

Revision_History
Revision_History-1.SchDoc

Revision_History
Revision_History-2.SchDoc

Occupied I2C1 Bus addresses:

Current measurement IC14
INA219 FC address 0x40

EEPROM IC33
M24C02 FC address 0x57

RTC IC21
M41T0M6 FC address 0xD0

US HUB IC9
USB2514B FC address 0x50 - (Optional)

Audio Codec IC28
NAU88C22YG FC address 0x1A

LVDS display touch controller - 0x4A

DDC FC address 0x50 - (Optional)

Please check the notes appearing in red on the schematic pages. In addition, please check the Errata document of the respective product (the potential issues discovered/reported are going to appear in the Errata first). Follow the guidance provided in the relevant Carrier Board Design Guide. Please carefully review your designs against all of the sections of the Carrier Board Design Guide before proceeding with manufacturing your custom carrier board. The documents referenced are available on our Developer Website.

REVISION HISTORY

The differences in the design data for the Apalis Evaluation Board between "V1.0 UNVALIDATED" and "V1.0" are as follows:

- Hardware_Architecture schematic page:
- The Hardware Architecture has been modified accordingly to the following points.
1. Power_Supply schematic page:
 - Cosmetic changes: the PMIC schematic and the 3.3V_SW CTRL block have been moved in the "Power_Switch" Schematic sheet.
 - Cosmetic changes: the mechanical components have been moved in the "Mechanical" sheet.
 - Cosmetic changes: the Power IN, Power OUT and the EMI filter stages have been reorganized.
 2. Power_Switch schematic page:
 - Cosmetic changes: the PMIC schematic and the 3.3V_SW CTRL block have been moved from the "Power_Supply" Schematic sheet.
 - The NOTE 1 has been added to the schematic page: "It is recommended to add a 100K pull up resistor to the signal WAKE1_MICO#".
 - The NOTE 2 has been added to the schematic page: "It is recommended to add a 100K pull down resistor to the signal POWER_ENABLE_MOCIF".
 3. USB_Hub schematic page:
 - Minor cosmetic changes.
 4. USB_Connectors schematic page:
 - The NOTE 6 has been added to the schematic page: "It is recommended to connect also the signal USB01_VBUS to the ESD protection diode and to add 100K pull down resistor".
 5. Audio_Codec schematic page:
 - Cosmetic changes: the IC28 has been divided in two subparts to improve the schematic readability;
 - the input subpart has been left in the "Audio_Codec" schematic page, the output subpart has been moved in the "HDA_Connectors" schematic page.
 - Cosmetic changes: the S/PDIF output has been moved in the "HDA_Connectors" schematic page.
 - The IC28 has component has been updated: the new Design Item ID is: IC-Realtek-ALC898.
 - The NOTE 7 has been added to the schematic page: "A rewiring through the jumper area is needed for the HDA interface".
 - To connect the signals correctly, the following connections are needed:
Remove the Jumpers X6 pins 5, 7, 8, 9.
Connect X5 pin 5 to X7 pin 9
Connect X5 pin 7 to X7 pin 8
Connect X5 pin 8 to X7 pin 5
Connect X5 pin 9 to X7 pin 7
 6. HDA_Connectors schematic page:
 - Cosmetic changes: the IC28 has been divided in two subparts to improve the schematic readability;
 - the input subpart has been left in the "Audio_Codec" schematic page, the output subpart has been moved in the "HDA_Connectors" schematic page.
 - Cosmetic changes: the S/PDIF output has been moved in the "HDA_Connectors" schematic page.
 7. SPDIF schematic page:
 - Minor cosmetic changes.
 8. Analogue_Audio schematic page:
 - Minor cosmetic changes.
 9. Camera schematic page:
 - Minor cosmetic changes.
 10. RGB_Breakout schematic page:
 - Minor cosmetic changes.
 11. DDC schematic page:
 - Minor cosmetic changes.
 12. DVI-I schematic page:
 - Minor cosmetic changes to highlight that the EDS protection diodes need to be placed close to the DVI-I connector.
 - The NOTE 5 has been added to the schematic page: "It is recommended to connect also the signal HDMI1_HPD to the ESD protection diode".
 13. LVDS schematic page:
 - Cosmetic changes: the bus LCD1[0..29] has been added to this schematic page because the signals PWM_BKL1 and BKL1_ON are not contained in the bus LVDS1[0..19].
 14. Serial schematic page:
 - Minor cosmetic changes.
 - The resistor R303 has been marked as not assembled, the resistor R302 has been marked as assembled.
 15. Sata schematic page:
 - Minor cosmetic changes.
 16. PCI_Express_Switch schematic page:
 - The NOTE 3 has been added to the schematic page: "The resistor R183 is not needed if the signal WAKE1_MICO# has already a pull up (see NOTE 1)".
 17. PCI_Express_Connectors schematic page:
 - The NOTE 4 has been added to the schematic page: "The capacitors C277 and C278 must have a 16V voltage rating".
 18. SPI schematic page:
 - Minor cosmetic changes.
 19. Type_Specific schematic page:
 - Minor cosmetic changes.
 20. Mechanical schematic page:
 - This schematic page has been added.
 - Cosmetic changes: the mechanical components which were in the "Power_Supply" schematic sheet have been moved in this schematic sheet.
 - The shunt jumpers JMP1 - JMP148 have been added to this schematic page.
 - The spacers MECH-HiTech-KFE-M3-8ET have been added to this schematic page.
 - The component CON-DECA-MC100-508-02-1x2-Mate has been added to this schematic page.
 21. Schematic pages:
 - The Schematic pages have been renumbered.
 22. Apalis Evaluation Board Schematic Library file:
 - This schematic page has been added.
 - The component IC-R-Realtek-ALC898-TEMP has been updated: the new Design Item ID is: IC-Realtek-ALC899.
 - The component Con-Tyco-3-641126-3 has been deleted from the library.
 - The component MECH-HiTech-KFE-M3-8ET has been added to the library.
 - The component MECH-Shunt-Jumper-Black-2.54mm has been added to the library.
 - The component CON-DECA-MC100-508-02-1x2-Mate has been added to the library.

23 August 2013

23. Audio_Codec schematic page:
- The NOTE 8 has been added to the schematic page: "The bead L33 needs to be assembled".
24. JTAG schematic page:
- The NOTE 9 has been added to the JTAG schematic page: "On Apalis Evaluation Board V1.0, the connector X59 has been layouted rotated by 180 degrees on the PCB by mistake. This means that the signal JTAG_TDI on the carrier board is connected to VREF_JTAG on the module and so on. Please consider this information while placing the same connector on your PCB design. Please contact the Toradex support if you need to test this interface on the Apalis Evaluation Board."

21 November 2013

25. USB_Hub schematic page:
- The NOTE 10 has been added to the schematic page: "It is recommended to assemble 0R resistor instead of 22R for R289 and R290".

IF IN DOUBT ASK

09 October 2014

26. New Hardware Revision, Apalis Evaluation Board V1.1
27. All schematic pages:
 - Schematic page template has been updated.
 - "Port Cross Reference" has been added to the project.
28. Power Switch schematic page:
 - The modification suggested in the NOTE 1 has been implemented: a pull-up resistor R218, 4.7K Ohm has been added to the signal WAKE1_MICO#.
 - The modification suggested in the NOTE 2 has been implemented: a pull-down resistor R219, 100K Ohm has been added to the signal POWER_ENABLE_MOCI.
29. Power Supply schematic page:
 - New power connector X48 for SATA interface has been added in the schematic page.
 - New power connector X47 has been added in the schematic page.
30. DVI-I schematic page:
 - The modification suggested in the NOTE 5 has been implemented: HDMI1_HPD signal has been connected to the ESD protection diode D1.
 - Level shifter circuit has been implemented to the HDMI1_HPD signal using T18, R4, and R311 in the schematic page.
 - Resistor R4 value has been changed from 1K to 47K in the schematic page.
31. USB Connectors schematic page:
 - The modification suggested in the NOTE 6 has been implemented: signal VCC_USB01 has been connected to the ESD protection diode D16.
 - The NOTE 12 has been added to the schematic page: "The ferrite bead L46 has been marked not assembled because it back-feeds 5V_SW power rail via ESD diode D16."
 - L46 has been marked not assembled in the assembly variant.
 - The NOTE 6 has been updated in the schematic page: "It is recommended to add 100K pull down resistor to the signal USB01_VBUS."
32. USB Hub schematic page:
 - The modification suggested in the NOTE 10 has been implemented: resistors R289 and R290 value have been changed from 22R to 0R in the schematic page.
33. PCIe Express Switch schematic page:
 - Net PCIE1_PEX_RESET# has been added.
 - Assembly option for routing the signal PCIE1_PEX_RESET# has been implemented using resistors R300 and R310.
 - The NOTE 13 has been added to the schematic page: "GPIO7 has been used to control PEX_PREST# pin on PCIe switch because of the errata Err_5 mentioned in the document PEX8050AA_Errata_v1.8_30Nov2012. Please contact PLX for further information."
 - The modification suggested in the NOTE 3 has been implemented: resistor R183 has been marked as not assembled in the assembly variant.
34. PCI Express Connectors schematic page:
 - The modification suggested in the NOTE 4 has been implemented: capacitors C277 and C278 voltage rating have been changed to 16V.
35. JTAG schematic page:
 - The issue related to NOTE 9 in the revision V1.0 has been fixed: JTAG Connector X59 has been rotated by 180 degree in the PCB layout.
36. Serial schematic page:
 - A pull-up resistor R312, 1M Ohm has been added to the signal UART1_USB_RXD.
37. Audio Codec schematic page:
 - The issue related to NOTE 7 in the revision V1.0 has been fixed: DAP signal are rearranged between breakout connector X6 and X7.
 - The modification suggested in the NOTE 8 has been implemented: assembly variant has been updated to mark ferrite bead L33 as assembled.
38. Apalis Evaluation Board PCB layout:
 - PCB design has been updated with all the schematic changes.
 - Jumper JP21 has been repositioned on the PCB.

15 May 2015

39. SATA schematic page:
- The NOTE 14 has been added to the schematic page: "NOTE 14: Mini PCIe connector schematic symbol is used in the schematic for the mSATA connector (X36), as Mini PCIe and mSATA use the same physical connector. It is important to note that the mSATA interface specifies the RX+ signal on pin 23 and RX- signal on pin 25, whereas the Mini PCIe Card features the RX+ signal on pin 25 and RX- on pin 23. The PCIe interface supports polarity reversal, but not the SATA interface. Since the Mini PCIe connector pin names doesn't match with the mSATA signals, the situation might be confusing. Special attention must be paid while reading or connecting the mSATA signals. "
40. Mechanical schematic page:
- Mechanical components part number have been made visible.
41. JTAG schematic page:
- The NOTE 15 has been added to the schematic page: "NOTE 15: Normally, JTAG interface is not required on the Apalis carrier board. For flashing and debugging purpose, the system Recovery mode over USB (USB01) and Serial Port (UART1) shall be used. On custom carrier board, customers are recommended to implement the JTAG interface only if it is necessary."

03 June 2015

42. Apalis Evaluation Board PCB layout.
- Position of the silkscreen text "TX" and "RX" for LED12 and LED13 respectively have been corrected.

12 August 2015

43. Schematic Library file.
- The components TP-Keystone-5011, IC-Realtek-ALC898, LED-Osram-LS T670-K1L2-1, LED-Osram-T670-K1L2-1 have been updated because of small typo errors in the component parameters description.

03 February 2016

- 44. Schematic files.
 - The "NA" notes have been eliminated all over the project since altium can add this note automatically using the assembly variants
 - The bus GPIO name has been modified to GPIO[1..8].
- 45. Power Supply schematic files.
 - The notes related to decoupling capacitors position have been corrected.
- 46. Mechanical schematic files and Schematic library file.
 - The PCB1 component version has been corrected to the right value.
- 47. Sata, PCI_Express_Connectors schematic files and Schematic library file.
 - The component CON-Molex-67910-5700 has been updated to avoid the PCIe/Sata potential confusion.
- 48. Power_Switch schematic file.
 - The Value of the resistor R44 has been corrected to match the resistor assembled on the board.

15 June 2016

49. Power Switch Schematic page.
- The NOTE 16 has been added to the schematic page: "NOTE 16: Apalis Evaluation Board V1.1A, 3.3V output power supply is designed for 15W (max). Please check if the available power is enough for the Apalis module of your choice."


