

REV	DATE	PAGES	DESCRIPTION
A1	06/29/2021	All	Preliminary Release for checking
B1	01/03/2022	Pa58 Pa59 Pa64 Pa65 Pa66	Change U17/U18 pin / EN connection to 3V3_STBY Swap MAX_10C_SCL_SDA connection on U93 Swap MAX_10C_SCL_SDA connection on U96 Correct Table of Contents, Pa20, Pa21 Update Block Diagram. Remove Reference to U20-U2C and U12-13A
C1	03/19/2024		

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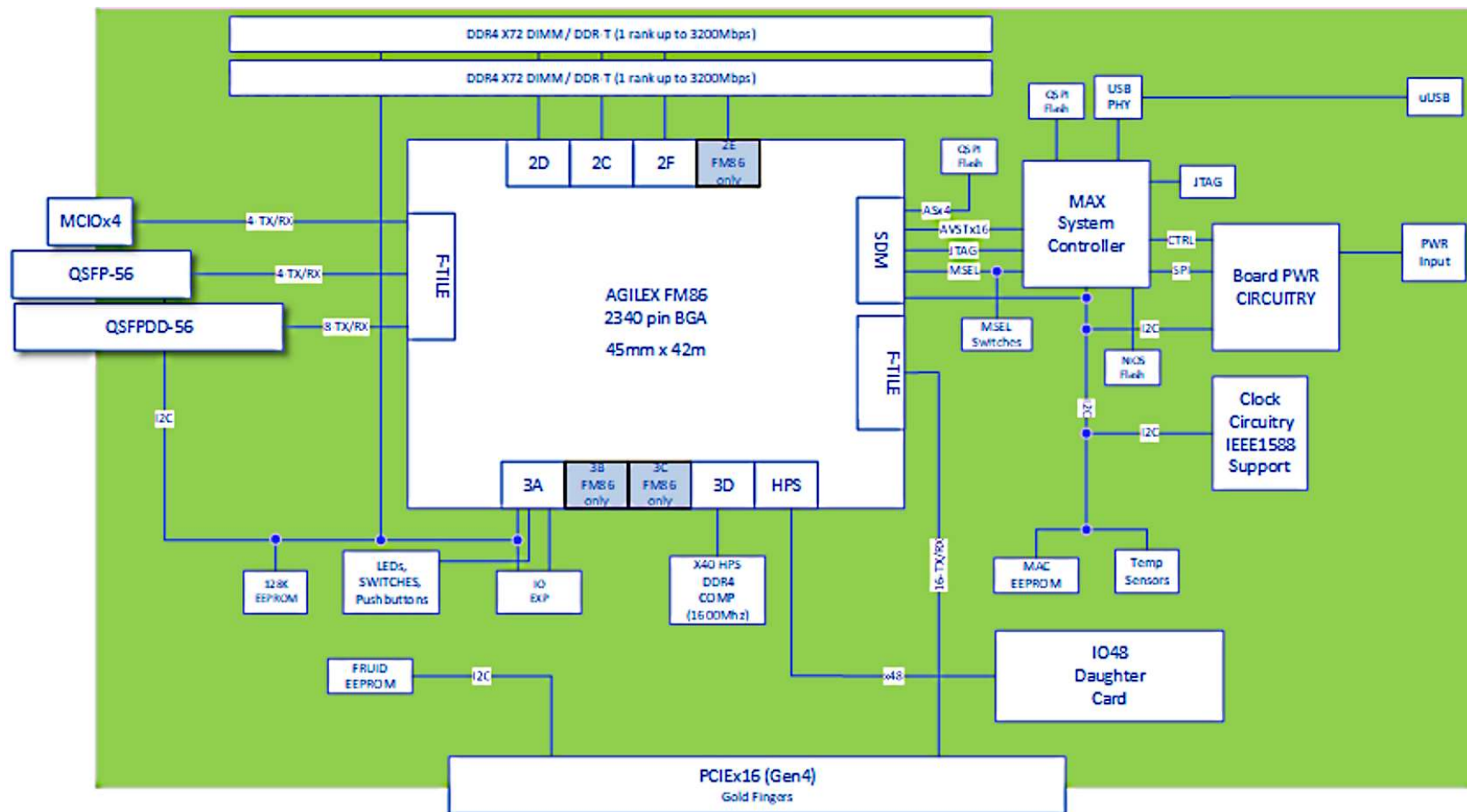
SPEED TOP Number - 99ARL0 / 99ARL1 / 99ARL2  
 Top Assembly - M60066-001  
 PCB Assembly - M46634-100  
 Schematic - 180-0330678-B1  
 FM86/76 Raw PCB - 100-0330678-B1  
 Gerbers - 110-0330678-B1

AGILEX FPGA (PROD) P/N: AGFB027R24C2E2V (MMID: TBD)  
 AGILEX FPGA (ES) P/N: AGFB027R24C2E2VR0 (MMID: 99AKGJ)  
 DIMM P/N: Micron MTA18ASF2G72PZ-3G2J3 (K55448-002)

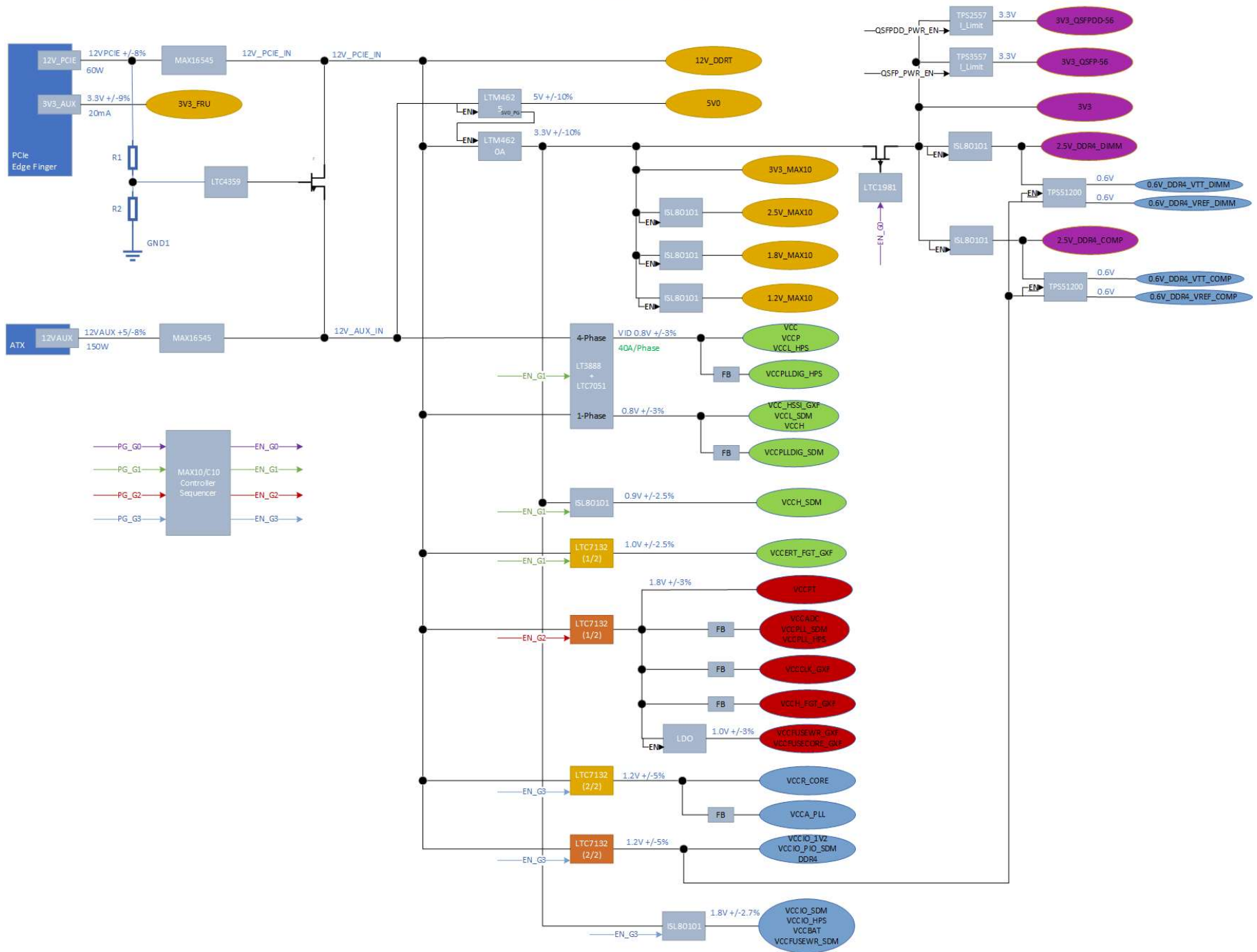


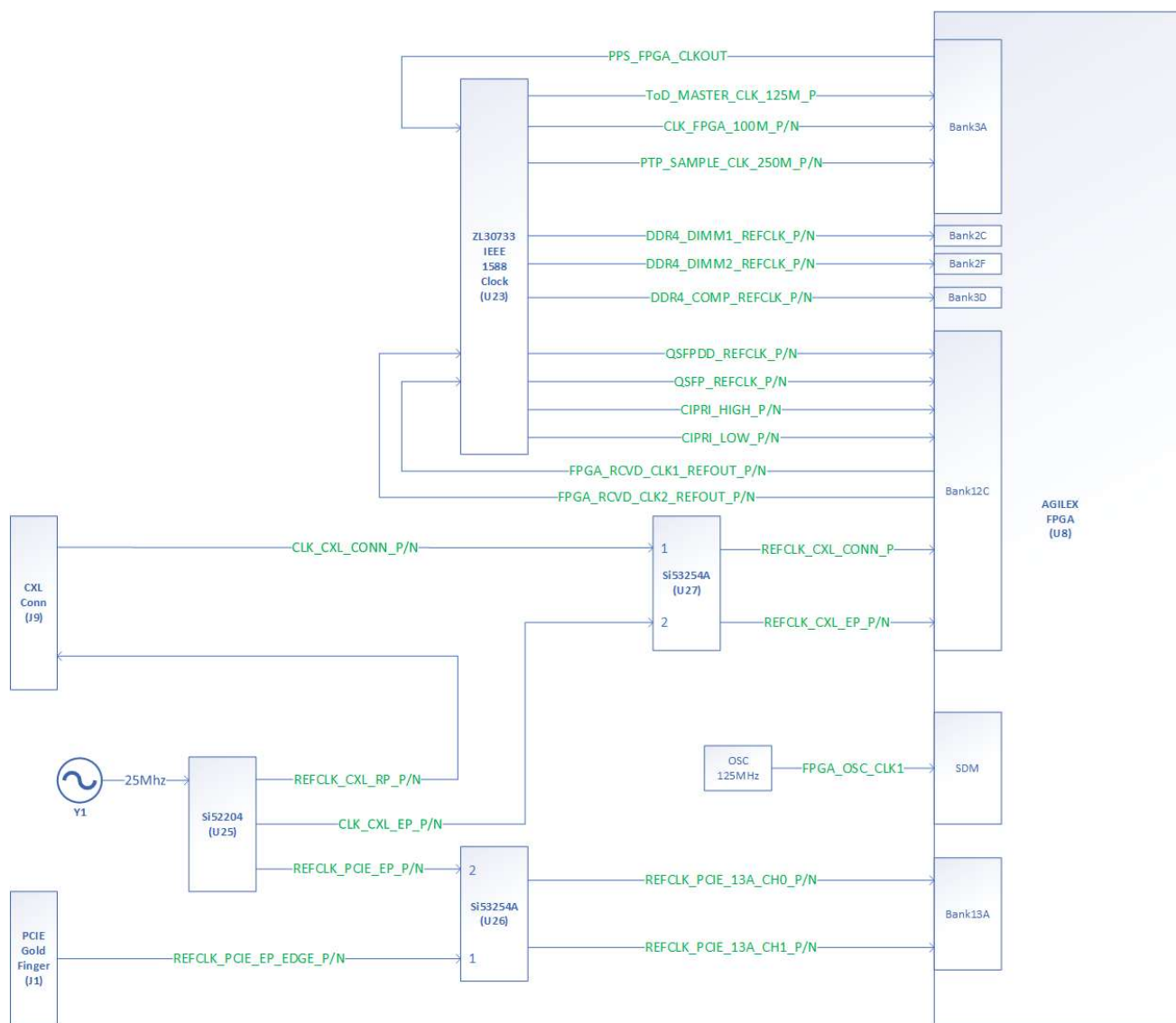
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AGILEX FM86/FM76 DEVELOPMENT KIT			
Size	Document Number	Rev	
C	180-0330678-C1	C1	
Date:	Tuesday, March 19, 2024	Sheet	1 of 58

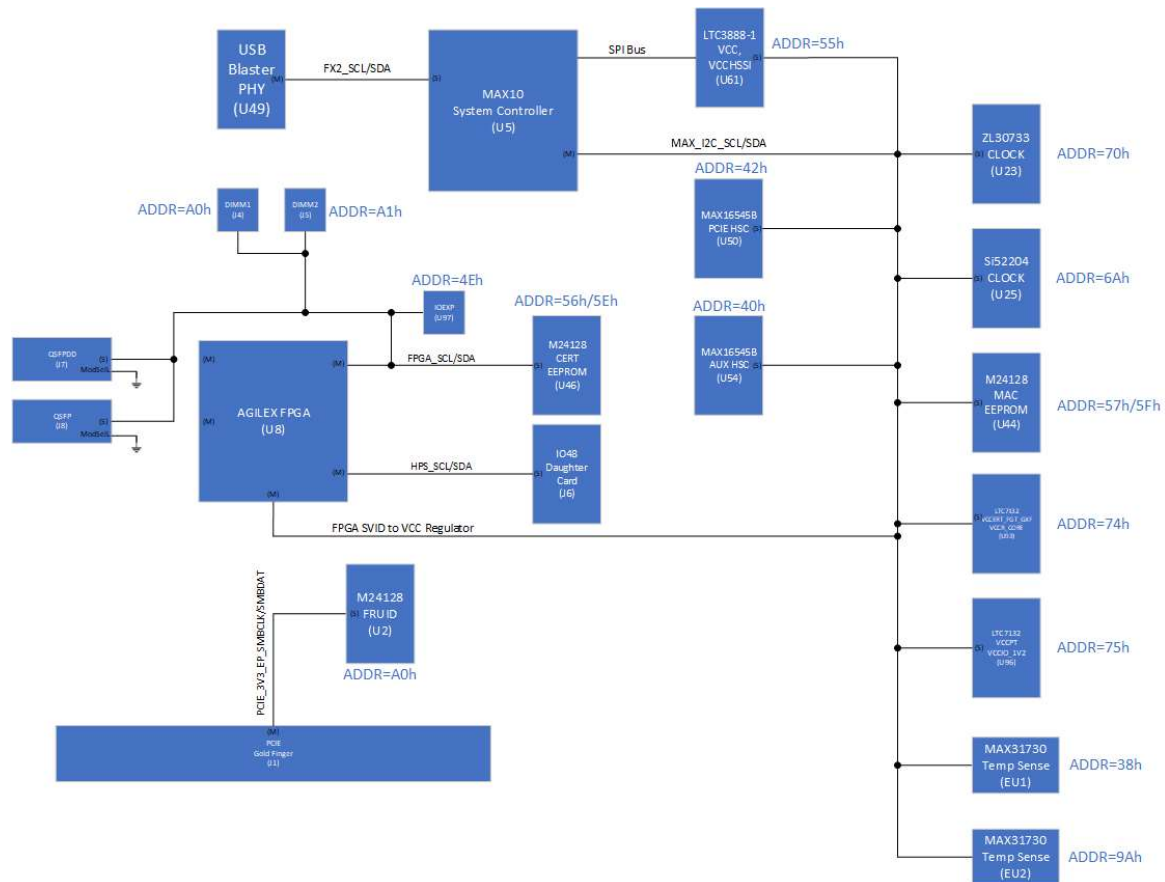
Name	Official Name	Board OPN	Board MMID	Device OPN	Device MMID
FM86 FPGA DK (ES)	Intel Agilex F-Series FPGA Development Kit, Two F-Tile Edition (ES)	DK-DEV-AGF027F1ES	99ARL0	AGFB027R24C2E2VR0	99AKGJ
FM86 FPGA DK (Prod)	Intel Agilex F-Series FPGA Development Kit, Two F-Tile Edition (Prod)	DK-DEV-AGF027FA	99ARL1	AGFB027R24C2E2V	TBD
FM76 FPGA DK	Intel Agilex F-Series FPGA Development Kit, Two F-Tile and High-Performance Crypto Edition	DK-DEV-AGF023FA	99ARL2		

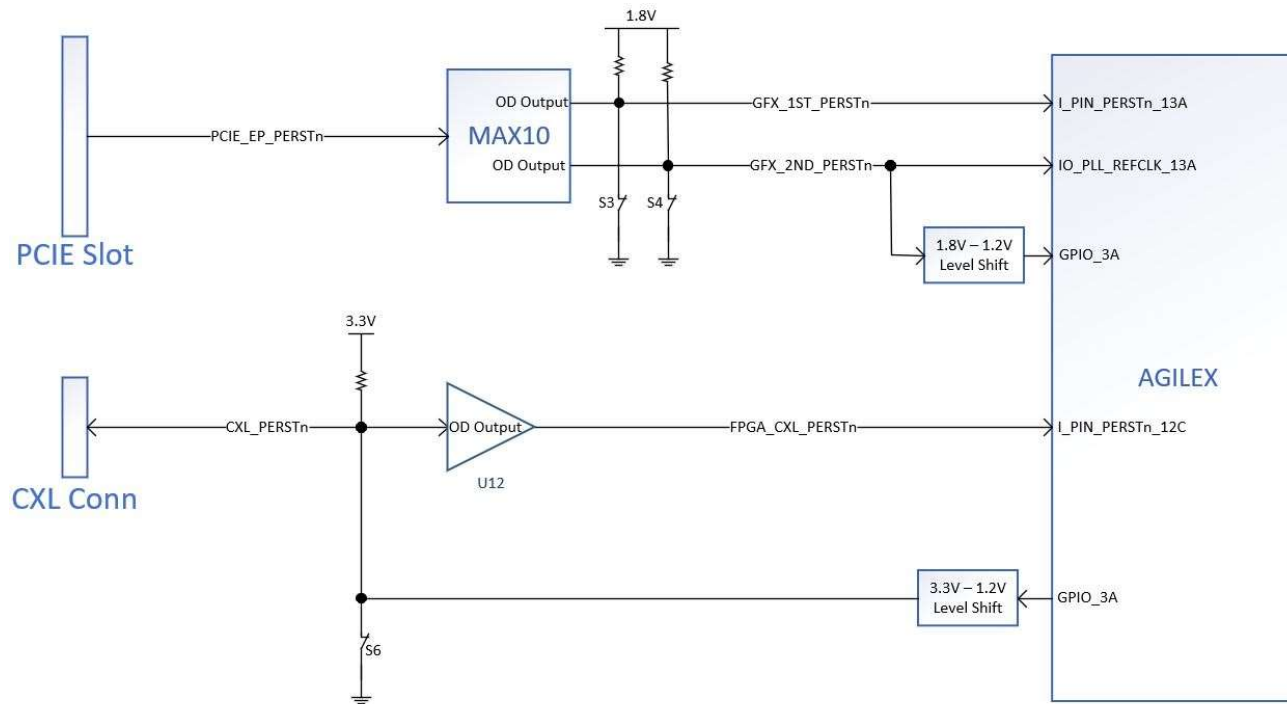
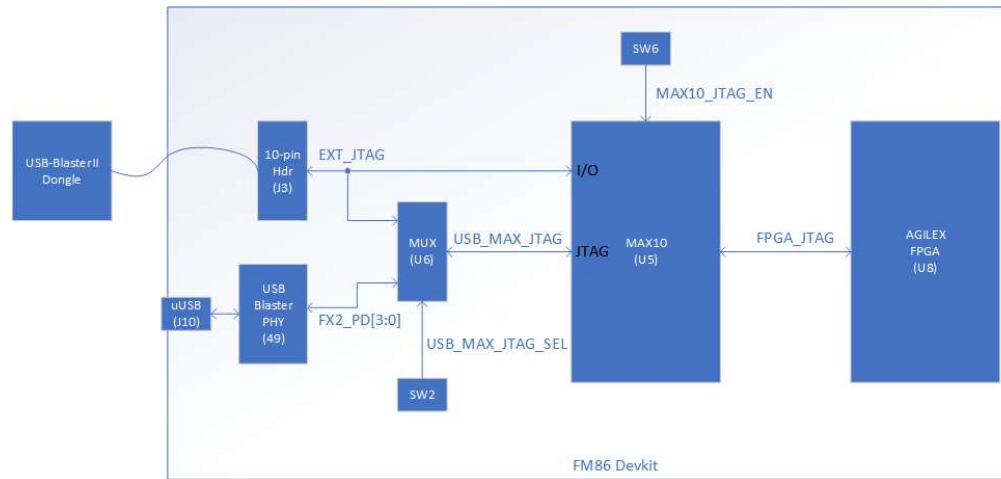


