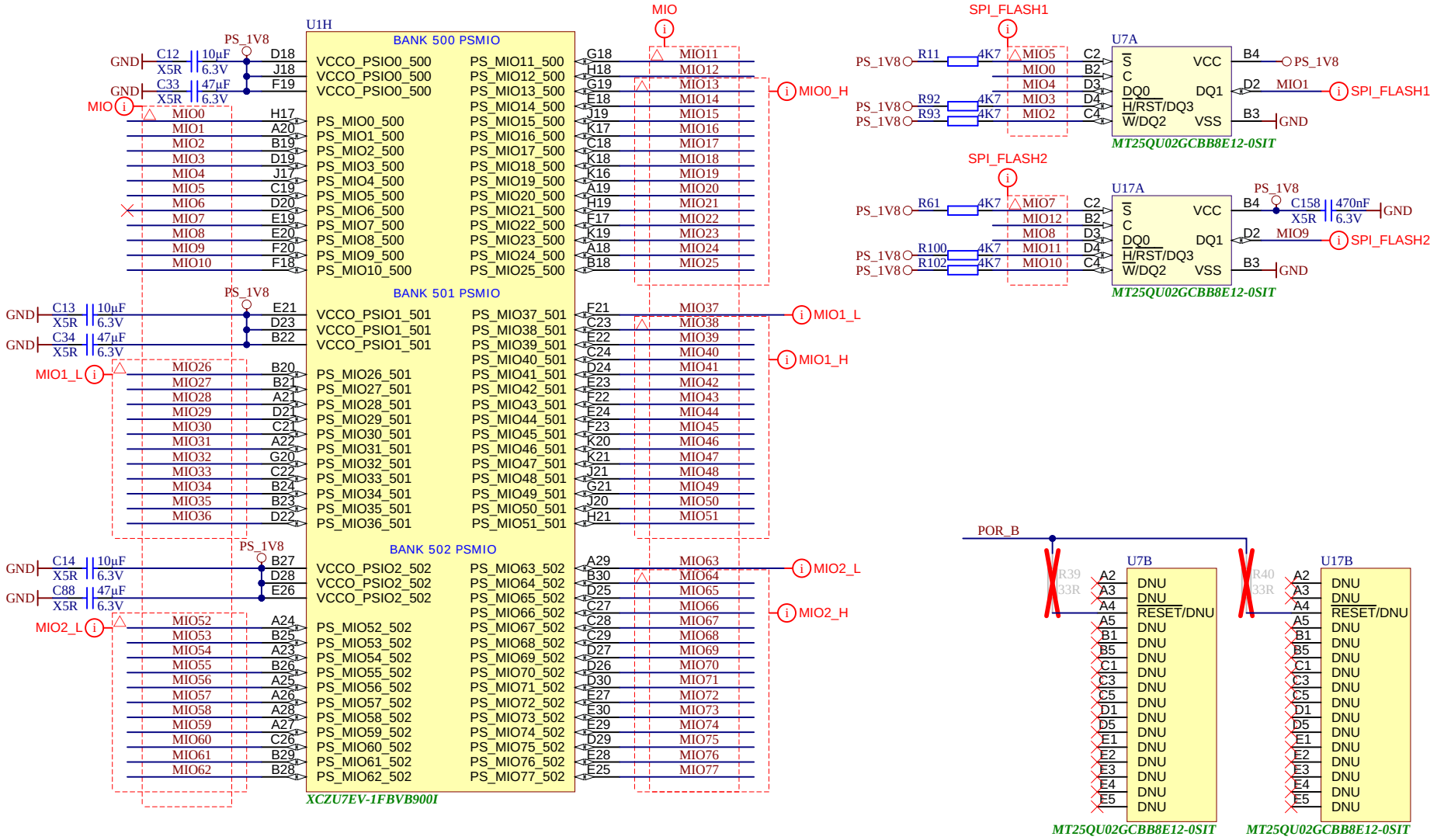
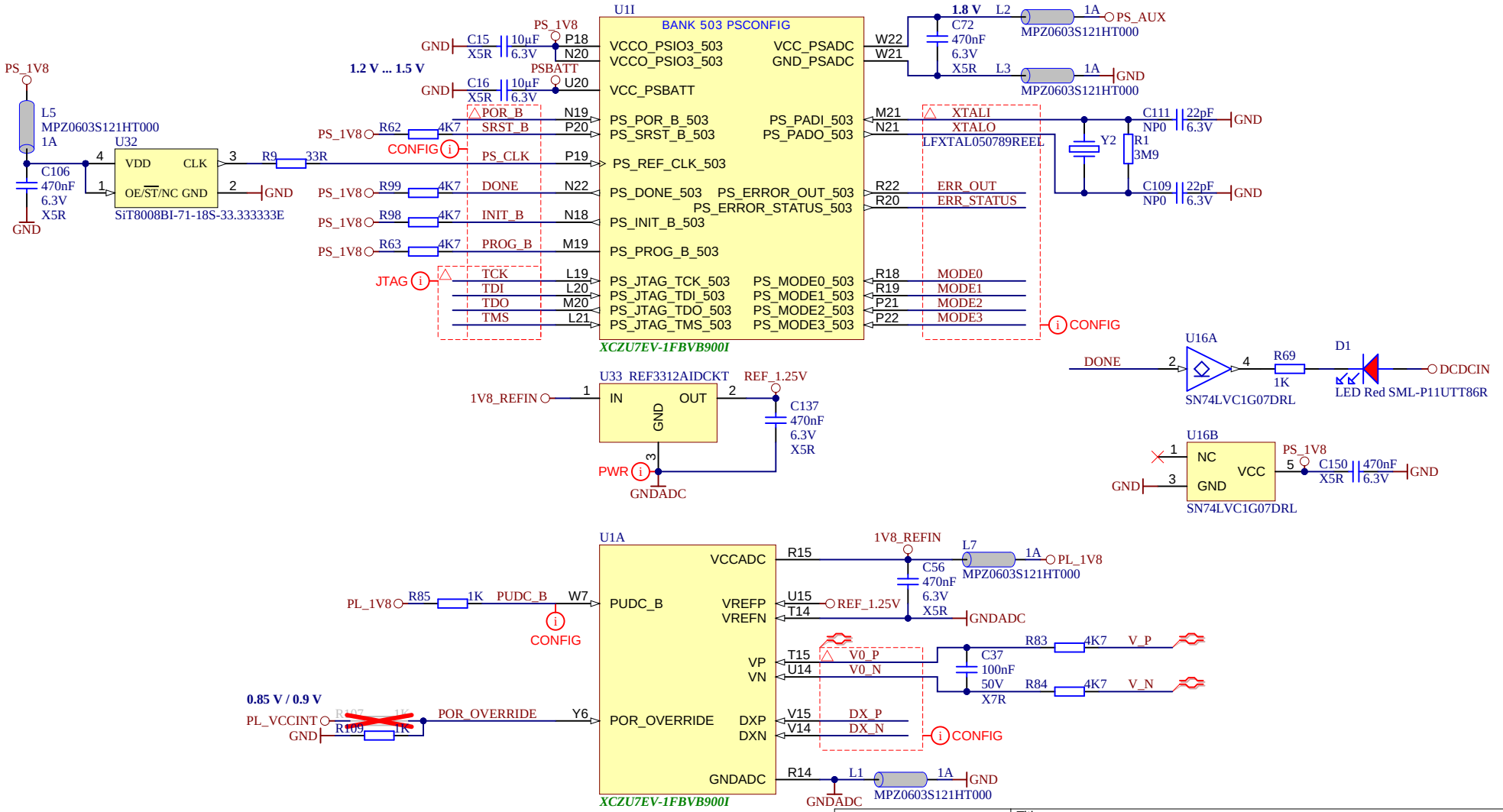
Title: TE0807 – GTH Banks			
A4	Number: TE0807 7DI84-A		Rev. 04
Date: 19.06.2024	Copyright: Trenz Electronic GmbH		Page 15 of 32
Filename: B_GT.SchDoc			



