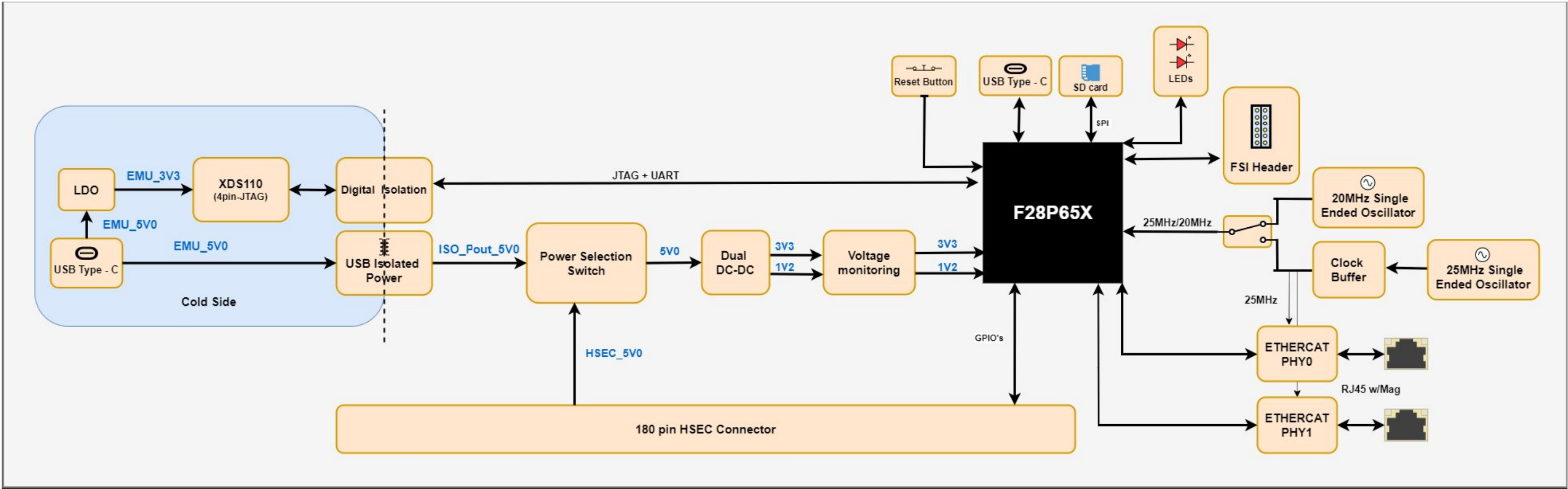


- 1) USB Differential Pairs - 90 Ohm
(A) XDS_D_P and XDS_D_N
(B) USB_D_P (GPIO42) and USB_D_N (GPIO43)
- 2) ADC Differential pair Impedance Matching - 50 Ohm
(A) HSEC_ADC even pins should match with HSEC_ADC + 1 pin(ie ADC-C2 should match with ADC-C3)
(B) MCU_ADC even pins should match with MCU_ADC + 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

