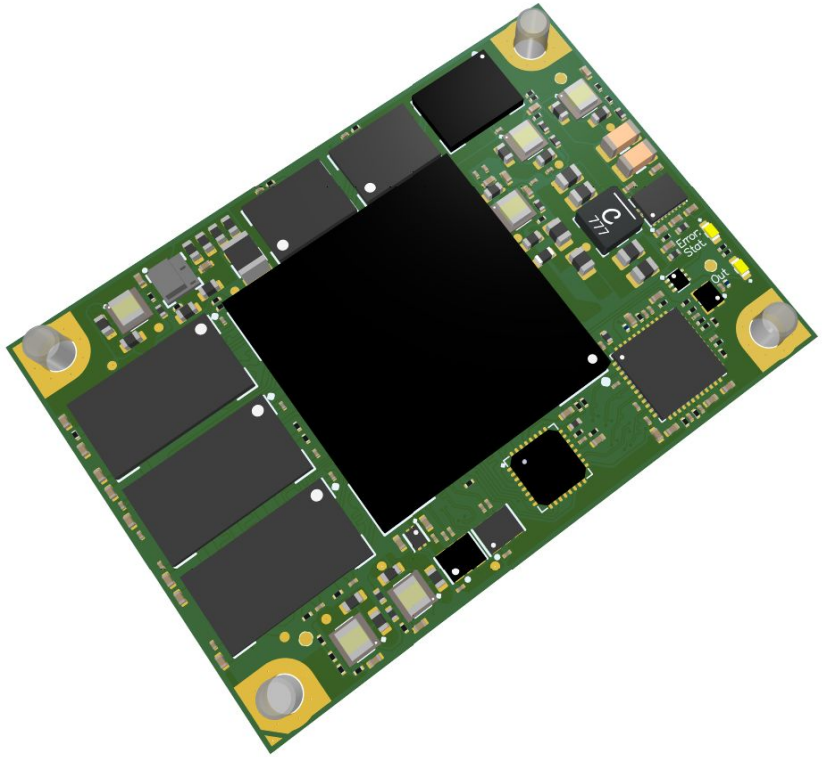

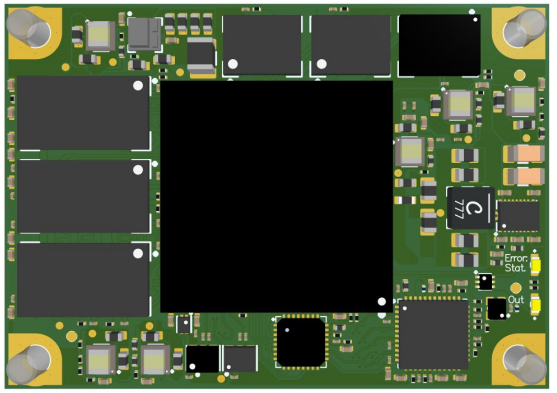

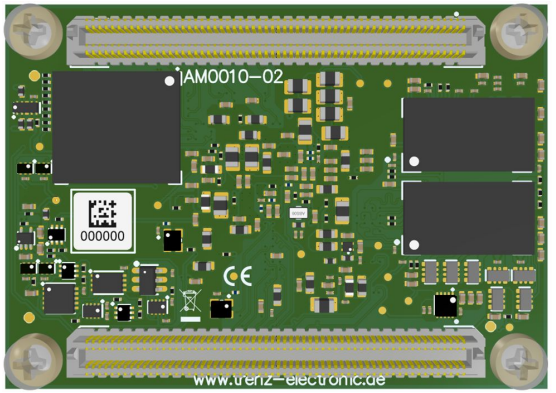

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Project is protected under copyright and we strongly and strictly prohibit the reverse engineering or recreation, even if the design is just adapted or modified. AM0010 is protected under such right and in case of plagiarism we will have to do anything necessary in order to protect our assets.

Schematics and other handouts serve for informational purposes only!

trenz electronic	Title: AM0010 – Legal Notices Modules		
A4	Number: Legal Notices Modules 2AE21MA		Rev. 02
Date: 22.07.2022	Copyright: Trenz Electronic GmbH		Page 1 of 30
Filename: Legal Notices Modules.SchDoc			

U_B2B_Connector_1
B2B_Connector_1.SchDoc

U_B2B_Connector_2
B2B_Connector_2.SchDoc

U_MPSoC
MPSoC.SchDoc

U_DDR4-RAM
DDR4-RAM.SchDoc

U_DDR4-RAM_2
DDR4-RAM_2.SchDoc

U_DDR4-RAM_3
DDR4-RAM_3.SchDoc

U_DDR4-RAM_4
DDR4-RAM_4.SchDoc

U_DDR4-RAM_5
DDR4-RAM_5.SchDoc

U_DDR4-CAPS
DDR4-CAPS.SchDoc

U_DDR4-TERM
DDR4-TERM.SchDoc

U_ETHPHY
ETHPHY.SchDoc

U_USBPHY
USBPHY.SchDoc

U_eMMC
eMMC.SchDoc

U_MISC
MISC.SchDoc

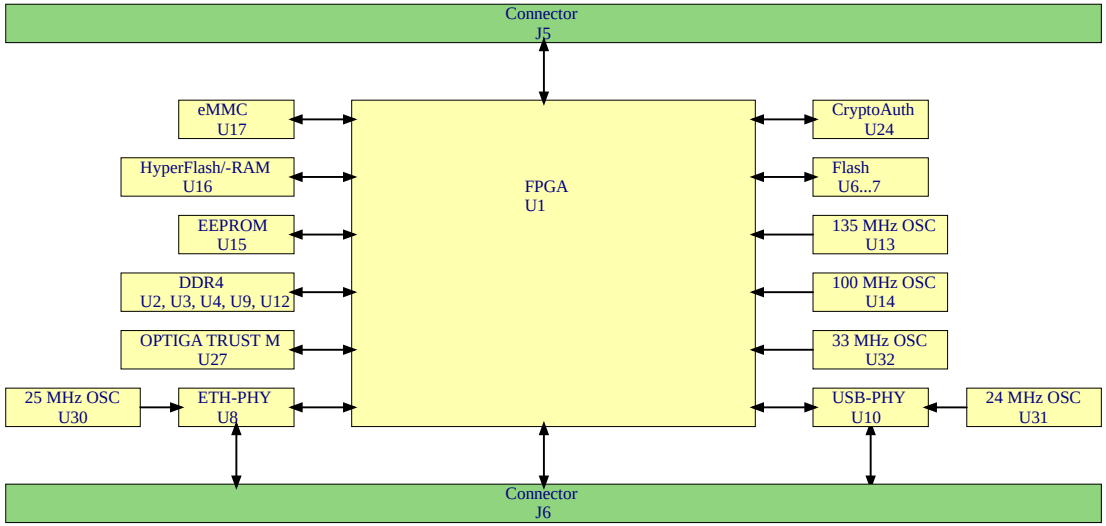
U_POWER_1
POWER_1.SchDoc

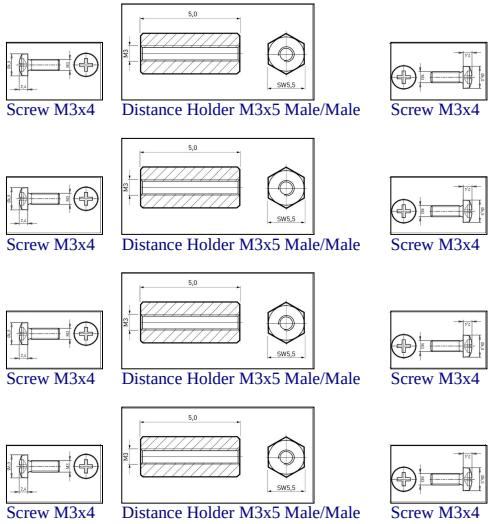
U_POWER_2
POWER_2.SchDoc

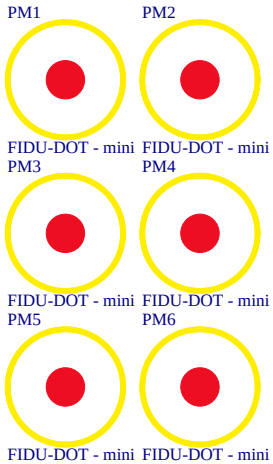
U_REV_CH
Revision_Changes.SchDoc

U_Legal_Notices_Modules
Legal Notices Modules.SchDoc

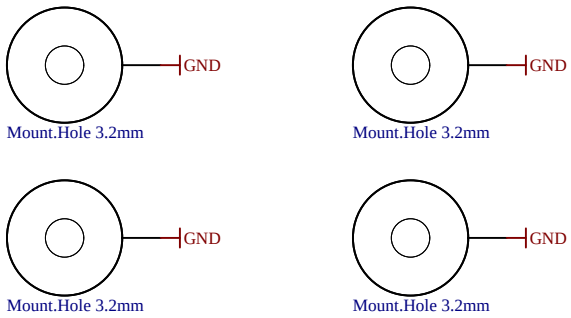
Special notes:







Serial
Serial
Serialnumber 6,3 x 6.3mm



UKCA
UKCA Logo on Top Overlay
UKCA-TOPOVERLAY

Assembly variant	2AE21MA
Created by	ED
Modified by	ED
Modified at	02.07.21
SVN Revision	

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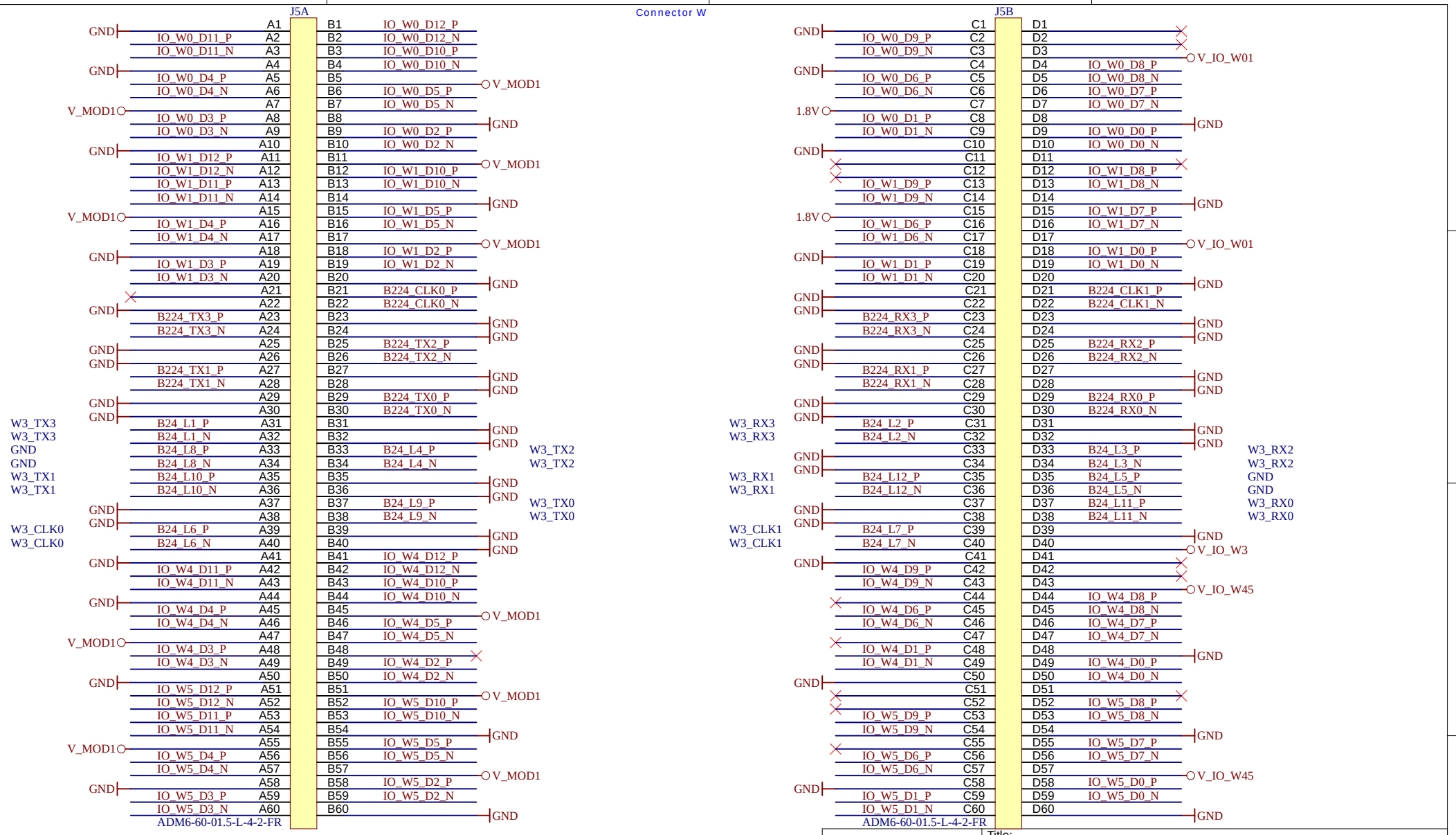
Title: AM0010		
A4	Number: AM0010 2AE21MA	Rev. 02
Date: 22.07.2022	Copyright: Trenz Electronic GmbH	Page 2 of 30
Filename: AM0010.SchDoc		



