

MAXWELL CUSTOMER PROCESSOR BOARD

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REV	A
VER	1.0

REVISION HISTORY

VER #	DATE	DESCRIPTION OF CHANGES	AUTHOR	REVIEWED BY	APPROVED BY
0.1	9th JAN 2020	Drafted from "PROC062E4_SCH" document.	Mistral Design Team	AJIT MB	AJIT MB
0.2	9th JAN 2020	Updated REV A schematic as per change list document.	Mistral Design Team	AJIT MB	AJIT MB
0.3	23rd JAN 2020	Changed SoC WKUP domain supply VDD_MCU	Mistral Design Team	AJIT MB	AJIT MB
0.4	30th JAN 2020	1. Added Bulk Cap for VDDA_OSC1 and VDDA_3V3_SDIO. 2. Added Pull down for OSP1_DQS signal. 3. Replaced R749 by FL40	Mistral Design Team	AJIT MB	AJIT MB
0.5	10th FEB 2020	Updated alternate for components	Mistral Design Team	AJIT MB	AJIT MB
1.0	10th FEB 2020	Baselined	Mistral Design Team	AJIT MB	AJIT MB

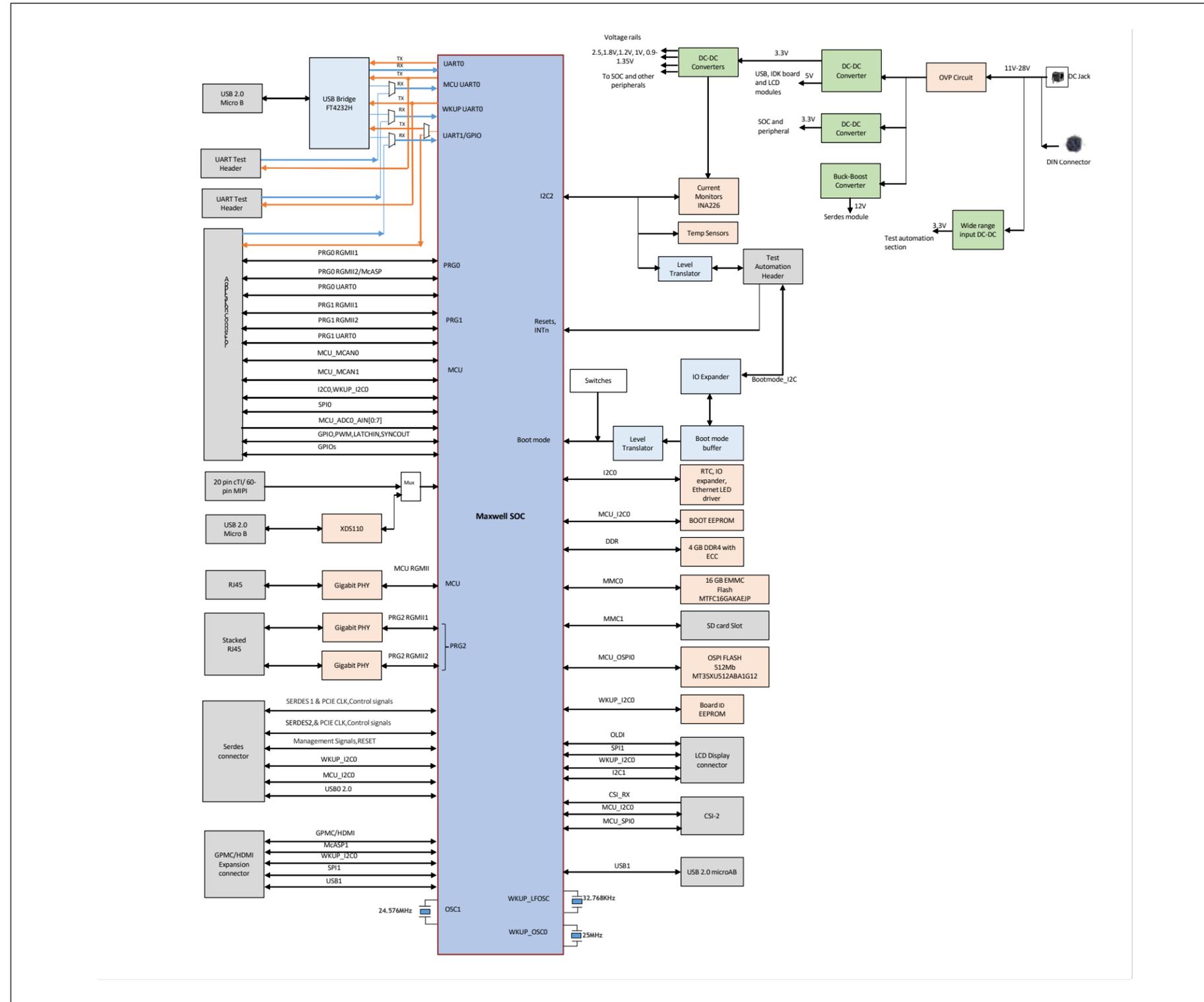
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Title REVISION HISTORY

Size	Variant Name = PROC062 001 OPN#TMDX654IDKEVM	Rev
C		A
Date:	Thursday, February 20, 2020	Sheet 2 of 44

BLOCK DIAGRAM_CP BOARD



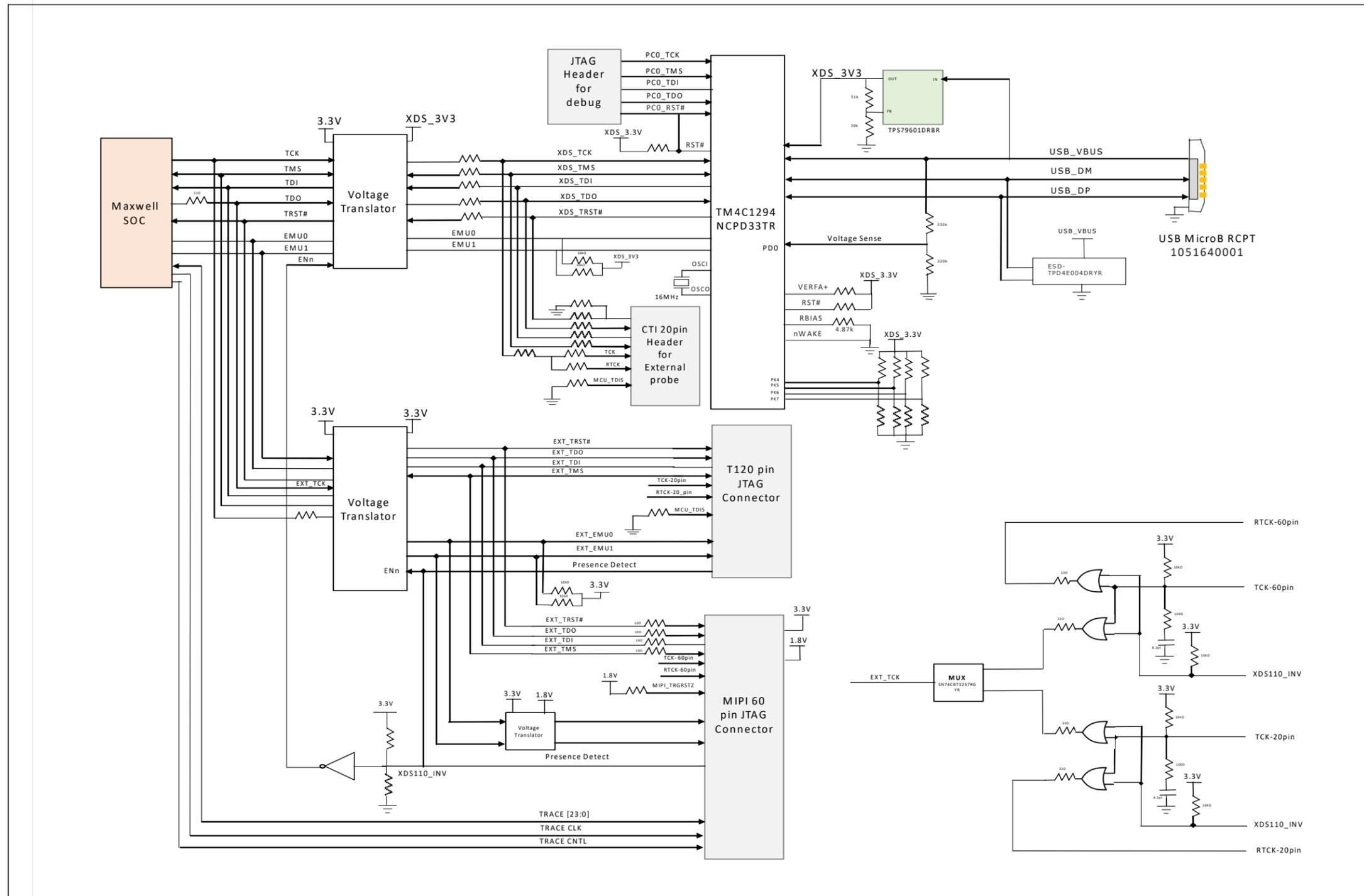
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Title BLOCK DIAGRAM_CP BOARD

Size	Variant Name = PROC082 001 OPN#TMDX654IDKEVM	Rev
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BLOCK DIAGRAM_XDS110



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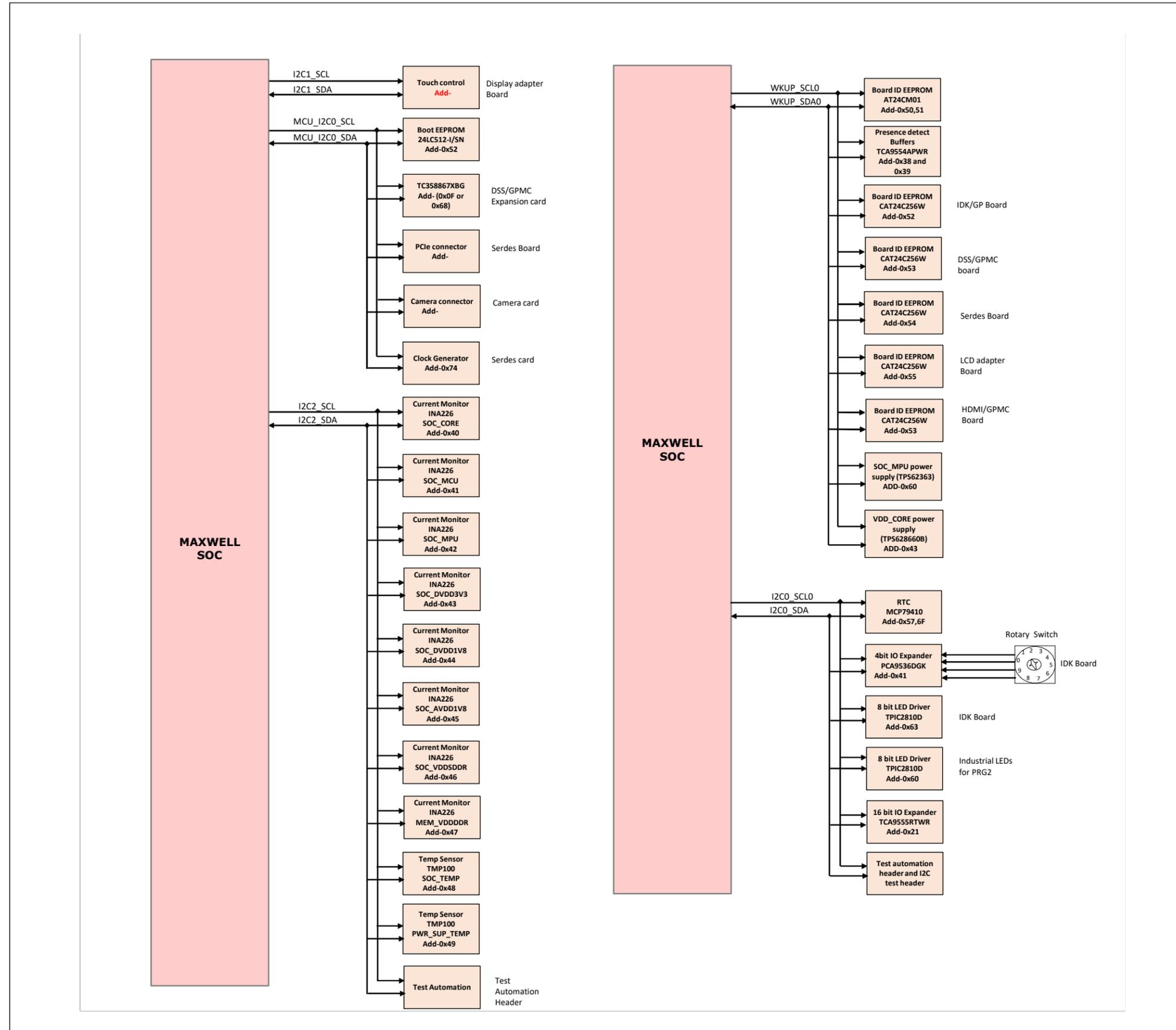


Title			BLOCK DIAGRAM_XDS110
Size	Variant Name = PROC082 001 OPN#TMDX654IDKEVM		Rev
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GPIO MAPPING TABLE

Total No of GPIOs Required from Maxwell SoC								
SI No	GPIO Description	Required on	FUNCTIONALITY	GPIO Number	SoC Muxed Signal name	Direction WRT CTRL	Default state	Active state
1	Two MCU Domain GPIO for CP board push button1	Customer Processor Board	Push button	WKUP_GPIO0_24	MCU_OSPIO_CSN1	Input	High	Low
2	Two MCU Domain GPIO for CP board push button1	Customer Processor Board	Push button	WKUP_GPIO0_27	MCU_OSPI1_DQS	Input	High	Low
3	eMMC Reset control GPIO	Customer Processor Board	Reset	I2C GPIO Expander		Output	High	Low
4	OSPI flash Reset control GPIO	Customer Processor Board	Reset	I2C GPIO Expander		Output	High	Low
5	SPI NOR flash Reset control GPIO	Customer Processor Board	Reset	I2C GPIO Expander		Output	High	Low
6	ICSSG_PRG2_Ethernet PHY Reset control GPIO	Customer Processor Board	Reset	I2C GPIO Expander		Output	High	Low
7	ICSSG_PRG2_Ethernet PHY Interrupt GPIO	Customer Processor Board	Interrupt	GPIO1_87	EXT_REFCLK1	Input/Output	High	Low
8	ICSSG_Ethernet PHY_1 Link Detection GPIO	Customer Processor Board	Link Detection (GPIO Input)	WKUP_GPIO0_50	MCU_SPIO_D1	Input	Low	High
9	ICSSG_Ethernet PHY_2 Link Detection GPIO	Customer Processor Board	Link Detection (GPIO Input)	WKUP_GPIO0_8	WKUP_GPIO0_8	Input	Low	High
10	MCU domain Ethernet PHY Reset Control GPIO	Customer Processor Board	Reset	I2C GPIO Expander		Output	High	Low
11	MCU domain Ethernet PHY Interrupt GPIO	Customer Processor Board	Interrupt	GPIO1_80	MMC1_SDWP	Input/Output	High	Low
12	Three GPIO's are required to control the Mux select between UART test header RX , Application board & FT4232_ UART_RX	Customer Processor Board	Mux Selection	I2C GPIO Expander		Output	High	Low
13				I2C GPIO Expander		Output	High	Low
14				I2C GPIO Expander		Output	High	Low
15	VPP LDO enable	Customer Processor Board	VPP_EN	WKUP_GPIO0_26	MCU_OSPI1_LBCLKO	Output	Low	High
16	One WKUP_GPIO for VTT Regulator Enable	Customer Processor Board	VTT_EN	WKUP_GPIO0_28	MCU_OSPI1_DO	Output	Low	High
17	GPIO0 to drive PRG2 LED0	Customer Processor Board	LEDs	I2C GPIO Expander		Output	Low	High
18	GPIO1 to drive PRG2 LED1	Customer Processor Board	LEDs	I2C GPIO Expander		Output	Low	High
19	GPIO2 to drive PRG2 LED2	Customer Processor Board	LEDs	WKUP_GPIO0_0	WKUP_GPIO0_0	Output	Low	High
20	GPIO3 to drive PRG2 LED3	Customer Processor Board	LEDs	WKUP_GPIO0_1	WKUP_GPIO0_1	Output	Low	High
21	SOC MPU regulator reset control	Customer Processor Board	RESET_SoC_MPU	I2C GPIO Expander		Output	High	Low
22	SD card load switch enable control	Customer Processor Board	MMC1_SD_EN	I2C GPIO Expander		Output	High	Low
23	IDK_ICSSG_PRG0_Ethernet PHY Reset Control GPIO	IDK /GP Application board	Reset	GPIO1_58	PRG0_PRU1_GPO9	Output	High	Low
24	IDK_ICSSG_PRG0_Ethernet PHY Interrupt GPIO	IDK /GP Application board	Interrupt	GPIO1_39	PRG0_PRU0_GPO10	Input/Output	High	Low
25	IDK_ICSSG_PRG1_Ethernet PHY Reset Control GPIO	IDK /GP Application board	Reset	GPIO1_38	PRG0_PRU0_GPO9	Output	High	Low
26	IDK_ICSSG_PRG1_Ethernet PHY Interrupt GPIO	IDK /GP Application board	Interrupt	GPIO1_59	PRG0_PRU1_GPO10	Output	High	Low
27	IDK_ICSSG_Ethernet PHY_1 Link Detection GPIO	IDK /GP Application board	Link Detection (GPIO Input)	GPIO1_36/GPIO1_37	PRG0_PRU0_GPO7/PRG0_PRU0_GPO8	Input	Low	High
28	IDK_ICSSG_Ethernet PHY_2 Link Detection GPIO	IDK /GP Application board	Link Detection (GPIO Input)	GPIO1_56/GPIO1_57	PRG0_PRU1_GPO7/PRG0_PRU1_GPO8	Input	Low	High
29	IDK_ICSSG_Ethernet PHY_3 Link Detection GPIO	IDK /GP Application board	Link Detection (GPIO Input)	GPIO0_63/GPIO0_64	PRG1_PRU0_GPO7/PRG1_PRU0_GPO8	Input	Low	High
30	IDK_ICSSG_Ethernet PHY_4 Link Detection GPIO	IDK /GP Application board	Link Detection (GPIO Input)	GPIO0_83/GPIO0_84	PRG1_PRU1_GPO7/PRG1_PRU1_GPO8	Input	Low	High
31	IDK_ICSSG0_Ethernet LED0	IDK /GP Application board	LEDs	GPIO1_46	PRG0_PRU0_GPO17	Output	Low	High
32	IDK_ICSSG0_Ethernet LED1	IDK /GP Application board	LEDs	GPIO1_66	PRG0_PRU1_GPO17	Output	Low	High
33	IDK_ICSSG0_Ethernet LED2	IDK /GP Application board	LEDs	GPIO1_48	PRG0_PRU0_GPO19	Output	Low	High
34	IDK_ICSSG0_Ethernet LED3	IDK /GP Application board	LEDs	GPIO1_68	PRG0_PRU1_GPO19	Output	Low	High
35	IDK_ICSSG0_Ethernet LED4	IDK /GP Application board	LEDs	GPIO0_73	PRG1_PRU0_GPO17	Output	Low	High
36	IDK_ICSSG0_Ethernet LED5	IDK /GP Application board	LEDs	GPIO0_93	PRG1_PRU1_GPO17	Output	Low	High
37	IDK_ICSSG0_Ethernet LED6	IDK /GP Application board	LEDs	GPIO0_75	PRG1_PRU0_GPO19	Output	Low	High
38	IDK_ICSSG0_Ethernet LED7	IDK /GP Application board	LEDs	GPIO0_95	PRG1_PRU1_GPO19	Output	Low	High
39	Touch Reset Control GPIO	LCD Adapter Board	Reset	I2C GPIO Expander		Output	High	Low
40	Touch Interrupt GPIO	LCD Adapter Board	Interrupt	I2C GPIO Expander		Input	Low	High
41	LCD Display Enable GPIO	LCD Adapter Board	LCD_EN	I2C GPIO Expander		Output	High	Low
42	CSI Camera Module Reset Control GPIO	CSI Connector	Reset	I2C GPIO Expander		Output	High	Low
43	Display_Power_Down GPIO	HDMI / GPMC Daughter Card	Display_PowerDown	I2C GPIO Expander		Output	High	Low
44	Touch Event GPIO	HDMI / GPMC Daughter Card	Interrupt	I2C GPIO Expander		Input	High	Low
45	SGMII PHY reset control	Serdes Modules	Reset	I2C GPIO Expander		Output	High	Low
46	SGMII PHY Interrupt	Serdes Modules	Interrupt	GPIO1_81	NMIN	Input/Output	High	Low

I2C TREE



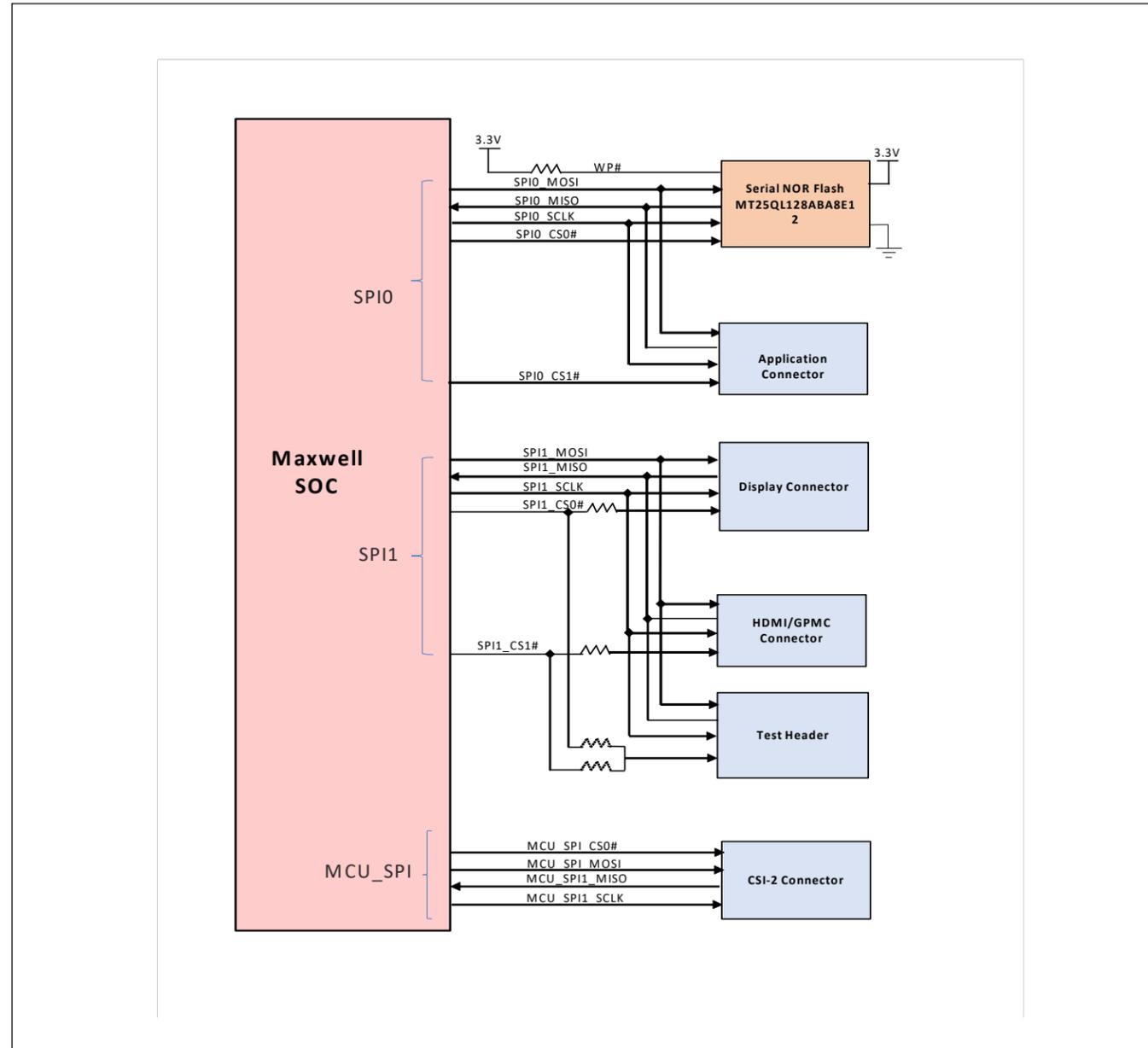
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Title I2C TREE

Size	Variant Name = PROC082 001 OPN#TMDX654IDKEVM	Rev
C		A
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SPI TREE



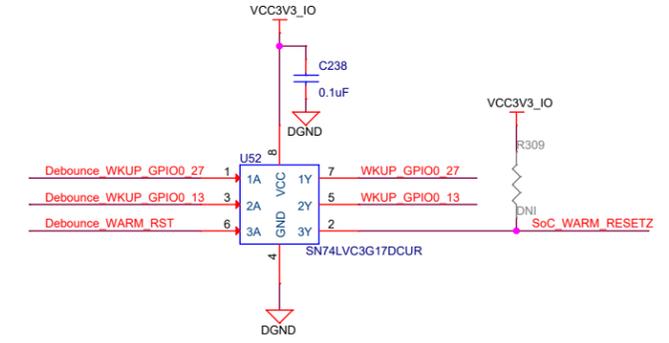
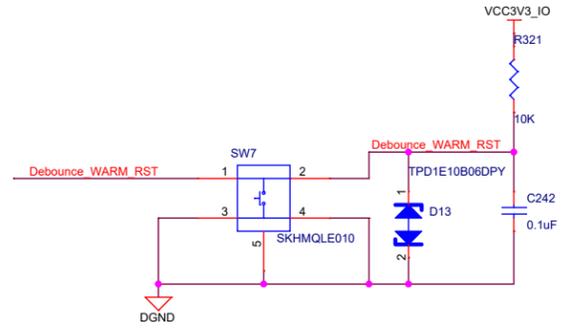
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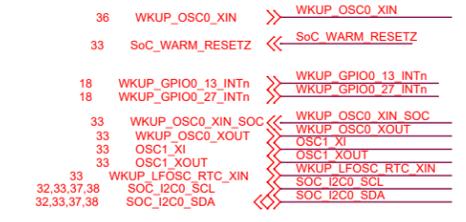
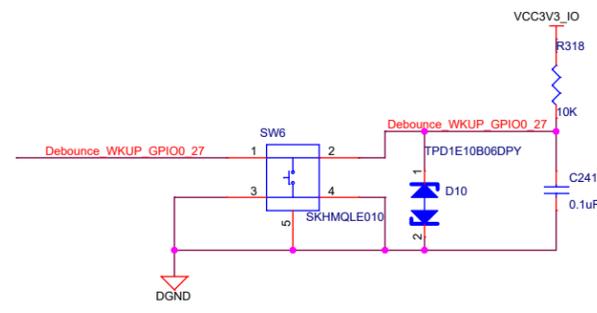
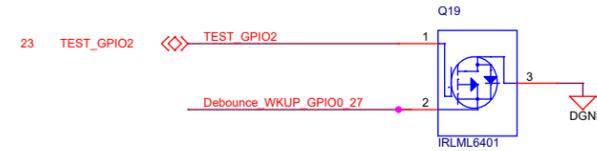
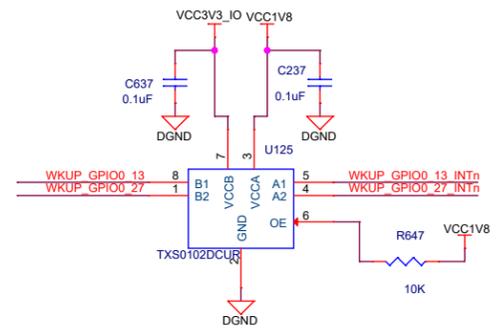
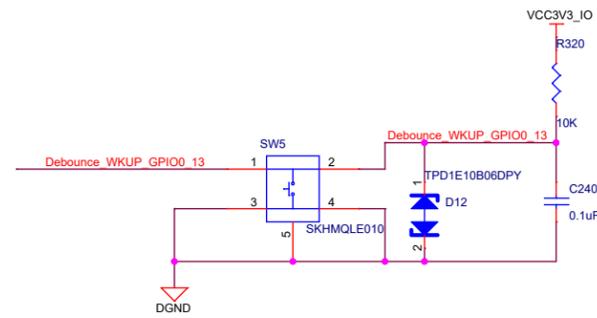
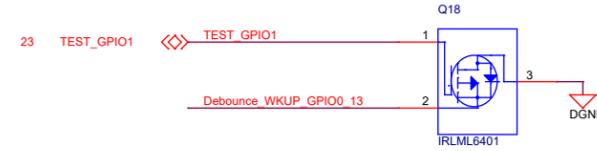
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Size	Variant Name = PROC082 001 OPN#TMDX654IDKEVM	Rev
C		A
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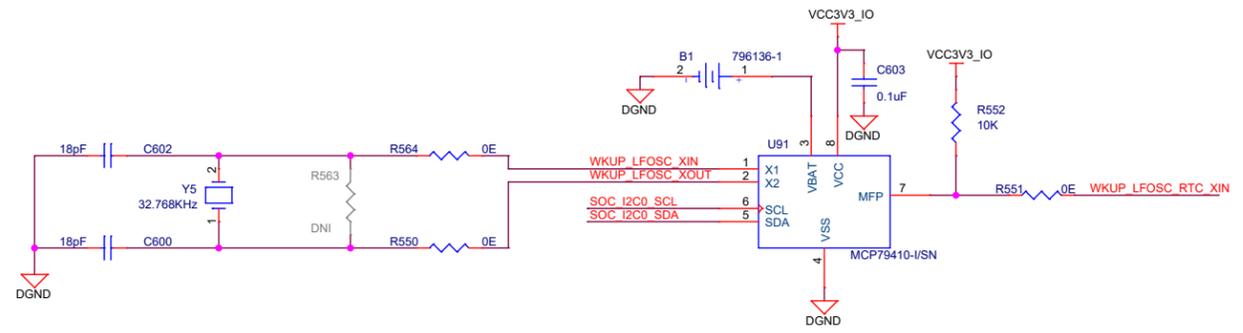
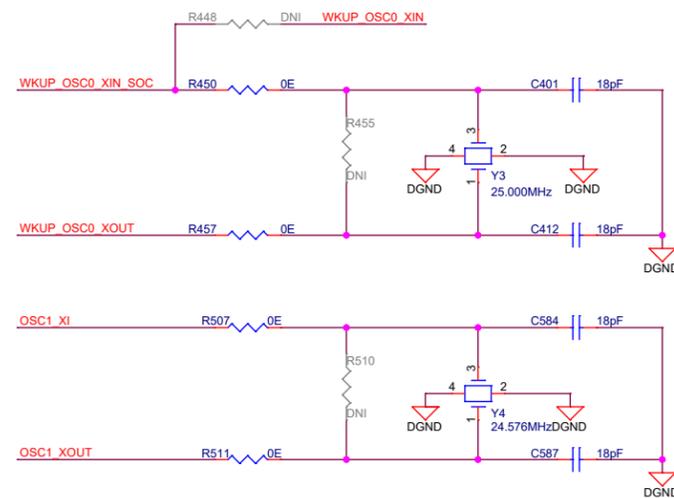
SoC WARM_RST



MCU_PUSH BUTTONS



SoC CLOCK

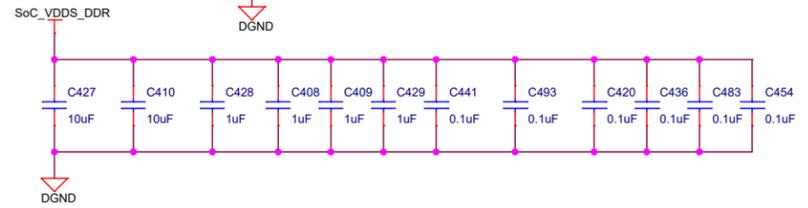
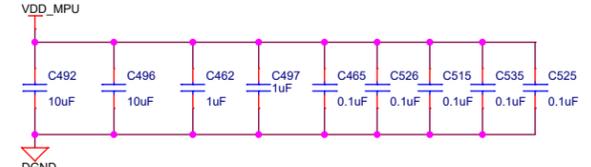
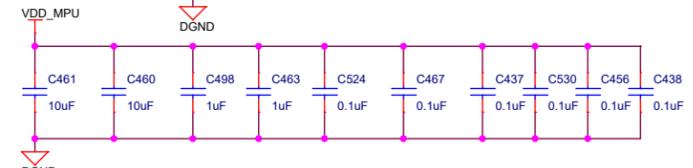
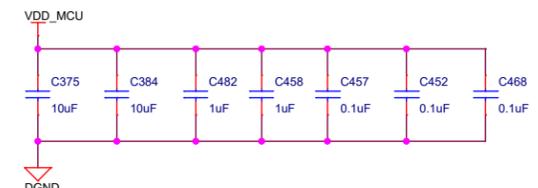
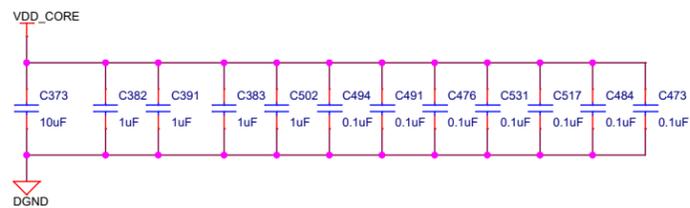
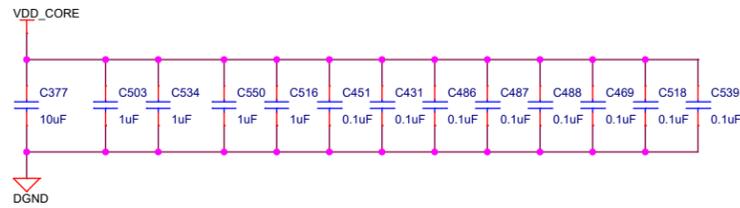
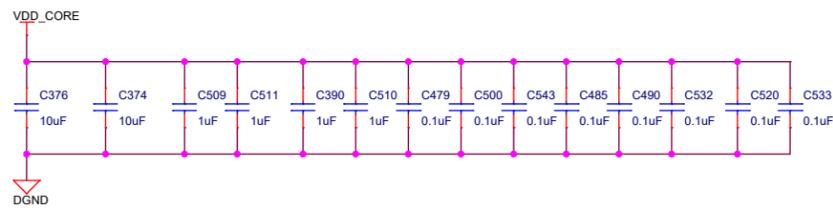
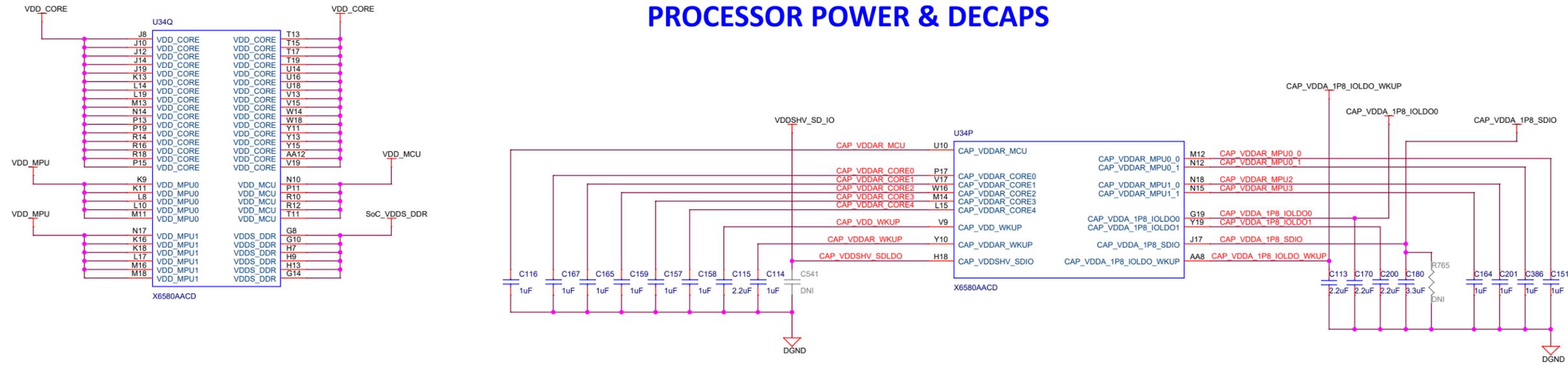


