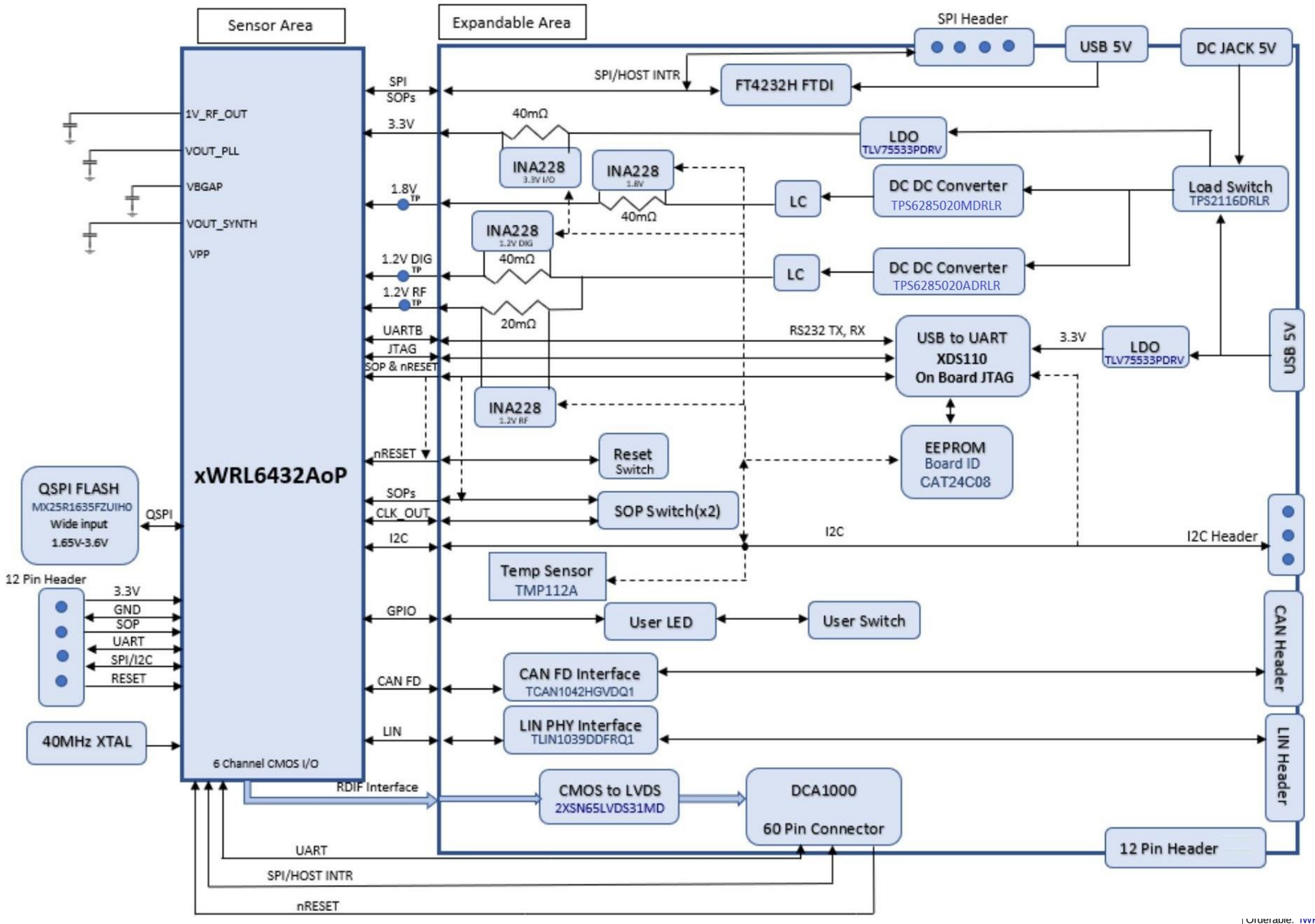
BLOCK DIAGRAM

Revision History				
Rev	ECN #	Approved Date	Approved by	Notes
B	1	22/11/23	Ankit / Chethan	1. DNP R242 to disconnect USER_LED_SW_GPIO0 signal to FTDI chip. 2. PMIC_CLKOUT_SOP1 signal to pin 4 of male headers on sensor area and pin 3 of female connector on expandable area. 3. TP13 added for SOP1 at sensor area.
B	2	01/12/23	Ankit / Chethan	1. SW2 Added for optional 5V power for sensor board 2. SW3 added for SOP0 selection



S.No	DESCRIPTION	I2C ADDRESS
1	CURRENT SENSOR 3.3V	100 0101
2	CURRENT SENSOR 1.8V	100 0000
3	CURRENT SENSOR 1.2V	100 0001
4	CURRENT SENSOR RF_1.2V	100 0100
5	TEMPERATURE SENSOR	100 1011
6	EEPROM	1010 0XX

Orderable: TWRL6432AOPEVM	Designed for: Public Release	Mod. Date: 1/3/2024
TID #: N/A	Project Title: xWRL6432AOP	
Number: PROC177 Rev: B	Sheet Title: BLOCK DIAGRAM	
SVN Rev: Unknown revision	Assembly Variant: 001_IWR	Sheet: 1 of 17
Drawn By: Mistral	File: PROC177B_Block_Diagram.SchDoc	Size: B
Engineer: Mistral	Contact: http://www.ti.com/support	

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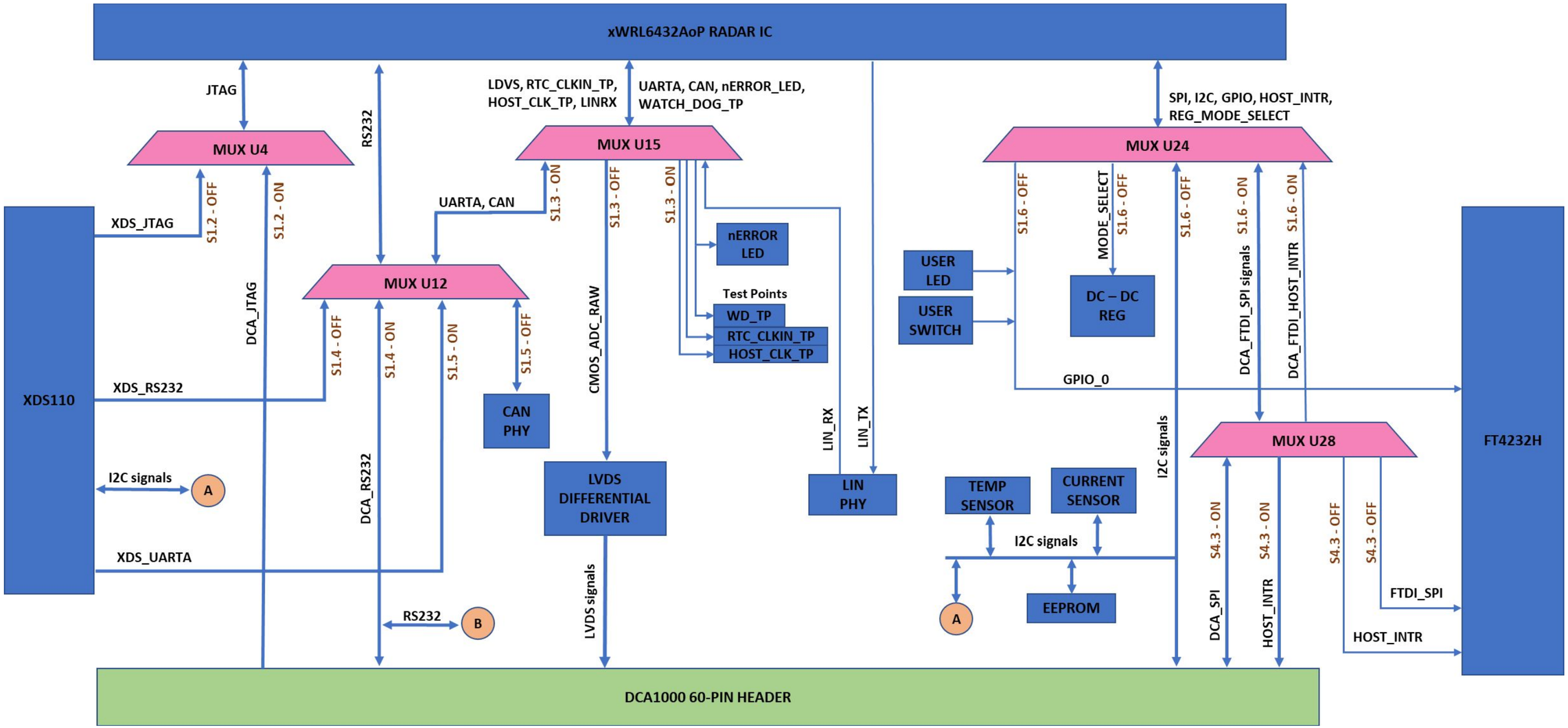
MUX BLOCK DIAGRAM



Orderable: IWRL6432AOPEVM	Designed for: Public Release	Mod. Date: 1/3/2024
TID #: N/A	Project Title: xWRL6432AOP	
Number: PROC177 Rev: B	Sheet Title: MUX BLOCK DIAGRAM	
SVN Rev: Unknown revision	Assembly Variant: 001_IWR	Sheet: 2 of 17
Drawn By: Mistral	File: PROC177B_MUX_Block_Diagram.SchDoc	Size: B
Engineer: Mistral	Contact: http://www.ti.com/support	

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Orderable: IWRL6432AOPEVM		Designed for: Public Release	Mod. Date: 1/3/2024
TID #: N/A		Project Title: xWRL6432AOP	
Number: PROC177	Rev: B	Sheet Title: TABLE OF CONTENTS	
SVN Rev: Unknown revision		Assembly Variant: 001_IWR	Sheet: 3 of 17
Drawn By: Mistral		File: PROC177B_Table_Of_Contents.SchDoc	Size: B
Engineer: Mistral		Contact: http://www.ti.com/support	