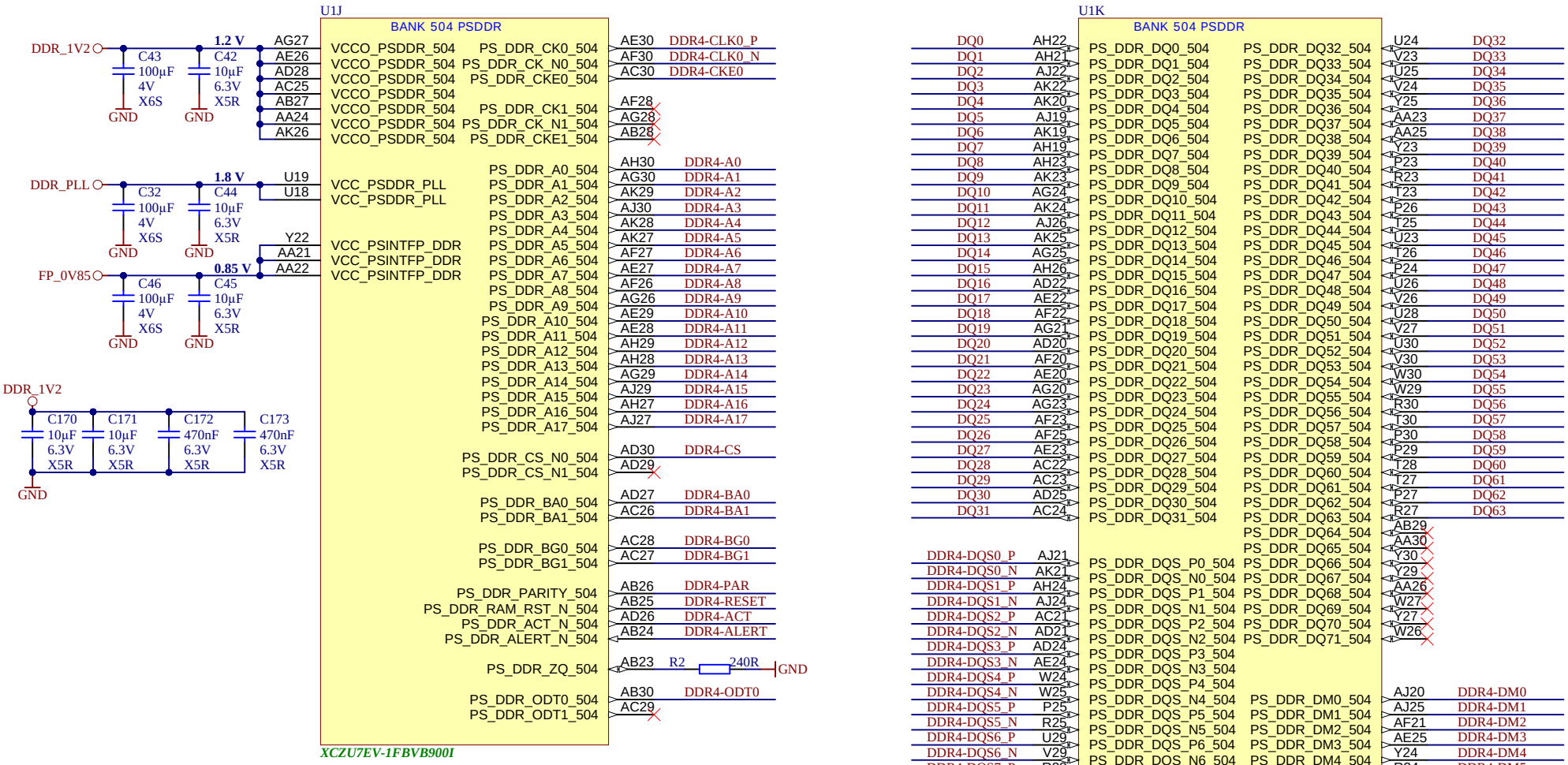
trenz electronic	Title: TE0807 – GTH Power		
A4	Number: TE0807 7DI84-A		Rev. 04
Date: 19.06.2024	Copyright: Trenz Electronic GmbH		Page 16 of 32
Filename: B_GT_2.SchDoc			



trenz electronic	Title: TE0807 – MIO Banks		
A4	Number: TE0807 7DI84-A		Rev. 04
Date: 19.06.2024	Copyright: Trenz Electronic GmbH		Page 17 of 32
Filename: B_MIO.SchDoc			



	Title: TE0807 – Config		
A4	Number: TE0807 7DI84-A		Rev. 04
Date: 19.06.2024	Copyright: Trenz Electronic GmbH		Page 18 of 32
Filename: CONFIG.SchDoc			