# Power Tree



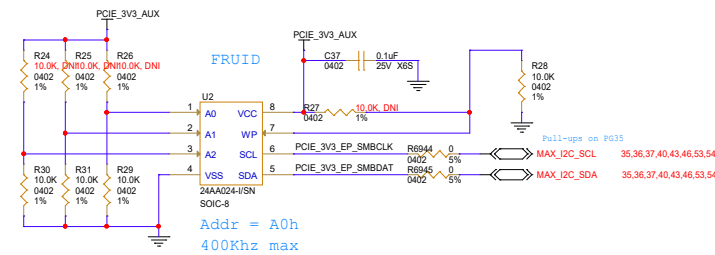
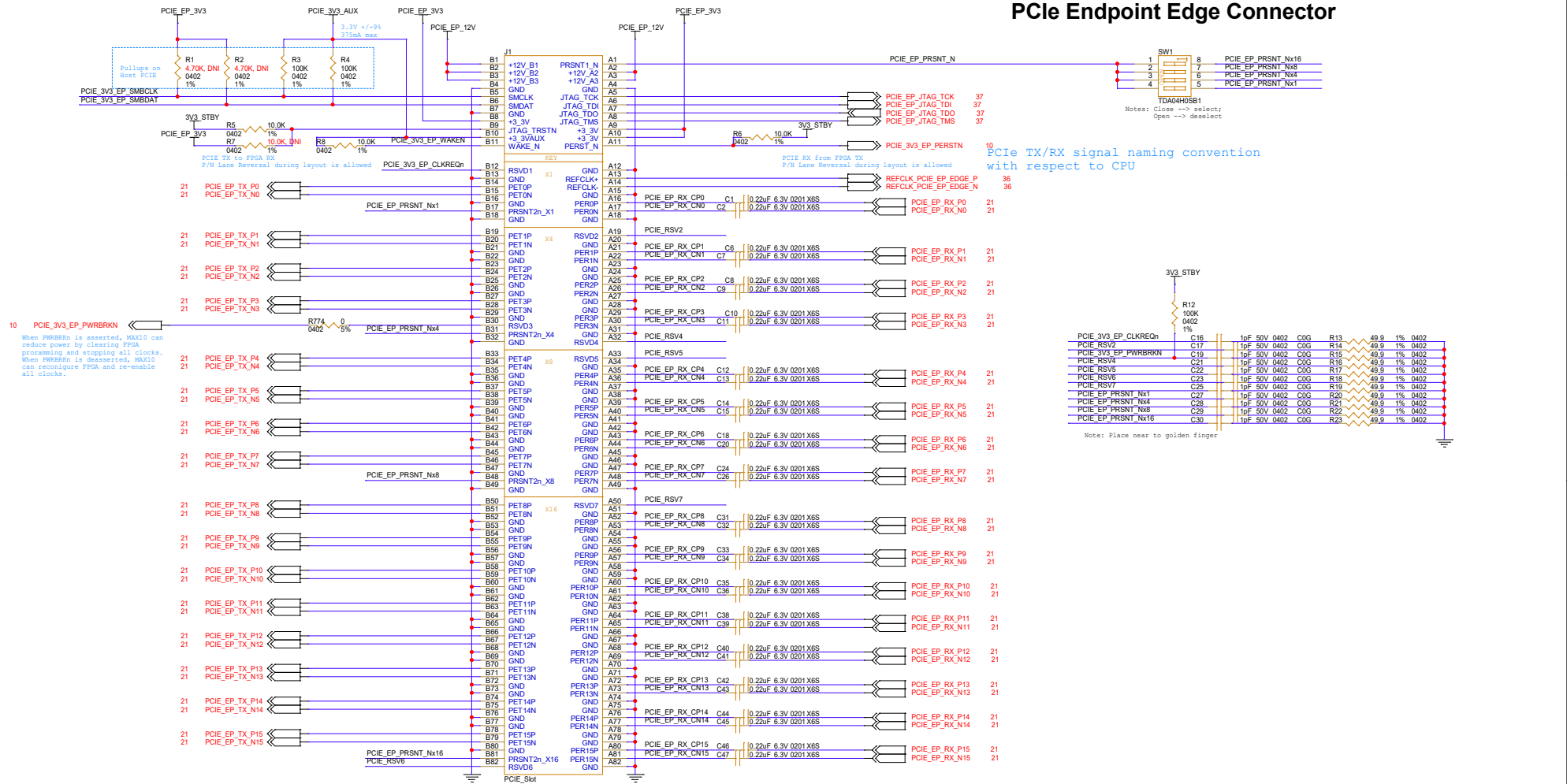






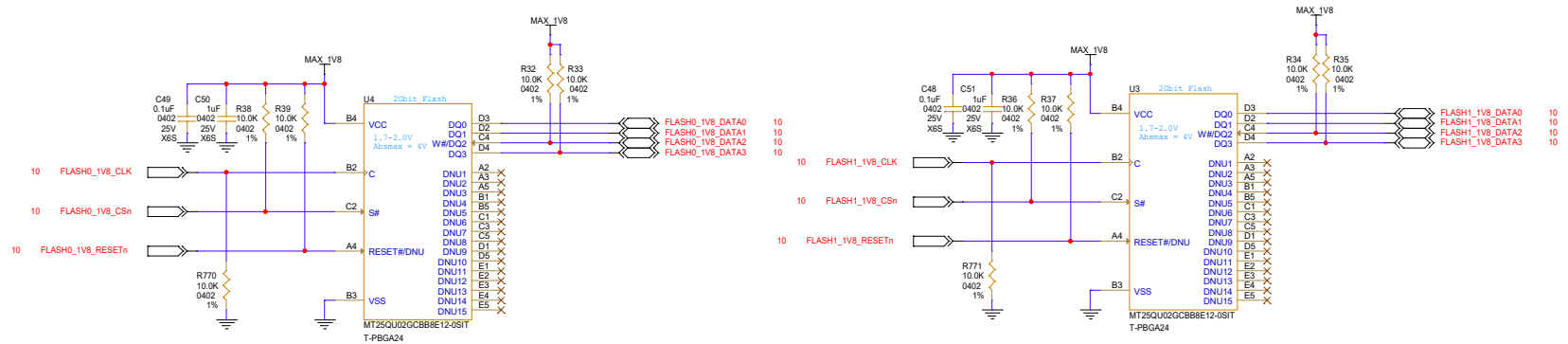


# PCIe Endpoint Edge Connector



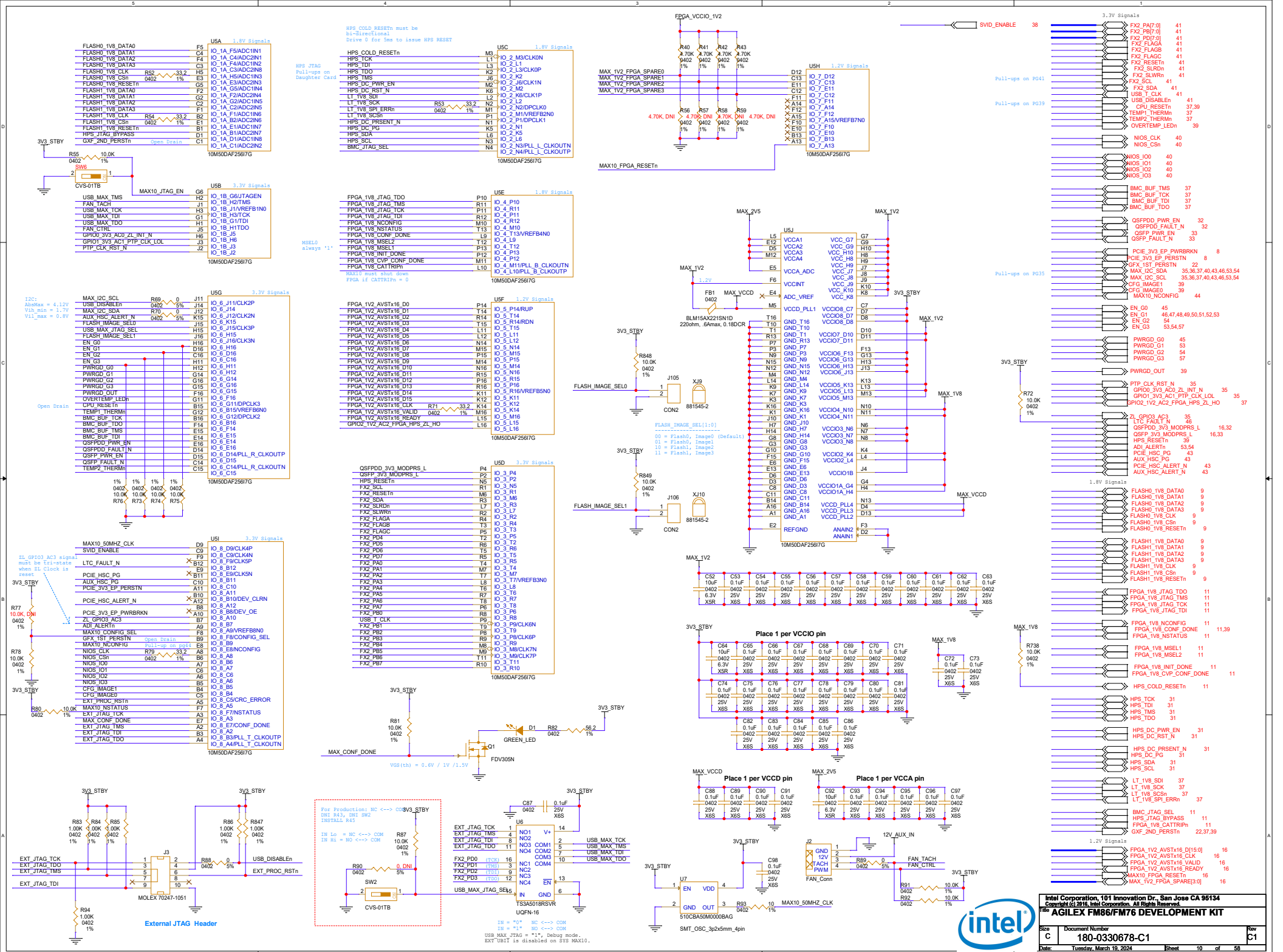
# QSPI Flash for FPGA Image

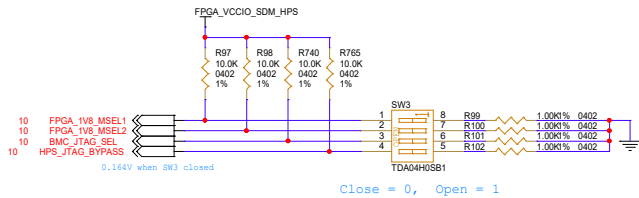
AGILEX AGF027 Bit Stream size = 833.4Mbits  
total FPGA image support = 4



These are dual-die flash so each device is 2 loads on MAX10 IOs

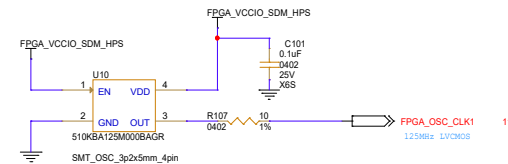
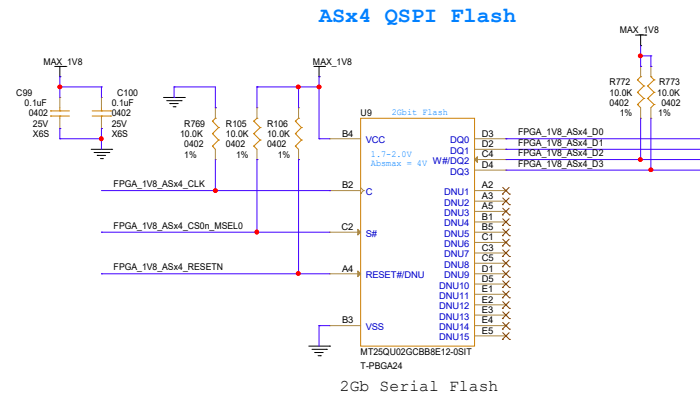
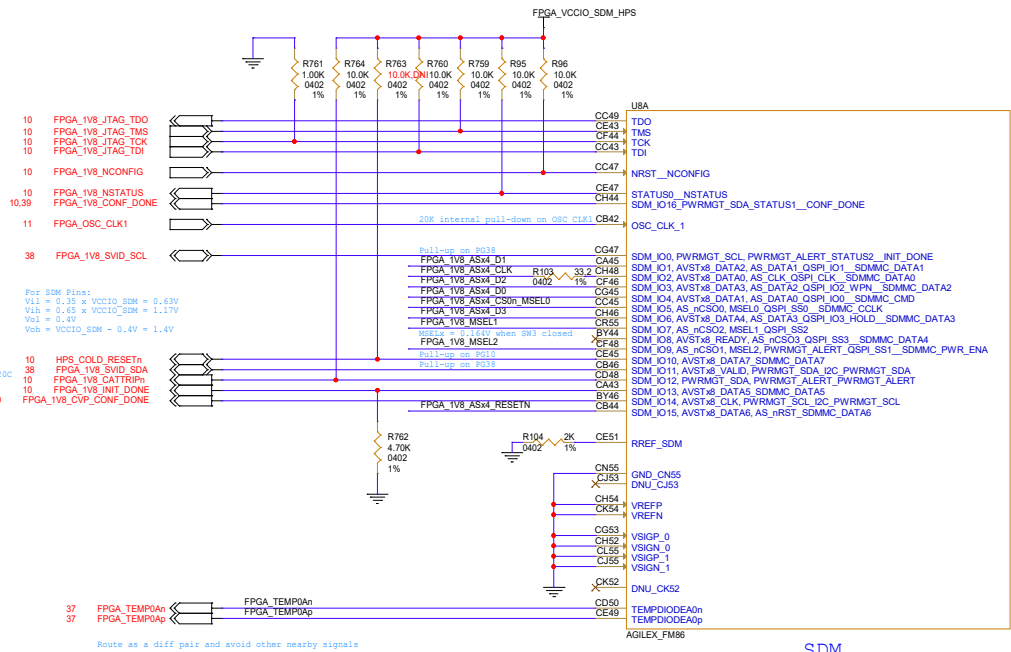






Config Mode	MSEL2	MSEL1	MSEL0
JTAG	1	1	1
AVST x16	1	0	1
AS x4 Fast (CVP)	0	0	1
AS x4 Norm	0	1	1

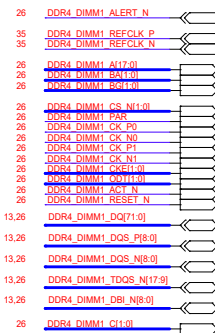
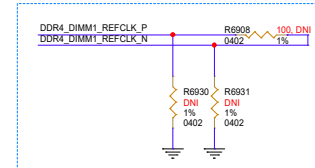
CATREF = 0 if FPGA Die Temp >= 120C



U88		
DDR4 DIMM1 DQ14	DE17	IO, DIFF_RX_2C1N, DQ8
DDR4 DIMM1 DQ12	DF16	IO, DIFF_RX_2C1P, DQ8
DDR4 DIMM1 DQ15	DJ17	IO, DIFF_TX_2C1N, DQ8
DDR4 DIMM1 DQ15	DH16	IO, DIFF_TX_2C1P, DQ8
DDR4 DIMM1 TDQS N10	DE19	IO, DIFF_RX_2C2N, DQ8
DDR4 DIMM1 DBI N1	DF18	IO, DIFF_RX_2C2P, DQ8
DDR4 DIMM1 DQS N1	DJ19	IO, DIFF_RX_2C2P, DQ8
DDR4 DIMM1 DQS P1	DH18	IO, DIFF_TX_2C2N, DQ8N8
DDR4 DIMM1 DQ11	DE21	IO, DIFF_TX_2C2P, DQ8N8
DDR4 DIMM1 DQ8	DF20	IO, CDR, DIFF_RX_2C3N, DQ8
DDR4 DIMM1 DQ9	DJ21	IO, CDR, DIFF_RX_2C3P, DQ8
DDR4 DIMM1 DQ10	DH20	IO, DIFF_TX_2C3N, DQ8
DDR4 DIMM1 DQ4	DA21	IO, DIFF_TX_2C3P, DQ8
DDR4 DIMM1 DQ2	DY20	IO, DIFF_RX_2C4N, DQ9
DDR4 DIMM1 DQ3	DC21	IO, DIFF_RX_2C4P, DQ9
DDR4 DIMM1 DQ5	DD20	IO, DIFF_TX_2C4N, DQ9
DDR4 DIMM1 TDQS N15	DA23	IO, DIFF_TX_2C4P, DQ9
DDR4 DIMM1 DBI N5	CY22	IO, DIFF_RX_2C5N, DQ9
DDR4 DIMM1 DQS N5	DC23	IO, DIFF_RX_2C5P, DQ9
DDR4 DIMM1 DQS P5	DD22	IO, PLL_2C_T_CLKOUT1N, DIFF_TX_2C5N, DQ8N9
DDR4 DIMM1 DQ5	DA25	IO, PLL_2C_T_CLKOUT1P, PLL_2C_T_CLKOUT1, PLL_2C_T_FB1, DIFF_TX_2C5P, DQ8N9
DDR4 DIMM1 DQ4	CY24	IO, CDR, DIFF_RX_2C6N, DQ9
DDR4 DIMM1 DQ9	DC25	IO, RZQ, B_2C_CDR, DIFF_RX_2C6P, DQ9
DDR4 DIMM1 DQ9	DD24	IO, CLK_T_2C_IN, DQ9
DDR4 DIMM1 DQ3	DE23	IO, CLK_T_2C_IP, DQ9
DDR4 DIMM1 DQ3	DF22	IO, CLK_T_2C_IN, DQ10
DDR4 DIMM1 DQ3	DJ23	IO, CLK_T_2C_OP, DQ10
DDR4 DIMM1 DQ3	DH22	IO, DIFF_TX_2C7N, DQ10
DDR4 DIMM1 TDQS N13	DE25	IO, DIFF_TX_2C7P, DQ10
DDR4 DIMM1 DBI N4	DF24	IO, PLL_2C_T_CLKOUT0N, DIFF_RX_2C8N, DQ10
DDR4 DIMM1 DQS N4	DJ25	IO, PLL_2C_T_CLKOUT0P, PLL_2C_T_CLKOUT0, PLL_2C_T_FB0, DIFF_RX_2C8P, DQ10
DDR4 DIMM1 DQS P4	DH24	IO, DIFF_TX_2C8N, DQ8H0
DDR4 DIMM1 DQ3	DE27	IO, DIFF_TX_2C8P, DQ8I0
DDR4 DIMM1 DQ3	DF26	IO, CDR, DIFF_RX_2C9N, DQ10
DDR4 DIMM1 DQ3	DJ27	IO, CDR, DIFF_RX_2C9P, DQ10
DDR4 DIMM1 DQ3	DH26	IO, DIFF_TX_2C9N, DQ10
DDR4 DIMM1 DQ4	DA27	IO, DIFF_TX_2C9P, DQ10
DDR4 DIMM1 DQ5	CY26	IO, DIFF_RX_2C10N, DQ11
DDR4 DIMM1 DQ6	DC27	IO, DIFF_RX_2C10P, DQ11
DDR4 DIMM1 DQ7	DD26	IO, DIFF_TX_2C10N, DQ11
DDR4 DIMM1 TDQS N9	DA29	IO, DIFF_TX_2C10P, DQ11
DDR4 DIMM1 DBI N0	CY28	IO, DIFF_RX_2C11N, DQ11
DDR4 DIMM1 DQS N0	DC29	IO, DIFF_RX_2C11P, DQ8I1
DDR4 DIMM1 DQS P0	DD28	IO, DIFF_TX_2C11N, DQ8N11
DDR4 DIMM1 DQ3	DA31	IO, CDR, DIFF_RX_2C12N, DQ11
DDR4 DIMM1 DQ2	CY30	IO, CDR, DIFF_RX_2C12P, DQ11
DDR4 DIMM1 DQ0	DC31	IO, DIFF_TX_2C12N, DQ11
DDR4 DIMM1 DQ1	DD30	IO, DIFF_TX_2C12P, DQ11
AGILEX FM86		

BANK 2C available in both FM86, FM76

External termination for tuning since OCT +/-40ohm accuracy.  
OCT should be turned off when external termination is used



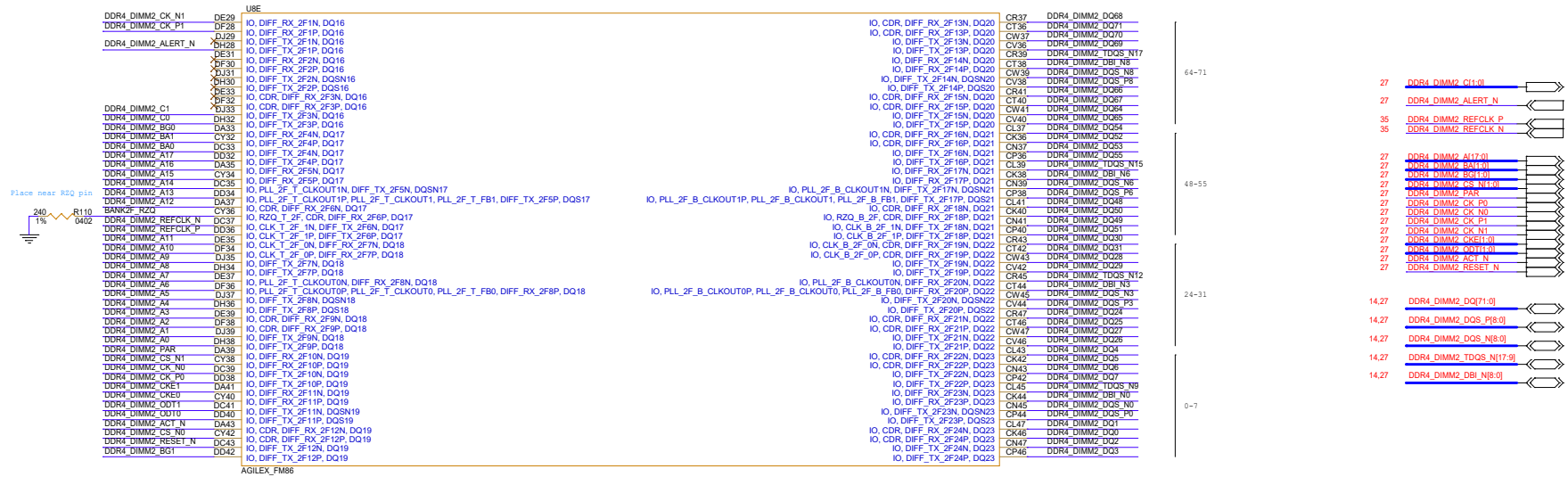


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**File AGILEX FMN6/FM76 DEVELOPMENT KIT**

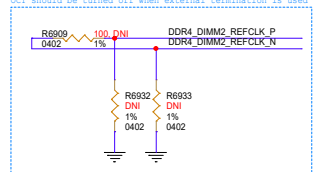
Size	Document Number	Rev
C	18-0330678-C1	C1
Date:	Tuesday, March 19, 2024	Sheet 14 of 58