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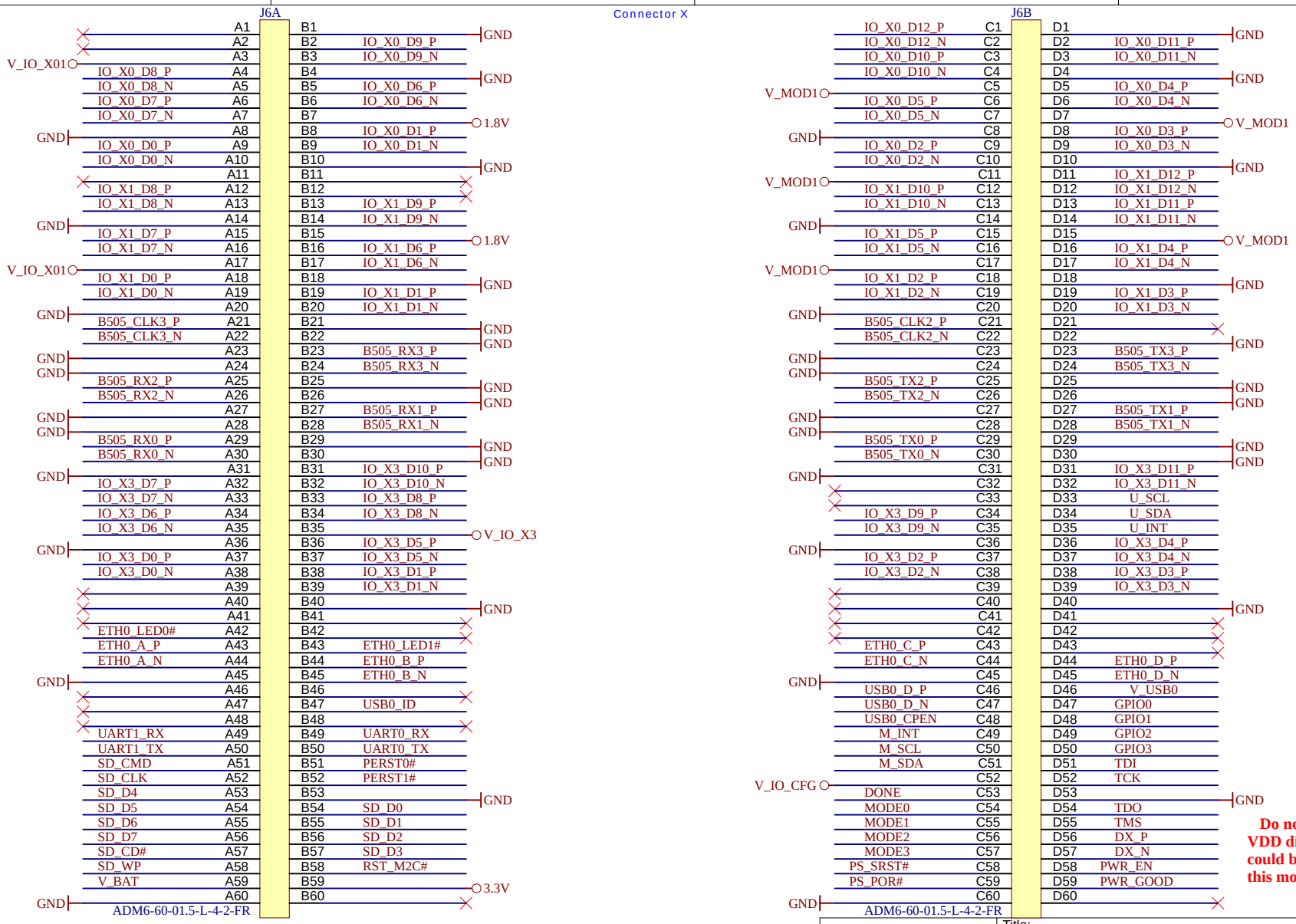
Date: 22.07.2022	Copyright: Trenz Electronic GmbH		Page 3 of 30
Filename: B2B_Connector_1.SchDoc			



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Title: AM0010 – B2B_Connector_2		
A4	Number: B2B_Connector_2 2AE21MA	Rev. 02
Date: 22.07.2022	Copyright: Trenz Electronic GmbH	Page 4 of 30
Filename: B2B_Connector_2.SchDoc		

U_B64
B64.SchDoc

U_B65
B65.SchDoc

U_B66
B66.SchDoc

U_B_HD
B_HD.SchDoc

U_B_MIO
B_MIO.SchDoc

U_PS_DDR
PS_DDR.SchDoc

U_B_PS_GT
B_PS_GT.SchDoc

U_B_GT
B_GT.SchDoc

U_CONFIG
CONFIG.SchDoc

U_ZU_POWER
ZU_POWER.SchDoc

U_ZU_PS_POWER
ZU_PS_POWER.SchDoc

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Title: AM0010 – MPSoC		
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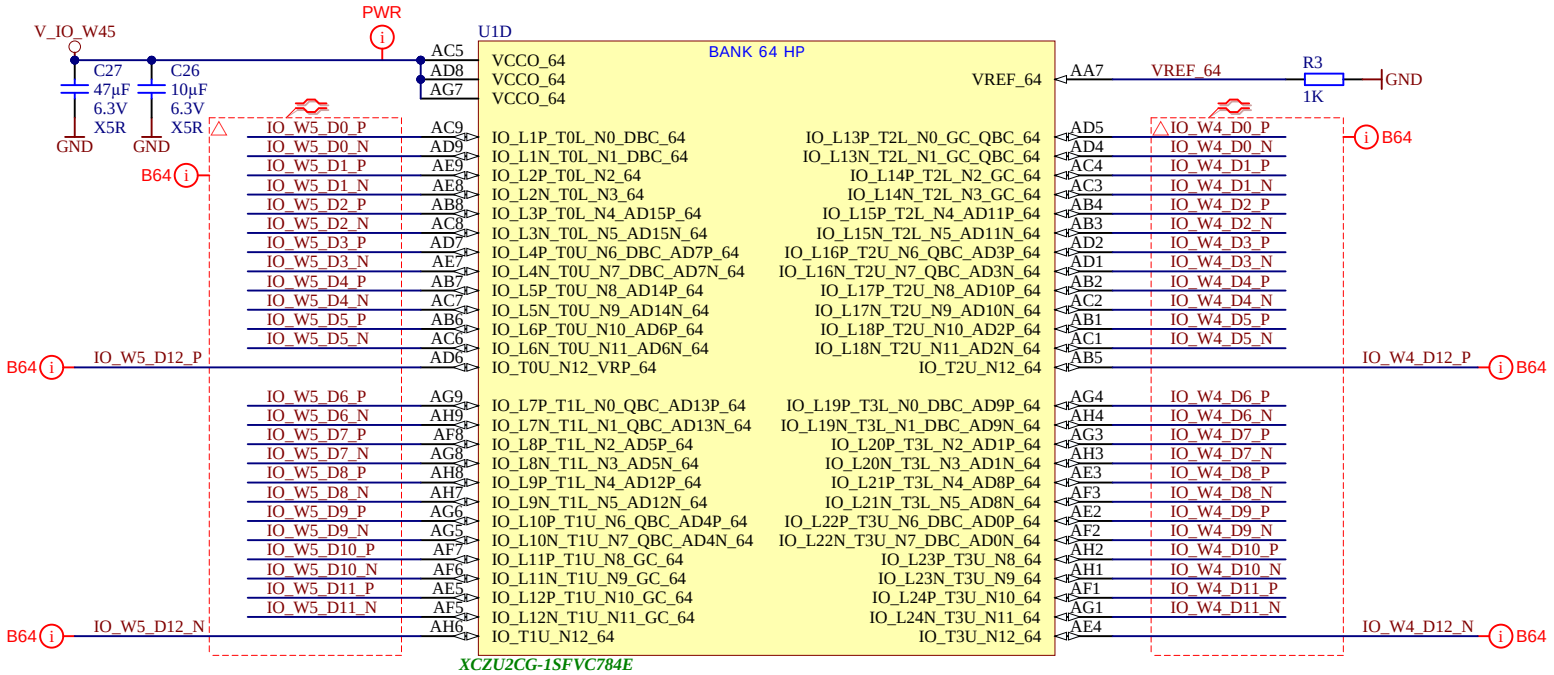
Date: 22.07.2022	Copyright: Trenz Electronic GmbH	Page 5 of 30
Filename: MPSoC.SchDoc		



trenz electronic	Title: AM0010 – B64		
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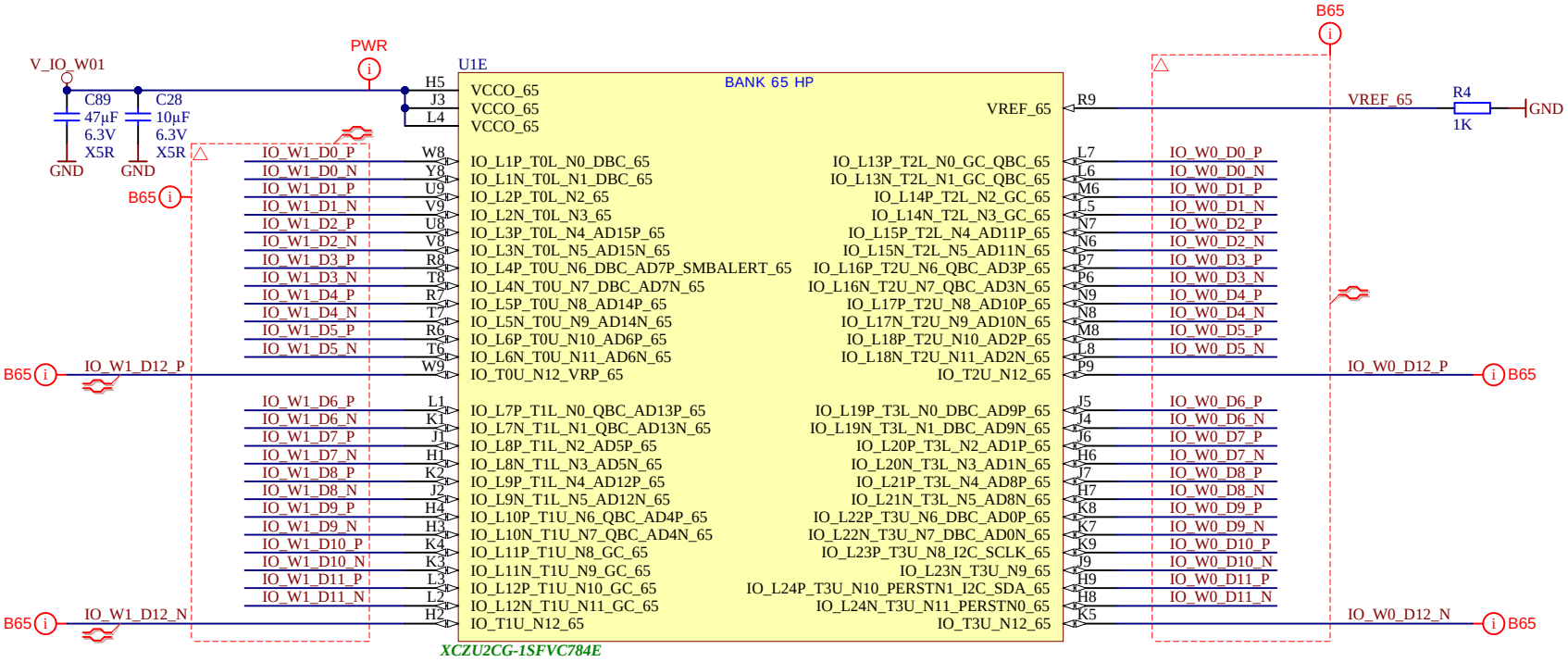
Date: 22.07.2022	Copyright: Trenz Electronic GmbH		Page 6 of 30
Filename: B64.SchDoc			



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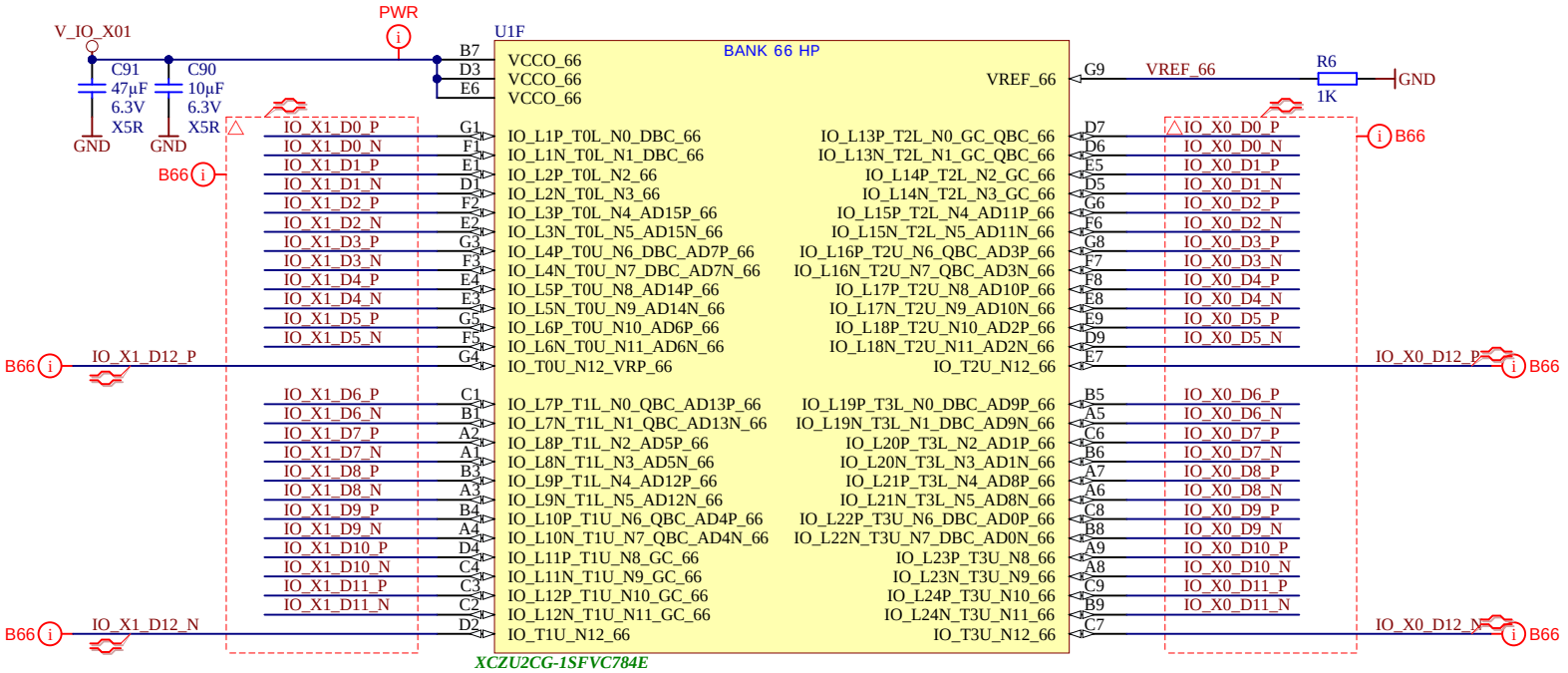
Date: 22.07.2022	Copyright: Trenz Electronic GmbH		Page 7 of 30
Filename: B65.SchDoc			