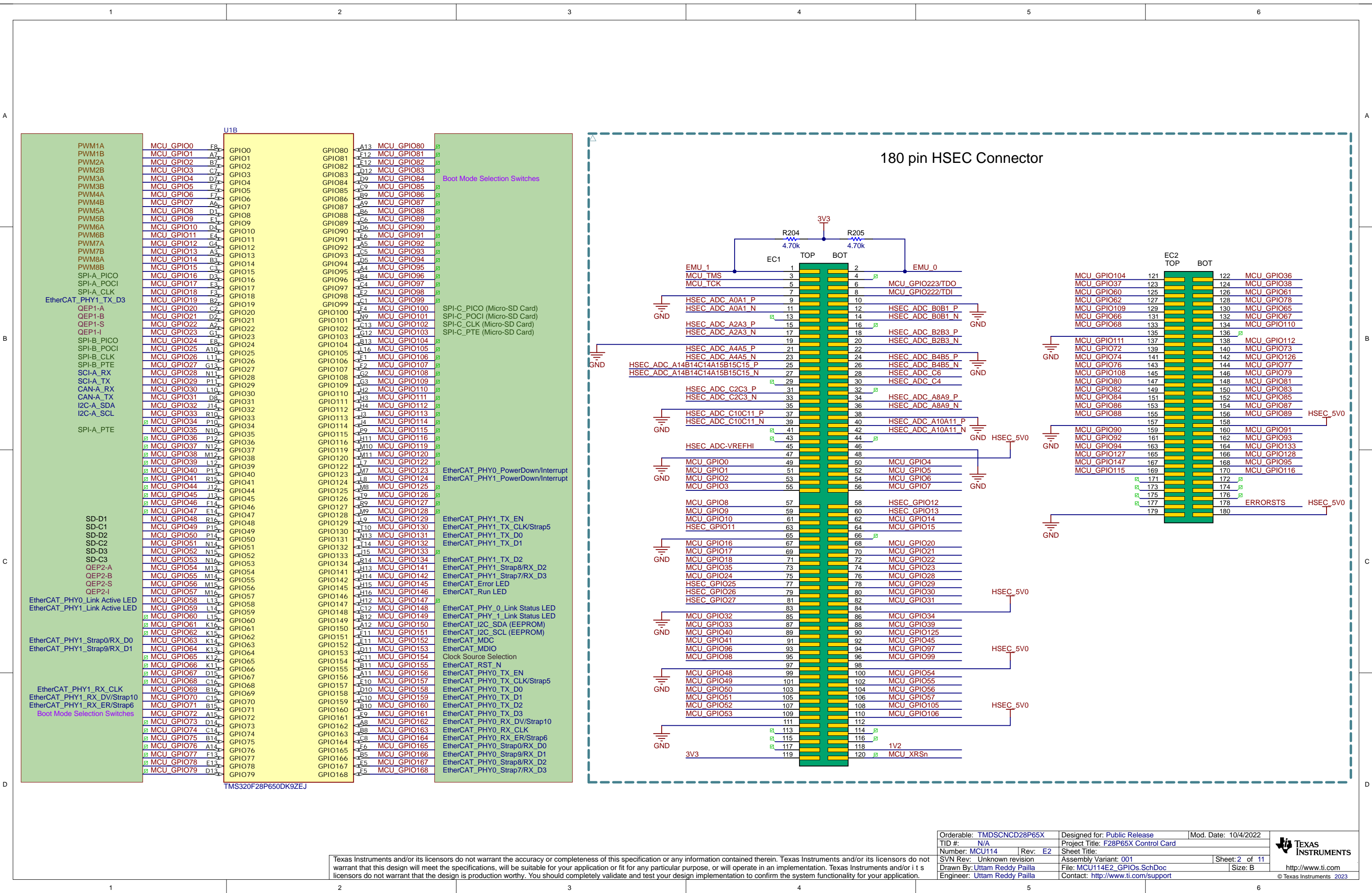
Rev	ECN #	Approved Date	Approved by	Notes
E1	N/A	9/12/2022	UR	Original engineering release
E2	N/A	04/08/2023	UR	1. Cosmetic changes to PCB silk screen 2. GPIO42 and GPIO43 traces for USB data peripheral (J4) were swapped near U1C

