

ConnectCore 6UL Single Board Computer PRO

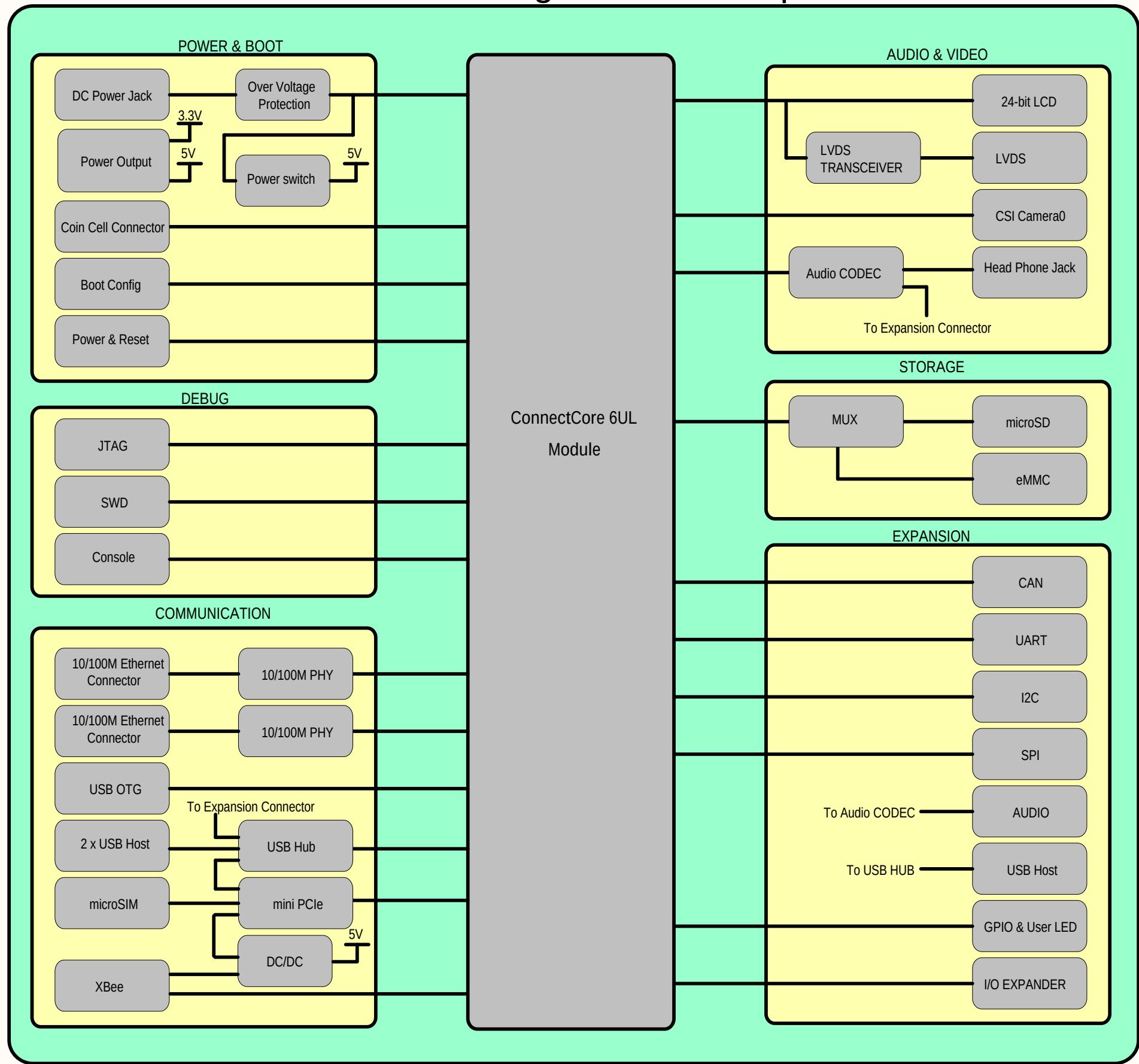


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Title: Block Diagram

Designer: Sébastien MEYER | Sheet: 1 of 14

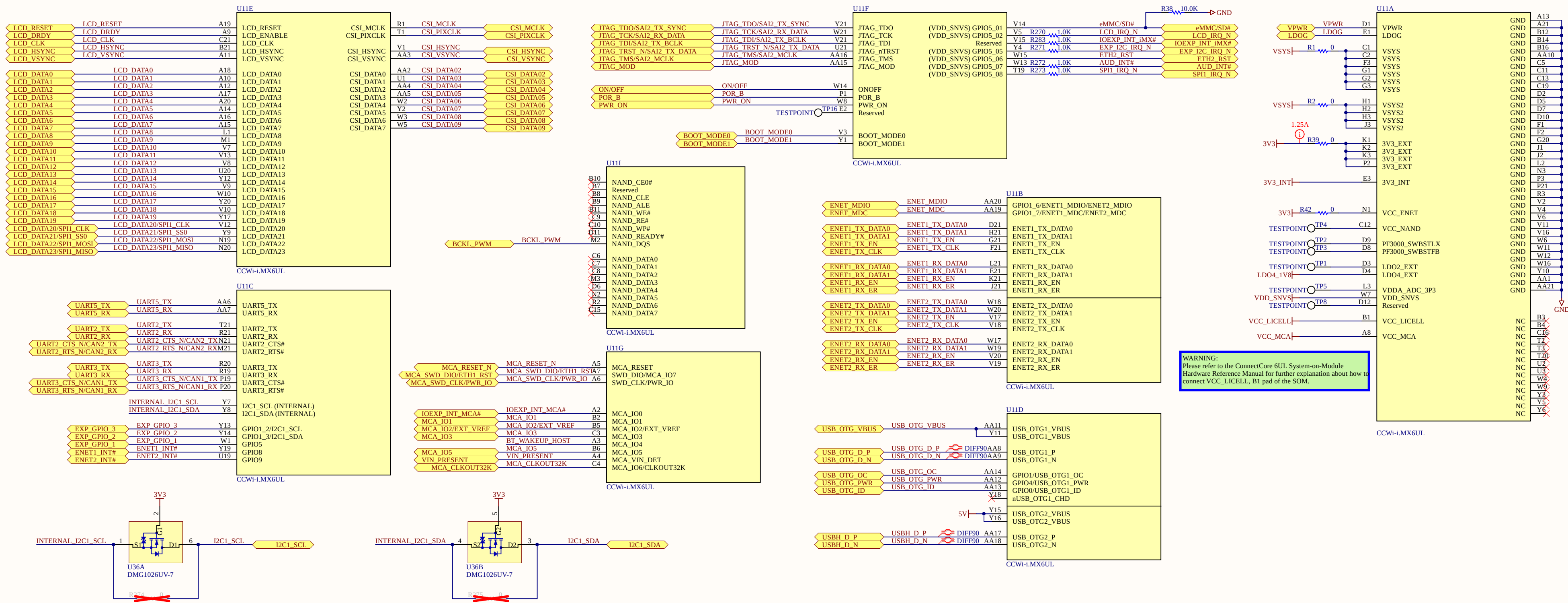
Variant: 55001883-01

Rev: D

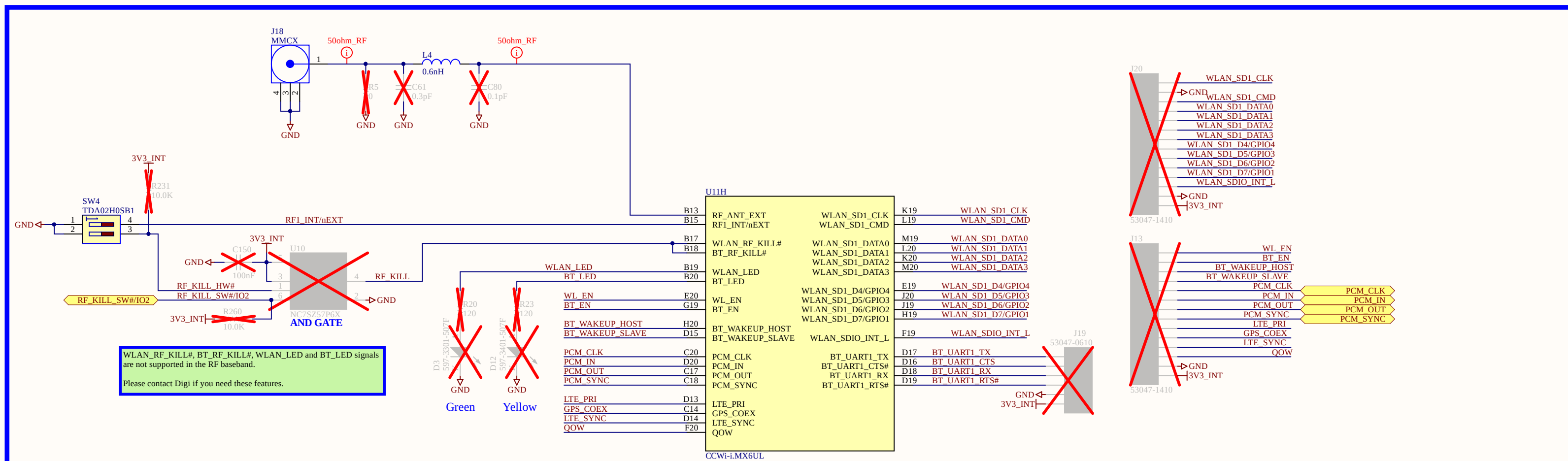
Description: ConnectCore 6UL SBC PRO



ConnectCore for i.MX6UL Module



RF



The schematic diagram illustrates the MCA board's control and power connections. It features two switches, SW1 and SW2, both of type KSC221JLFS. SW1 is connected to a 100K resistor (R83) leading to VCC_MCA, and its other terminal is connected to a 0 ohm resistor (R99) leading to MCA_SWD_CLK/PWR_IO. SW2 is connected to a 100K resistor (R97) leading to VCC_MCA, and its other terminal is connected to a 0 ohm resistor (R98) leading to MCA_RESET_N. A 3-pin connector J3 (53047-0310) is shown with pins 1, 2, and 3. Pin 1 is connected to the common terminal of SW1, pin 2 is connected to the common terminal of SW2, and pin 3 is connected to GND. A red 'X' is placed over the text 'ON/OFF' in the center of the diagram.