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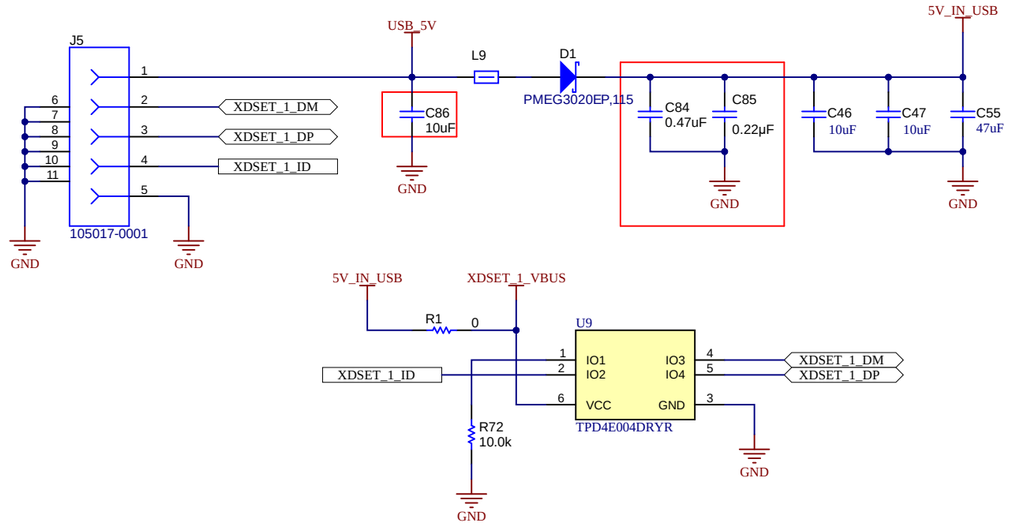
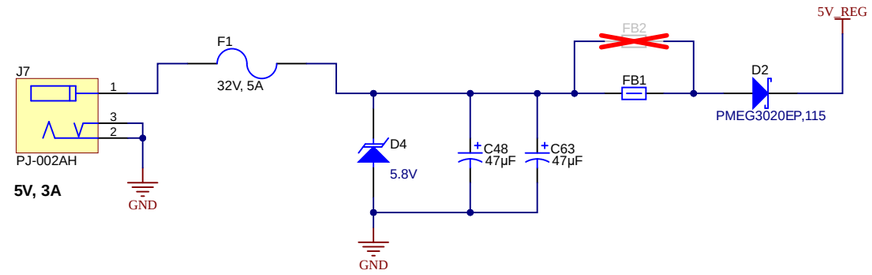
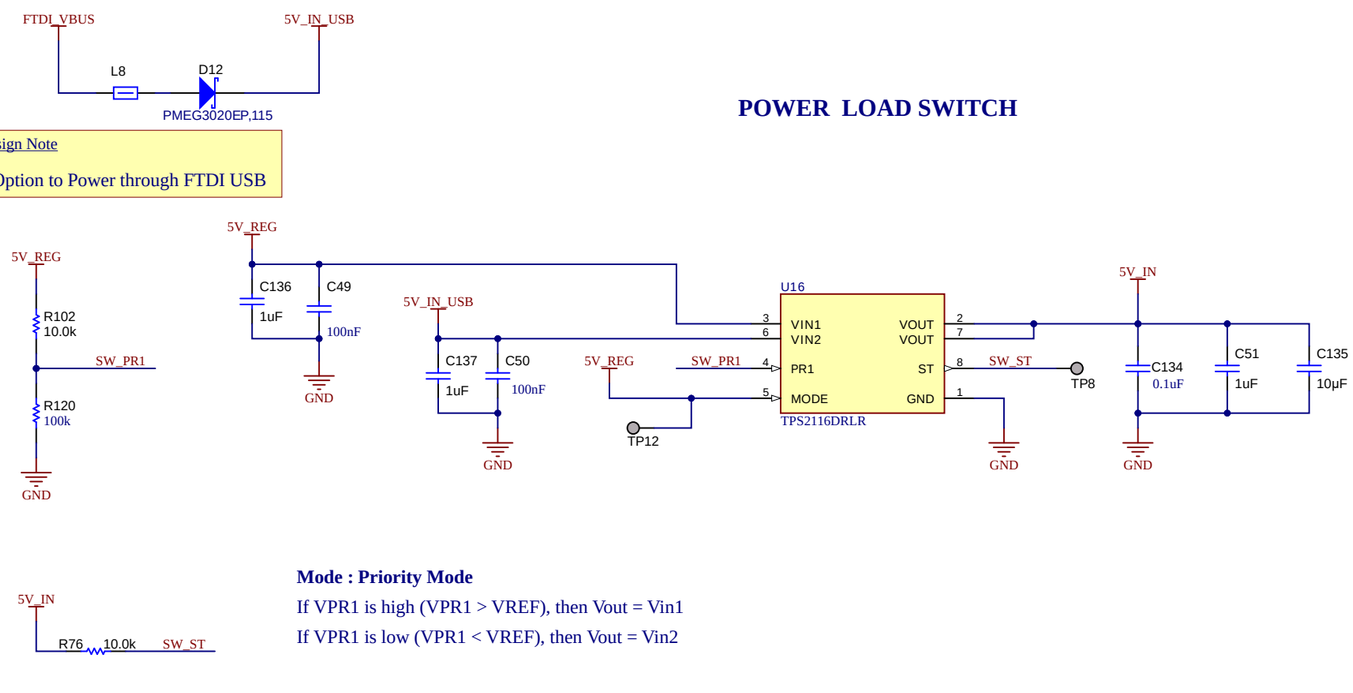
USB CONNECTOR



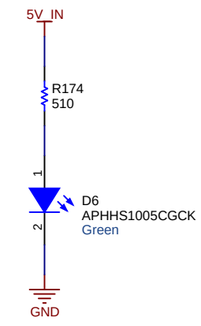
DC JACK



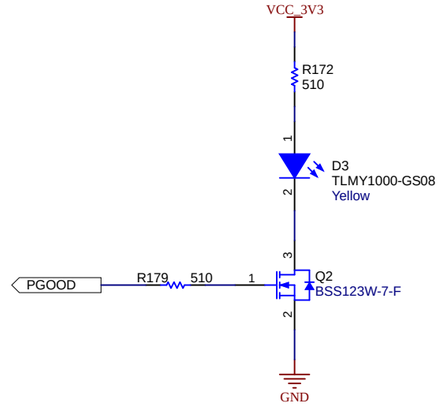
POWER LOAD SWITCH



5V LED INDICATION



PGOOD LED



Orderable: IWRL6432AOPEVM	Designed for: Public Release	Mod. Date: 1/3/2024
TID #: N/A	Project Title: xWRL6432AOP	
Number: PROC177 Rev: B	Sheet Title: USB_PWR_DC_JACK_SWITCH	
SVN Rev: Unknown revision	Assembly Variant: 001_IWR	Sheet: 4 of 17
Drawn By: Mistral	File: PROC177B_USB_PWR_DC_Jack_Switch.SchDoc	Size: B
Engineer: Mistral	Contact: http://www.ti.com/support	

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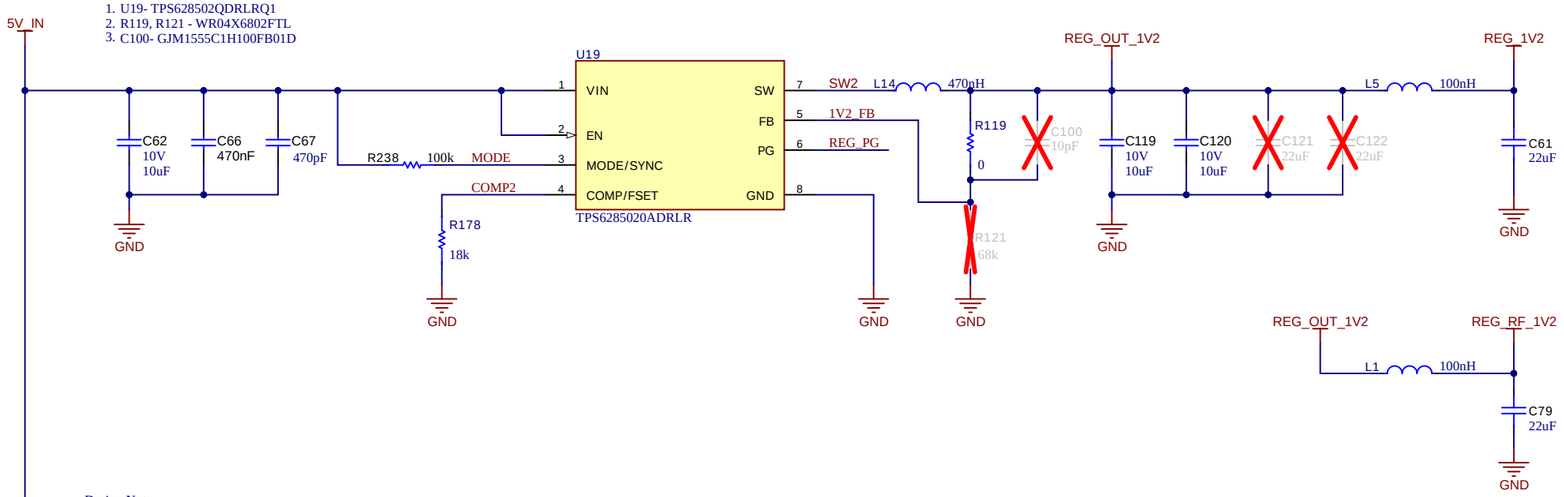
DC-DC REGULATOR - 1.2V

Design Note
For Adjustale Regulator Mount

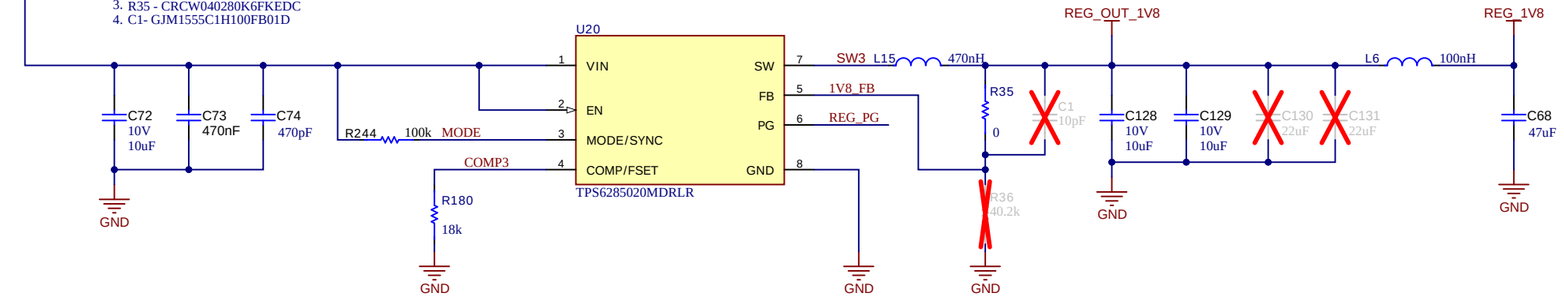
1. U19- TPS628502QDRLRQ1
2. R119, R121 - WR04X6802FTL
3. C100- GJM1555C1H100FB01D



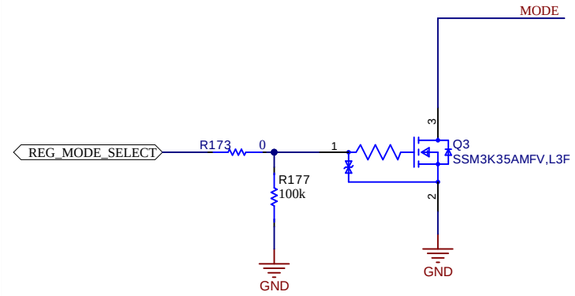
DC-DC REGULATOR - 1.8V

Design Note
For Adjustale Regulator Mount

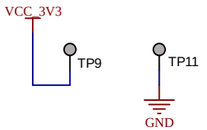
1. U20- TPS628502QDRLRQ1
2. R36 - CRCW040240K2FKEDC
3. R35 - CRCW040280K6FKEDC
4. C1- GJM1555C1H100FB01D



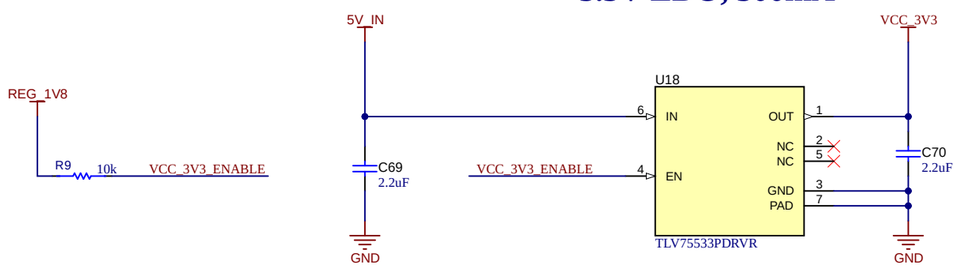
MODE CONTROL



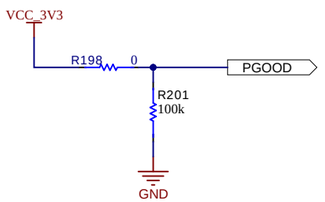
TEST POINTS



3.3V LDO, 500mA



Design note:- 3.3V LDO enable with 1.8V



The VCC_3V3 Output from LDO is used as PGOOD

Orderable: IWRL6432AOPEVM		Designed for: Public Release	Mod. Date: 1/3/2024
TID #: N/A		Project Title: xWRL6432AOP	
Number: PROC177	Rev: B	Sheet Title: DC_REGULATORS & LDO	
SVN Rev: Unknown revision		Assembly Variant: 001_IWR	Sheet: 5 of 17
Drawn By: Mistral		File: PROC177B_DC_Regulators.SchDoc	Size: B
Engineer: Mistral		Contact: http://www.ti.com/support	