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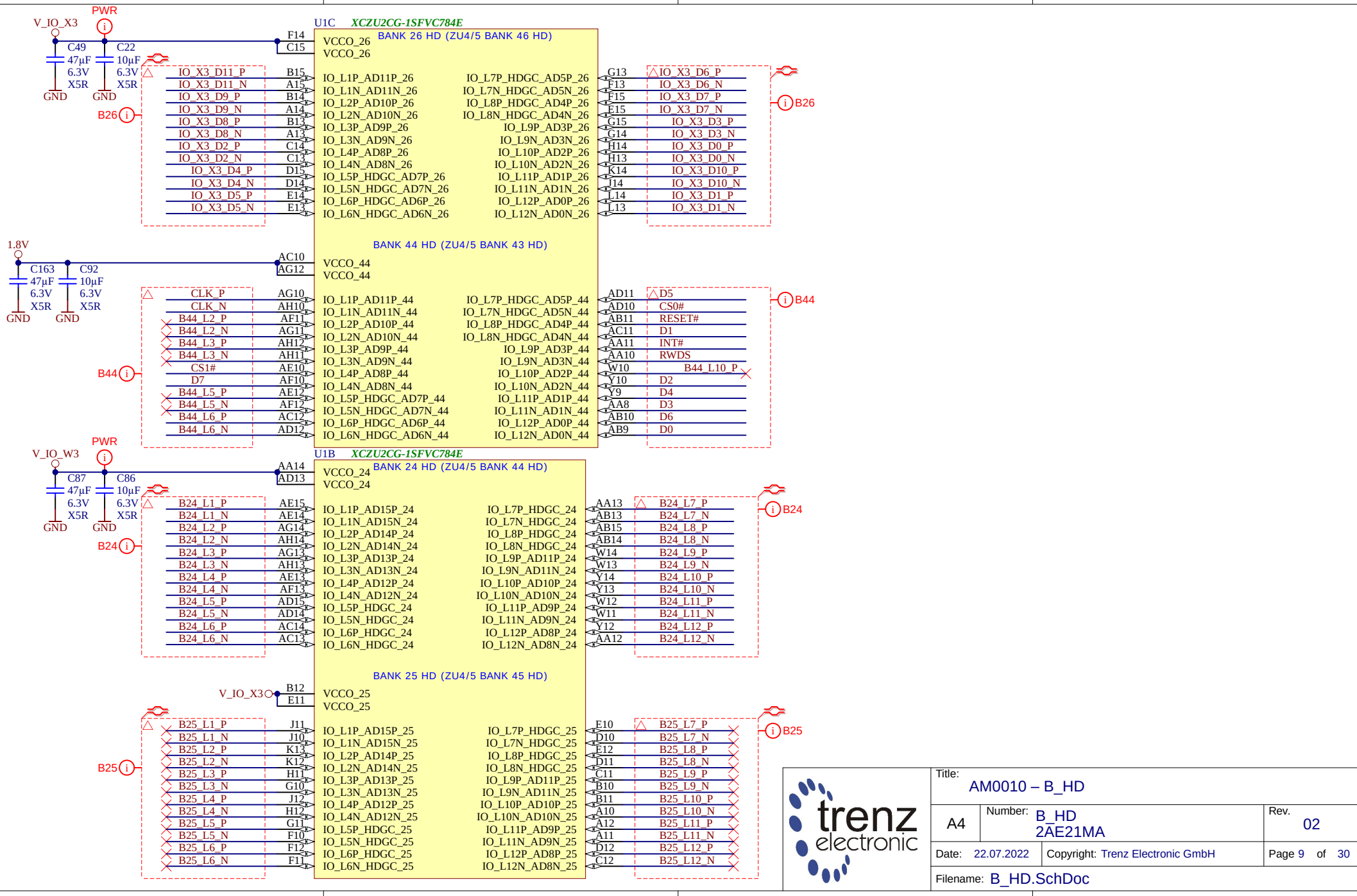
Date: 22.07.2022	Copyright: Trenz Electronic GmbH		Page 8 of 30
Filename: B66.SchDoc			


V_IO_X3
PWR
C49
47µF
6.3V
X5R
C22
10µF
6.3V
X5R
GND
U1C
XCZU2CG-1SFVC784E
BANK 26 HD (ZU4/5 BANK 46 HD)
VCCO_26
F14
C15
IO_X3_D11_P
IO_X3_D11_N
IO_X3_D9_P
IO_X3_D9_N
IO_X3_D8_P
IO_X3_D8_N
IO_X3_D2_P
IO_X3_D2_N
IO_X3_D4_P
IO_X3_D4_N
IO_X3_D5_P
IO_X3_D5_N
B26
IO_X3_D6_P
IO_X3_D6_N
IO_X3_D7_P
IO_X3_D7_N
IO_X3_D3_P
IO_X3_D3_N
IO_X3_D0_P
IO_X3_D0_N
IO_X3_D10_P
IO_X3_D10_N
IO_X3_D1_P
IO_X3_D1_N
1.8V
C163
47µF
6.3V
X5R
C92
10µF
6.3V
X5R
BANK 44 HD (ZU4/5 BANK 43 HD)
VCCO_44
AC10
AG12
CLK_P
CLK_N
B44_L2_P
B44_L2_N
B44_L3_P
B44_L3_N
CS1#
D7
B44_L5_P
B44_L5_N
B44_L6_P
B44_L6_N
B44
D5
CS0#
RESET#
D1
INT#
RWDS
B44_L10_P
D2
D4
D3
D6
D0
U1B
XCZU2CG-1SFVC784E
BANK 24 HD (ZU4/5 BANK 44 HD)
VCCO_24
AA14
AD13
V_IO_W3
C87
47µF
6.3V
X5R
C86
10µF
6.3V
X5R
B24_L1_P
B24_L1_N
B24_L2_P
B24_L2_N
B24_L3_P
B24_L3_N
B24_L4_P
B24_L4_N
B24_L5_P
B24_L5_N
B24_L6_P
B24_L6_N
B24
B24_L7_P
B24_L7_N
B24_L8_P
B24_L8_N
B24_L9_P
B24_L9_N
B24_L10_P
B24_L10_N
B24_L11_P
B24_L11_N
B24_L12_P
B24_L12_N
BANK 25 HD (ZU4/5 BANK 45 HD)
V_IO_X3
B12
E11
B25_L1_P
B25_L1_N
B25_L2_P
B25_L2_N
B25_L3_P
B25_L3_N
B25_L4_P
B25_L4_N
B25_L5_P
B25_L5_N
B25_L6_P
B25_L6_N
B25
B25_L7_P
B25_L7_N
B25_L8_P
B25_L8_N
B25_L9_P
B25_L9_N
B25_L10_P
B25_L10_N
B25_L11_P
B25_L11_N
B25_L12_P
B25_L12_N
IO_L1P_AD11P_26
IO_L1N_AD11N_26
IO_L2P_AD10P_26
IO_L2N_AD10N_26
IO_L3P_AD9P_26
IO_L3N_AD9N_26
IO_L4P_AD8P_26
IO_L4N_AD8N_26
IO_L5P_HDGC_AD7P_26
IO_L5N_HDGC_AD7N_26
IO_L6P_HDGC_AD6P_26
IO_L6N_HDGC_AD6N_26
IO_L7P_HDGC_AD5P_26
IO_L7N_HDGC_AD5N_26
IO_L8P_HDGC_AD4P_26
IO_L8N_HDGC_AD4N_26
IO_L9P_AD3P_26
IO_L9N_AD3N_26
IO_L10P_AD2P_26
IO_L10N_AD2N_26
IO_L11P_AD1P_26
IO_L11N_AD1N_26
IO_L12P_AD0P_26
IO_L12N_AD0N_26
IO_L1P_AD11P_44
IO_L1N_AD11N_44
IO_L2P_AD10P_44
IO_L2N_AD10N_44
IO_L3P_AD9P_44
IO_L3N_AD9N_44
IO_L4P_AD8P_44
IO_L4N_AD8N_44
IO_L5P_HDGC_AD7P_44
IO_L5N_HDGC_AD7N_44
IO_L6P_HDGC_AD6P_44
IO_L6N_HDGC_AD6N_44
IO_L7P_HDGC_AD5P_44
IO_L7N_HDGC_AD5N_44
IO_L8P_HDGC_AD4P_44
IO_L8N_HDGC_AD4N_44
IO_L9P_AD3P_44
IO_L9N_AD3N_44
IO_L10P_AD2P_44
IO_L10N_AD2N_44
IO_L11P_AD1P_44
IO_L11N_AD1N_44
IO_L12P_AD0P_44
IO_L12N_AD0N_44
IO_L1P_AD15P_24
IO_L1N_AD15N_24
IO_L2P_AD14P_24
IO_L2N_AD14N_24
IO_L3P_AD13P_24
IO_L3N_AD13N_24
IO_L4P_AD12P_24
IO_L4N_AD12N_24
IO_L5P_HDGC_24
IO_L5N_HDGC_24
IO_L6P_HDGC_24
IO_L6N_HDGC_24
IO_L7P_HDGC_24
IO_L7N_HDGC_24
IO_L8P_HDGC_24
IO_L8N_HDGC_24
IO_L9P_AD11P_24
IO_L9N_AD11N_24
IO_L10P_AD10P_24
IO_L10N_AD10N_24
IO_L11P_AD9P_24
IO_L11N_AD9N_24
IO_L12P_AD8P_24
IO_L12N_AD8N_24
IO_L1P_AD15P_25
IO_L1N_AD15N_25
IO_L2P_AD14P_25
IO_L2N_AD14N_25
IO_L3P_AD13P_25
IO_L3N_AD13N_25
IO_L4P_AD12P_25
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IO_L7N_HDGC_25
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IO_L9P_AD11P_25
IO_L9N_AD11N_25
IO_L10P_AD10P_25
IO_L10N_AD10N_25
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IO_L12N_AD8N_25
trenz electronic
Title: AM0010 – B_HD
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Number: B_HD 2AE21MA
Rev. 02
Date: 22.07.2022
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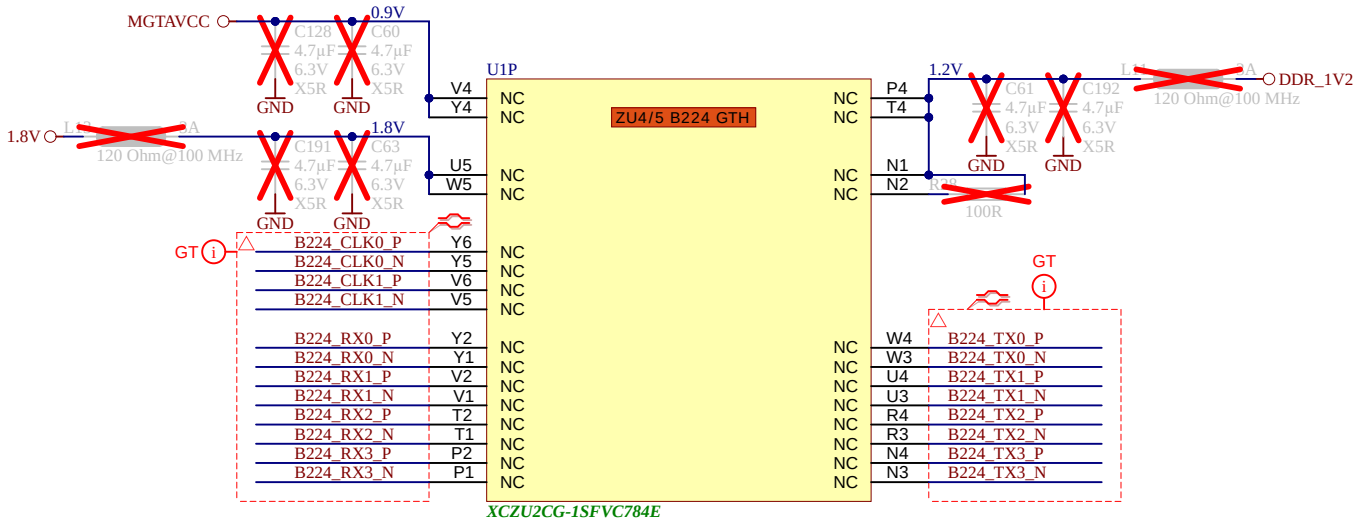
Filename: B_HD.SchDoc



trenz electronic	Title: AM0010 – B_GT		
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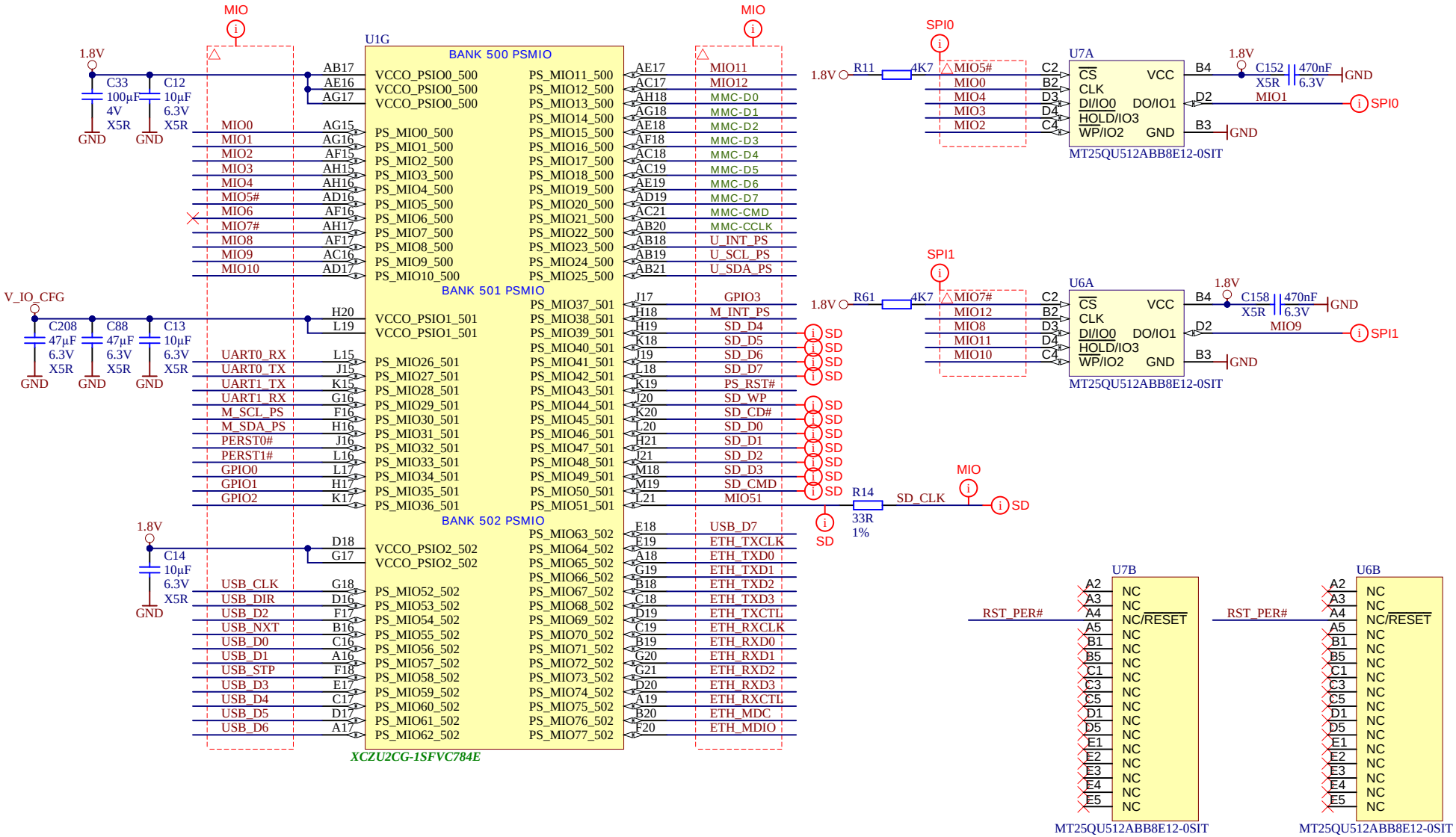
Date: 22.07.2022	Copyright: Trenz Electronic GmbH		Page 10 of 30
Filename: B_GT.SchDoc			



