MAXWELL CUSTOMER PROCESSOR BOARD

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VER	1.0

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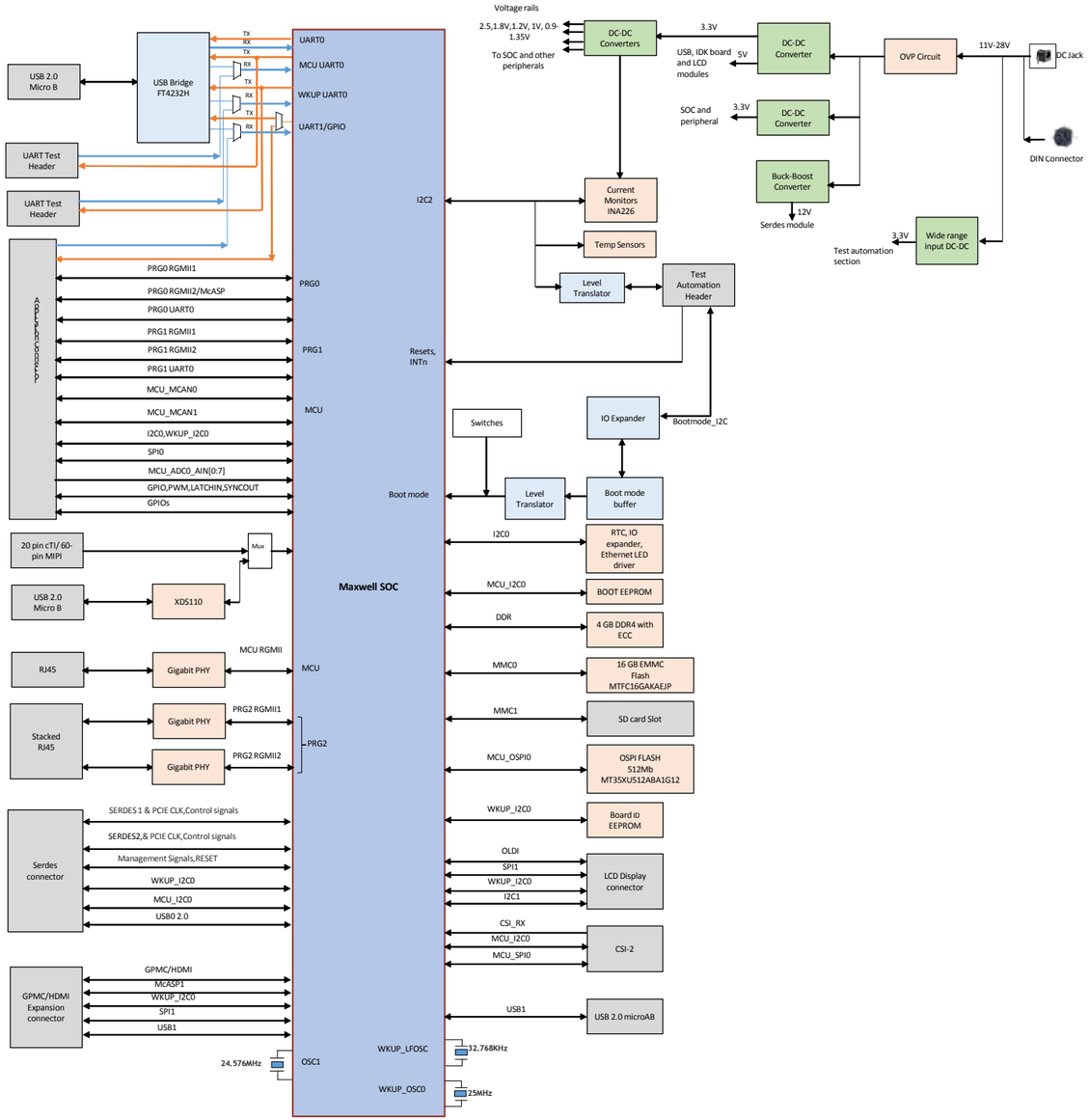
REVISION HISTORY

VER #	DATE	DESCRIPTION OF CHANGES	AUTHOR	REVIEWED BY	APPROVED BY
0.1	3rd JUN 2019	Drafted from "PROC062E3_SCH" document.	Mistral Design Team	AJIT MB	AJIT MB
0.2	26th JUN 2019	Updated REV E4 schematic as per change list document.	Mistral Design Team	AJIT MB	AJIT MB
0.3	28th JUN 2019	Updated test automation power section and LCD adpater board load switch.	Mistral Design Team	AJIT MB	AJIT MB
0.4	3rd JUL 2019	Updated variants	Mistral Design Team	AJIT MB	AJIT MB
0.5	13rd AUG 2019	Updated VDD_CORE regulator section	Mistral Design Team	AJIT MB	AJIT MB
0.6	22 AUG 2019	Updated VDD_1V0 and VDD_DLL section	Mistral Design Team	AJIT MB	AJIT MB
1.0	28 AUG 2019	Baselined			

BLOCK DIAGRAM_CP BOARD



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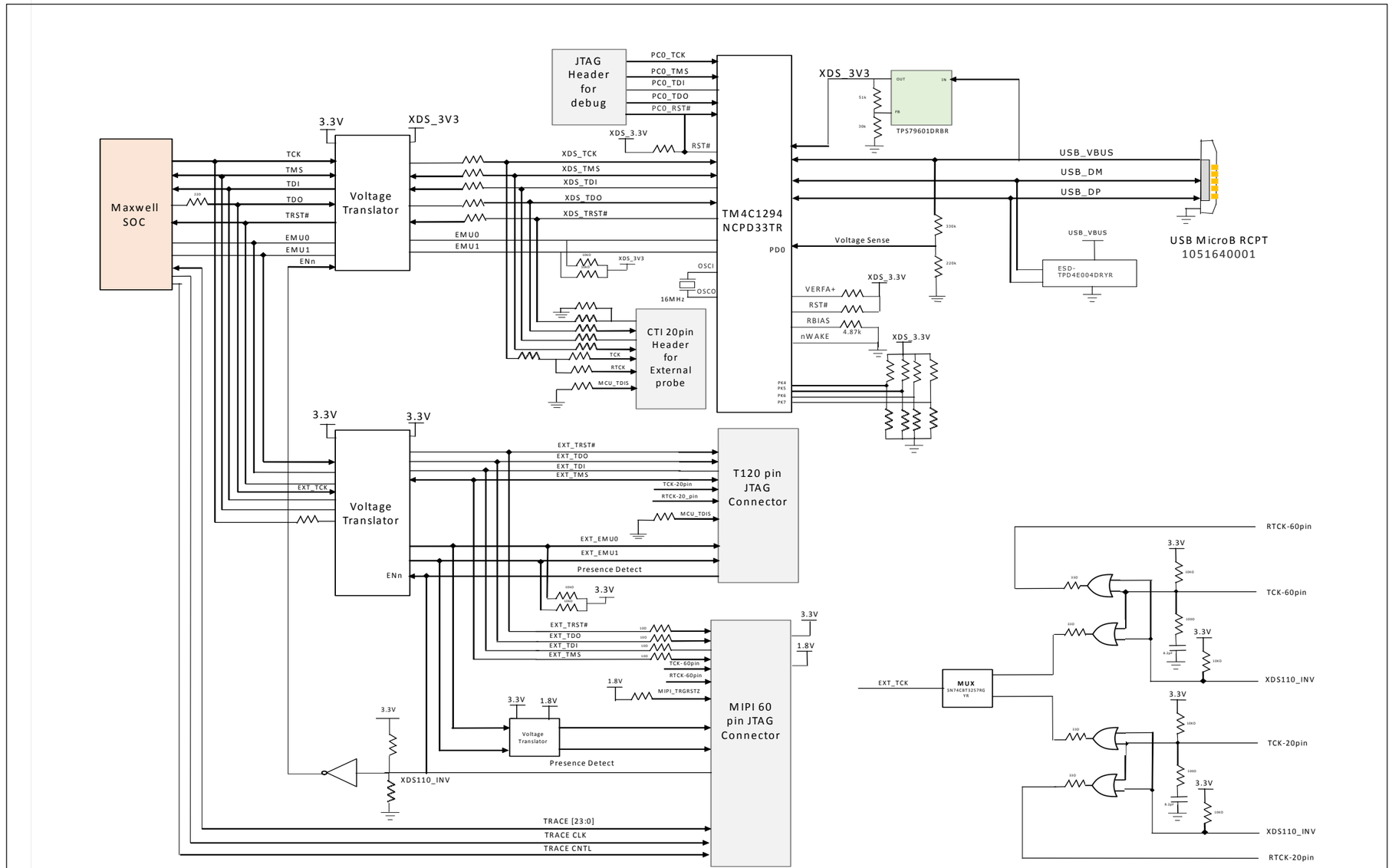
BLOCK DIAGRAM_XDS110



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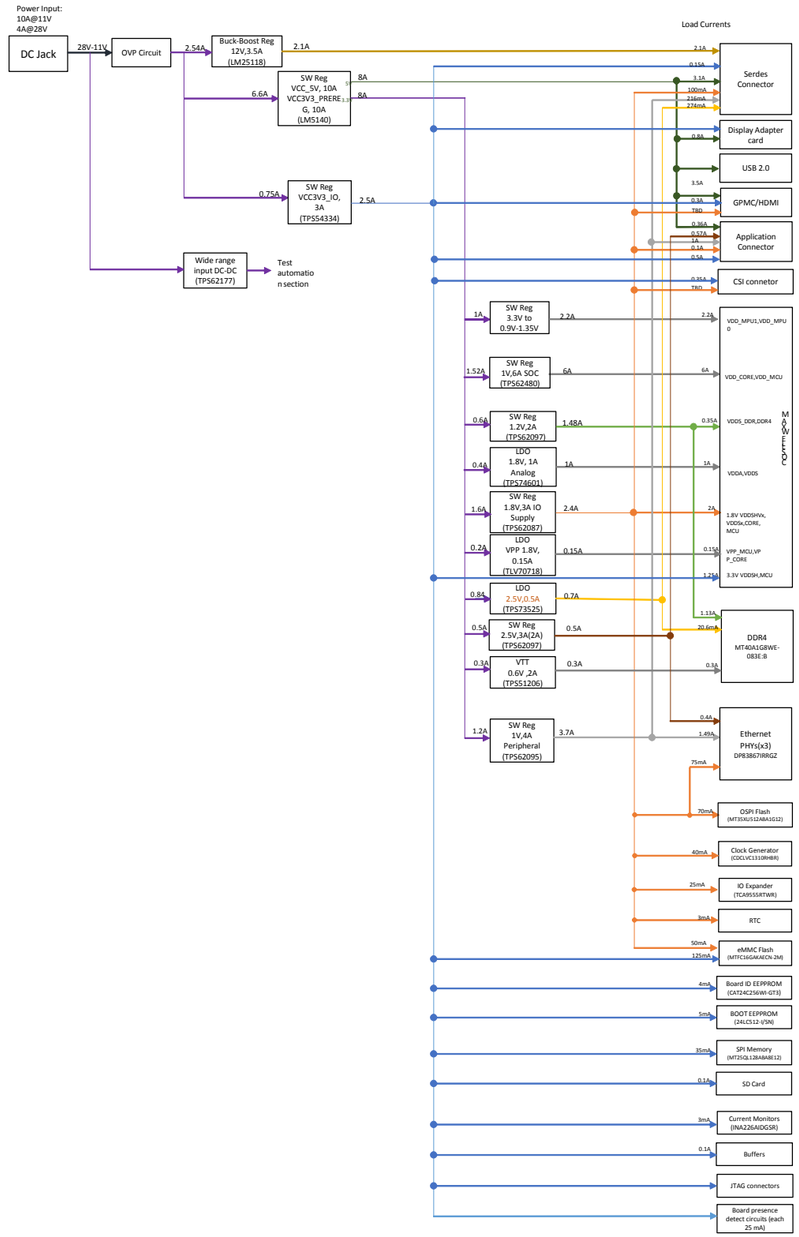
POWER FLOW DIAGRAM

MAXIE Customer Processor Board Power Tree



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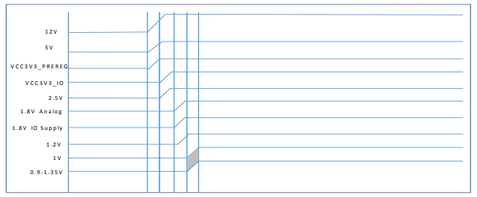
POWER SEQUENCE

Power up Sequence

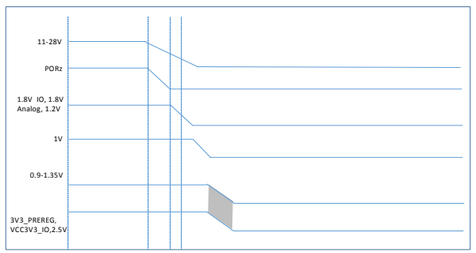


Power up Sequence:
12V, 5V,3V3_PREREG --->VCC3V3_IO, 2.5V --->1.8V Analog, 1.8V IO Supply ---> 1V SOC ,0.9-1.35V

There is no sequencing for 1V Peripheral supply

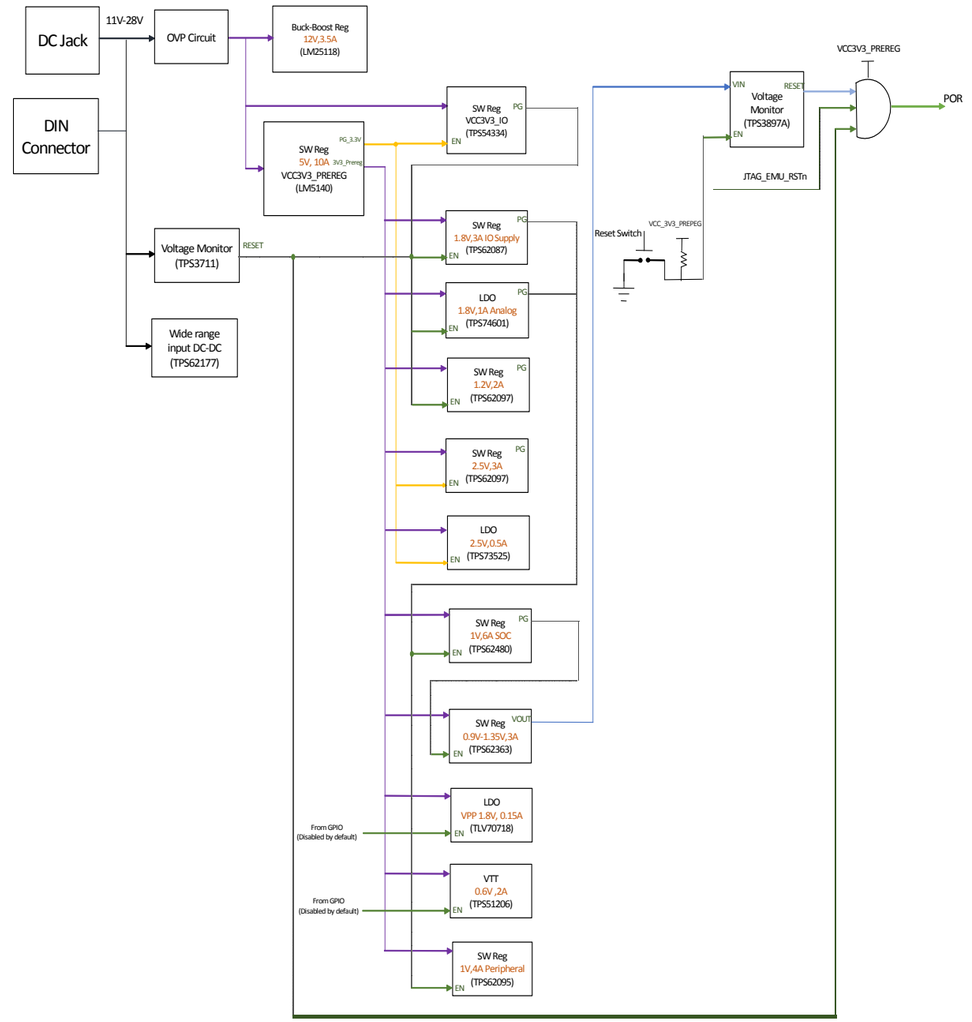
Note: Grey shaded areas are windows where it is valid to ramp the voltage rail.

Power down Sequence



Power down Sequence:
1.2V, 1.8V Analog, 1.8V IO Supply ---> 1V SOC ---> 0.9-1.35V --->3V3_PREREG, VCC3V3_IO, 2.5V

Note: Grey shaded areas are windows where it is valid to ramp down the voltage rail.



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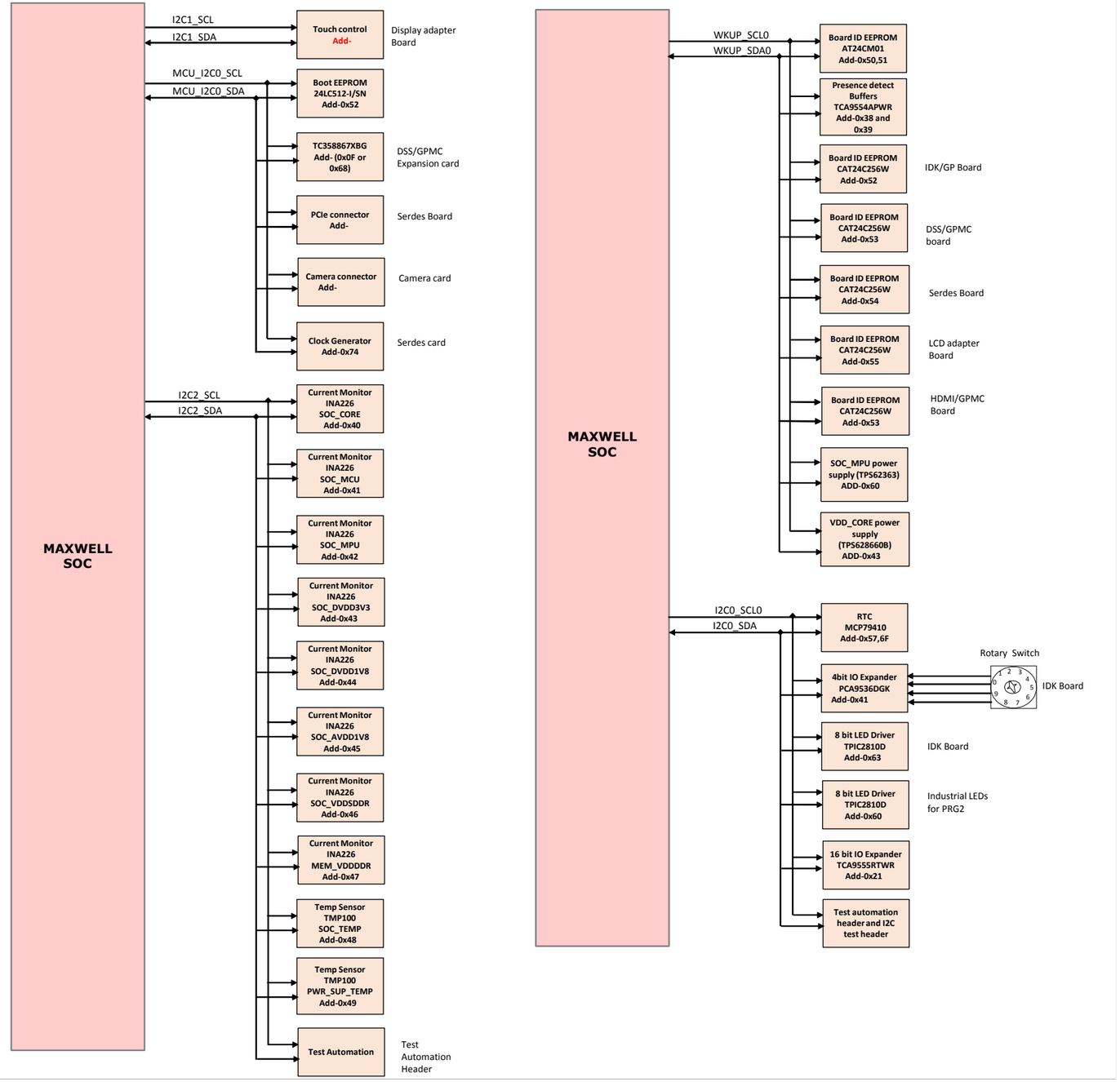
GPIO MAPPING TABLE

Total No of GPIOs Required from Maxwell SoC								
Sl 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_OSPI0_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_SPI0_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_D0	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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Size C	Variant Name = PROC062 001 OPN#TMDX654IDKEVM	Rev E4
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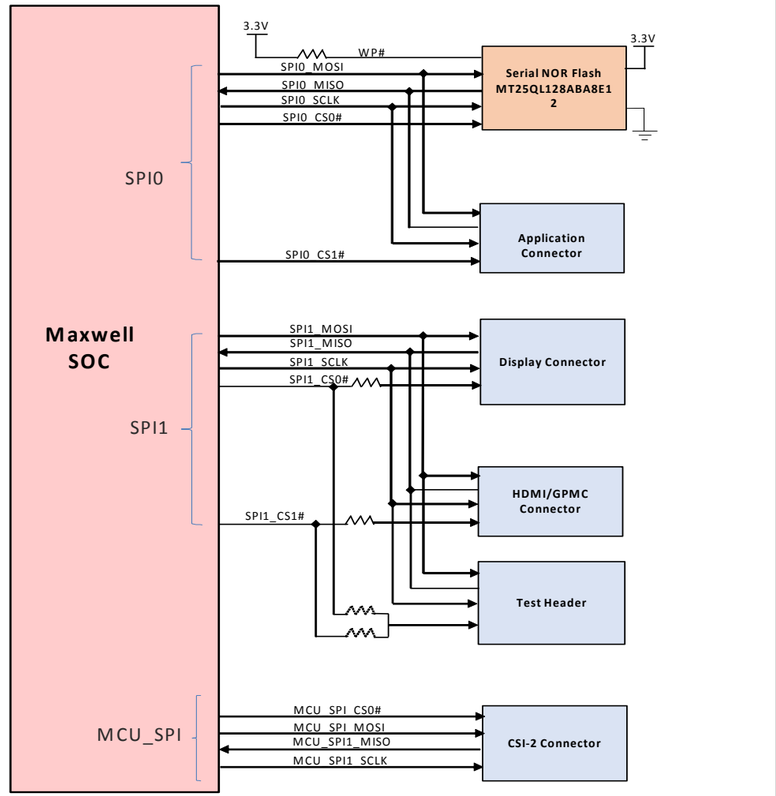
SPI TREE



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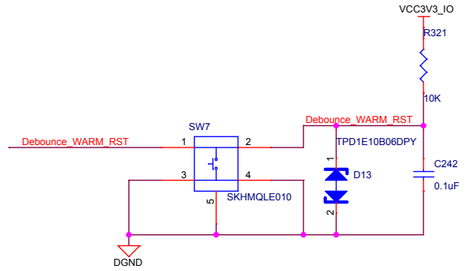
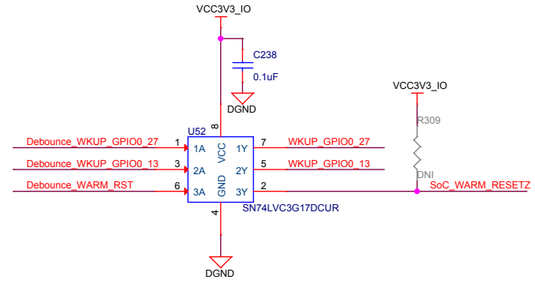
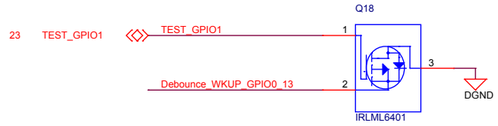
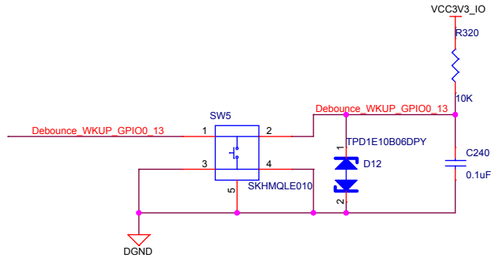
SoC WARM_RST