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Title		SoC CLOCK & RESET	
Size	Variant Name = PROC082 001 OPN#TMDX654IDKEVM	Rev	A
Date:	Monday, February 10, 2020	Sheet	10 of 44

PROCESSOR POWER & DECAPS



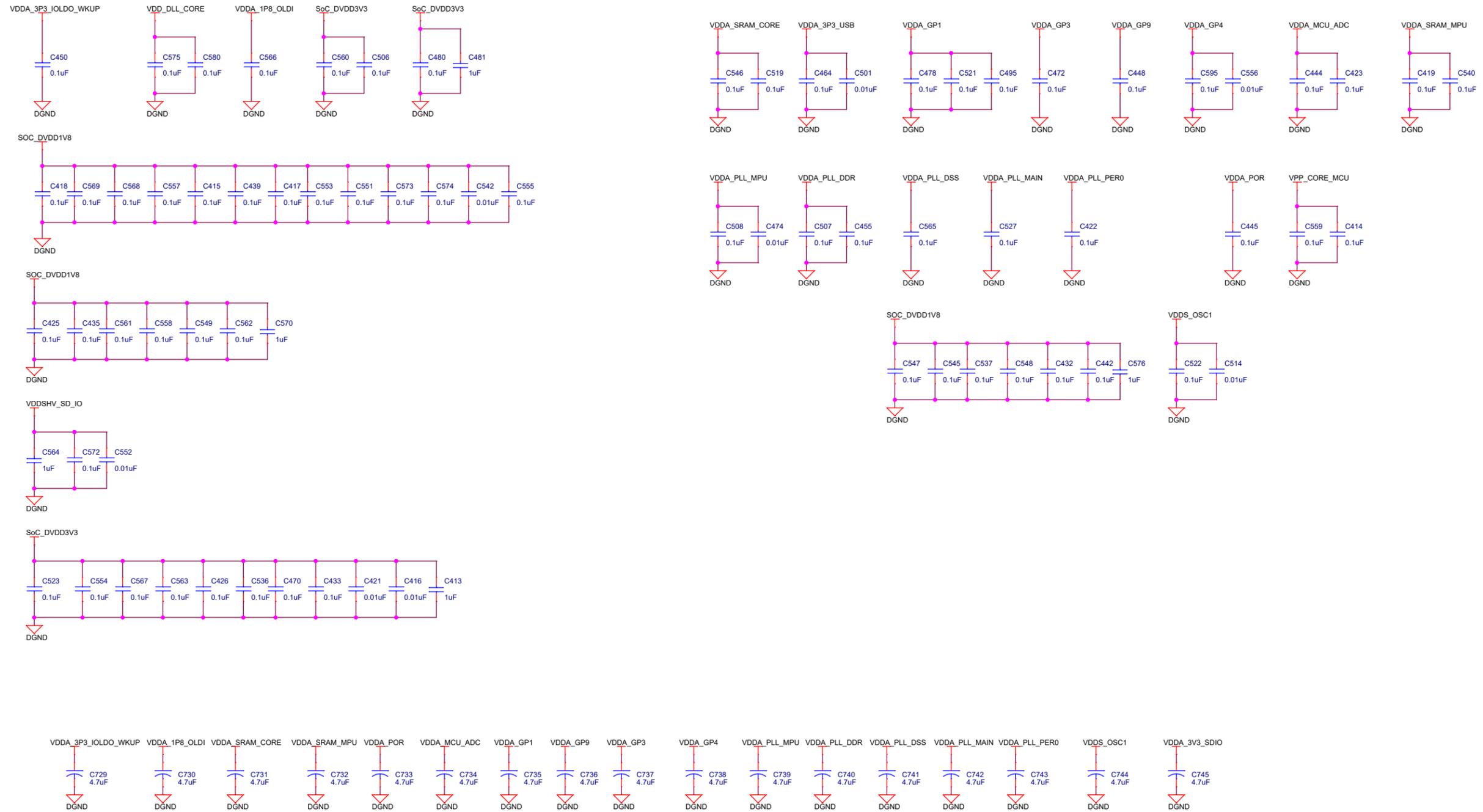
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Title SoC POWER1

Size	Variant Name = PROC082 001 OPN#TMDX654IDKEVM	Rev
C		A
Date:	Friday, February 07, 2020	Sheet 11 of 44

PROCESSOR DECAPS



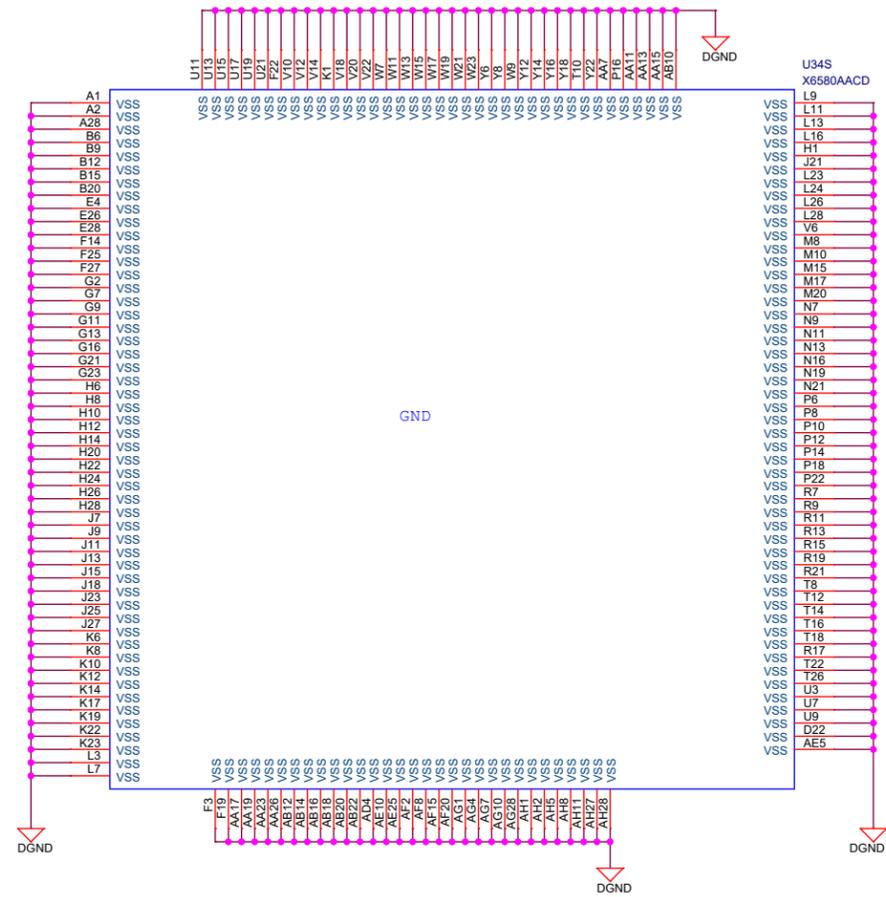
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Title SoC POWER3

Size	Variant Name = PROC082 001 OPN#TMDX654IDKEVM	Rev
C		A
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SoC POWER - VSS



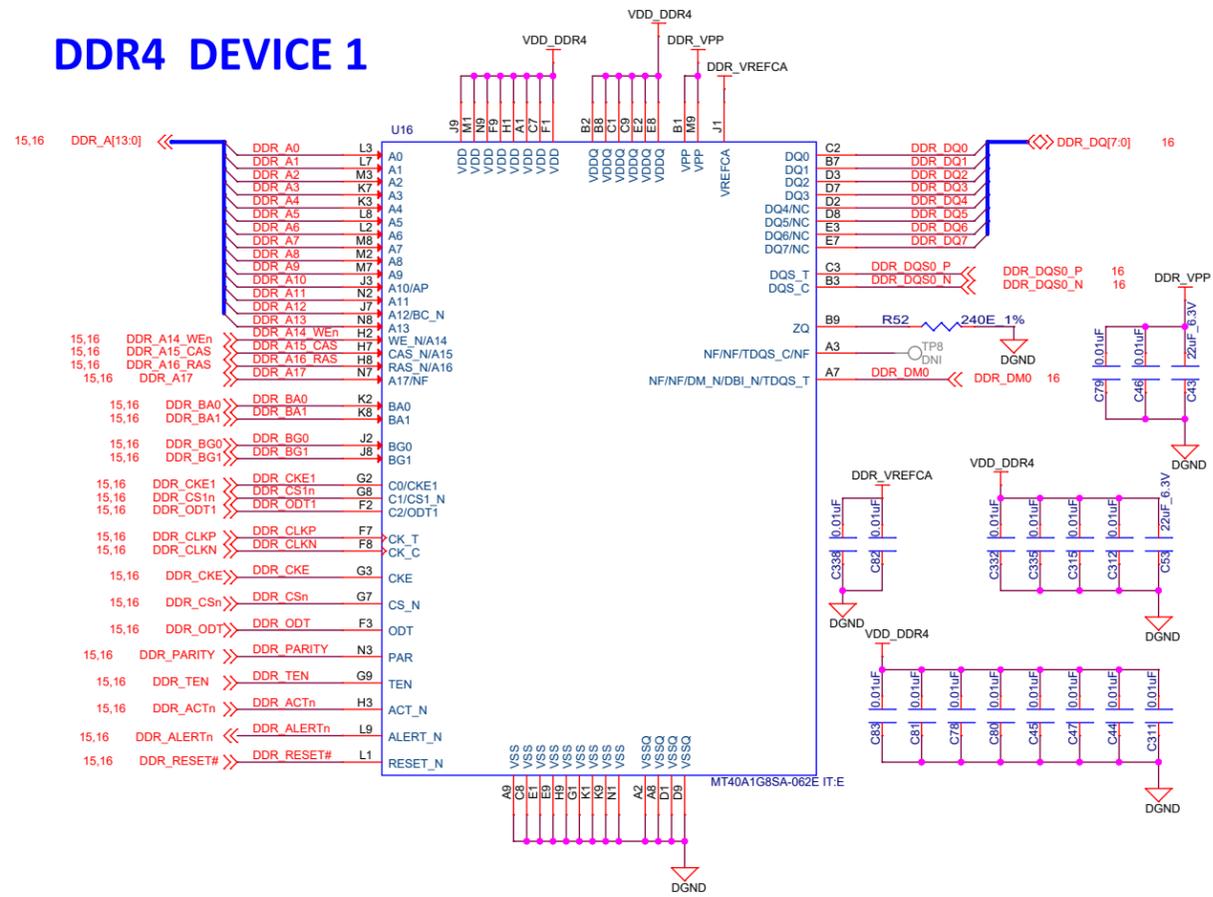
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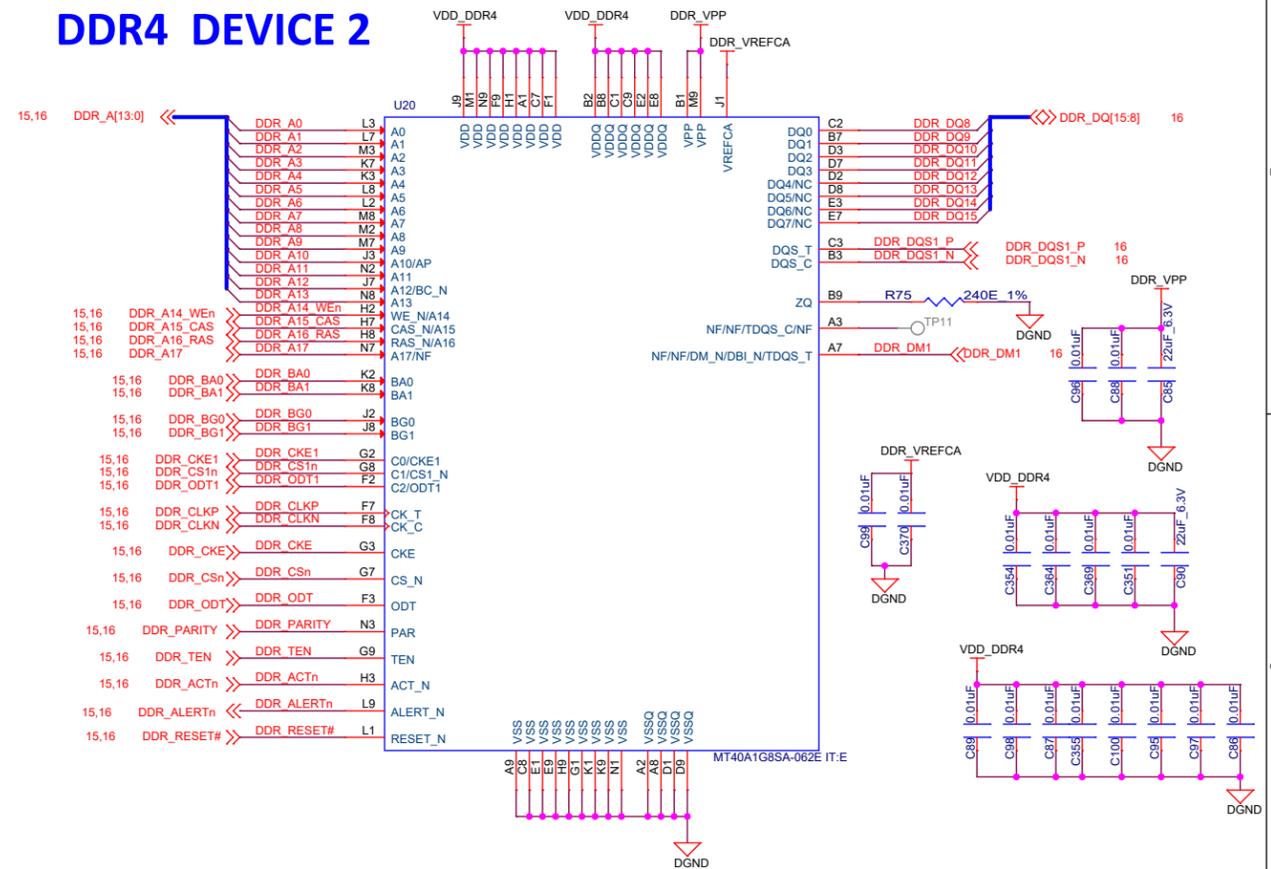
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C		A
Date:	Friday, February 07, 2020	Sheet 14 of 44

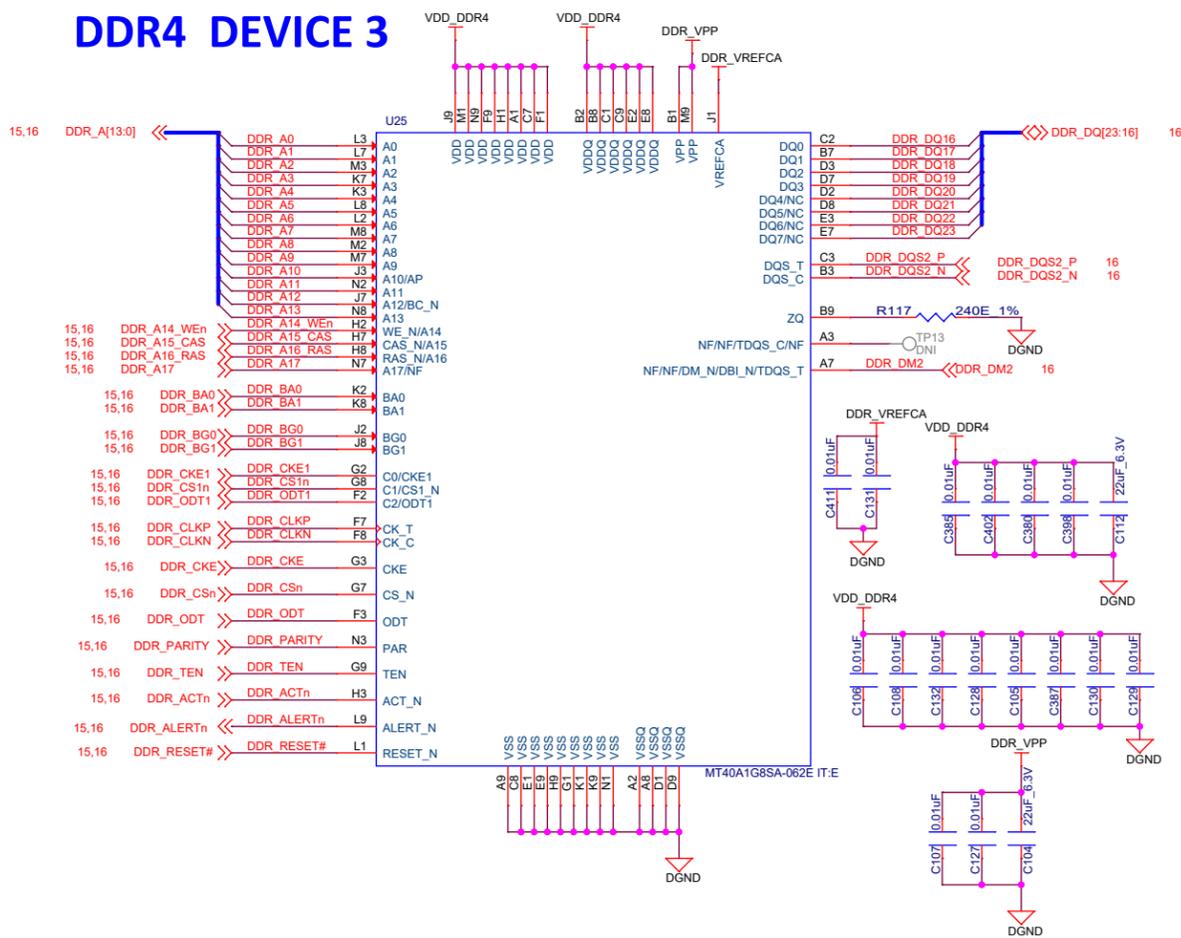
DDR4 DEVICE 1



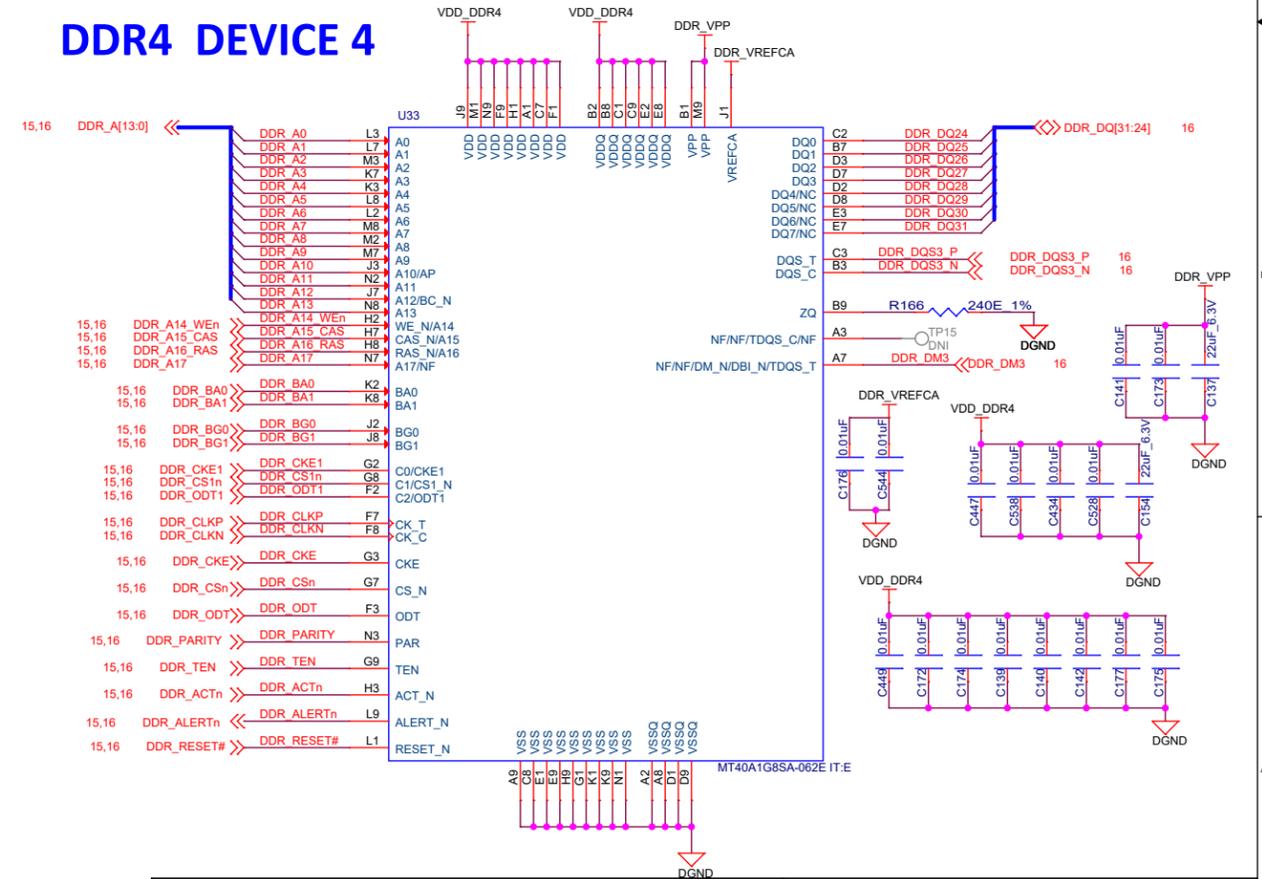
DDR4 DEVICE 2



DDR4 DEVICE 3



DDR4 DEVICE 4

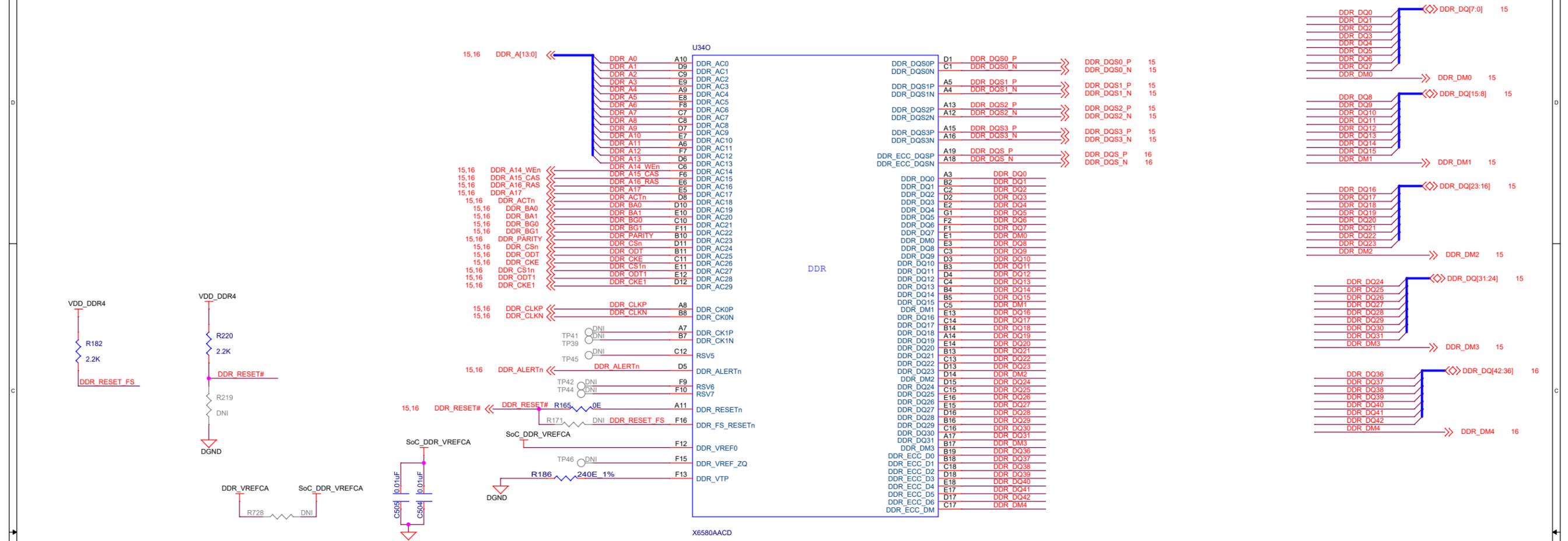


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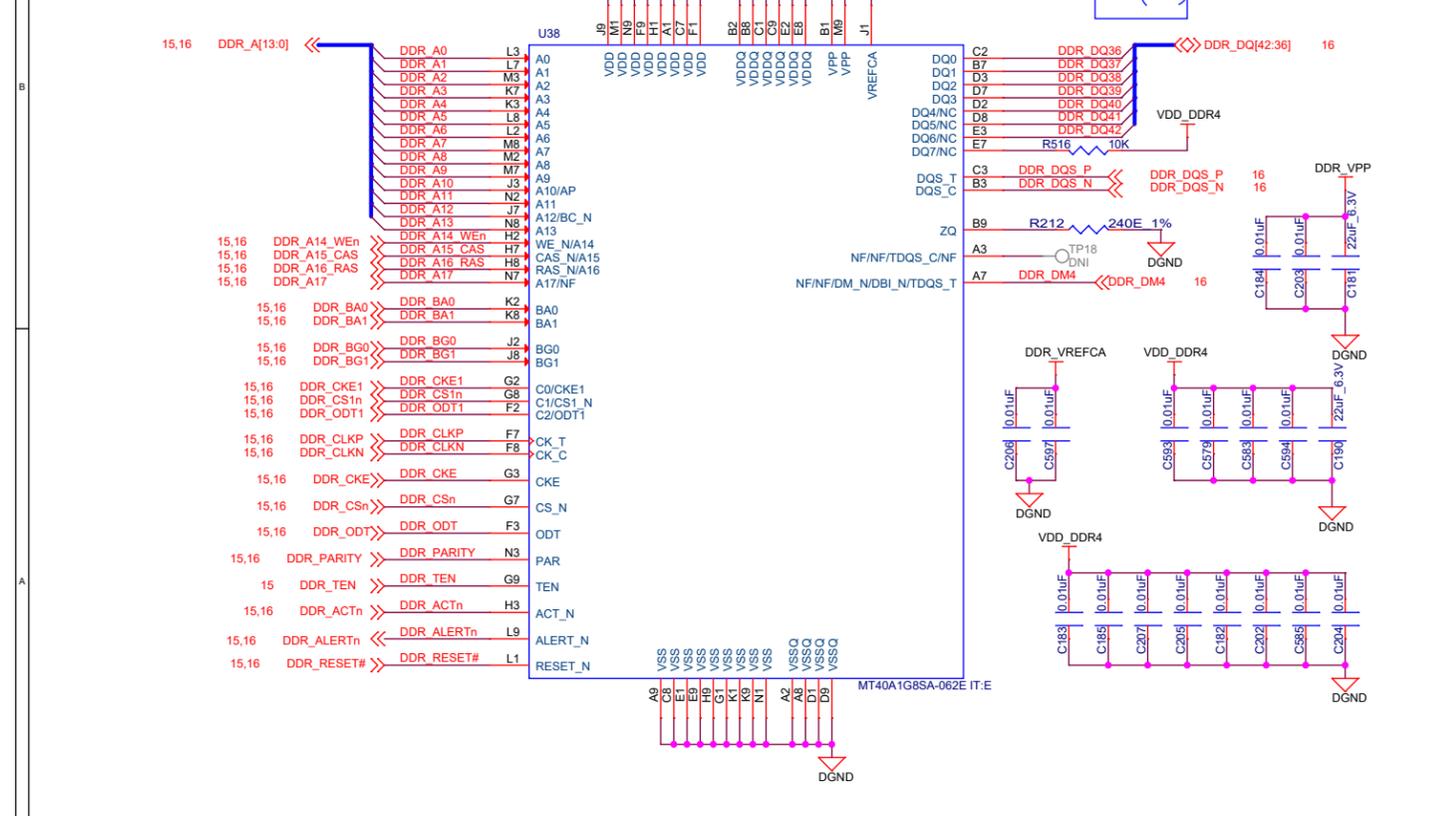


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Size	Variant Name = PROC082 001 OPN#TMDX654IDKEVM	Rev
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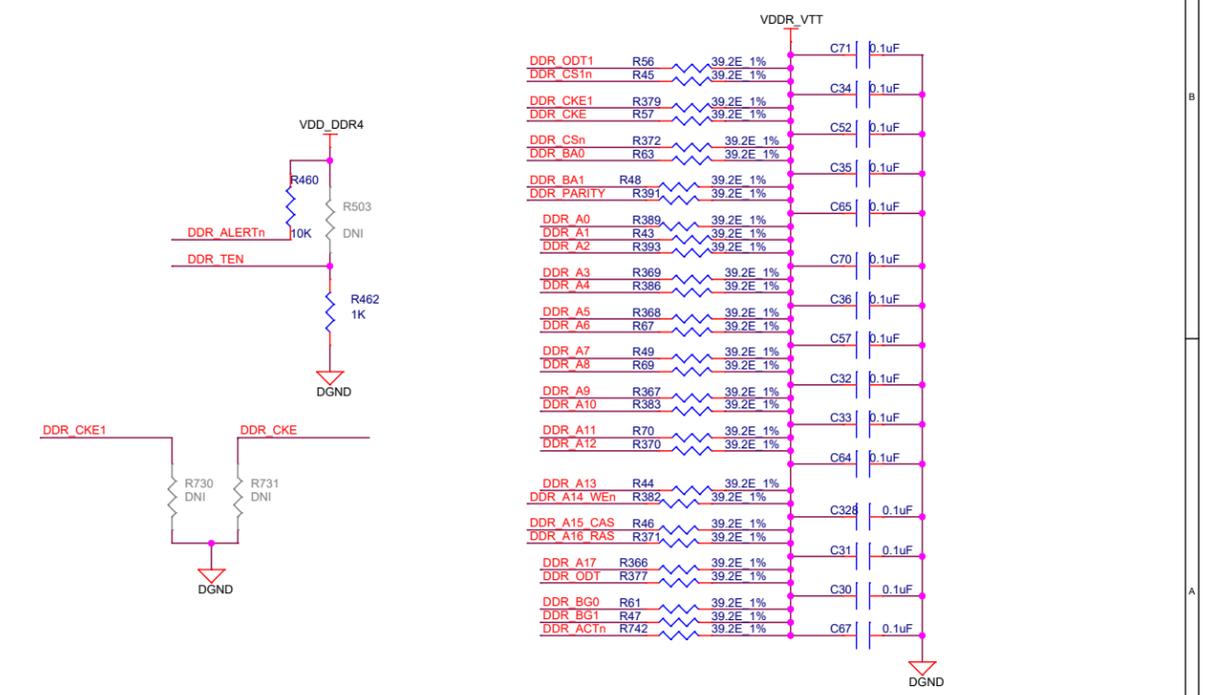
SoC DDR INTERFACE