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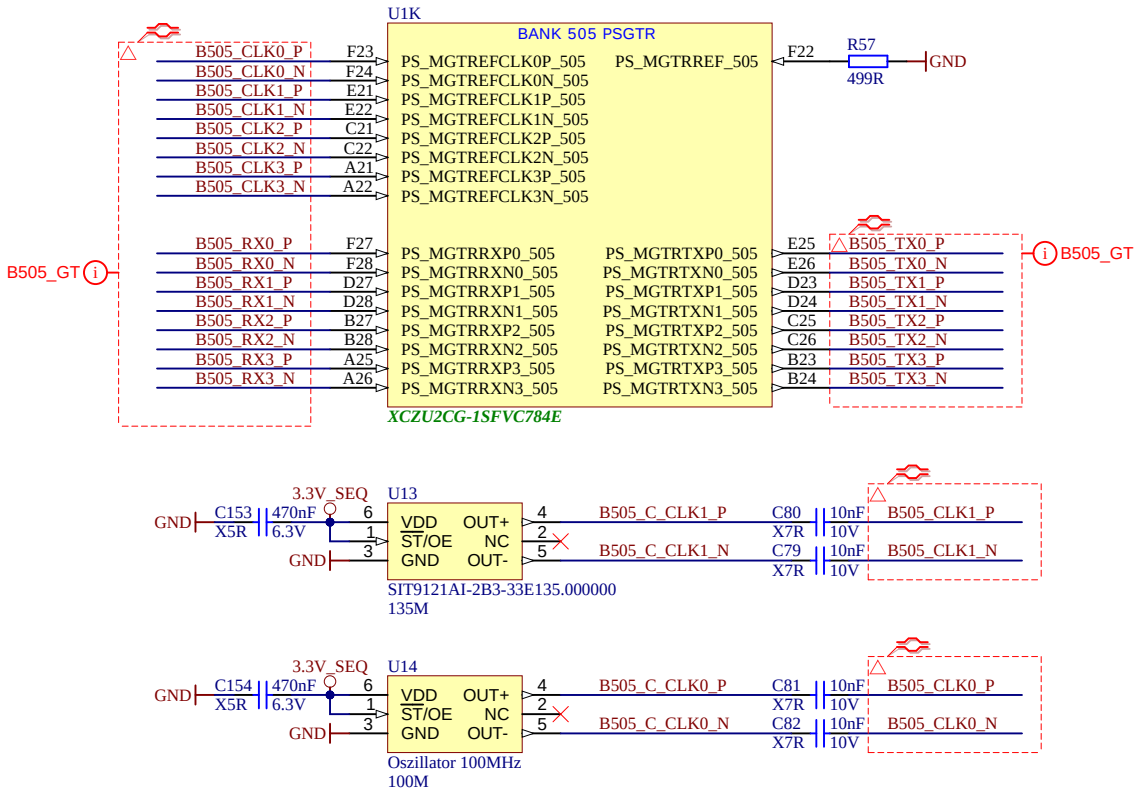
Date: 22.07.2022	Copyright: Trenz Electronic GmbH		Page 11 of 30
Filename: B_MIO.SchDoc			



trenz electronic	Title: AM0010 – B_PS_GT	
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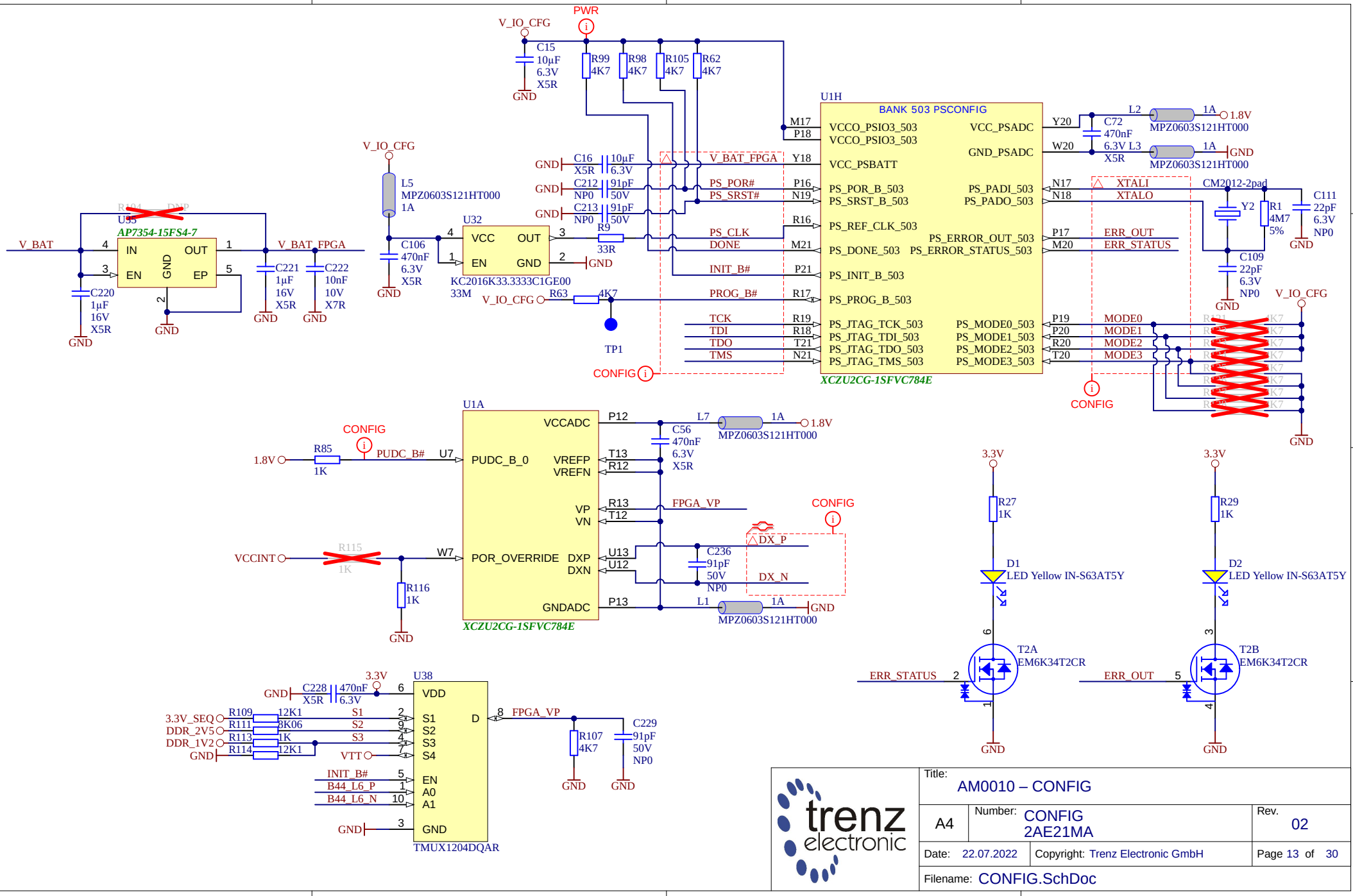
Date: 22.07.2022	Copyright: Trenz Electronic GmbH	Page 12 of 30
Filename: B_PS_GT.SchDoc		



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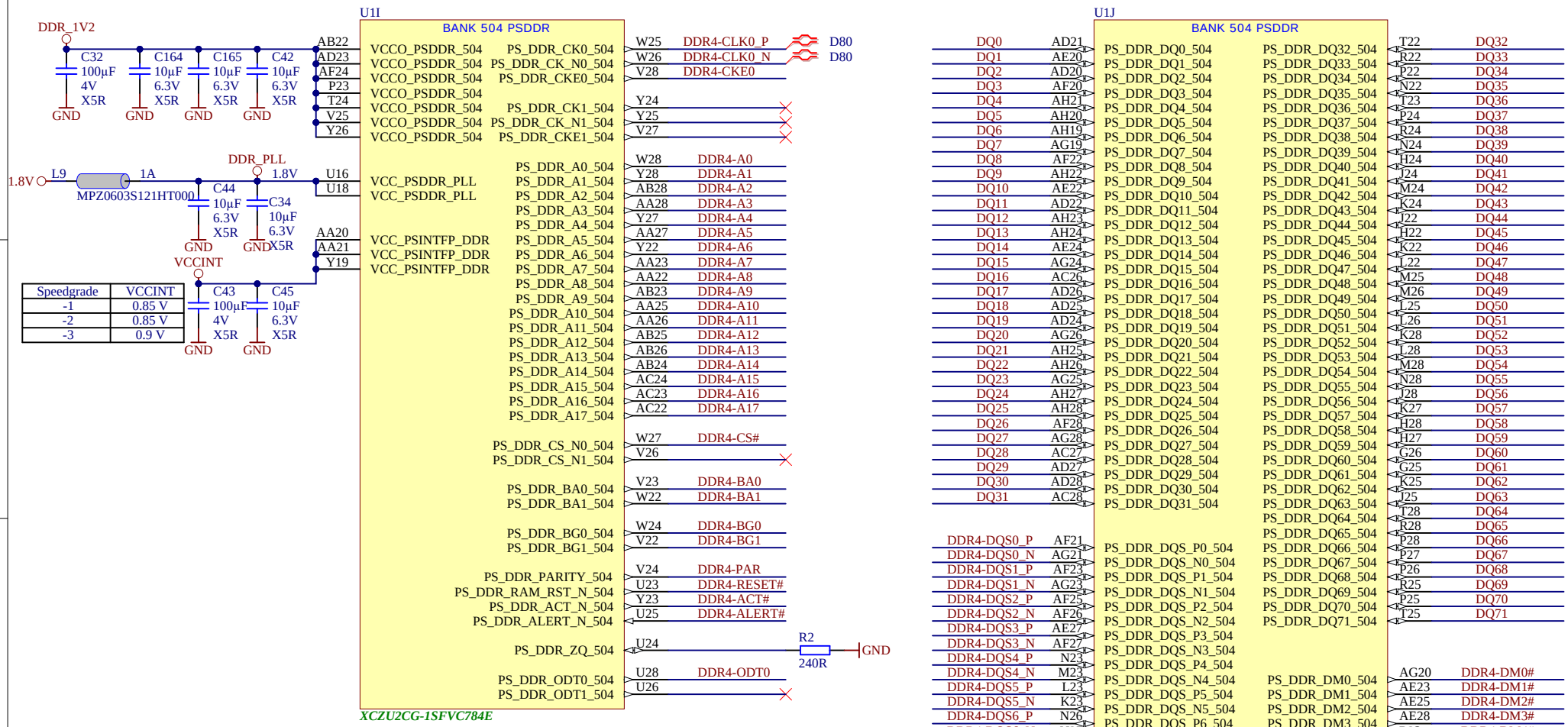
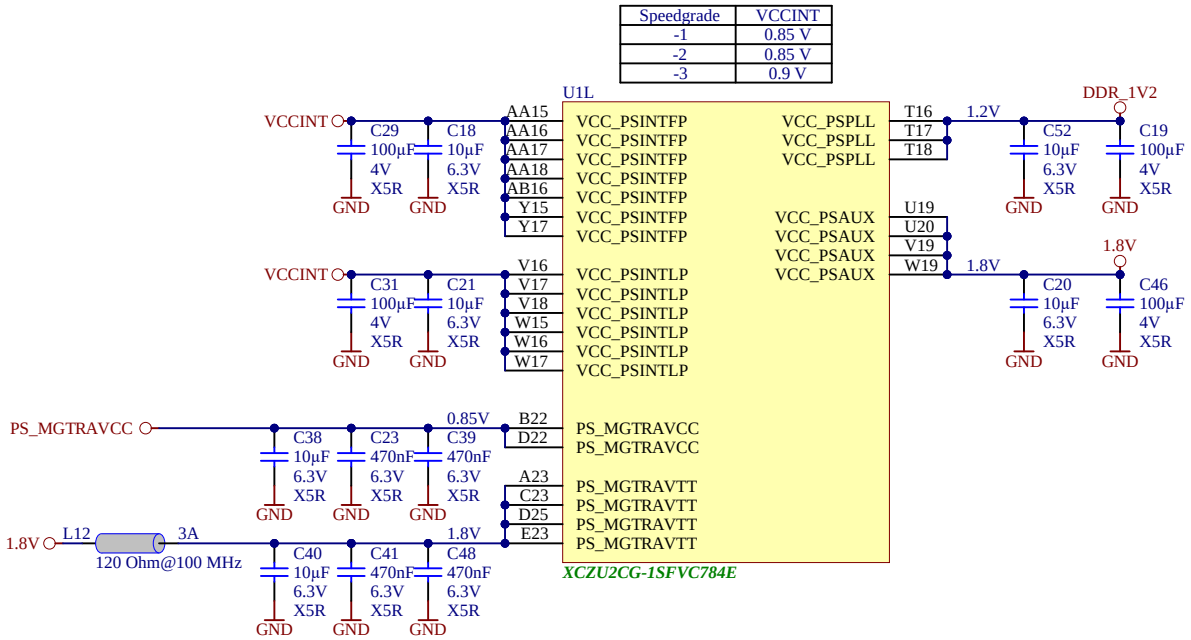
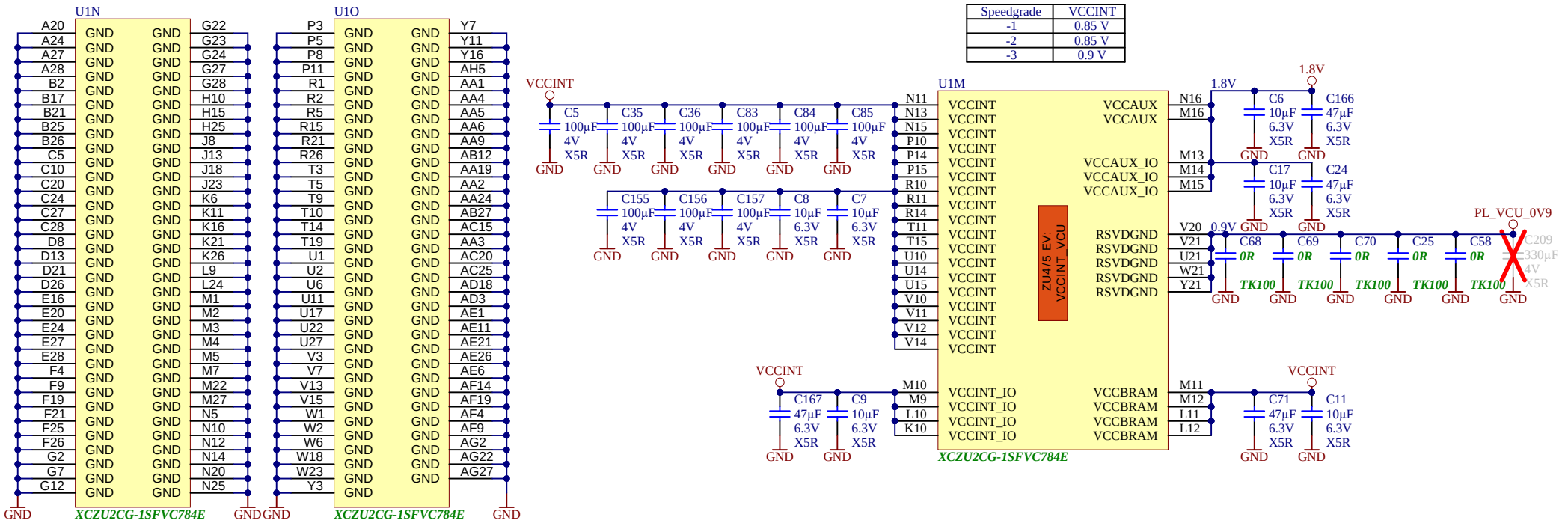
Title: AM0010 – CONFIG			
A4	Number: CONFIG 2AE21MA		Rev. 02
Date: 22.07.2022	Copyright: Trenz Electronic GmbH		Page 13 of 30
Filename: CONFIG.SchDoc			



