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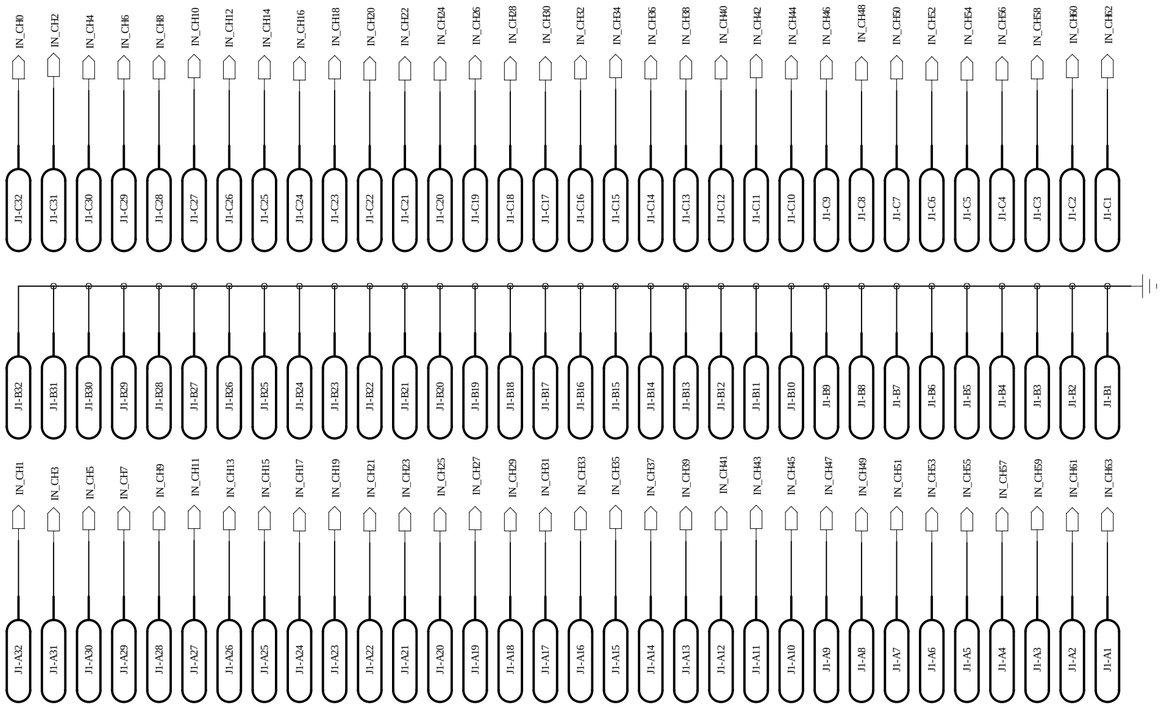

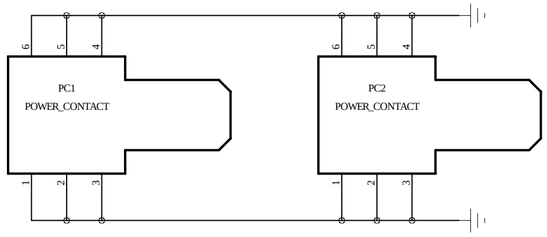

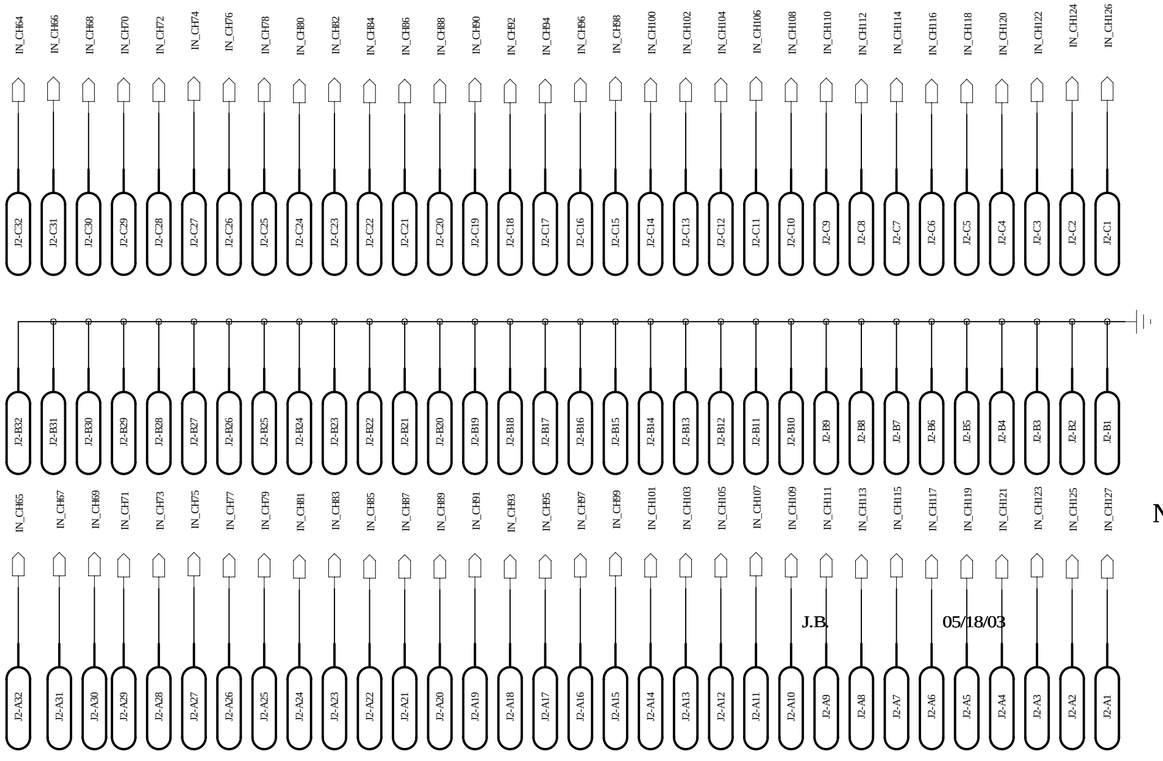

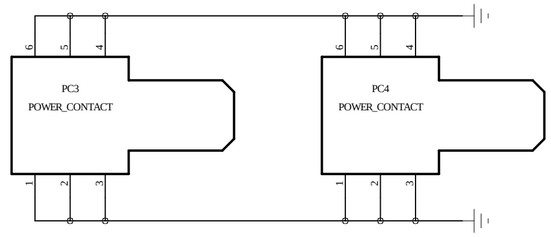

Nevis Laboratories

Tutorial Design

J.B. 05/18/03

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B PM 041801 C

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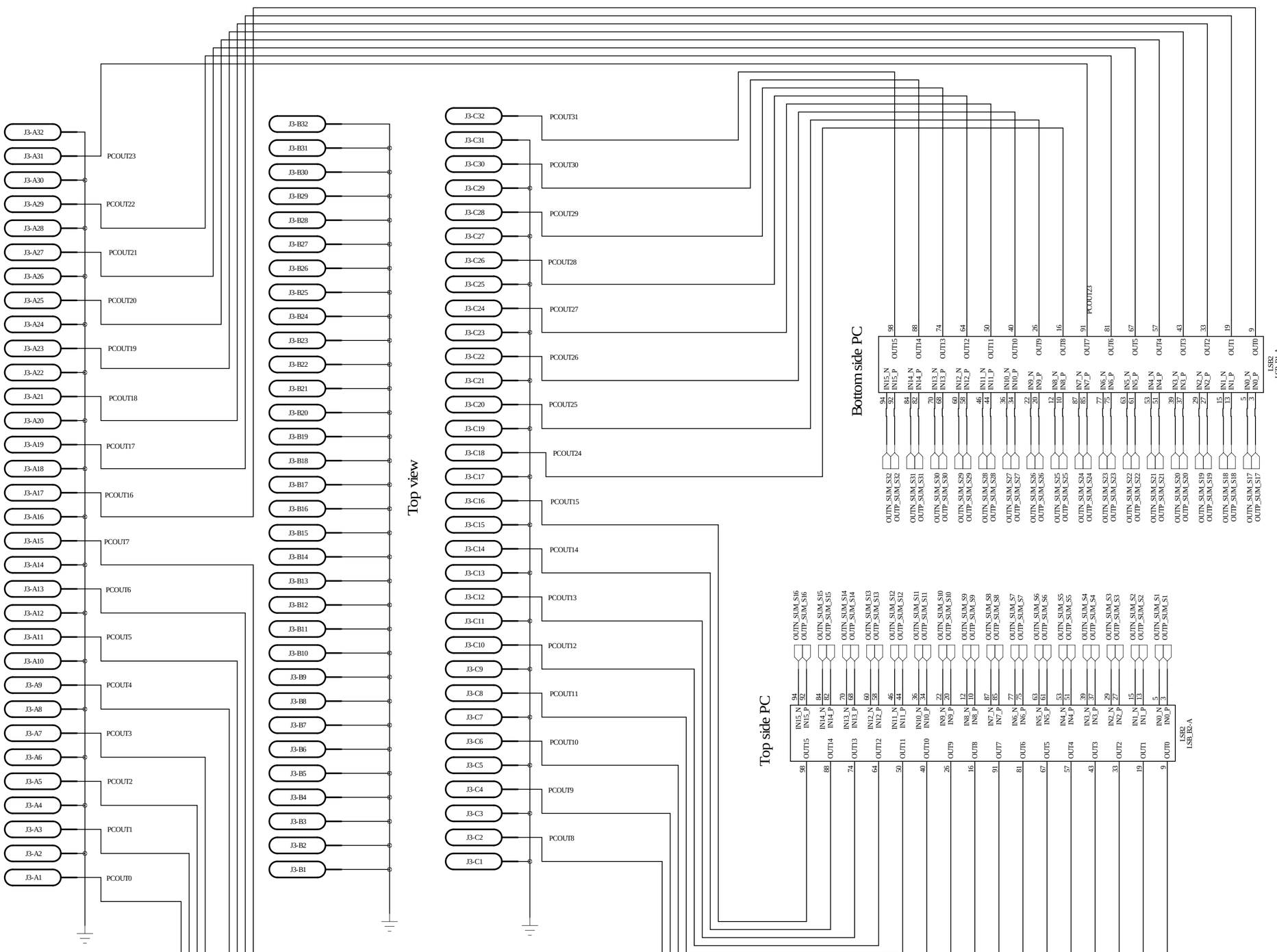

Nevis Laboratories

Tutorial Design

J.B. 05/18/03

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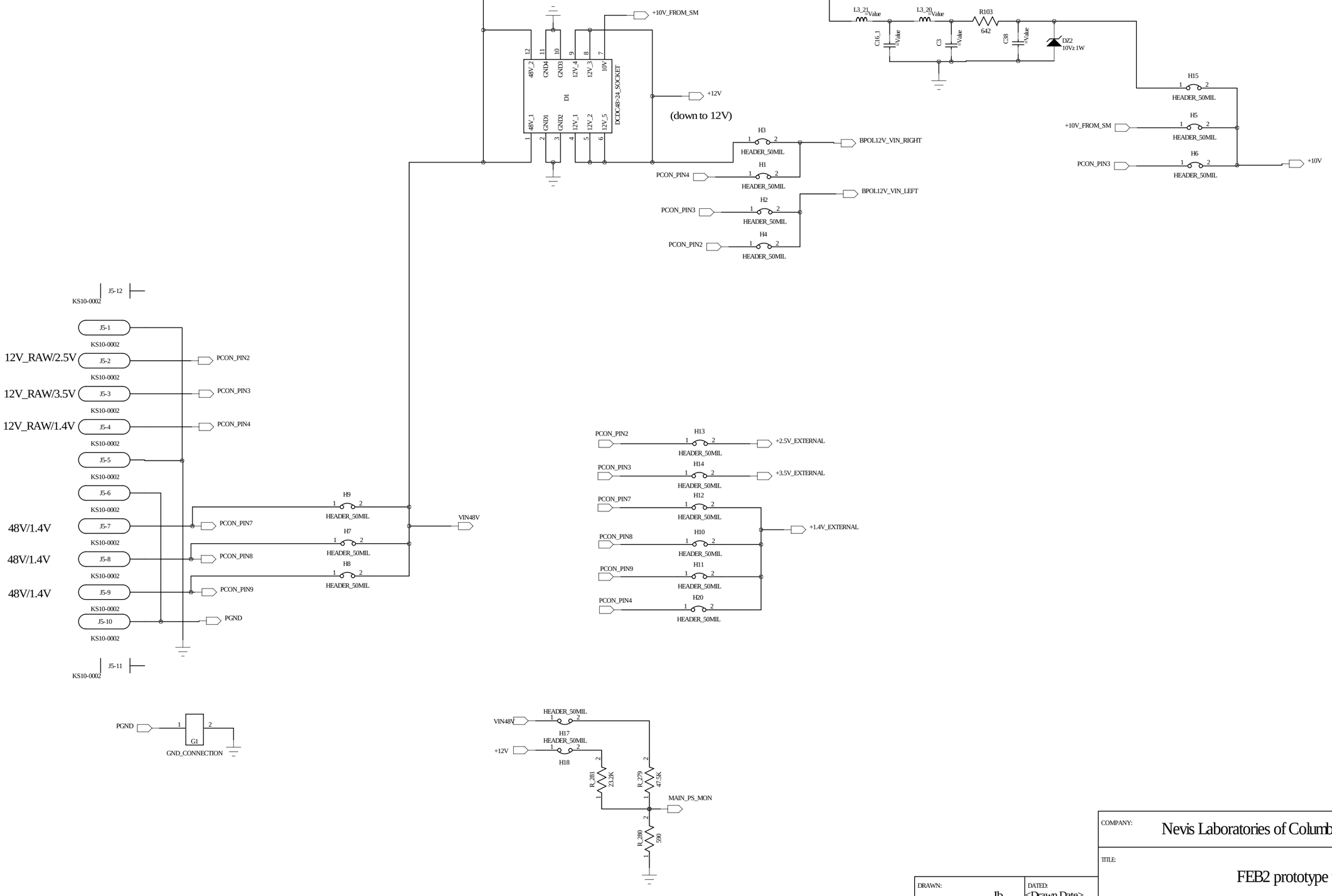

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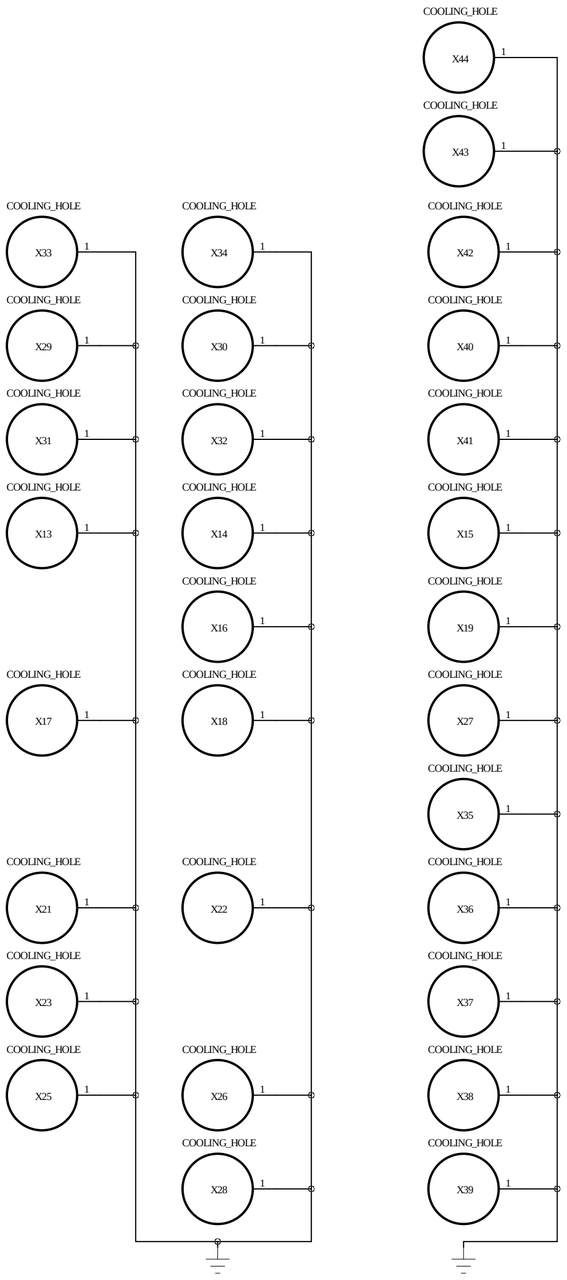

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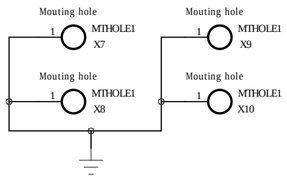
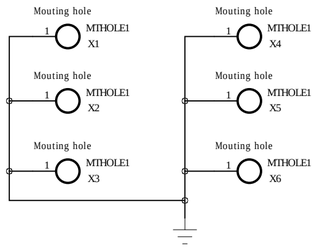
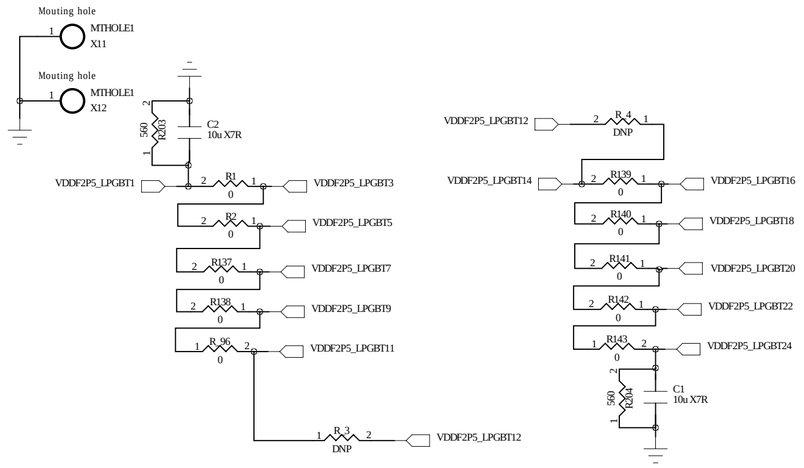
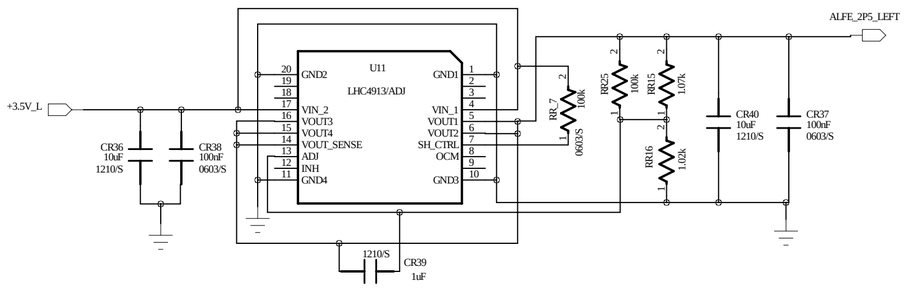
REVISION RECORD			
LTR	ECO NO:	APPROVED:	DATE:

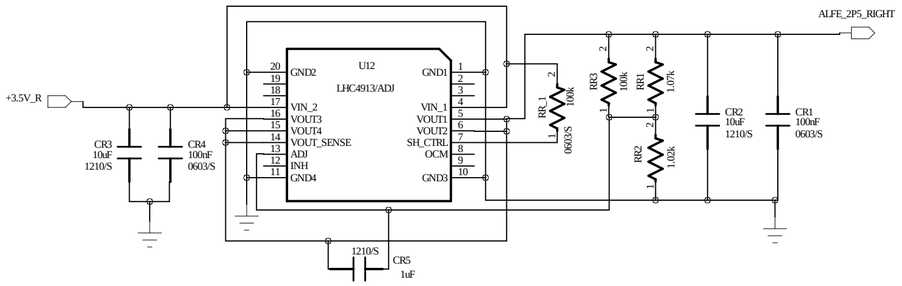
Mounting holes for the panel

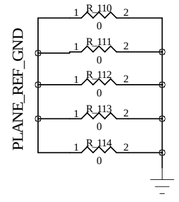












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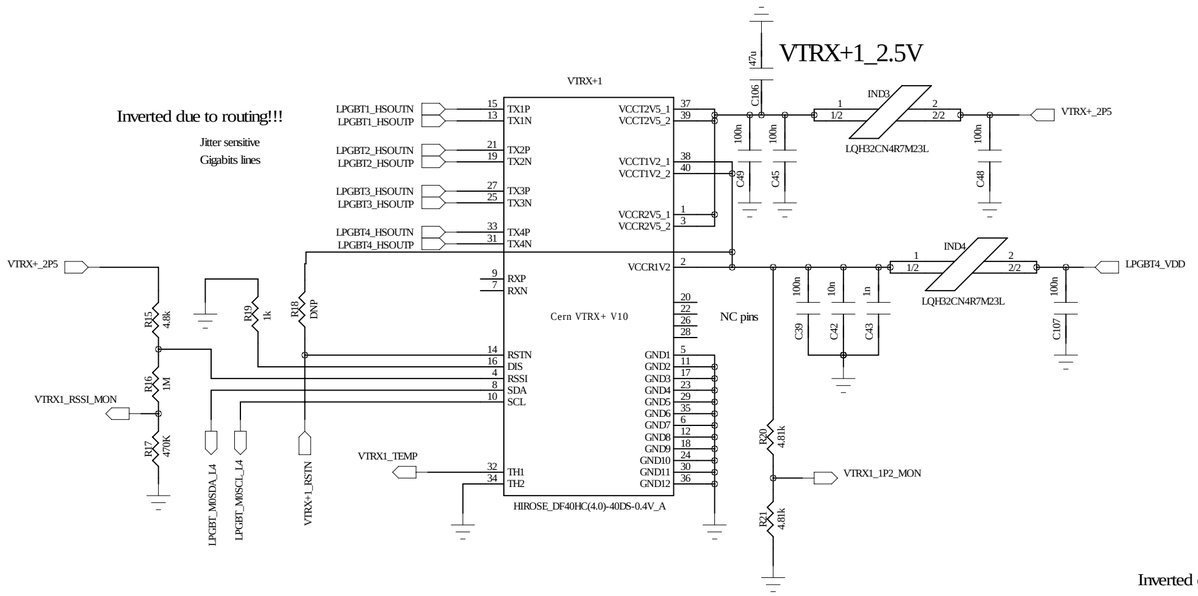
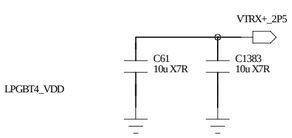
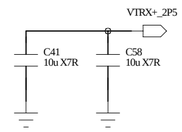
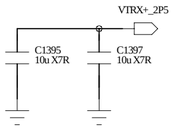
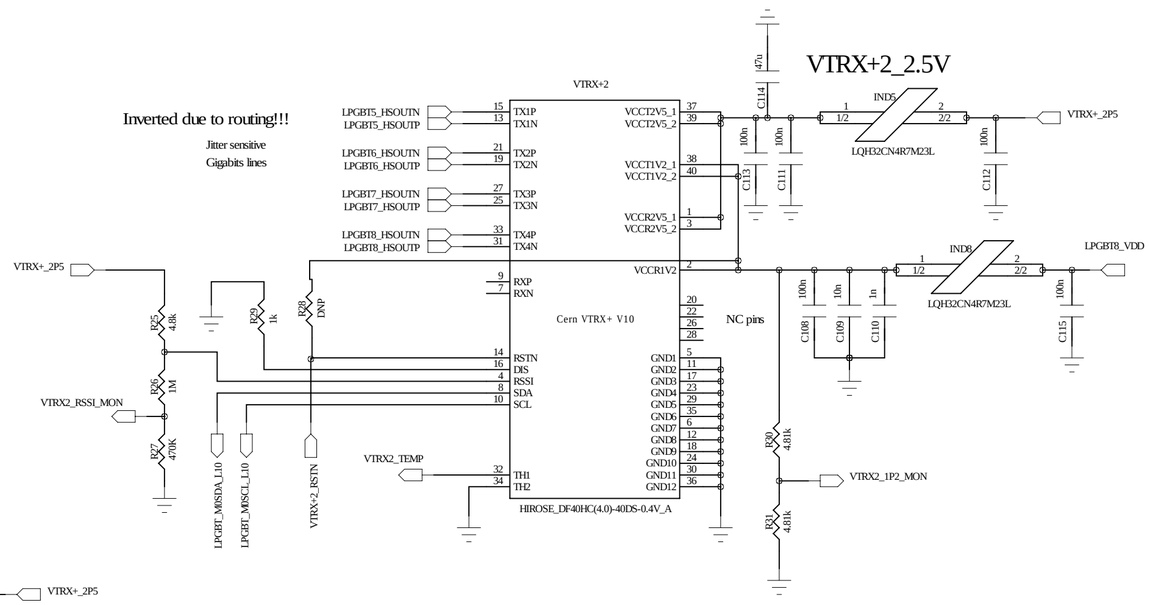


