



Regarding the usage of our schematics and alike documentation for Trenz module TE0726

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Schematics and other handouts serve for informational purposes only!

|   |  |                                       |              |
|---|--|---------------------------------------|--------------|
|  | Title: Legal Notices Modules           |                                       |              |
|   | A4                                     | Number: TE0726<br>41C94-A             | Rev. 04      |
|   | Date: 2023-03-20                       | Copyright: Trenz Electronic GmbH / TT | Page 1 of 18 |
|   | Filename: Legal Notices Modules.SchDoc |                                       |              |

| REV  | Description   |                    |
|------|---|--------------------|
| -01  | Initial revision  |                    |
| -02  | <ol style="list-style-type: none"> <li>1. CSI CLK line moved to MRCC pin, CSI lanes swap -&gt; DONE</li> <li>2. CSI camera GPIO moved to MIO GPIO -&gt; DONE</li> <li>3. RPi GPIO 14,15 moved from MIO to PL -&gt; DONE</li> <li>4. add C for SD Card VCC (required by SD spec) 47uF -&gt;DONE</li> <li>5. add C for RPi camera - prevent voltage drop at camera init - 47uF ? or R + 47uf -&gt;DONE</li> <li>6. fix MODE pin strapping -&gt; DONE</li> <li>7. LED change 0603 (cheaper) -&gt; DONE</li> <li>8. add POWER connector 2 pin -&gt; DONE (2pin 2.54mm)</li> <li>9. change HDMI ESD to ESD+EMI -&gt; DONE (replaced on EMI4192)</li> <li>10. fix HDMI HPD and backpower? how? -&gt; fix reset</li> <li>11. DSI find solution for LS mode</li> <li>12. fix XADC power caps -&gt; DONE</li> <li>13. change LPDDR2 -&gt;&gt; DDR3L -&gt; DONE</li> </ol>  |                    |
| -03  | <ol style="list-style-type: none"> <li>1. make variants: <ol style="list-style-type: none"> <li>a) default with DDR3L 128Mb;</li> <li>b) TE0726-03M with DDR3L 512Mb;</li> <li>c) TE0726-03L with DDR3L 128Mb, without usb's, eth_phy, connectors usb, RJ-45, CSI,DSI,HDMI, jack 3.5mm -&gt; done</li> </ol> </li> <li>2. replace FTDI on 56pins package -&gt; done</li> <li>3. move LED's as raspberry pi 3 -&gt; done</li> <li>4. replace POWER connector on right angle connector -&gt; done (not fitted)</li> <li>5. make corect conection PUDC pin -&gt; done</li> <li>6. optimize BOM, replace on cheaper components -&gt; done (replace HDMI, DSI/CSI connector, USB stacked connectors, RJ-45, power connector)</li> </ol>  |                    |
| -03a | <ol style="list-style-type: none"> <li>1. VBUS Resistor R94 replaced by 10k ohm (was 12k1)</li> </ol>   | VY<br>(08.04.2019) |
| -04  | <ol style="list-style-type: none"> <li>1. EOL components U16, U17, U19, U20 (EN5311QI) were replaced by MPM3834CGPA;</li> <li>2. Added MIC bias power L12, C114, R151 (Page 16);</li> <li>3. Added Legal notices (Page 1);</li> <li>4. Added power diagram (Page 4);</li> <li>5. Added S1 switch and R152 for "JTAG only mode" enable (Page 8);</li> <li>6. The signals were renamed:<br/>- SPI-DQ0/M0 ----&gt; SPI-DQ0/M3,<br/>- SPI-DQ3/M3 ----&gt; SPI-DQ3/M0<br/>according to AMD Table 6-4 (Page 8);</li> <li>7. ECC function has been added for U8 (Page 11);</li> <li>7.1 Added I2C level shifter U12 for DDR3 ECC function (Page 11);</li> <li>7.2 Added Buffers U24, U25 to match the level of signals (Page 6);</li> <li>7.3. Added Diode D7, resistors R155, R160.</li> <li>8. EOL components L1, L2, L3, L4, L6, L7, L9, L10 BKP0603HS121-T replaced by MPZ0603S121HT000.</li> <li>9. EOL components D8, D9 SP5001-04TTG replaced by EM18042MUTAG.</li> <li>10. Resistors R80-R82 replaced by 10k ohm (was 1k43).</li> <li>11. Added Testpoints TP15 - TP20.</li> <li>12. The type of testpoints TP1 - TP14 was updated. Diameter changed from 0.8 mm to 1 mm.</li> <li>13. CEC function is not supported. L11 was removed. C127, D5, R140, R42 are DNP.</li> <li>14. Power-up sequencing was updated for new DC-DC supplies.</li> <li>15. Capacitors C29, C32, C33 replaced by 470nF (was 100nF).</li> </ol> | VG<br>(06.10.2023) |

|   |                                   |                                  |             |
|---|-----------------------------------|----------------------------------|-------------|
|  | Title: Revision_Changes           |                                  |             |
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|   | Filename: Revision_Changes.SchDoc |                                  |             |

1

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A

A

B

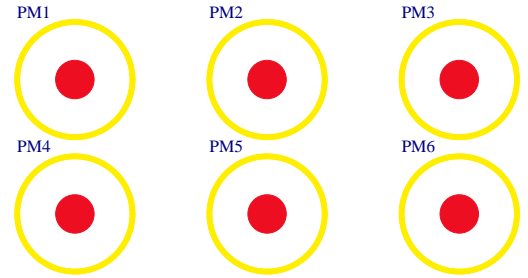
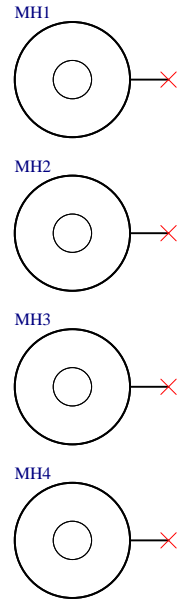
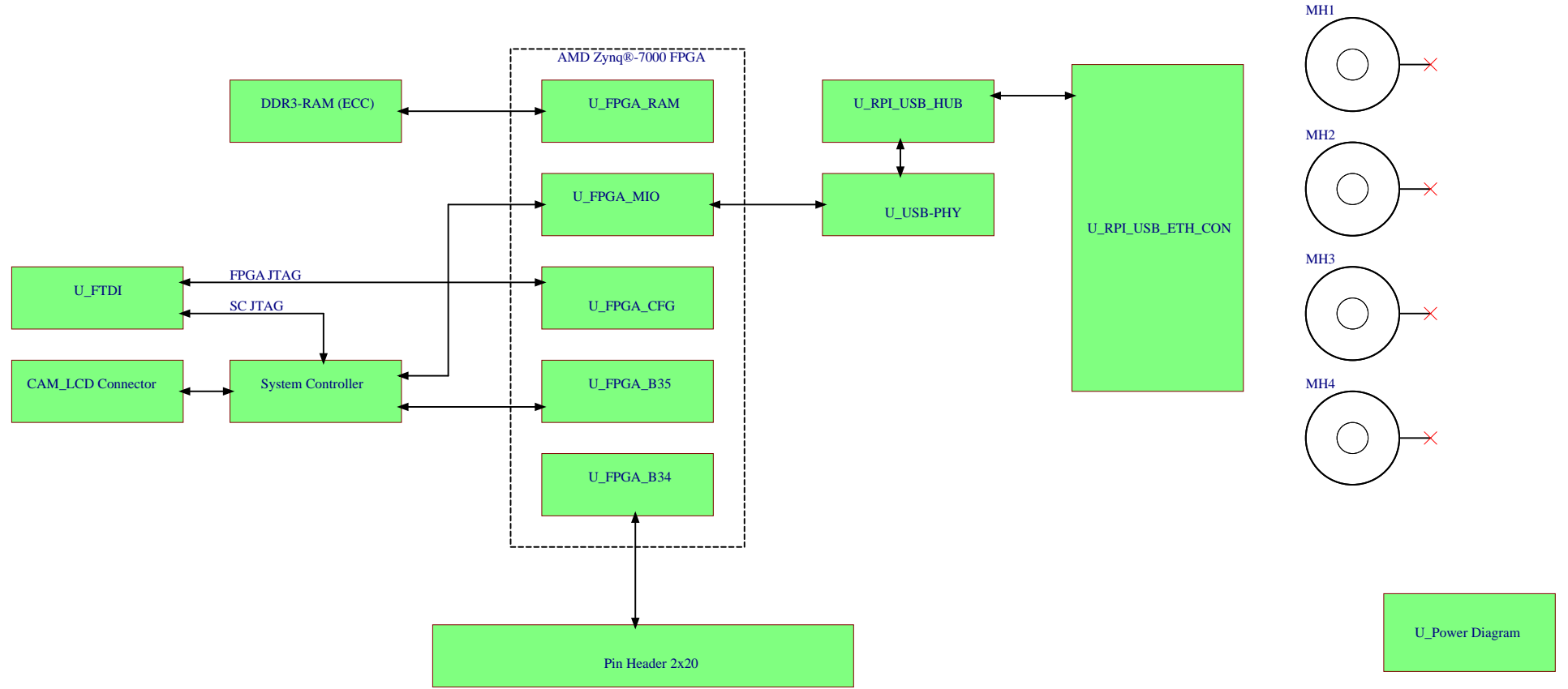
B

