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M3, Tight Fit



M3, Tight Fit



M3, Tight Fit



M3, Tight Fit



M3, Tight Fit



M3, Tight Fit



M3, Tight Fit

**Title: Mechanical & Title Page**

Approved: NO



Rev: 05

Project: Sonata

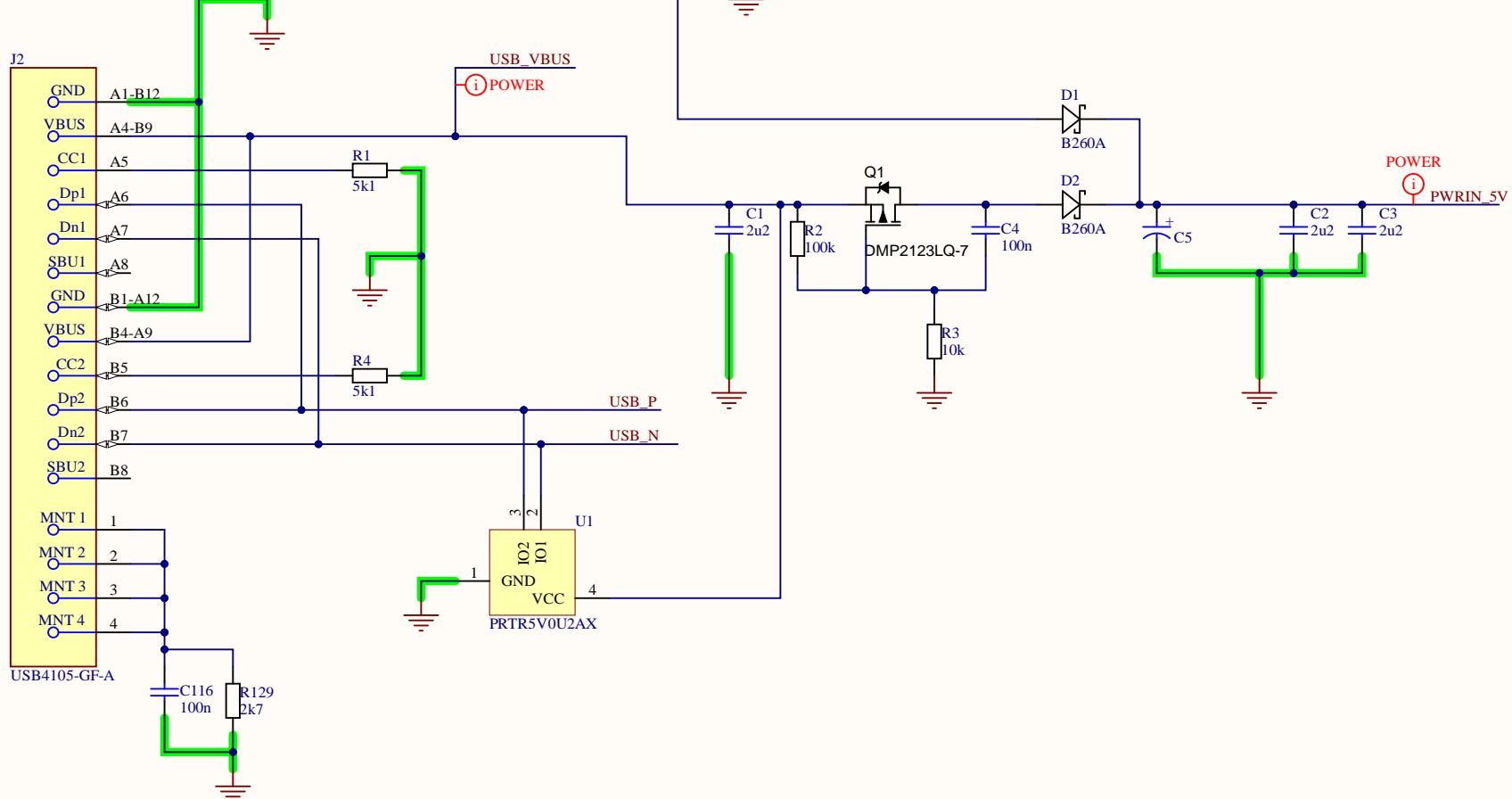
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Time: 3:14:02 PM | Sheet 1 of 20

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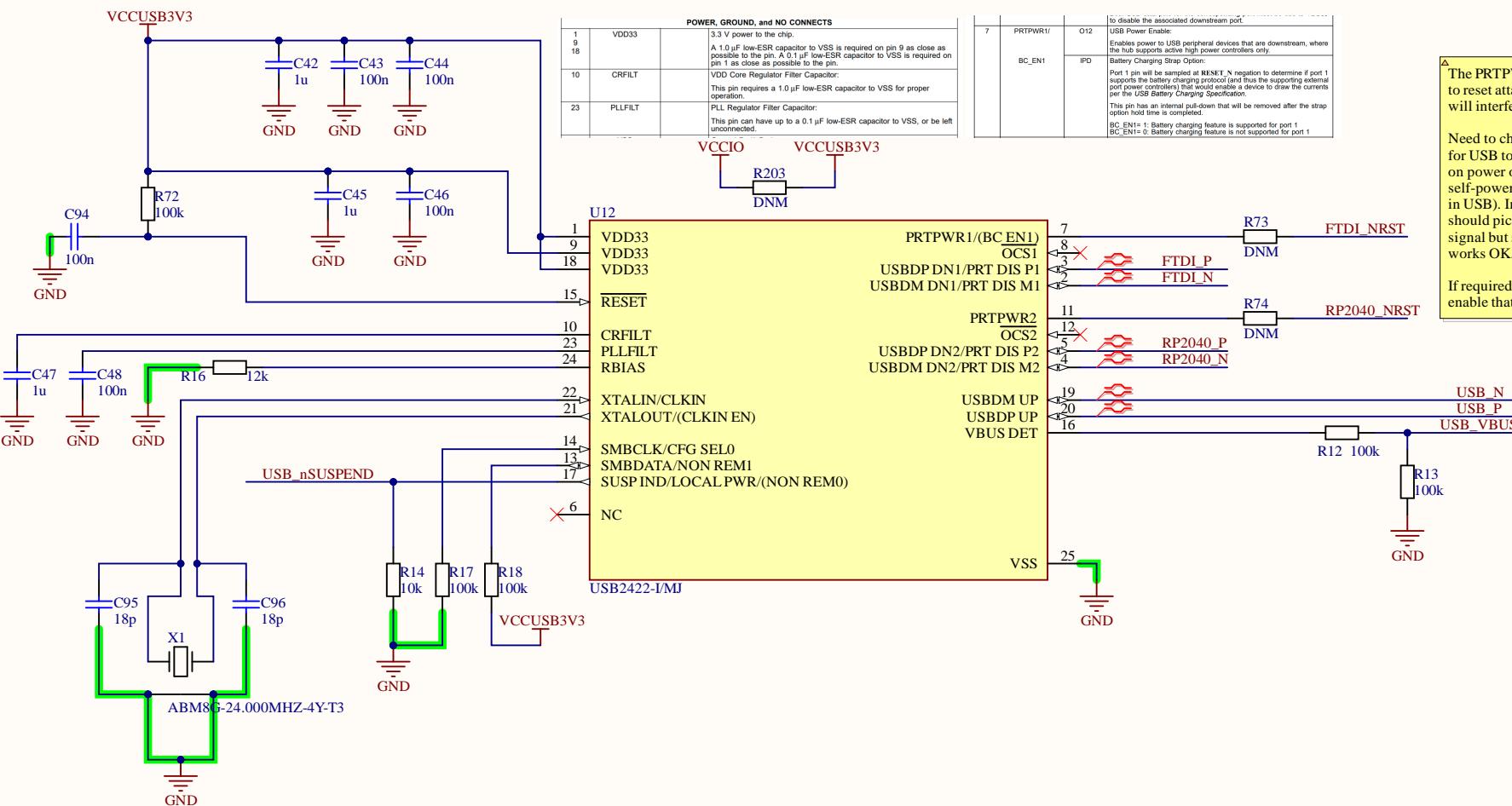


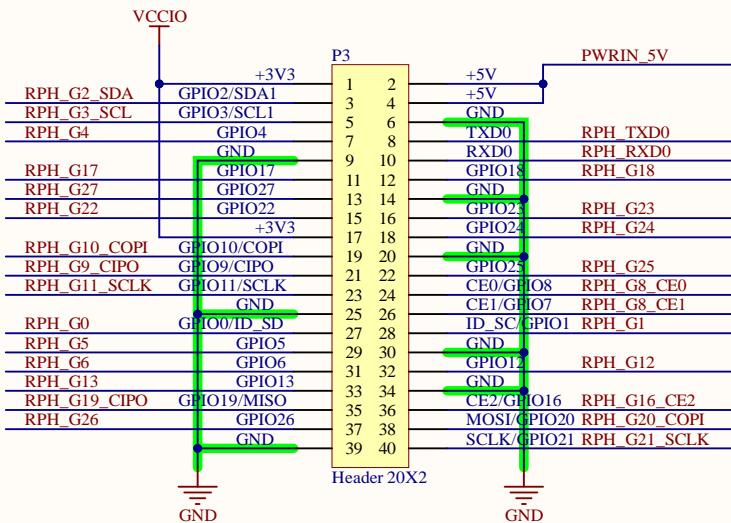
TABLE 4-1: HUB CONFIGURATION OPTIONS

CFG_SEL	Description
0	Default configuration: <ul style="list-style-type: none"><li>Strap options enabled</li><li>Hub descriptors indicate the hub as "self-powered"</li></ul>
1	The hub is configured externally over SMBus (as an SMBus slave device with address 0101100b): <ul style="list-style-type: none"><li>Strap options disabled</li><li>Self-powered or bus-powered depending on register settings</li><li>All registers configured over SMBus</li></ul>