16 April 2018

50. Power Switch Schematic page
- NOTE 16 has been updated.



Title <i>Apalis Evaluation Board</i>			<i>Toradex AG</i> <i>Ebenastrasse 10</i>
Size: A3	Number: 2.	Revision: V1.2	<i>Horw</i> <i>6048</i>
Date: 8/15/2022	Time: 6:57:43 PM	Sheet 2 of 32	<i>Switzerland</i>
File: Revision History-1.SchDoc			

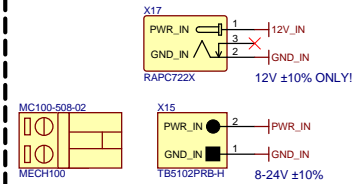
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A	<div>REVISION HISTORY</div> <div>Revision V1.2</div> <div>1. Analogue Audio 3.5 mm jack triple-stacked connector X26 has been replaced with three separate 3.5 mm jack connectors X27, X41, X42. Ferrite bead L1 joining analog and digital grounds (AGND and GND) has been replaced with the 0R 0603 resistor R223. Bypass capacitor C13 has been connected to the AGND instead of GND. Capacitors C3, C8, C11 between AGND and GND Nets have been removed. 47 uF 6.3V tantalum capacitors C4, C5, C10 have been replaced with 100uF 10V 1210 ceramic capacitors (C4, C5) and 22uF 10V 0805 (C10). ESD protection diodes D37-D42 have been added to protect Analogue Audio external connections. SoM's Analogue Audio signals routing has been improved.</div> <div>2. ESD protection diodes D27, D28 (DT1140-04LP-7) have been added to the Ethernet interface.</div> <div>3. 0603 0R resistor R156 has been added to the RESET pin of the USB HUB (IC9). Unused pins of the crystal OSC1 (USB HUB) have been connected to GND.</div>			19. Galvanic isolation ICs IC10, IC13 has been replaced with the isolated CAN transceivers ISO1042BDW/R and protected with the ESD diodes PESD21VN24-T (D25, D26). Old CAN transceivers IC11, IC14 have been removed. 2x 60.4 Ohm resistors in combination with the 4.7nF 50V 0603 capacitors have been added to both CAN interface for proper termination (R97, R98, R103, R104, C212, C213) Additional 2-pin jumpers J25, J34, J35, J36 allow to switch the termination ON or OFF. LED31 and LED32 have been added to indicate when CAN1 and CAN2 transceivers are powered up. DC-DC converters NTE0505MC-R (IC12, IC15) have been replaced with the less expensive part B0505XT-1WR2. 1206 size 220 Ohm resistors R247, R248 have been added to provide the 10% minimum load for the isolated DC-DC converters. According to the DC-DC converters datasheet's recommendation, capacitors C126, C131 have been marked as "Not Assembled." The CAN transceivers activity indication LEDs LED14, LED15, LED16, LED17 have been removed. 0603 size 120-ohm pull-up resistors R94, R95, R100, R101 have been replaced with 0402 10k.			36. 2.5V voltage comparator based on the transistor T19 and resistors R191, R192, R193, R194 has been added to the POWER_ENABLE_MOCI signal coming out from SoM to avoid the power shut down issues caused by the SoM's backfeeding.	
				20. RS232 transceivers IC6, IC7 (SN65C3243DBR) has been replaced with a pin to pin compatible IC MAX3243IDB to avoid backfeeding.			37. EOL USB 3.0 connector AMTEK USB-001-AU-3.0-L (X51) were replaced with a new part SS-52000-001.	
				21. MIPI CSI-2 FCC camera connector X60 (FH12-24S-0.5SVA(54)) in combination with 0R configuration resistors R332-R351 have been added.			38. All the externally exposed interfaces have been protected with ESD diodes.	A
				22. USB_Connectors schematic has been reworked, and IC30 and IC31 (TPS2052BD) with the current limit of 0.5A were used on the USB connectors X53 and X54, respectively. IC32 (TPS2052BD) has been replaced with the new part TPS2066CD and used as a power switch for the USB 3.0 interface connectors X49, X51. 100nF 0402 16V ceramic capacitors C243, C244, C253 have been added to the power supply inputs of the IC32, IC30, and IC31, respectively.			39. EOL LDO regulator NCV4264-2ST50T3G (IC16) has been replaced with a new part MCP1799-5002H/DB.	
				23. Audio Codec IC28 has been replaced with a new one containing integrated speaker driver. 3.5 mm jack tripple stacked connector X27 has been replaced with three separate 3.5 mm jack connectors X65, X66, X67 3.5 mm jack connector X64 for AUX OUT signals has been added. Spring connector X43 and pin header X44 providing speaker connection have been added. Pin headers X62, X63 providing stereo speaker connection have been added. Electret microphone for testing microphone input feature while external microphone disconnected has been placed on the board. ESD protection diodes D12, D13, D15, D19, D24, D29, D30, D31, D32, D33, D34, D35, D36 have been added to protect Audio Codec external connections. 12 MHz clock OSC3 and jumper JP26 have been added to provide an option to choose the audio codec's MASTER CLOCK signal source.			40. EOL Schottky diodes BAT54S (D4, D5) were replaced with a new part BAT54XV2T5G.	
B				24. EOL MXM3 connector X1 has been replaced with a new part MM70-314B1-2-R300.			41. EOL indication LEDs have been replaced with new parts. Green: LED1, LED2, LED3, LED4, LED9, LED10, LED11, LED12, LED19, LED21, LED22, LED23, LED24, LED25, LED26, LED27, LED28, LED29, LED30, LED31, LED32, LED33 (LG T67K-H2K1-24-Z). Red: LED5, LED6, LED7, LED8, LED18 (LS T67K-K1L2-1-Z). Yellow: LED34, LED35, LED36, LED37, LED38 (LY T67K-J2L1-26-Z). LEDs brightness has been reduced by increasing the current limiting resistors values.	
				25. PCI Express switch IC24, and PCI Express connectors X43, X44 have been removed. PCI Express interface has been routed directly to the Mini PCIe connector X45.			42. RGB display pin header X20 and discrete components JP14, C98, C99, C107, and L14 have been removed.	
				26. Digital temperature sensor TMP75CIDGKR (IC24) with address configuration resistors R166, R184, R185, R186, R187, R188 has been added and connected to the I2C1 serial bus.			43. ESD protection diodes D65 D66 were added to protect the RS485/RS422 transceiver (IC14).	
				27. Tantalum USB Bulk capacitors C291, C300, C295, C307, C304, C311 have been replaced with 100uF 10V 1210 ceramic capacitors and moved to the other sides of ferrite beads (closer to the connectors).			44. ESD protection diodes D57, D58, D59 (D5V0L1B2S9-7) have been added to the board control buttons SW9, SW10, SW11, respectively. ESD protection diode D61 (DT1240-04LP-7) has been added to protect the IC41 USB connection.	
				28. Additional ceramic USB Bulk capacitors C169, C170, C171, C172, C173, C174 (100uF 10V 1210) has been added in parallel to the C291, C300, C295, C307, C304, C311, respectively, to comply with USB specification.			45. ESD protection diodes D52-D56 (D5V0L1B2S9-7) have been added to protect the SoM's resistive touch controller interface (connectors X16 and X31).	B
C				29. Ferrite beads L44, L53, L58, L60, L65, L51 have been removed, and ground pins of the USB connectors have been connected directly to the GND plane.			46. DVI connector X11 has been replaced with the HDMI 2.1 connector (MOLEX 2086581051). I2C level shifter IC27 (PCA9306DCTR) was replaced with a new part PCA9617ADP. Diode D10 has been replaced with the current limited power switch IC11 (AP22653W6-7). Common-mode chokes L14, L34, L35, L36 have been added to the high-speed TDMS signals. CEC signal has been connected to the connector X11 through the jumper JP14 and level-shifting circuit based on transistor T18 and discrete parts D3, D47, R4, R240. HPD level-shifting circuit has been improved. Two transistors, T21, T22, and resistors R241, R242, R243, have been used instead of single transistor T18 and resistors R4, R311. 220pF capacitor C14 has been removed, and the pull-down resistor R249 for net HDMI1_HPD_MXM3 has been added.	
				30. Micro-AB connector X49 has been replaced with a Type-C one SS-52400-003. Multiplexer IC HD3SS3212IRKSR for the SS USB signals in conjunction with the Configuration Channel Logic IC USB321AI/RVBR have been added. All connections have been protected with the ESD diodes D14, D16, D45 (DT1240-04LP-7), and D46 (D5V0L1B2S9-7) Type-B connector X50 has been removed.			47. The single-channel USB to UART converter has been replaced with the four-channel USB to UART/JTAG converter IC41 (FT4232HL). Level-shifters IC8, IC19, IC44 (SN74AVC4T774RSVR), and 3-state buffer IC36 (NC7SZ126M5X) have been added to avoid backfeeding and to provide level-shifting for the JTAG and UART signals. USB Type B connector X29 has been replaced with Type-C (SS-52400-003). Level-shifting circuits Based on the transistors T1, T2, T11, T17 have been added to provide USB control for the board "ON/OFF", "RESET", "RECOVERY", "FORCE OFF" features.	
				31. 4-bit SD Card connector Wurth 693063020911 (X18) is used on the primary MMC Card interface instead of the 8-bit connector in the previous design. SD Card connector X19 has been replaced with a Micro SD connector Wurth 693071010811. The purpose of the four MMC Card data lanes (MMC1_D4-MMC1_D7) unused in a new design has been changed to control the power switches IC35, IC38, IC39, IC40 of the CAN1, CAN2 transceivers, and Micro SD, SD Cards respectively. ESD protection diodes D11, D23, D43, D44 (DT1240-04LP-7) have been added for X18 and X19.			48. "RECOVERY" button SW11 in conjunction with the tristate buffer IC6 (SN74LVC1G125DCKR), "RECOVERY SIGNAL POLARITY" jumper JP29, and C43, R67, R168 components were added.	C
				32. 100k 0603 resistors R312, R355, R378, R380, R52, R54, R56, R61, R62, R70, R279, R294, R301, R358, R360, R375, R158 have been replaced with 10k 0603 resistors and pull down resistor R196 (10k 0603) has been added.			49. 2x stacked D-Sub 9-pin connector X28 has been replaced with a 1x D-Sub 9-pin connector A-DS 09 A/KG-T2S. IR transceiver X20 (TFDU4101) and discrete components C57, C62, R66, R67, R68, R69 have been removed. SoM's serial port UART3 has been connected to the USB to Serial converter IC41 port D. 10k pull-up resistor R369 has been added to the UART2_RTS net to prevent it from floating if the SoM's RTS signal is disconnected.	
				33. SPDIF transmitter X21 and discrete parts R275, R276, C287, C313 have been removed.			50. Power measurement feature based on the IC14 and current shunt R165 has been implemented. 0603 0R resistors R15, R16, R17, R21 are used for the IC14 I2C bus address configuration 1206 resistors R15, R16, R17, R19, R20, R21 have been removed and replaced with high power 1206 0R resistor R167 connected in parallel with the jumper JP4 to provide an option for current measurement with the current clamp.	
D				34. The pull-up resistors R29, R30, R31, R32, R39, R46, R47, R48, R49, R50 for the SD and MMC Card interfaces have been marked as "Not Assembled".			51. Protection diodes D70, D71, D72, D73, D74, D75, D76, D77 (PESD15VL1BA) have been added to improve the RS232 interface ESD protection.	
				35. 1nF 16V 0402 stitching capacitors for the low-speed type-specific signals have been added (C57, C62, C71, C79, C148, C222, C223, C224, C225, C226, C227).			52. Full-sized hinged SIM Card connector X46 has been replaced with the push-pull Nano-SIM connector (Molex1042240820) and 100nF 16V 0402 capacitor has been added to the VCC (S1) pin of the connector X46. The UIM interface lines have been protected with the ESD diode D78 (DT1240-04LP-7). 100nF 50V 0603 capacitor C258 and two 0R 0603 resistors R371, R376 providing some assembly options have been added on the X46 connector VPP pin S5.	D
	1	2	3	4	5	6	7	8



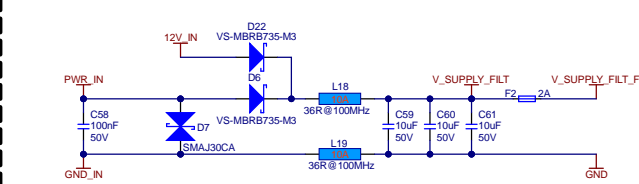
Swiss. Embedded. Computing.