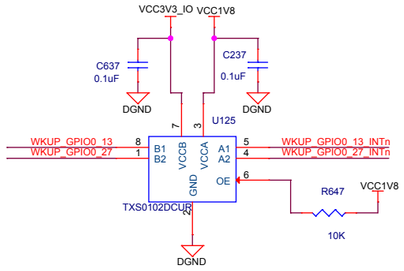


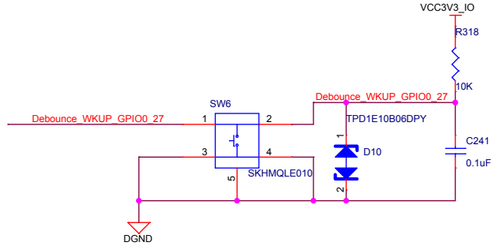


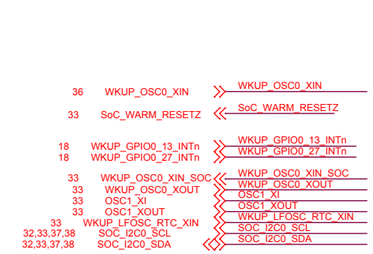
MCU_PUSH BUTTONS



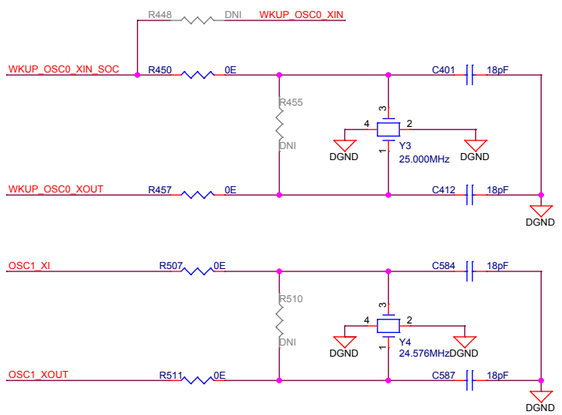


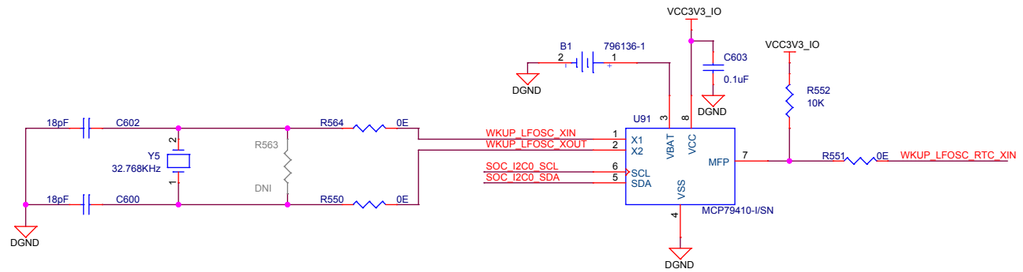






SoC CLOCK





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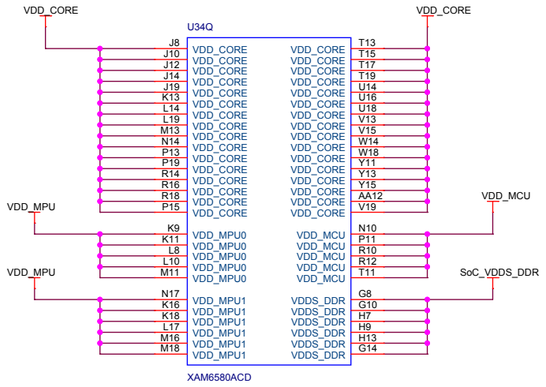
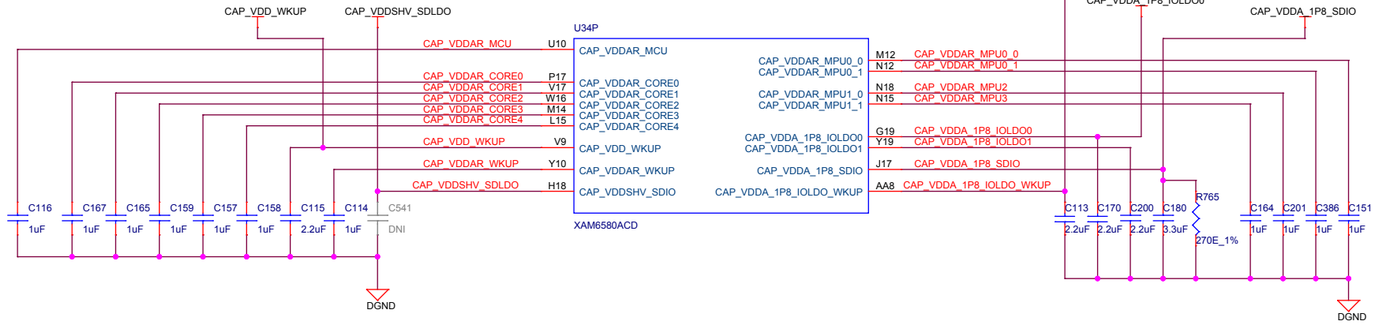
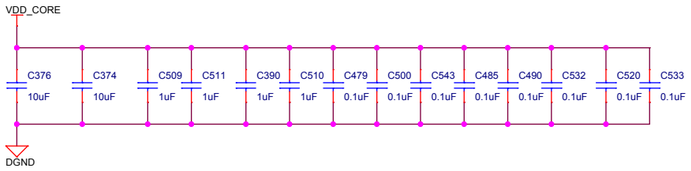
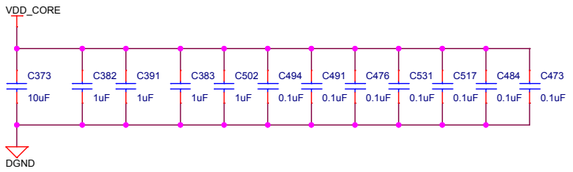
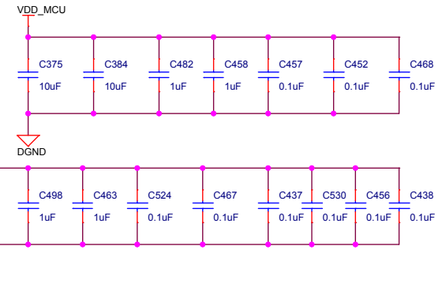
PROCESSOR POWER & DECAPS

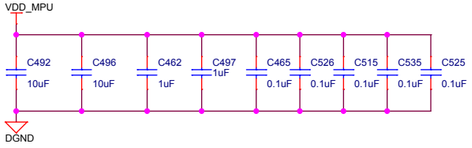


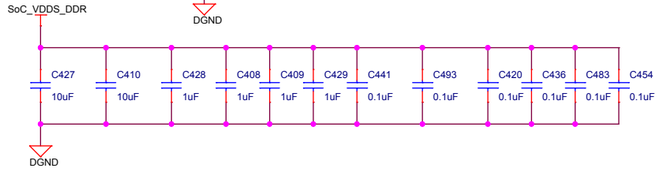












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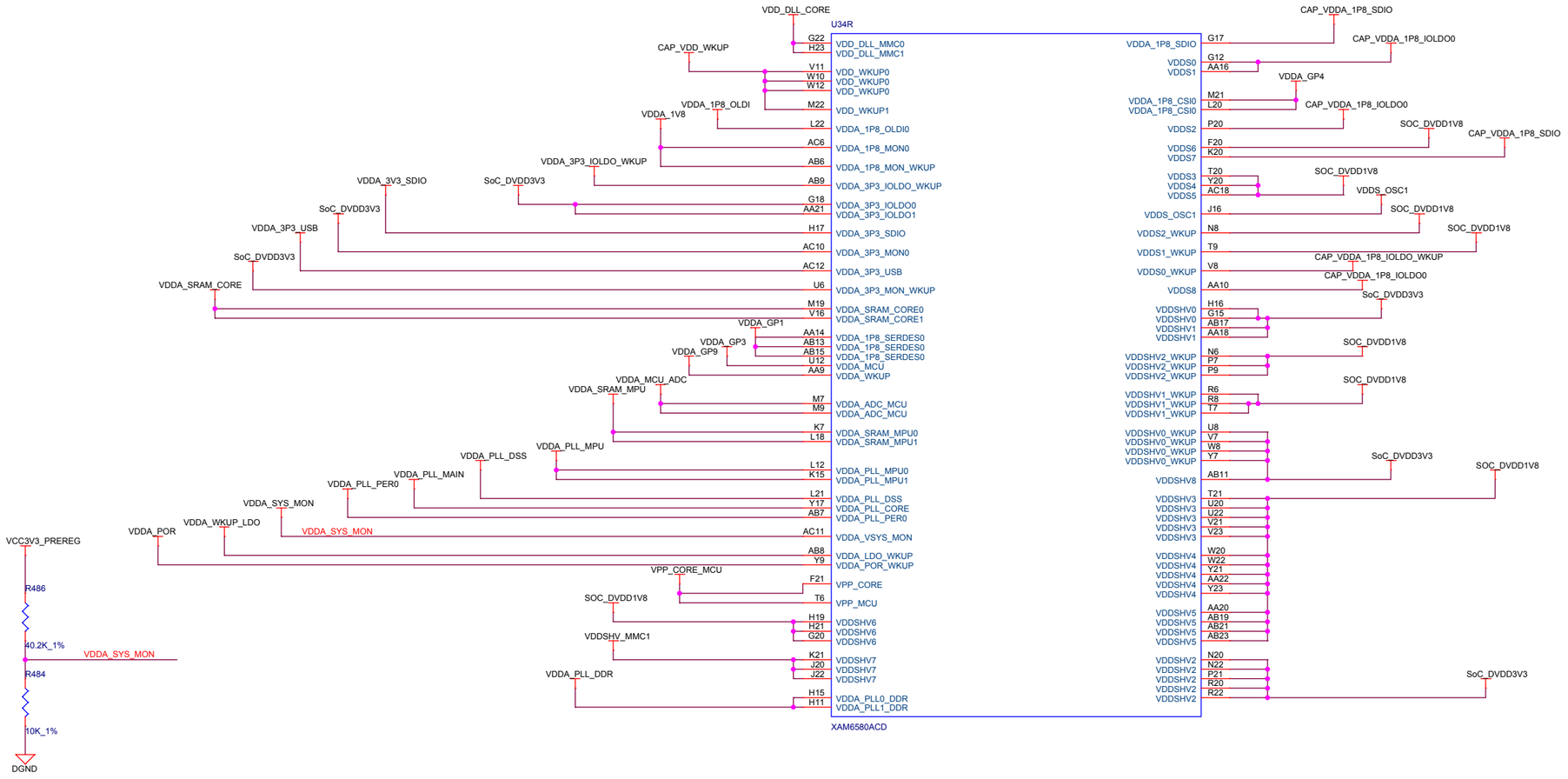
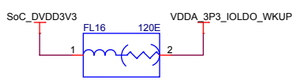
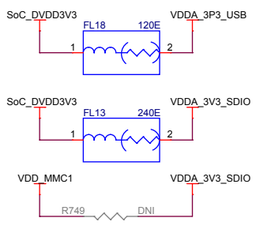
SoC POWER



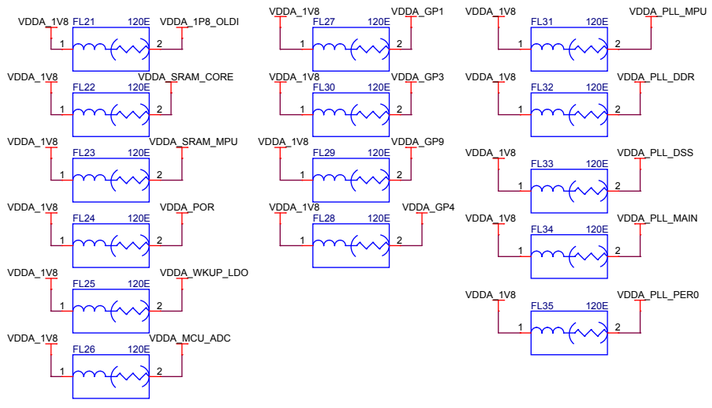
3.3V IO SUPPLY



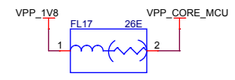
3.3V ANALOG SUPPLY



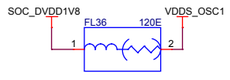
1.8V Analog SUPPLY



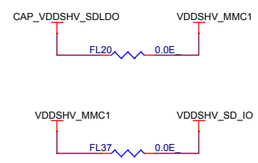
VPP SUPPLY



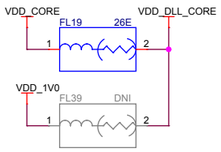
OSCILLATOR SUPPLY



MMC1 IO SUPPLY



CORE SUPPLY



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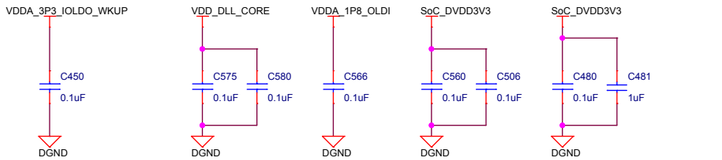
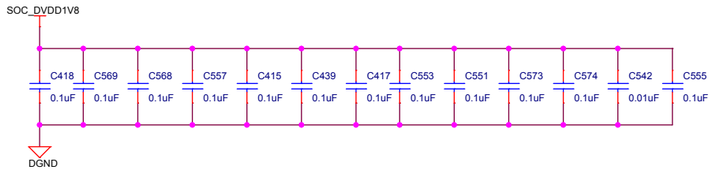
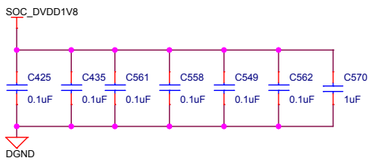
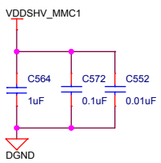
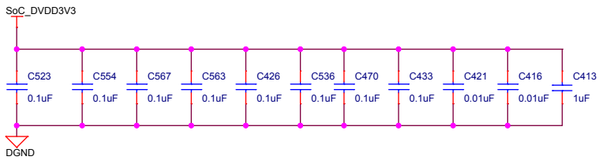
PROCESSOR DECAPS

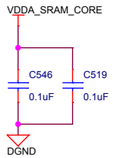


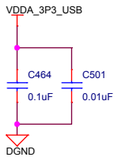


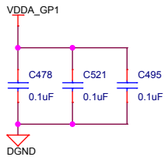


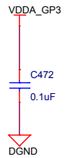


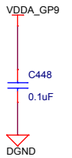


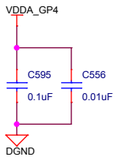


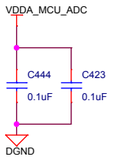


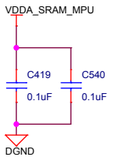


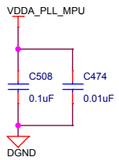


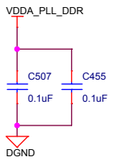


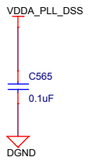


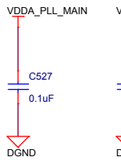


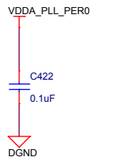


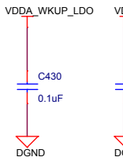


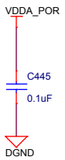


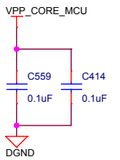


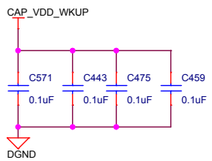


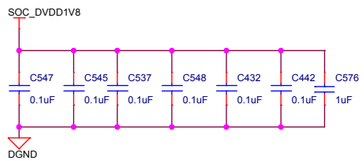


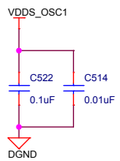












Designed for TI by Mistral Solutions Pvt Ltd

Title	SoC POWER3	
Size: C	Variant Name = PROC062 001 OPN#TMDX654IDKEVM	Rev: E4
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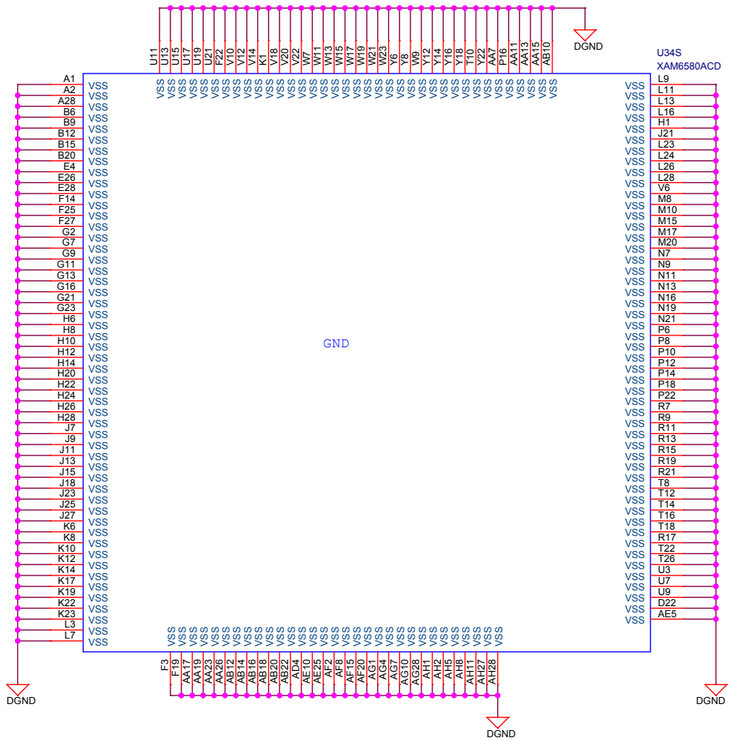
SoC POWER - VSS



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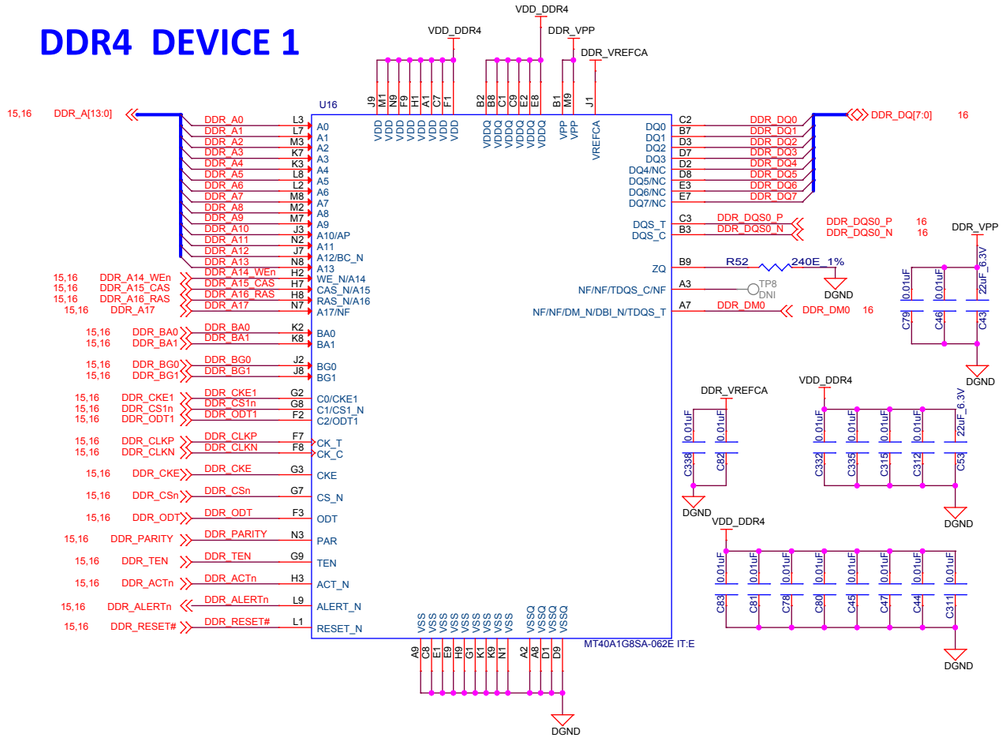
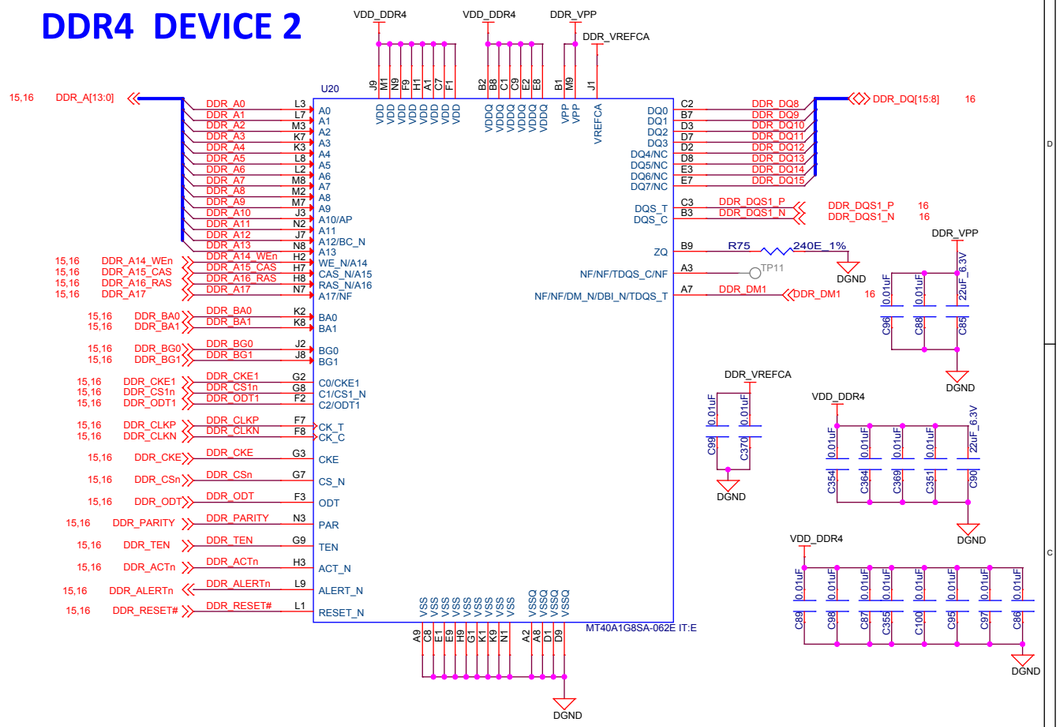
Title	SoC POWER4	
Size C	Variant Name = PROC062 001 OPN#TMDX654IDKEVM	Rev E4
Date: Thursday, August 22, 2019	Sheet 14 of 44	