U1J
BANK 504 PSDDR
DDR_1V2
1.2 V
C43 100µF 4V X6S
C42 10µF 6.3V X5R
GND
AG27
AE26
AD28
AC25
AB27
AA24
AK26
VCCO_PSDDR_504
DDR_PLL
1.8 V
C32 100µF 4V X6S
C44 10µF 6.3V X5R
U19
U18
VCC_PSDDR_PLL
FP_0V85
0.85 V
C46 100µF 4V X6S
C45 10µF 6.3V X5R
Y22
AA21
AA22
VCC_PSINTFP_DDR
C170 10µF 6.3V X5R
C171 10µF 6.3V X5R
C172 470nF 6.3V X5R
C173 470nF 6.3V X5R
PS_DDR_CK0_504
PS_DDR_CK_N0_504
PS_DDR_CKE0_504
PS_DDR_CK1_504
PS_DDR_CK_N1_504
PS_DDR_CKE1_504
PS_DDR_A0_504
PS_DDR_A1_504
PS_DDR_A2_504
PS_DDR_A3_504
PS_DDR_A4_504
PS_DDR_A5_504
PS_DDR_A6_504
PS_DDR_A7_504
PS_DDR_A8_504
PS_DDR_A9_504
PS_DDR_A10_504
PS_DDR_A11_504
PS_DDR_A12_504
PS_DDR_A13_504
PS_DDR_A14_504
PS_DDR_A15_504
PS_DDR_A16_504
PS_DDR_A17_504
PS_DDR_CS_N0_504
PS_DDR_CS_N1_504
PS_DDR_BA0_504
PS_DDR_BA1_504
PS_DDR_BG0_504
PS_DDR_BG1_504
PS_DDR_PARITY_504
PS_DDR_RAM_RST_N_504
PS_DDR_ACT_N_504
PS_DDR_ALERT_N_504
PS_DDR_ZQ_504
PS_DDR_ODT0_504
PS_DDR_ODT1_504
AE30 DDR4-CLK0_P
AF30 DDR4-CLK0_N
AC30 DDR4-CKE0
AF28
AG28
AB28
AH30 DDR4-A0
AG30 DDR4-A1
AK29 DDR4-A2
AJ30 DDR4-A3
AK28 DDR4-A4
AK27 DDR4-A5
AF27 DDR4-A6
AE27 DDR4-A7
AF26 DDR4-A8
AG26 DDR4-A9
AE29 DDR4-A10
AE28 DDR4-A11
AH29 DDR4-A12
AH28 DDR4-A13
AG29 DDR4-A14
AJ29 DDR4-A15
AH27 DDR4-A16
AJ27 DDR4-A17
AD30 DDR4-CS
AD29
AD27 DDR4-BA0
AC26 DDR4-BA1
AC28 DDR4-BG0
AC27 DDR4-BG1
AB26 DDR4-PAR
AB25 DDR4-RESET
AD26 DDR4-ACT
AB24 DDR4-ALERT
AB23 R2 240R GND
AB30 DDR4-ODT0
AC29
XCZU7EV-1FBVB900I
U1K
BANK 504 PSDDR
DQ0 AH22
DQ1 AH21
DQ2 AJ22
DQ3 AK22
DQ4 AK20
DQ5 AJ19
DQ6 AK19
DQ7 AH19
DQ8 AH23
DQ9 AK23
DQ10 AG24
DQ11 AK24
DQ12 AJ26
DQ13 AK25
DQ14 AG25
DQ15 AH26
DQ16 AD22
DQ17 AE22
DQ18 AF22
DQ19 AG21
DQ20 AD20
DQ21 AF20
DQ22 AE20
DQ23 AG20
DQ24 AG23
DQ25 AF23
DQ26 AF25
DQ27 AE23
DQ28 AC22
DQ29 AC23
DQ30 AD25
DQ31 AC24
DDR4-DQS0_P AJ21
DDR4-DQS0_N AK21
DDR4-DQS1_P AH24
DDR4-DQS1_N AJ24
DDR4-DQS2_P AC21
DDR4-DQS2_N AD21
DDR4-DQS3_P AD24
DDR4-DQS3_N AE24
DDR4-DQS4_P W24
DDR4-DQS4_N W25
DDR4-DQS5_P P25
DDR4-DQS5_N R25
DDR4-DQS6_P U29
DDR4-DQS6_N V29
DDR4-DQS7_P R28
DDR4-DQS7_N R29
Y28
AA28
PS_DDR_DQ0_504
PS_DDR_DQ1_504
PS_DDR_DQ2_504
PS_DDR_DQ3_504
PS_DDR_DQ4_504
PS_DDR_DQ5_504
PS_DDR_DQ6_504
PS_DDR_DQ7_504
PS_DDR_DQ8_504
PS_DDR_DQ9_504
PS_DDR_DQ10_504
PS_DDR_DQ11_504
PS_DDR_DQ12_504
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V23 DQ33
U25 DQ34
V24 DQ35
Y25 DQ36
AA23 DQ37
AA25 DQ38
Y23 DQ39
P23 DQ40
R23 DQ41
T23 DQ42
P26 DQ43
T25 DQ44
U23 DQ45
T26 DQ46
P24 DQ47
U26 DQ48
V26 DQ49
U28 DQ50
V27 DQ51
U30 DQ52
V30 DQ53
W30 DQ54
W29 DQ55
R30 DQ56
T30 DQ57
P30 DQ58
P29 DQ59
T28 DQ60
T27 DQ61
P27 DQ62
R27 DQ63
AB29
AA30
Y30
Y29
AA26
W27
Y27
W26
AJ20 DDR4-DM0
AJ25 DDR4-DM1
AF21 DDR4-DM2
AE25 DDR4-DM3
Y24 DDR4-DM4
R24 DDR4-DM5
V28 DDR4-DM6
P28 DDR4-DM7
AA27
XCZU7EV-1FBVB900I
trenz electronic
Title: TE0807 – PS_DDR
A4
Number: TE0807 7DI84-A
Rev. 04
Date: 19.06.2024
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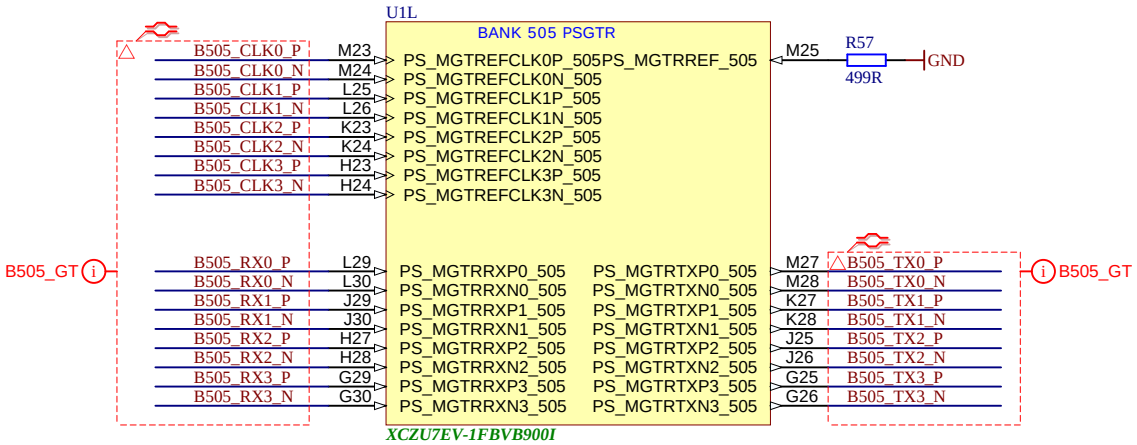
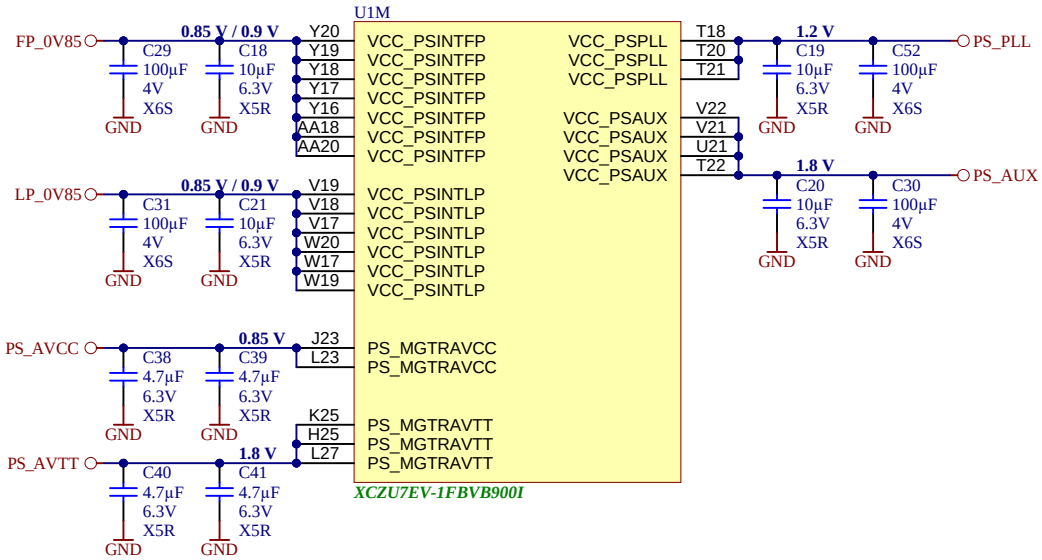
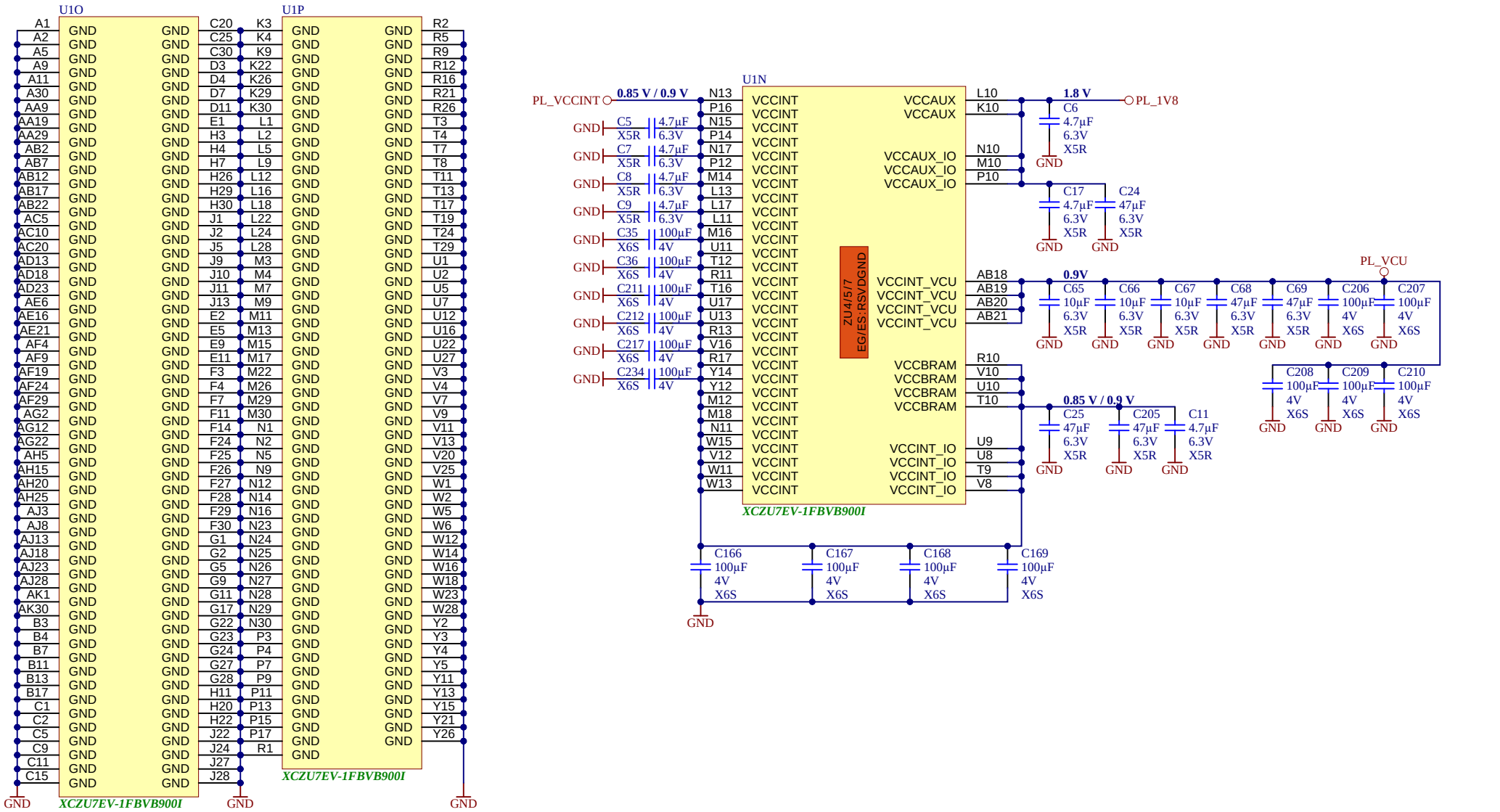
Filename: PS_DDR.SchDoc