ECC DEVICE



DDR TERMINATION

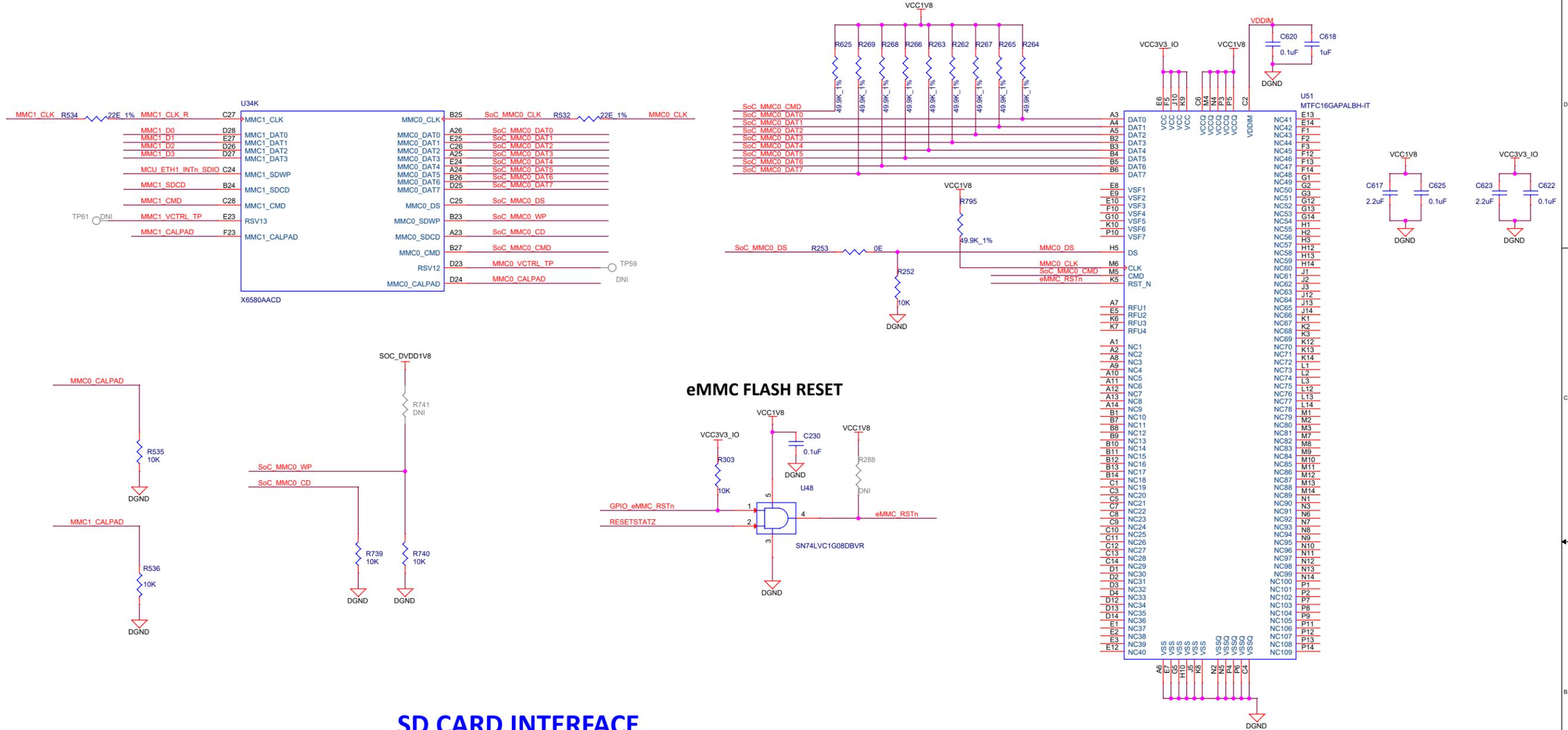


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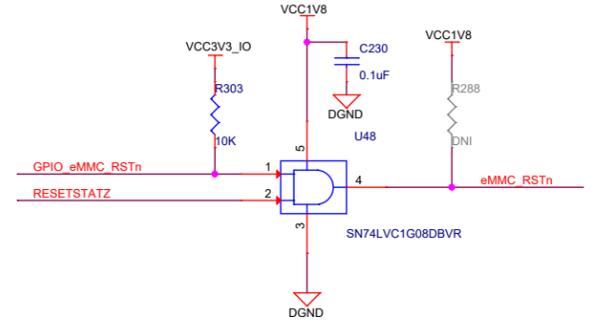


Title		
DDR4 ECC & TERMINATIONS		
Size	Rev	
C	A	Variant Name = PROC082 001 OPN#TMDX654IDKEVM
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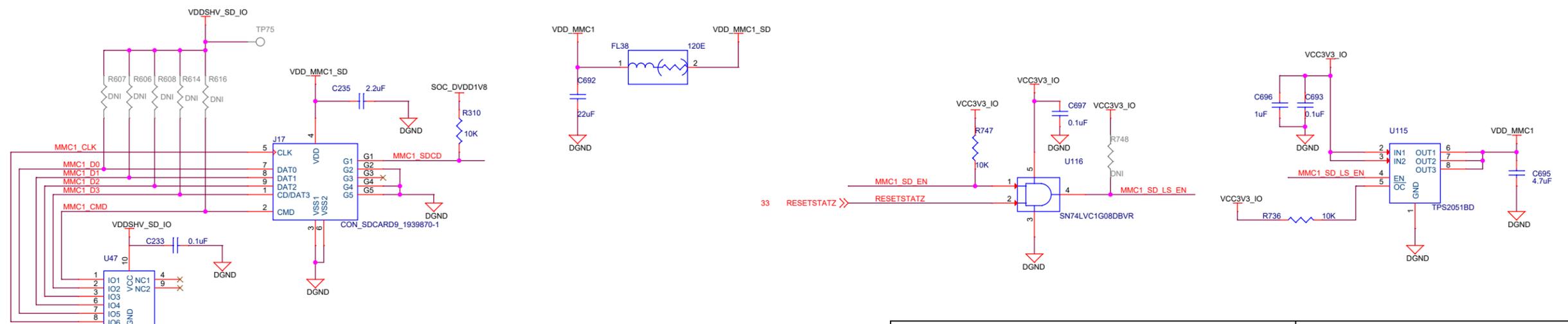
eMMC FLASH



eMMC FLASH RESET



SD CARD INTERFACE



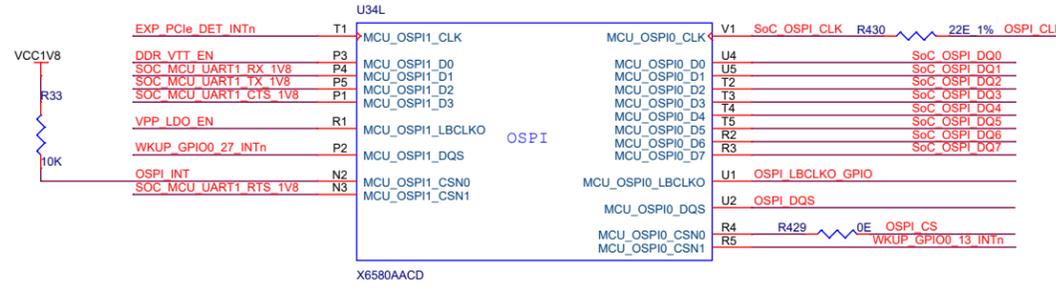
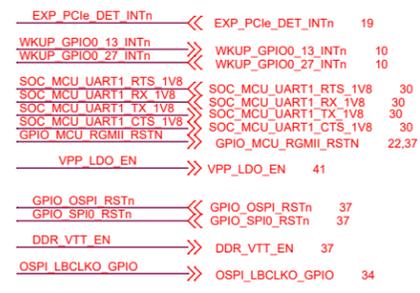
- 18.41 VPP_LDO_EN <<< VPP_LDO_EN
- 37 GPIO_eMMC_RSTn <<< GPIO_eMMC_RSTn
- 38 MCU_ETH1_INTr_SDIO <<< MCU_ETH1_INTr_SDIO
- 19 MMC1_SD_EN <<< MMC1_SD_EN

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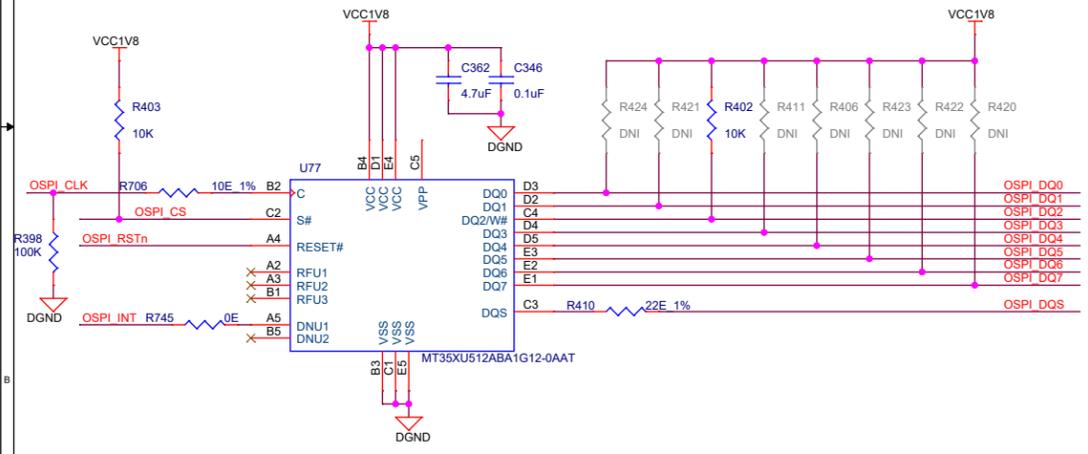
TEXAS INSTRUMENTS **MISTRAL**

Title: eMMC_FLASH_SDCARD INTERFACE		Rev: A
Size: C	Variant Name = PROC082 001 OPN#TMDX654IDKEVM	Rev: A
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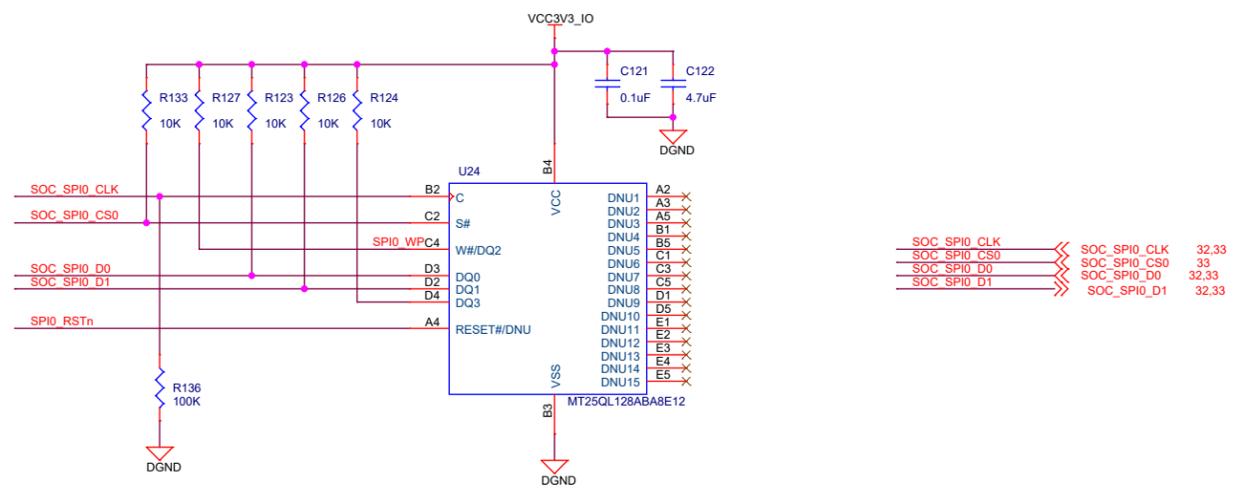
SOC OSPI INTERFACE



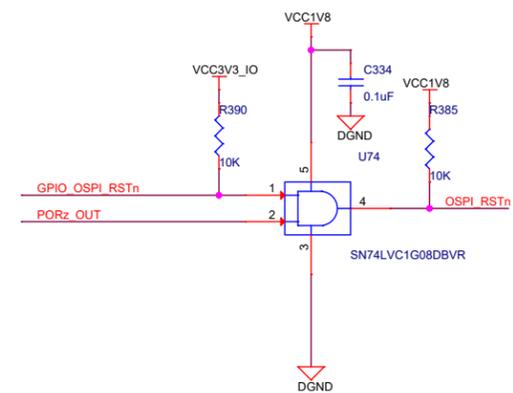
OSPI FLASH



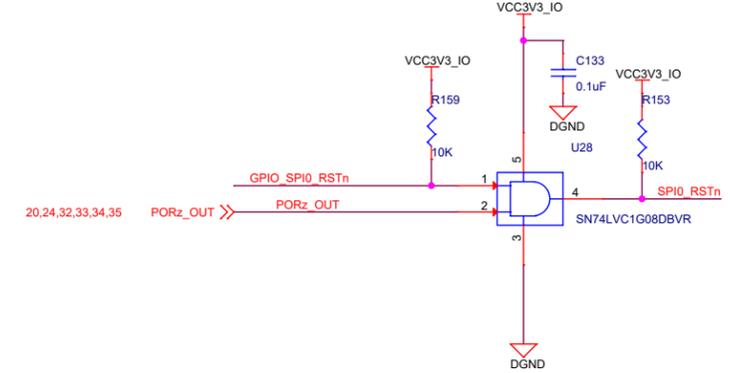
SPI NOR Flash



OSPI FLASH RESET



SPI FLASH RESET

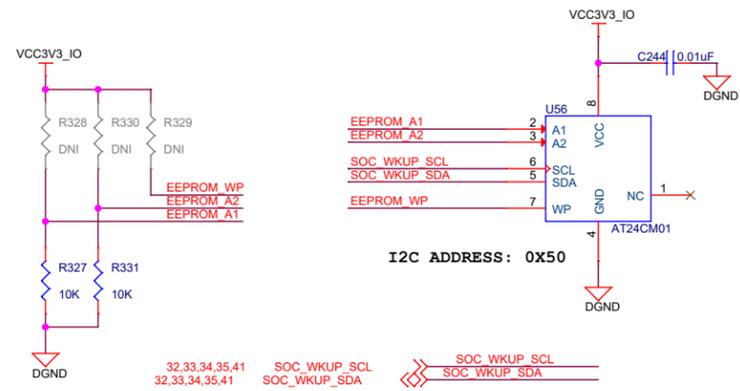


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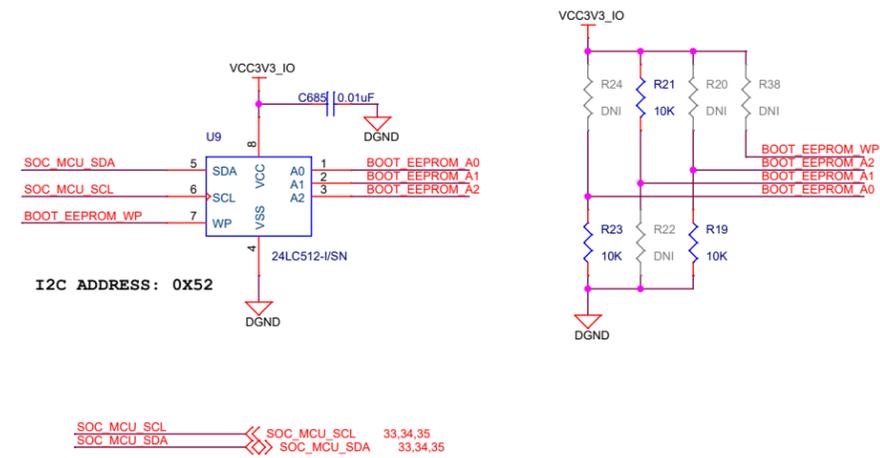


Title OSPI FLASH & SPI NOR FLASH		
Size	Variant Name = PROC082 001 OPN#TMDX654IDKEVM	Rev
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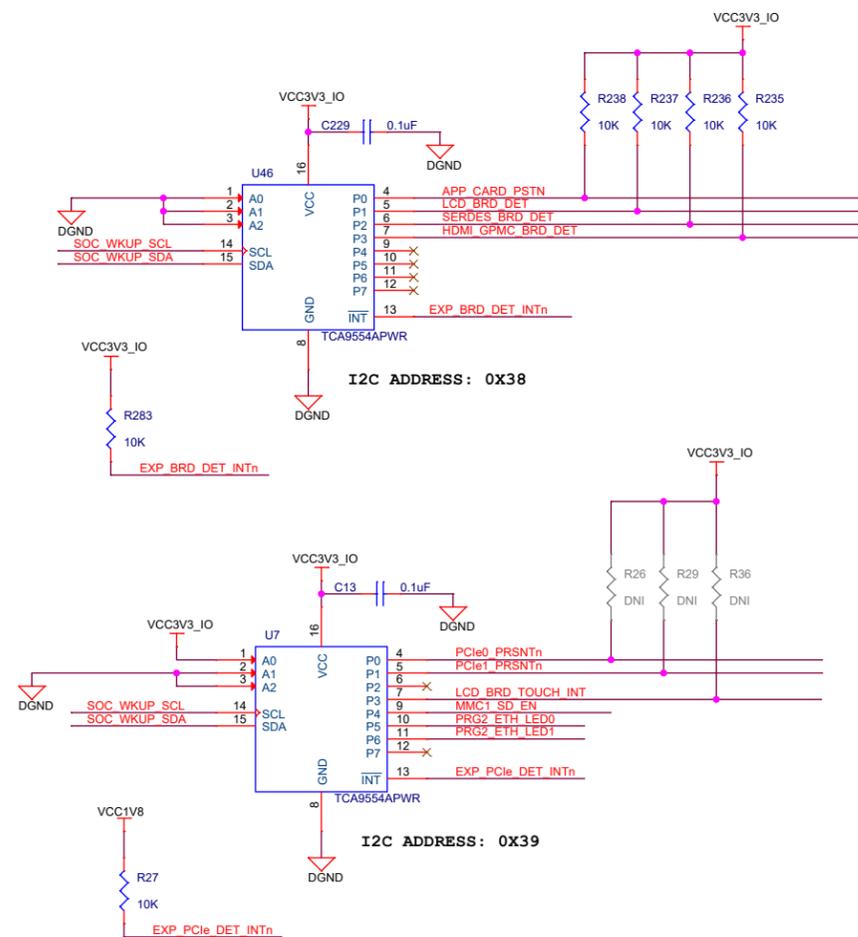
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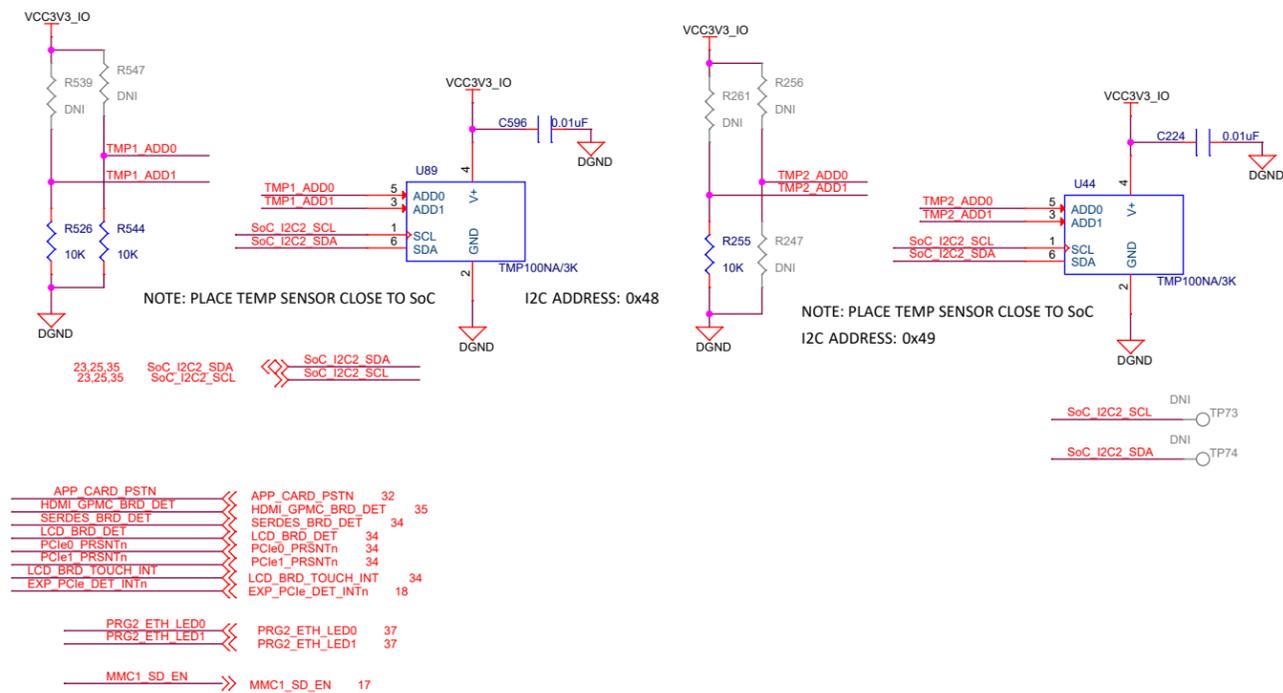
BOOT EEPROM



BOARD PRESENCE DETECT CIRCUIT



TEMPERATURE SENSOR

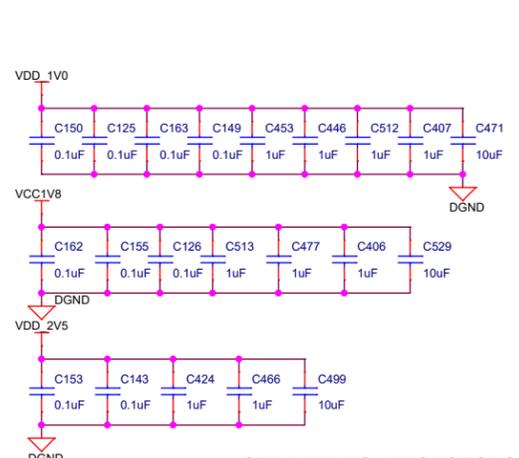


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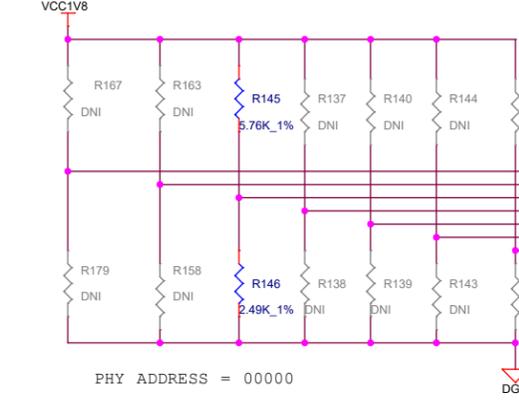


Title EEPROM, PRESENCE DETECTION & TEMP SENSOR

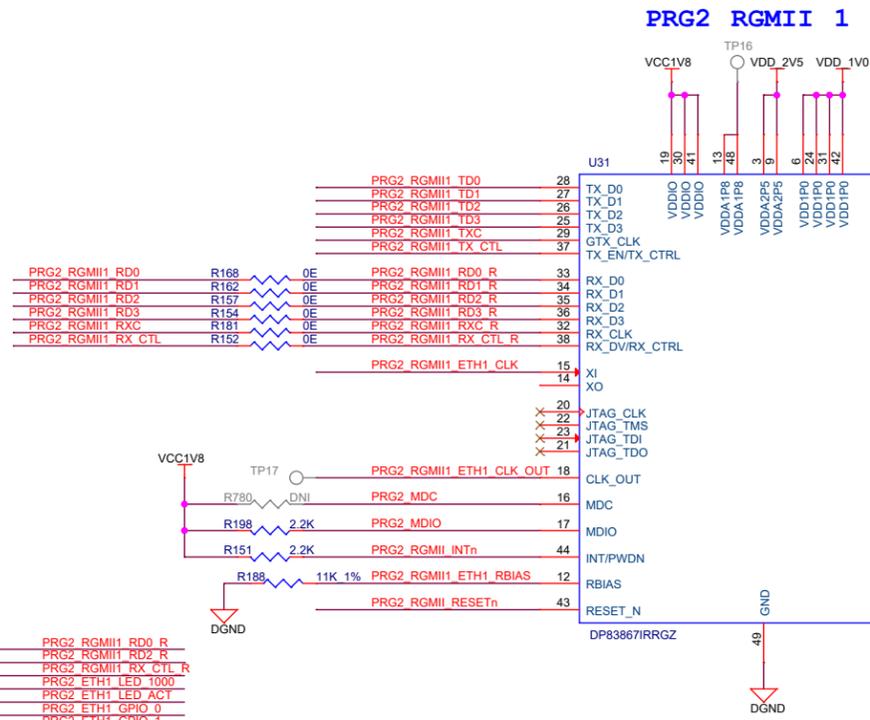
Size	Variant Name = PROC082 001 OPN#TMDX654IDKEVM	Rev
C		A
Date:	Friday, February 07, 2020	Sheet 19 of 44



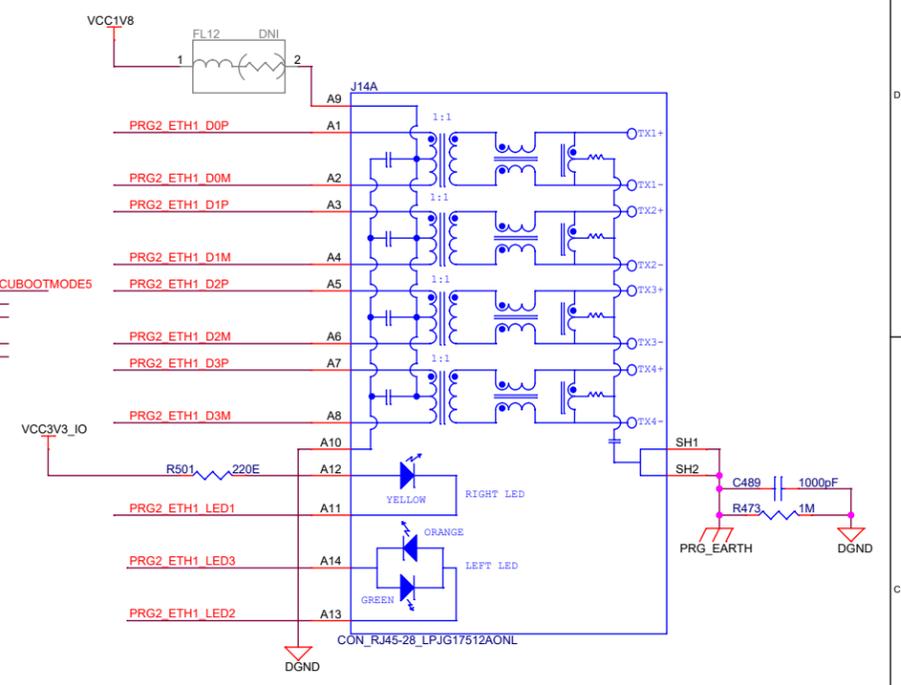
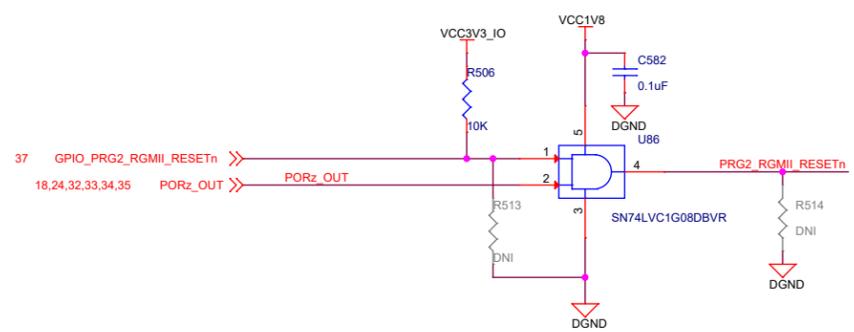
STRAPPING RESISTORS



PHY ADDRESS = 00000

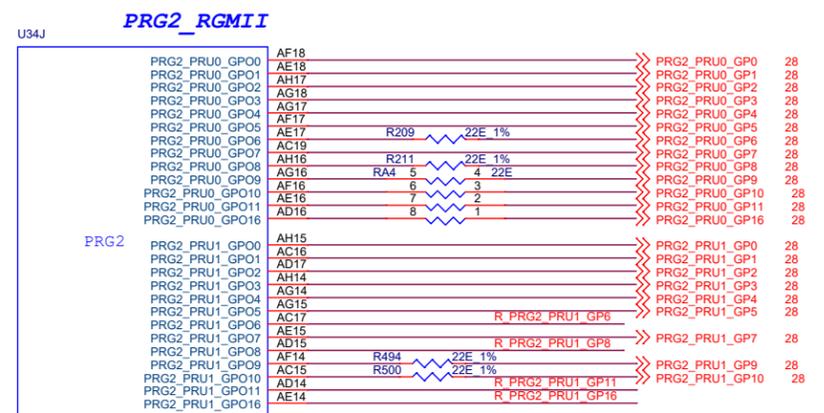


PRG2 PHY1 RESET



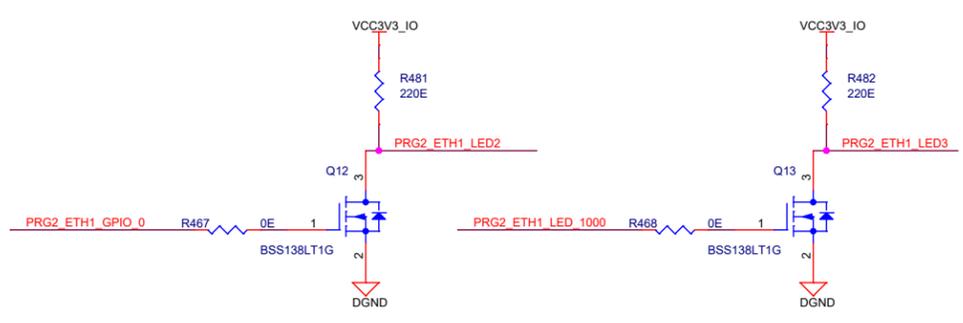
21,38	PRG2_RGMII_INTn	PRG2_RGMII_INTn
36	PRG2_RGMII_ETH1_CLK	PRG2_RGMII_ETH1_CLK
28	PRG2_RGMII_TD0	PRG2_RGMII_TD0
28	PRG2_RGMII_TD1	PRG2_RGMII_TD1
28	PRG2_RGMII_TD2	PRG2_RGMII_TD2
28	PRG2_RGMII_TD3	PRG2_RGMII_TD3
28	PRG2_RGMII_TXC	PRG2_RGMII_TXC
28	PRG2_RGMII_TX_CTL	PRG2_RGMII_TX_CTL
28	PRG2_RGMII_RD0	PRG2_RGMII_RD0
28	PRG2_RGMII_RD1	PRG2_RGMII_RD1
28	PRG2_RGMII_RD2	PRG2_RGMII_RD2
28	PRG2_RGMII_RD3	PRG2_RGMII_RD3
28	PRG2_RGMII_RXC	PRG2_RGMII_RXC
28	PRG2_RGMII_RX_CTL	PRG2_RGMII_RX_CTL
21,28,34	PRG2_MDC	PRG2_MDC
21,28,34	PRG2_MDIO	PRG2_MDIO
21	PRG2_RGMII_RESETn	PRG2_RGMII_RESETn
24,33	PRG2_ETH1_LED_LINK/MCUBOOTMODE5	PRG2_ETH1_LED_LINK/MCUBOOTMODE5

RGMII ETHERNET PHY - ICSSG



R PRG2_PRU1_GP11	RA2	8	1	22E	PRG2_PRU1_GP11
R PRG2_PRU1_GP16	7	2	2	22E	PRG2_PRU1_GP16
R PRG2_PRU1_GP6	6	3	3	22E	PRG2_PRU1_GP6
R PRG2_PRU1_GP8	5	4	4	22E	PRG2_PRU1_GP8
R PRG2_PRU1_GP6					PRG2_PRU1_GP6
R PRG2_PRU1_GP8					PRG2_PRU1_GP8
R PRG2_PRU1_GP11					PRG2_PRU1_GP11
R PRG2_PRU1_GP16					PRG2_PRU1_GP16

PRG2_ETHERNET PHY- 1 SPEED & ACTIVITY LED 'S DRIVERS

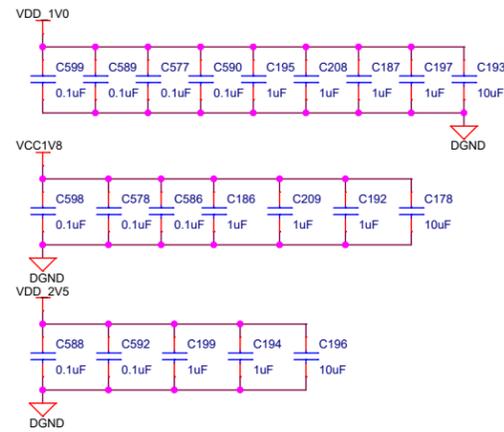


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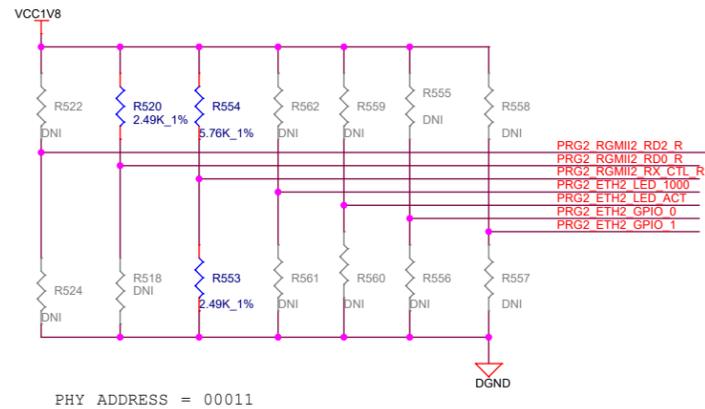


Title		RGMII ETHERNET PHY - ICSSG PRG2_PRU0	
Size	Variant Name = PROC062 001 OPN#TMDX654IDKEVM	Rev	
C		A	
Date:	Friday, February 07, 2020	Sheet	20 of 44