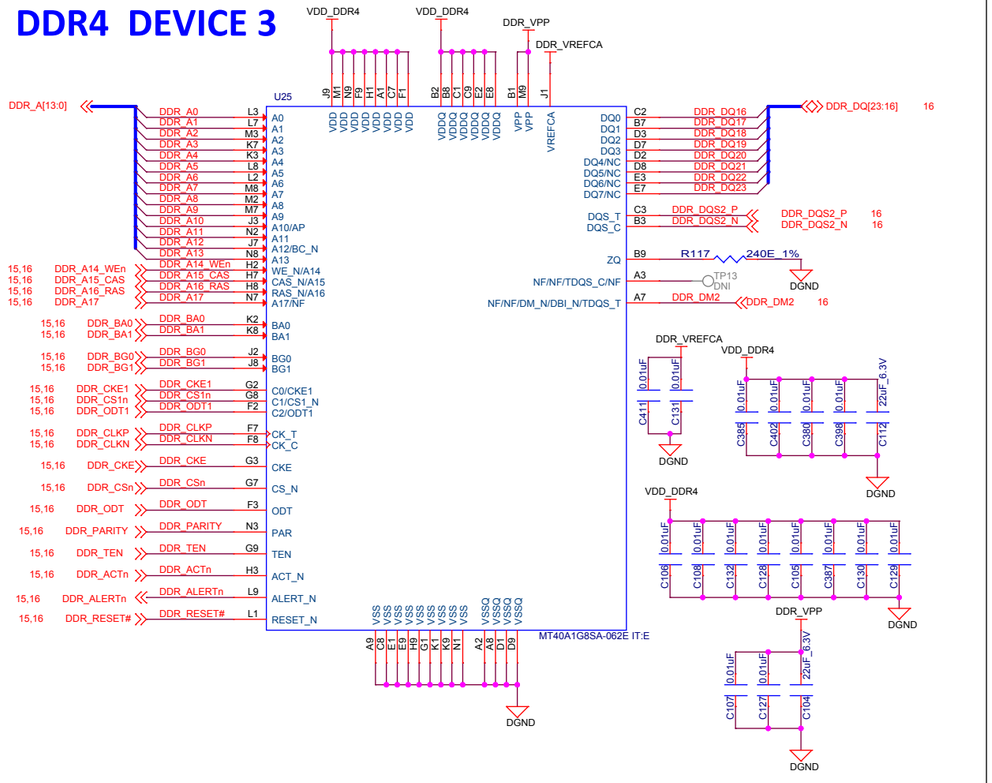
DDR4 DEVICE 1



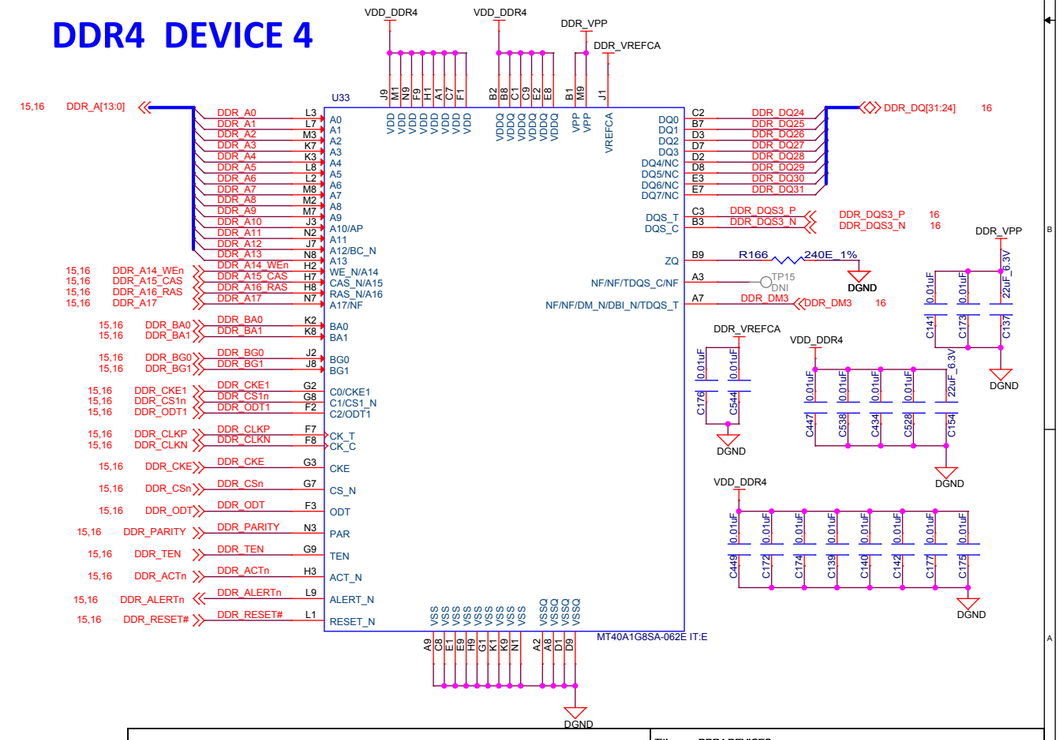
DDR4 DEVICE 2



DDR4 DEVICE 3



DDR4 DEVICE 4



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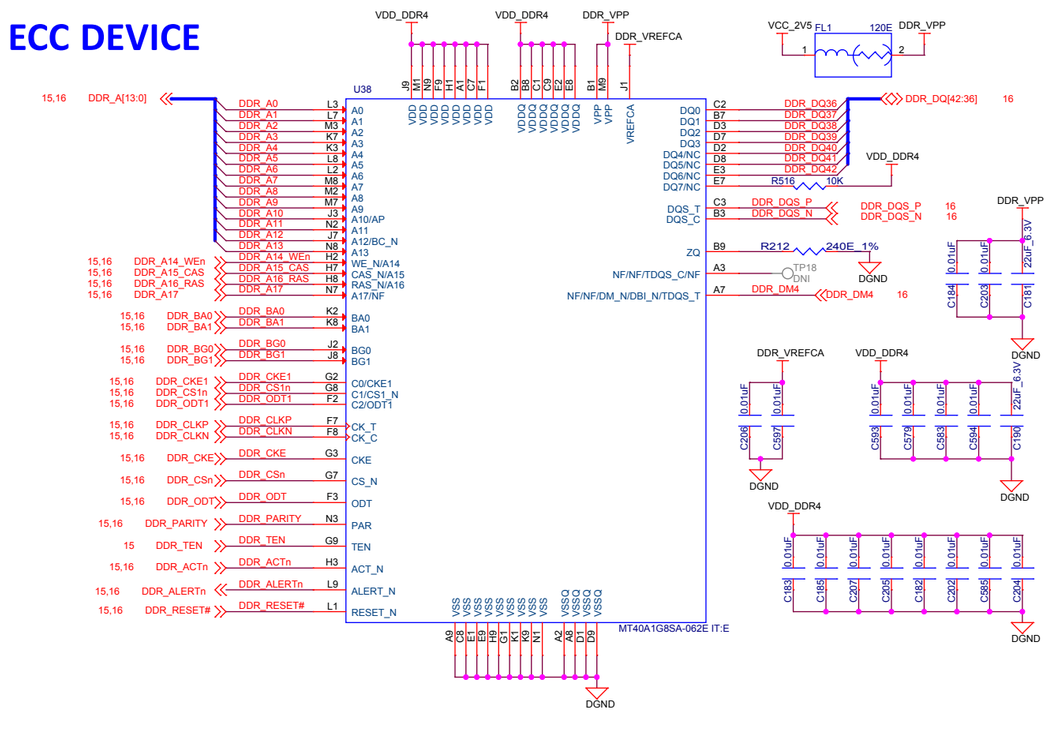
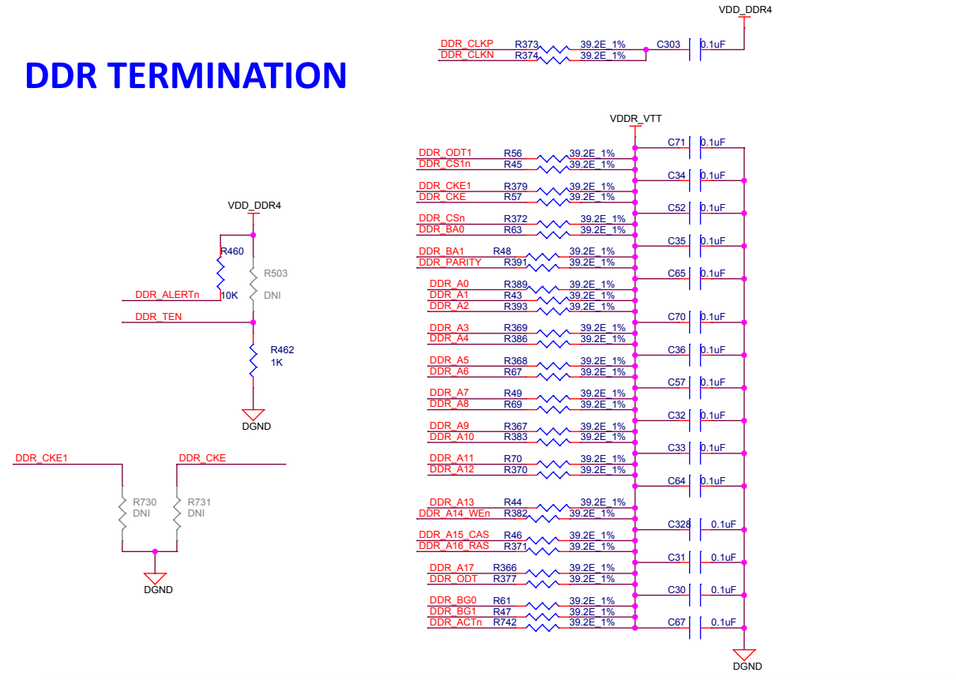
Title	DDR4 DEVICES	
Size C	Variant Name = PROC062 001 OPN#TMDX654IDKEVM	Rev E4
Date: Monday, August 26, 2019	Sheet 15 of 44	

SoC DDR INTERFACE

ECC DEVICE



DDR TERMINATION



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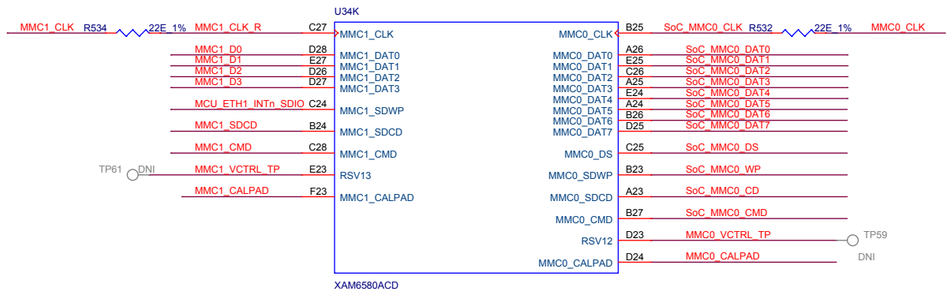
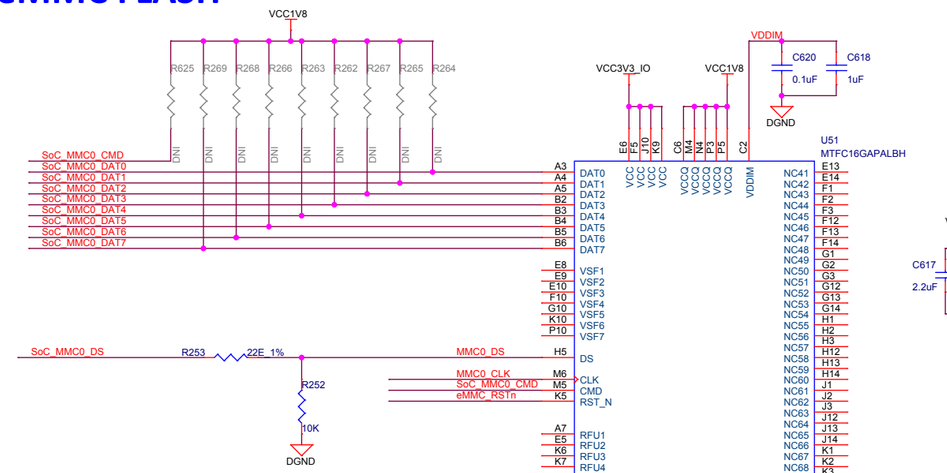
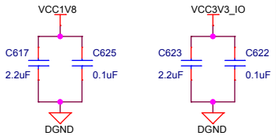
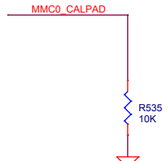
Title	DDR4 ECC & TERMINATIONS	
Size C	Variant Name = PROC062 001 OPN#TMDX654IDKEVM	Rev E4
Date: Thursday, August 22, 2019	Sheet 16 of 44	

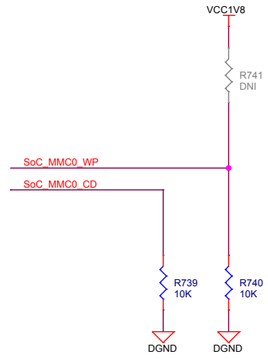
eMMC FLASH



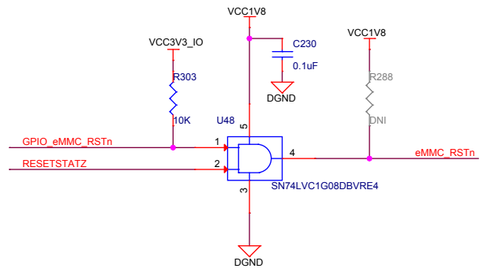




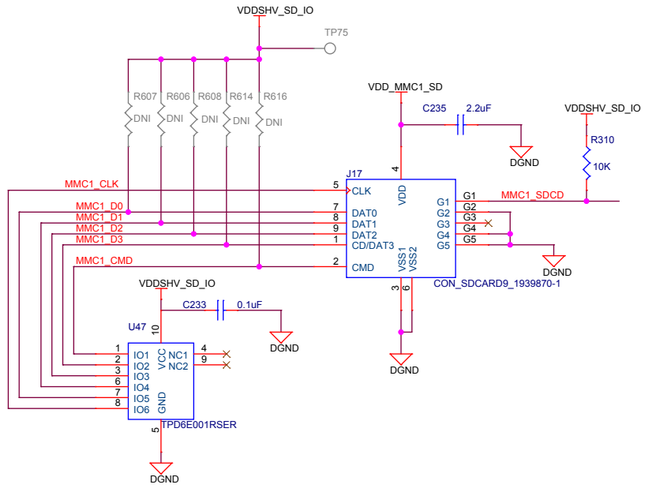


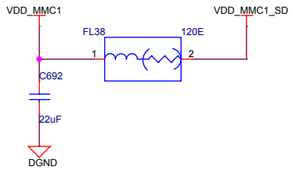


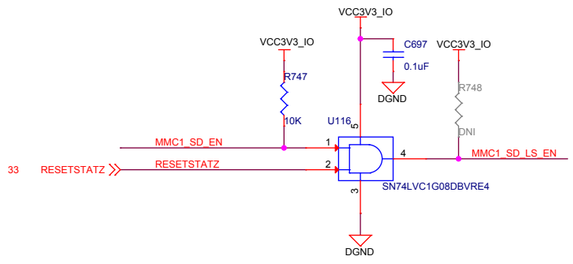
eMMC FLASH RESET

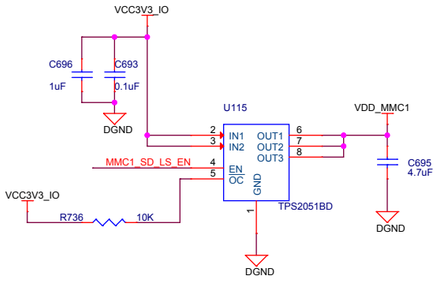


SD CARD INTERFACE









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Title	eMMC FLASH_SDCARD INTERFACE	
Size	Variant Name = PROC062 001 OPN#TMDX654IDKEVM	Rev
C		E4
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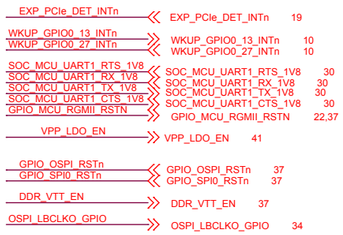
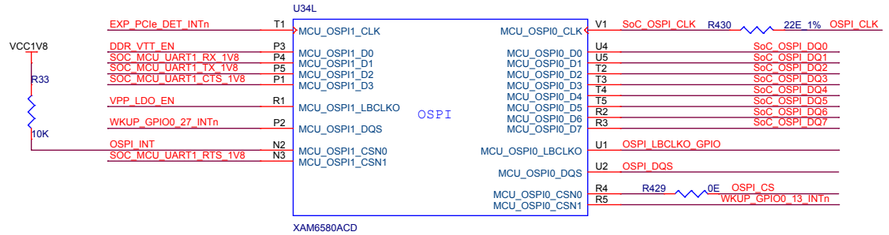
SOC OSPI INTERFACE

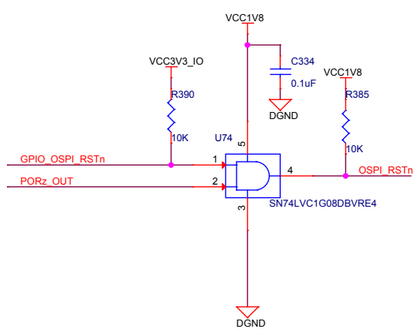




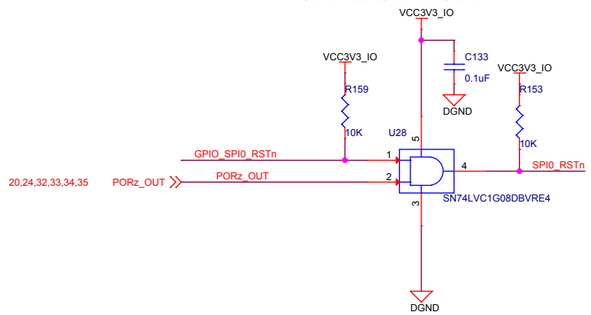
OSPI FLASH

SPI NOR Flash

OSPI FLASH RESET



SPI FLASH RESET



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Title	OSPI FLASH & SPI NOR FLASH	
Size C	Variant Name = PROC062 001 OPN#TMDX654IDKEVM	Rev E4
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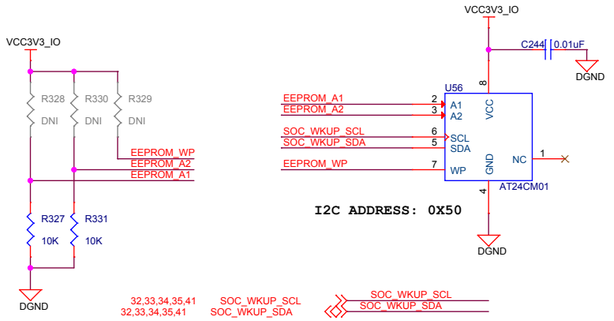
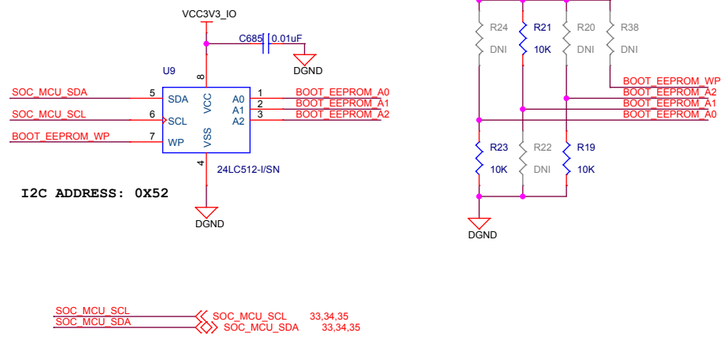
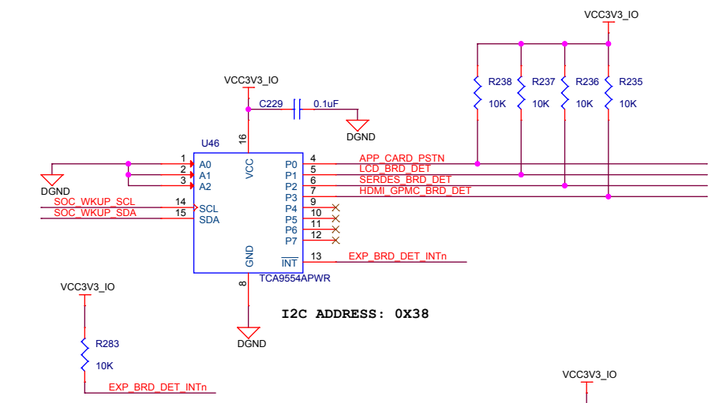
BOARD ID EEPROM



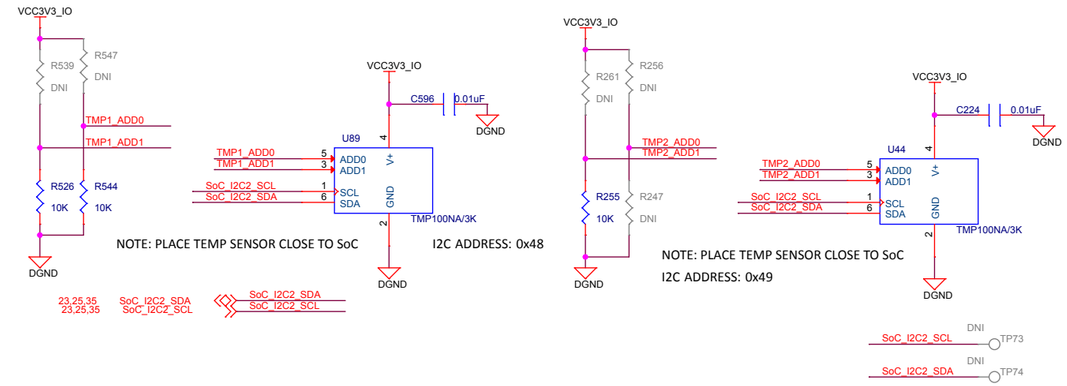
BOOT EEPROM

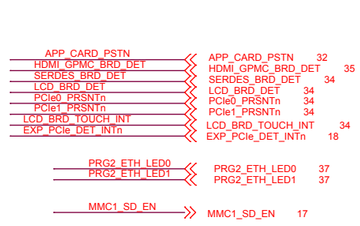


BOARD PRESENCE DETECT CIRCUIT



TEMPERATURE SENSOR





Designed for TI by Mistral Solutions Pvt Ltd

Title	EEPROM,PRESENCE DETECTION & TEMP SENSOR	
Size C	Variant Name = PROC062 001 OPN#TMDX654IDKEVM	Rev E4
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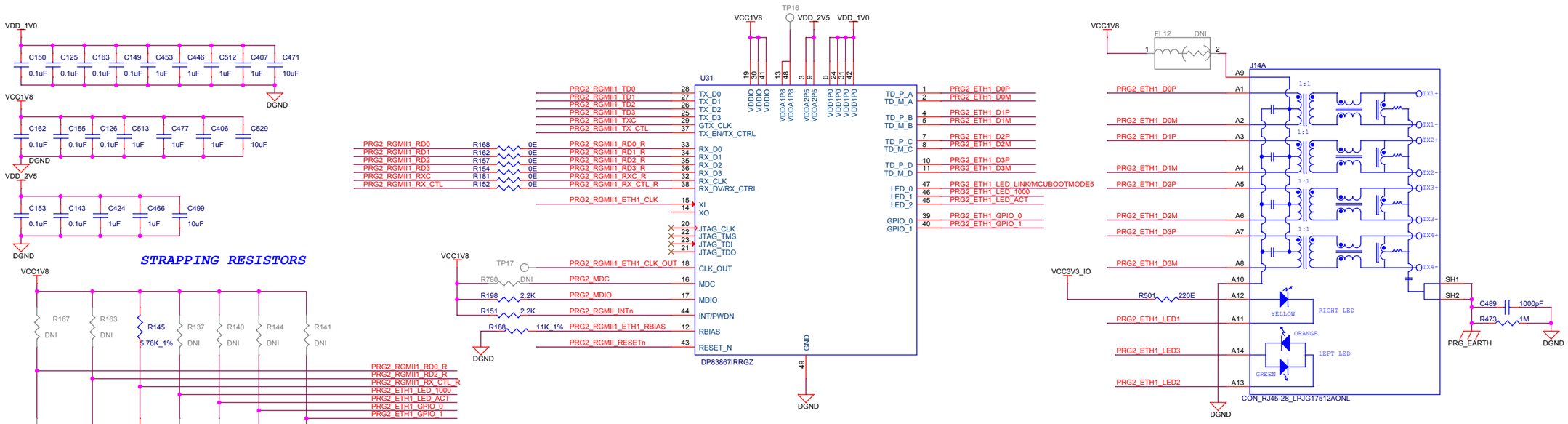
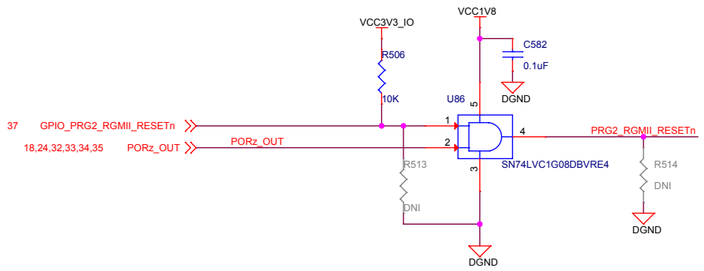
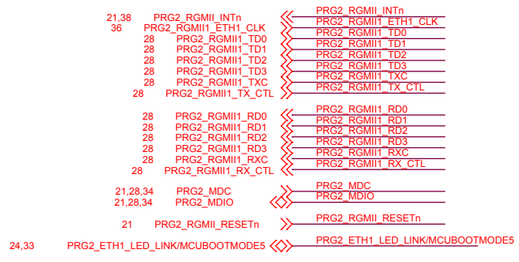
PRG2 RGMII 1

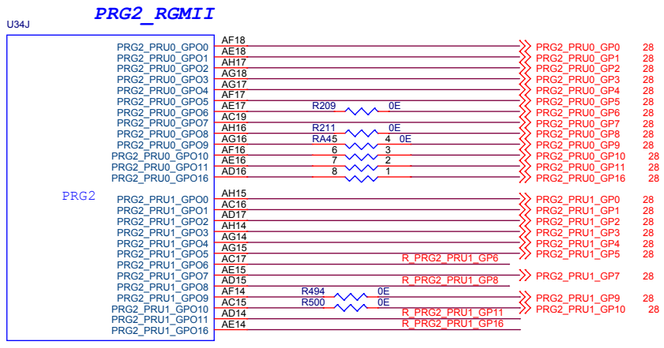


PRG2 PHY1 RESET

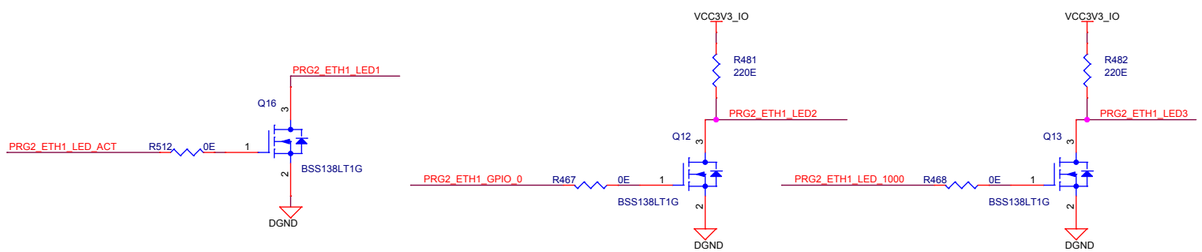




RGMII ETHERNET PHY - ICSSG



PRG2_ETHERNET PHY- 1 SPEED & ACTIVITY LED 's DRIVERS



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Title	RGMII ETHERNET PHY - ICSSG PRG2_PRU0	
Size C	Variant Name = PROC062 001 OPN#TMDX654IDKEVM	Rev E4
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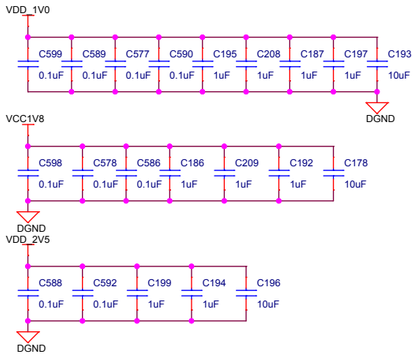
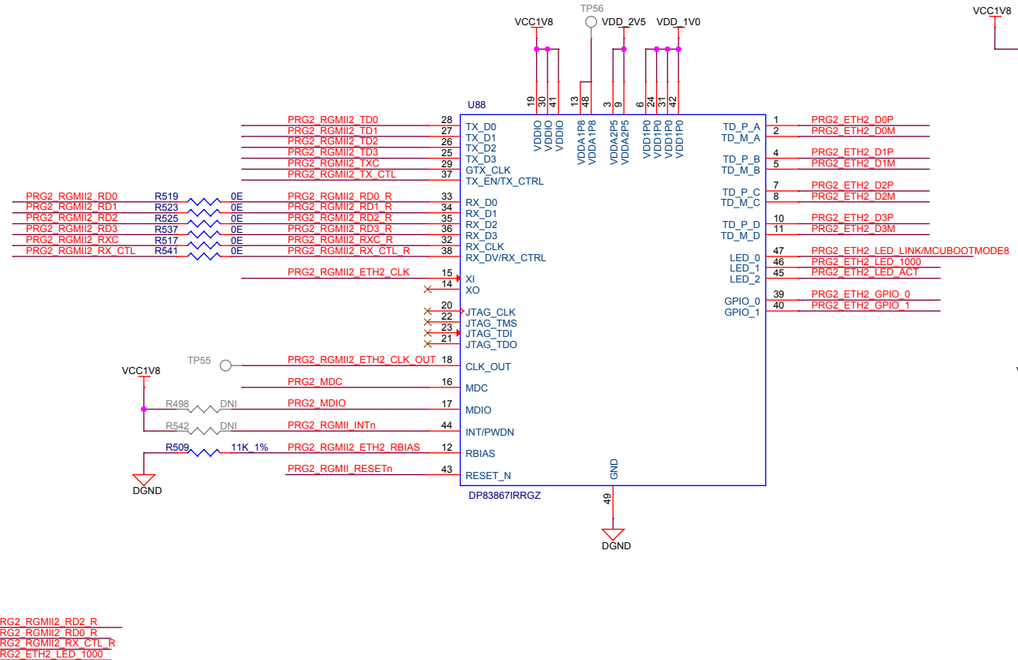
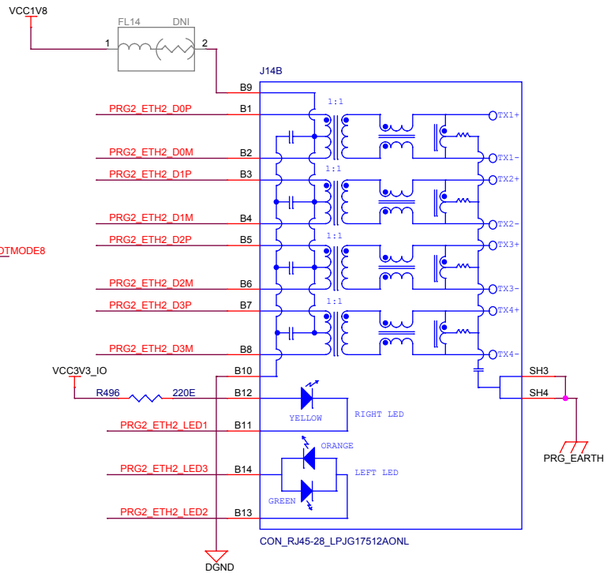
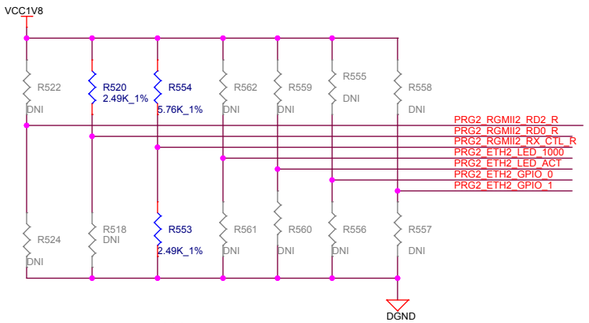
PRG2 RGMII 2