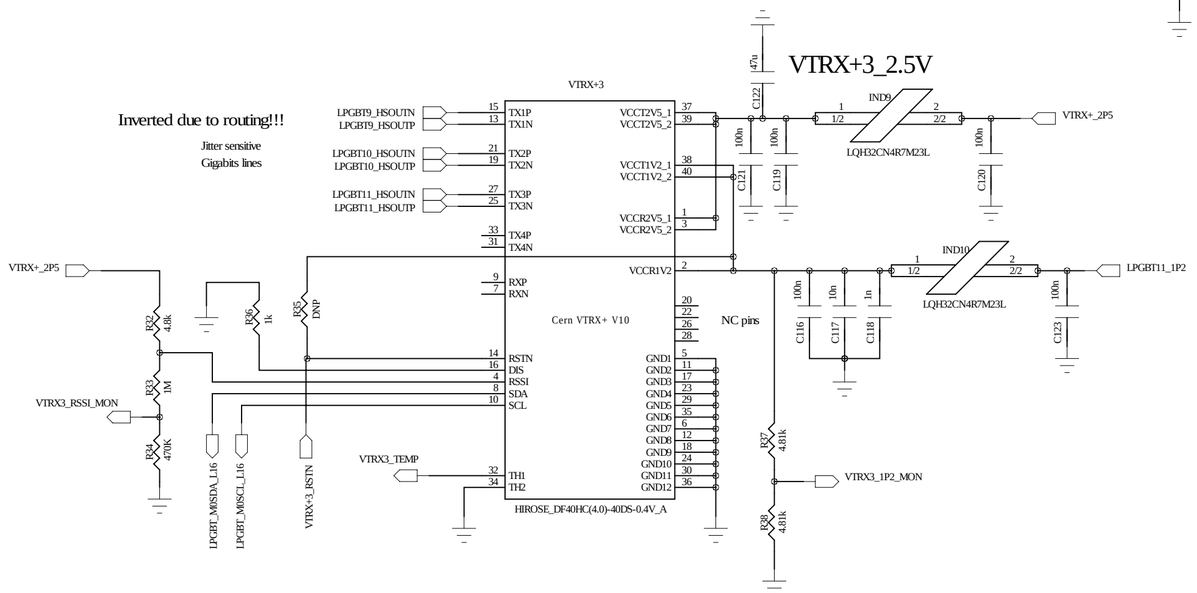
Chnge the RSTN resistoer on all VTRx+s from DNP to 1K











COMPANY: Nevis Laboratories of Columbia University					
TITLE: FEB2 prototype v2.0					
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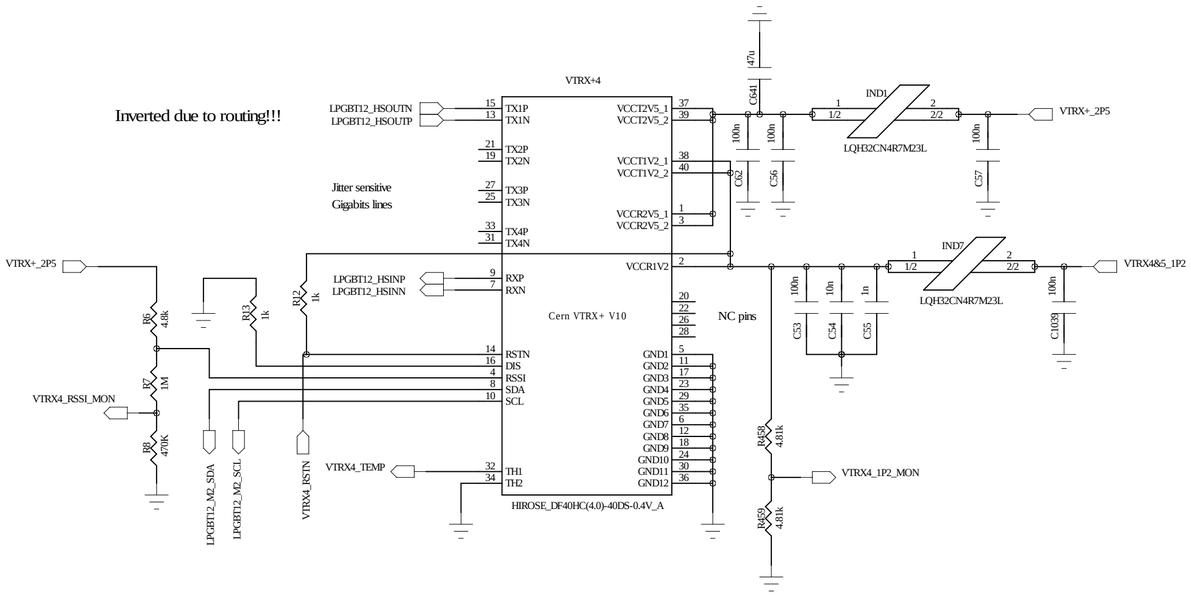
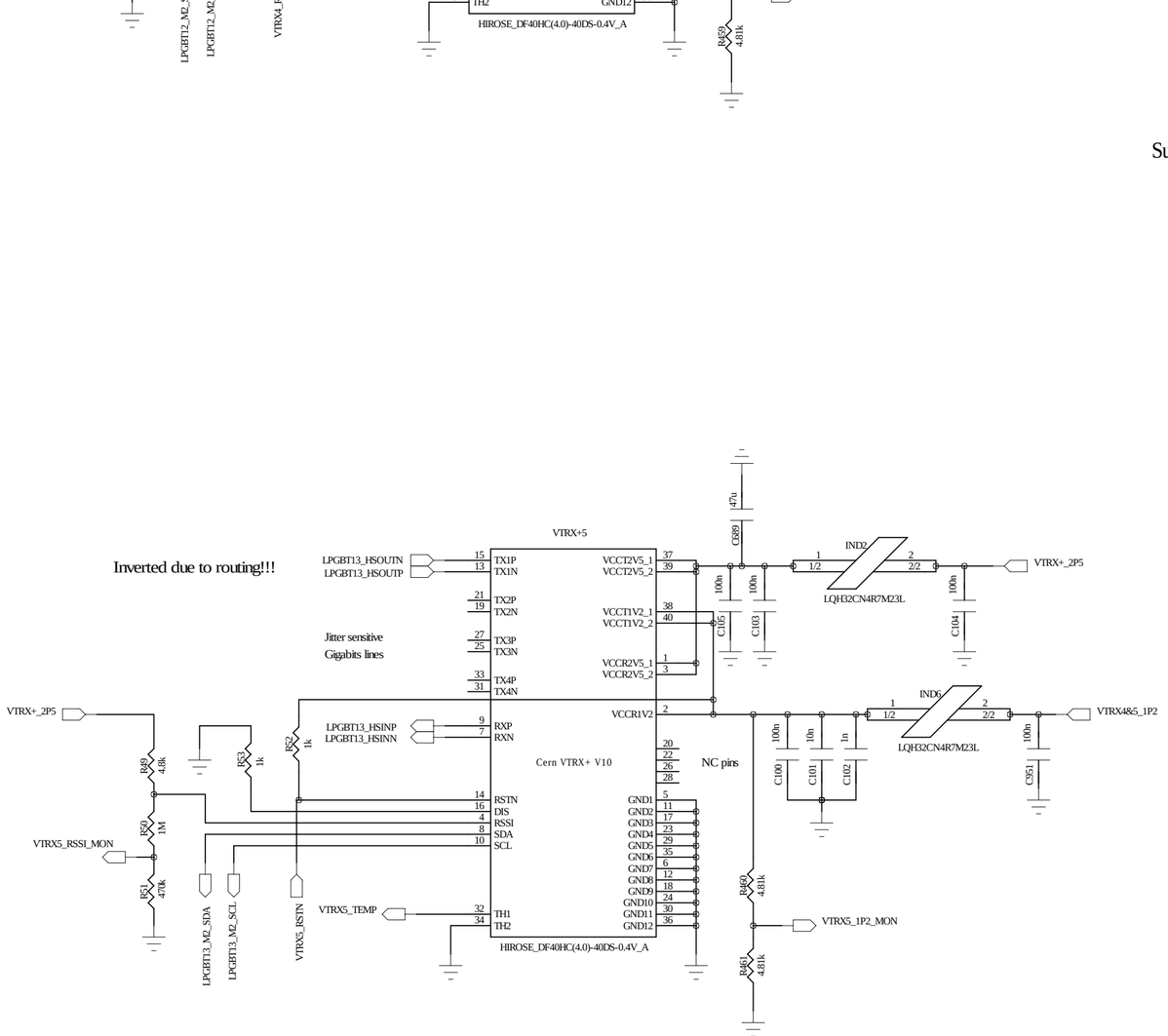
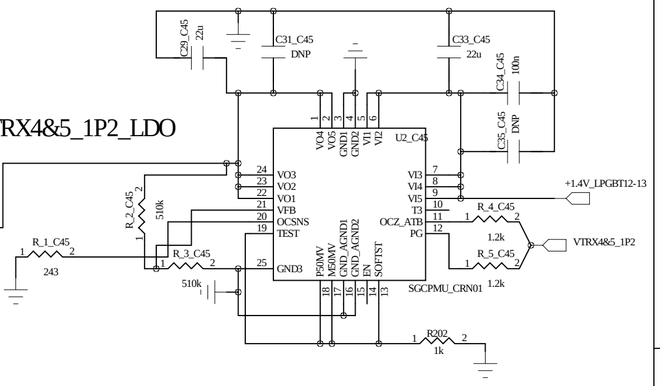


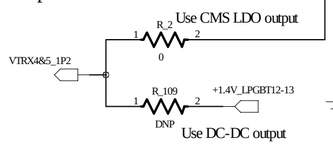


LpGBT12&13_+1.2V

VTRX4&5_1P2_LDO



Supply rail switch for LpGBT12&13



This option needs changed resistor R_76 to value of 8.66kOhm

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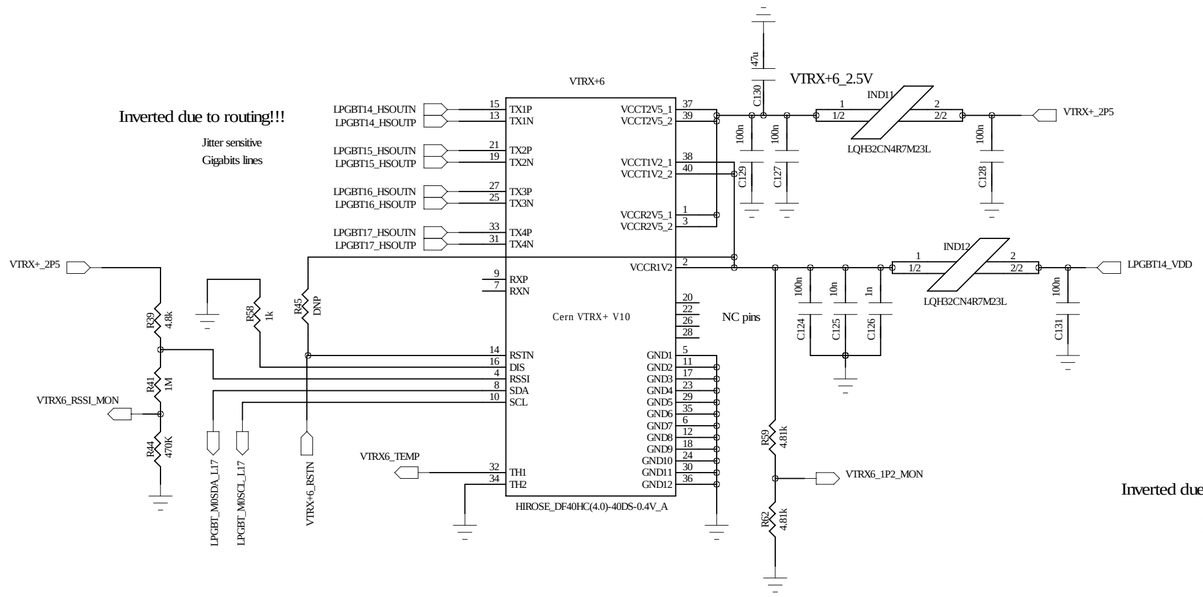

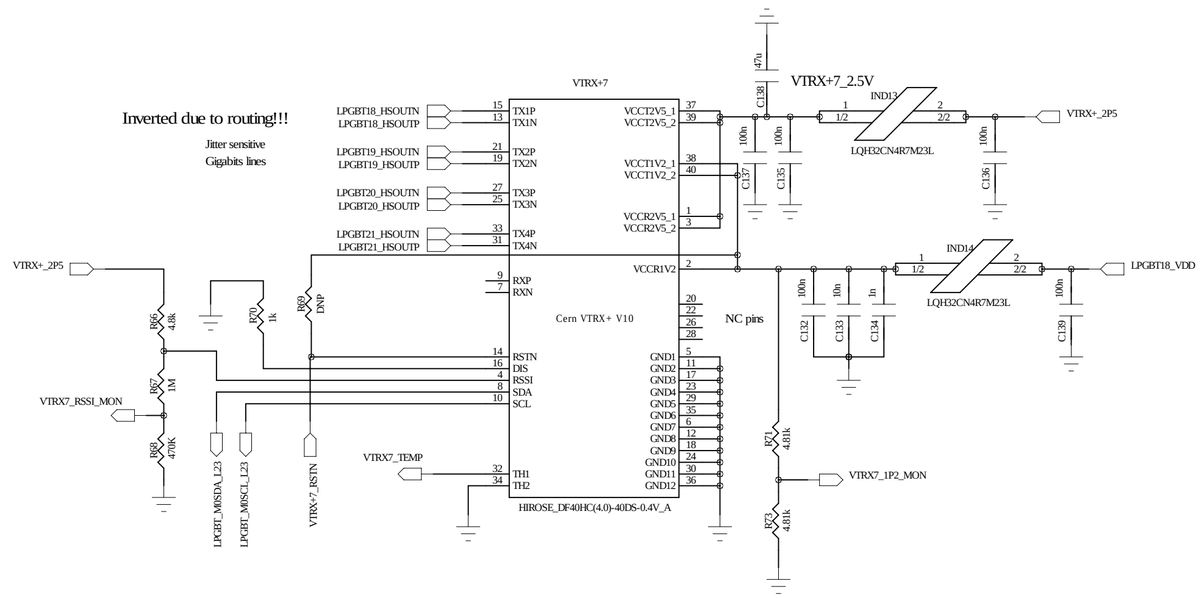

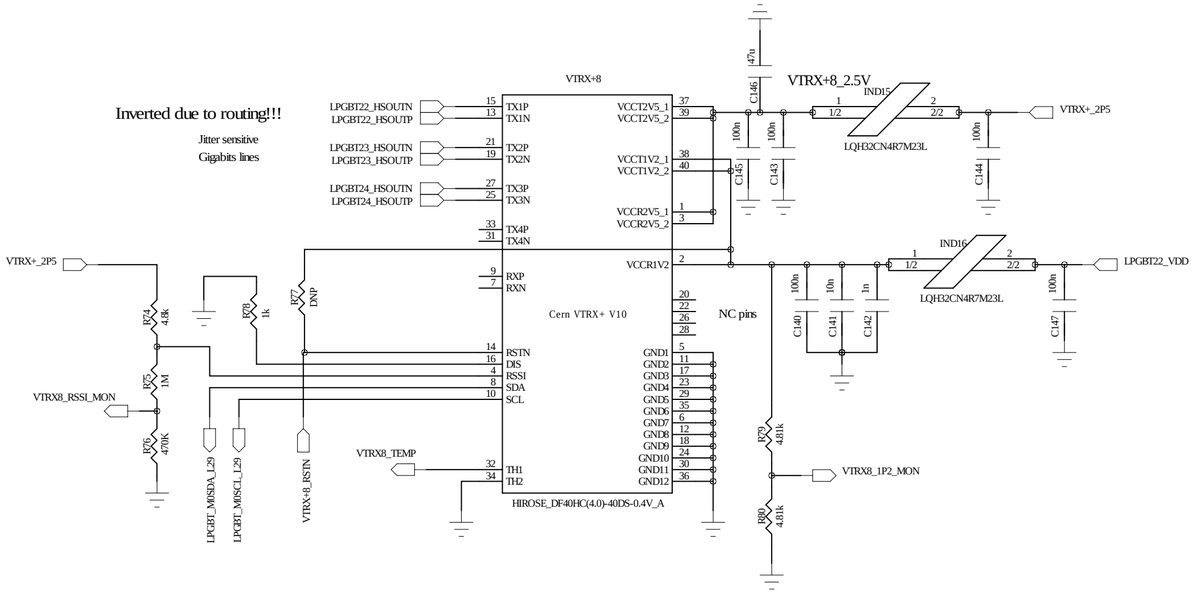

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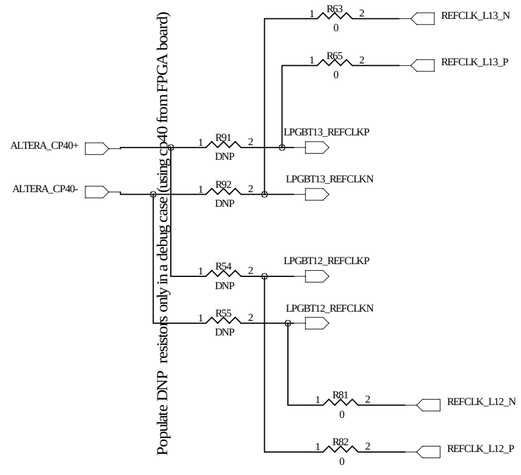

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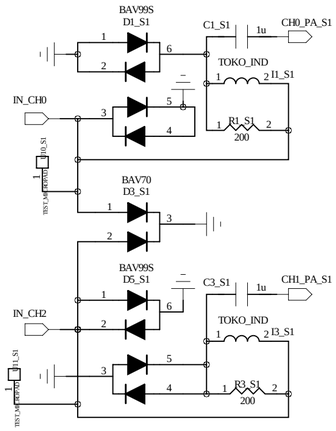

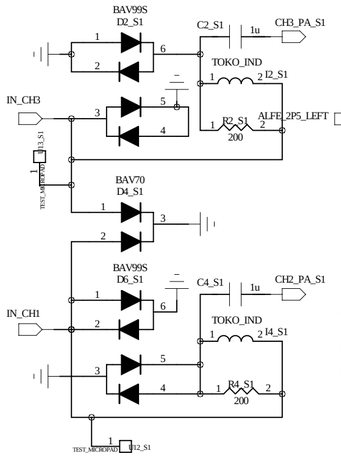

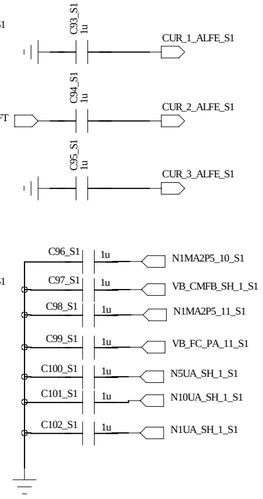

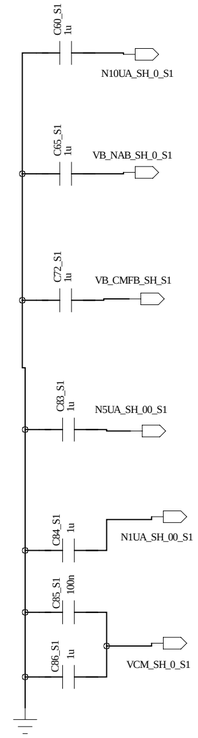

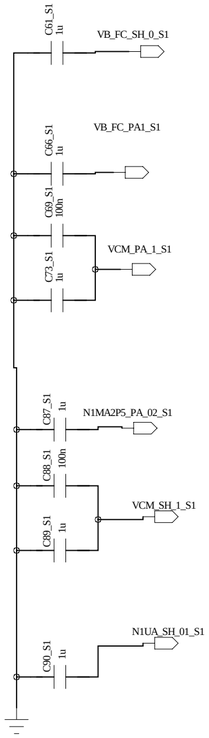

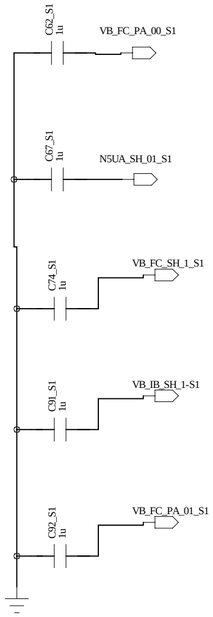

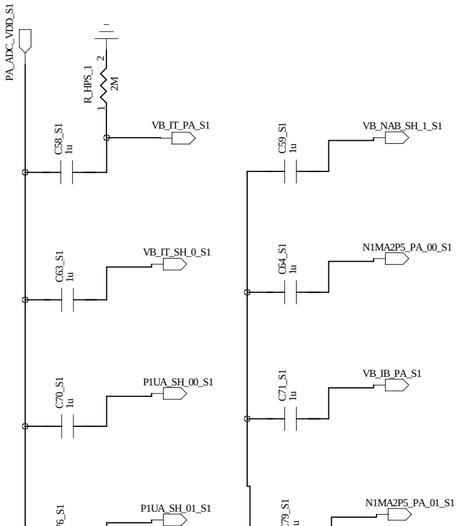

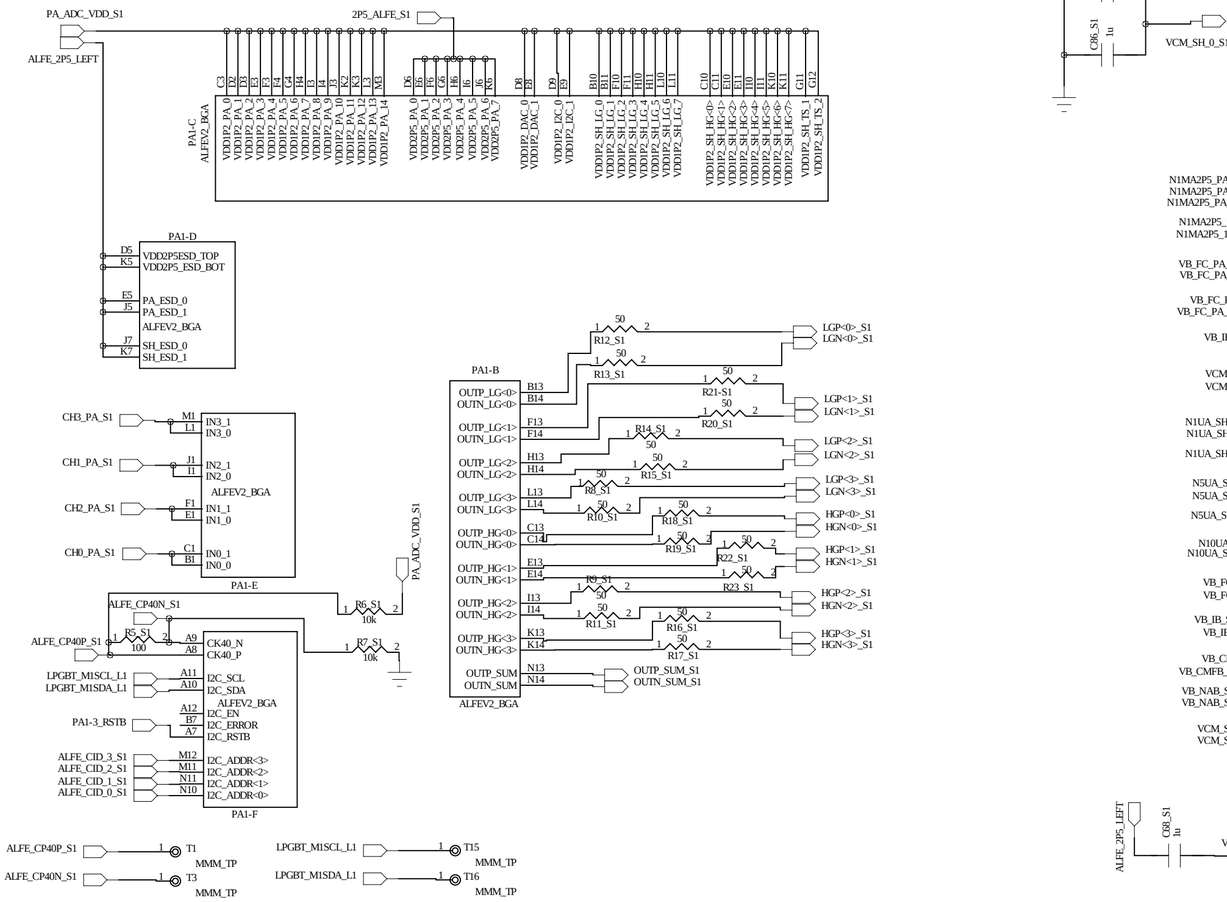

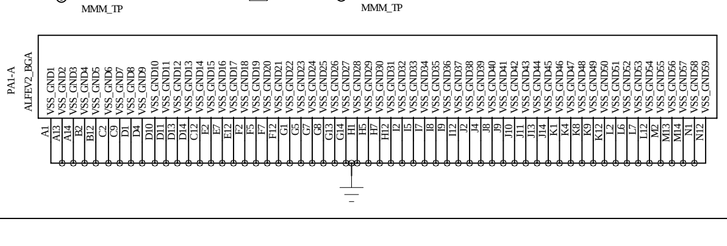

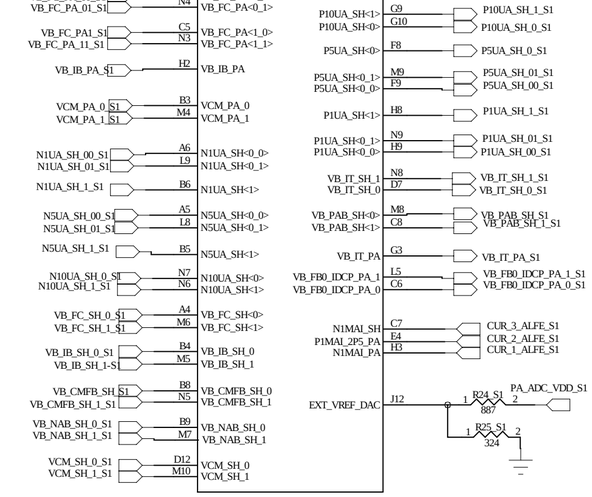

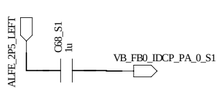

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REVISION RECORD			
LTR	ECO NO:	APPROVED:	DATE:

