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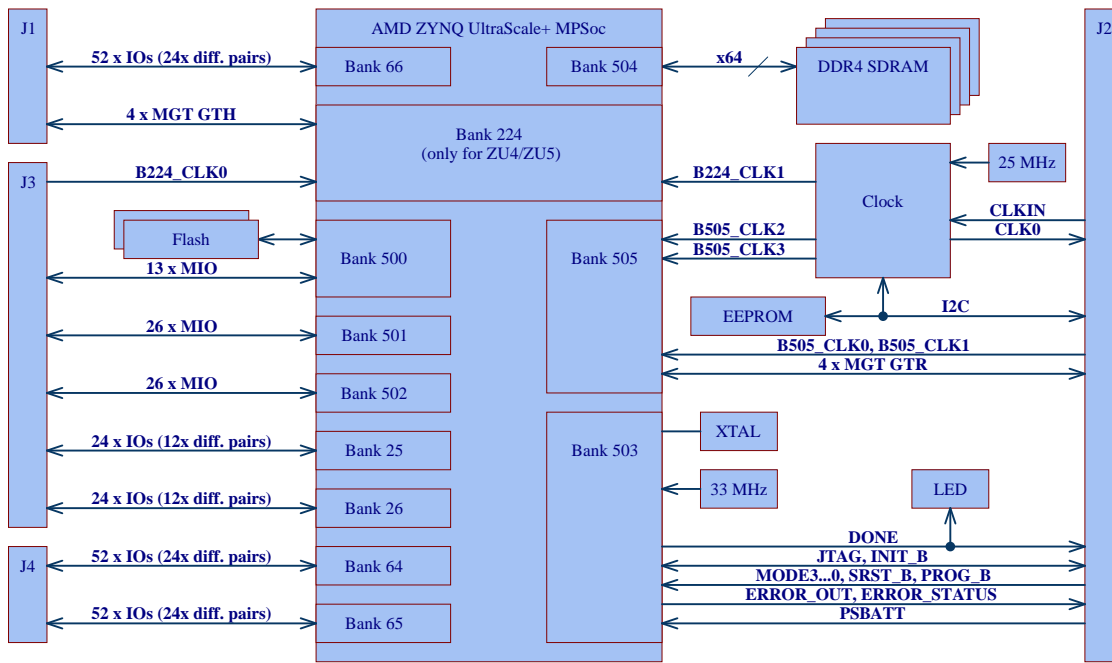
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Schematics and other handouts serve for informational purposes only!

| | |
|------------------|------------|
| Drawn by | ED |
| Checked by | MR |
| Assembly variant | 4BE81-A |
| Created by | ED |
| Modified by | ED |
| Modified at | 2023-05-17 |



| | | |
|--|----------------------------------|--------------|
| Title: TE0813 - Legal Notices | | |
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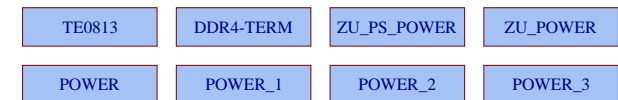


Supported Voltage Ranges:

| Power Rail | Direction | Range | Tolerance | Description | Note |
|------------|-----------|---------------|-----------|-------------------|---|
| 3.3VIN | IN | 3.3V | +/- 5 % | Micromodule Power | Management voltage rail, supplied by power rail |
| PL_DCIN | IN | 3.3V | +/- 5 % | Micromodule Power | Programmable Logic, supplied by power rail |
| LP_DCDC | IN | 3.3V | +/- 3 % | Micromodule Power | Low-Power Domain, supplied by power rail |
| GT_DCDC | IN | 3.3V | +/- 3 % | Micromodule Power | GTH Transceiver, supplied by power rail |
| DCDCIN | IN | 3.3V | +/- 5 % | Micromodule Power | Full-Power Domain and GTR, supplied by power rail |
| VCCO_64 | IN | 1.0 V - 1.8 V | +/- 3 % | HP IO Bank 64 | Supplied by external power rail via B2B connector |
| VCCO_65 | IN | 1.0 V - 1.8 V | +/- 3 % | HP IO Bank 65 | Supplied by external power rail via B2B connector |
| VCCO_66 | IN | 1.0 V - 1.8 V | +/- 3 % | HP IO Bank 66 | Supplied by external power rail via B2B connector |
| VCCO_25 | IN | 1.2 V - 3.3 V | +/- 3 % | HD IO Bank 25 | Supplied by external power rail via B2B connector |
| VCCO_26 | IN | 1.2 V - 3.3 V | +/- 3 % | HD IO Bank 26 | Supplied by external power rail via B2B connector |
| PSBATT | IN | 1.2 V - 1.5 V | - | RTC / BBRAM | Supplied by external power rail via B2B connector |
| PL_1V8 | OUT | 1.8 V | +/- 3 % | Power for Carrier | Micromodule: Programmable Logic |
| PS_1V8 | OUT | 1.8 V | +/- 3 % | Power for Carrier | Micromodule: Processing System |
| DDR_1V2 | OUT | 1.2 V | +/- 3 % | Power for Carrier | Micromodule: PS DDR I/O Supply |


I2C Address:

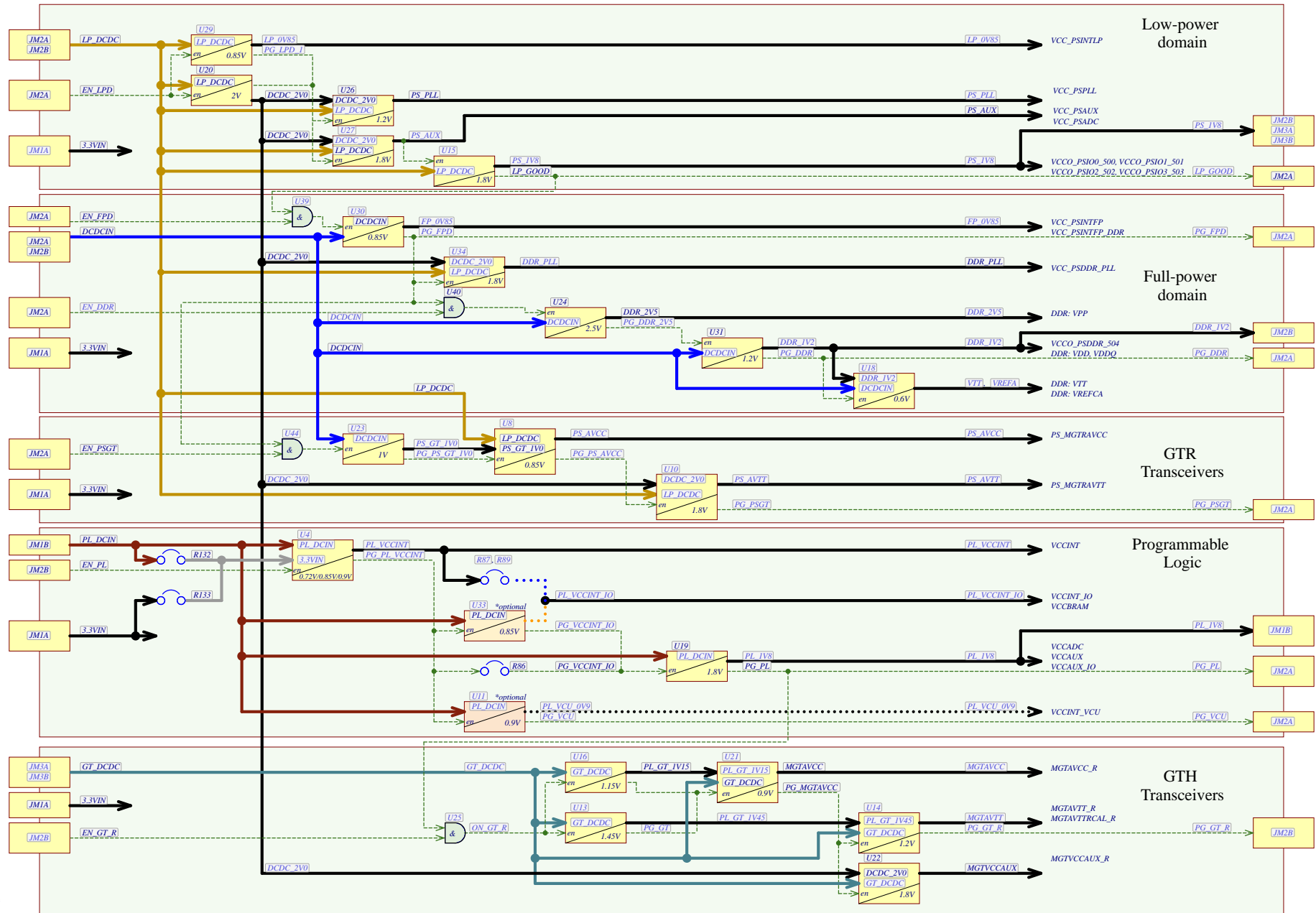
| Device | I2C ADDR | Note |
|-------------------|----------|------|
| PLL U5 | 0x70 | - |
| EEPROM U28 | 0x50 | - |



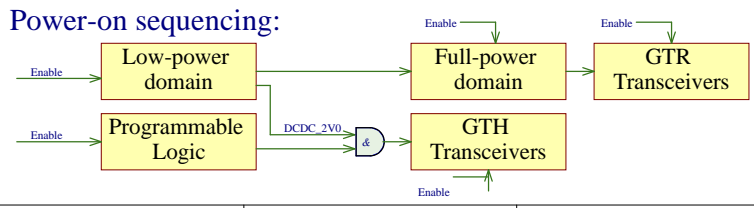
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| Title: TE0813 - System Overview | | |
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| REV | DATE | Description | |
|-----|---------|--|----|
| -01 | 2021-05 | Initial revision | VT |
| | 2022-03 | Added Table with Supported Voltage Ranges | |
| | 2022-05 | Changed DCDC U4 TPS548A28 to MPQ8633BGLE-Z Changed C92 100nF to 1nF | |
| | 2022-11 | Added additional Info about Voltage Range | |
| -02 | 2023-07 | <p>1. Change DCDC U11 from EN6347QI to MPM3860GQW-Z and adapted according circuits.</p> <p>2. Connected DDR4-TEN signals together for U2, U3, U9, and U12 and pulled them low via 499 Ohm resistor R131. Added a testpoint TP3 for DDR4-TEN.</p> <p>3. Changed voltage rail from 1.35 V to 1.45 V via adapting voltage divider resistors R33 and R38 and changed according voltage rail name PL_GT_1V35 to PL_GT_1V45.</p> <p>4. Changed voltage rail from 1.05 V to 1.15 V via adaption voltage divider resistors R44 and R46 and changed according rail name PL_GT_1V05 to PL_GT_1V15.</p> <p>5. Added diode D2 between U41 pin 3 net MR and voltage rail 3.3VIN.</p> <p>6. Connected enable signal for U11 and U33 from "3.3VIN" to "PG_PL_VCCINT".</p> <p>7. Added capacitors C137, C147, and C148 for VTT voltage rail.</p> <p>8. Added resistors R132 (default: not fitted) and R133 to supply U4 VCC either from "PL_DCCIN" or from "3.3VIN".</p> <p>9. Change resistor R92 from 4.22 kOhm to 9.09 kOhm to set current limit to nearly 14.5 A for U4.</p> <p>10. Added remote sense option:</p> <p>10.1 R134 for U30</p> <p>10.2 R135 for U29</p> <p>10.3 R136 for U31</p> <p>11. Added decoupling capacitors:</p> <p>11.1 C210 and C211 for U5.</p> <p>11.2 C190 for U7.</p> <p>11.3 C198, C199, and C213 for U8.</p> <p>11.4 C153, C170...172 for U9</p> <p>11.5 C196 C197, and C212 for U10.</p> <p>11.6 C156 and C157 for U12</p> <p>11.7 C207 and C208 for U14.</p> <p>11.8 C189 for U17.</p> <p>11.9 C149...152, C205, and C206 for U18</p> <p>11.10 C209 and C217 for U21.</p> <p>11.11 C214...216 for U22.</p> <p>11.12 C154 and C155 for U24</p> <p>11.13 C188 and C191 for U26.</p> <p>11.14 C187 and C195 for U27.</p> <p>11.15 C203 and C204 for U34.</p> <p>11.16 C201 for U39.</p> <p>11.17 C202 for U40.</p> <p>11.18 C178 for U41.</p> <p>11.19 C200 for U44.</p> <p>12. Added testpoints TP4, TP19, TP26.</p> <p>13. Added UKCA logo.</p> <p>14. Change 100 nF capacitors C135 and C136 from 6.3 V to 25 V for BOM optimization.</p> | ED |

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- EN_GT_R Net name
- Power bus
- - - - - Control signal
- - - - - Power bus in FPGA speedgrade -1/-2/-3 assembly variants
- - - - - Power bus in FPGA speedgrade -1L/-2L assembly variants (low power)
- PL_DCIN
0.9V Optional power converter
- & Logic AND gate



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Special notes:

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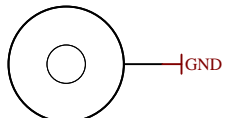
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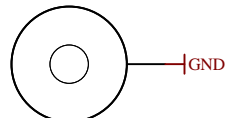
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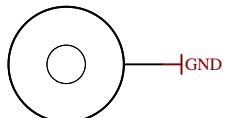
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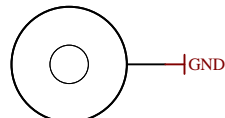
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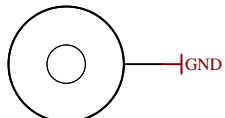
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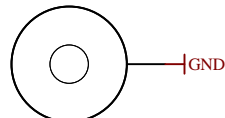
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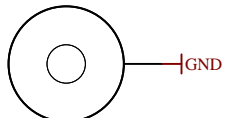
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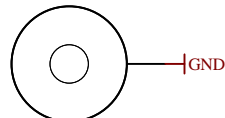
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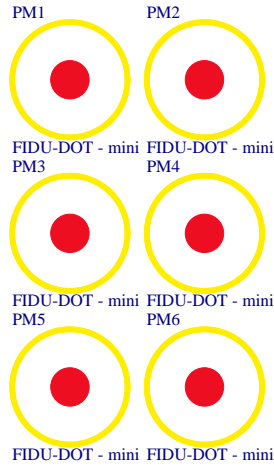
Mount.Hole 3.2mm für Unterlegscheibe