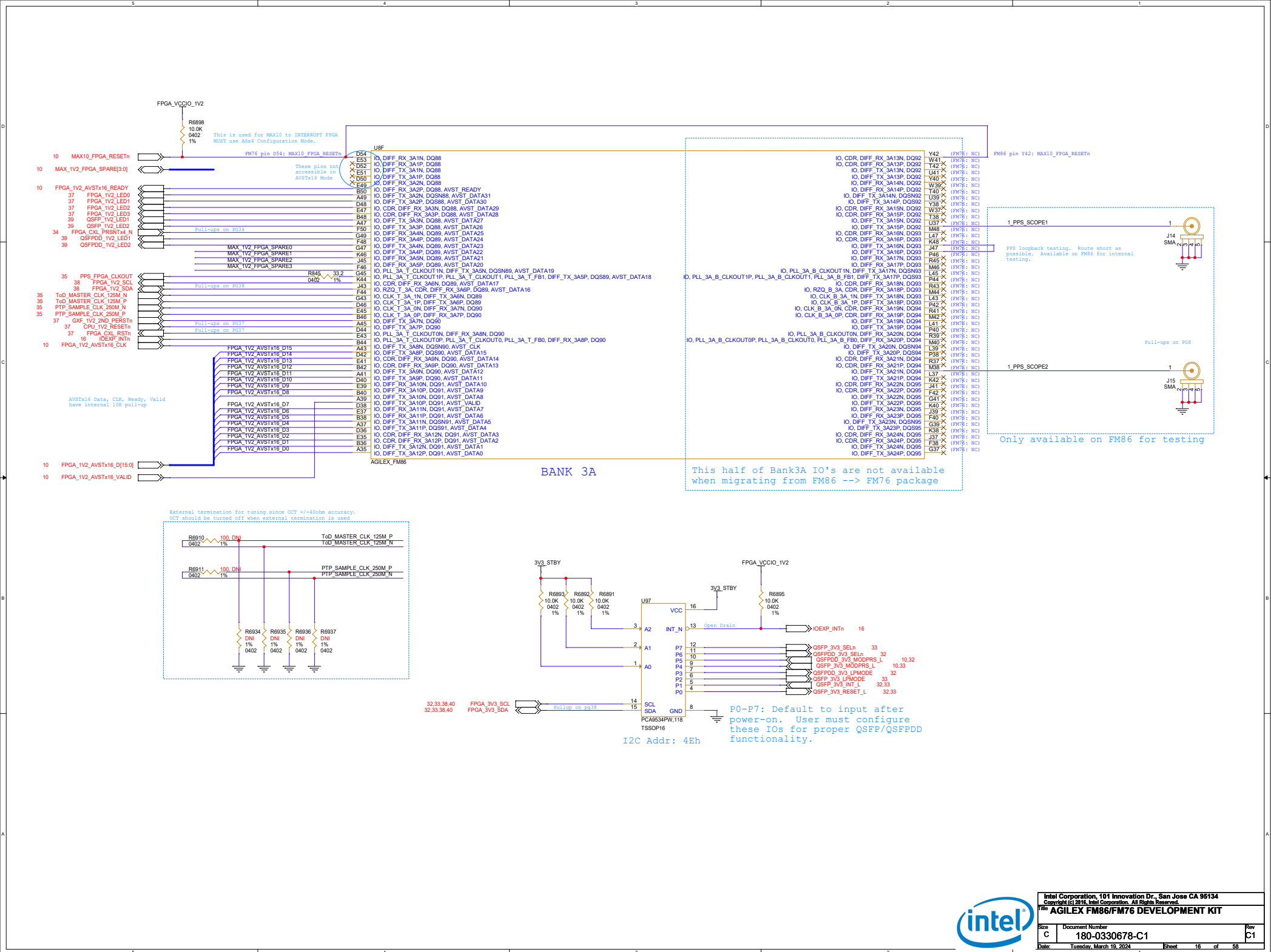
DIMM2 not available in FM76 Devkit version



BANK 2F available in both FM86, FM76

External termination for tuning since OCT +/-40ohm accuracy.  
OCT should be turned off when external termination is used.





Bank3B is not available in Agilex FM76.  
So no IO's will be used to support Migration from FM86 --> FM76.  
BANK3B is powered down in this devkit.

U8G		
(FM76: NC)	X K36	IO, CDR, DIFF, RX, 3B13N, DQ84
(FM76: NC)	X J35	IO, CDR, DIFF, RX, 3B13P, DQ84
(FM76: NC)	X F36	IO, DIFF, TX, 3B13N, DQ84
(FM76: NC)	X G35	IO, DIFF, TX, 3B13P, DQ84
(FM76: NC)	X K34	IO, DIFF, RX, 3B14N, DQ84
(FM76: NC)	X J33	IO, DIFF, RX, 3B14P, DQ84
(FM76: NC)	X F34	IO, DIFF, TX, 3B14N, DQ84
(FM76: NC)	X G33	IO, DIFF, TX, 3B14P, DQ84
(FM76: NC)	X K32	IO, CDR, DIFF, RX, 3B15N, DQ84
(FM76: NC)	X J31	IO, CDR, DIFF, RX, 3B15P, DQ84
(FM76: NC)	X F32	IO, DIFF, TX, 3B15N, DQ84
(FM76: NC)	X G31	IO, DIFF, TX, 3B15P, DQ84
(FM76: NC)	X D34	IO, DIFF, TX, 3B16P, DQ85
(FM76: NC)	X E33	IO, DIFF, TX, 3B16P, DQ85
(FM76: NC)	X R34	IO, DIFF, TX, 3B16P, DQ85
(FM76: NC)	X A33	IO, DIFF, TX, 3B16P, DQ85
(FM76: NC)	X D32	IO, DIFF, TX, 3B16P, DQ85
(FM76: NC)	X E31	IO, DIFF, TX, 3B16P, DQ85
(FM76: NC)	X B32	IO, DIFF, TX, 3B16P, DQ85
(FM76: NC)	X A31	IO, PLL, 3B, T, CLKOUT1N, DIFF, TX, 3B5N, DQSN81
(FM76: NC)	X D30	IO, PLL, 3B, T, CLKOUT1P, PLL, 3B, T, CLKOUT1, PLL, 3B, T, FB1, DIFF, TX, 3B5P, DQSN81
(FM76: NC)	X E29	IO, CDR, DIFF, RX, 3B6N, DQ81
(FM76: NC)	X B30	IO, RZQ, T, 3B, CDR, DIFF, RX, 3B6P, DQ81
(FM76: NC)	X A29	IO, CLK, T, 3B, 1N, DIFF, TX, 3B6N, DQ81
(FM76: NC)	X K30	IO, CLK, T, 3B, 1P, DIFF, TX, 3B6P, DQ81
(FM76: NC)	X J29	IO, CLK, T, 3B, 1N, DIFF, RX, 3B7N, DQ82
(FM76: NC)	X F30	IO, CLK, T, 3B, 1P, DIFF, RX, 3B7P, DQ82
(FM76: NC)	X G29	IO, DIFF, TX, 3B7N, DQ82
(FM76: NC)	X K28	IO, DIFF, TX, 3B7P, DQ82
(FM76: NC)	X J27	IO, PLL, 3B, T, CLKOUT0N, DIFF, RX, 3B8N, DQ82
(FM76: NC)	X F28	IO, PLL, 3B, T, CLKOUT0P, PLL, 3B, T, CLKOUT0, PLL, 3B, T, FB0, DIFF, RX, 3B8P, DQ82
(FM76: NC)	X G27	IO, DIFF, TX, 3B8N, DQ82
(FM76: NC)	X K26	IO, DIFF, TX, 3B8P, DQ82
(FM76: NC)	X J25	IO, CDR, DIFF, RX, 3B9N, DQ82
(FM76: NC)	X F26	IO, CDR, DIFF, RX, 3B9P, DQ82
(FM76: NC)	X G25	IO, DIFF, TX, 3B9N, DQ82
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(FM76: NC)	X A27	IO, DIFF, TX, 3B10P, DQ83
(FM76: NC)	X D26	IO, DIFF, RX, 3B11N, DQ83
(FM76: NC)	X E25	IO, DIFF, RX, 3B11P, DQ83
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(FM76: NC)	X B24	IO, CDR, DIFF, RX, 3B12P, DQ83
(FM76: NC)	X A23	IO, DIFF, TX, 3B12N, DQ83
(FM76: NC)	X	IO, DIFF, TX, 3B12P, DQ83
AGILEX_FM86		
(FM76: NC)	X P36	IO, CDR, DIFF, RX, 3B13N, DQ84
(FM76: NC)	X R35	IO, CDR, DIFF, RX, 3B13P, DQ84
(FM76: NC)	X M36	IO, DIFF, TX, 3B13N, DQ84
(FM76: NC)	X L35	IO, DIFF, TX, 3B13P, DQ84
(FM76: NC)	X P34	IO, DIFF, RX, 3B14N, DQ84
(FM76: NC)	X R33	IO, DIFF, RX, 3B14P, DQ84
(FM76: NC)	X M34	IO, DIFF, TX, 3B14N, DQ84
(FM76: NC)	X L33	IO, DIFF, TX, 3B14P, DQ84
(FM76: NC)	X P32	IO, CDR, DIFF, RX, 3B15N, DQ84
(FM76: NC)	X R31	IO, CDR, DIFF, RX, 3B15P, DQ84
(FM76: NC)	X M32	IO, DIFF, TX, 3B15N, DQ84
(FM76: NC)	X L31	IO, DIFF, TX, 3B15P, DQ84
(FM76: NC)	X P31	IO, CDR, DIFF, RX, 3B16N, DQ85
(FM76: NC)	X R30	IO, CDR, DIFF, RX, 3B16P, DQ85
(FM76: NC)	X M31	IO, DIFF, TX, 3B16N, DQ85
(FM76: NC)	X L30	IO, DIFF, TX, 3B16P, DQ85
(FM76: NC)	X P30	IO, CLK, B, 3B, 0N, CDR, DIFF, RX, 3B16N, DQ86
(FM76: NC)	X R29	IO, CLK, B, 3B, 0P, CDR, DIFF, RX, 3B16P, DQ86
(FM76: NC)	X M30	IO, DIFF, TX, 3B16N, DQ86
(FM76: NC)	X L29	IO, DIFF, TX, 3B16P, DQ86
(FM76: NC)	X P29	IO, PLL, 3B, B, CLKOUT0N, DIFF, RX, 3B20N, DQ86
(FM76: NC)	X R28	IO, PLL, 3B, B, CLKOUT0P, PLL, 3B, B, FB0, DIFF, RX, 3B20P, DQ86
(FM76: NC)	X M29	IO, DIFF, TX, 3B20N, DQ86
(FM76: NC)	X L28	IO, DIFF, TX, 3B20P, DQ86
(FM76: NC)	X P28	IO, CDR, DIFF, RX, 3B21N, DQ86
(FM76: NC)	X R27	IO, CDR, DIFF, RX, 3B21P, DQ86
(FM76: NC)	X M28	IO, DIFF, TX, 3B21N, DQ86
(FM76: NC)	X L27	IO, DIFF, TX, 3B21P, DQ86
(FM76: NC)	X P27	IO, CDR, DIFF, RX, 3B22N, DQ87
(FM76: NC)	X R26	IO, CDR, DIFF, RX, 3B22P, DQ87
(FM76: NC)	X M27	IO, DIFF, TX, 3B22N, DQ87
(FM76: NC)	X L26	IO, DIFF, TX, 3B22P, DQ87
(FM76: NC)	X P26	IO, DIFF, RX, 3B23N, DQ87
(FM76: NC)	X R25	IO, DIFF, RX, 3B23P, DQ87
(FM76: NC)	X M26	IO, DIFF, TX, 3B23N, DQ87
(FM76: NC)	X L25	IO, DIFF, TX, 3B23P, DQ87
(FM76: NC)	X P25	IO, CDR, DIFF, RX, 3B24N, DQ87
(FM76: NC)	X R24	IO, CDR, DIFF, RX, 3B24P, DQ87
(FM76: NC)	X M25	IO, DIFF, TX, 3B24N, DQ87
(FM76: NC)	X L24	IO, DIFF, TX, 3B24P, DQ87

BANK 3B available only in FM86, not FM76



Bank3C is not available in Agilex FM76.  
So no IO's will be used to support Migration from FM86 --> FM76.  
Bank3C is powered down in this devkit

Only half of Bank3C migrates from FM86 --> FM76

USB			
(FM76: NC)	<del>X</del> D12	IO, DIFF, RX, 3C1N, DQ56	Y14
(FM76: NC)	<del>X</del> E11	IO, DIFF, RX, 3C1P, DQ56	W15
(FM76: NC)	<del>X</del> B12	IO, DIFF, TX, 3C1N, DQ56	T14
(FM76: NC)	<del>X</del> A11	IO, DIFF, TX, 3C1N, DQ56	U13
(FM76: NC)	<del>X</del> D14	IO, DIFF, TX, 3C1P, DQ56	Y16
(FM76: NC)	<del>X</del> E13	IO, DIFF, RX, 3C2N, DQ56	W15
(FM76: NC)	<del>X</del> B14	IO, DIFF, RX, 3C2P, DQ56	T16
(FM76: NC)	<del>X</del> A13	IO, DIFF, TX, 3C2N, DQ56	U15
(FM76: NC)	<del>X</del> D15	IO, DIFF, TX, 3C2P, DQ56	W18
(FM76: NC)	<del>X</del> E15	IO, CDR, DIFF, RX, 3C3N, DQ56	Y18
(FM76: NC)	<del>X</del> B16	IO, CDR, DIFF, RX, 3C3P, DQ56	T18
(FM76: NC)	<del>X</del> A15	IO, DIFF, TX, 3C3N, DQ56	U17
(FM76: NC)	<del>X</del> D14	IO, DIFF, TX, 3C3P, DQ56	Y17
(FM76: NC)	<del>X</del> E13	IO, DIFF, RX, 3C4N, DQ57	R13
(FM76: NC)	<del>X</del> B14	IO, DIFF, RX, 3C4P, DQ57	M14
(FM76: NC)	<del>X</del> A14	IO, DIFF, TX, 3C4N, DQ57	L13
(FM76: NC)	<del>X</del> D15	IO, DIFF, TX, 3C4P, DQ57	P16
(FM76: NC)	<del>X</del> E15	IO, DIFF, RX, 3C5N, DQ57	R15
(FM76: NC)	<del>X</del> B16	IO, DIFF, RX, 3C5P, DQ57	M16
(FM76: NC)	<del>X</del> A15	IO, PLL, 3C, T, CLKOUT1N, DIFF, TX, 3C5N, DQ57	L15
(FM76: NC)	<del>X</del> D16	IO, PLL, 3C, T, CLKOUT1P, PLL, 3C, T, CLKOUT1, PLL, 3C, T, FB1, DIFF, TX, 3C5P, DQ57	P18
(FM76: NC)	<del>X</del> E16	IO, CDR, DIFF, RX, 3C6N, DQ57	R17
(FM76: NC)	<del>X</del> B17	IO, R2Q, T, 3C, CDR, DIFF, RX, 3C6P, DQ57	M18
(FM76: NC)	<del>X</del> A16	IO, CLK, T, 3C, IN, DIFF, TX, 3C6N, DQ57	L17
(FM76: NC)	<del>X</del> D17	IO, CLK, T, 3C, IP, DIFF, TX, 3C6P, DQ57	P20
(FM76: NC)	<del>X</del> E17	IO, CLK, T, 3C, ON, DIFF, RX, 3C7N, DQ58	R19
(FM76: NC)	<del>X</del> B18	IO, CLK, T, 3C, OP, DIFF, RX, 3C7P, DQ58	M20
(FM76: NC)	<del>X</del> A17	IO, DIFF, TX, 3C7N, DQ58	L19
(FM76: NC)	<del>X</del> D20	IO, DIFF, TX, 3C7P, DQ58	P22
(FM76: NC)	<del>X</del> E19	IO, PLL, 3C, T, CLKOUT0N, DIFF, RX, 3C8N, DQ58	R21
(FM76: NC)	<del>X</del> B20	IO, PLL, 3C, T, CLKOUT0P, PLL, 3C, T, CLKOUT0, PLL, 3C, T, FB0, DIFF, RX, 3C8P, DQ58	M22
(FM76: NC)	<del>X</del> A19	IO, DIFF, TX, 3C8N, DQ58	L21
(FM76: NC)	<del>X</del> D22	IO, DIFF, TX, 3C8P, DQ58	P24
(FM76: NC)	<del>X</del> E21	IO, CDR, DIFF, RX, 3C9N, DQ58	R23
(FM76: NC)	<del>X</del> B22	IO, CDR, DIFF, RX, 3C9P, DQ58	M24
(FM76: NC)	<del>X</del> A21	IO, DIFF, TX, 3C9N, DQ58	L23
(FM76: NC)	<del>X</del> D20	IO, DIFF, TX, 3C9P, DQ58	Y20
(FM76: NC)	<del>X</del> E19	IO, DIFF, RX, 3C10N, DQ59	W19
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(FM76: NC)	<del>X</del> A19	IO, DIFF, TX, 3C10N, DQ59	U19
(FM76: NC)	<del>X</del> D22	IO, DIFF, TX, 3C10P, DQ59	Y22
(FM76: NC)	<del>X</del> E21	IO, DIFF, RX, 3C11N, DQ59	W21
(FM76: NC)	<del>X</del> B22	IO, DIFF, TX, 3C11P, DQ59	Y22
(FM76: NC)	<del>X</del> A21	IO, DIFF, TX, 3C11N, DQ59	U21
(FM76: NC)	<del>X</del> D23	IO, DIFF, TX, 3C11P, DQ59	Y24
(FM76: NC)	<del>X</del> E22	IO, CDR, DIFF, RX, 3C12N, DQ59	W23
(FM76: NC)	<del>X</del> B23	IO, CDR, DIFF, RX, 3C12P, DQ59	Y24
(FM76: NC)	<del>X</del> A22	IO, DIFF, TX, 3C12N, DQ59	U23
(FM76: NC)	<del>X</del> D23	IO, DIFF, TX, 3C12P, DQ59	Y23
AGILEX_FM86			