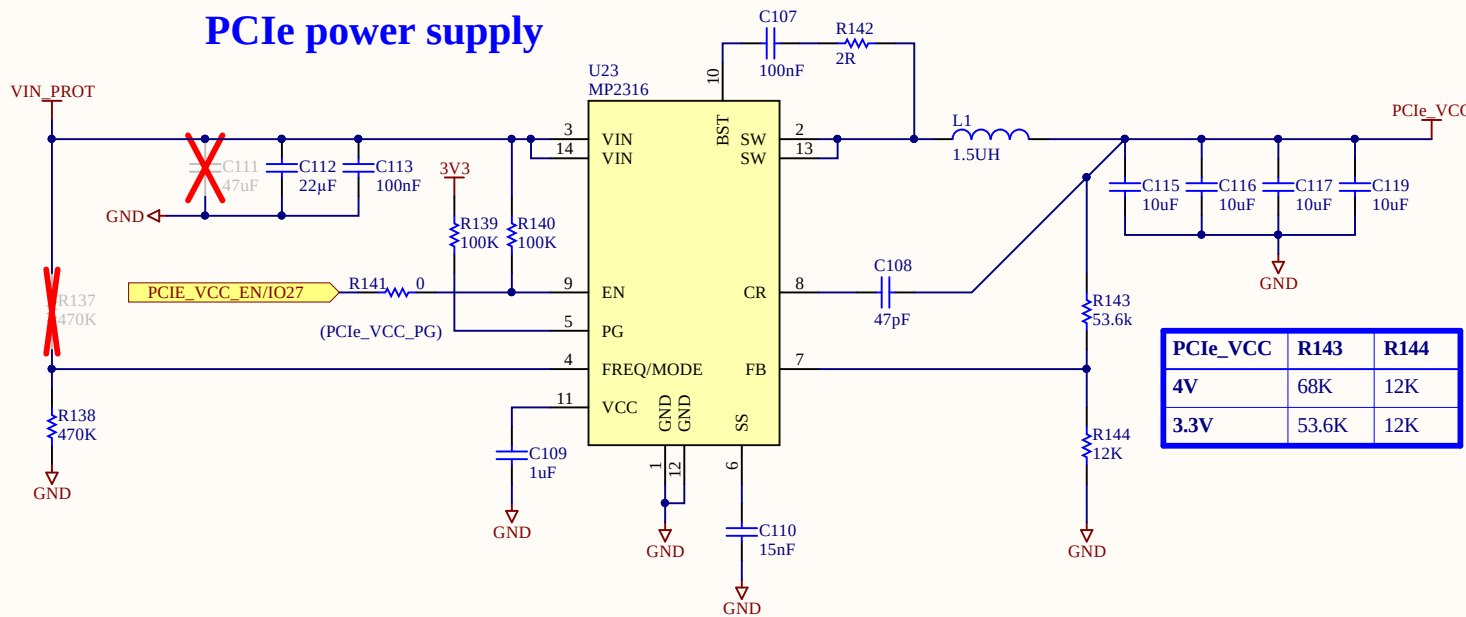
The diagram illustrates a complex power management circuit. It starts with a 5V input (VIN) and a Coin Cell (J2). The 5V input passes through a fuse (J1) and a filter capacitor (FIL1) to a voltage divider (R11, R13) and a diode (D2). This feeds into a MOSFET driver stage (U3, Q1, R120, R14) which controls a power MOSFET (Q9) switching the main VIN line. A current measurement point (5A) is shown before the MOSFET. The Coin Cell (J2) is connected to a voltage divider (R8) and a low-dropout regulator (U26, AP2202). The regulator's output (VOUT) is connected to a current sensor (D13) and a voltage divider (R179, R180) providing a 3.3V reference. Another current measurement point (0.2A) is shown after the regulator. The main VIN line continues through a protection resistor (R126), a capacitor (C121), and a diode (U5) to a second current measurement point (5A) at VIN_PROT. This leads to another MOSFET driver stage (U1, Q10, R224, R225) controlling a second MOSFET (Q10) switching the VSYS line. Current measurement points (3A) are shown before and after this MOSFET. Various capacitors (C1-C9) are used for decoupling throughout the circuit.