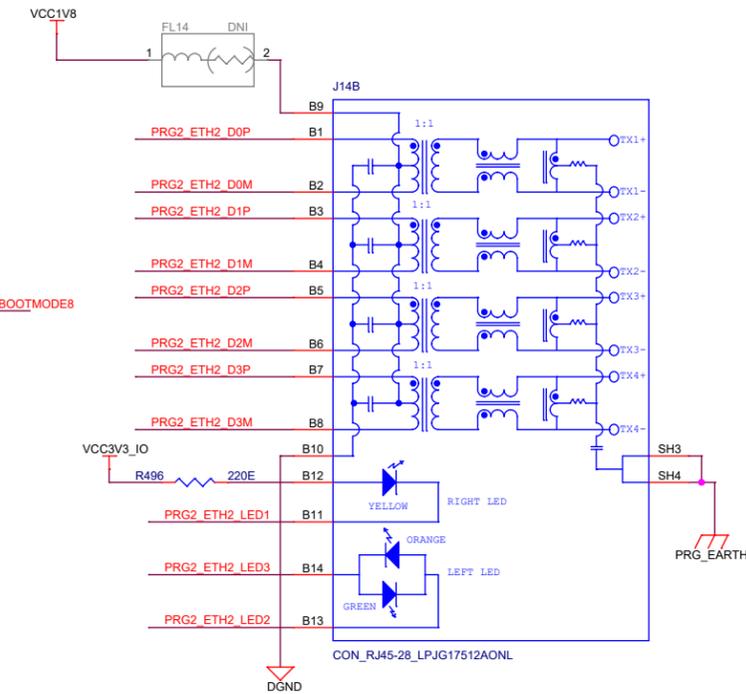
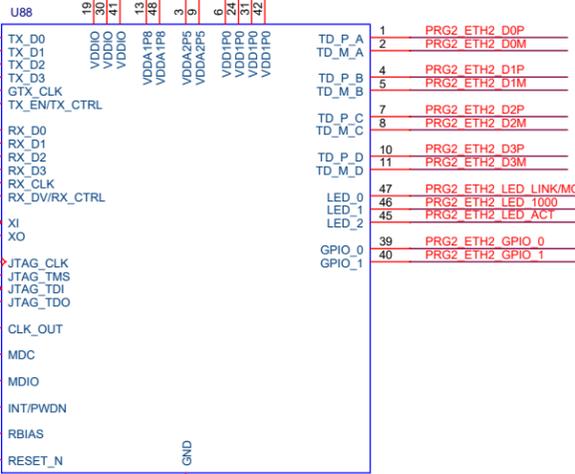
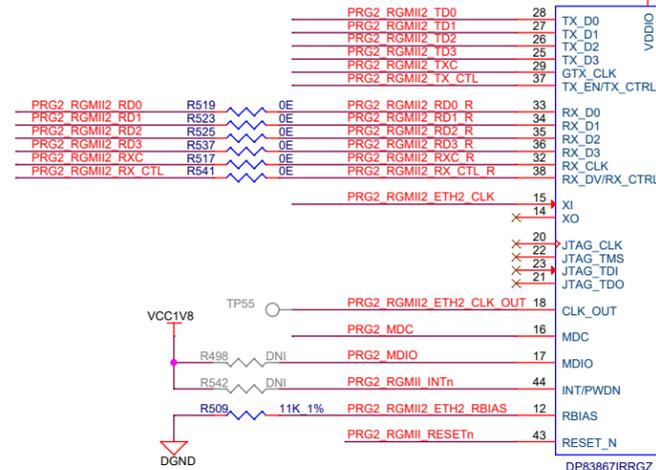
PRG2 RGMII 2



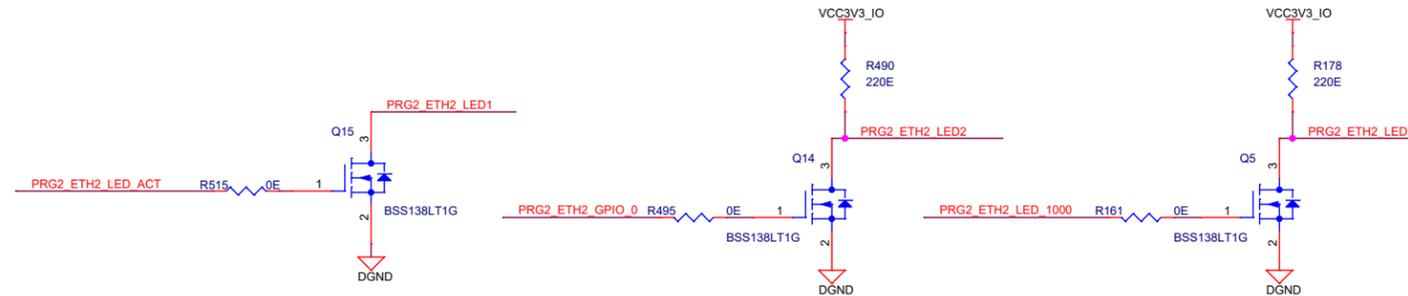
STRAPPING RESISTORS



PHY ADDRESS = 00011



PRG2_ETHERNET - 2 SPEED & ACTIVITY LED 'S DRIVERS



20	PRG2_RGMII2_RESETn	PRG2_RGMII2_RESETn
20,38	PRG2_RGMII2_INTn	PRG2_RGMII2_INTn
24,33	PRG2_ETH2_LED_LINK/MCUBOOTMODE8	PRG2_ETH2_LED_LINK/MCUBOOTMODE8
36	PRG2_RGMII2_ETH2_CLK	PRG2_RGMII2_ETH2_CLK
28	PRG2_RGMII2_TD0	PRG2_RGMII2_TD0
28	PRG2_RGMII2_TD1	PRG2_RGMII2_TD1
28	PRG2_RGMII2_TD2	PRG2_RGMII2_TD2
28	PRG2_RGMII2_TD3	PRG2_RGMII2_TD3
28	PRG2_RGMII2_TXC	PRG2_RGMII2_TXC
28	PRG2_RGMII2_TX_CTL	PRG2_RGMII2_TX_CTL
28	PRG2_RGMII2_RD0	PRG2_RGMII2_RD0
28	PRG2_RGMII2_RD1	PRG2_RGMII2_RD1
28	PRG2_RGMII2_RD2	PRG2_RGMII2_RD2
28	PRG2_RGMII2_RD3	PRG2_RGMII2_RD3
28	PRG2_RGMII2_RXC	PRG2_RGMII2_RXC
28	PRG2_RGMII2_RX_CTL	PRG2_RGMII2_RX_CTL
20,28,34	PRG2_MDIO	PRG2_MDIO
20,28,34	PRG2_MDC	PRG2_MDC

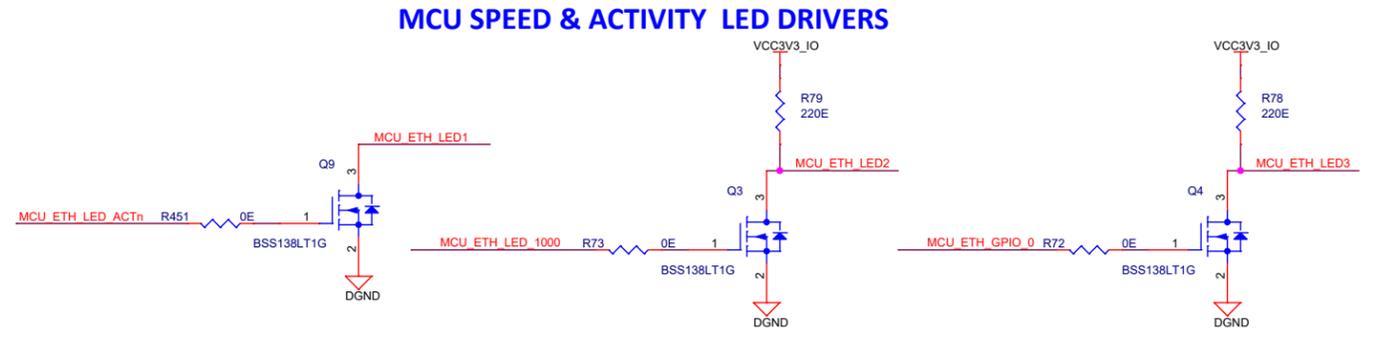
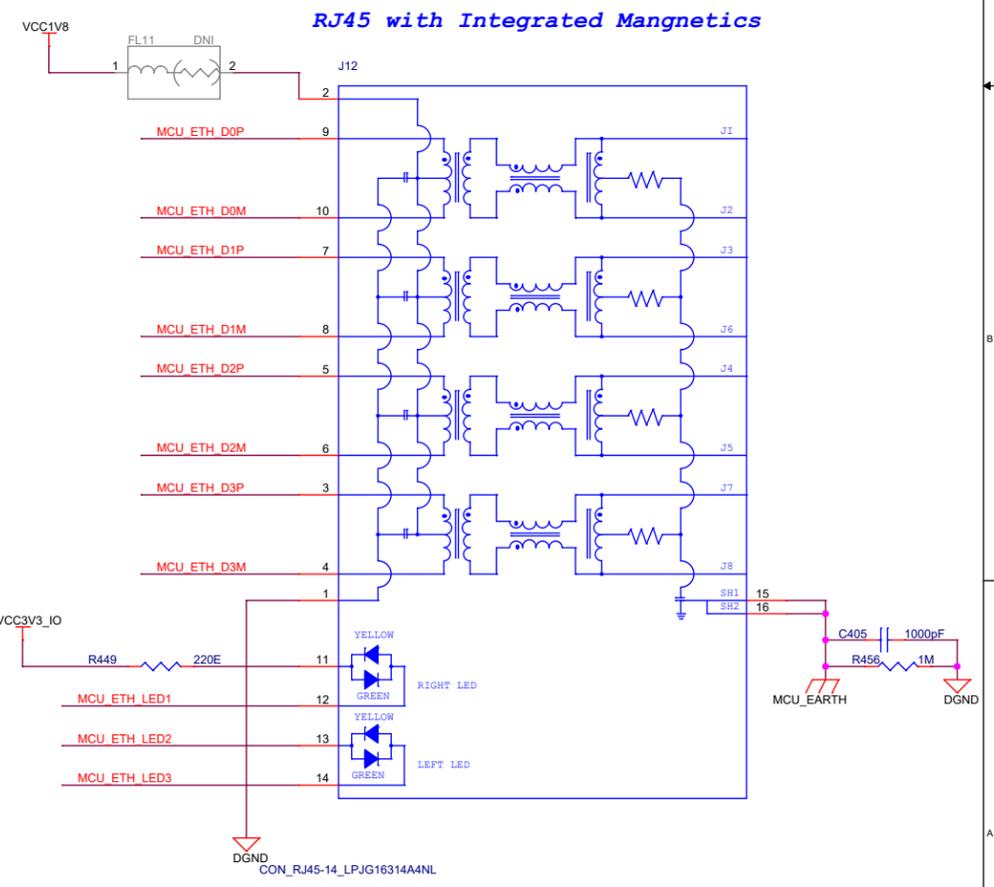
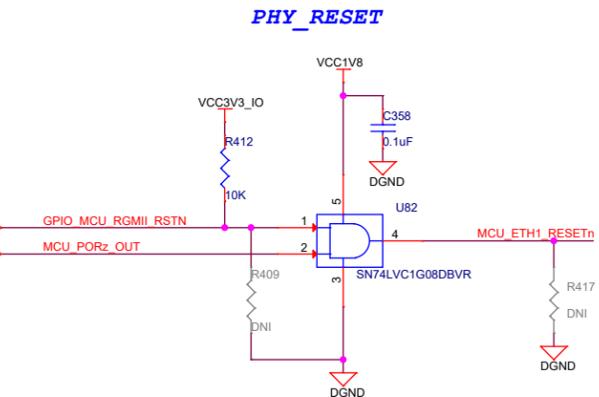
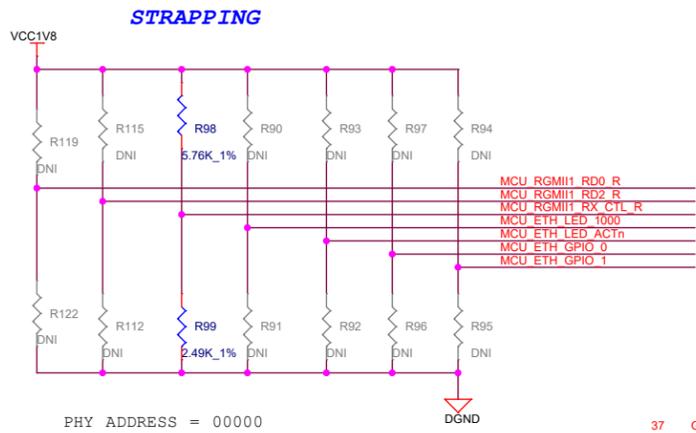
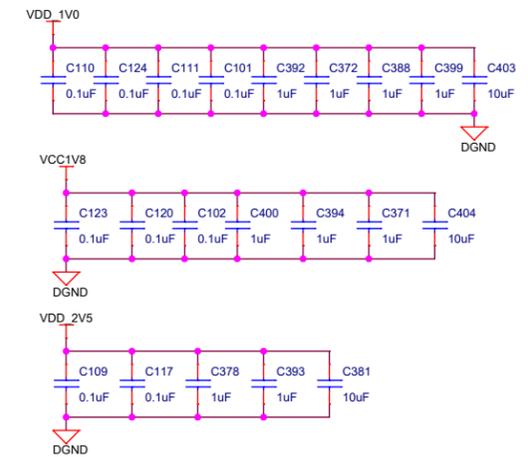
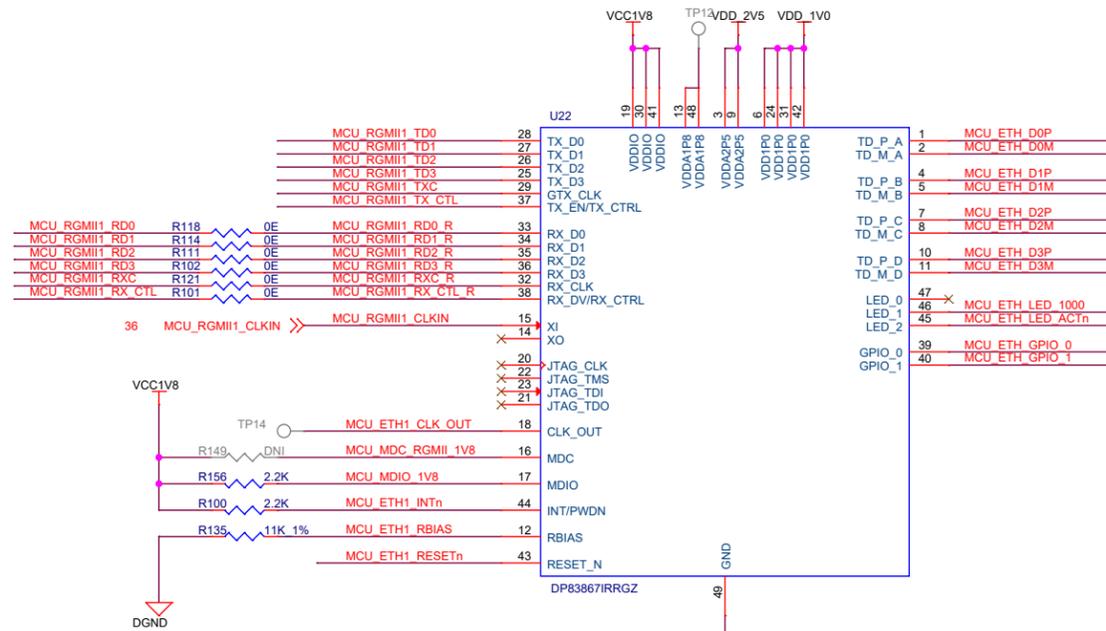
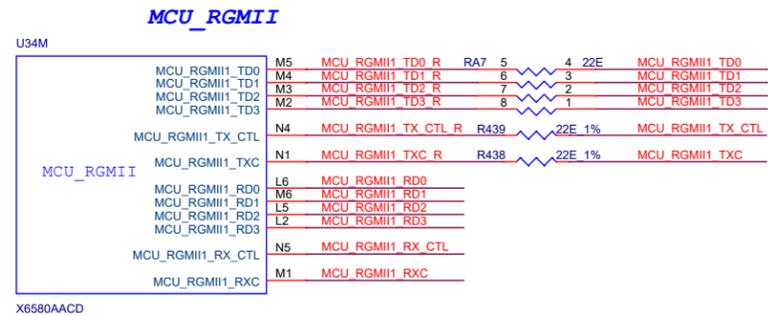
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Title RGMII ETHERNET PHY - ICSSG PRG2_PRU1

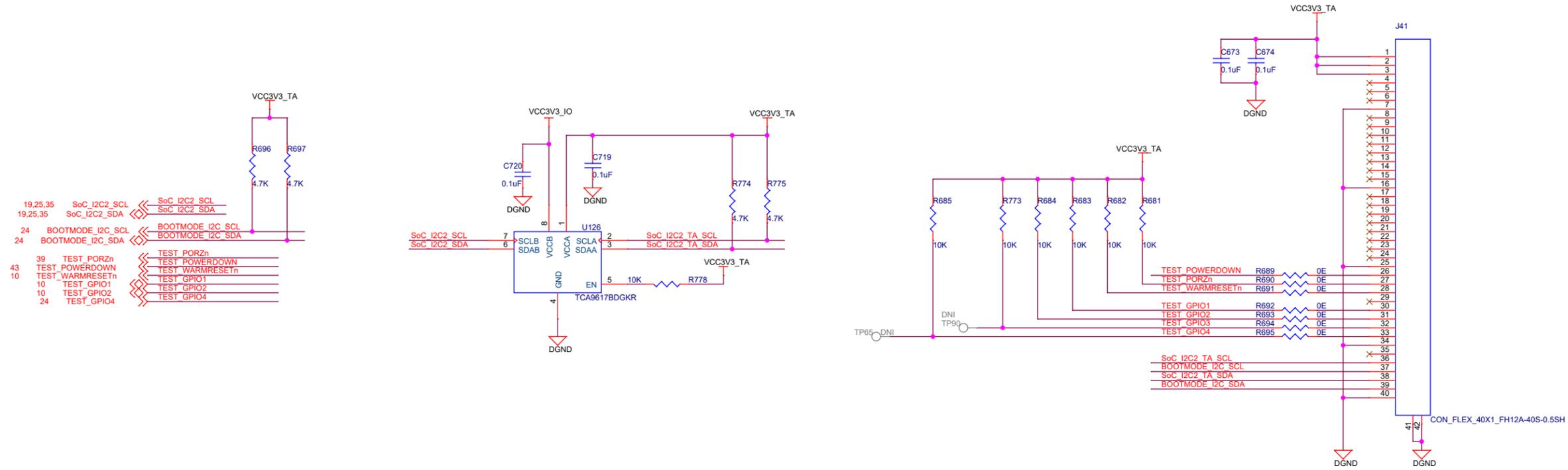
Size	Variant Name = PROC062 001 OPN#TMDX654IDKEVM	Rev	A
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RGMII ETHERNET PHY - MCU



TEST AUTOMATION

40-PIN AUTOMATION HEADER



TEST AUTOMATION GPIO MAPPING

SIGNAL NAME	DESCRIPTION	Direction WRT CTRL	Internal/ External PU/PD states
TEST_POWERDOWN	Used to Power down the OVP Circuit	OUTPUT	External Pullup
TEST_PORZn	Used to Reset the SoC PORz	OUTPUT	External Pullup
TEST_WARMRESETh	Used to Reset the SoC Warmreset	OUTPUT	External Pullup
TEST_GPIO1	Used to Generate the interrupt on WKUP_GPIO0_13_INTn Pin	OUTPUT	External Pullup
TEST_GPIO2	Used to Generate the interrupt on WKUP_GPIO0_27_INTn	OUTPUT	External Pullup
TEST_GPIO3	Used to Enable the BOOTMODE Buffer	OUTPUT	External Pullup
TEST_GPIO4	Used to Reset the Bootmode IO Expander	OUTPUT	External Pullup

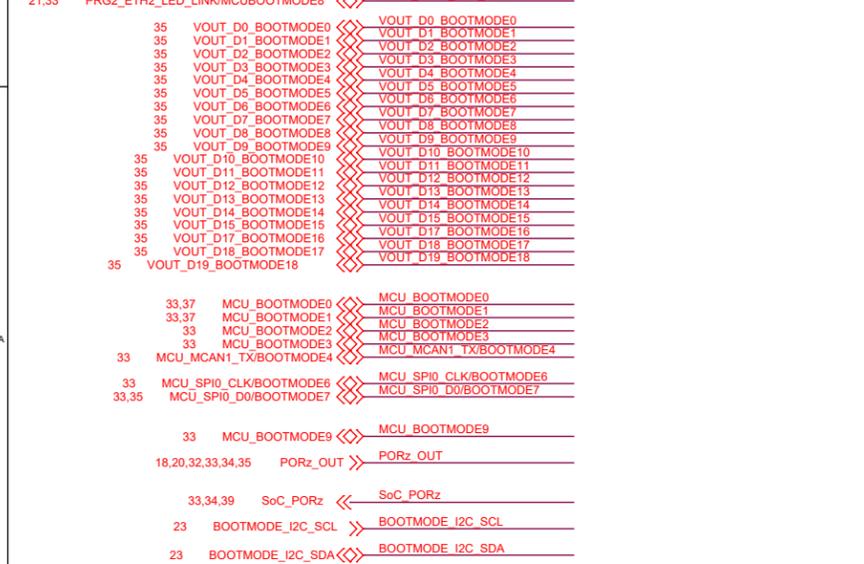
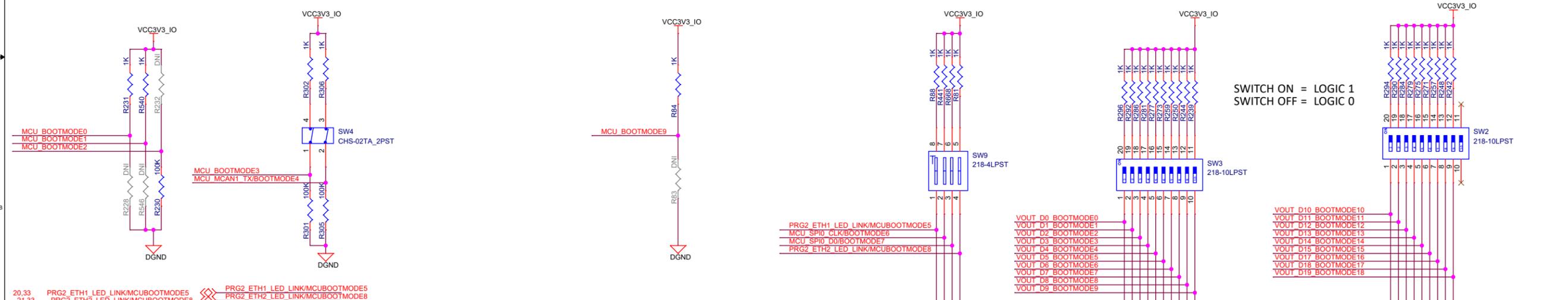
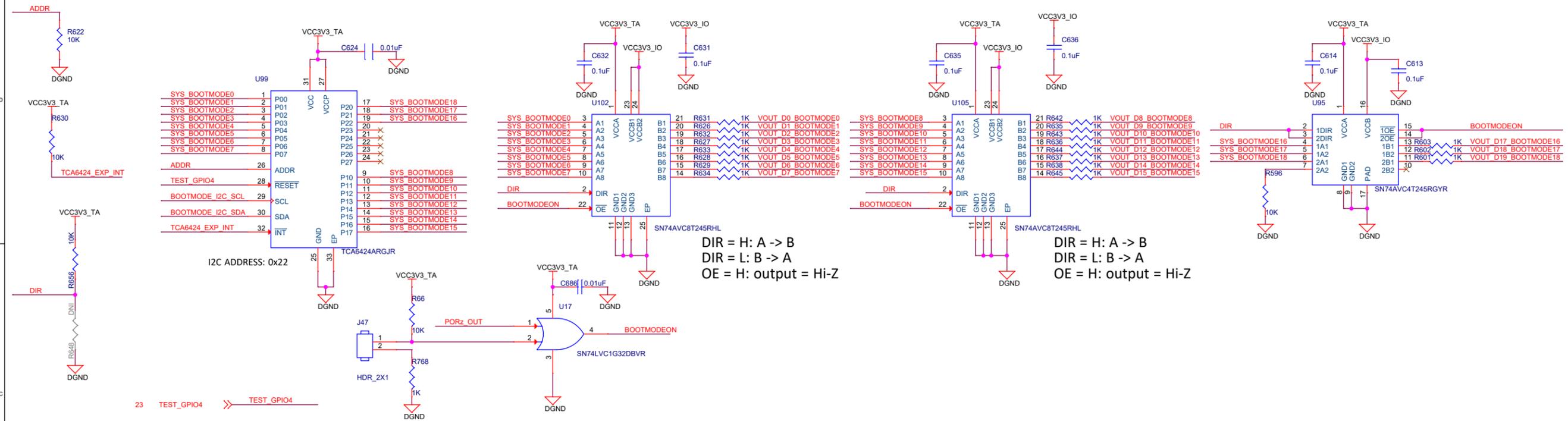
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Title TEST AUTOMATION

Size	Variant Name = PROC082 001 OPN#TMDX654IDKEVM	Rev
C		A
Date:	Friday, February 07, 2020	Sheet 23 of 44

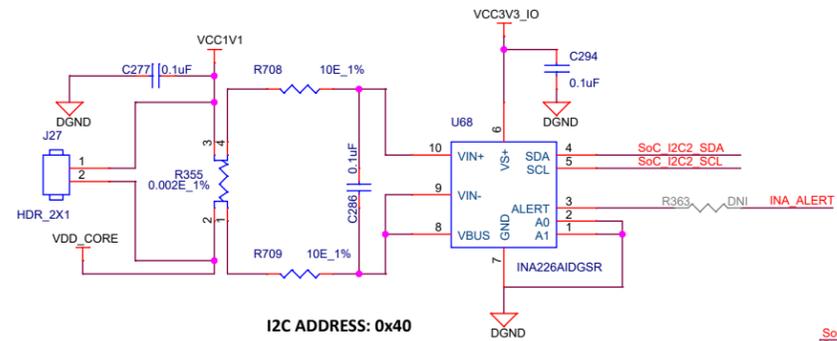
BOOT MODE BUFFER & SWITCHES



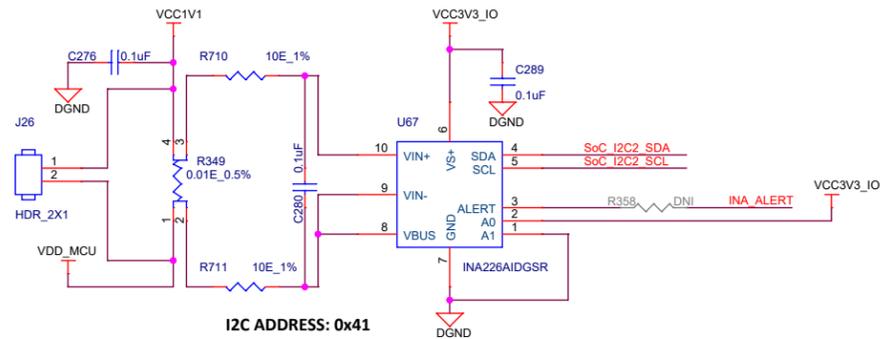
- ### BOOT MODES SUPPORTED
1. OSPI
 2. MMC1 - SD CARD
 3. MMC0 - eMMC
 4. PCIE (endpoint)
 5. CPSW Ethernet Slave
 6. USB Host
 7. USB Device

CURRENT MONITORING DEVICES

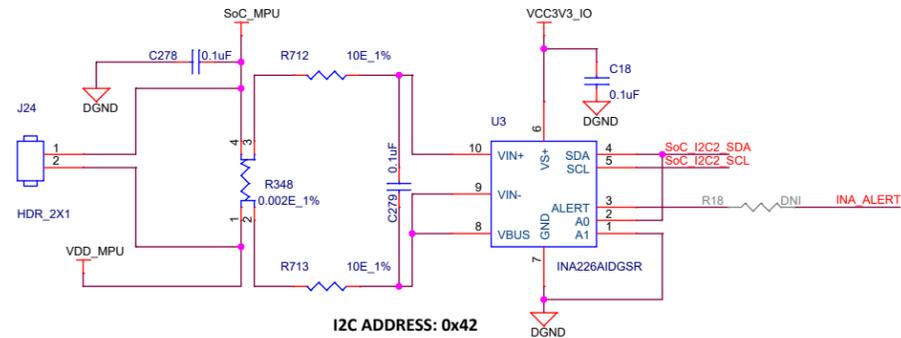
VDD_CORE



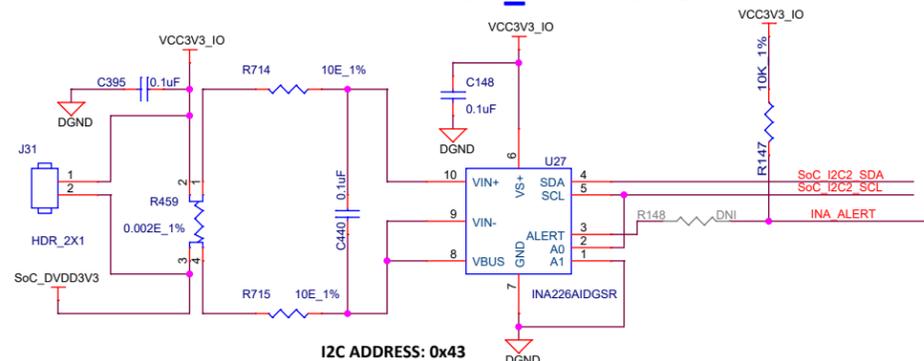
VDD_MCU



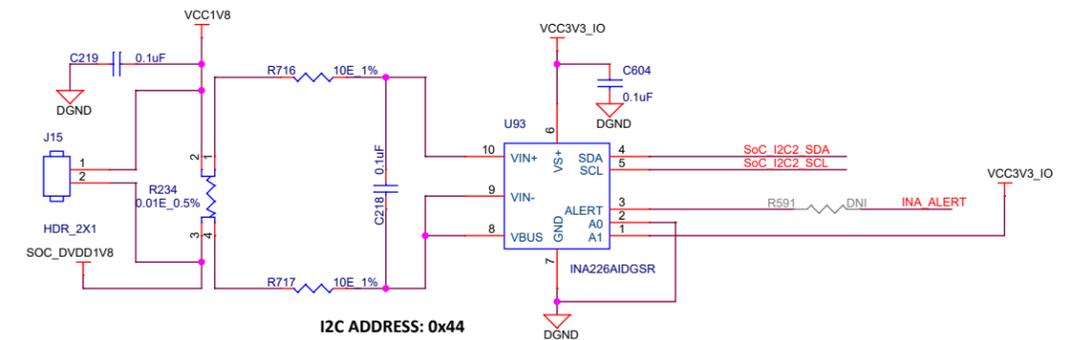
VDD_MPU



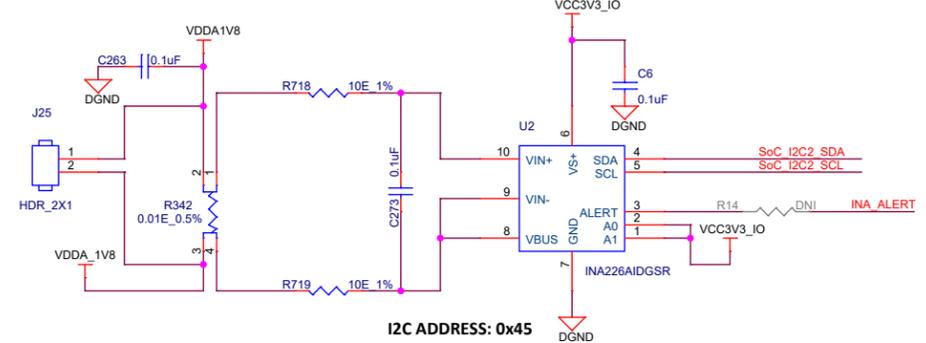
SoC_DVDD3V3



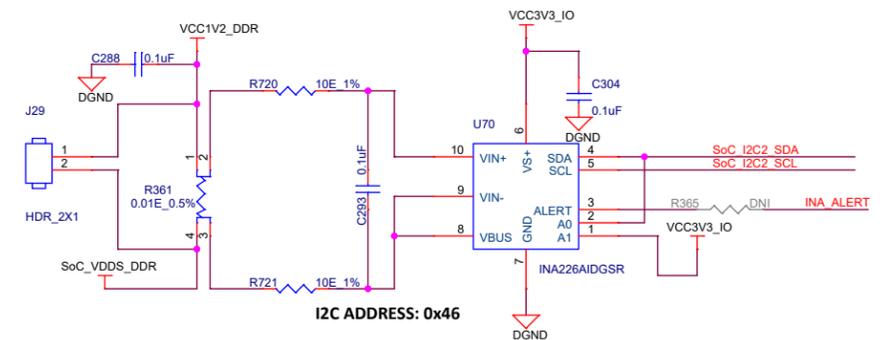
SoC_DVDD1V8



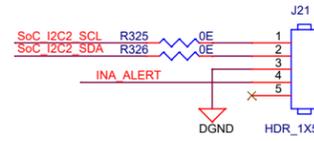
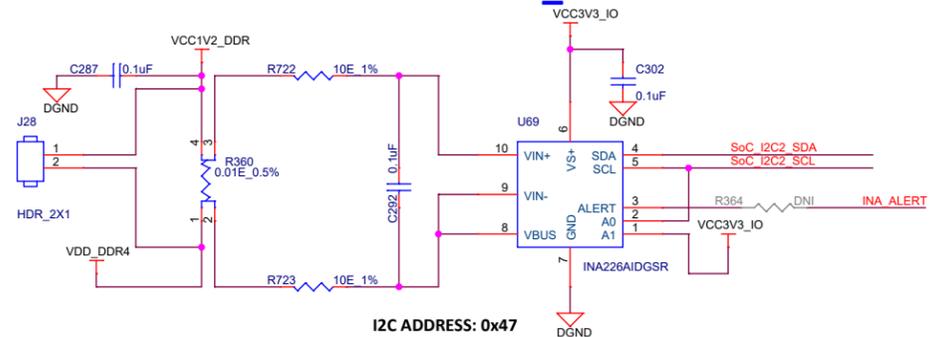
SoC_AVDD1V8



SoC_VDDS_DDR



VDD_DDR



INA I2C SLAVE ADDRESS		
POWER SOURCE	SUPPLY NET	SLAVE ADDRESS (IN HEX)
VCC1V0	VDD_CORE	40
VCC1V0	VDD_MCU	41
SoC_MPU	VDD_MPU	42
VCC3V3_IO	SoC_DVDD3V3	43
VCC1V8	SoC_DVDD1V8	44
VDDA1V8	SoC_AVDD1V8	45
VCC1V2_DDR	SoC_VDDS_DDR	46
VCC1V2_DDR	VDD_DDR	47



