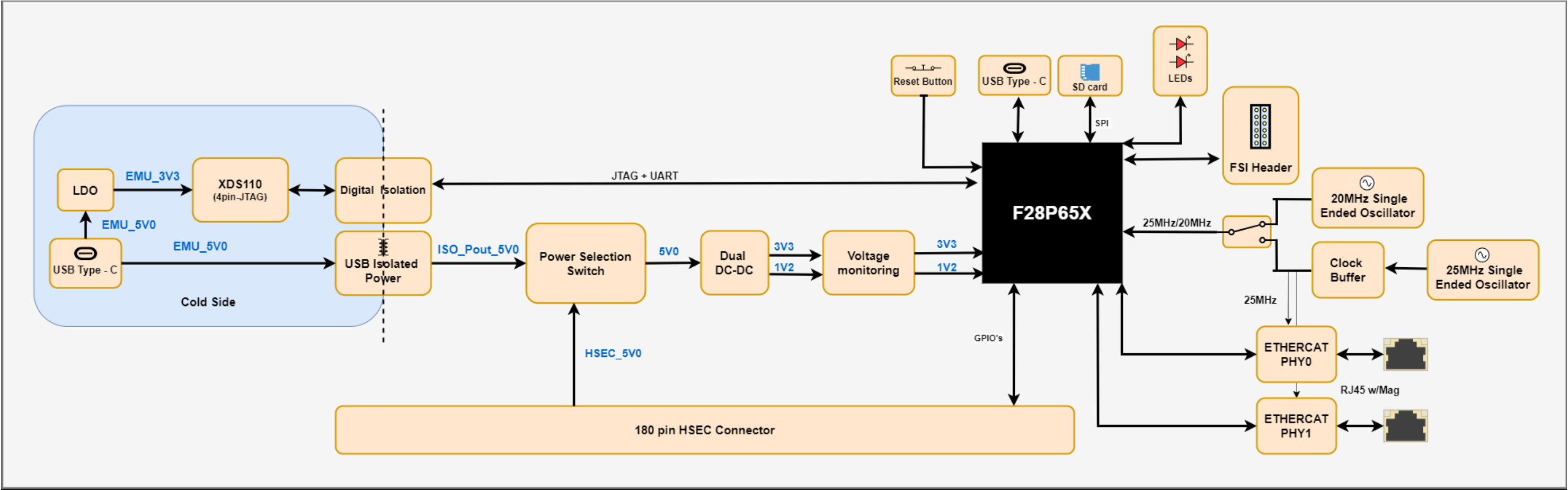
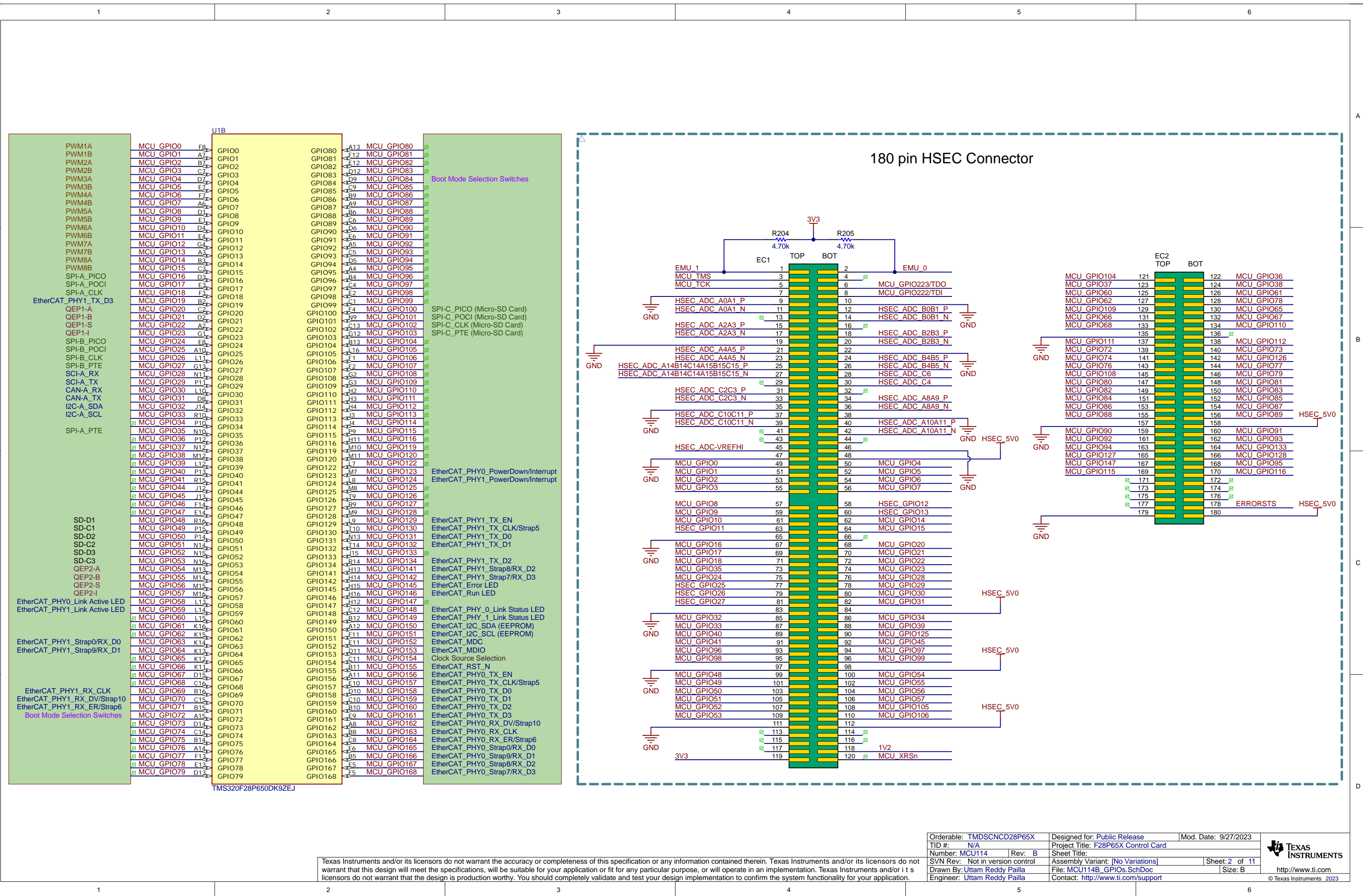