Mount.Hole 3.2mm für Unterlegscheibe



Mount.Hole 3.2mm für Unterlegscheibe



UKCA1

UKCA Logo on Top Overlay

UKCA-TOPOVERLAY

CE1

CE Logo on Top Overlay

CE-TOPOVERLAY

MECH1

TE Address Overlay

LOGO ADDRESS

LOGO1

TE Logo PRINT Layer

LOGO PRINT

Serial
Serialnumber 6,3 x 6.3mm



Title: TE0813

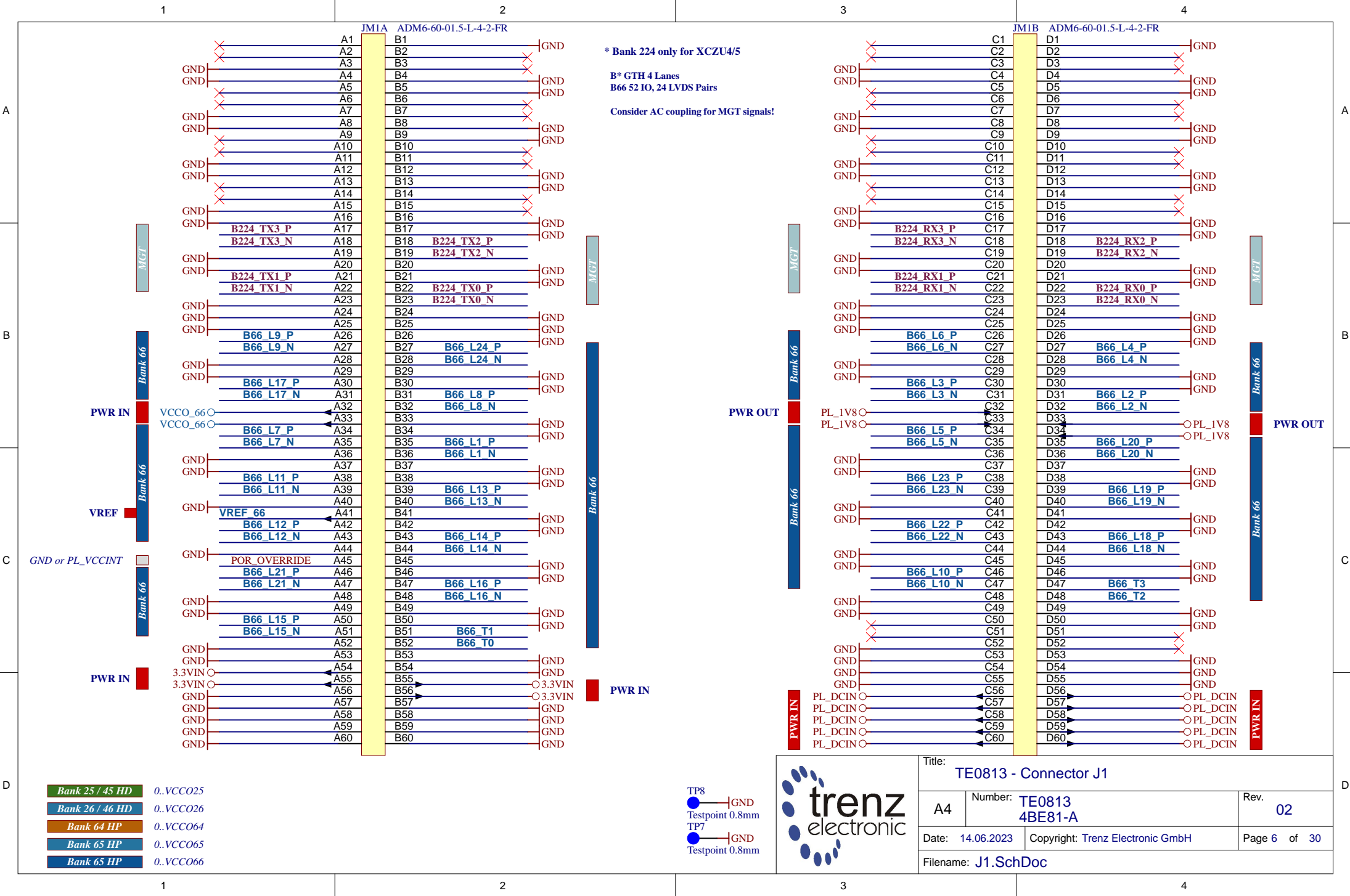
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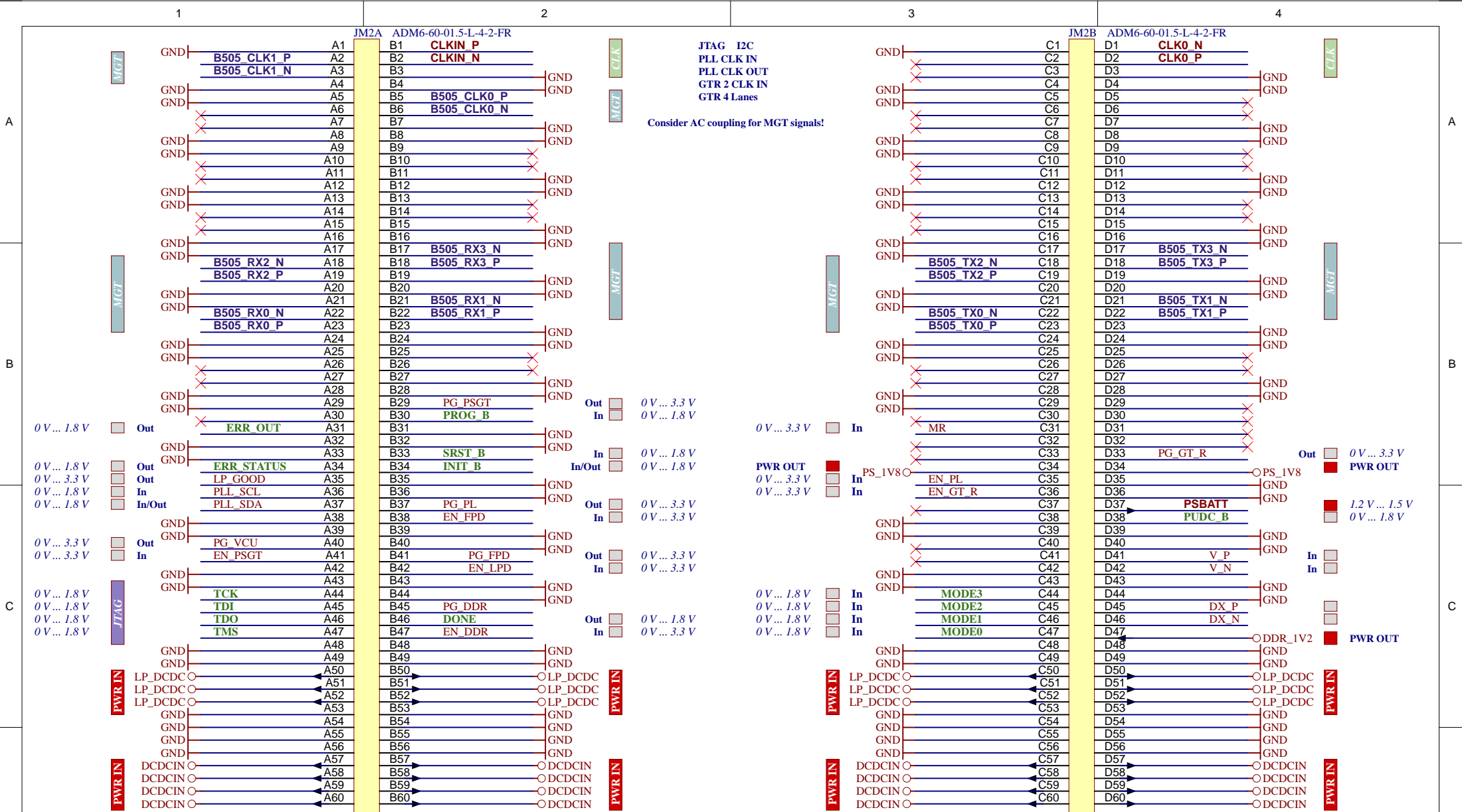
* Bank 224 only for XCZU4/5
 B* GTH 4 Lanes
 B66 52 IO, 24 LVDS Pairs
 Consider AC coupling for MGT signals!

- Bank 25 / 45 HD ..VCC025
- Bank 26 / 46 HD ..VCC026
- Bank 64 HP ..VCC064
- Bank 65 HP ..VCC065
- Bank 65 HP ..VCC066

TP8 — GND
 Testpoint 0.8mm
 TP7 — GND
 Testpoint 0.8mm

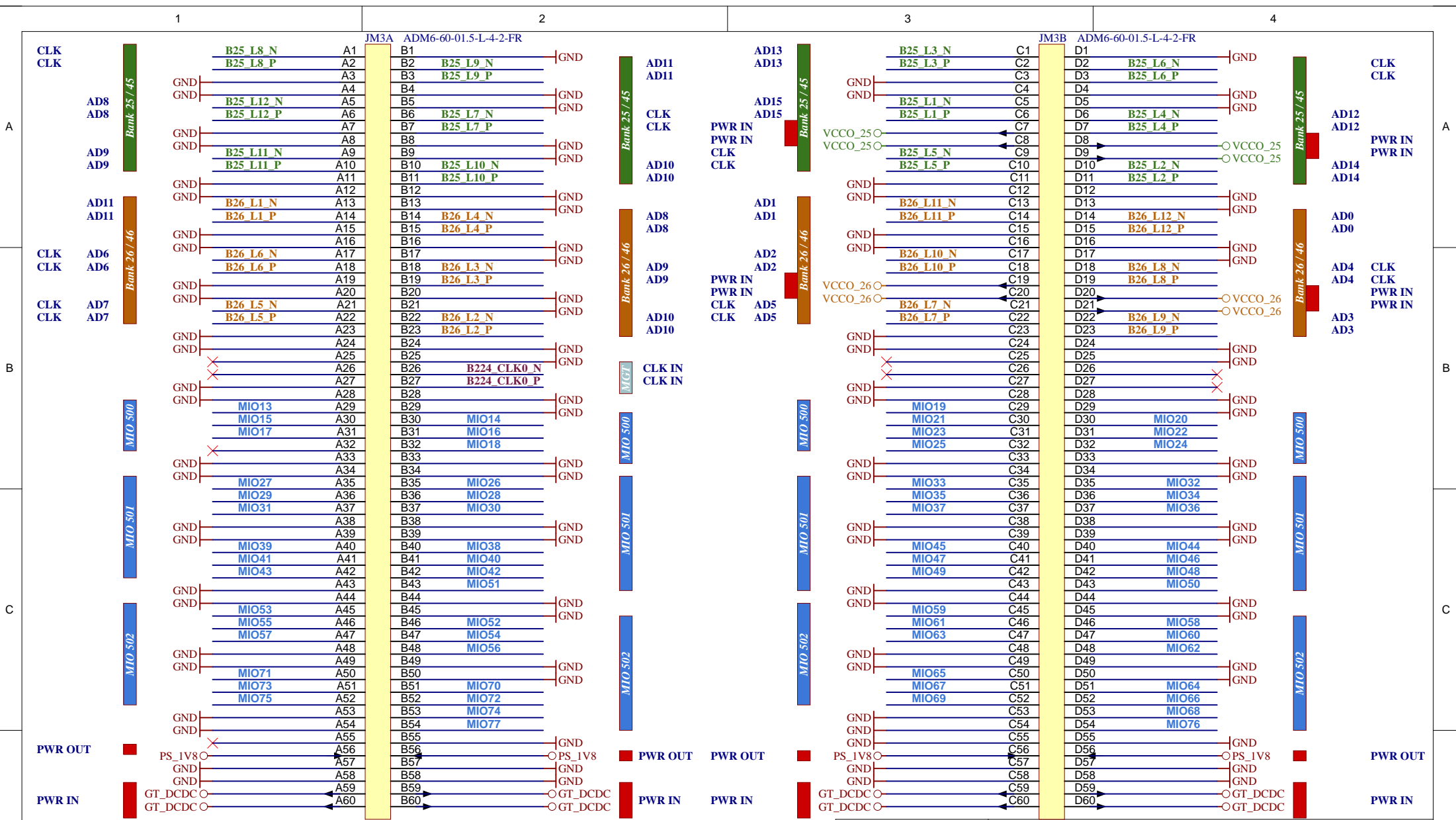


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- Bank 25 / 45 HD ..VCC025
- Bank 26 / 46 HD ..VCC026
- Bank 64 HP ..VCC064
- Bank 65 HP ..VCC065
- Bank 65 HP ..VCC066
- * Bank 25 for XCZU2/3
- * Bank 45 for XCZU4/5
- ** Bank 26 for XCZU2/3
- ** Bank 46 for XCZU4/5
- *** Bank 224 only for XCZU4/5
- B* 24 IO, 12 LVDS Pairs
- B** 24 IO, 12 LVDS Pairs
- B*** GTH 1 CLK IN
- 65 MIO



