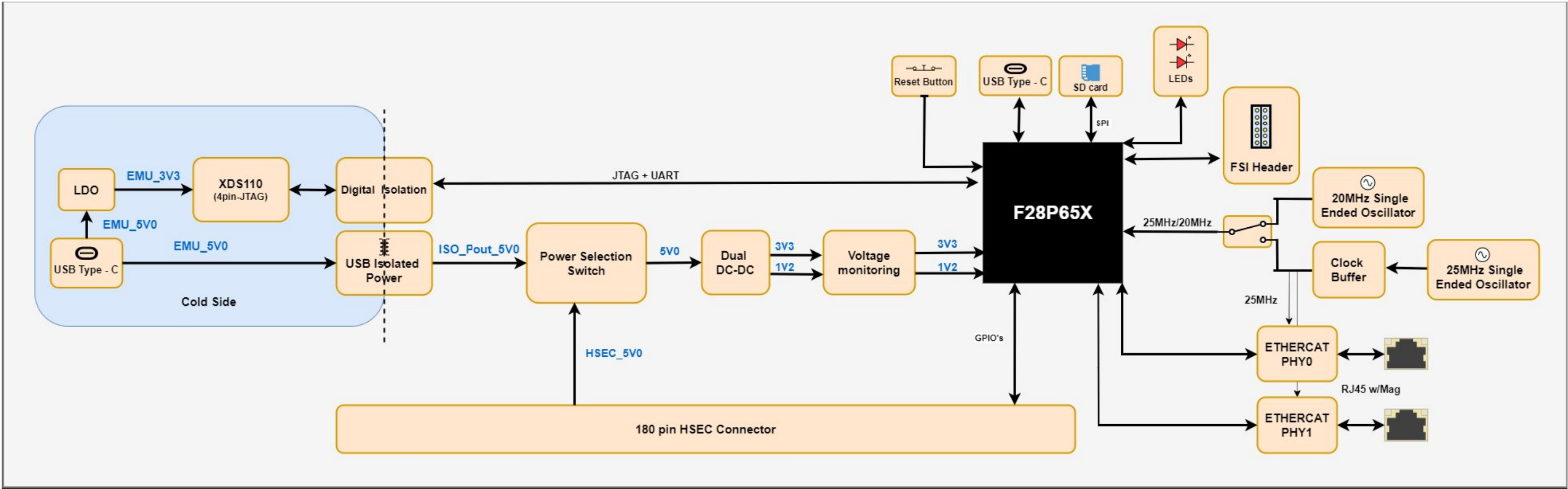


- 1) USB Differential Pairs - 90 Ohm
(A) XDS_D_P and XDS_D_N
(B) USB_D_P (GPIO42) and USB_D_N (GPIO43)
- 2) ADC Differential pair Impedance Matching - 50 Ohm
(A) HSEC_ADC even pins should match with HSEC_ADC + 1 pin(ie ADC-C2 should match with ADC-C3)
(B) MCU_ADC even pins should match with MCU_ADC +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

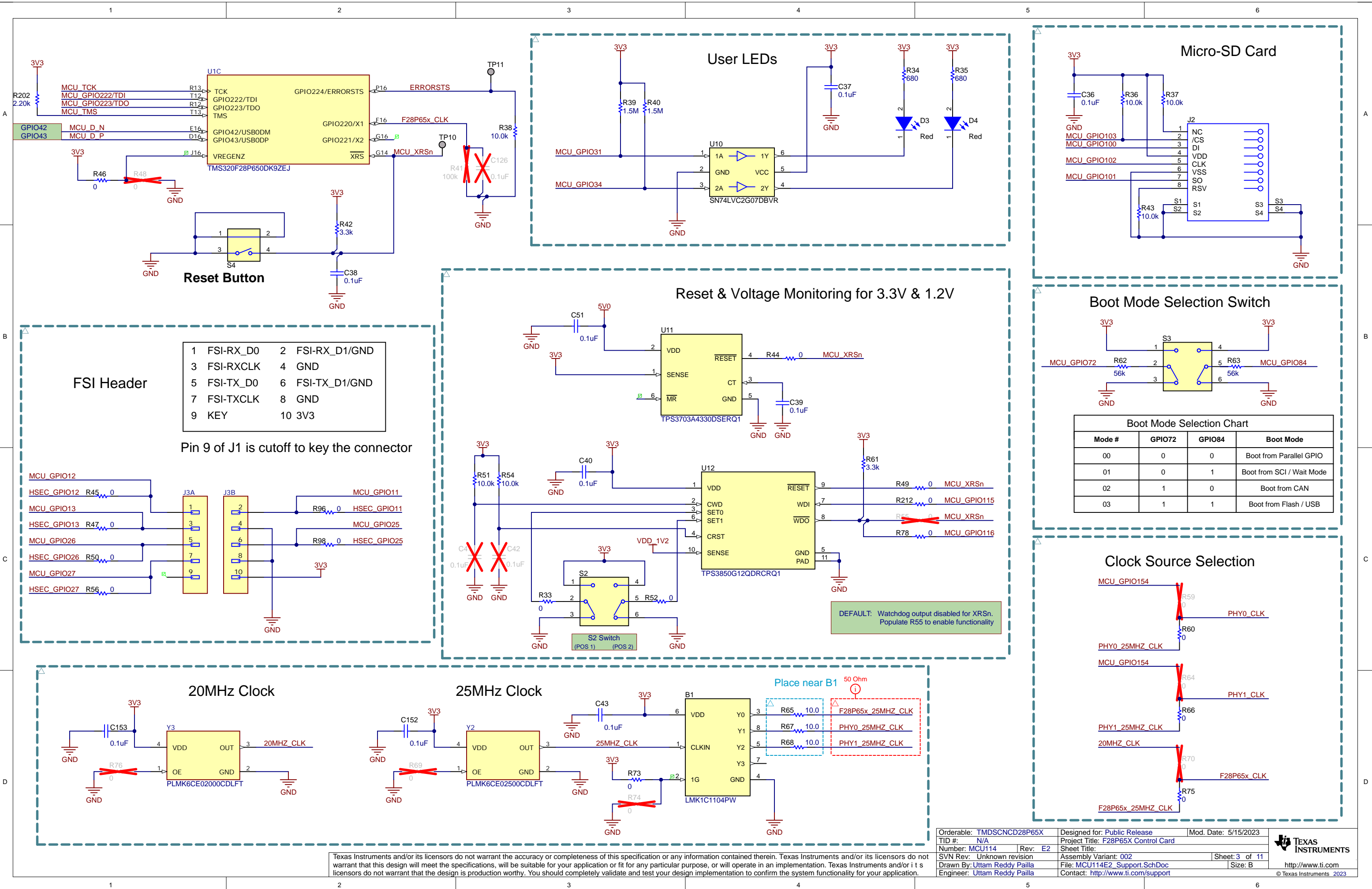
Rev	ECN #	Approved Date	Approved by	Notes
E1	N/A	9/12/2022	UR	Original engineering release
E2	N/A	04/08/2023	UR	1. Cosmetic changes to PCB silk screen 2. GPIO42 and GPIO43 traces for USB data peripheral (J4) were swapped near U1C