STRAPPING RESISTORS



PHY ADDRESS = 00011

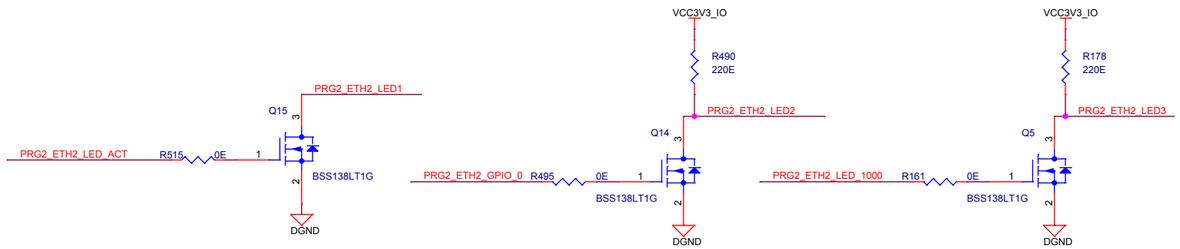
20 PRG2_RGMII_RESETn → PRG2_RGMII_RESETn
20,38 PRG2_RGMII_INTn → PRG2_RGMII_INTn
24,33 PRG2_ETH2_LED_LINK/MCUBOOTMODE8 → PRG2_ETH2_LED_LINK/MCUBOOTMODE8

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

PRG2_ETHERNET - 2 SPEED & ACTIVITY LED 's DRIVERS

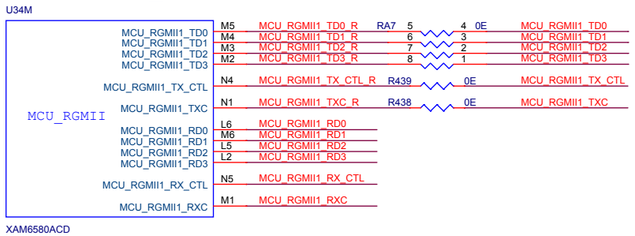


Designed for TI by Mistral Solutions Pvt Ltd

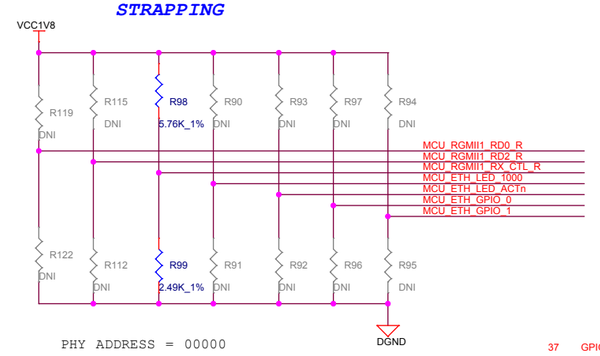
Title	RGMII ETHERNET PHY - ICSSG PRG2_PRU1	
Size C	Variant Name = PROC062 001 OPN#TMDX654IDKEVM	Rev E4
Date: Thursday, August 29, 2019	Sheet 21 of 44	

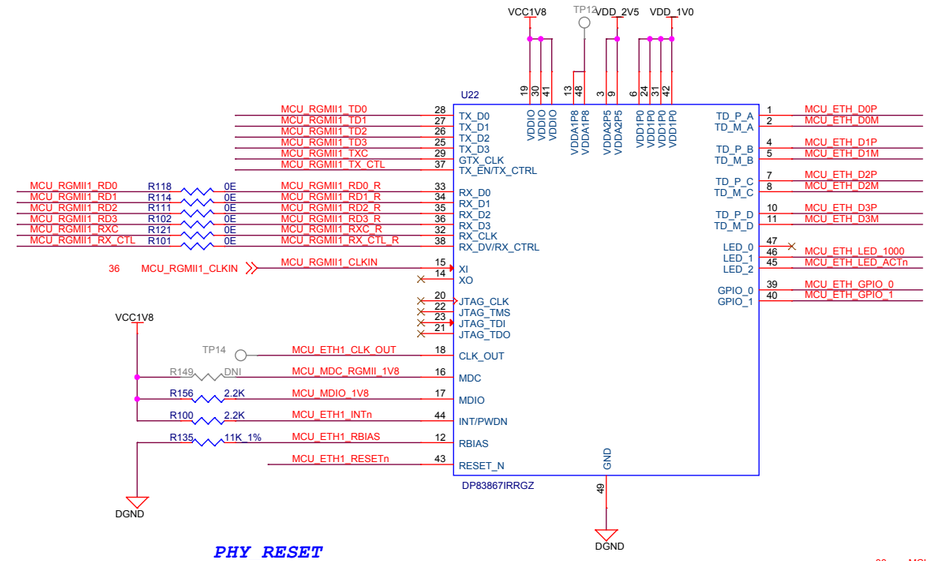
RGMII ETHERNET PHY - MCU

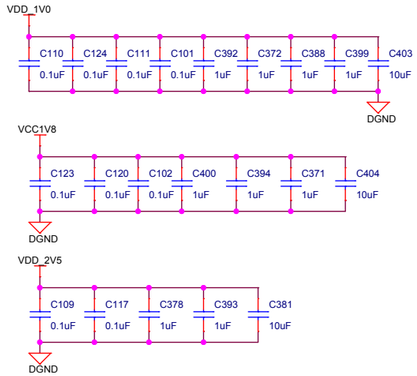
MCU_RGMII



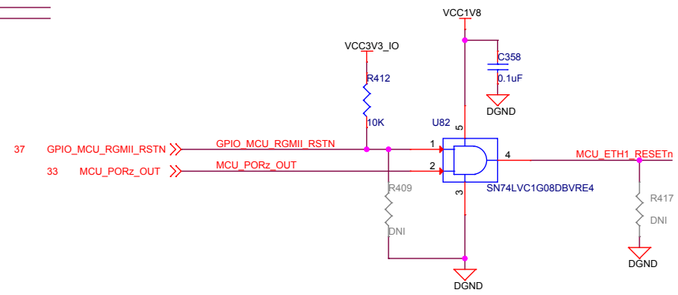
STRAPPING





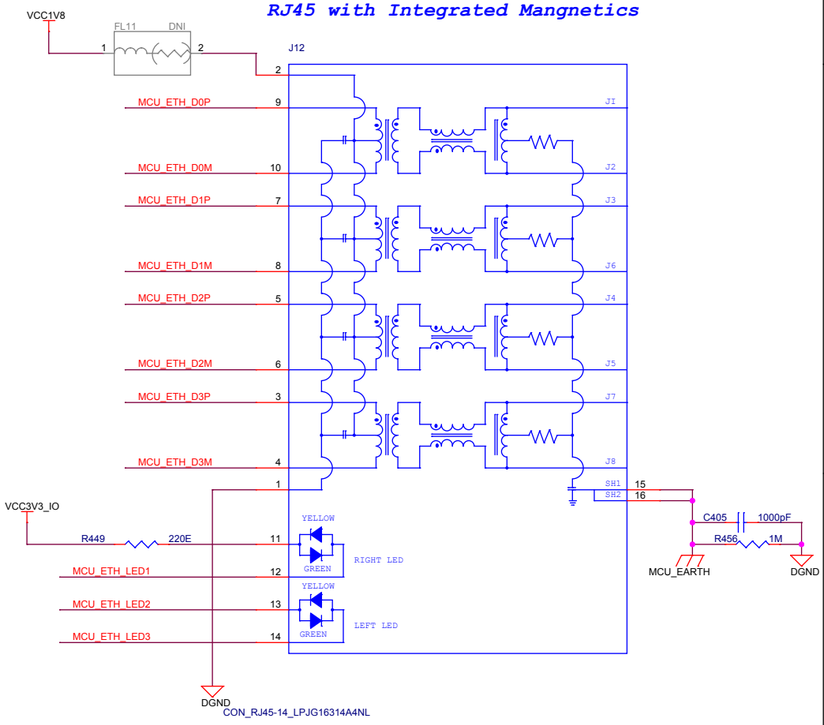


PHY_RESET

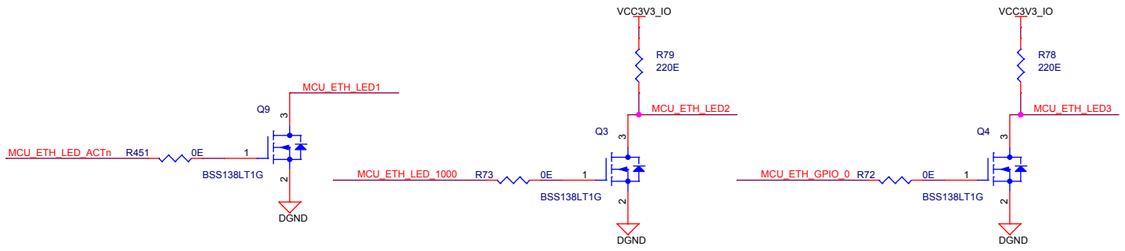


38 MCU_ETH1_INTn → MCU_ETH1_INTn
33 MCU_MDC_RGMII_1V8 → MCU_MDC_RGMII_1V8
33 MCU_MDIO_1V8 → MCU_MDIO_1V8

RJ45 with Integrated Mangnetics



MCU SPEED & ACTIVITY LED DRIVERS

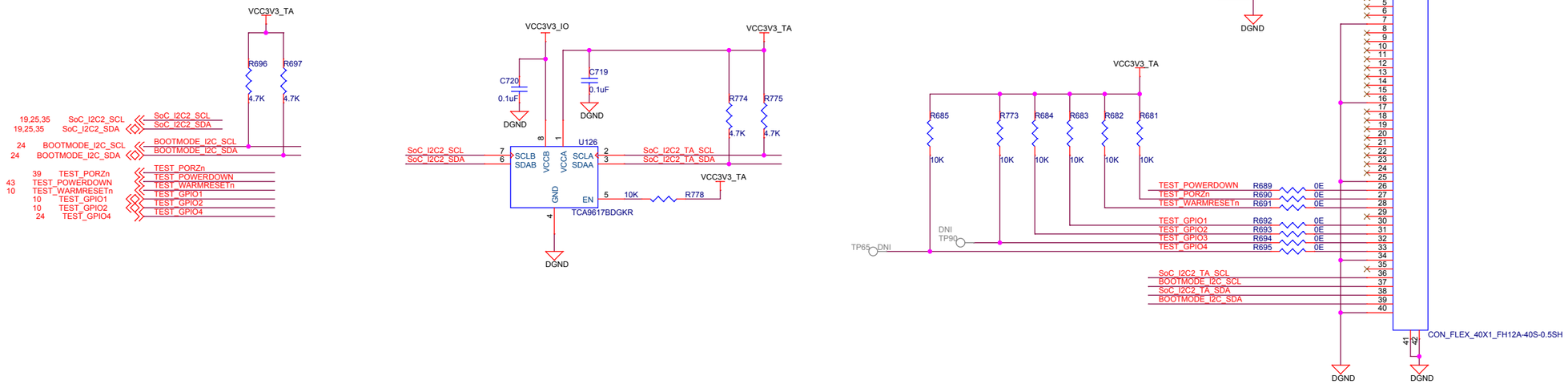


Designed for TI by Mistral Solutions Pvt Ltd

Title	RGMII ETHERNET PHY - MCU		
Size C	Variant Name = PROC062 001 OPN#TMDX654IDKEVM		Rev E4
Date: Wednesday, August 28, 2019		Sheet 22 of 44	

TEST AUTOMATION

40-PIN AUTOMATION HEADER



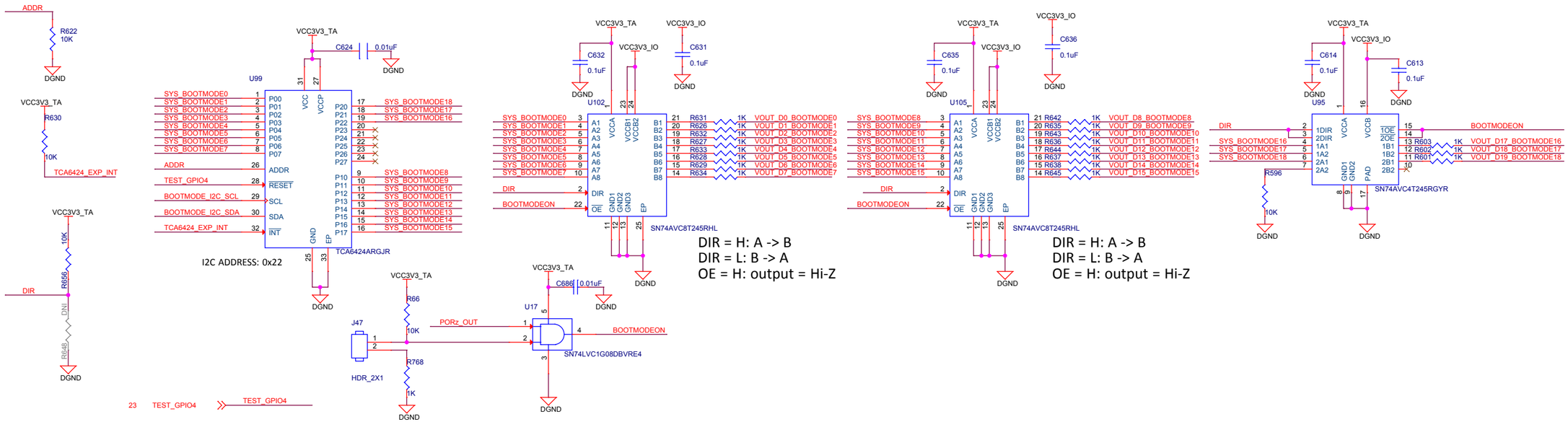
TEST AUTOMATION GPIO MAPPING

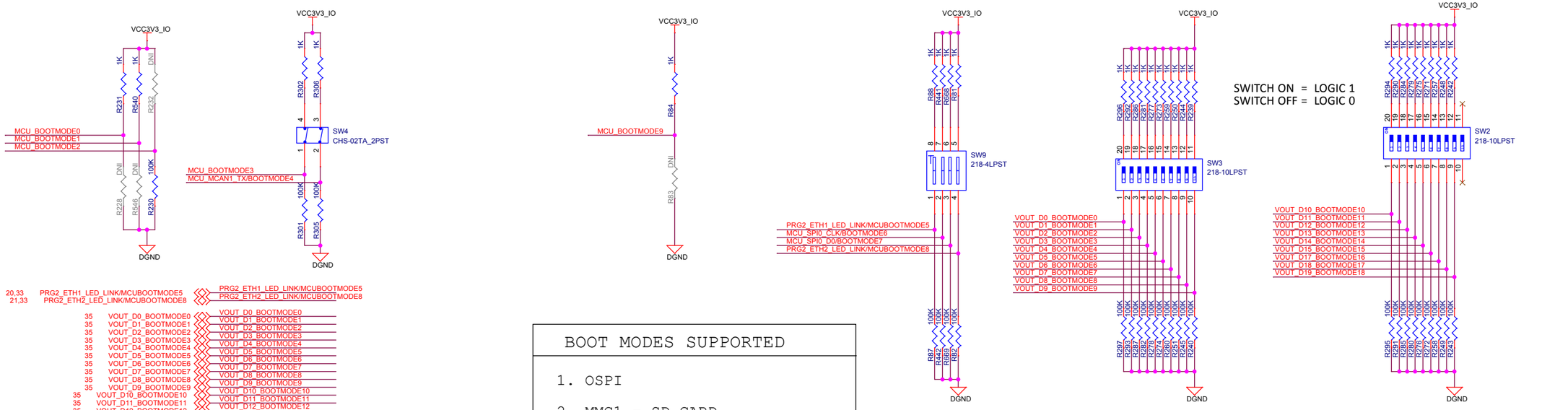
SIGNAL NAME	DESCRIPTION	Direction WRT CTRL	Internal/ External PU/PD states
TEST_POWERDOWN	Used to Power down the OVP Circuit	OUTPUT	External Pullup
TEST_PORZn	Used to Reset the SoC PORz	OUTPUT	External Pullup
TEST_WARMRESETn	Used to Reset the SoC Warmreset	OUTPUT	External Pullup
TEST_GPIO1	Used to Generate 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

Designed for TI by Mistral Solutions Pvt Ltd

Title	TEST AUTOMATION	
Size C	Variant Name = PROC062 001 OPN#TMDX654IDKEVM	Rev E4
Date: Wednesday, August 28, 2019	Sheet 23 of 44	

BOOT MODE BUFFER & SWITCHES





BOOT MODES SUPPORTED

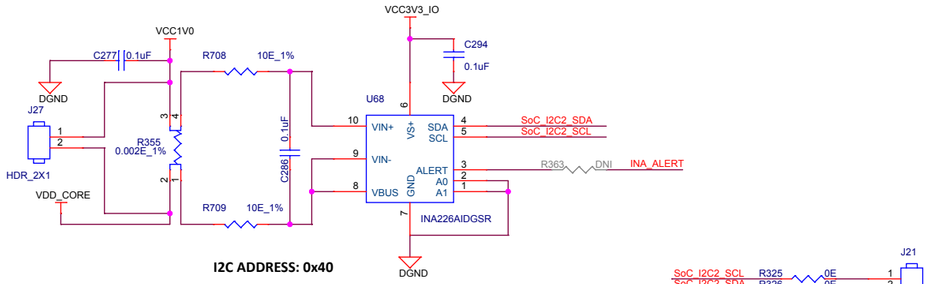
1. OSPI
2. MMC1 - SD CARD
3. MMC0 - eMMC
4. PCIE (endpoint)
5. CPSW Ethernet Slave
6. USB Host
7. USB Device

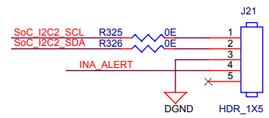
Designed for TI by Mistral Solutions Pvt Ltd

Title	BOOT MODE BUFFER & SWITCHES	
Size C	Variant Name = PROC062 001 OPN#TMDX654IDKEVM	Rev E4
Date: Wednesday, August 28, 2019	Sheet 24 of 44	

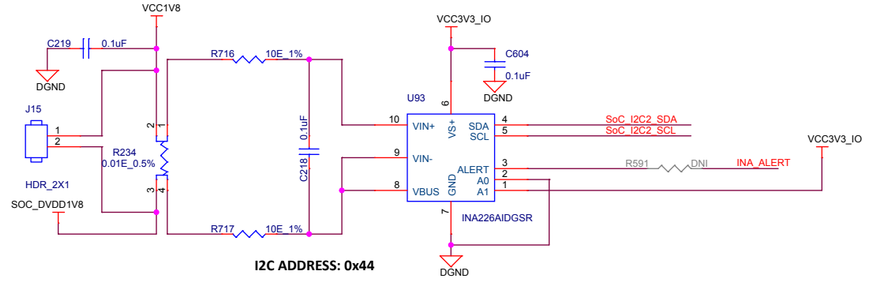
CURRENT MONITORING DEVICES

VDD_CORE

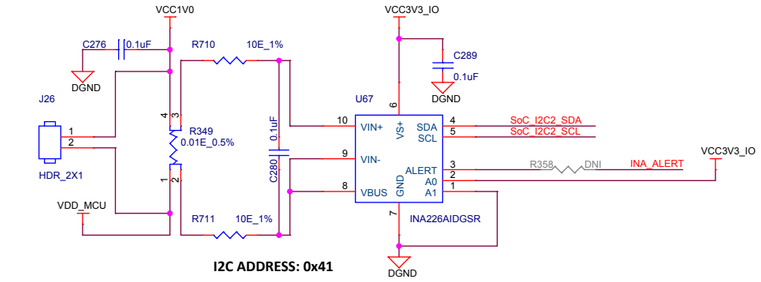




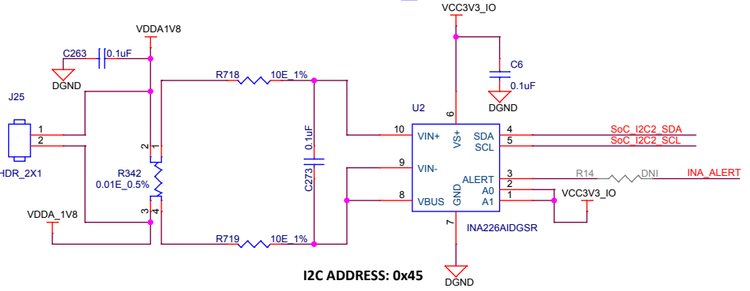
SoC_DVDD1V8



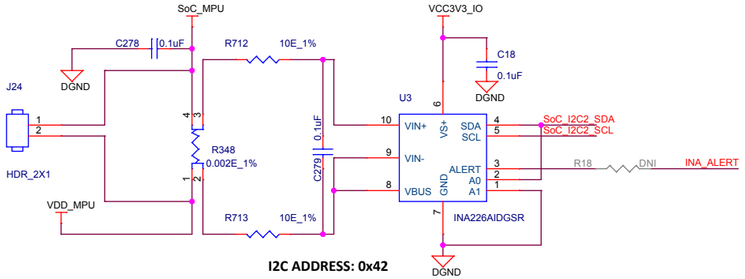
VDD_MCU



SoC_AVDD1V8

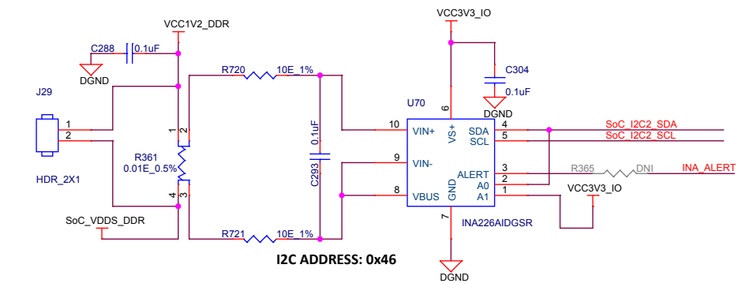


VDD_MPU

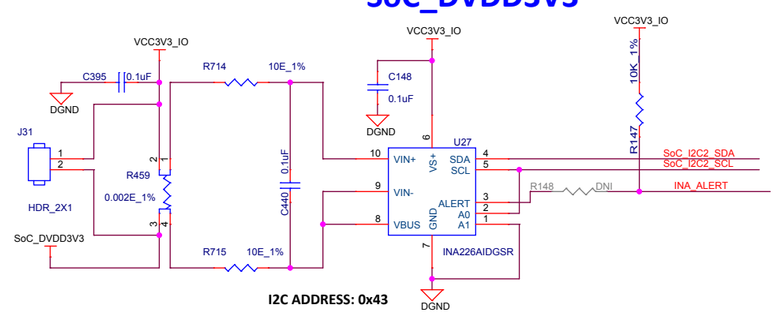


INA I2C SLAVE ADDRESS		
POWER SOURCE	SUPPLY NET	SLAVE ADDRESS (IN HEX)
VCC1V0	VDD_CORE	40
VCC1V0	VDD_MCU	41
SoC_MPU	VDD_MPU	42
VCC3V3_IO	SoC_DVDD3V3	43
VCC1V8	SoC_DVDD1V8	44
VDDA1V8	SoC_AVDD1V8	45
VCC1V2_DDR	SoC_VDDS_DDR	46
VCC1V2_DDR	VDD_DDR	47

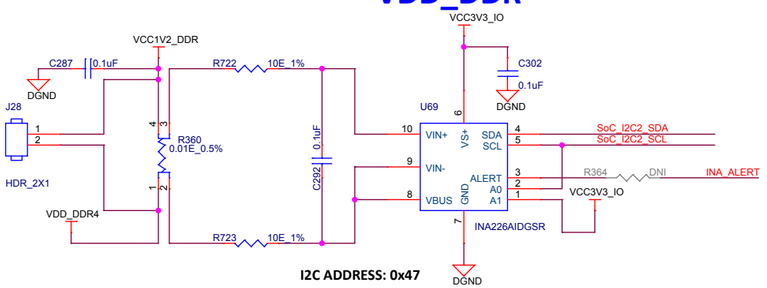
SoC_VDDS_DDR



SoC_DVDD3V3



VDD_DDR

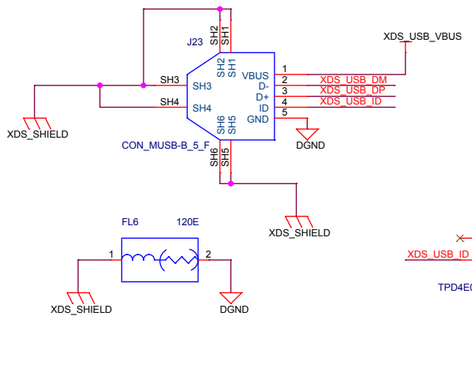


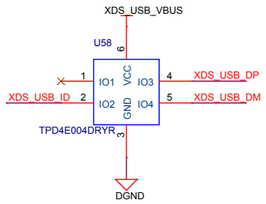
Designed for TI by Mistral Solutions Pvt Ltd