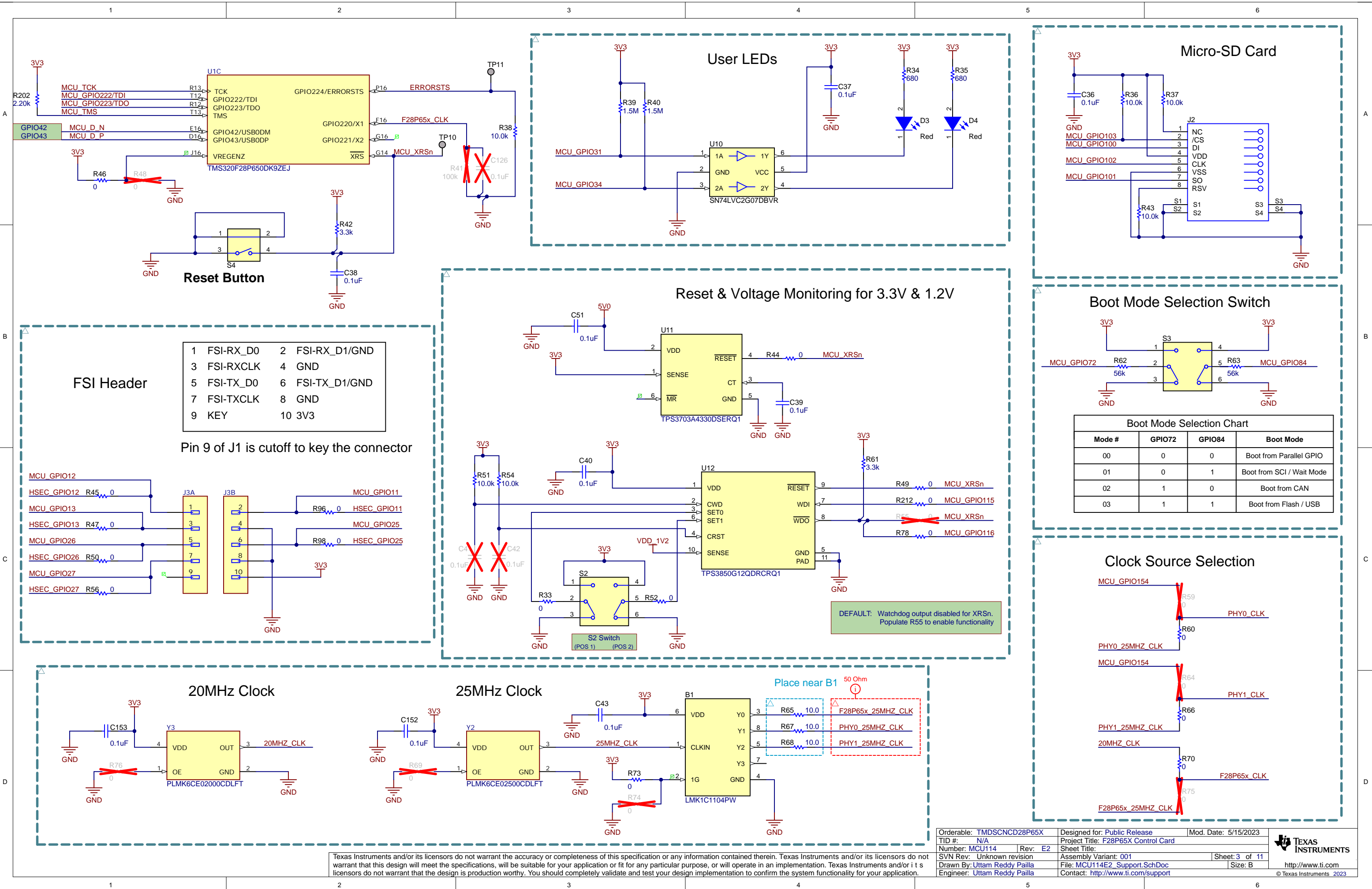


Power to the MCU is either supported by the USB-C on the left or the HSEC 180 pin.

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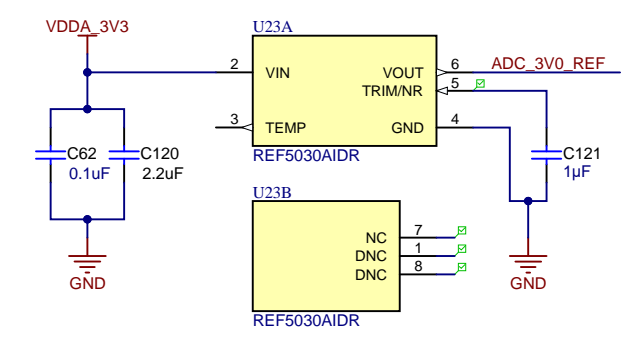
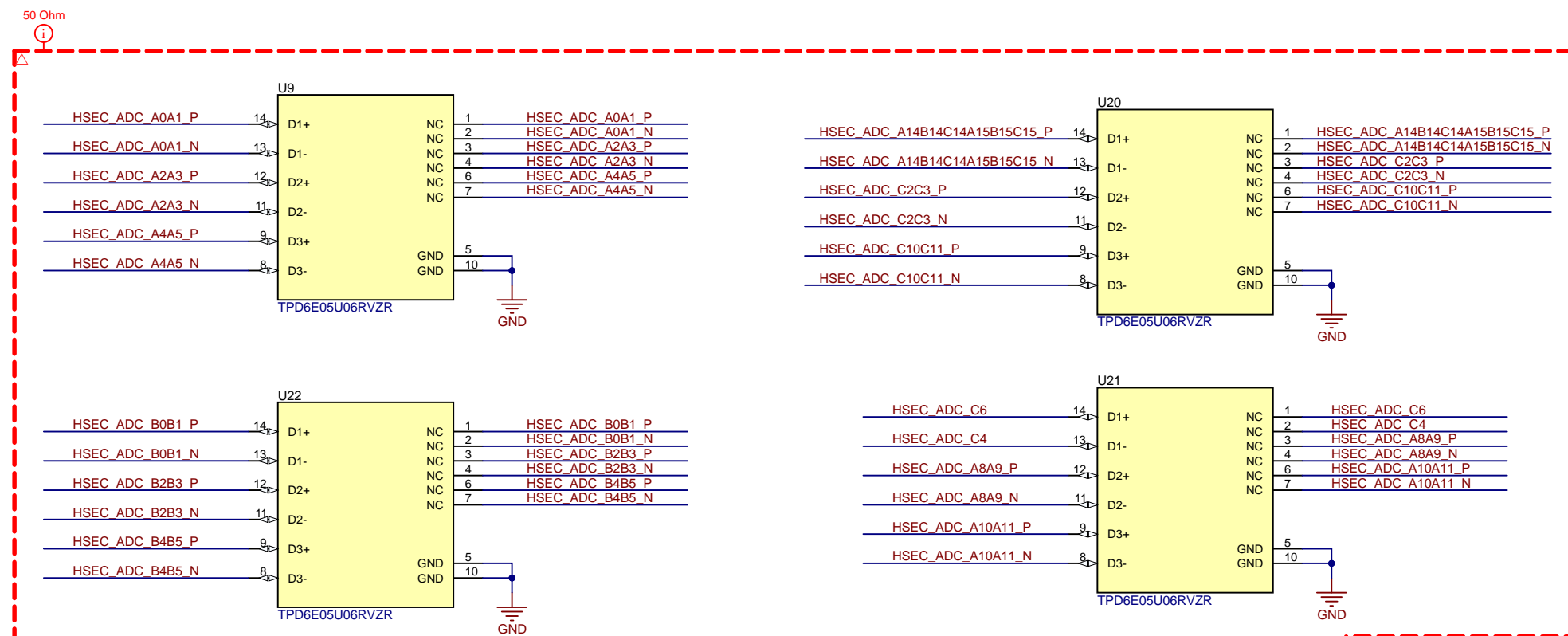
Orderable: TMDSCNCD28P65X	Designed for: Public Release	Mod. Date: 6/7/2023
TID #: N/A	Project Title: F28P65X Control Card	
Number: MCU114	Rev: E2	Sheet Title:
SVN Rev: Unknown revision	Assembly Variant: 001	Sheet: 1 of 11
Drawn By: Uttam Reddy Paila	File: MCU114E2_CoverSheet.SchDoc	Size: B
Engineer: Uttam Reddy Paila	Contact: http://www.ti.com/support	