Not available in FM76

Available in FM86 and FM76



BYTE1: 8-15

BYTE3: 24-31

BYTE2: 16-23

BYTE0: 0-7

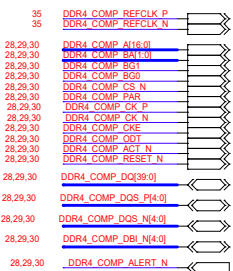
DDR4_COMP_DQ9		P2	IO, DIFF_RX_3D1N, DQ48	IO, CDR, DIFF_RX_3D13N, DQ52	AD2	DDR4_COMP_DQ33
DDR4_COMP_DQ11		R1	IO, DIFF_RX_3D1P, DQ48	IO, CDR, DIFF_RX_3D13P, DQ52	AE1	DDR4_COMP_DQ38
DDR4_COMP_DQ14		M2	IO, DIFF_TX_3D1N, DQ48	IO, DIFF_TX_3D13N, DQ52	AB2	DDR4_COMP_DQ34
DDR4_COMP_DQ15		L1	IO, DIFF_TX_3D1P, DQ48	IO, DIFF_TX_3D13P, DQ52	AA1	DDR4_COMP_DQ36
DDR4_COMP_DBI_N1		X R3	IO, DIFF_RX_3D2N, DQ48	IO, DIFF_RX_3D14N, DQ52	AA3	DDR4_COMP_DBI_N4
DDR4_COMP_DQS_N1		M4	IO, DIFF_RX_3D2P, DQ48	IO, DIFF_RX_3D14P, DQ52	AB4	DDR4_COMP_DQS_N4
DDR4_COMP_DQ12		P6	IO, DIFF_TX_3D2P, DQ48	IO, DIFF_TX_3D14P, DQ52	AA5	DDR4_COMP_DQS_M4
DDR4_COMP_DQ13		R5	IO, CDR, DIFF_RX_3D3N, DQ48	IO, CDR, DIFF_RX_3D15N, DQ52	AB6	DDR4_COMP_DQS_M4
DDR4_COMP_DQ8		M6	IO, CDR, DIFF_RX_3D3P, DQ48	IO, CDR, DIFF_RX_3D15P, DQ52	AB7	DDR4_COMP_DQ37
DDR4_COMP_DQ10		L5	IO, DIFF_TX_3D3N, DQ48	IO, DIFF_TX_3D15N, DQ52	AB8	DDR4_COMP_DQ35
DDR4_COMP_DQ27		K2	IO, DIFF_TX_3D3P, DQ48	IO, DIFF_TX_3D15P, DQ52	AA7	DDR4_COMP_DQ32
DDR4_COMP_DQ25		J1	IO, DIFF_RX_3D4N, DQ49	IO, CDR, DIFF_RX_3D16N, DQ53	V2	DDR4_COMP_BA0
DDR4_COMP_DQ26		F2	IO, DIFF_RX_3D4P, DQ49	IO, CDR, DIFF_RX_3D16P, DQ53	W1	DDR4_COMP_BA1
DDR4_COMP_DQ31		G1	IO, DIFF_TX_3D4N, DQ49	IO, DIFF_TX_3D16N, DQ53	T2	DDR4_COMP_BA0
DDR4_COMP_DQ31		X K4	IO, DIFF_TX_3D4P, DQ49	IO, DIFF_TX_3D16P, DQ53	U1	DDR4_COMP_ALERT_N
DDR4_COMP_DBI_N3		X J3	IO, DIFF_RX_3D5N, DQ49	IO, DIFF_RX_3D17N, DQ53	V4	DDR4_COMP_A16
DDR4_COMP_DQS_N3		F4	IO, DIFF_RX_3D5P, DQ49	IO, DIFF_RX_3D17P, DQ53	W3	DDR4_COMP_A15
DDR4_COMP_DQS_P3		G3	IO, PLL_3D_T_CLKOUT1N, DIFF_TX_3D5N, DQ54	IO, PLL_3D_B_CLKOUT1N, DIFF_TX_3D17N, DQ53	T4	DDR4_COMP_A14
DDR4_COMP_DQ28		K6	IO, PLL_3D_T_CLKOUT1P, PLL_3D_T_CLKOUT1, PLL_3D_T_FB1, DIFF_TX_3D5P, DQ54	IO, PLL_3D_B_CLKOUT1P, PLL_3D_B_CLKOUT1, PLL_3D_B_FB1, DIFF_TX_3D17P, DQ53	U3	DDR4_COMP_A13
DDR4_COMP_DQ29		J5	IO, CDR, DIFF_RX_3D6N, DQ49	IO, CDR, DIFF_RX_3D18N, DQ53	V6	DDR4_COMP_A12
DDR4_COMP_DQ24		F6	IO, R2Q_T_3D_CDR, DIFF_RX_3D6P, DQ49	IO, R2Q_B_3D_CDR, DIFF_RX_3D18P, DQ53	W5	DDR4_COMP_R2Q
DDR4_COMP_DQ30		G5	IO, CLK_T_3D_1N, DIFF_TX_3D6N, DQ49	IO, CLK_B_3D_1N, DIFF_TX_3D18N, DQ53	T6	DDR4_COMP_REFCLK_N
DDR4_COMP_DQ19		D6	IO, CLK_T_3D_1P, DIFF_TX_3D6P, DQ49	IO, CLK_B_3D_1P, DIFF_TX_3D18P, DQ53	U5	DDR4_COMP_REFCLK_P
DDR4_COMP_DQ23		E5	IO, CLK_T_3D_0N, DIFF_RX_3D7N, DQ50	IO, CLK_B_3D_0N, CDR, DIFF_RX_3D19N, DQ54	V8	DDR4_COMP_A11
DDR4_COMP_DQ17		B6	IO, CLK_T_3D_0P, DIFF_RX_3D7P, DQ50	IO, CLK_B_3D_0P, CDR, DIFF_RX_3D19P, DQ54	W7	DDR4_COMP_A10
DDR4_COMP_DQ21		C5	IO, DIFF_TX_3D7N, DQ50	IO, DIFF_TX_3D19N, DQ54	T8	DDR4_COMP_A9
DDR4_COMP_DBI_N2		X D8	IO, DIFF_TX_3D7P, DQ50	IO, DIFF_TX_3D19P, DQ54	U7	DDR4_COMP_A8
DDR4_COMP_DQS_N2		E7	IO, PLL_3D_T_CLKOUT1N, DIFF_RX_3D8N, DQ50	IO, PLL_3D_B_CLKOUT1N, DIFF_RX_3D20N, DQ54	Y10	DDR4_COMP_A7
DDR4_COMP_DQS_P2		B8	IO, PLL_3D_T_CLKOUT1P, PLL_3D_T_CLKOUT0, PLL_3D_T_FB0, DIFF_RX_3D8P, DQ50	IO, PLL_3D_B_CLKOUT1P, PLL_3D_B_CLKOUT0, PLL_3D_B_FB0, DIFF_RX_3D20P, DQ54	Y9	DDR4_COMP_A6
DDR4_COMP_DQ20		A7	IO, DIFF_TX_3D8N, DQ50	IO, DIFF_TX_3D20N, DQ54	U9	DDR4_COMP_A5
DDR4_COMP_DQ18		D10	IO, DIFF_TX_3D8P, DQ50	IO, DIFF_TX_3D20P, DQ54	Y12	DDR4_COMP_A3
DDR4_COMP_DQ22		E9	IO, CDR, DIFF_RX_3D9N, DQ50	IO, CDR, DIFF_RX_3D21N, DQ54	W11	DDR4_COMP_A2
DDR4_COMP_DQ22		B10	IO, CDR, DIFF_RX_3D9P, DQ50	IO, CDR, DIFF_RX_3D21P, DQ54	T12	DDR4_COMP_A1
DDR4_COMP_DQ16		A9	IO, DIFF_TX_3D9N, DQ50	IO, DIFF_TX_3D21N, DQ54	U11	DDR4_COMP_A0
DDR4_COMP_DQ3		K8	IO, DIFF_TX_3D9P, DQ50	IO, DIFF_TX_3D21P, DQ54	P8	DDR4_COMP_PAR
DDR4_COMP_DQ7		J7	IO, DIFF_RX_3D10N, DQ51	IO, CDR, DIFF_RX_3D22N, DQ55	R7	DDR4_COMP_CK_N
DDR4_COMP_DQ1		F8	IO, DIFF_RX_3D10P, DQ51	IO, DIFF_TX_3D22N, DQ55	M8	DDR4_COMP_CK_P
DDR4_COMP_DQ5		G7	IO, DIFF_TX_3D10N, DQ51	IO, DIFF_TX_3D22P, DQ55	L7	DDR4_COMP_CKE
DDR4_COMP_DBI_N0		X K8	IO, DIFF_RX_3D11N, DQ51	IO, DIFF_RX_3D23N, DQ55	P10	DDR4_COMP_CKE
DDR4_COMP_DQS_N0		F10	IO, DIFF_RX_3D11P, DQ51	IO, DIFF_RX_3D23P, DQ55	M10	DDR4_COMP_CKE
DDR4_COMP_DQS_P0		G9	IO, DIFF_TX_3D11N, DQ51	IO, DIFF_TX_3D23N, DQ55	L9	DDR4_COMP_CDT
DDR4_COMP_DQ6		K12	IO, DIFF_TX_3D11P, DQ51	IO, DIFF_TX_3D23P, DQ55	P12	DDR4_COMP_ACT_N
DDR4_COMP_DQ4		J11	IO, CDR, DIFF_RX_3D12N, DQ51	IO, CDR, DIFF_RX_3D24N, DQ55	R11	DDR4_COMP_CS_N
DDR4_COMP_DQ0		F12	IO, CDR, DIFF_RX_3D12P, DQ51	IO, CDR, DIFF_RX_3D24P, DQ55	M12	DDR4_COMP_RESET_N
DDR4_COMP_DQ2		G11	IO, DIFF_TX_3D12N, DQ51	IO, DIFF_TX_3D24N, DQ55	L11	DDR4_COMP_BG1
			IO, DIFF_TX_3D12P, DQ51	IO, DIFF_TX_3D24P, DQ55		

AGILEX\_FM86

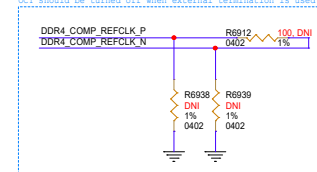
BANK 3D available in both FM86, FM76

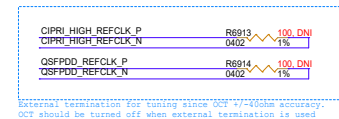
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(ECC)

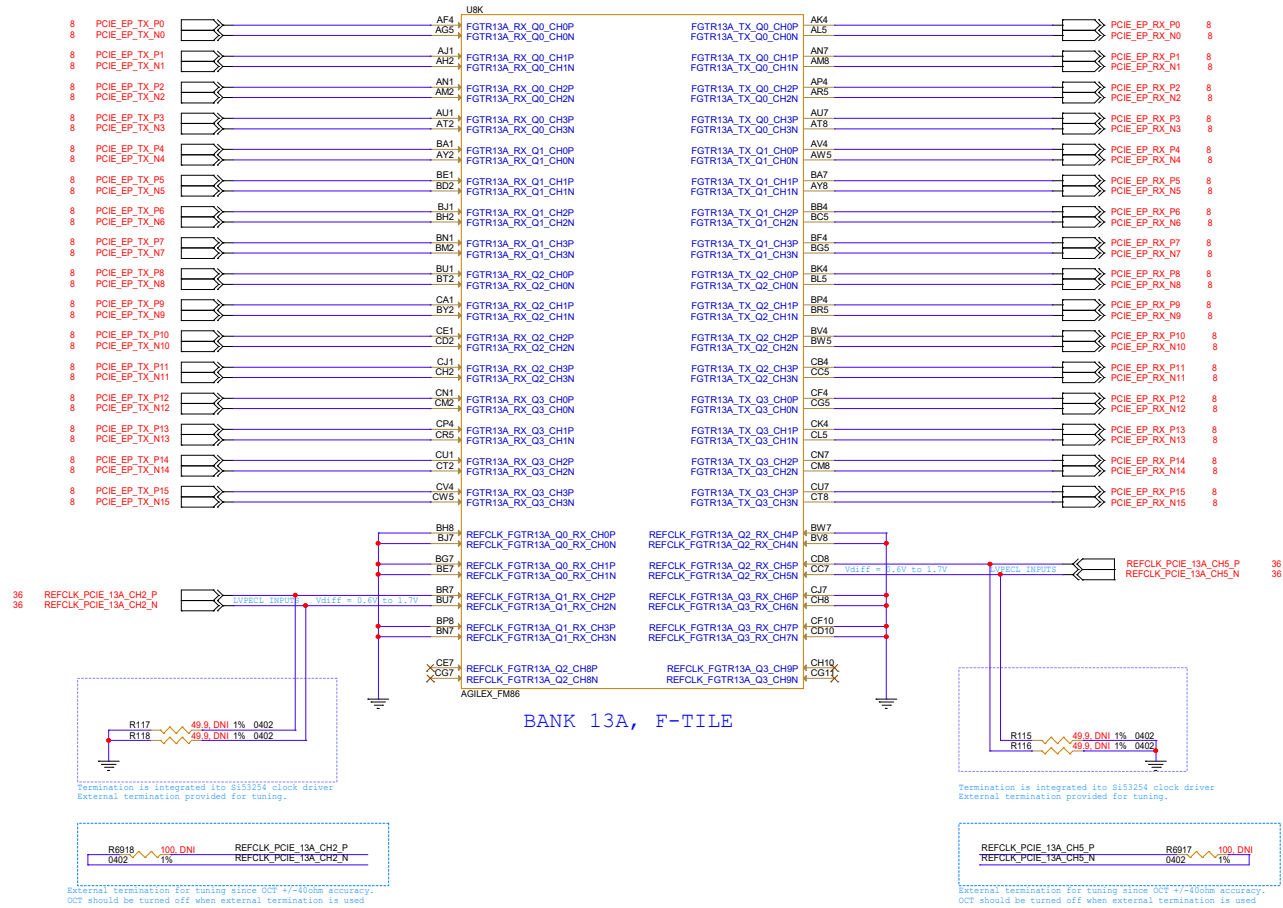
Place near R5Q pin

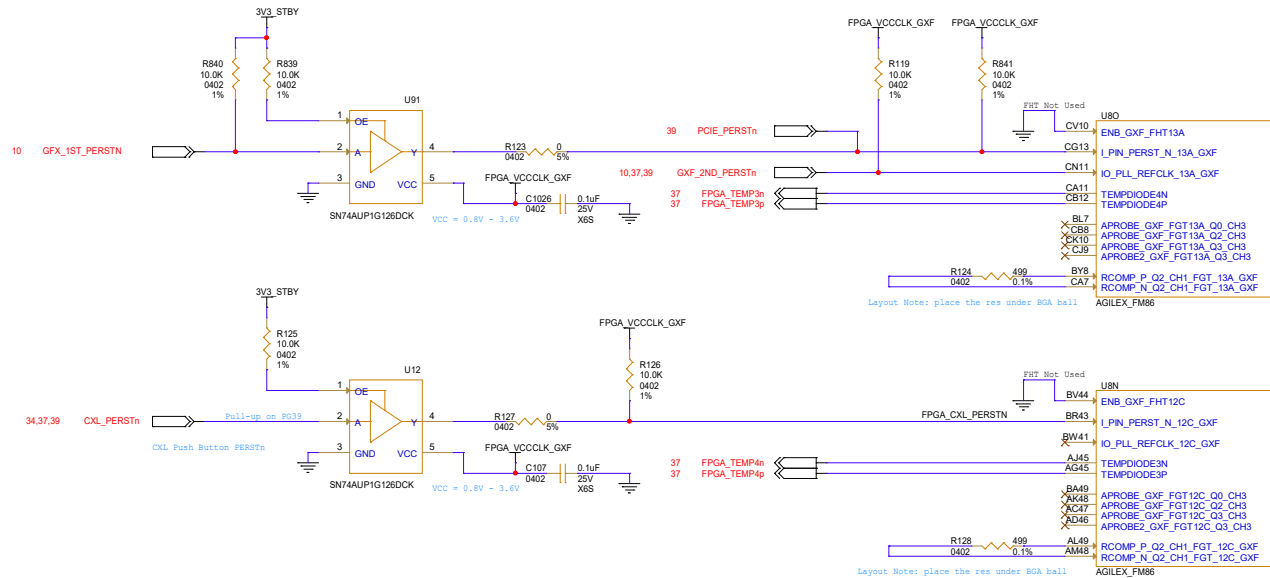
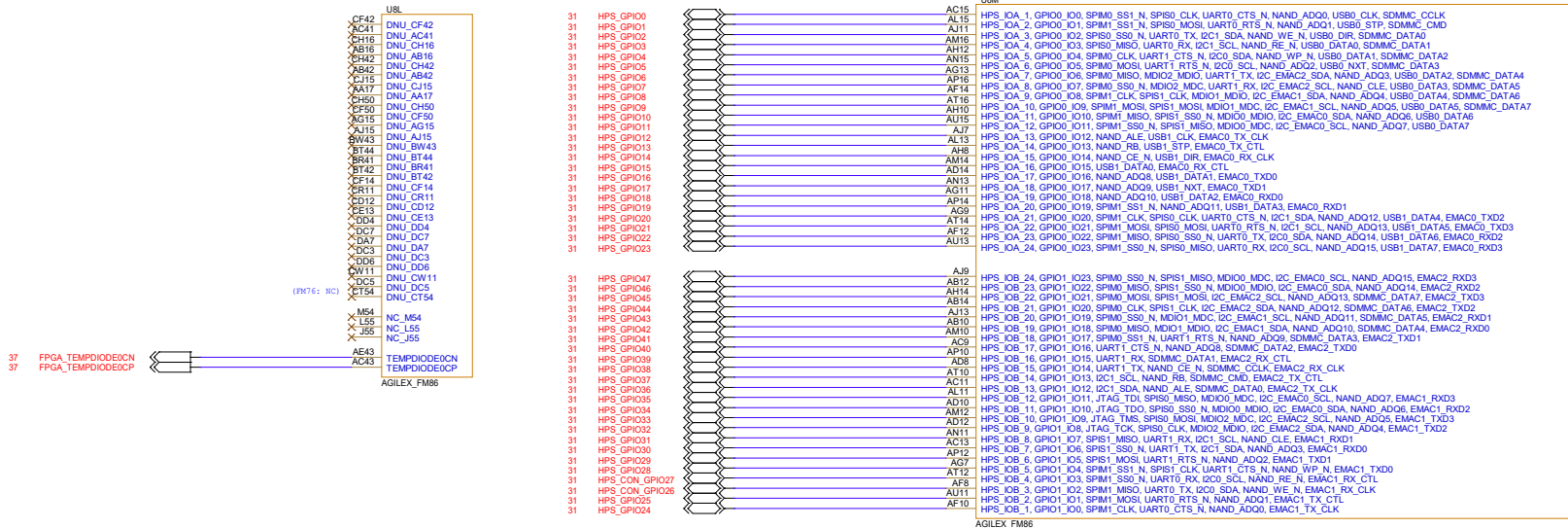


External termination for tuning since OCT +/-40ohm accuracy.  
OCT should be turned off when external termination is used.











[illegible]

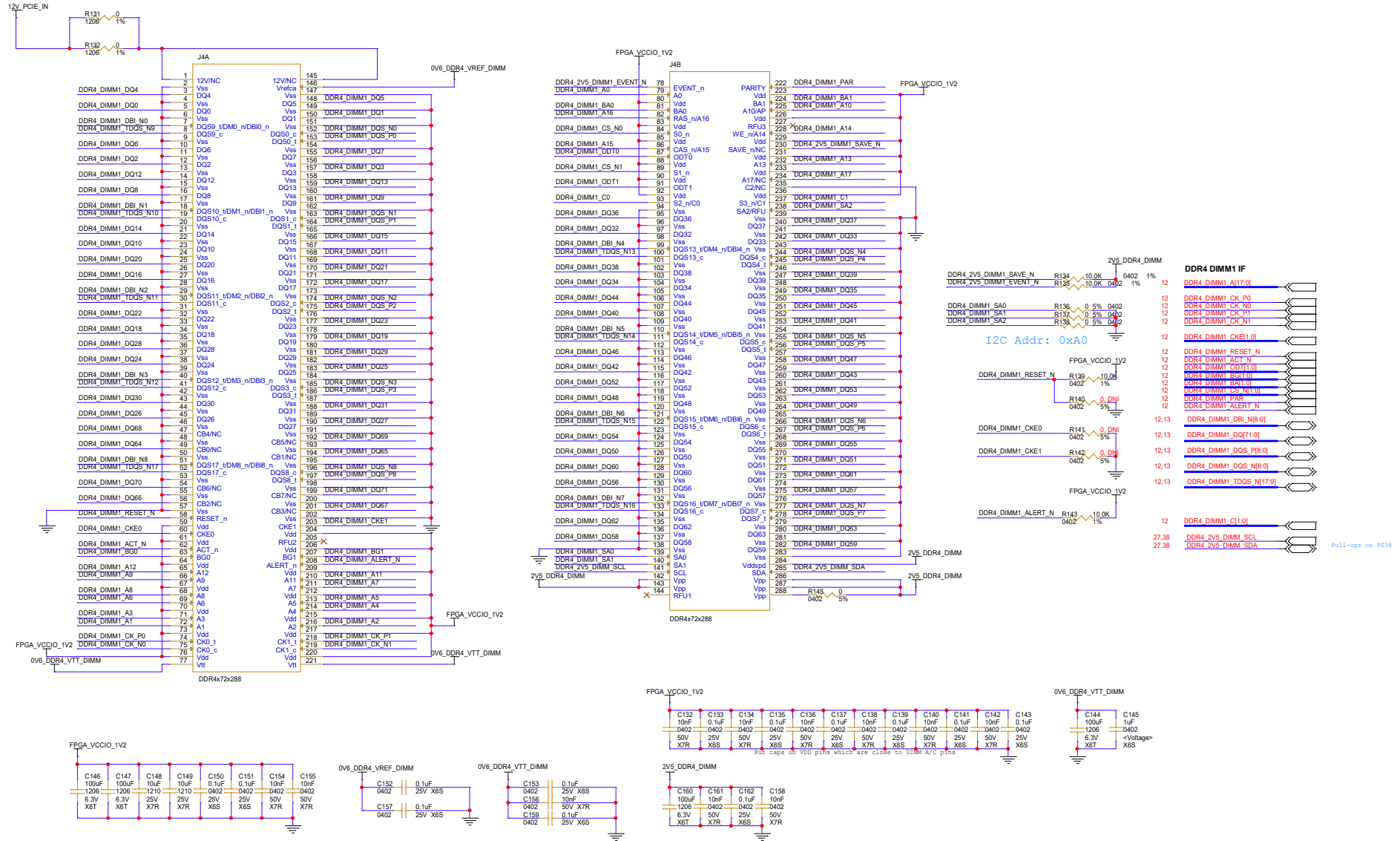
# DDR4/DDR-T DIMM Pin Map

Pin #	Front Side	Pin #	Back Side	Pin #	Front Side	Pin #	Back Side	Pin #	Front Side	Pin #	Back Side	Pin #	Front Side	Pin #	Back Side
1	VDD	145	VDD	38	DQ24	182	VSS	75	CLK0#	219	CLK1#	108	DQ40	252	VSS
2	VSS	146	VREFCA	39	VSS	183	DQ25	76	VDD	220	VDD	109	VSS	253	DQ41
3	DQ4	147	VSS	40	DQS12	184	VSS	77	VTT	221	VTT	110	DQS14	254	VSS
4	VSS	148	DQ5	41	DQS12#	185	DQS13#					111	DQS14#	255	DQS5#
5	DQ0	149	VSS	42	VSS	186	DQS3					112	VSS	256	DQS5
6	VSS	150	DQ1	43	DQ30	187	VSS					113	DQ45	257	VSS
7	DQS0	151	VSS	44	VSS	188	DQ31					114	VSS	258	DQ47
8	DQS0#	152	DQS0#	45	DQ26	189	VSS	78	EVENT	222	PARITY	115	DQ42	259	VSS
9	VSS	153	DQS0	46	VSS	190	DQ27	79	A0	223	VDD	116	VSS	260	DQ43
10	DQ6	154	VSS	47	CB4	191	VSS	80	VDD	224	BA1	117	DQ52	261	VSS
11	VSS	155	DQ7	48	VSS	192	CB5	81	BA0	225	A10	118	VSS	262	DQ53
12	DQ2	156	VSS	49	CB0	193	VSS	82	RASH/A16	226	VDD	119	DQ49	263	VSS
13	VSS	157	DQ3	50	VSS	194	CB1	83	VDD	227	RFU	120	VSS	264	DQ49
14	DQ12	158	VSS	51	DQS17	195	VSS	84	CS0#	228	WE#/A14	121	DQS15	265	VSS
15	VSS	159	DQ13	52	DQS17#	196	DQS8#	85	VDD	229	VDD	122	DQS15#	266	DQS6#
16	DQ8	160	VSS	53	VSS	197	DQS8	86	CASH/A15	230	SAVE#	123	VSS	267	DQS6
17	VSS	161	DQ9	54	CB6	198	VSS	87	ODT0	231	VDD	124	DQ54	268	VSS
18	DQS10	162	VSS	55	VSS	199	CB7	88	VDD	232	A13	125	VSS	269	DQS5
19	DQS10#	163	DQS1#	56	CB2	200	VSS	89	CS1#	233	VDD	126	DQ50	270	VSS
20	VSS	164	DQS1	57	VSS	201	CB3	90	VDD	234	A17	127	VSS	271	DQS1
21	DQ14	165	VSS	58	RESET#	202	VSS	91	ODT1	235	C2	128	DQ60	272	VSS
22	VSS	166	DQ15	59	VDD	203	CKE1	92	VDD	236	VDD	129	VSS	273	DQ51
23	DQ10	167	VSS	60	CKE0	204	VDD	93	C0	237	C1	130	DQ36	274	VSS
24	VSS	168	DQ11	61	VDD	205	RFU	94	VSS	238	SA2	131	VSS	275	DQ57
25	DQ20	169	VSS	62	ACT#	206	VDD	95	DQ36	239	VSS	132	DQS16	276	VSS
26	VSS	170	DQ21	63	BG0	207	BG1	96	VSS	240	DQ37	133	DQS16#	277	DQS7#
27	DQ16	171	VSS	64	VDD	208	ALERT#	97	DQ32	241	VSS	134	VSS	278	DQS7
28	VSS	172	DQ17	65	A12	209	VDD	98	VSS	242	DQ33	135	DQ52	279	VSS
29	DQS11	173	VSS	66	A9	210	A11	99	DQS13	243	VSS	136	VSS	280	DQ63
30	DQS11#	174	DQS2#	67	VDD	211	A7	100	DQS13#	244	DQS4#	137	DQ58	281	VSS
31	VSS	175	DQS2	68	A8	212	VDD	101	VSS	245	DC154	138	VSS	282	DQ59
32	DQ22	176	VSS	69	A6	213	A5	102	DQ38	246	VSS	139	SA0	283	VSS
33	VSS	177	DQ23	70	VDD	214	A4	103	VSS	247	DQ39	140	SA1	284	VDDSPD
34	DQ18	178	VSS	71	A3	215	VDD	104	DQ34	248	VSS	141	SCL	285	SDA
35	VSS	179	DQ19	72	A1	216	A2	105	VSS	249	DQ35	142	VPP	286	VPP
36	DQ28	180	VSS	73	VDD	217	VDD	106	DQ44	250	VSS	143	VPP	287	VPP
37	VSS	181	DQ29	74	CLK0	218	CLK1	107	VSS	251	DQ45	144	RFU	288	VPP