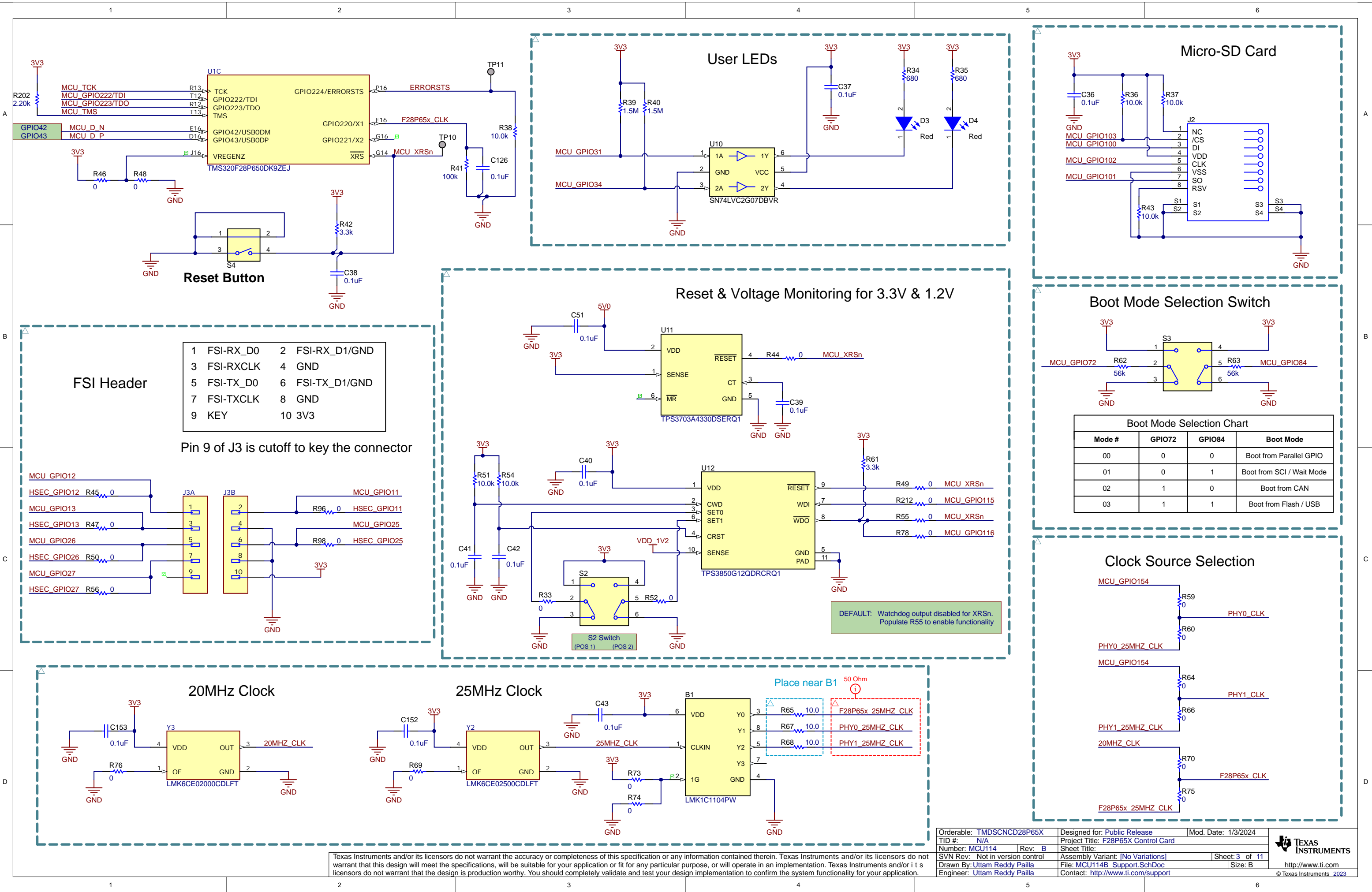
- 1) USB Differential Pairs - 90 Ohm
(A) XDS_D_P and XDS_D_N
(B) USB_D_P (GPIO42) and USB_D_N (GPIO43)
- 2) ADC Differential pair Impedance Matching - 50 Ohm
(A) HSEC_ADC even pins should match with HSEC_ADC + 1 pin(ie ADC-C2 should match with ADC-C3)
(B) MCU_ADC even pins should match with MCU_ADC + 1 pin(ie MCU_ADC-A0 should match with MCU_ADC-A1)
- 3) ETHERCAT Differential pairs - 100 Ohm
(A) TD_P and TD_N
(B) RD_P and RD_N
- 4) CLK Paths - 50 Ohm
(A) F28P65x_25MHz_CLK
(B) PHY0_25MHz_CLK and PHY1_25MHz_CLK

Revision History				
Rev	ECN #	Approved Date	Approved by	Notes
E1	N/A	September 12, 2022	UR	Original engineering release
E2	N/A	April 8, 2023	UR	Refer Errata section in the TMDSCNCD28P65X controlCARD Information Guide
A	N/A	June 7, 2023	UR	Cosmetic changes to PCB silk screen
B	N/A	January 2, 2024	UR	Initial F28P650DK9 has ADC issues resolved



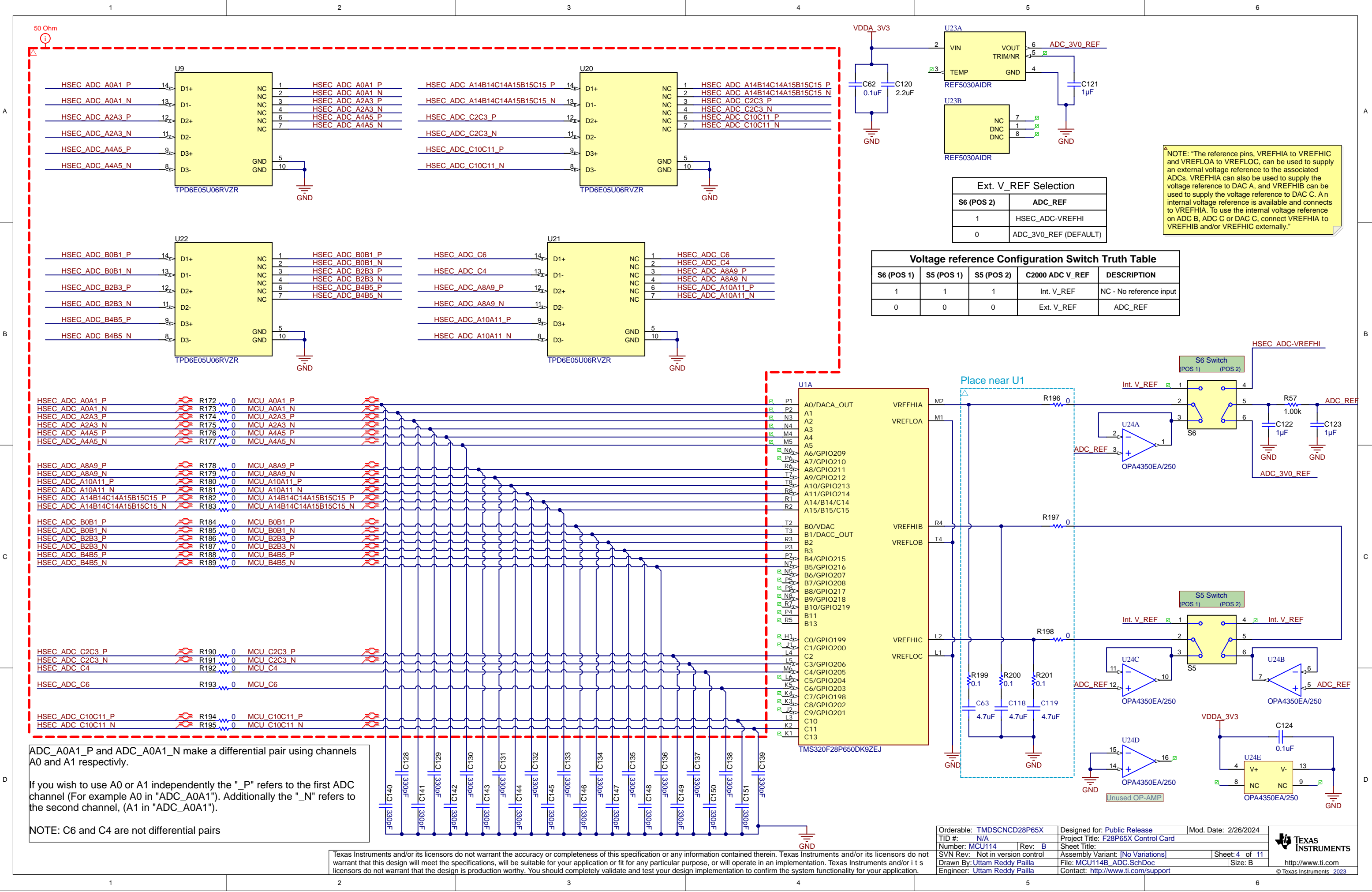
Power to the MCU is either supported by the USB-C on the left or the HSEC 180 pin.