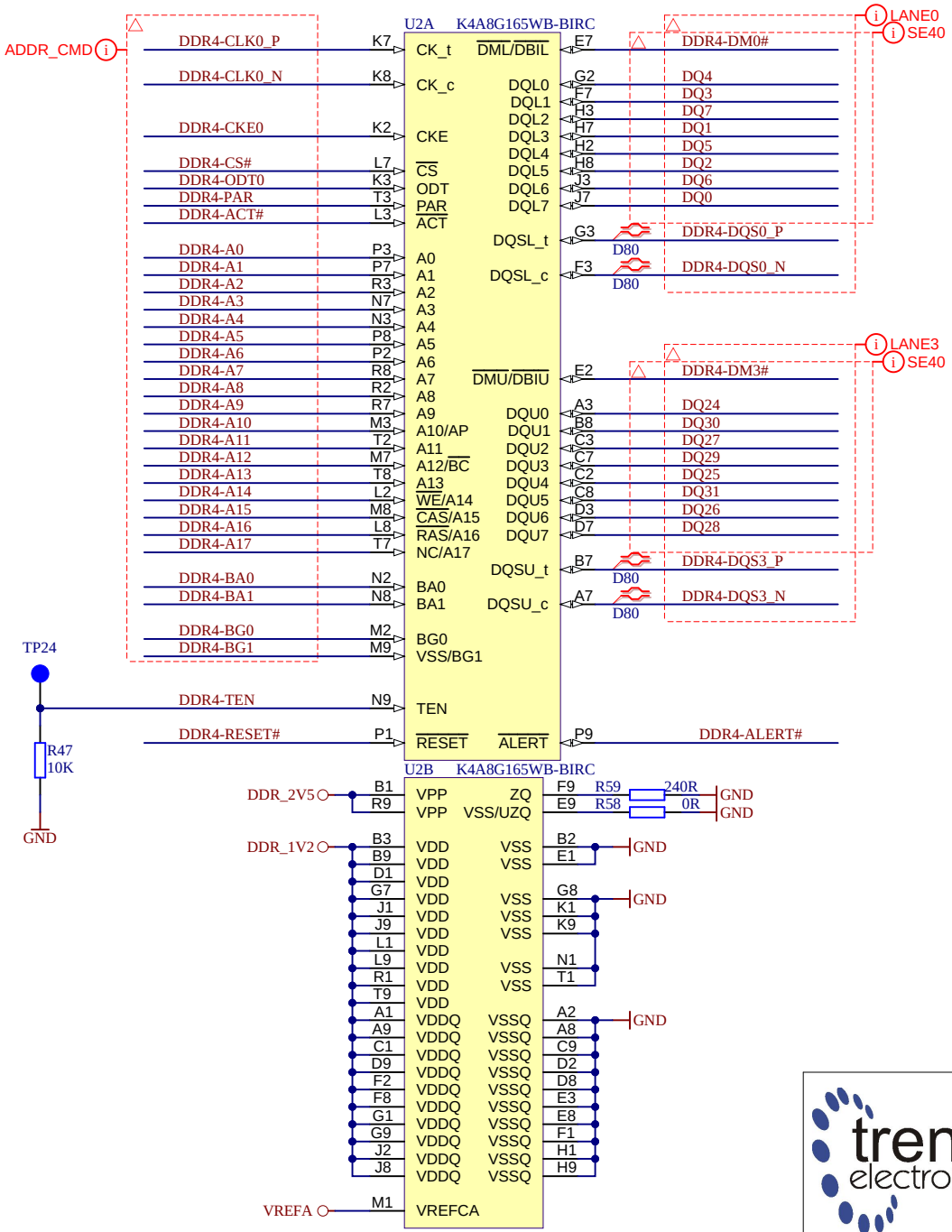
Title:	AM0010 – PS_DDR
A4	Number: PS_DDR 2AE21MA
Rev.	02
Date: 22.07.2022	Copyright: Trenz Electronic GmbH
Page 14 of 30	
Filename: PS_DDR.SchDoc	



trenz electronic	Title: AM0010 – ZU_PS_POWER		
A4	Number: ZU_PS_POWER 2AE21MA		Rev. 02
Date: 22.07.2022	Copyright: Trenz Electronic GmbH		Page 15 of 30
Filename: ZU_PS_POWER.SchDoc			



Title: AM0010 – ZU_POWER		
A4	Number: ZU_POWER 2AE21MA	Rev. 02
Date: 22.07.2022	Copyright: Trenz Electronic GmbH	Page 16 of 30
Filename: ZU_POWER.SchDoc		



trenz electronic	Title: AM0010 – DDR4-RAM		
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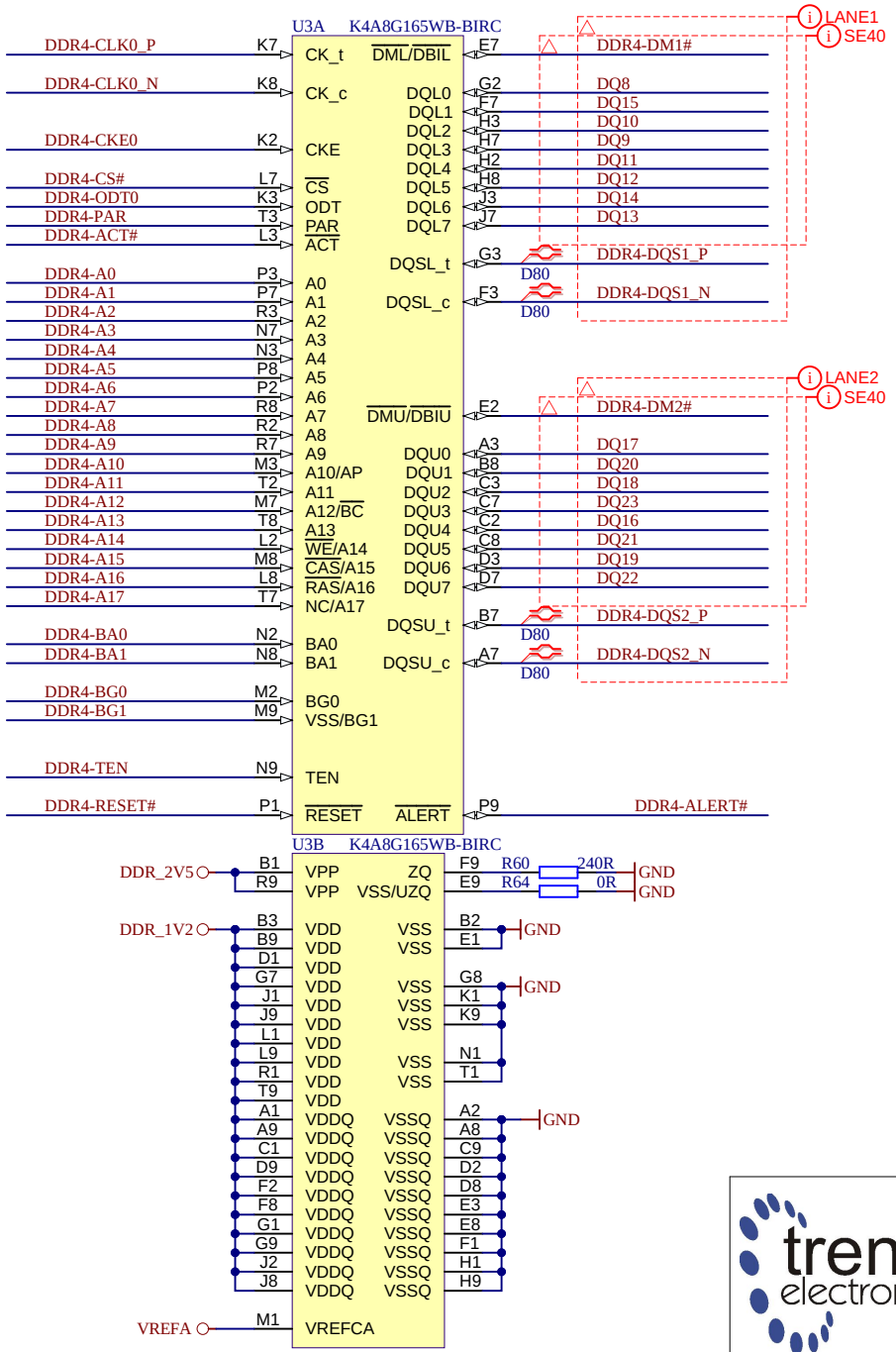
	Date: 22.07.2022	Copyright: Trenz Electronic GmbH	Page 17 of 30
	Filename: DDR4-RAM.SchDoc		



trenz electronic	Title: AM0010 – DDR4-RAM_2		
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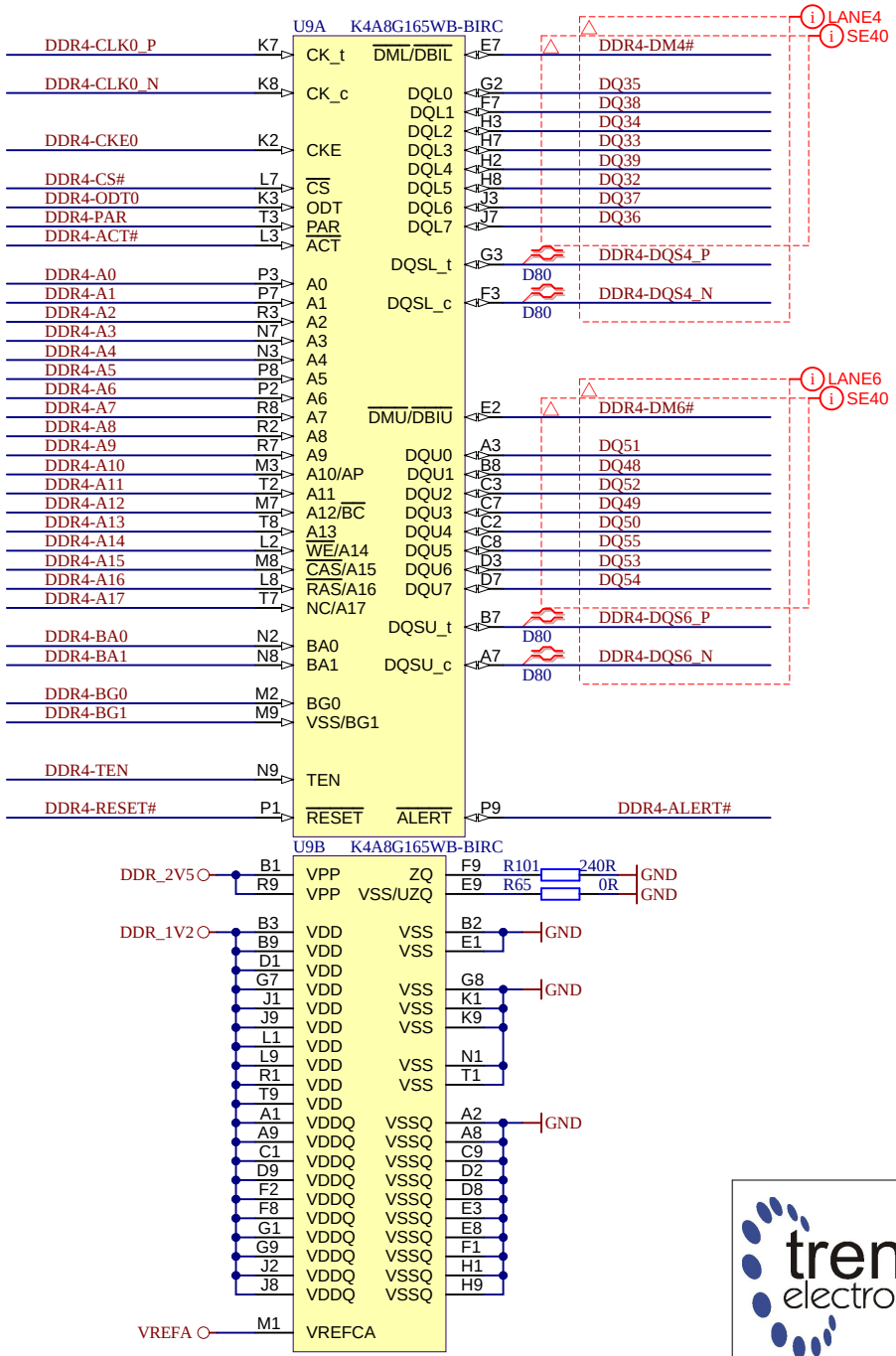
	Date: 22.07.2022	Copyright: Trenz Electronic GmbH	Page 18 of 30
	Filename: DDR4-RAM_2.SchDoc		