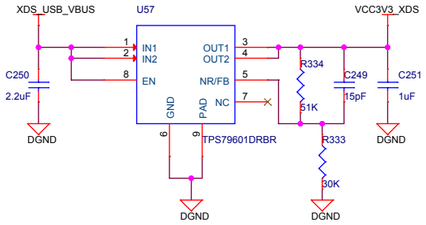
Title	CURRENT MONITORING DEVICES	
Size: C	Variant Name = PROC062 001 OPN#TMDX654IDKEVM	Rev: E4
Date: Wednesday, August 28, 2019	Sheet 25 of 44	

XDS110 POWER

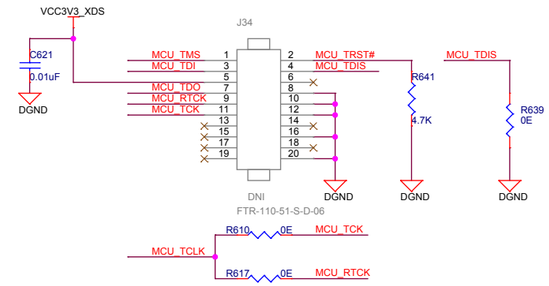
USB Connector



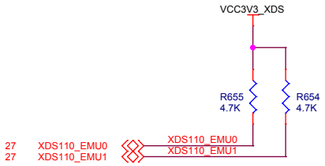


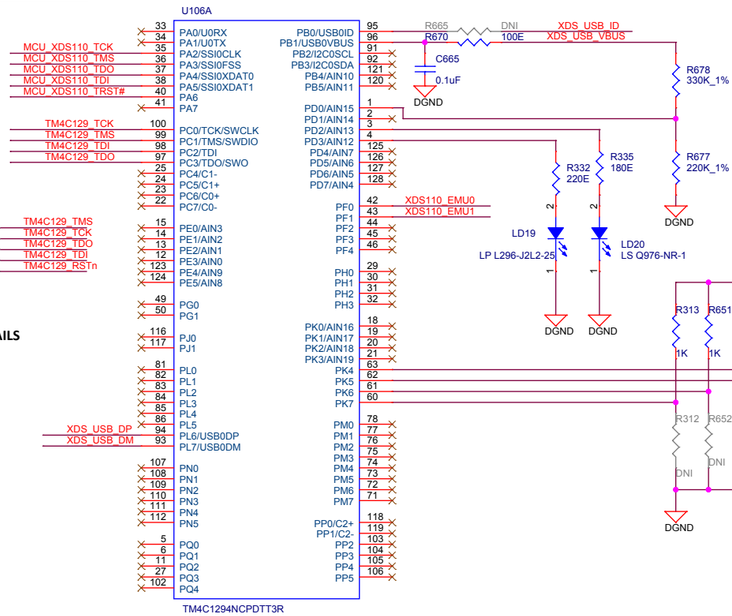


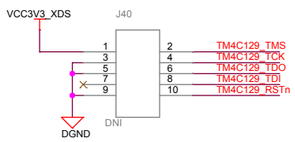
CTI 20 Pin Header external probe



XDS110 DEBUGGER

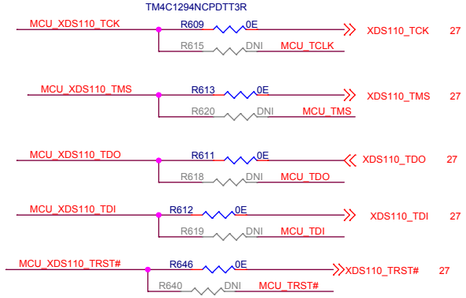


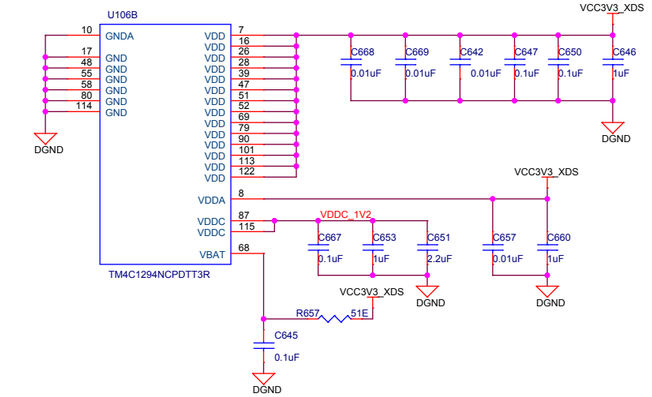


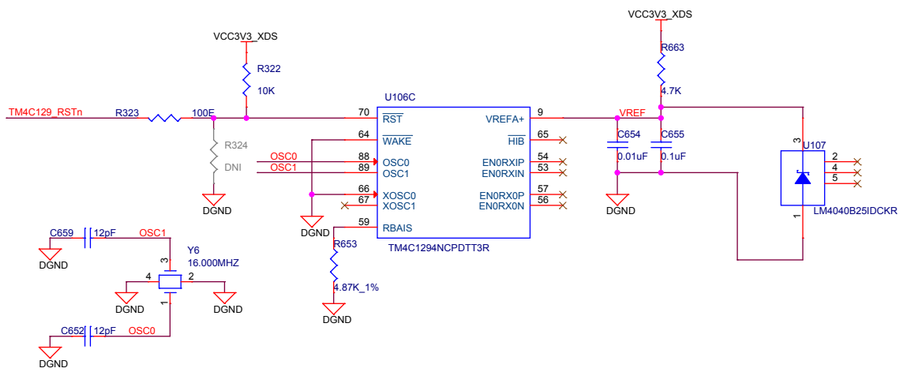


10-PIN PLUG-OF-NAILS

This will indicate the unique ID of the Debugger





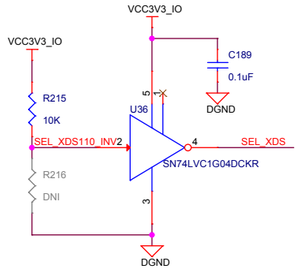


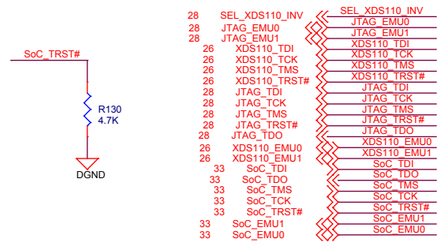
0- Ohm Res MUX between XDS110 JTAG and MCU cTI 20 pin connector.
-For XDS110 JTAG R609,R613,R611,R612 and R646 Should be installed and R615,R620,R618,R619 and R640 Should be DNI'd.
-For MCU cTI 20 pin , R615,R620,R618,R619 and R640 Should be Installed and R609,R613,R611,R612 and R646 Should be DNI'd.

Designed for TI by Mistral Solutions Pvt Ltd

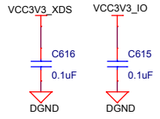
Title	XDS110 DEBUGGER	
Size	Variant Name = PROC062 001 OPN#TMDX654IDKEVM	Rev
C		E4
Date:	Wednesday, August 28, 2019	Sheet 26 of 44

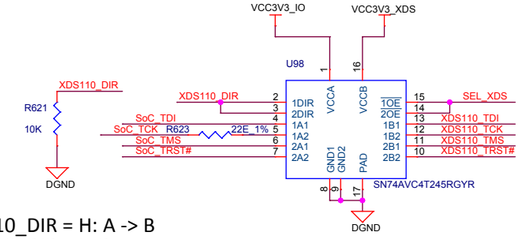
JTAG BUFFER



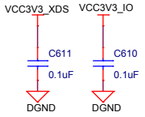


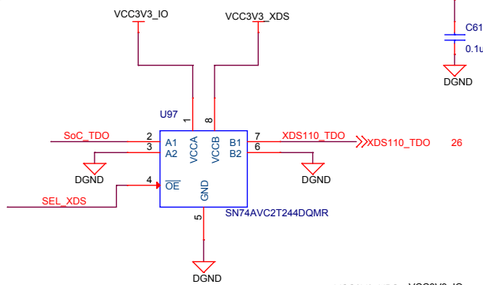
BUFFER XDS110

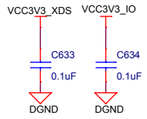


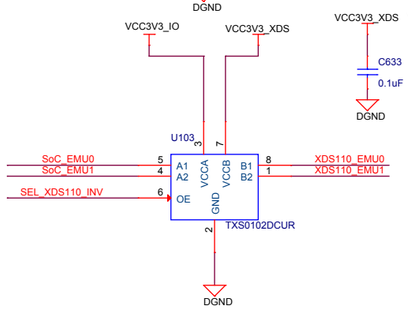


XDS110_DIR = H: A -> B
XDS110_DIR = L: B -> A
OE = H: output = Hi-Z

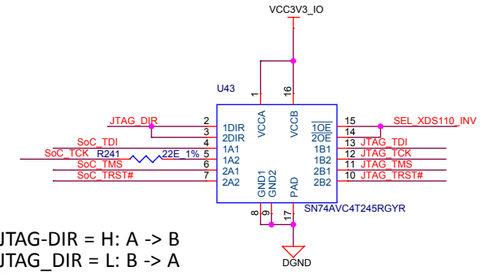




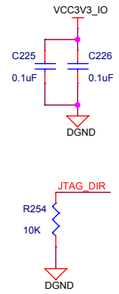


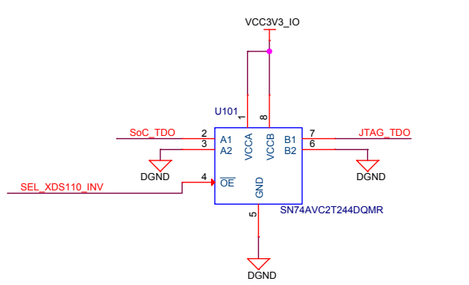


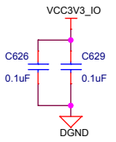
BUFFER 20 PIN JTAG

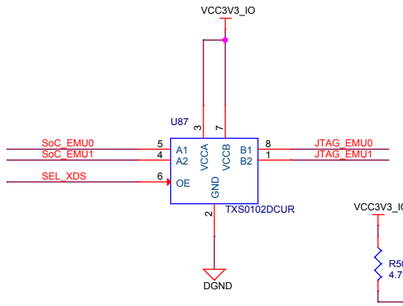


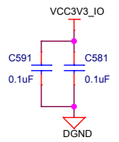
JTAG-DIR = H: A -> B
JTAG_DIR = L: B -> A
OE = H: output = Hi-Z

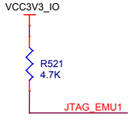












Designed for TI by Mistral Solutions Pvt Ltd

Title	JTAG BUFFER	
Size		Rev
C	Variant Name = PROC062 001 OPN#TMDX654IDKEVM	E4
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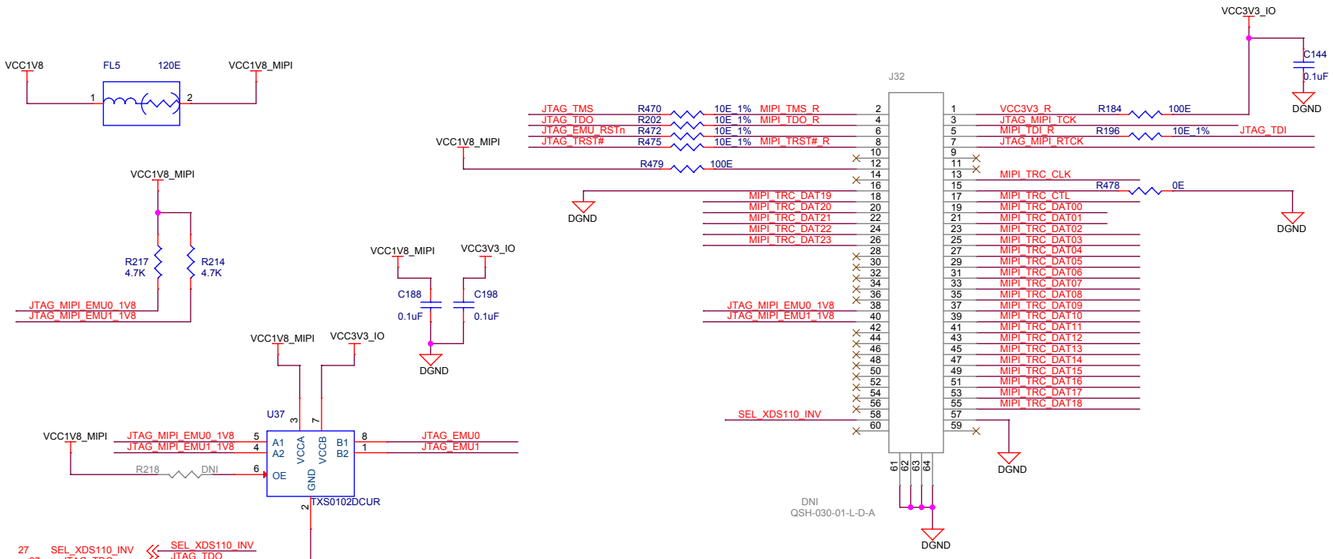
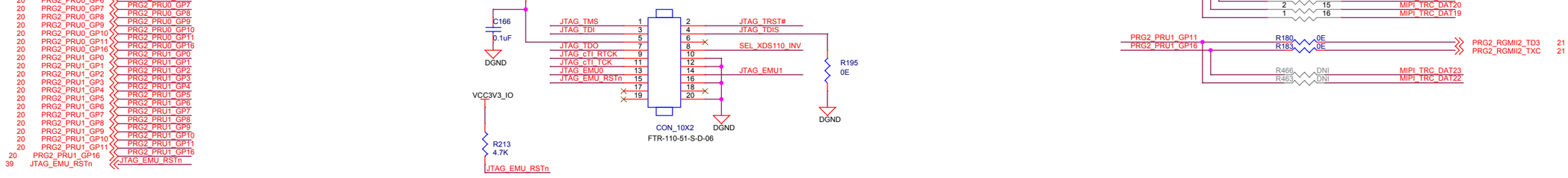
MIPI 60 PIN CONNECTOR

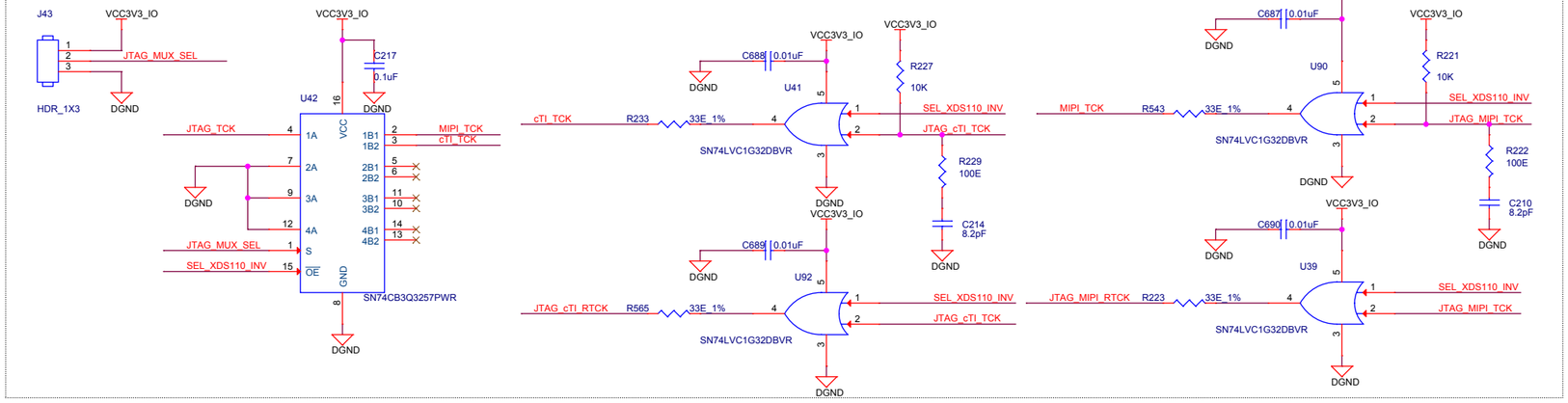
0- Ohm Res MUX between PRG2_Ethernet PHY (CP Board PHY) and JTAG TRACE Funct i ondity
-For PRG2_Ethernet PHY RA3 , RA5 , RA1 , R180 & R183 Should be installed and RA10, RA11 ,RA9 , R466 & R463 Should be DNI'd.
-For TRACE RA10, RA11 ,RA9 , R466 & R463 Should be Installed and RA3 , RA5 , RA1 , R180 & R183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



JTAG 20 PIN cTI CONNECTOR



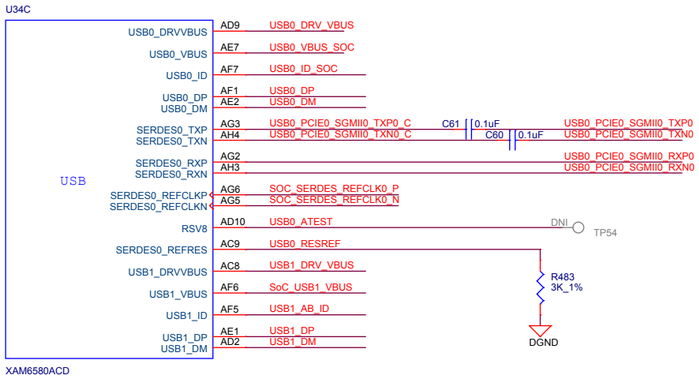
JTAG CLOCK BUFFER



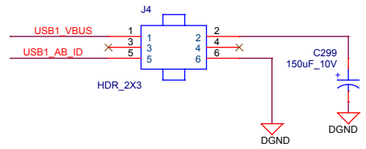
Designed for TI by Mistral Solutions Pvt Ltd

Title	MIPI 60 PIN CONNECTOR	
Size C	Variant Name = PROC062 001 OPN#TMDX654IDKEVM	Rev E4
Date: Monday, September 30, 2019	Sheet 28 of 44	

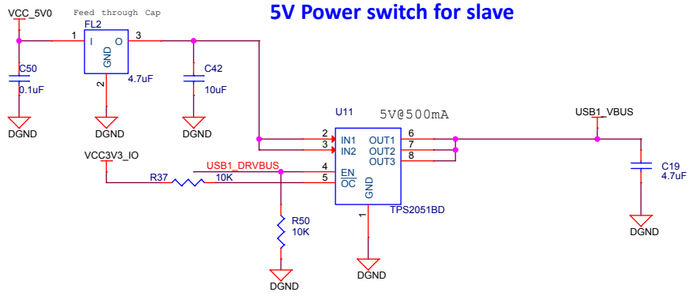
USB 2.0 INTERFACE



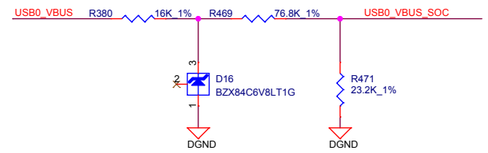
2X3 header to enable bulk capacitance on USB1_VBUS in host mode and to ground USB_AB_ID pin, if a non standard cable is used



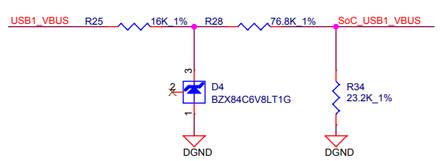
5V Power switch for slave

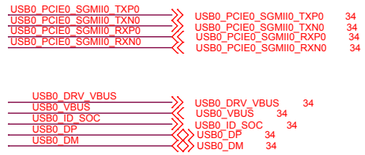


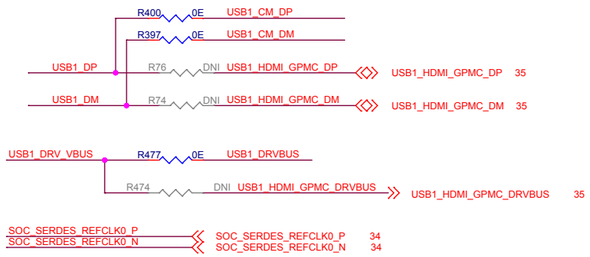
Resistor divider on SOC_VBUS



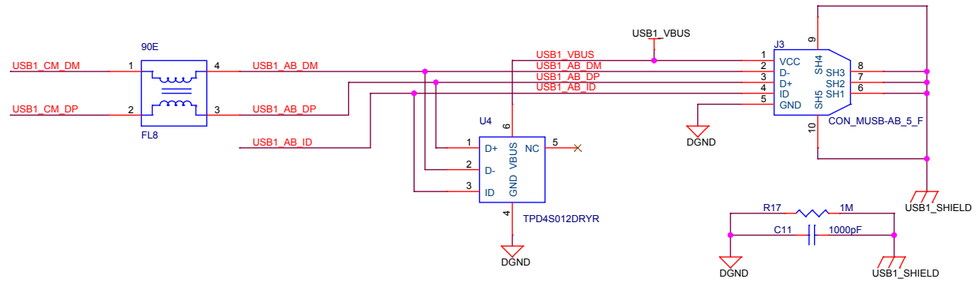
Resistor divider on SOC_VBUS







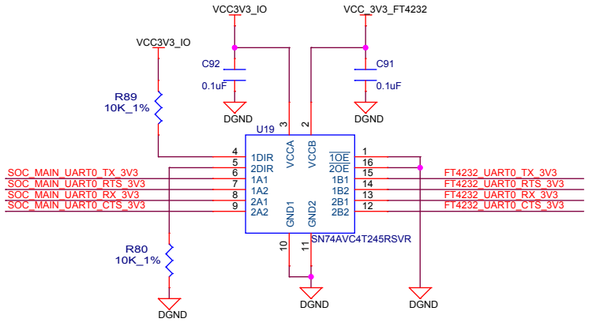
Micro USB 2.0 AB Connector

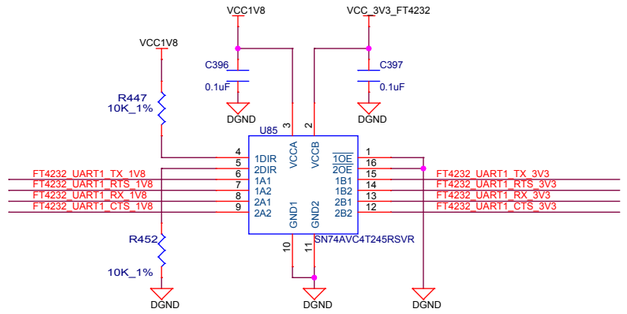


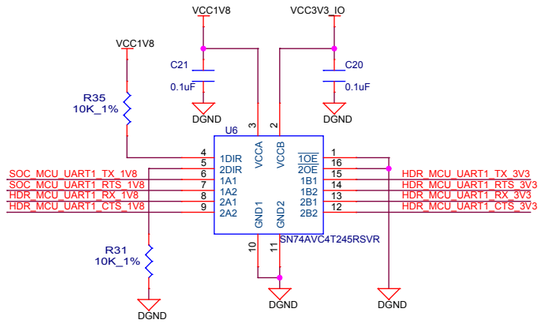
Designed for TI by Mistral Solutions Pvt Ltd

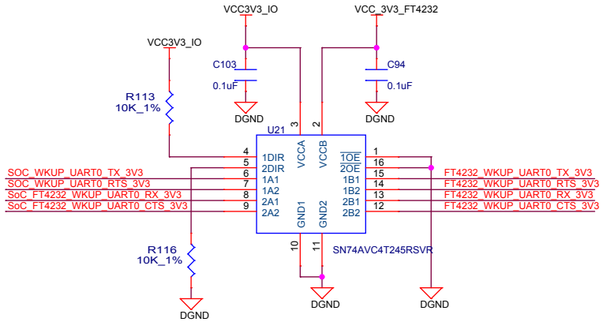
Title	USB 2.0 INTERFACE	
Size C	Variant Name = PROC062 001 OPN#TMDX654IDKEVM	Rev E4
Date: Wednesday, August 28, 2019	Sheet 29 of 44	