VOUT = 1.25 * (1 + R180 / R179)
= 1.25 * (1 + 20K / 12K)
= 3.3V

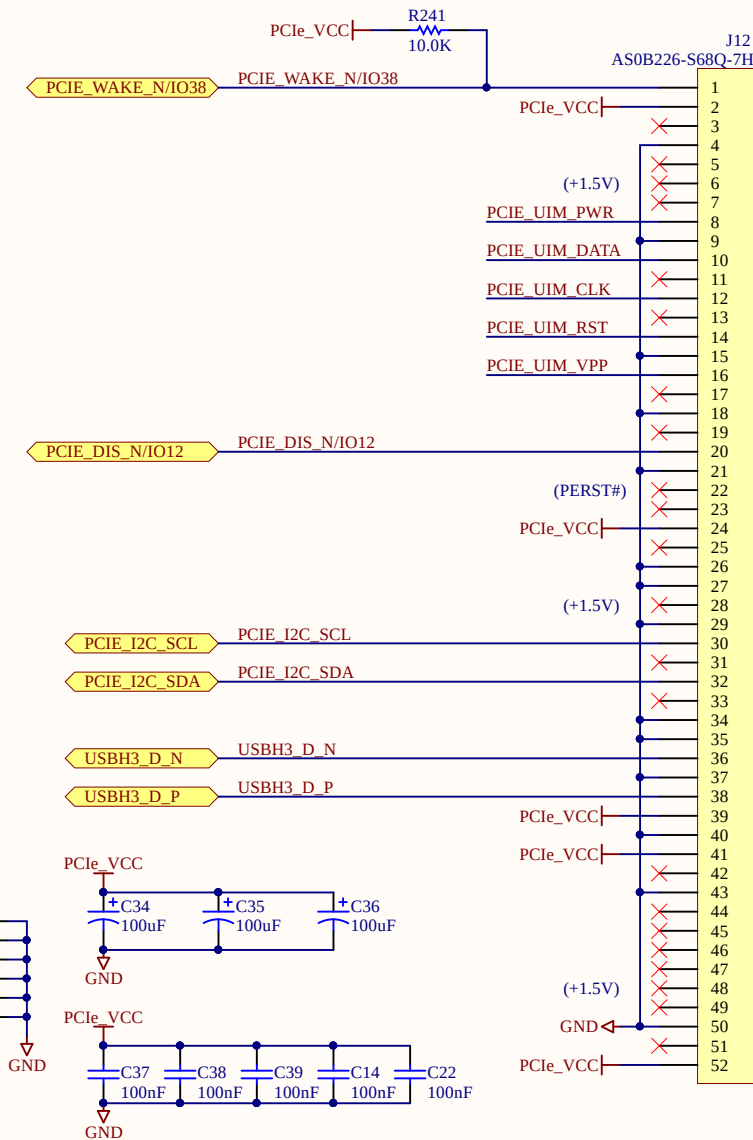


DIGI™

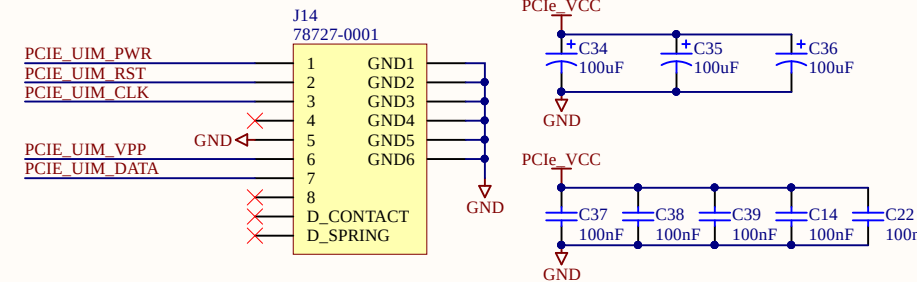
PCIe power supply



miniPCIe

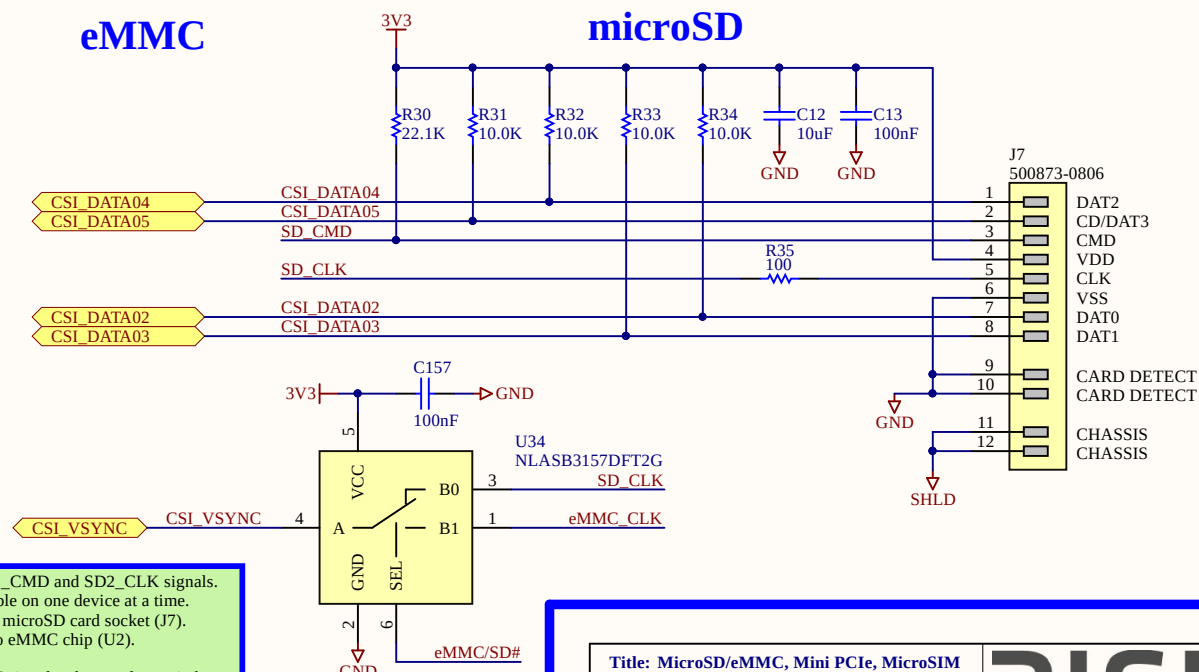


micro SIM



eMMC

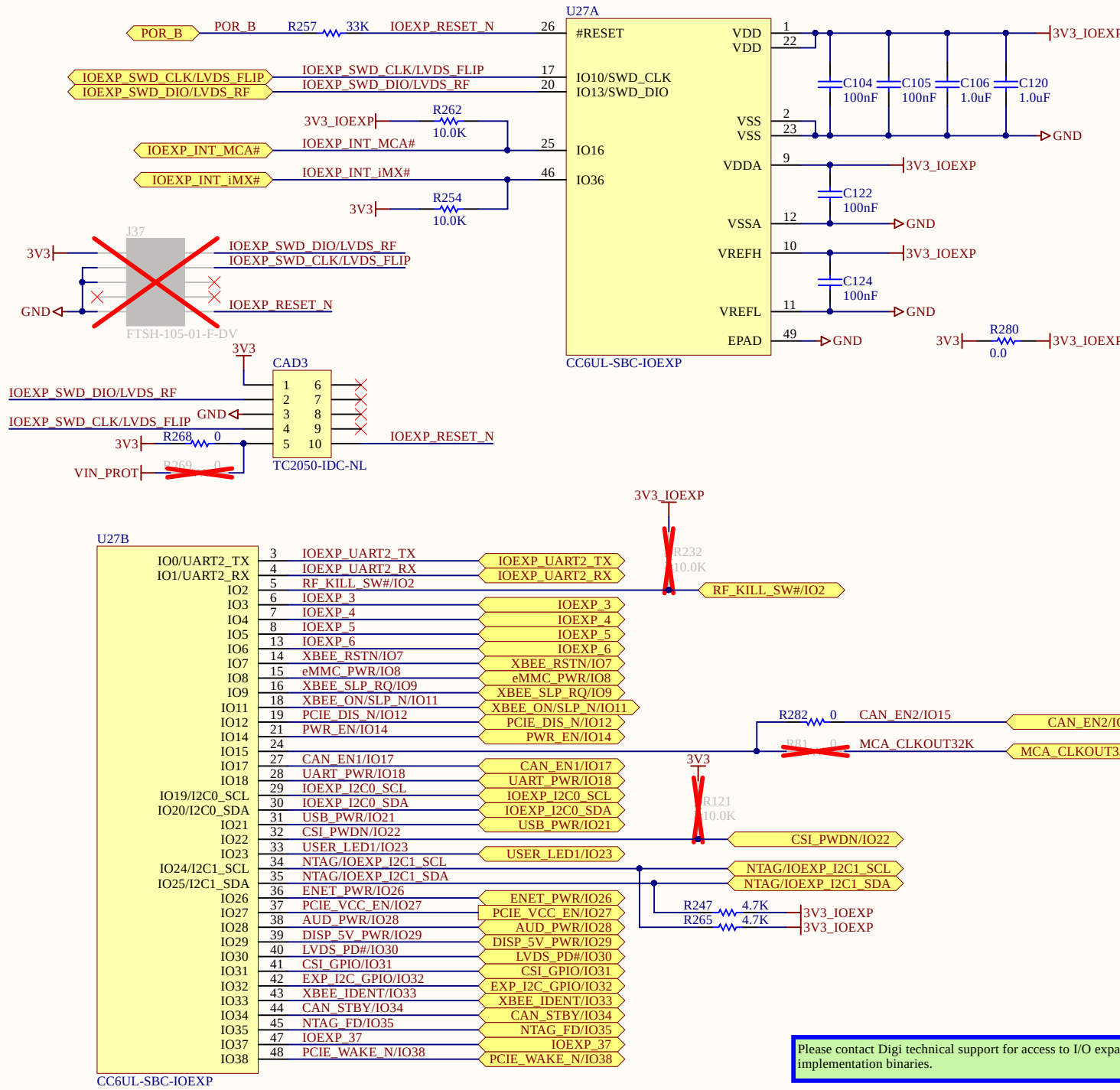
microSD



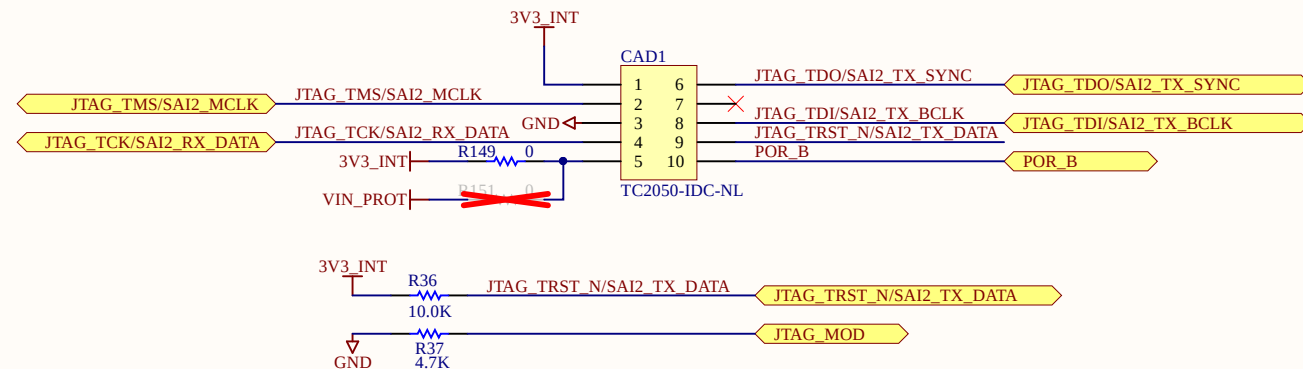
U33 and U34 are analog switches responsible for multiplexing SD2_CMD and SD2_CLK signals. Through these switches, the CMD and CLK signals are only available on one device at a time. When eMMC/SD# signal is LOW, CMD and CLK are connected to microSD card socket (J7). When eMMC/SD# signal is HIGH, CMD and CLK are connected to eMMC chip (U2).

R243/R244/R245/R246 are available for connecting CMD and CLK signals when analog switches are not populated.