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Orderable: TMDSCNCD28P65X	Designed for: Public Release	Mod. Date: 5/15/2023
TID #: N/A	Project Title: F28P65X Control Card	
Number: MCU114	Rev: E2	
SVN Rev: Unknown revision	Assembly Variant: 001	Sheet: 3 of 11
Drawn By: Uttam Reddy Paila	File: MCU114E2_Support.SchDoc	Size: B
Engineer: Uttam Reddy Paila	Contact: http://www.ti.com/support	



Ext. V_REF Selection	
S6 (POS 2)	ADC_REF
1	HSEC_ADC-VREFHI
0	ADC_3V0_REF (DEFAULT)

S6 (POS 1)	S5 (POS 1)	S5 (POS 2)	C2000 ADC V_REF	DESCRIPTION
1	1	1	Int. V_REF	NC - No reference input
0	0	0	Ext. V_REF	ADC_REF




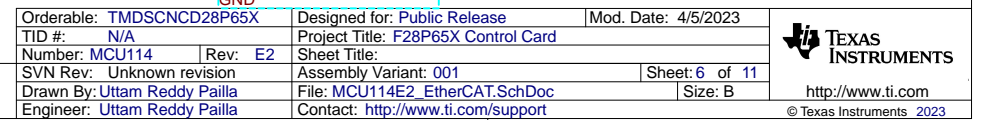
ADC_A0A1_P and ADC_A0A1_N make a differential pair using channels A0 and A1 respectively.

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").