BAV99S D1_S2 · C1_S2 1u · CH0_PA_S2 · TOKO_IND I1_S2 · R1_S2 200 · IN_CH4 · U10_S2 TEST_MICROPAD
BAV99S D2_S2 · C2_S2 1u · CH3_PA_S2 · TOKO_IND I2_S2 · R2_S2 200 · IN_CH7 · U13_S2 TEST_MICROPAD
BAV70 D3_S2 · BAV99S D5_S2 · C3_S2 1u · CH1_PA_S2 · TOKO_IND I3_S2 · R3_S2 200 · IN_CH6 · U11_S2 TEST_MICROPAD
BAV70 D4_S2 · BAV99S D6_S2 · C4_S2 1u · CH2_PA_S2 · TOKO_IND I4_S2 · R4_S2 200 · IN_CH5 · U12_S2 TEST_MICROPAD

C93_S2 1u · CUR_1_ALFE_S2
ALFE_2P5_LEFT · C94_S2 1u · CUR_2_ALFE_S2
C95_S2 1u · CUR_3_ALFE_S2

C96_S2 1u · N1MA2P5_10_S2
C97_S2 1u · VB_CMFB_SH_1_S2
C98_S2 1u · N1MA2P5_11_S2
C99_S2 1u · VB_FC_PA_11_S2
C100_S2 1u · N5UA_SH_1_S2
C101_S2 1u · N10UA_SH_1_S2
C102_S2 1u · N1UA_SH_1_S2

C60_S2 1u · N10UA_SH_0_S2
C63_S2 1u · VB_NAB_SH_0_S2
C72_S2 1u · VB_CMFB_SH_S2
C83_S2 1u · N5UA_SH_00_S2
C84_S2 1u · N1UA_SH_00_S2
C85_S2 100n · C86_S2 1u · VCM_SH_0_S2

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C92_S2 1u · VB_FC_PA_01_S2

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C105_S2 1u · P5UA_SH_00_S2
C106_S2 1u · P1UA_SH_1_S2
C107_S2 1u · VB_PAB_SH_1_S2

PA_ADC_VDD_S2 · ALFE_2P5_LEFT · 2P5_ALFE_S3

PA2-C ALFEV2_BGA: VDD1P2_PA_0 C3 · VDD1P2_PA_1 D2 · VDD1P2_PA_2 E3 · VDD1P2_PA_3 F3 · VDD1P2_PA_4 F4 · VDD1P2_PA_5 G4 · VDD1P2_PA_6 H4 · VDD1P2_PA_7 J3 · VDD1P2_PA_8 J4 · VDD1P2_PA_9 J5 · VDD1P2_PA_10 K2 · VDD1P2_PA_11 K3 · VDD1P2_PA_12 L3 · VDD1P2_PA_13 M3 · VDD1P2_PA_14 D6 · VDD2P5_PA_0 E6 · VDD2P5_PA_1 F6 · VDD2P5_PA_2 G6 · VDD2P5_PA_3 H6 · VDD2P5_PA_4 J6 · VDD2P5_PA_5 K6 · VDD2P5_PA_6 D8 · VDD2P5_PA_7 B8 · VDD1P2_DAC_0 D9 · VDD1P2_DAC_1 B9 · VDD1P2_I2C_0 B10 · VDD1P2_I2C_1 B11 · VDD1P2_SH_LG_0 F10 · VDD1P2_SH_LG_1 F11 · VDD1P2_SH_LG_2 G11 · VDD1P2_SH_LG_3 H10 · VDD1P2_SH_LG_4 H11 · VDD1P2_SH_LG_5 L10 · VDD1P2_SH_LG_6 L11 · VDD1P2_SH_LG_7 C10 · VDD1P2_SH_HG_0 C11 · VDD1P2_SH_HG_1 E10 · VDD1P2_SH_HG_2 E11 · VDD1P2_SH_HG_3 H10 · VDD1P2_SH_HG_4 H11 · VDD1P2_SH_HG_5 K10 · VDD1P2_SH_HG_6 K11 · VDD1P2_SH_HG_7 G11 · VDD1P2_SH_TS_1 G12 · VDD1P2_SH_TS_2

PA2-D: D5 VDD2P5ESD_TOP · K5 VDD2P5_ESD_BOT · E5 PA_ESD_0 · J5 PA_ESD_1 · ALFEV2_BGA · J7 SH_ESD_0 · K7 SH_ESD_1

PA2-B: OUTP_LG<0> B13 · OUTN_LG<0> B14 · OUTP_LG<1> F13 · OUTN_LG<1> F14 · OUTP_LG<2> H13 · OUTN_LG<2> H14 · OUTP_LG<3> L13 · OUTN_LG<3> L14 · OUTP_HG<0> C13 · OUTN_HG<0> C14 · OUTP_HG<1> E13 · OUTN_HG<1> E14 · OUTP_HG<2> I13 · OUTN_HG<2> I14 · OUTP_HG<3> K13 · OUTN_HG<3> K14 · OUTP_SUM N13 · OUTN_SUM N14 · ALFEV2_BGA
R12_S2 50 · R13_S2 50 · R14_S2 50 · R15_S2 50 · R16_S2 50 · R17_S2 50 · R18_S2 50 · R19_S2 50 · R20_S2 50 · R21_S2 50 · R22_S2 50 · R23_S2 50
LGP<0>_S2 · LGN<0>_S2 · LGP<1>_S2 · LGN<1>_S2 · LGP<2>_S2 · LGN<2>_S2 · LGP<3>_S2 · LGN<3>_S2 · HGP<0>_S2 · HGN<0>_S2 · HGP<1>_S2 · HGN<1>_S2 · HGP<2>_S2 · HGN<2>_S2 · HGP<3>_S2 · HGN<3>_S2 · OUTP_SUM_S2 · OUTN_SUM_S2

CH3_PA_S2 · CH1_PA_S2 · CH2_PA_S2 · CH0_PA_S2 · PA2-E: IN3_1 M1 · IN3_0 L1 · IN2_1 J1 · IN2_0 I1 · IN1_1 F1 · IN1_0 E1 · IN0_1 C1 · IN0_0 B1 · ALFEV2_BGA
PA_ADC_VDD_S2 · R6_S2 10k · R7_S2 10k
ALFE_CP40N_S2 · R5_S2 100 · ALFE_CP40P_S2 · PA2-F: CK40_N A9 · CK40_P A8 · I2C_SCL A11 · I2C_SDA A10 · ALFEV2_BGA · I2C_EN A12 · I2C_ERROR B7 · I2C_RSTB A7
LPGBT_MOSCL_L2 · LPGBT_MOSDA_L2 · PA1-3_RSTB · ALFE_CID_3_S2 M12 · ALFE_CID_2_S2 M11 · ALFE_CID_1_S2 N11 · ALFE_CID_0_S2 N10 · I2C_ADDR<3> · I2C_ADDR<2> · I2C_ADDR<1> · I2C_ADDR<0>

PA2-A ALFEV2_BGA: VSS_GND1 A1 · VSS_GND2 A13 · VSS_GND3 A14 · VSS_GND4 B2 · VSS_GND5 B12 · VSS_GND6 C3 · VSS_GND7 D1 · VSS_GND8 D14 · VSS_GND9 D4 · VSS_GND10 D10 · VSS_GND11 D11 · VSS_GND12 D13 · VSS_GND13 C12 · VSS_GND14 E2 · VSS_GND15 E7 · VSS_GND16 E9 · VSS_GND17 F2 · VSS_GND18 F5 · VSS_GND19 F12 · VSS_GND20 G1 · VSS_GND21 G5 · VSS_GND22 G7 · VSS_GND23 G8 · VSS_GND24 G9 · VSS_GND25 G13 · VSS_GND26 G14 · VSS_GND27 H1 · VSS_GND28 H5 · VSS_GND29 H7 · VSS_GND30 H12 · VSS_GND31 J2 · VSS_GND32 J13 · VSS_GND33 K5 · VSS_GND34 K7 · VSS_GND35 L5 · VSS_GND36 L7 · VSS_GND37 L9 · VSS_GND38 L12 · VSS_GND39 J4 · VSS_GND40 J9 · VSS_GND41 J10 · VSS_GND42 J11 · VSS_GND43 J12 · VSS_GND44 J14 · VSS_GND45 K1 · VSS_GND46 K4 · VSS_GND47 K8 · VSS_GND48 K9 · VSS_GND49 K12 · VSS_GND50 L2 · VSS_GND51 L6 · VSS_GND52 L8 · VSS_GND53 L12 · VSS_GND54 M2 · VSS_GND55 M13 · VSS_GND56 N1 · VSS_GND57 N14 · VSS_GND58 N12 · VSS_GND59

PA2-G ALFEV2_BGA
N1MA2P5_PA_00_S2 A2 · N1MA2P5_PA_01_S2 G2 · N1MA2P5_PA_02_S2 N2 · N1MA2P5_PA<0_0> · N1MA2P5_PA<0_1> · N1MA2P5_PA<0_2>
N1MA2P5_10_S2 C4 · N1MA2P5_11_S2 L4 · N1MA2P5_PA<1_0> · N1MA2P5_PA<1_1>
VB_FC_PA_00_S2 A3 · VB_FC_PA_01_S2 N4 · VB_FC_PA<0_0> · VB_FC_PA<0_1>
VB_FC_PA1_S2 C5 · VB_FC_PA_11_S2 N3 · VB_FC_PA<1_0> · VB_FC_PA<1_1>
VB_IB_PA_S2 H2 · VB_IB_PA
VCM_PA_0_S2 B3 · VCM_PA_1_S2 M4 · VCM_PA_0 · VCM_PA_1
N1UA_SH_00_S2 A6 · N1UA_SH_01_S2 L9 · N1UA_SH<0_0> · N1UA_SH<0_1>
N1UA_SH_1_S2 B6 · N1UA_SH<1>
N5UA_SH_00_S2 A5 · N5UA_SH_01_S2 L8 · N5UA_SH<0_0> · N5UA_SH<0_1>
N5UA_SH_1_S2 B5 · N5UA_SH<1>
N10UA_SH_0_S2 N7 · N10UA_SH_1_S2 N6 · N10UA_SH<0> · N10UA_SH<1>
VB_FC_SH_0_S2 A4 · VB_FC_SH_1_S2 M6 · VB_FC_SH<0> · VB_FC_SH<1>
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VB_CMFB_SH_S2 B8 · VB_CMFB_SH_1_S2 N5 · VB_CMFB_SH_0 · VB_CMFB_SH_1
VB_NAB_SH_0_S2 B9 · VB_NAB_SH_1_S2 M7 · VB_NAB_SH_0 · VB_NAB_SH_1
VCM_SH_0_S2 D12 · VCM_SH_1_S2 M10 · VCM_SH_0 · VCM_SH_1
P10UA_SH<1> G9 · P10UA_SH<0> G10 · P10UA_SH_1_S2 · P10UA_SH_0_S2
P5UA_SH<0> F8 · P5UA_SH_0_S2
P5UA_SH<0_1> M9 · P5UA_SH<0_0> F9 · P5UA_SH_01_S2 · P5UA_SH_00_S2
P1UA_SH<1> H8 · P1UA_SH_1_S2
P1UA_SH<0_1> N9 · P1UA_SH<0_0> H9 · P1UA_SH_01_S2 · P1UA_SH_00_S2
VB_IT_SH_1 N8 · VB_IT_SH_0 D7 · VB_IT_SH_1_S2 · VB_IT_SH_0_S2
VB_PAB_SH<0> M8 · VB_PAB_SH<1> C8 · VB_PAB_SH_S2 · VB_PAB_SH_1_S2
VB_IT_PA_S2 G3 · VB_IT_PA
VB_FB0_IDCP_PA_1 L5 · VB_FB0_IDCP_PA_0 C6 · VB_FB0_IDCP_PA_1_S2 · VB_FB0_IDCP_PA_0_S2
N1MAI_SH C7 · P1MAI_2P5_PA E4 · N1MAI_PA H3 · CUR_3_ALFE_S2 · CUR_2_ALFE_S2 · CUR_1_ALFE_S2
EXT_VREF_DAC · J12 · R24_S2 887 · R25_S2 324 · PA_ADC_VDD_S2

ALFE_2P5_LEFT · C68_S2 1u · VB_FB0_IDCP_PA_0_S2
ALFE_2P5_LEFT · C75_S2 1u · VB_FB0_IDCP_PA_1_S2

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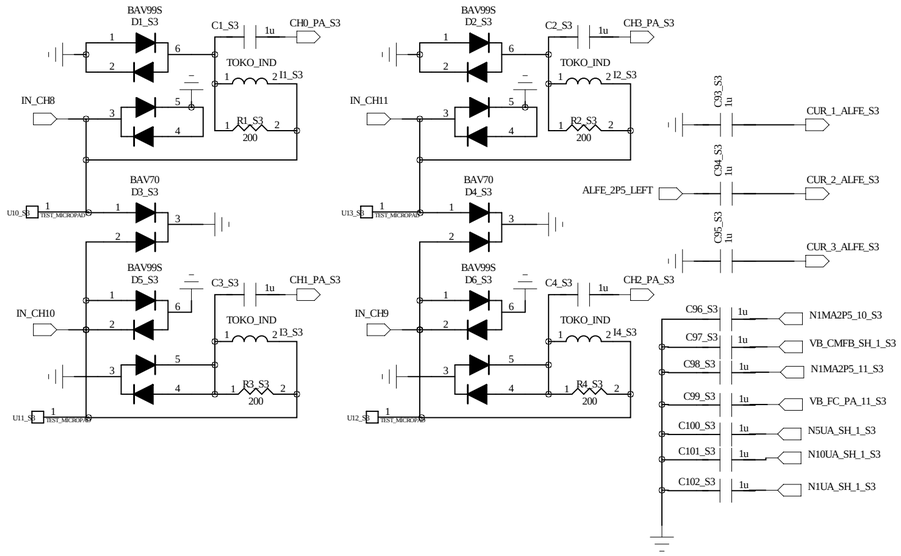

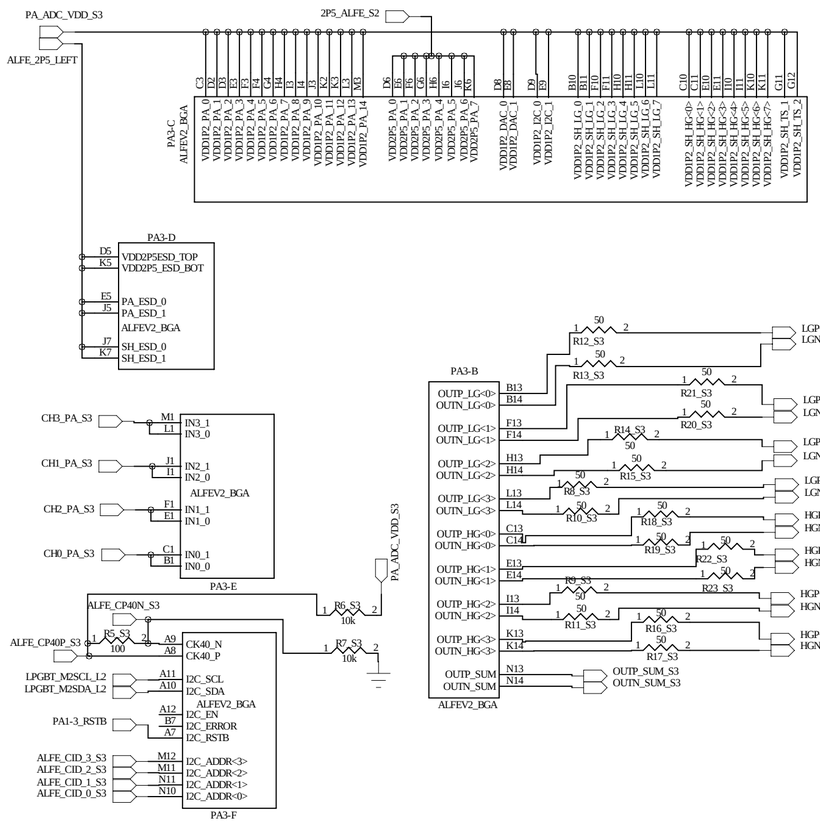

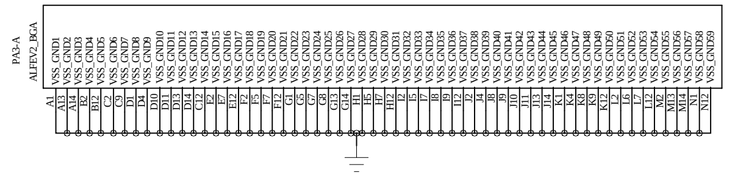

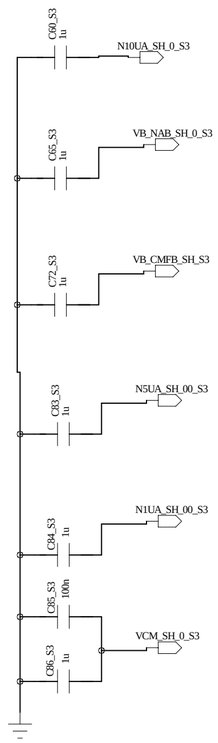

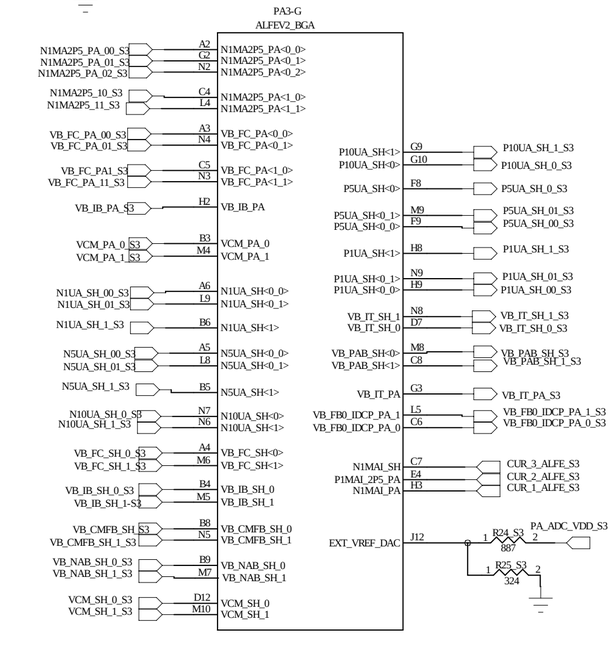

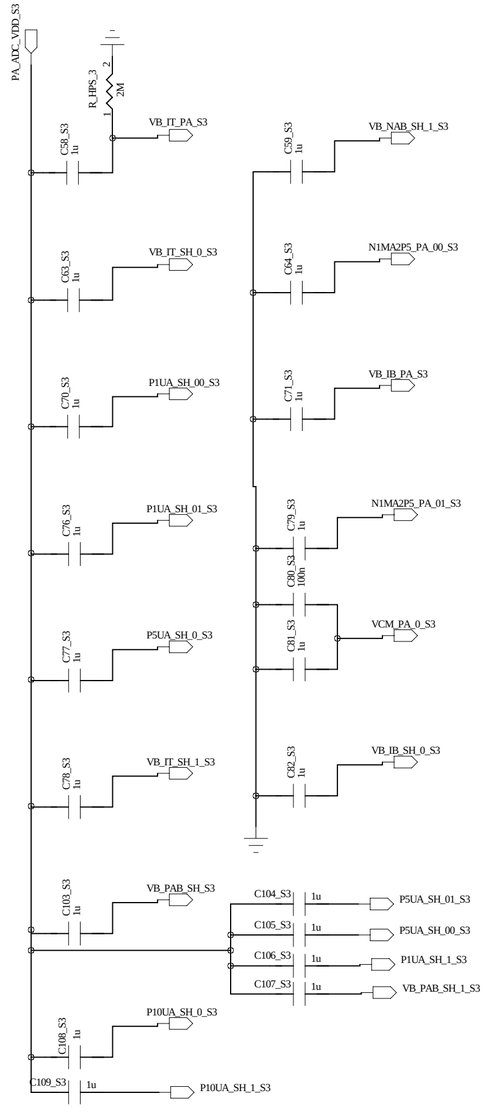

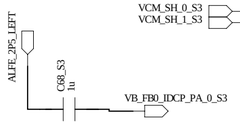

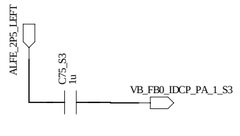

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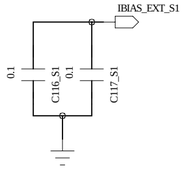