C

C

D

D



Serial  
Serialnumber 6,3 x 6.3mm

MECH1  
TE Address Overlay  
LOGO ADDRESS

UKCA  
UKCA Logo on Top Overlay  
UKCA-TOOVERLAY

LOGO1  
TE Logo PRINT Layer  
LOGO PRINT

CE  
CE Logo on Top Overlay  
CE-TOOVERLAY

|                  |            |
|------------------|------------|
| Drawn by         | VG         |
| Checked by       | IG         |
| Assembly variant | 41C94-A    |
| Created by       | VG         |
| Modified by      | 2023-09-28 |
| Modified at      | VG         |



|                         |                                  |             |
|-------------------------|----------------------------------|-------------|
| Title: Overview         |                                  |             |
| A4                      | Number: TE0726<br>41C94-A        | Rev. 04     |
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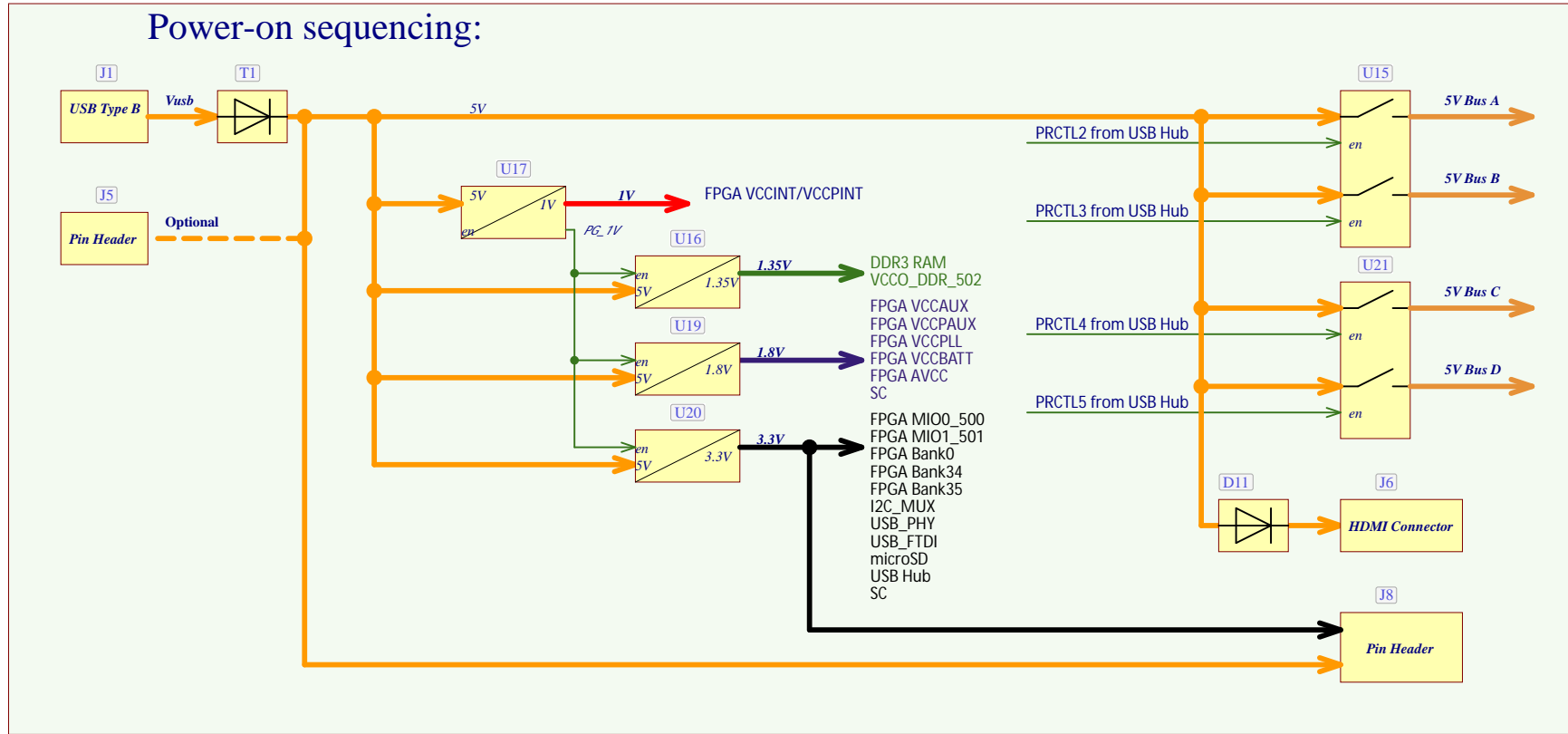
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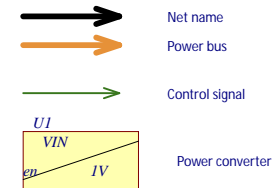
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## Power-on sequencing:



## Supported Voltage Ranges:

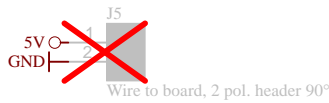
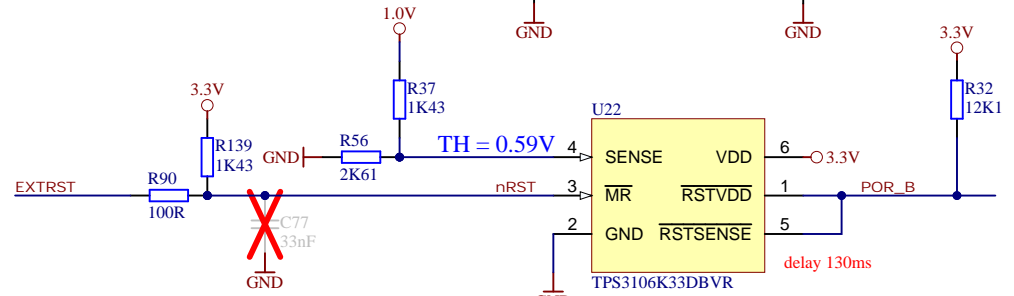
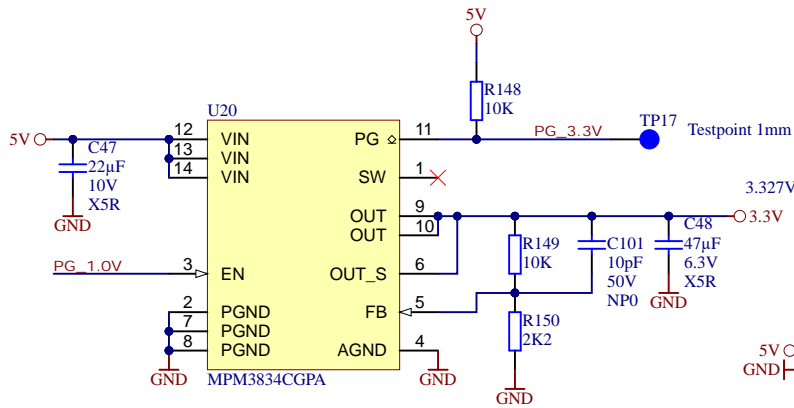
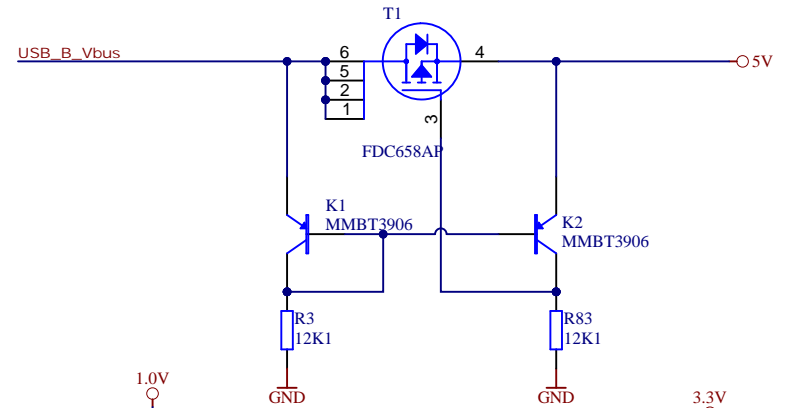
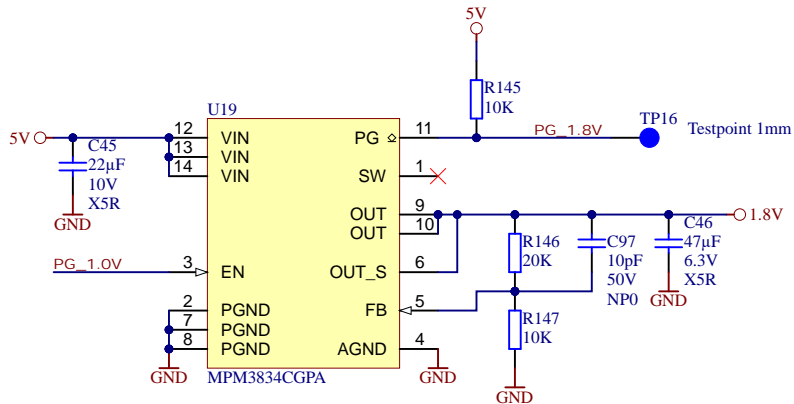
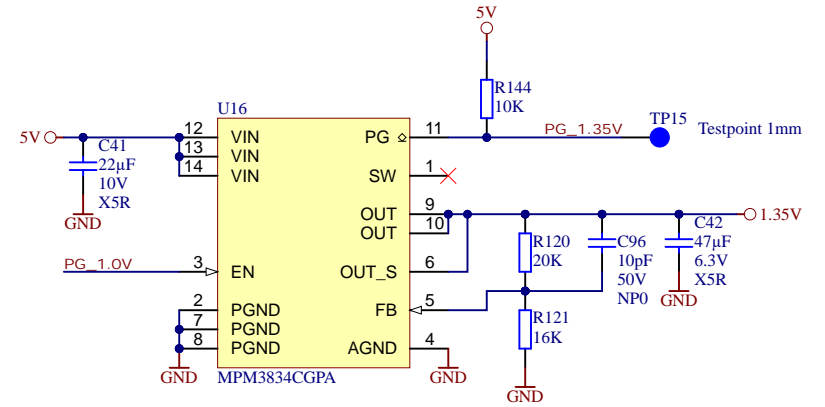
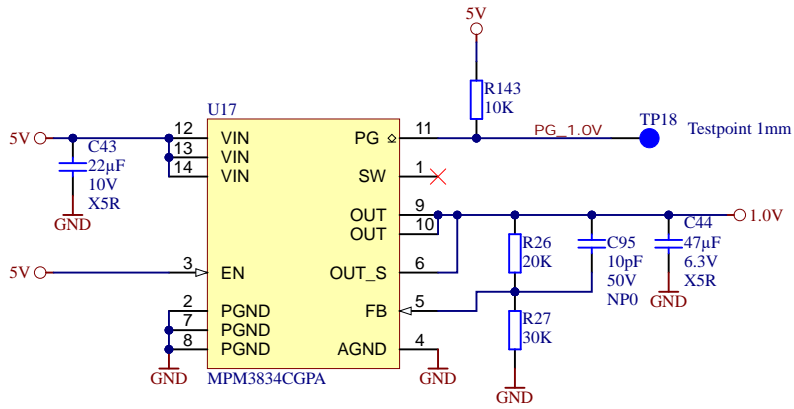
| Power Rail | Direction | Range | Tolerance | Description       | Note |
|------------|-----------|-------|-----------|-------------------|------|
| 5V         | OUT       | 5V    | +/-5%     | Micromodule Power | -    |
| USB_B_Vbus | IN        | 5V    | +/-5%     | Micromodule Power | -    |
| 3.3V       | OUT       | 3.3V  | +/-3%     | Micromodule Power | -    |