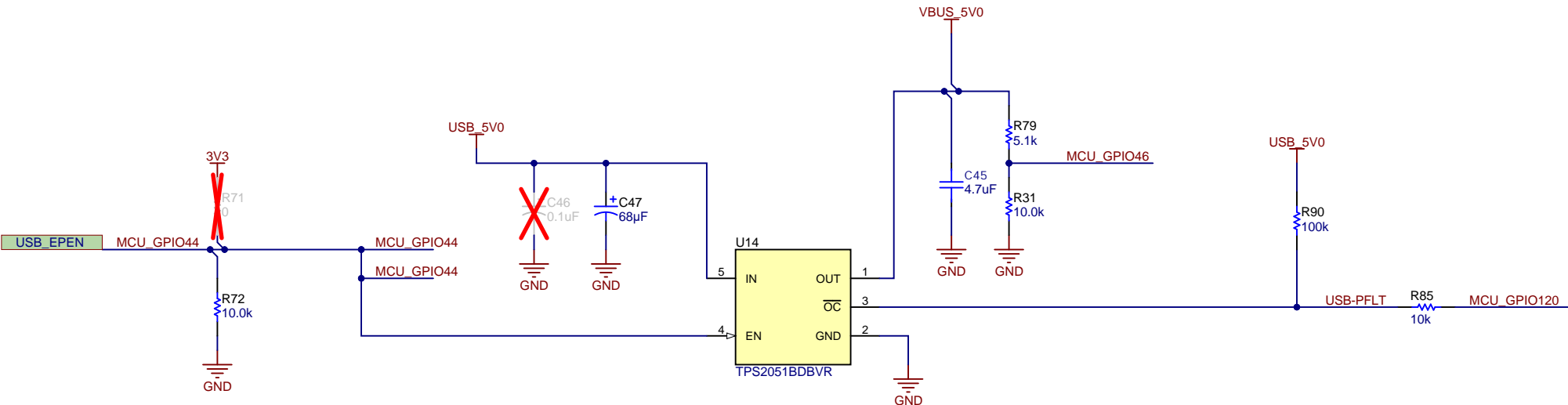
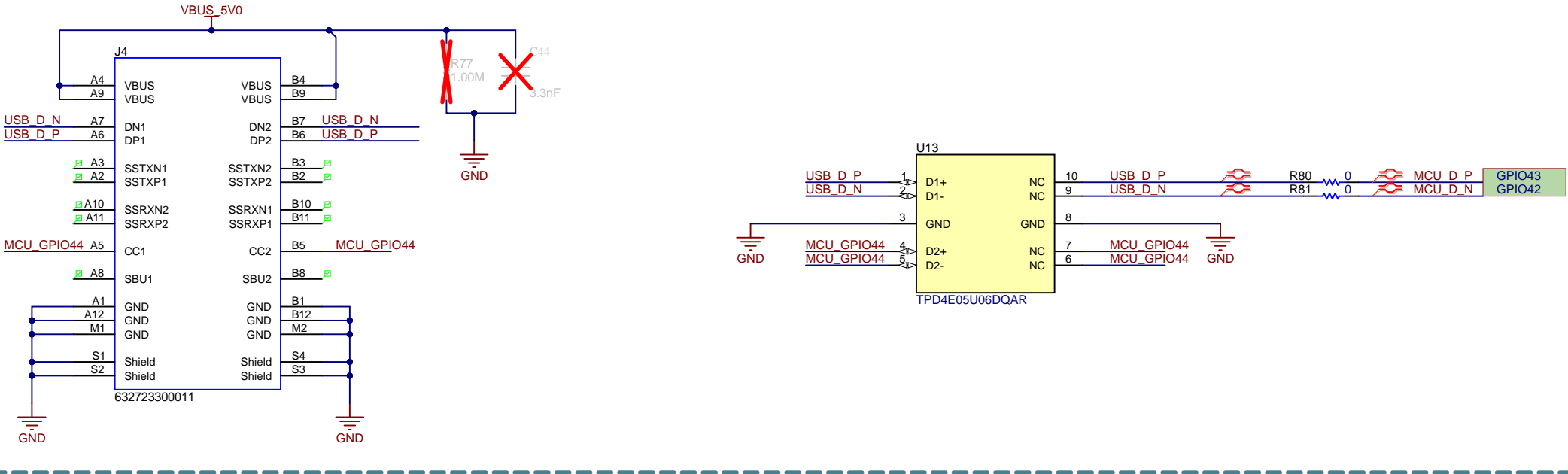
NOTE: C6 and C4 are not differential pairs

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Orderable: TMDSCNCD28P65X	Designed for: Public Release	Mod. Date: 5/12/2023	 http://www.ti.com © Texas Instruments 2023
TID #: N/A	Project Title: F28P65X Control Card		
Number: MCU114	Rev: E2	Sheet Title:	
SVN Rev: Unknown revision	Assembly Variant: 001	Sheet: 4 of 11	
Drawn By: Uttam Reddy Pailla	File: MCU114E2_ADC_SchDoc	Size: B	
Engineer: Uttam Reddy Pailla	Contact: http://www.ti.com/support		