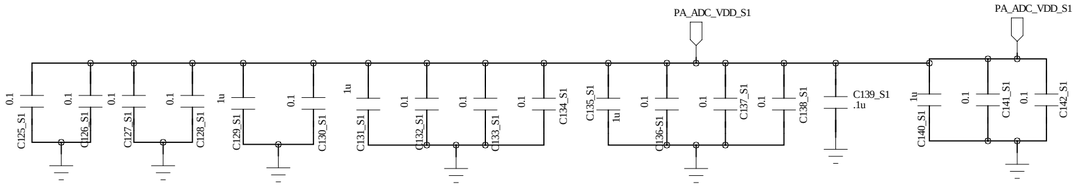

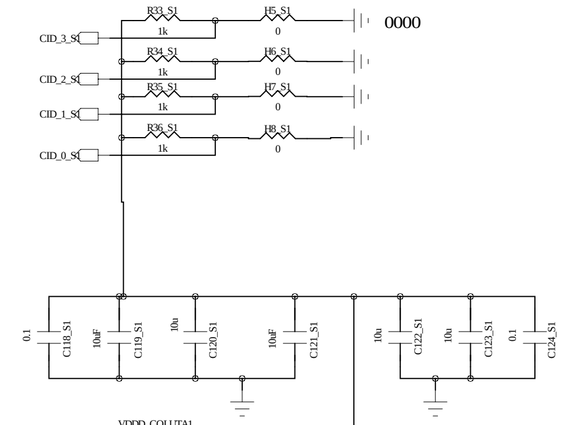

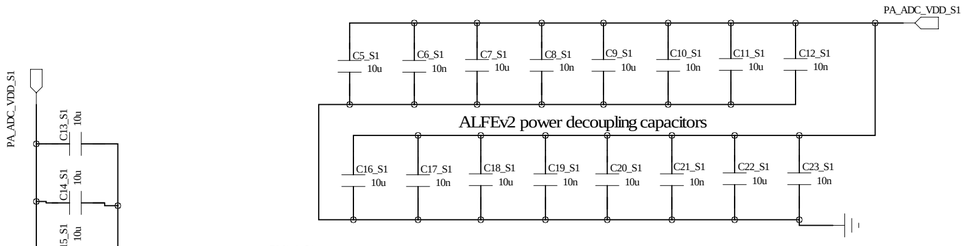

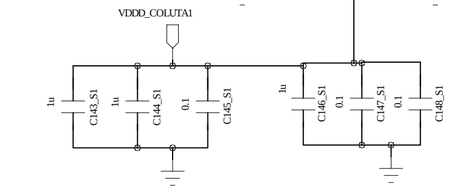

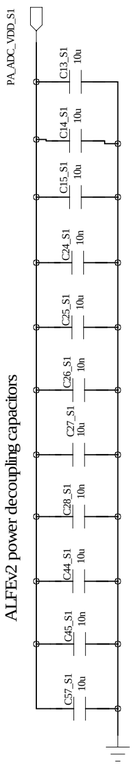

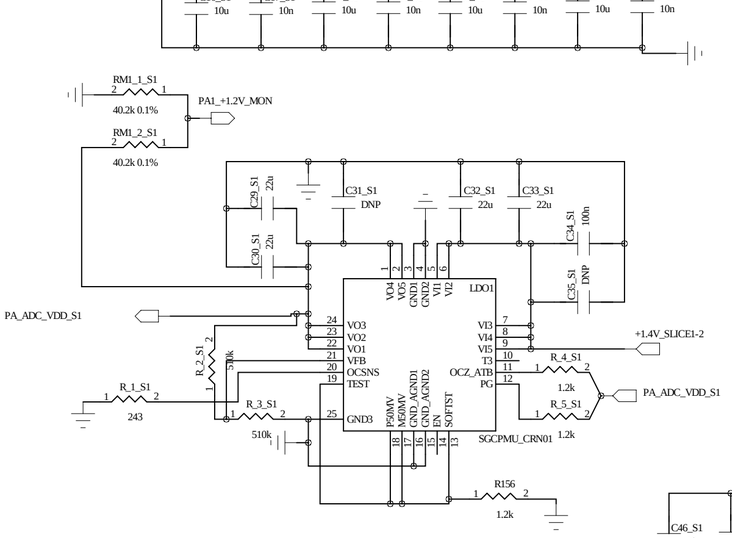

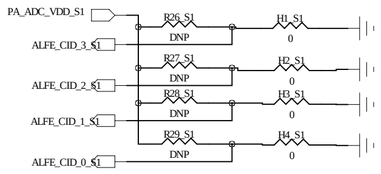

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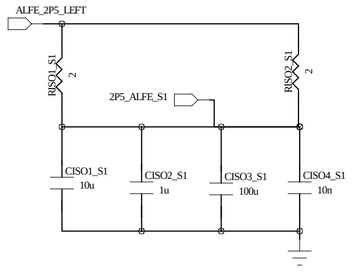
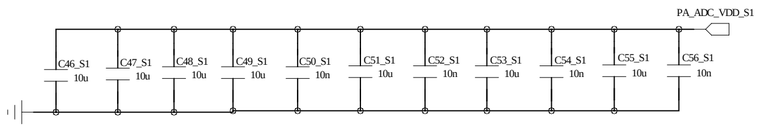
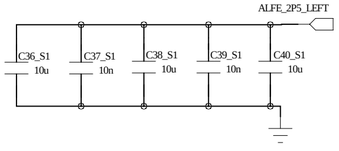
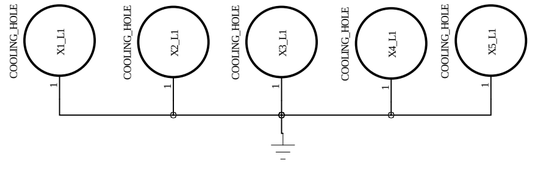


ALFEv2 power decoupling capacitors







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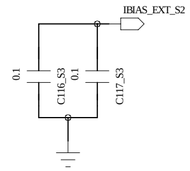

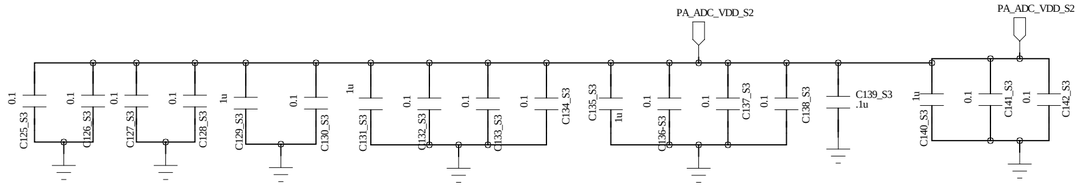

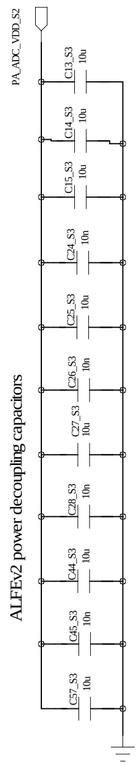

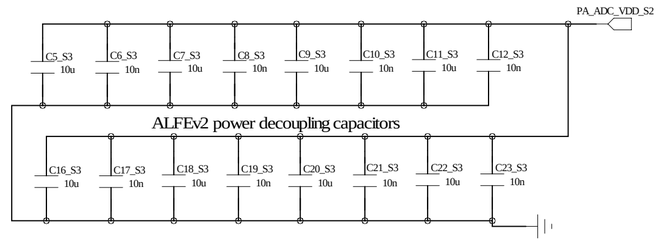

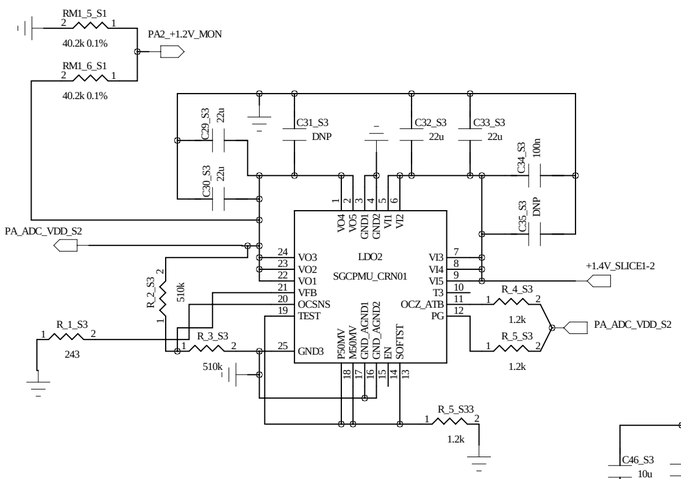

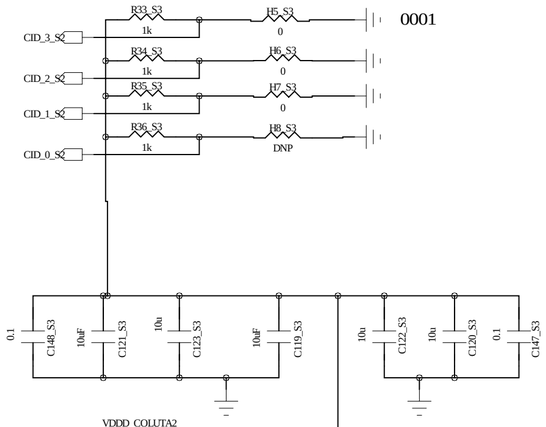

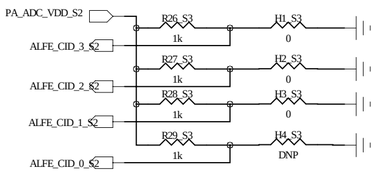

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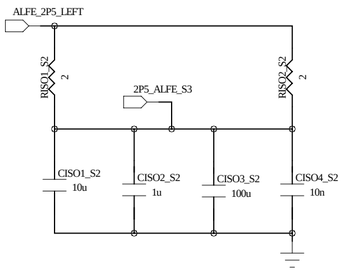

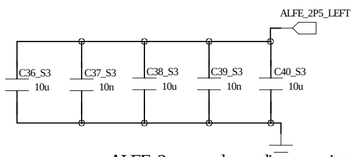

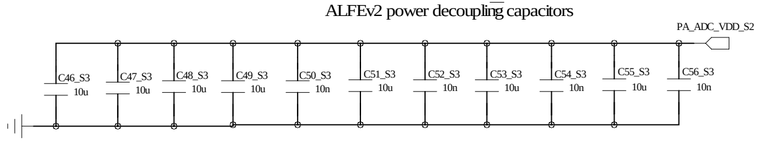

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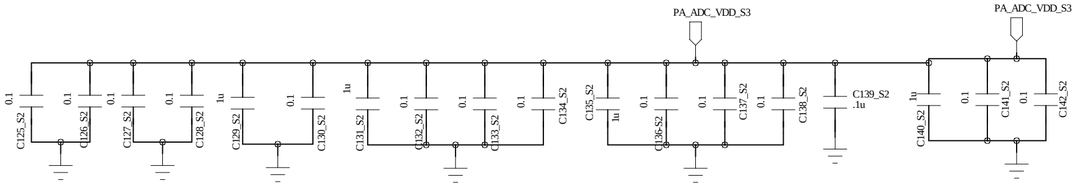

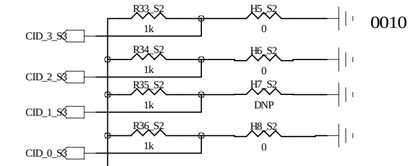

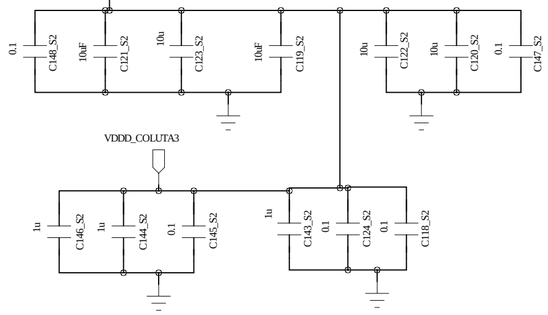

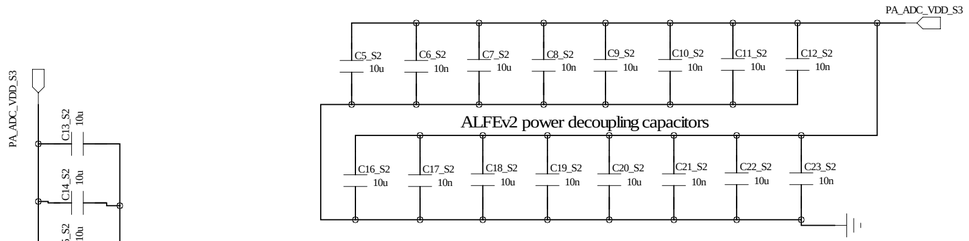

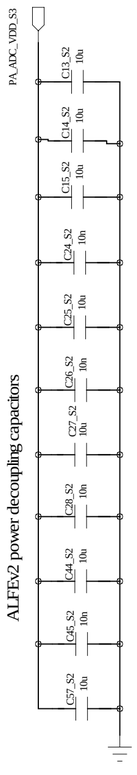

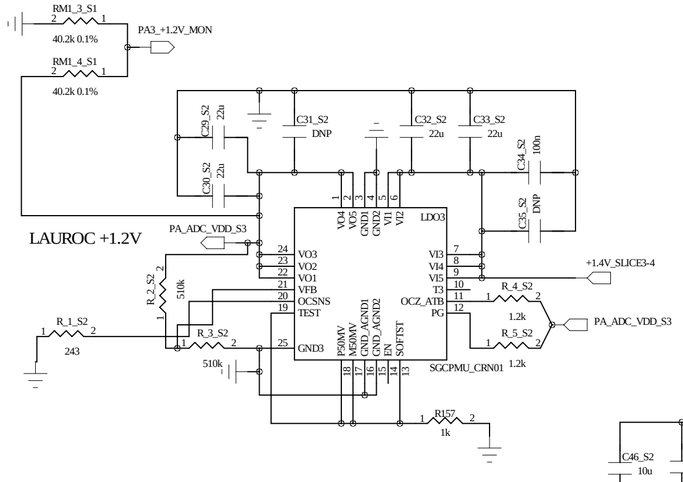

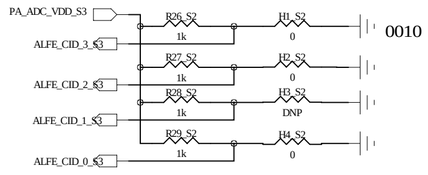

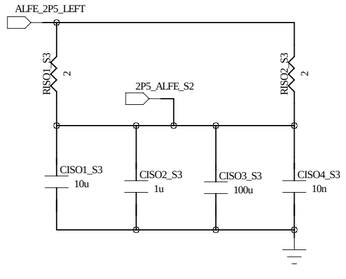

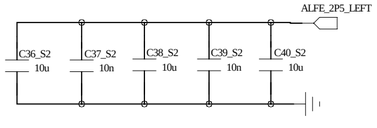

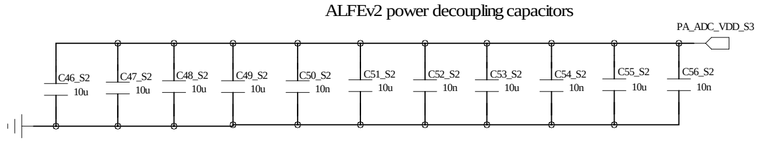

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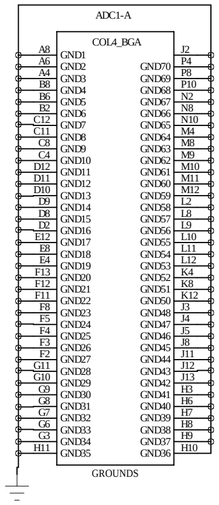

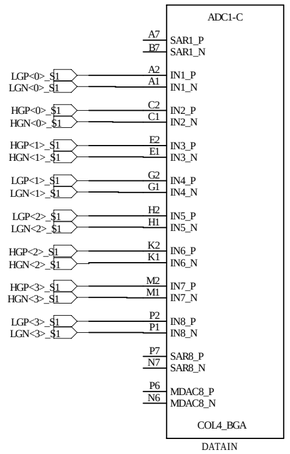

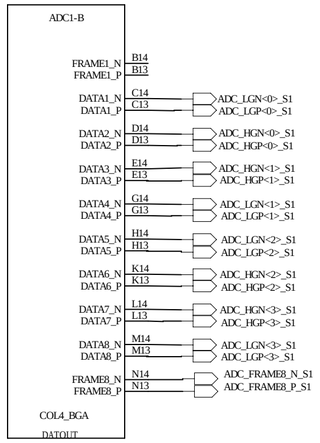

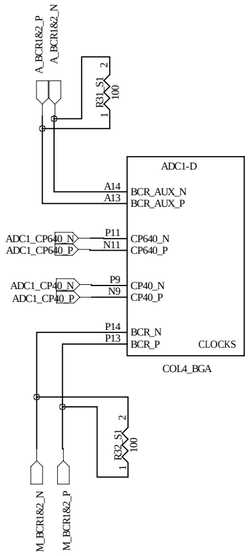

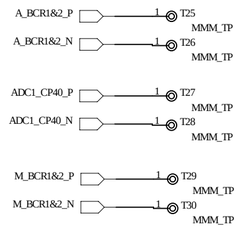

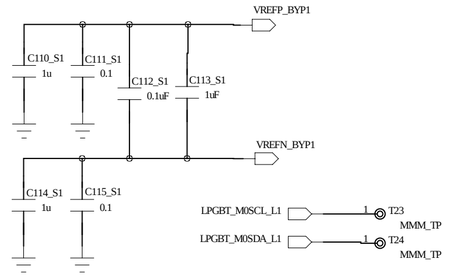

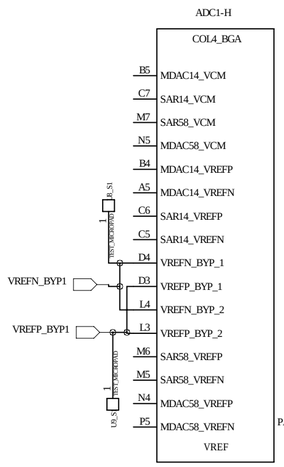

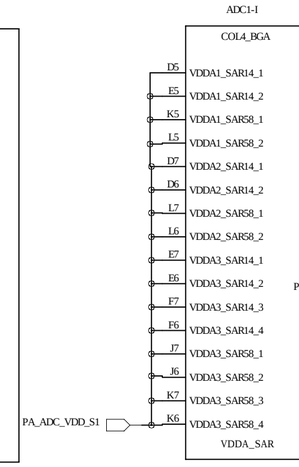

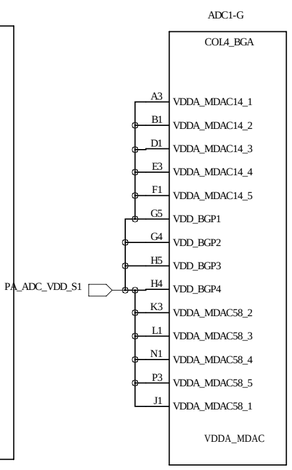

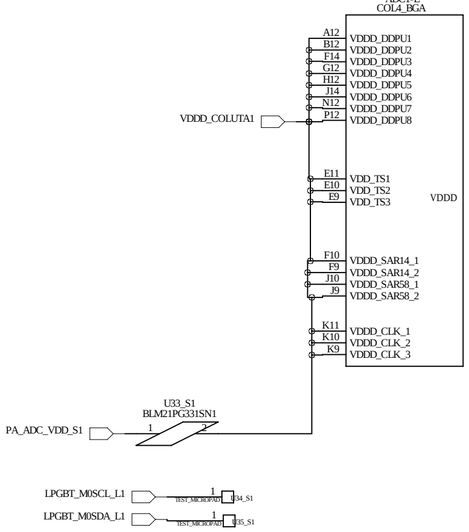

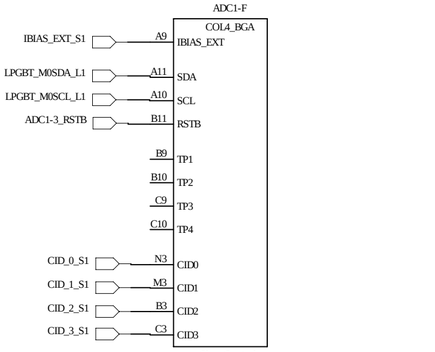

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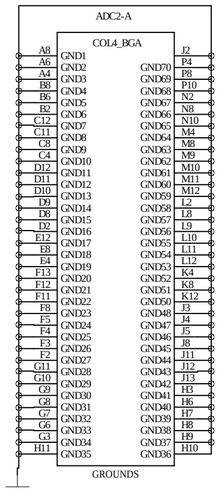

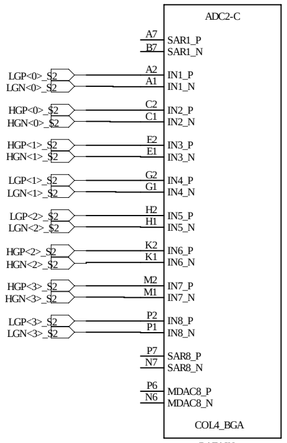

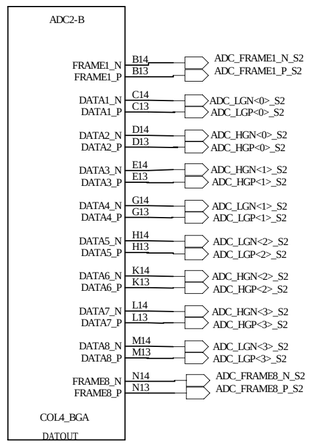

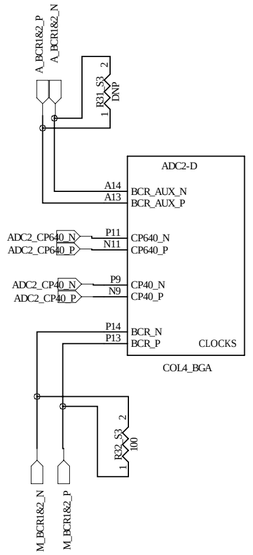

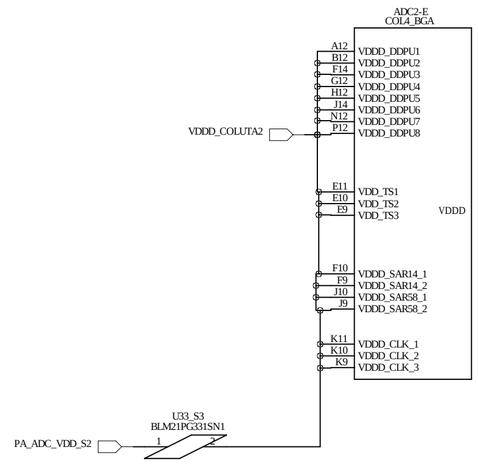

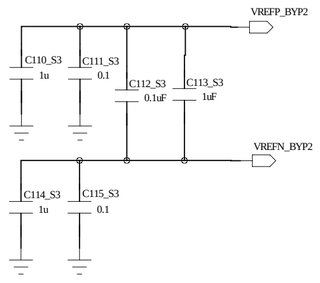

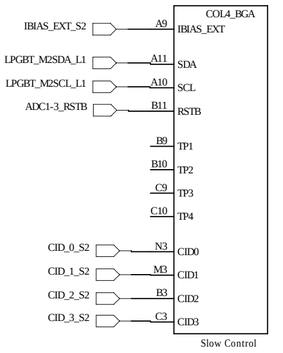

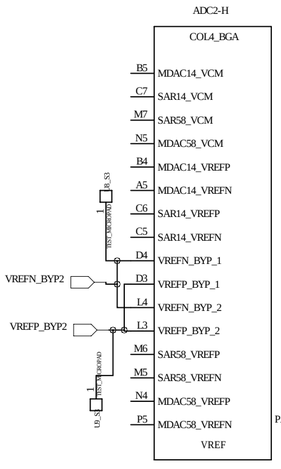

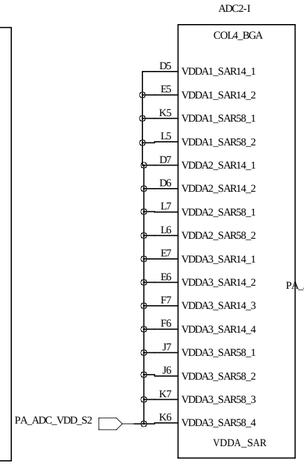

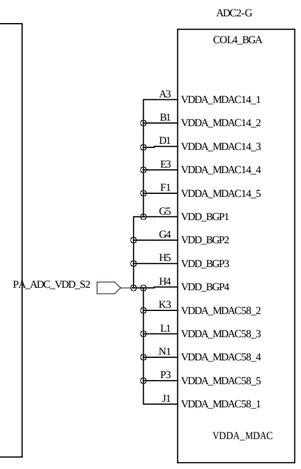

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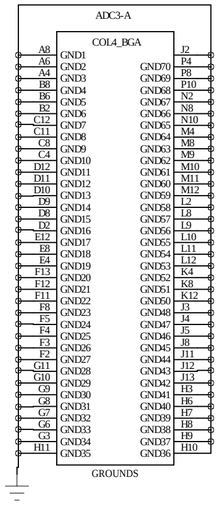