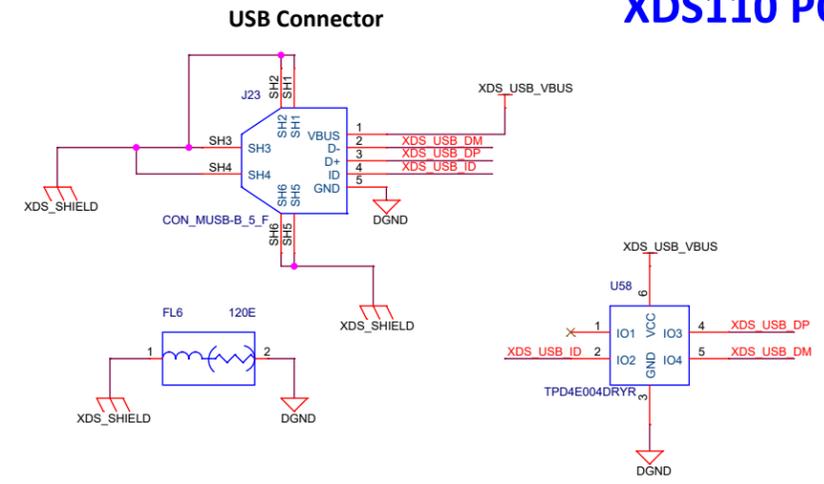
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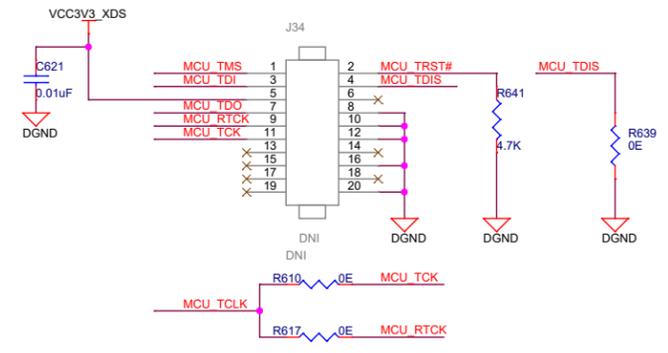
Title CURRENT MONITORING DEVICES

Size
C Variant Name = PROC082 001 OPN#TMDX654IDKEVM Rev
Date: Friday, February 07, 2020 Sheet 25 of 44

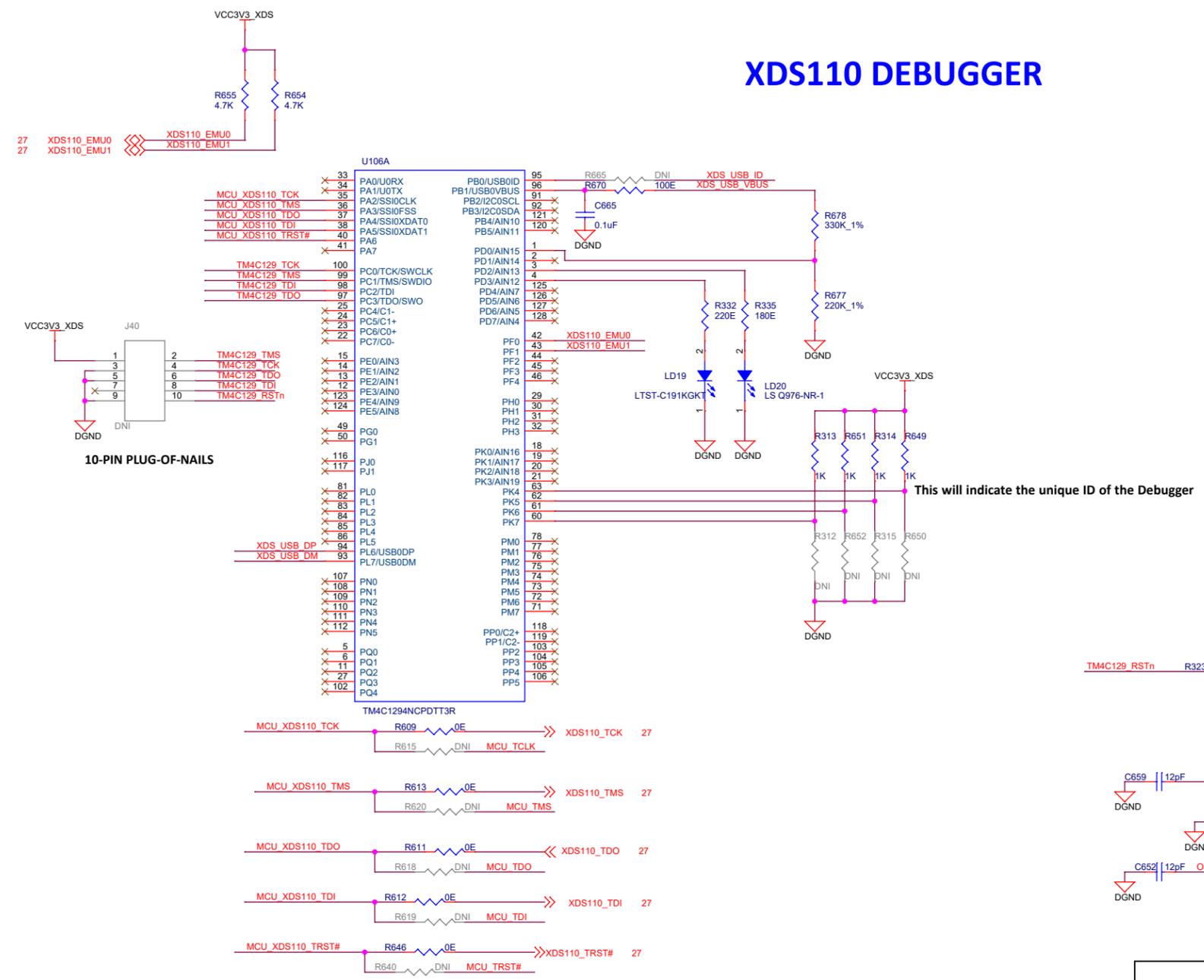
XDS110 POWER



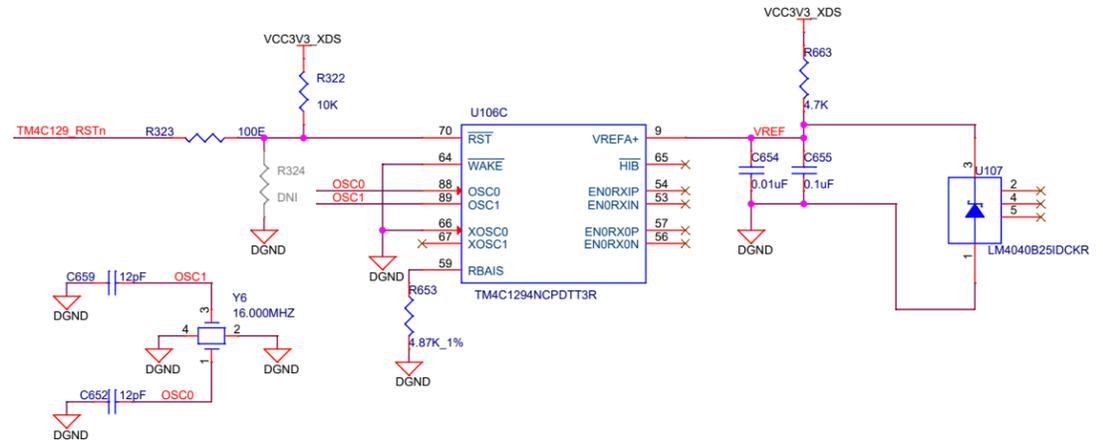
CTI 20 Pin Header external probe



XDS110 DEBUGGER

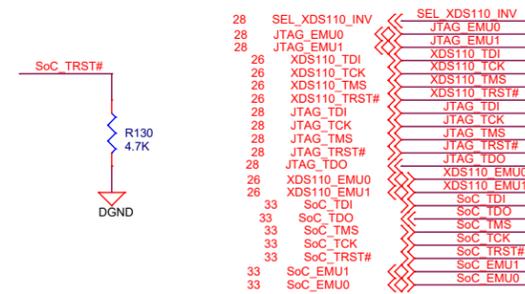
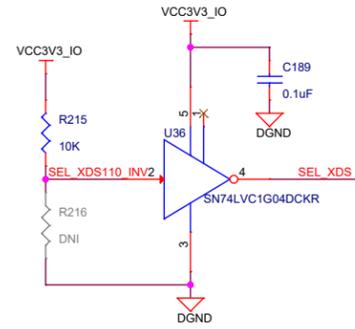


This will indicate the unique ID of the Debugger



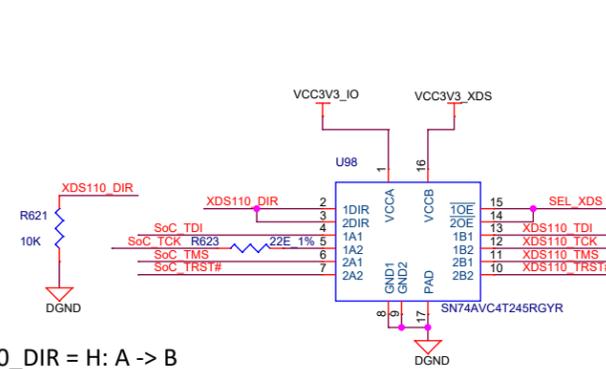
0- Ohm Res MUX between XDS110 JTAG and MCU cTI 20 pin connector.
 -For XDS110 JTAG R609,R613,R611,R612 and R646 Should be installed and R615,R620,R618,R619 and R640 Should be DNI'd.
 -For MCU cTI 20 pin , R615,R620,R618,R619 and R640 Should be Installed and R609,R613,R611,R612 and R646 Should be DNI'd.

JTAG BUFFER



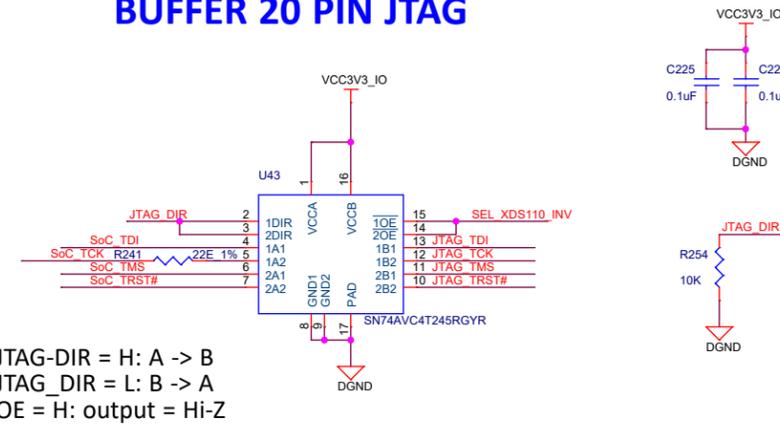
28	SEL_XDS110_INV	SEL_XDS110_INV
28	JTAG_EMU0	JTAG_EMU0
28	JTAG_EMU1	JTAG_EMU1
26	XDS110_TDI	XDS110_TDI
26	XDS110_TCK	XDS110_TCK
26	XDS110_TMS	XDS110_TMS
28	XDS110_TRST#	XDS110_TRST#
28	JTAG_TDI	JTAG_TDI
28	JTAG_TCK	JTAG_TCK
28	JTAG_TMS	JTAG_TMS
28	JTAG_TRST#	JTAG_TRST#
28	JTAG_TDO	JTAG_TDO
28	XDS110_EMU0	XDS110_EMU0
26	XDS110_EMU1	XDS110_EMU1
33	SoC_TDI	SoC_TDI
33	SoC_TDO	SoC_TDO
33	SoC_TMS	SoC_TMS
33	SoC_TCK	SoC_TCK
33	SoC_TRST#	SoC_TRST#
33	SoC_EMU1	SoC_EMU1
33	SoC_EMU0	SoC_EMU0

BUFFER XDS110

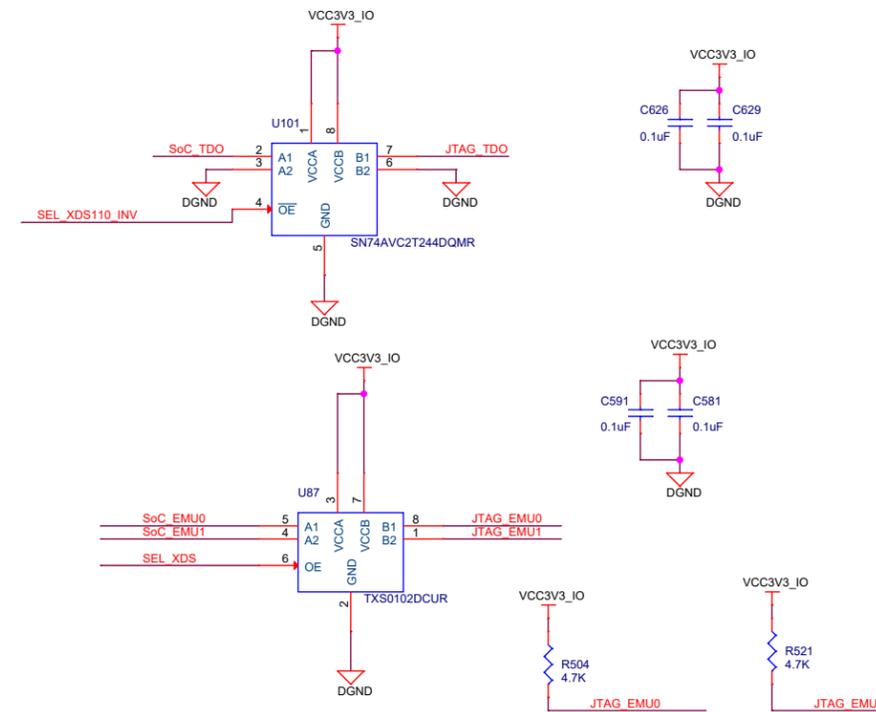
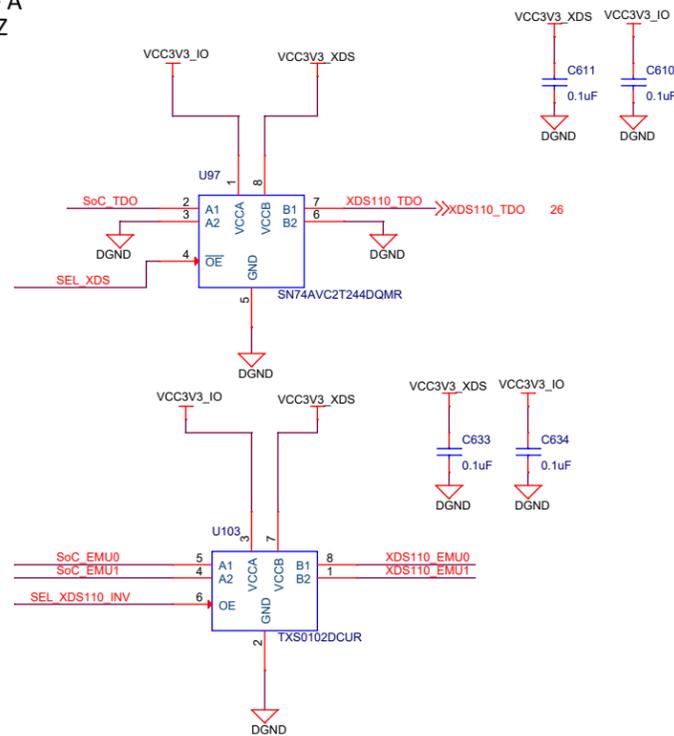


XDS110_DIR = H: A -> B
 XDS110_DIR = L: B -> A
 OE = H: output = Hi-Z

BUFFER 20 PIN JTAG



JTAG_DIR = H: A -> B
 JTAG_DIR = L: B -> A
 OE = H: output = Hi-Z



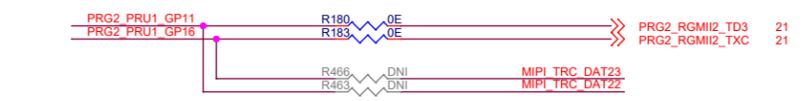
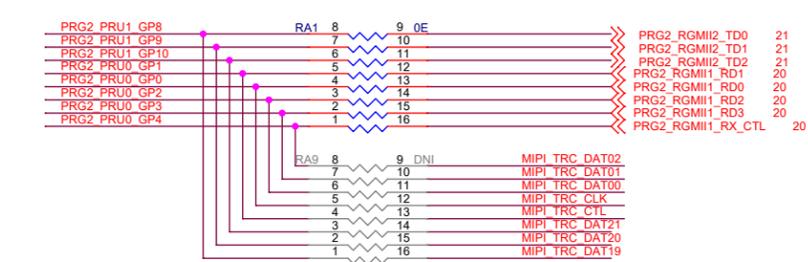
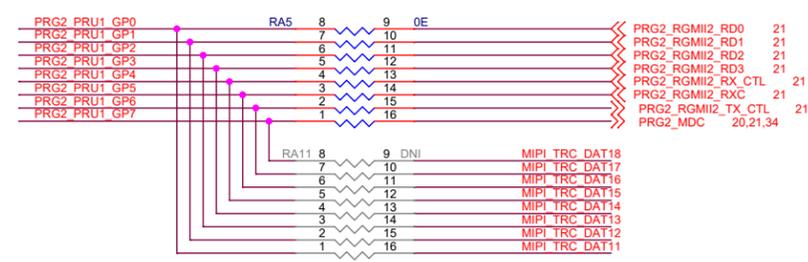
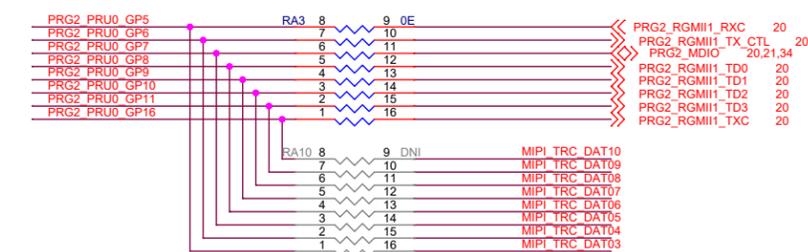
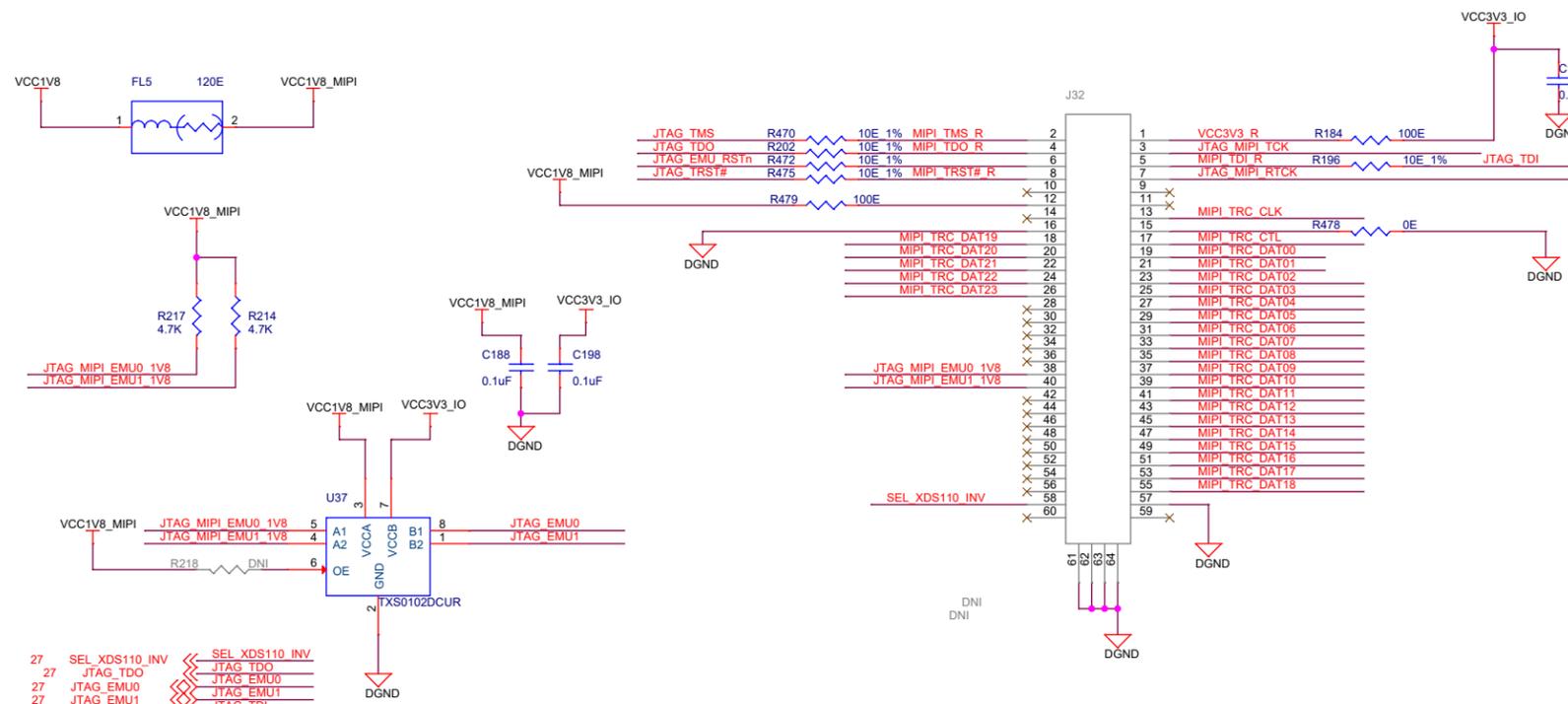
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Title			JTAG BUFFER
Size	Variant Name = PROC082 001 OPN#TMDX654IDKEVM		Rev
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Date:	Friday, February 07, 2020	Sheet	27 of 44

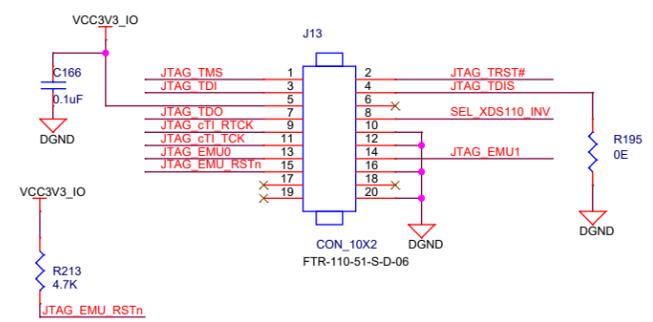
MIPI 60 PIN CONNECTOR

0- Ohm Res MUX between PRG2_Ethernet PHY (CP Board PHY) and JTAG TRACE Functionality
 -For PRG2_Ethernet PHY RA3, RA5, RA1, R180 & R183 Should be installed and RA10, RA11, RA9, R466 & R463 Should be DNI'd.
 -For TRACE RA10, RA11, RA9, R466 & R463 Should be Installed and RA3, RA5, RA1, R180 & R183 Should be DNI'd.

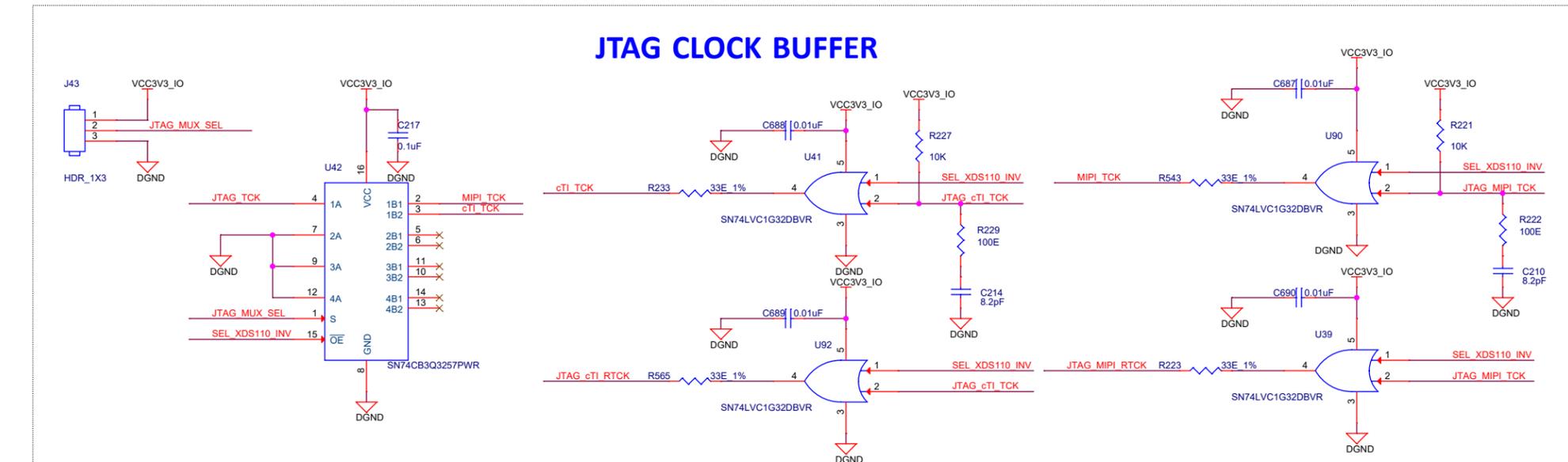


JTAG 20 PIN cTI CONNECTOR

27	SEL_XDS110_INV	SEL_XDS110_INV
27	JTAG_TDO	JTAG_TDO
27	JTAG_EMU0	JTAG_EMU0
27	JTAG_EMU1	JTAG_TDI
27	JTAG_TDI	JTAG_TCK
27	JTAG_TCK	JTAG_TMS
27	JTAG_TMS	JTAG_TRST#
27	JTAG_TRST#	JTAG_TRST#
20	PRG2_PRU0_GP0	PRG2_PRU0_GP0
20	PRG2_PRU0_GP1	PRG2_PRU0_GP1
20	PRG2_PRU0_GP2	PRG2_PRU0_GP2
20	PRG2_PRU0_GP3	PRG2_PRU0_GP3
20	PRG2_PRU0_GP4	PRG2_PRU0_GP4
20	PRG2_PRU0_GP5	PRG2_PRU0_GP5
20	PRG2_PRU0_GP6	PRG2_PRU0_GP6
20	PRG2_PRU0_GP7	PRG2_PRU0_GP7
20	PRG2_PRU0_GP8	PRG2_PRU0_GP8
20	PRG2_PRU0_GP9	PRG2_PRU0_GP9
20	PRG2_PRU0_GP10	PRG2_PRU0_GP10
20	PRG2_PRU0_GP11	PRG2_PRU0_GP11
20	PRG2_PRU0_GP16	PRG2_PRU0_GP16
20	PRG2_PRU1_GP0	PRG2_PRU1_GP0
20	PRG2_PRU1_GP1	PRG2_PRU1_GP1
20	PRG2_PRU1_GP2	PRG2_PRU1_GP2
20	PRG2_PRU1_GP3	PRG2_PRU1_GP3
20	PRG2_PRU1_GP4	PRG2_PRU1_GP4
20	PRG2_PRU1_GP5	PRG2_PRU1_GP5
20	PRG2_PRU1_GP6	PRG2_PRU1_GP6
20	PRG2_PRU1_GP7	PRG2_PRU1_GP7
20	PRG2_PRU1_GP8	PRG2_PRU1_GP8
20	PRG2_PRU1_GP9	PRG2_PRU1_GP9
20	PRG2_PRU1_GP10	PRG2_PRU1_GP10
20	PRG2_PRU1_GP11	PRG2_PRU1_GP11
20	PRG2_PRU1_GP16	PRG2_PRU1_GP16
39	JTAG_EMU_RSTn	JTAG_EMU_RSTn



JTAG CLOCK BUFFER

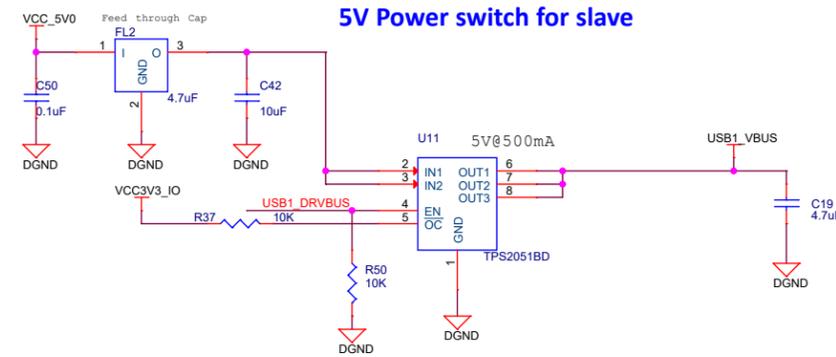
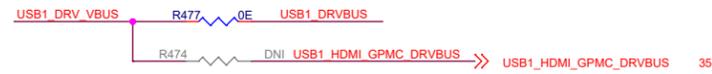
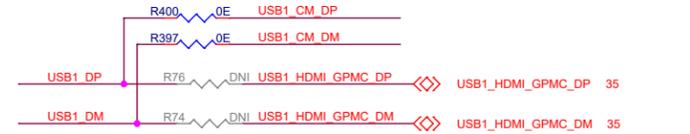
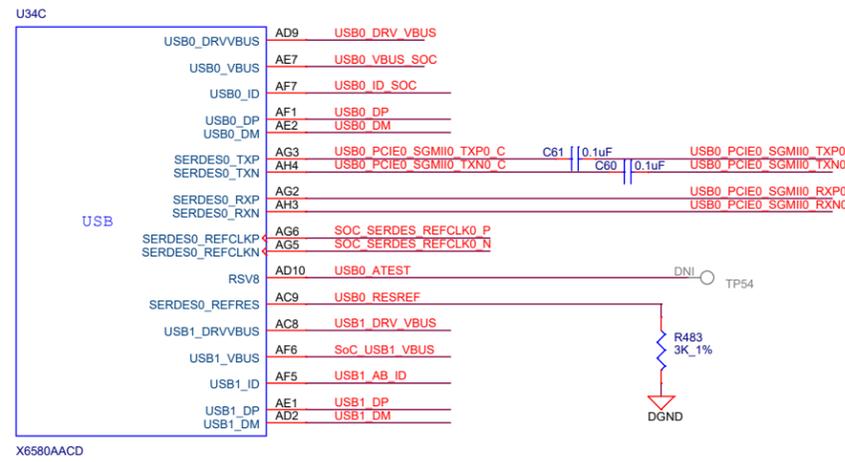


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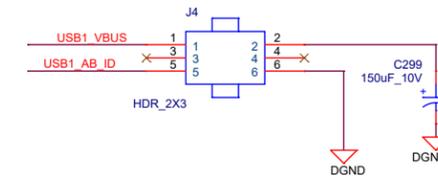


Title			MIPI 60 PIN CONNECTOR
Size	Variant Name = PROC082 001 OPN#TMDX654IDKEVM	Rev	A
Date:	Friday, February 07, 2020	Sheet	28 of 44

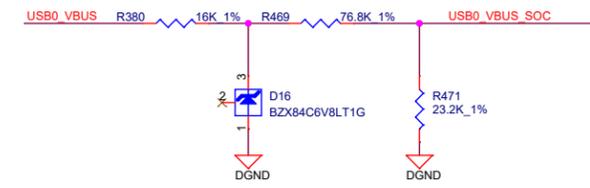
USB 2.0 INTERFACE



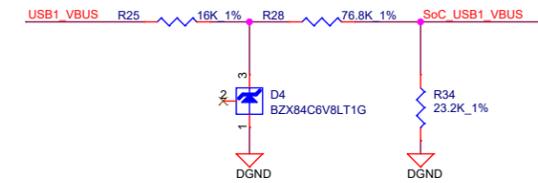
2X3 header to enable bulk capacitance on USB1_VBUS in host mode and to ground USB_AB_ID pin, if a non standard cable is used