USB- Type C Connector - Data Peripheral to MCU



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

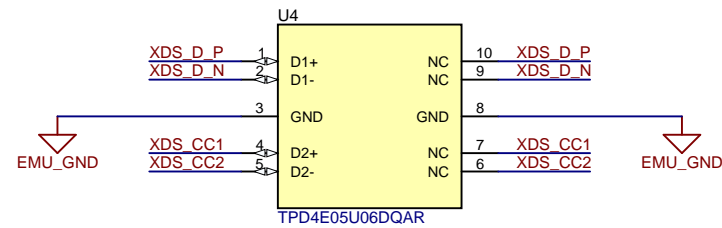
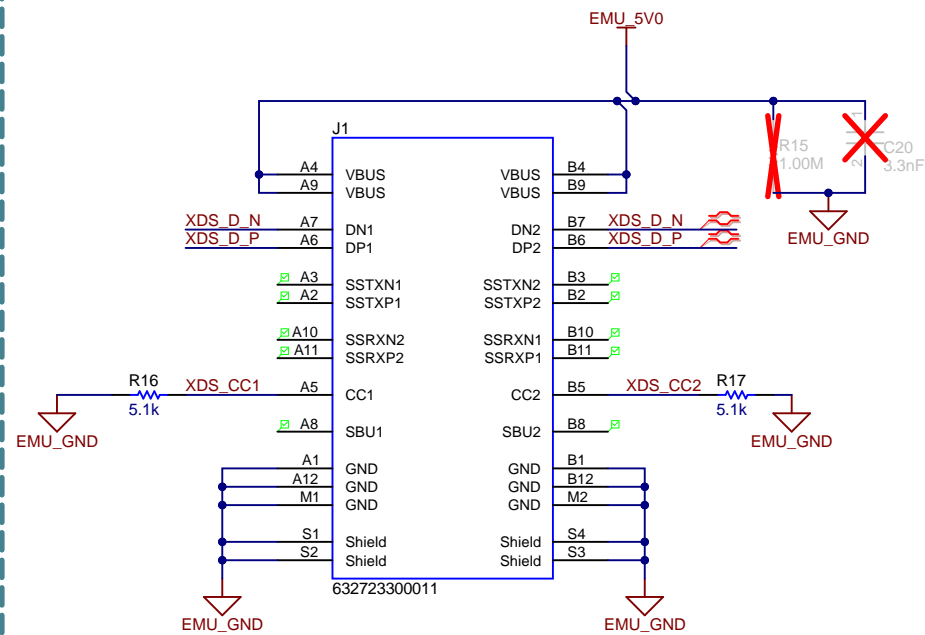
NOTE: USB VBUS_5V0, PFLT & EPEN do not have a specific mux position in this device.

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

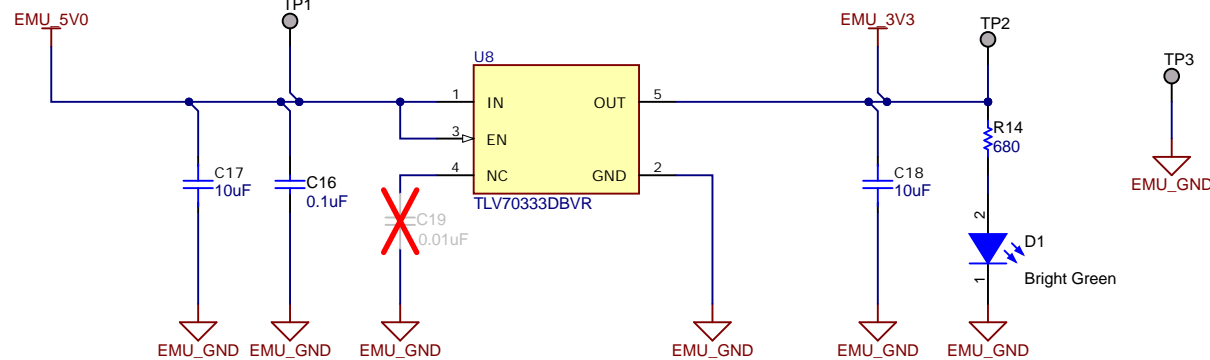
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Orderable: TMDSCNCD28P65X	Designed for: Public Release	Mod. Date: 5/15/2023
TID #: N/A	Project Title: F28P65X Control Card	
Number: MCU114	Rev: E2	Sheet Title:
SVN Rev: Unknown revision	Assembly Variant: 001	Sheet: 7 of 11
Drawn By: Uttam Reddy Paila	File: MCU114E2_USB.SchDoc	Size: B
Engineer: Uttam Reddy Paila	Contact: http://www.ti.com/support	