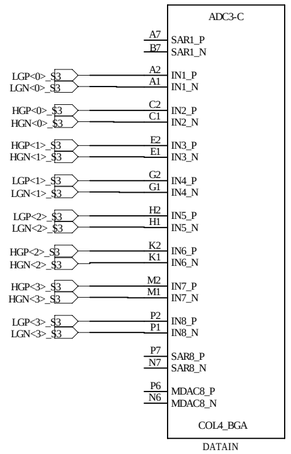

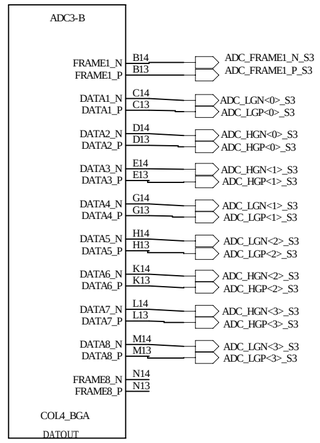

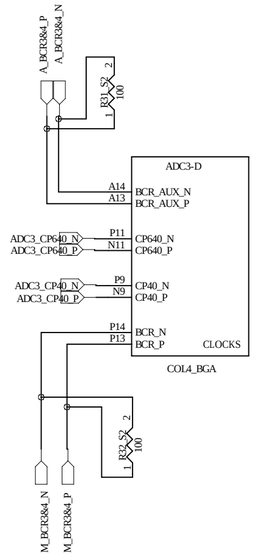

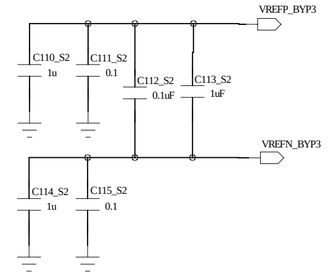

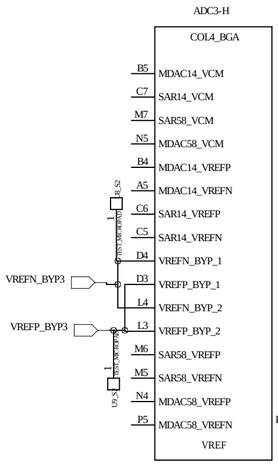

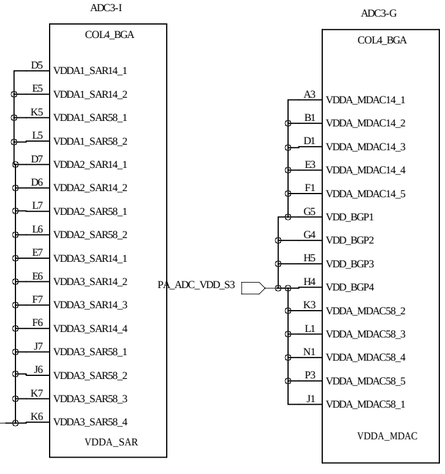

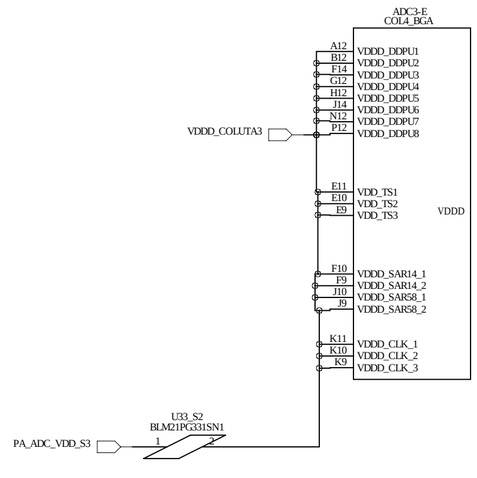

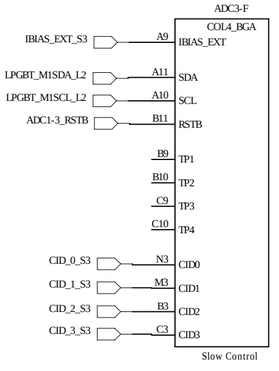

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Simplex TX 10GHz FEC5 mode 1001

Lock to external 40MHz

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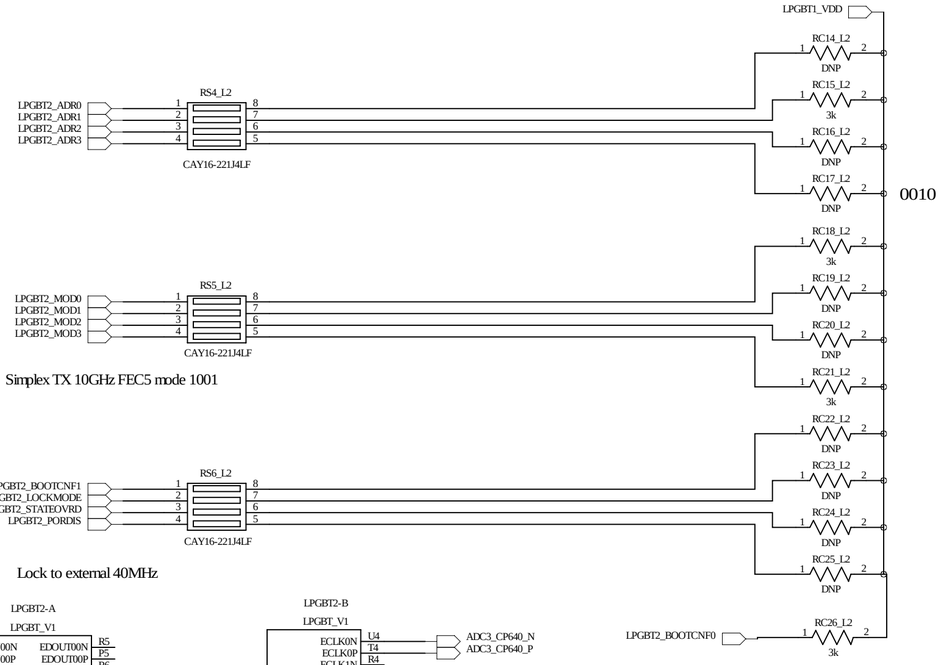

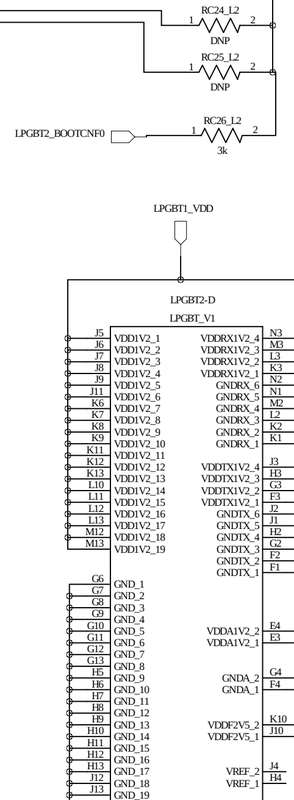

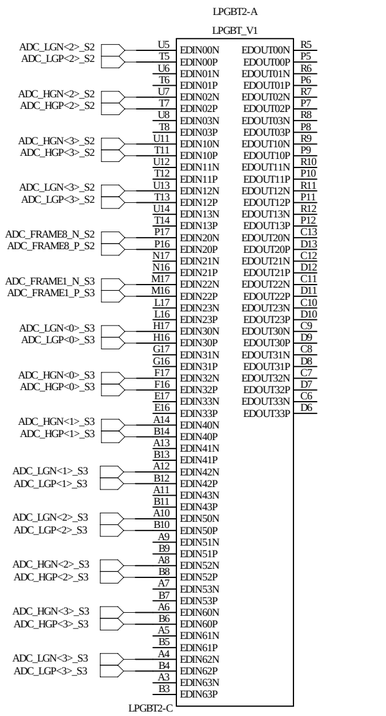

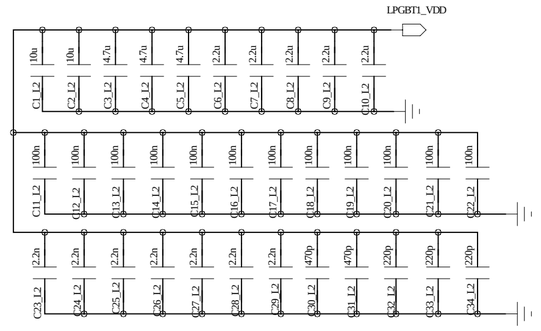

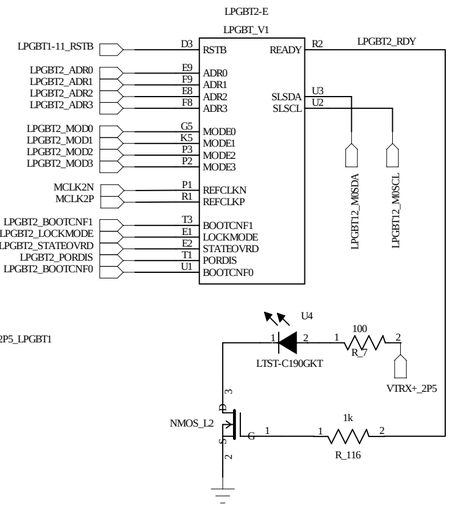

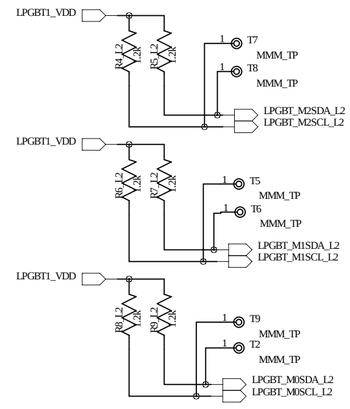

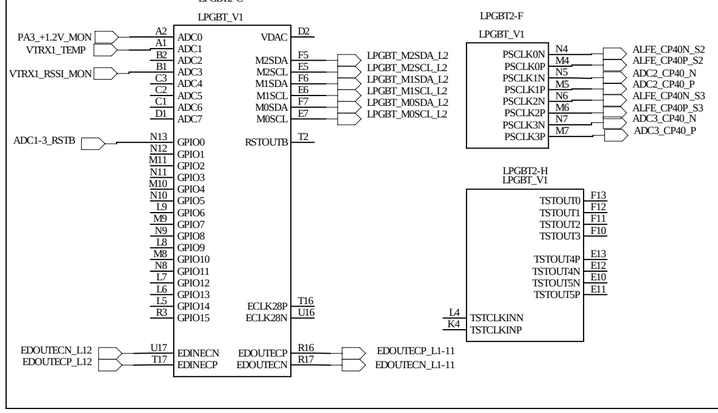

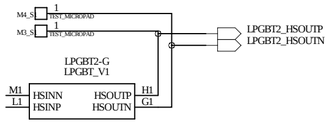

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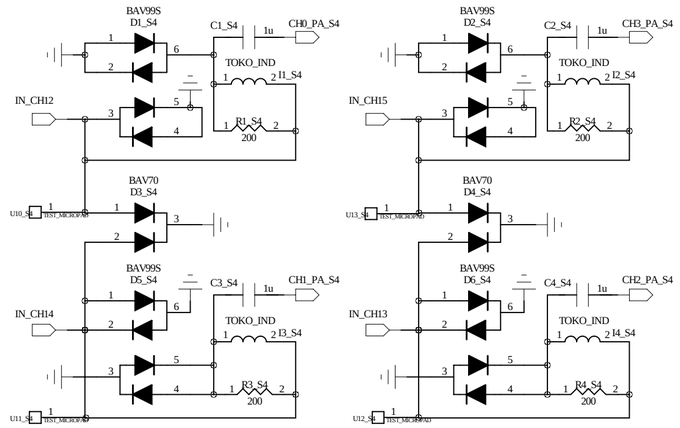

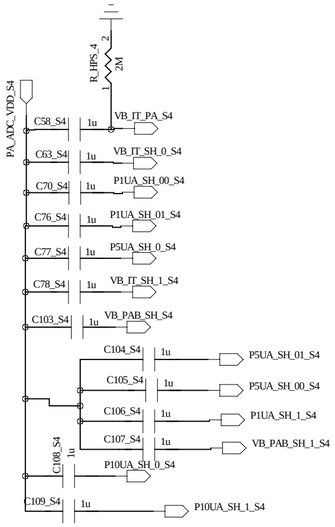

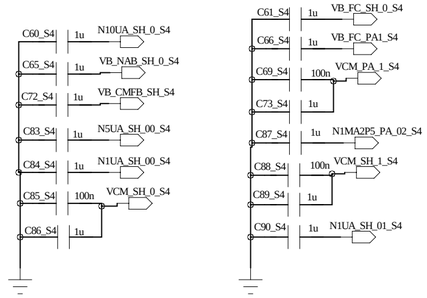

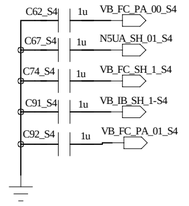

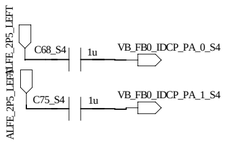

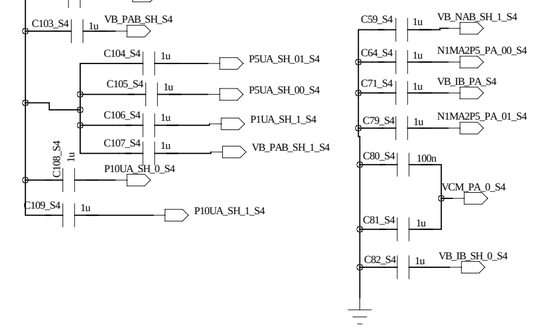

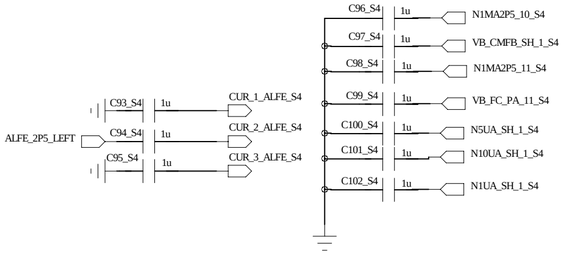

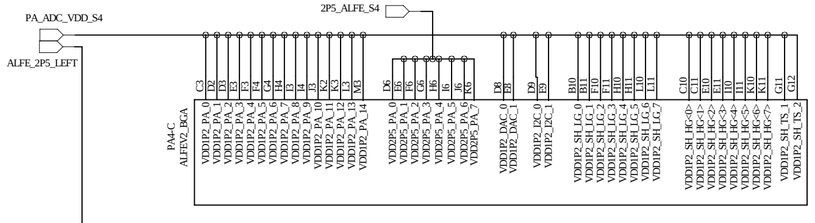

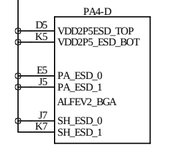

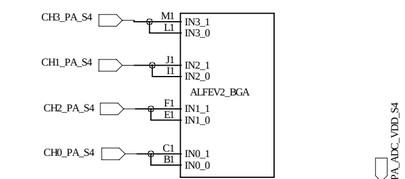

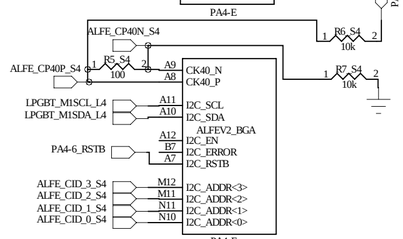

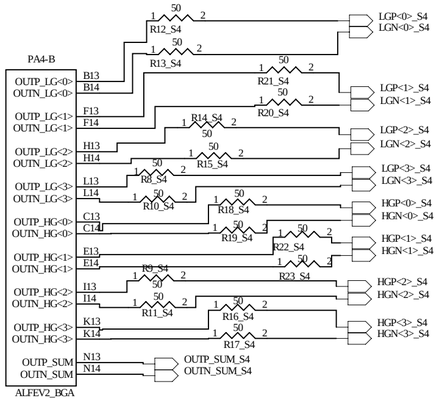

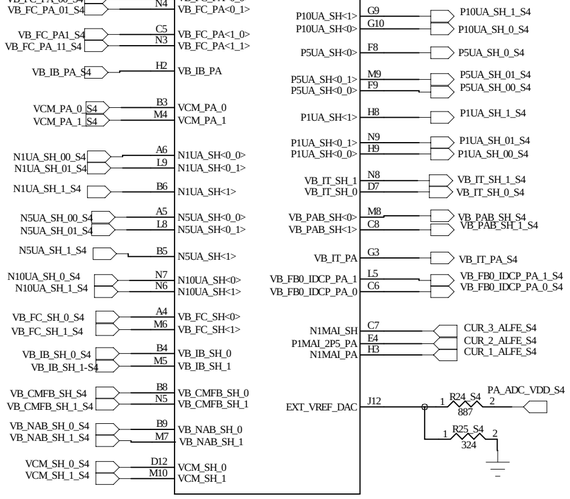

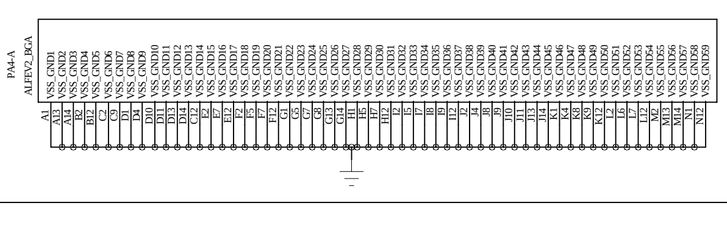

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RELEASED: jb	DATED: <Release Date>	DRAWING NO: 35	REV: v2.0
		SCALE: <Scale>	SHEET: 21 OF 154

REVISION RECORD			
LTR	ECO NO:	APPROVED:	DATE:

BAV99S D1_S5 · C1_S5 1u · CH0_PA_S5 · TOKO_IND I1_S5 · IN_CH16 · R1_S5 200 · BAV70 D3_S5 · U10_S5 TEST_MICROPAD

BAV99S D2_S5 · C2_S5 1u · CH3_PA_S5 · TOKO_IND I2_S5 · IN_CH19 · R2_S5 200 · BAV70 D4_S5 · U13_S5 TEST_MICROPAD

BAV99S D5_S5 · C3_S5 1u · CH1_PA_S5 · TOKO_IND I3_S5 · IN_CH18 · R3_S5 200 · U11_S5 TEST_MICROPAD

BAV99S D6_S5 · C4_S5 1u · CH2_PA_S5 · TOKO_IND I4_S5 · IN_CH17 · R4_S5 200 · U12_S5 TEST_MICROPAD

C93_S5 1u · CUR_1_ALFE_S5 · C94_S5 1u · CUR_2_ALFE_S5 · C95_S5 1u · CUR_3_ALFE_S5 · ALFE_2P5_LEFT

C96_S5 1u · N1MA2P5_10_S5 · C97_S5 1u · VB_CMFB_SH_1_S5 · C98_S5 1u · N1MA2P5_11_S5 · C99_S5 1u · VB_FC_PA_11_S5 · C100_S5 1u · N5UA_SH_1_S5 · C101_S5 1u · N10UA_SH_1_S5 · C102_S5 1u · N1UA_SH_1_S5

C60_S5 1u · N10UA_SH_0_S5 · C65_S5 1u · VB_NAB_SH_0_S5 · C72_S5 1u · VB_CMFB_SH_S5 · C83_S5 1u · N5UA_SH_00_S5 · C84_S5 1u · N1UA_SH_00_S5 · C85_S5 100n · C86_S5 1u · VCM_SH_0_S5

C61_S5 1u · VB_FC_SH_0_S5 · C66_S5 1u · VB_FC_PA1_S5 · C69_S5 100n · C73_S5 1u · VCM_PA_1_S5 · C87_S5 1u · N1MA2P5_PA_02_S5 · C88_S5 100n · C89_S5 1u · VCM_SH_1_S5 · C90_S5 1u · N1UA_SH_01_S5

C62_S5 1u · VB_FC_PA_00_S5 · C67_S5 1u · N5UA_SH_01_S5 · C74_S5 1u · VB_FC_SH_1_S5 · C91_S5 1u · VB_IB_SH_1-S5 · C92_S5 1u · VB_FC_PA_01_S5

PA_ADC_VDD_S5 · R_HPS_5 2M · C58_S5 1u · VB_IT_PA_S5 · C63_S5 1u · VB_IT_SH_0_S5 · C70_S5 1u · P1UA_SH_00_S5 · C76_S5 1u · P1UA_SH_01_S5 · C77_S5 1u · P5UA_SH_0_S5 · C78_S5 1u · VB_IT_SH_1_S5 · C103_S5 1u · VB_PAB_SH_S5 · C108_S5 1u · P10UA_SH_0_S5 · C109_S5 1u · P10UA_SH_1_S5

C59_S5 1u · VB_NAB_SH_1_S5 · C64_S5 1u · N1MA2P5_PA_00_S5 · C71_S5 1u · VB_IB_PA_S5 · C79_S5 1u · N1MA2P5_PA_01_S5 · C80_S5 100n · C81_S5 1u · VCM_PA_0_S5 · C82_S5 1u · VB_IB_SH_0_S5 · C104_S5 1u · P5UA_SH_01_S5 · C105_S5 1u · P5UA_SH_00_S5 · C106_S5 1u · P1UA_SH_1_S5 · C107_S5 1u · VB_PAB_SH_1_S5

PA5-G ALFEV2_BGA

N1MA2P5_PA_00_S5	A2	N1MA2P5_PA<0_0>
N1MA2P5_PA_01_S5	G2	N1MA2P5_PA<0_1>
N1MA2P5_PA_02_S5	N2	N1MA2P5_PA<0_2>
N1MA2P5_10_S5	C4	N1MA2P5_PA<1_0>
N1MA2P5_11_S5	L4	N1MA2P5_PA<1_1>
VB_FC_PA_00_S5	A3	VB_FC_PA<0_0>
VB_FC_PA_01_S5	N4	VB_FC_PA<0_1>
VB_FC_PA1_S5	C5	VB_FC_PA<1_0>
VB_FC_PA_11_S5	N3	VB_FC_PA<1_1>
VB_IB_PA_S5	H2	VB_IB_PA
VCM_PA_0_S5	B3	VCM_PA_0
VCM_PA_1_S5	M4	VCM_PA_1
N1UA_SH_00_S5	A6	N1UA_SH<0_0>
N1UA_SH_01_S5	L9	N1UA_SH<0_1>
N1UA_SH_1_S5	B6	N1UA_SH<1>
N5UA_SH_00_S5	A5	N5UA_SH<0_0>
N5UA_SH_01_S5	L8	N5UA_SH<0_1>
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N10UA_SH_0_S5	N7	N10UA_SH<0>
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VB_FC_SH_0_S5	A4	VB_FC_SH<0>
VB_FC_SH_1_S5	M6	VB_FC_SH<1>
VB_IB_SH_0_S5	B4	VB_IB_SH_0
VB_IB_SH_1-S5	M5	VB_IB_SH_1
VB_CMFB_SH_S5	B8	VB_CMFB_SH_0
VB_CMFB_SH_1_S5	N5	VB_CMFB_SH_1
VB_NAB_SH_0_S5	B9	VB_NAB_SH_0
VB_NAB_SH_1_S5	M7	VB_NAB_SH_1
VCM_SH_0_S5	D12	VCM_SH_0
VCM_SH_1_S5	M10	VCM_SH_1
P10UA_SH<1>	G9	P10UA_SH_1_S5
P10UA_SH<0>	G10	P10UA_SH_0_S5
P5UA_SH<0>	F8	P5UA_SH_0_S5
P5UA_SH<0_1>	M9	P5UA_SH_01_S5
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P1UA_SH<1>	H8	P1UA_SH_1_S5
P1UA_SH<0_1>	N9	P1UA_SH_01_S5
P1UA_SH<0_0>	H9	P1UA_SH_00_S5
VB_IT_SH_1	N8	VB_IT_SH_1_S5
VB_IT_SH_0	D7	VB_IT_SH_0_S5
VB_PAB_SH<0>	M8	VB_PAB_SH_S5
VB_PAB_SH<1>	C8	VB_PAB_SH_1_S5
VB_IT_PA	G3	VB_IT_PA_S5
VB_FB0_IDCP_PA_1	L5	VB_FB0_IDCP_PA_1_S5
VB_FB0_IDCP_PA_0	C6	VB_FB0_IDCP_PA_0_S5
N1MAI_SH	C7	CUR_3_ALFE_S5
P1MAI_2P5_PA	E4	CUR_2_ALFE_S5
N1MAI_PA	H3	CUR_1_ALFE_S5
EXT_VREF_DAC	J12	PA_ADC_VDD_S5