U\_PowerSupply  
PowerSupply.SchDoc



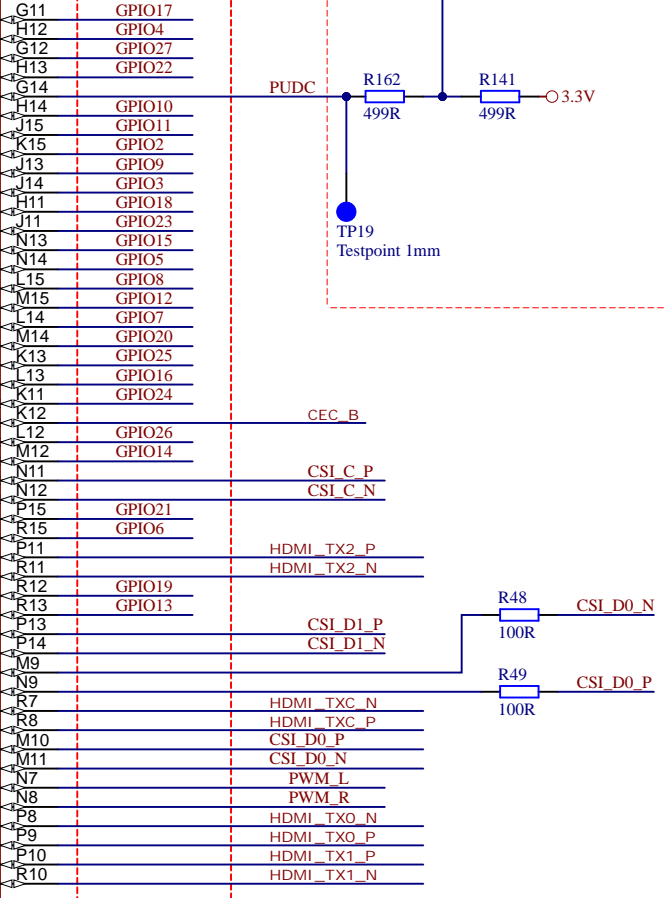
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|                                | A4                   | Number: TE0726<br>41C94-A        |
|                                | Date: 2023-03-20     | Copyright: Trenz Electronic GmbH |
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| Filename: Power_Diagram.SchDoc |                      |                                  |



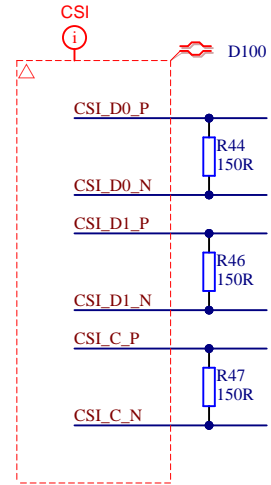
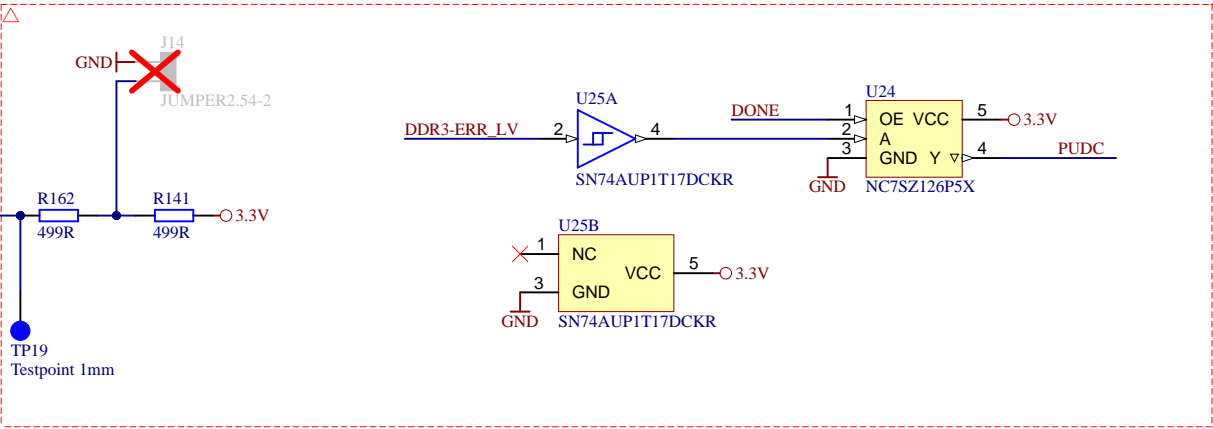
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BANK 34

- IO\_L1P\_T0\_34
- IO\_L1N\_T0\_34
- IO\_L2P\_T0\_34
- IO\_L2N\_T0\_34
- IO\_L3P\_T0\_DQS\_PUDC\_B\_34
- IO\_L3N\_T0\_DQS\_34
- IO\_L4P\_T0\_34
- IO\_L4N\_T0\_34
- IO\_L5P\_T0\_34
- IO\_L5N\_T0\_34
- IO\_L6P\_T0\_34
- IO\_L6N\_T0\_VREF\_34
- IO\_L7P\_T1\_34
- IO\_L7N\_T1\_34
- IO\_L8P\_T1\_34
- IO\_L8N\_T1\_34
- IO\_L9P\_T1\_DQS\_34
- IO\_L9N\_T1\_DQS\_34
- IO\_L10P\_T1\_34
- IO\_L10N\_T1\_34
- IO\_L11P\_T1\_SRCC\_34
- IO\_L11N\_T1\_SRCC\_34
- IO\_L12P\_T1\_MRCC\_34
- IO\_L12N\_T1\_MRCC\_34
- IO\_L13P\_T2\_MRCC\_34
- IO\_L13N\_T2\_MRCC\_34
- IO\_L15P\_T2\_DQS\_34
- IO\_L15N\_T2\_DQS\_34
- IO\_L16P\_T2\_34
- IO\_L16N\_T2\_34
- IO\_L17P\_T2\_34
- IO\_L17N\_T2\_34
- IO\_L18P\_T2\_34
- IO\_L18N\_T2\_34
- IO\_L19P\_T3\_34
- IO\_L19N\_T3\_VREF\_34
- IO\_L20P\_T3\_34
- IO\_L20N\_T3\_34
- IO\_L21P\_T3\_DQS\_34
- IO\_L21N\_T3\_DQS\_34
- IO\_L22P\_T3\_34
- IO\_L22N\_T3\_34
- IO\_L23P\_T3\_34
- IO\_L23N\_T3\_34
- IO\_L24P\_T3\_34
- IO\_L24N\_T3\_34



XC7Z010-1CLG225C



|                                  |   |                            |
|----------------------------------|---|----------------------------|
| Title: <b>FPGA B34</b>           |   |                            |
| A4                               | Number: <b>TE0726<br/>41C94-A</b>       | Rev. <b>04</b>             |
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| Filename: <b>FPGA_B34.SchDoc</b> |   |                            |

1

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A

A

B

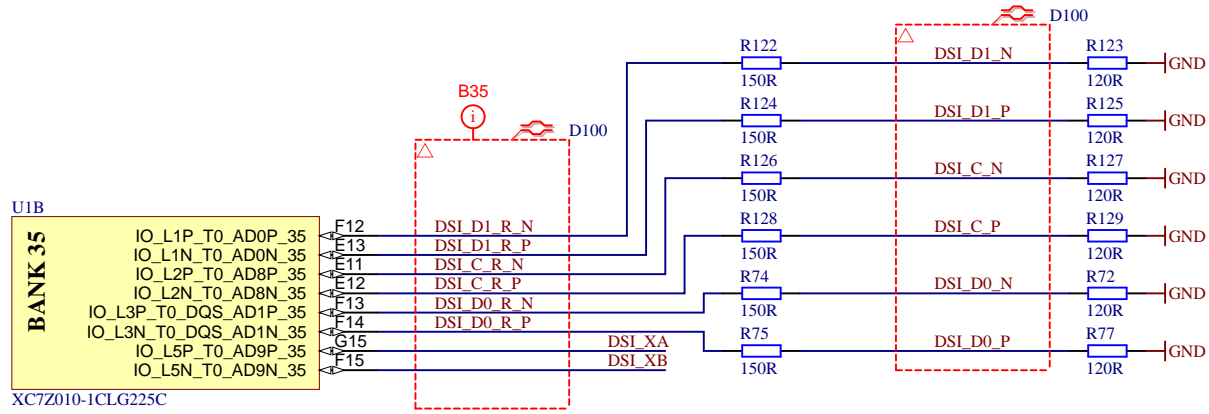
B


C

C

D

D



|   |                                  |   |                            |
|---|----------------------------------|---|----------------------------|
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|   | A4                               | Number: <b>TE0726<br/>41C94-A</b>       | Rev. <b>04</b>             |
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1

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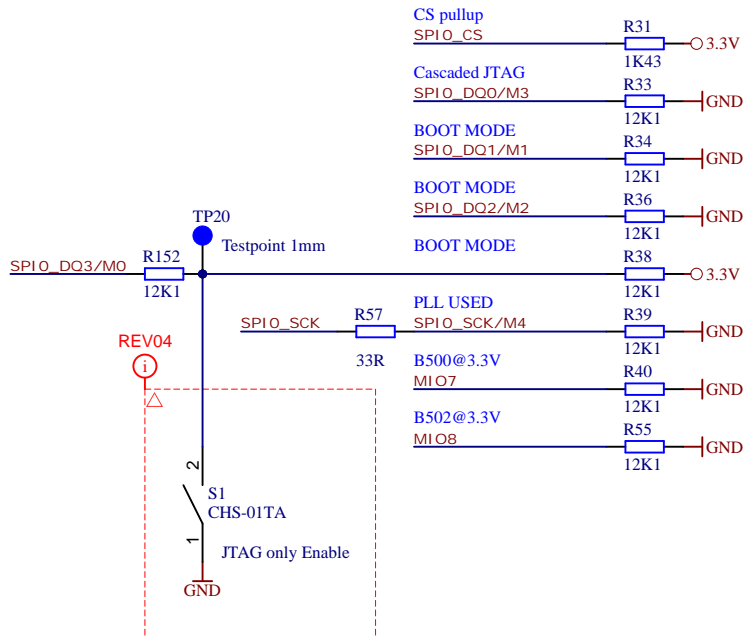
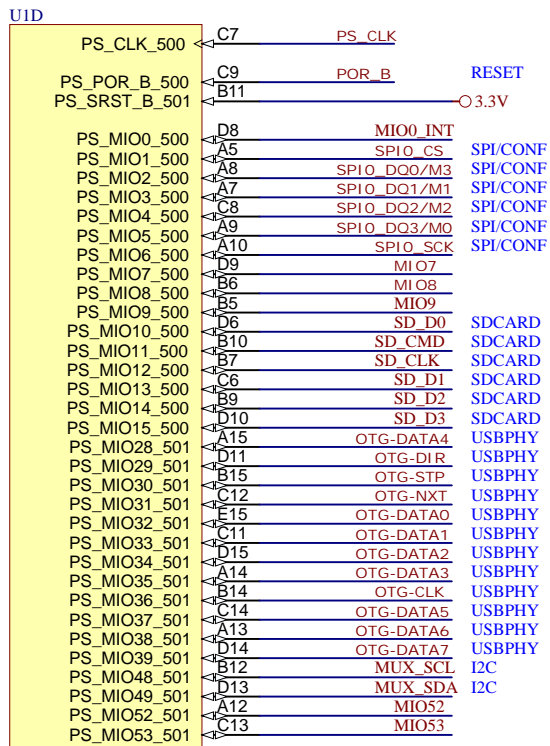
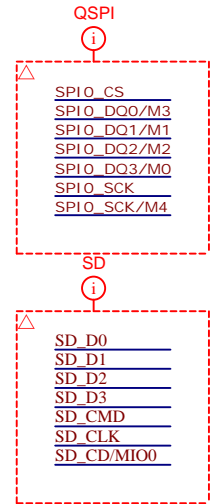
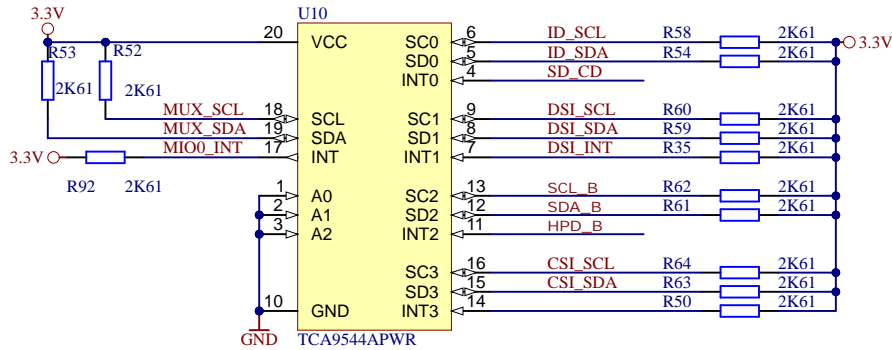
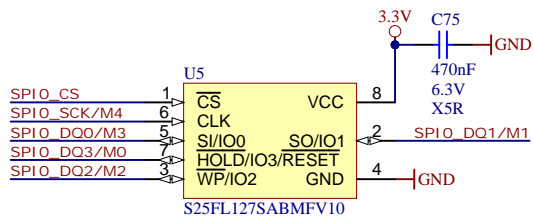