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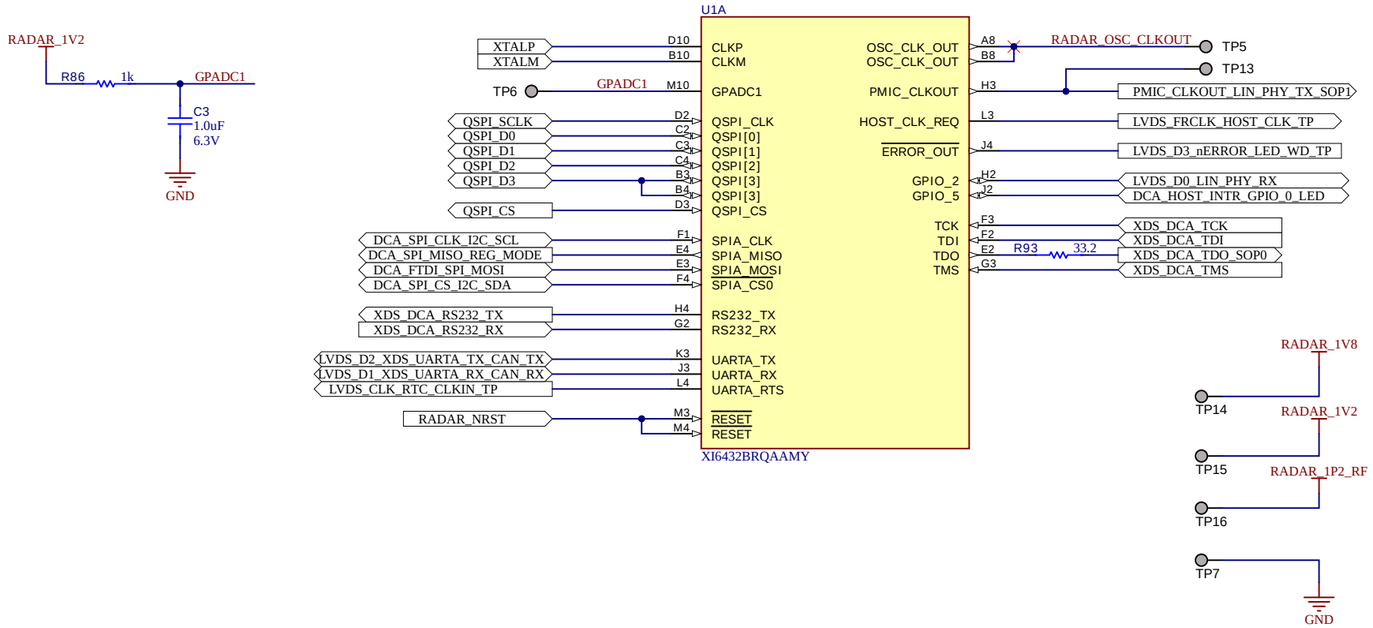
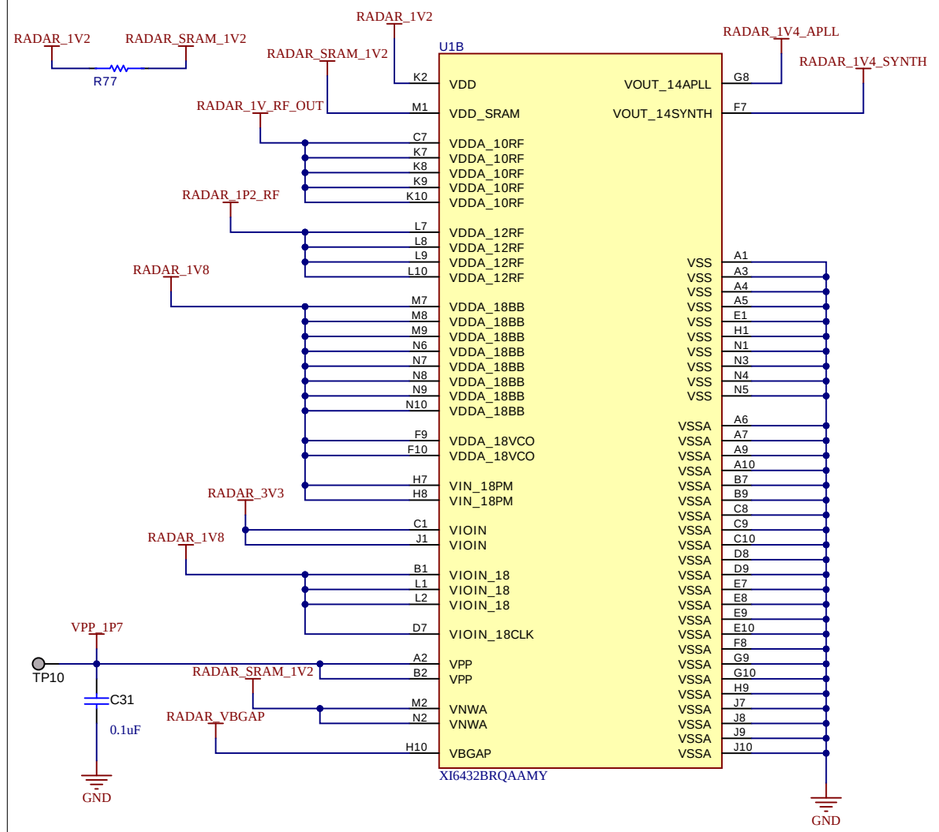
xWRL6432AOP CHIP (SENSOR BOARD)

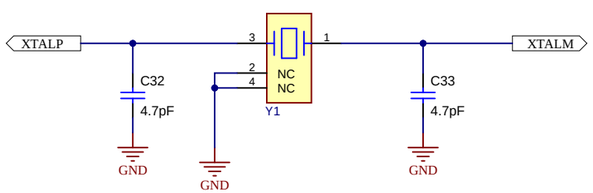
xWRL6432AOP CHIP - INTERFACE



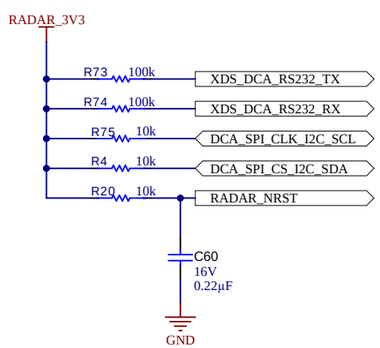
xWRL6432AOP CHIP - POWER



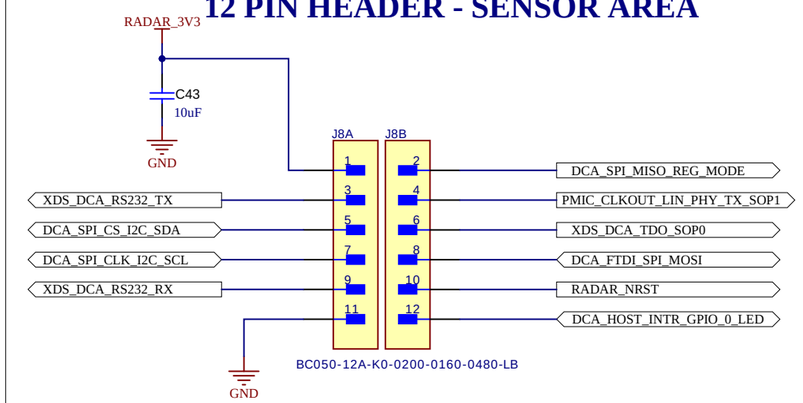
40 MHz CRYSTAL OSCILLATOR



Alternate Crystal part number :
XRCGE40M000FBAABR0(Murata)
CX2016SA40000D0PTWC1



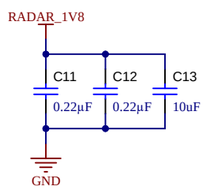
12 PIN HEADER - SENSOR AREA



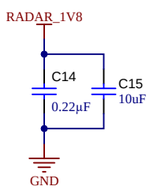
Orderable: IWRL6432AOPEVM		Designed for: Public Release	Mod. Date: 1/17/2024
TID #: N/A		Project Title: xWRL6432AOP	
Number: PROC177	Rev: B	Sheet Title: xWRL6432AOP_CHIP	
SVN Rev: Unknown revision		Assembly Variant: 001_IWR	Sheet: 6 of 17
Drawn By: Mistral		File: PROC177B_xWRL6432AoP_Chip.SchDoc	Size: B
Engineer: Mistral		Contact: http://www.ti.com/support	

xWRL6432AOP CHIP SUPPLY_DECOUPLING_CAPS (SENSOR BOARD)

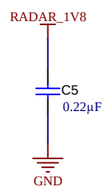
BB SUPPLY



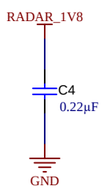
VCLK SUPPLY



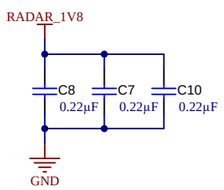
VCO_LDO SUPPLY



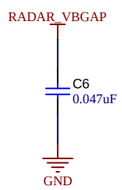
PM SUPPLY



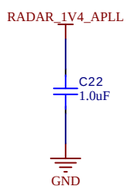
1P8V IO SUPPLY



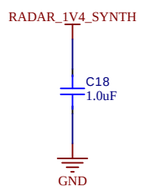
VBGAP SUPPLY



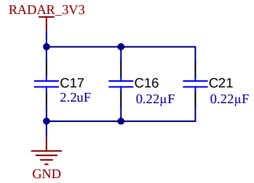
VOUT_PLL SUPPLY



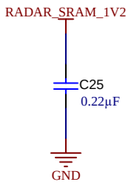
VOUT_SYNTH SUPPLY



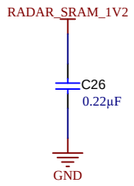
3V3_IO SUPPLY



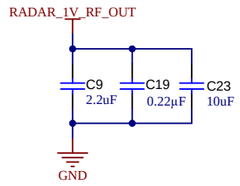
VNWA SUPPLY



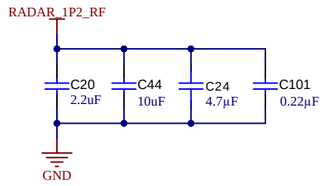
SRAM SUPPLY



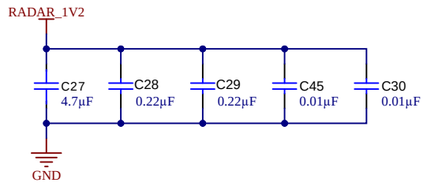
1V_RF_OUT SUPPLY



1V2_RF SUPPLY



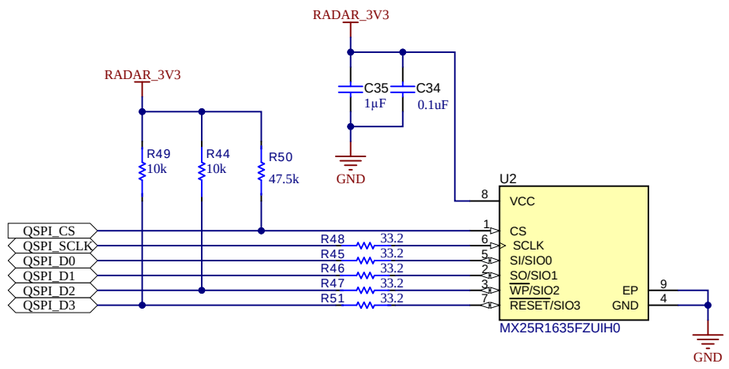
1V2 DIG SUPPLY



Design Note

Decoupling Capacitors followed as per xWRL6432 FCCSP EVM

QSPI FLASH (SENSOR BOARD)