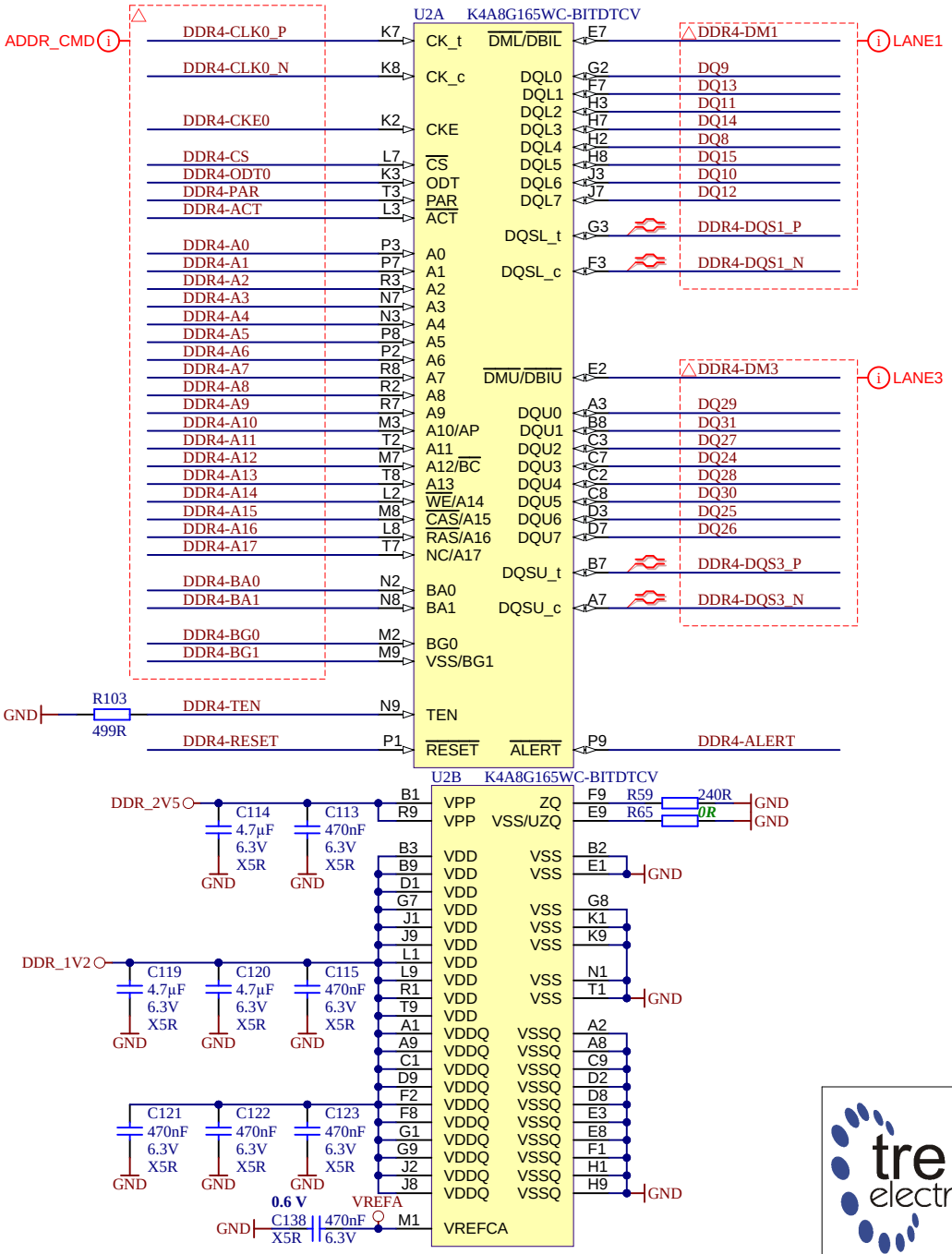
trenz electronic	Title: TE0807 – B_PS_GT		
A4	Number: TE0807 7DI84-A		Rev. 04
Date: 19.06.2024	Copyright: Trenz Electronic GmbH		Page 20 of 32
Filename: B_PS_GT.SchDoc			



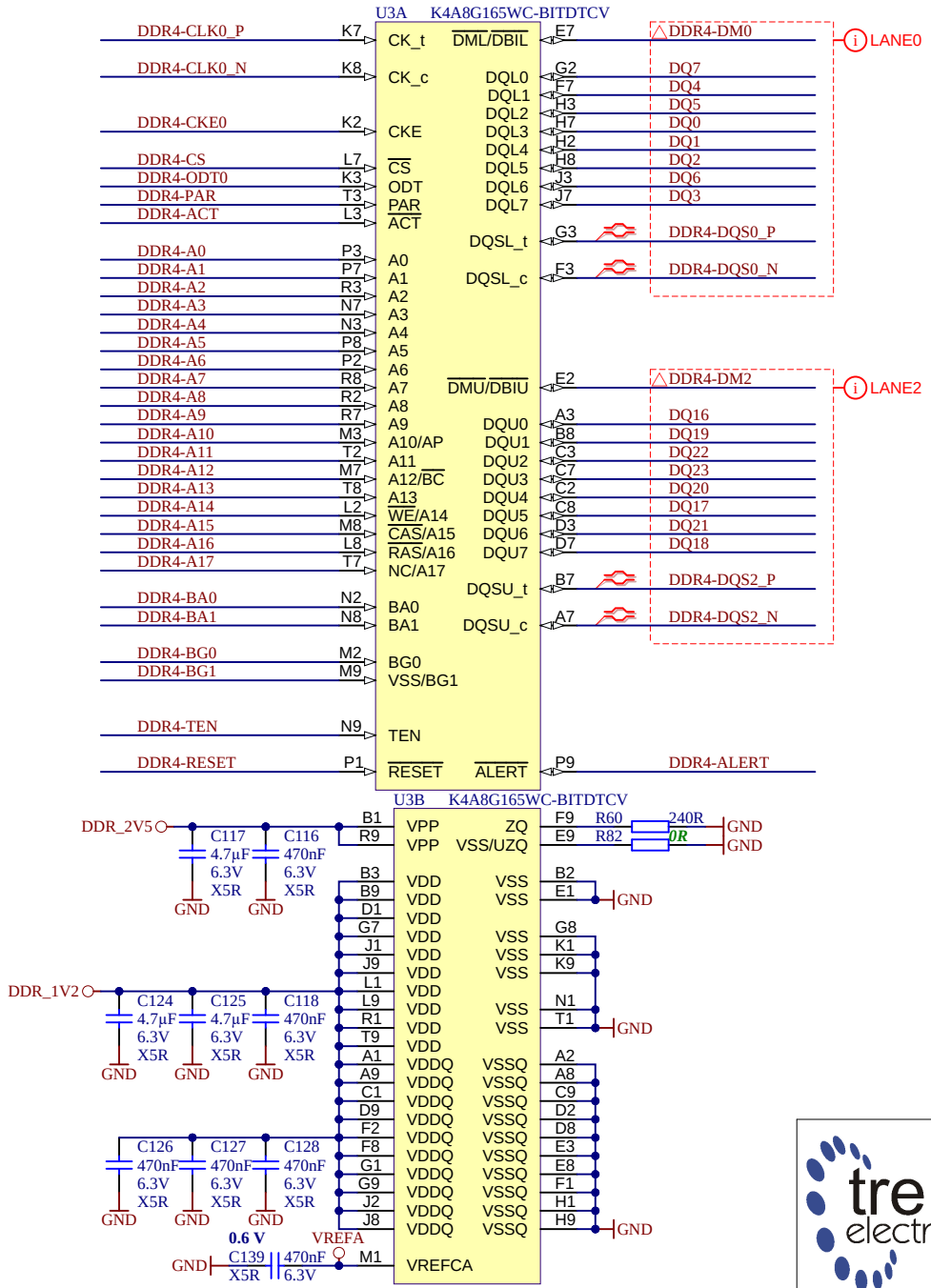
trenz electronic	Title: TE0807 – ZU_PS_POWER		
A4	Number: TE0807 7DI84-A		Rev. 04
Date: 19.06.2024	Copyright: Trenz Electronic GmbH		Page 21 of 32
Filename: ZU_PS_POWER.SchDoc			



Title: TE0807 – ZU_POWER			
A4	Number: TE0807 7DI84-A		Rev. 04
Date: 19.06.2024	Copyright: Trenz Electronic GmbH		Page 22 of 32
Filename: ZU_POWER.SchDoc			