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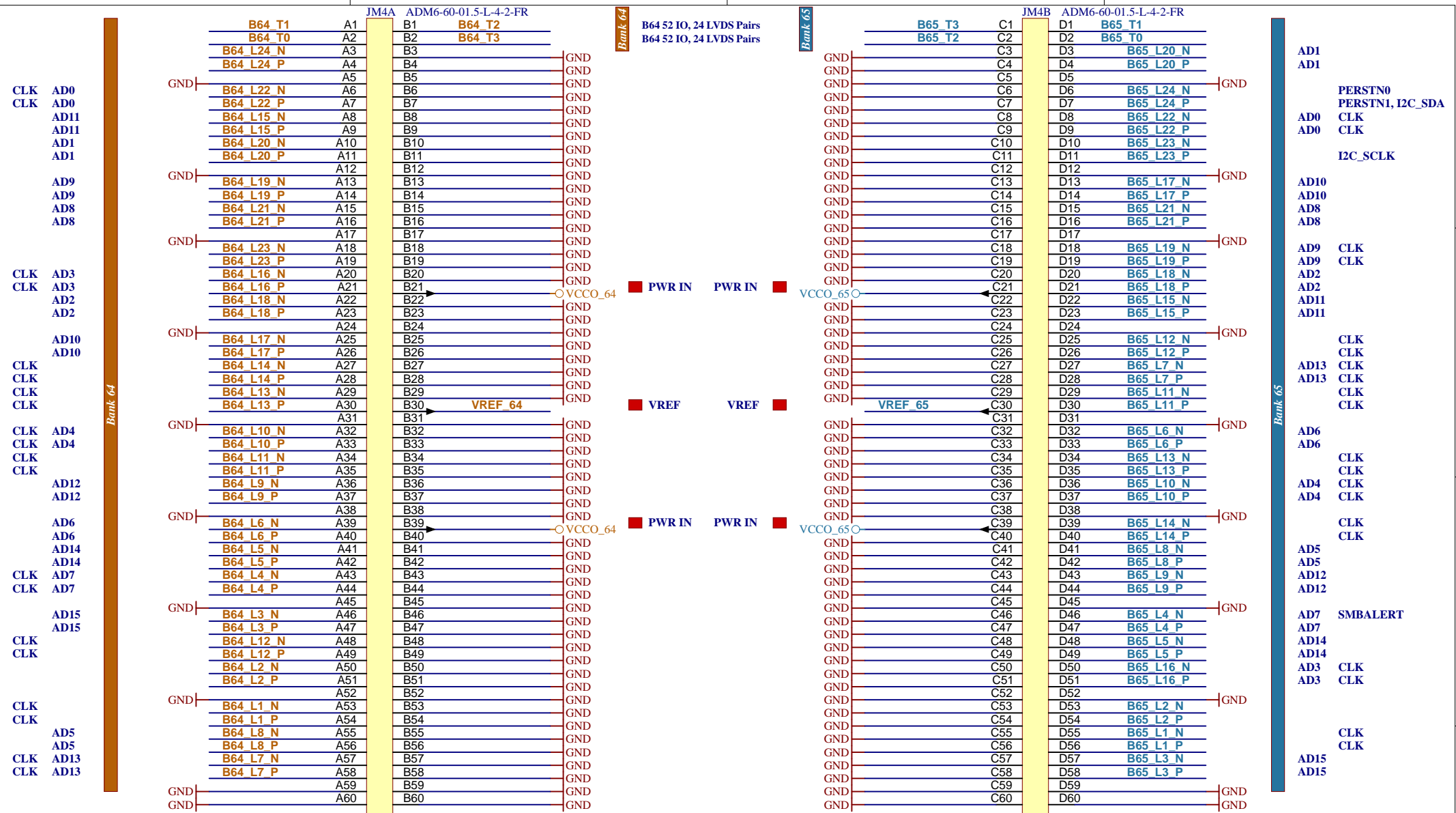
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- Bank 25 / 45 HD ..VCCO25
- Bank 26 / 46 HD ..VCCO26
- Bank 64 HP ..VCCO64
- Bank 65 HP ..VCCO65
- Bank 65 HP ..VCCO66