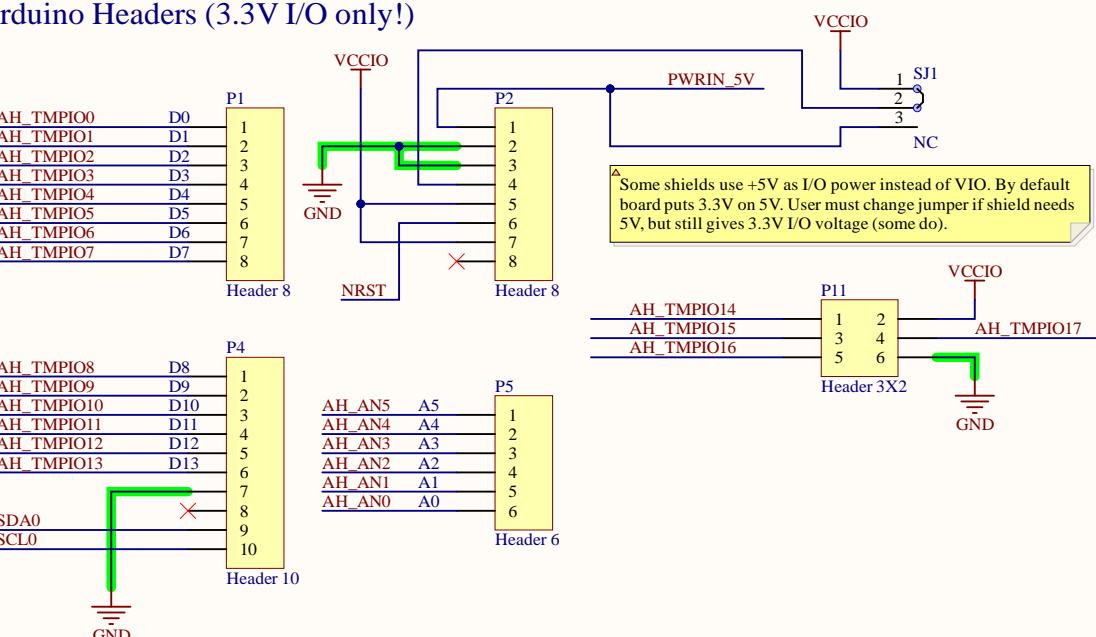
Strap config, non-removable ports.

NON\_Rem[1:0] = 00: all ports are removable  
 NON\_Rem[1:0] = 01: port 1 is non-removable  
 NON\_Rem[1:0] = 10: ports 1 and 2 are non-removable  
 NON\_Rem[1:0] = 11: reserved

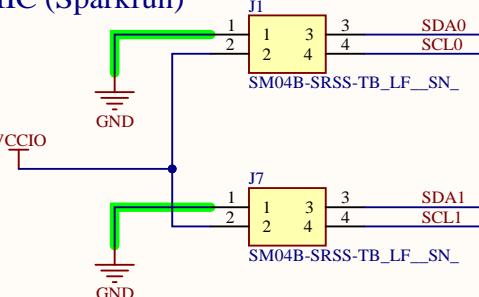
## R-Pi Headers



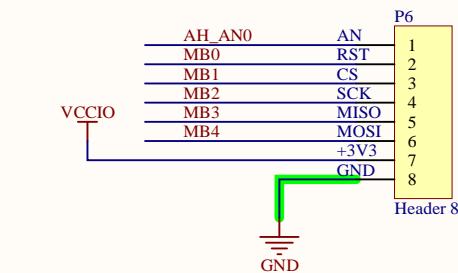
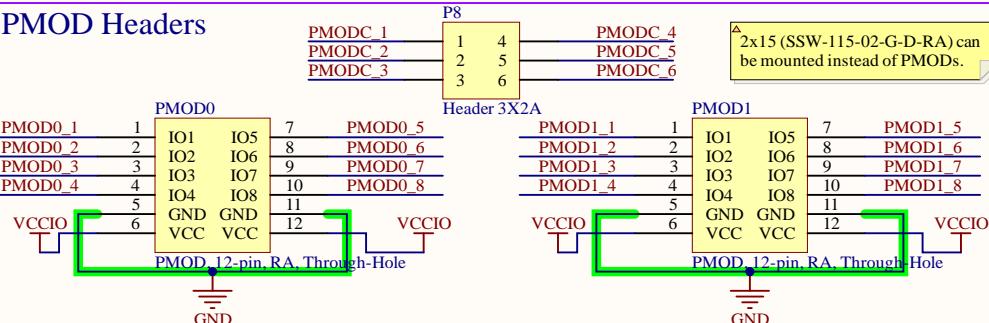
## Arduino Headers (3.3V I/O only!)



## QWIIC (Sparkfun)

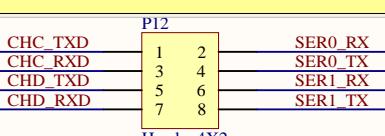


## PMOD Headers



mikroBUS Click

Jumpers serial to FTDI, or use to breakout extra serial.



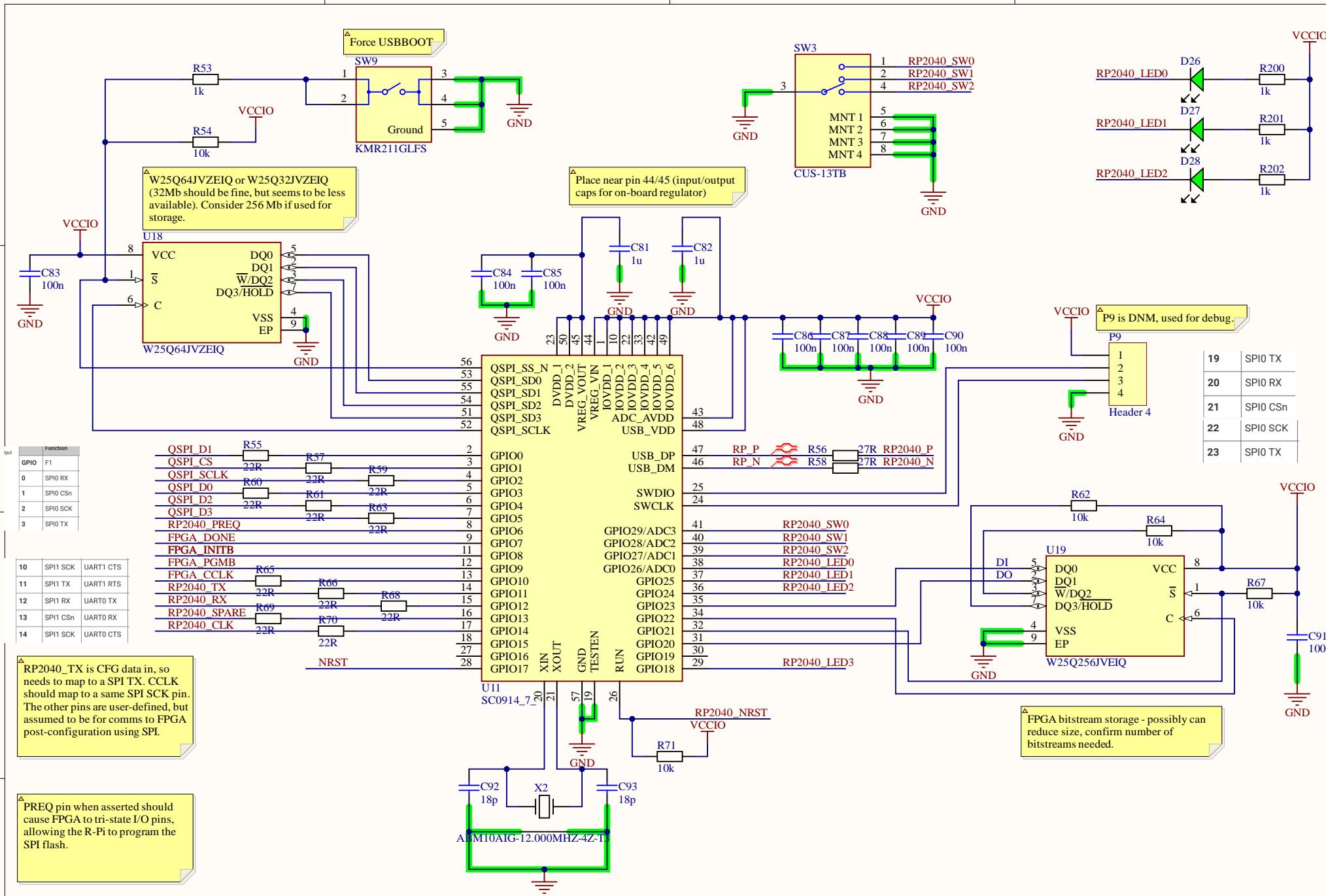
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Rev: 05 Project: Sonata