	Title: TE0807 – DDR4-RAM_1		
A4	Number: TE0807 7DI84-A		Rev. 04
Date: 19.06.2024	Copyright: Trenz Electronic GmbH		Page 23 of 32
Filename: DDR4-RAM.SchDoc			



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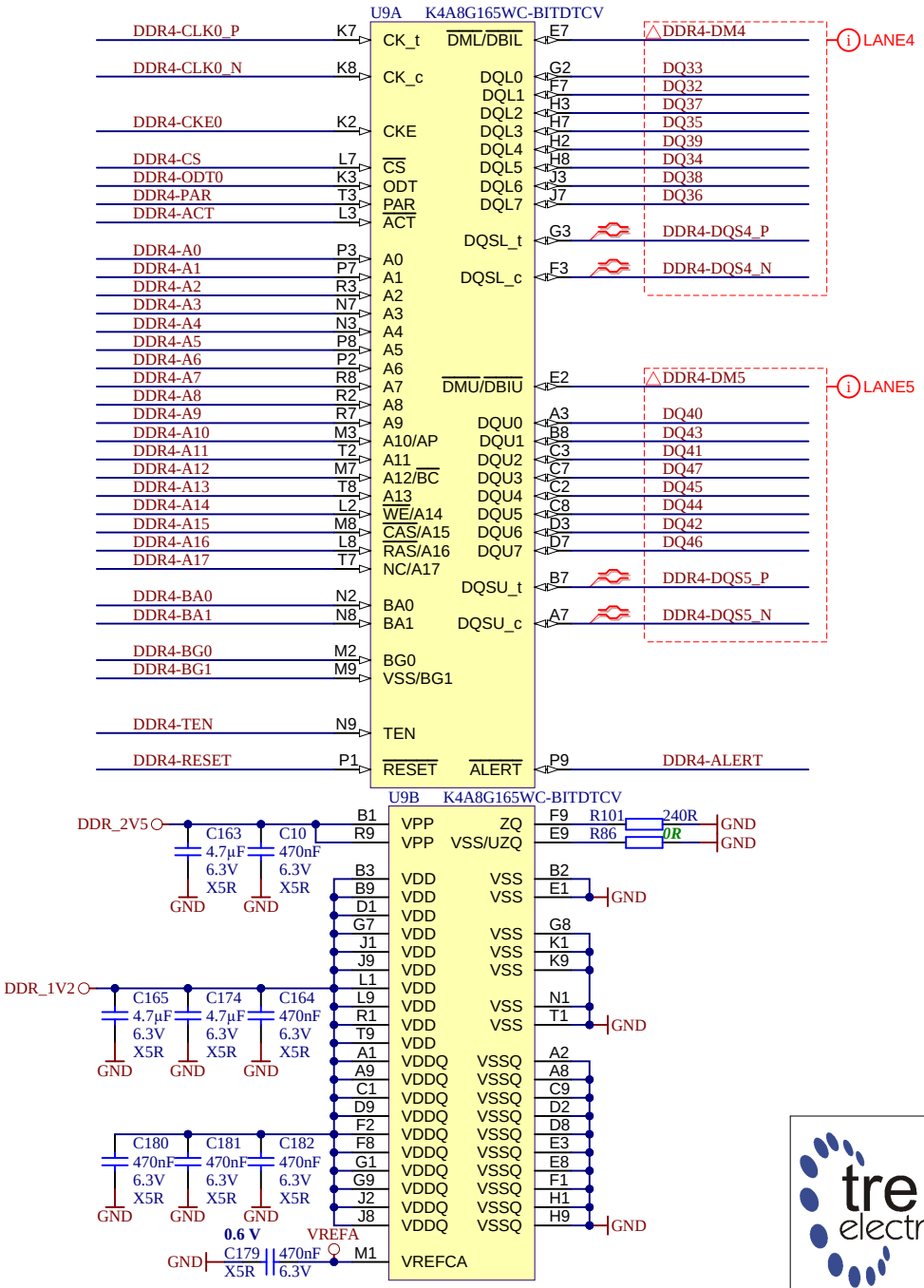
	Date: 19.06.2024	Copyright: Trenz Electronic GmbH	Page 24 of 32
	Filename: DDR4-RAM_2.SchDoc		



trenz electronic	Title: TE0807 – DDR4-RAM_3		
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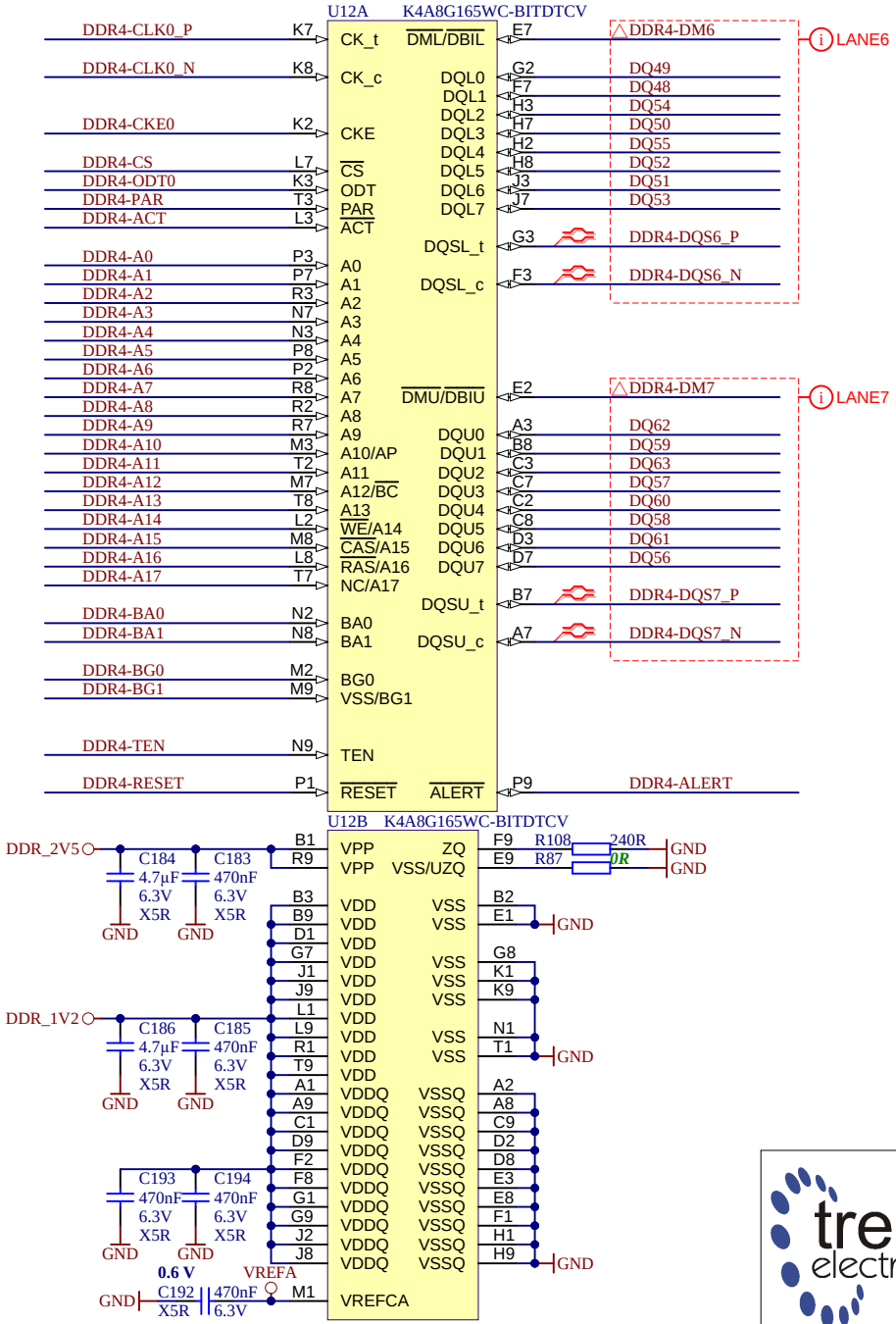
	Date: 19.06.2024	Copyright: Trenz Electronic GmbH	Page 25 of 32
	Filename: DDR4-RAM_3.SchDoc		