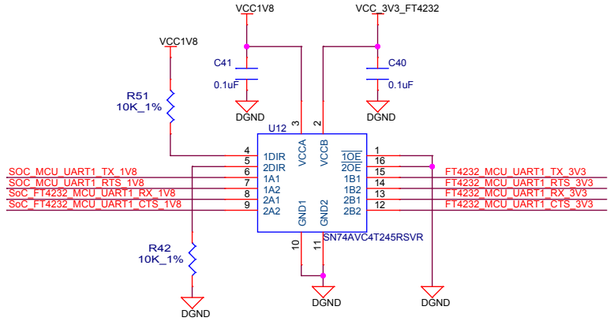
FT4232 LEVEL TRANSLATOR

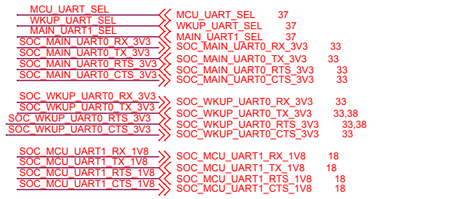




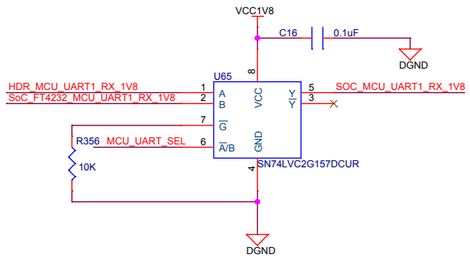


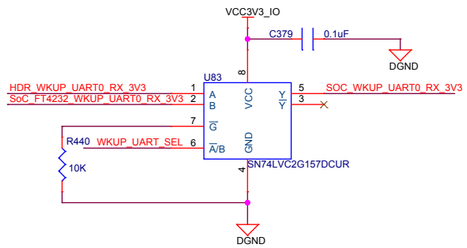


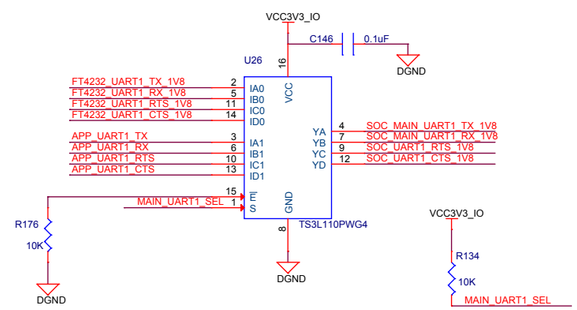


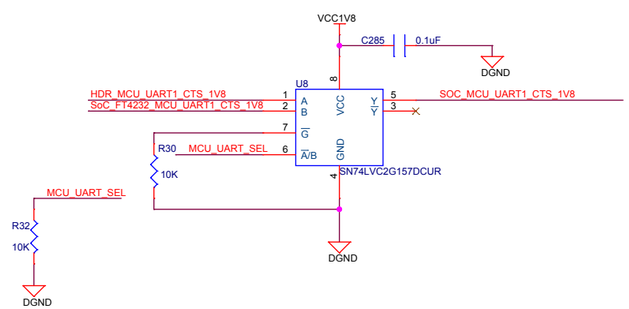


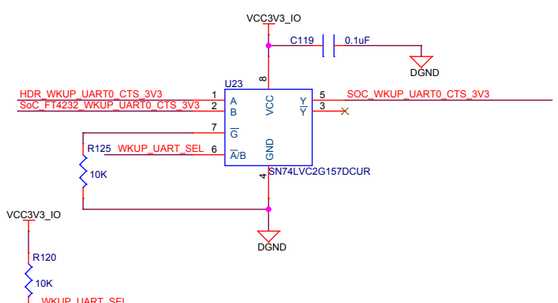
2:1 MUX









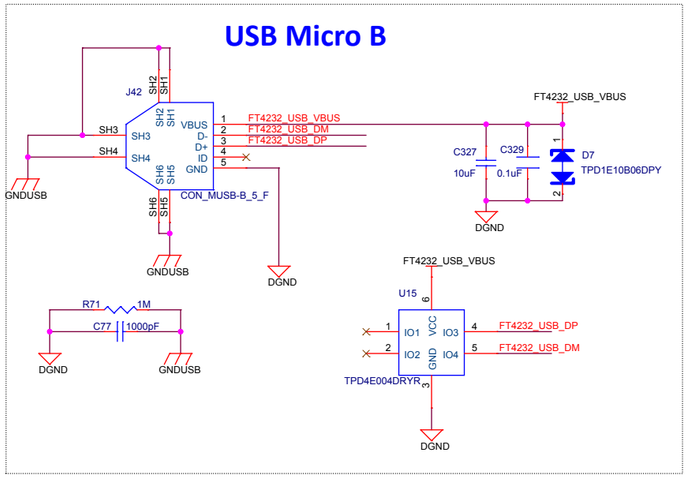


Designed for TI by Mistral Solutions Pvt Ltd

Title	FT4232 LEVEL TRANSLATOR	
Size: C	Variant Name = PROC062 001 OPN#TMDX654IDKEVM	Rev: E4
Date: Wednesday, August 28, 2019	Sheet 30 of 44	

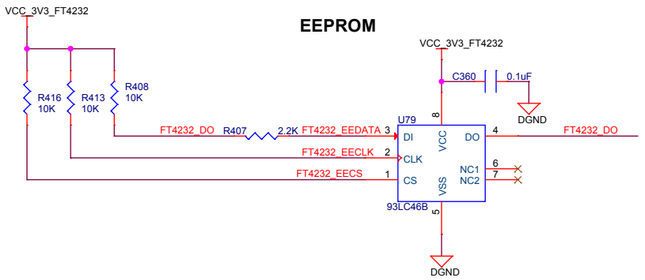
FT4232 UART

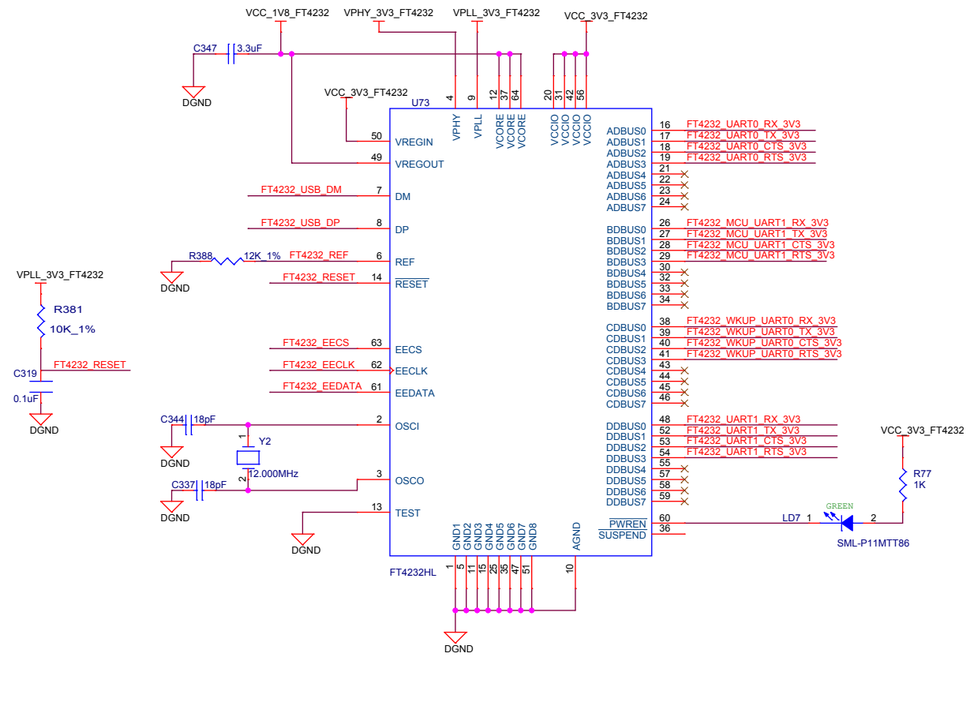
USB Micro B

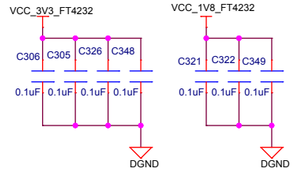


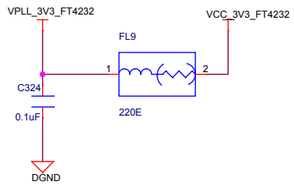
FT4232: 5V to 3.3V@500mA LDO

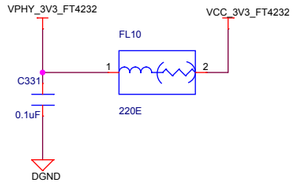
EEPROM











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

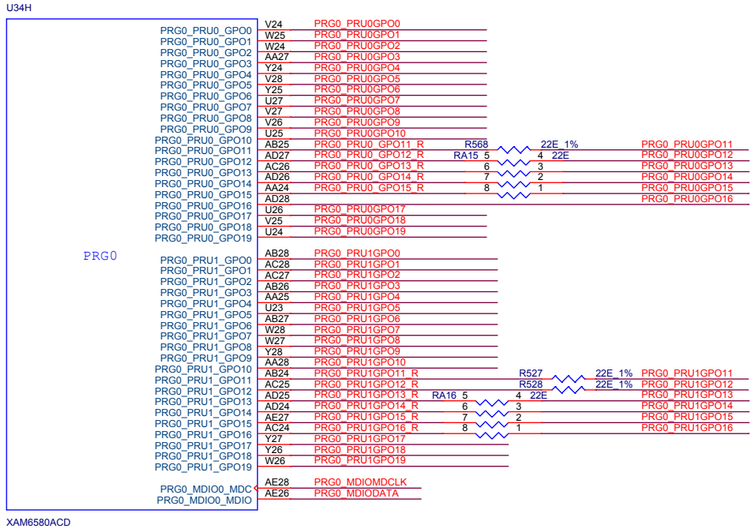
FT4232_MCU_UART1_TX_3V3 → FT4232_MCU_UART1_TX_3V3 30
FT4232_MCU_UART1_RTS_3V3 → FT4232_MCU_UART1_RTS_3V3 30
FT4232_MCU_UART1_RX_3V3 → FT4232_MCU_UART1_RX_3V3 30
FT4232_MCU_UART1_CTS_3V3 → FT4232_MCU_UART1_CTS_3V3 30

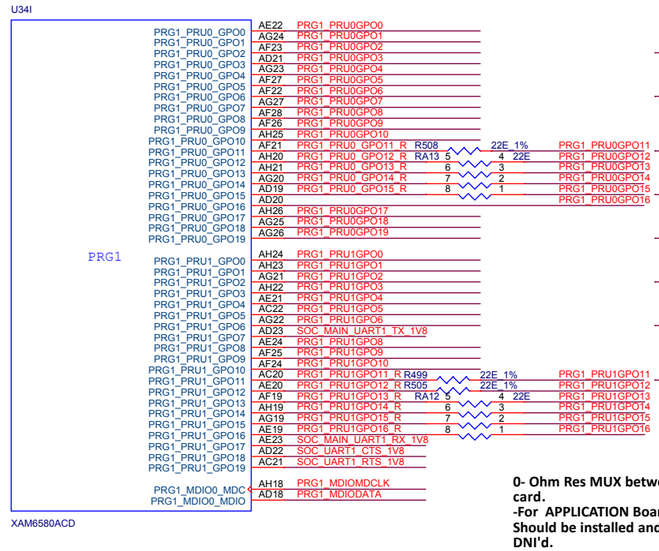
Designed for TI by Mistral Solutions Pvt Ltd

Texas Instruments | MISTRAL

Title	FT4232 UART TO USB BRIDGE	
Size C	Variant Name = PROC062 001 OPN#TMDX654IDKEVM	Rev E4
Date: Thursday, August 29, 2019	Sheet 31 of 44	

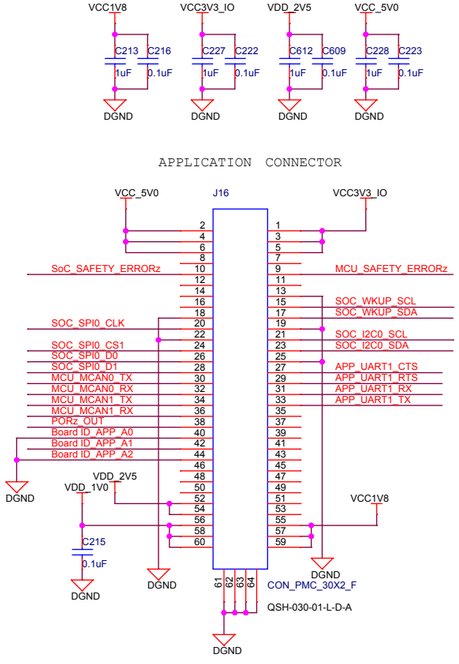
APPLICATION BOARD INTERFACE

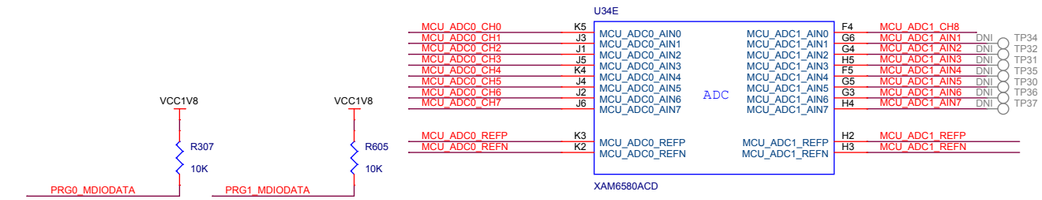


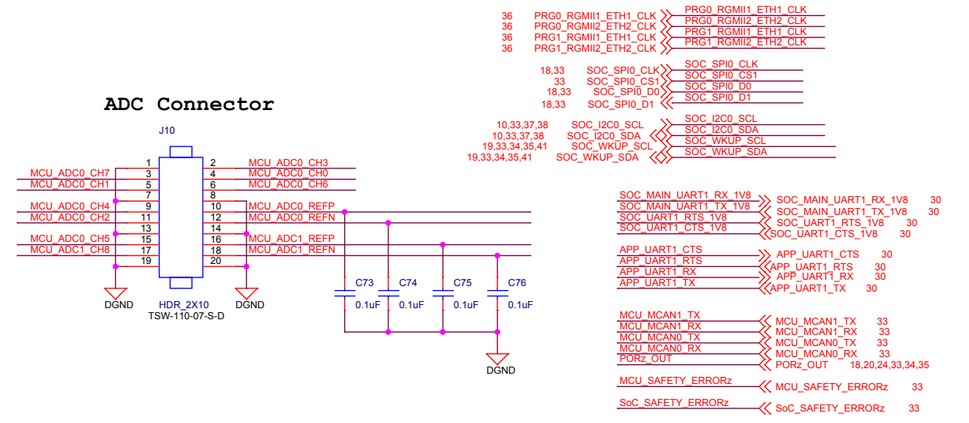


0- Ohm Res MUX between APPLICATION Board connector and HDMI / GPMC Daughter card.
-For APPLICATION Board connector R570 , R589 ,R576 ,R580 ,R578, R574 ,R572 & R587 Should be installed and R569, R590, R575, R579 ,R577 , R573, R571 & R588 Should be DNI'd.
-For HDMI / GPMC Daughter card R569, R590, R575,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

APPLICATION BOARD CONNECTORS



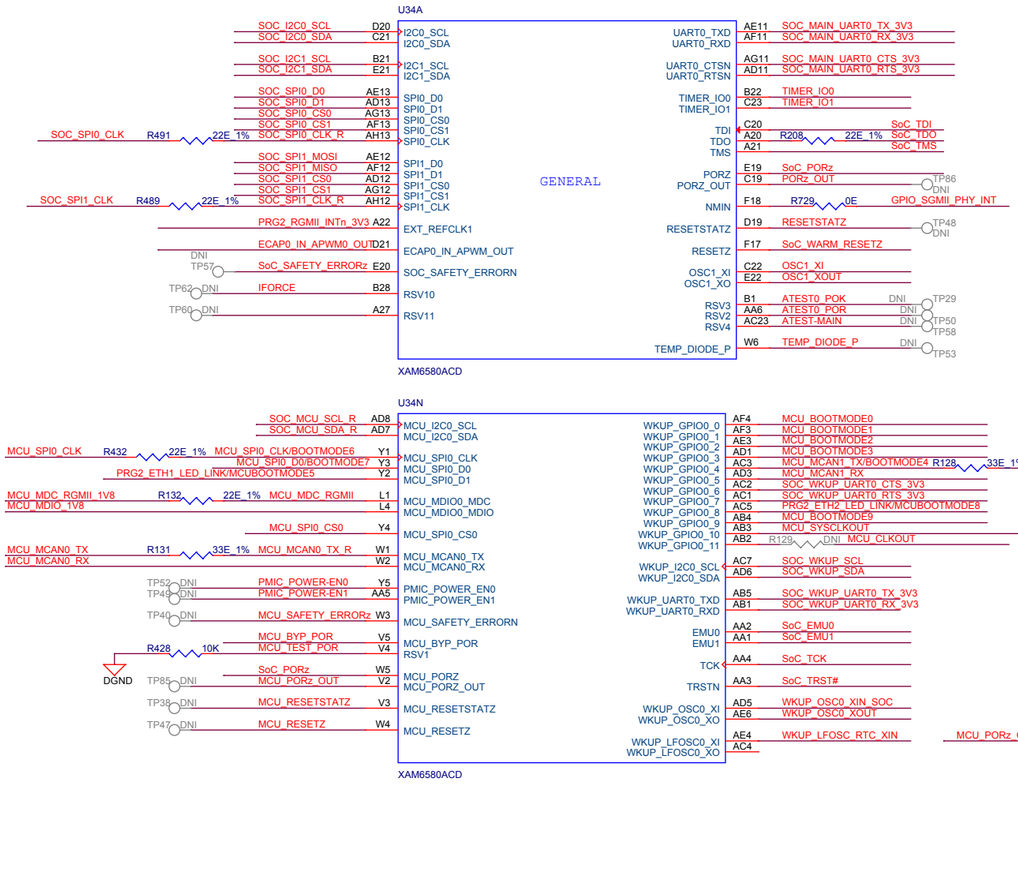


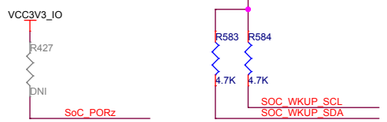


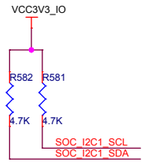
Designed for TI by Mistral Solutions Pvt Ltd

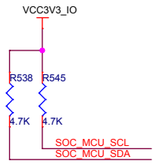
Title	APPLICATION BOARD CONNECTOR	
Size C	Variant Name = PROC062 001 OPN#TMDX654IDKEVM	Rev E4
Date: Wednesday, August 28, 2019	Sheet 32 of 44	

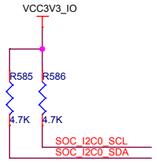
GENERAL & MCU_GENERAL

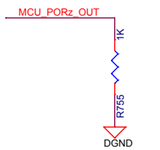


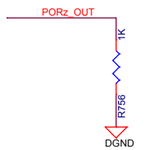


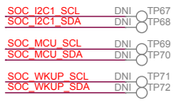




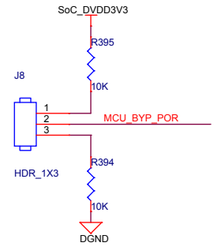




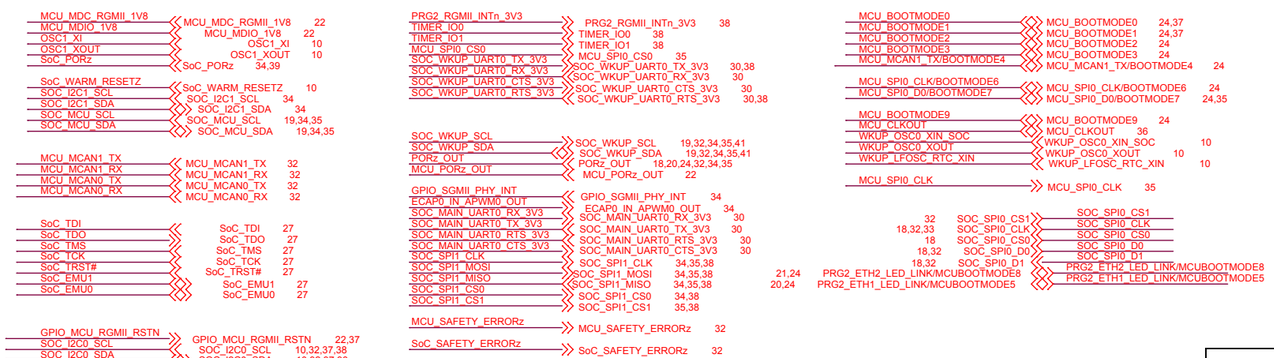




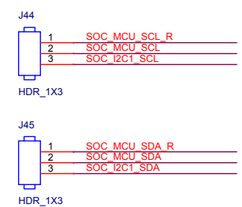
Jumper to select Internal PORz & External PORz



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



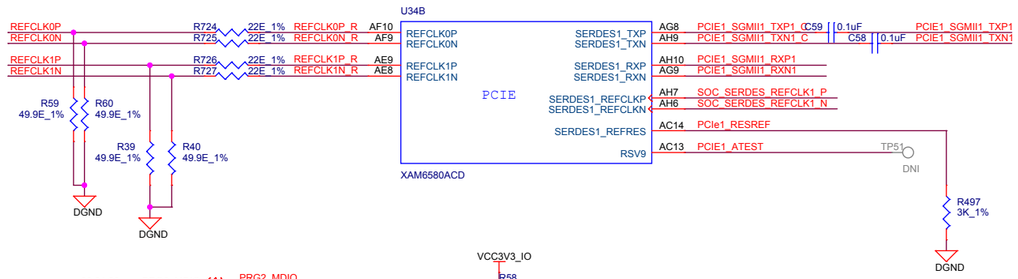
Jumper option to connect the peripherals connected on MCU_I2C to SoC I2C1



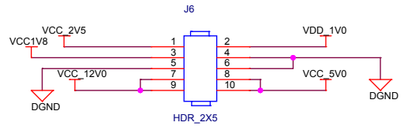
Designed for TI by Mistral Solutions Pvt Ltd

Title	SOC_GENERAL & MCU GENERAL		
Size			Rev
C	Variant Name = PROC062 001 OPN#TMDX654IDKEVM		E4
Date:	Thursday, August 29, 2019	Sheet 33 of 44	

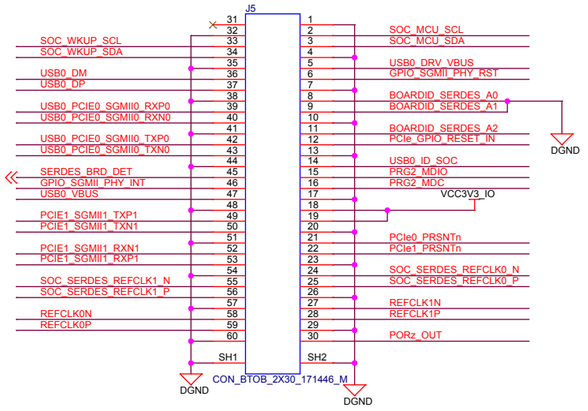
SERDES INTERFACE

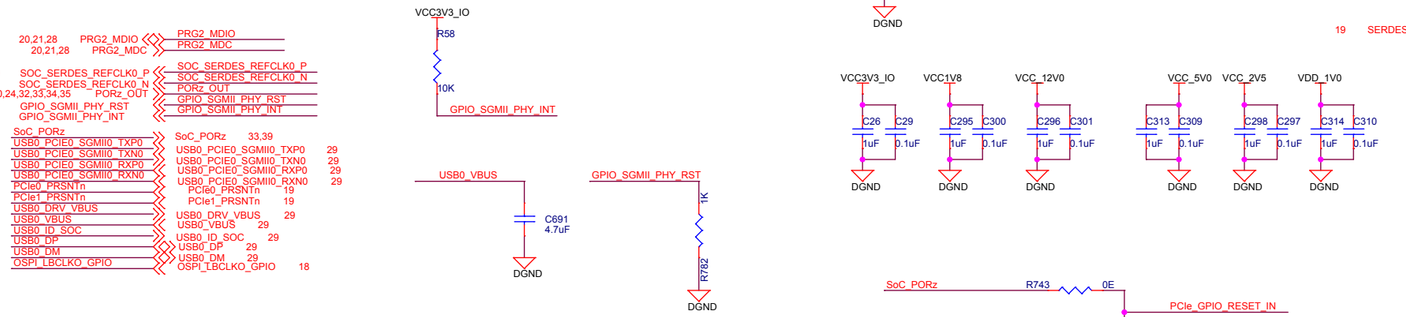


SERDES POWER CONNECTOR

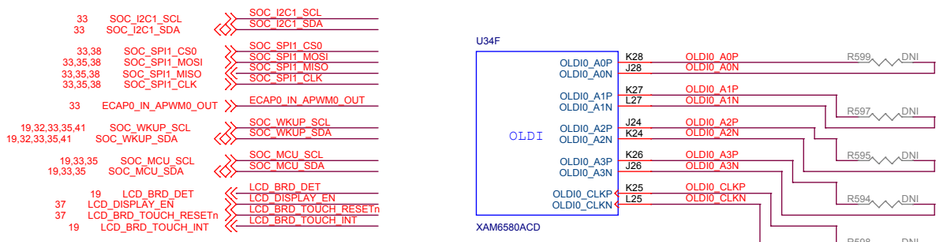


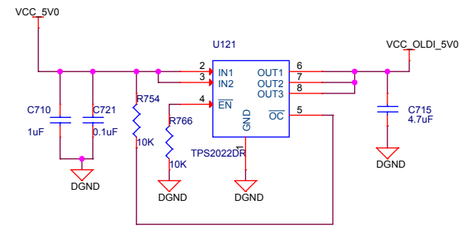
SERDES CONNECTOR

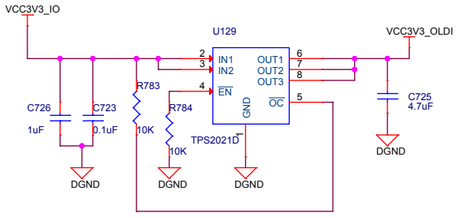


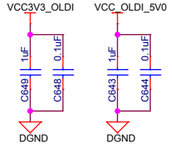


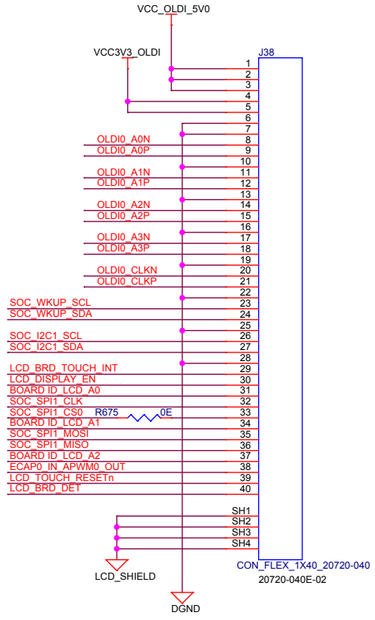
OLDI INTERFACE

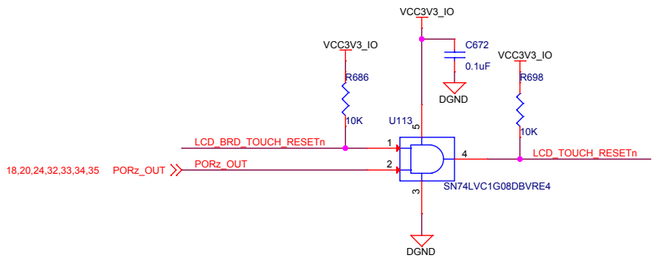


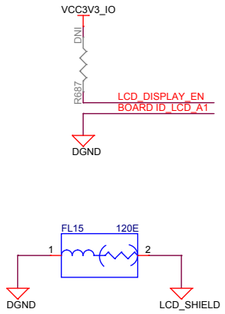








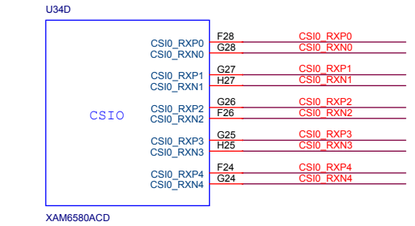




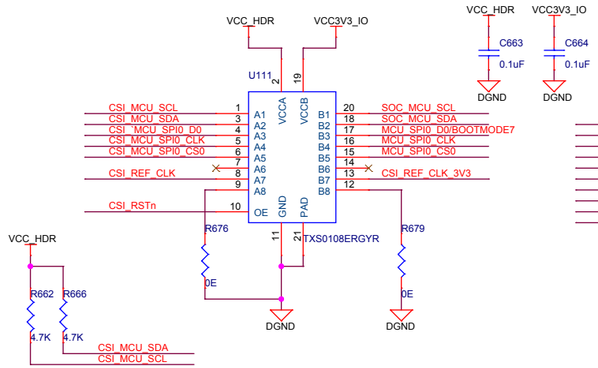
Designed for TI by Mistral Solutions Pvt Ltd