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Orderable: TMDSCNCD28P65X	Designed for: Public Release	Mod. Date: 1/3/2024
TID #: N/A	Project Title: F28P65X Control Card	
Number: MCU114	Rev: B	Sheet Title:
SVN Rev: Not in version control	Assembly Variant: [No Variations]	Sheet: 3 of 11
Drawn By: Uttam Reddy Paila	File: MCU114B_Support.SchDoc	Size: B
Engineer: Uttam Reddy Paila	Contact: http://www.ti.com/support	

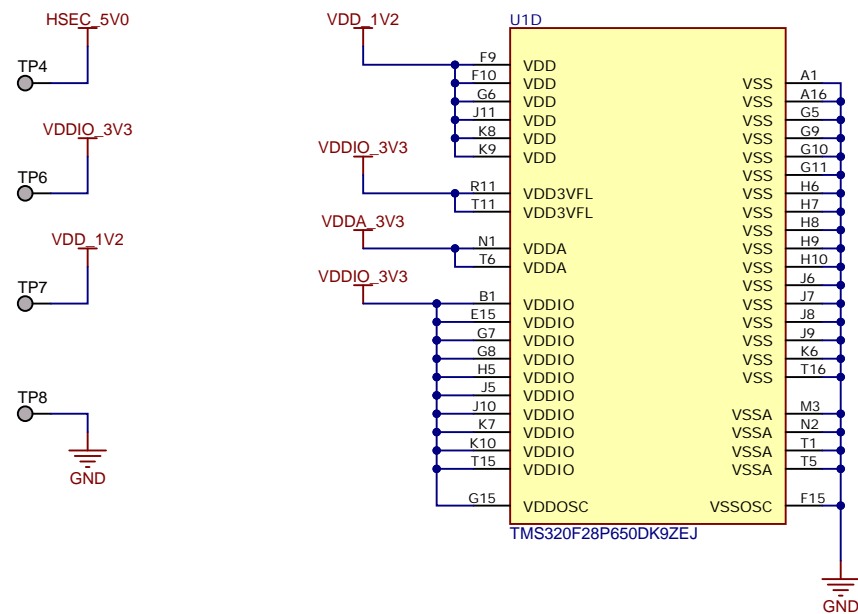
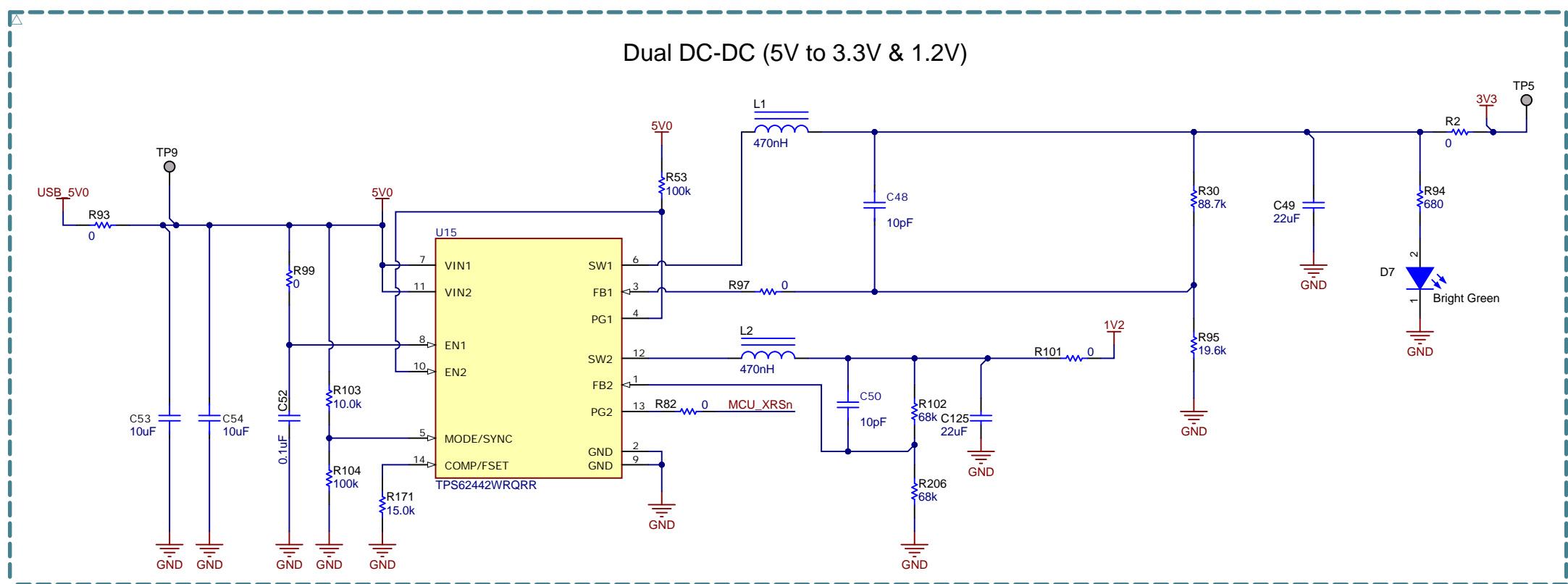


ADC_A0A1_P and ADC_A0A1_N make a differential pair using channels A0 and A1 respectively.