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Title: AM0010 – DDR4-RAM_3		
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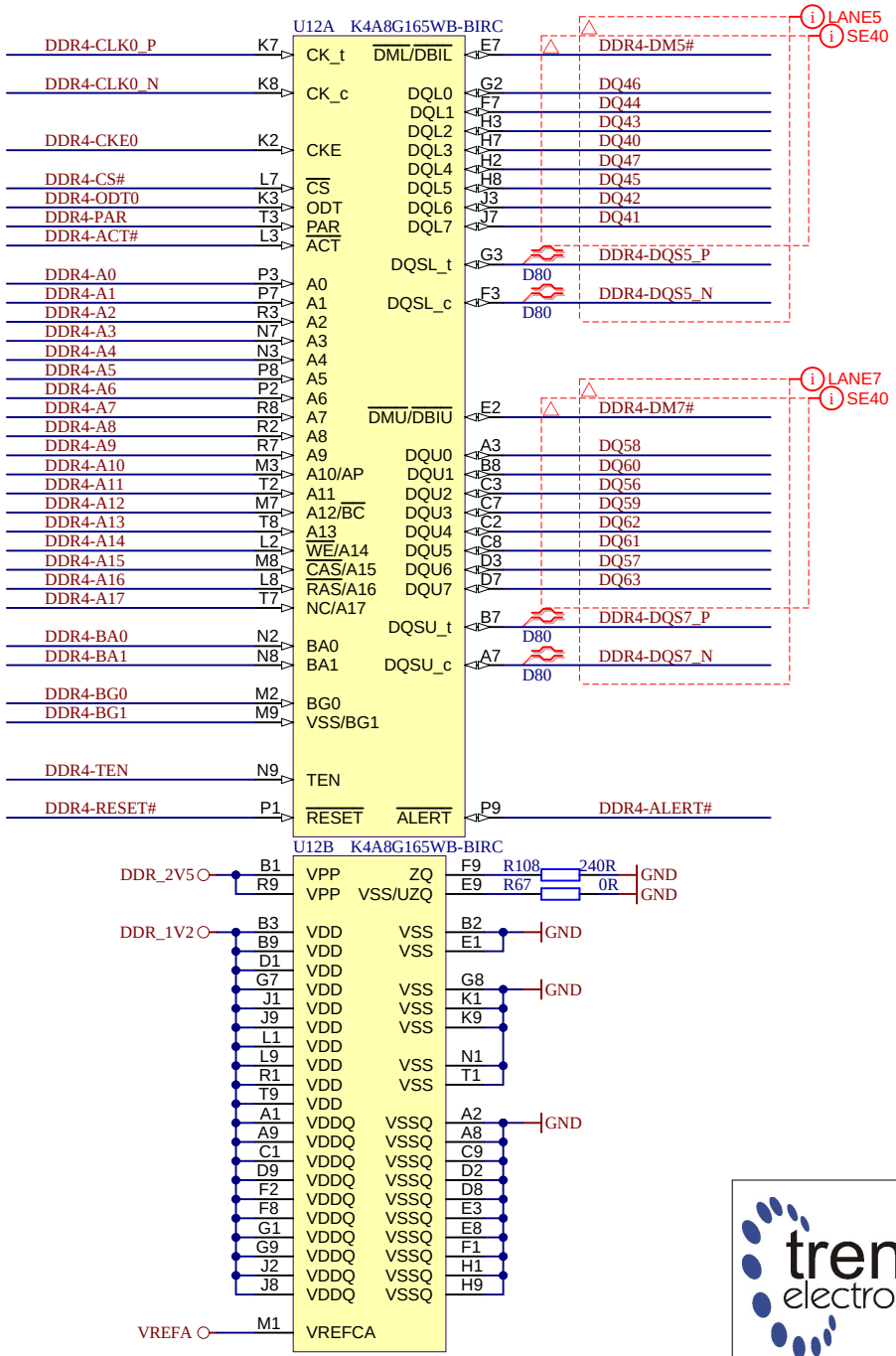
Date: 22.07.2022	Copyright: Trenz Electronic GmbH	Page 19 of 30
Filename: DDR4-RAM_3.SchDoc		


U12A K4A8G165WB-BIRC
DDR4-CLK0_P K7 CK_t
DDR4-CLK0_N K8 CK_c
DDR4-CKE0 K2 CKE
DDR4-CS# L7 CS
DDR4-ODT0 K3 ODT
DDR4-PAR T3 PAR
DDR4-ACT# L3 ACT
DDR4-A0 P3 A0
DDR4-A1 P7 A1
DDR4-A2 R3 A2
DDR4-A3 N7 A3
DDR4-A4 N3 A4
DDR4-A5 P8 A5
DDR4-A6 P2 A6
DDR4-A7 R8 A7
DDR4-A8 R2 A8
DDR4-A9 R7 A9
DDR4-A10 M3 A10/AP
DDR4-A11 T2 A11
DDR4-A12 M7 A12/BC
DDR4-A13 T8 A13
DDR4-A14 L2 WE/A14
DDR4-A15 M8 CAS/A15
DDR4-A16 L8 RAS/A16
DDR4-A17 T7 NC/A17
DDR4-BA0 N2 BA0
DDR4-BA1 N8 BA1
DDR4-BG0 M2 BG0
DDR4-BG1 M9 VSS/BG1
DDR4-TEN N9 TEN
DDR4-RESET# P1 RESET
DML/DBIL E7 DDR4-DM5#
DQL0 G2 DQ46
DQL1 F7 DQ44
DQL2 H3 DQ43
DQL3 H7 DQ40
DQL4 H2 DQ47
DQL5 H8 DQ45
DQL6 J3 DQ42
DQL7 J7 DQ41
DQSL_t G3 DDR4-DQS5_P
DQSL_c F3 DDR4-DQS5_N
D80
D80
LANE5
SE40
DMU/DBIU E2 DDR4-DM7#
DQU0 A3 DQ58
DQU1 B8 DQ60
DQU2 C3 DQ56
DQU3 C7 DQ59
DQU4 C2 DQ62
DQU5 C8 DQ61
DQU6 D3 DQ57
DQU7 D7 DQ63
DQSU_t B7 DDR4-DQS7_P
DQSU_c A7 DDR4-DQS7_N
D80
D80
LANE7
SE40
ALERT P9 DDR4-ALERT#
U12B K4A8G165WB-BIRC
DDR_2V5 B1 R9 VPP
VPP
ZQ F9 R108 240R GND
VSS/UZQ E9 R67 0R GND
DDR_1V2 B3 B9 D1 G7 J1 J9 L1 L9 R1 T9 VDD
VDD
VSS B2 E1 GND
G8 K1 K9 N1 T1 GND
A1 A9 C1 D9 F2 F8 G1 G9 J2 J8 VDDQ
VSSQ A2 A8 C9 D2 D8 E3 E8 F1 H1 H9 GND
VREFA M1 VREFCA
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Title: AM0010 – DDR4-RAM_4
A4
Number: DDR4-RAM_4 2AE21MA
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Date: 22.07.2022
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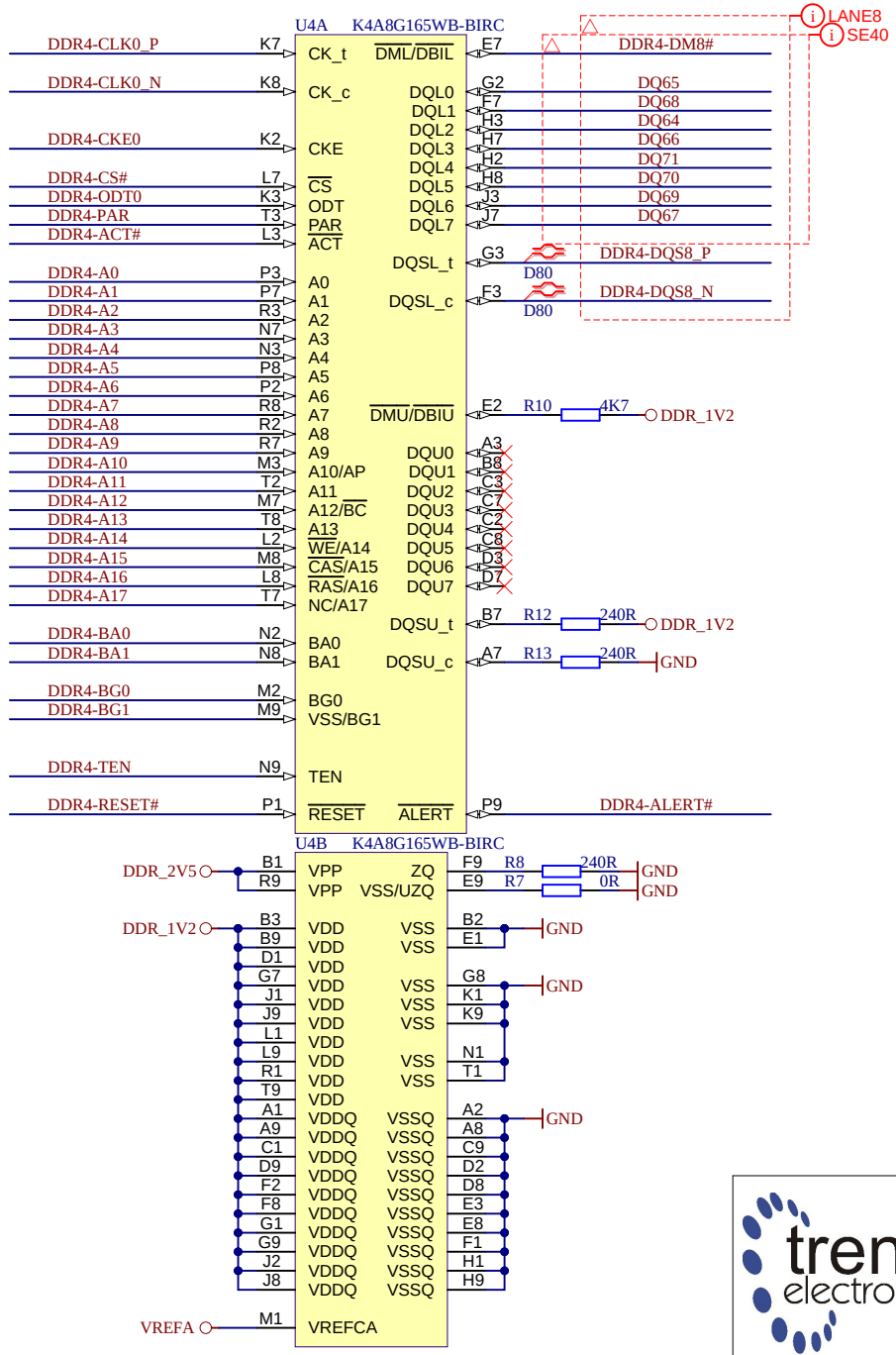
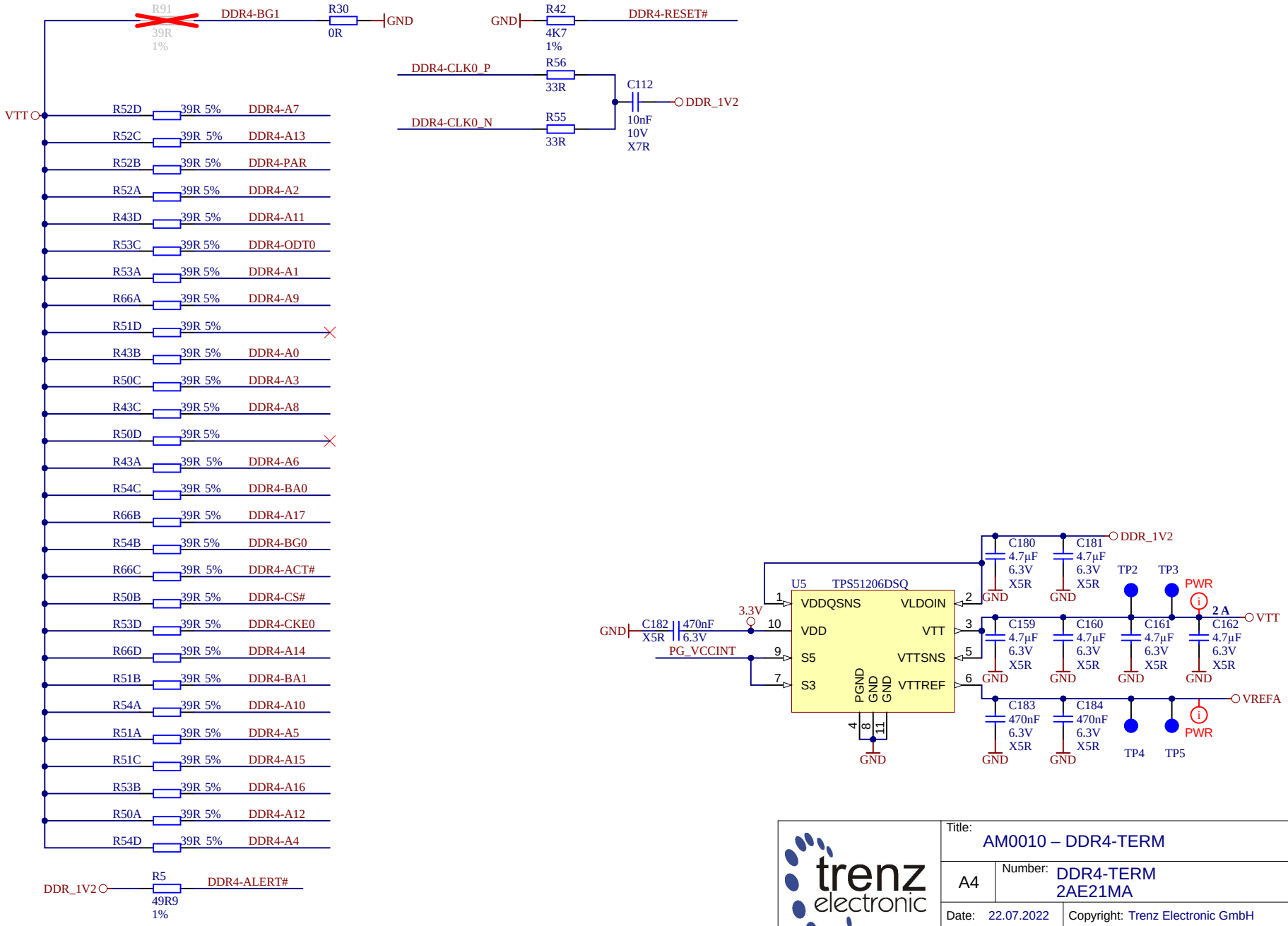
Filename: DDR4-RAM_4.SchDoc



trenz electronic	Title: AM0010 – DDR4-RAM_5		
A4	Number: DDR4-RAM_5 2AE21MA		Rev. 02
Date: 22.07.2022	Copyright: Trenz Electronic GmbH		Page 21 of 30
Filename: DDR4-RAM_5.SchDoc			



trenz electronic	Title: AM0010 – DDR4-TERM		
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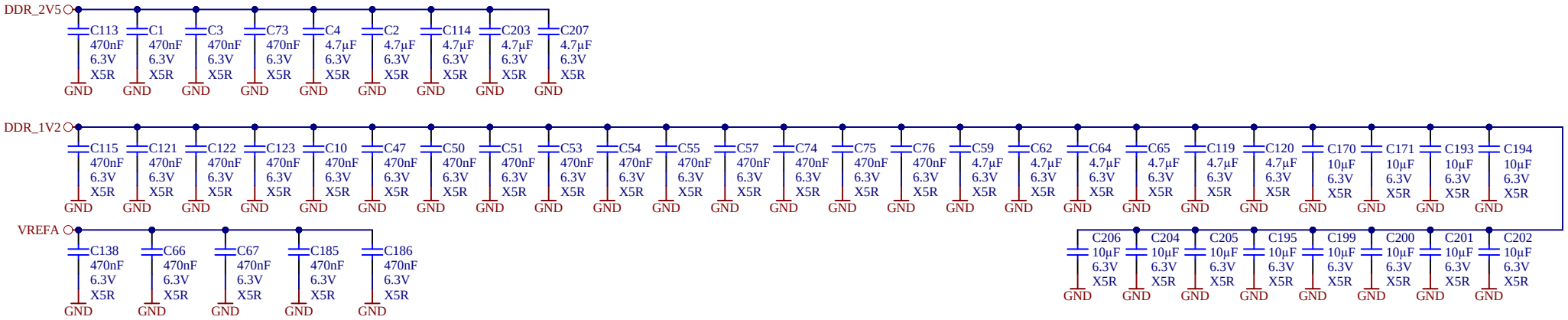
Date: 22.07.2022	Copyright: Trenz Electronic GmbH		Page 22 of 30
Filename: DDR4-TERM.SchDoc			