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Date: 8/15/2022	Time: 6:57:43 PM	Sheet 3	of 32	
File: Revision History-2_SchDoc				

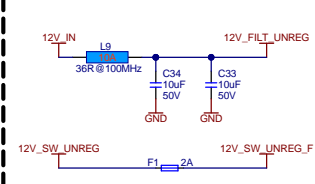
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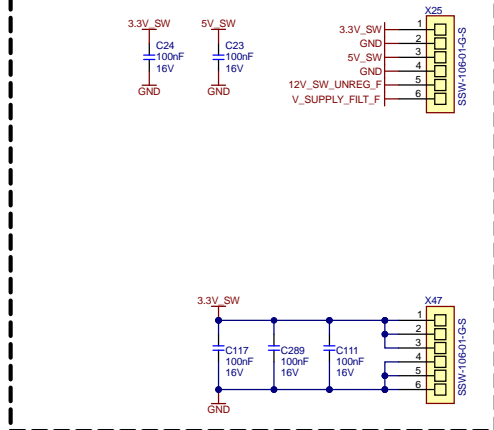
EMI INPUT FILTER STAGE



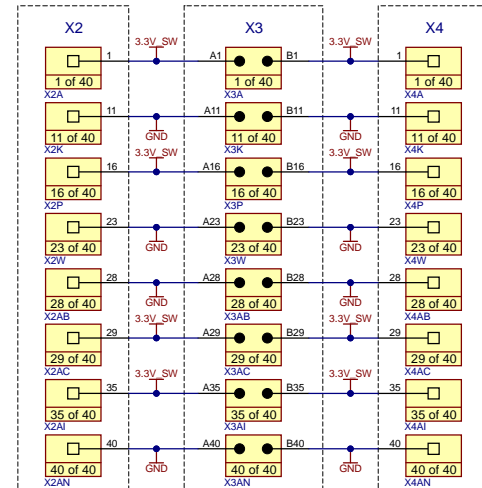
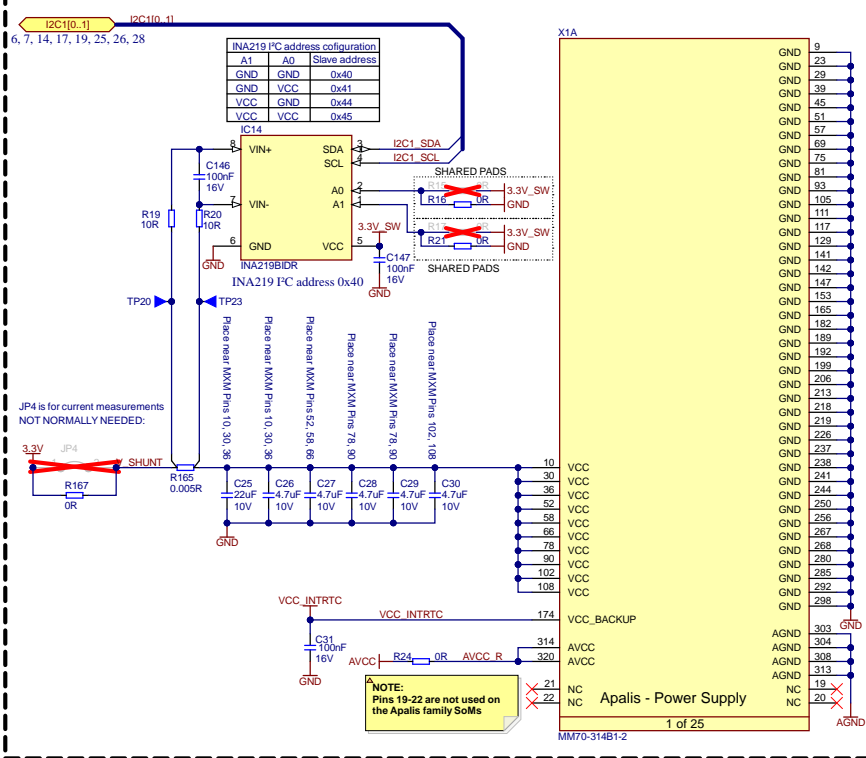
12V EMI INPUT FILTER STAGE AND FUSE



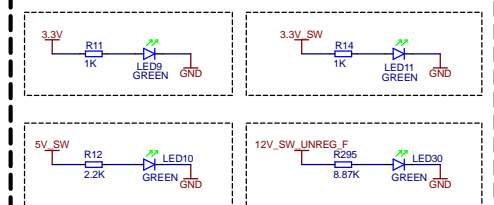
POWER OUT



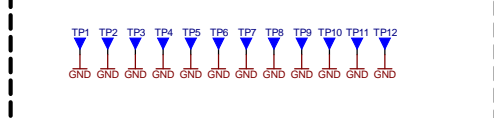
APALIS MXM3 POWER SUPPLY



POWER SUPPLY INDICATIONS

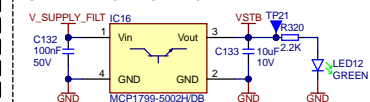


GND TESTPOINTS

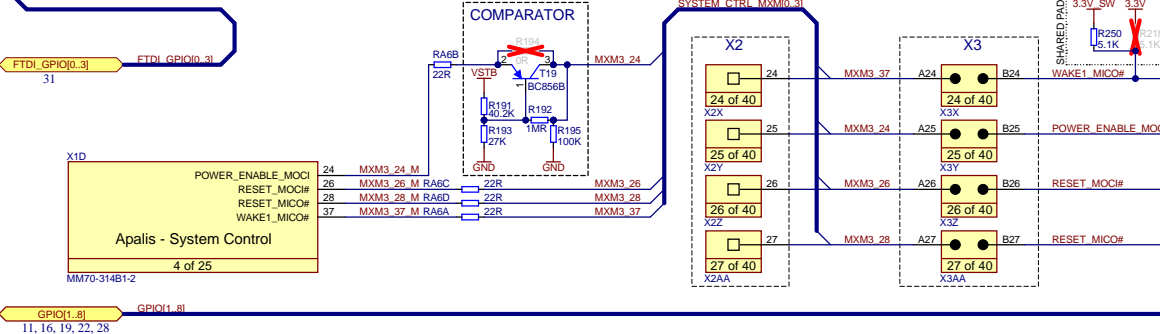
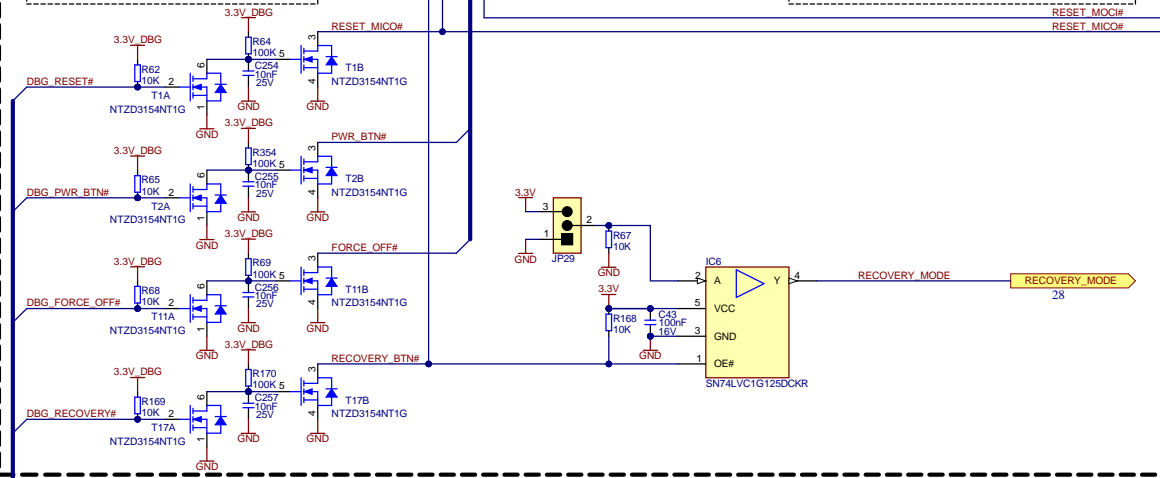
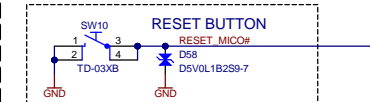
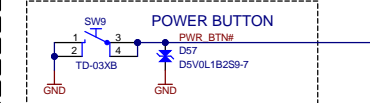
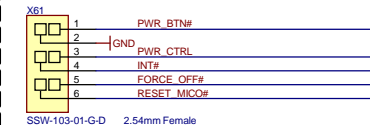
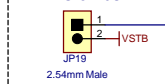


PUSH BUTTON CONTROLLER

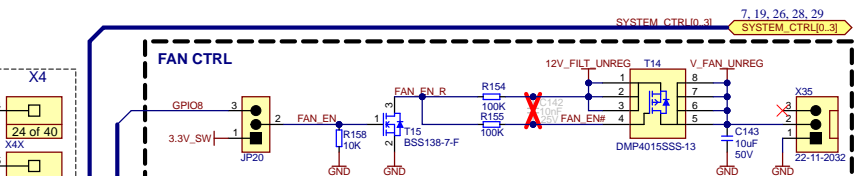
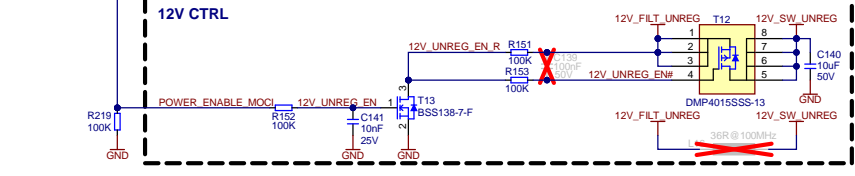
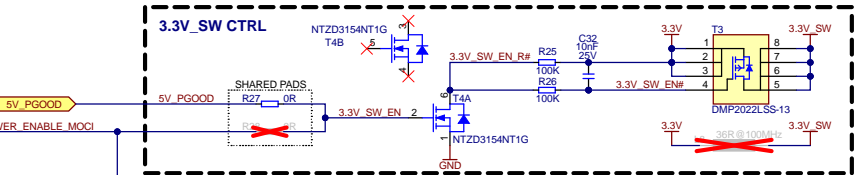
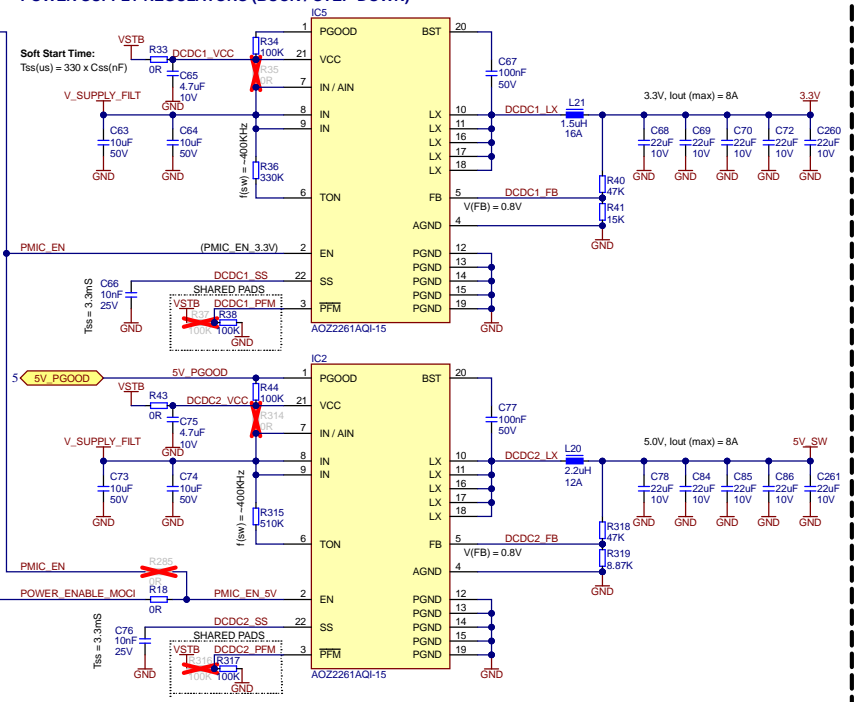
STANDBY VOLTAGE LDO



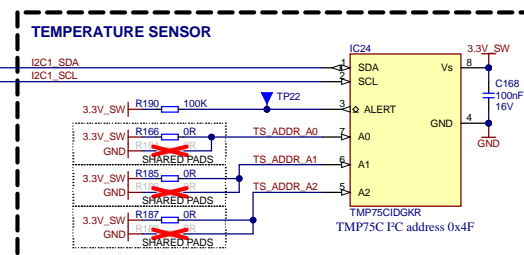
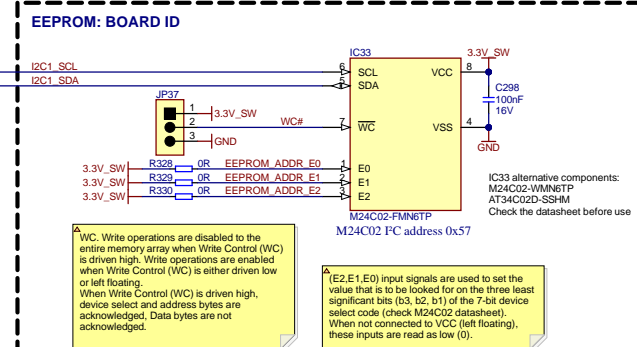
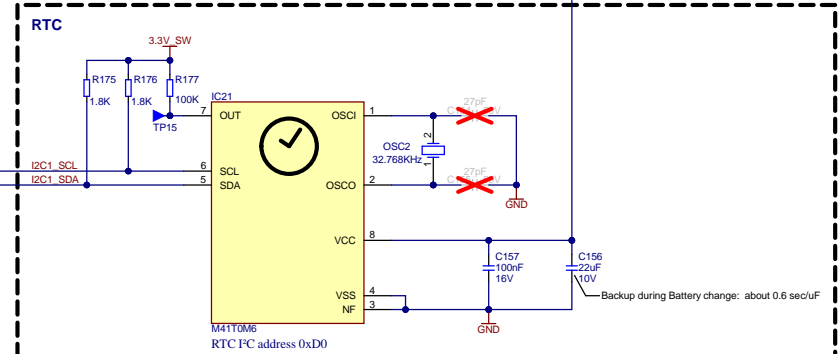
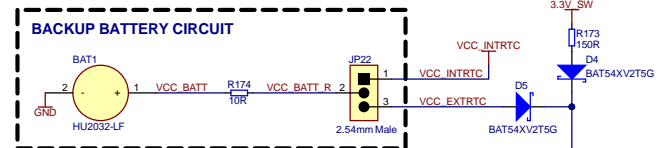
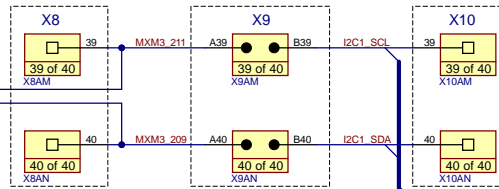
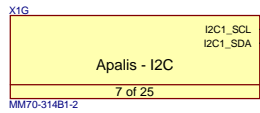
ALWAYS ON JUMPER