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

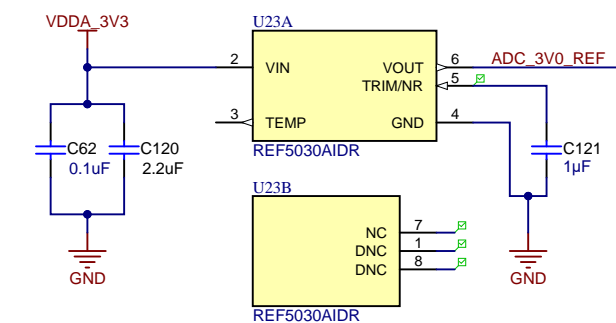
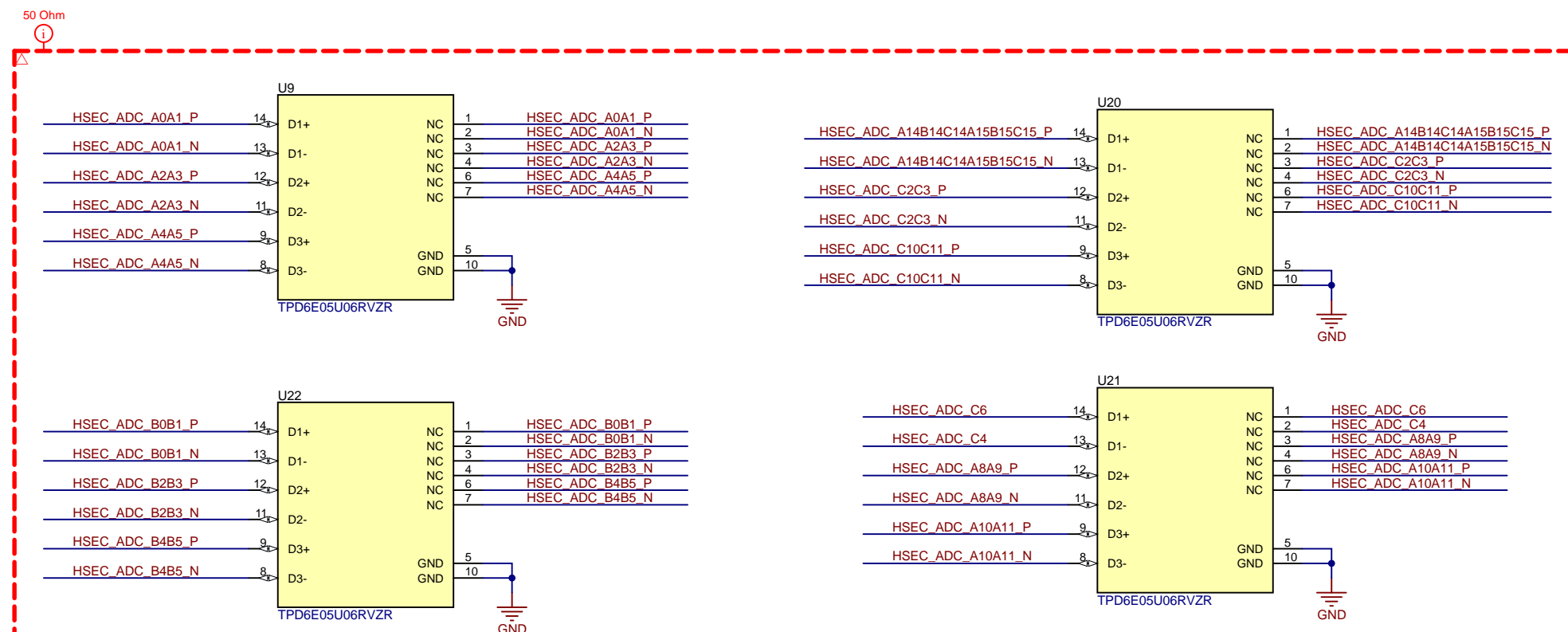
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Orderable: TMDSCNCD28P65X	Designed for: Public Release	Mod. Date: 6/7/2023
TID #: N/A	Project Title: F28P65X Control Card	
Number: MCU114	Rev: E2	Sheet Title:
SVN Rev: Unknown revision	Assembly Variant: 002	Sheet: 1 of 11
Drawn By: Uttam Reddy Paila	File: MCU114E2_CoverSheet.SchDoc	Size: B
Engineer: Uttam Reddy Paila	Contact: http://www.ti.com/support	