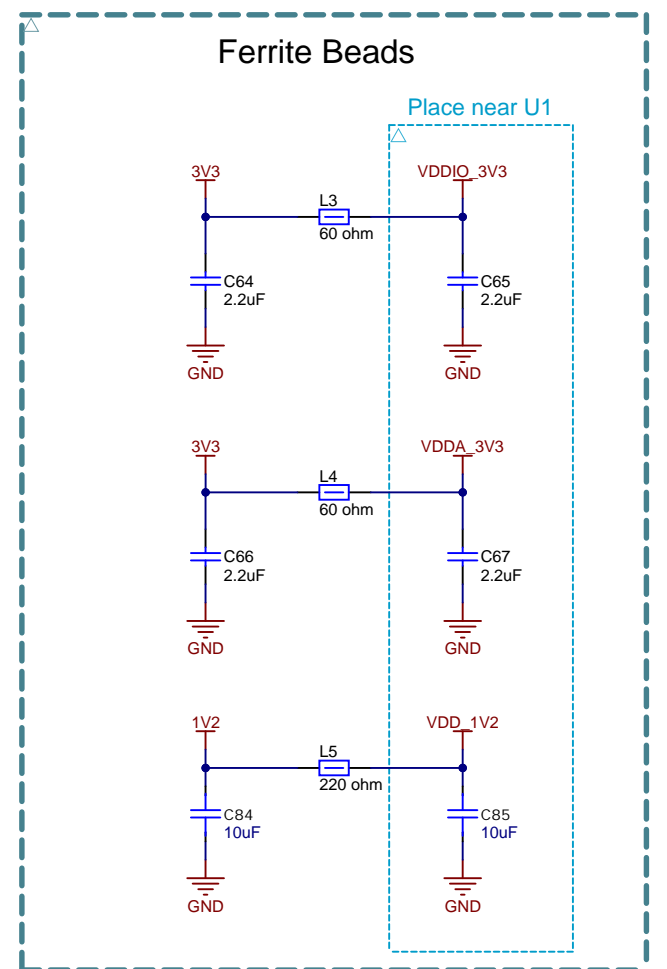
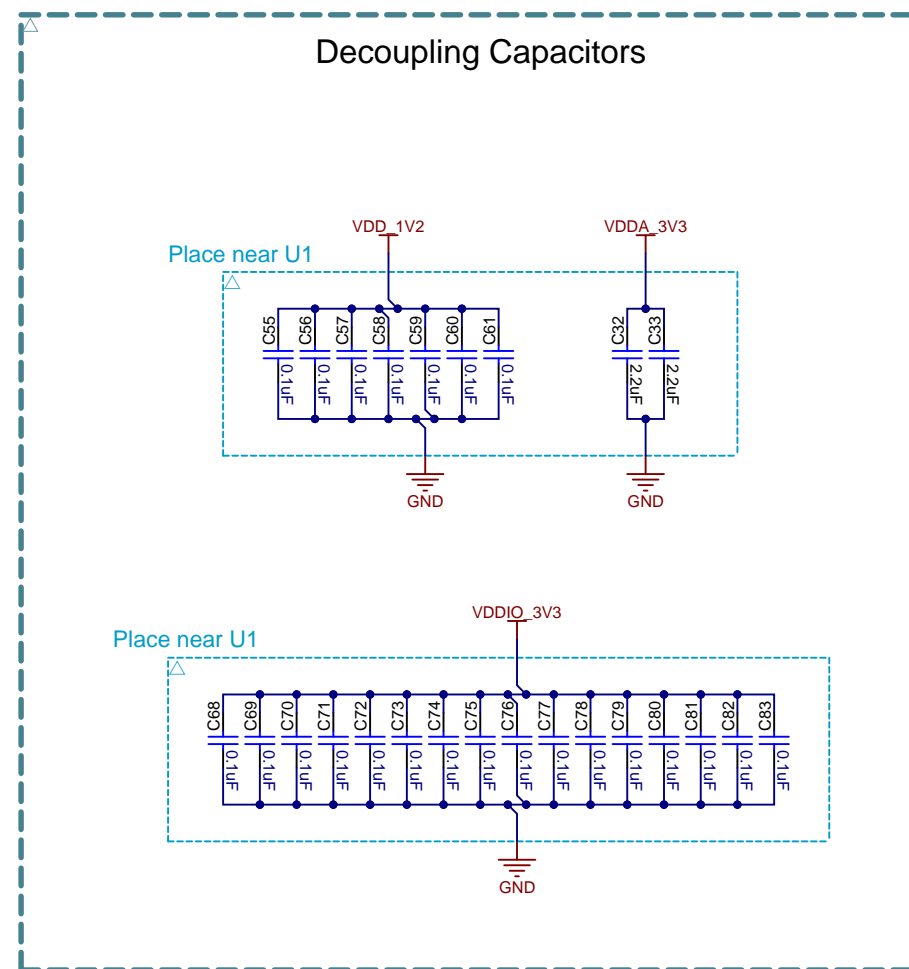
If you wish to use A0 or A1 independently the "_P" refers to the first ADC channel (For example A0 in "ADC_A0A1"). Additionally the "_N" refers to the second channel, (A1 in "ADC_A0A1").