USB- Type C Connector - XDS110

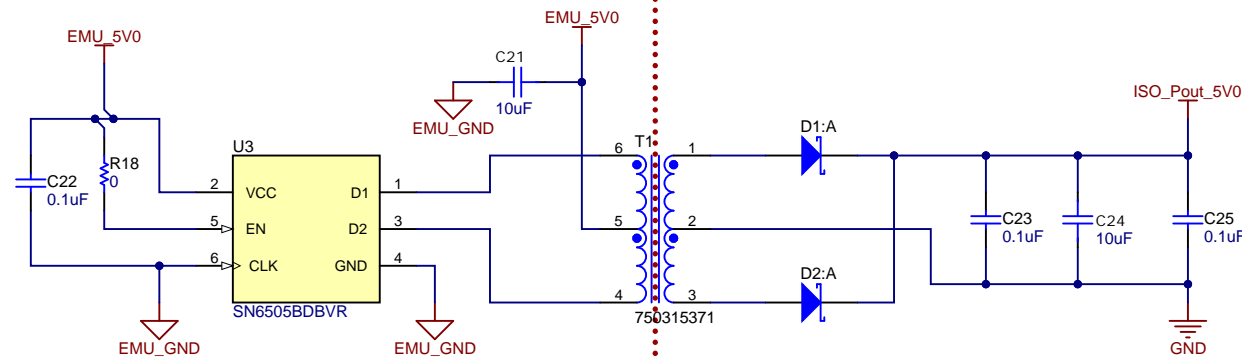


LDO_5V0_3V3



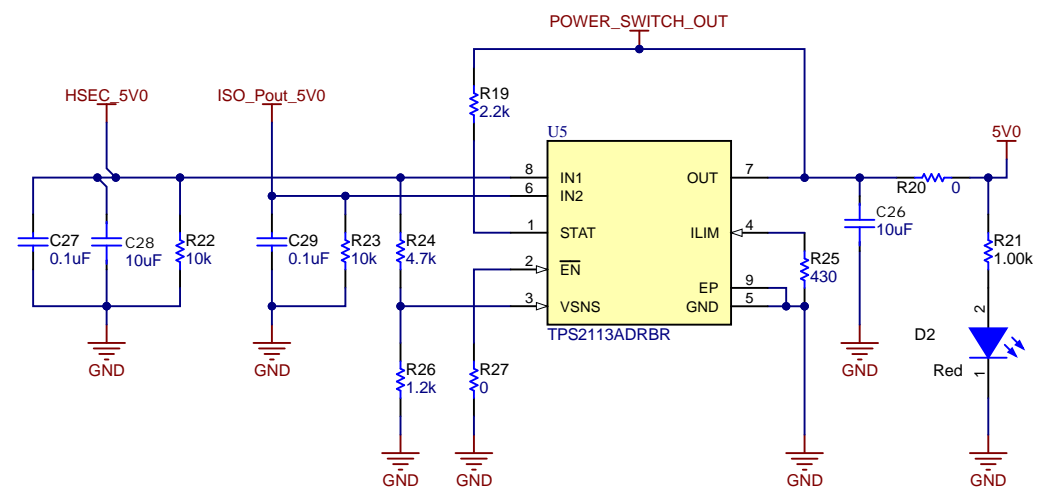
(Cold Side)

USB Isolated Power



(Hot Side)

Power Selection Switch



Switch Truth Table

HSEC_5V0 > 4V	ISO_Pout_5V0 > HSEC_5V0	POWER_SWITCH_OUT
Yes	X	HSEC_5V0
No	No	HSEC_5V0
No	Yes	ISO_Pout_5V0