Orderable: IWRL6432AOPEVM	Designed for: Public Release	Mod. Date: 1/3/2024
TID #: N/A	Project Title: xWRL6432AOP	
Number: PROC177 Rev: B	Sheet Title: DECOUPLING_CAPS_QSPI FLASH	
SVN Rev: Unknown revision	Assembly Variant: 001_IWR	Sheet: 7 of 17
Drawn By: Mistral	File: PROC177B_Decoupling_caps_QSPI_Flash_SB.SchDoc	Size: B
Engineer: Mistral	Contact: http://www.ti.com/support	

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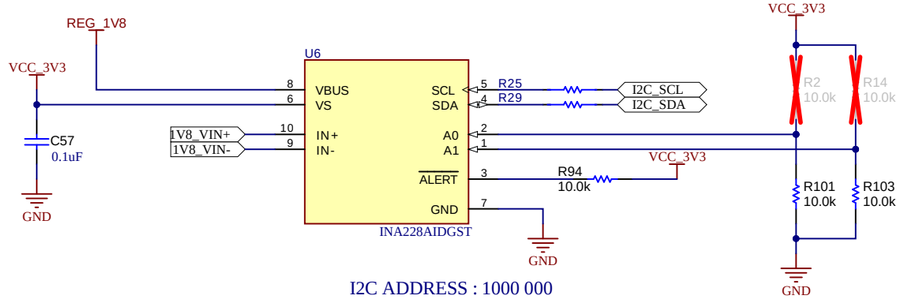
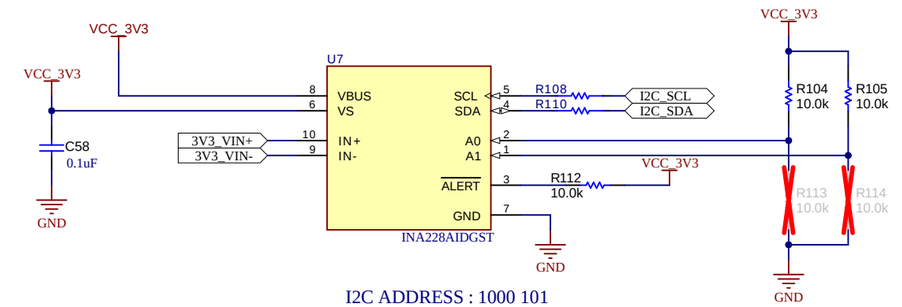
CURRENT SENSOR- 1V8



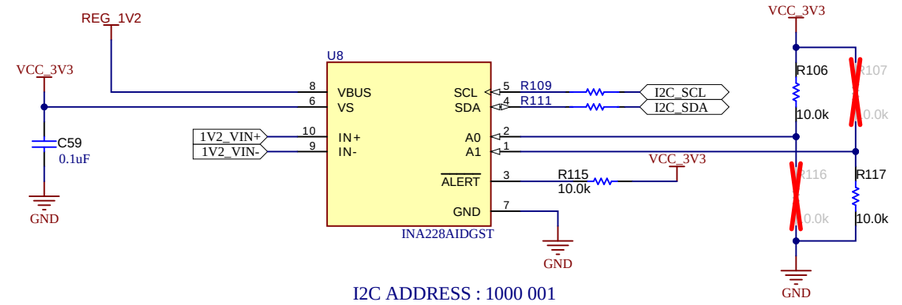
I2C ADDRESS : 1000 000

CURRENT SENSOR- 3V3



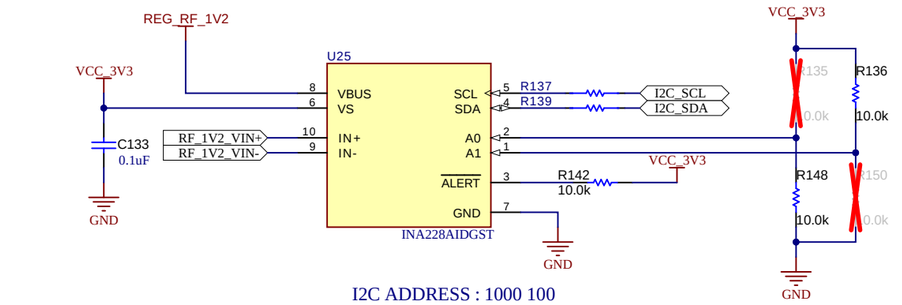
I2C ADDRESS : 1000 101

CURRENT SENSOR- 1V2



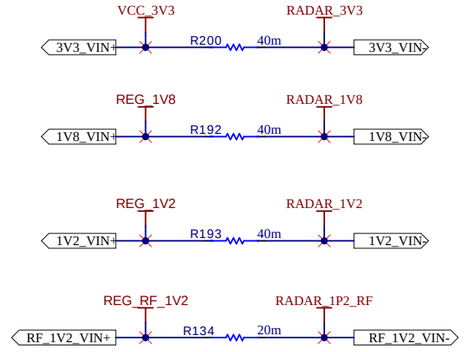
I2C ADDRESS : 1000 001

CURRENT SENSOR- RF_1V2



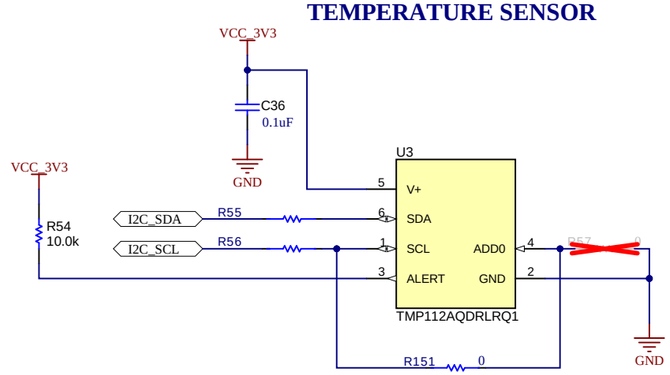
I2C ADDRESS : 1000 100

CURRENT SENSE RESISTORS



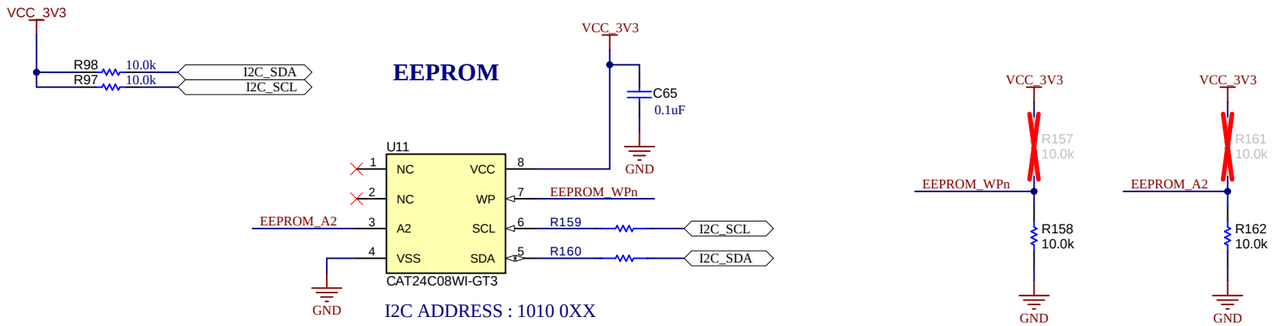
Design Note: 'Generic No ERCs' were placed intentionally on either sides of Current sense resistors

TEMPERATURE SENSOR



I2C ADDRESS : 1001 011

EEPROM



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Orderable: IWRL6432AOPEVM		Designed for: Public Release	Mod. Date: 1/3/2024
TID #: N/A		Project Title: xWRL6432AOP	
Number: PROC177	Rev: B	Sheet Title: TEMP_CURRENT_SENSORS_EEPROM	
SVN Rev: Unknown revision		Assembly Variant: 001_IWR	Sheet: 8 of 17
Drawn By: Mistral		File: PROC177B_Temp_Current_sensors_EPROM.SchDoc	
Engineer: Mistral		Contact: http://www.ti.com/support	

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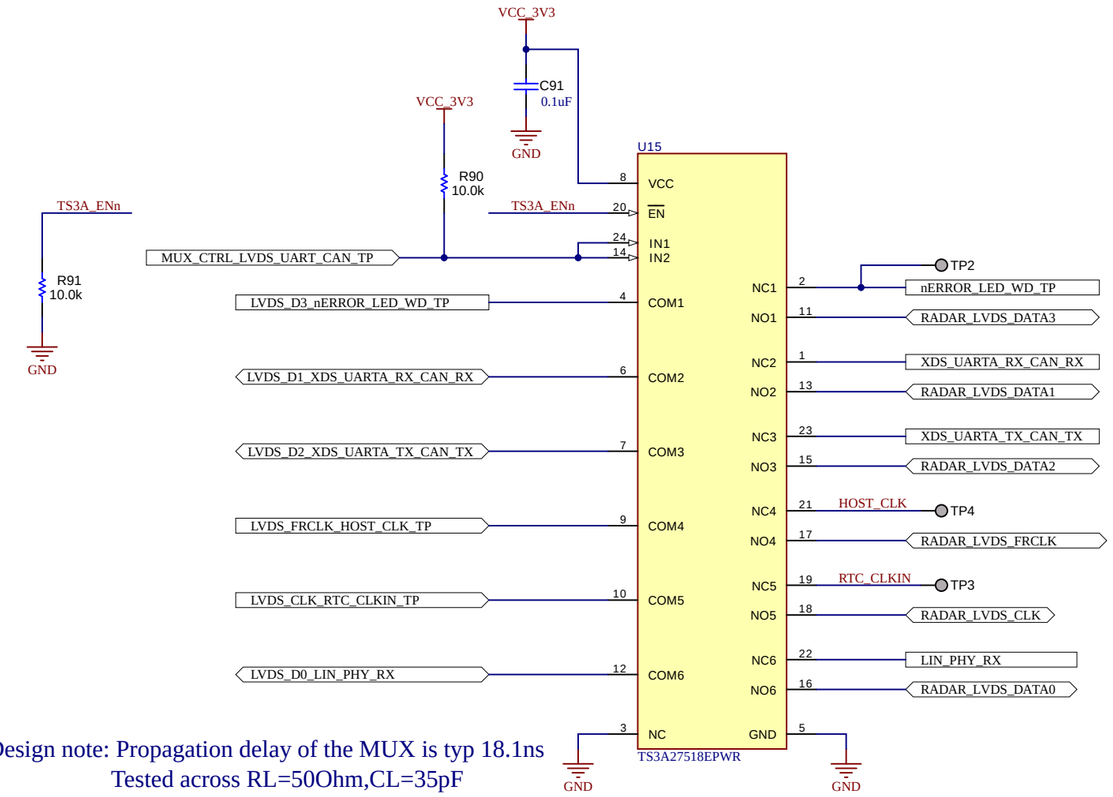
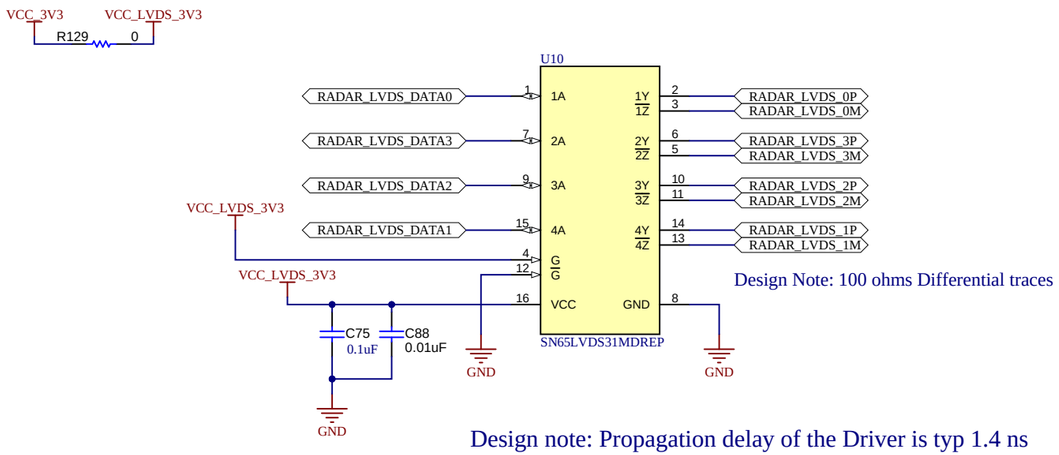
ANALOG MUX - RADAR DATA & CLOCK