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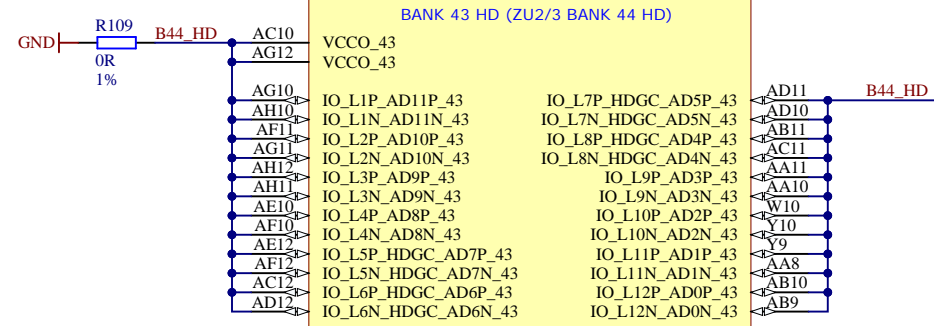
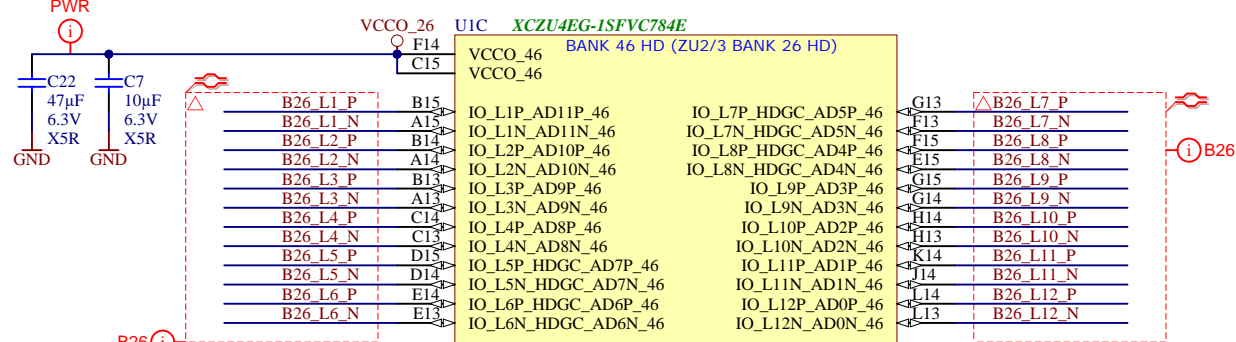
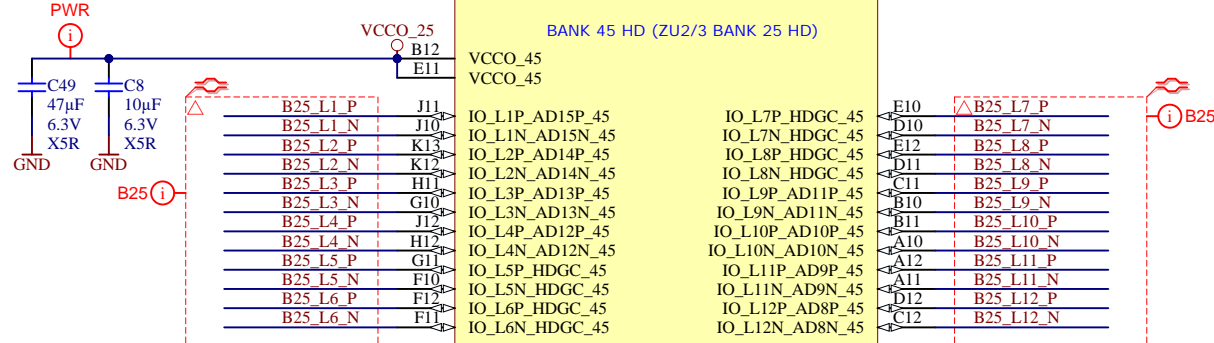
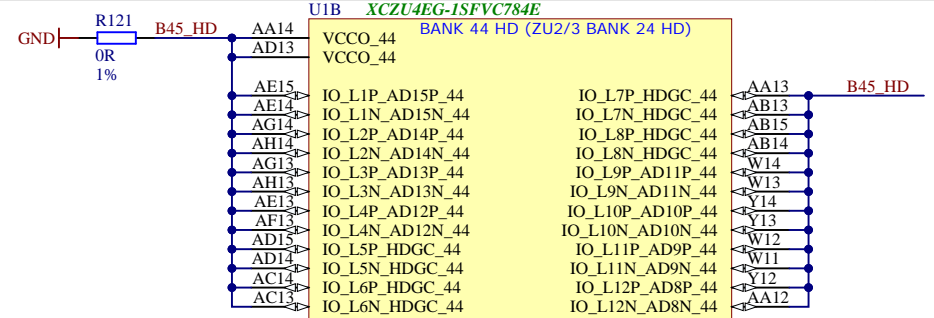
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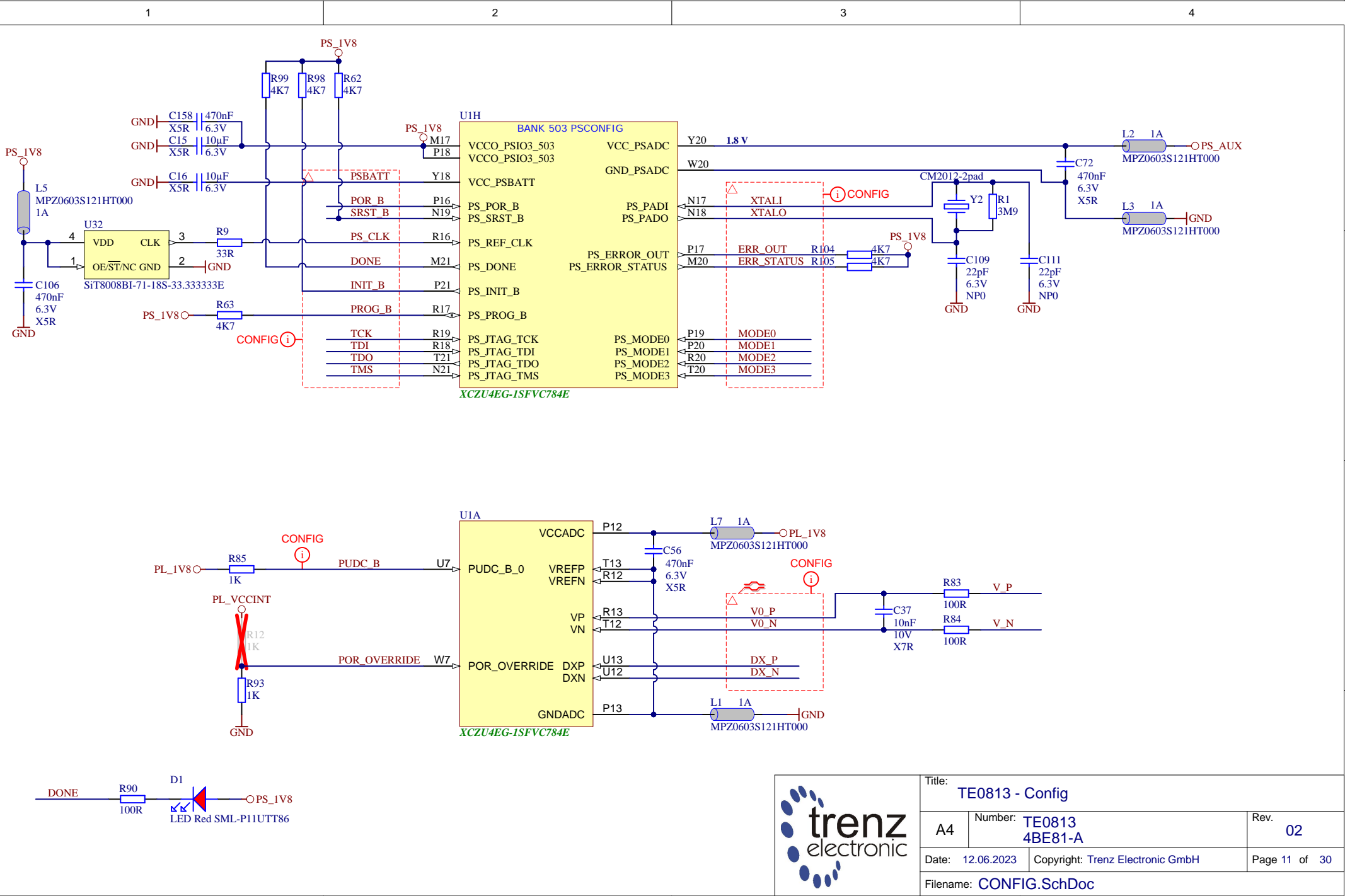
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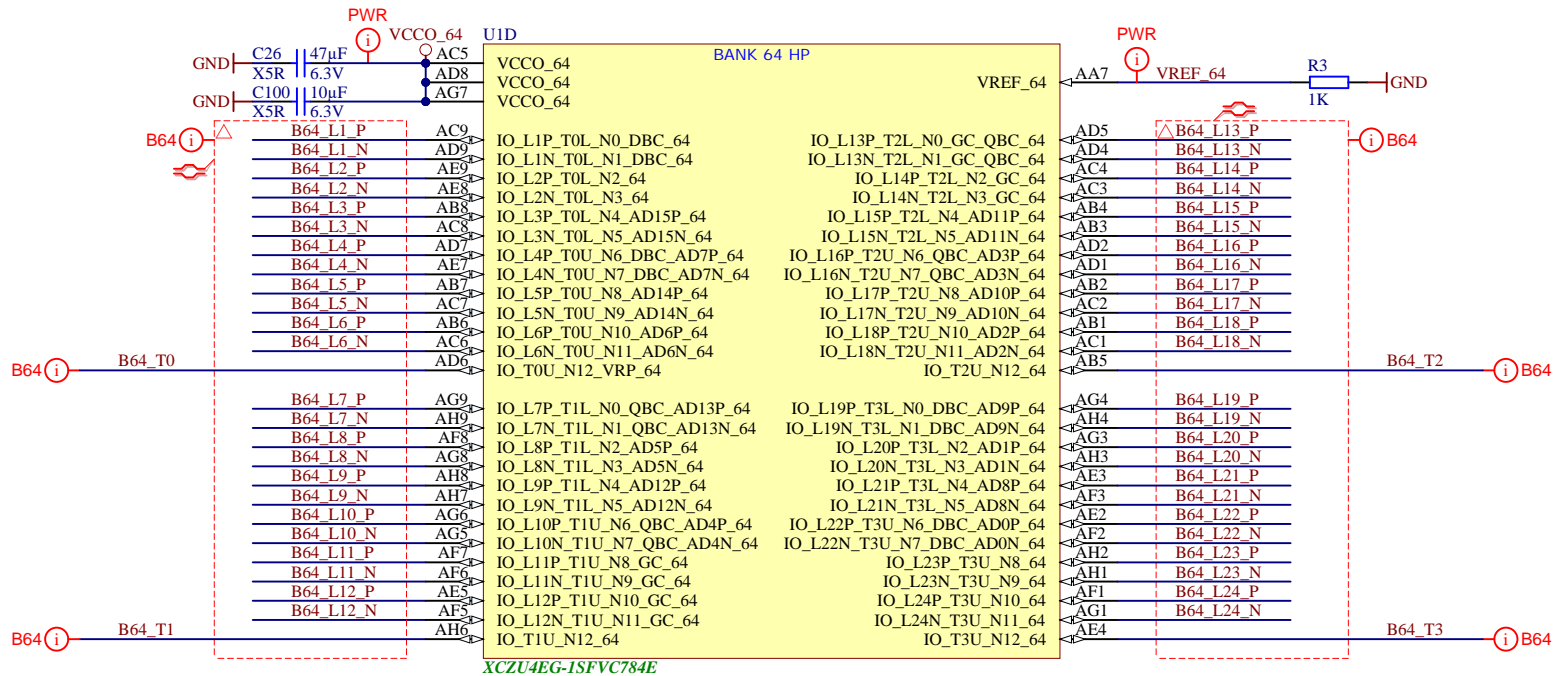
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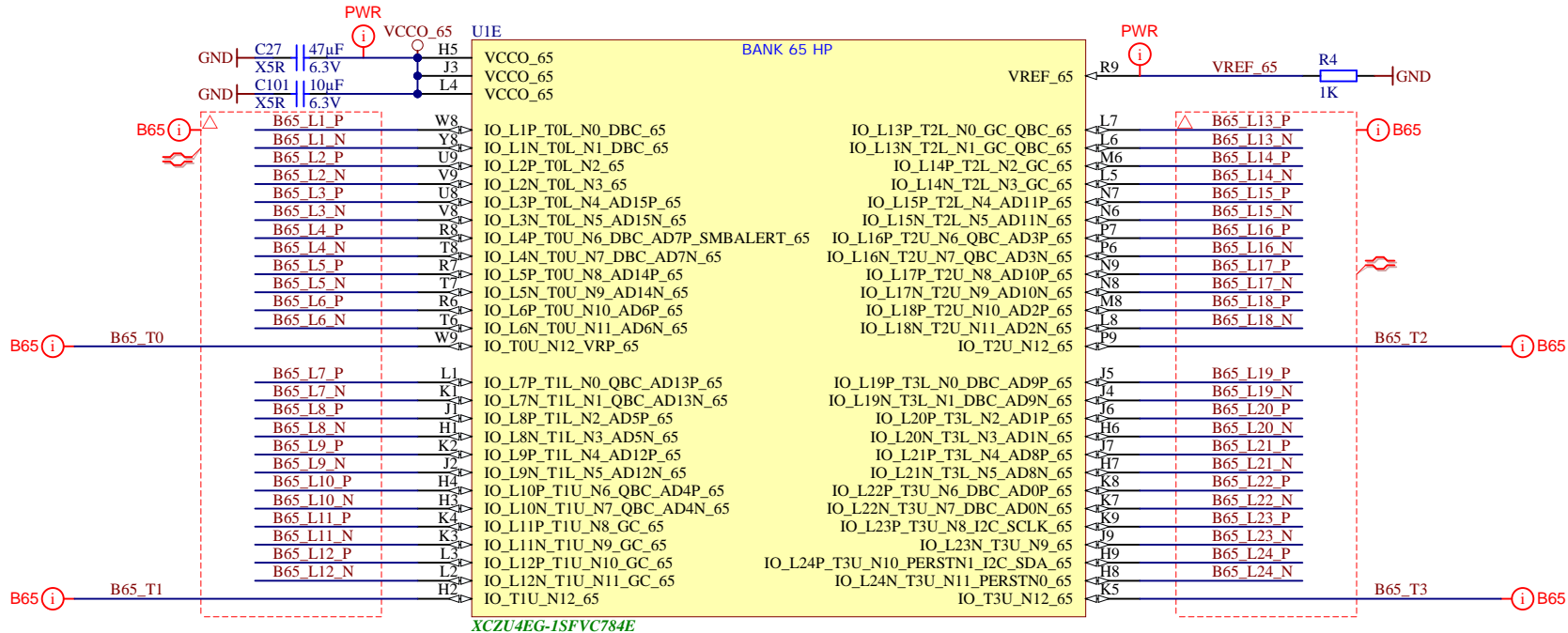
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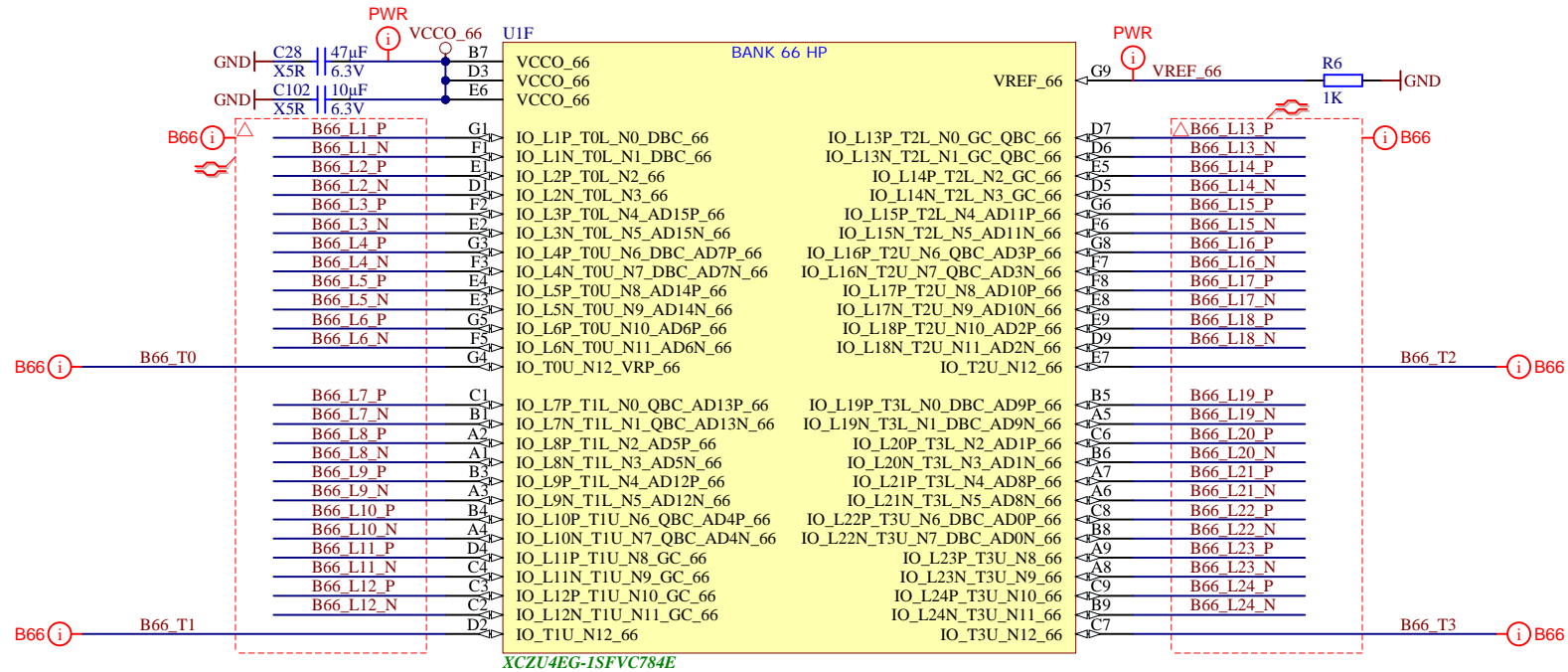
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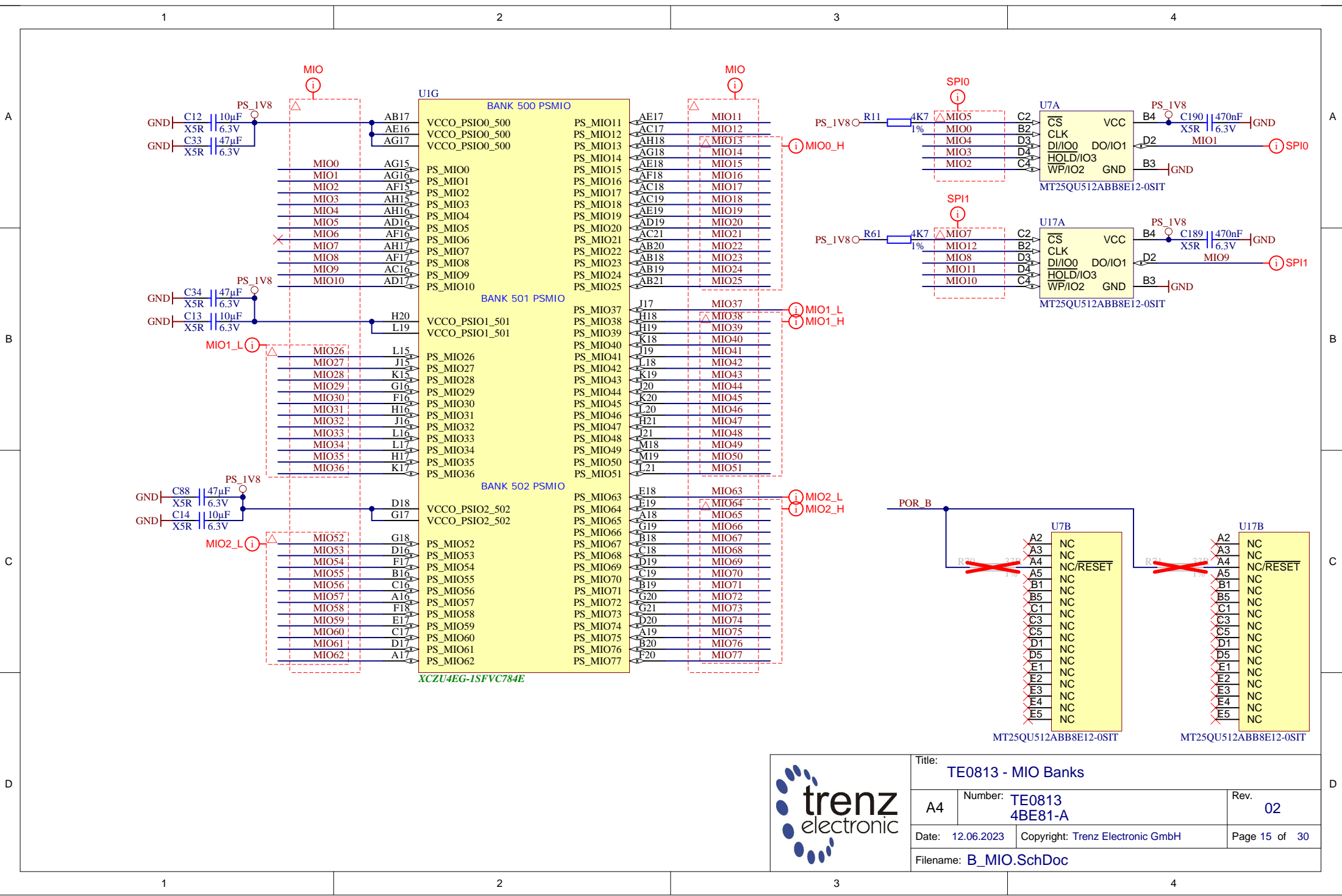
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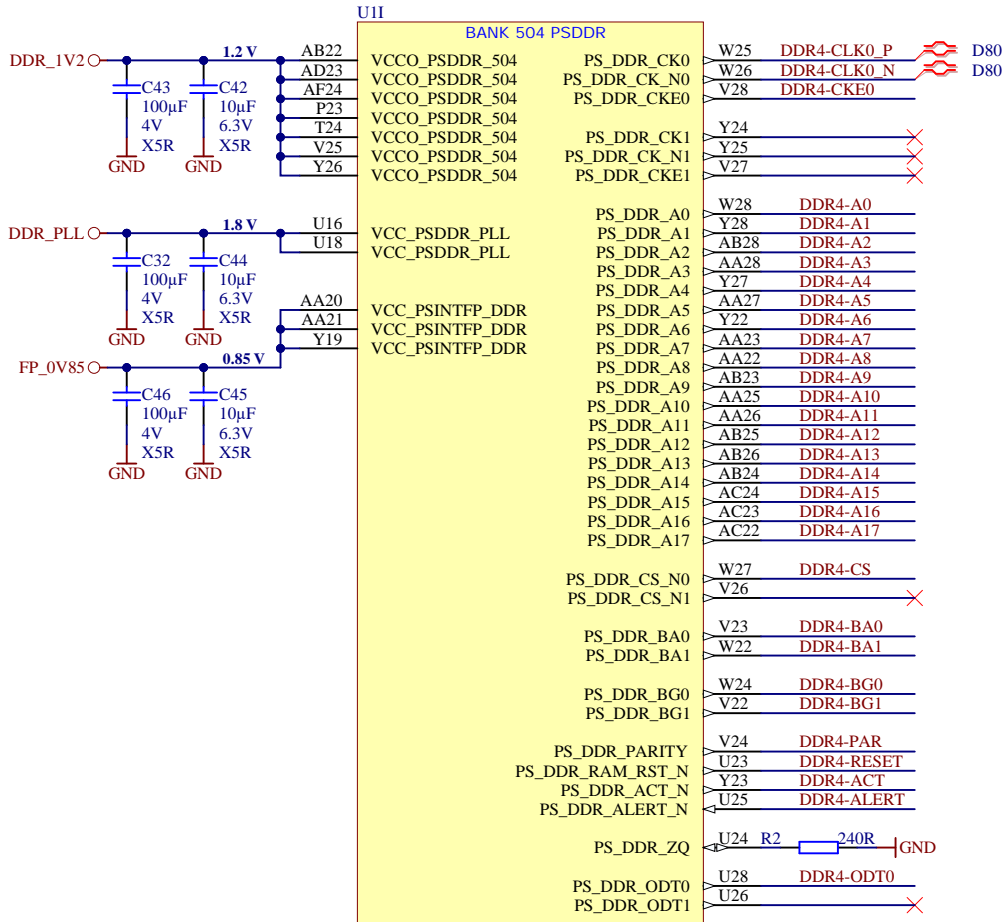
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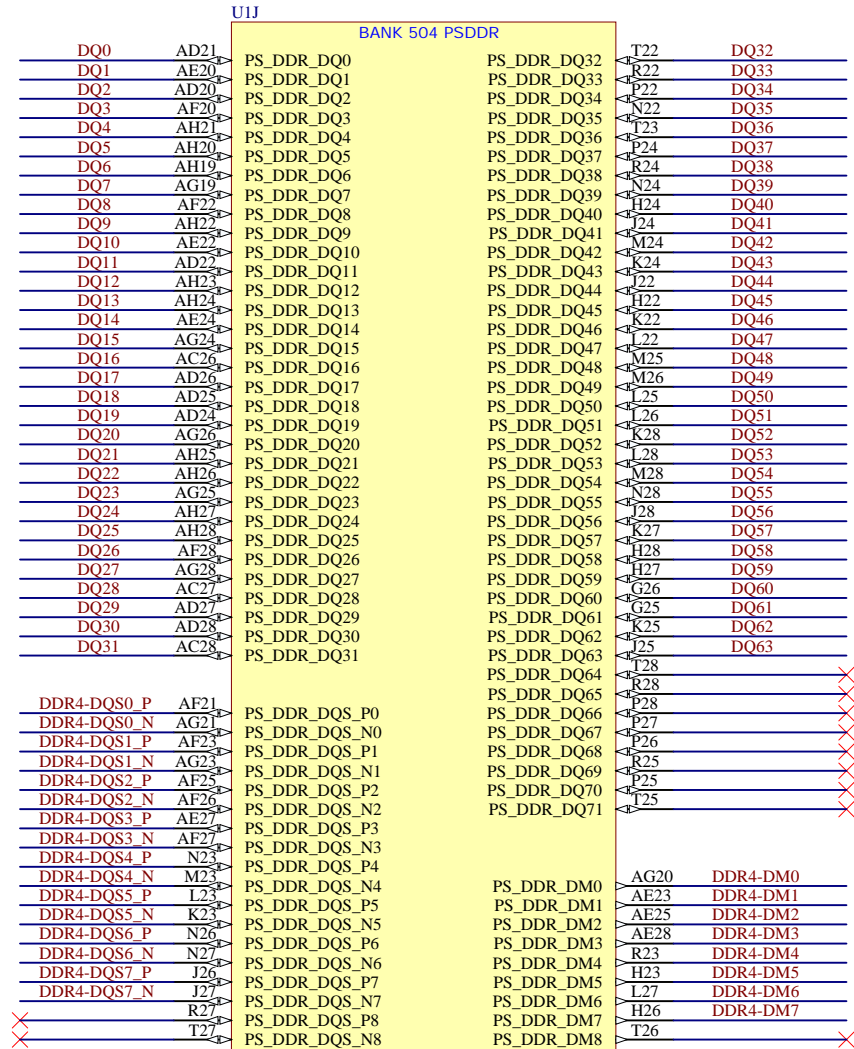
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XCZU4EG-1SFVC784E