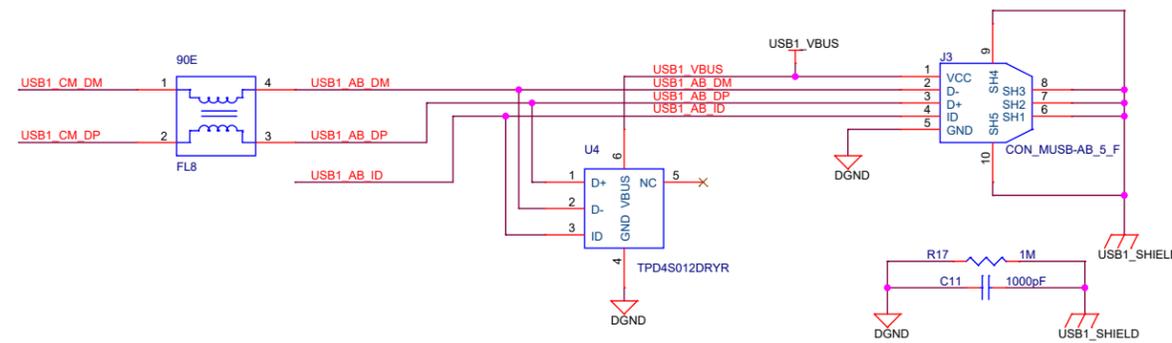
Resistor divider on SOC_VBUS



Resistor divider on SOC_VBUS



Micro USB 2.0 AB Connector



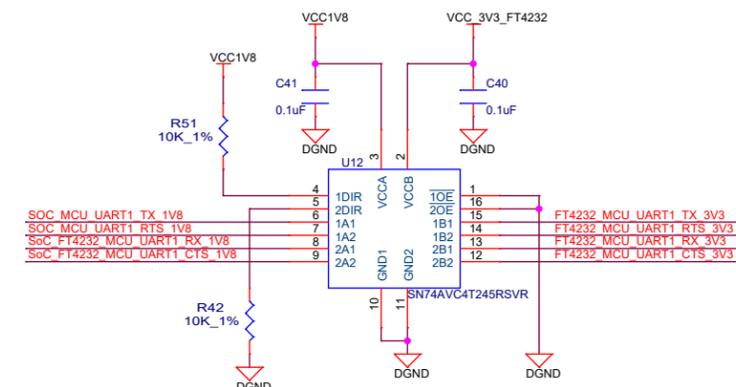
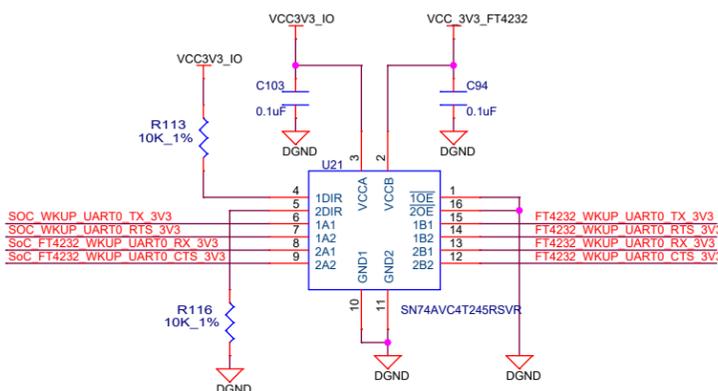
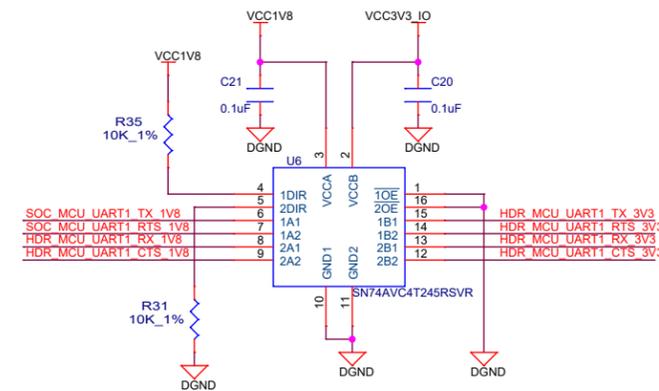
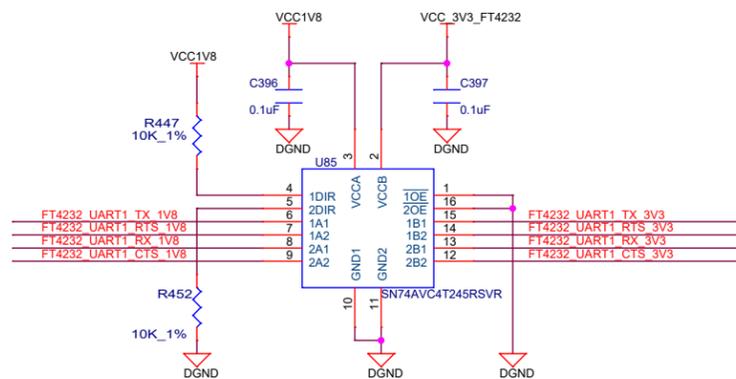
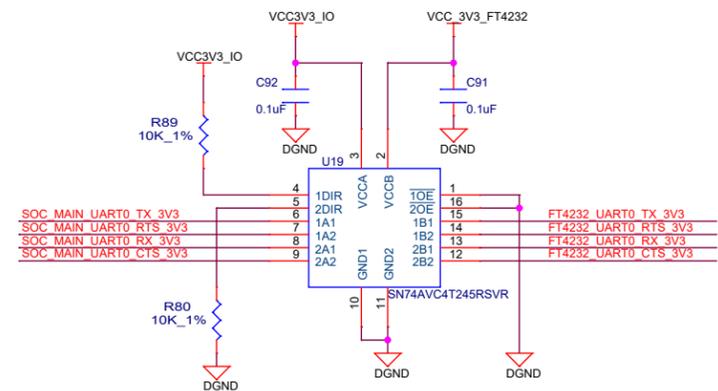
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Title: USB 2.0 INTERFACE

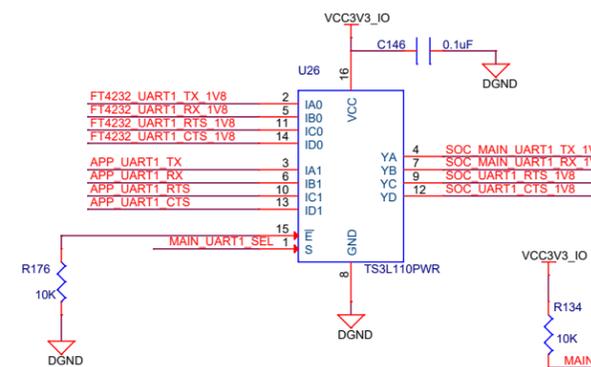
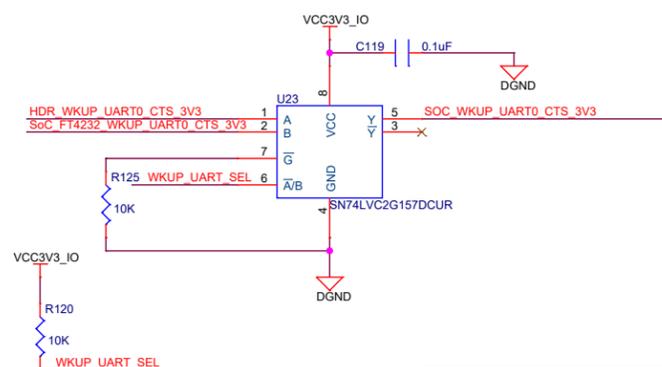
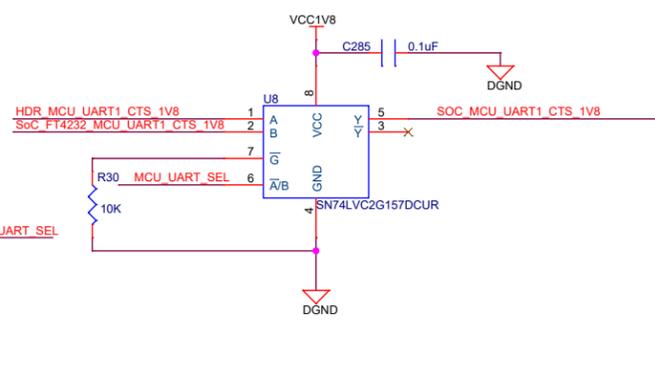
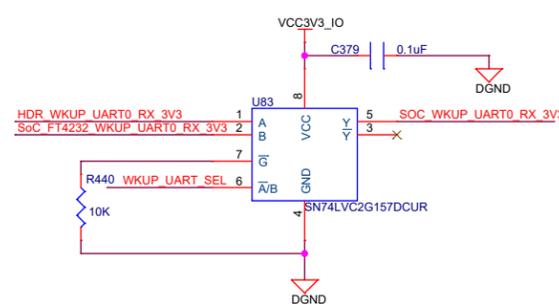
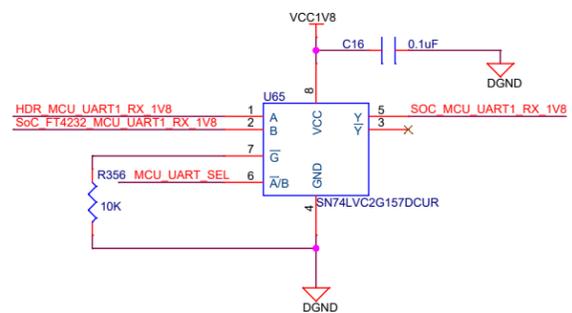
Size	Rev
C	Variant Name = PROC062 001 OPN#TMDX654IDKEVM
Date: Friday, February 07, 2020	Sheet 29 of 44

FT4232 LEVEL TRANSLATOR



MCU_UART_SEL	<<	MCU_UART_SEL	37
WKUP_UART_SEL	<<	WKUP_UART_SEL	37
MAIN_UART1_SEL	<<	MAIN_UART1_SEL	37
SOC_MAIN_UART0_RX_3V3	<<	SOC_MAIN_UART0_RX_3V3	33
SOC_MAIN_UART0_TX_3V3	<<	SOC_MAIN_UART0_TX_3V3	33
SOC_MAIN_UART0_RTS_3V3	<<	SOC_MAIN_UART0_RTS_3V3	33
SOC_MAIN_UART0_CTS_3V3	<<	SOC_MAIN_UART0_CTS_3V3	33
SOC_WKUP_UART0_RX_3V3	<<	SOC_WKUP_UART0_RX_3V3	33
SOC_WKUP_UART0_TX_3V3	<<	SOC_WKUP_UART0_TX_3V3	33,38
SOC_WKUP_UART0_RTS_3V3	<<	SOC_WKUP_UART0_RTS_3V3	33,38
SOC_WKUP_UART0_CTS_3V3	<<	SOC_WKUP_UART0_CTS_3V3	33,38
SOC_MCU_UART1_RX_1V8	<<	SOC_MCU_UART1_RX_1V8	18
SOC_MCU_UART1_TX_1V8	<<	SOC_MCU_UART1_TX_1V8	18
SOC_MCU_UART1_RTS_1V8	<<	SOC_MCU_UART1_RTS_1V8	18
SOC_MCU_UART1_CTS_1V8	<<	SOC_MCU_UART1_CTS_1V8	18
SOC_MAIN_UART1_RX_1V8	<<	SOC_MAIN_UART1_RX_1V8	32
SOC_MAIN_UART1_TX_1V8	<<	SOC_MAIN_UART1_TX_1V8	32
SOC_UART1_RTS_1V8	<<	SOC_UART1_RTS_1V8	32
SOC_UART1_CTS_1V8	<<	SOC_UART1_CTS_1V8	32
APP_UART1_CTS	<<	APP_UART1_CTS	32
APP_UART1_RTS	<<	APP_UART1_RTS	32
APP_UART1_RX	<<	APP_UART1_RX	32
APP_UART1_TX	<<	APP_UART1_TX	32
HDR_MCU_UART1_RTS_3V3	<<	HDR_MCU_UART1_RTS_3V3	38
HDR_MCU_UART1_CTS_3V3	<<	HDR_MCU_UART1_CTS_3V3	38
HDR_MCU_UART1_TX_3V3	<<	HDR_MCU_UART1_TX_3V3	38
HDR_MCU_UART1_RX_3V3	<<	HDR_MCU_UART1_RX_3V3	38
HDR_WKUP_UART0_RX_3V3	<<	HDR_WKUP_UART0_RX_3V3	38
HDR_WKUP_UART0_CTS_3V3	<<	HDR_WKUP_UART0_CTS_3V3	38

2:1 MUX



FT4232_UART0_TX_3V3	<<	FT4232_UART0_TX_3V3	31
FT4232_UART0_RTS_3V3	<<	FT4232_UART0_RTS_3V3	31
FT4232_UART0_RX_3V3	<<	FT4232_UART0_RX_3V3	31
FT4232_UART0_CTS_3V3	<<	FT4232_UART0_CTS_3V3	31
FT4232_UART1_TX_3V3	<<	FT4232_UART1_TX_3V3	31
FT4232_UART1_RTS_3V3	<<	FT4232_UART1_RTS_3V3	31
FT4232_UART1_RX_3V3	<<	FT4232_UART1_RX_3V3	31
FT4232_UART1_CTS_3V3	<<	FT4232_UART1_CTS_3V3	31
FT4232_WKUP_UART0_TX_3V3	<<	FT4232_WKUP_UART0_TX_3V3	31
FT4232_WKUP_UART0_RTS_3V3	<<	FT4232_WKUP_UART0_RTS_3V3	31
FT4232_WKUP_UART0_RX_3V3	<<	FT4232_WKUP_UART0_RX_3V3	31
FT4232_WKUP_UART0_CTS_3V3	<<	FT4232_WKUP_UART0_CTS_3V3	31
FT4232_MCU_UART1_TX_3V3	<<	FT4232_MCU_UART1_TX_3V3	31
FT4232_MCU_UART1_RTS_3V3	<<	FT4232_MCU_UART1_RTS_3V3	31
FT4232_MCU_UART1_RX_3V3	<<	FT4232_MCU_UART1_RX_3V3	31
FT4232_MCU_UART1_CTS_3V3	<<	FT4232_MCU_UART1_CTS_3V3	31

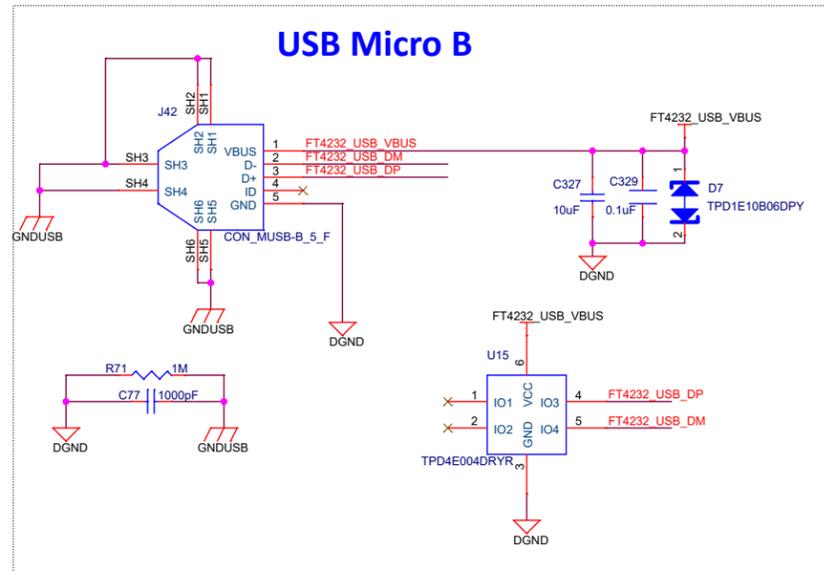
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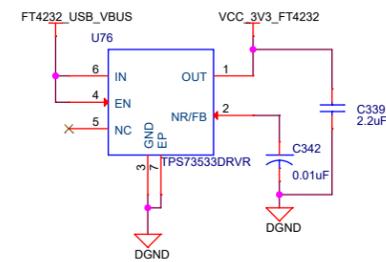
Title FT4232 LEVEL TRANSLATOR

Size	Variant Name = PROC082 001 OPN#TMDX654IDKEVM	Rev	A
Date:	Friday, February 07, 2020	Sheet	30 of 44

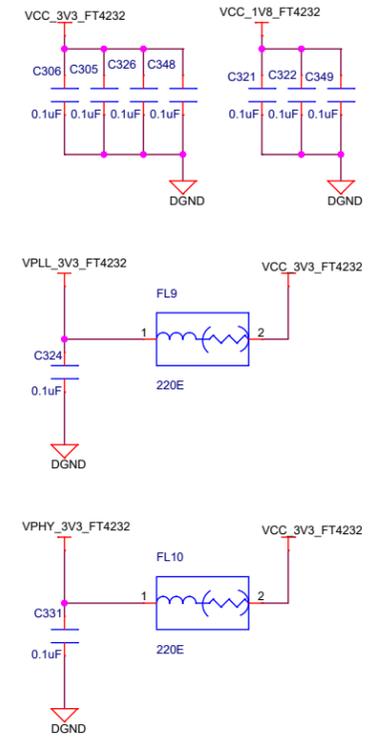
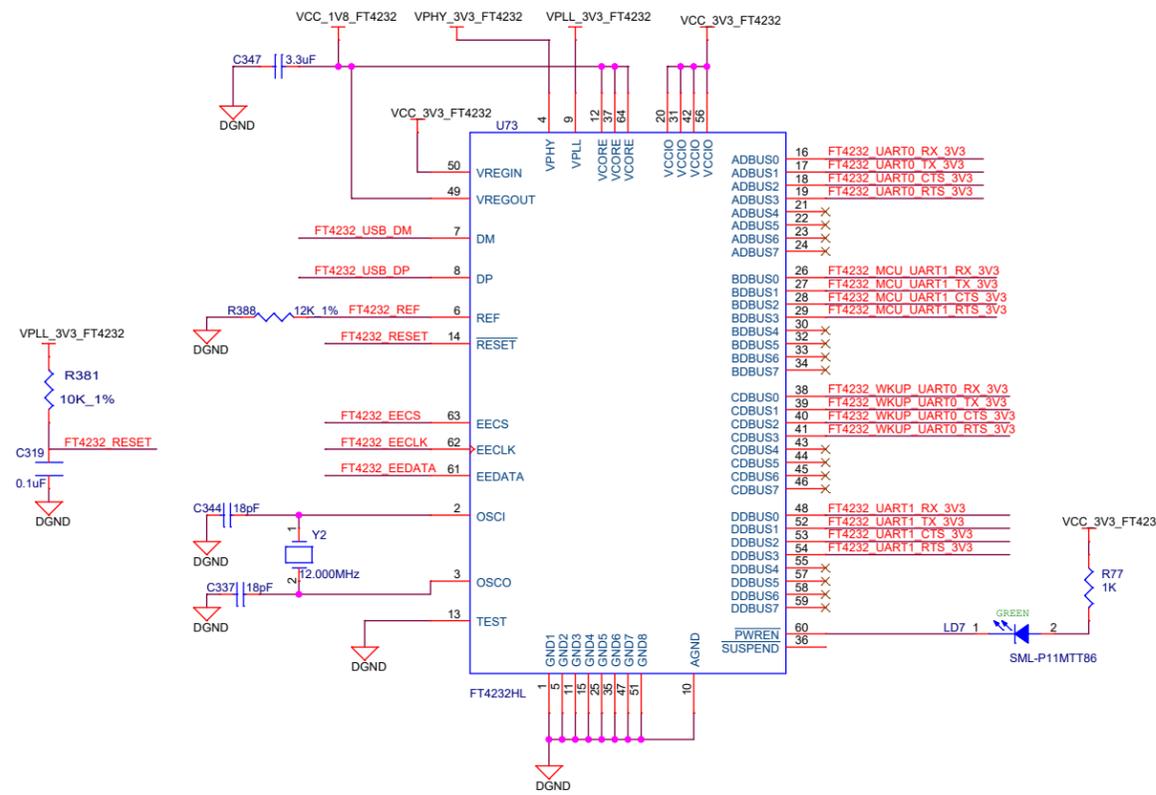
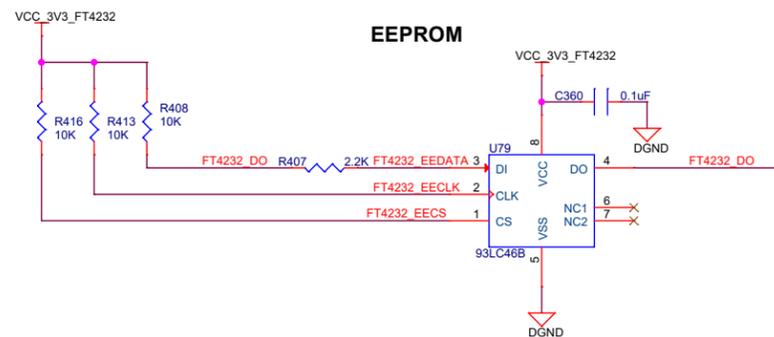
FT4232 UART



FT4232: 5V to 3.3V@500mA LDO



EEPROM



FT4232 UART0 TX 3V3	<<FT4232_UART0_TX_3V3	30
FT4232 UART0 RTS 3V3	<<FT4232_UART0_RTS_3V3	30
FT4232 UART0 RX 3V3	<<FT4232_UART0_RX_3V3	30
FT4232 UART0 CTS 3V3	<<FT4232_UART0_CTS_3V3	30
FT4232 UART1 TX 3V3	<<FT4232_UART1_TX_3V3	30
FT4232 UART1 RTS 3V3	<<FT4232_UART1_RTS_3V3	30
FT4232 UART1 RX 3V3	<<FT4232_UART1_RX_3V3	30
FT4232 UART1 CTS 3V3	<<FT4232_UART1_CTS_3V3	30
FT4232 WKUP UART0 TX 3V3	<<FT4232_WKUP_UART0_TX_3V3	30
FT4232 WKUP UART0 RTS 3V3	<<FT4232_WKUP_UART0_RTS_3V3	30
FT4232 WKUP UART0 RX 3V3	<<FT4232_WKUP_UART0_RX_3V3	30
FT4232 WKUP UART0 CTS 3V3	<<FT4232_WKUP_UART0_CTS_3V3	30
FT4232 MCU UART1 TX 3V3	<<FT4232_MCU_UART1_TX_3V3	30
FT4232 MCU UART1 RTS 3V3	<<FT4232_MCU_UART1_RTS_3V3	30
FT4232 MCU UART1 RX 3V3	<<FT4232_MCU_UART1_RX_3V3	30
FT4232 MCU UART1 CTS 3V3	<<FT4232_MCU_UART1_CTS_3V3	30

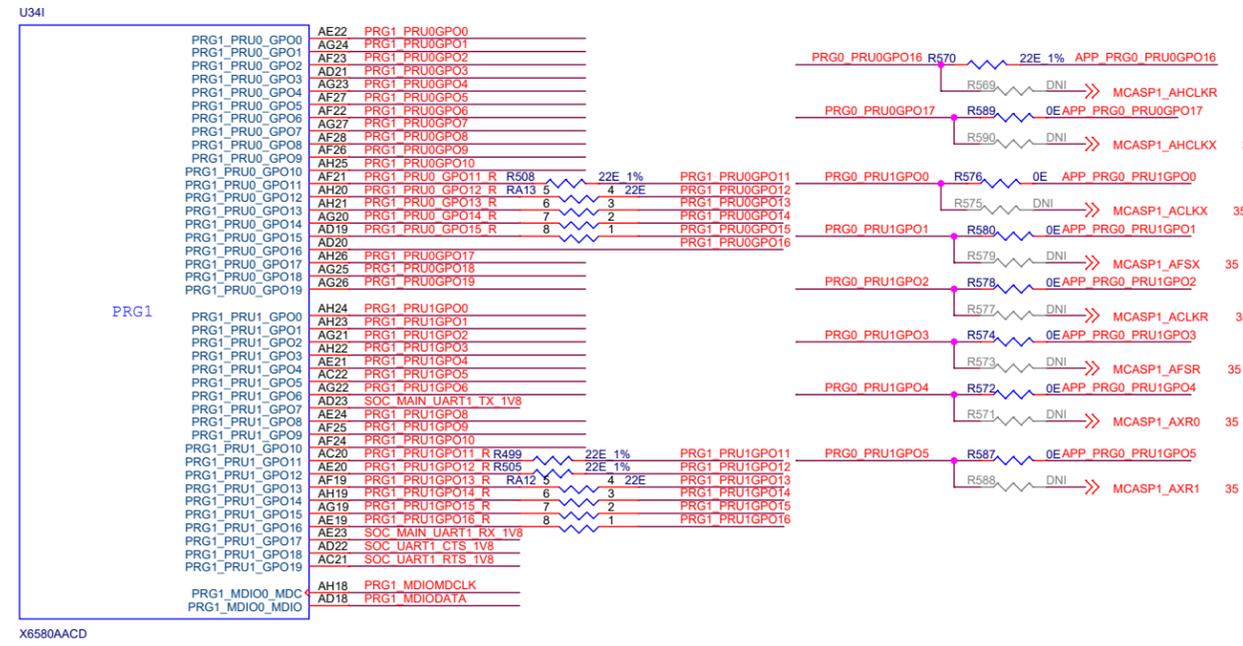
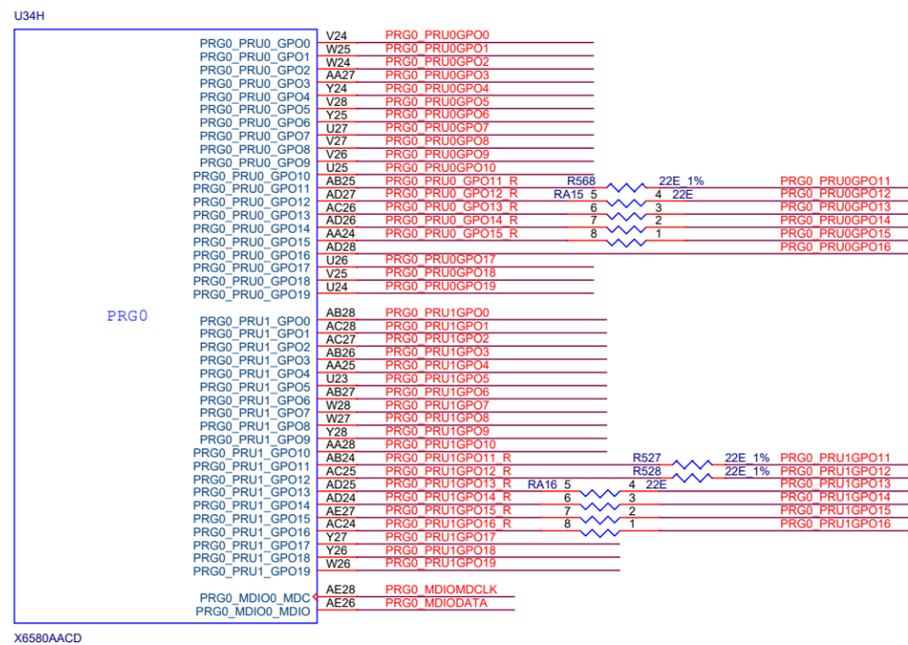
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Title FT4232 UART TO USB BRIDGE

Size	Variant Name = PROC082 001 OPN#TMDX654IDKEVM	Rev
C		A
Date:	Friday, February 07, 2020	Sheet 31 of 44

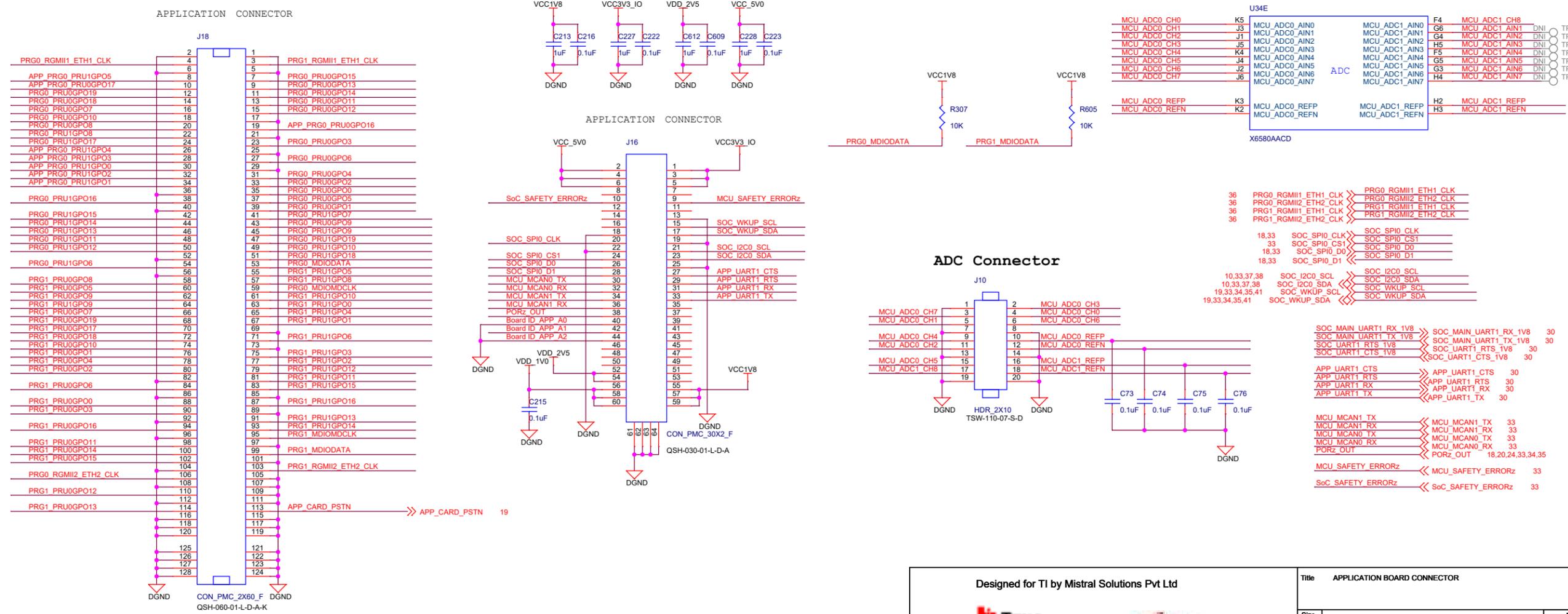
APPLICATION BOARD INTERFACE



0- Ohm Res MUX between APPLICATION Board connector and HDMI / GPMC Daughter card.
 -For APPLICATION Board connector R570, R589, R576, R580, R578, R574, R572 & R587 Should be installed and R569, R590, R575, R579, R577, R573, R571 & R588 Should be DNI'd.
 -For HDMI / GPMC Daughter card R569, R590, R575, R579, R577, R573, R571 & R588 Should be installed and R570, R589, R576, R580, R578, R574, R572 & R587 Should be DNI'd.

Customer Note - See Users Guide for more information on DNI resistor alternatives

APPLICATION BOARD CONNECTORS

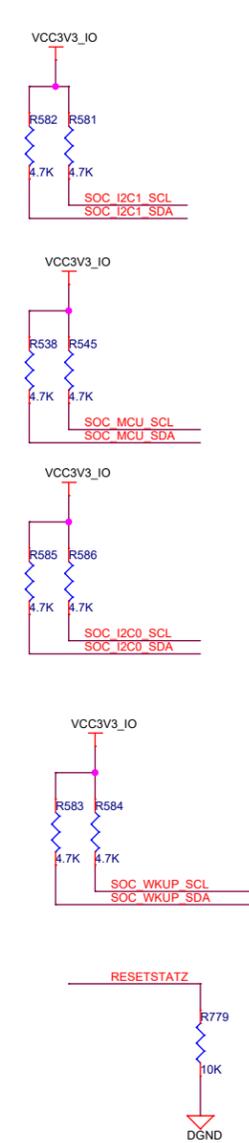
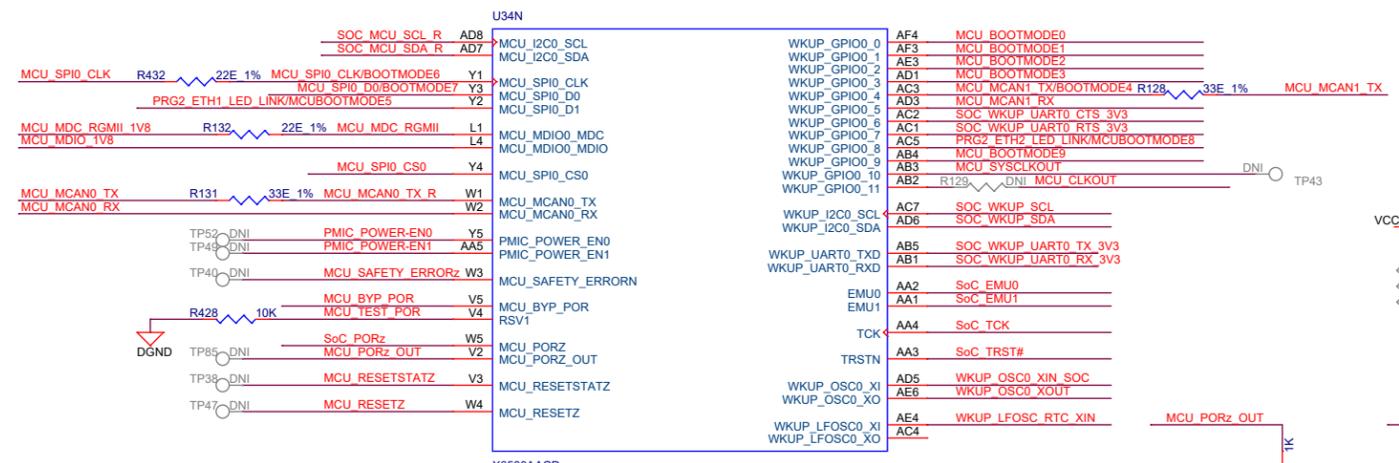
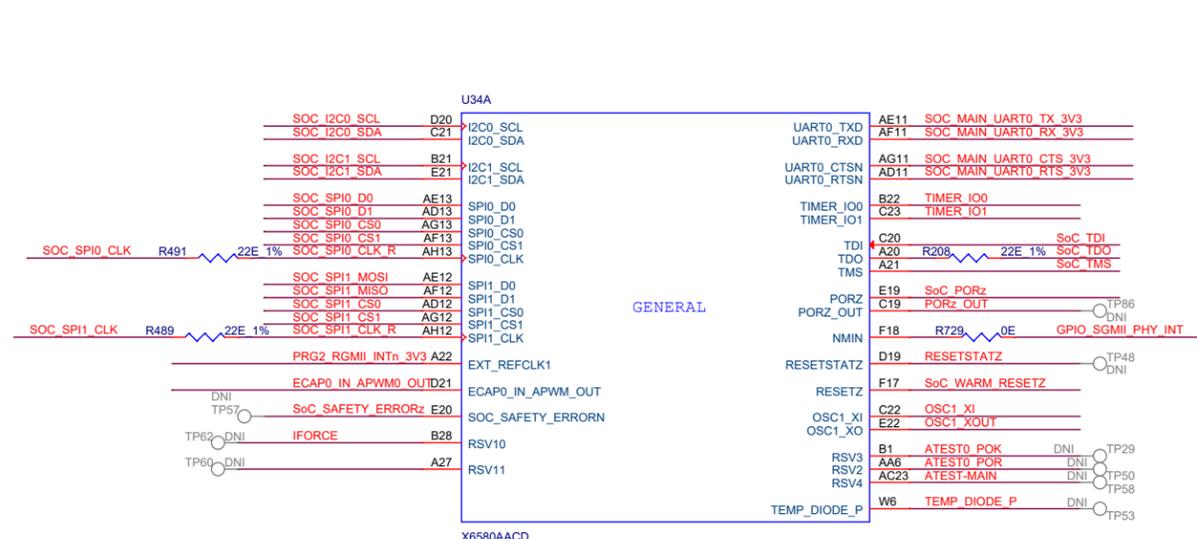


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TEXAS INSTRUMENTS **MISTRAL**

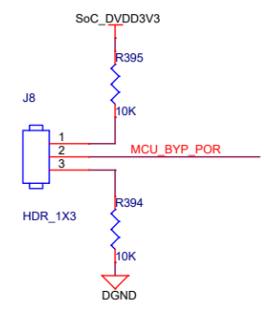
Title		APPLICATION BOARD CONNECTOR
Size	Variant Name = PROC082 001 OPN#TMDX654IDKEVM	Rev
C		A
Date:	Monday, February 10, 2020	Sheet 32 of 44

GENERAL & MCU_GENERAL



SOC I2C1 SCL	DNI	TP67
SOC I2C1 SDA	DNI	TP68
SOC MCU SCL	DNI	TP69
SOC MCU SDA	DNI	TP70
SOC WKUP SCL	DNI	TP71
SOC WKUP SDA	DNI	TP72