NOTE: C6 and C4 are not differential pairs

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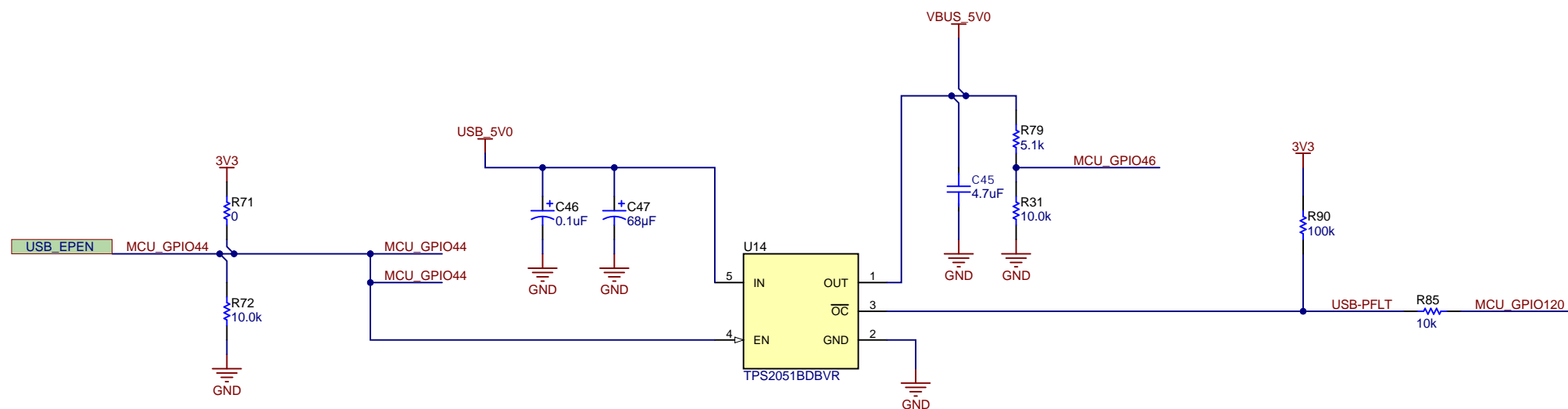
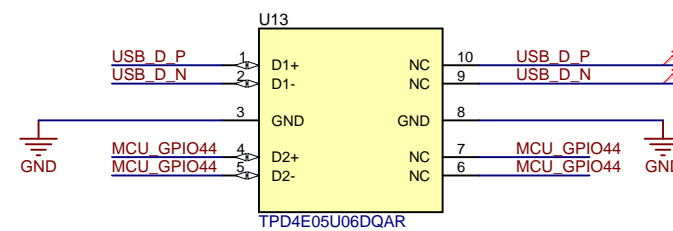
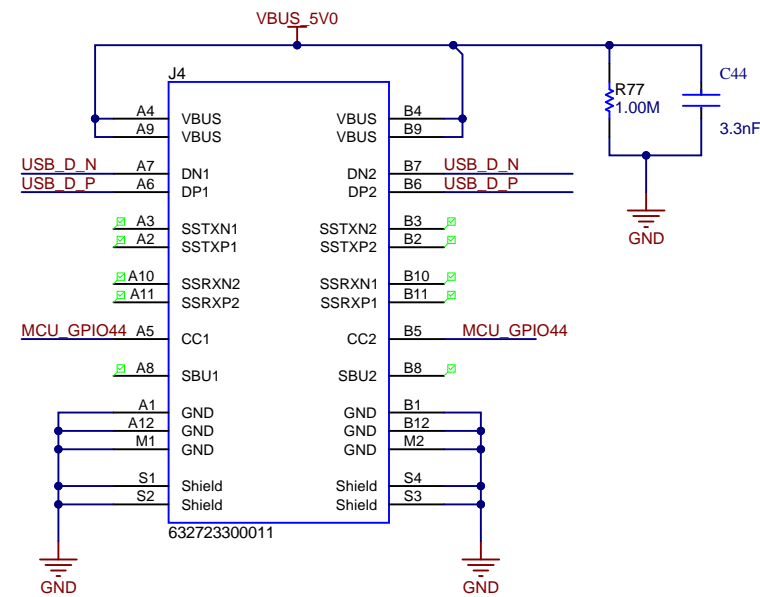
- NOTES:**
- 1) TPS62442 Dual DC-DC provides an output current of 2A/2A or 3A/1A, this amount of current capacity should not be necessary for certain applications using F28P65x. This is just necessary for the control card design
 - 2) Alternative part: TPS62441 Dual DC-DC provides an output current of 1A/1A
 - 3) DC-DC can be used without supervisory circuit in specific applications by considering the slew rates of MCU and DC-DC for proper reset.



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Orderable: TMDSCNCD28P65X	Designed for: Public Release	Mod. Date: 2/26/2024
TID #: N/A	Project Title: F28P65X Control Card	
Number: MCU114	Rev: B	Sheet Title:
SVN Rev: Not in version control	Assembly Variant: [No Variations]	Sheet: 5 of 11
Drawn By: Uttam Reddy Paila	File: MCU114B_Power.SchDoc	Size: B
Engineer: Uttam Reddy Paila	Contact: http://www.ti.com/support	

VBUS_5V0



Switch Truth Table		
MCU_GPIO44 STATUS	DESCRIPTION	USB_MODE
1 (HIGH)	UB_CC1 & USB_CC2 are pulled up	Host mode - DFP
0 (LOW)	UB_CC1 & USB_CC2 are strongly pulled down	Device mode - UFP (DEFAULT)