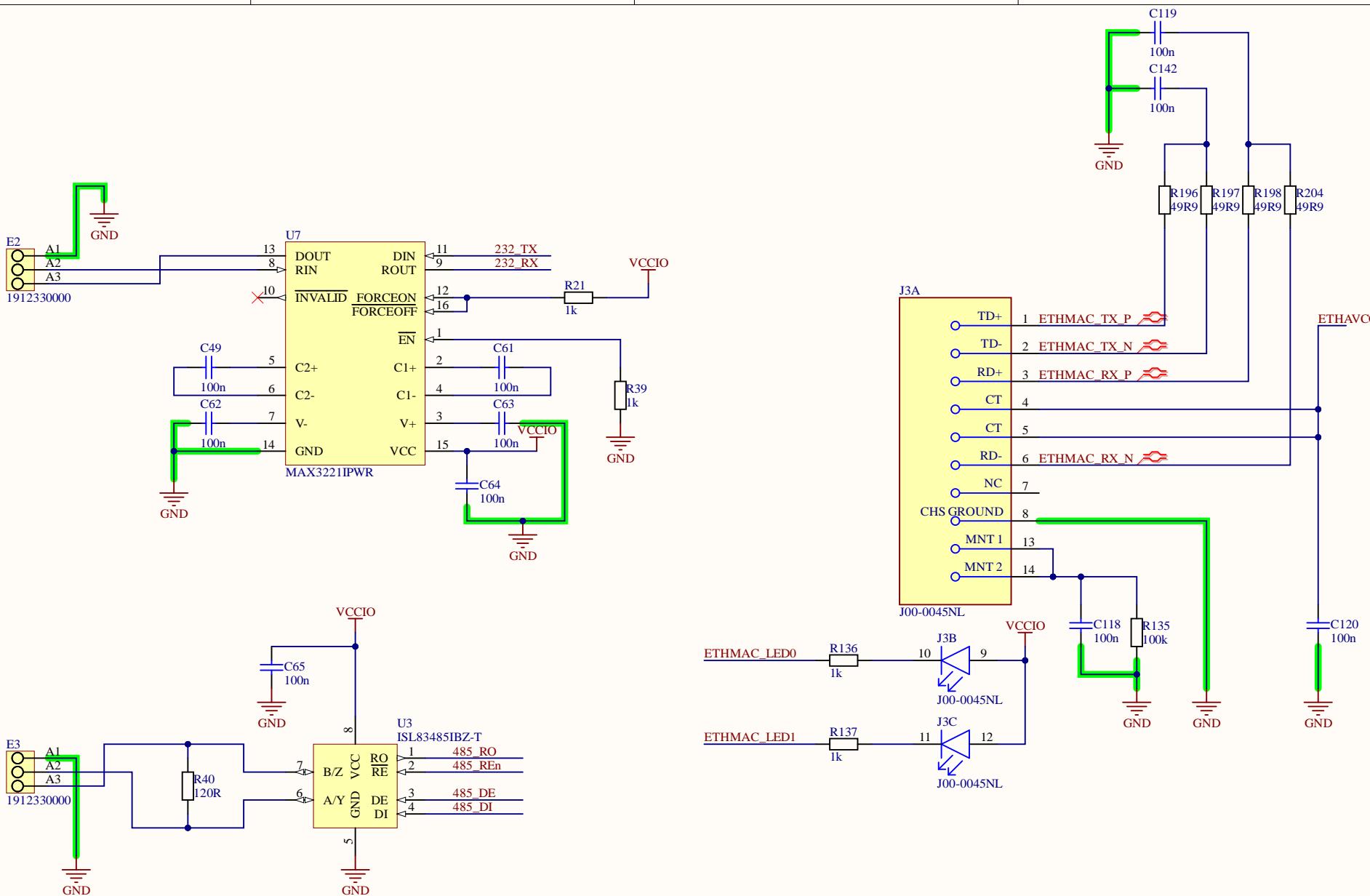
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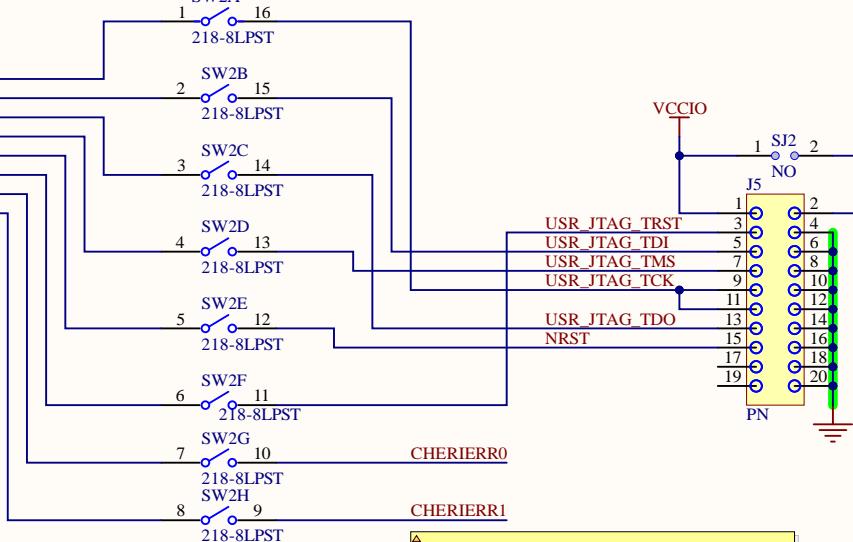
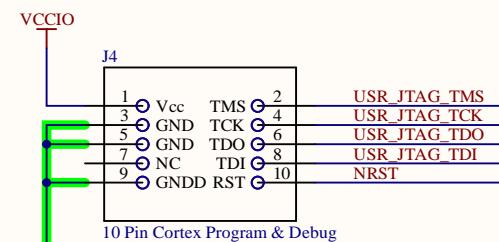
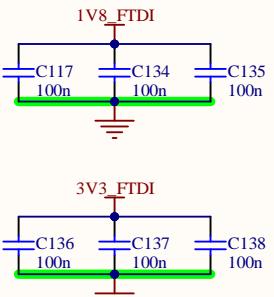
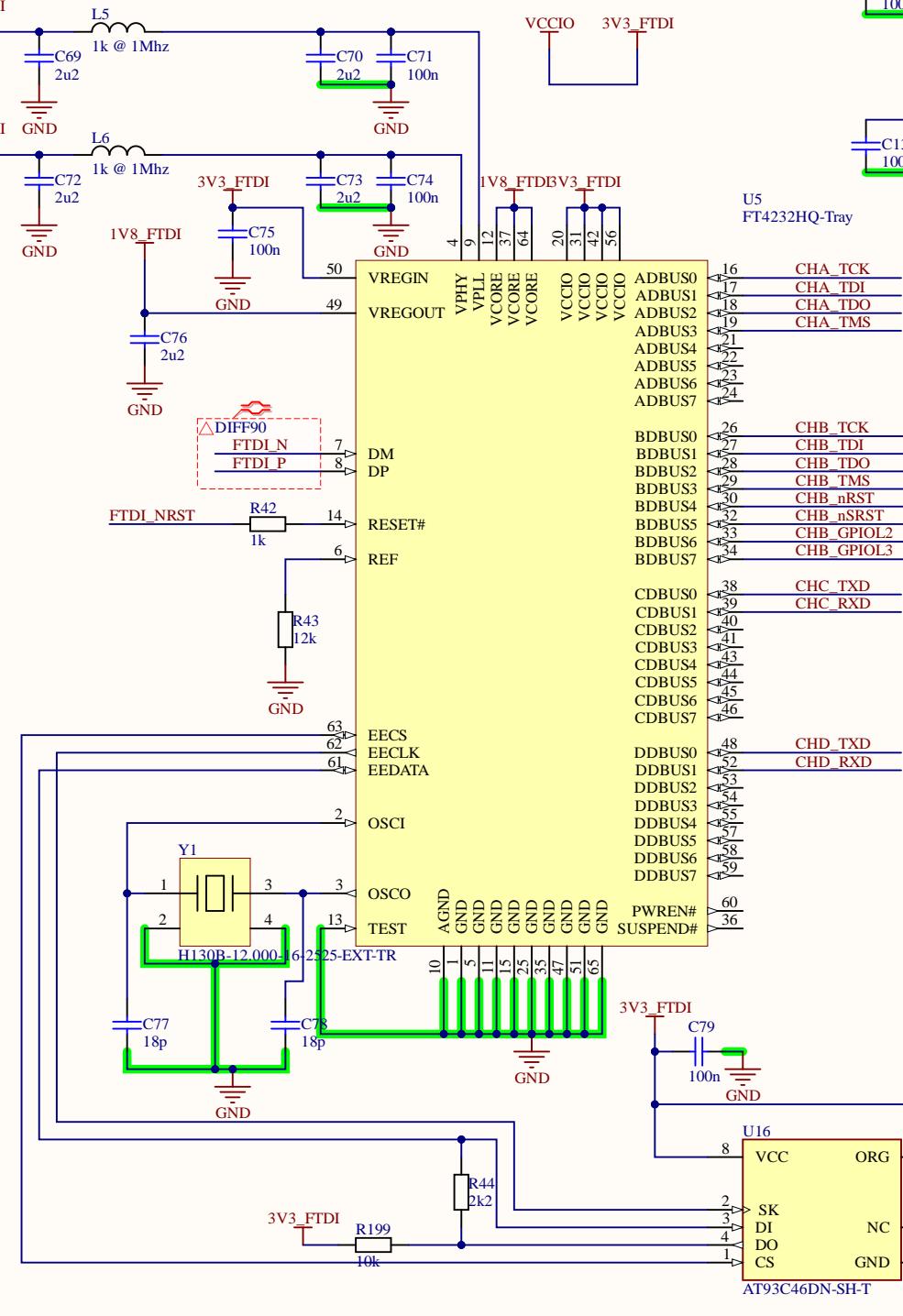
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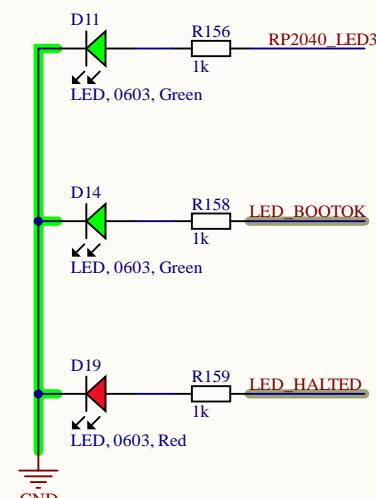
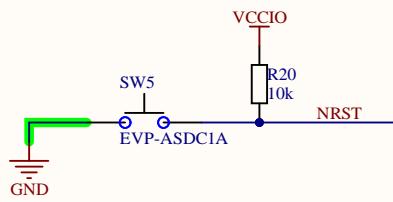
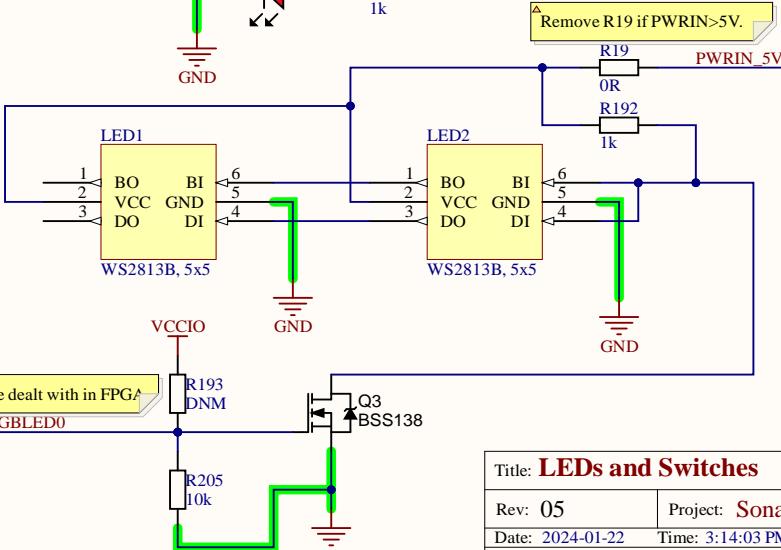
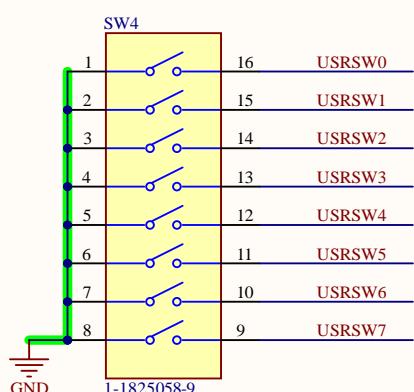
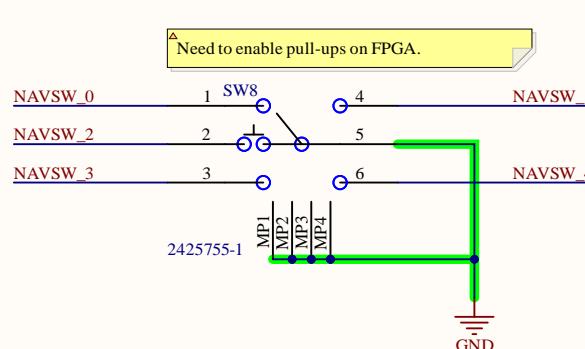
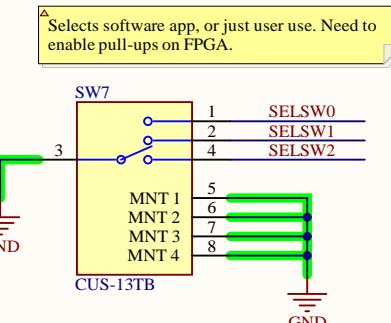
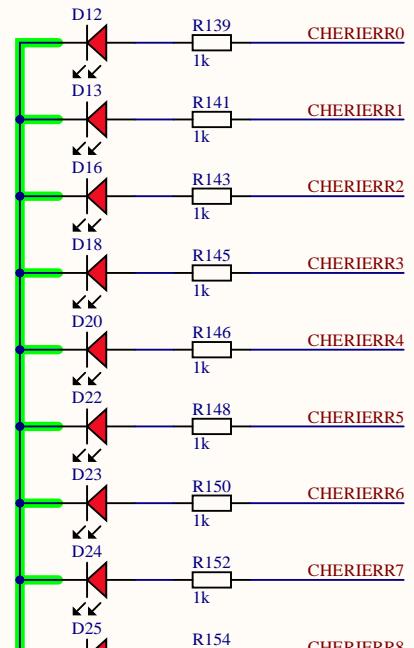
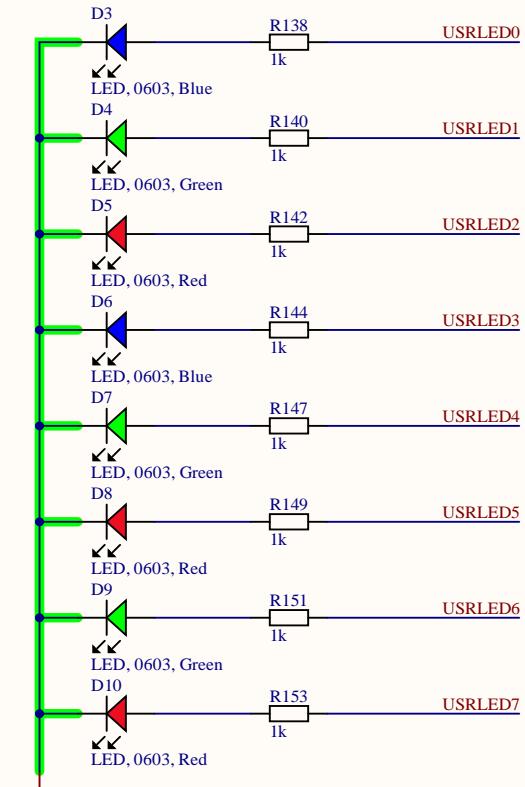