Table 6-4: Boot Mode MIO Strapping Pins

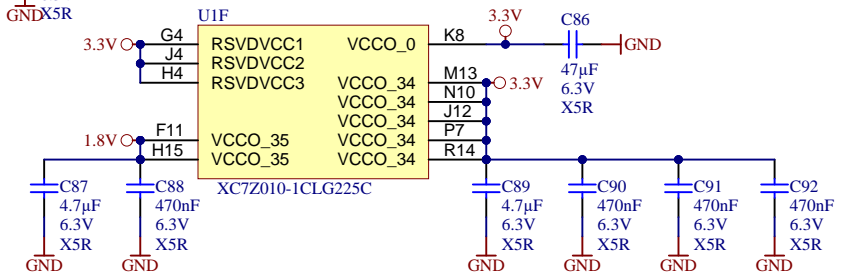
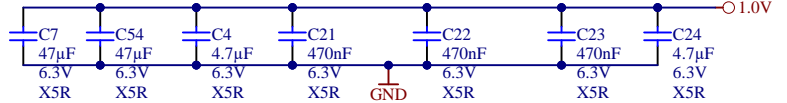
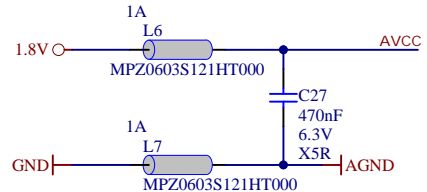
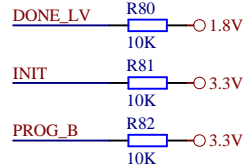
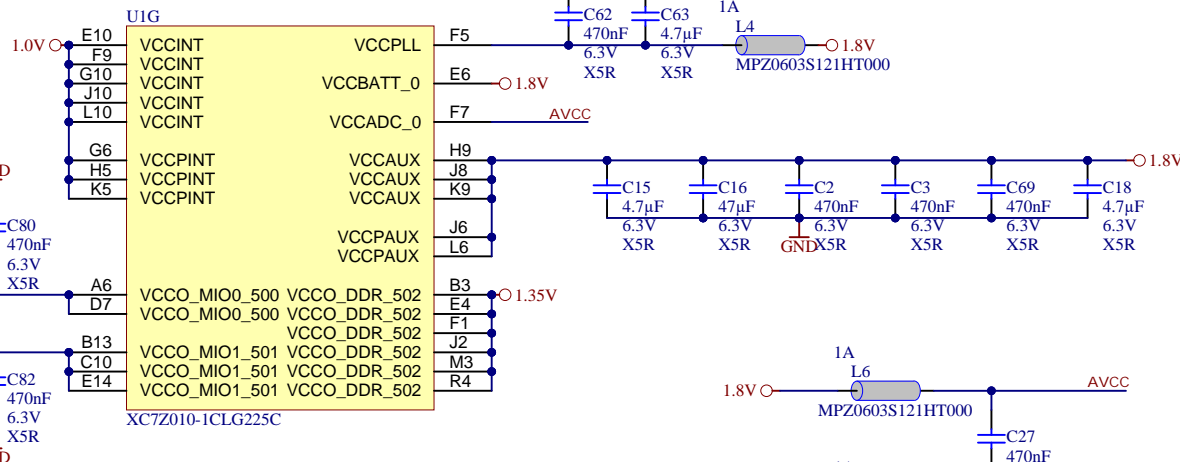
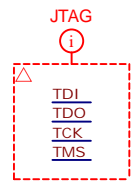
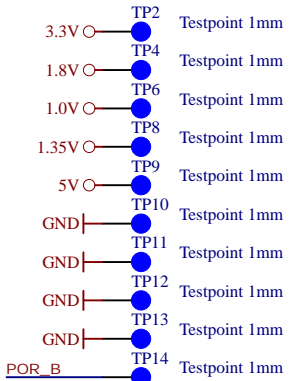
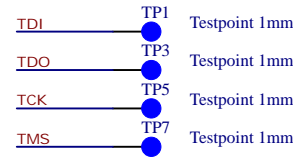
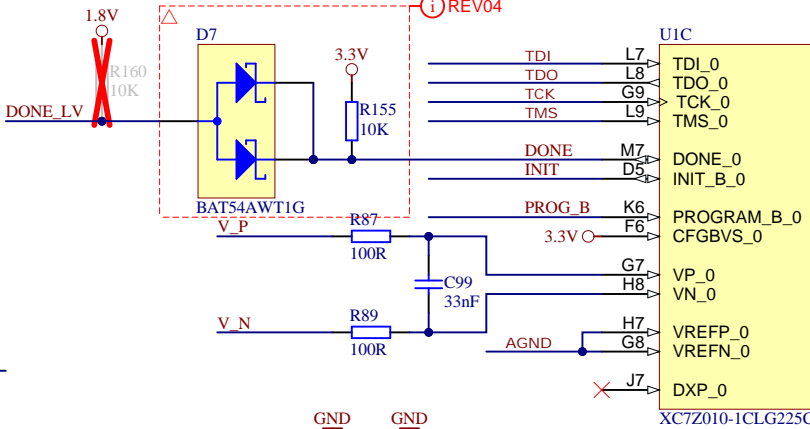
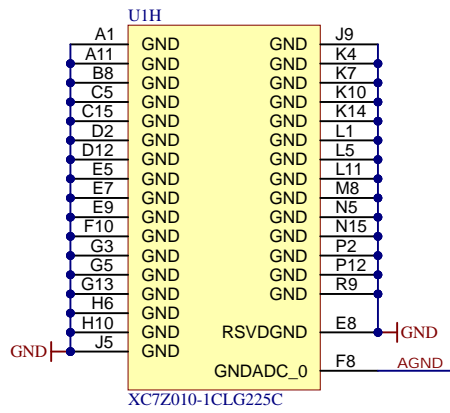
| Pin-signal / Mode                                      | MIO[8]   | MIO[7]   | MIO[6]       | MIO[5]       | MIO[4]       | MIO[3]       | MIO[2]       |
|--|----------|----------|--------------|--------------|--------------|--------------|--------------|
|  | VMODE[1] | VMODE[0] | BOOT_MODE[4] | BOOT_MODE[0] | BOOT_MODE[2] | BOOT_MODE[1] | BOOT_MODE[3] |
| Boot Devices   |          |          |              |              |              |              |              |
| JTAG Boot Mode; cascaded is most common <sup>(1)</sup> |          | 0        |              | 0            |              | 0            |              |
| NOR Boot <sup>(3)</sup>                                |          | 0        |              | 0            |              | 1            |              |
| NAND   |          | 0        |              | 1            |              | 0            |              |
| Quad-SP <sup>(3)</sup>                                 |          | 1        |              | 0            |              | 0            |              |
| SD Card  |          | 1        |              | 1            |              | 0            |              |