DDR-T DIMM Pin Map is Identical to standard DDR4 DIMM Pin Map except the DDR-T protocol repurposes five of these pins:

- CS1# (pin 89) : Grant, GNT# <0> Input
- CKE1 (pin 203) : Request, REQ# <0> Output
- ODT1 (pin 91) : Error, ERR# Output
- CLK1 (pin 218):Early Read ID, ERID<0> Output
- CLK1# (pin 219):Early Read ID, ERID<1> Output

# DDR4/DDR-T DIMM 1



Intel Corporation, 101 Innovation Dr., San Jose CA 95134

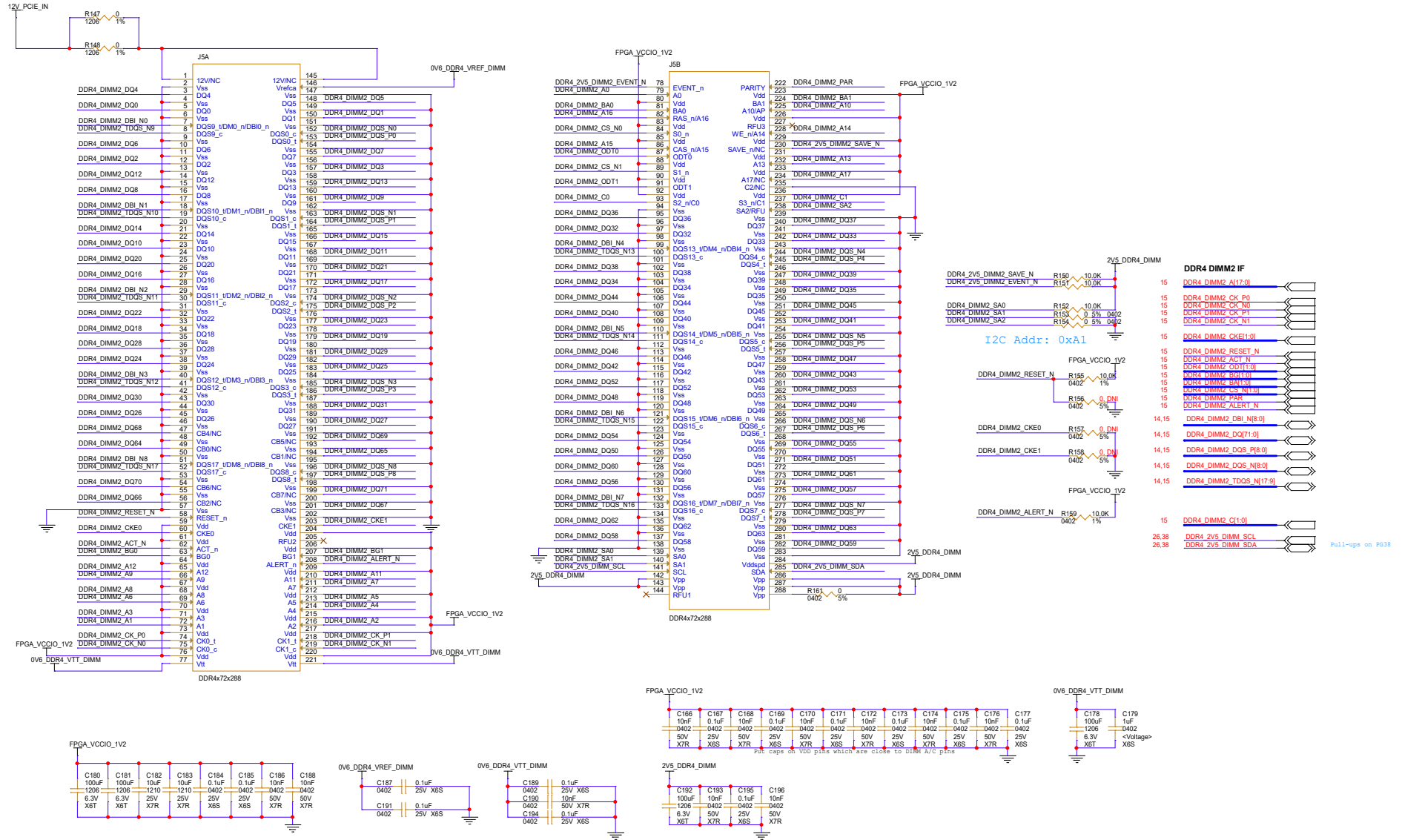
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AGILEX FM86/FM76 DEVELOPMENT KIT

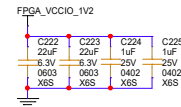
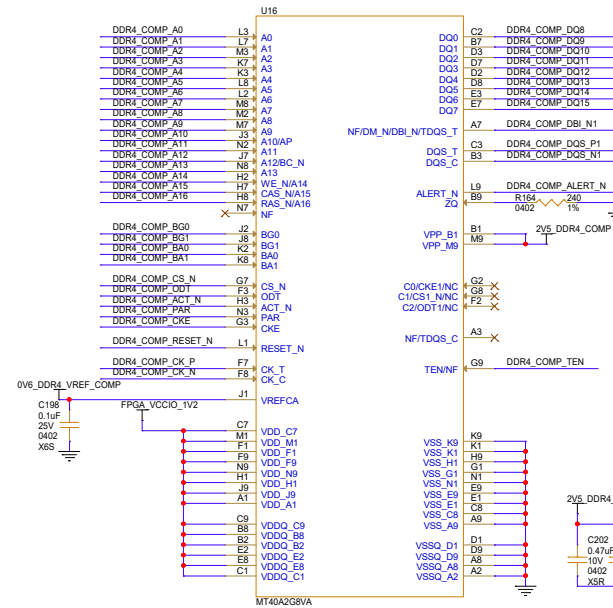
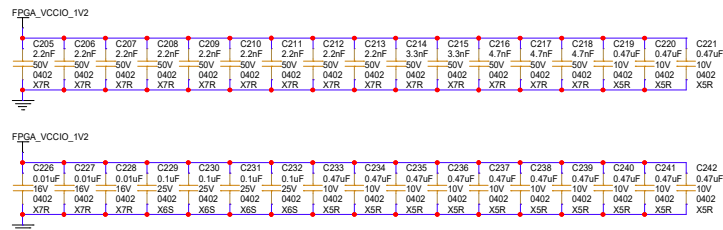
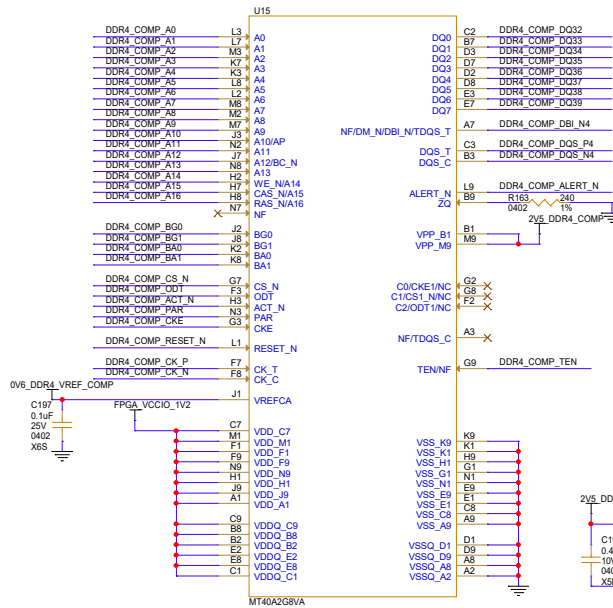
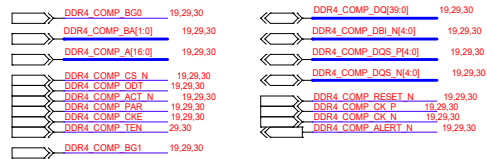
Size C Document Number 180-0330678-C1 Rev C1

Date: Tuesday, March 19, 2024 Sheet 26 of 58

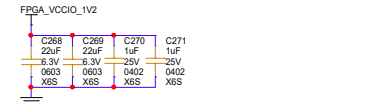
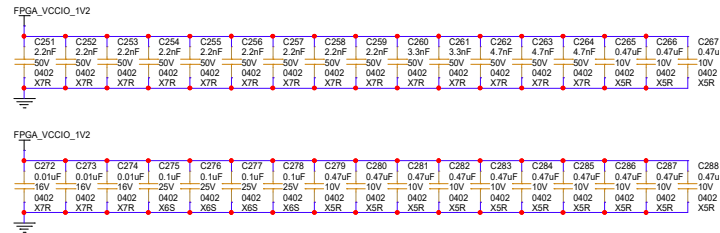
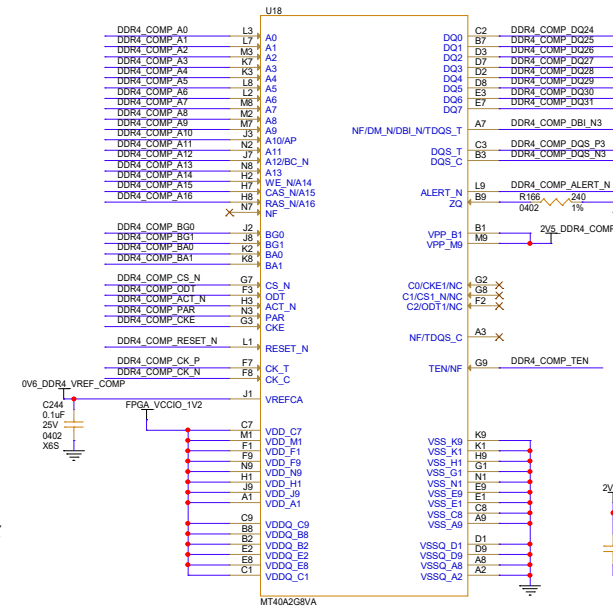
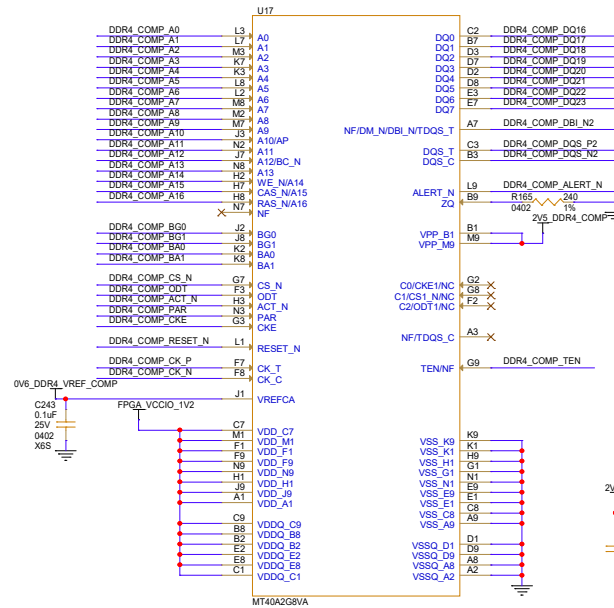
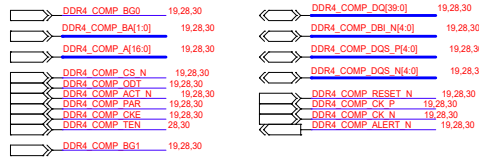
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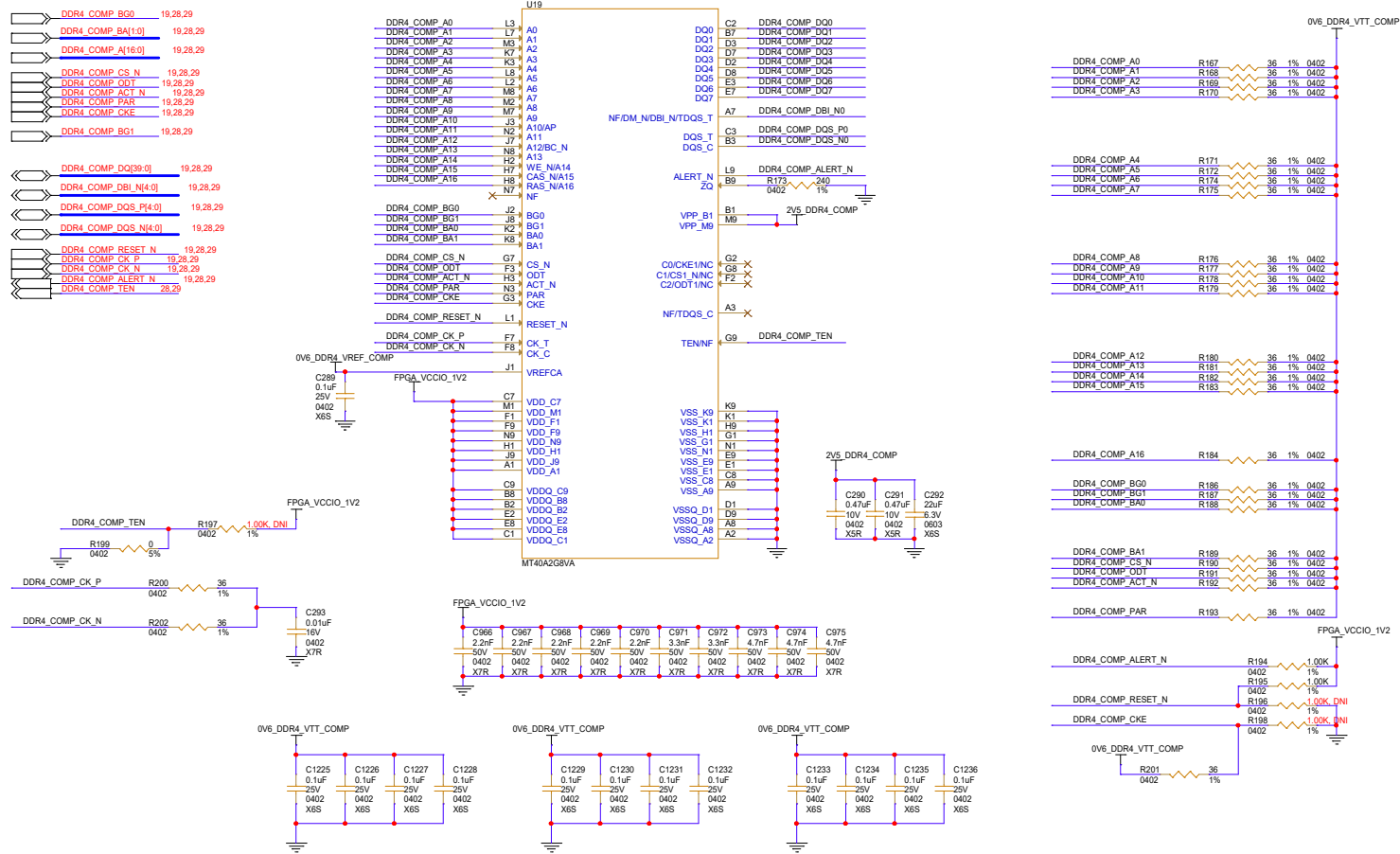
## DDR4 COMPONENT #1/#2



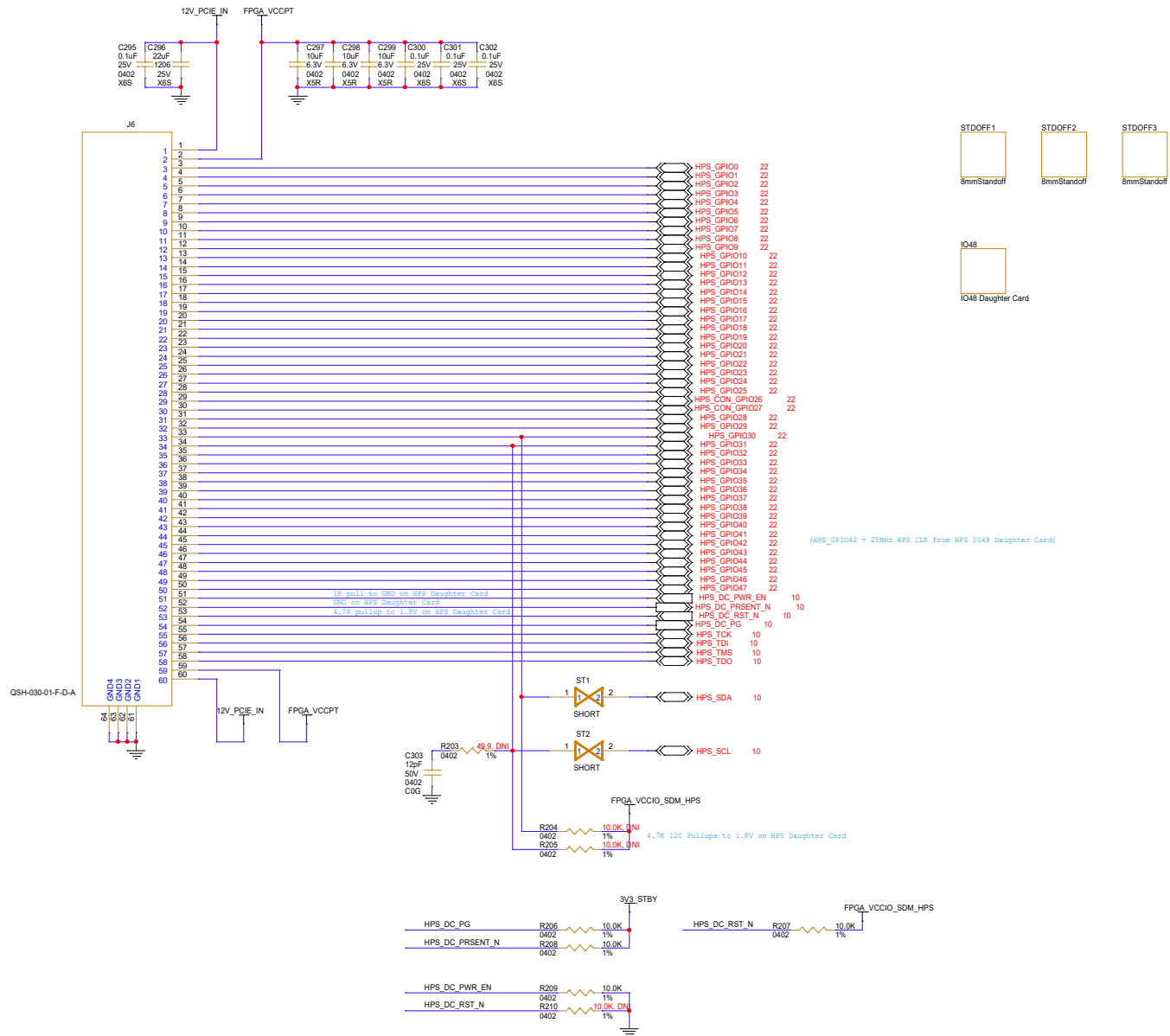
# DDR4 COMPONENT #3/#4

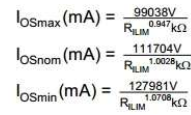


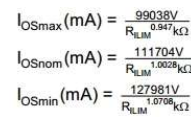
# DDR4 COMPONENT #5 & Termination



# HPS IO-48 Daughter Card Connector

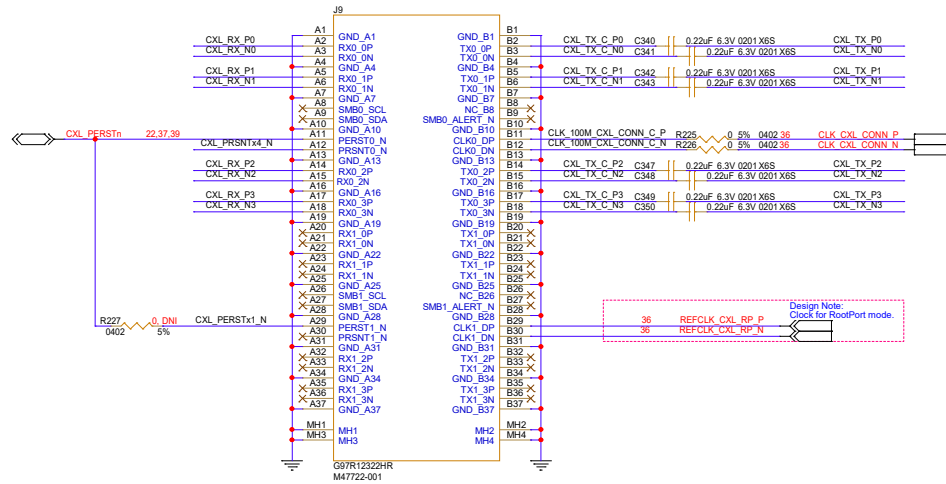




[illegible]

Amphenol U95-T1C1-101A



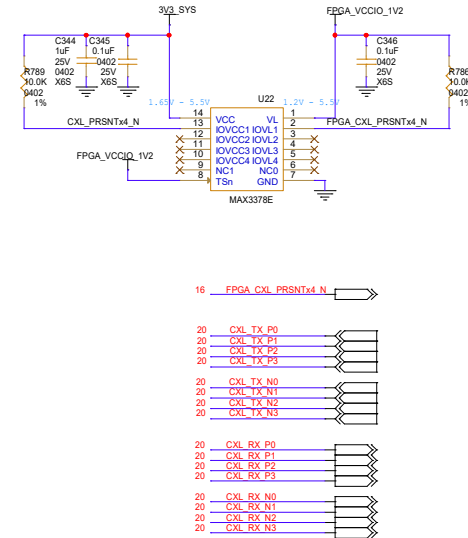


CXL Interface is designed to support the FM85 Devkit M.2 Daughter Card (M-Key for PCIe4 and SATA). When connecting to this card, FM86 Devkit CXL channels will be connected to M.2 channels 8-11 (J5) on the daughter card. PCIe\_100M\_ROOT0\_P/N clock must be selected as the default PCIe clock on the M.2 Daughter Card.