Title: RP2040 Controller		Approved: NO	NewAE Technology
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A

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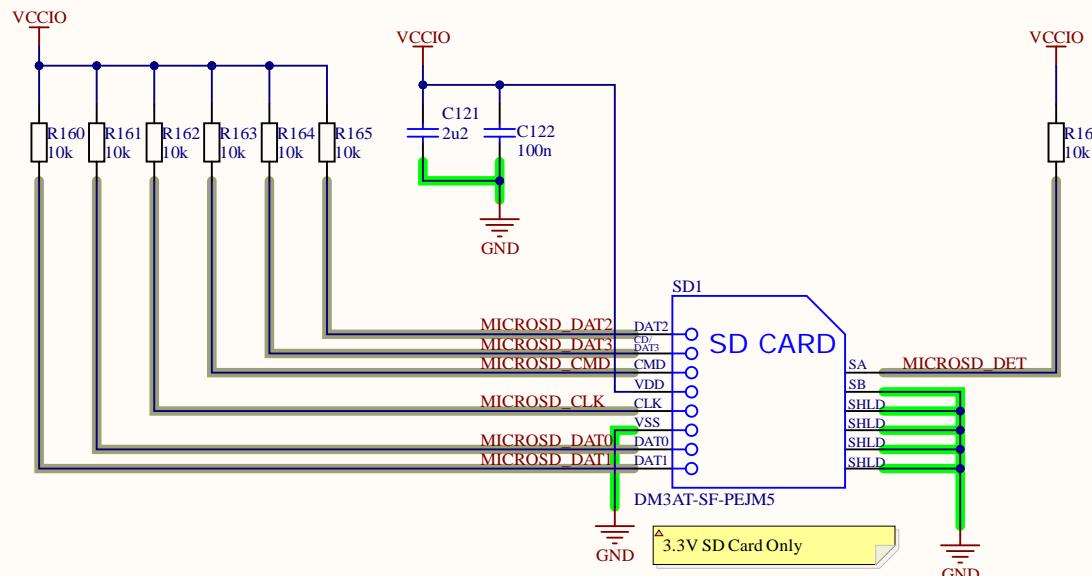
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Title: MicroSD Card Connector