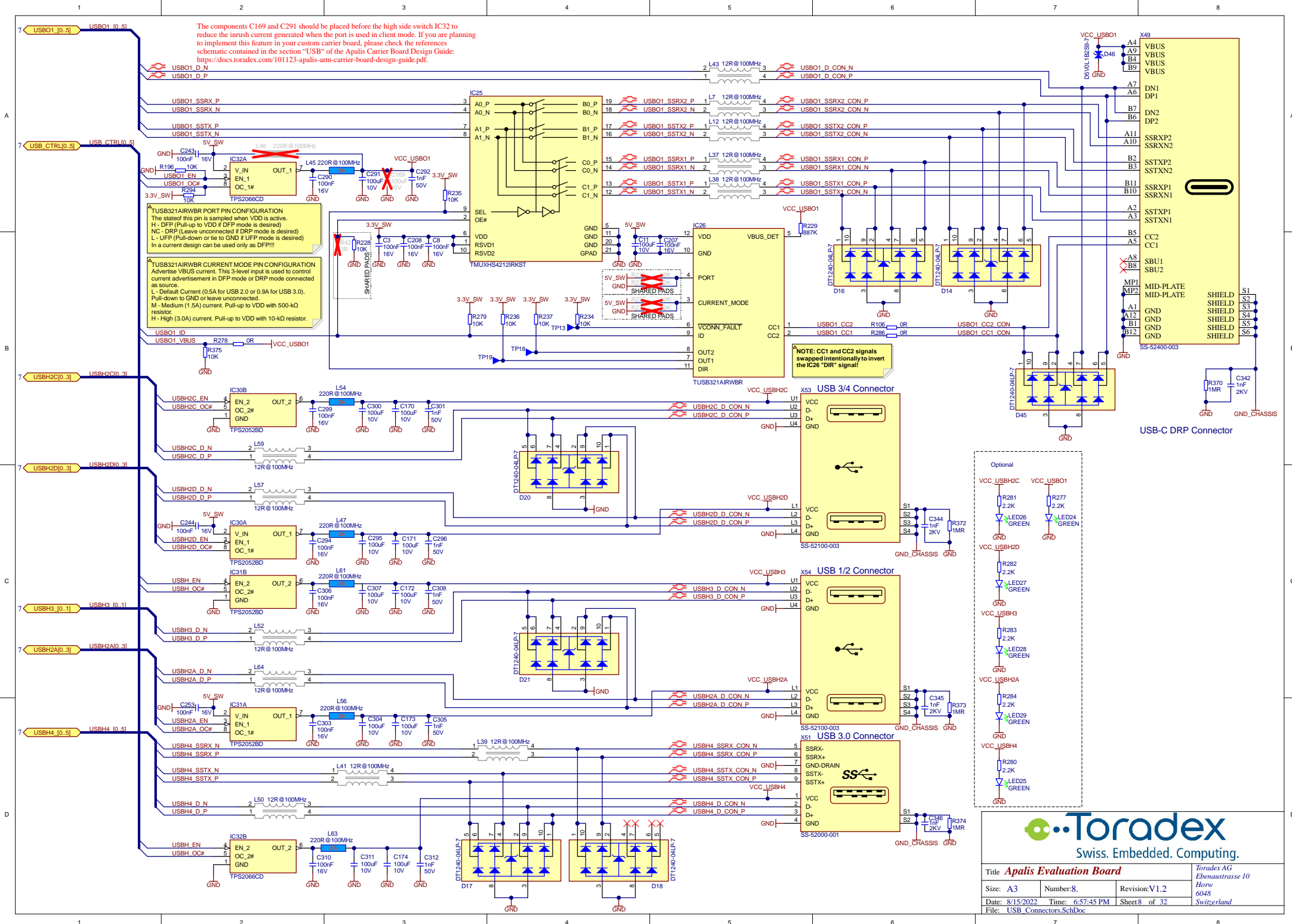
POWER SUPPLY REGULATORS (BUCK / STEP-DOWN)

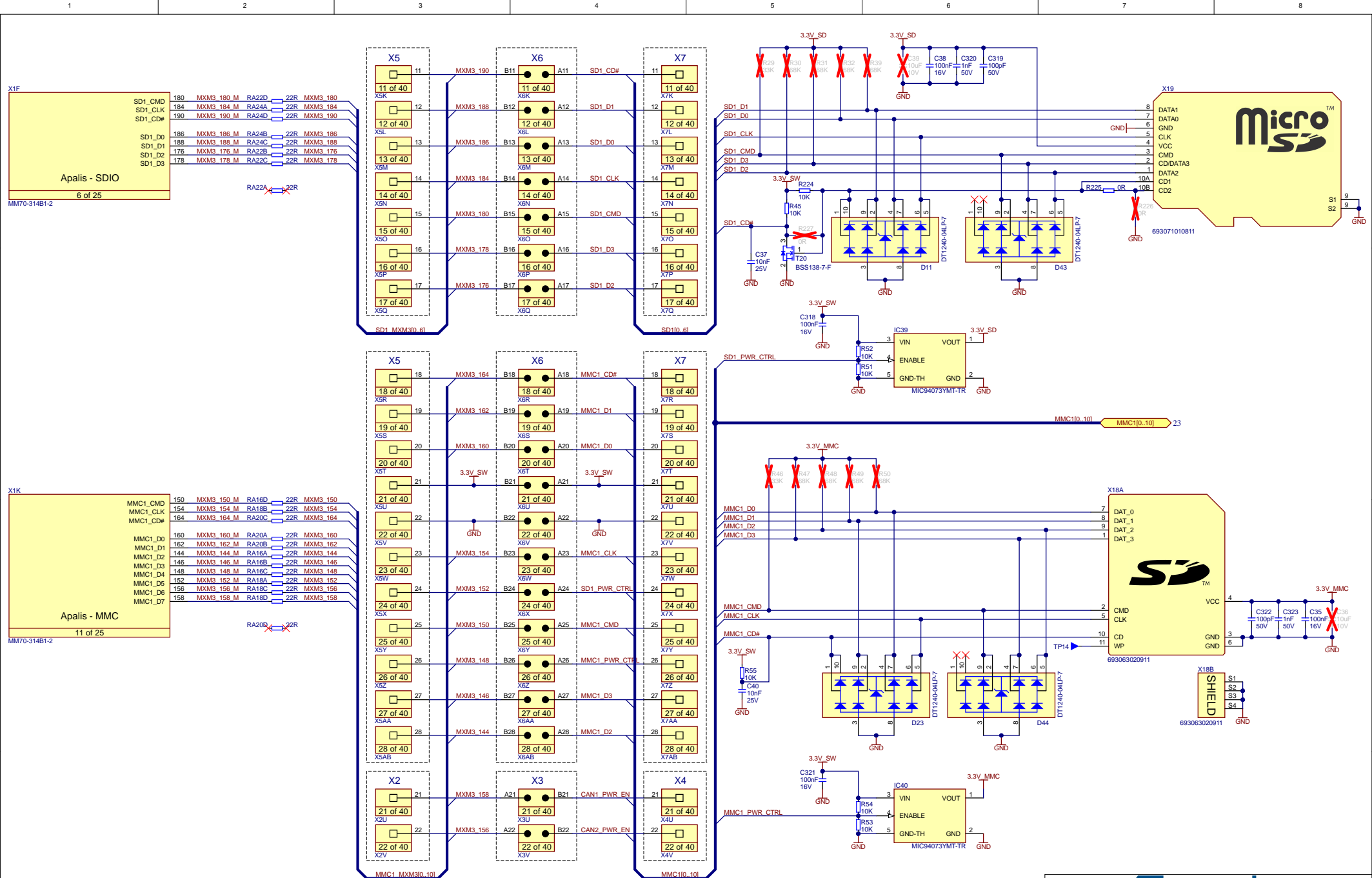


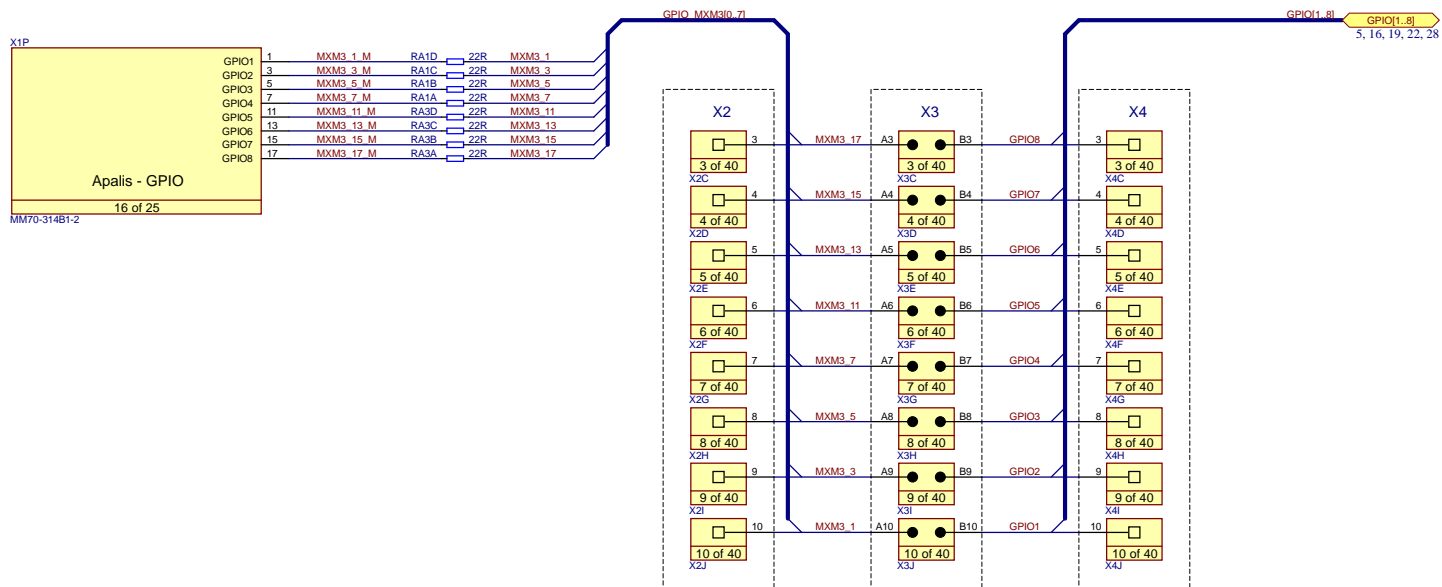
Title <i>Apalis Evaluation Board</i>			Toradex AG Ebenastrasse 10
Size: <i>A3</i>	Number: <i>5</i>	Revision: <i>V1.2</i>	<i>Howe 6048 Switzerland</i>
Date: <i>8/15/2022</i>	Time: <i>6:57:44 PM</i>	Sheet <i>5</i> of <i>32</i>	
File: <i>Power_Switch.SchDoc</i>			