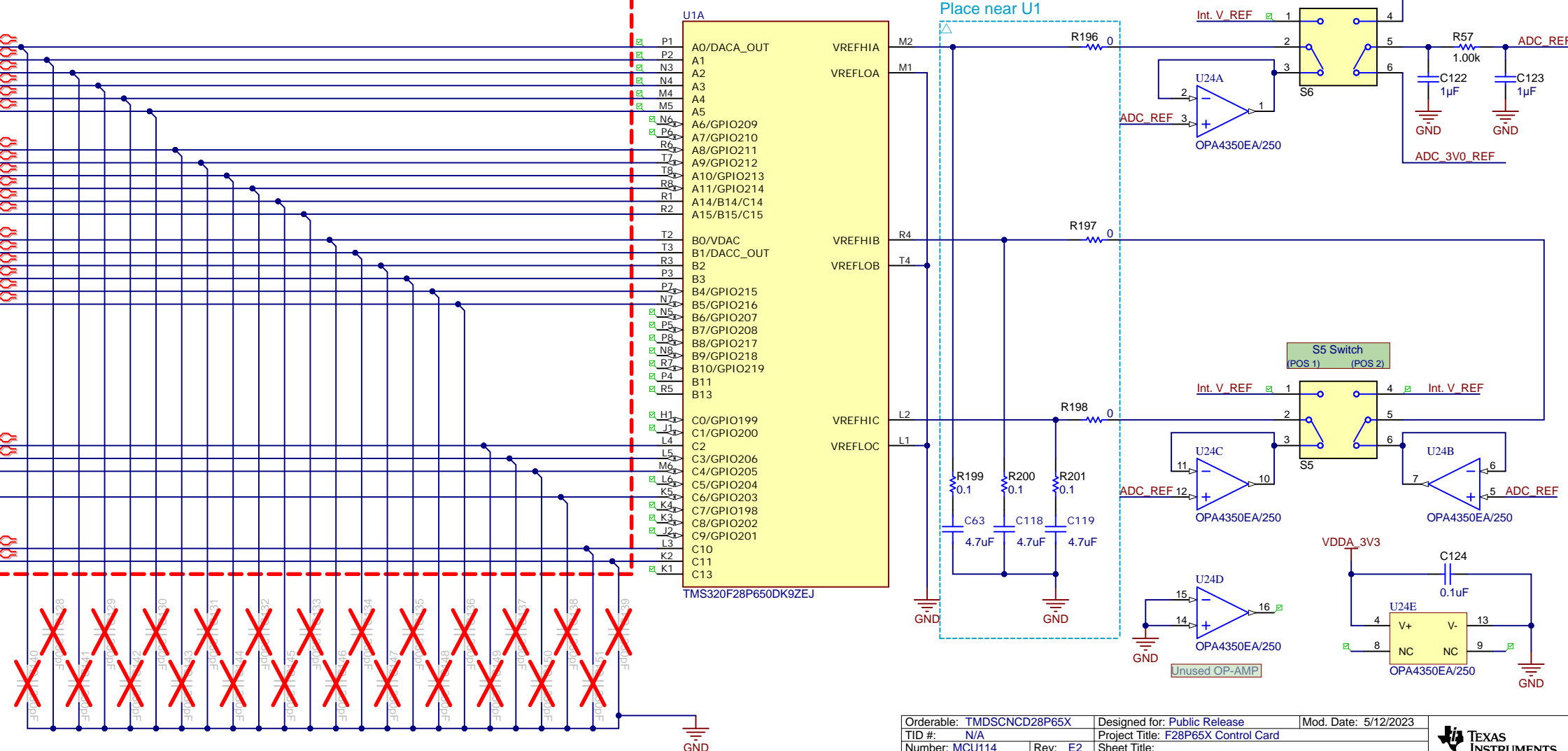
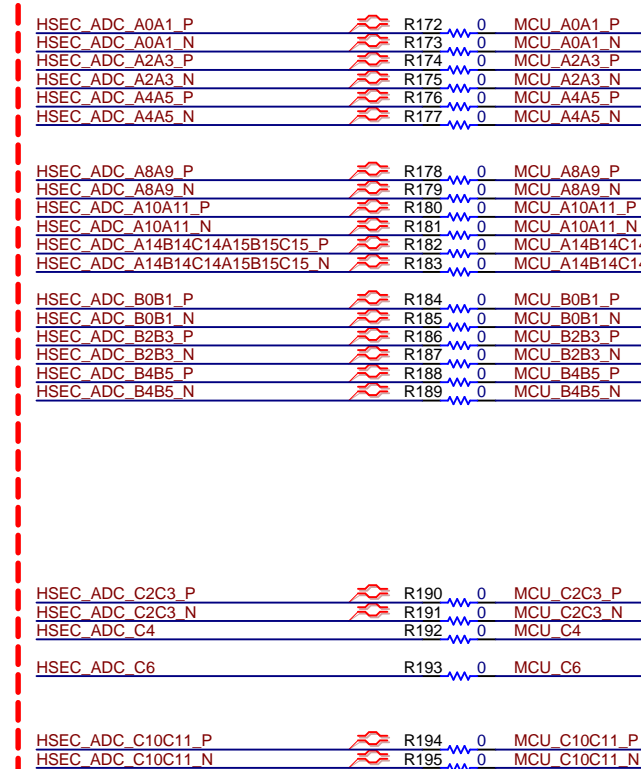
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Orderable: TMDSCNCD28P65X	Designed for: Public Release	Mod. Date: 5/15/2023
TID #: N/A	Project Title: F28P65X Control Card	
Number: MCU114	Rev: E2	
SVN Rev: Unknown revision	Assembly Variant: 002	Sheet: 3 of 11
Drawn By: Uttam Reddy Paila	File: MCU114E2_Support.SchDoc	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