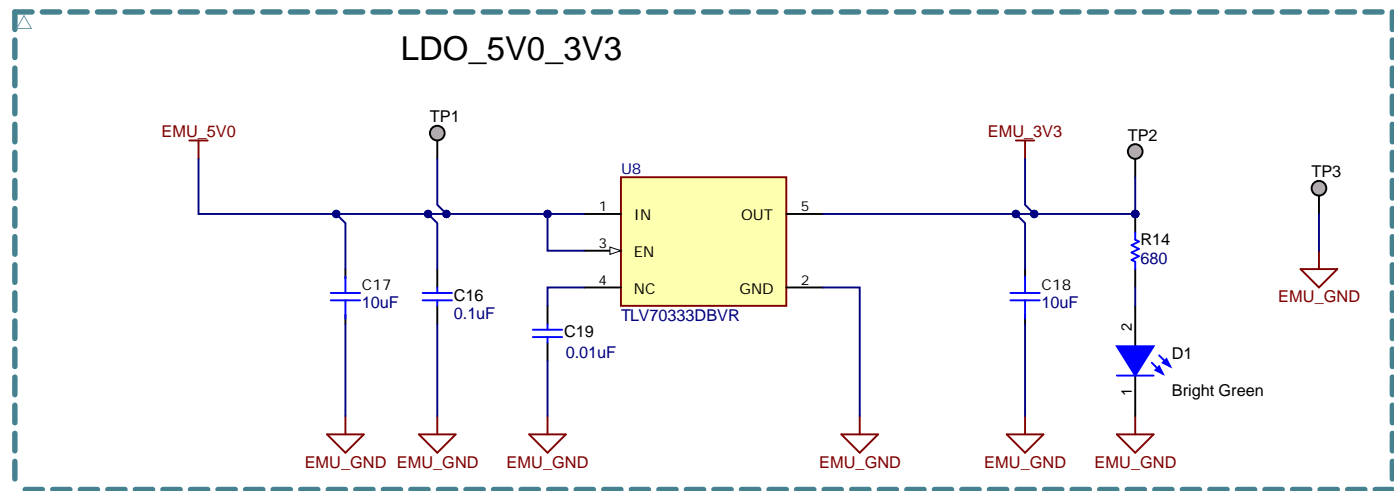
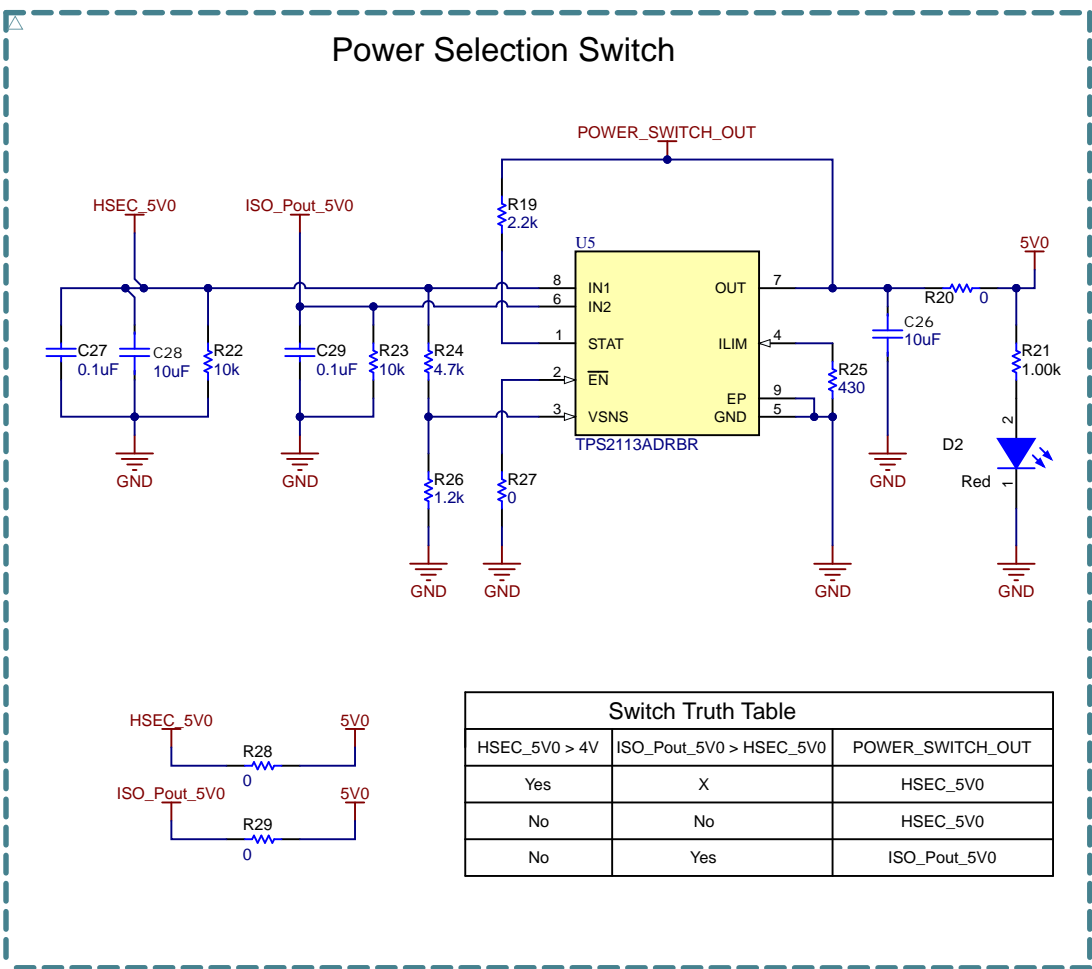
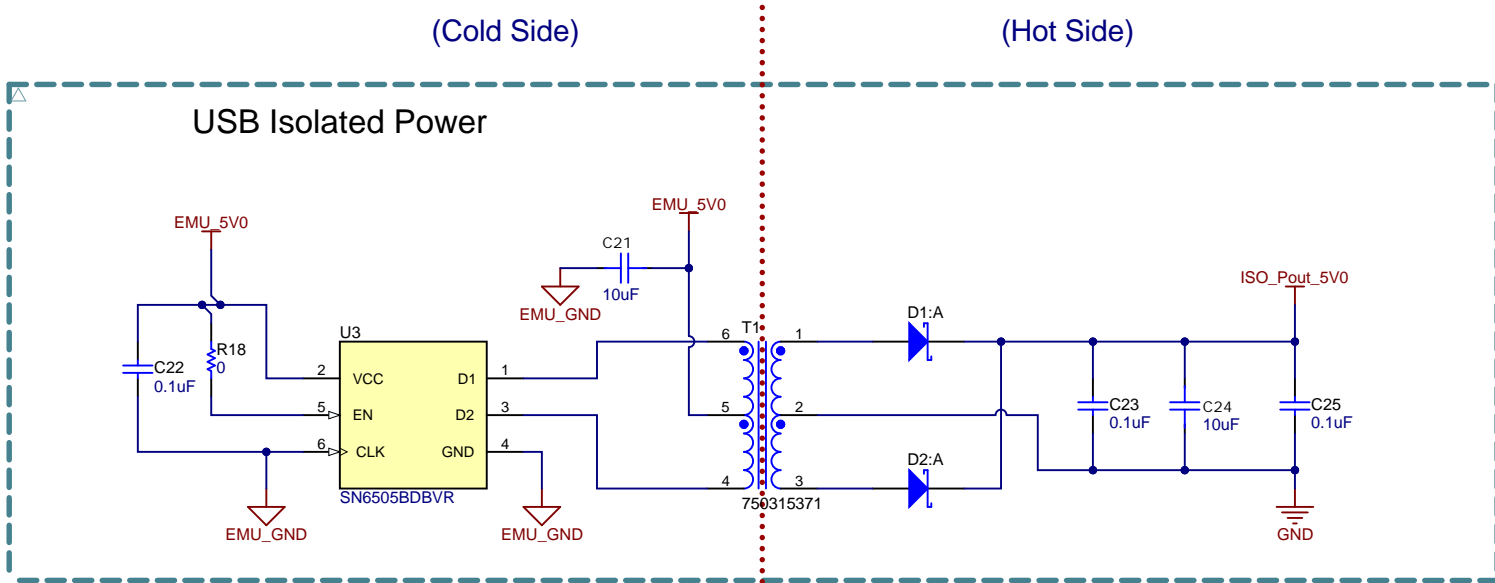
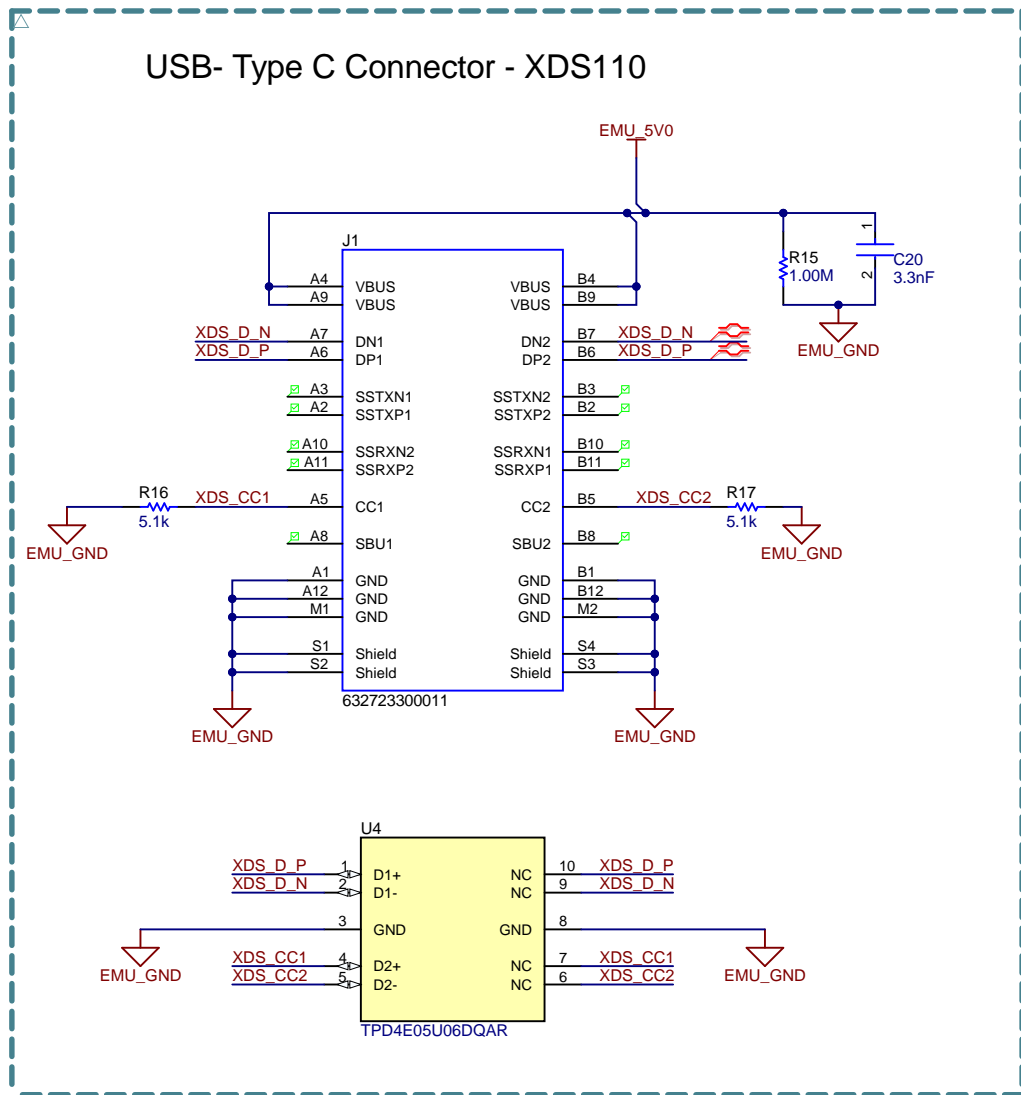
NOTE: USB VBUS_5V0, PFLT & EPEN do not have a specific mux position in this device.