Design note: Propagation delay of the MUX is typ 18.1ns
Tested across RL=50Ohm,CL=35pF

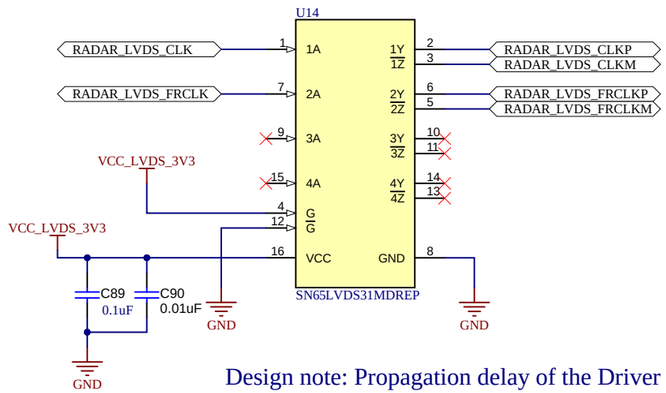
DIFFERENTIAL LVDS DRIVER - DATA



Design Note: 100 ohms Differential traces

Design note: Propagation delay of the Driver is typ 1.4 ns

DIFFERENTIAL LVDS DRIVER - CLK



Design note: Propagation delay of the Driver is typ 1.4 ns

Orderable: IWRL6432AOPEVM		Designed for: Public Release	Mod. Date: 1/17/2024
TID #: N/A		Project Title: xWRL6432AOP	
Number: PROC177	Rev: B	Sheet Title: LVDS_DRIVER	
SVN Rev: Unknown revision		Assembly Variant: 001_IWR	Sheet: 9 of 17
Drawn By: Mistral		File: PROC177B_LVDS_Driver.SchDoc	Size: B
Engineer: Mistral		Contact: http://www.ti.com/support	

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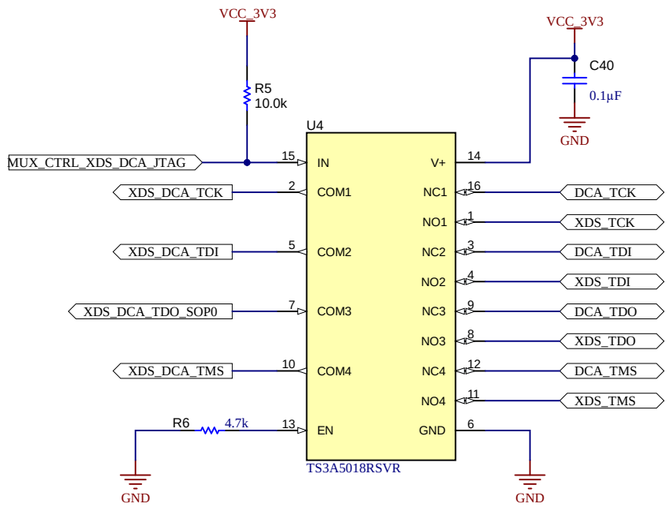
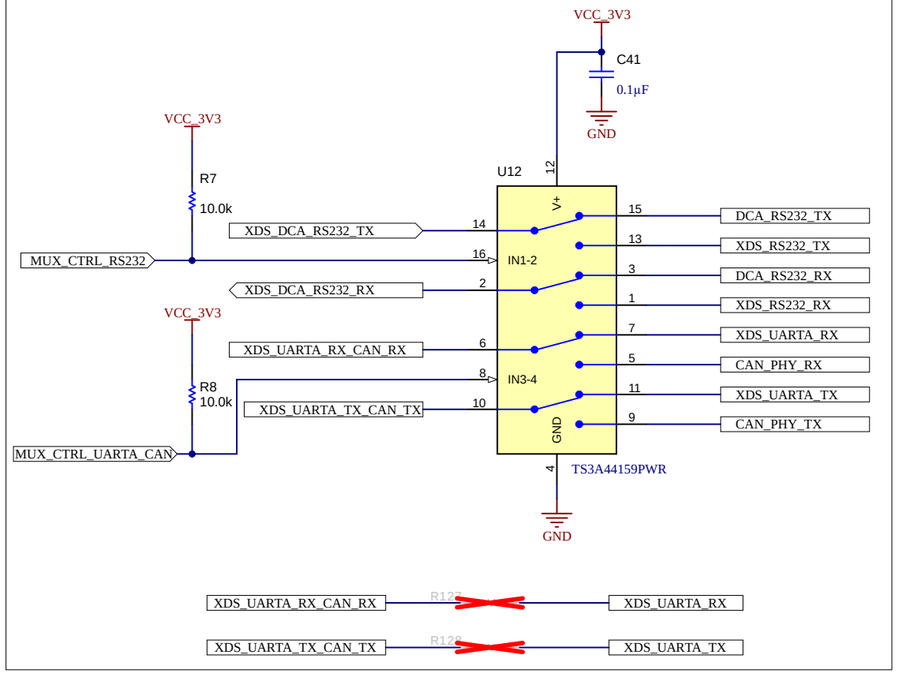
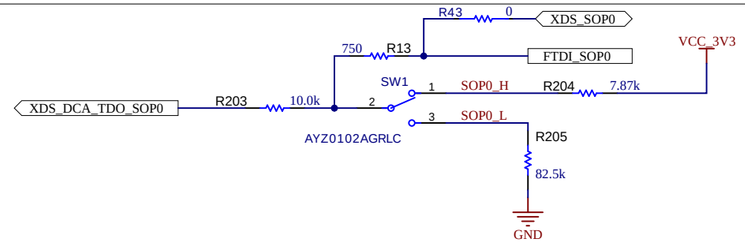
ANALOG MUX

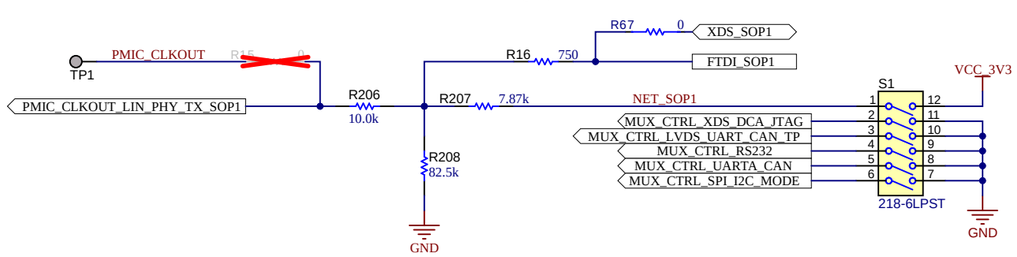


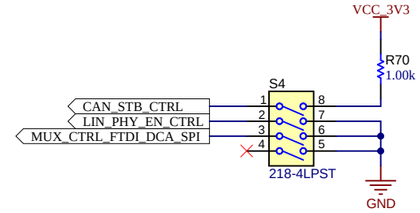
UART-ANALOG SWITCH



SOP & MUX CONTROL







CONTROL TABLE

	Switch Position OFF	Switch Position ON
S4.1	CAN PHY : Stand-by Mode Disable	CAN PHY : Stand-by Mode Enable
S4.2	LIN PHY : Enable	LIN PHY : Disable
S4.3	FTDI SPI	DCA SPI

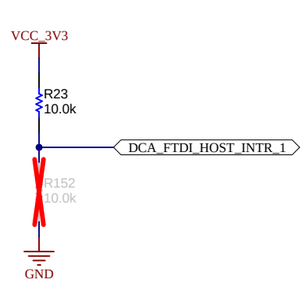
SOP CONFIGURATION

SOP Mode	PMIC_CLK_OUT, TDO	Combination	SWITCH POSITION S1.1(SOP1)	SW1(SOP0)
SOP_MODE1	Device management mode / QSPI Flashing mode	0 0	**OFF**	**2--3**
SOP_MODE2	Application mode / Functional mode	0 1	**OFF**	**2--1**
SOP_MODE4	Debug mode / mmWave studio connectivity mode	1 1	**ON**	**2--1**

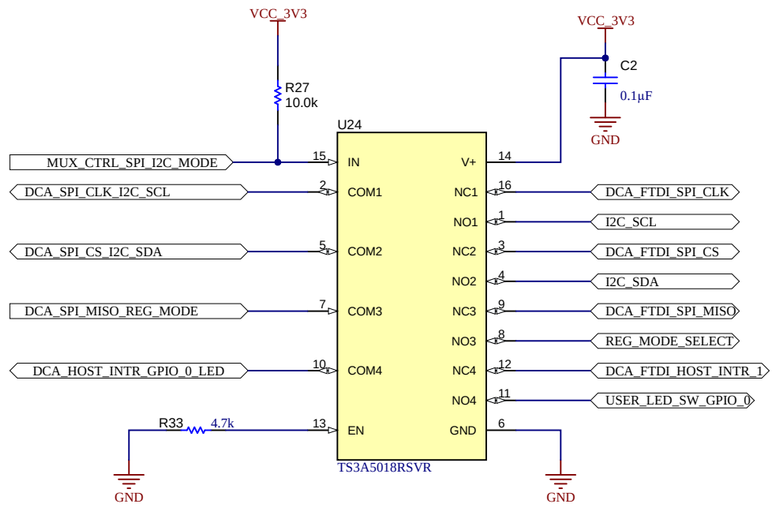
MUX TABLE

	Switch Position OFF	Switch Position ON
S1.2	XDS_JTAG	DCA_JTAG
S1.3	LVDS	LIN_RX, XDS_UARTA/CAN, NERROR_LED, WATCH_DOG_TP, RTC_CLK_IN_TP, HOST_CLK_TP
S1.4	XDS_RS232	DCA_RS232
S1.5	CAN	XDS_UARTA
S1.6	I2C, REG_MODE, LED_SW_GPIO	SPI

ANALOG MUX - SPI/12C



DCA_FTDI_HOST_INTR_1 is the SPI_BUSY signal



Orderable: IWRL6432AOPEVM	Designed for: Public Release	Mod. Date: 1/17/2024
TID #: N/A	Project Title: xWRL6432AOP	
Number: PROC177 Rev: B	Sheet Title: ANALOG_MUX_SOP_CTRL	
SVN Rev: Unknown revision	Assembly Variant: 001_IWR	Sheet: 10 of 17
Drawn By: Mistral	File: PROC177B_Analog_Mux_SOP_Ctrl.SchDoc	Size: B
Engineer: Mistral	Contact: http://www.ti.com/support	