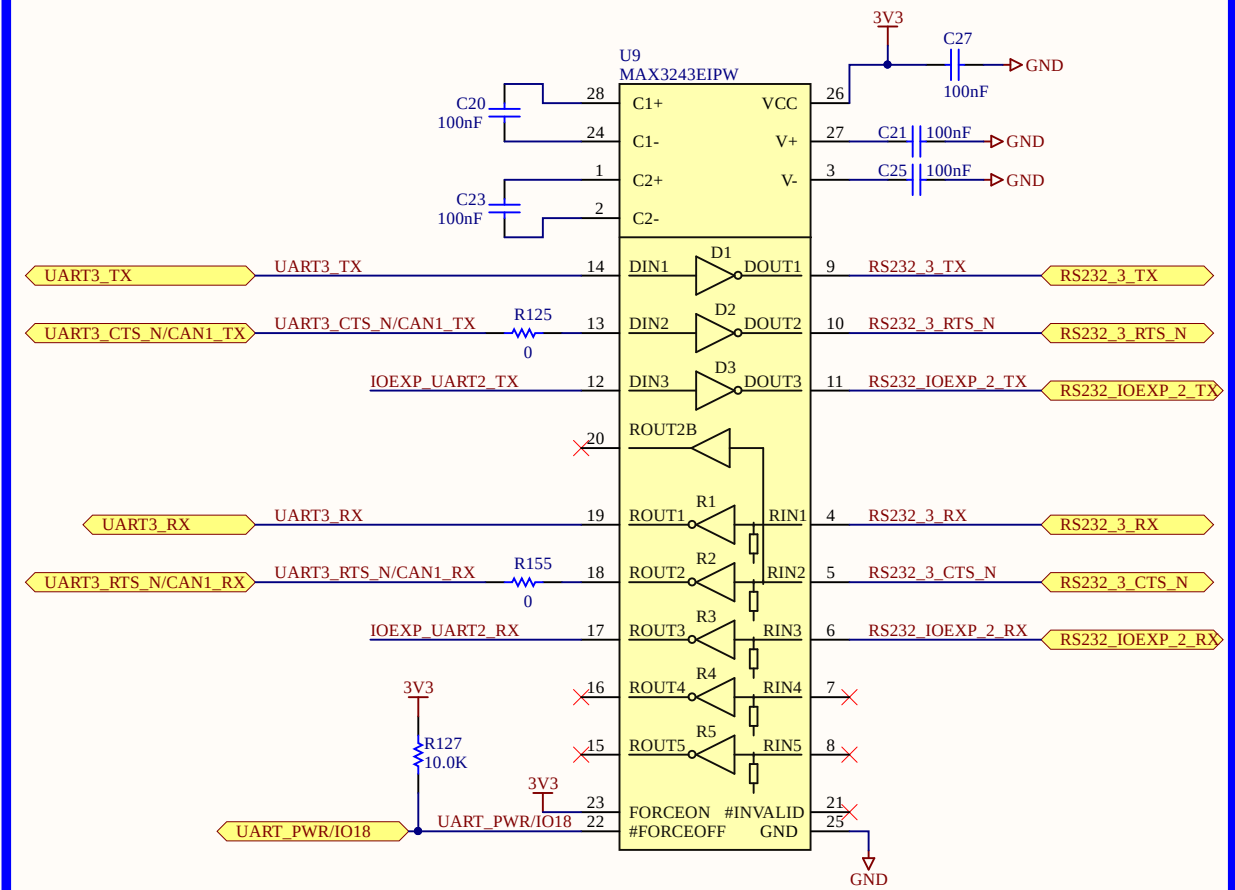
I/O EXPANDER



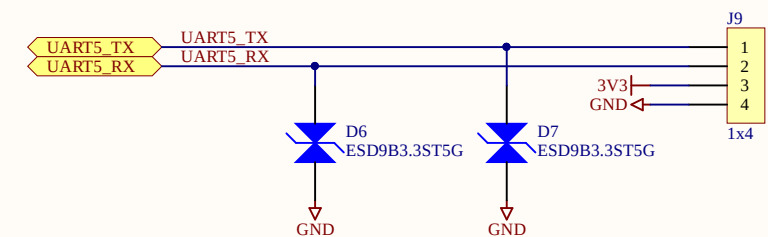
JTAG



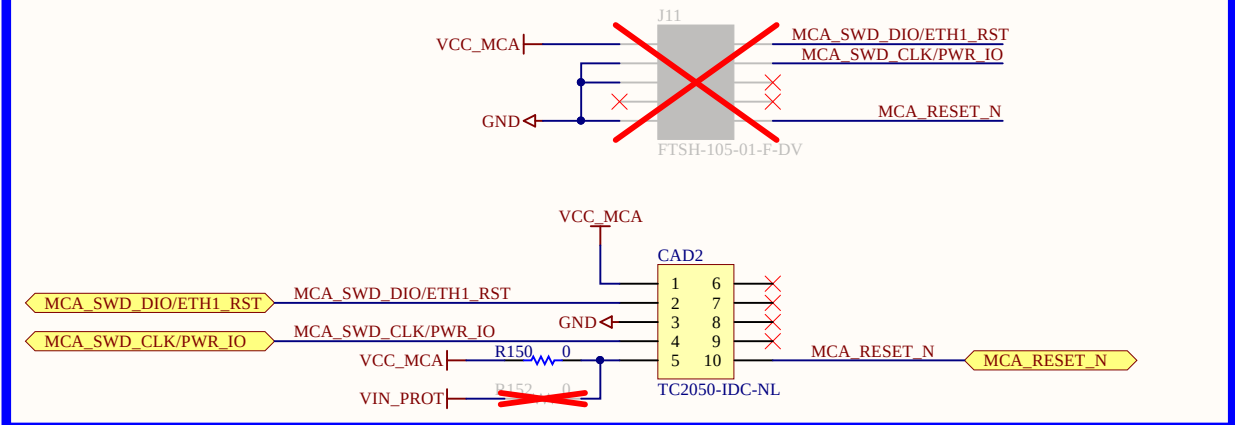
UART 1&3



Console TTL



SWD



Title: JTAG, SWD, Console, UART

Designer: Sébastien MEYER Sheet: 5 of 14

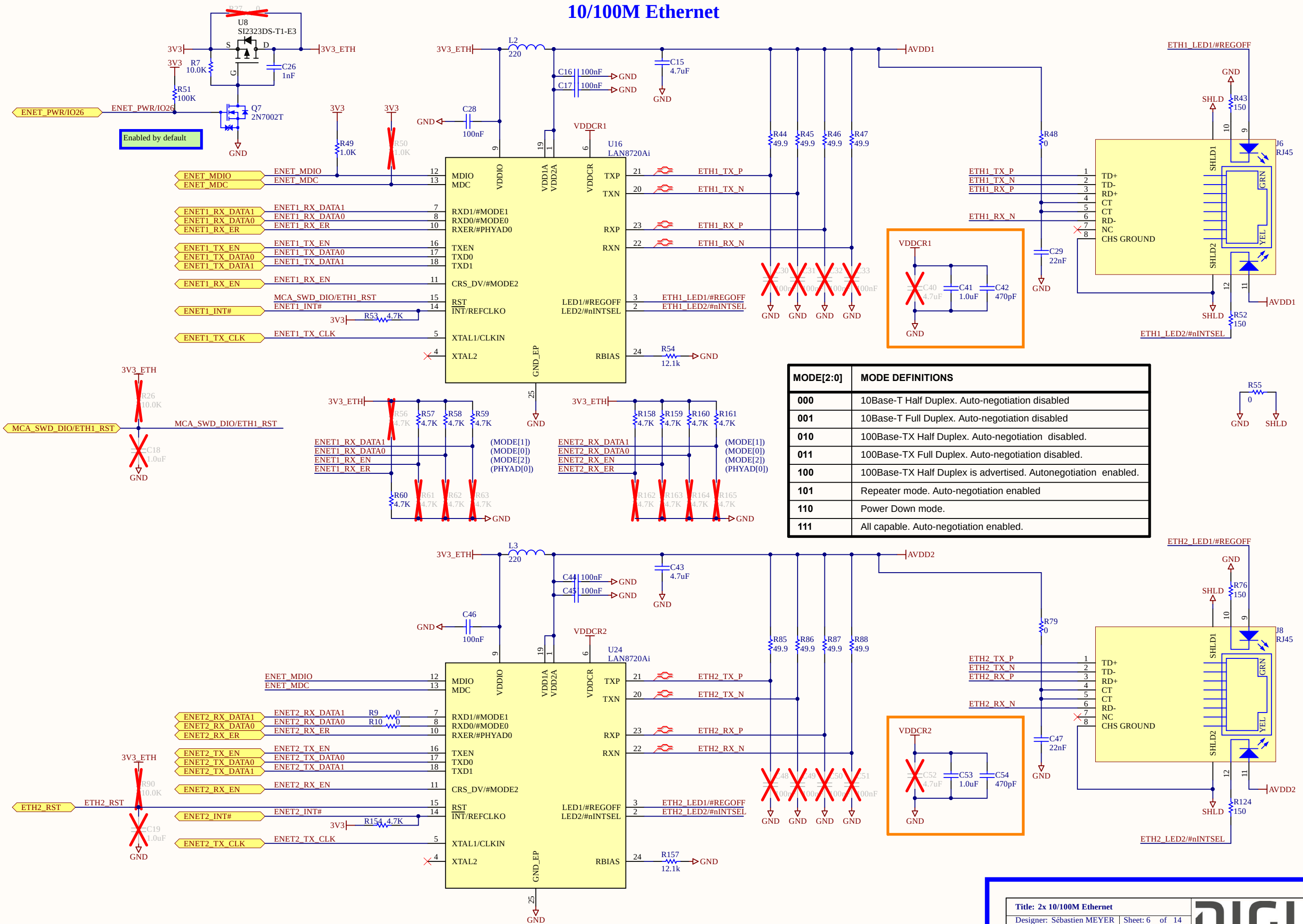
Variant: 55001883-01

Rev: D

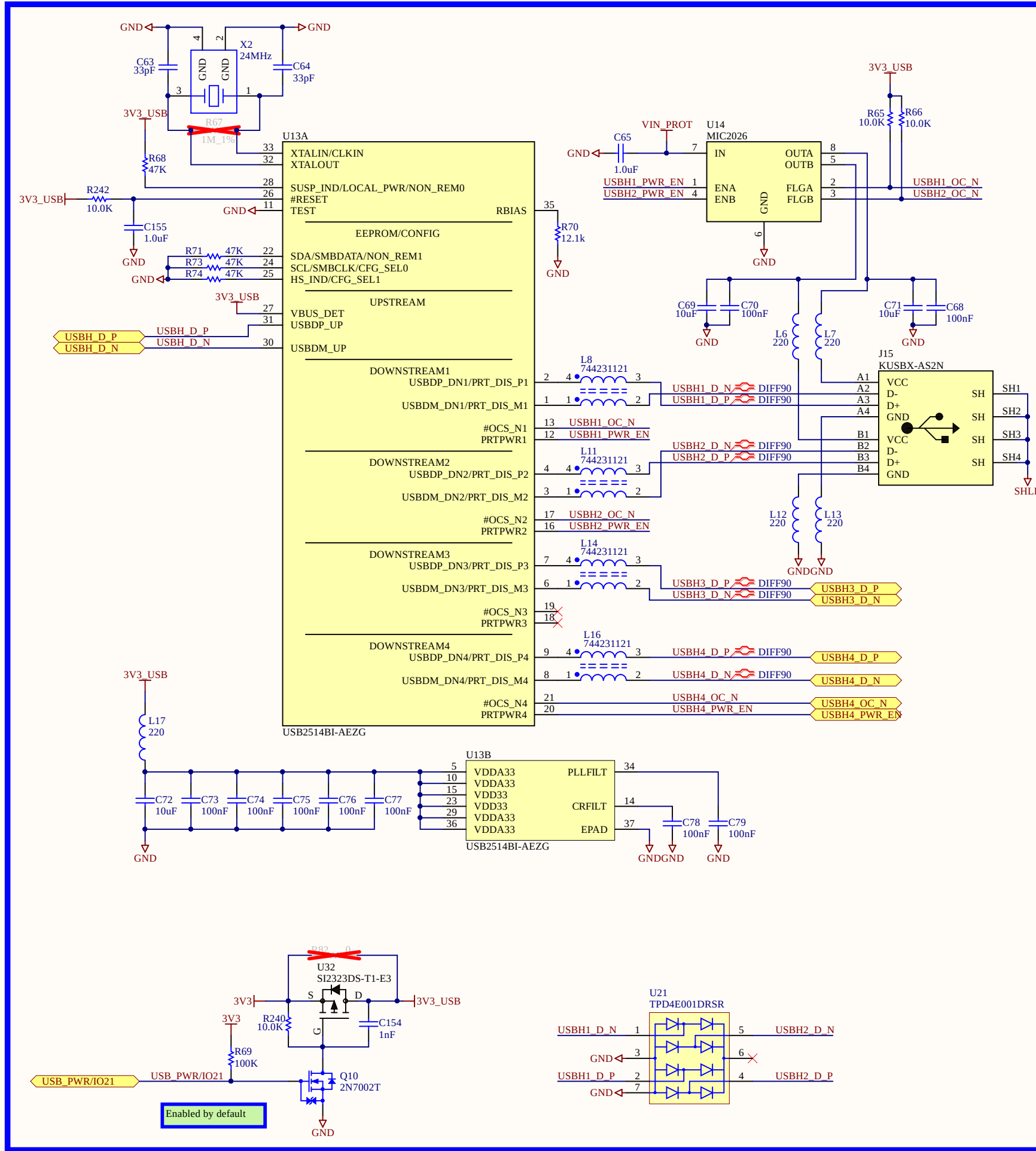
Description: ConnectCore 6UL SBC PRO



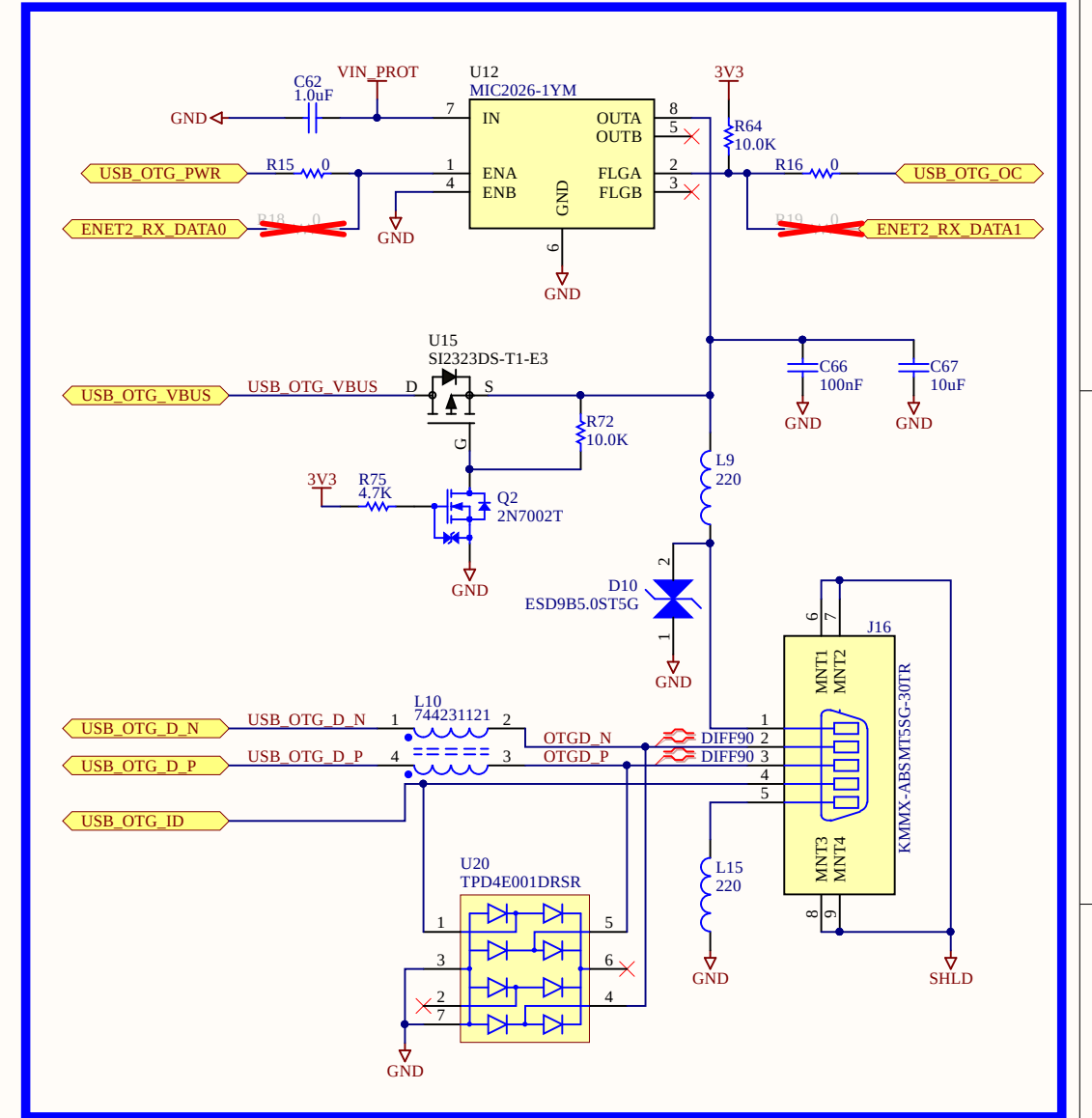
10/100M Ethernet



USB_HOST

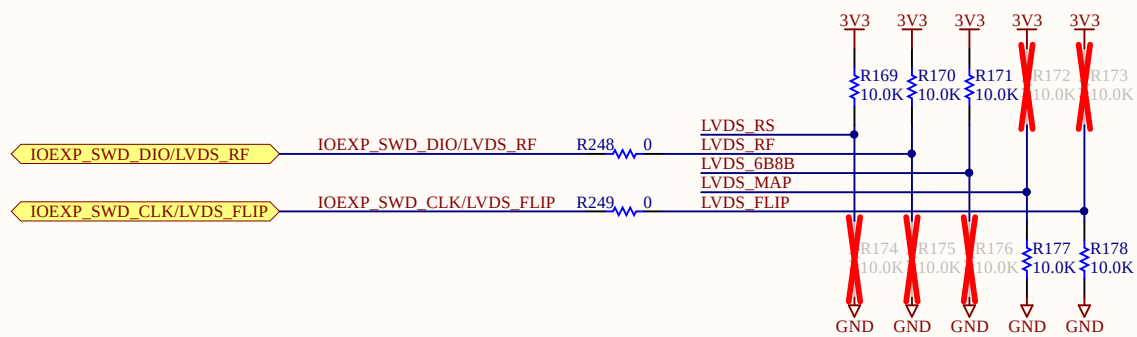
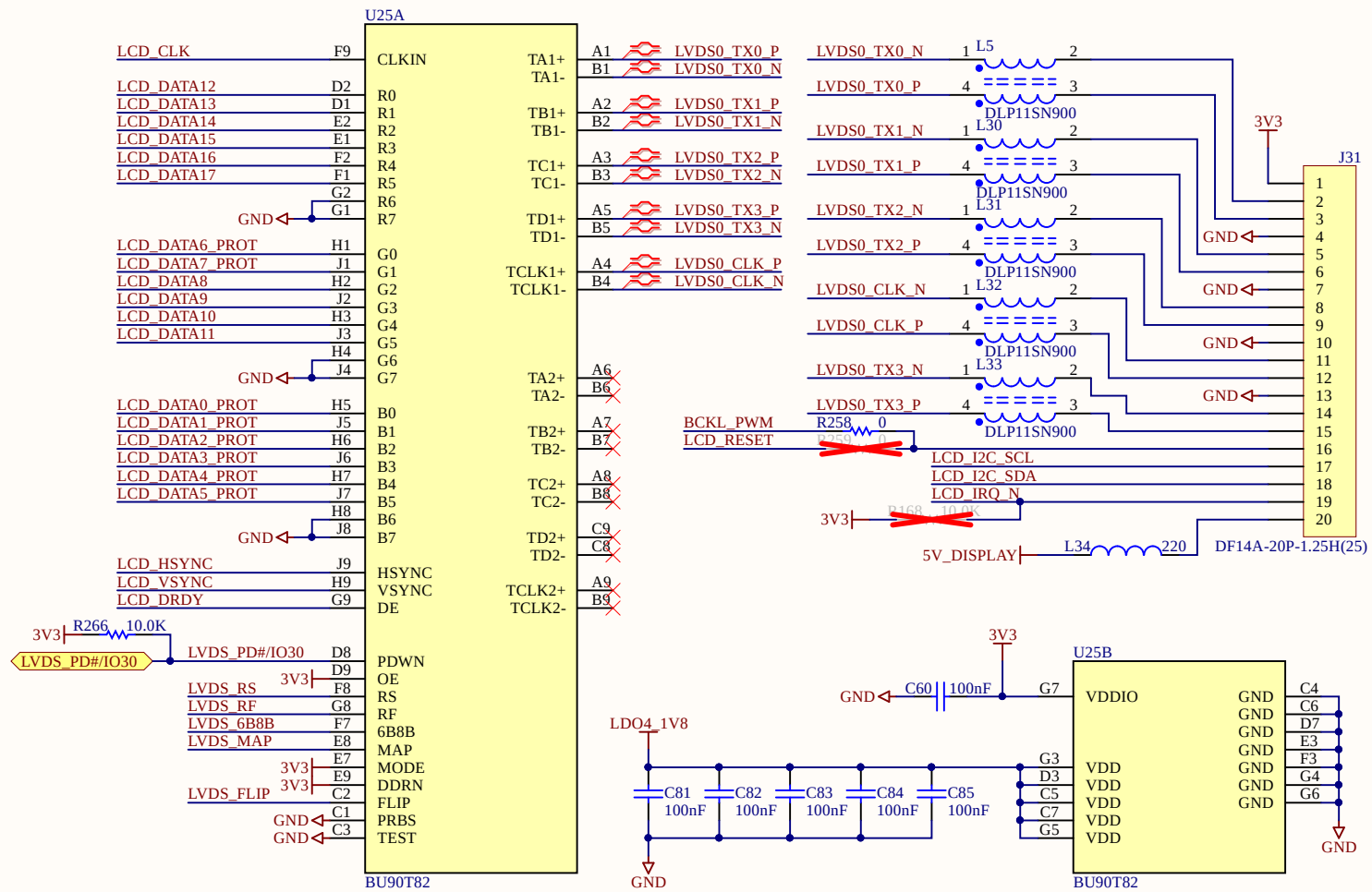


USB_OTG



Title: USB OTG, USB Hub, USB Host		
Designer: Sébastien MEYER	Sheet: 7 of 14	
Variant: 55001883-01		
Rev: D		
Description: ConnectCore 6UL SBC PRO		

LVDS