XCZU4EG-1SFVC784E



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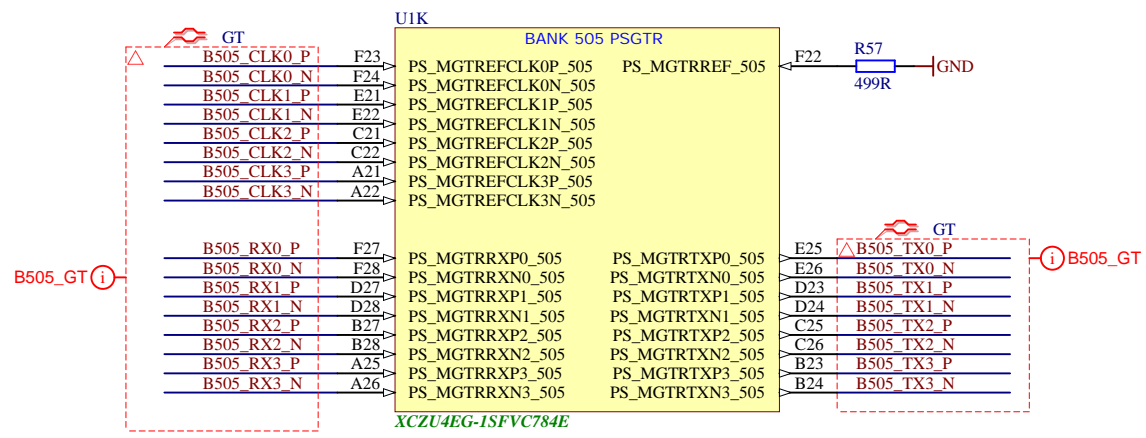
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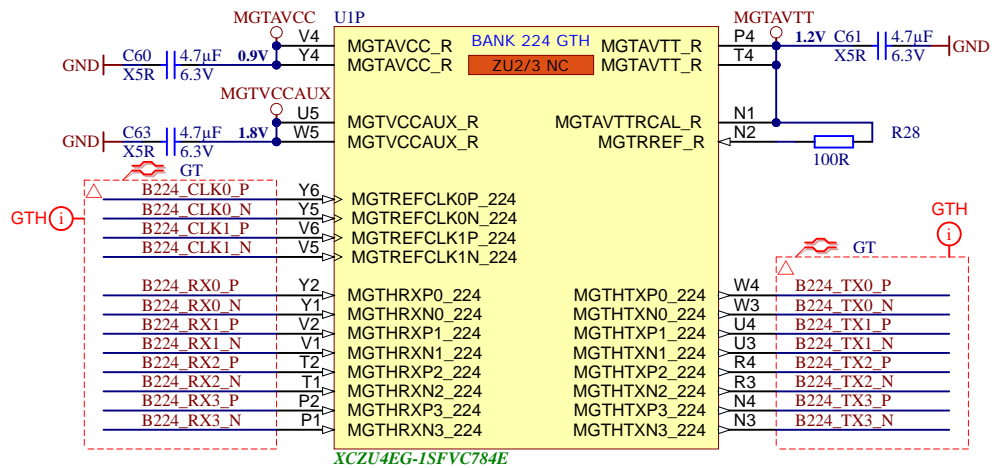
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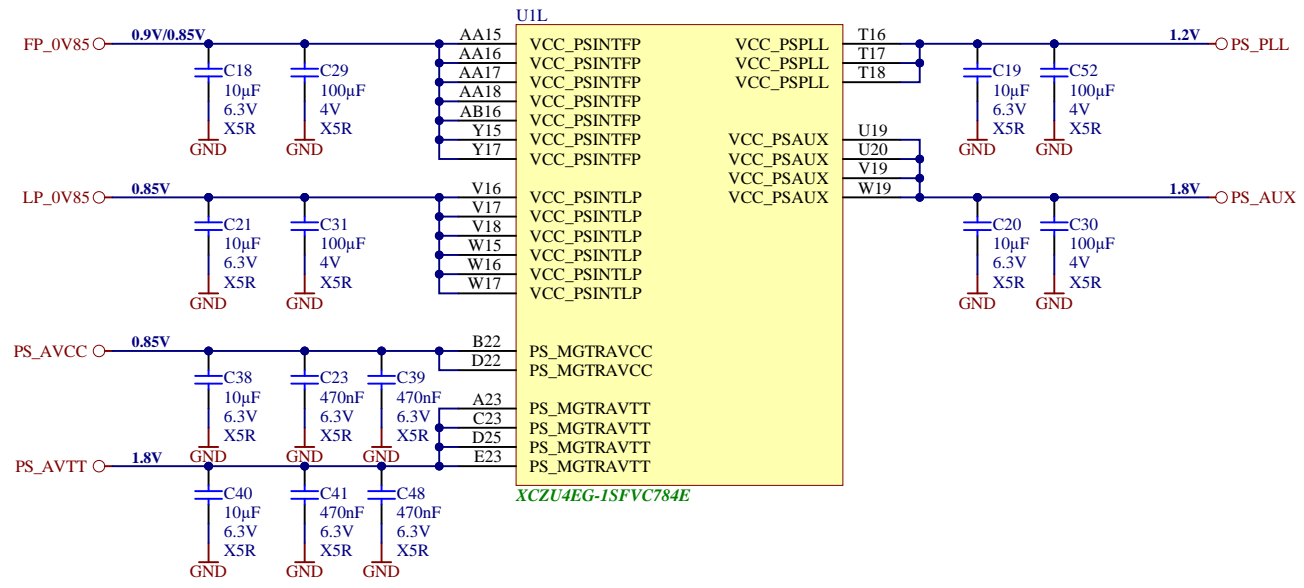
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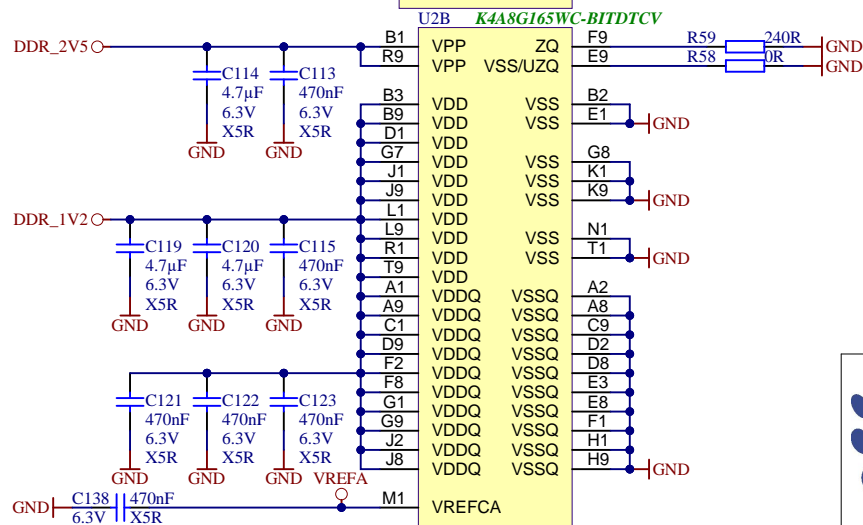
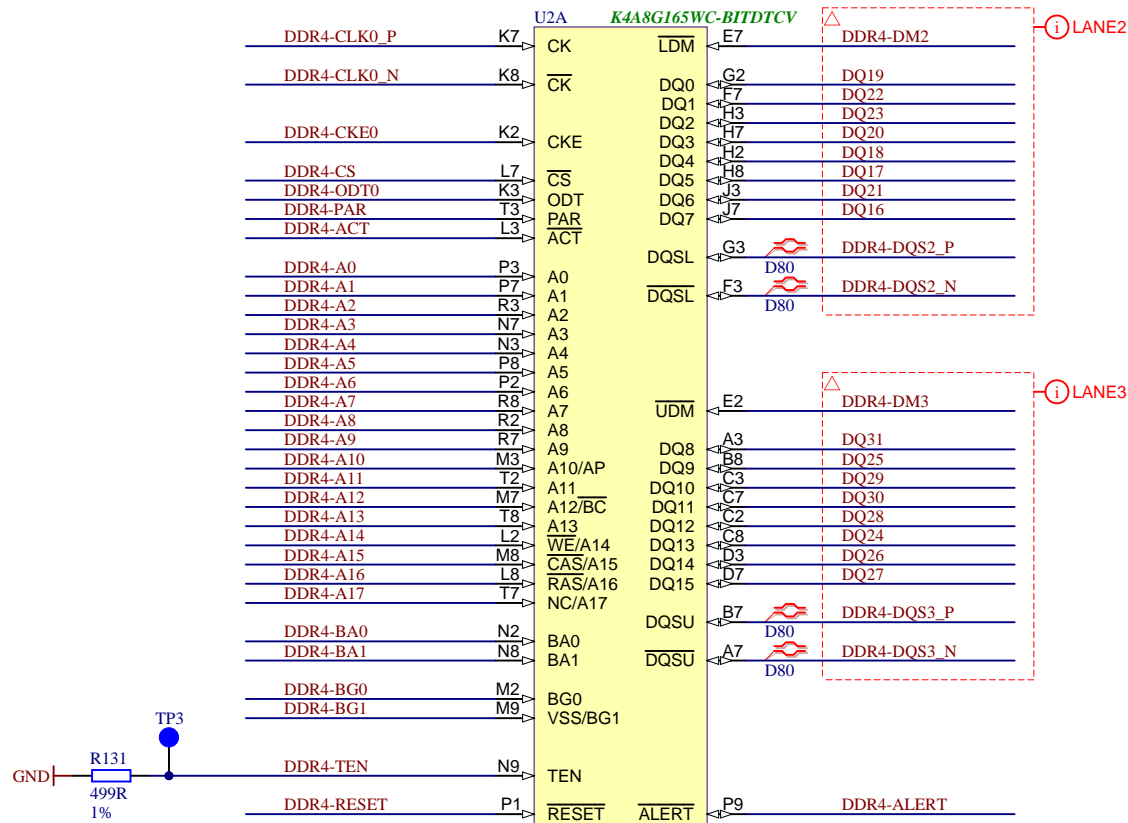
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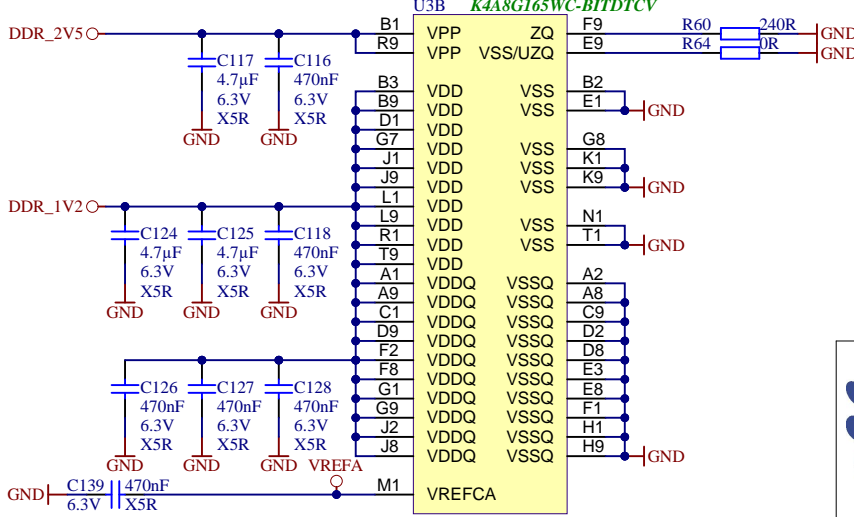
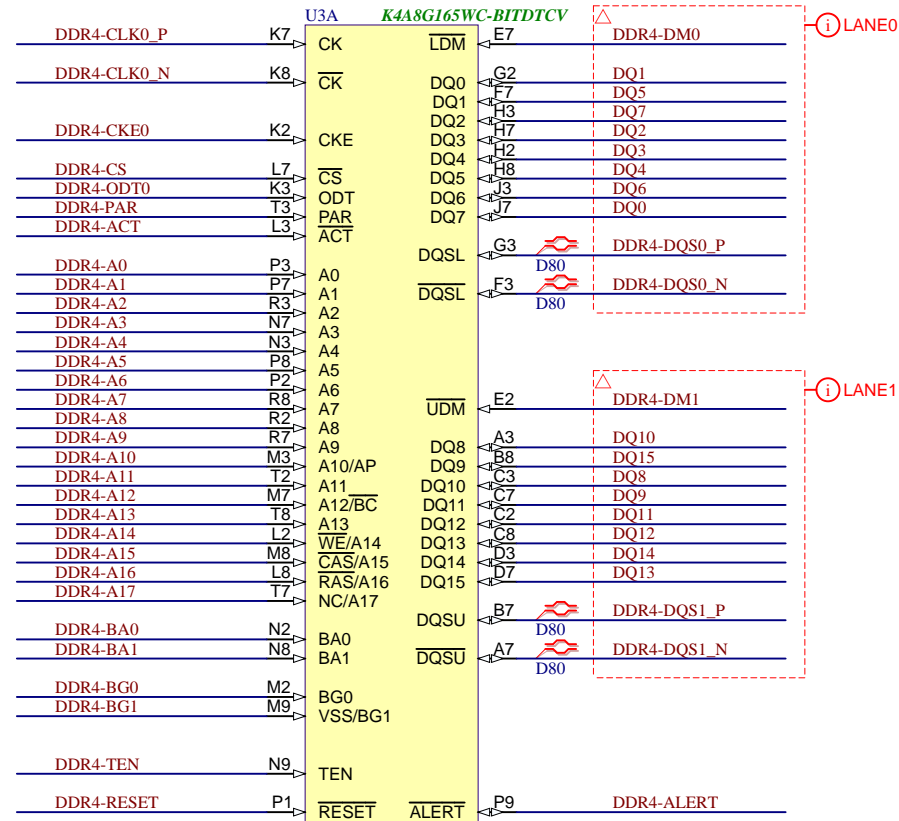
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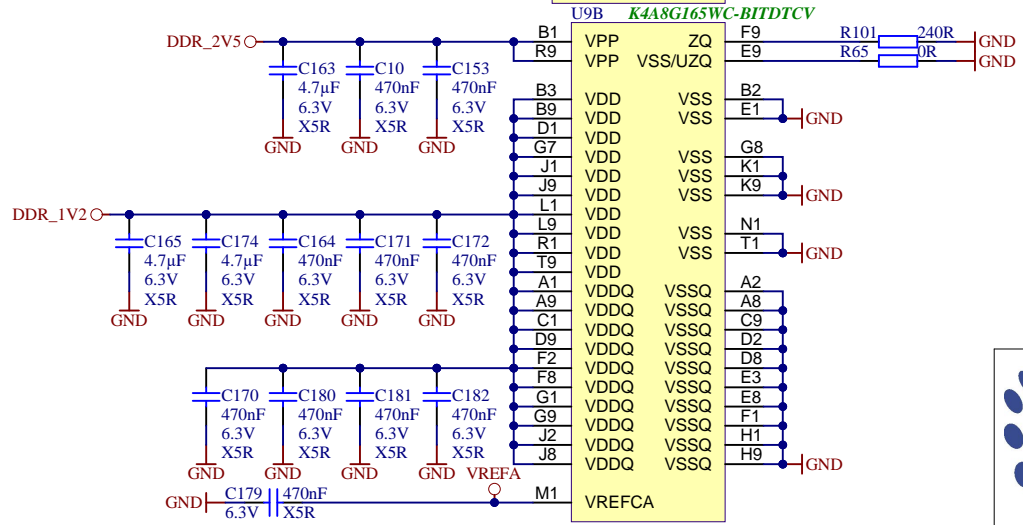
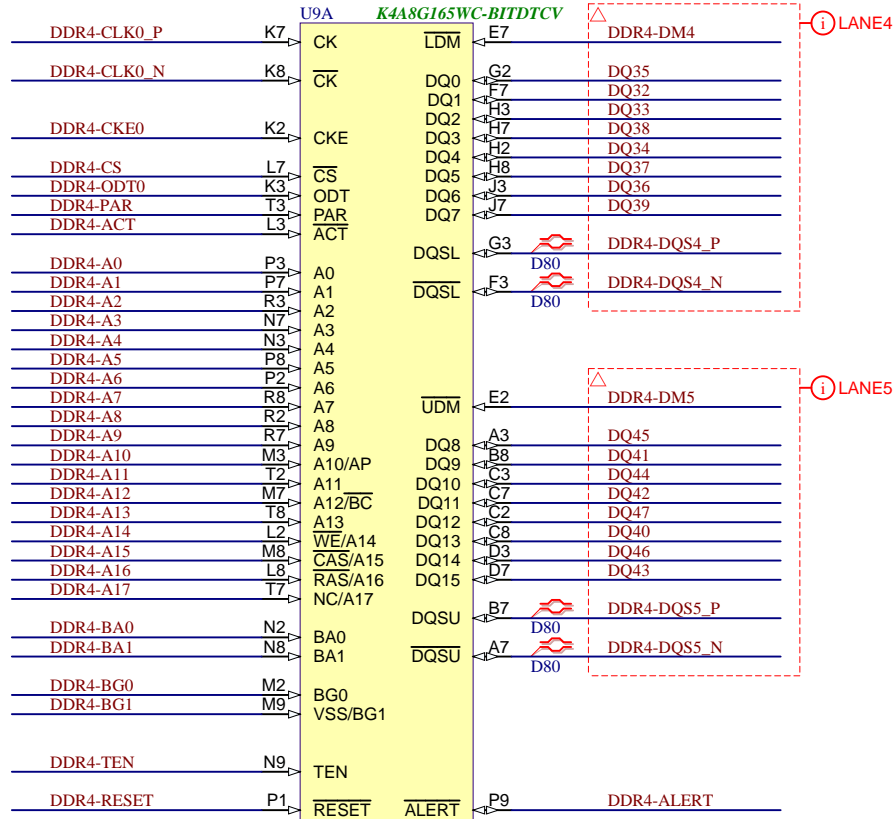
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A