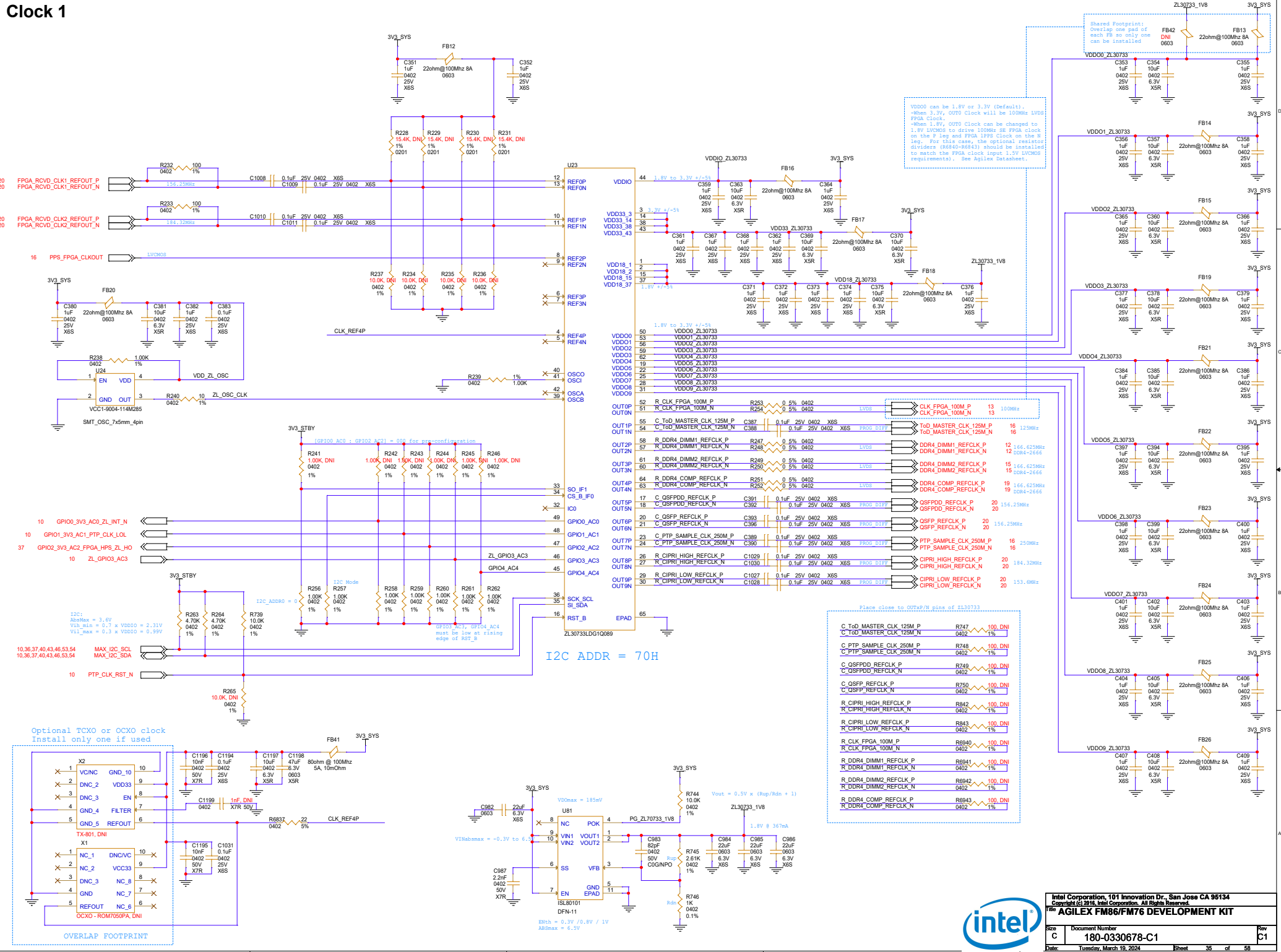
For FM86 Devkit to FM86 Devkit communication using PCIe4 over CXL with one devkit configured as the RP and the other as the EP, you must use the local PCIe CLK from U25 (REFCLK\_CXL\_RP\_P/N) for each board

I2C is not supported.

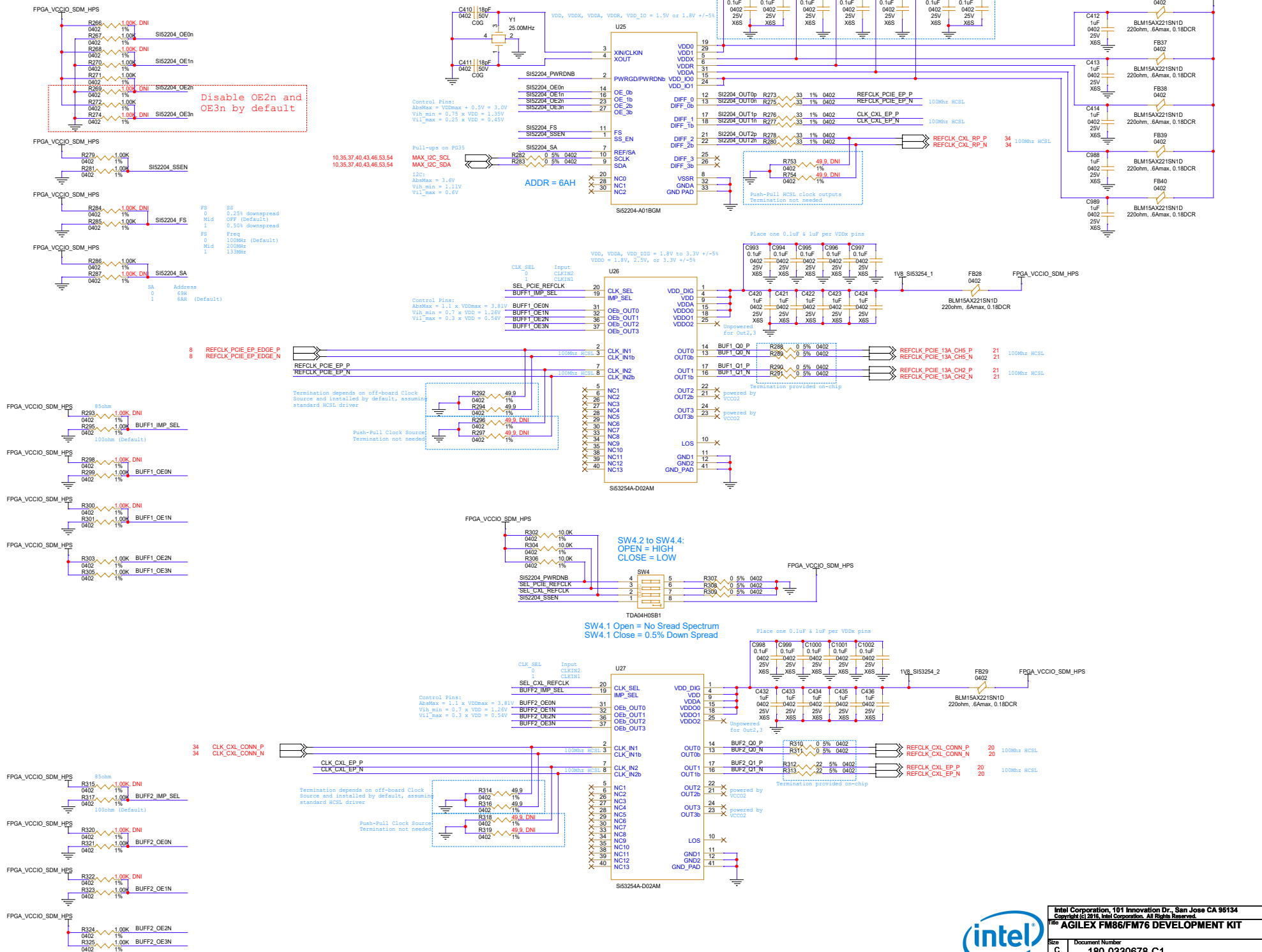
## CXL Connector

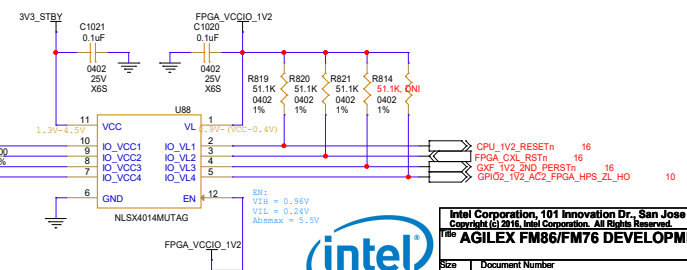
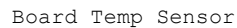
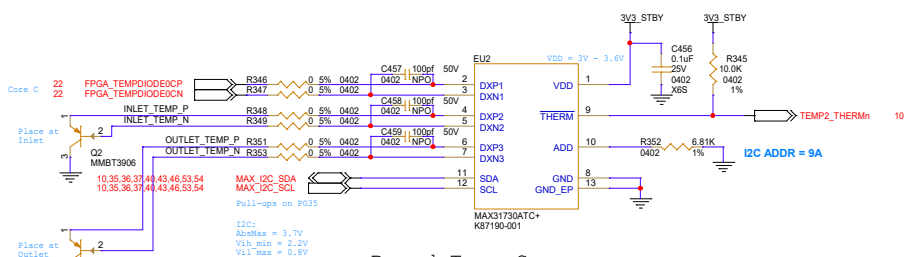
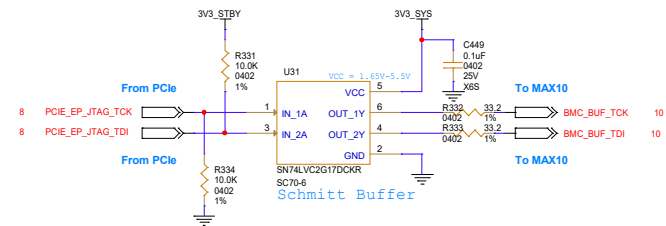


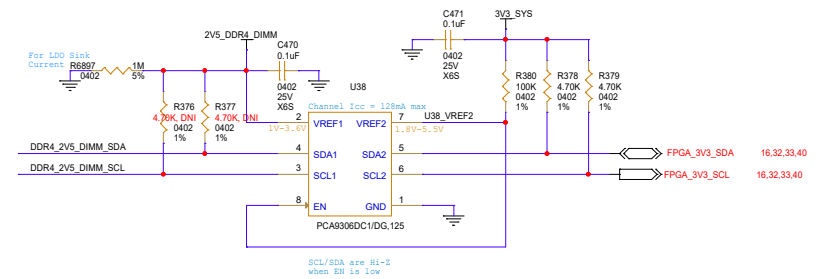
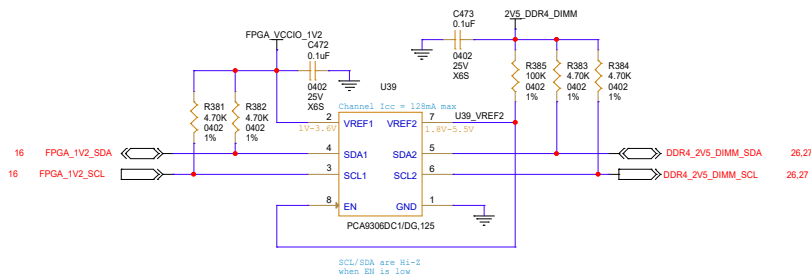
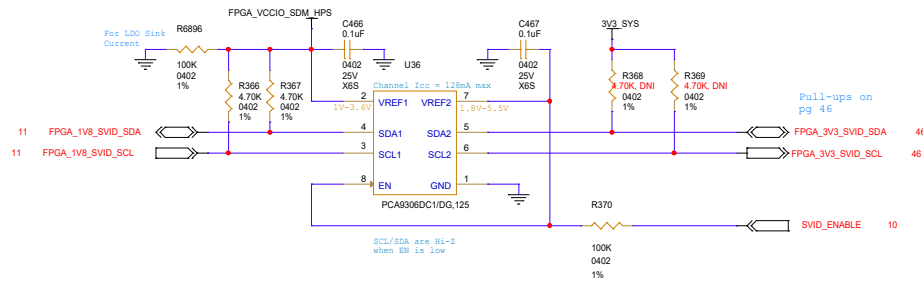
## Clock 1



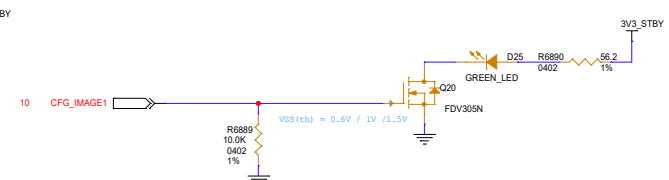
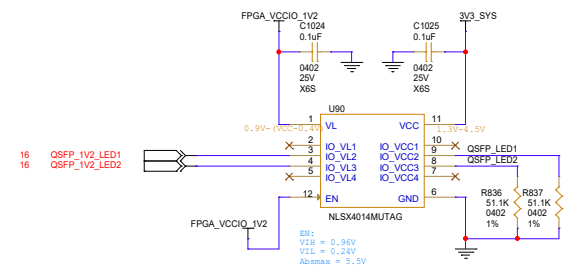
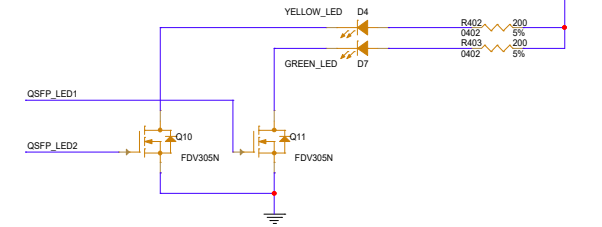
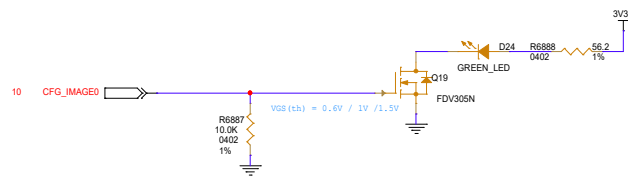
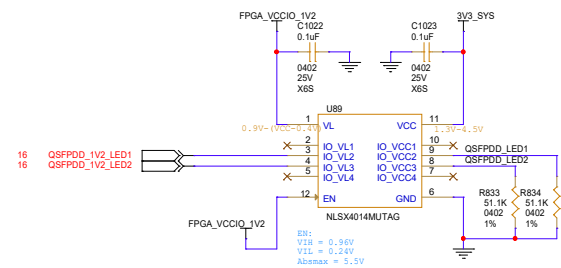
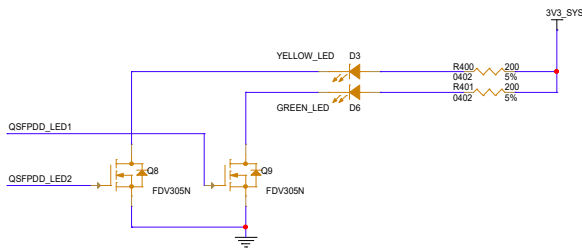
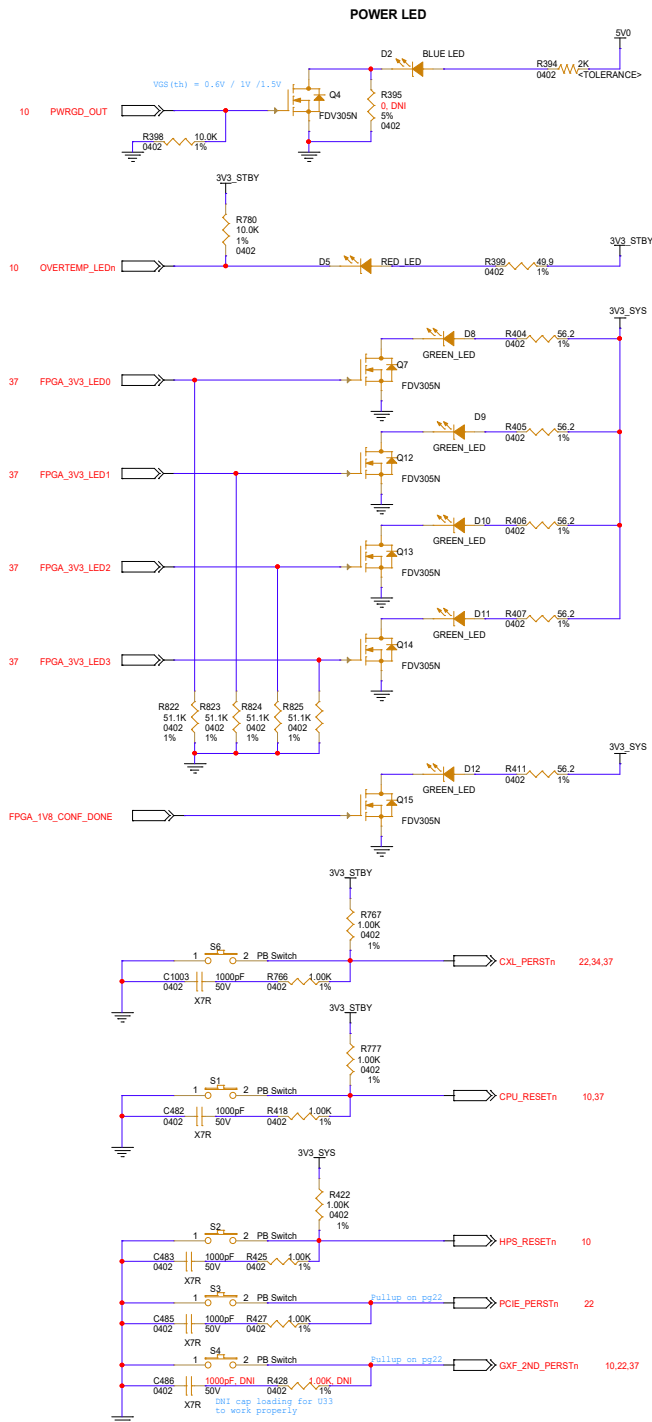
## Clock 2



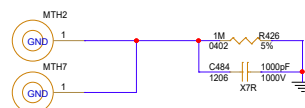




## LEDs And PushButtons



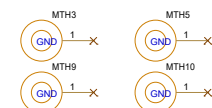
Large Mounting holes on the rear of board



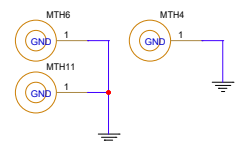
Large Mounting holes on the front of board

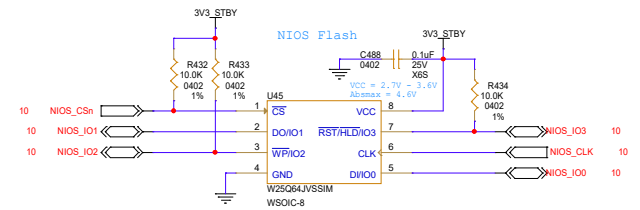
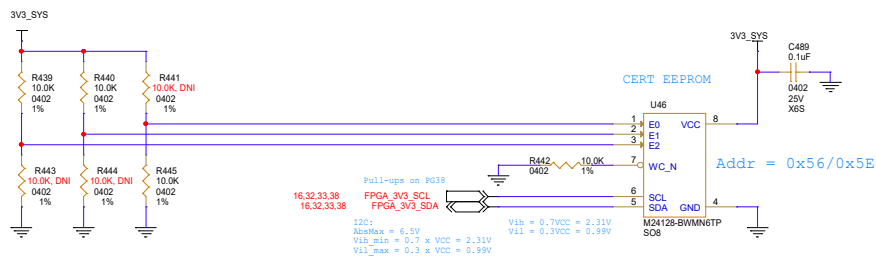
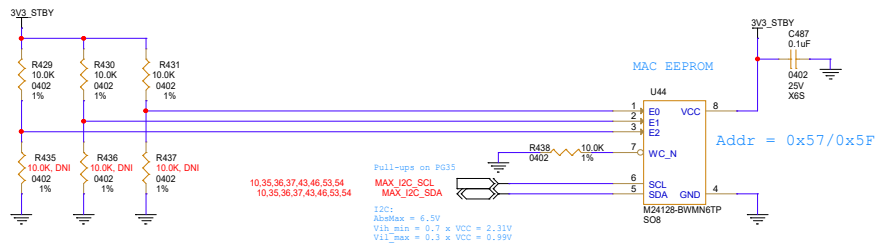