In this controlCARD, a standard GPIO is used to detect changes to these signals.

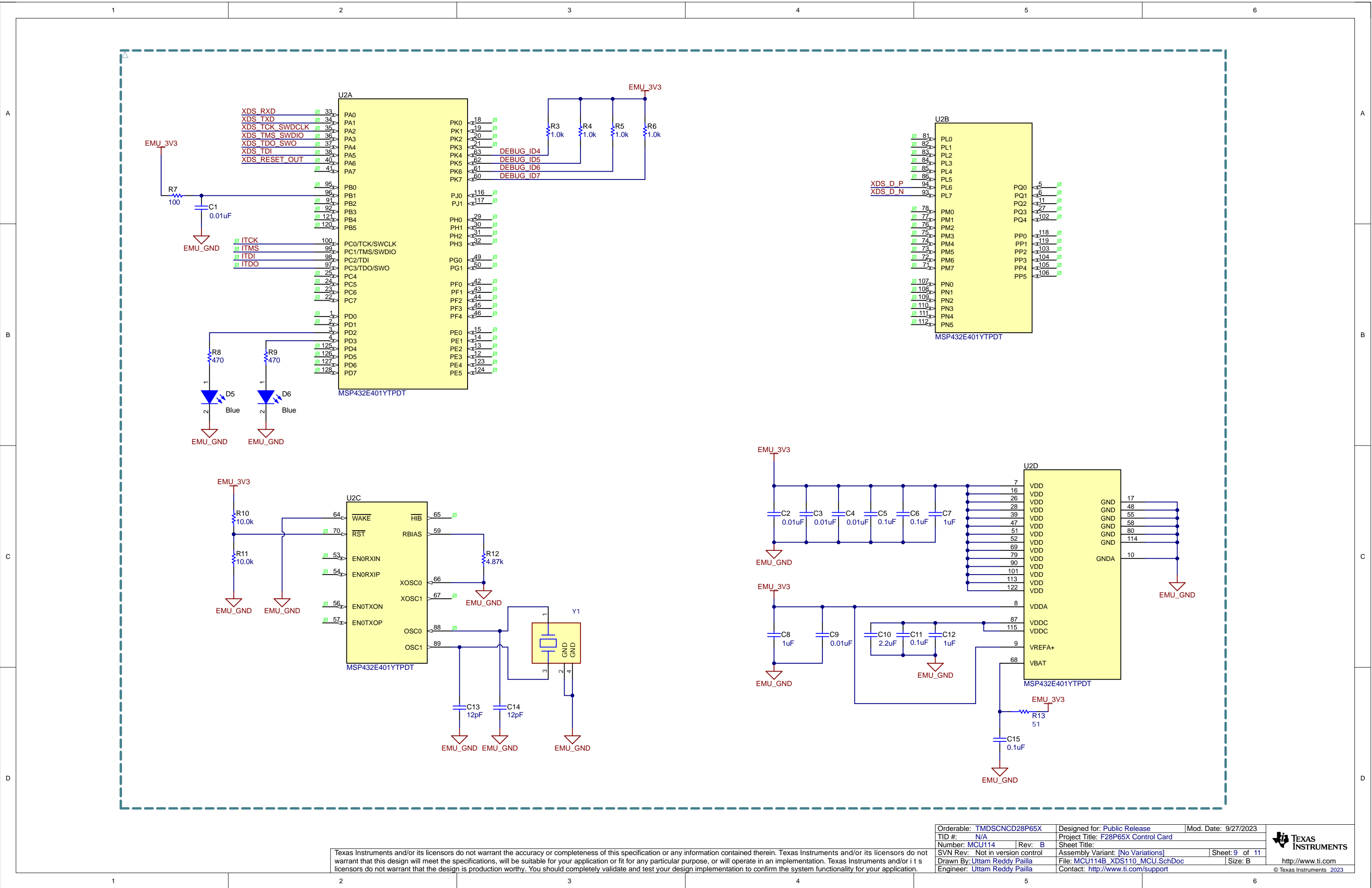
NOTE: for TYPE C, the USB2.0 OTG device is referred as a Dual Role Port (DRP)

DRP can function either as a USB host or USB peripheral, the selection choice depends on the channel configuration (CC1/CC2).