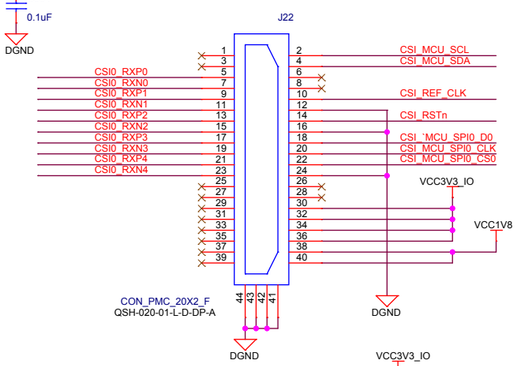
Title	SERDES & DISPLAY INTERFACE	
Size C	Variant Name = PROC062 001 OPN#TMDX654IDKEVM	Rev E4
Date: Wednesday, August 28, 2019	Sheet 34 of 44	

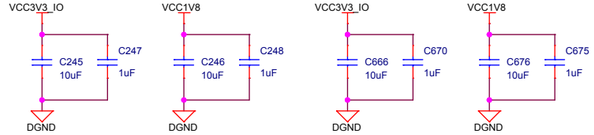
CSI INTERFACE

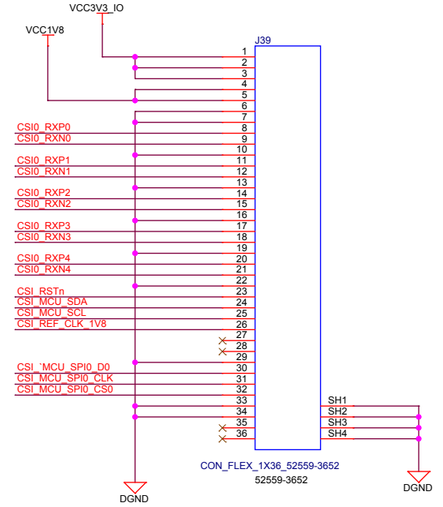


Jumper to select the IO level of CSI Control interfaces (I2C & SPI)

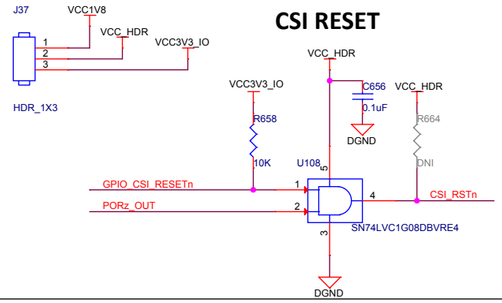


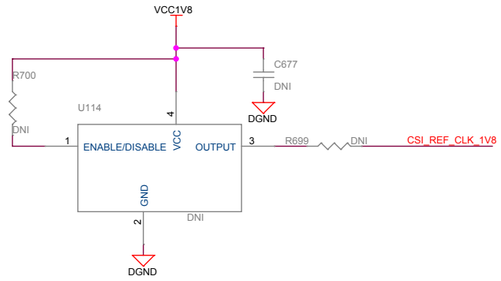


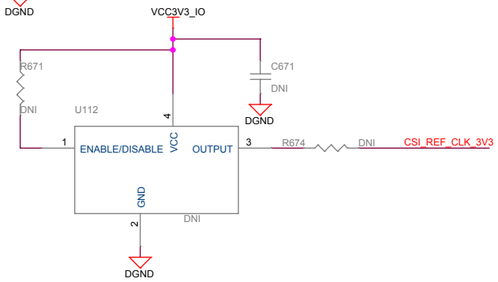




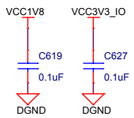
CSI RESET

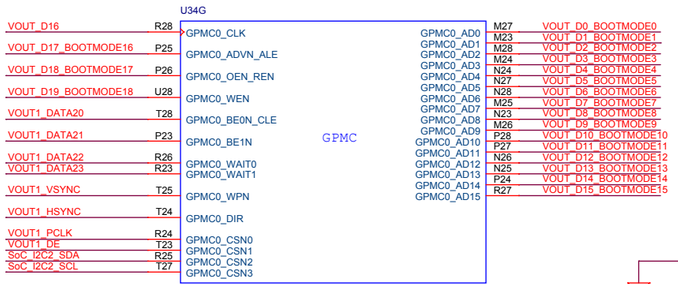


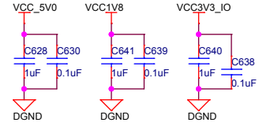


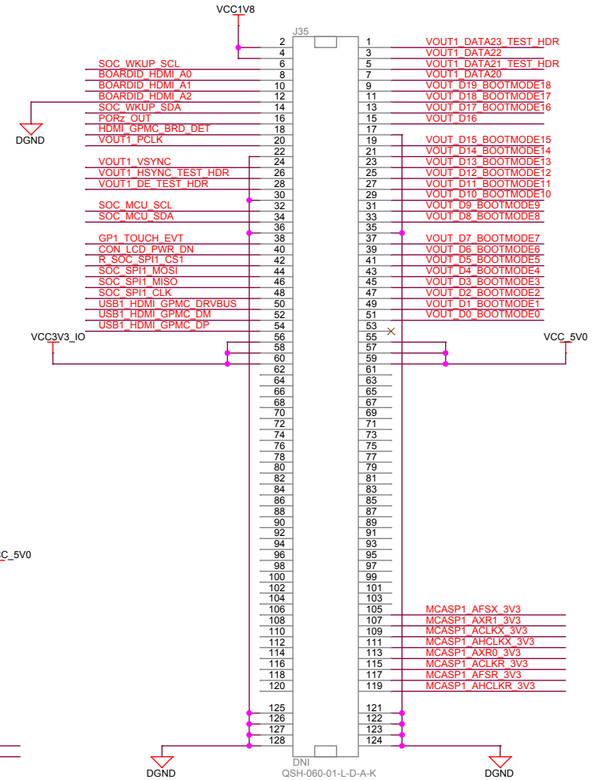


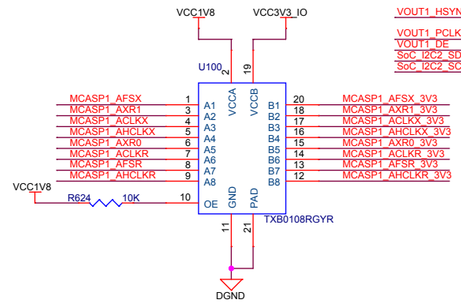
DSS/GPMC Interface

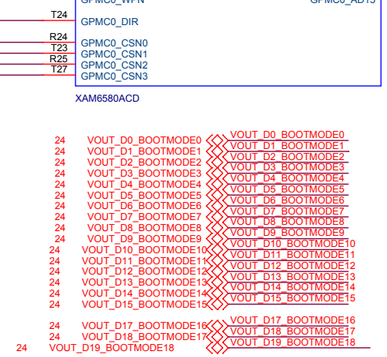


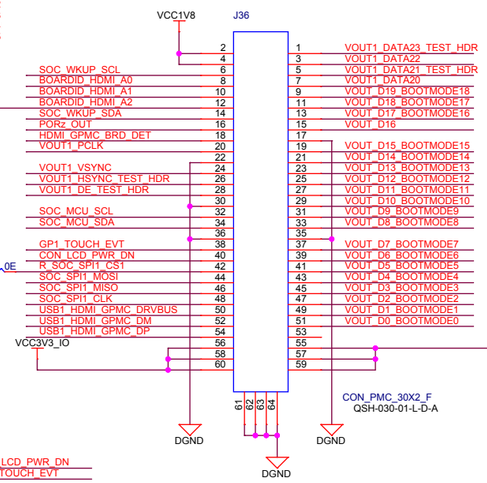


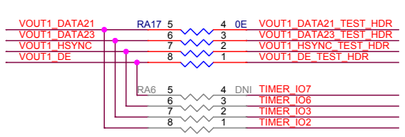


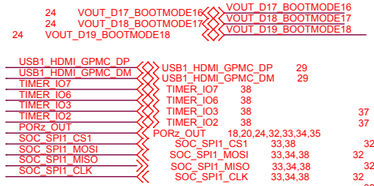


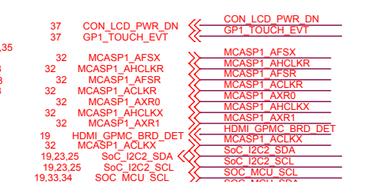












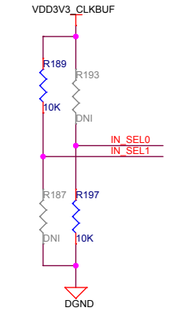
0- Ohm Res MUX between HDMI / GPMC and Test Header Timer signals.
-For HDMI / GPMC , RA17 Should be installed and RA6 Should be DNI'd.
-For test header Timer signals , RA6 Should be Installed and RA17 Should be DNI'd.

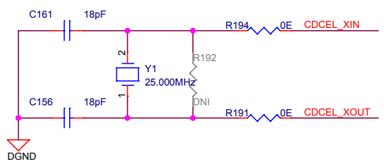
Designed for TI by Mistral Solutions Pvt Ltd

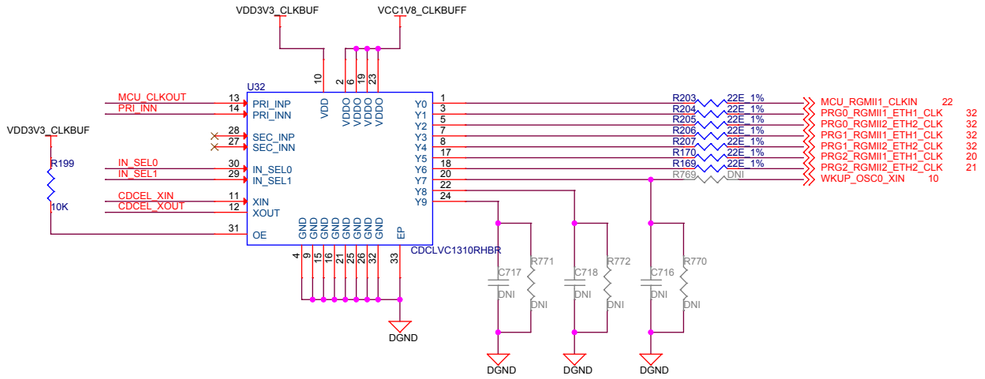
Title	CSI,GPMC/DSS INTERFACE	
Size C	Variant Name = PROC062 001 OPN#TMDX654IDKEVM	Rev E4
Date: Thursday, August 29, 2019	Sheet 35 of 44	

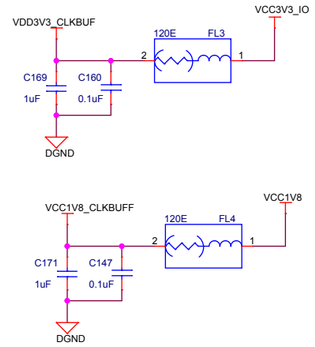
ETHERNET PHY CLOCK BUFFER

REFERENCE INPUT SELECTION

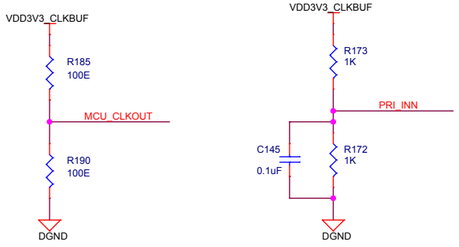








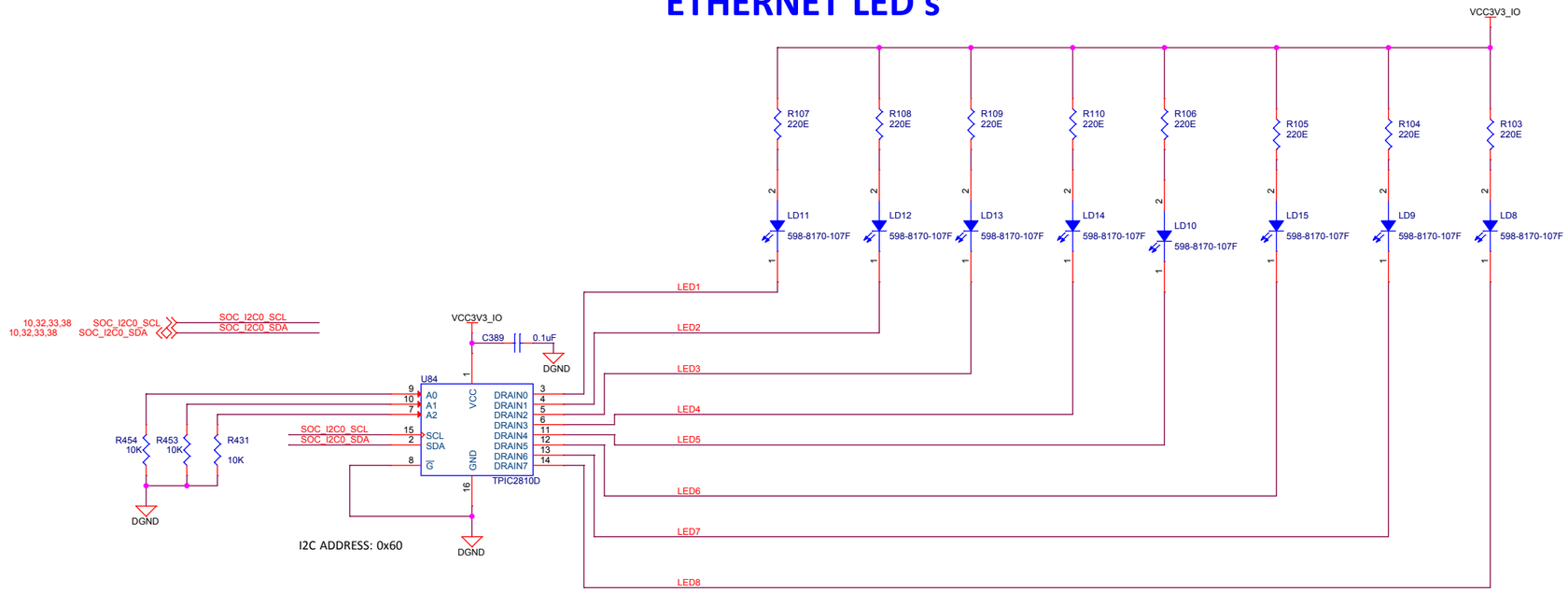
MCU_CLKOUT ⟩⟩ MCU_CLKOUT 33



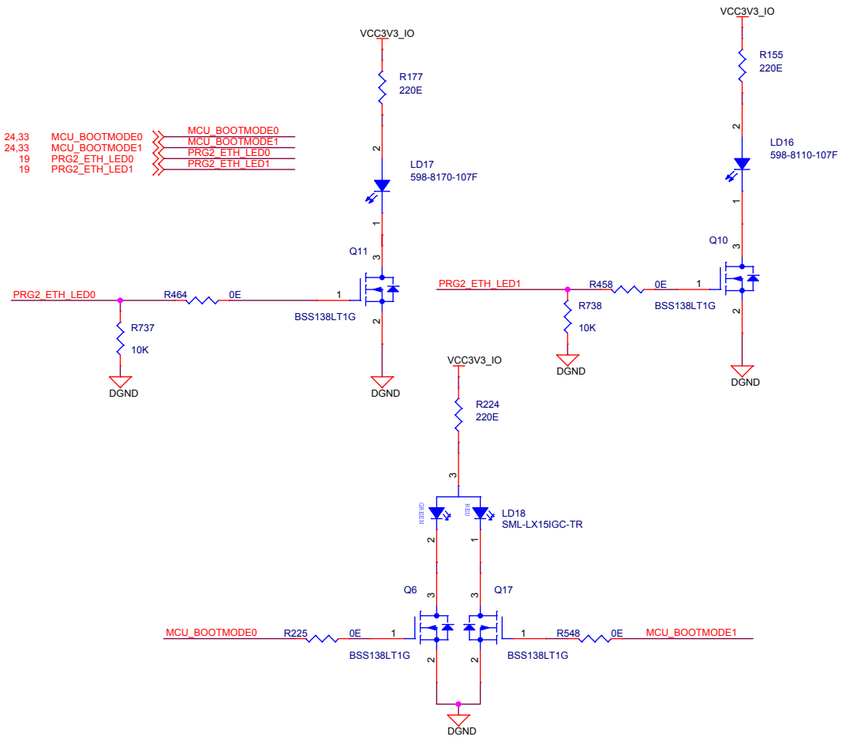
Designed for TI by Mistral Solutions Pvt Ltd

Title	ETHERNET PHY CLOCK GENERATOR	
Size	Variant Name = PROC062 001 OPN#TMDX654IDKEVM	Rev
C		E4
Date: Wednesday, August 28, 2019	Sheet 36 of 44	

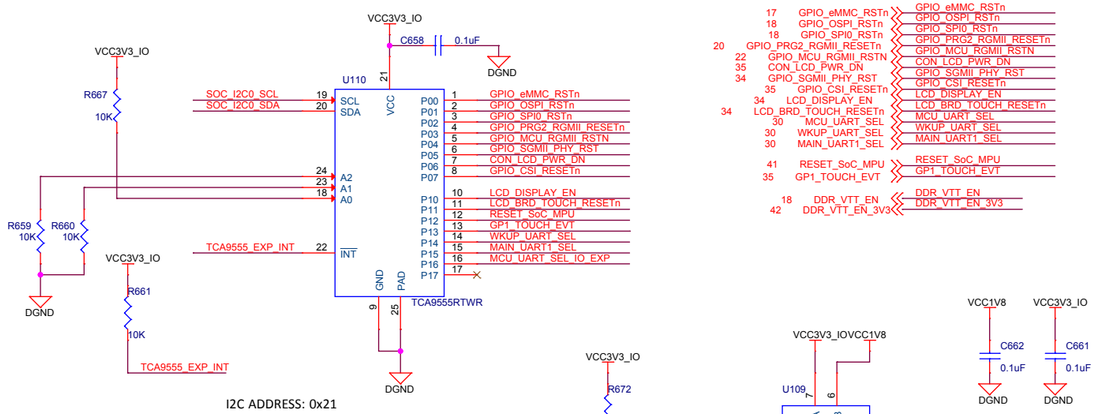
ETHERNET LED's

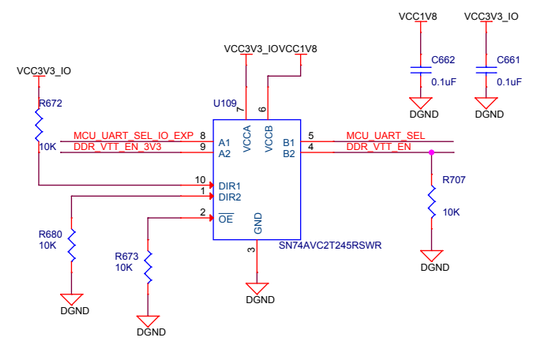


PRG2 ETHERNET LED's



I2C IO Expander

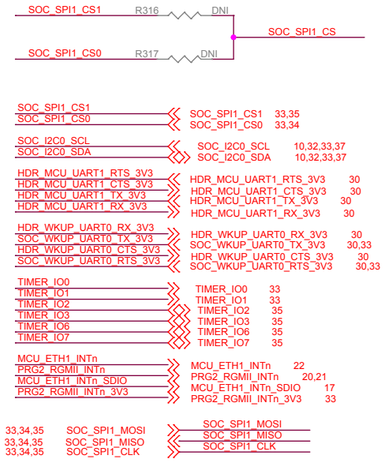




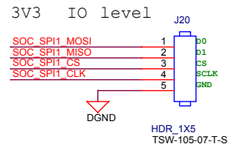
Designed for TI by Mistral Solutions Pvt Ltd

Title	ETHERNET LEDs	
Size C	Variant Name = PROC062 001 OPN#TMDX654IDKEVM	Rev E4
Date: Wednesday, August 28, 2019	Sheet 37 of 44	

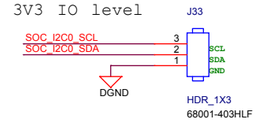
TEST HEADER



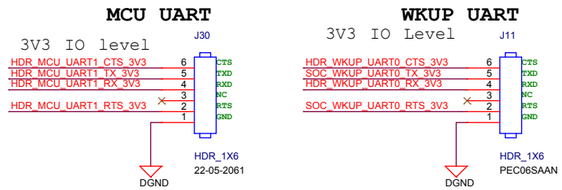
SPI TEST HEADER



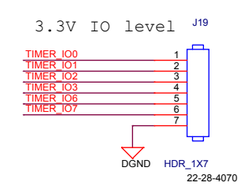
I2C TEST HEADER

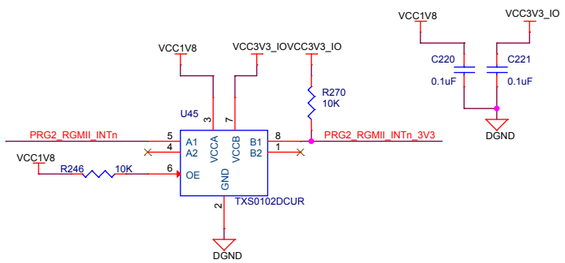


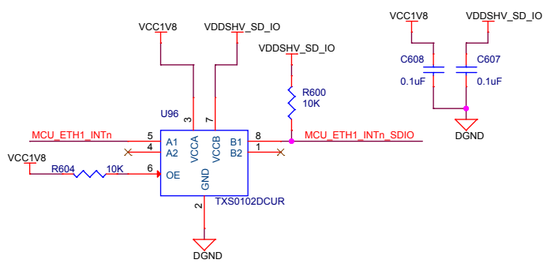
UART TEST HEADER



TIMER SIGNALS TEST HEADER





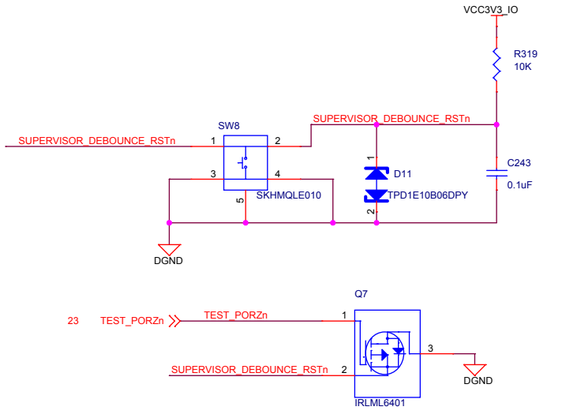


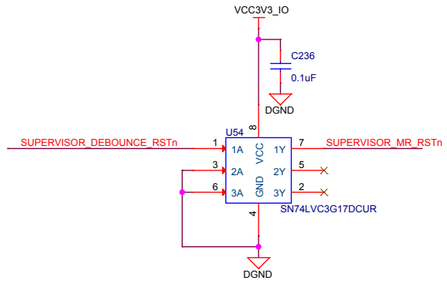
Designed for TI by Mistral Solutions Pvt Ltd

Title	TEST HEADER	
Size	Variant Name = PROC062 001 OPN#TMDX654IDKEVM	Rev
C		E4
Date: Wednesday, August 28, 2019	Sheet 38 of 44	

VOLTAGE SUPERVISOR

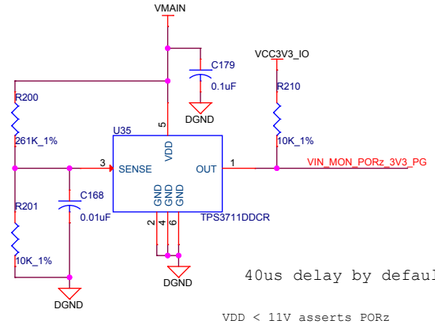
DEBOUNCE CIRCUIT





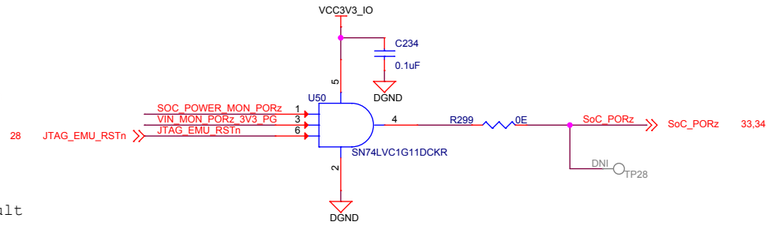
41,42 VIN_MON_PORz_3V3_PG <<< VIN_MON_PORz_3V3_PG

Under Voltage Monitor (VMAIN)