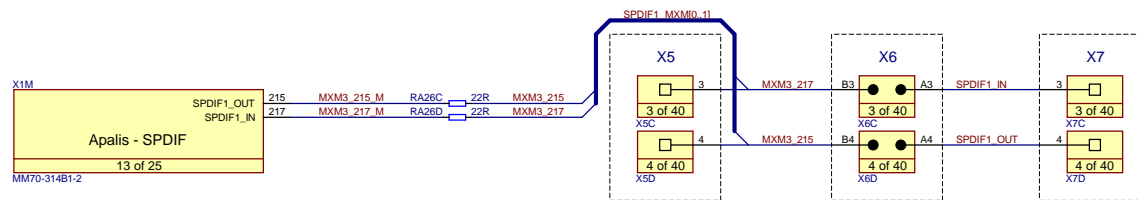


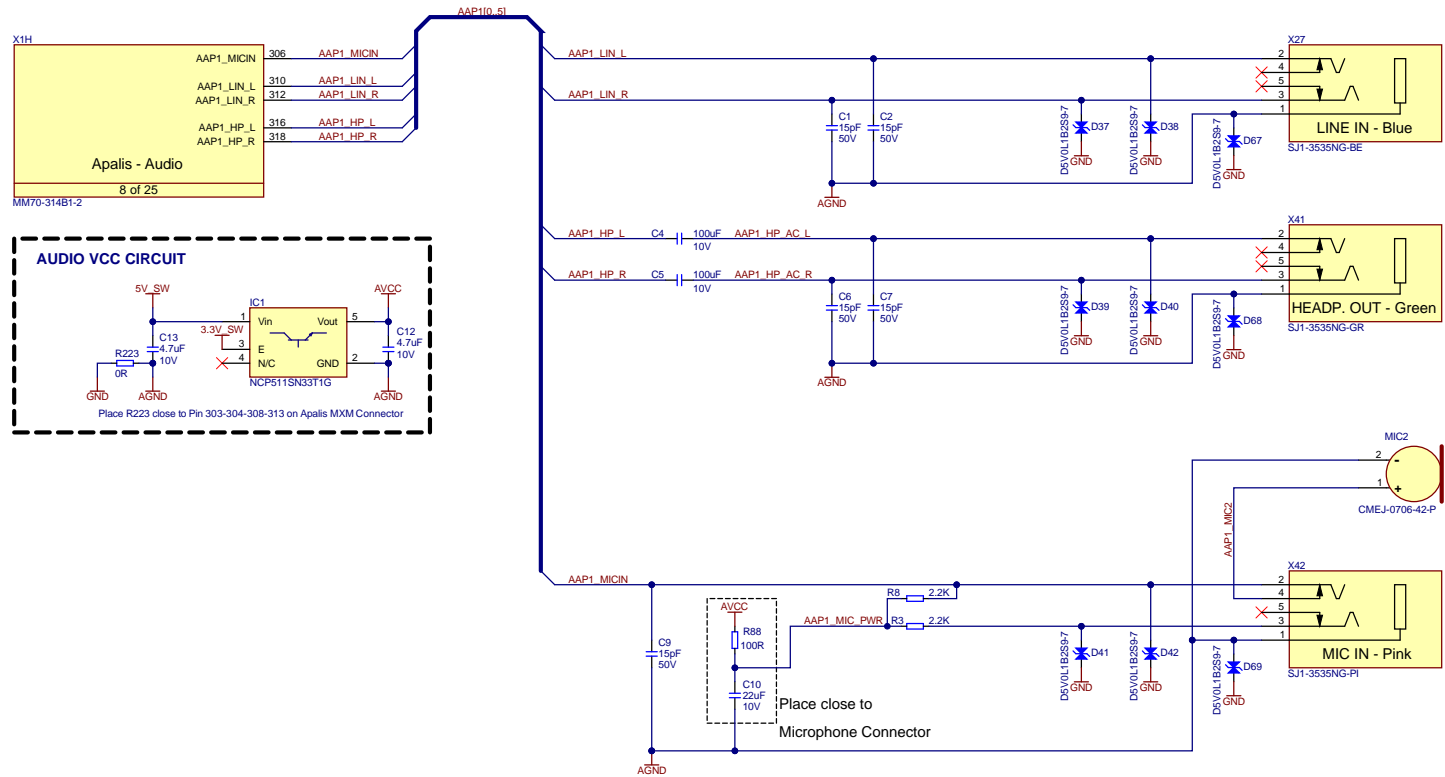
Title Apalis Evaluation Board			Toradex AG Ebenastrasse 10 Horw 6048 Switzerland	
Size: A3	Number: 6.	Revision: V1.2		
Date: 8/15/2022	Time: 6:57:44 PM	Sheet 6 of 32		
File: I2C_Devices.SchDoc				

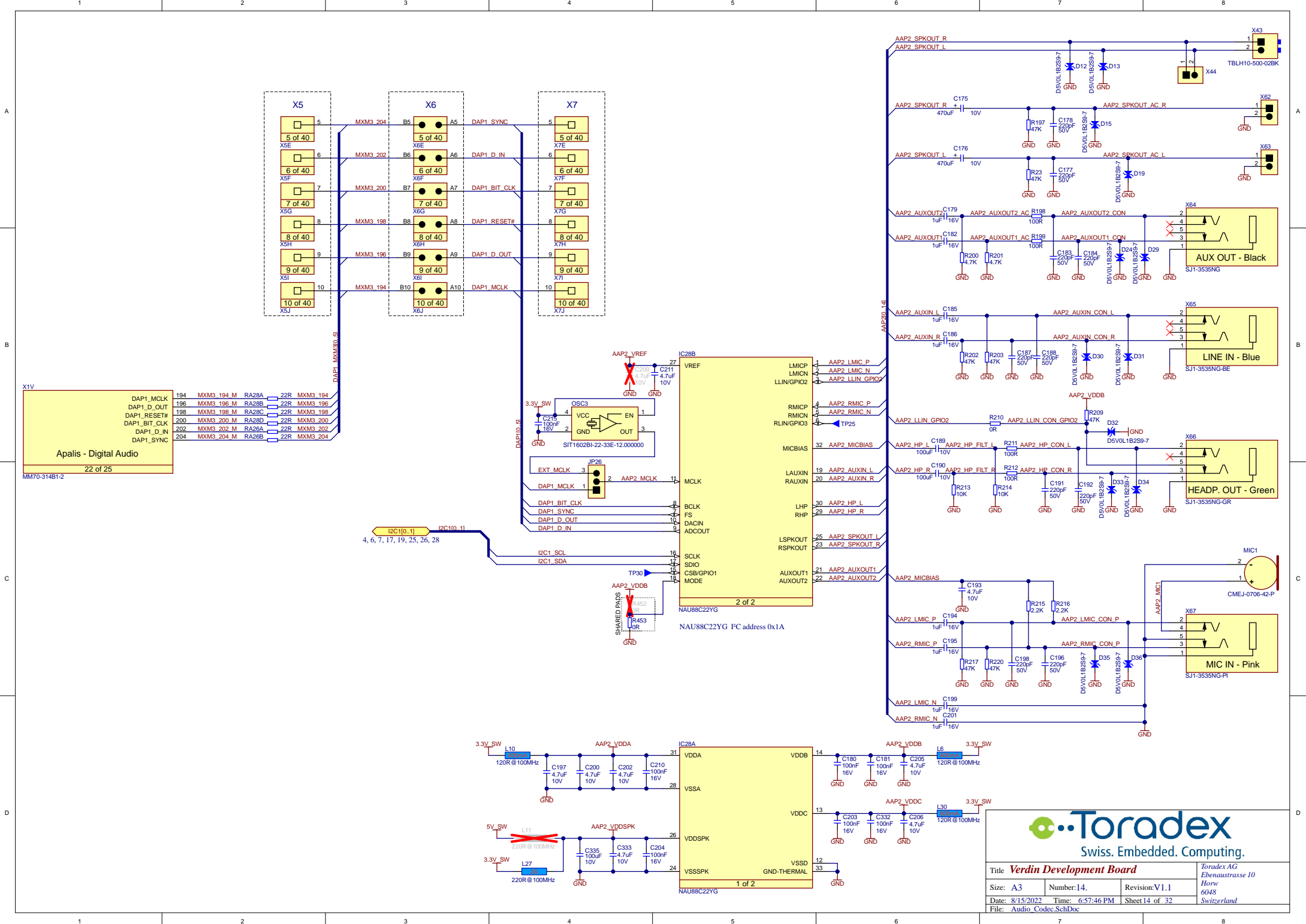




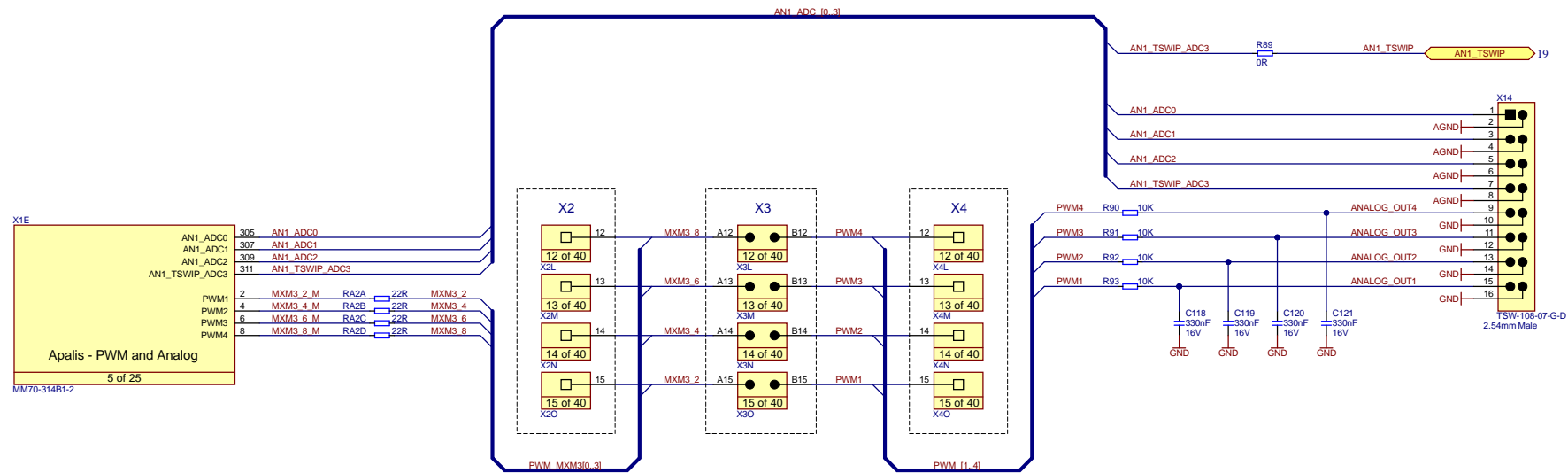




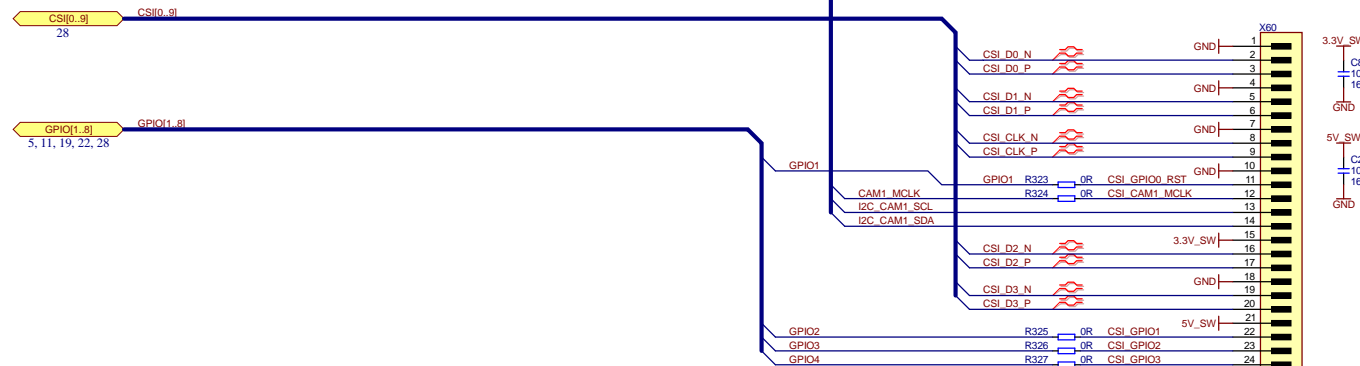
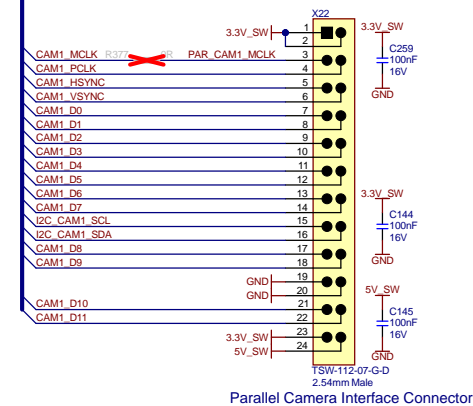
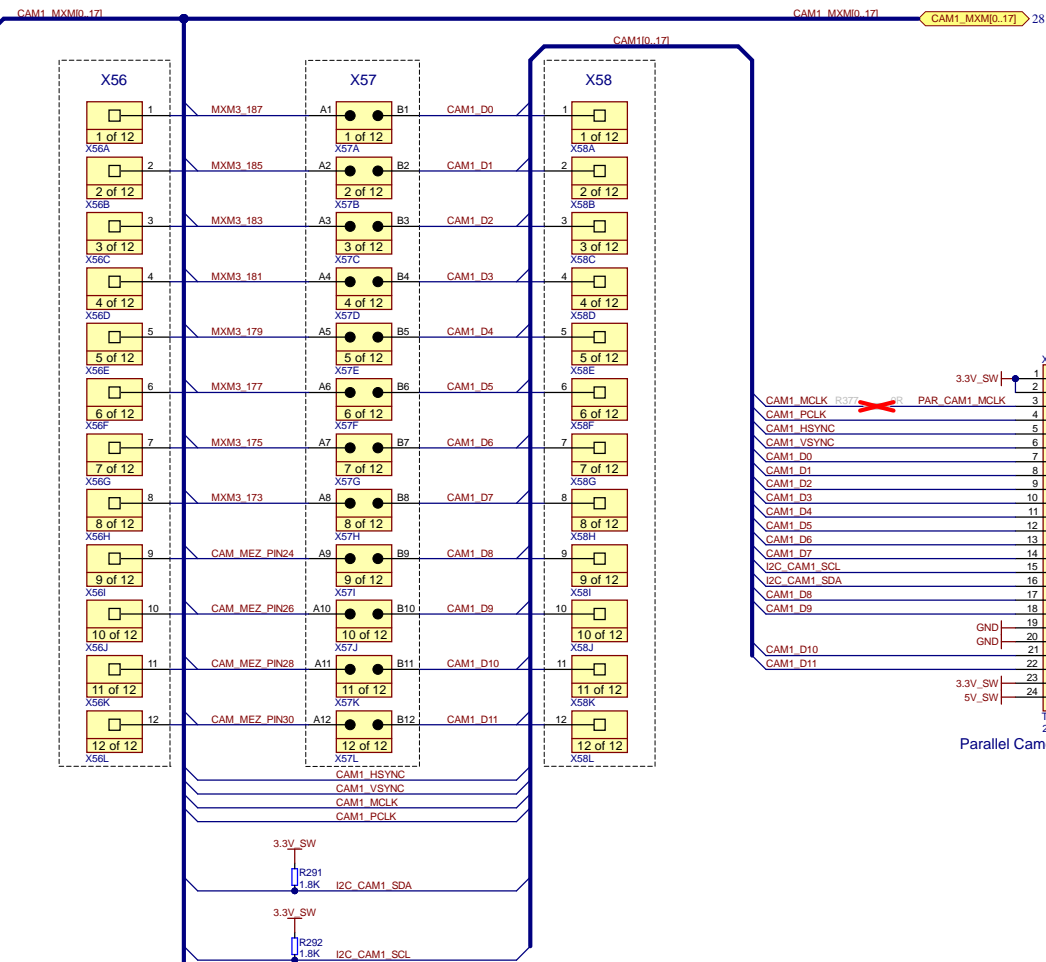
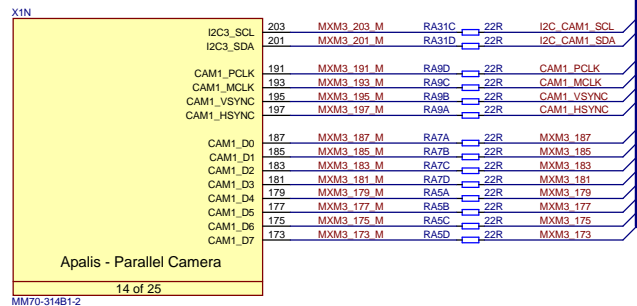