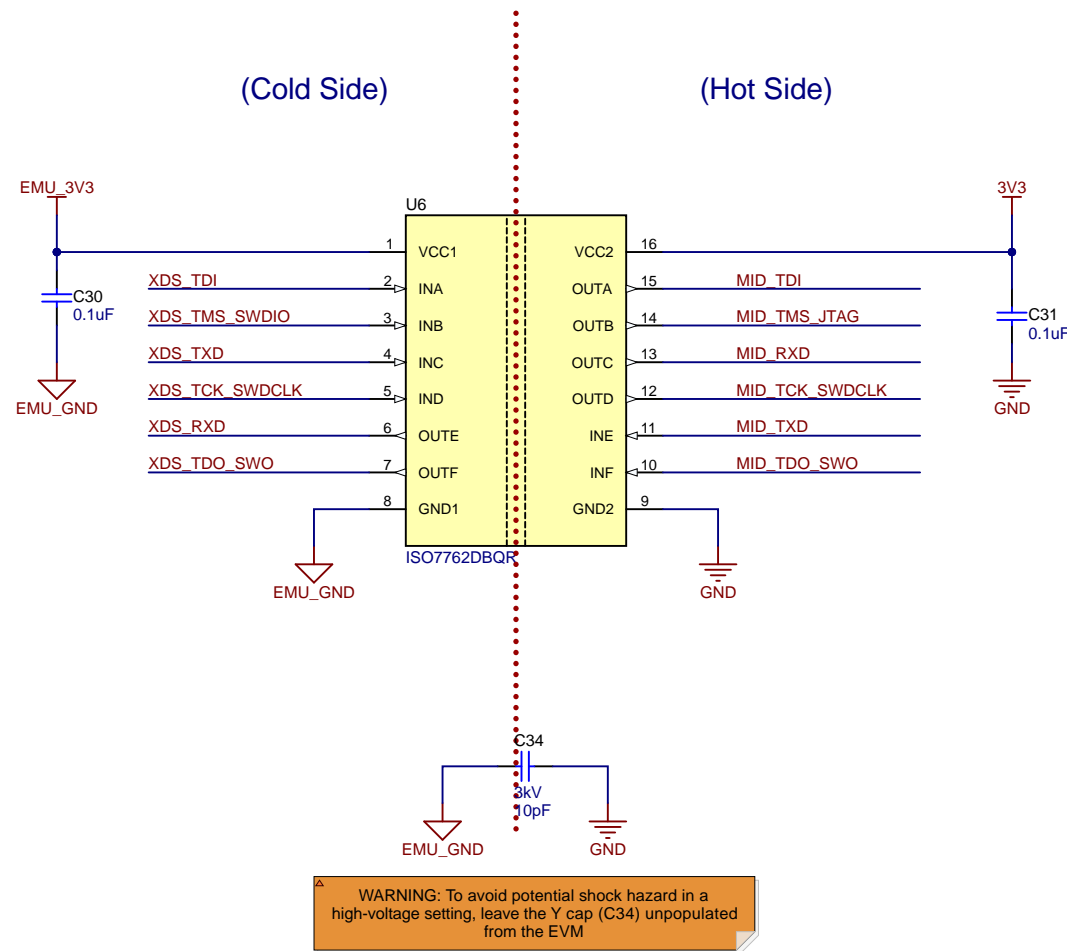
1. USB host (DFP) - Use pull-up resistors on CC1/CC2 ; Provides Vbus to the attached peripheral
2. USB peripheral (UFP) -Use pull-down resistors on CC1/CC2 ; monitors Vbus to establish a data connection and/or power on board circuits



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NOTE: In this design JTAG signals are isolated.
cJTAG is not supported on this control card.



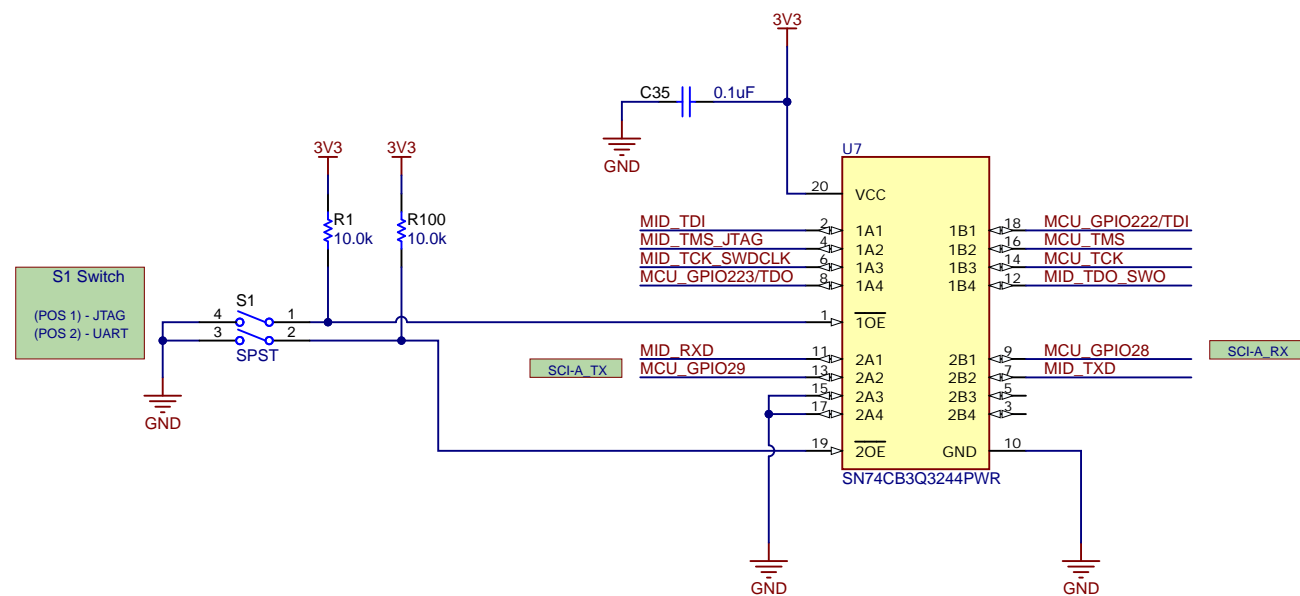
S1 - JTAG Emulation & UART Switch

POS 1 ON: Use XDS110 emulator that is on the cCARD

POS 1 OFF: Boot from FLASH/peripheral (see boot mode switch) OR use emulator on baseboard

POS 2 ON: GPIOs 28 & 29 will be connected to the USB-to-UART adapter on the XDS110 emulator

POS 2 OFF: GPIOs 28 & 29 are disconnected from the USB-to-UART adapter on the XDS110 emulator and connected to the HSEC connector pins



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Orderable: TMDSCNCD28P65X	Designed for: Public Release	Mod. Date: 11/3/2023
TID #: N/A	Project Title: F28P65X Control Card	
Number: MCU114	Rev: B	Sheet Title:
SVN Rev: Not in version control	Assembly Variant: [No Variations]	Sheet: 10 of 11
Drawn By: Uttam Reddy Pailla	File: MCU114B_Emulator_Interface.SchDoc	Size: B
Engineer: Uttam Reddy Pailla	Contact: http://www.ti.com/support	