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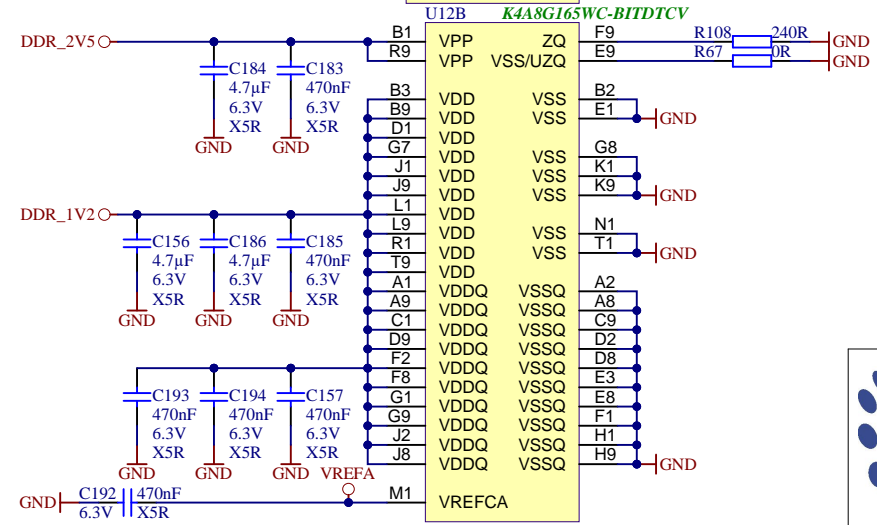
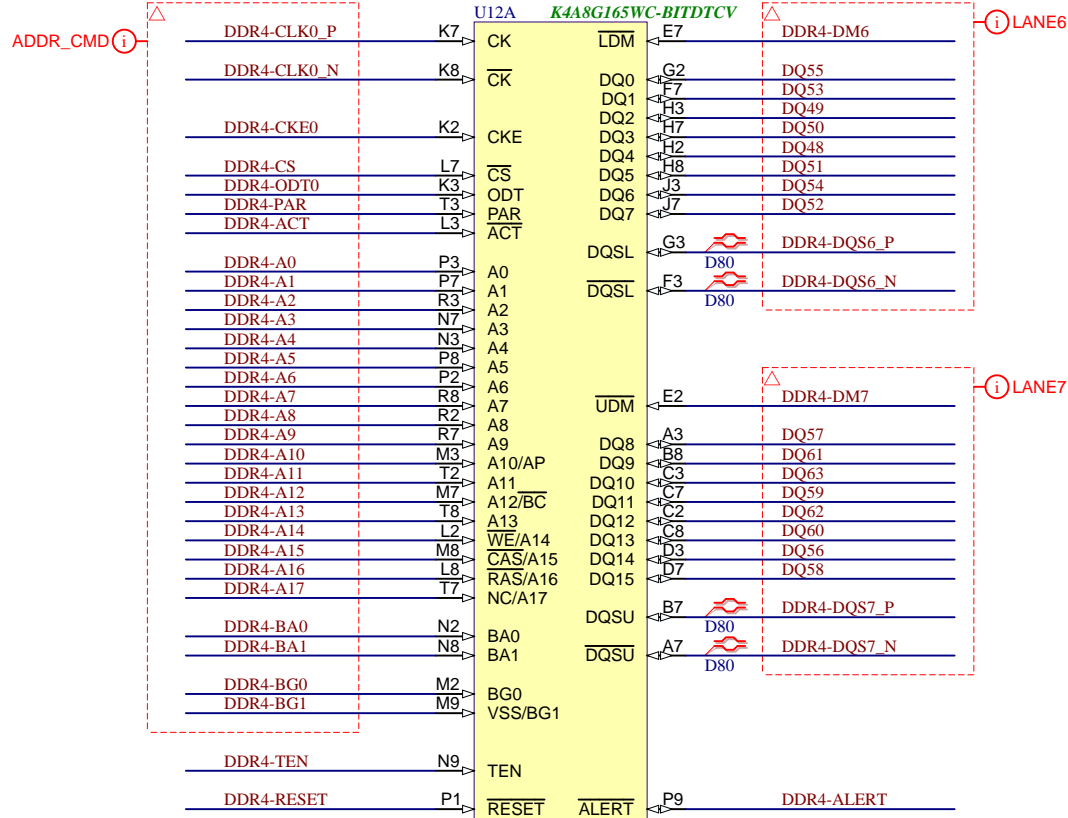
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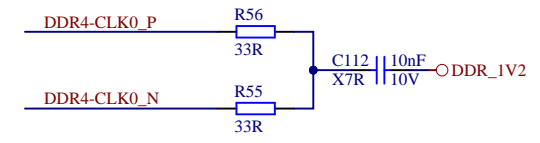
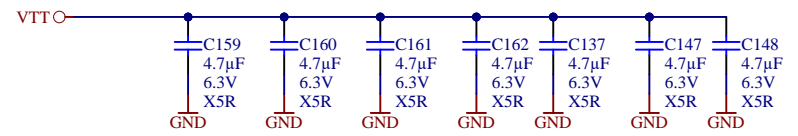
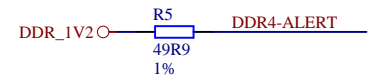
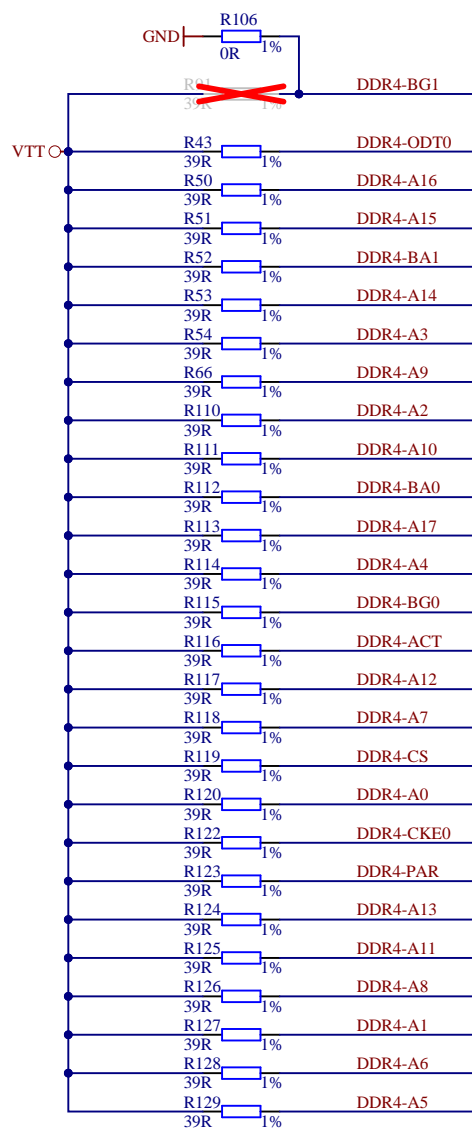
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D