Title: FPGA MIO

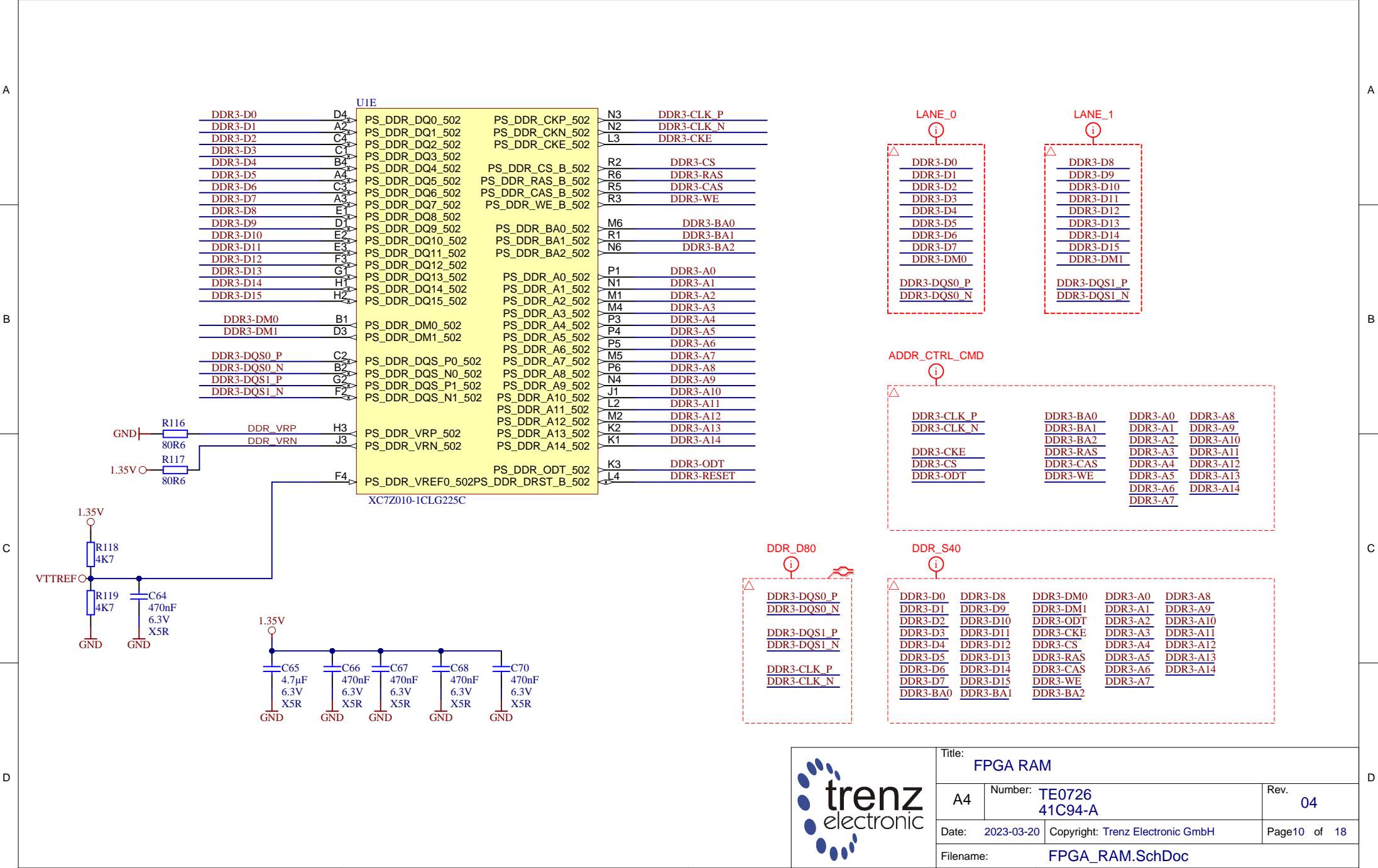


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|                                  |   |                            |
|----------------------------------|---|----------------------------|
| Title: <b>FPGA PWR</b>           |   |                            |
| A4                               | Number: <b>TE0726<br/>41C94-A</b>       | Rev. <b>04</b>             |
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| Filename: <b>FPGA_CFG.SchDoc</b> |   |                            |



|                                  |                         |   |
|----------------------------------|-------------------------|---|
|                                  | Title: <b>FPGA RAM</b>  |   |
|                                  | A4                      | Number: <b>TE0726<br/>41C94-A</b>       |
|                                  | Date: <b>2023-03-20</b> | Copyright: <b>Trenz Electronic GmbH</b> |
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| Filename: <b>FPGA_RAM.SchDoc</b> |                         |   |

1

2

3

4

A

A

B

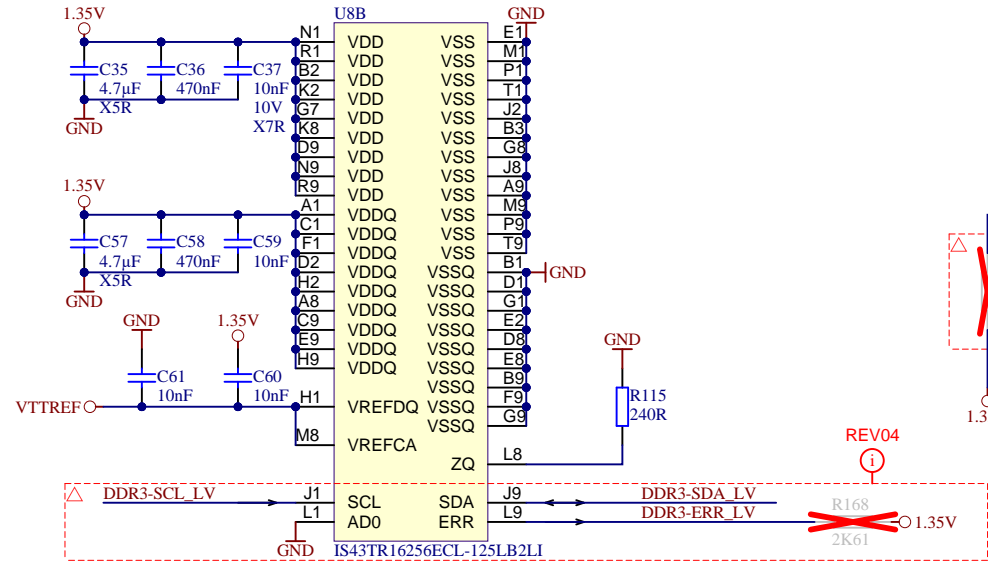
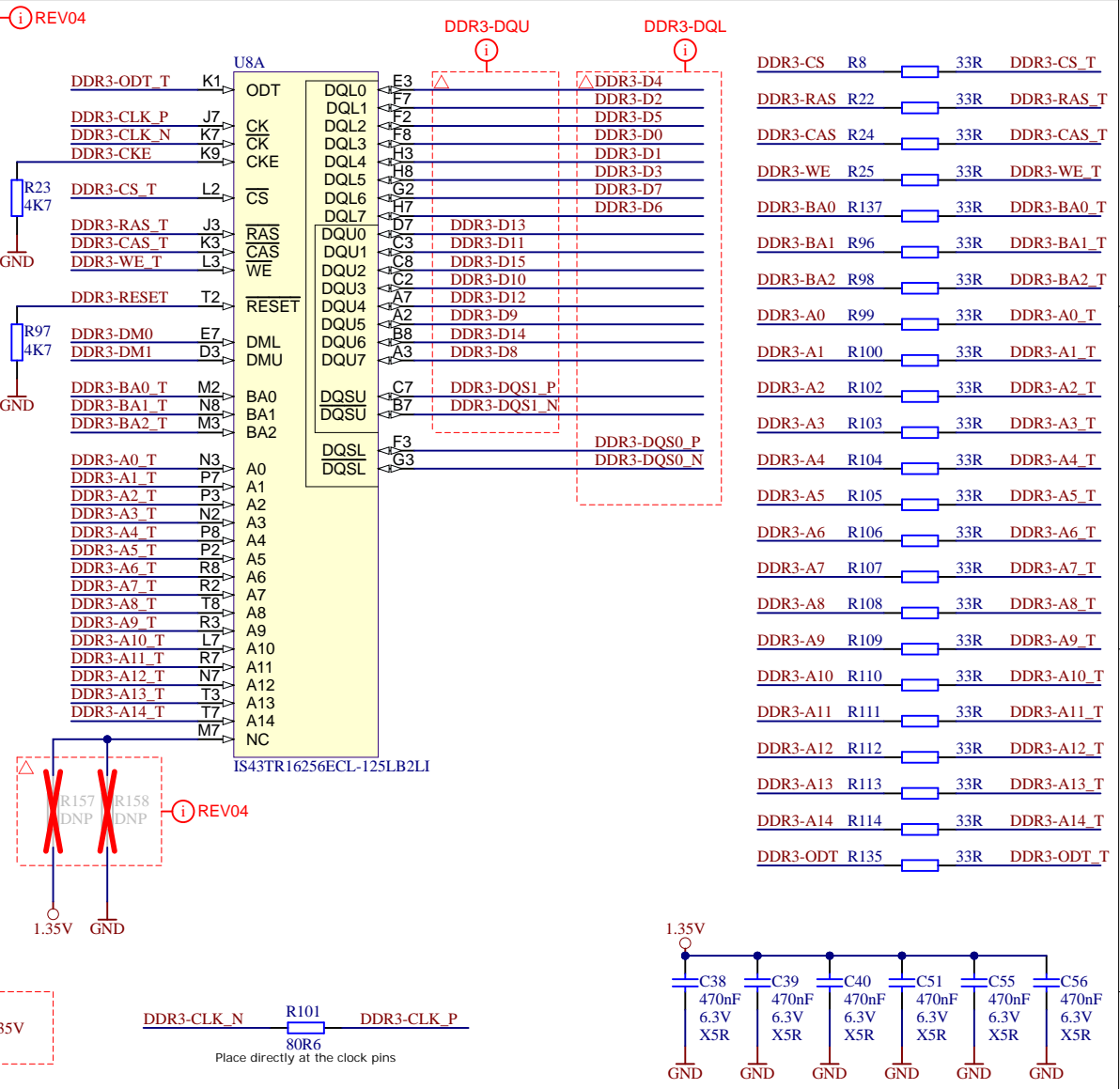
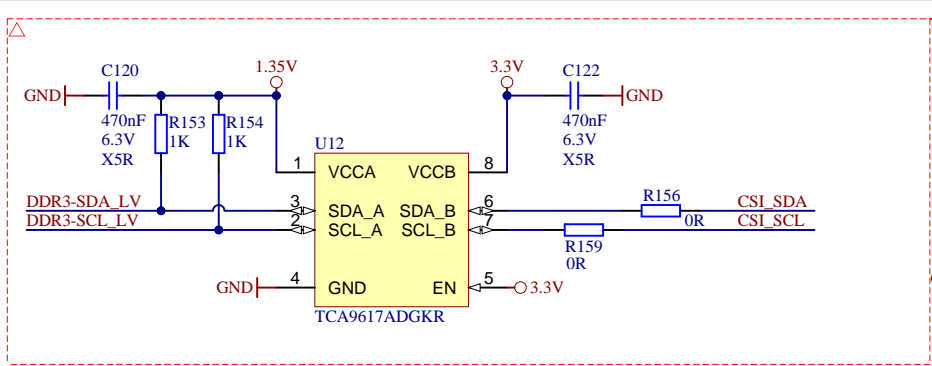
B