Title Verdin Development Board			Toradex AG Ebenastrasse 10 6048 Switzerland
Size: A3	Number: 14	Revision: V1.1	
Date: 8/15/2022	Time: 6:57:46 PM	Sheet 14 of 32	
File: Audio_Codec.SchDoc			



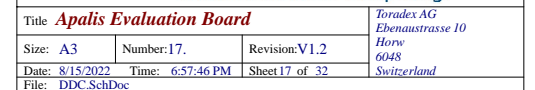
Title <i>Apalis Evaluation Board</i>			<i>Toradex AG</i> <i>Ebenaustrasse 10</i>
Size: <i>A3</i>	Number: <i>15.</i>	Revision: <i>V1.2</i>	<i>Horw</i> <i>6048</i>
Date: <i>8/15/2022</i>	Time: <i>6:57:46 PM</i>	Sheet <i>15</i> of <i>32</i>	<i>Switzerland</i>
File: <i>Analog IOs.SCHDOC</i>			

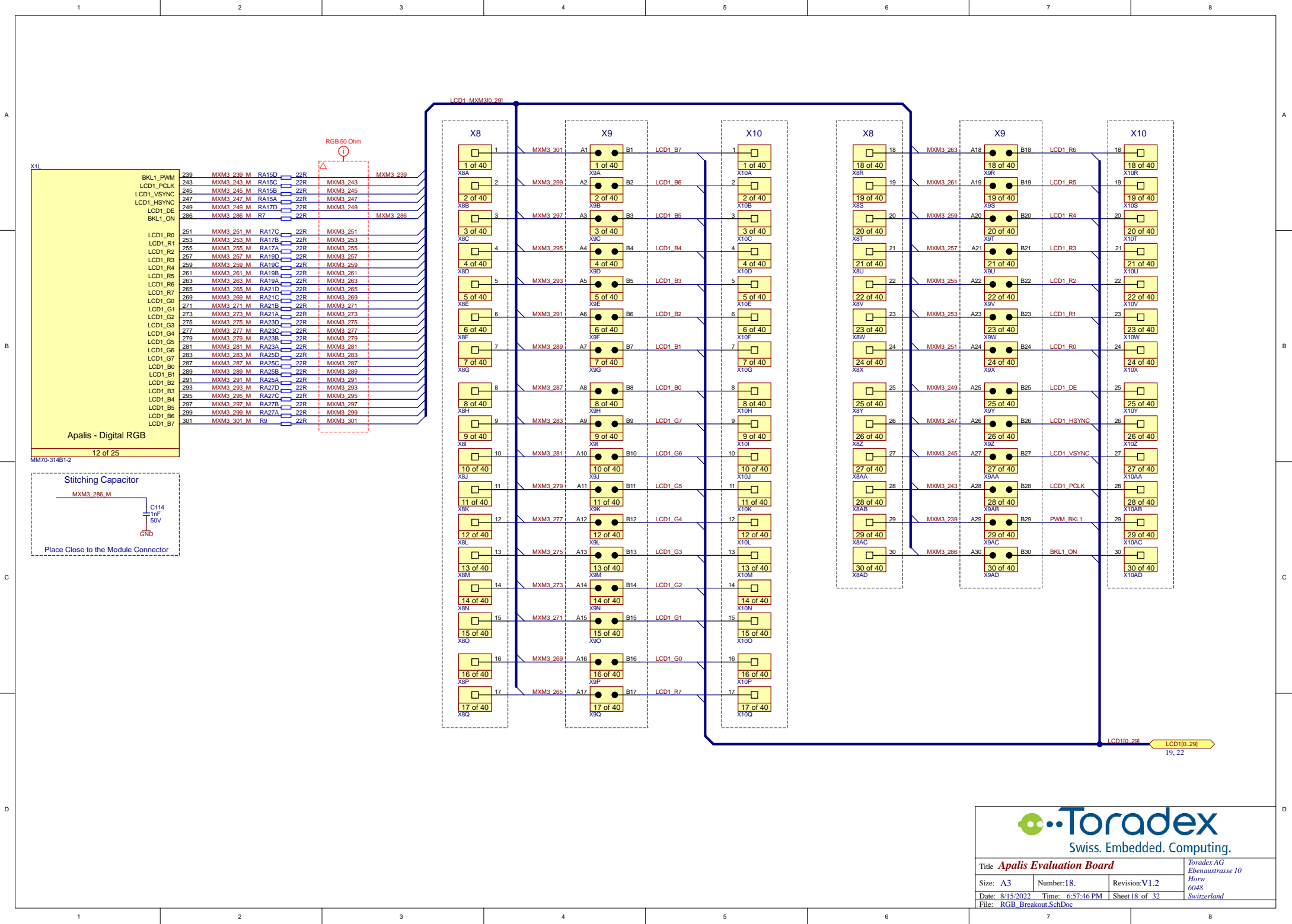


CSI (MIPI) Camera Connector

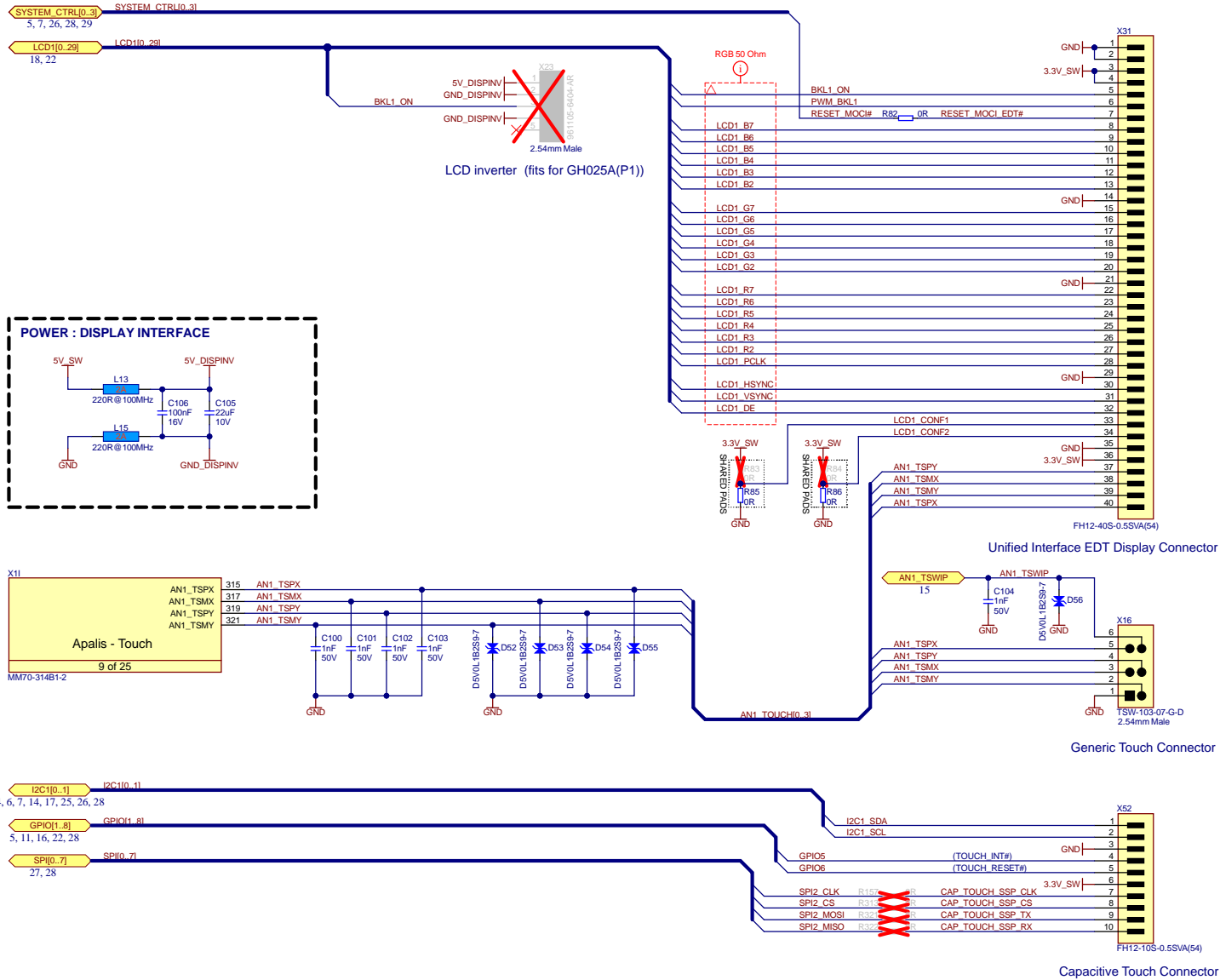


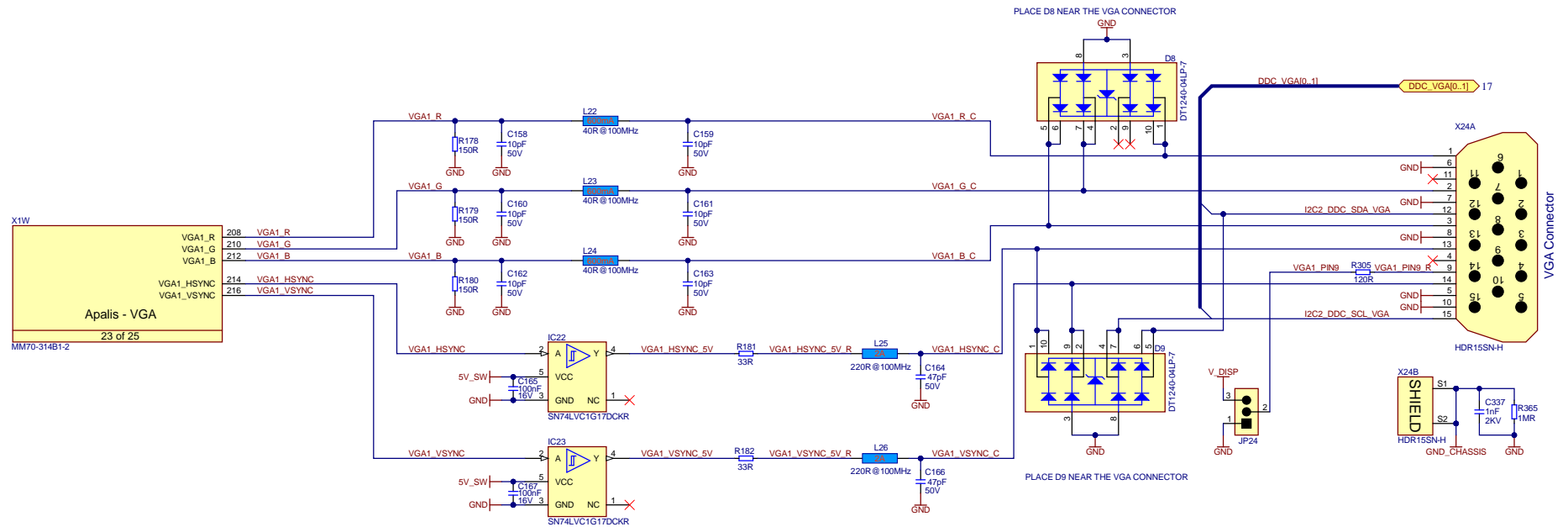
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Size: <i>A3</i>	Number: <i>16</i>	Revision: <i>V1.2</i>		
Date: <i>8/15/2022</i>	Time: <i>6:57:46 PM</i>	Sheet <i>16</i> of <i>32</i>		
File: <i>Camera Interface.SCHDOC</i>				