Approved: NO



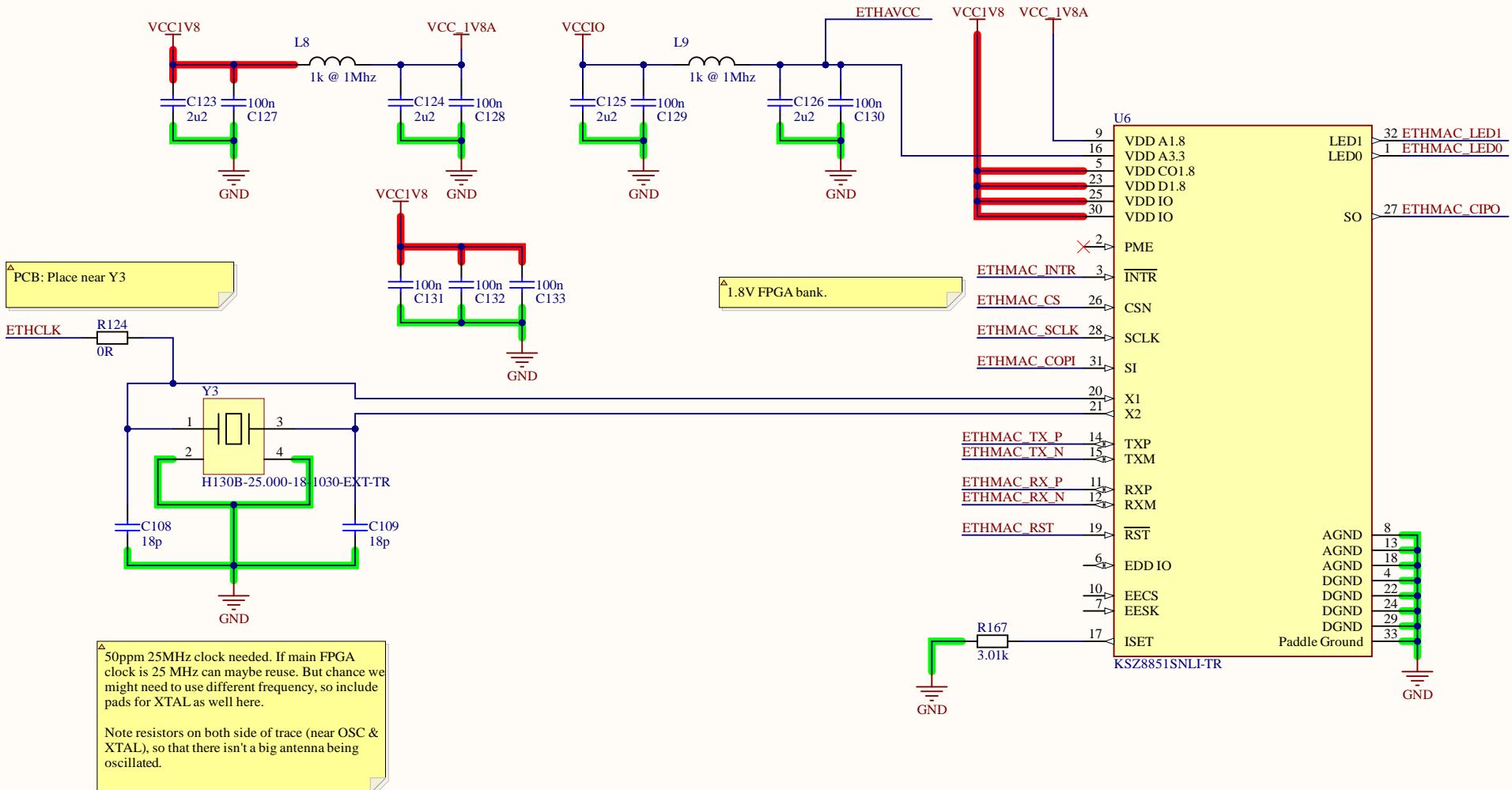
Rev: 05

Project: Sonata

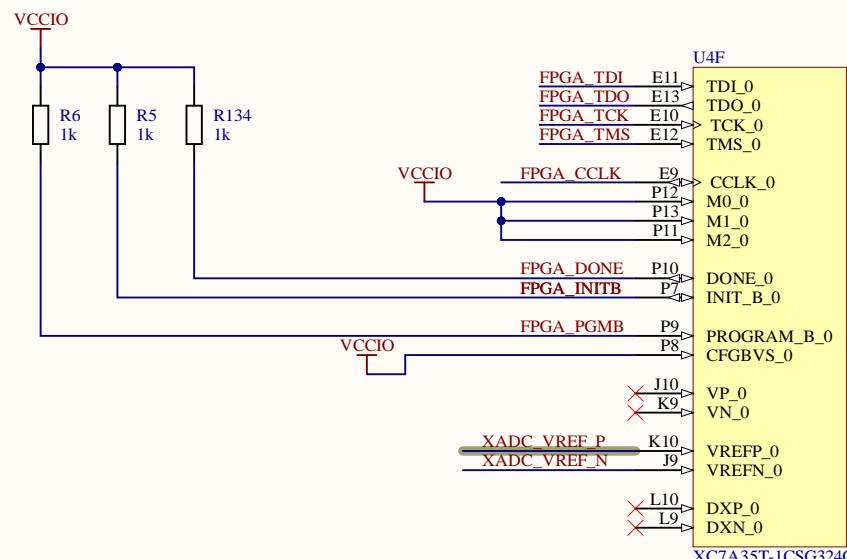
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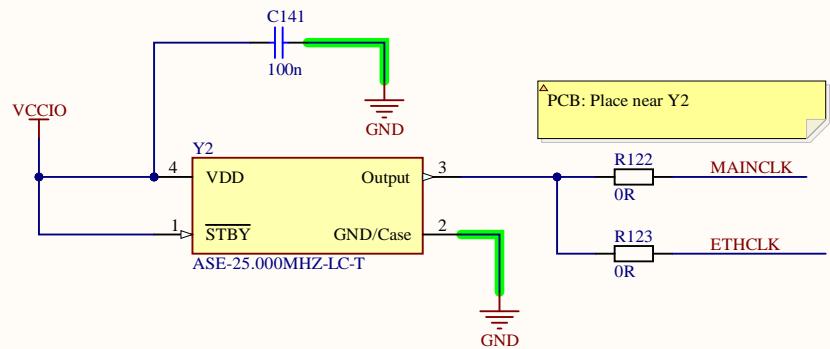
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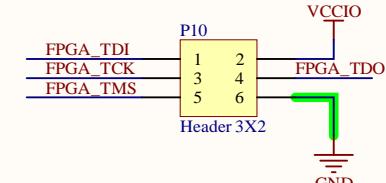
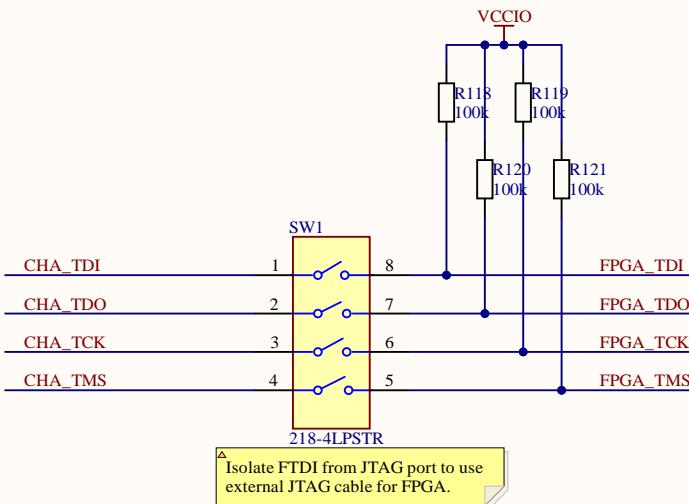
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**U4A**

IO_0_14	R11	R183C	33R	RPH_G8_CE1
IO_L19P_T3_A10_D26_14	T11	R188A	33R	AH_TMPIO0
IO_L20P_T3_A08_D24_14	U12	R188B	33R	AH_TMPIO1
IO_L5P_T0_D06_14	R12	R188C	33R	AH_TMPIO2
IO_L23N_T3_A02_D18_14	U13	R188D	33R	AH_TMPIO3
IO_25_14	R10	R189A	33R	AH_TMPIO4
IO_L20N_T3_A07_D23_14	V12	R189B	33R	AH_TMPIO5
IO_L19N_T3_A09_D25_VREF_14	U11	R189C	33R	AH_TMPIO6
IO_L4N_T0_D05_14	M18	R189D	33R	AH_TMPIO7
IO_L17N_T2_A13_D29_14	U18	R190A	33R	AH_TMPIO8
IO_L15N_T2_DQS_DOUT_CS0_B_14	T16	R190B	33R	AH_TMPIO9
IO_L18P_T2_A12_D28_14	U16	R190C	33R	AH_TMPIO10
IO_L7N_T1_D10_14	T18	R190D	33R	AH_TMPIO11
IO_L15P_T2_DQS_RDWR_B_14	R16	R191A	33R	AH_TMPIO12
IO_L12N_T1_MRCC_14	R17	R191B	33R	AH_TMPIO13
IO_L7P_T1_D09_14	R18	R191C	33R	AH_TMPIO14
IO_L8N_T1_D12_14	P14	R191D	33R	AH_TMPIO15
IO_L9P_T1_DQS_14	N17	R168	22R	AH_TMPIO16
IO_L6N_T0_D08_VREF_14	M13	R169	22R	AH_TMPIO17
IO_L10P_T1_D14_14	M16	R175D	33R	RPH_G3_SCL
IO_L10N_T1_D15_14	M17			RP2040_RX
IO_L4P_T0_D04_14	L18	R175A	33R	RPH_RXD0
IO_L1P_T0_D00_MOSL_14	K17	R175B	33R	RPH_TXD0
IO_L6P_T0_FCS_B_14	L13	R175C	33R	RPH_G2_SDA
IO_L1N_T0_D01_DIN_14	K18	R175D	33R	RP2040_TX
IO_L13P_T2_MRCC_14	P15			MAINCLK
IO_L11P_T1_SRCC_14	N15	R177A	33R	RPH_G4
IO_L2N_T0_D03_14	M14	R177B	33R	RPH_G17
IO_L2P_T0_D02_14	L14	R177C	33R	RPH_G27
IO_L3N_T0_DQS_EMCCLK_14	L16	R177D	33R	RPH_G22
IO_L16N_T2_A15_D31_14	V16	R179A	33R	RPH_G10_COPI
IO_L18N_T2_A11_D27_14	V17	R179B	33R	RPH_G9_CIPO
IO_L12P_T1_MRCC_14	P17	R179C	33R	RPH_G11_SCLK
IO_L17P_T2_A14_D30_14	U17	R179D	33R	RPH_G0
IO_L23P_T3_A03_D19_14	T13	R181A	33R	RPH_G5
IO_L22P_T3_A05_D21_14	U14	R181B	33R	RPH_G6
IO_L5N_T0_D07_14	R13	R181C	33R	RPH_G13
IO_L21N_T3_A04_D20_14	V14	R181D	33R	RPH_G19_CIPO
IO_L13N_T2_MRCC_14	R15	R182A	33R	RPH_G26
IO_L9N_T1_DQS_D13_14	P18	R182B	33R	RPH_G18
IO_L8P_T1_D11_14	N14	R182C	33R	RPH_G23
IO_L11N_T1_SRCC_14	N16	R182D	33R	RPH_G24
IO_L3P_T0_DQS_PUDC_B_14	L15	R183A	33R	RPH_G25
IO_L16P_T2_CSR_B_14	V15	R183B	33R	RPH_G8_CE0
IO_L14P_T2_SRCC_14	T14			RP2040_CLK
IO_L14N_T2_SRCC_14	T15	R183D	33R	RPH_G1
IO_L21P_T3_DQS_14	V10	R184A	33R	RPH_G12
IO_L24P_T3_A01_D17_14	T9	R184B	33R	RPH_G16_CE2
IO_L24N_T3_A00_D16_14	T10	R185C	33R	RPH_G20_COPI
IO_L21N_T3_DQS_A06_D22_14	V11	R185D	33R	RPH_G21_SCLK