LVDS_RS: LVDS Swing Mode Select:

H: 350mV
L: 200mV

LVDS_RF: Input CLK Triggering Edge Select:

H: Rising Edge
L: Falling Edge

LVDS_6B8B: 6bit/8bit Mode Select:

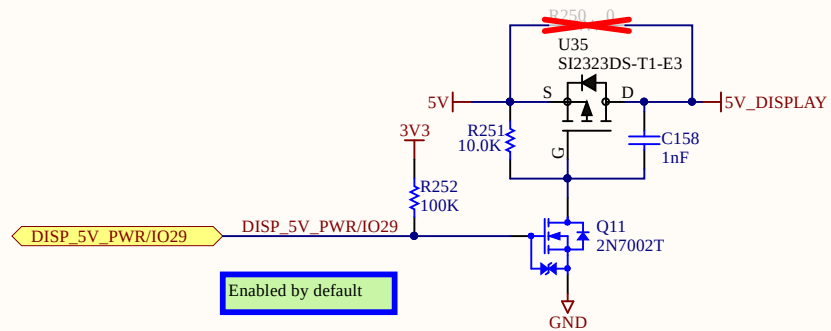
H: 6bit mode (TD1+/-, TD2+/- outputs are Hi-Z)
L: 8bit mode

LVDS_MAP: LVDS Output Data Mapping Select:

H: JEIDA
L: VESA

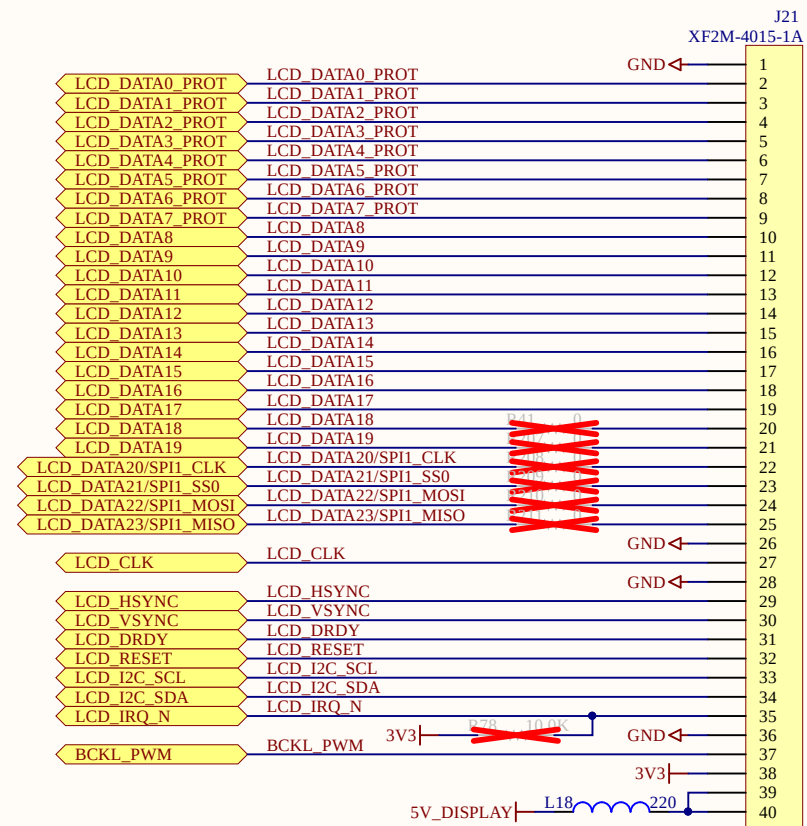
LVDS_FLIP: LVDS Output Pin Reverse Select:

H: Reverse
L: Normal



Enabled by default

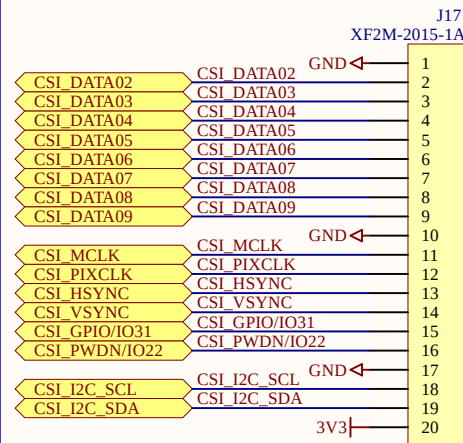
Parallel Display 0



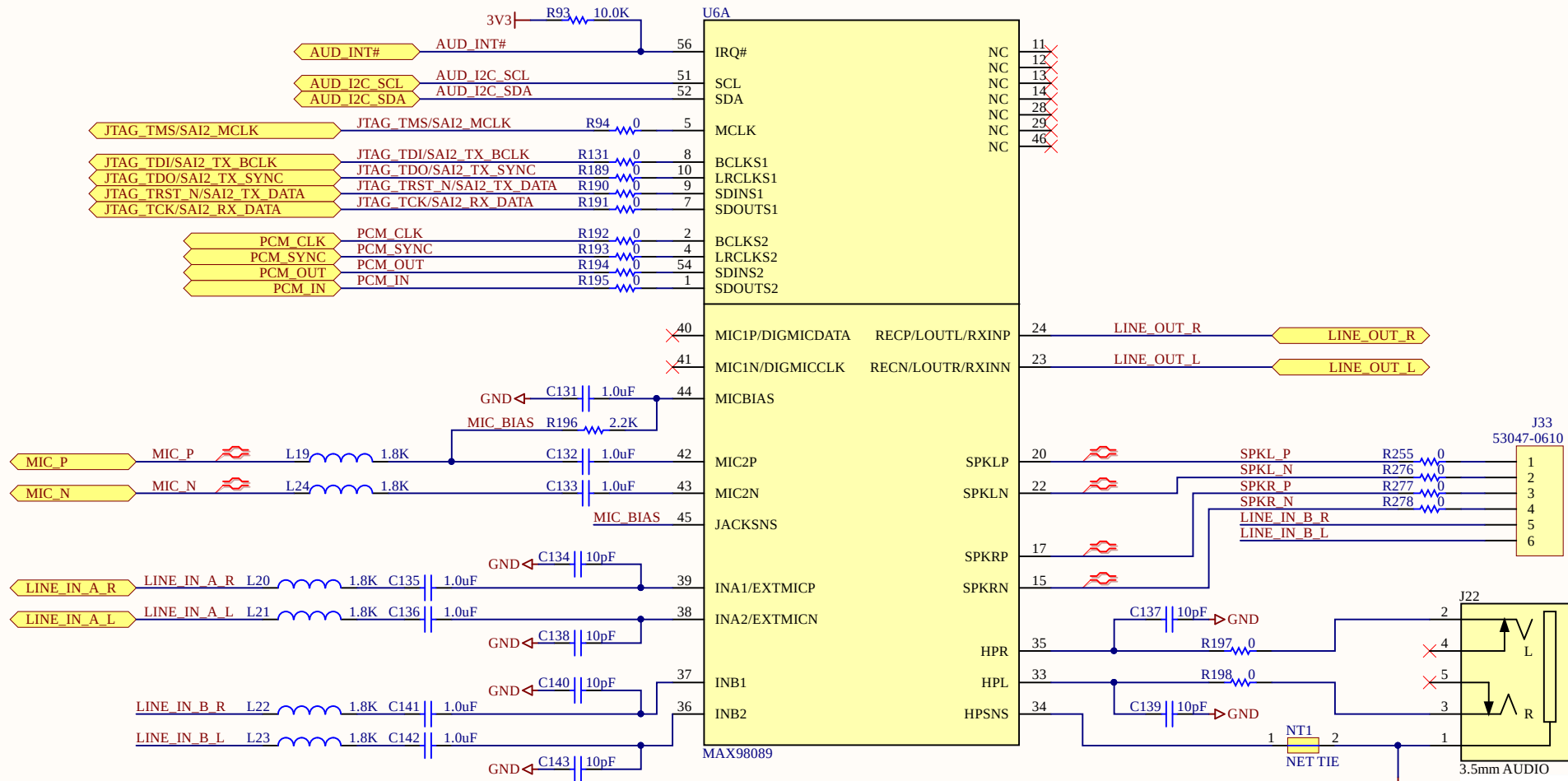
3V3 maximum current allowed on J21: 0.5A
5V maximum current allowed on J21: 1A

If higher currents are required on boards connected to J21, an external supply must be used to power them.