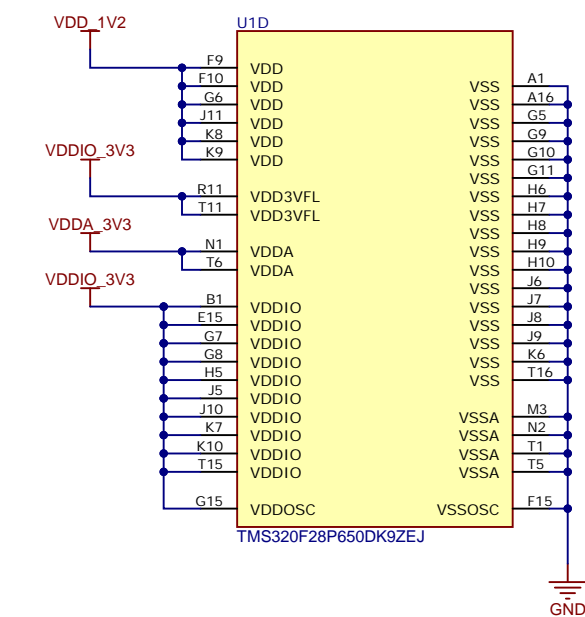
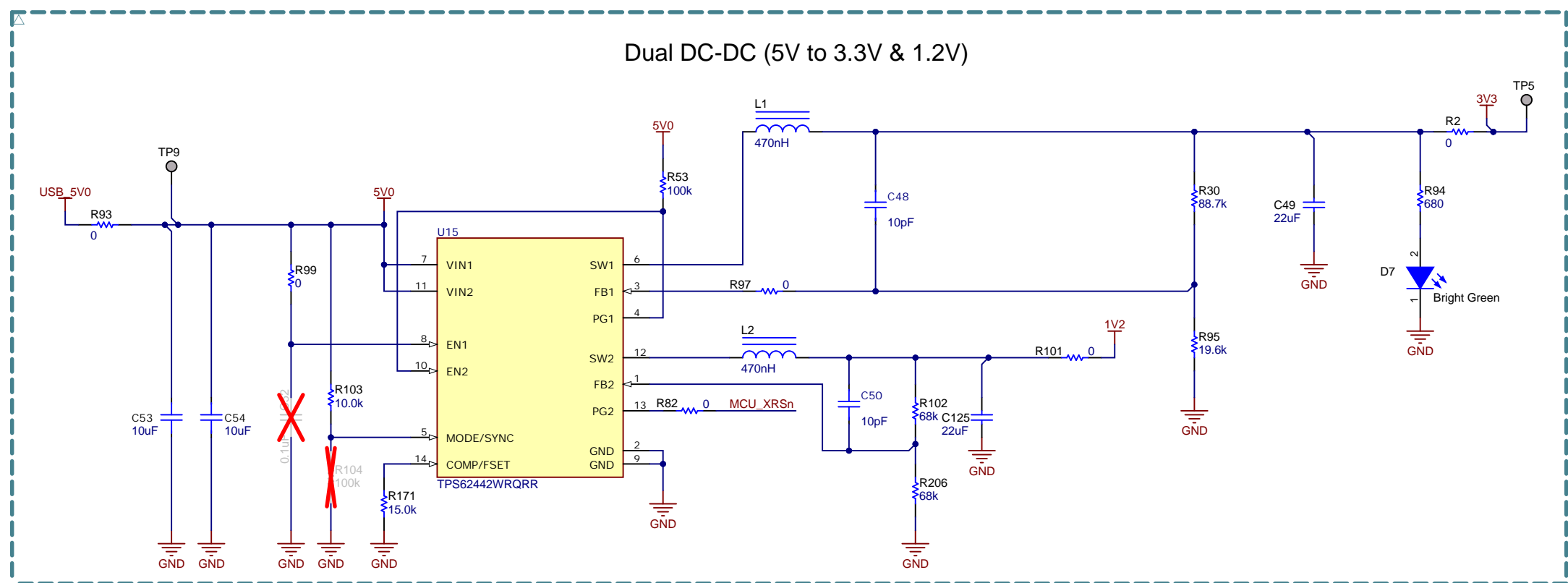
ADC_A0A1_P and ADC_A0A1_N make a differential pair using channels A0 and A1 respectively.