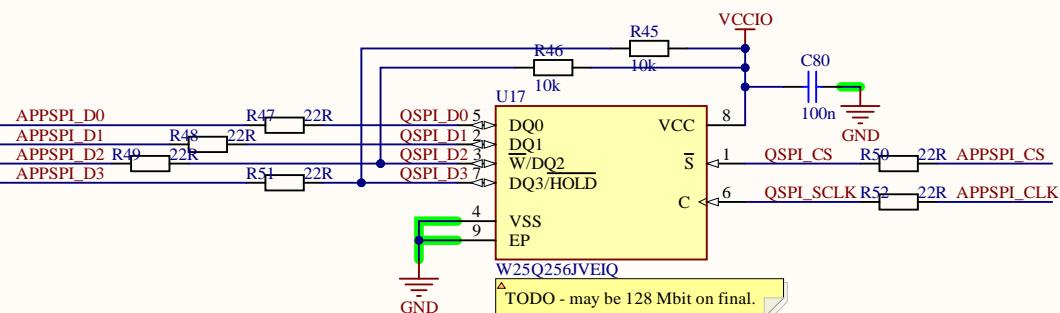
XC7A35T-1CSG324C

**U4D**

IO_0_34	K6			CHERIERR0
IO_L1P_T0_34	L1			CHERIERR1
IO_L1N_T0_34	M1			CHERIERR2
IO_L2P_T0_34	K3			CHERIERR3
IO_L2N_T0_34	L3			CHERIERR4
IO_L3P_T0_DQS_34	N2			CHERIERR5
IO_L3N_T0_DQS_34	N1			CHERIERR6
IO_L4P_T0_34	M3			CHERIERR7
IO_L4N_T0_34	M2			CHERIERR8
IO_L5P_T0_34	K5			LED_LEGACY
IO_L5N_T0_34	L4			LED_CHERI
IO_L6P_T0_34	L6			LED_HALTED
IO_L6N_T0_VREF_34	L5			LED_BOOTOK
IO_L22N_T3_34	U6			MICROSD_CLK
IO_L10N_T1_34	V4			MICROSD_DAT0
IO_L23P_T3_34	R7			MICROSD_DAT1
IO_L10P_T1_34	V5			MICROSD_DAT2
IO_L24N_T3_34	T8			MICROSD_DAT3
IO_L24P_T3_34	R8			MICROSD_CMD
IO_L22P_T3_34	U7	R170A	33R	SDA0
IO_L21N_T3_DQS_34	V9	R170B	33R	SCL0
IO_L20P_T3_34	V7	R170C	33R	SDA1
IO_L21P_T3_DQS_34	U9	R170D	33R	SCL1
IO_L12P_T1_MRCC_34	T5			NRST
IO_L12N_T1_MRCC_34	T4			FPGAIO_TURBO
IO_L13P_T2_MRCC_34	N5			LCD_BACKLIGHT
IO_L8N_T1_34	U3	R171	22R	RP2040_PREQ
IO_L14P_T2_SRCC_34	P4			RP2040_SPARE
IO_L14N_T2_SRCC_34	P3	232_TX		
IO_L18N_T2_34	N6	232_RX		
IO_L15N_T2_DQS_34	R2	485_RO		
IO_L16N_T2_34	M4	485_DE		
IO_L16N_T2_34	N4	485_REn		
IO_L18P_T2_34	M6	485_DI		
IO_L15P_T2_DQS_34	P2	R178A	33R	MB0
IO_L17P_T2_34	R1	R178B	33R	MB1
IO_L17N_T2_34	T1	R178C	33R	MB2
IO_L7P_T1_34	U1	R178D	33R	MB3
IO_L11N_T1_SRCC_34	T3	R180A	33R	MB4
IO_L7N_T1_34	V1	R180B	33R	MB5
IO_L9P_T1_DQS_34	U2	R180C	33R	MB6
IO_L9N_T1_DQS_34	V2	R180D	33R	MB7
IO_25_34	U8	R184A	33R	MB8
IO_L23N_T3_34	T6	R184B	33R	MB9
IO_L20N_T3_34	V6	R184C	33R	MB10
IO_L19P_T3_34	R6			LCD_RST
IO_L8P_T1_34	U4			LCD_DC
IO_L11P_T1_SRCC_34	R3			LCD_COP1
IO_L19N_T3_VREF_34	R5			LCD_CLK
IO_L13N_T2_MRCC_34	P5			LCD_CS

XC7A35T-1CSG324C

R184D 33R

**U4D**

This SPI flash can be driven from both the FPGA and from the RP2040. Ideally placed between them with a sort of daisy-chain style routing FPGA--&gt;SPI--&gt;RP2040, as short as possible.

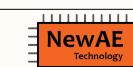
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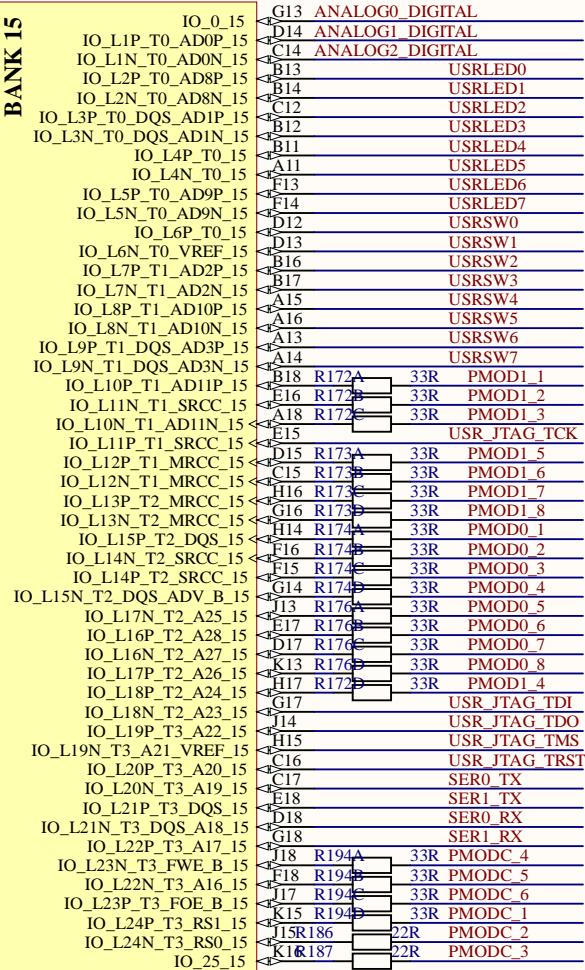
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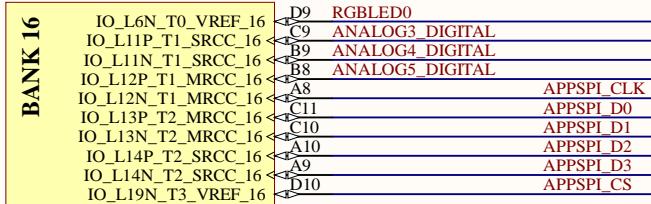
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U4B