trenz electronic	Title: AM0010 – DDR4-CAPS		
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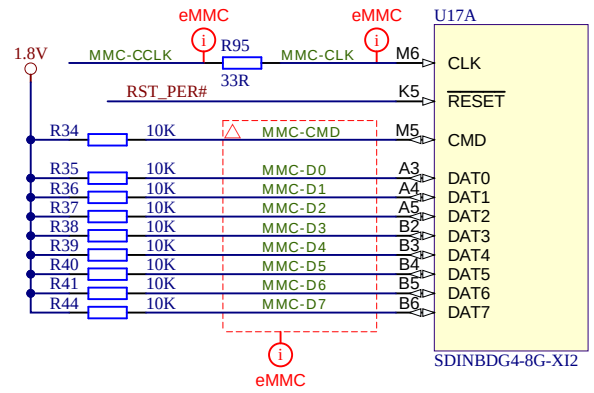
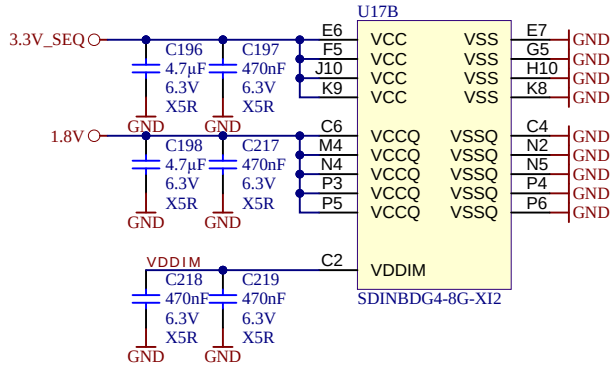
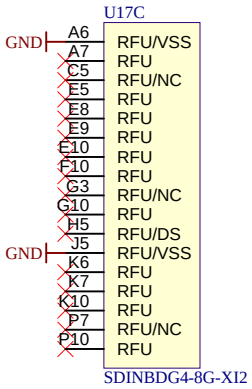
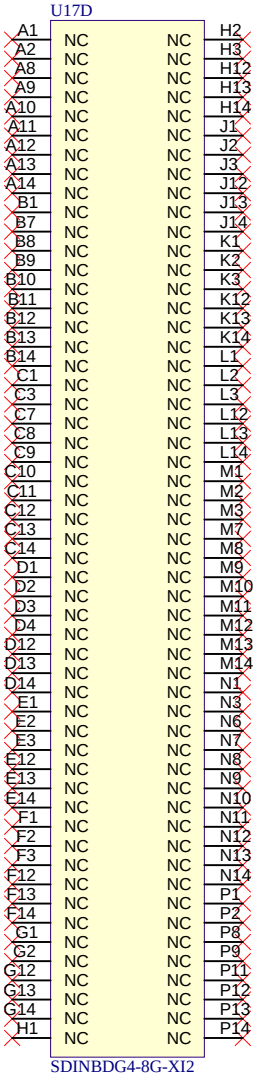
Date: 22.07.2022	Copyright: Trenz Electronic GmbH		Page 23 of 30
Filename: DDR4-CAPS.SchDoc			

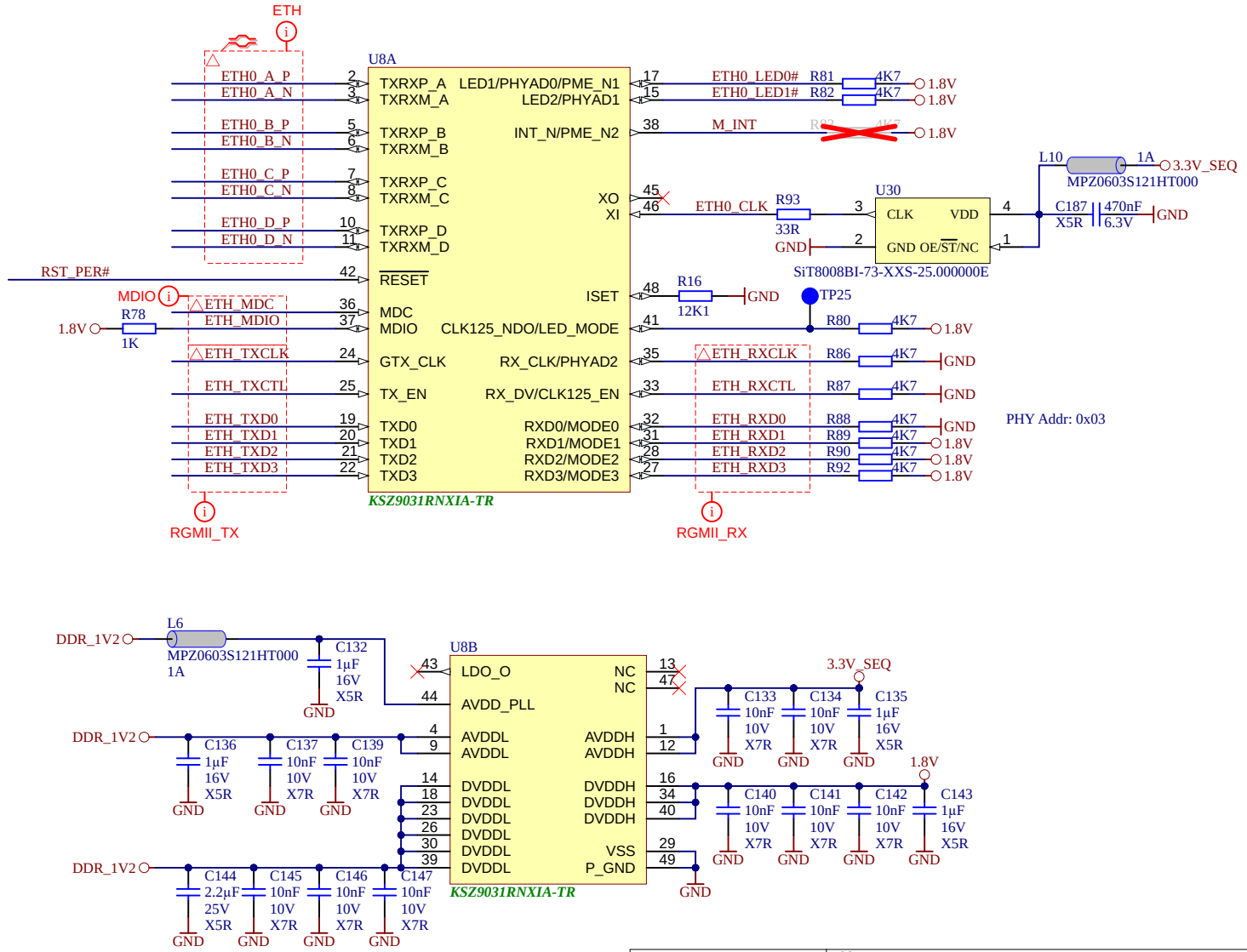








trenz electronic	Title: AM0010 – eMMC	
A4	Number: eMMC 2AE21MA	Rev. 02
Date: 22.07.2022	Copyright: Trenz Electronic GmbH	Page 24 of 30
Filename: eMMC.SchDoc		



Title: AM0010 – ETHPHY			
A4	Number: ETHPHY 2AE21MA		Rev. 02
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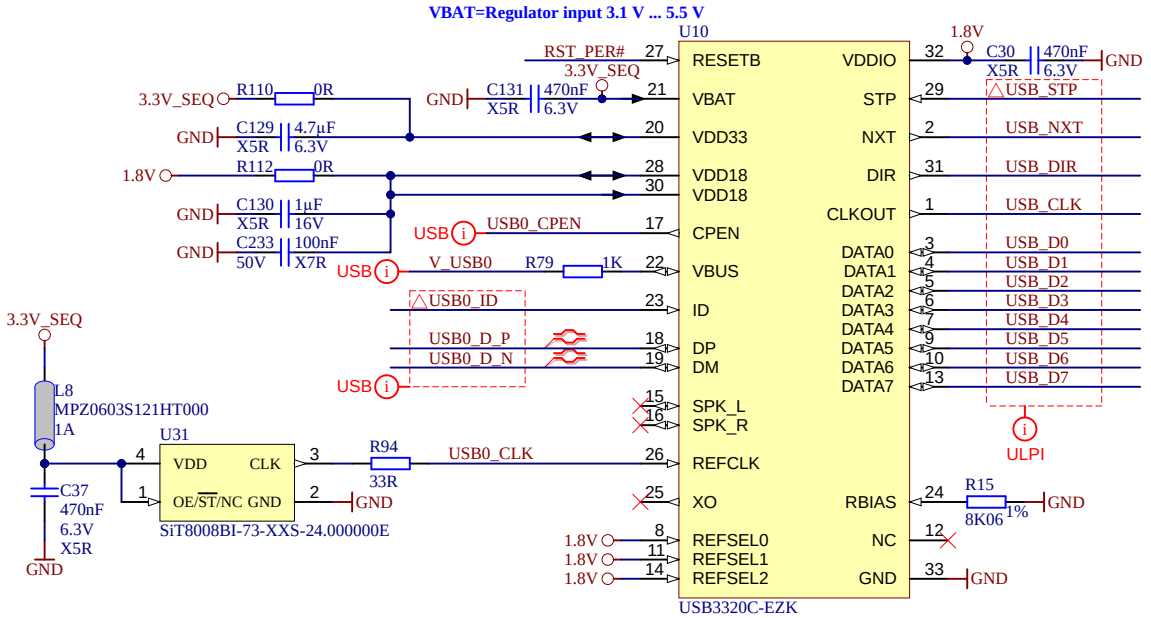
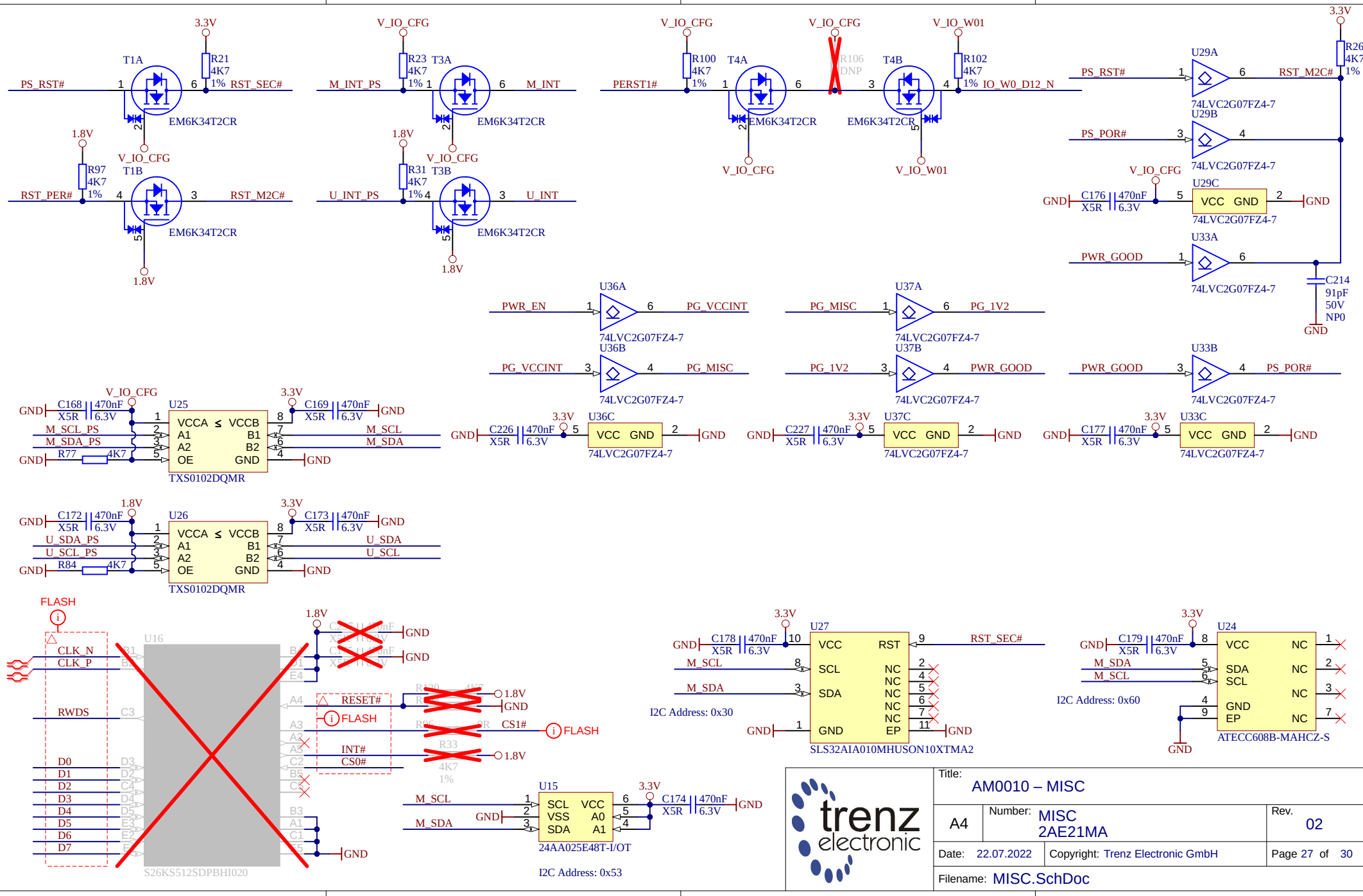
Filename: ETHPHY.SchDoc			

Modify variants!