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

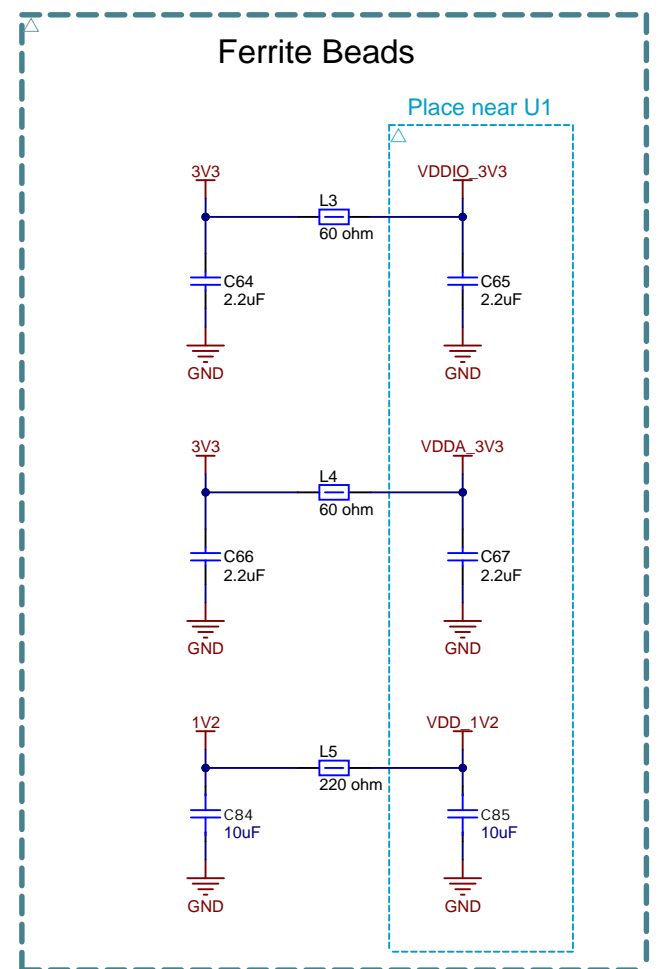
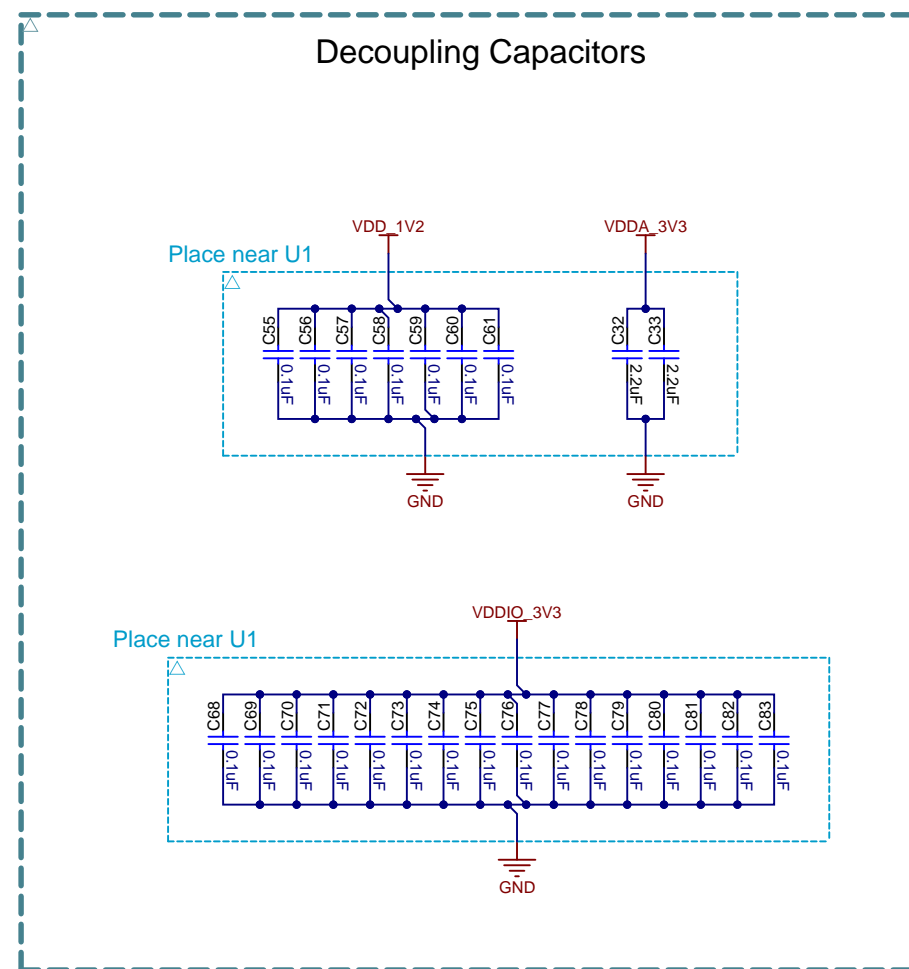
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Orderable: TMDSCNCD28P65X	Designed for: Public Release	Mod. Date: 5/12/2023	 TEXAS INSTRUMENTS http://www.ti.com © Texas Instruments, 2023
TID #: N/A	Project Title: F28P65X Control Card		
Number: MCU114 Rev: E2	Sheet Title:		
SVN Rev: Unknown revision	Assembly Variant: 002	Sheet: 4 of 11	
Drawn By: Uttam Reddy Paila	File: MCU114E2_ADC_SchDoc	Size: B	
Engineer: Uttam Reddy Paila	Contact: http://www.ti.com/support		