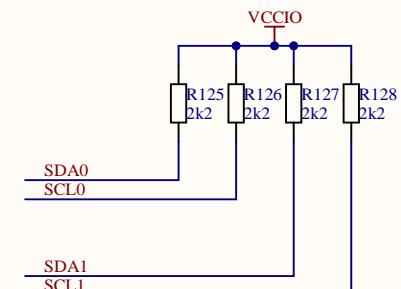


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U4C



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Title: IO Banks 15 + 16

Rev: 05

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Date: 2024-01-22

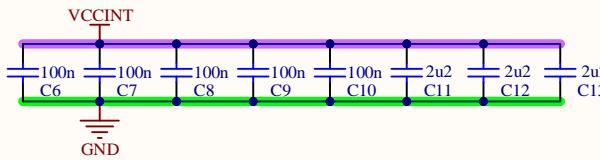
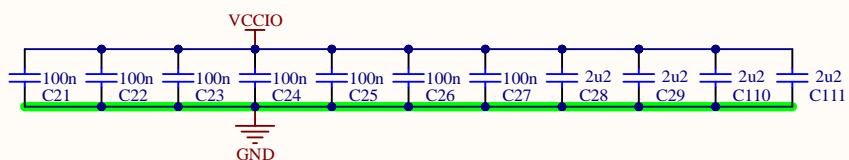
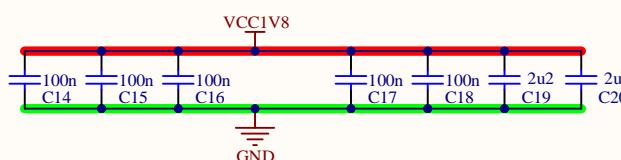
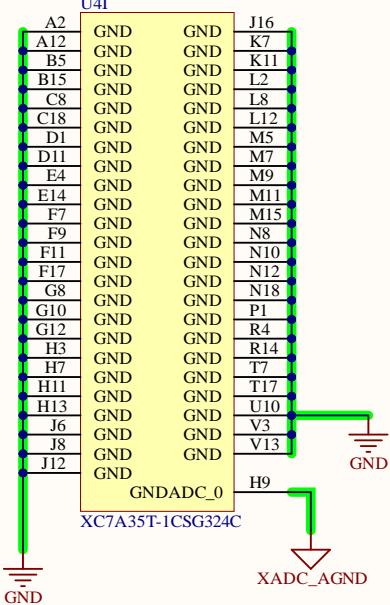
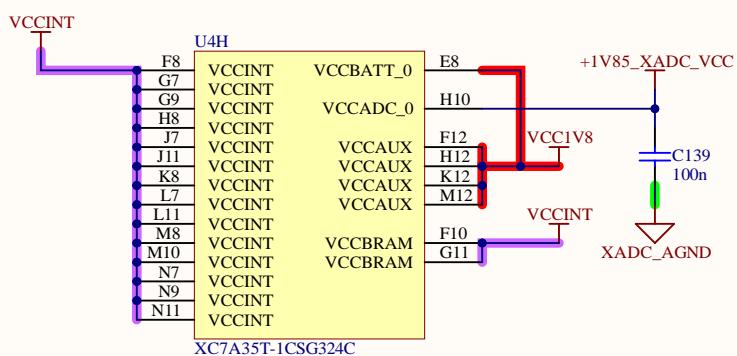
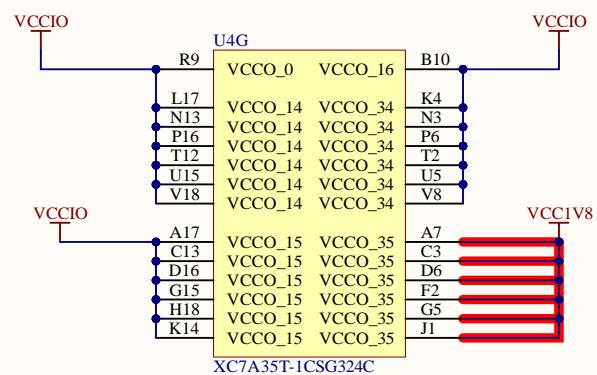
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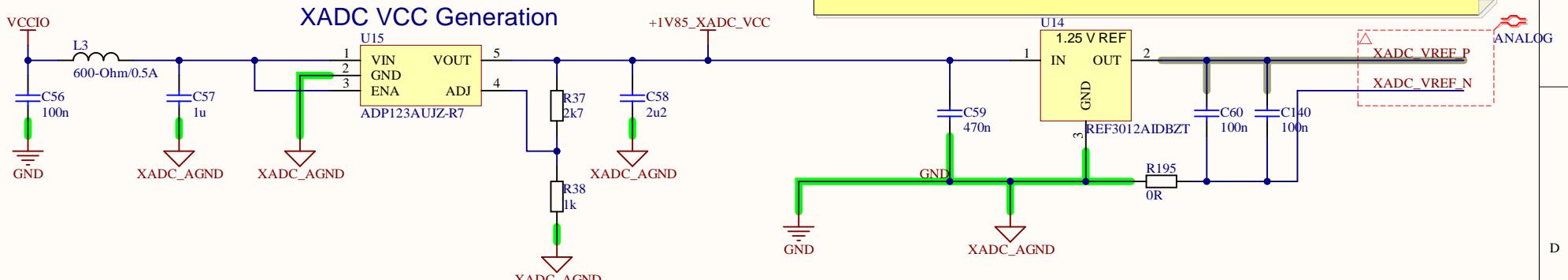
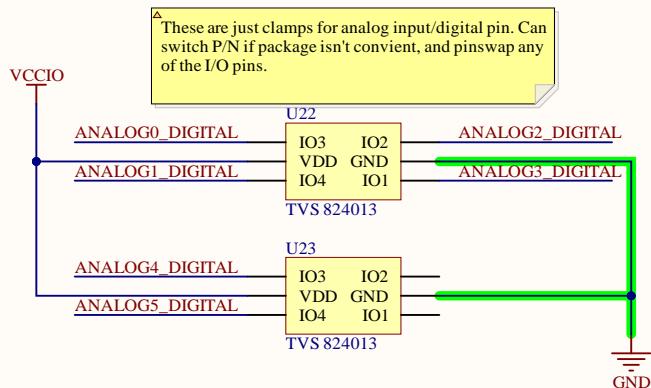
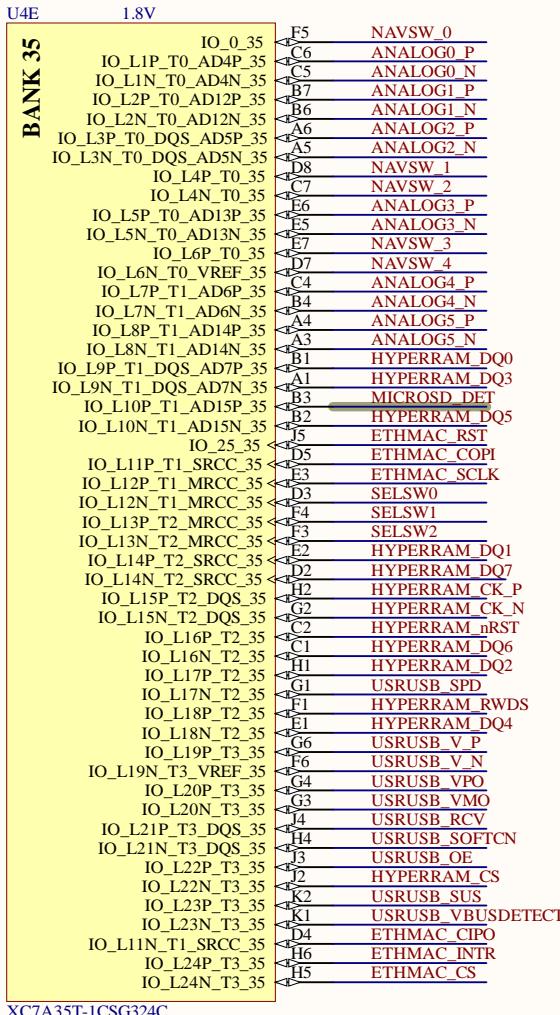
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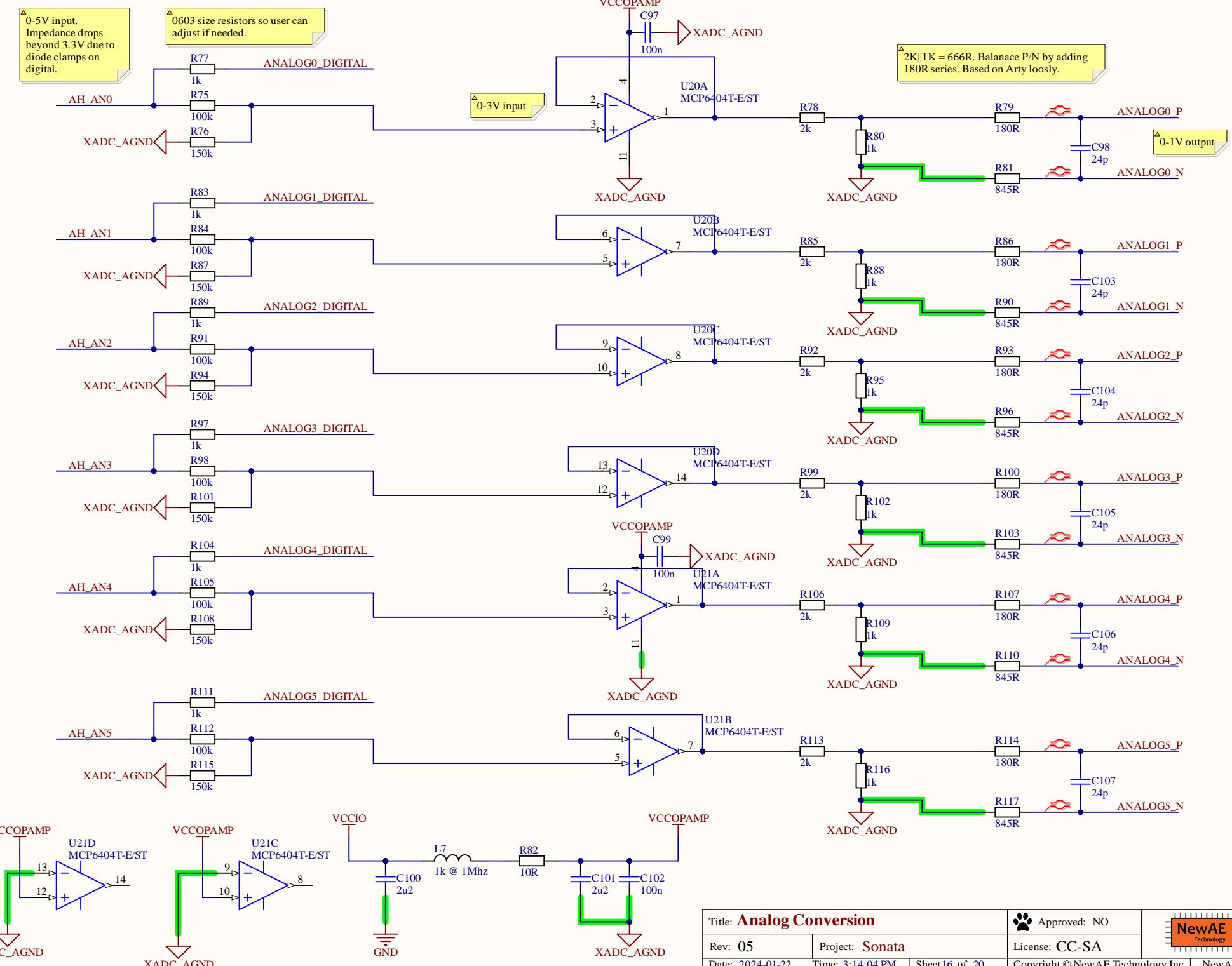
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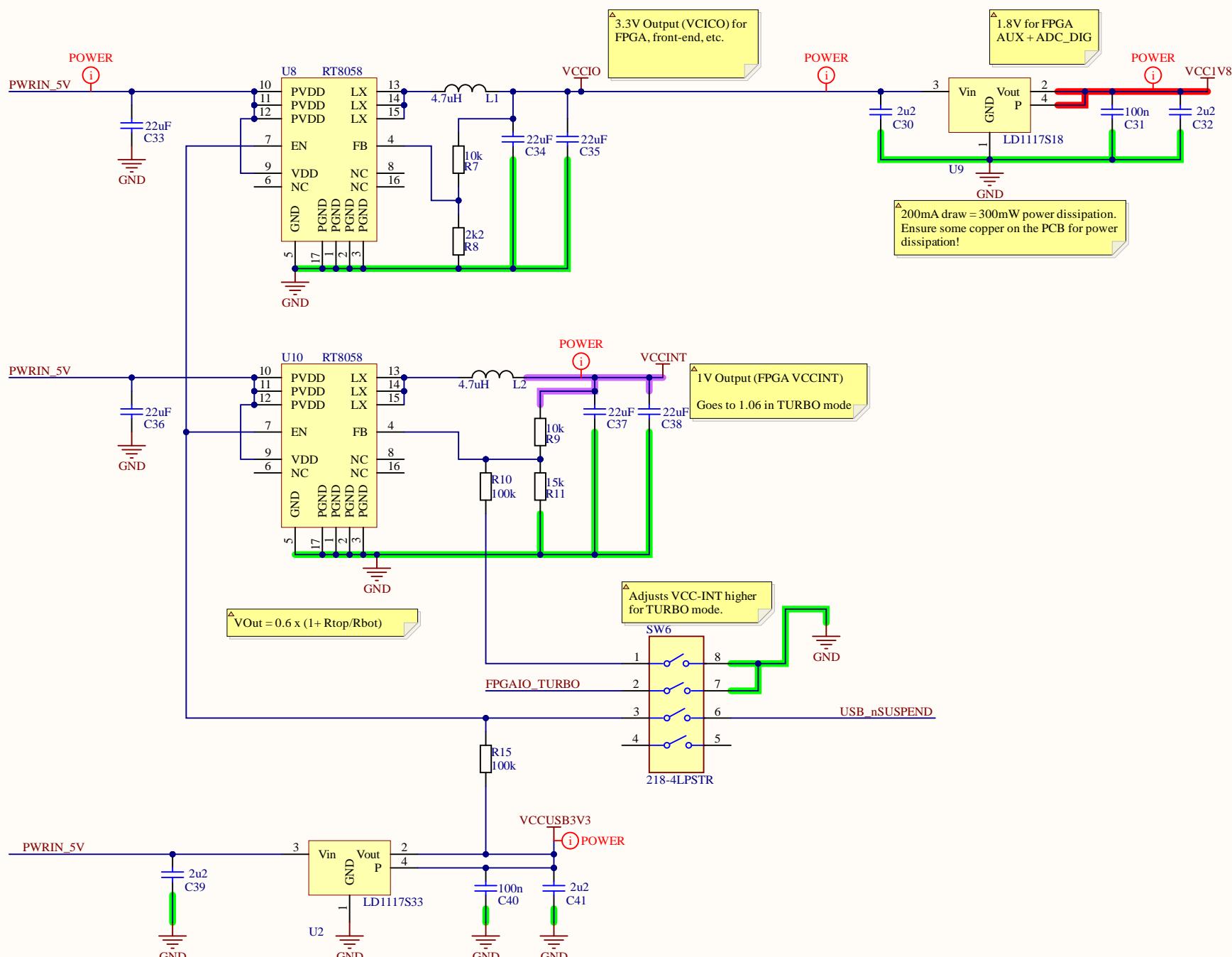
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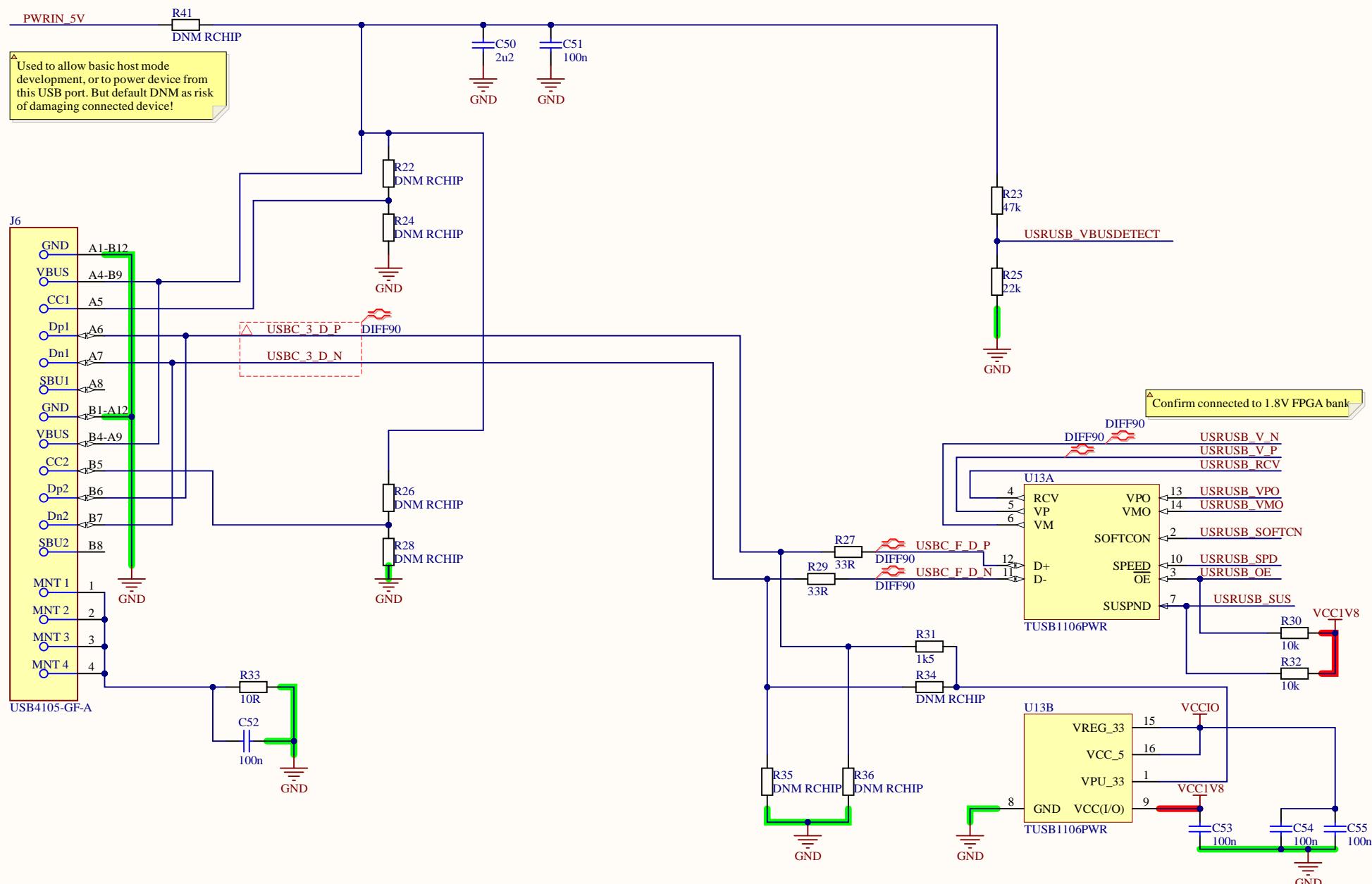
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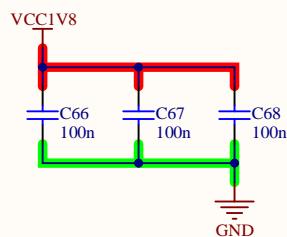