R24_S5 887 · R25_S5 324

PA_ADC_VDD_S5 · ALFE_2P5_LEFT · 2P5_ALFE_S5

PA5-C ALFEV2_BGA: VDD1P2_PA_0 C3 · VDD1P2_PA_1 D2 · VDD1P2_PA_2 D3 · VDD1P2_PA_3 E3 · VDD1P2_PA_4 F3 · VDD1P2_PA_5 F4 · VDD1P2_PA_6 G4 · VDD1P2_PA_7 H4 · VDD1P2_PA_8 I3 · VDD1P2_PA_9 J3 · VDD1P2_PA_10 K2 · VDD1P2_PA_11 K3 · VDD1P2_PA_12 L3 · VDD1P2_PA_13 M3 · VDD1P2_PA_14 J4 · VDD2P5_PA_0 D6 · VDD2P5_PA_1 E6 · VDD2P5_PA_2 F6 · VDD2P5_PA_3 G6 · VDD2P5_PA_4 H6 · VDD2P5_PA_5 J6 · VDD2P5_PA_6 K6 · VDD2P5_PA_7 · VDD1P2_DAC_0 D8 · VDD1P2_DAC_1 B8 · VDD1P2_I2C_0 D9 · VDD1P2_I2C_1 E9 · VDD1P2_SH_LG_0 B10 · VDD1P2_SH_LG_1 B11 · VDD1P2_SH_LG_2 F10 · VDD1P2_SH_LG_3 F11 · VDD1P2_SH_LG_4 H10 · VDD1P2_SH_LG_5 H11 · VDD1P2_SH_LG_6 L10 · VDD1P2_SH_LG_7 L11 · VDD1P2_SH_HG<0> C10 · VDD1P2_SH_HG<1> C11 · VDD1P2_SH_HG<2> E10 · VDD1P2_SH_HG<3> E11 · VDD1P2_SH_HG<4> I10 · VDD1P2_SH_HG<5> I11 · VDD1P2_SH_HG<6> K10 · VDD1P2_SH_HG<7> K11 · VDD1P2_SH_TS_1 G11 · VDD1P2_SH_TS_2 G12

PA5-D: D5 K5 VDD2P5ESD_TOP · VDD2P5_ESD_BOT · E5 PA_ESD_0 · J5 PA_ESD_1 · ALFEV2_BGA · J7 SH_ESD_0 · K7 SH_ESD_1

PA5-B ALFEV2_BGA: OUTP_LG<0> B13 · OUTN_LG<0> B14 · OUTP_LG<1> F13 · OUTN_LG<1> F14 · OUTP_LG<2> H13 · OUTN_LG<2> H14 · OUTP_LG<3> L13 · OUTN_LG<3> L14 · OUTP_HG<0> C13 · OUTN_HG<0> C14 · OUTP_HG<1> E13 · OUTN_HG<1> E14 · OUTP_HG<2> I13 · OUTN_HG<2> I14 · OUTP_HG<3> K13 · OUTN_HG<3> K14 · OUTP_SUM N13 · OUTN_SUM N14

R12_S5 · R13_S5 · R21_S5 · R20_S5 · R14_S5 · R15_S5 · R8_S5 · R10_S5 · R18_S5 · R19_S5 · R22_S5 · R23_S5 · R9_S5 · R11_S5 · R16_S5 · R17_S5 (50)

LGP<0>_S5 · LGN<0>_S5 · LGP<1>_S5 · LGN<1>_S5 · LGP<2>_S5 · LGN<2>_S5 · LGP<3>_S5 · LGN<3>_S5 · HGP<0>_S5 · HGN<0>_S5 · HGP<1>_S5 · HGN<1>_S5 · HGP<2>_S5 · HGN<2>_S5 · HGP<3>_S5 · HGN<3>_S5 · OUTP_SUM_S5 · OUTN_SUM_S5

PA5-E: CH3_PA_S5 · M1 L1 IN3_1 IN3_0 · CH1_PA_S5 · J1 I1 IN2_1 IN2_0 · CH2_PA_S5 · F1 E1 IN1_1 IN1_0 · CH0_PA_S5 · C1 B1 IN0_1 IN0_0 · ALFEV2_BGA

PA_ADC_VDD_S5 · R6_S5 10k · R7_S5 10k

PA5-F: ALFE_CP40N_S5 · R5_S5 100 · ALFE_CP40P_S5 · A9 CK40_N · A8 CK40_P · LPGBT_M0SCL_L5 A11 I2C_SCL · LPGBT_M0SDA_L5 A10 I2C_SDA · ALFEV2_BGA · PA4-6_RSTB A12 B7 A7 I2C_EN I2C_ERROR I2C_RSTB · ALFE_CID_3_S5 M12 · ALFE_CID_2_S5 M11 · ALFE_CID_1_S5 N11 · ALFE_CID_0_S5 N10 · I2C_ADDR<3> · I2C_ADDR<2> · I2C_ADDR<1> · I2C_ADDR<0>

UU15_S5 · UU14_S5 TEST_MICROPAD · ADC_FRAME8_N_S5 · ADC_FRAME8_P_S5

ALFE_2P5_LEFT · C68_S5 1u · VB_FB0_IDCP_PA_0_S5

ALFE_2P5_LEFT · C75_S5 1u · VB_FB0_IDCP_PA_1_S5

PA5-A ALFEV2_BGA: VSS_GND1 A1 · VSS_GND2 A13 · VSS_GND3 A14 · VSS_GND4 B2 · VSS_GND5 B12 · VSS_GND6 C2 · VSS_GND7 C9 · VSS_GND8 D1 · VSS_GND9 D4 · VSS_GND10 D10 · VSS_GND11 D11 · VSS_GND12 D13 · VSS_GND13 D14 · VSS_GND14 E2 · VSS_GND15 E7 · VSS_GND16 F2 · VSS_GND17 F7 · VSS_GND18 F12 · VSS_GND19 F13 · VSS_GND20 F14 · VSS_GND21 G1 · VSS_GND22 G5 · VSS_GND23 G7 · VSS_GND24 G8 · VSS_GND25 G13 · VSS_GND26 G14 · VSS_GND27 H1 · VSS_GND28 H5 · VSS_GND29 H7 · VSS_GND30 H12 · VSS_GND31 J2 · VSS_GND32 J5 · VSS_GND33 J7 · VSS_GND34 J8 · VSS_GND35 J9 · VSS_GND36 J12 · VSS_GND37 J14 · VSS_GND38 K4 · VSS_GND39 K7 · VSS_GND40 K8 · VSS_GND41 K9 · VSS_GND42 K10 · VSS_GND43 K11 · VSS_GND44 K14 · VSS_GND45 L1 · VSS_GND46 L2 · VSS_GND47 L7 · VSS_GND48 L8 · VSS_GND49 L9 · VSS_GND50 L12 · VSS_GND51 L13 · VSS_GND52 L14 · VSS_GND53 M2 · VSS_GND54 M5 · VSS_GND55 M11 · VSS_GND56 M14 · VSS_GND57 N1 · VSS_GND58 N8 · VSS_GND59 N12

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RELEASED: jb	DATED: <Release Date>	DRAWING NO: 35	REV: v2.0
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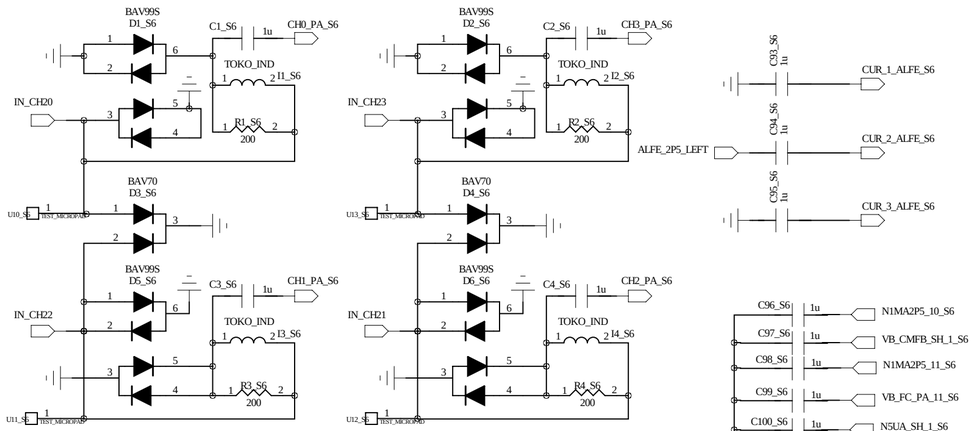

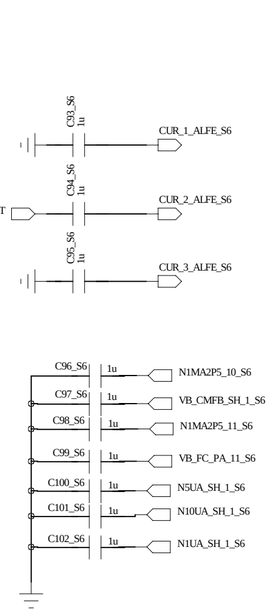

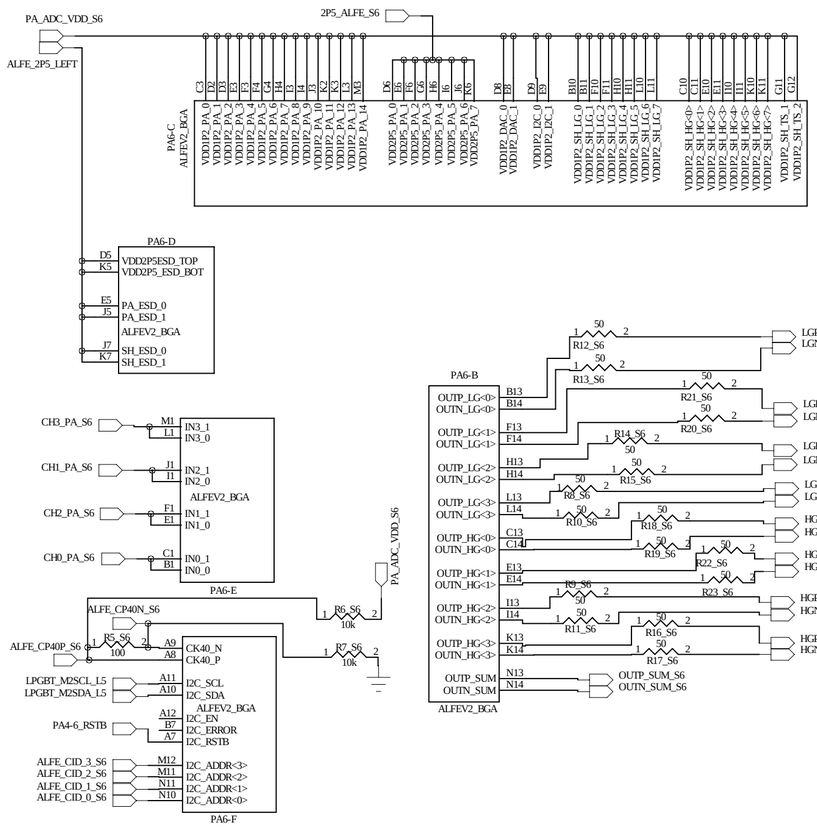

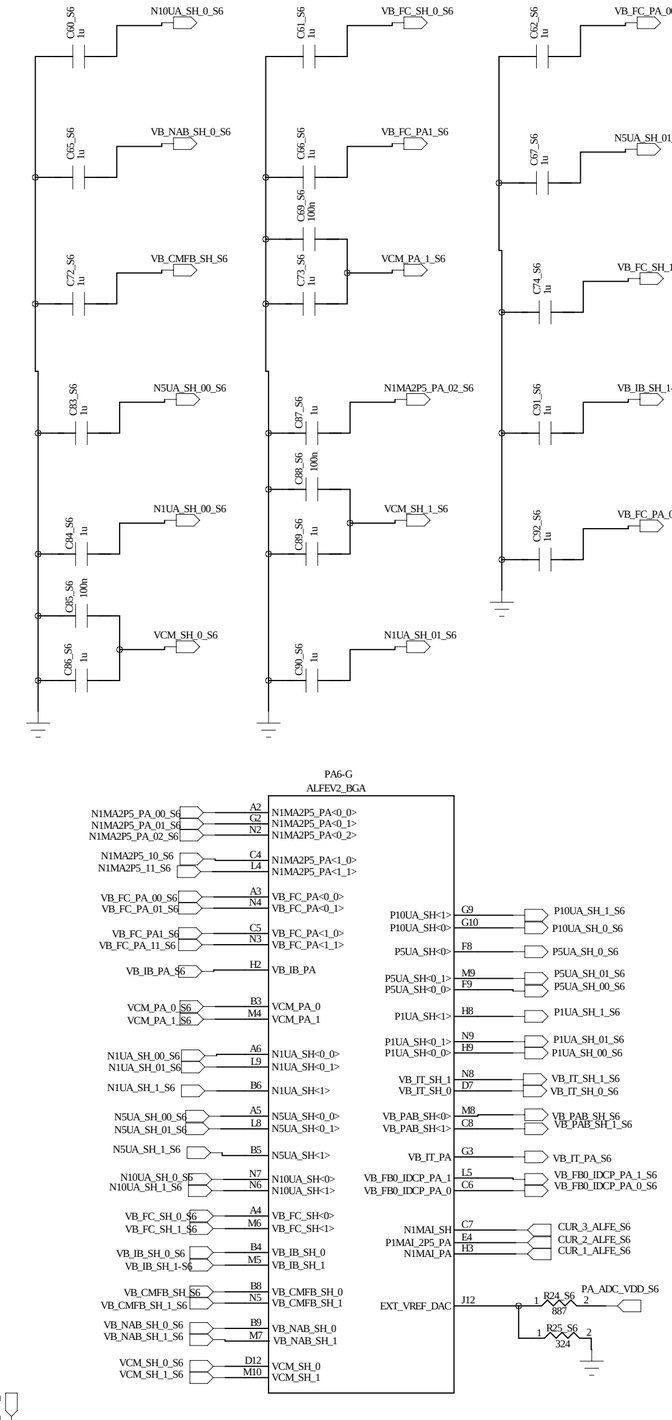

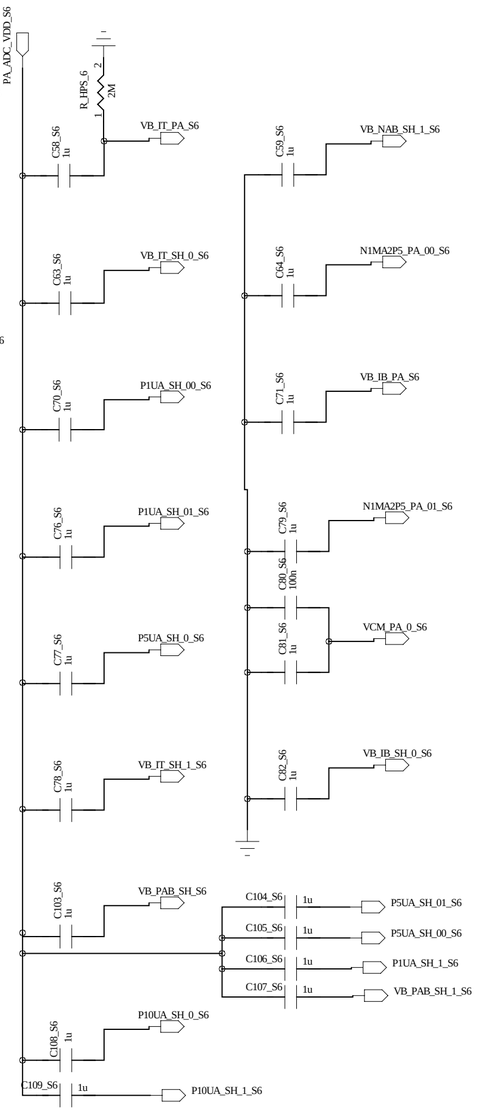

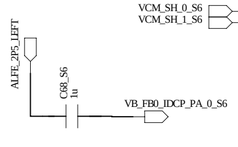

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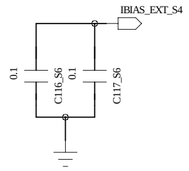

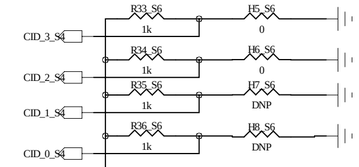

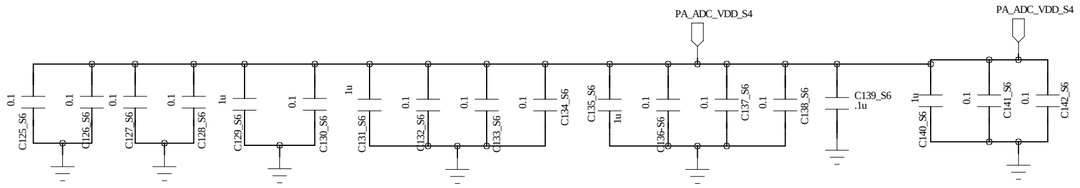

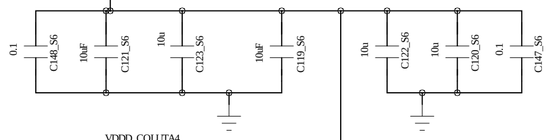

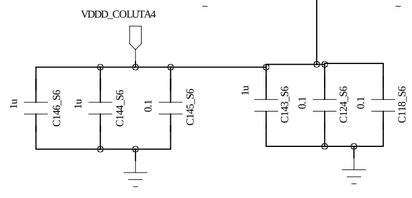

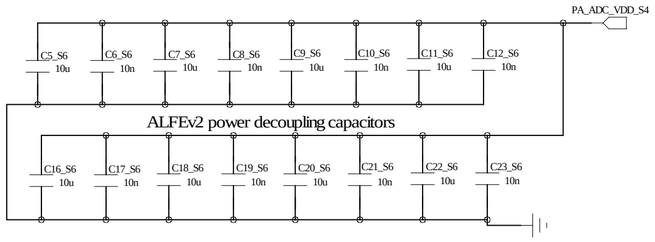

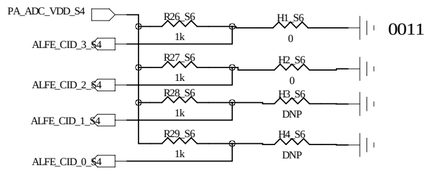

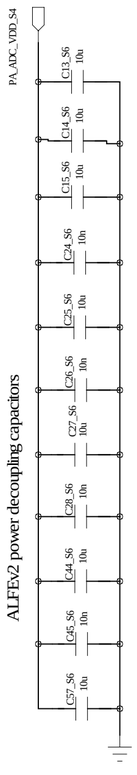

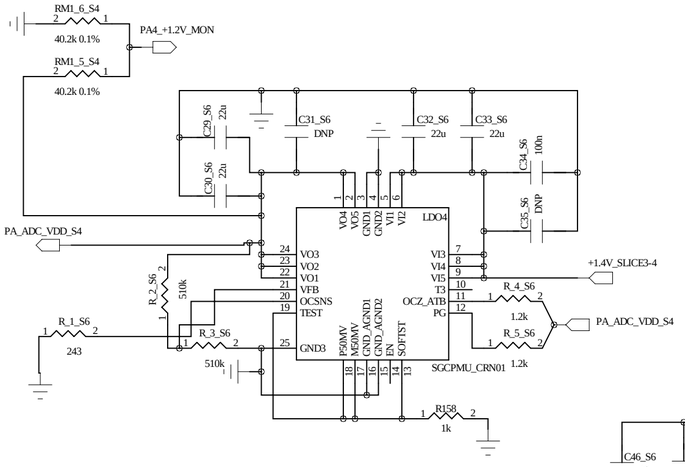

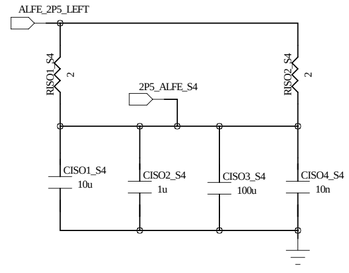

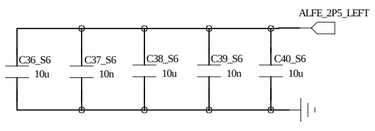

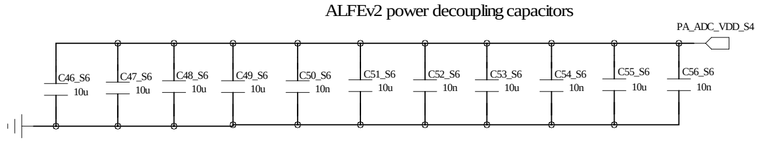

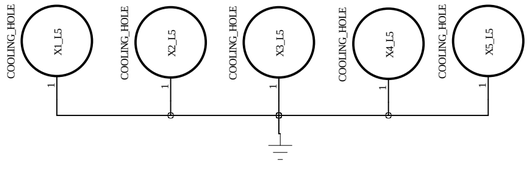

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RELEASED: jb	DATED: <Release Date>	DRAWING NO: 35	REV: v2.0
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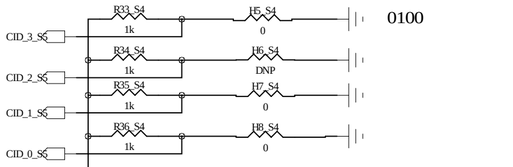