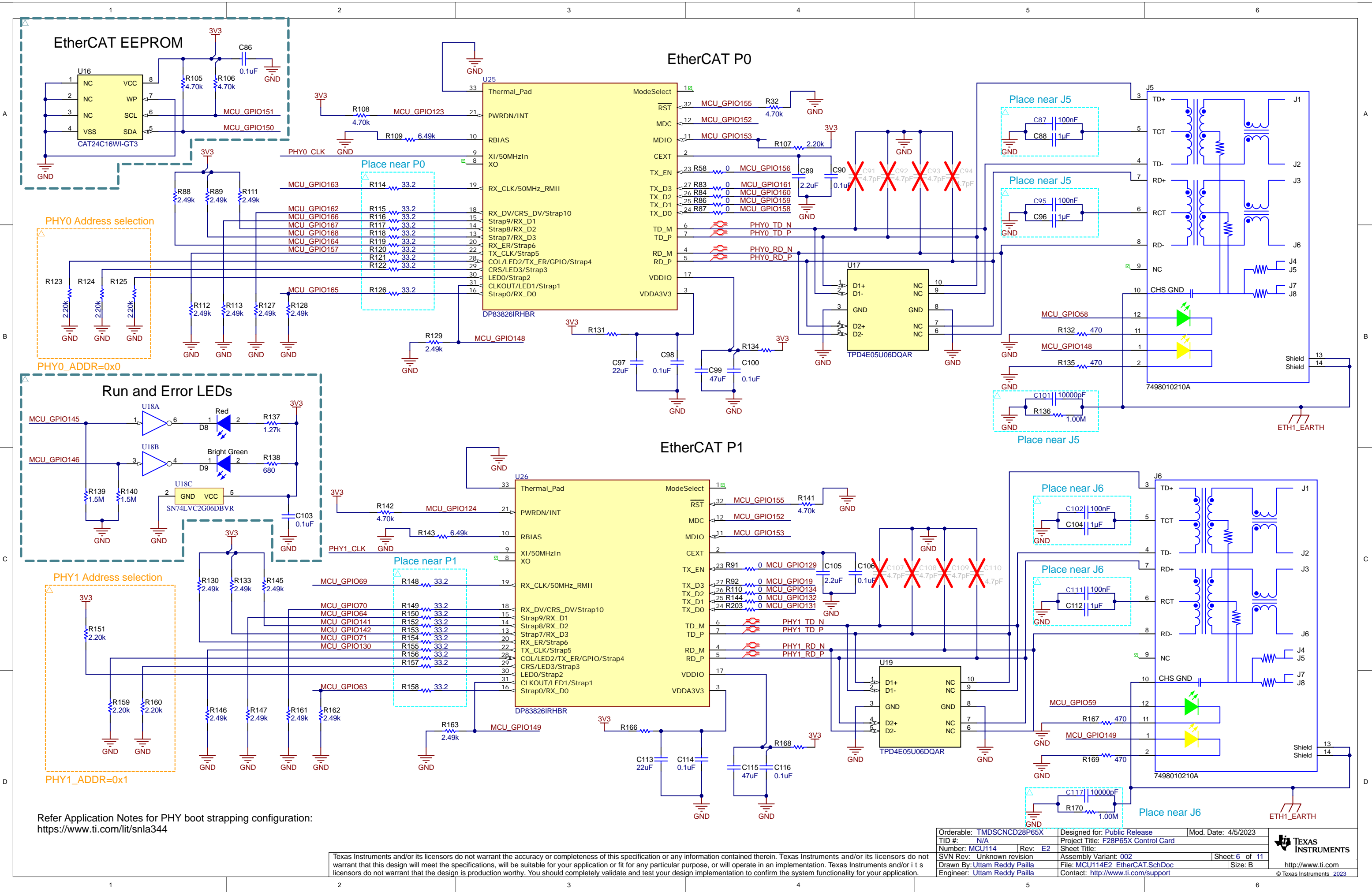
NOTES:

- 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: 4/14/2023
TID #: N/A	Project Title: F28P65X Control Card	
Number: MCU114	Rev: E2	Sheet Title:
SVN Rev: Unknown revision	Assembly Variant: 002	Sheet 5 of 11
Drawn By: Uttam Reddy Paila	File: MCU114E2_Power.SchDoc	Size: B
Engineer: Uttam Reddy Paila	Contact: http://www.ti.com/support	



Refer Application Notes for PHY boot strapping configuration:
<https://www.ti.com/lit/snla344>