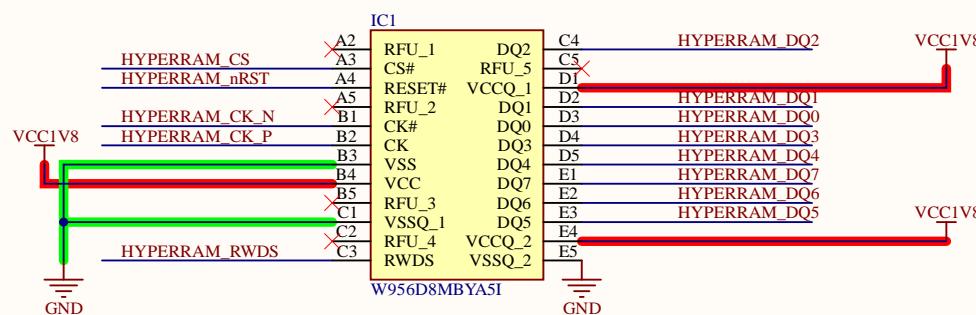
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A



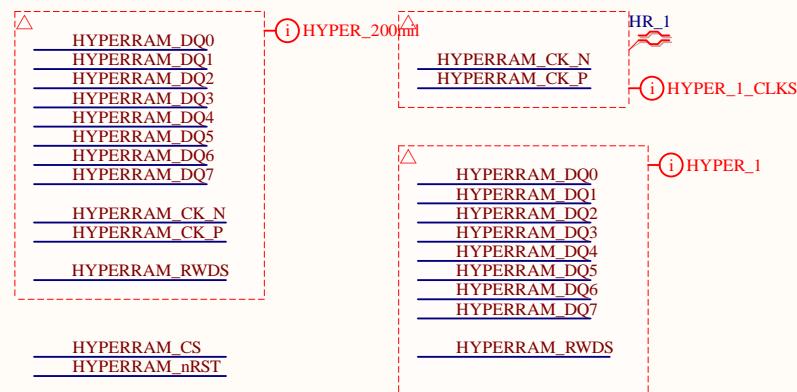
B



C

Table 5 Length matching

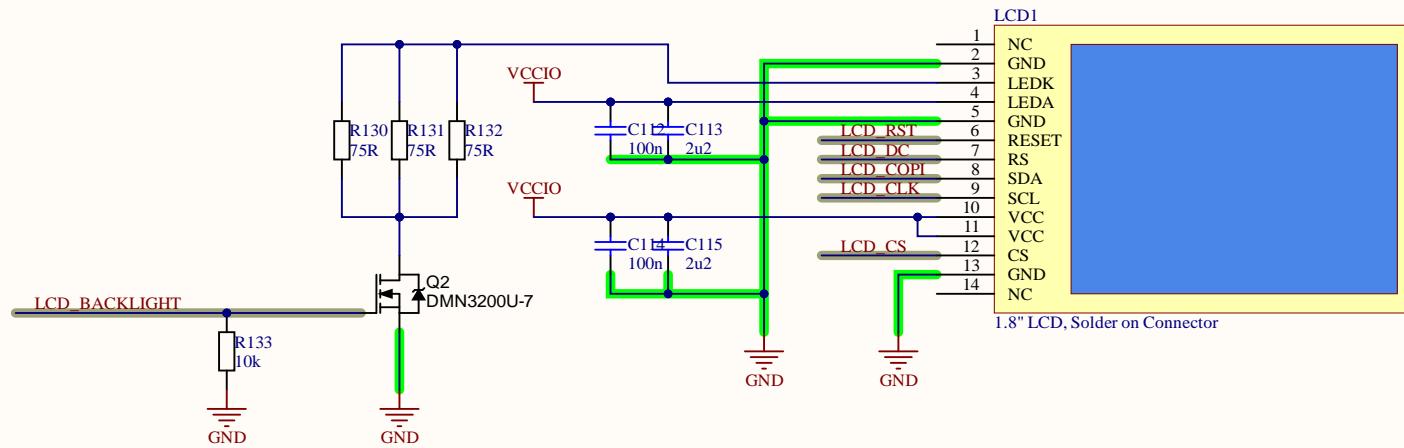
Signal group	Length matching tolerance
	200 MHz
CK to CK#	±10 mils
RWDS to DQ[7:0]	±15 mils
RWDS1 to DQ[15:8] <sup>1</sup>	±15 mils
DQx[7:0] to DQy[7:0]	±30 mils
DQx[15:8] to DQy[15:8] <sup>1</sup>	
CK/CK# to DQ[7:0]	±200 mils
CK/CK# to DQ[15:0] <sup>1</sup>	
CK/CK# to CS#	±1500 mils
CK/CK# to RWDS	±1500 mils
RESET# to RST# to CS#	±2000 mils



<sup>1</sup>nRST is longest PCB trace, taken out of group to avoid making length matching harder as length match is +/- 2 inches so will meet that anyway...

A

A



B

B

C

C

D

D

Title: <b>LCD</b>		Approved: NO	
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