Large Mounting holes for heatsink

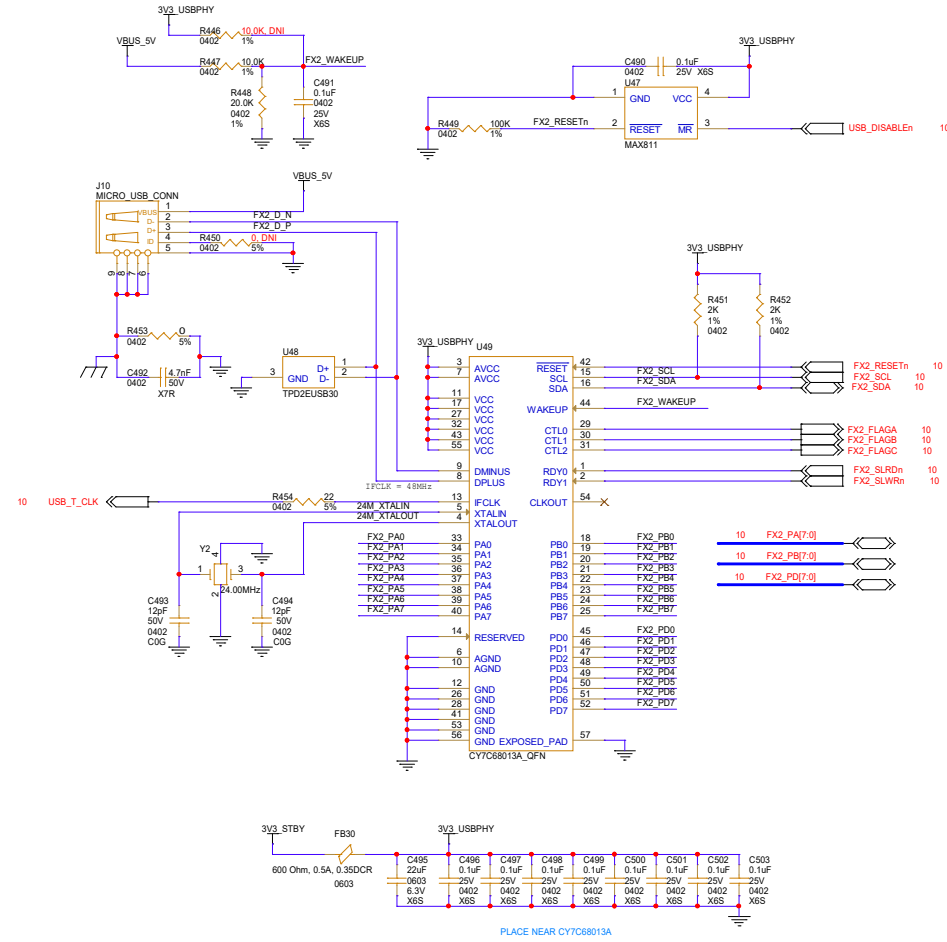


Large Mounting holes for IO48 Daughter Card





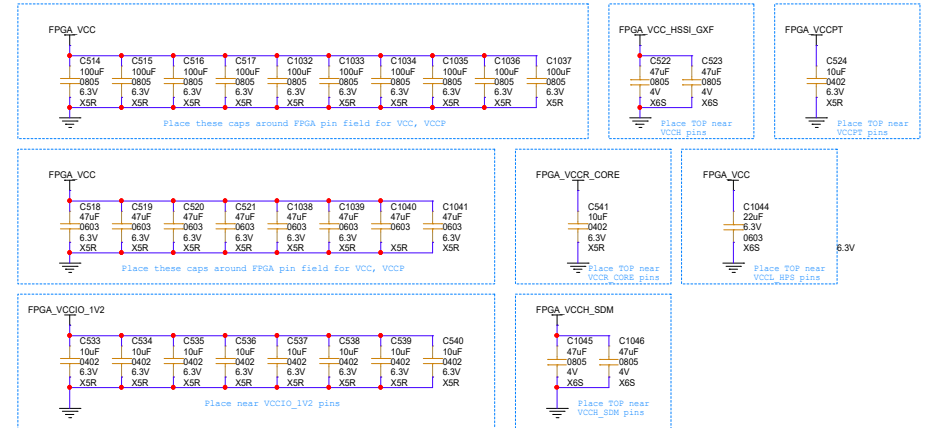
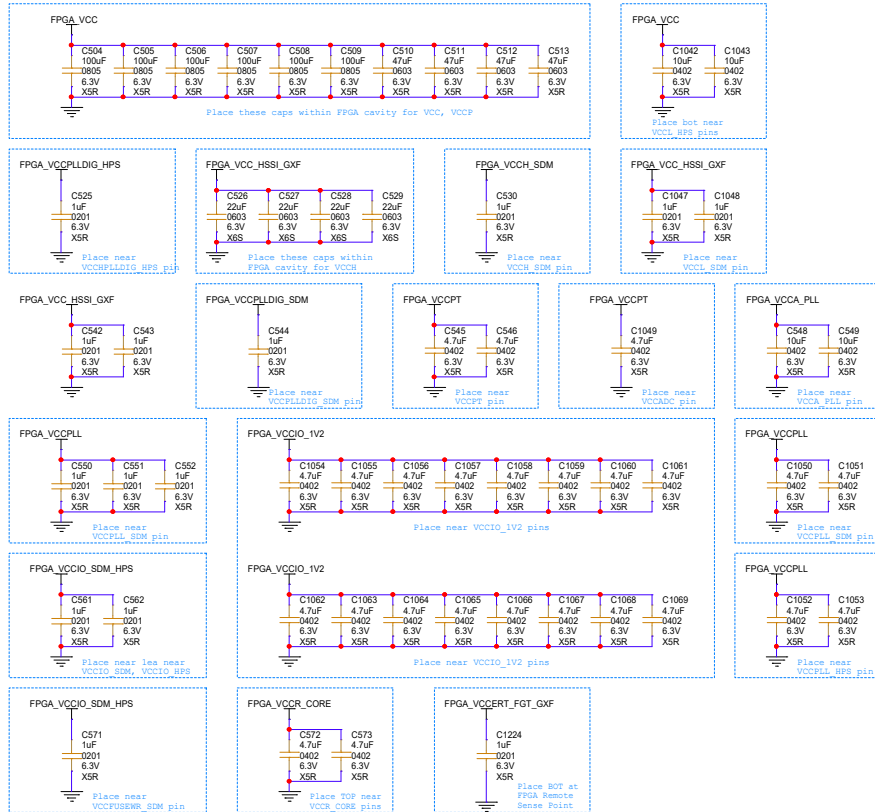
# USB-BlasterII Phy



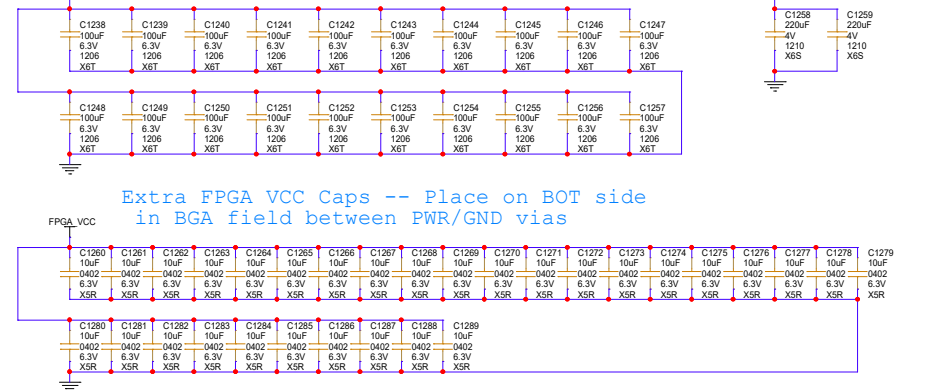
# FPGA Core Decoupling

Place on TOP Side

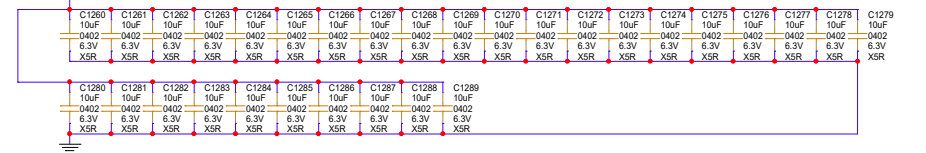
Place on BOT Side



Extra FPGA VCC Caps -- Place on BOT side periphery, 2-GND vias each cap gnd pad minimum



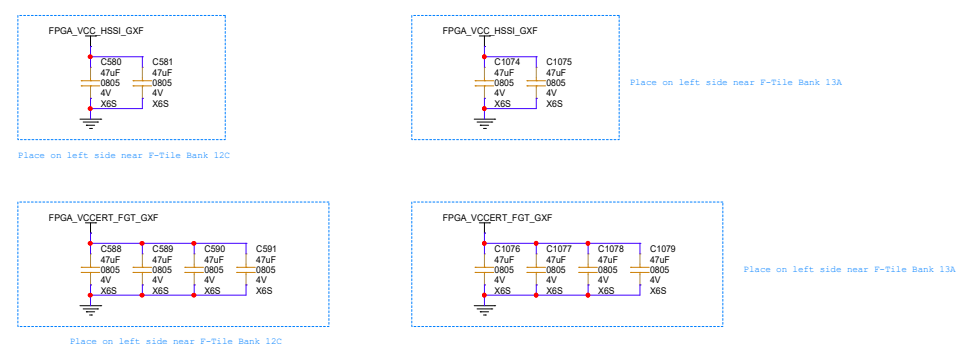
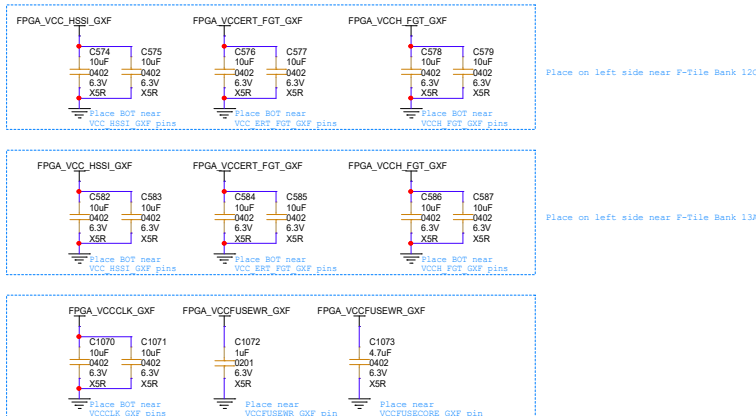
Extra FPGA VCC Caps -- Place on BOT side in BGA field between PWR/GND vias

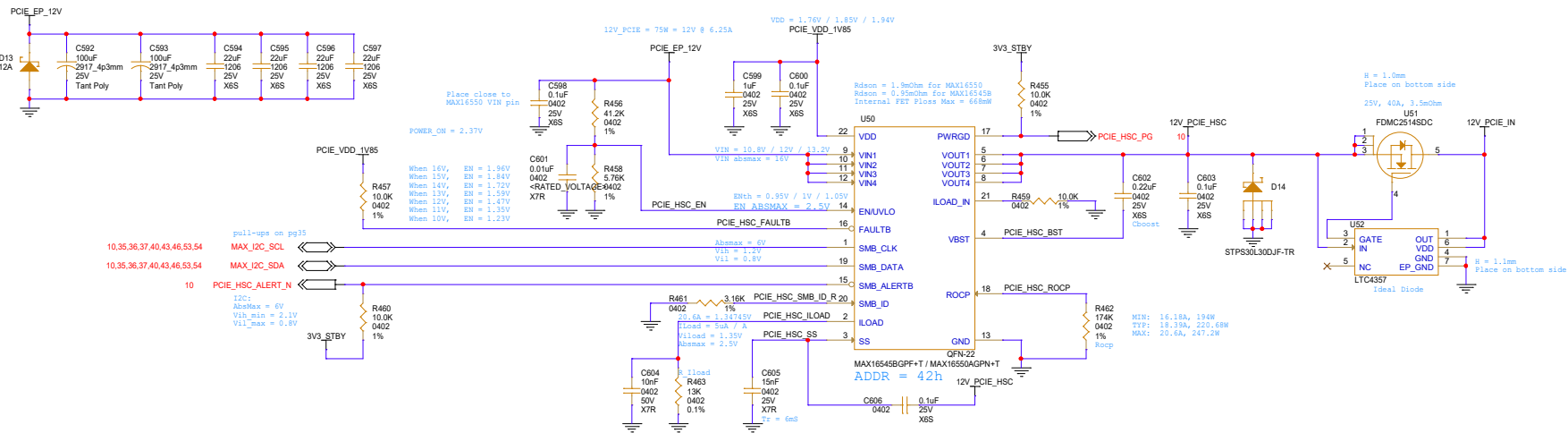


# FPGA F-Tile Decoupling

Place on TOP Side

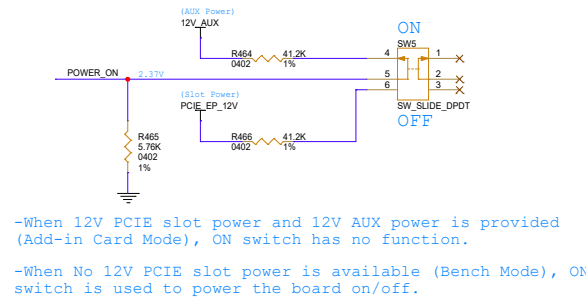
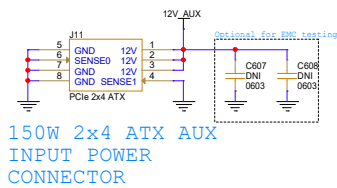
Place on BOT Side





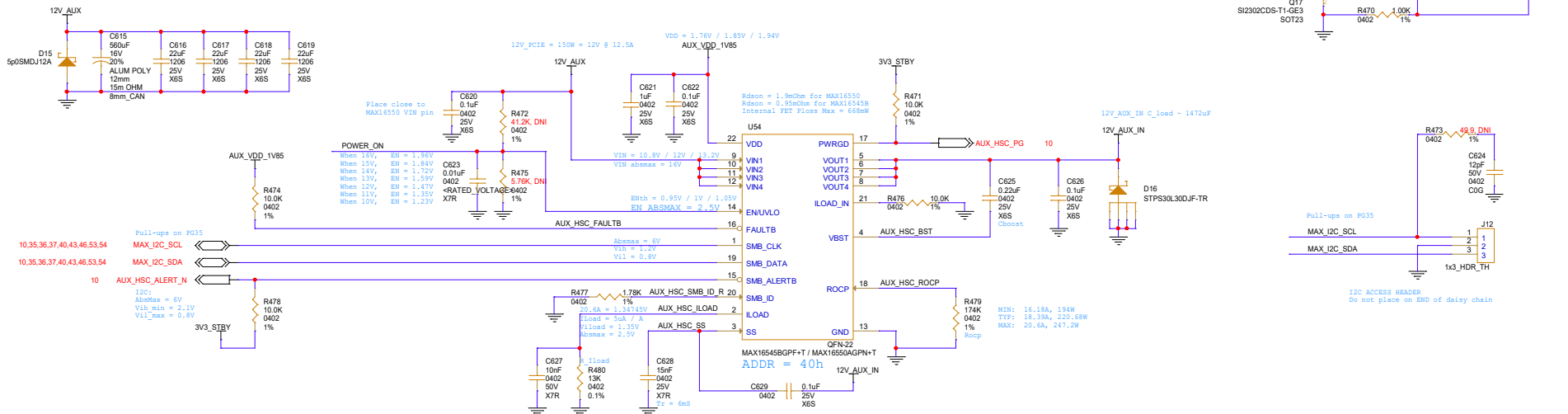
12V\_PCIE Hot Swap Controller

## Power On Switch



-When 12V PCIe slot power and 12V AUX power is provided (Add-in Card Mode), ON switch has no function.

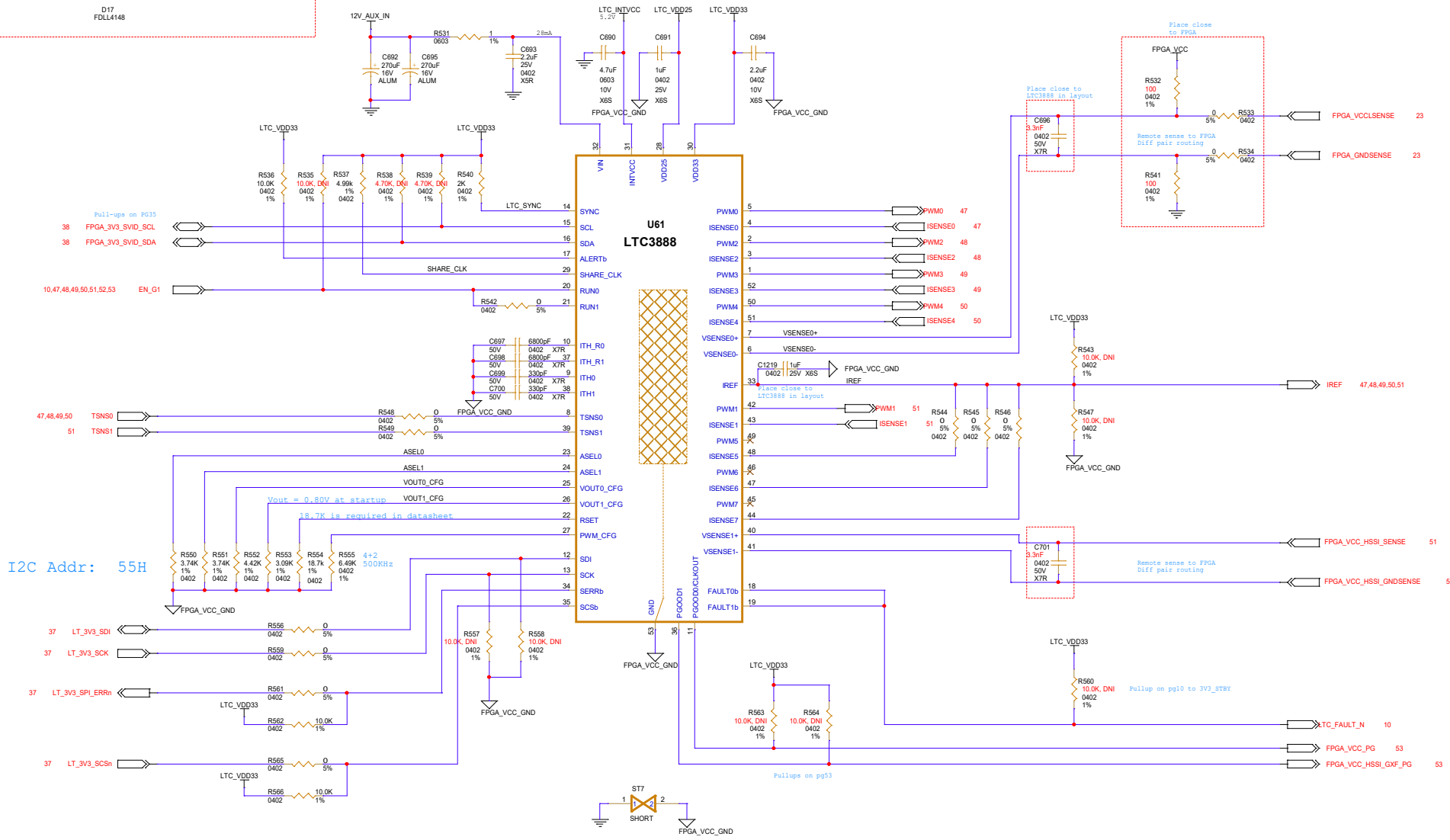
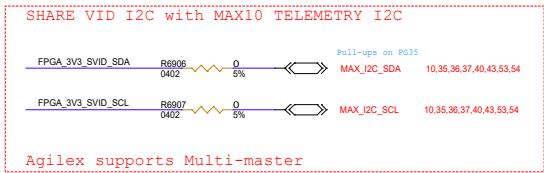
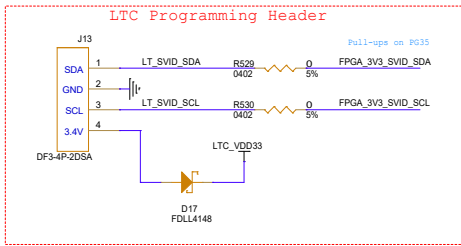
-When No 12V PCIe slot power is available (Bench Mode), ON switch is used to power the board on/off.