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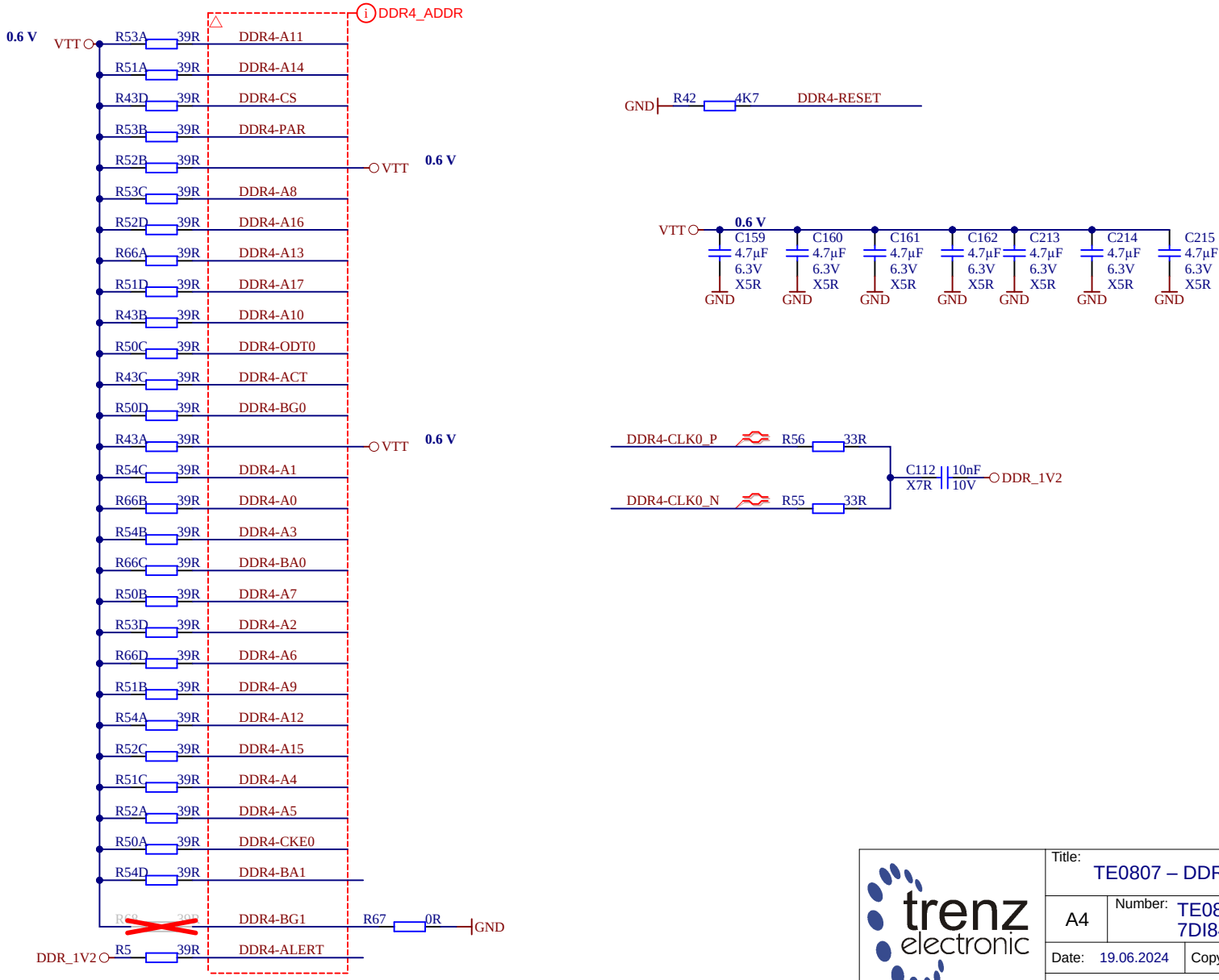
Date: 19.06.2024	Copyright: Trenz Electronic GmbH		Page 26 of 32
Filename: DDR4-RAM_4.SchDoc			



trenz electronic	Title: TE0807 – DDR4-TERM		
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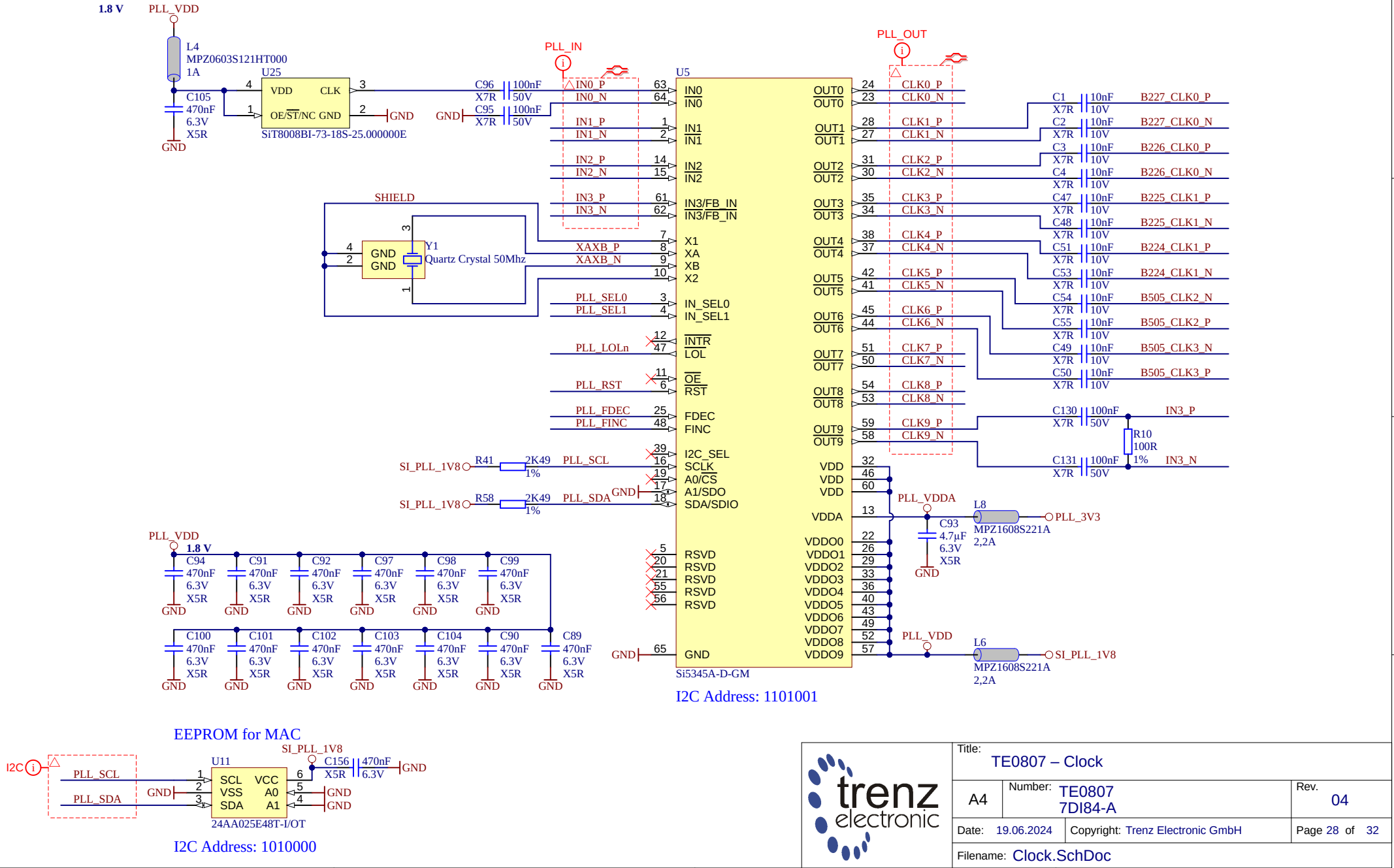
	Date: 19.06.2024	Copyright: Trenz Electronic GmbH	Page 27 of 32
	Filename: DDR4-TERM.SchDoc		