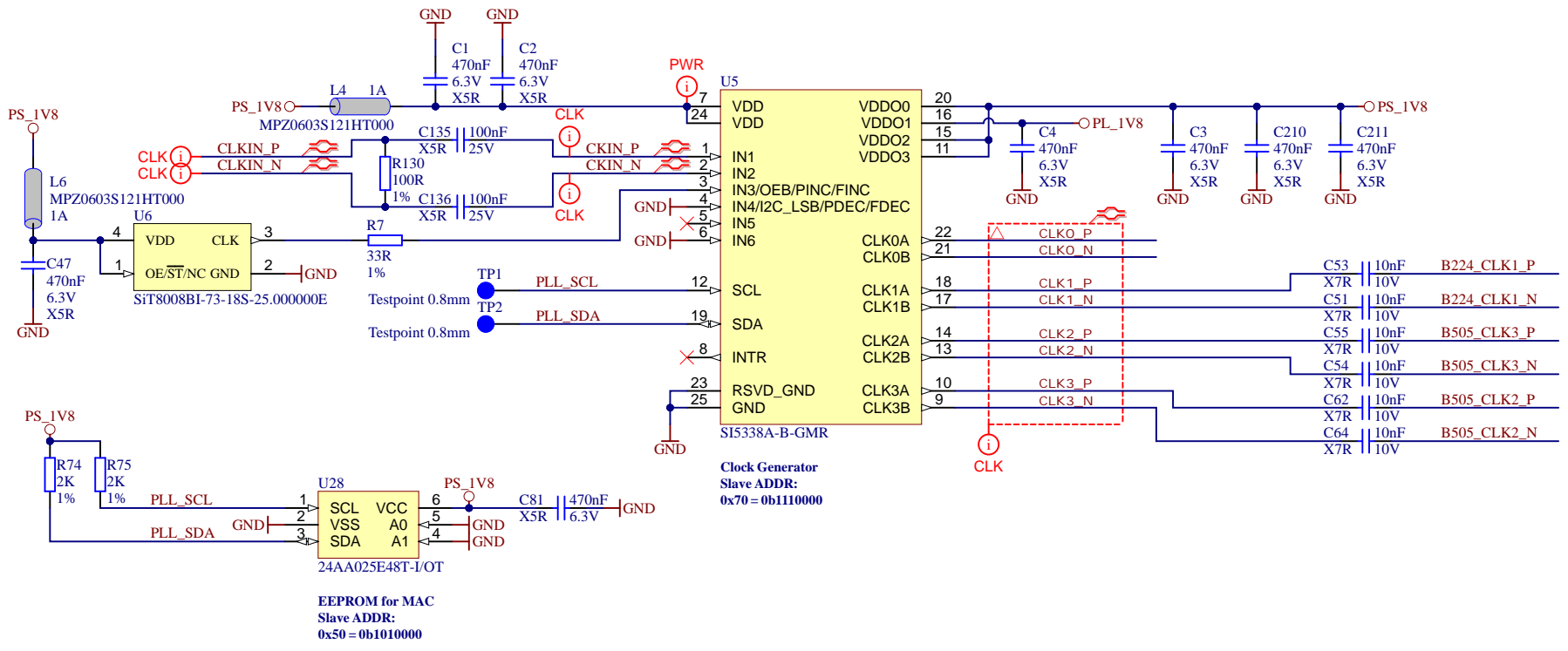
D




| | | |
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| Title: TE0813 - DDR4_4_RAM | | |
| A4 | Number: TE0813 4BE81-A | Rev. 02 |
| Date: 12.06.2023 | Copyright: Trenz Electronic GmbH | Page 24 of 30 |
| Filename: DDR4-RAM_4.SchDoc | | |



| | | |
|----------------------------|----------------------------------|---------------|
| Title: TE0813 - DDR4_TERM | | |
| A4 | Number: TE0813 4BE81-A | Rev. 02 |
| Date: 12.06.2023 | Copyright: Trenz Electronic GmbH | Page 25 of 30 |
| Filename: DDR4-TERM.SchDoc | | |

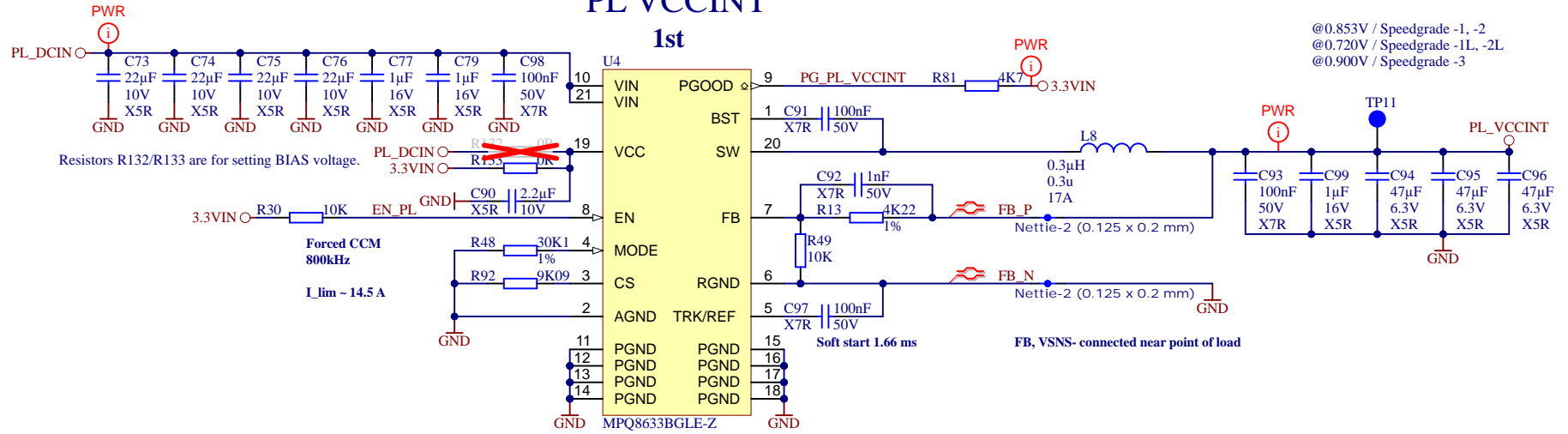


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|  | | Title: TE0813 - CLOCK | |
| | | A4 | Number: TE0813 4BE81-A |
| Date: 12.06.2023 | | Copyright: Trenz Electronic GmbH | |
| Filename: Clock.SchDoc | | Page 26 of 30 | |

U4 can be TPS548A28RWWR or MPQ8633BGLE-Z which is up to Trenz Electronic GmbH.

PL VCCINT

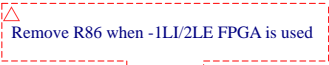
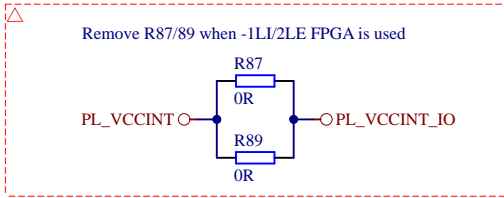
1st



| FPGA Speedgrade | R13 | R49 | PL_VCCINT |
|-----------------|-----------|---------|-----------|
| -1LI | 2 kOhm | 10 kOhm | 0.720 V |
| -2LE | 2 kOhm | 10 kOhm | 0.720 V |
| -1 | 4.22 kOhm | 10 kOhm | 0.853 V |
| -2 | 4.22 kOhm | 10 kOhm | 0.853 V |
| -3E | 10 kOhm | 20 kOhm | 0.900 V |

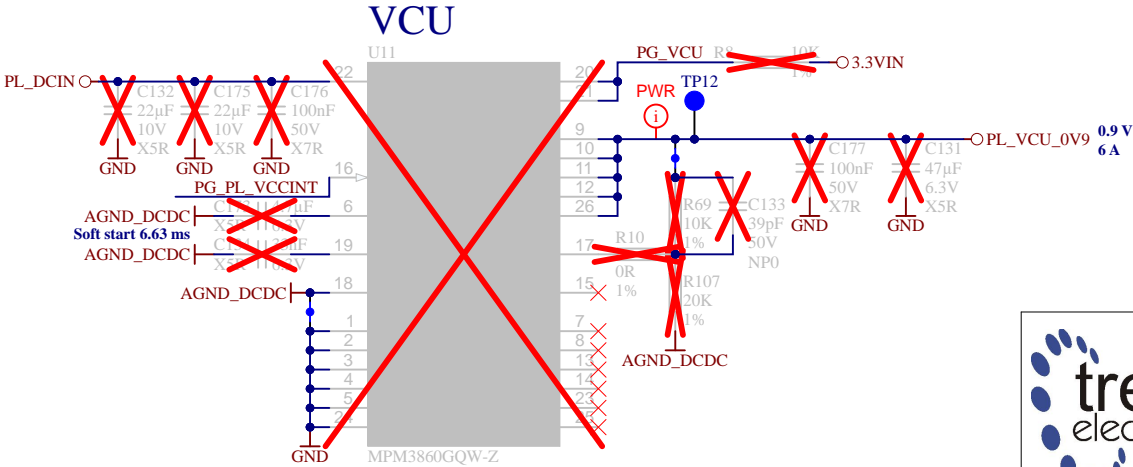
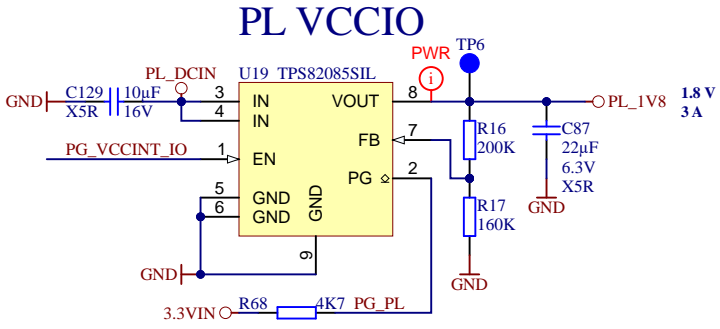
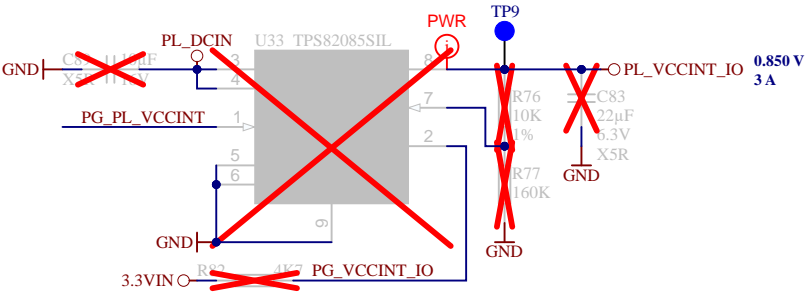
U4 pin compatible with
 -- TPS548B28 (20A)
 -- TPS548A28 (15A)
 -- TPS54JA20 (12A)