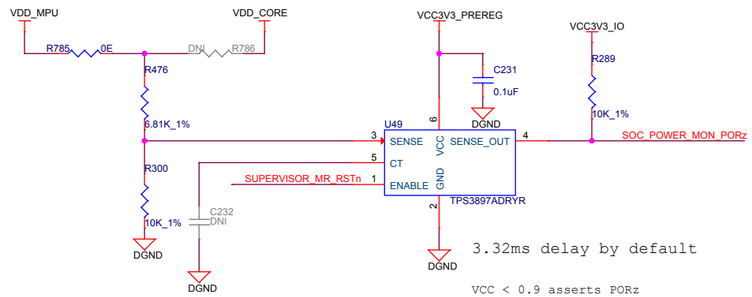


40us delay by default

VDD < 11V asserts PORz



Under Voltage Monitor (VDD_MPU / VDD_CORE)



3.32ms delay by default

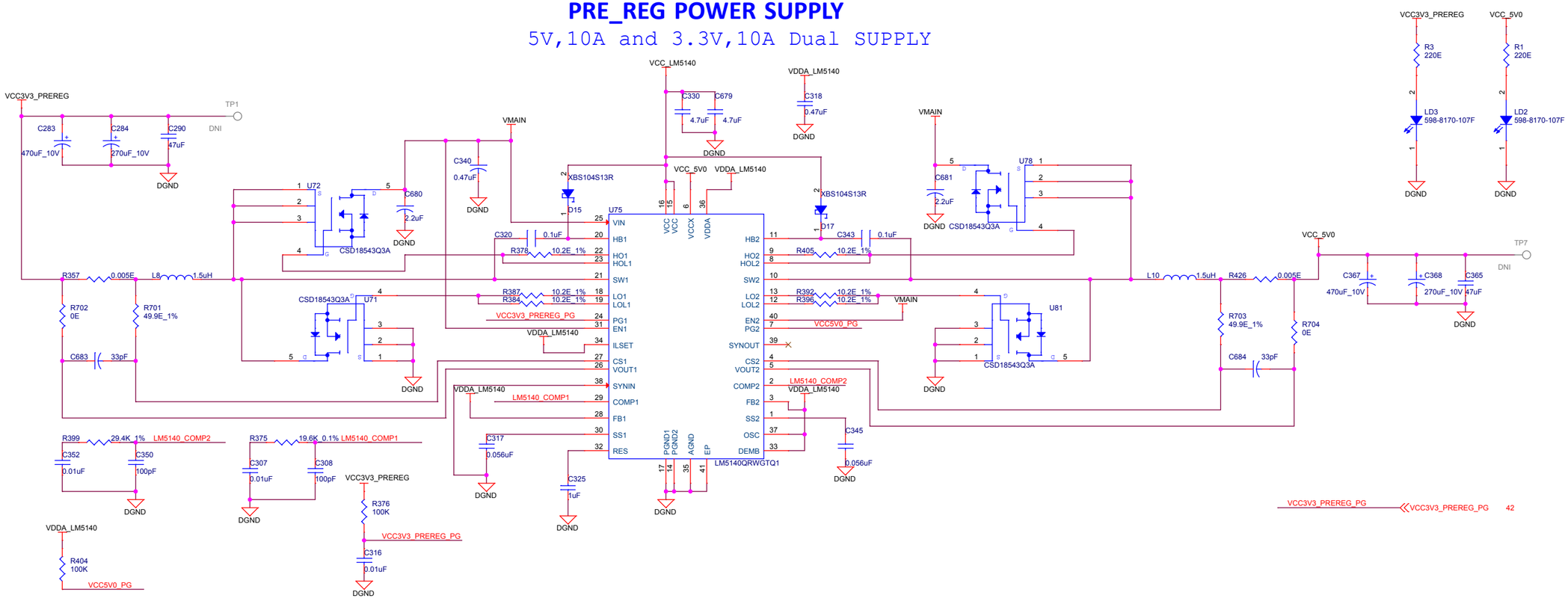
VCC < 0.9 asserts PORz

Designed for TI by Mistral Solutions Pvt Ltd

Title	VOLTAGE SUPERVISOR & WKUP LEDs	
Size C	Variant Name = PROC062 001 OPN#TMDX654IDKEVM	Rev E4
Date: Wednesday, August 28, 2019	Sheet 39 of 44	

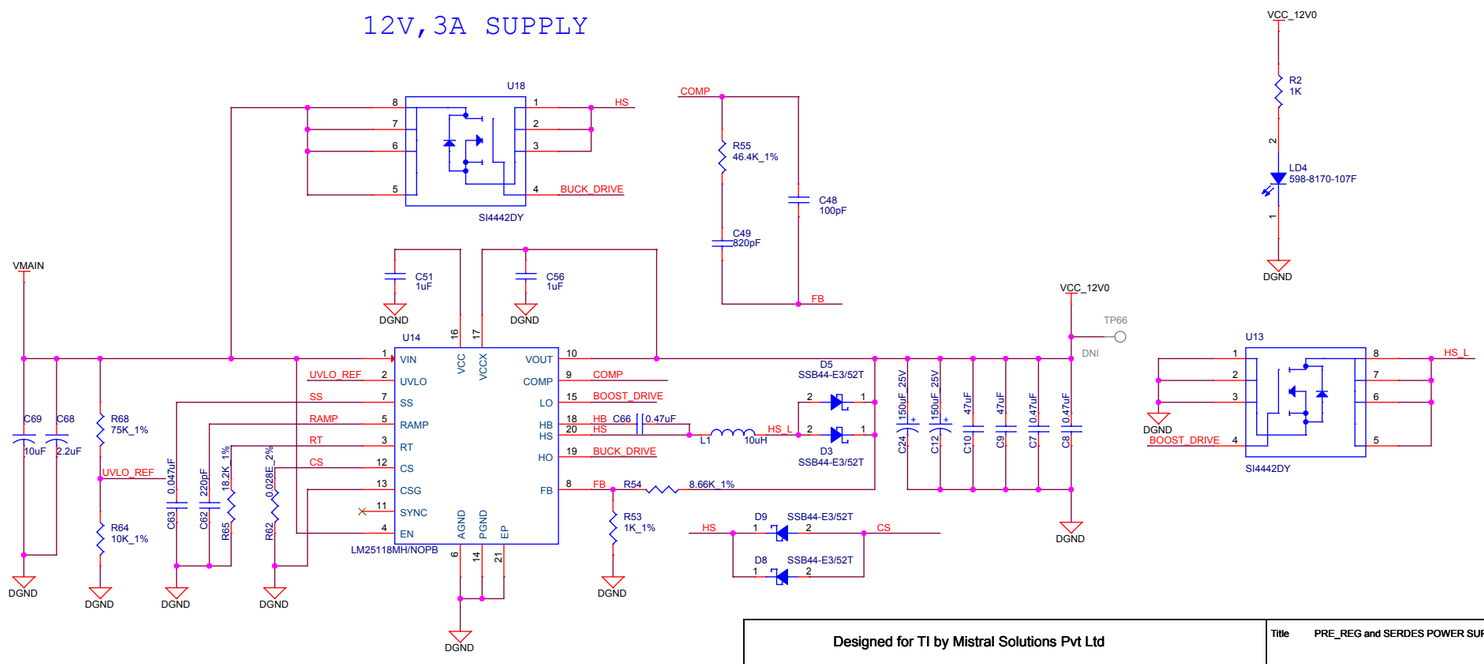
PRE_REG POWER SUPPLY

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



SERDES POWER SUPPLY

12V,3A SUPPLY

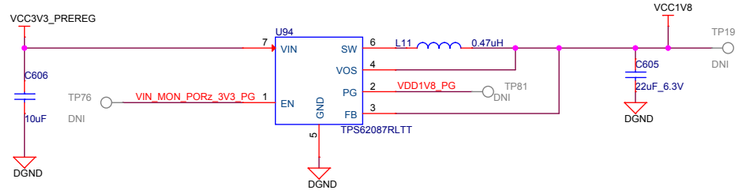


Designed for TI by Mistral Solutions Pvt Ltd

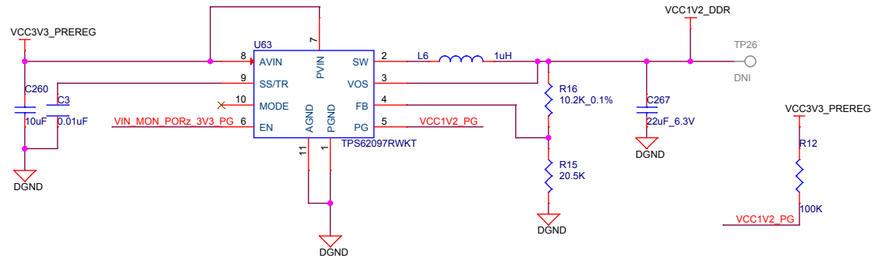
Title	PRE_REG and SERDES POWER SUPPLY	
Size	Variant Name = PROC062 001 OPN#TMDX654IDKEVM	Rev
C		E4
Date:	Wednesday, August 28, 2019	Sheet 40 of 44

SoC POWER SUPPLY

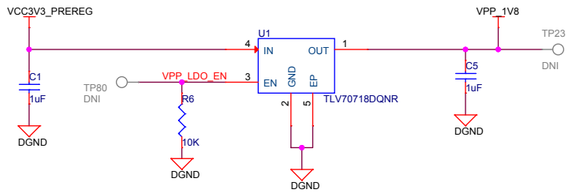
1.8V IO, 3.0AMPS SUPPLY



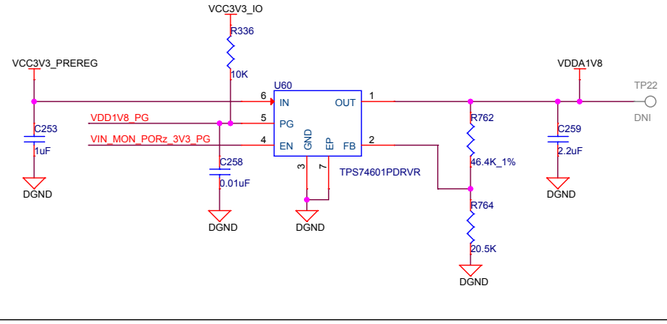
1.2V, 2.0AMPS SUPPLY



1.8V VPP, 0.15AMPS SUPPLY



1.8V Analog , 1AMPS SUPPLY



19,32,33,34,35 SOC_WKUP_SCL >> SOC_WKUP_SCL

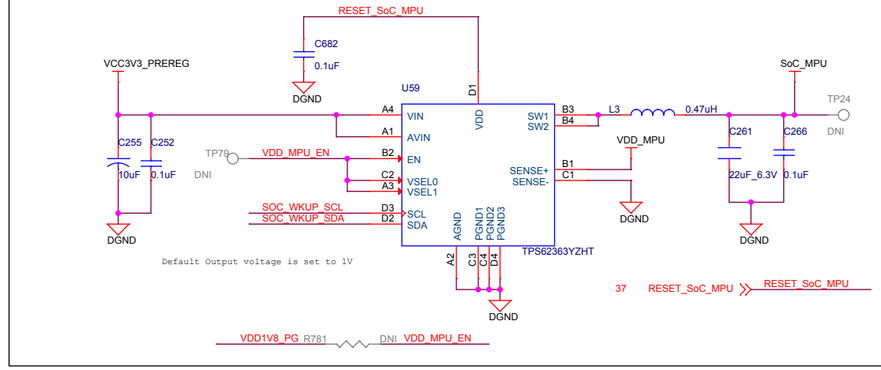
19,32,33,34,35 SOC_WKUP_SDA >> SOC_WKUP_SDA

18 VPP_LDO_EN << VPP_LDO_EN

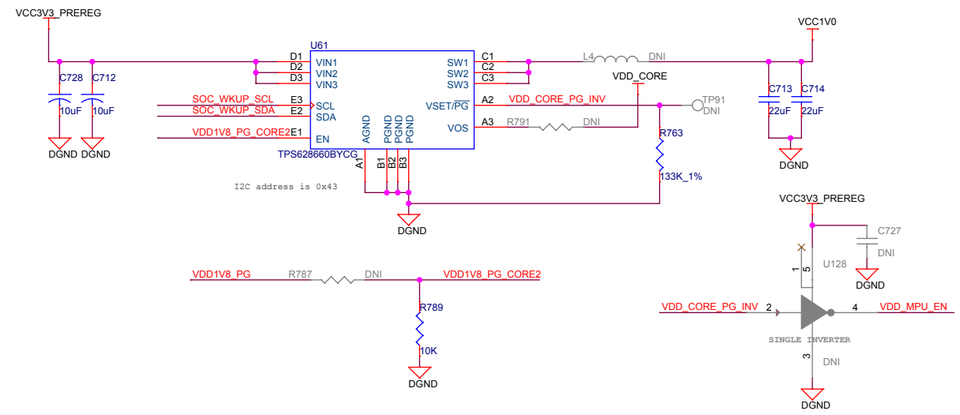
39,42 VIN_MON_PORz_3V3_PG << VIN_MON_PORz_3V3_PG

39,42 VDD1V8_PG << VDD1V8_PG

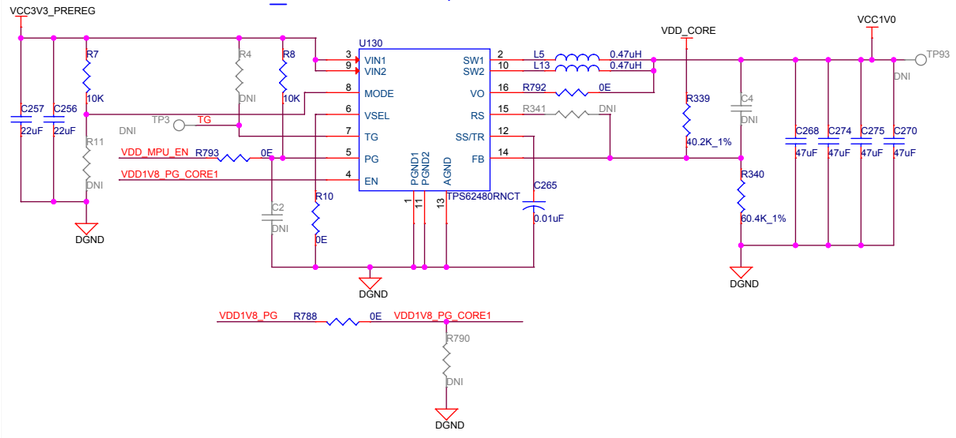
0.9-1.35V, 3.0AMPS SUPPLY



VDD_CORE 1.0V, 6.0AMPS SUPPLY (Optional)



VDD_CORE 1.0V, 6.0AMPS SUPPLY

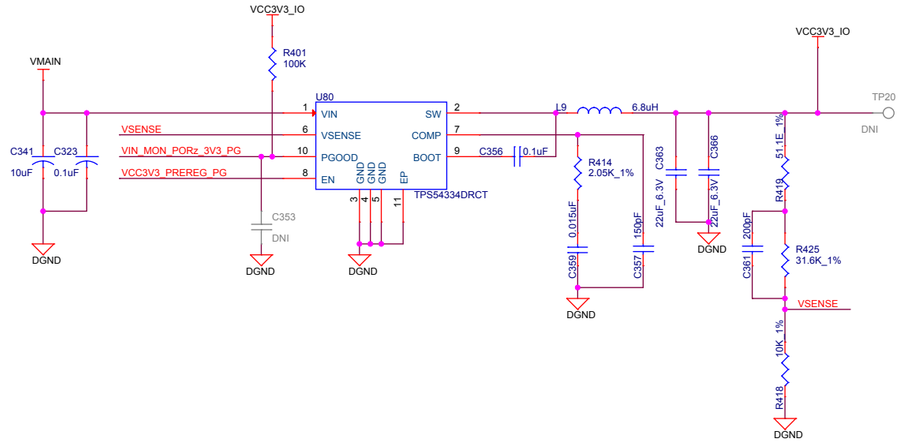


Designed for TI by Mistral Solutions Pvt Ltd

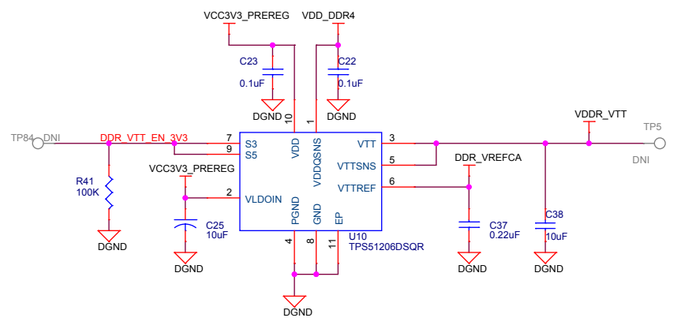
Title	SoC POWER SUPPLY	
Size C	Variant Name = PROC062 001 OPN#TMDX654IDKEVM	Rev E4
Date: Wednesday, August 28, 2019	Sheet 41 of 44	

PERIPHERAL POWER SUPPLY

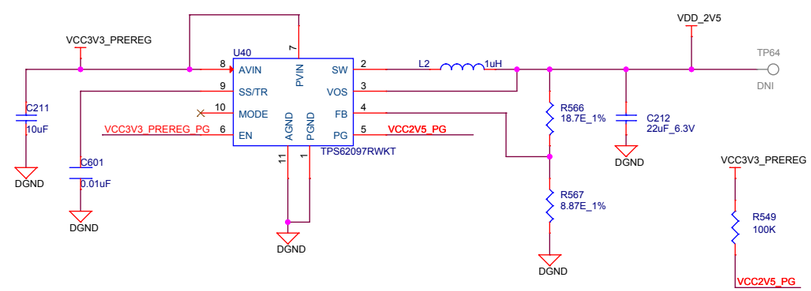
3.3V, 3.0AMPS SUPPLY



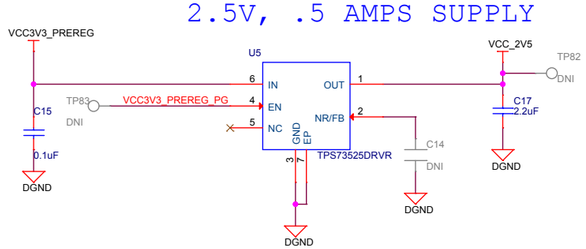
VTT SUPPLY FOR DDR4



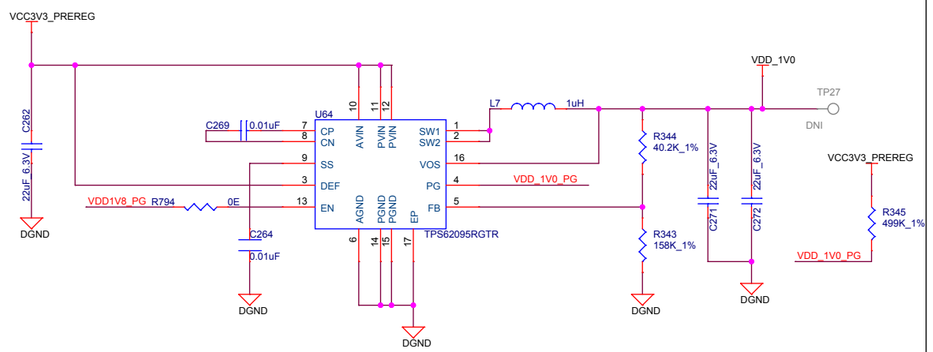
2.5V, 2.0AMPS SUPPLY



2.5V, .5 AMPS SUPPLY



1.0V ETHERNET PHY POWER SUPPLY



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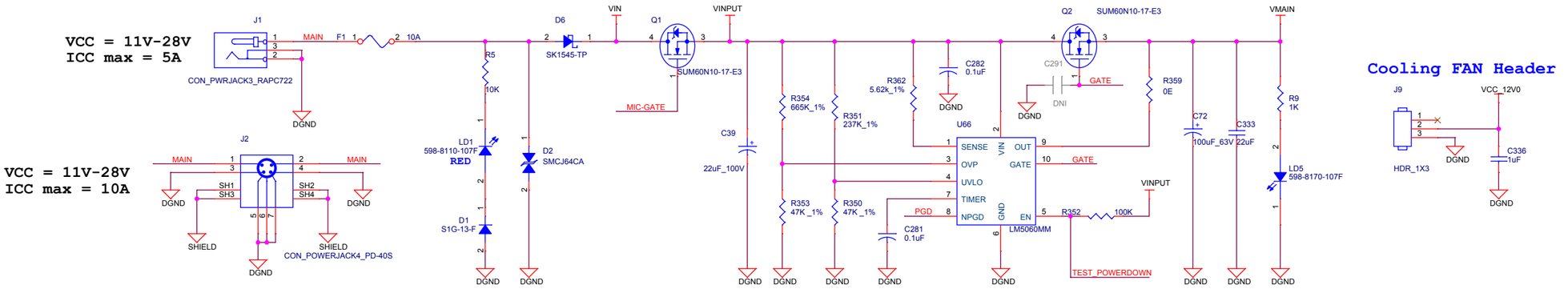
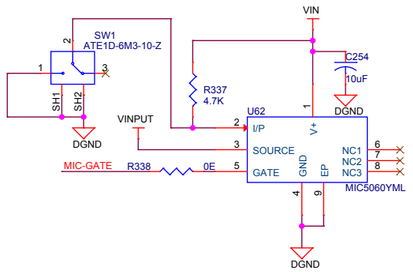
Title	PERIPHERAL POWER SUPPLY	
Size: C	Variant Name = PROC062 001 OPN#TMDX654IDKEVM	Rev: E4
Date: Wednesday, August 28, 2019	Sheet 42 of 44	

OVER VOLTAGE PROTECTION CIRCUIT



ON/ OFF Control SWITCH



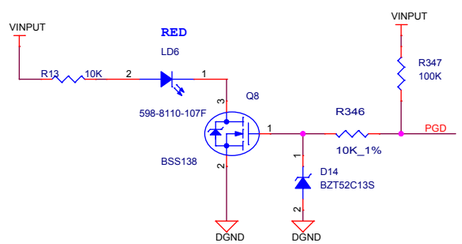
Condition	LED Status(LD1)
Reverse Voltage	ON

23 TEST_POWERDOWN <<< TEST_POWERDOWN

Note:-

UVLO set for 11V
OVP set for 28V

Fault Indication

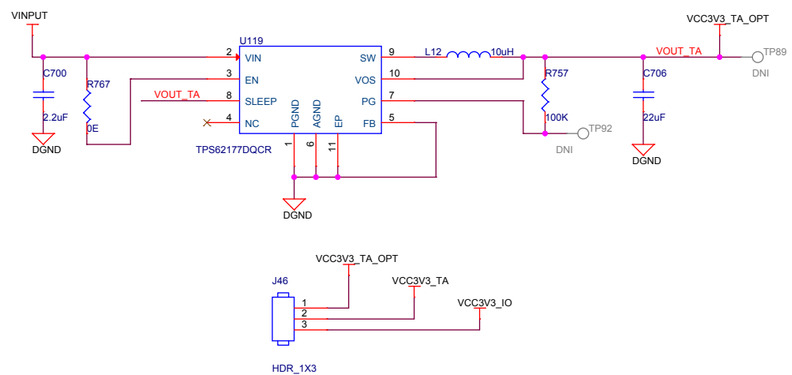


Condition	LED Status(LD6)
VINPUT between 11 to 28V	OFF
VINPUT above 28V or below 11V	ON

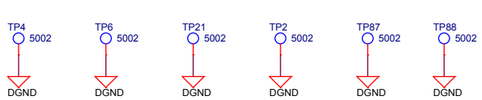
Note:-

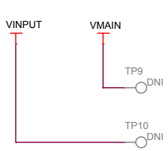
When fault is indicated, set to proper voltage and power cycle the board.

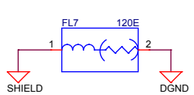
TEST AUTOMATION BOARD POWER



Ground test points







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Title	OVER VOLTAGE PROTECTION CKT AND TEST AUTOMATION POWER	
Size: C	Variant Name = PROC062 001 OPN#TMDX654IDKEVM	Rev: E4
Date: Wednesday, August 28, 2019	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

MH1 MH2 MH3 MH4 MH5 MH6 MH7
970300151 970300151 970300151 970300151 970300151 970300151 970300151

MH8 MH9 MH10 MH11 MH12
970060151 970060151 970060151 970060151 970060151

MH28 MH29 MH30 MH31 MH32 MH33
971050151 971050151 971050151 971050151 971300151 971300151

SCREWS

MH13 MH14 MH15 MH16 MH17 MH18 MH34 MH35 MH36 MH37
29300 29300 29300 29300 29300 29300 29300 29300 29300 29300

MH19 MH20 MH21 MH22 MH23 MH24 MH25 MH26 MH27
29304 29304 29304 29304 29304 29304 29304 29304 29304

WASHER's

M10 M11 M12 M13 M14 M15 M16 M17 M18
4692 4692 4692 4692 4692 4692 4692 4692 4692

M19 M20 M21 M22 M23 M24 M25 M26 M27
4692 4692 4692 4692 4692 4692 4692 4692 4692

RUBBER FEET

M1 M2 M3 M4 M5 M6 M7 M8 M9
728 728 728 728 728 728 728 728 728

JUMPERs

ACC1 ACC2 ACC3
SPC02SYAN SPC02SYAN SPC02SYAN

ACC8 ACC7 ACC4
SPC02SYAN SPC02SYAN MNT-103-BK-G

FIDUCIALS

FID1 DNI FID2 DNI FID3 DNI
FID4 DNI FID5 DNI FID6 DNI

Socket & Processor as Accessories

ACC5 DNI

ACC6 DNI **Processor**

BARE PCB

PCB1 PROC062

Assembled PCB's

PCBA1 PROC064 PCBA2 PROC066 PCBA3 PROC067

LABELS

Board Serial No.

LBL1 PCB LABEL THT-103-423-10

ORDERABLE PART NO

LBL2 PCB LABEL THT-103-423-10

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

LOGOs

PCB LOGO DNI **Texas Intruments**

PCB LOGO DNI **For Evaluation only; not FCC approved for resale**

PCB LOGO DNI **WEEE Mark**

PCB LOGO DNI **CE Mark**

Designed for TI by Mistral Solutions Pvt Ltd

Title	HARDWARE SCHEMATICS	
Size C	Variant Name = PROC062 001 OPN#TMDX654IDKEVM	Rev E4
Date: Thursday, August 22, 2019	Sheet 44 of 44	