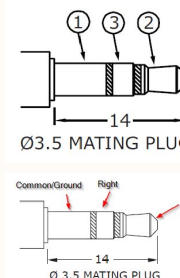
Parallel Camera



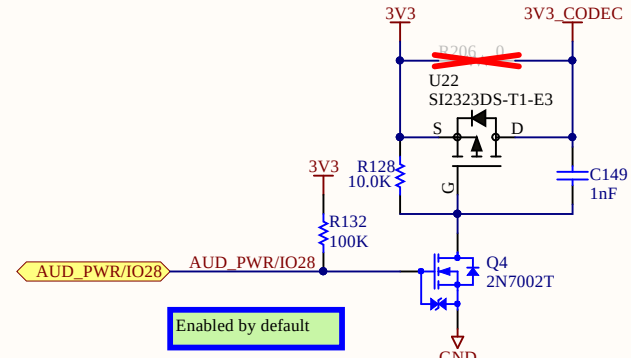
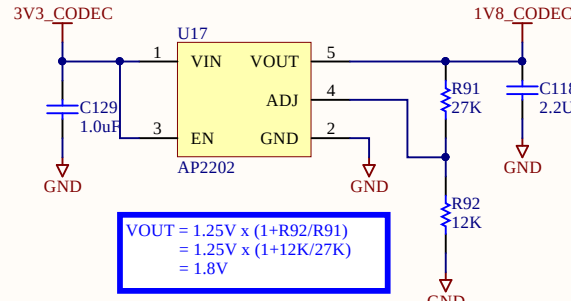
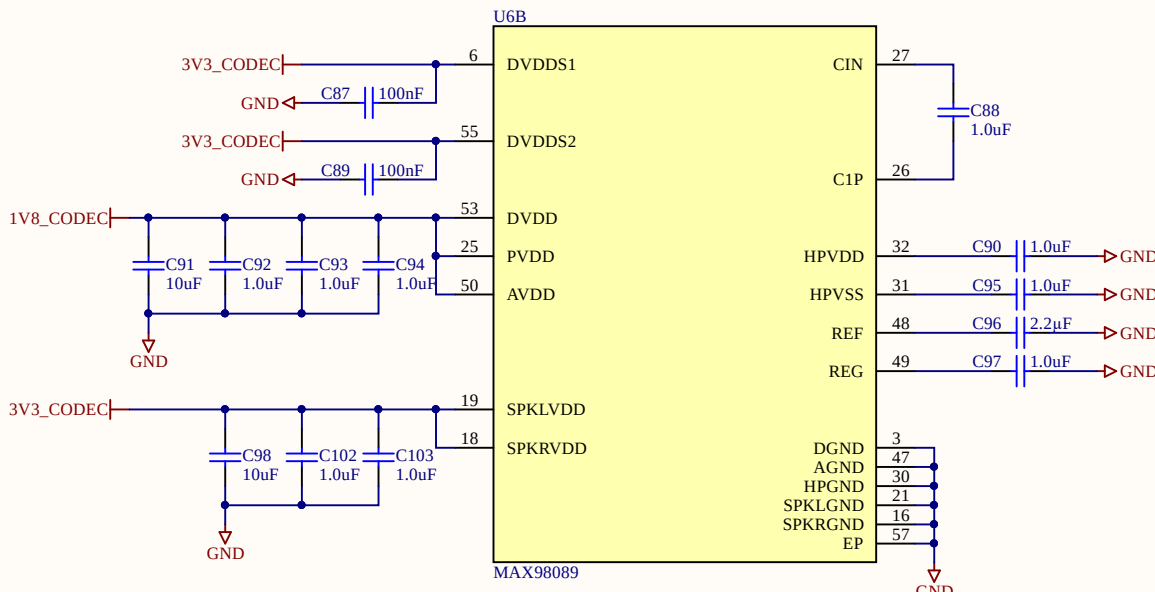
AUDIO



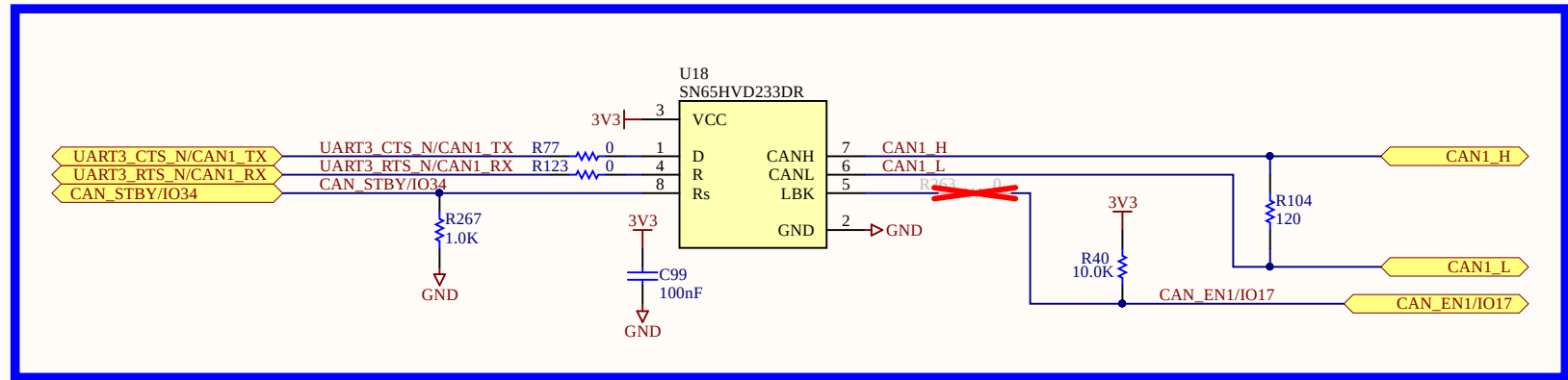
WARNING:
Right and left channels are inverted on J22.
J22.2 should be the left channel and J22.3 should be right channel



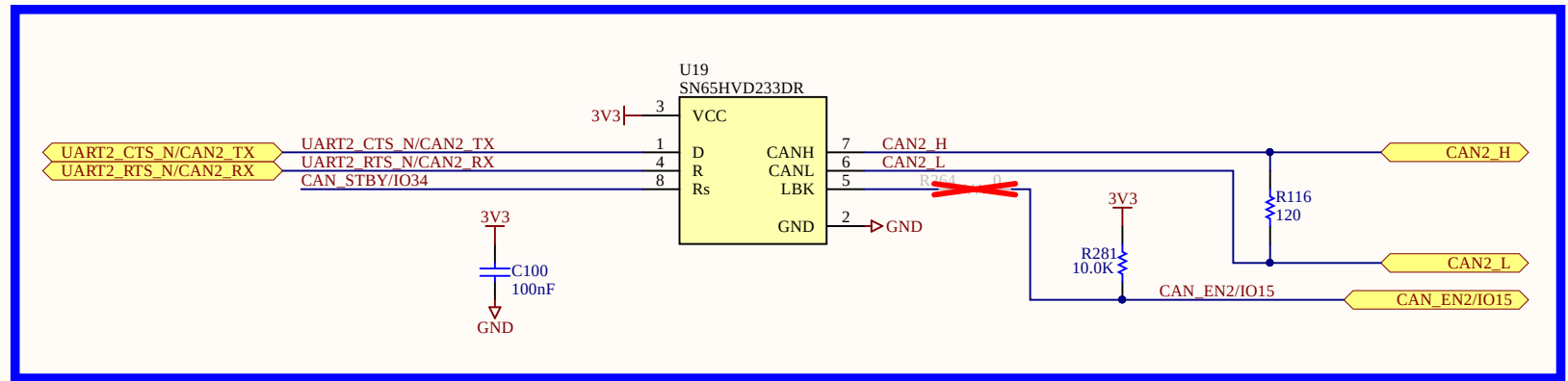
Model No.	SJ1-3515-SMT
Schematic	
PIN	
1	sleeve
2	tip
3	ring
10	tip switch
11	ring switch