C

C

D

D



I2C Address: 0x18



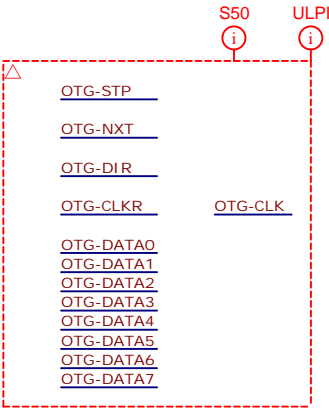
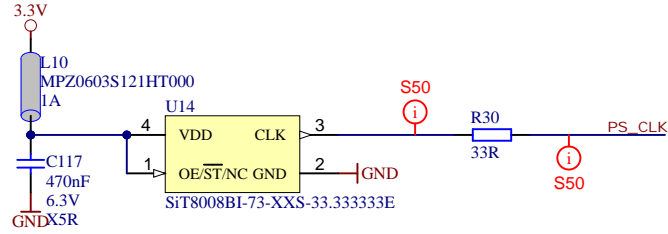
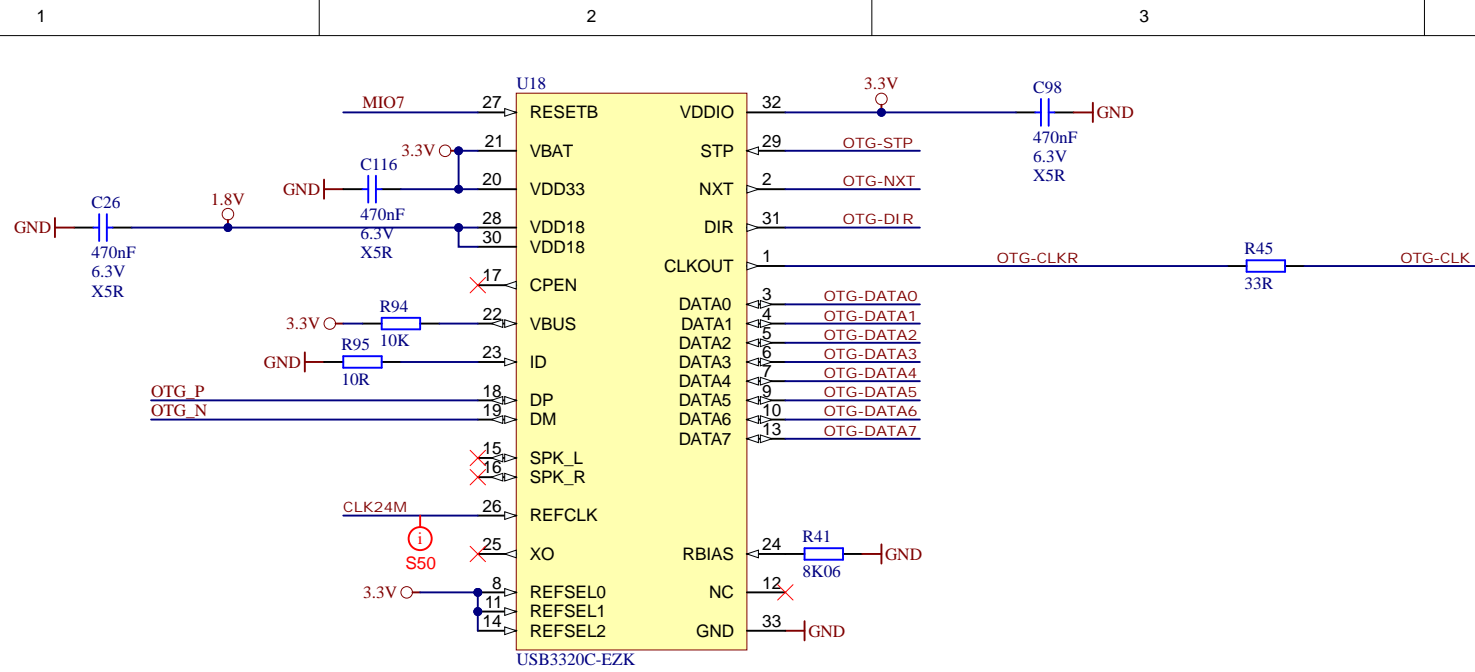
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1

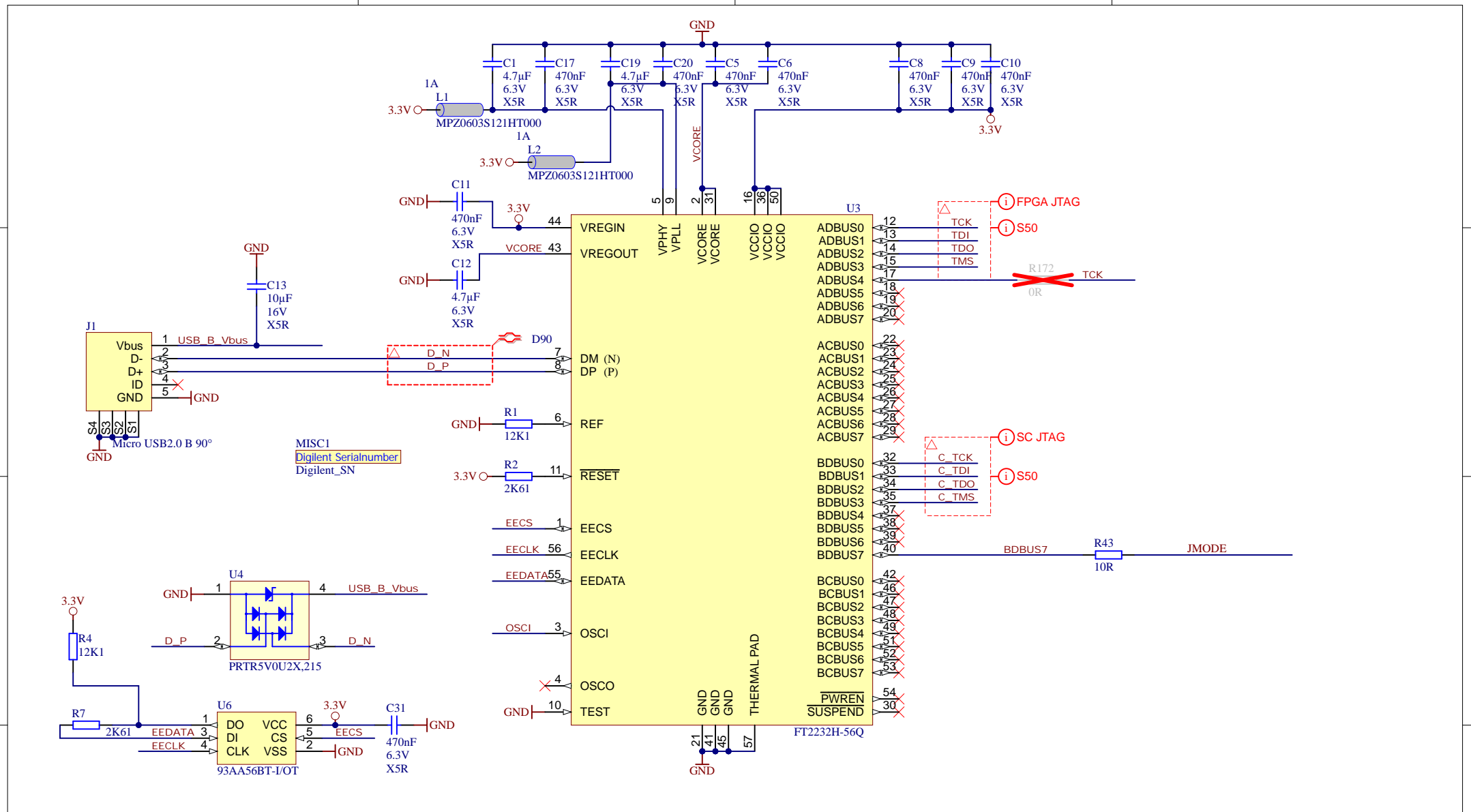
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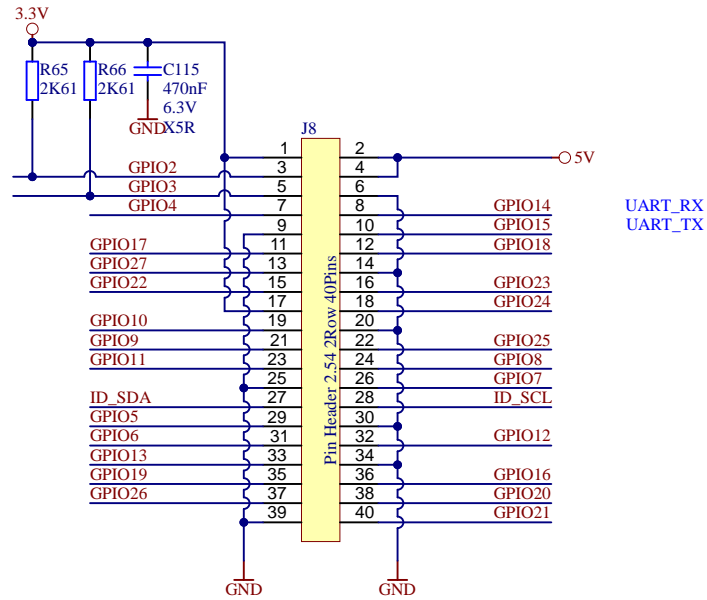
4



|   |  |   |   |
|---|--|---|---|
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|   |  | A4                                      | Number: <b>TE0726</b><br><b>41C94-A</b> |
| Date: <b>2023-03-20</b>   |  | Copyright: <b>Trenz Electronic GmbH</b> |   |
| Filename: <b>USB-PHY.SchDoc</b>   |  | Page <b>12</b> of <b>18</b>             |   |



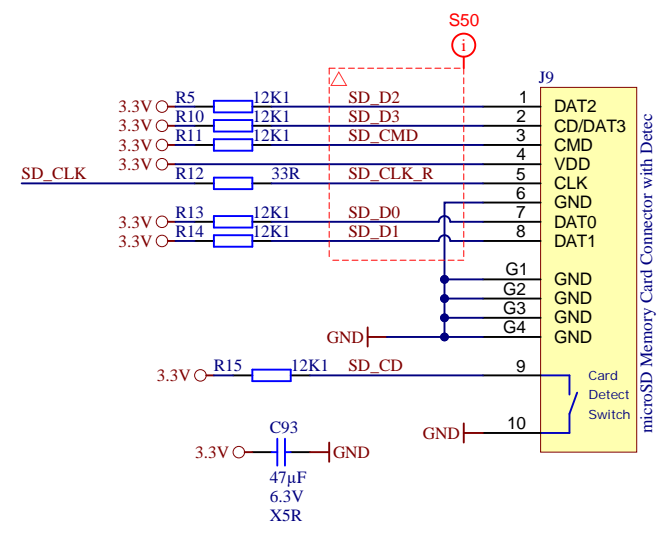
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| A4                    | Number: TE0726<br>41C94-A        | Rev. 04      |
| Date: 2023-03-20      | Copyright: Trenz Electronic GmbH | Page13 of 18 |
| Filename: FTDI.SchDoc |                                  |              |