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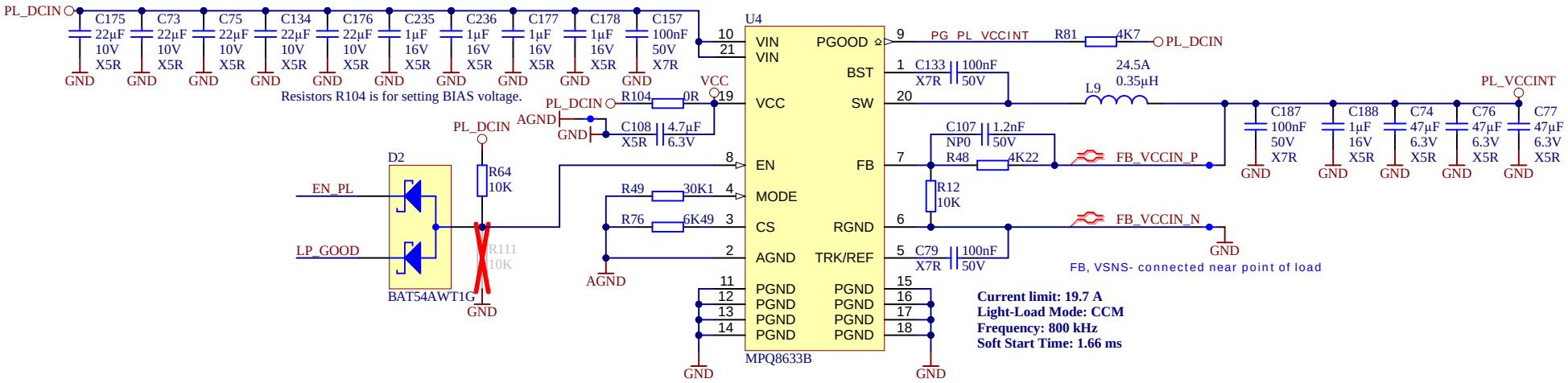
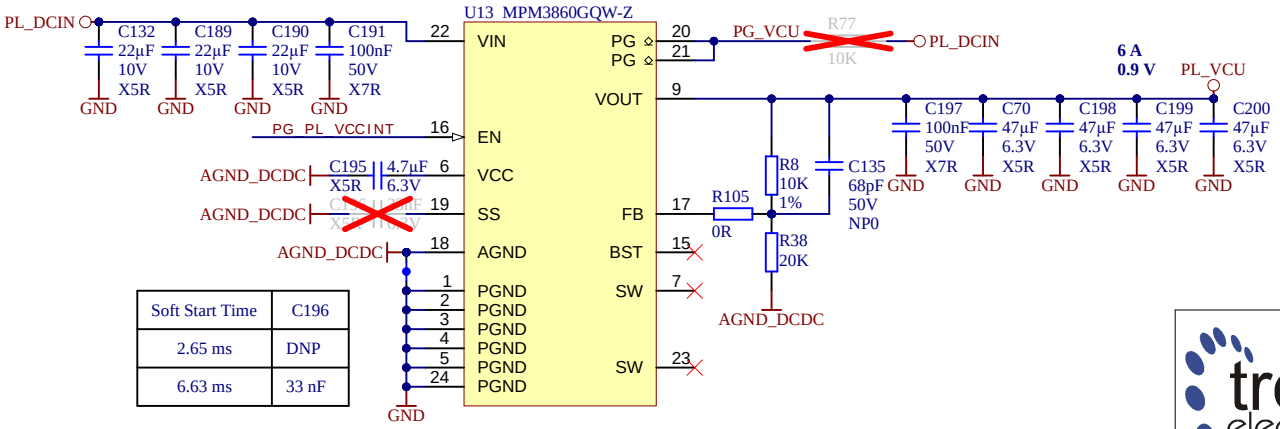
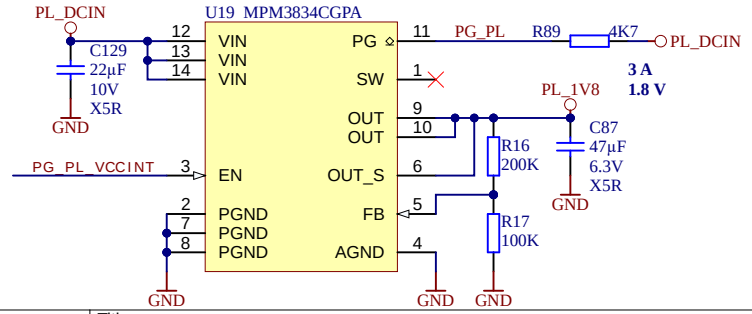
Title: TE0807 – Clock			
A4	Number: TE0807 7DI84-A		Rev. 04
Date: 19.06.2024	Copyright: Trenz Electronic GmbH		Page 28 of 32
Filename: Clock.SchDoc			



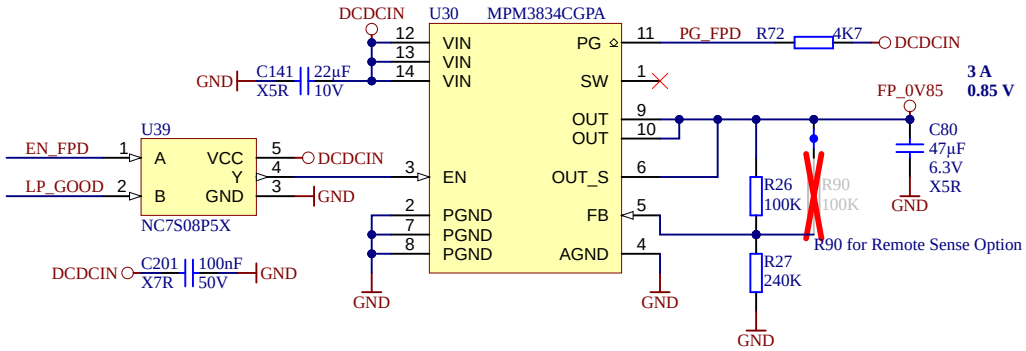
FPGA Speedgrade	R48	R12	PL_VCCINT	C107
-1	4.22 kOhm	10 kOhm	0.853 V	1.2 nF
-2	4.22 kOhm	10 kOhm	0.853 V	1.2 nF
-3	10 kOhm	20 kOhm	0.900 V	560 pF

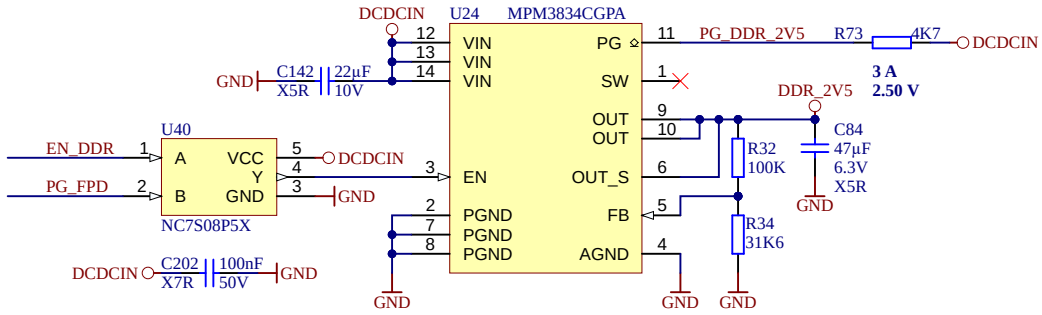


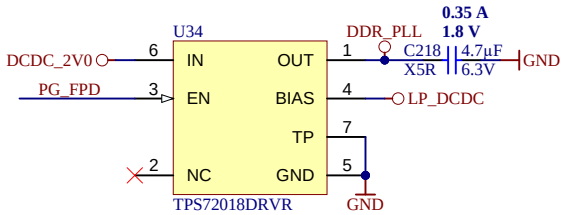
Soft Start Time	C196
2.65 ms	DNP
6.63 ms	33 nF

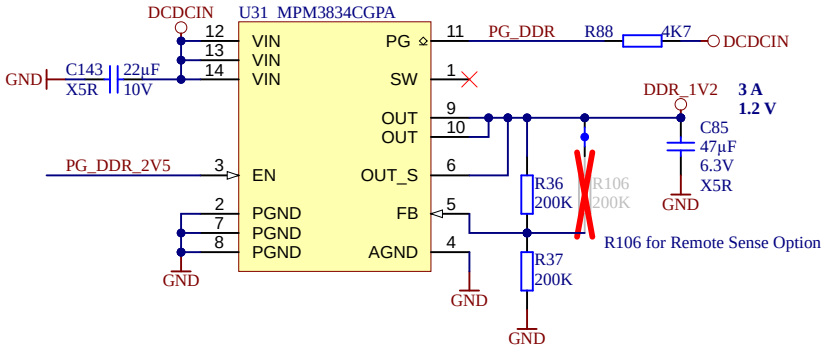


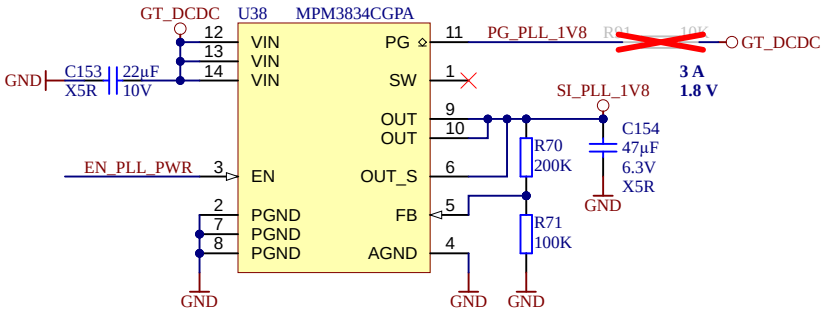
Title: TE0807 – POWER_1			
A4	Number: TE0807 7DI84-A		Rev. 04
Date: 19.06.2024	Copyright: Trenz Electronic GmbH		Page 29 of 32
Filename: POWER.SchDoc			