Jumper to select Internal PORz & External PORz



To Disable the Internal PORz, Connect the Jumper between Pin no 1 & 2 of J8.
To Enable the Internal PORz, Connect the Jumper between Pin no 2 & 3 of J8

MCU MDC RGMII 1V8	MCU MDIO 1V8	OSC1_XI	OSC1_XOUT	SoC PORz	SoC WARM RESETZ	SOC I2C1 SCL	SOC I2C1 SDA	SOC MCU SCL	SOC MCU SDA
MCU_MDC_RGMII_1V8	MCU_MDIO_1V8	OSC1_XI	OSC1_XOUT	SoC_PORz	SoC_WARM_RESETZ	SOC_I2C1_SCL	SOC_I2C1_SDA	SOC_MCU_SCL	SOC_MCU_SDA
22	22	10	10	34,39	10	34	19,34,35	19,34,35	19,34,35

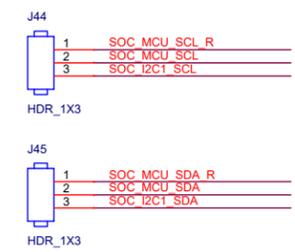
MCU MCAN1 TX	MCU MCAN1 RX	MCU MCAN0 TX	MCU MCAN0 RX	SoC TDI	SoC TDO	SoC TMS	SoC TRST#	SoC EMU0	SoC EMU1
MCU_MCAN1_TX	MCU_MCAN1_RX	MCU_MCAN0_TX	MCU_MCAN0_RX	SoC_TDI	SoC_TDO	SoC_TMS	SoC_TRST#	SoC_EMU0	SoC_EMU1
32	32	32	32	27	27	27	27	27	27

GPIO MCU RGMII RSTN	SOC I2C0 SCL	SOC I2C0 SDA	RESETSTATZ
GPIO_MCU_RGMII_RSTN	SOC_I2C0_SCL	SOC_I2C0_SDA	RESETSTATZ
22,37	10,32,37,38	10,32,37,38	17

MCU_BOOTMODE0	MCU_BOOTMODE1	MCU_BOOTMODE2	MCU_BOOTMODE3	MCU_BOOTMODE4	MCU_BOOTMODE5	MCU_BOOTMODE6	MCU_BOOTMODE7	MCU_BOOTMODE8	MCU_BOOTMODE9
MCU_BOOTMODE0	MCU_BOOTMODE1	MCU_BOOTMODE2	MCU_BOOTMODE3	MCU_BOOTMODE4	MCU_BOOTMODE5	MCU_BOOTMODE6	MCU_BOOTMODE7	MCU_BOOTMODE8	MCU_BOOTMODE9
24,37	24,37	24	24	24	24,35	24	24,35	24	24

MCU_CLKOUT	WKUP OSC0_XIN SOC	WKUP OSC0_XOUT	WKUP LFOSC_RTC_XIN	MCU_SPI0_CLK
MCU_CLKOUT	WKUP_OSC0_XIN_SOC	WKUP_OSC0_XOUT	WKUP_LFOSC_RTC_XIN	MCU_SPI0_CLK
36	10	10	10	35

Jumper option to connect the peripherals connected on MCU_I2C to SoC I2C1

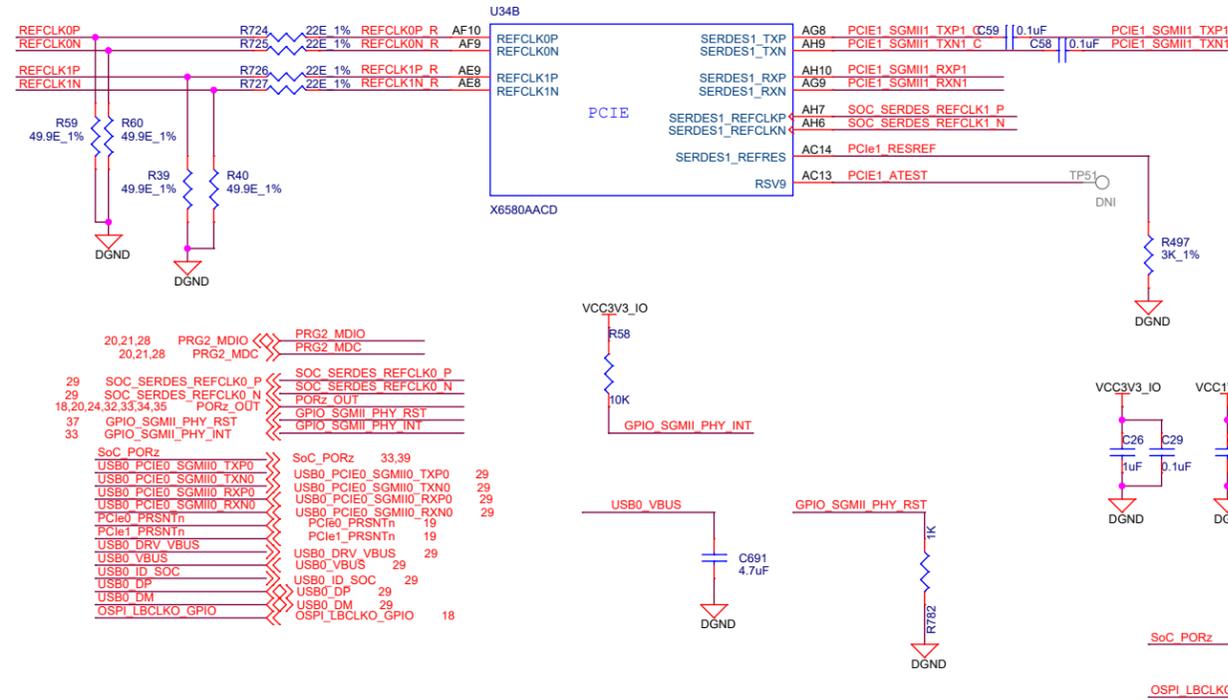


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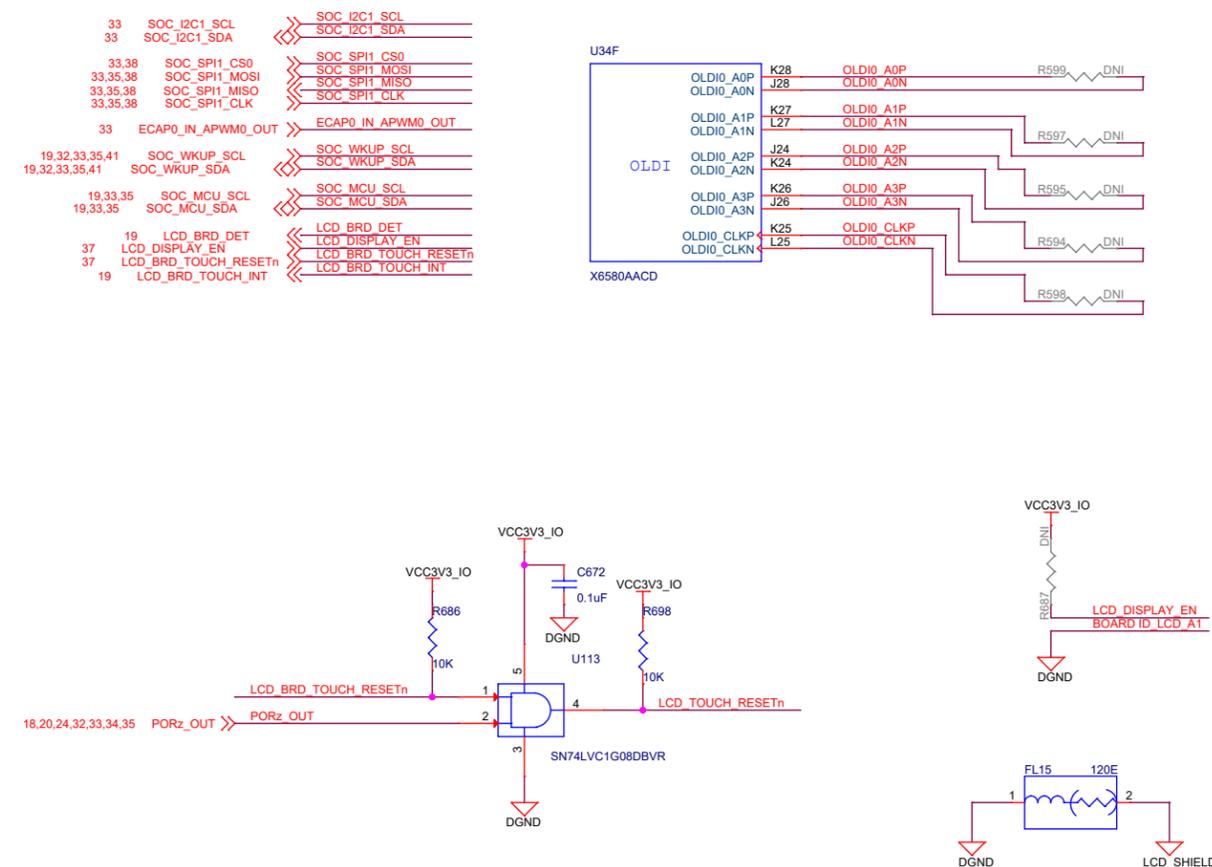


Title		SOC_GENERAL & MCU GENERAL	
Size	Variant Name = PROC082 001 OPN#TMDX654IDKEVM	Rev	A
Date:	Friday, February 07, 2020	Sheet	33 of 44

SERDES INTERFACE



OLDI INTERFACE



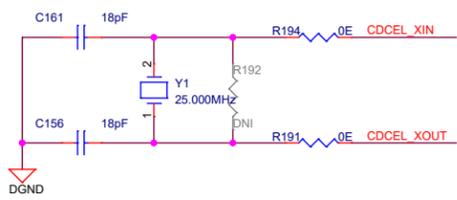
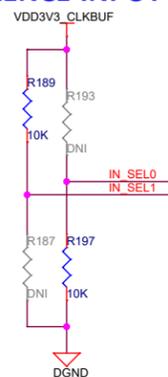
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TEXAS INSTRUMENTS **MISTRAL**

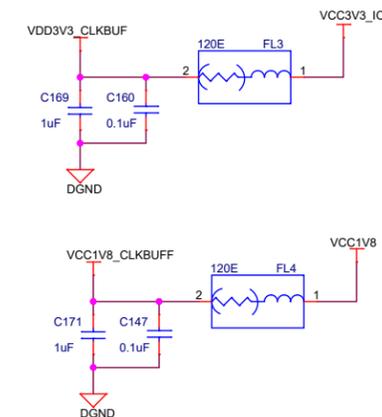
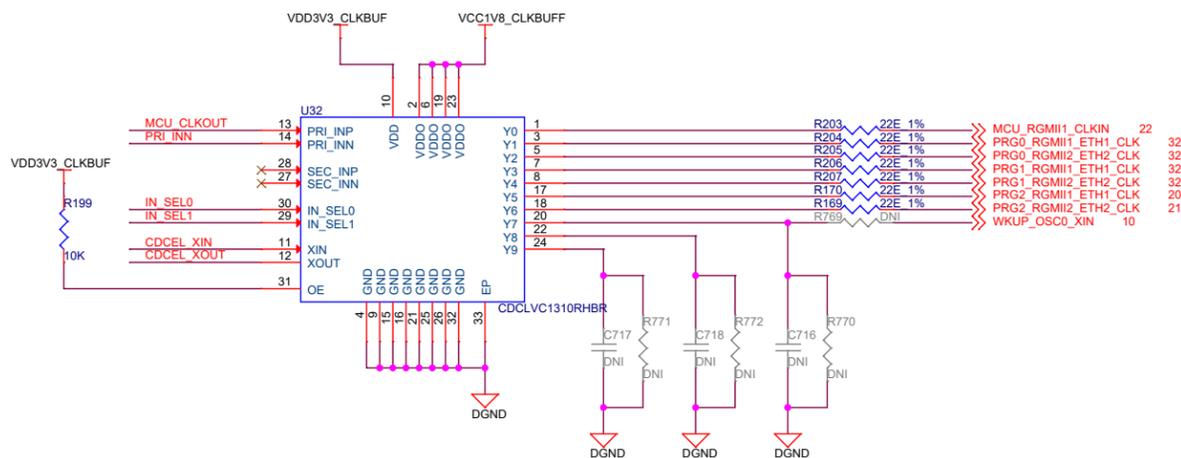
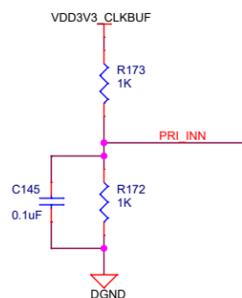
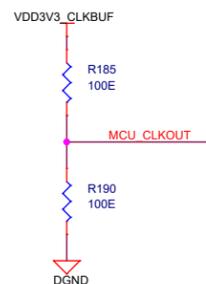
Title		SERDES & DISPLAY INTERFACE	
Size	Variant Name = PROC082 001 OPN#TMDX654IDKEVM	Rev	
C		A	
Date:	Friday, February 07, 2020	Sheet	34 of 44

ETHERNET PHY CLOCK BUFFER

REFERENCE INPUT SELECTION



MCU_CLKOUT → MCU_CLKOUT 33

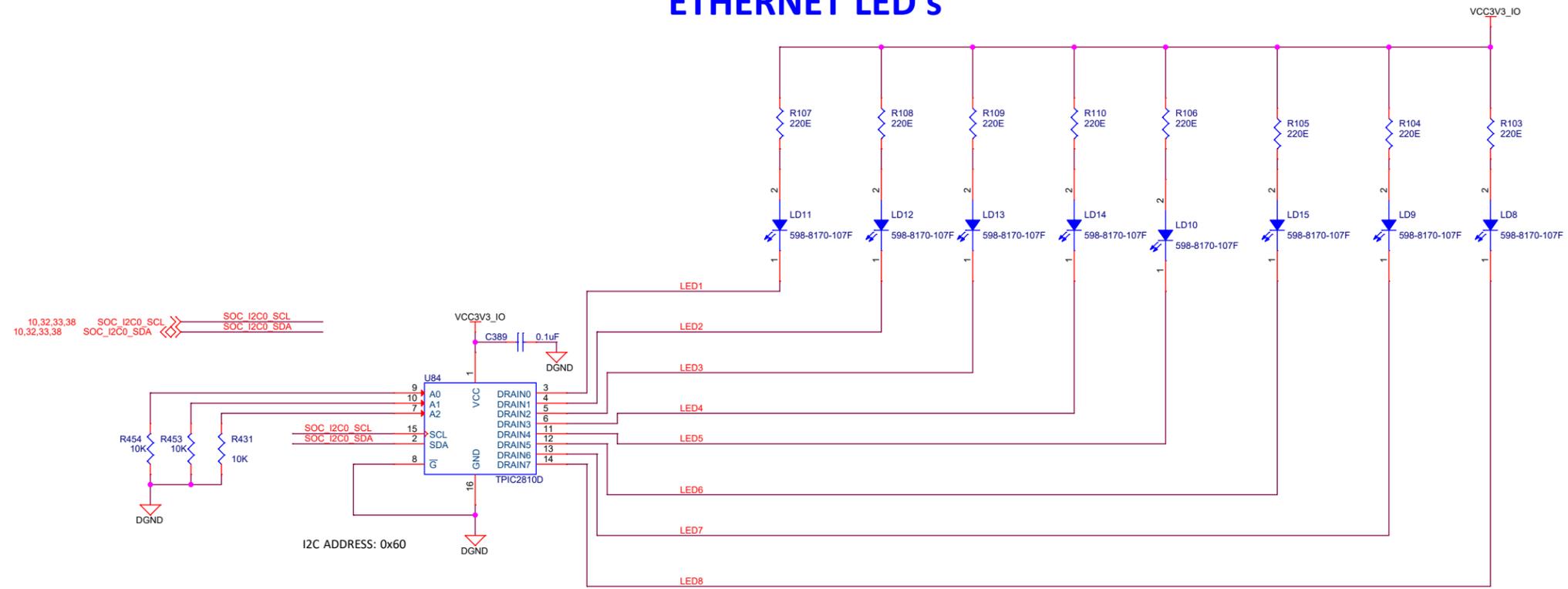


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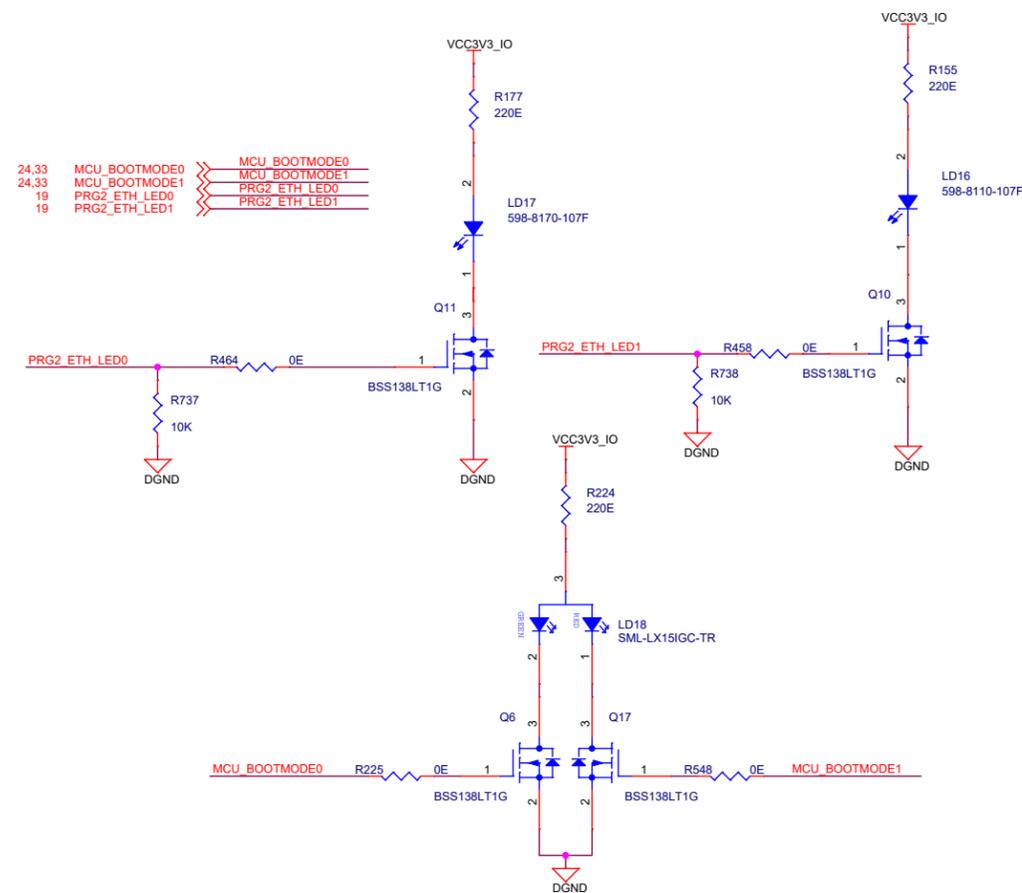


Title		ETHERNET PHY CLOCK GENERATOR	
Size		Rev	
C	Variant Name = PROC062 001 OPN#TMDX654IDKEVM	A	
Date:	Friday, February 07, 2020	Sheet	36 of 44

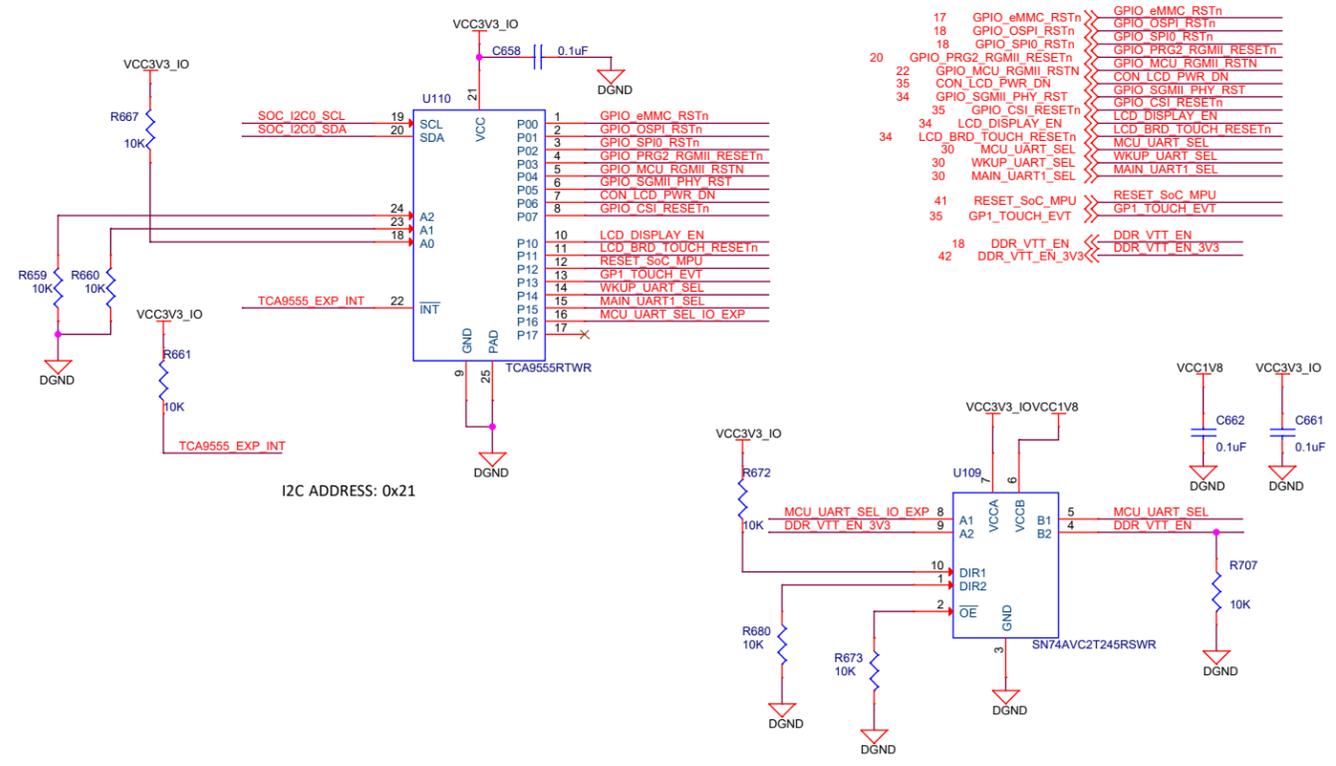
ETHERNET LED'S



PRG2 ETHERNET LED'S



I2C IO Expander



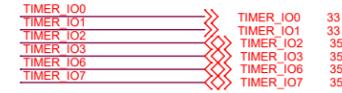
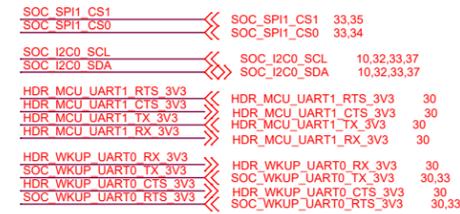
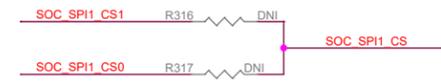
17	GPIO eMMC RSTn	GPIO eMMC RSTn
18	GPIO OSPI RSTn	GPIO OSPI RSTn
18	GPIO SPI0 RSTn	GPIO SPI0 RSTn
20	GPIO_PRG2_RGMII_RESEIn	GPIO PRG2 RGMII RESEIn
22	GPIO_MCU_RGMII_RSTn	GPIO MCU RGMII RSTn
22	CON_LCD_PWR_DN	CON LCD PWR DN
35	GPIO_SGMII_PHY_RST	GPIO SGMII PHY RST
34	GPIO_CSI_RESEIn	GPIO CSI RESEIn
34	LCD_DISPLAY_EN	LCD DISPLAY EN
34	LCD_BRD_TOUCH_RESEIn	LCD BRD TOUCH RESEIn
30	MCU_UART_SEL	MCU UART SEL
30	WKUP_UART_SEL	WKUP UART SEL
30	MAIN_UART1_SEL	MAIN UART1 SEL
41	RESET_SoC_MPU	RESET SoC MPU
35	GPI_TOUCH_EVT	GPI TOUCH EVT
18	DDR_VTT_EN	DDR VTT EN
42	DDR_VTT_EN_3V3	DDR VTT EN 3V3

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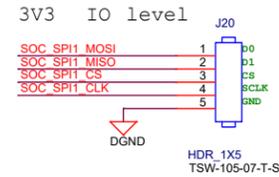


Title		ETHERNET LED'S
Size	Variant Name = PROC082 001 OPN#TMDX654IDKEVM	Rev
C		A
Date:	Friday, February 07, 2020	Sheet 37 of 44

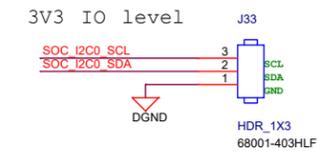
TEST HEADER



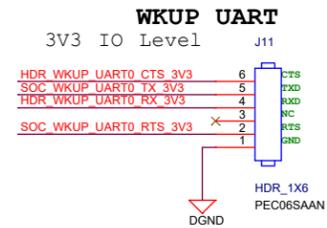
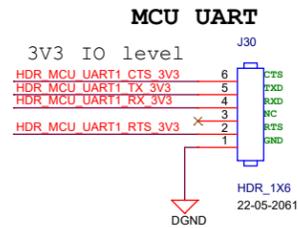
SPI TEST HEADER



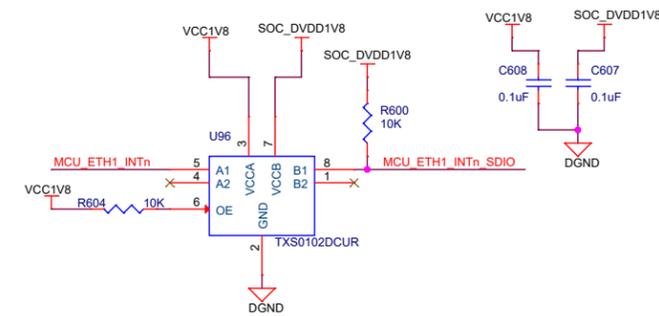
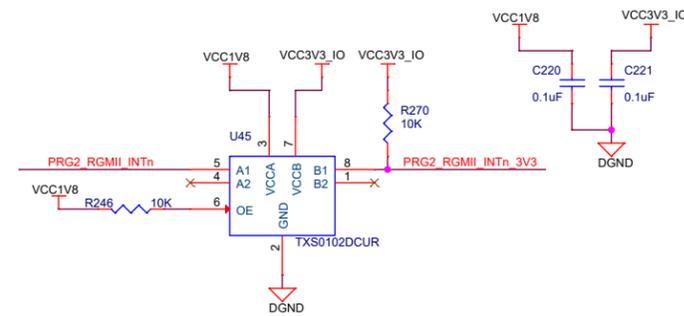
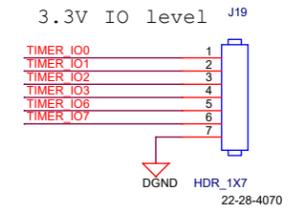
I2C TEST HEADER



UART TEST HEADER



TIMER SIGNALS TEST HEADER



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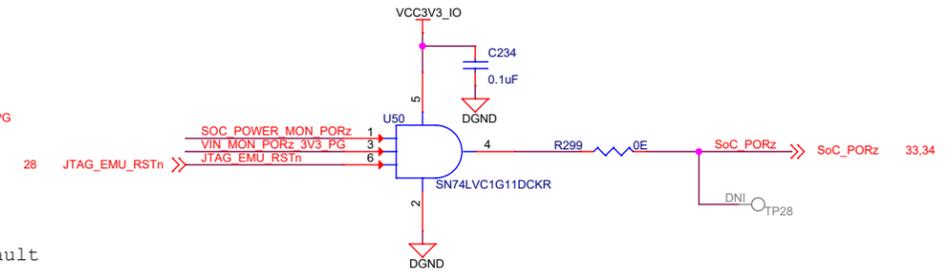
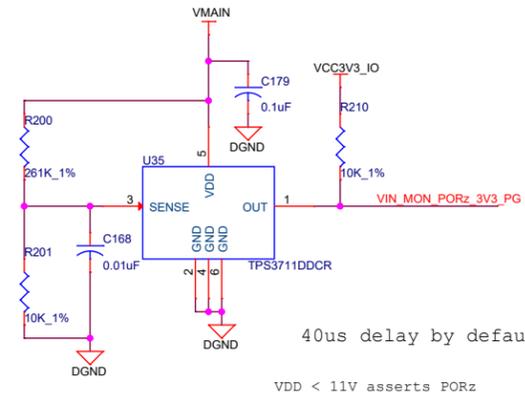
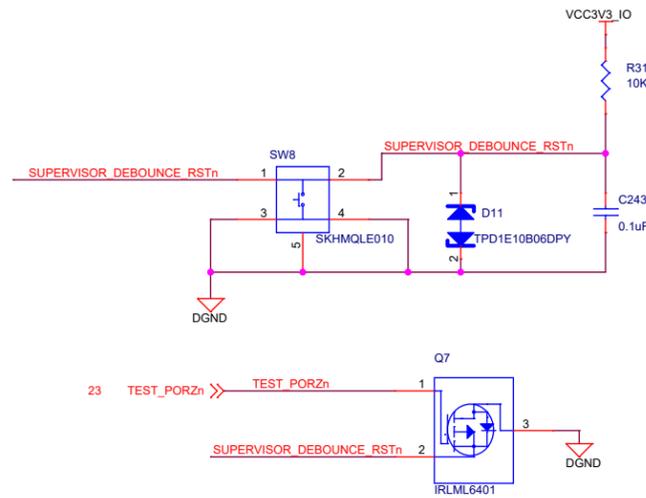


Title TEST HEADER

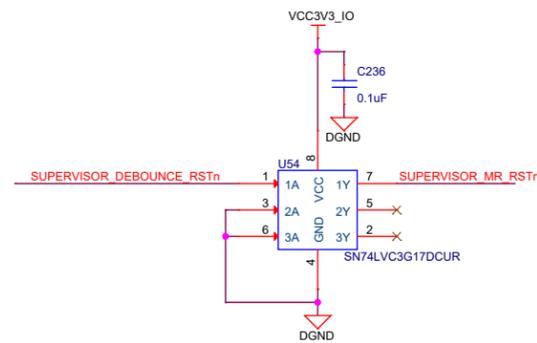
Size	Variant Name = PROC082 001 OPN#TMDX654IDKEVM	Rev
C		A
Date:	Friday, February 07, 2020	Sheet 38 of 44

VOLTAGE SUPERVISOR

Under Voltage Monitor (VMAIN)

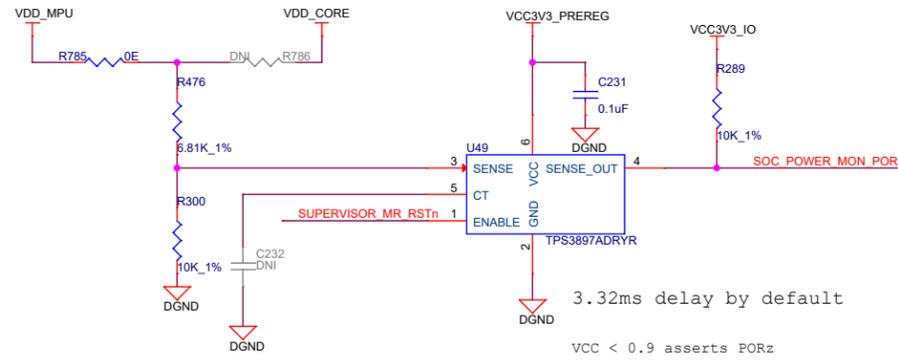


DEBOUNCE CIRCUIT



41.42 VIN_MON_PORz_3V3_PG << VIN_MON_PORz_3V3_PG

Under Voltage Monitor (VDD_MPU / VDD_CORE)



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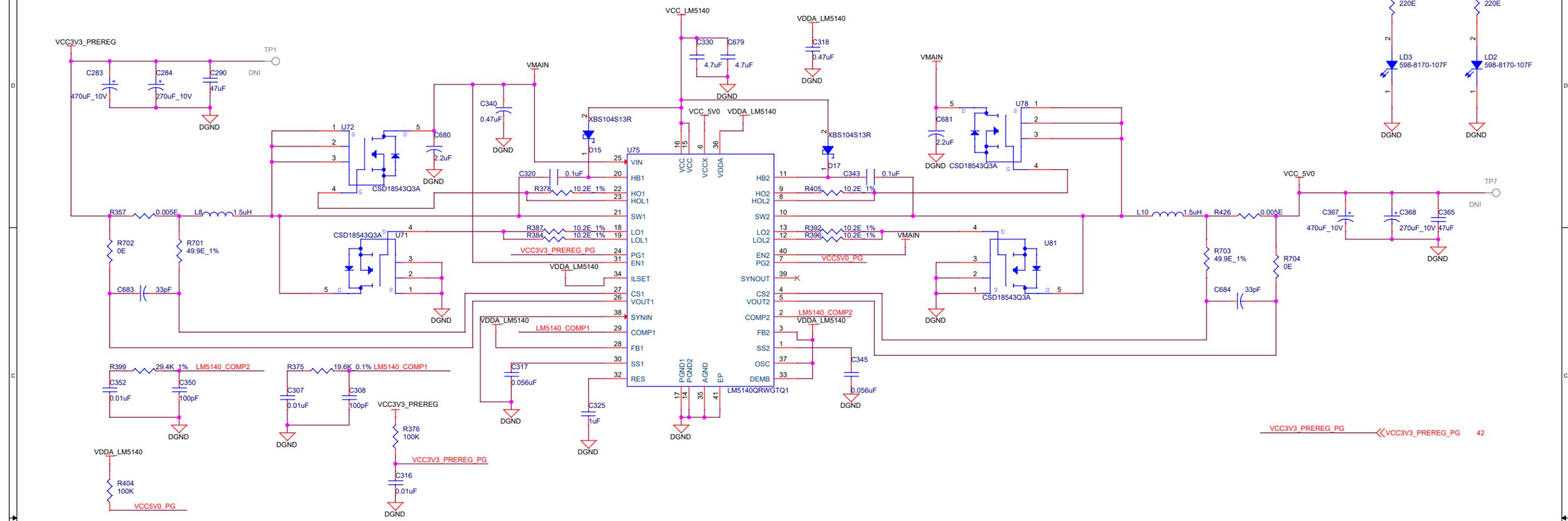