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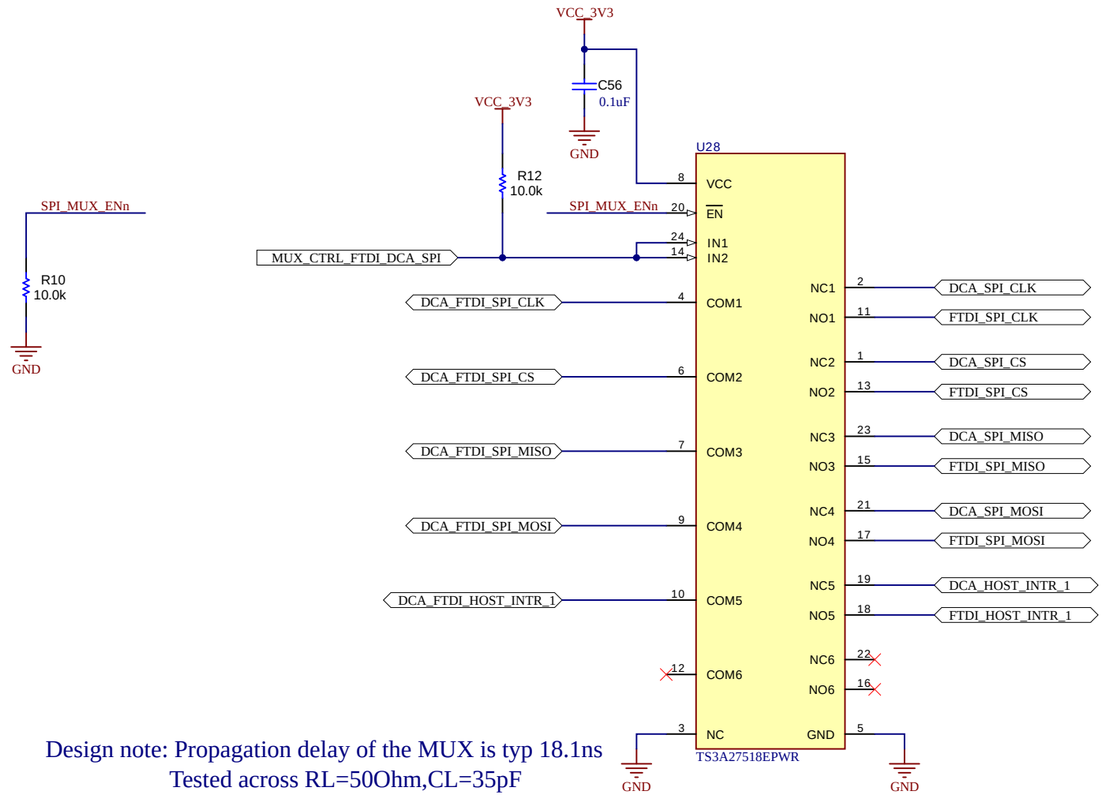
ANALOG MUX SPI- DCA/FTDI



Design note: Propagation delay of the MUX is typ 18.1ns
Tested across RL=50Ohm,CL=35pF

Orderable: IWRL6432AOPEVM	Designed for: Public Release	Mod. Date: 1/3/2024
TID #: N/A	Project Title: xWRL6432AOP	
Number: PROC177 Rev: B	Sheet Title: Analog Mux SPI	
SVN Rev: Unknown revision	Assembly Variant: 001_IWR	Sheet: 11 of 17
Drawn By: Mistral	File: PROC177B_Analog_MUX_SPI.SchDoc	Size: B
Engineer: Mistral	Contact: http://www.ti.com/support	

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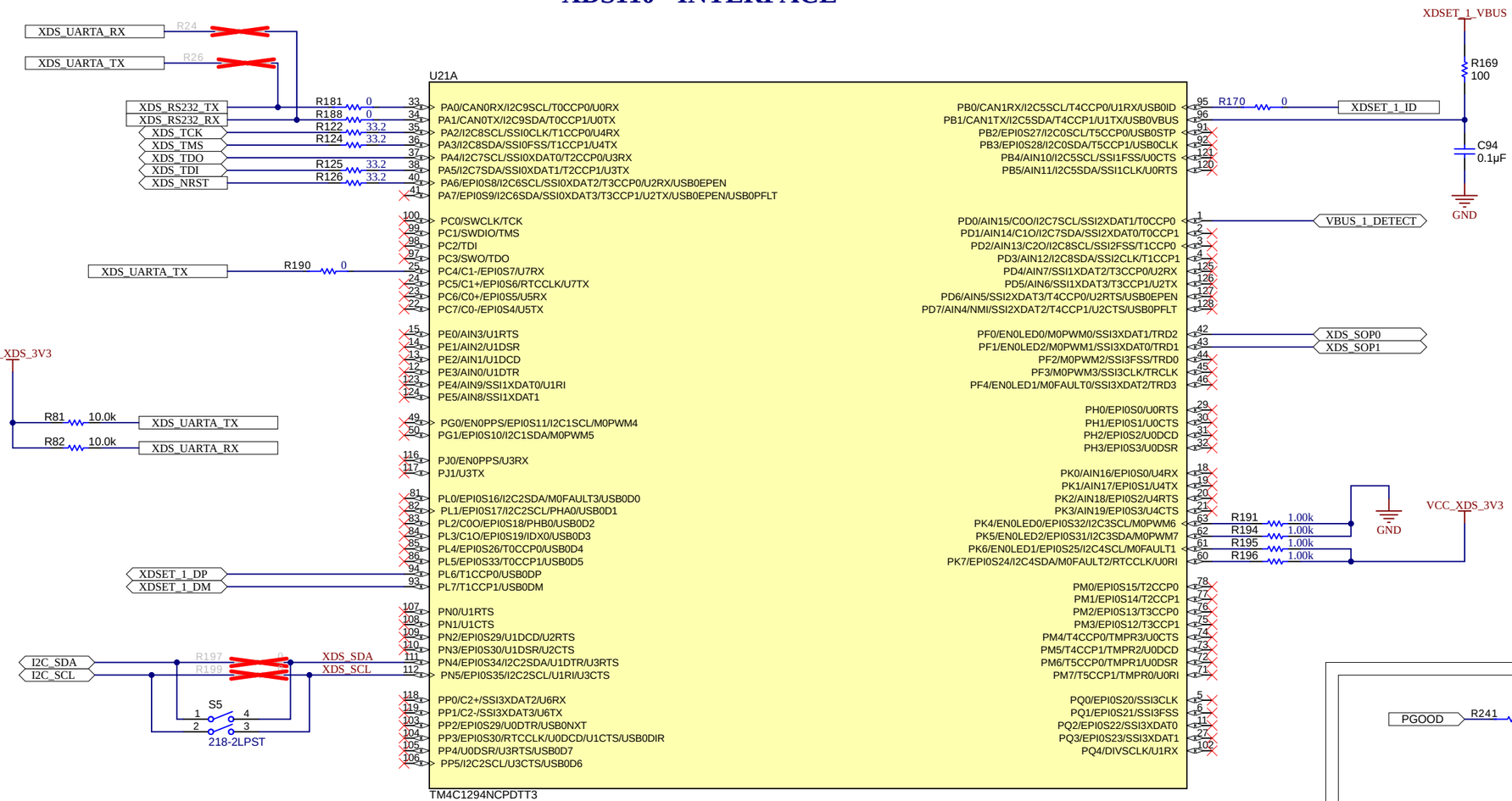
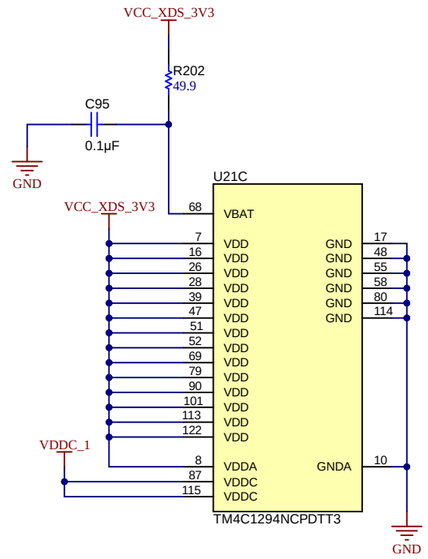
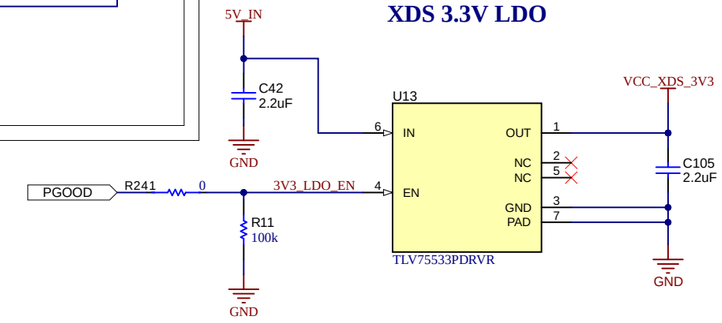
XDS110 - INTERFACE



XDS110 - POWER

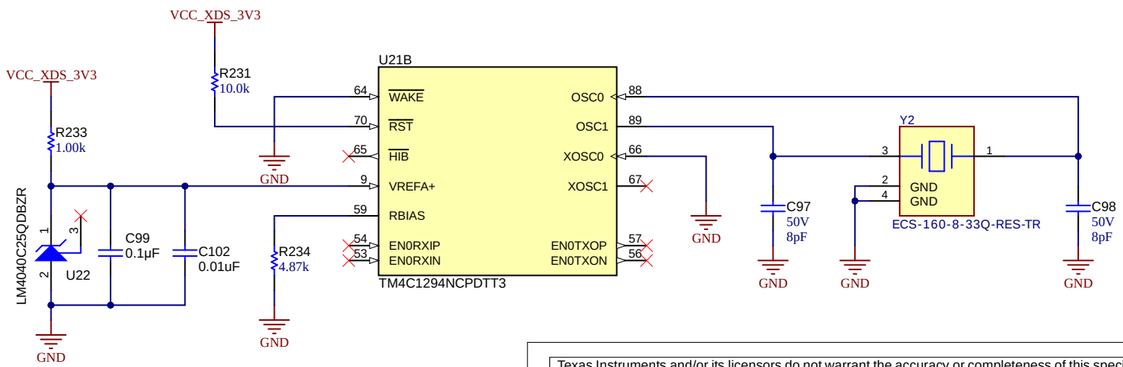


XDS 3.3V LDO

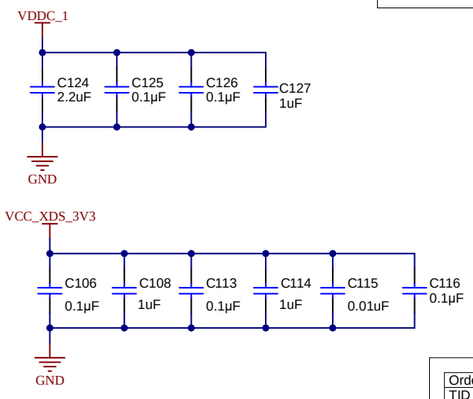


By Default LDO is disabled
When 3V3 DC-DC regulator is powered up, then it gets enabled