UART\_RX  
UART\_TX

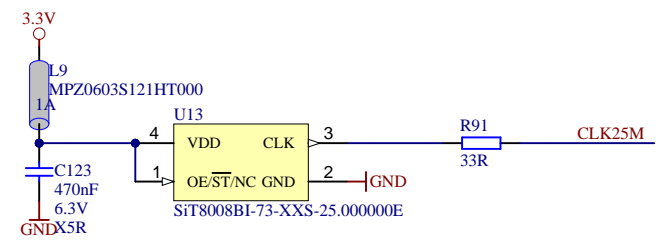
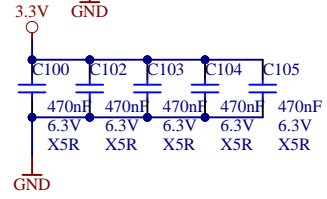
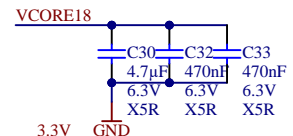
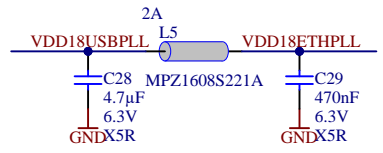
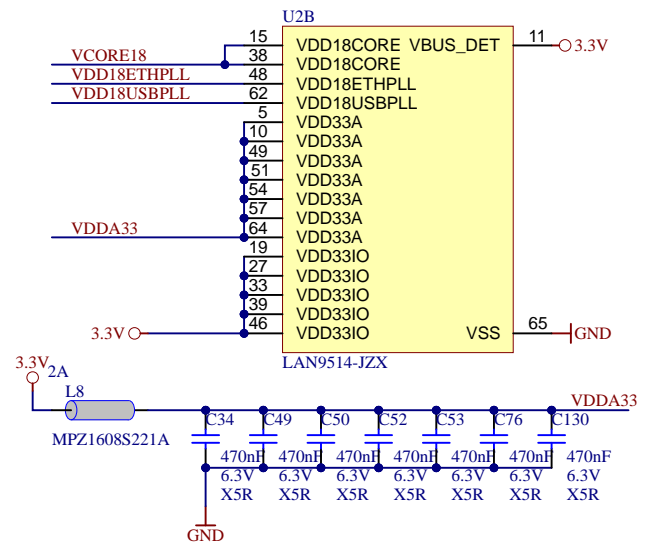
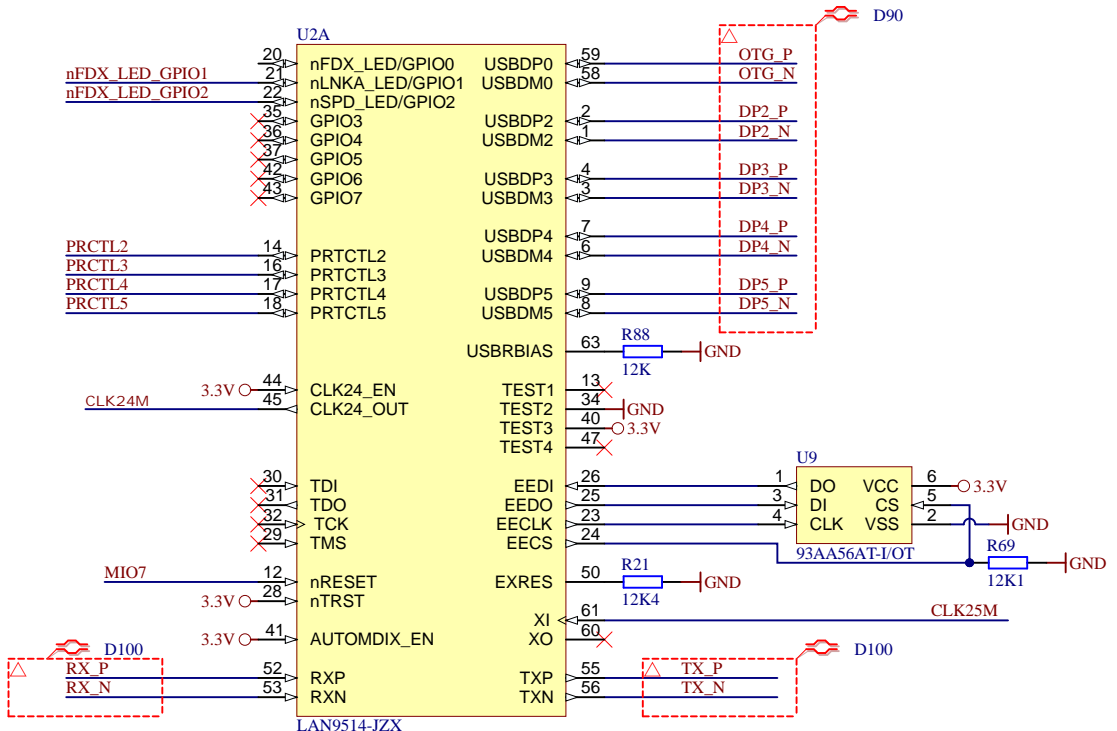


JUMPER2.54-2

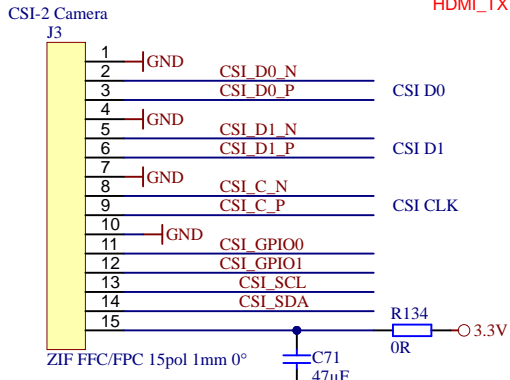


microSD Memory Card Connector with Detec  
Card Detect Switch

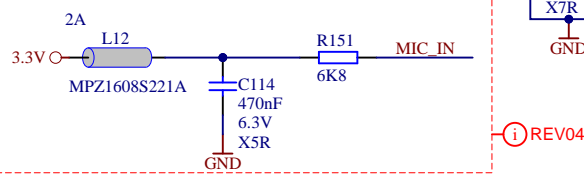
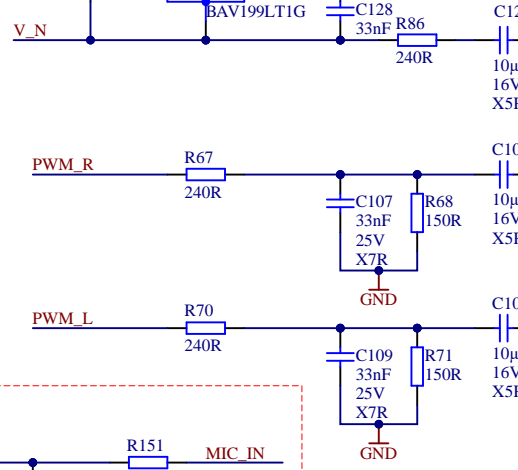
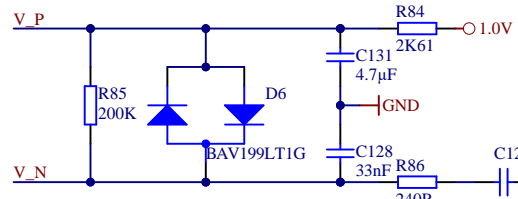
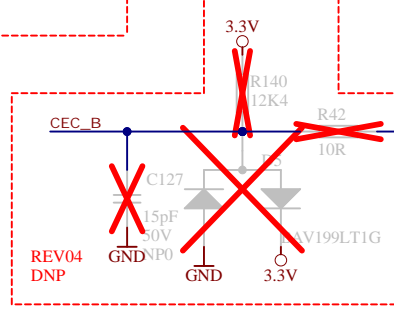
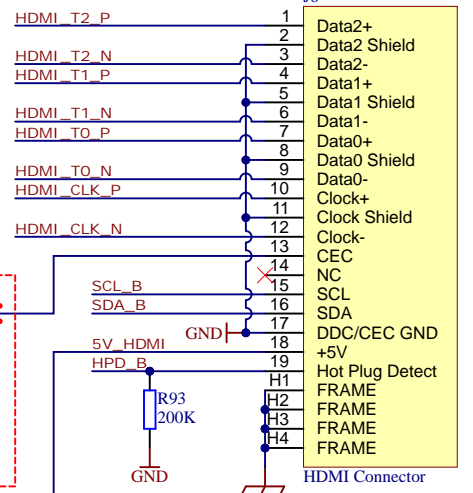
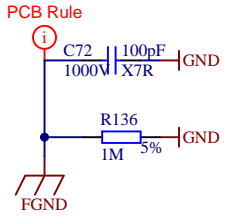
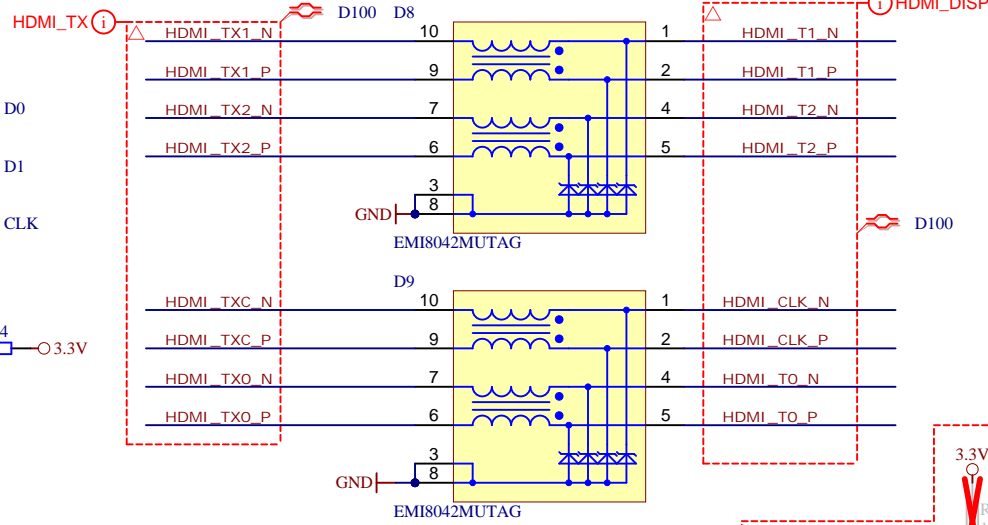
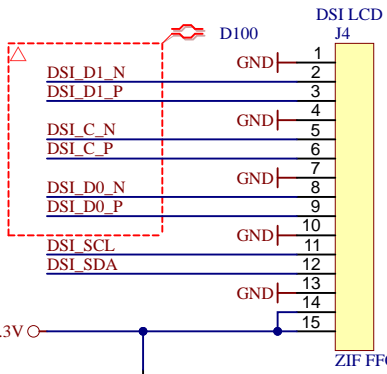
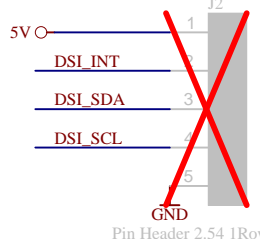
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|   |  |                                  | A4                       | Number: <b>TE0726<br/>41C94-A</b> |
| Date: 2023-03-20  |  | Copyright: Trenz Electronic GmbH |                          | Page 14 of 18                     |
| Filename: <b>RPi-Headers.SchDoc</b>   |  |                                  |                          |                                   |



|  |                                     |   |                             |
|--|-------------------------------------|---|-----------------------------|
|  | Title: <b>Connectors</b>            |   |                             |
|  | A4                                  | Number: <b>TE0726<br/>41C94-A</b>       | Rev. <b>04</b>              |
|  | Date: <b>2023-03-20</b>             | Copyright: <b>Trenz Electronic GmbH</b> | Page <b>15</b> of <b>18</b> |
|  | Filename: <b>RPi-USB-HUB.SchDoc</b> |   |                             |