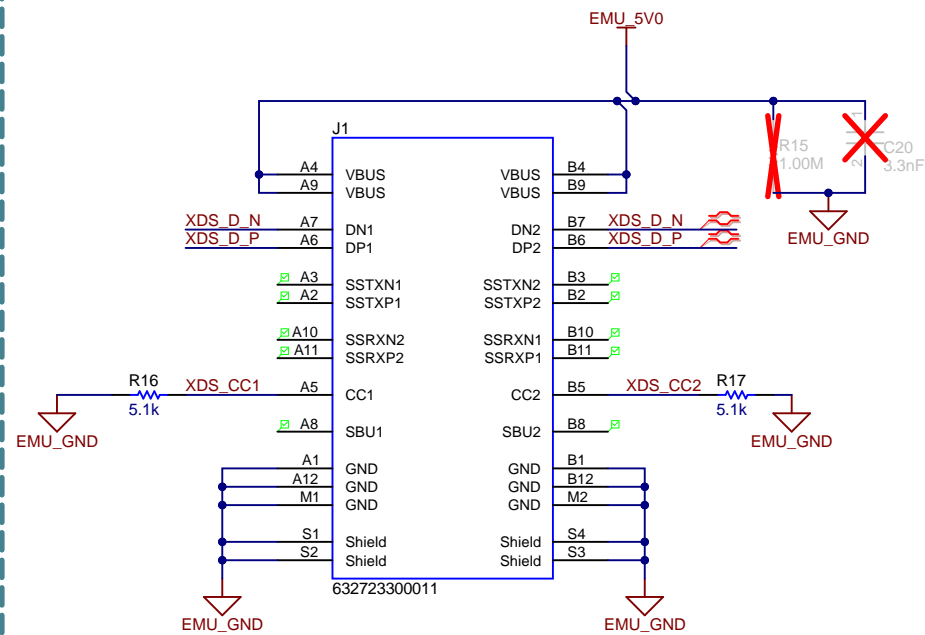
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Orderable: TMDSCNCD28P65X	Designed for: Public Release	Mod. Date: 4/5/2023
TID #: N/A	Project Title: F28P65X Control Card	
Number: MCU114	Rev: E2	Sheet Title:
SVN Rev: Unknown revision	Assembly Variant: 002	Sheet: 6 of 11
Drawn By: Uttam Reddy Paila	File: MCU114E2_EtherCAT_SchDoc	Size: B
Engineer: Uttam Reddy Paila	Contact: http://www.ti.com/support	

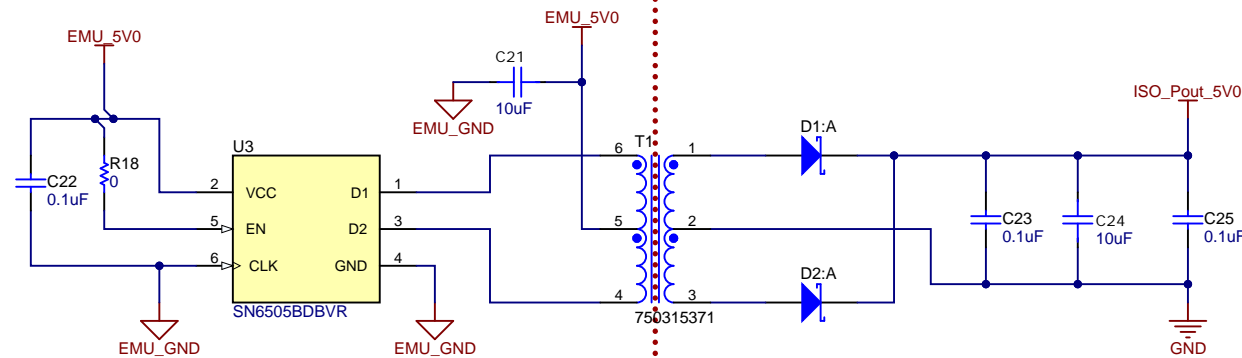


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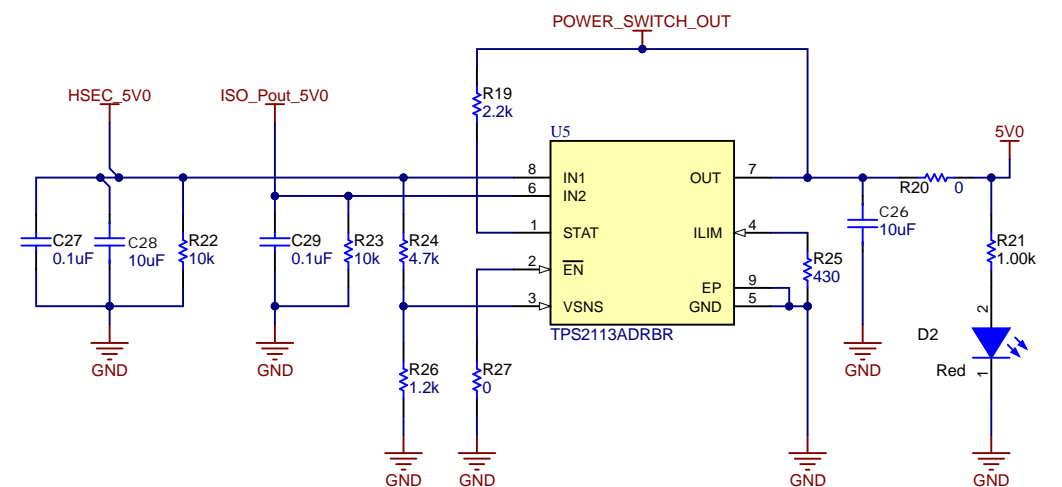
USB- Type C Connector - XDS110