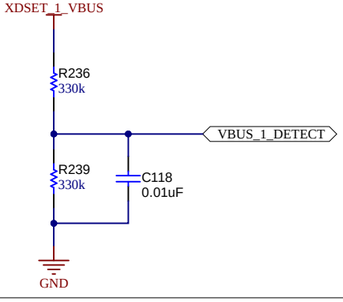
XDS110 - XTAL



DECOUPLING CAPS - XDS



VBUS_DETECT



Orderable: IWRL6432AOPEVM	Designed for: Public Release	Mod. Date: 1/3/2024
TID #: N/A	Project Title: xWRL6432AOP	
Number: PROC177 Rev: B	Sheet Title: XDS110_INTERFACE	
SVN Rev: Unknown revision	Assembly Variant: 001_IWR	Sheet: 12 of 17
Drawn By: Mistral	File: PROC177B_XDS110_Interface.SchDoc	Size: B
Engineer: Mistral	Contact: http://www.ti.com/support	

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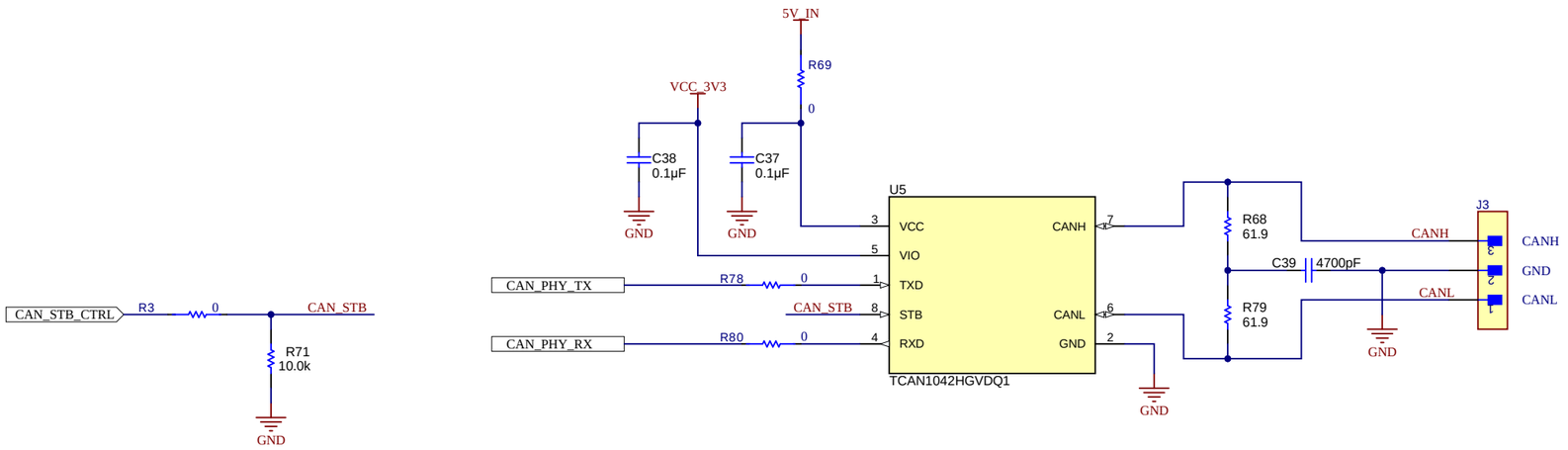
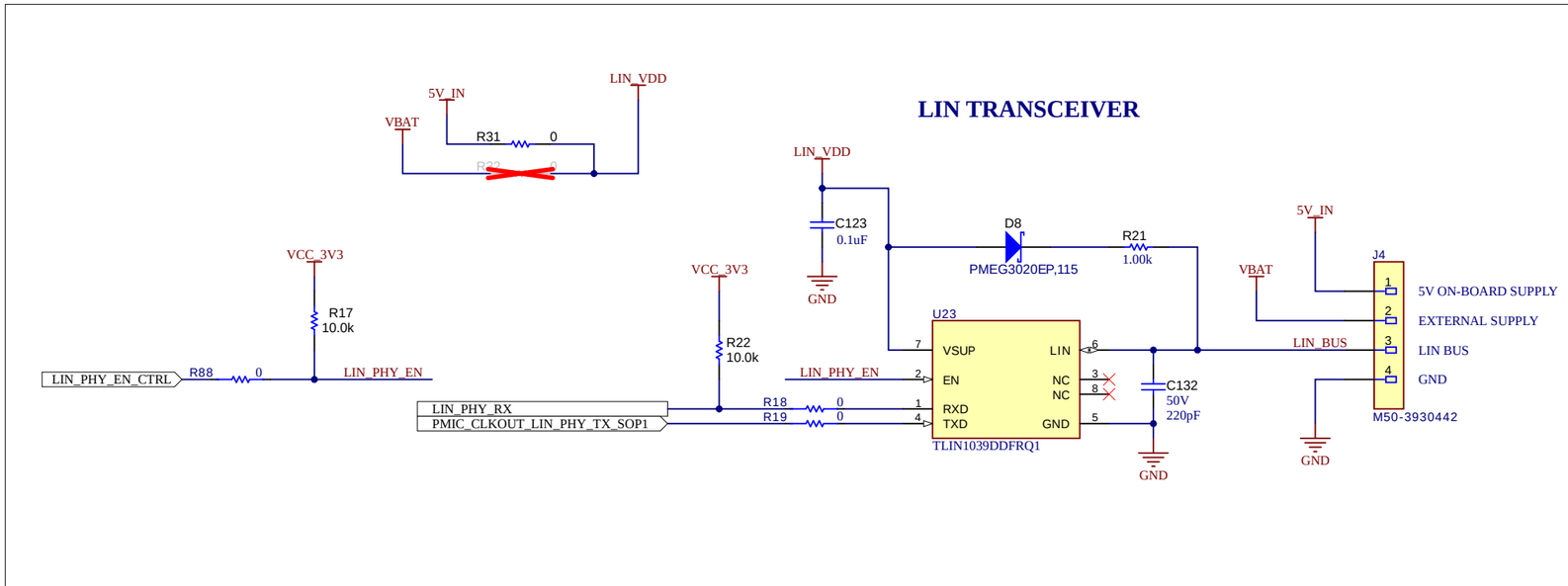
CAN TRANSCEIVER



LIN TRANSCEIVER



Orderable: IWRL6432AOPEVM		Designed for: Public Release	Mod. Date: 1/3/2024
TID #: N/A		Project Title: xWRL6432AOP	
Number: PROC177	Rev: B	Sheet Title: CAN_LIN_PHY_INTERFACE	
SVN Rev: Unknown revision		Assembly Variant: 001_IWR	Sheet: 13 of 17
Drawn By: Mistral		File: PROC177B_CAN_LIN_PHY_Interface.SchDoc	Size: B
Engineer: Mistral		Contact: http://www.ti.com/support	

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FTDI - USB to SPI CONVERTER

VCC_XDS_3V3 — L7 — FTDI_3V3

Review Note

FTDI_3V3 Power from XDS LDO 3V3

FTDI SUPPLY DECAPS

VCORE DECAPS

FTDI_VCORE: C139 4.7uF, C140 0.1µF → GND

FTDI_3V3 — L2 — VPHY_FTDI: C141 4.7uF, C142 0.1µF → GND

VREGOUT DECAPS

FTDI_VCORE: C143 0.1µF, C144 0.1µF → GND

FTDI_3V3 — L3 — VPLL_FTDI: C145 4.7uF, C146 0.1µF → GND

VREGIN DECAPS

FTDI_3V3: C149 1uF, C150 0.1µF → GND

VCCIO DECAPS

FTDI_3V3: C151 1uF, C152 0.1µF, C153 0.1µF → GND

U27 FT4232HL

VPHY_FTDI → VPHY (4)
VPLL_FTDI → VPLL (9)
FTDI_VCORE → VCORE (12, 37, 64)
FTDI_3V3 → VCCIO (20, 31, 42, 56)
FTDI_VCORE → VREGIN (50)
VREGOUT (49)
FTDI_USBD_N → DM (7)
FTDI_USBD_P → DP (8)
R218 10.0k REF_FTDI → REF (6)
FTDI_3V3 — R237 1.00k RST_FTDI → RESET# (14)
EECS (63), EECLK (62), EEDATA (61)
Y3 12MHz XTAL: XI_FTDI (2), XO_FTDI (3); C147 8pF, C148 8pF → GND
OSCI (2), OSCO (3), TEST (13)
AGND (10), GND (1, 5, 11, 15, 25, 35, 47, 51)

ADBUS0 (16) FTDI_SPICLK — R186 33.2 — FTDI_SPI_CLK
ADBUS1 (17) FTDI_MOSI — R187 33.2 — FTDI_SPI_MOSI
ADBUS2 (18) FTDI_MISO — R189 0 — FTDI_SPI_MISO
ADBUS3 (19) FTDI_SPICS — R209 33.2 — FTDI_SPI_CS
ADBUS4 (21), ADBUS5 (22), ADBUS6 (23), ADBUS7 (24)

VCC_3V3 — R99 100k

BDBUS0 (26), BDBUS1 (27), BDBUS2 (28), BDBUS3 (29), BDBUS4 (30)
BDBUS5 (32) HOSTIRQ_FTDI_IN — R216 0 — FTDI_HOST_INTR_1
BDBUS6 (33), BDBUS7 (34) HOSTIRQ_FTDI_OUT — R217 0

CDBUS0 (38), CDBUS1 (39), CDBUS2 (40), CDBUS3 (41), CDBUS4 (43), CDBUS5 (44)
CDBUS6 (45) NRST_FTDI — R243 0 — RADAR_NRST_2
CDBUS7 (46)

DDBUS0 (48), DDBUS1 (52), DDBUS2 (53)
DDBUS3 (54) SOP1_FTDI — R248 — FTDI_SOP1
DDBUS4 (55) SOP0_FTDI — R249 — FTDI_SOP0
DDBUS5 (57), DDBUS6 (58)
DDBUS7 (59) — R242 — USER_LED_SW_GPIO_0

PWREN# (60)
SUSPEND# (36) — R251 33.2 FTDI_SUSPEND_N — R252 510 — D10 Yellow → GND

FTDI EEPROM

FTDI_3V3 — R167 10.0k, R168 10.0k, R184 10.0k, C138 0.1µF → GND

U26 93LC46B-I/ST

VCC (8), NC (6), NC (7)
EECLK (2) → CLK
EEDATA (3) → DI
EECS (4) → CS
DO (1)
VSS (5) → GND
R185 2.2k

FTDI USB PORT

FTDI_VBUS — C157 10µF → GND

J10 105017-0001

1 → FTDI_VBUS
2 → FTDI_USBD_N
3 → FTDI_USBD_P
4 → FTDI_USBID
5 → GND
6, 7, 8, 9, 10, 11 → GND

R261 → GND

FTDI USB - ESD PROTECTION

FTDI_VBUS — R259 0 — C158 0.1µF → GND

U29 TPD4E004DRYR

FTDI_USBD_N (1), FTDI_USBD_P (2)
IO1, IO2, IO3, IO4 → FTDI_USBID (4, 5)
VCC (6), GND (3) → GND
R260 30.0k → GND

Orderable: IWRL6432AOPEVM		Designed for: Public Release	Mod. Date: 1/3/2024
TID #: N/A		Project Title: xWRL6432AOP	
Number: PROC177	Rev: B	Sheet Title: FTDI_USB to SPI_Converter	
SVN Rev: Unknown revision		Assembly Variant: 001_IWR	Sheet: 14 of 17
Drawn By: Mistral		File: PROC177B_FTDI.SchDoc	Size: B
Engineer: Mistral		Contact: http://www.ti.com/support	