CSI Camera: 0x64  
CSI Camera sensor: 0x10



|                                     |                                   |                |
|-------------------------------------|-----------------------------------|----------------|
| Title: <b>Connectors</b>            |                                   |                |
| A4                                  | Number: <b>TE0726<br/>41C94-A</b> | Rev. <b>04</b> |
| Date: 2023-03-20                    | Copyright: Trenz Electronic GmbH  | Page16 of 18   |
| Filename: <b>RPi-CAM-LCD.SchDoc</b> |                                   |                |



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A

A

B

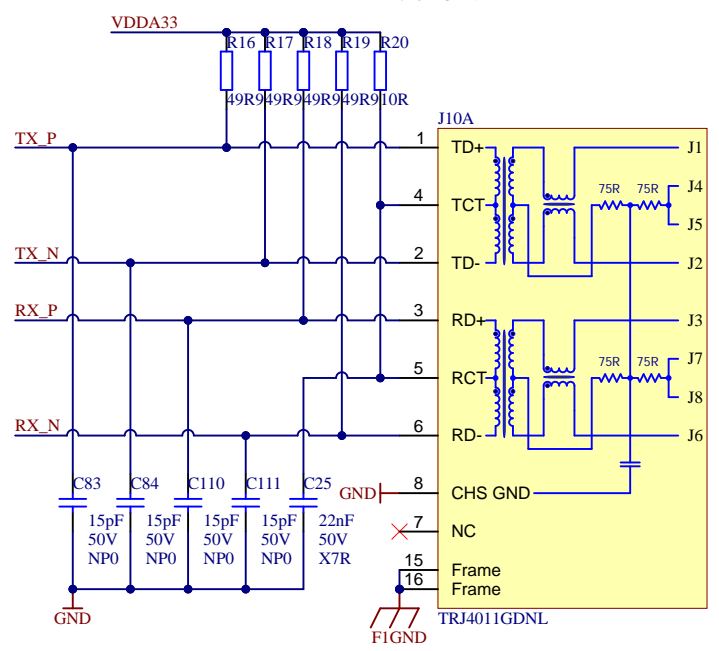
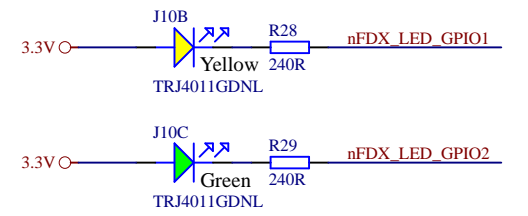
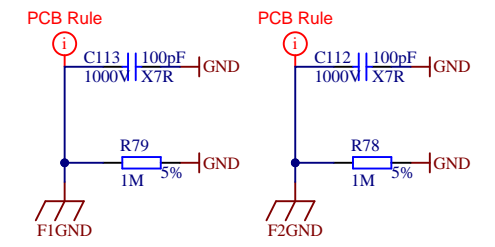
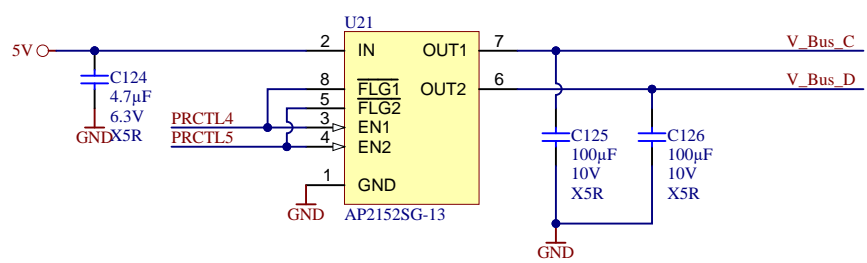
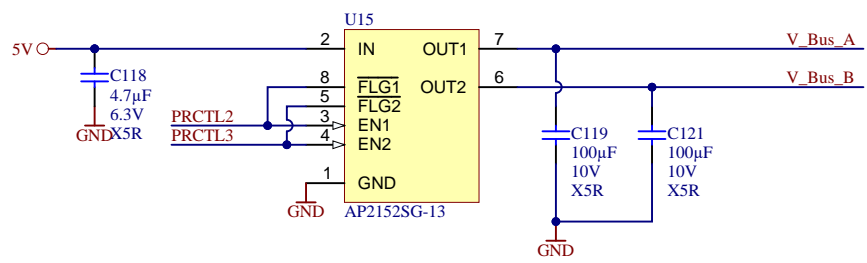
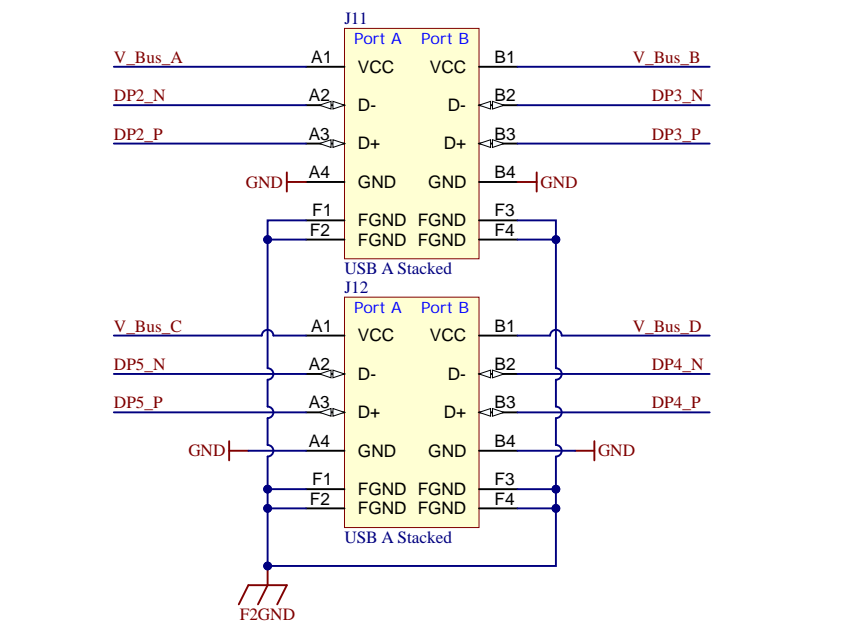
B


C

C

D

D



|   |  |   |                            |                                   |
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|   |  |   | A4                         | Number: <b>TE0726<br/>41C94-A</b> |
| Date: <b>2023-03-20</b>   |  | Copyright: <b>Trenz Electronic GmbH</b> |                            | Page <b>17</b> of <b>18</b>       |
| Filename: <b>PRI-USB-ETH-CON.SchDoc</b>   |  |   |                            |                                   |

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4

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3

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A

A

B

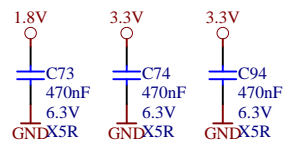
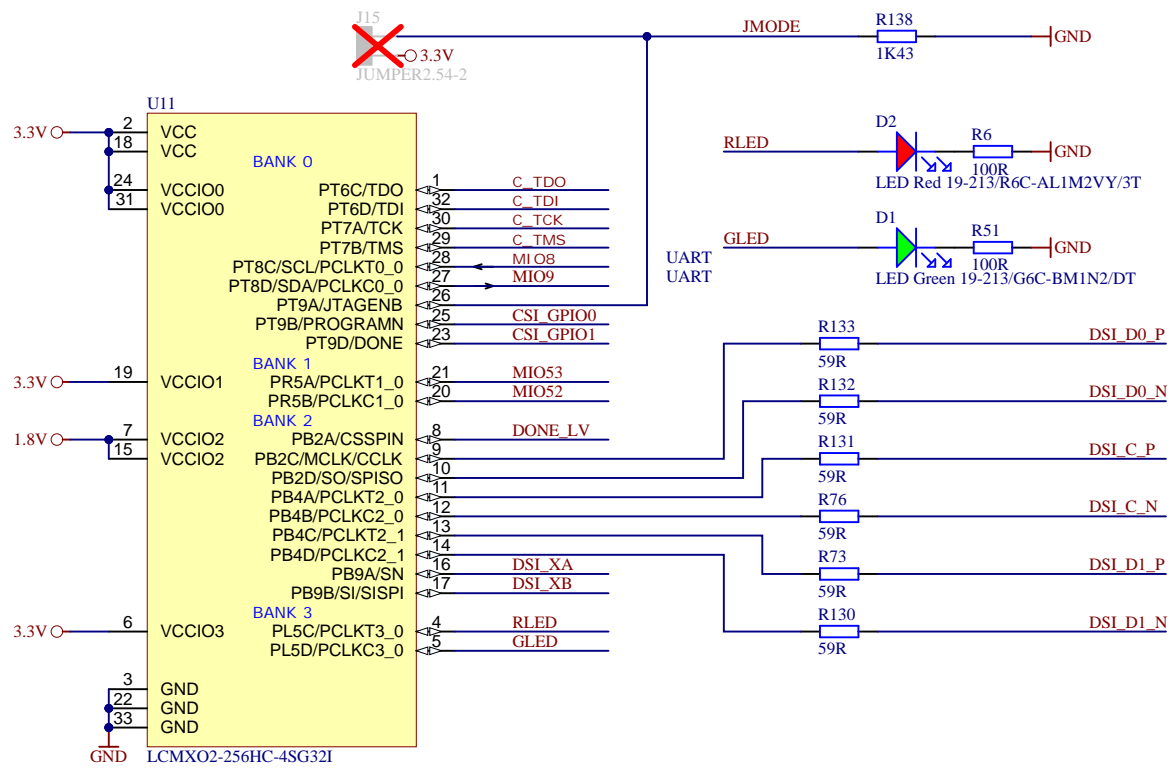
B

C

C

D

D



|  |                            |   |
|--|----------------------------|---|
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|  | A4                         | Number: <b>TE0726<br/>41C94-A</b>       |
|  | Date: <b>2023-03-20</b>    | Copyright: <b>Trenz Electronic GmbH</b> |
|  | Filename: <b>SC.SchDoc</b> | Rev. <b>04</b>                          |
|  |                            | Page <b>18</b> of <b>18</b>             |

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