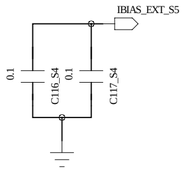

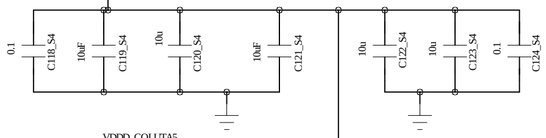

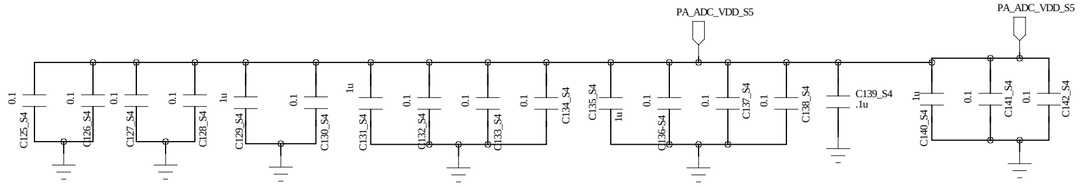

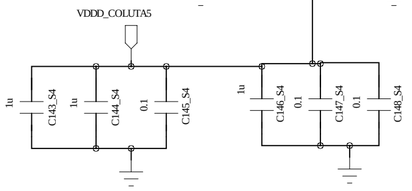

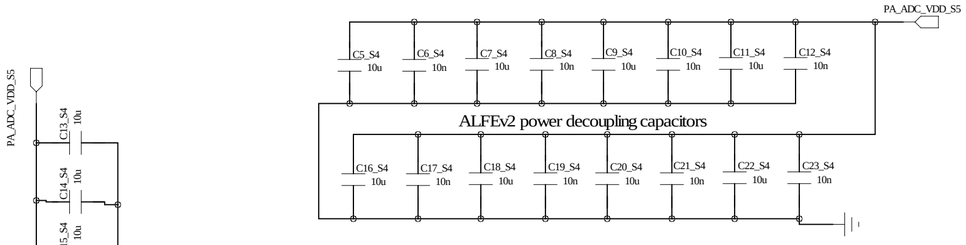

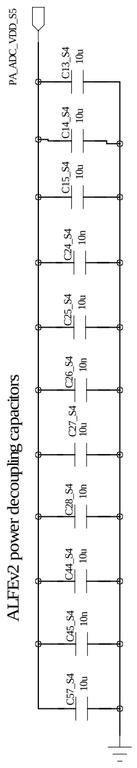

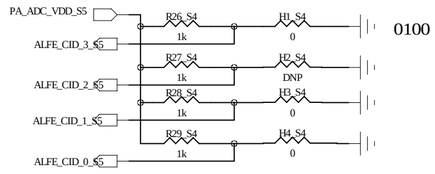

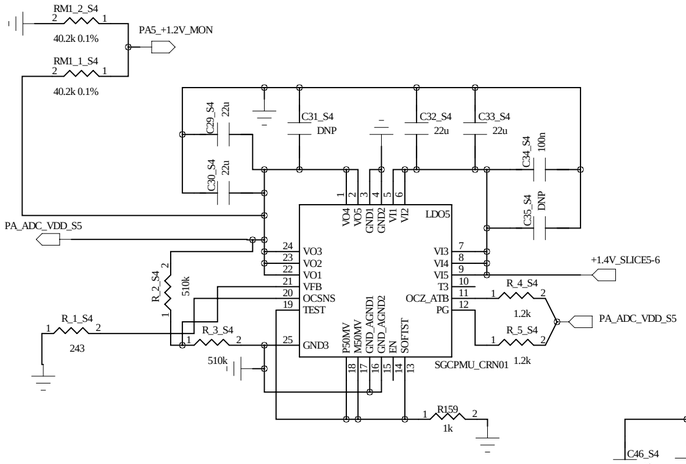

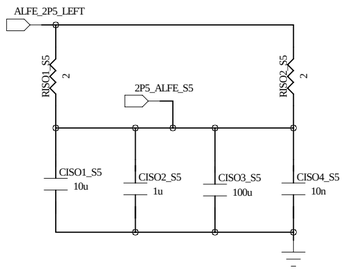

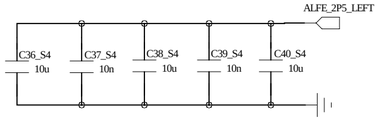

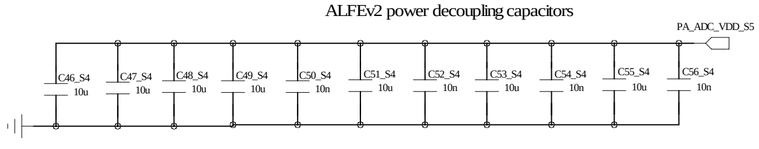

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QUALITY CONTROL: jb	DATED: <QC Date>	CODE: jb2023	SIZE: C
RELEASED: jb	DATED: <Release Date>	DRAWING NO: 35	REV: v2.0
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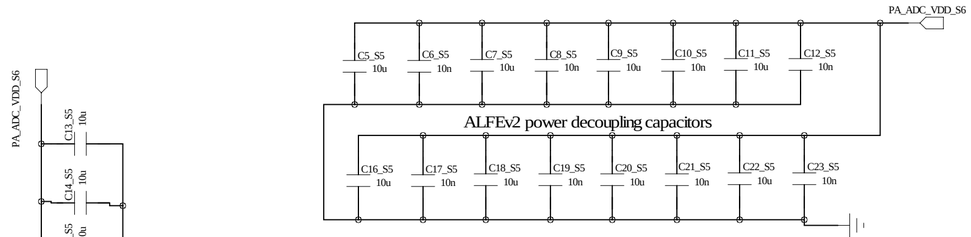
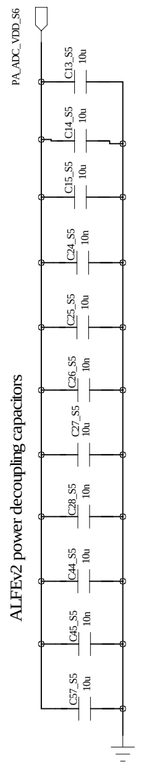
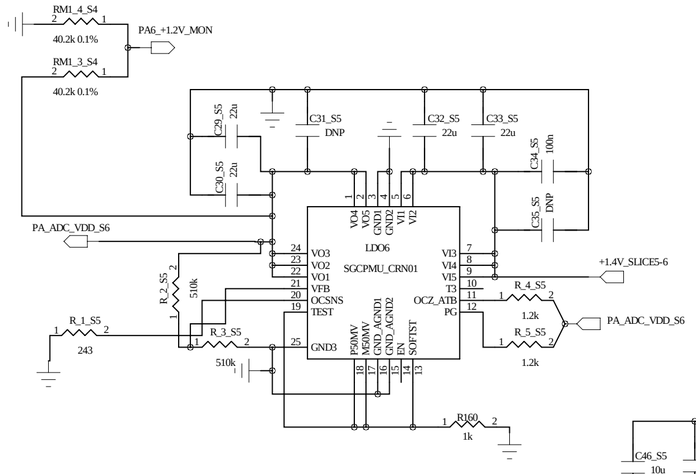
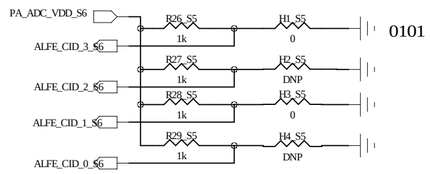
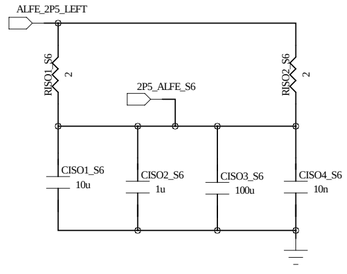
LTR	ECO NO:	APPROVED:	DATE:

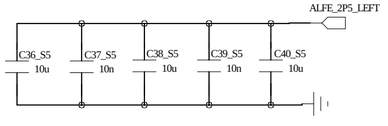


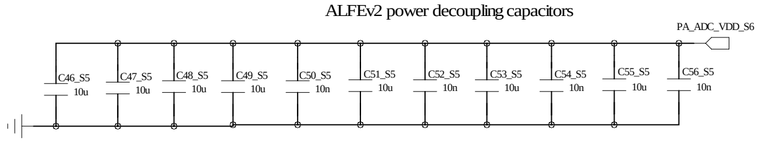












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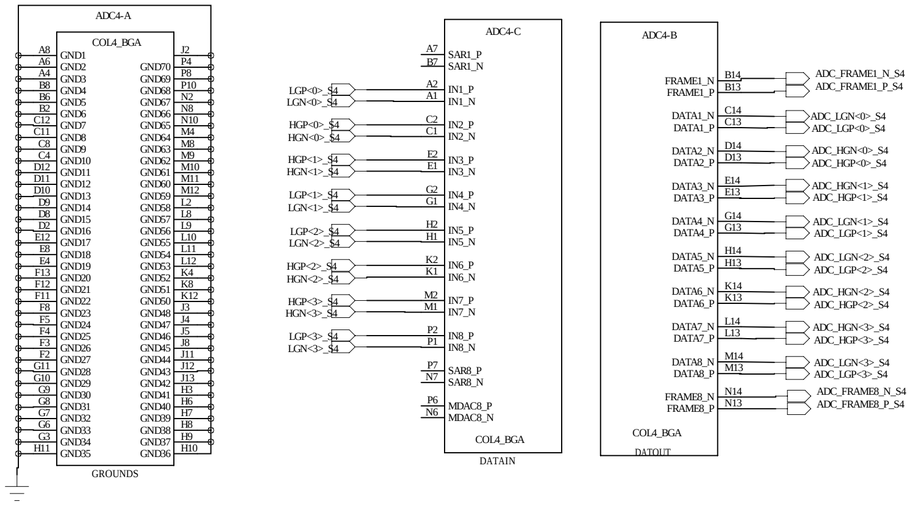

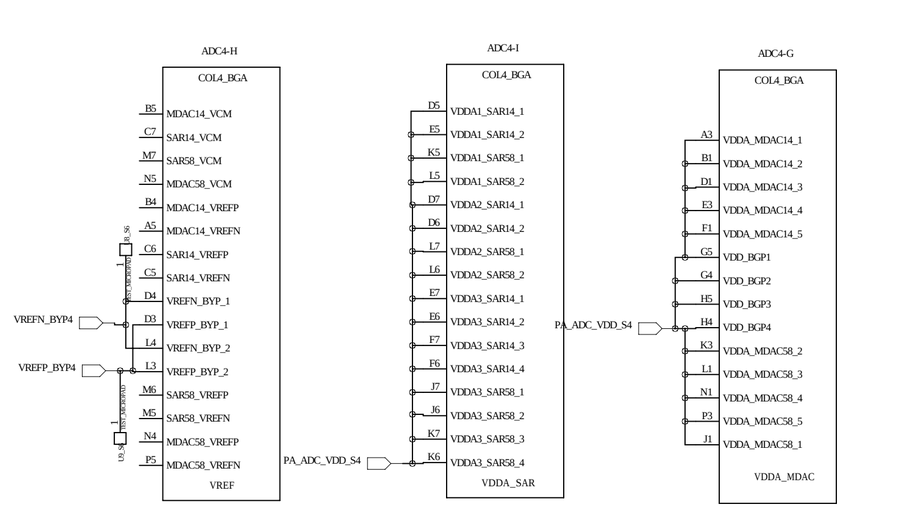

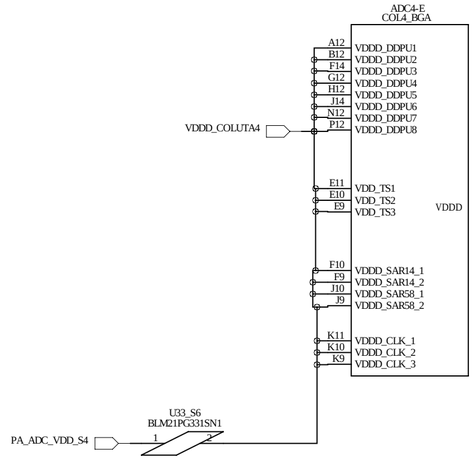

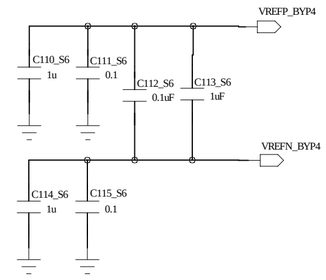

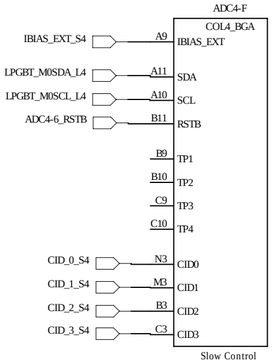

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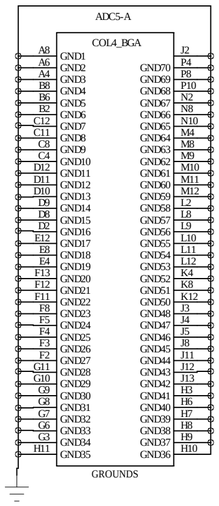

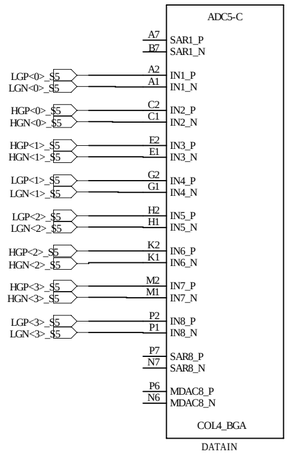

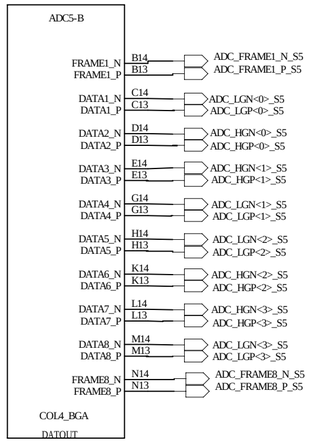

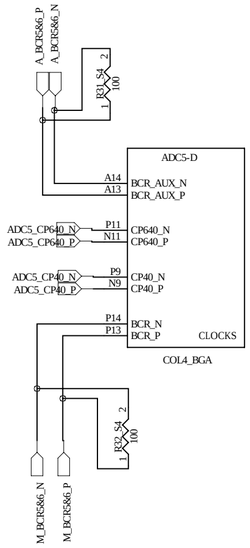

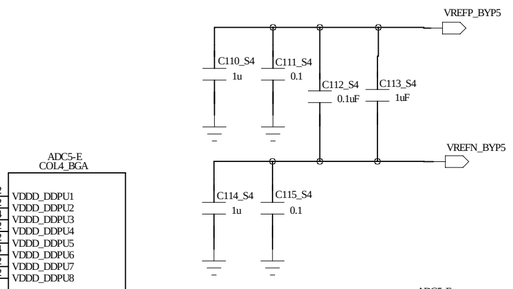

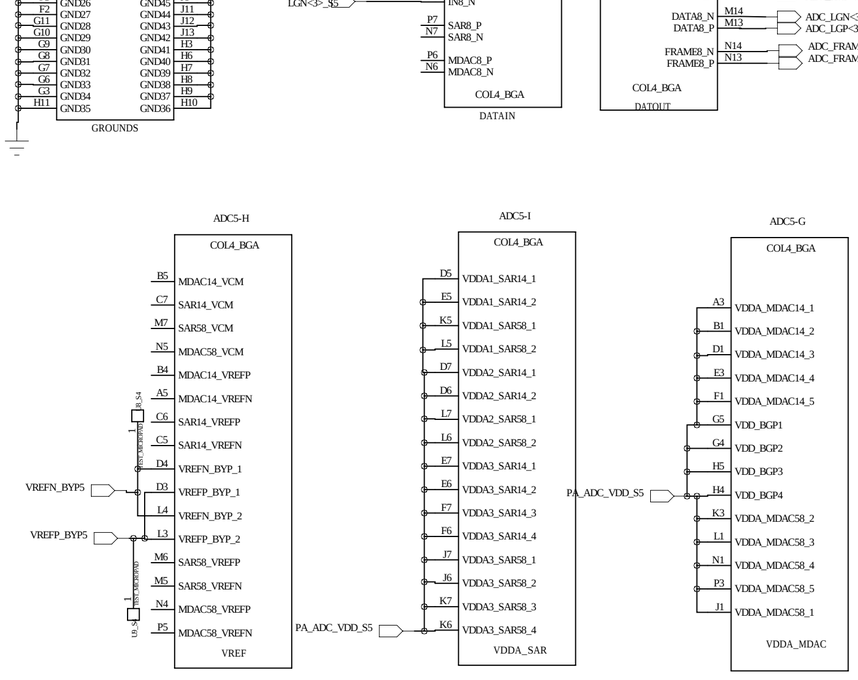

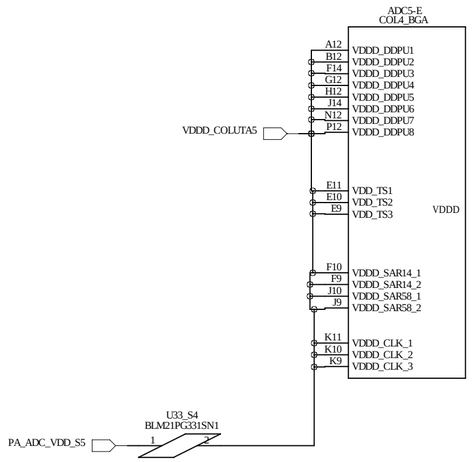

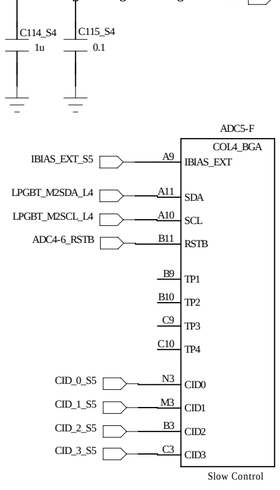

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0101

R33_S5 1k — H5_S5 0
R34_S5 1k — H6_S5 DNP
R35_S5 1k — H7_S5 0
R36_S5 1k — H8_S5 DNP

CID_3_S6
CID_2_S6
CID_1_S6
CID_0_S6

C148_S5 0.1 · C121_S5 10nF · C123_S5 10u · C119_S5 10nF · C122_S5 10u · C120_S5 10u · C147_S5 0.1

VDDD_COLUTA6

C146_S5 1u · C144_S5 1u · C145_S5 0.1 · C143_S5 1u · C124_S5 0.1 · C118_S5 1u

IBIAS_EXT_S6

C116_S5 0.1 · C117_S5 0.1

PA_ADC_VDD_S6

C125_S5 0.1 · C126_S5 0.1 · C127_S5 0.1 · C128_S5 0.1 · C129_S5 1u · C130_S5 0.1 · C131_S5 1u · C132_S5 0.1 · C133_S5 0.1 · C134_S5 0.1 · C135_S5 1u · C136_S5 0.1 · C137_S5 0.1 · C138_S5 0.1 · C139_S5 1u · C140_S5 1u · C141_S5 0.1 · C142_S5 0.1

ADC6-A
COL4_BGA
GROUNDS

A8	GND1	GND70	J2
A6	GND2	GND69	P4
A4	GND3	GND68	P8
B8	GND4	GND67	P10
B6	GND5	GND66	N2
B2	GND6	GND65	N8
C12	GND7	GND64	N10
C11	GND8	GND63	M4
C8	GND9	GND62	M9
C4	GND10	GND61	M10
D12	GND11	GND60	M11
D11	GND12	GND59	M12
D10	GND13	GND58	L2
D9	GND14	GND57	L8
D8	GND15	GND56	L9
D2	GND16	GND55	L10
E12	GND17	GND54	L11
E8	GND18	GND53	L12
E4	GND19	GND52	K4
F13	GND20	GND51	K8
F12	GND21	GND50	K12
F11	GND22	GND48	J3
F8	GND23	GND47	J4
F5	GND24	GND46	J5
F4	GND25	GND45	J8
F3	GND26	GND44	J11
F2	GND27	GND43	J12
G11	GND28	GND42	J13
G10	GND29	GND41	H3
G9	GND30	GND40	H6
G8	GND31	GND39	H7
G7	GND32	GND38	H8
G6	GND33	GND37	H9
G3	GND34	GND36	H10
H11	GND35		

ADC6-C
COL4_BGA
DATAIN

A7	SAR1_P	
B7	SAR1_N	
A2	IN1_P	LGP<0>_S6
A1	IN1_N	LGN<0>_S6
C2	IN2_P	HGP<0>_S6
C1	IN2_N	HGN<0>_S6
E2	IN3_P	HGP<1>_S6
E1	IN3_N	HGN<1>_S6
G2	IN4_P	LGP<1>_S6
G1	IN4_N	LGN<1>_S6
H2	IN5_P	LGP<2>_S6
H1	IN5_N	LGN<2>_S6
K2	IN6_P	HGP<2>_S6
K1	IN6_N	HGN<2>_S6
M2	IN7_P	HGP<3>_S6
M1	IN7_N	HGN<3>_S6
P2	IN8_P	LGP<3>_S6
P1	IN8_N	LGN<3>_S6
P7	SAR8_P	
N7	SAR8_N	
P6	MDAC8_P	
N6	MDAC8_N	

ADC6-B
COL4_BGA
DATOUT

B14	ADC_FRAME1_N_S6	FRAME1_N
B13	ADC_FRAME1_P_S6	FRAME1_P
C14	ADC_LGN<0>_S6	DATA1_N
C13	ADC_LGP<0>_S6	DATA1_P
D14	ADC_HGN<0>_S6	DATA2_N
D13	ADC_HGP<0>_S6	DATA2_P
E14	ADC_HGN<1>_S6	DATA3_N
E13	ADC_HGP<1>_S6	DATA3_P
G14	ADC_LGN<1>_S6	DATA4_N
G13	ADC_LGP<1>_S6	DATA4_P
H14	ADC_LGN<2>_S6	DATA5_N
H13	ADC_LGP<2>_S6	DATA5_P
K14	ADC_HGN<2>_S6	DATA6_N
K13	ADC_HGP<2>_S6	DATA6_P
L14	ADC_HGN<3>_S6	DATA7_N
L13	ADC_HGP<3>_S6	DATA7_P
M14	ADC_LGN<3>_S6	DATA8_N
M13	ADC_LGP<3>_S6	DATA8_P
N14		FRAME8_N
N13		FRAME8_P

A_DCRS686_P
A_DCRS686_N
R31_S5 2 DNP

ADC6-D
COL4_BGA
CLOCKS

A14	BCR_AUX_N	
A13	BCR_AUX_P	
P11	CP640_N	ADC6_CP640_N
N11	CP640_P	ADC6_CP640_P
P9	CP40_N	ADC6_CP40_N
N9	CP40_P	ADC6_CP40_P
P14	BCR_N	
P13	BCR_P	

R32_S5 2 DNP

M_DCRS686_N
M_DCRS686_P

ADC6-E
COL4_BGA
VDDD

A12	VDDD_DDPU1	
B12	VDDD_DDPU2	
F14	VDDD_DDPU3	
G12	VDDD_DDPU4	
H12	VDDD_DDPU5	
J14	VDDD_DDPU6	
N12	VDDD_DDPU7	
P12	VDDD_DDPU8	VDDD_COLUTA6
E11	VDD_TS1	
E10	VDD_TS2	
E9	VDD_TS3	
F10	VDDD_SAR14_1	
F9	VDDD_SAR14_2	
J10	VDDD_SAR58_1	
J9	VDDD_SAR58_2	
K11	VDDD_CLK_1	
K10	VDDD_CLK_2	
K9	VDDD_CLK_3	

U33_S5 BLM21PG331SN1 1 2 — PA_ADC_VDD_S6

VREFP_BYP6 — C110_S5 1u · C111_S5 0.1 · C112_S5 0.1uF · C113_S5 1uF
VREFN_BYP6 — C114_S5 1u · C115_S5 0.1

ADC6-F
COL4_BGA
Slow Control

A9	IBIAS_EXT	IBIAS_EXT_S6
A11	SDA	LPGBT_M1SDA_L5
A10	SCL	LPGBT_M1SCL_L5
B11	RSTB	ADC4-6_RSTB
B9	TP1	
B10	TP2	
C9	TP3	
C10	TP4	
N3	CID0	CID_0_S6
M3	CID1	CID_1_S6
B3	CID2	CID_2_S6
C3	CID3	CID_3_S6

ADC6-H
COL4_BGA
VREF

B5	MDAC14_VCM	
C7	SAR14_VCM	
M7	SAR58_VCM	
N5	MDAC58_VCM	
B4	MDAC14_VREFP	
A5	MDAC14_VREFN	
C6	SAR14_VREFP	
C5	SAR14_VREFN	
D4	VREFN_BYP_1	
D3	VREFP_BYP_1	VREFN_BYP6
L4	VREFN_BYP_2	
L3	VREFP_BYP_2	VREFP_BYP6
M6	SAR58_VREFP	
M5	SAR58_VREFN	
N4	MDAC58_VREFP	
P5	MDAC58_VREFN	

R6_S5 1 100 OHM 0.063W
U3_S5 1 100 OHM 0.063W

ADC6-I
COL4_BGA
VDDA_SAR

D5	VDDA1_SAR14_1	
E5	VDDA1_SAR14_2	
K5	VDDA1_SAR58_1	
L5	VDDA1_SAR58_2	
D7	VDDA2_SAR14_1	
D6	VDDA2_SAR14_2	
L7	VDDA2_SAR58_1	
L6	VDDA2_SAR58_2	
E7	VDDA3_SAR14_1	
E6	VDDA3_SAR14_2	
F7	VDDA3_SAR14_3	
F6	VDDA3_SAR14_4	
J7	VDDA3_SAR58_1	
J6	VDDA3_SAR58_2	
K7	VDDA3_SAR58_3	
K6	VDDA3_SAR58_4	PA_ADC_VDD_S6

ADC6-G
COL4_BGA
VDDA_MDAC

A3	VDDA_MDAC14_1	
B1	VDDA_MDAC14_2	
D1	VDDA_MDAC14_3	
E3	VDDA_MDAC14_4	
F1	VDDA_MDAC14_5	
G5	VDD_BGP1	
G4	VDD_BGP2	
H5	VDD_BGP3	
H4	VDD_BGP4	PA_ADC_VDD_S6
K3	VDDA_MDAC58_2	
L1	VDDA_MDAC58_3	
N1	VDDA_MDAC58_4	
P3	VDDA_MDAC58_5	
J1	VDDA_MDAC58_1	