| | | |
|--|-------------------------|----------------------------------|
| | Title: TE0813 - POWER_1 | |
| | A4 | Number: TE0813 4BE81-A |
| | Date: 14.06.2023 | Copyright: Trenz Electronic GmbH |
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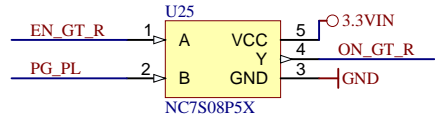
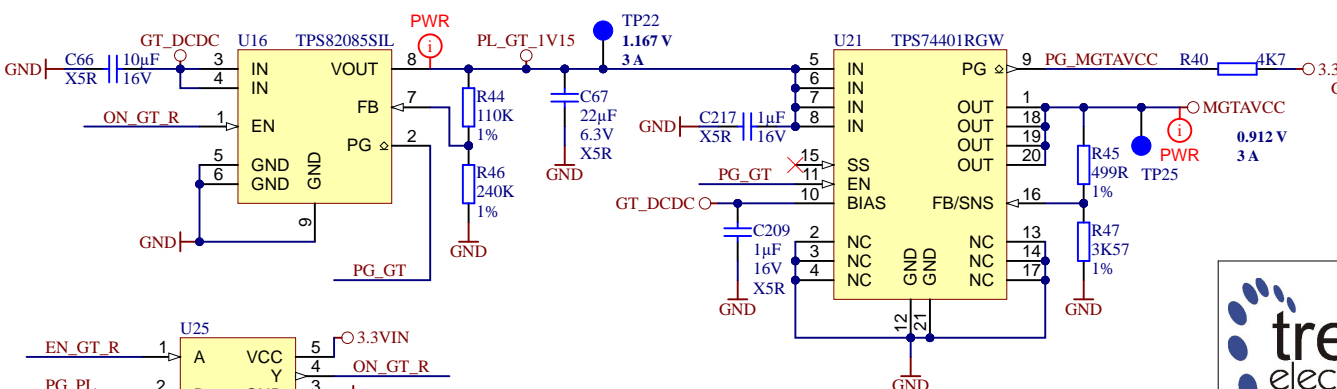
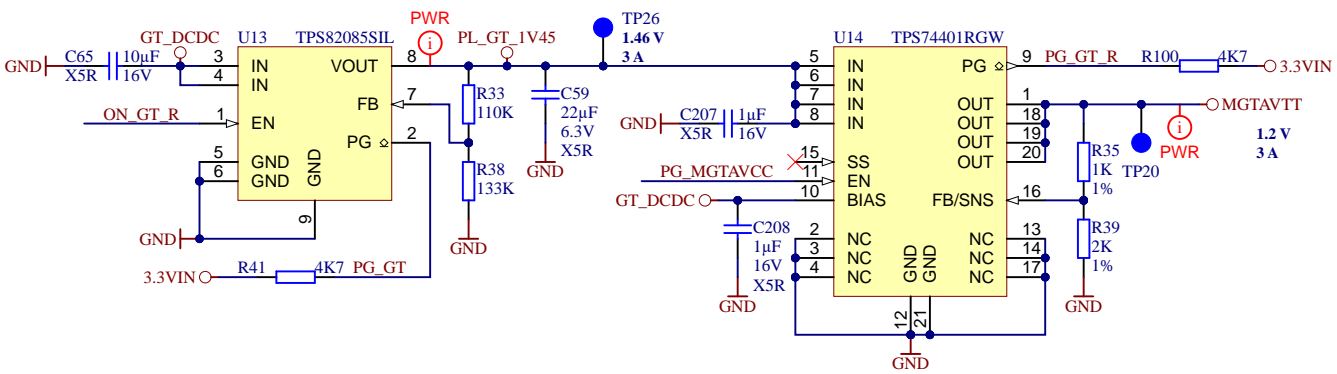
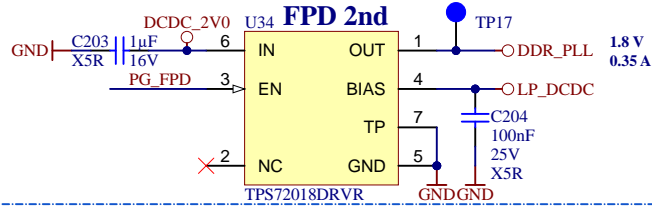
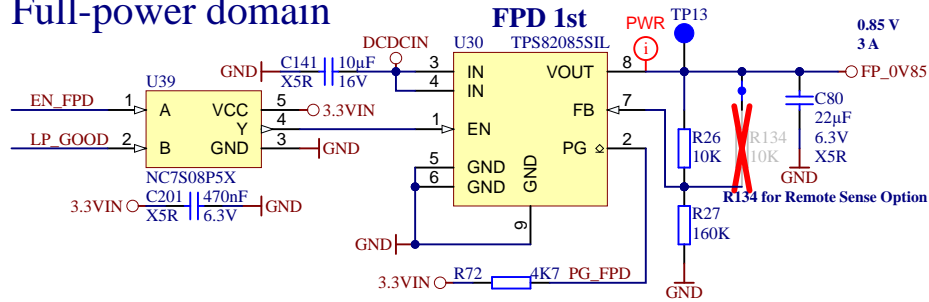
VCCINT_IO & VCCBRAM

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

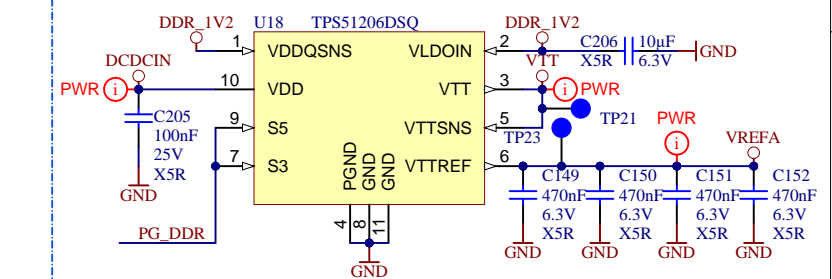
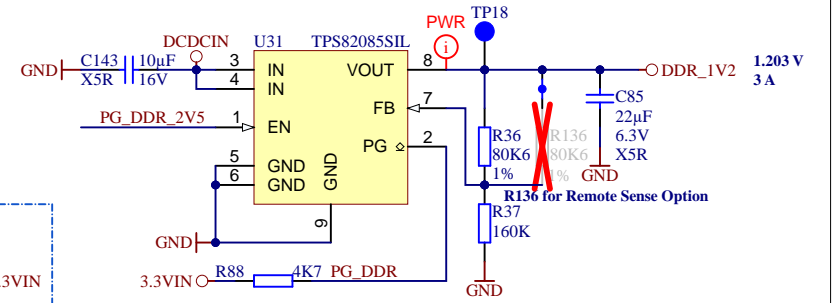
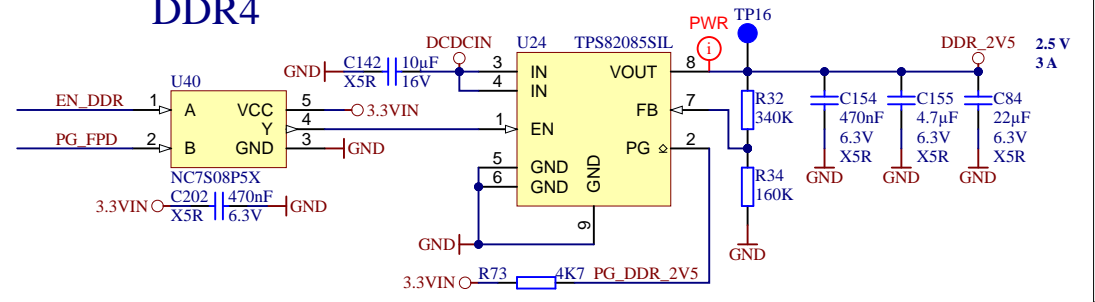


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|--------------------------|----------------------------------|---------------|
| Title: TE0813 - POWER_2 | | |
| A4 | Number: TE0813 4BE81-A | Rev. 02 |
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| Filename: POWER_1.SchDoc | | |

Full-power domain



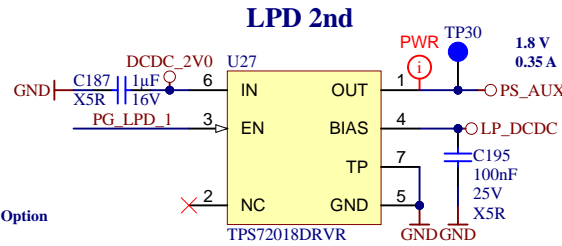
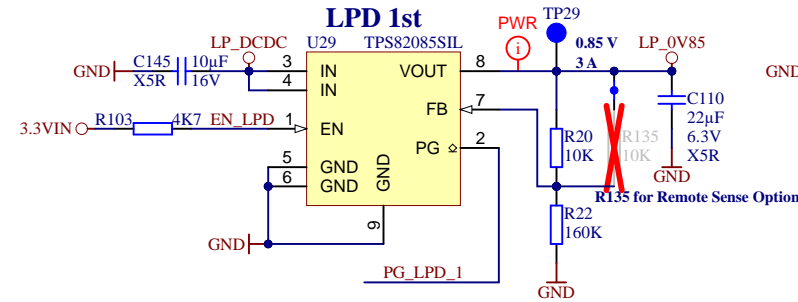
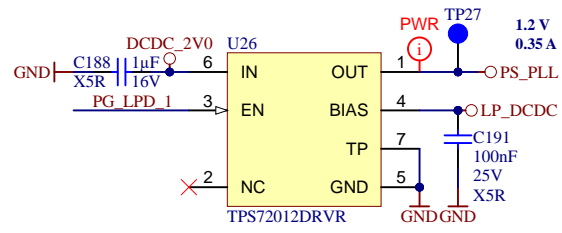
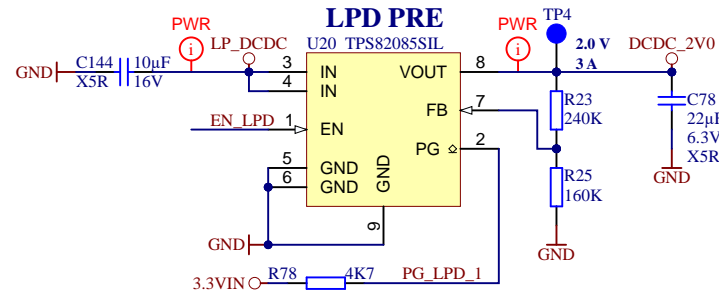
DDR4



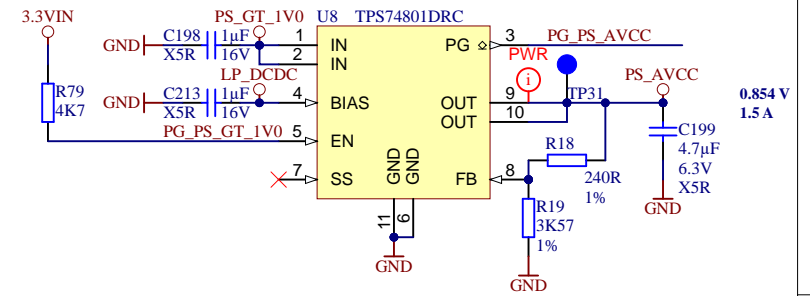
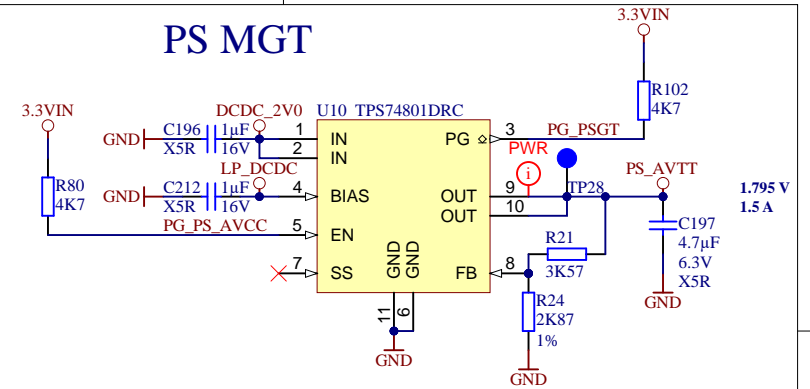
PL MGT

| | | |
|--------------------------|----------------------------------|---------------|
| Title: TE0813 - POWER_3 | | |
| A4 | Number: TE0813 4BE81-A | Rev. 02 |
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| Filename: POWER_2.SchDoc | | |

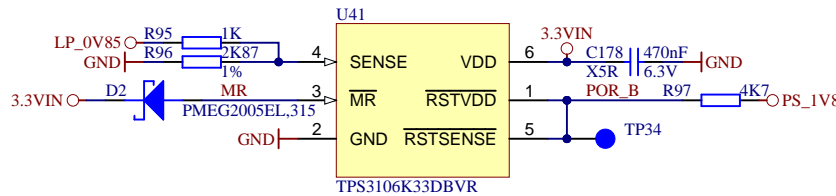
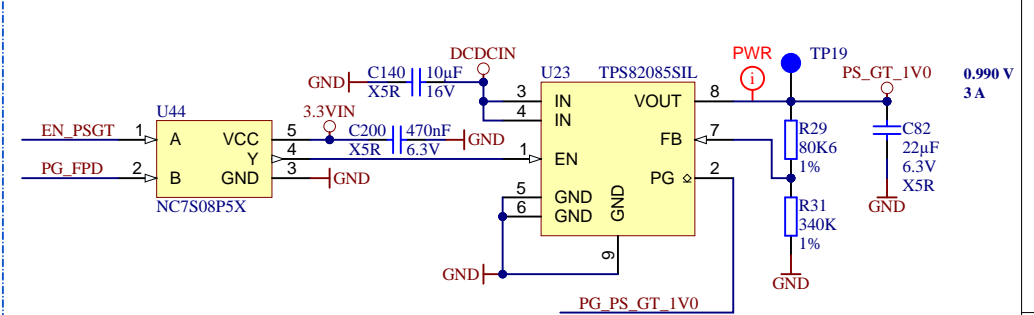
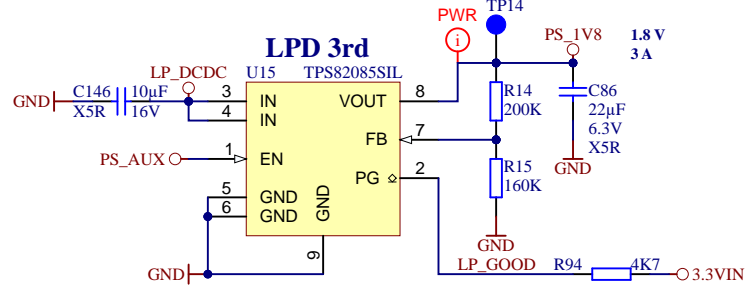
Low-power domain



PS MGT



PS MIO VCCIO



| Net Name | Voltage Rail | Low Detect |
|---------------------|--------------|------------|
| LP_OV85 | 0.85 V | 0.743 V |
| 3.3V _{VIN} | 3.3 V | 2.941 V |



| | | |
|--------------------------|----------------------------------|---------------|
| Title: TE0813 - POWER_4 | | |
| A4 | Number: TE0813 4BE81-A | Rev. 02 |
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| Filename: POWER_3.SchDoc | | |