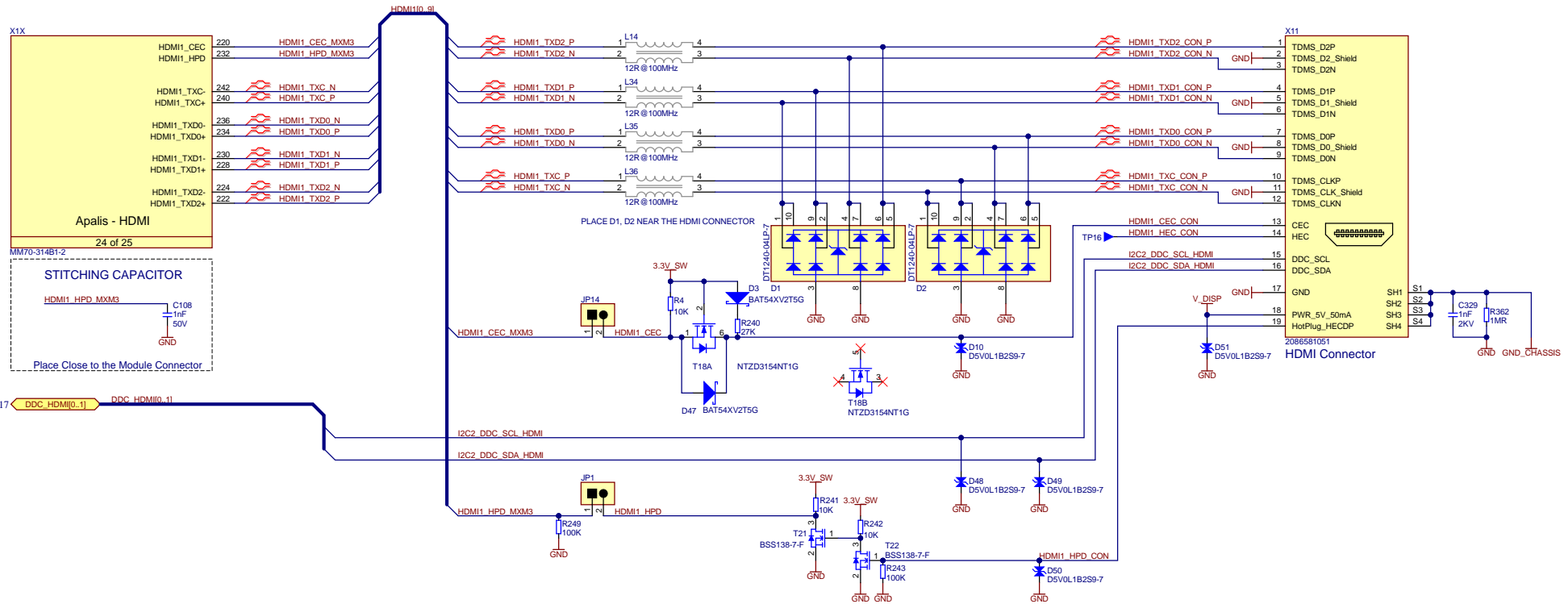


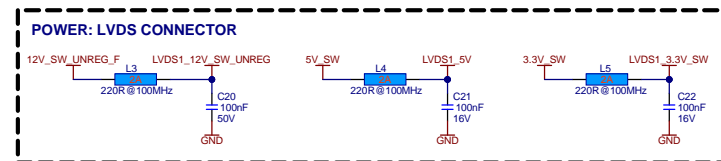
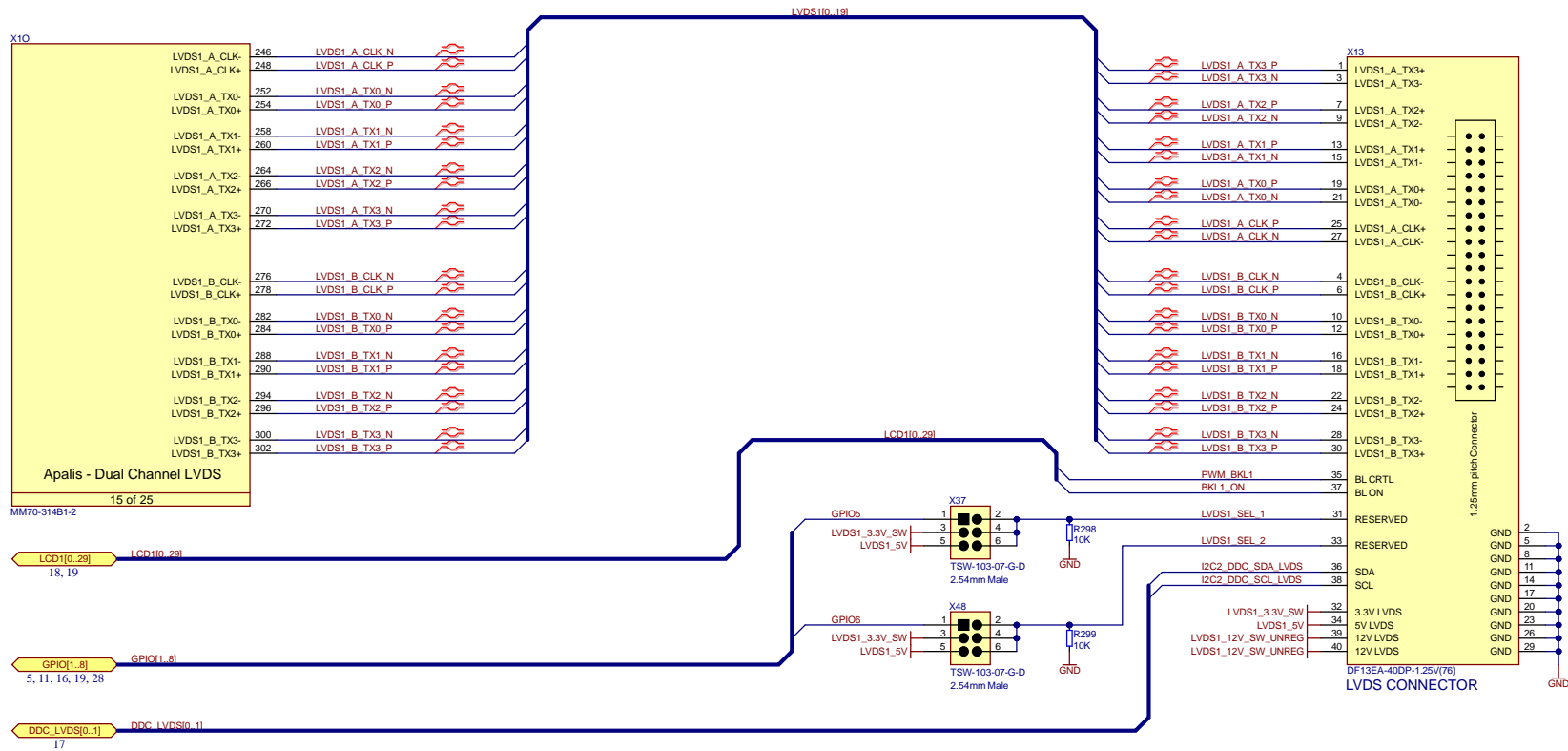


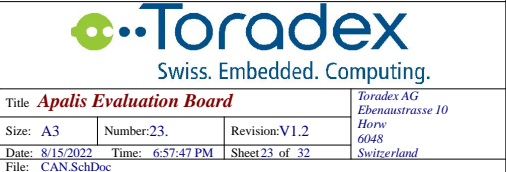
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Size: A3	Number: 18.	Revision: V1.2		
Date: 8/15/2022	Time: 6:57:46 PM	Sheet 18 of 32		
File: RGB-Breakout.SchDoc				













A

B

C

D

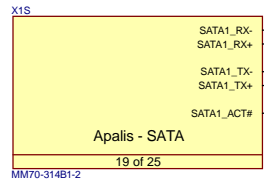
A

B

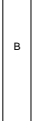
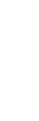
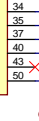
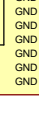
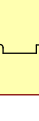
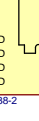
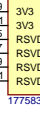
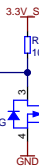
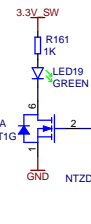
C

D

I2C1[0..1]
4, 6, 7, 14, 17, 19, 26, 28



SATA10_3I



mSATA

X36

W_DISABLE#

UIM_PWR

UIM_RESET

UIM_CLOCK

SMB_CLK

SMB_DAT

UIM_VPP

UIM_DATA

WAKE#

SIM_C8/RSVD

PERST#

SIM_C4/RSVD

CLKREQ#

LED_VWAWW

LED_WLANW

LED_WPANH

REF_CLK-

REF_CLK+

1V5

PCle_RX-/mSATA_RX+

1V5

PCle_RX+/mSATA_RX-

1V5

3V3_AUX

PCle_TX-

3V3

PCle_TX+

3V3

3.3V_mSATA1

3.3V_mSATA1

3.3V_mSATA1

3.3V_mSATA1

3.3V_mSATA1

3.3V_mSATA1

3.3V_mSATA1

3.3V_mSATA1

3.3V_mSATA1

3.3V_mSATA1

3.3V_mSATA1

3.3V_mSATA1

3.3V_mSATA1

3.3V_mSATA1

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3.3V_mSATA1

3.3V_mSATA1

3.3V_mSATA1

3.3V_mSATA1

3.3V_mSATA1

3.3V_mSATA1

3.3V_mSATA1

3.3V_mSATA1

3.3V_mSATA1

3.3V_mSATA1

3.3V_mSATA1

3.3V_mSATA1

3.3V_mSATA1

3.3V_mSATA1

3.3V_mSATA1

3.3V_mSATA1

3.3V_mSATA1

3.3V_mSATA1

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3.3V_mSATA1

3.3V_mSATA1

3.3V_mSATA1

3.3V_mSATA1

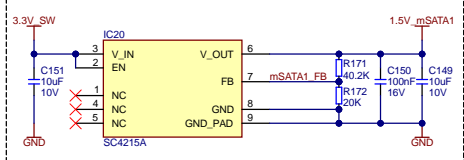
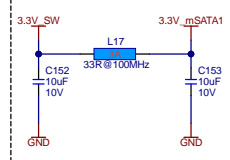
3.3V_mSATA1

3.3V_mSATA1

3.3V_mSATA1

3.3V_mSATA1

POWER : mSATA

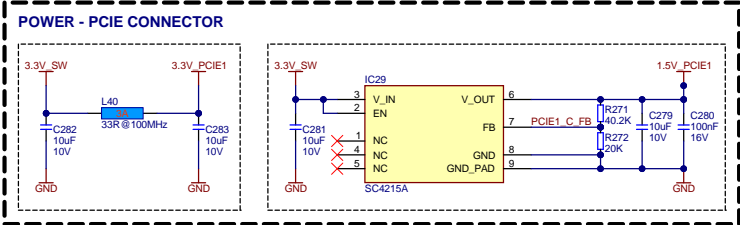
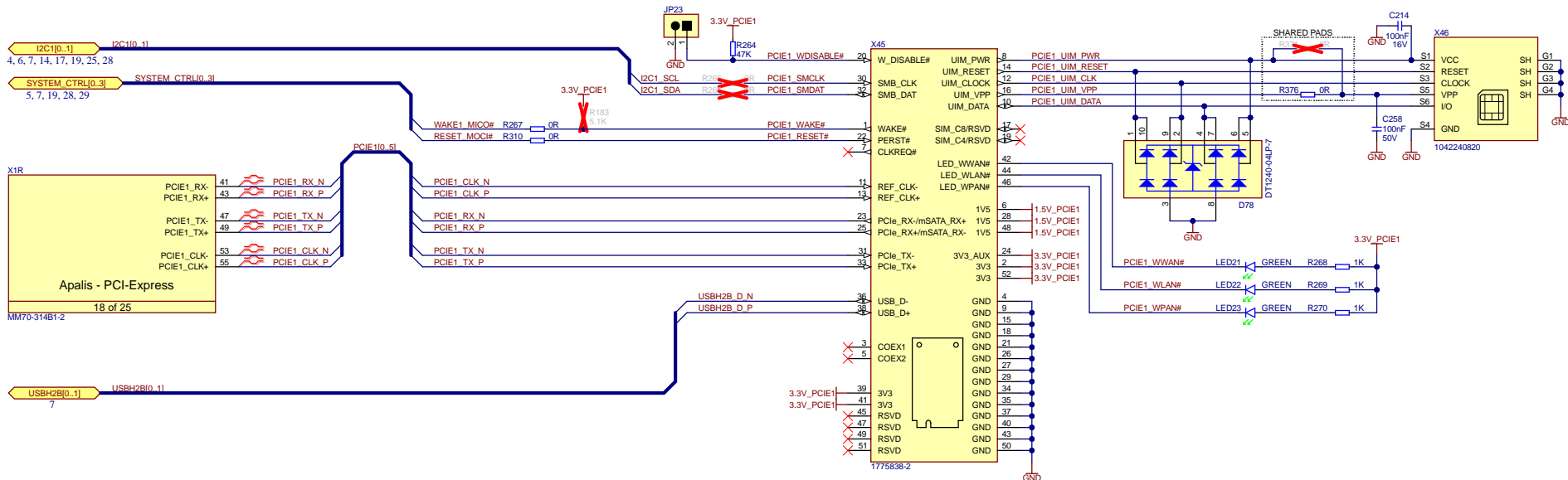


NOTE 14: Mini PCIe connector schematic symbol is used in the schematic for the mSATA connector (X36), as Mini PCIe and mSATA use the same physical connector. It is important to note that the mSATA interface specifies the RX+ signal on pin 23 and RX- signal on pin 25, whereas the Mini PCIe Card features the RX+ signal on pin 25 and RX- on pin 23. The PCIe interface supports polarity reversal, but not the SATA interface. Since the Mini PCIe connector pin names doesn't match with the mSATA signals, the situation might be confusing. Special attention must be paid while reading or connecting the mSATA signals.