	USB3320	USB3340
R110	0R	DNP
R112	0R	DNP
C129	4.7 µF	1 µF
C233	0.1 µF	1 µF



trenz electronic	Title: AM0010 – USBPHY		
A4	Number: USBPHY 2AE21MA		Rev. 02
Date: 22.07.2022	Copyright: Trenz Electronic GmbH		Page 26 of 30
Filename: USBPHY.SchDoc			



Title: AM0010 – MISC			
A4	Number: MISC 2AE21MA		Rev. 02
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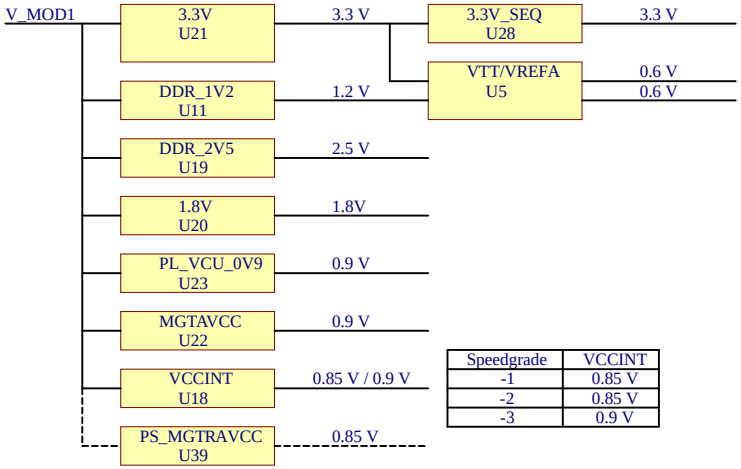
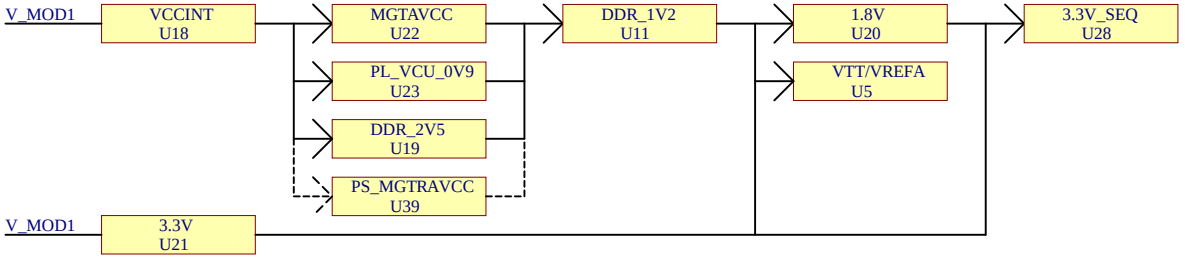
Filename: MISC.SchDoc			

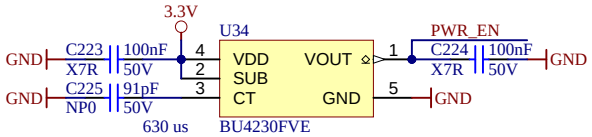
Power Supply Structure

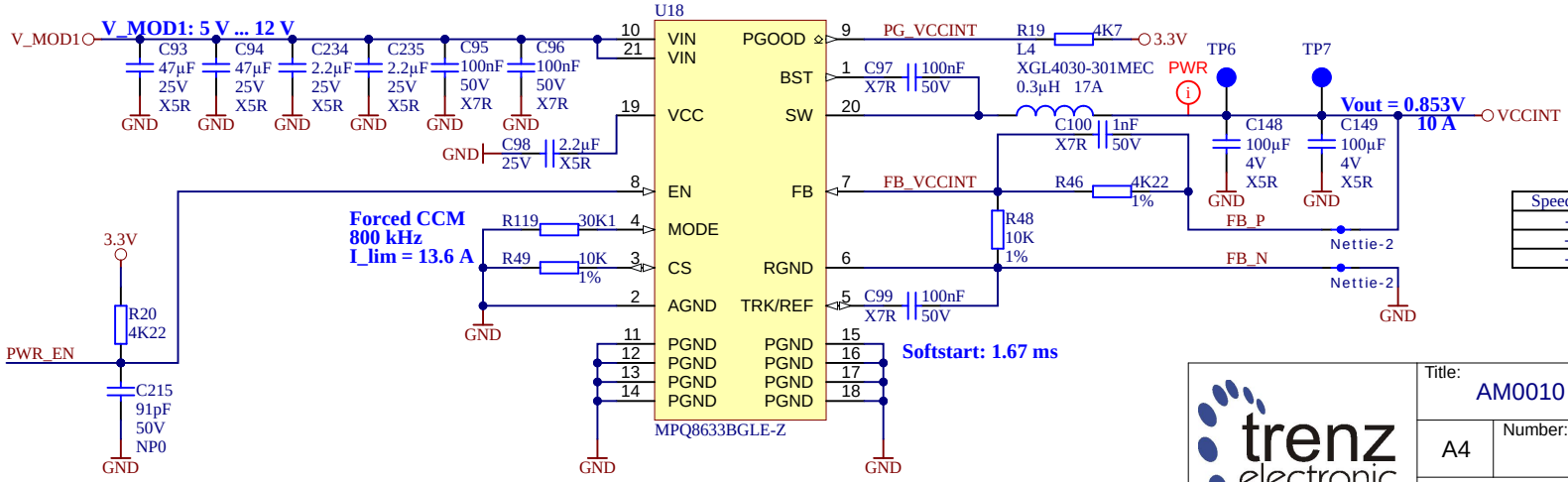


Speedgrade	VCCINT
-1	0.85 V
-2	0.85 V
-3	0.9 V

Power Supply Sequencing







Speedgrade	R46	R48	C100	VCCINT
-1	4K22	10K	1 nF	0.853 V
-2	4K22	10K	1 nF	0.853 V
-3	10K	20K	680 pF	0.900 V

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Title: AM0010 – POWER_1		
A4	Number: POWER_1 2AE21MA	Rev. 02
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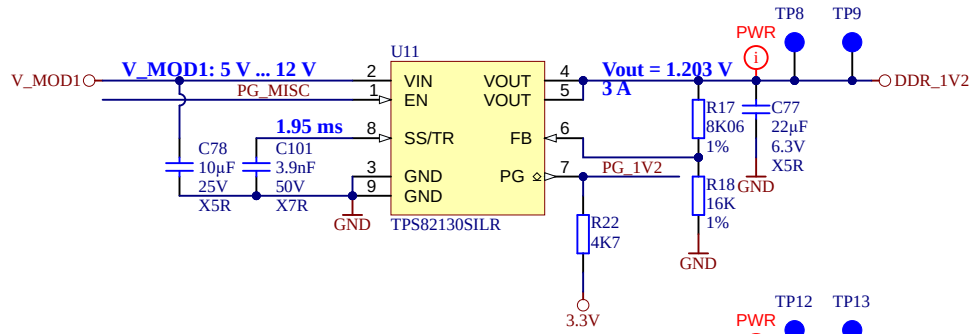
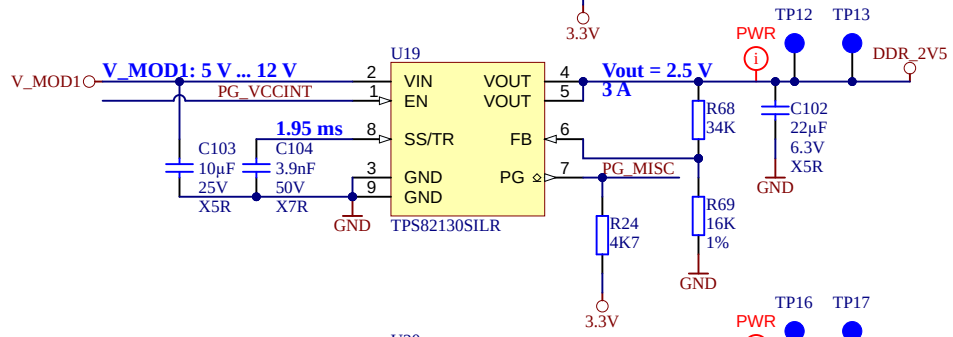
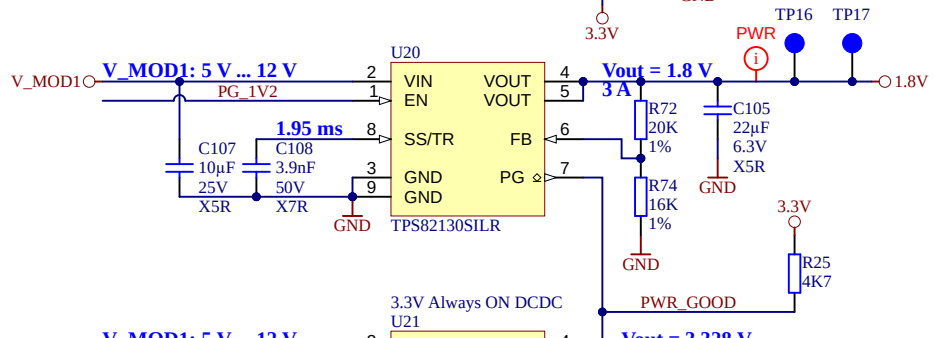
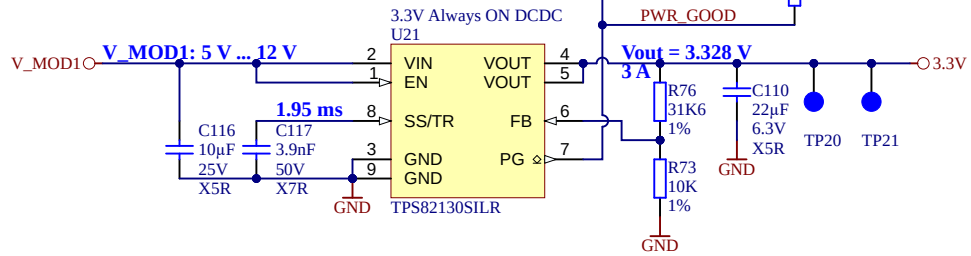
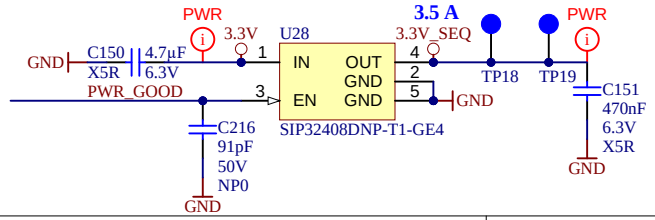
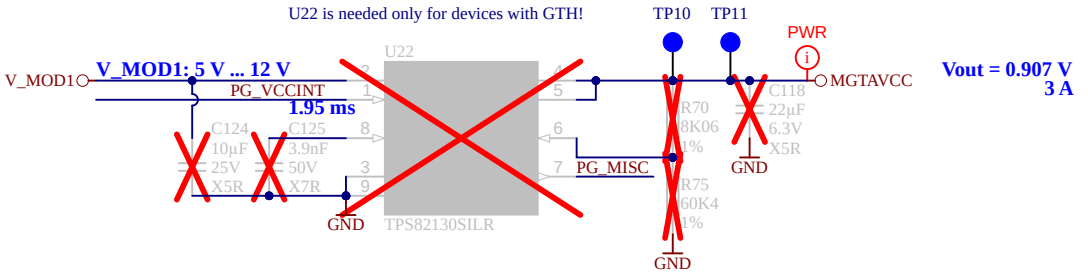


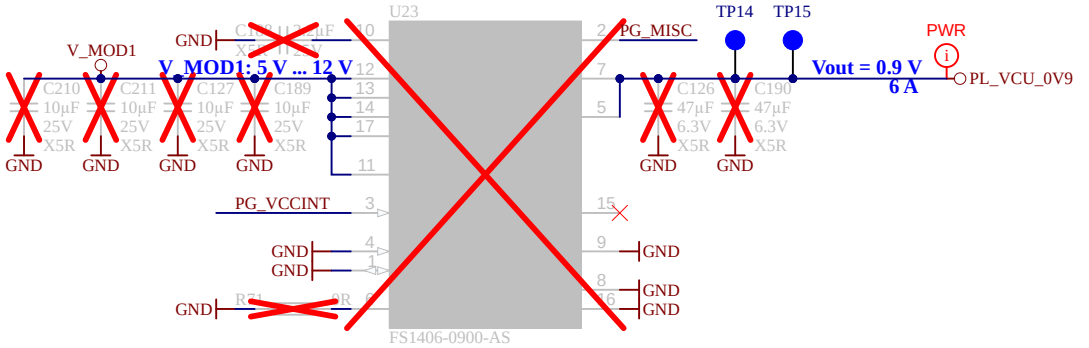








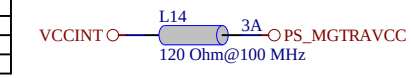




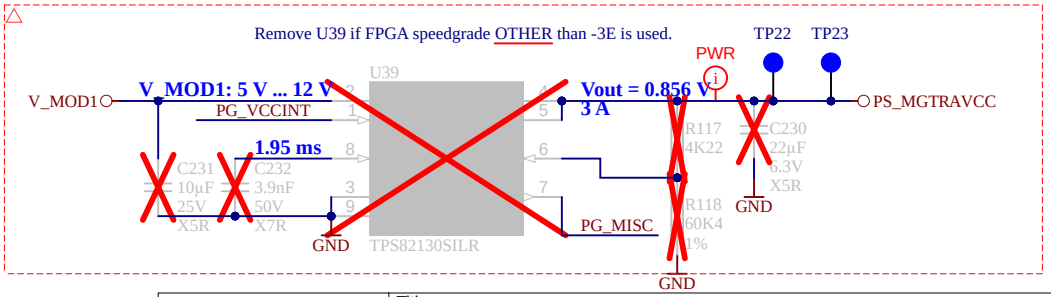
Modify variants!

Speedgrade	L14	VCCINT
-1	L14	0.85 V
-2	L14	0.85 V
-3	DNP	0.9 V

Remove L14 when FPGA speedgrade -3E is used



Vout_max= 0.876V (+3%)
Vout_nom= 0.85V
Vout_min= 0.833V (-2%)



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Title: AM0010 – POWER_2		
A4	Number: POWER_2 2AE21MA	Rev. 02
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REV	Description	
-01	Initial revision	AL/ED
-02	1. Added VRM U39 (C230...2, R117...8) to supply PS_MGTRAVCC in case of speed grade -3E SoC. 2. Added L14 in case of speed grade -1 or -2 SoC. 3. Replaced VRM U18 by MPQ8633BGLE-Z. 4. Updated power supply structure and sequencing. 5. Added testpoint (TP24) and pull down resistor (R47) to connected TEN inputs (N9) of DDR4 RAM chips (U2...4, U9, U12). 6. Updated pictures at "Legal Notices Modules.SchDoc". 7. Removed R32. 8. Changed R68 from 21K5 to 34K. 9. Changed R69 from 10K to 16K. 10. Changed R72 from 27K to 20K. 11. Changed R74 from 21K5 to 16K. 12. Changed R76 from 21K5 to 31K6. 13. Changed R73 from 10K 0201 to 10K 0402. 14. Removed R45. 15. Set HyperRAM/Flash (U16, C175, R103, R96) as optional (not assembled). 16. Changed R20 from 4K7 0201 to 4K22 0402. 17. Changed C98 from 10 nF 0201 to 2.2 µF 0402. 18. Added C234 and C235. 19. Changed C99 from 91 nF to 100 nF. 20. Changed C97 from 100 nF 25 V to 100 nF 50V. 21. Changed U10 from USB3340 to USB3320. 22. Changed C129 from 1 µF to 4.7 µF. 23. Added capacitor C236. 24. Added pull-up resistor R120. 25. Changed U16 RFU pins B5 and C5 from GND connection to floating. 26. Added pull-up/down resistor option for MODE3...0 pins (R121...R128). 27. Added testpoint TP25. 28. Added UKCA logo. 29. Added capacitor C237. 30. Swapped schematic sheet numbers 21 and 22. 31. Changed capacitors C95, C96, C223, C224, and C233 from 100 nF 25 V X5R to 50 V X7R. 32. Changed ferrid beads L11...L13 from MPZ1608S221A to BLM18SG121TN1D.	MST/DSC MST/DSC MST/DSC MST/DSC MST/DSC MST/DSC ED ED ED ED ED ED ED ED ED ED ED ED ED ED ED ED ED ED ED ED ED ED ED ED ED ED

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Title: AM0010 – Revision_Changes		
A4	Number: Revision_Changes 2AE21MA	Rev. 02
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