Title VOLTAGE SUPERVISOR & WKUP LEDs

Size	Variant Name = PROC082 001 OPN#TMDX654IDKEVM	Rev
C		A
Date:	Friday, February 07, 2020	Sheet 39 of 44

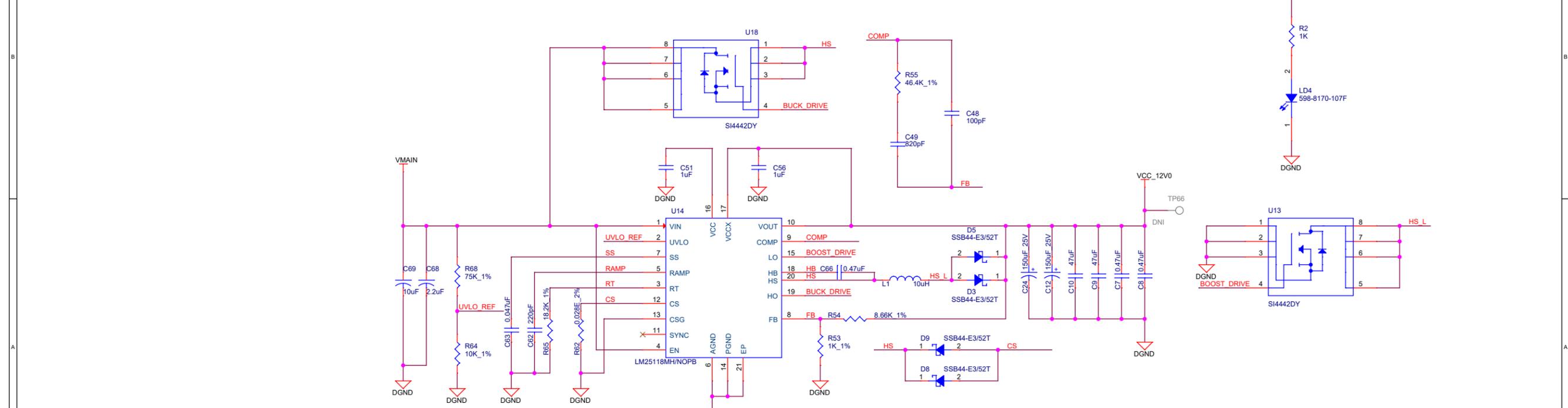
PRE_REG POWER SUPPLY

5V, 10A and 3.3V, 10A Dual SUPPLY



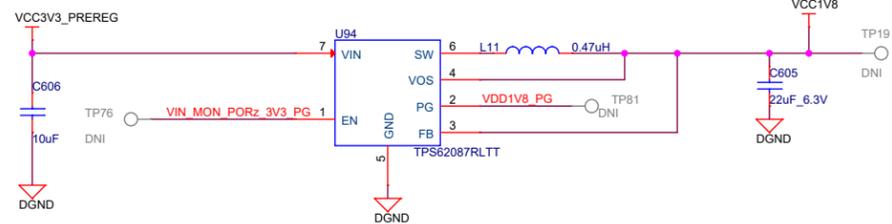
SERDES POWER SUPPLY

12V, 3A SUPPLY

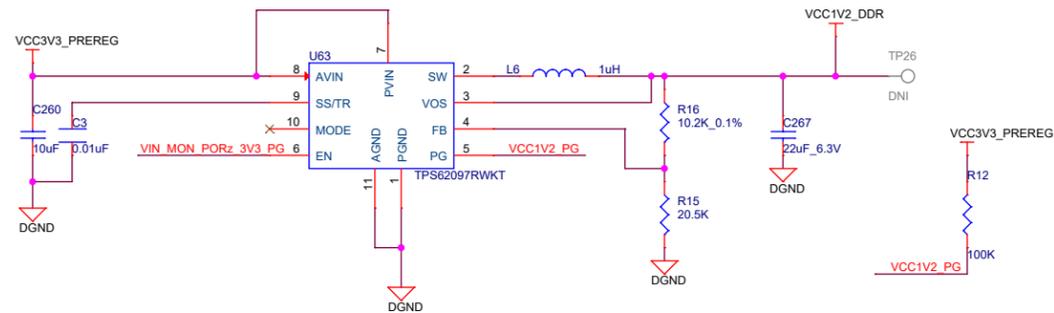


SoC POWER SUPPLY

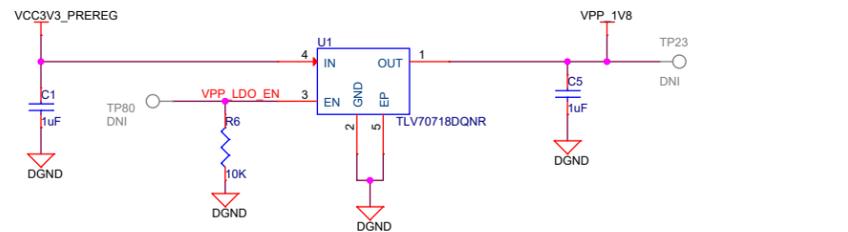
1.8V IO, 3.0AMPS SUPPLY



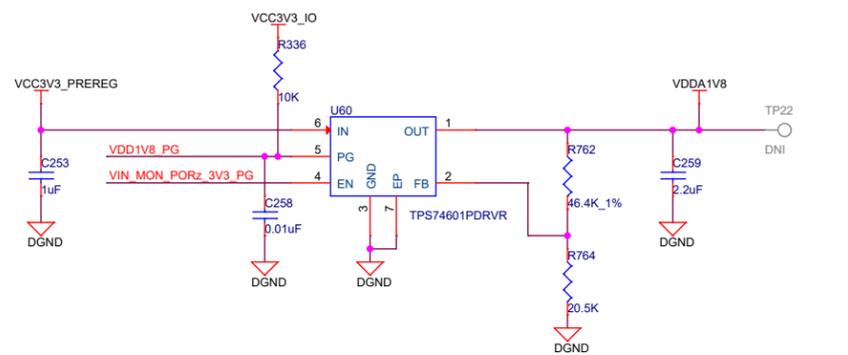
1.2V, 2.0AMPS SUPPLY



1.8V VPP, 0.15AMPS SUPPLY

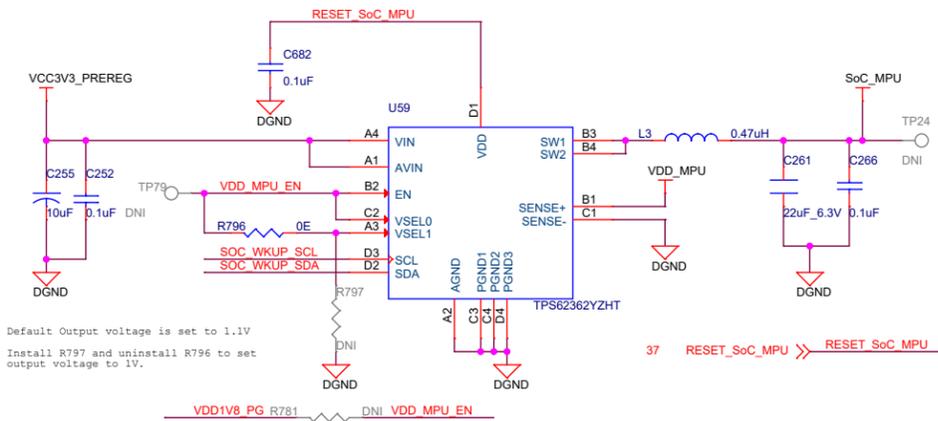


1.8V Analog , 1AMPS SUPPLY

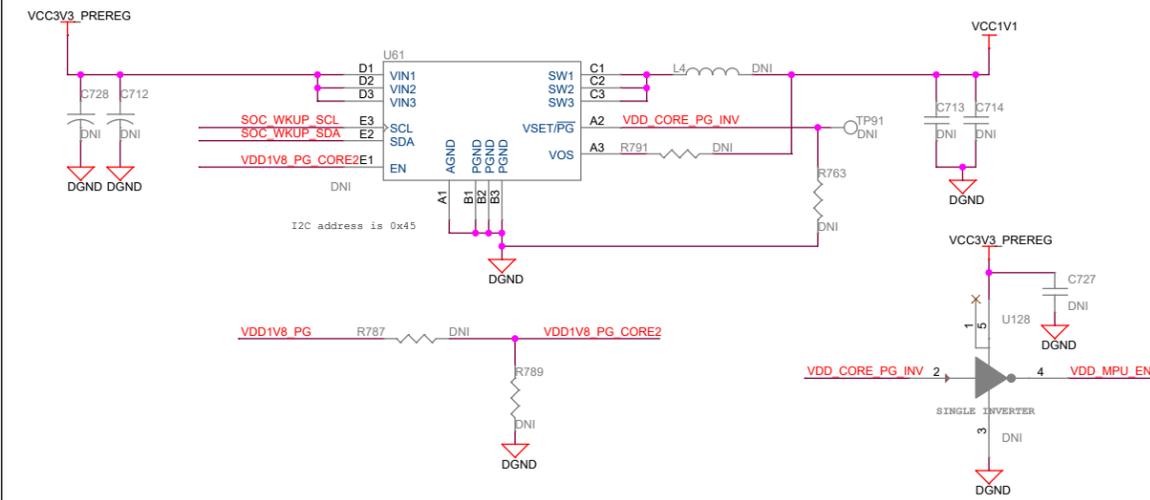


- 19,32,33,34,35 SOC_WKUP_SCL >> SOC_WKUP_SCL
- 19,32,33,34,35 SOC_WKUP_SDA <<> SOC_WKUP_SDA
- 18 VPP_LDO_EN <<< VPP_LDO_EN
- 39,42 VIN_MON_PORz_3V3_PG <<< VIN_MON_PORz_3V3_PG
- 39,42 VDD1V8_PG <<< VDD1V8_PG

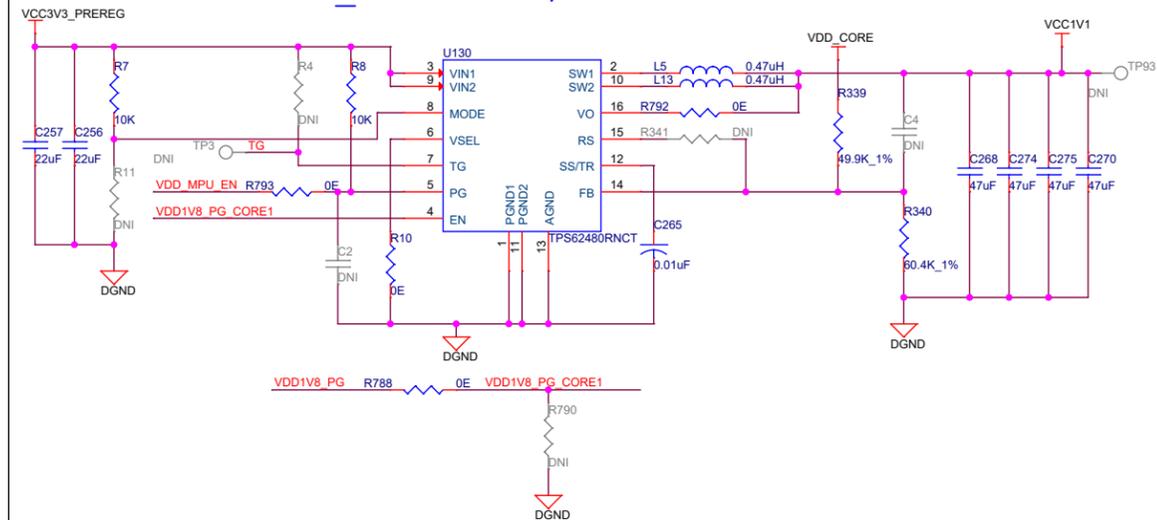
0.9-1.35V, 3.0AMPS SUPPLY



VDD_CORE 1.1V, 6.0AMPS SUPPLY (Optional)



VDD_CORE 1.1V, 6.0AMPS SUPPLY



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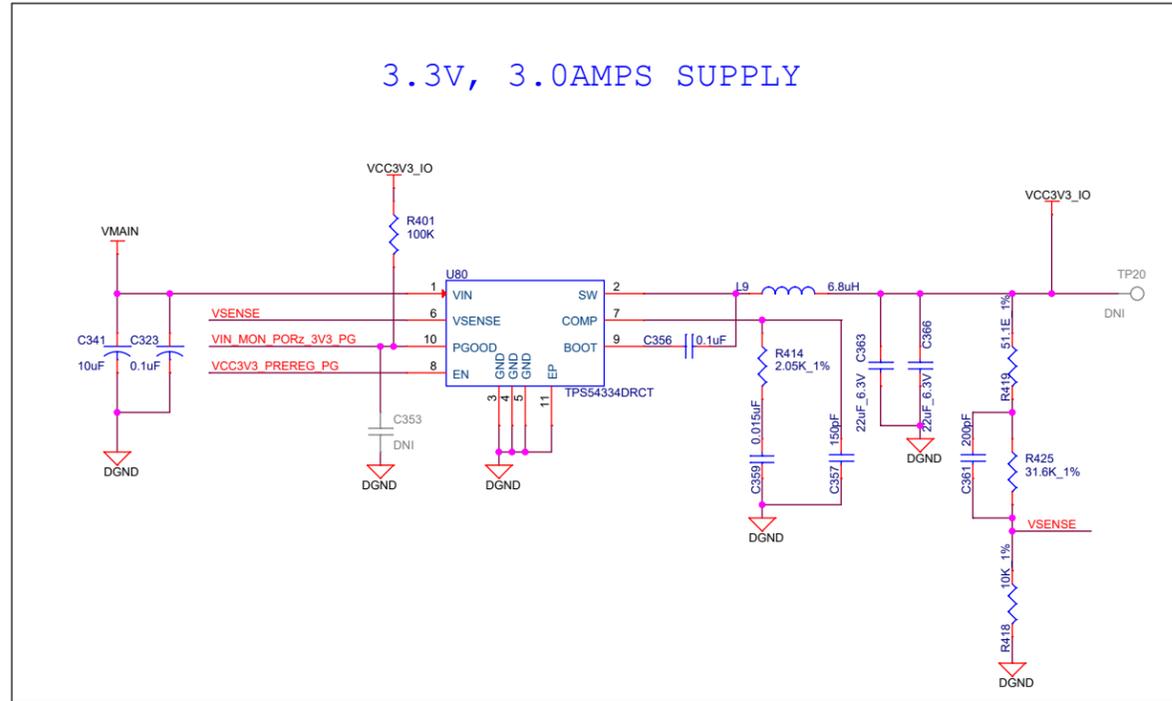
Title SoC POWER SUPPLY

Size C Variant Name = PROC082 001 OPN#TMDX654IDKEVM Rev A

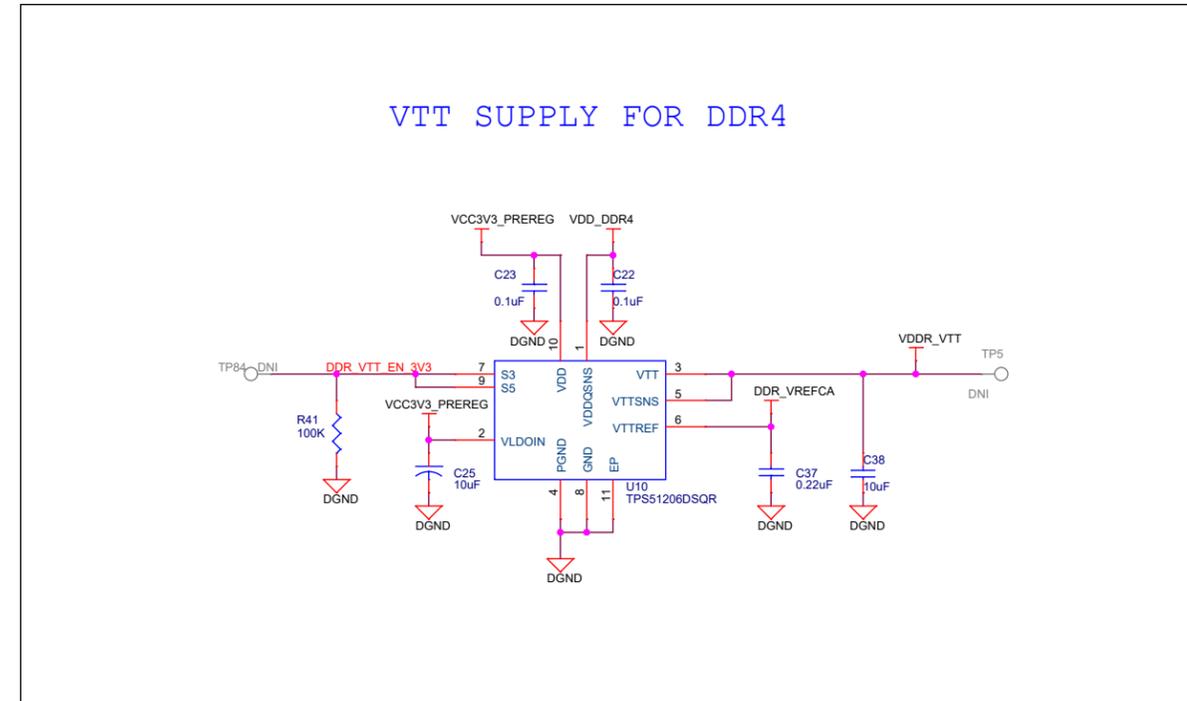
Date: Monday, February 10, 2020 Sheet 41 of 44

PERIPHERAL POWER SUPPLY

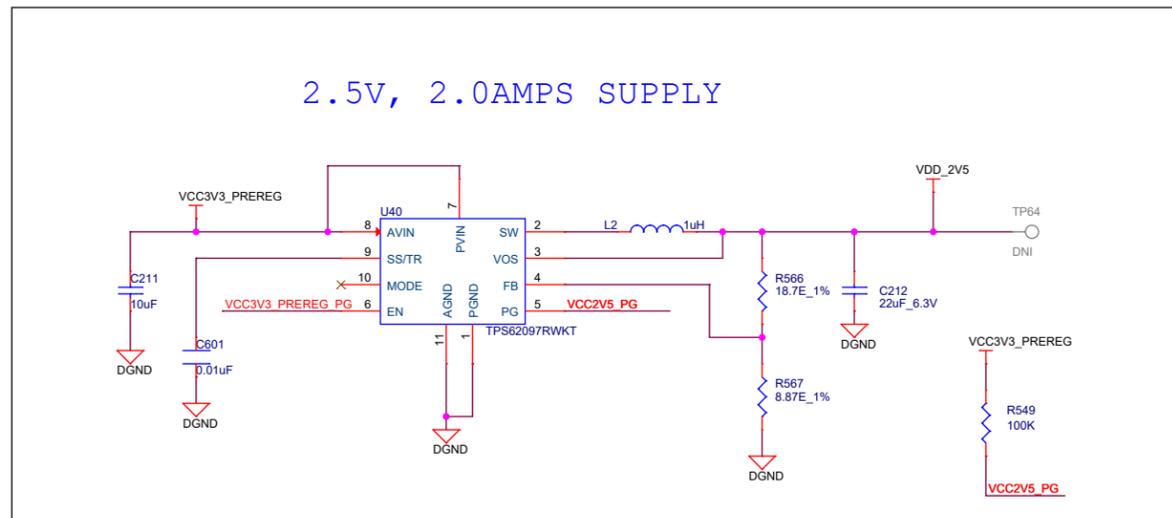
3.3V, 3.0AMPS SUPPLY



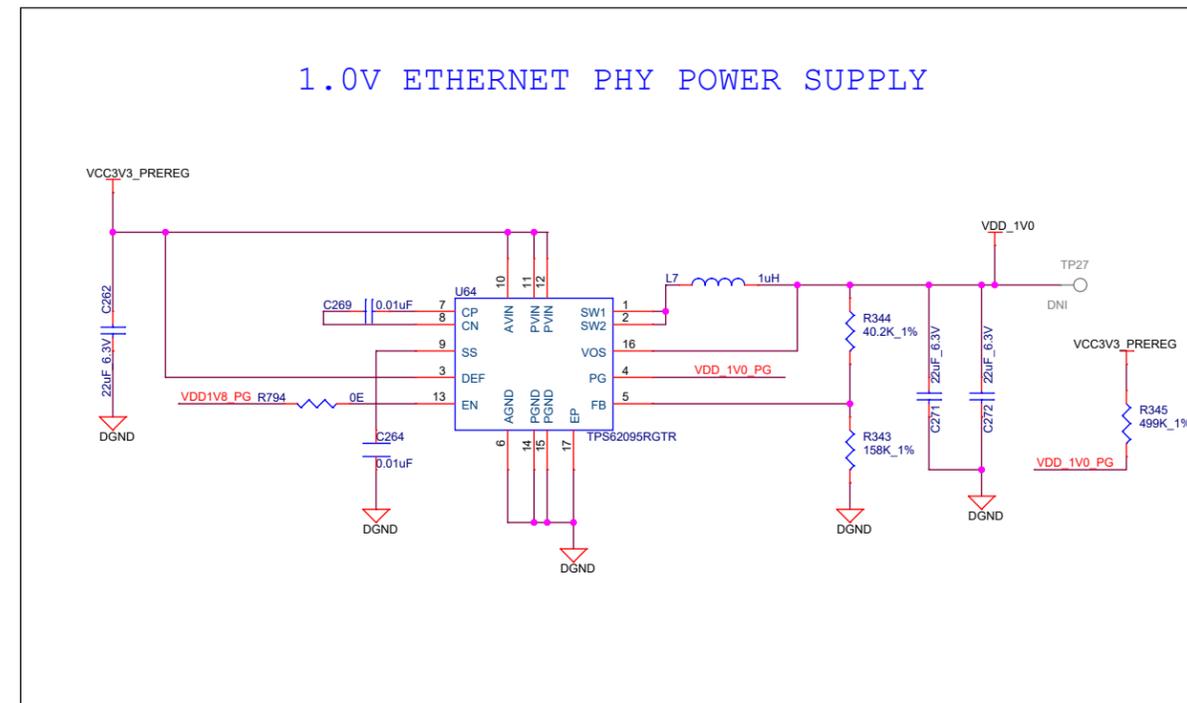
VTT SUPPLY FOR DDR4



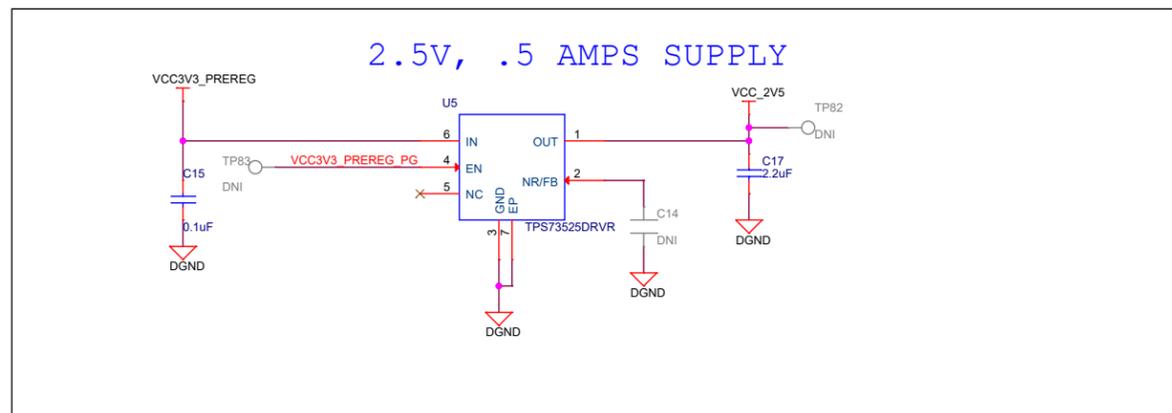
2.5V, 2.0AMPS SUPPLY



1.0V ETHERNET PHY POWER SUPPLY



2.5V, .5 AMPS SUPPLY



- 40 VDD1V8_PG >> VDD1V8_PG
- 40 VCC3V3_PREREG_PG >> VCC3V3_PREREG_PG
- 39,41 VIN_MON_PORz_3V3_PG << VIN_MON_PORz_3V3_PG
- 37 DDR_VTT_EN_3V3 << DDR_VTT_EN_3V3

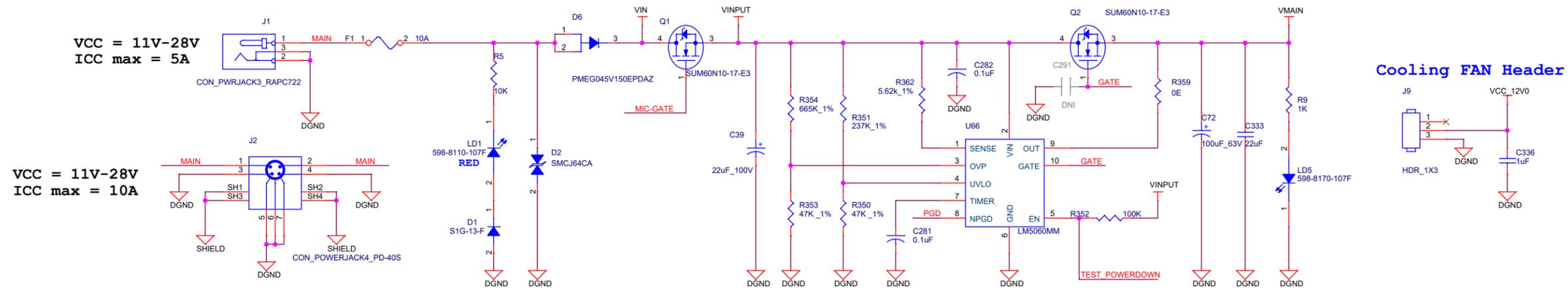
Designed for TI by Mistral Solutions Pvt Ltd



Title PERIPHERAL POWER SUPPLY

Size	Variant Name = PROC082 001 OPN#TMDX654IDKEVM	Rev
C		A
Date:	Monday, February 10, 2020	Sheet 42 of 44

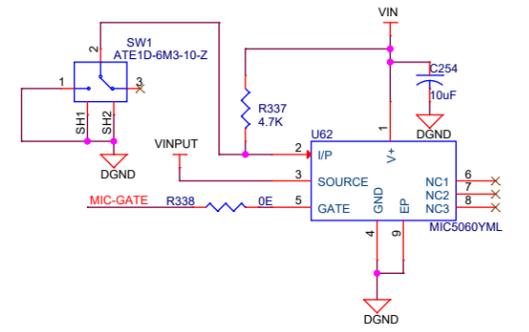
OVER VOLTAGE PROTECTION CIRCUIT



VCC = 11V-28V
ICC max = 5A

VCC = 11V-28V
ICC max = 10A

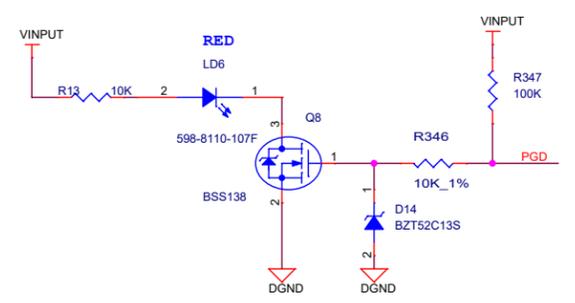
ON/ OFF Control SWITCH



Condition	LED Status (LD1)
Reverse Voltage	ON

Note:-
UVLO set for 11V
OVP set for 28V

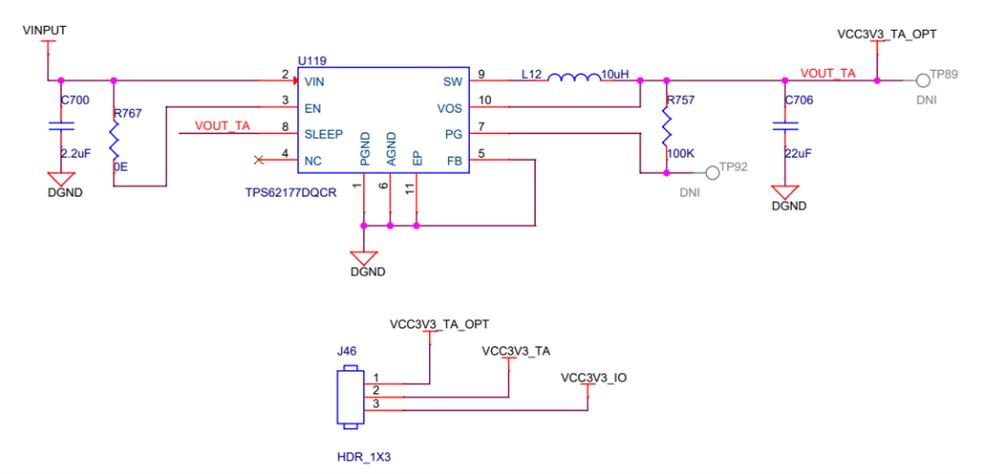
Fault Indication



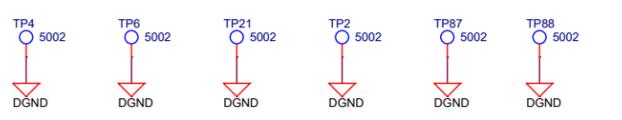
Condition	LED Status (LD6)
VINPUT between 11 to 28V	OFF
VINPUT above 28V or below 11V	ON

Note:-
When fault is indicated, set to proper voltage and power cycle the board.

TEST AUTOMATION BOARD POWER



Ground test points



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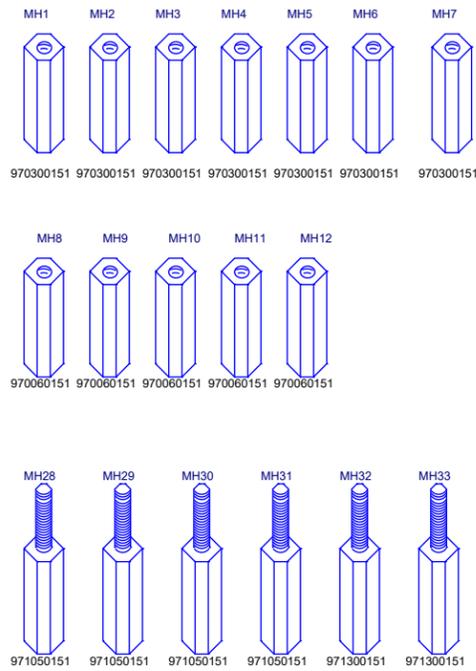
Title		
OVER VOLTAGE PROTECTION CKT AND TEST AUTOMATION POWER		
Size	Rev	
C	Variant Name = PROC082 001 OPN#TMDX654IDKEVM	A
Date:	Monday, February 10, 2020	Sheet 43 of 44

HARDWARE SCHEMATICS

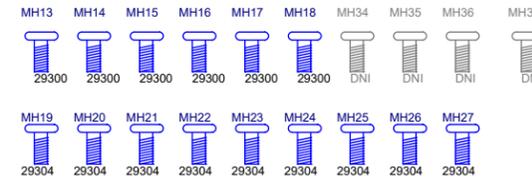
ASSEMBLY NOTES

1. All MSL components should be baked as per JEDEC standard.
2. PCB should be baked at 120 degree for 8 hours.
3. Board assembly must comply with workmanship standards. IPC-A-610 Class 2, unless otherwise specified.
4. These assemblies are ESD sensitive, ESD precautions shall be observed.
5. These assemblies must be clean and free from flux and all contaminants. Use of no clean flux is not acceptable.
6. Provide serial numbers to the assembled boards for identification.
7. The assembled board are wrapped in ESD Covers(individual) and packed securely before shipment.

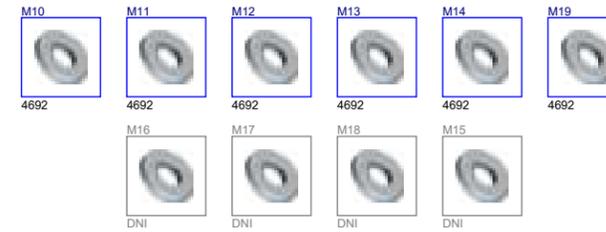
STANDOFFS



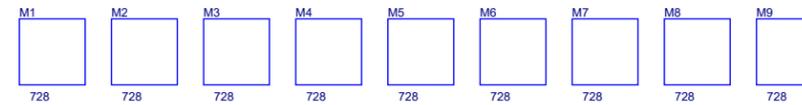
SCREWS



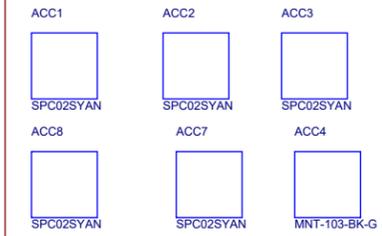
WASHER'S



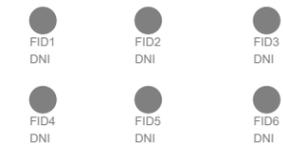
RUBBER FEET



JUMPERS



FIDUCIALS



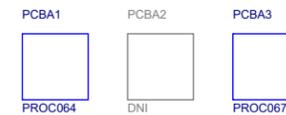
Socket & Processor as Accessories



BARE PCB

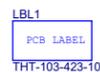


Assembled PCB's

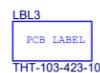


LABELS

Board Serial No.



Assembly Revision

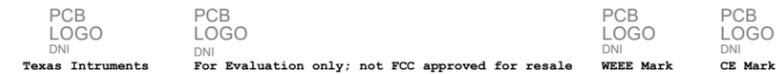


ORDERABLE PART NO



Orderable part number	
Variant	Label Text
001	TMDX654IDKEVM
002	TMDX654HSEVM
003	TMDX654GPEVM
004	TMDX654IDKEVM-S
005	TMDX654GPEVM-S

LOGOs



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Title: HARDWARE SCHEMATICS

Size	Variant Name = PROC062 001 OPN#TMDX654IDKEVM	Rev
C		A
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