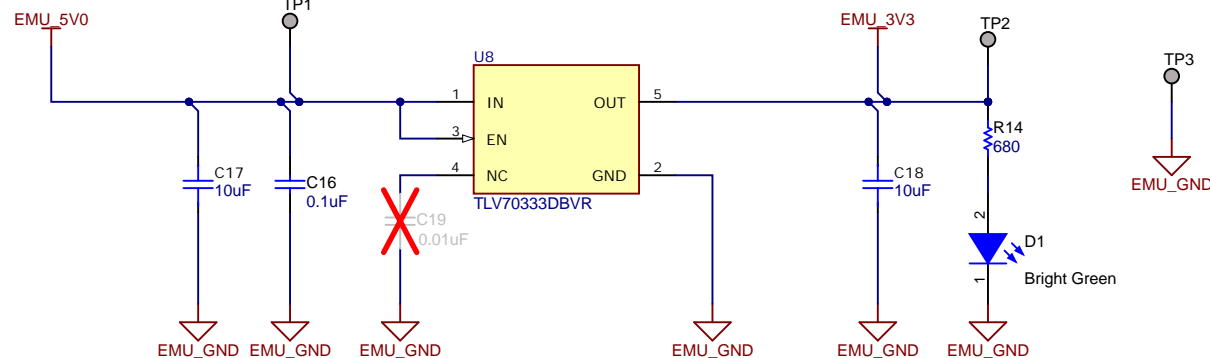
USB Isolated Power



Power Selection Switch



LDO_5V0_3V3



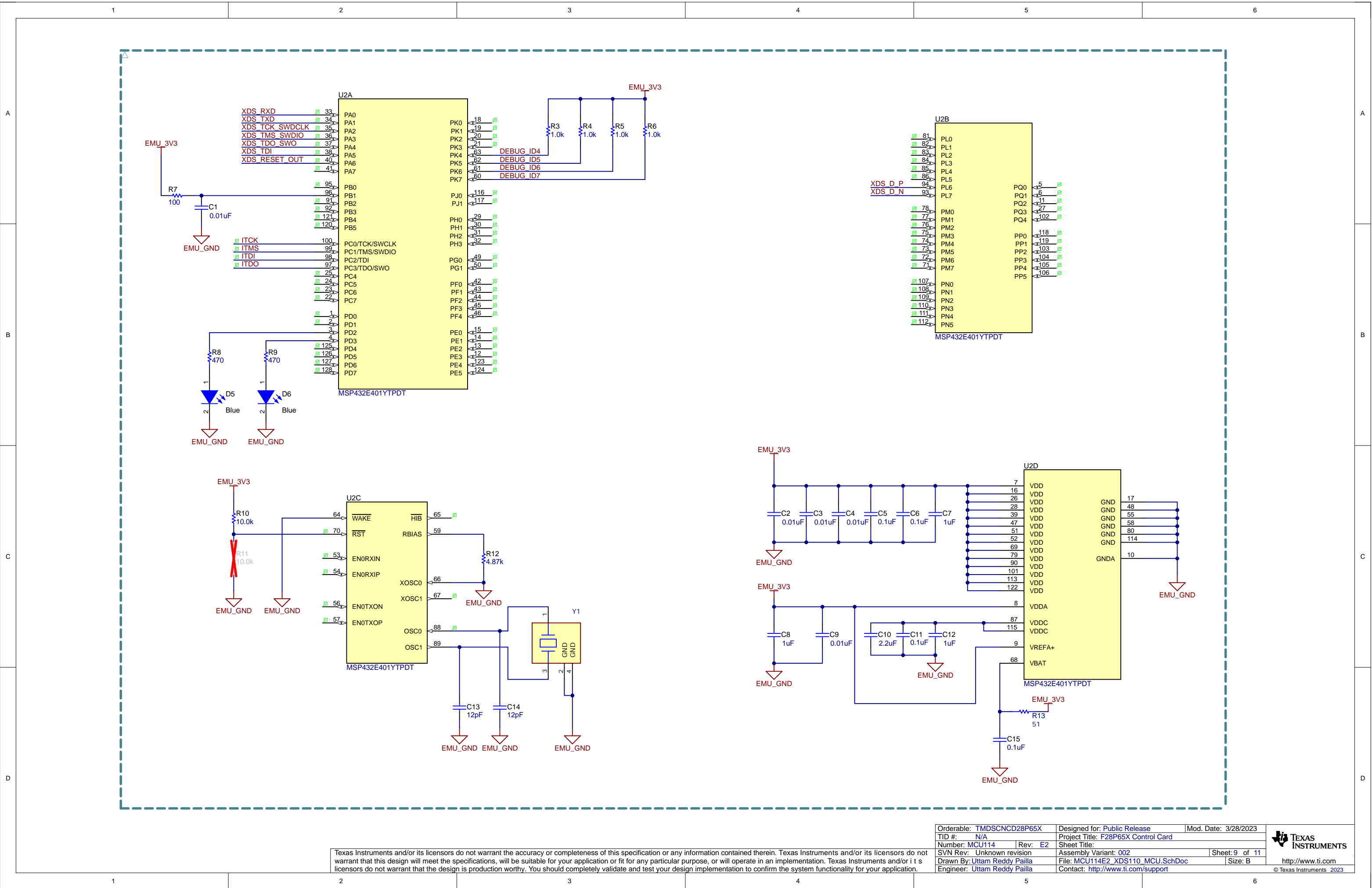
NOTE: for TYPE C, the USB2.0 OTG device is referred as a Dual Role Port (DRP)

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: 002	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: 002	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: 002	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