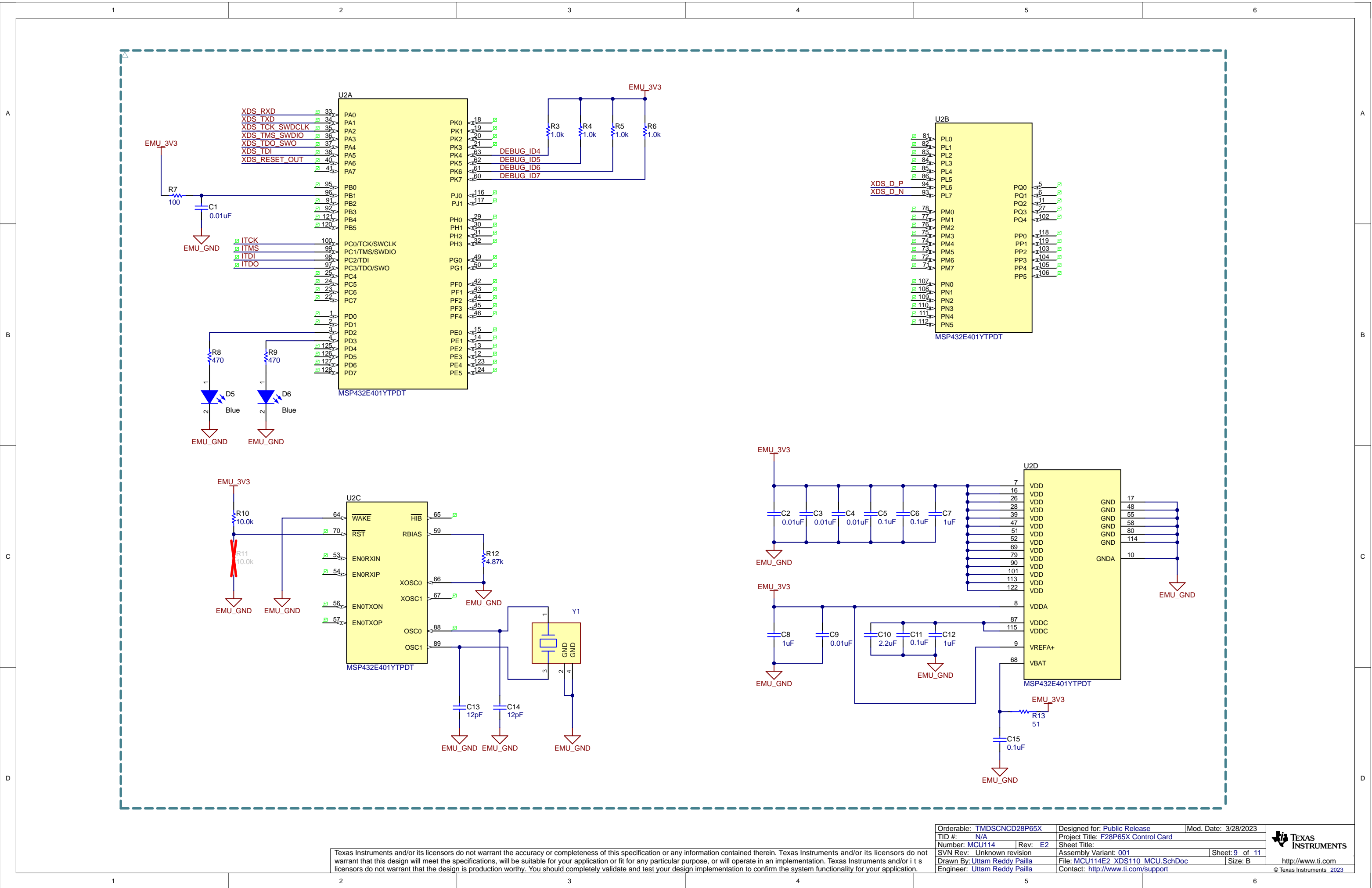
NOTE: for TYPE C, the USB2.0 OTG device is referred as a Dual Role Port (DRP)

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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Orderable: TMDSCNCD28P65X	Designed for: Public Release	Mod. Date: 5/8/2023
TID #: N/A	Project Title: F28P65X Control Card	
Number: MCU114	Rev: E2	Sheet Title:
SVN Rev: Unknown revision	Assembly Variant: 001	Sheet: 8 of 11
Drawn By: Uttam Reddy Paila	File: MCU114E2_XDS110_USB_Power.SchDoc	Size: B
Engineer: Uttam Reddy Paila	Contact: http://www.ti.com/support	



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Orderable: TMDSCNCD28P65X	Designed for: Public Release	Mod. Date: 3/28/2023
TID #: N/A	Project Title: F28P65X Control Card	
Number: MCU114	Rev: E2	Sheet Title:
SVN Rev: Unknown revision	Assembly Variant: 001	Sheet: 9 of 11
Drawn By: Uttam Reddy Paila	File: MCU114E2_XDS110_MCU.SchDoc	Size: B
Engineer: Uttam Reddy Paila	Contact: http://www.ti.com/support	

FID1 FID2 FID3 FID4 FID5 FID6

PCB Number: MCU114
PCB Rev: E2



PCB
LOGO
Texas Instruments

PCB
LOGO
FCC disclaimer

PCB
LOGO
WEEE logo

PCB
LOGO
ETHERCAT LABEL

Variant/Label Table	
Variant	Label Text
001	TMDSCNCD28P65X - 20MHz CLK
002	TMDSCNCD28P65X - 25MHz CLK

ZZ1

Label Assembly Note

Label Assembly Note
This Assembly Note is for PCB labels only

ZZ2

Assembly Note

These assemblies are ESD sensitive, ESD precautions shall be observed.

ZZ3

Assembly Note

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

ZZ4

Assembly Note

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

Orderable: TMDSCNCD28P65X	Designed for: Public Release	Mod. Date: 5/15/2023	 TEXAS INSTRUMENTS
TID #: N/A	Project Title: F28P65X Control Card		
Number: MCU114	Rev: E2	Sheet Title:	
SVN Rev: Unknown revision	Assembly Variant: 001	Sheet: 11 of 11	
Drawn By: Uttam Reddy Paila	File: MCU114E2_EVM_Hardware.SchDoc	Size: B	
Engineer: Uttam Reddy Paila	Contact: http://www.ti.com/support	http://www.ti.com © Texas Instruments 2023	



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