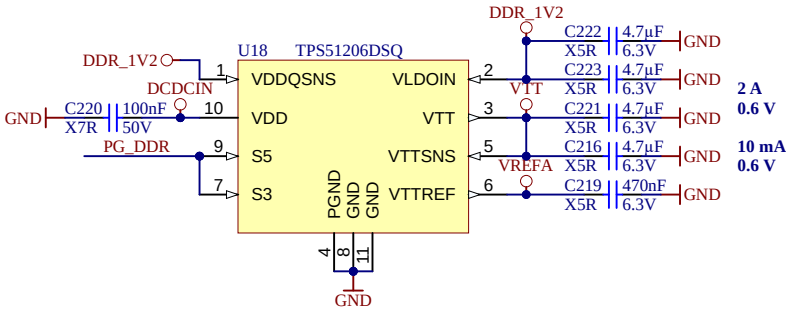












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Title: TE0807 – POWER_2		
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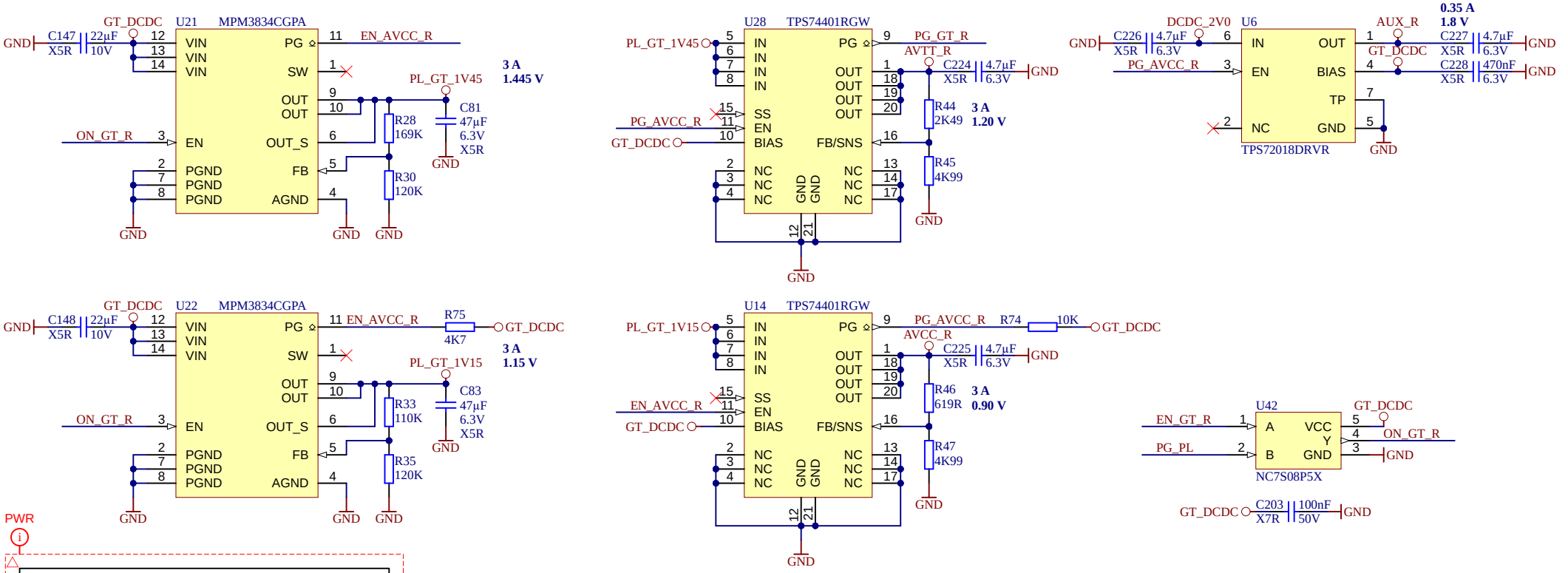
Date: 19.06.2024	Copyright: Trenz Electronic GmbH	Page 30 of 32
Filename: POWER_2.SchDoc		



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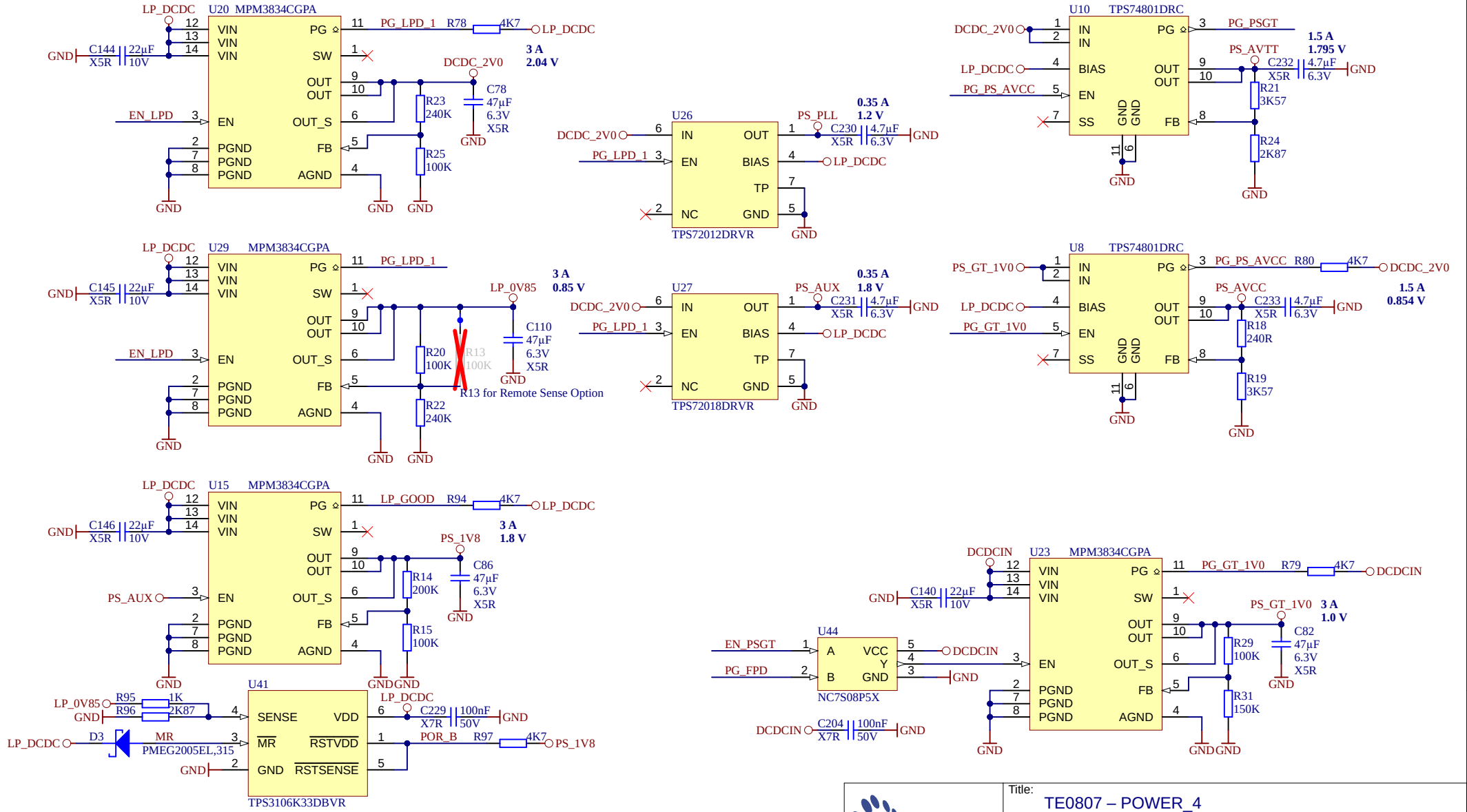
Title: TE0807 – POWER_3		
A4	Number: TE0807 7DI84-A	Rev. 04
Date: 19.06.2024	Copyright: Trenz Electronic GmbH	Page 31 of 32
Filename: POWER_3.SchDoc		



Net Name	Voltage Rail	Low Detect
LP_0V85	0.85 V	0.743 V
LP_DCDC	3.3 V	2.941 V

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Title: TE0807 – POWER_4		
A4	Number: TE0807 7DI84-A	Rev. 04
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Filename: POWER_4.SchDoc		