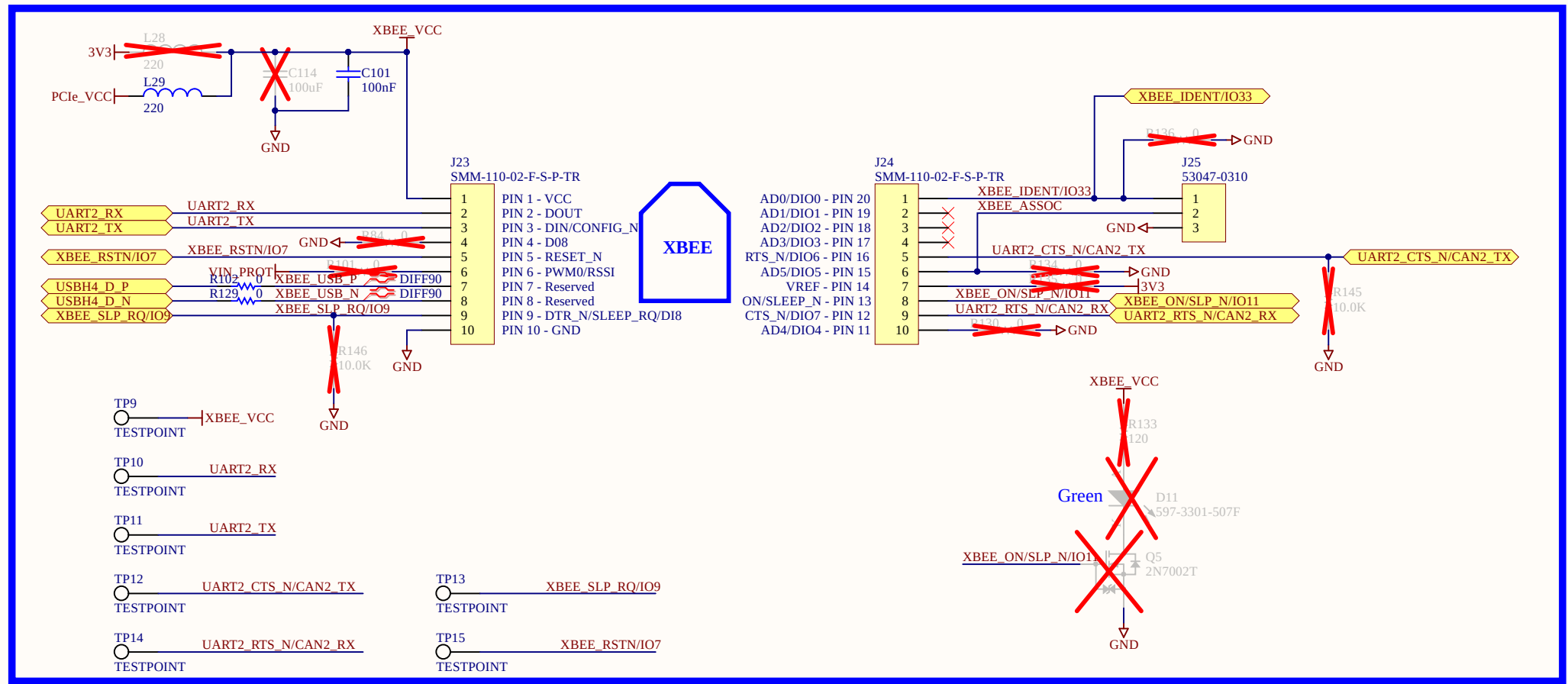
CAN1



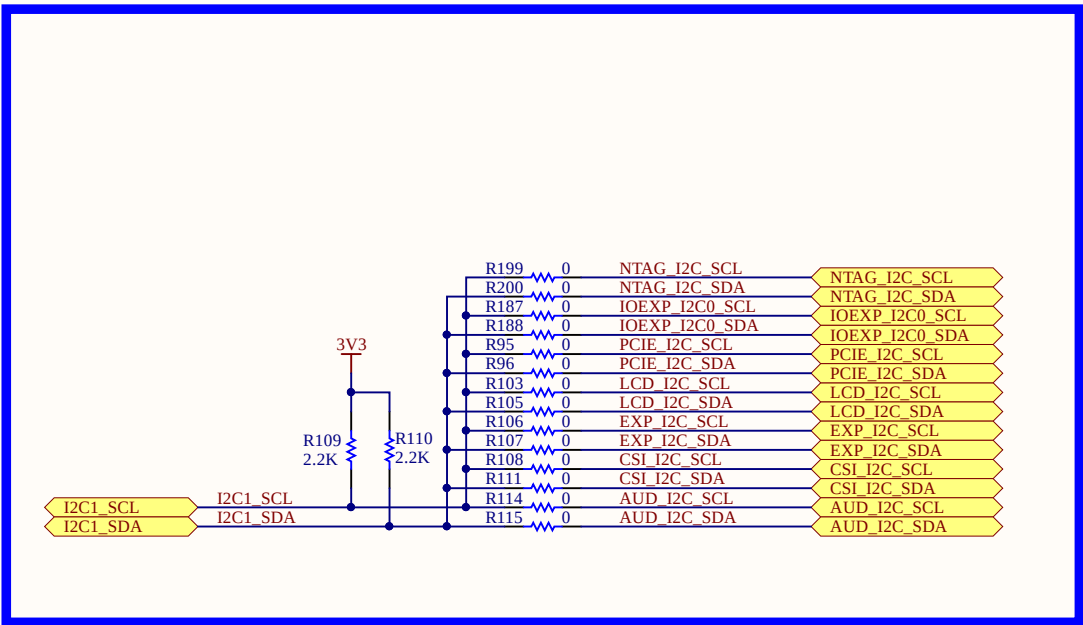
CAN2



XBee



I2C



I2C1 (3.3V)

Peripheral	Speed (kbps)	Addresses (hex)	Default Address (hex)
PCIe Port	TBD	TBD	TBD
LVDS0 Touch	TBD	TBD	TBD
LCD Touch	TBD	TBD	TBD
Expansion Port	TBD	TBD	TBD
Camera	TBD	TBD	TBD
Audio CODEC	400	Write : 0x20 Read : 0x21	Write : 0x20 Read : 0x21
IOEXP	TBD	TBD	TBD
NTAG	TBD	Write : 0xAA Read : 0xAB	Write : 0xAA Read : 0xAB