Revision History Notes



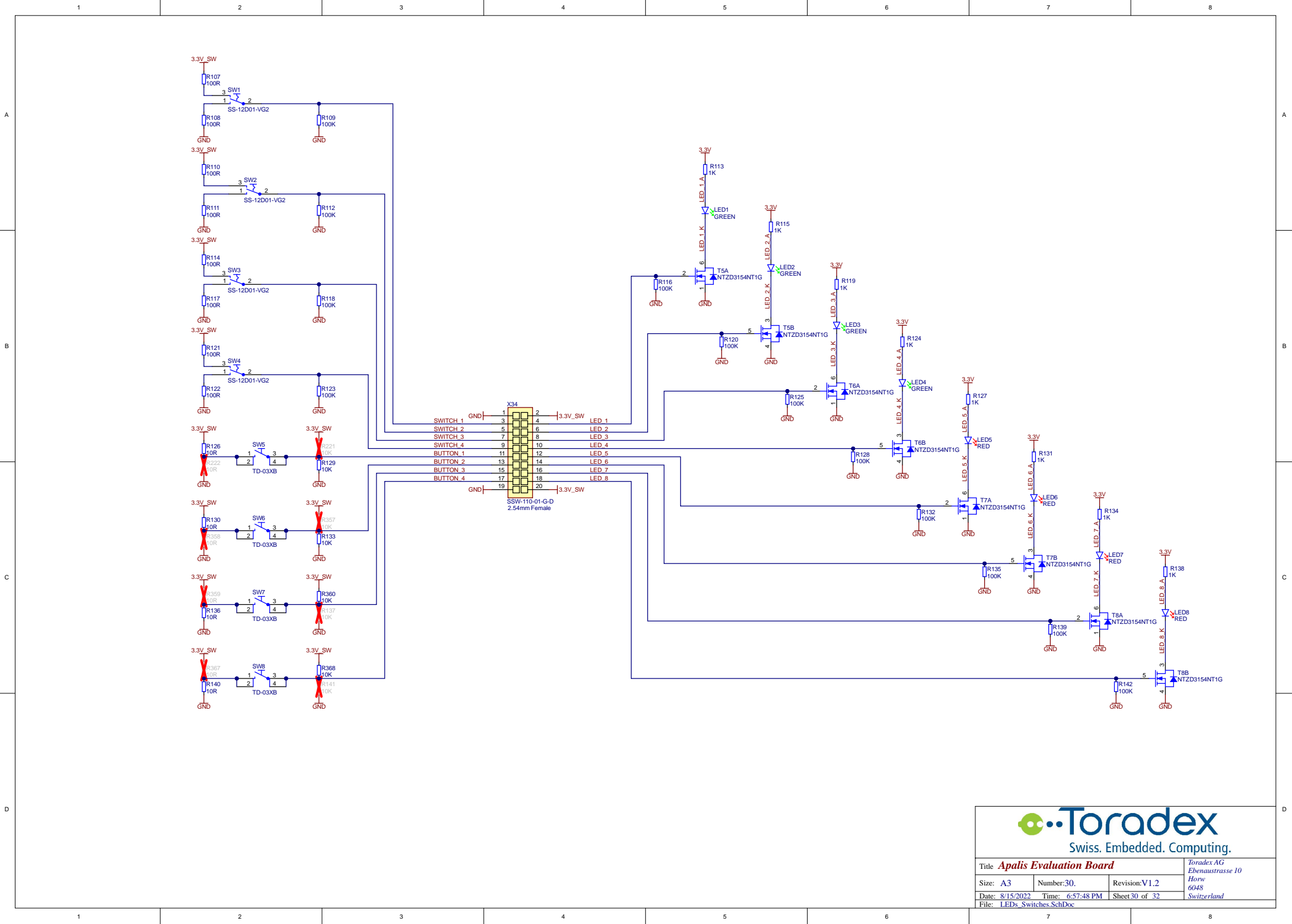
Title <i>Apalis Evaluation Board</i>			<i>Toradex AG</i> <i>Ebenastrasse 10</i>
Size: <i>A3</i>	Number: <i>25</i>	Revision: <i>V1.2</i>	<i>Horw</i> <i>6048</i>
Date: <i>8/15/2022</i>	Time: <i>6:57:48 PM</i>	Sheet <i>25</i> of <i>32</i>	<i>Switzerland</i>
File: <i>Sata.SCHDOC</i>			



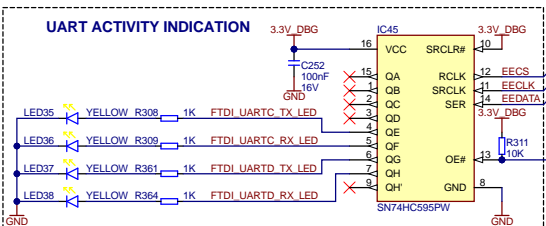
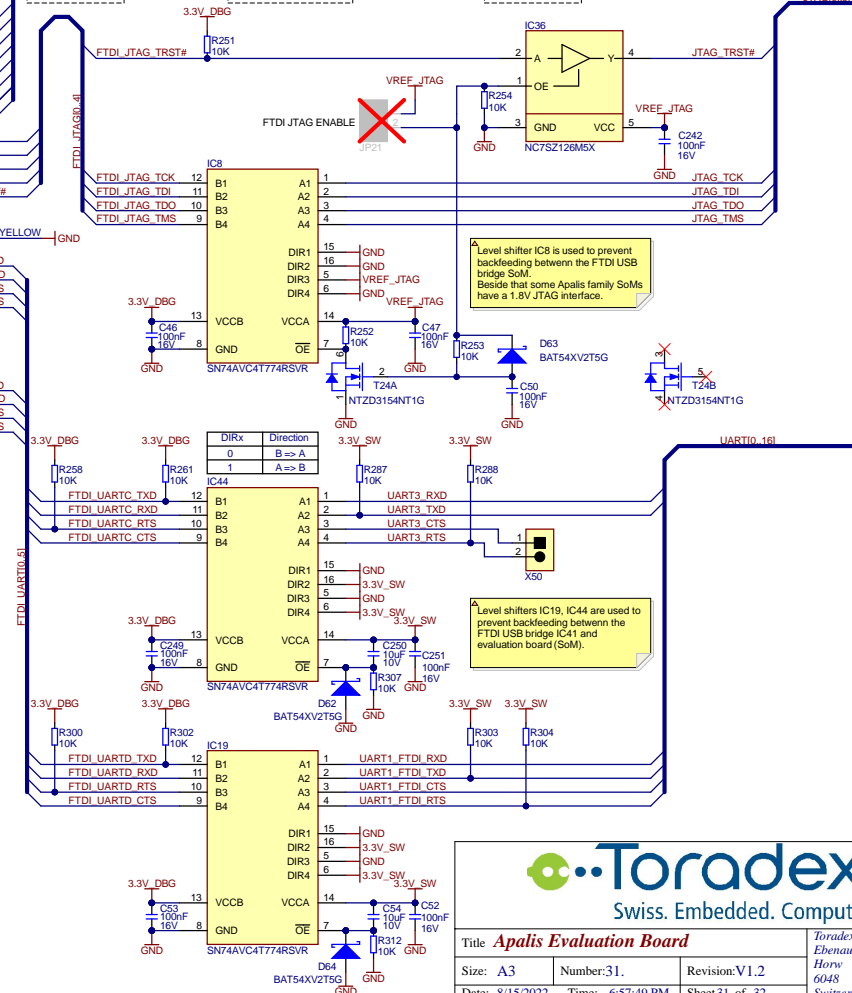
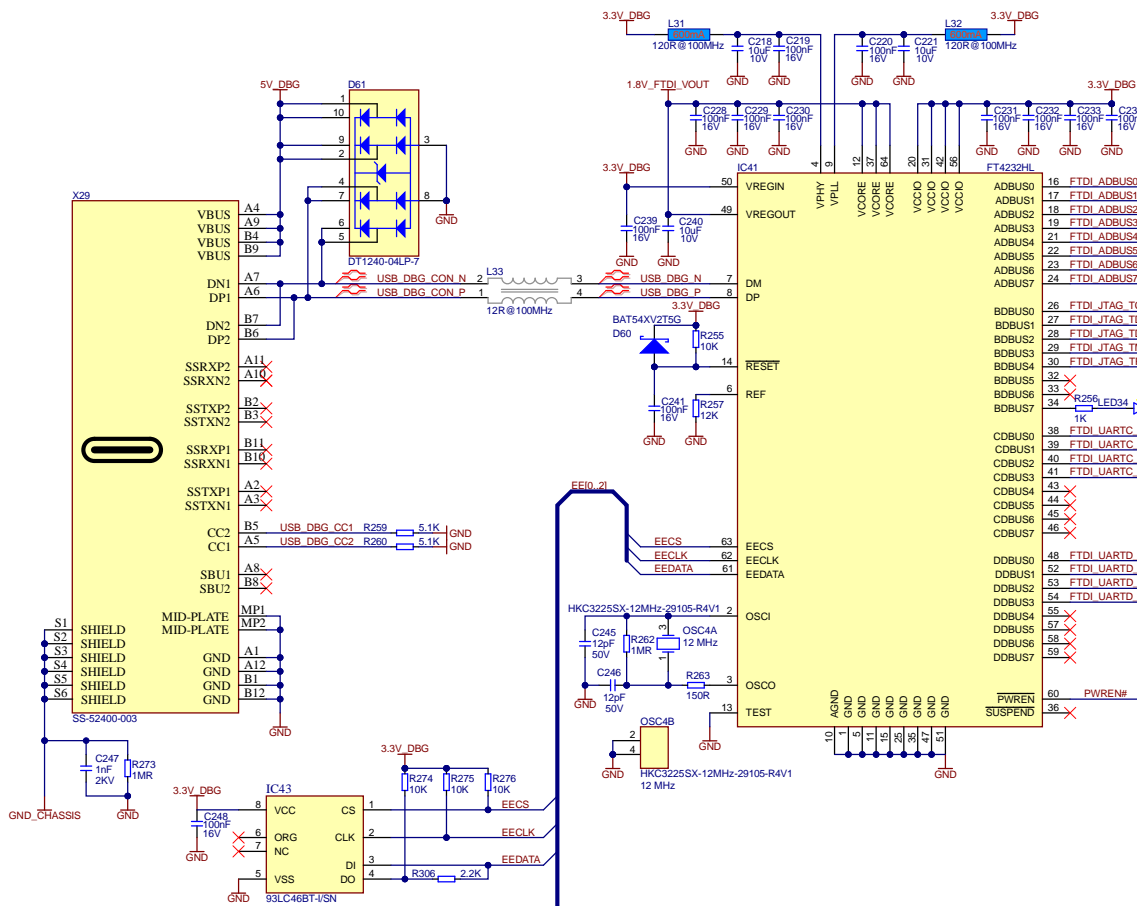
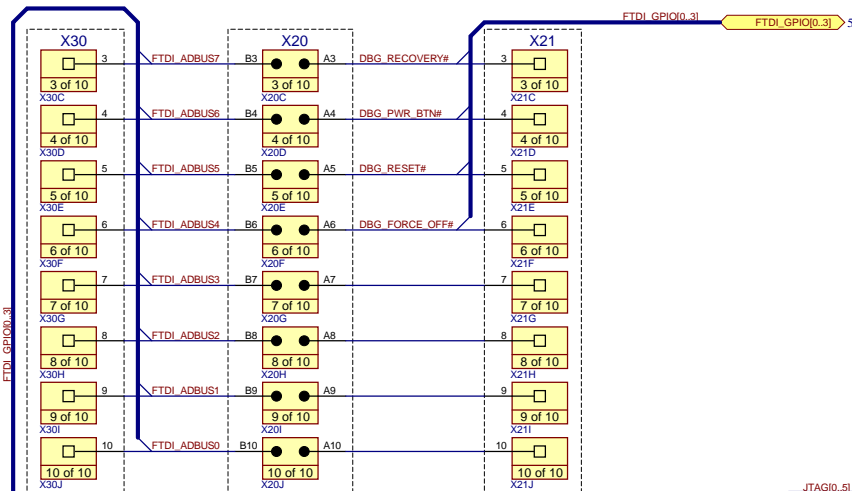
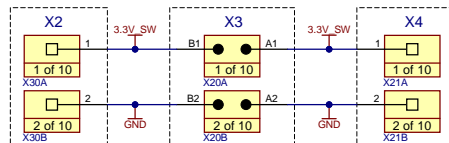
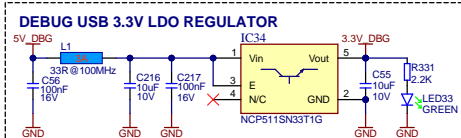


Title <i>Apalis Evaluation Board</i>			Toradex AG Ebenastrasse 10 Horn 6048 Switzerland
Size: A3	Number: 27.	Revision: V1.2	
Date: 8/15/2022	Time: 6:57:48 PM	Sheet 27 of 32	
File: SPLSCHDOC			





Title <i>Apalis Evaluation Board</i>			<i>Toradex AG</i> <i>Ebenastrasse 10</i>	
Size: A3	Number:30.	Revision:V1.2	<i>Horw</i> <i>6048</i>	
Date: 8/15/2022	Time: 6:57:48 PM	Sheet30 of 32	<i>Switzerland</i>	
File: LEDs_Switches.SchDoc				



Title <i>Apalis Evaluation Board</i>			Toradex AG Ebenaustrasse 10	
Size: A3	Number:31.	Revision:V1.2	Howe 6048 <i>Switzerland</i>	
Date: 8/15/2022	Time: 6:57:49 PM	Sheet 31 of 32		
File: USB_Debug_SchDoc				