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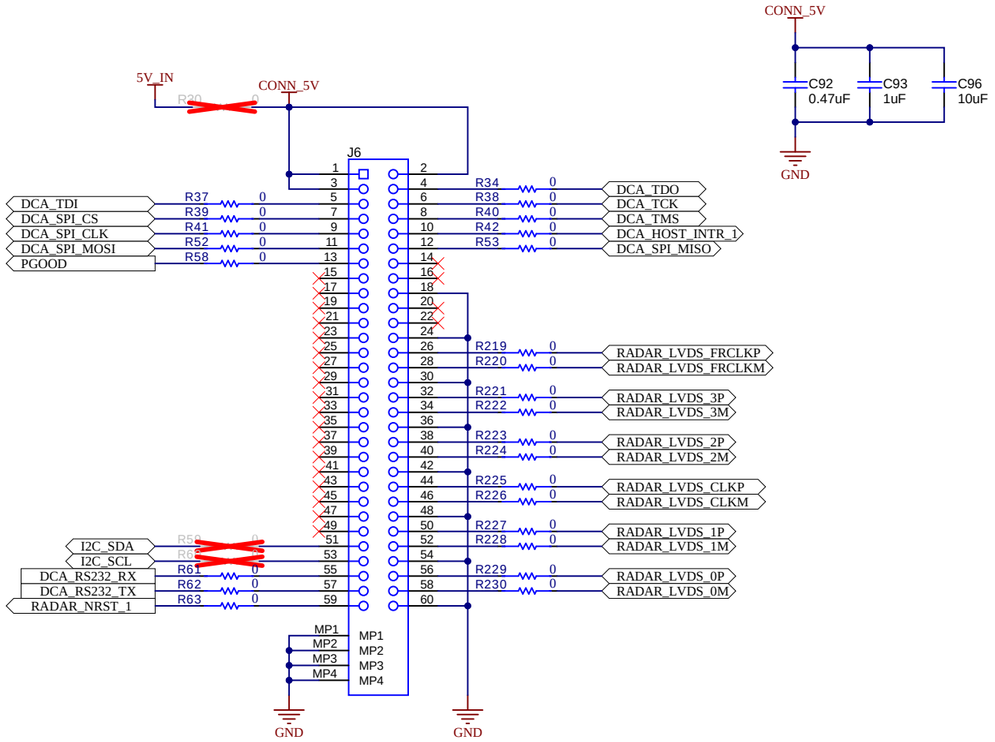
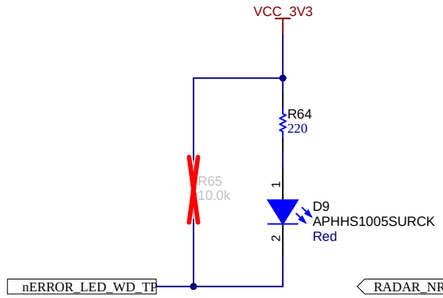
60-PIN HD CONNECTOR FOR DCA1000

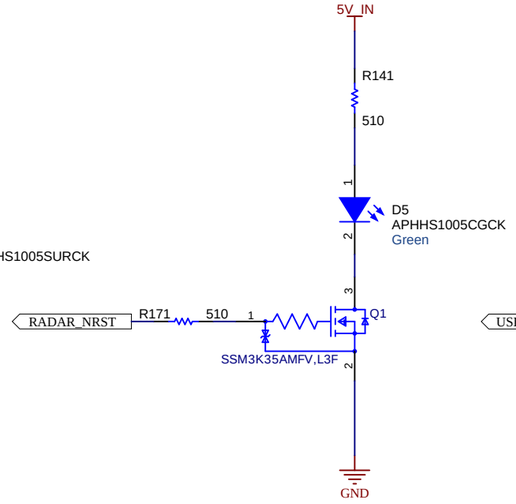


RESET, USER LEDS

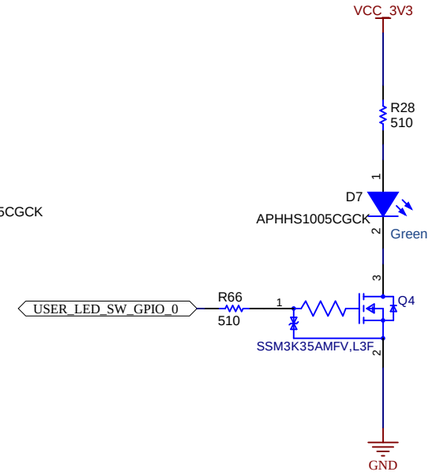
nERROR LED



RESET LED

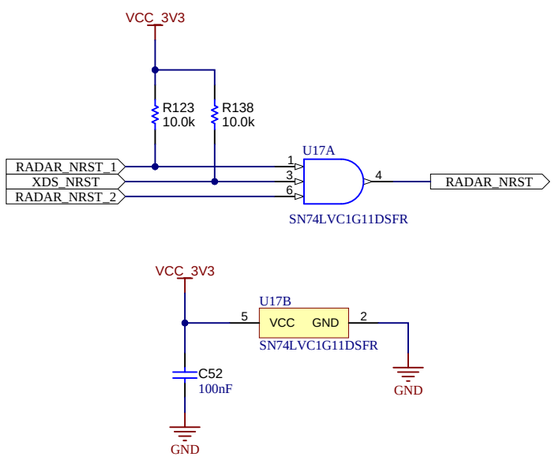


USER LED

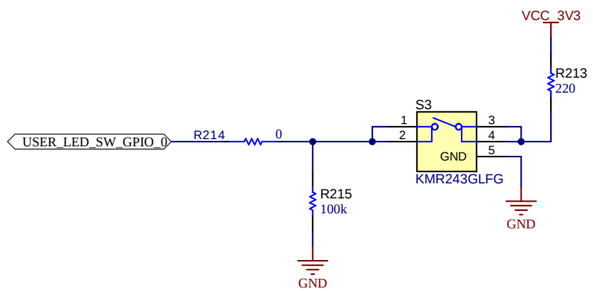


RESET, USER SWITCHES

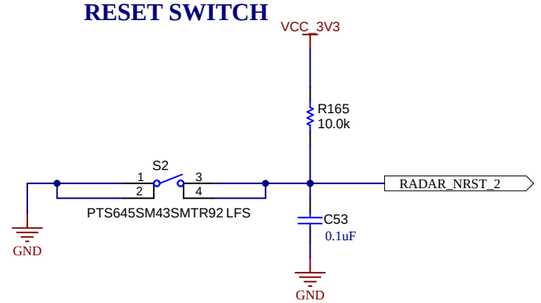
RESET



USER SWITCH



RESET SWITCH



Orderable: IWRL6432AOPEVM		Designed for: Public Release	Mod. Date: 1/3/2024
TID #: N/A		Project Title: xWRL6432AOP	
Number: PROC177	Rev: B	Sheet Title: DCA1000_CONN_RESET	
SVN Rev: Unknown revision		Assembly Variant: 001_IWR	Sheet: 15 of 17
Drawn By: Mistral		File: PROC177B_DCA1000_Connector_Reset.SchDoc	Size: B
Engineer: Mistral		Contact: http://www.ti.com/support	

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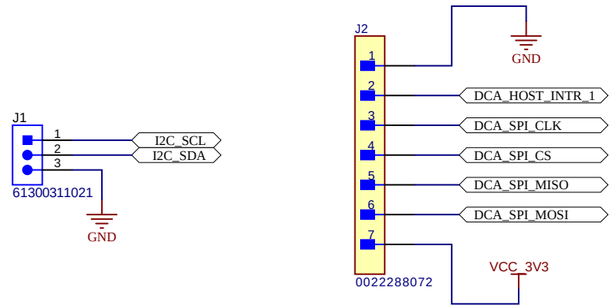
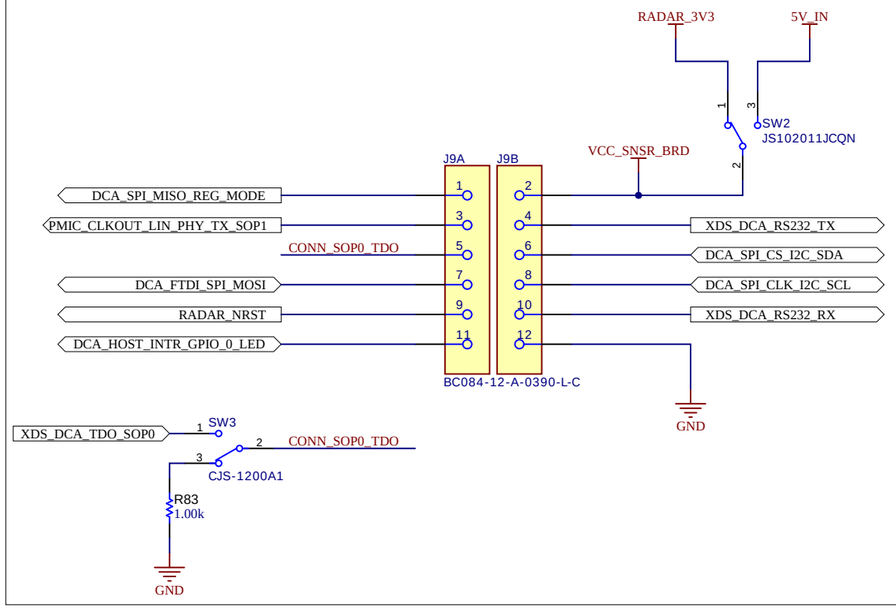
I2C & SPI HEADER FOR FTDI INTERFACE



FEMALE CONNECTOR- Expandable Area



Orderable: IWRL6432AOPEVM		Designed for: Public Release	Mod. Date: 1/17/2024
TID #: N/A		Project Title: xWRL6432AOP	
Number: PROC177	Rev: B	Sheet Title: I2C_SPI_INTERFACE_CONN_HEADER	
SVN Rev: Unknown revision		Assembly Variant: 001_IWR	Sheet: 16 of 17
Drawn By: Mistral		File: PROC177B_I2C_SPI_Connector.SchDoc	Size: B
Engineer: Mistral		Contact: http://www.ti.com/support	

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FID1 FID2 FID3 FID4 FID5 FID6

PCB Number: PROC177
PCB Rev: B

PCB
LOGO
Texas Instruments

CE Mark

PCB
LOGO
FCC disclaimer

PCB
LOGO
WEEE logo

CAUTION HOT SURFACE1

CAUTION HOT SURFACE

Variant/Label Table	
Variant	Label Text
001_IWR	IWRL6432AOP EVM
002_AWR	AWRL6432AOP EVM

CAPACITORS HIGHLIGHTED IN THE RED COLOR BOXES ARE ADDED FOR IMPROVEMENT AND THOSE ARE NOT MANDITORY.

LBL1
PCB Label
THT-14-423-10
Size: 0.65" x 0.20 "

ZZ1
Label Assembly Note
This Assembly Note is for PCB labels only

ZZ2
Assembly Note
These assemblies are ESD sensitive, ESD precautions shall be observed.

ZZ3
Assembly Note
These assemblies must be clean and free from flux and all contaminants. Use of no clean flux is not acceptable.

ZZ4
Assembly Note
These assemblies must comply with workmanship standards IPC-A-610 Class 2, unless otherwise specified.

ZZ5
Assembly Note
INDICATION FOR COMPONENTS D* ARE GIVEN AT THEIR CATHODE SIDE.

Orderable: IWRL6432AOPEVM		Designed for: Public Release	Mod. Date: 1/3/2024
TID #: N/A		Project Title: xWRL6432AOP	
Number: PROC177	Rev: B	Sheet Title: HARDWARE	
SVN Rev: Unknown revision		Assembly Variant: 001_IWR	Sheet: 17 of 17
Drawn By: Mistral		File: PROC177B_EVM_Hardware.SchDoc	Size: B
Engineer: Mistral		Contact: http://www.ti.com/support	

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