Title: CAN, I2C, XBee

Designer: Sébastien MEYER Sheet: 10 of 14

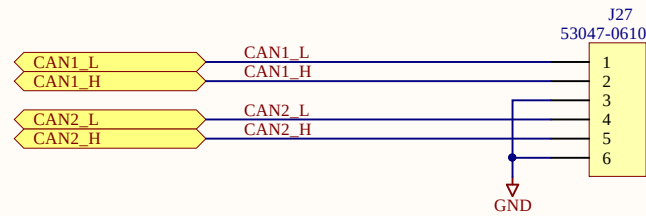
Variant: 55001883-01

Rev: D

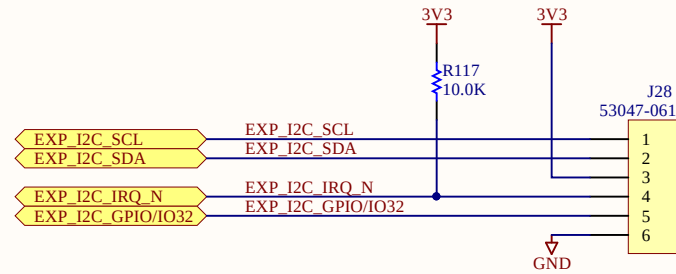
Description: ConnectCore 6UL SBC PRO



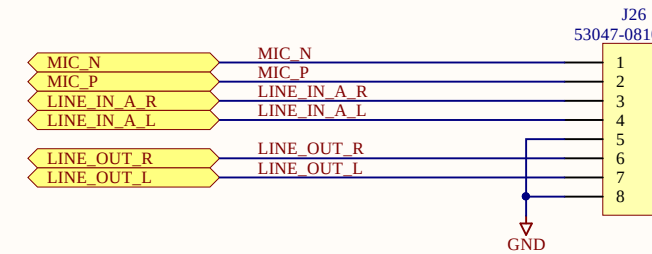
CAN



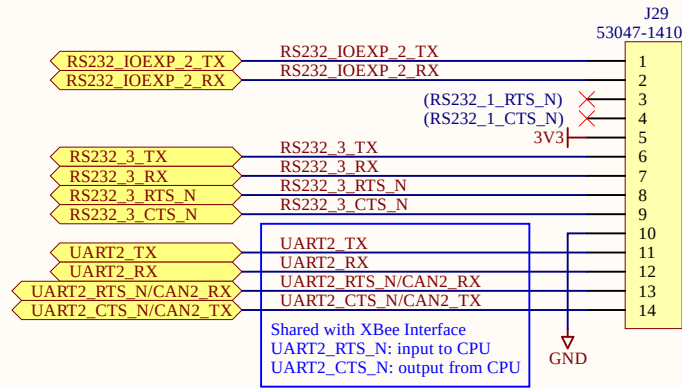
I2C



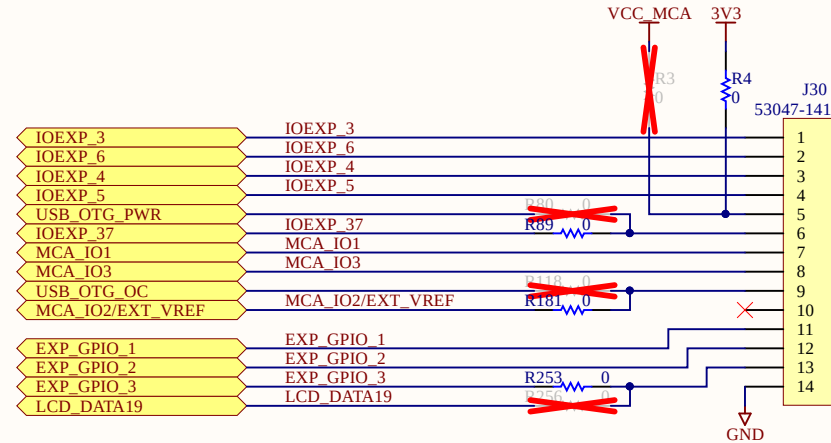
AUDIO



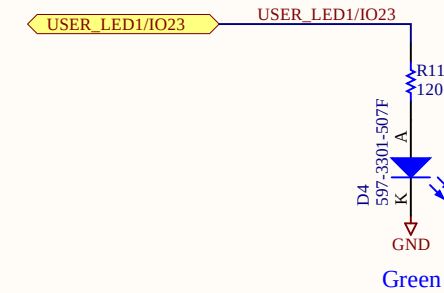
UART



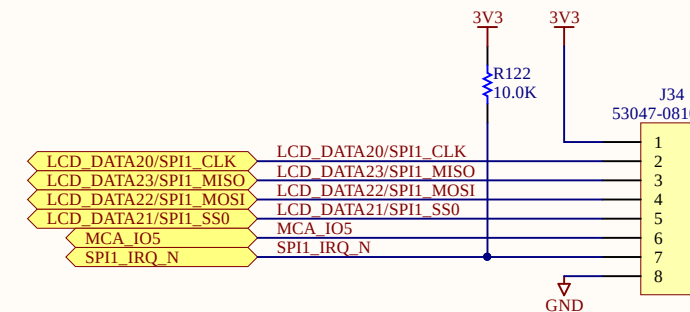
GPIO



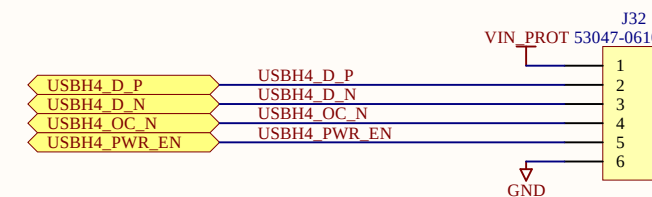
USER LED



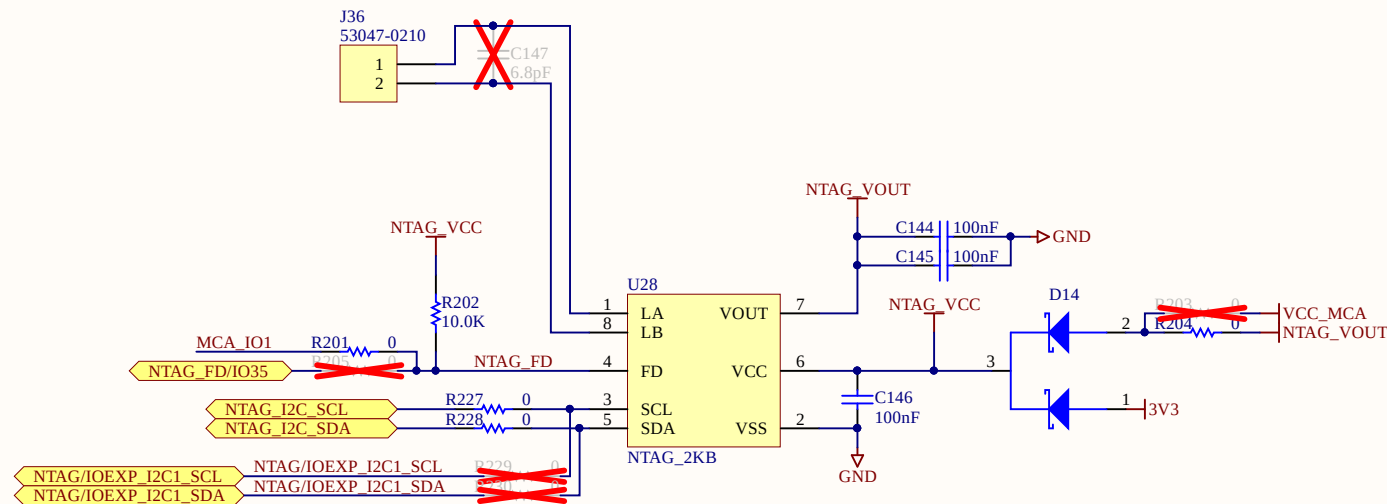
SPI



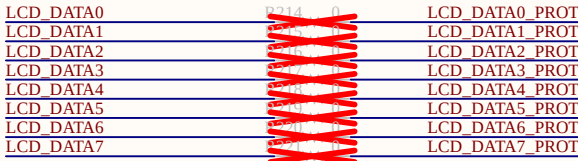
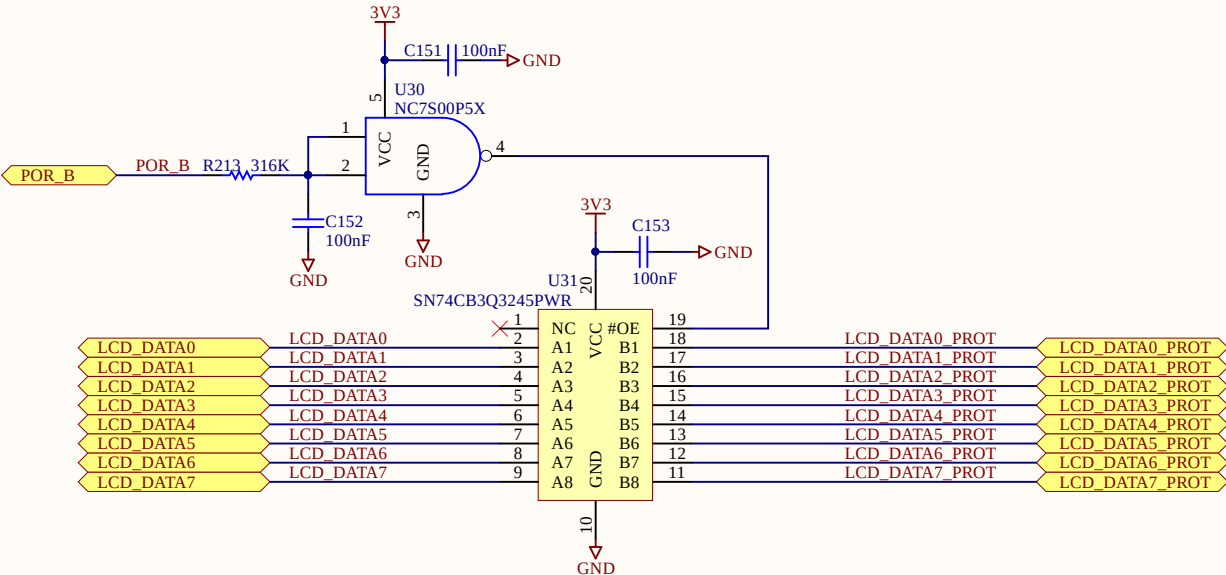
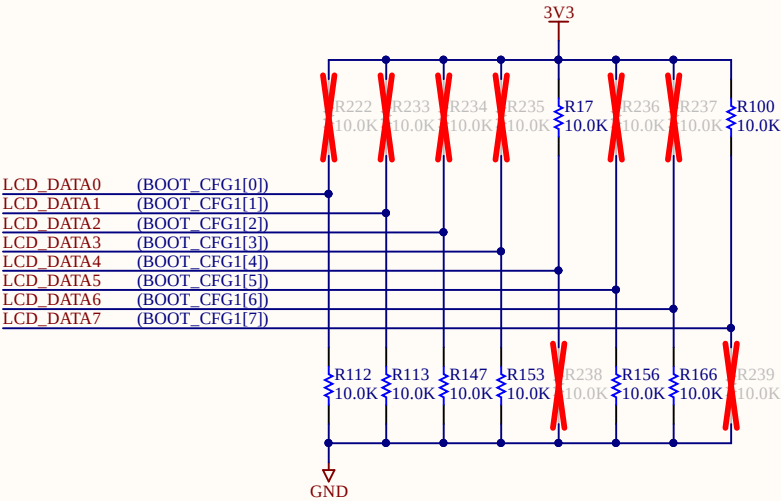
USB



NFC NTAG I2C



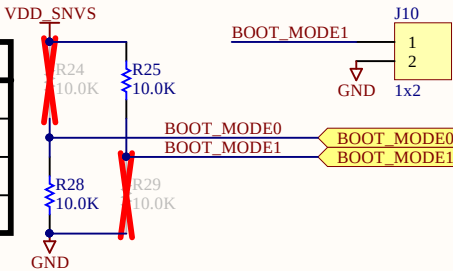
Bootstrap



BOOTSTRAP	NAND
BOOT_CFG1[0]	Row Address Cycles: 00 - 3 cycles 01 - 2 cycles 10 - 4 cycles 11 - 5 cycles
BOOT_CFG1[1]	
BOOT_CFG1[2]	Number of devices: 00 - 1 device 01 - 2 devices 10 - 4 devices 11 - Reserved
BOOT_CFG1[3]	
BOOT_CFG1[4]	Pages in Block: 00 - 128 pages 01 - 64 pages 10 - 32 pages 11 - 256 pages
BOOT_CFG1[5]	
BOOT_CFG1[6]	Samsung's toggle mode DDR NAND 0 - Raw NAND 1 - Toggle mode NAND
BOOT_CFG1[7]	Boot Device Selection: 1 - Boot from NAND interface

Boot Mode

BOOT_MODE1	BOOT_MODE0	Description
0	0	Boot from Fuses
0	1	Serial Downloader
1	0	Boot from board settings
1	1	Reserved



System Power Rails

Voltage (V)	Supply Name	Block	Generated by	Current Capability (mA)	Notes
5.0	VIN	Overvoltage Prot	External DC supply	-	
		MCA LDO			
	VIN_PROT	ConnectCore 6UL	Overvoltage Prot	-	
		5V load switch			
		USB Host VBUS			
		USB OTG VBUS			
	5V	LVDS0	Load switch (U7)	-	
		Parallel LCD			
		CC6UL VBUS			
3.3	3V3	eMMC	PMIC SW2	1250	
		microSD			
		UART RS-232			
		I/O EXPANDER			
		2x10/100M ENET			
		USB Hub			
		LVDS			
		Parallel LCD			
		Parallel Camera			
		AUDIO			
		CAN1/2			
		XBee			
		NTAG			
	PCIe_VCC	PCIe minicard	VIN_PROT	3000	
	VCC_MCA	MCA	AP2202	150	
3.0	VCC_LICELL	RTC	External Coin Cell	-	
	VDD_SNVS	BOOT	PMIC VSNVS	-	
1.8	LDO4_1V8	LVDS	PMIC LDO4	350	
	1V8_CODEC	AUDIO	AP2202	150	

GPIO Table

Signal Name	GPIO	Use
i.MX6UL processor		
GPIO1_5	GPIO1_5	EXP_GPIO_1
GPIO1_8	GPIO1_8	ENET1_INT#
GPIO1_9	GPIO1_9	ENET2_INT#
GPIO5_01	GPIO5_01	eMMC/SD#
GPIO5_02	GPIO5_02	LCD_IRQ_N
GPIO5_03	GPIO5_03	IOEXP_INT_iMX#
GPIO5_05	GPIO5_05	EXP_I2C_IRQ_N
GPIO5_06	GPIO5_06	ETH2_RST
GPIO5_07	GPIO5_07	AUD_INT#
GPIO5_08	GPIO5_08	SPI1_IRQ_N
MCA (KL03)		
SWD_CLK	PTA0	PWR_IO
MCA_IO0	PTB0/LLWU_P4	KL4_INT_MCA#
MCA_IO4	PTA9	BT_WAKEUP_HOST

	1	2	3	4	5	6	7	8												
A	Format: DD/MM/YYYY 12/02/2016 - ConnectCore i.MX6UL Single Board Computer * Initial version 19/09/2016 - ConnectCore i.MX6UL Single Board Computer * NPR004795 : 55001883-01 rev 03: - PCB spin: 3001517x-01 revA => 3001517x-02 revA 08/11/2016 - ConnectCore i.MX6UL Single Board Computer * NPR004832 : 55001883-01 rev 1P: - Change R212 to 2.2M - Populate R140 - Change R257 to 37K - Depopulate BT and WLAN LEDs - Marked CC6UL pad B7 as Reserved. This signal is used on the module. 21/02/2017 - ConnectCore i.MX6UL Single Board Computer * ECO007182 : 55001883-01 rev 2P: - Renamed signal CSI0_RSTN/IO22 in CSI0_PWDN/IO22 - Depopulate R121 (JIRA: CC6UL-541) - Renamed signal MCA_IO2 in MCA_IO2/EXT_VREF - Replace U11 P/N from 50001916-01 to 50001939-01 - Replace R24,R25, R28 and R29 resistors values from 1K to 10K (JIRA CC6UL-624) 05/05/2017 - ConnectCore 6UL SBC PRO * ECO007036 : 55001883-01 rev A: - Renamed nets CSI0_x into CSI_x - Renamed signal DISP0_x into LCD_x - Depopulate U10, C150, R260 and R231 - Renamed signal IOEXP_IO37 into IOEXP_37 - Depopulate R78 and R168 (fixing JIRA DEL-4191) 14/08/2017 - ConnectCore 6UL SBC PRO * ECO007701 : 55001883-01 rev B - Release to revB without changes. 28/09/2017 - ConnectCore 6UL SBC PRO * ECO-008055: 55001883-01 rev C: - Fixing JIRA CC6UL-869 - Depopulate SNVS circuitry on the module. - Connecting USB to XBee socket for supporting XBee Cellular: - Populate R102. - Populate R129. - Remove L28. - Populate L29. 22/03/2018 - ConnectCore 6UL SBC PRO * NPRO-005135: 55001883-02 rev A: - Creation of variant 55001883-02. 13/08/2018 - ConnectCore 6UL SBC PRO * ECO-009009: CC6UL Uboot MFG Test Correction: - Module has to be moved to the next revision and the SBC follows as where-used.								A											
B									B											
C	LBL1 LABEL 28000351_LABEL H1 H2 H3 H4 125mil 125mil 125mil 125mil TXT1 LABEL TEXT 95017001								C											
D									D											
							<table><tr><td colspan="2">Title: History</td><td rowspan="4"></td></tr><tr><td colspan="2">Designer: Sébastien MEYER</td><td>Sheet: 14 of 14</td></tr><tr><td colspan="2">Variant: 55001883-01</td><td>Rev: D</td></tr><tr><td colspan="3">Description: ConnectCore 6UL SBC PRO</td></tr></table>		Title: History			Designer: Sébastien MEYER		Sheet: 14 of 14	Variant: 55001883-01		Rev: D	Description: ConnectCore 6UL SBC PRO		
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