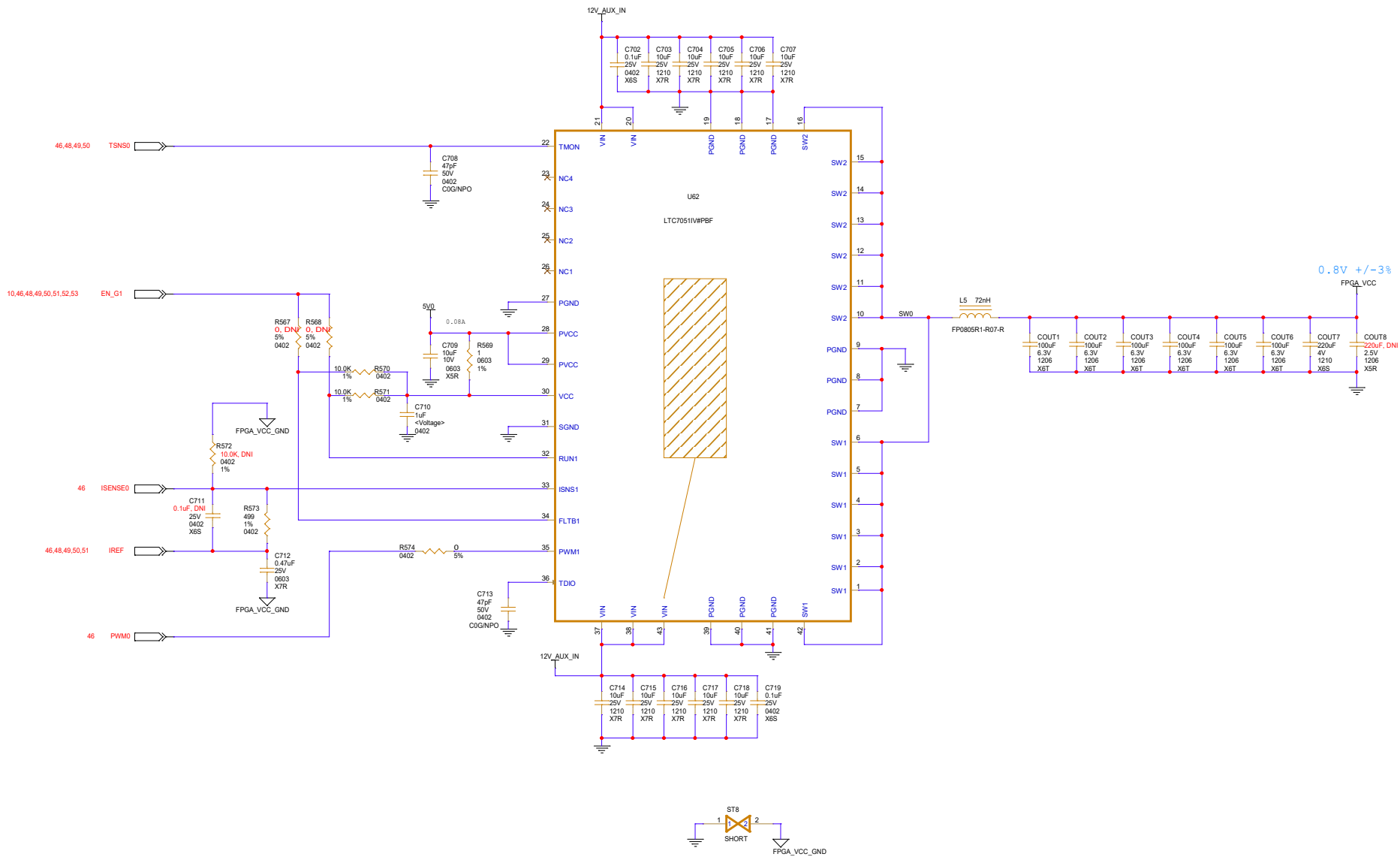


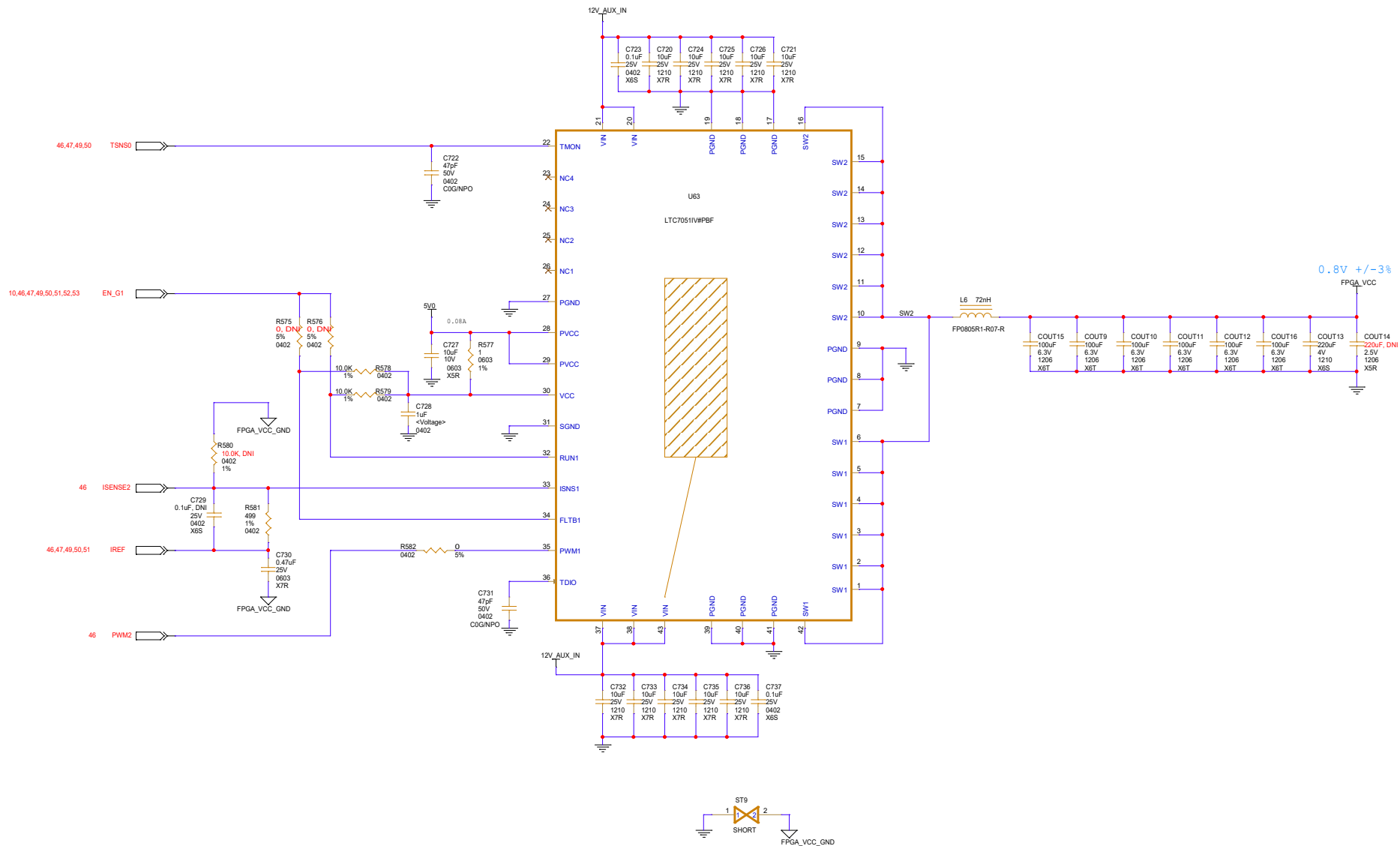
12V\_AUX Hot Swap Controller

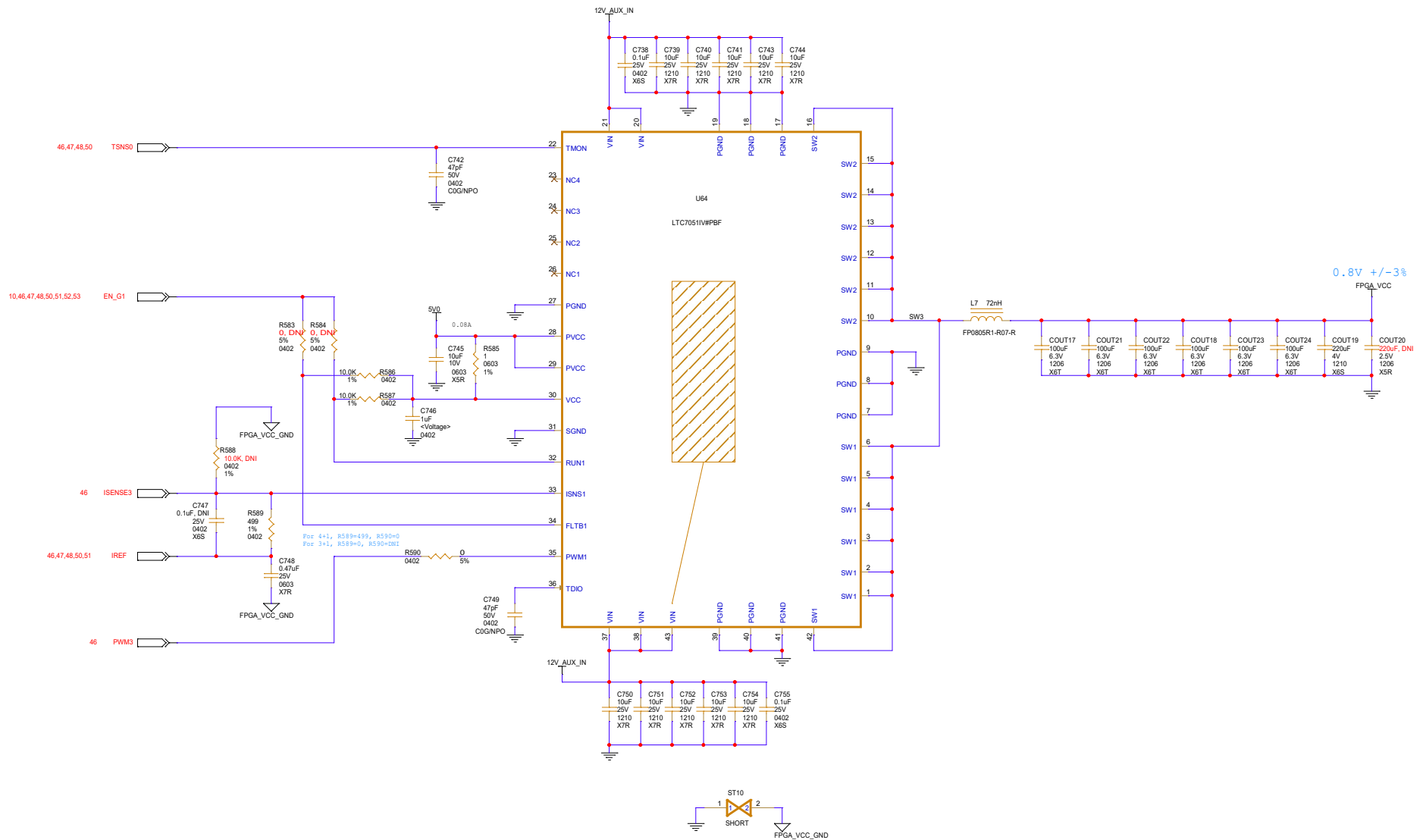


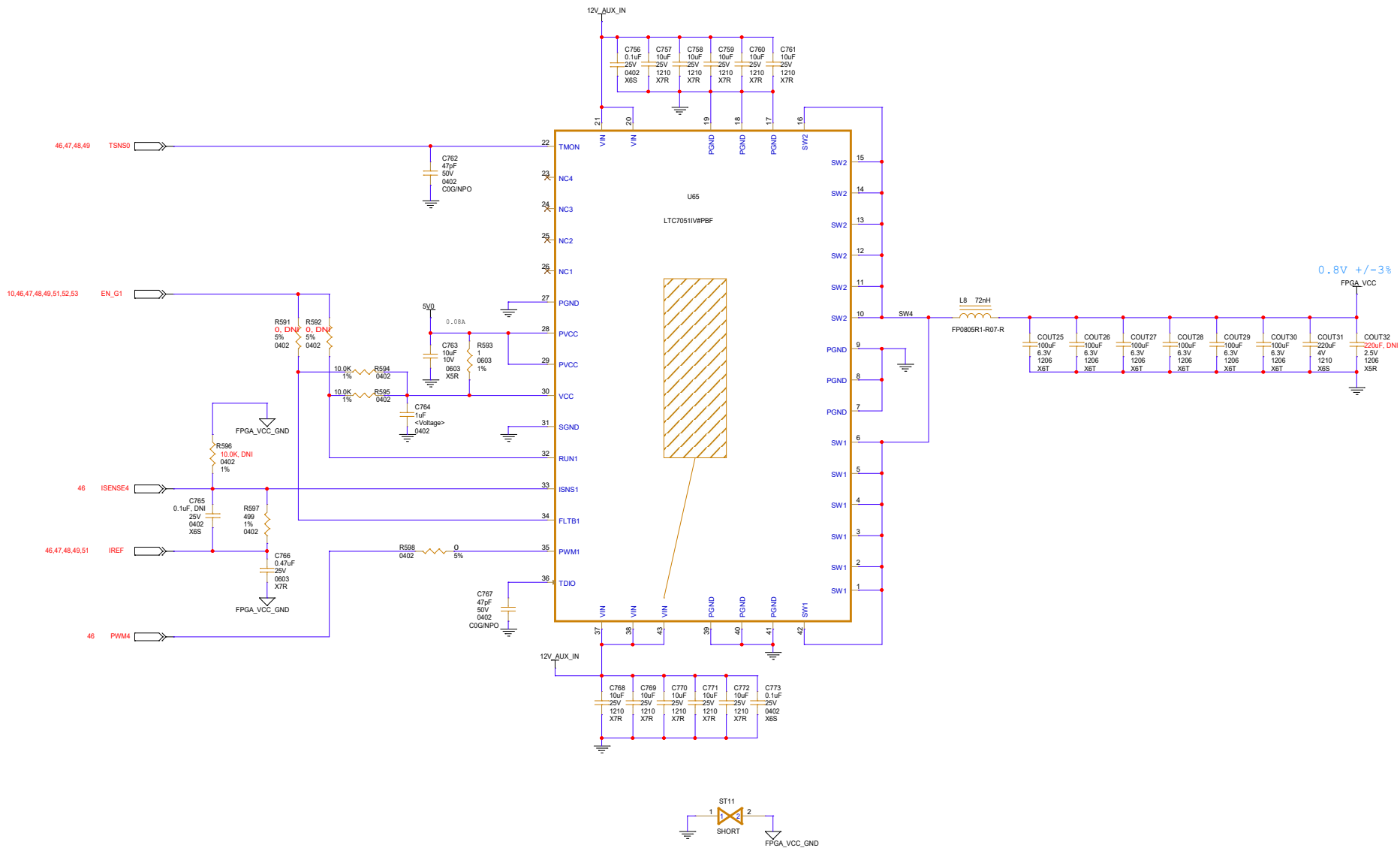


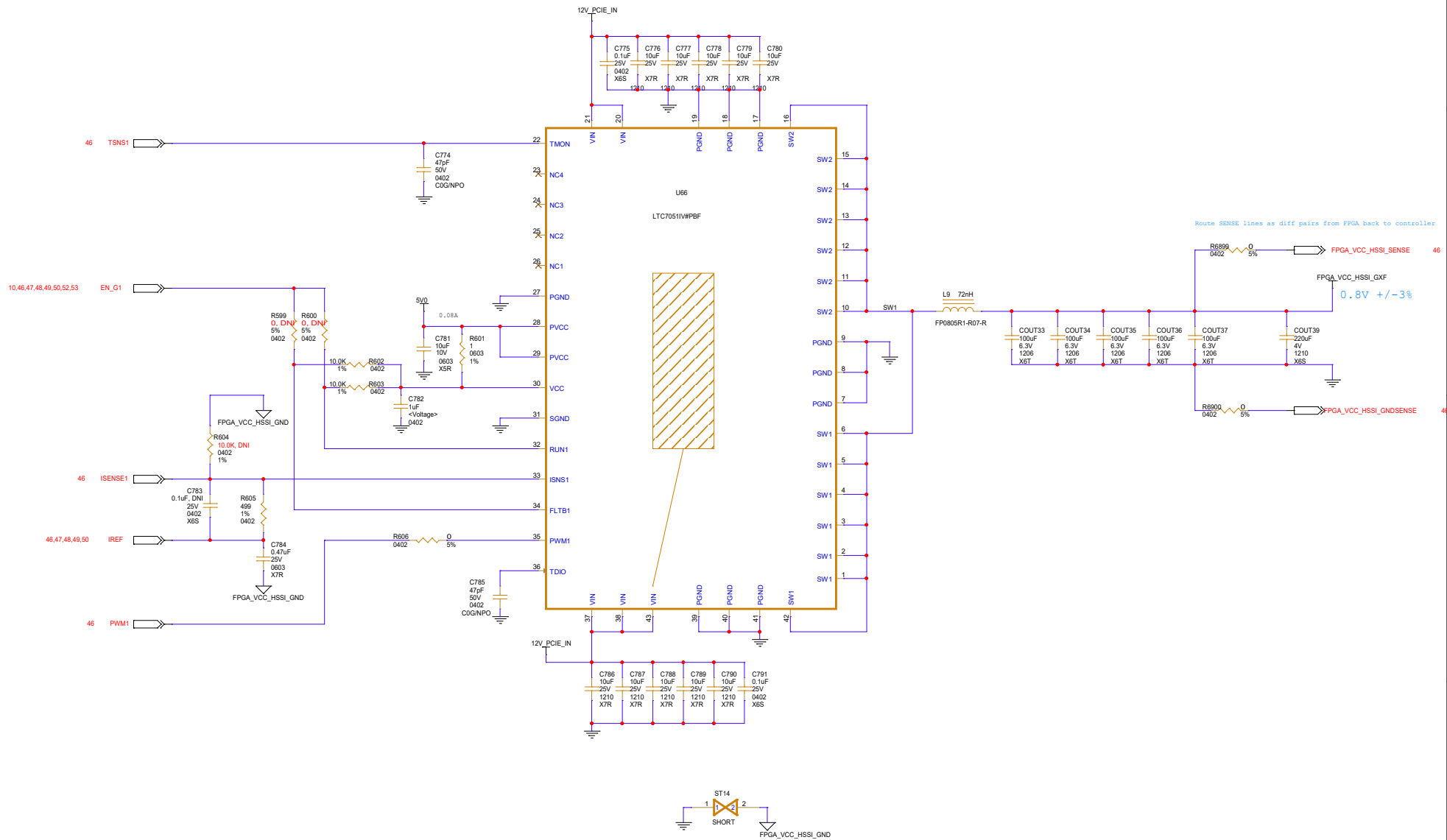




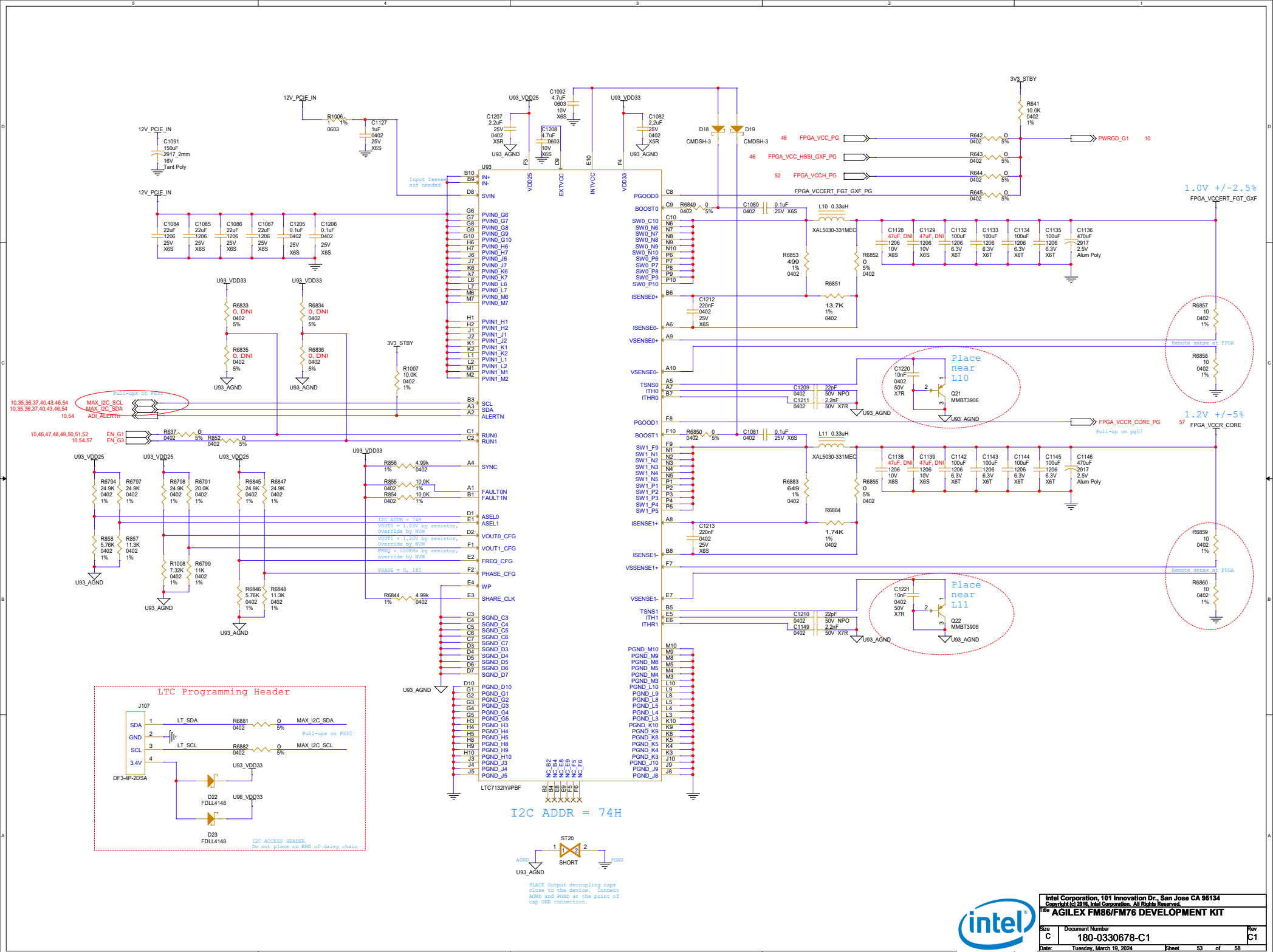




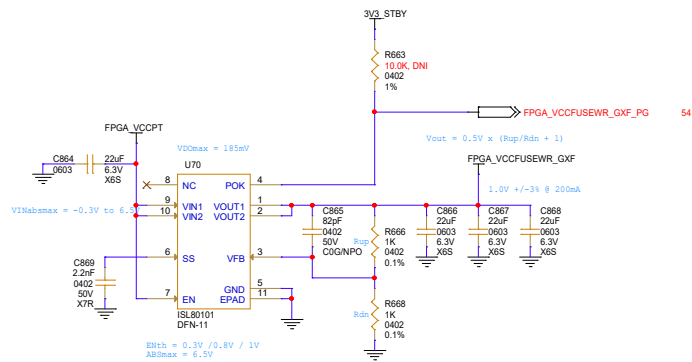












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