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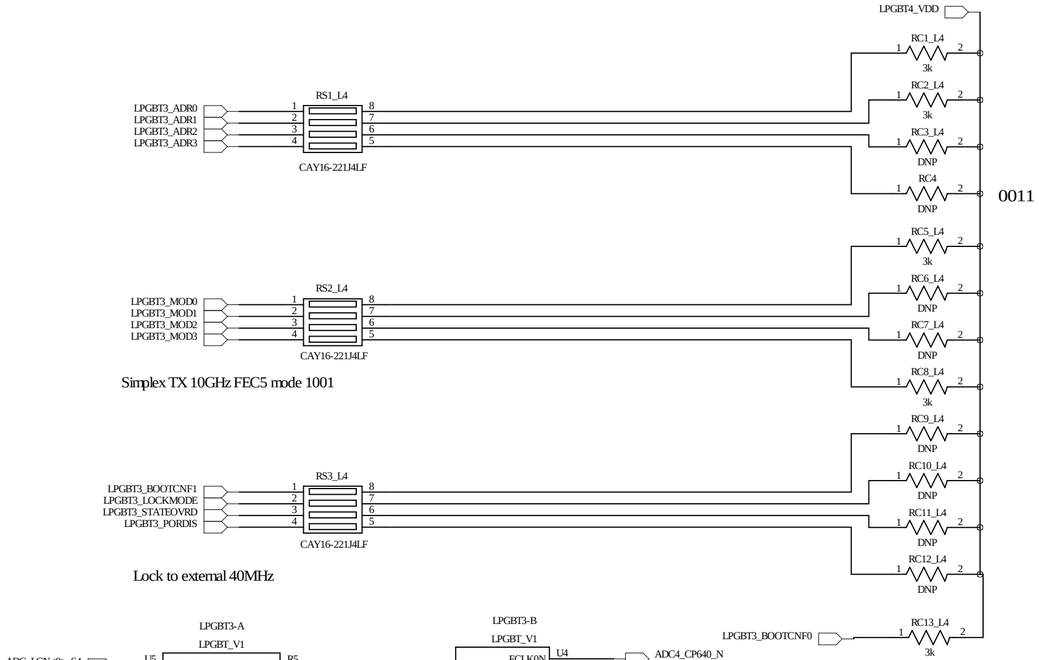

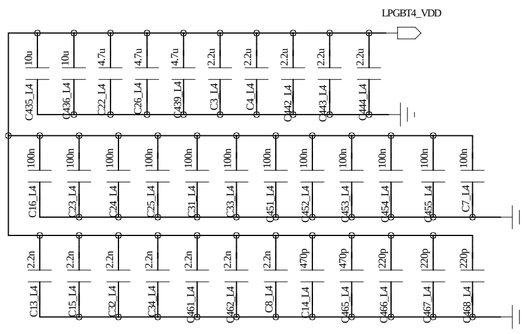

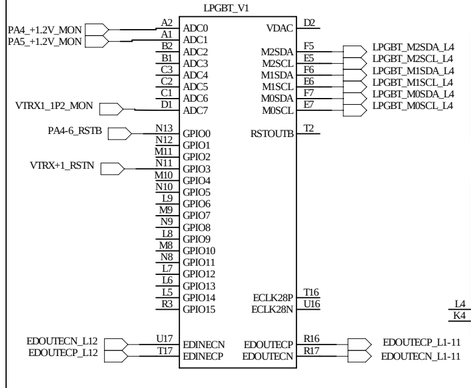

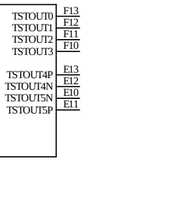

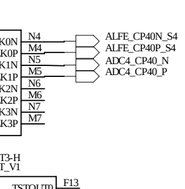

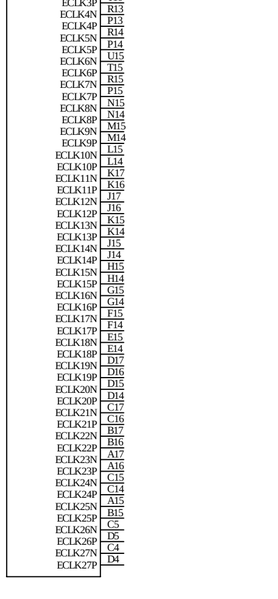

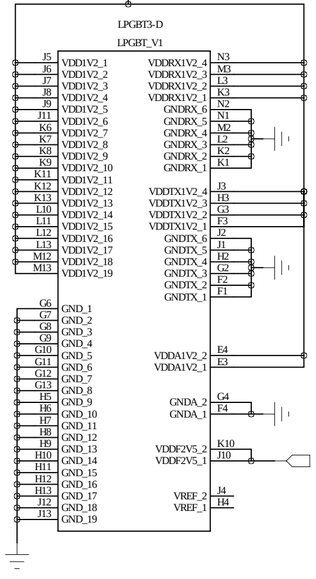

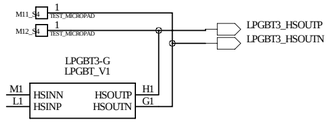

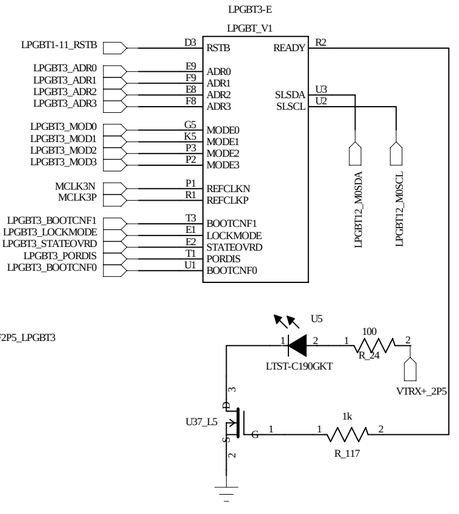

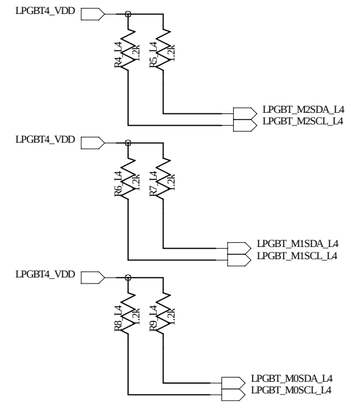

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RELEASED: jb	DATED: <Release Date>	DRAWING NO: 35	REV: v2.0
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RS4_L5
CAY16-221J4LF
LPGBT4_ADR0
LPGBT4_ADR1
LPGBT4_ADR2
LPGBT4_ADR3

RS5_L5
CAY16-221J4LF
LPGBT4_MOD0
LPGBT4_MOD1
LPGBT4_MOD2
LPGBT4_MOD3

Simplex TX 10GHzFEC5 mode 1001

RS6_L5
CAY16-221J4LF
LPGBT4_BOOTCNF1
LPGBT4_LOCKMODE
LPGBT4_STATEOVRD
LPGBT4_PORDIS

Lock to external 40MHz

LPGBT4_VDD
RC14_L5 DNP
RC15_L5 DNP
RC16_L5 3k
RC17_L5 DNP
0100
RC18_L5 3k
RC19_L5 DNP
RC20_L5 DNP
RC21_L5 3k
RC22_L5 DNP
RC23_L5 DNP
RC24_L5 DNP
RC25_L5 DNP
RC26_L5 3k
LPGBT4_BOOTCNF0

LPGBT4-A
LPGBT_V1
ADC_LGN<2>_S5
ADC_LGP<2>_S5
ADC_HGN<2>_S5
ADC_HGP<2>_S5
ADC_HGN<3>_S5
ADC_HGP<3>_S5
ADC_LGN<3>_S5
ADC_LGP<3>_S5
ADC_FRAME8_N_S5
ADC_FRAME8_P_S5
ADC_FRAME1_N_S6
ADC_FRAME1_P_S6
ADC_LGN<0>_S6
ADC_LGP<0>_S6
ADC_HGN<0>_S6
ADC_HGP<0>_S6
ADC_HGN<1>_S6
ADC_HGP<1>_S6
ADC_LGN<1>_S6
ADC_LGP<1>_S6
ADC_LGN<2>_S6
ADC_LGP<2>_S6
ADC_HGN<2>_S6
ADC_HGP<2>_S6
ADC_HGN<3>_S6
ADC_HGP<3>_S6
ADC_LGN<3>_S6
ADC_LGP<3>_S6
LPGBT4-C

LPGBT4-B
LPGBT_V1
ADC6_CP640_N
ADC6_CP640_P

LPGBT4_VDD
LPGBT4-D
LPGBT_V1
VDDF2P5_LPGBT3

LPGBT4-E
LPGBT_V1
LPGBT1-11_RSTB
LPGBT4_ADR0
LPGBT4_ADR1
LPGBT4_ADR2
LPGBT4_ADR3
LPGBT4_MOD0
LPGBT4_MOD1
LPGBT4_MOD2
LPGBT4_MOD3
MCLK4N
MCLK4P
LPGBT4_BOOTCNF1
LPGBT4_LOCKMODE
LPGBT4_STATEOVRD
LPGBT4_PORDIS
LPGBT4_BOOTCNF0
LPGBT12_M0SDA
LPGBT12_M0SCL

U6
LTST-C190GKT
R_74 100
VTRX+_2P5
NMOS_L4
R_118 1k

C29_M6 22u
C31_M6 DNP
C33_M6 22u
C34_M6 100n
C35_M6 DNP
LDO_LPGBT4
SGCPMU_CRN01
+1.4V_SLICE5-6
R_1_M6 243
R_2_M6 10k
R_3_M6 510k
R_4_M6 1.2k
R_5_M6 1.2k
R188 1k
C1_L5 2.2n
C2_L5 2.2n
C37_L5 10n
C63_L5 4.7n
C5_L5 100n
C6_L5 2.2n
C51_L5 2.2n
C66_L5 2.2n
C9_L5 2.2n
C10_L5 470p
C11_L5 2.2n
C12_L5 100n
C35_L5 100n
C41_L5 100n
C50_L5 100n
C56_L5 100n
C17_L5 4.7n
C18_L5 100n
C19_L5 100n
C20_L5 100n
C21_L5 4.7n
C57_L5 100n
C42_L5 10n
C49_L5 2.2n
C38_L5 2.2n
C39_L5 2.2n
C27_L5 100n
C28_L5 2.2n
C29_L5 100n
C30_L5 2.2n
C65_L5 470p
C40_L5 220p
C55_L5 220p
C58_L5 220p

R6_L5 2.2k
R5_L5 1.2k
R1_L5 2.2k
R2_L5 1.2k
R3_L5 2.2k
R4_L5 1.2k
LPGBT_M2SDA_L5
LPGBT_M2SCL_L5
LPGBT_M1SDA_L5
LPGBT_M1SCL_L5
LPGBT_M0SDA_L5
LPGBT_M0SCL_L5

LPGBT4-F
LPGBT_V1
ALFE_CP40N_S5
ALFE_CP40P_S5
ADC5_CP40_N
ADC5_CP40_P
ALFE_CP40N_S6
ALFE_CP40P_S6
ADC6_CP40_N
ADC6_CP40_P

LPGBT4-H
LPGBT_V1
TSTCLKINN
TSTCLKINP

LPGBT4-G
LPGBT_V1
TEST_MICROVAD
HSINN
HSINP
HSOUTP
HSOUTN
LPGBT4_HSOUTP
LPGBT4_HSOUTN

T81 MMM_TP LPGBT_M2SDA_L5
T76 MMM_TP LPGBT_M2SCL_L5
T77 MMM_TP LPGBT_M1SDA_L5
T78 MMM_TP LPGBT_M1SCL_L5
T79 MMM_TP LPGBT_M0SDA_L5
T80 MMM_TP LPGBT_M0SCL_L5

PA6_+1.2V_MON
ADC4-6_RSTB
EDOUTECN_L12
EDOUTECP_L12
EDOUTECP_L1-11
EDOUTECN_L1-11

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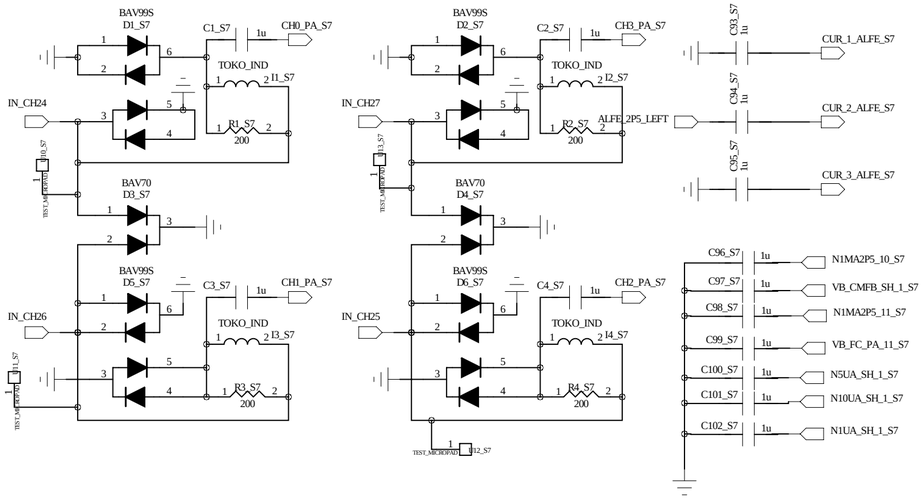

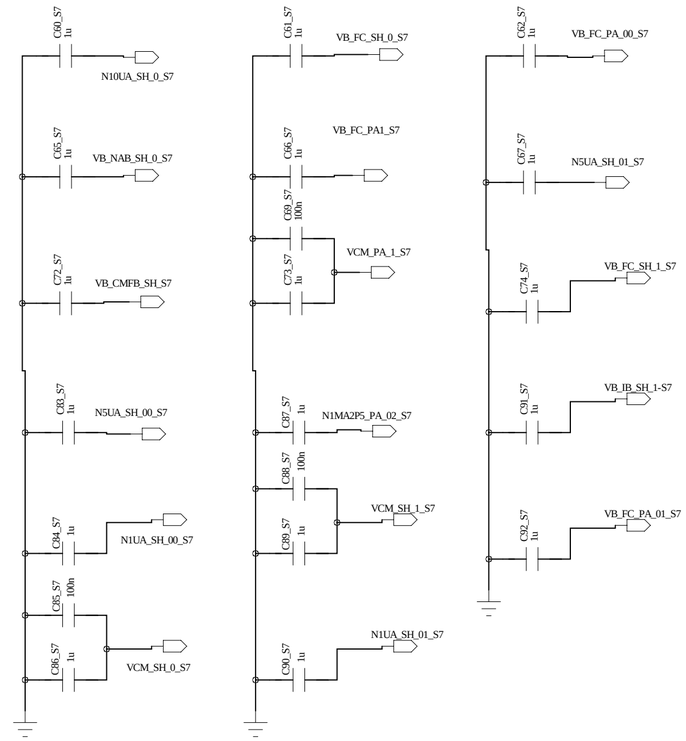

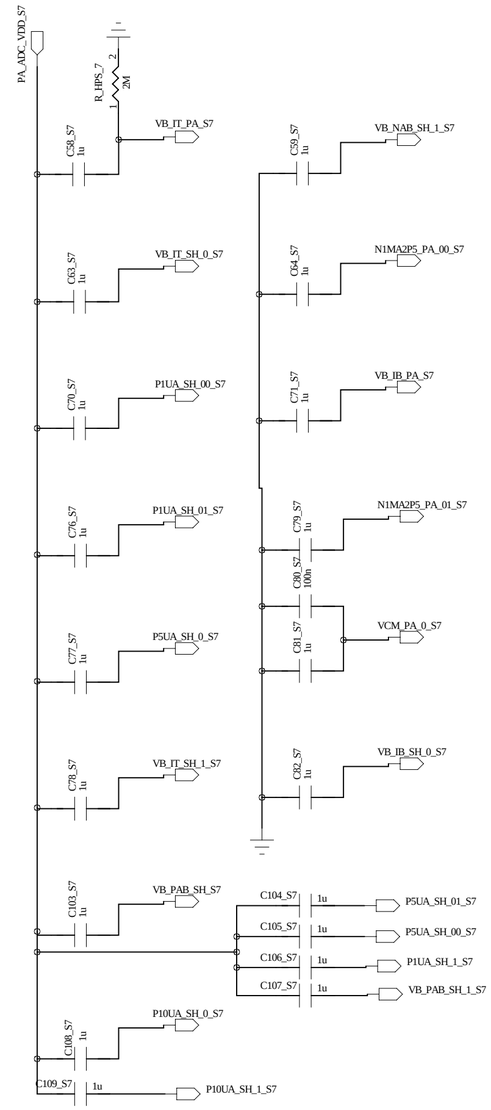

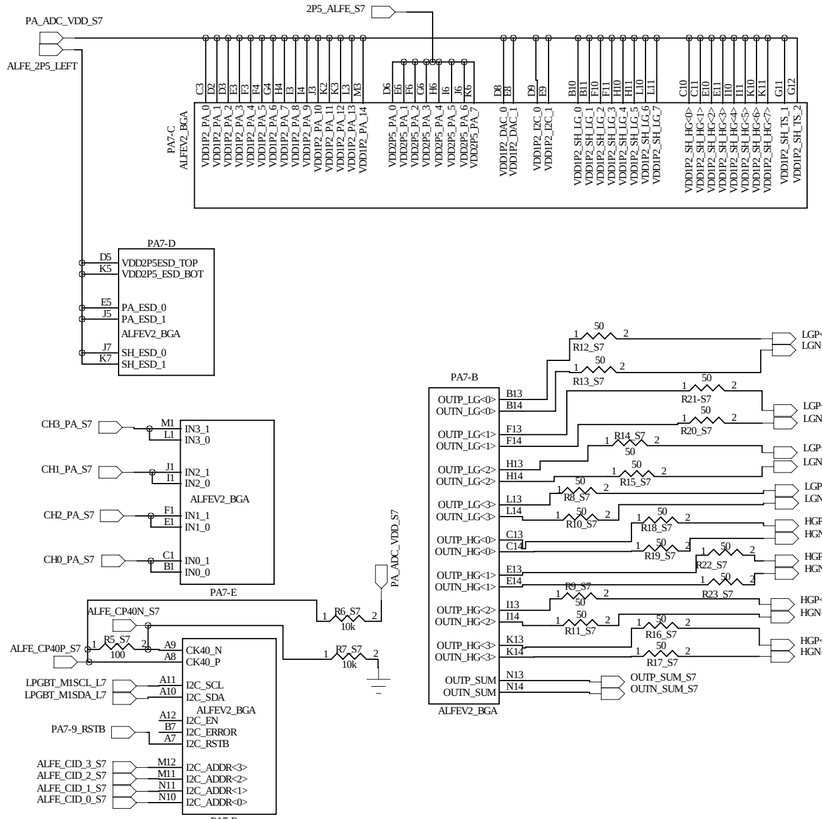

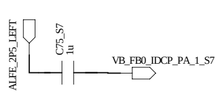

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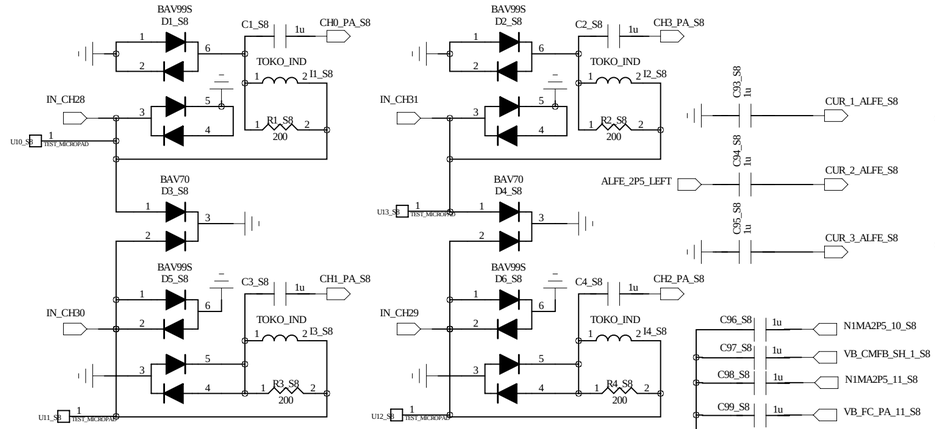

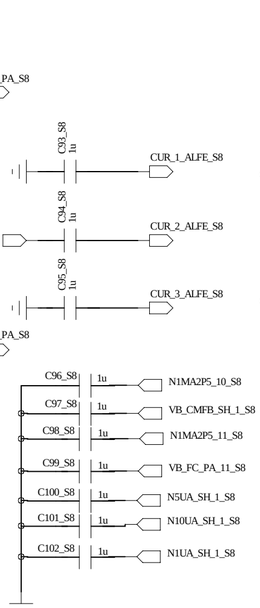

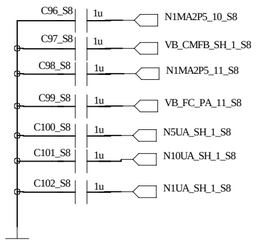

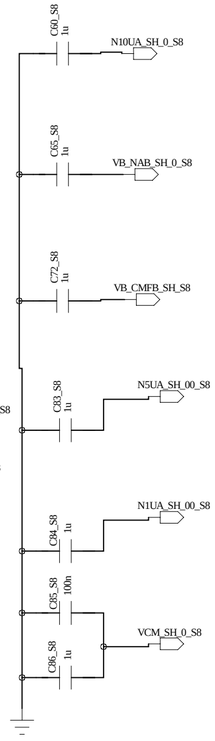

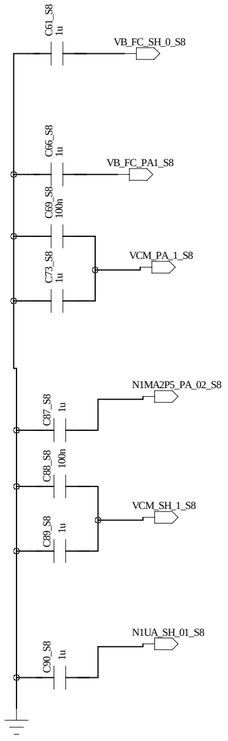

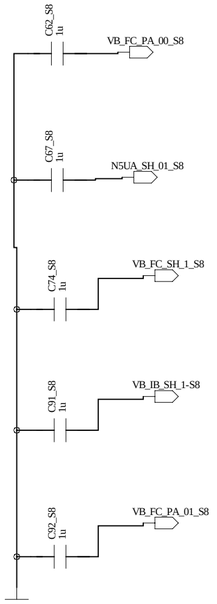

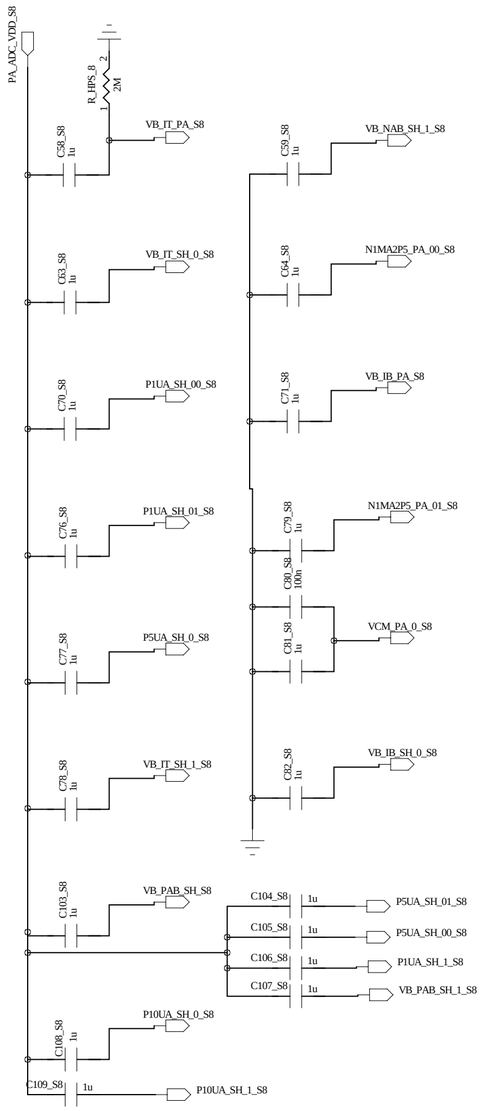

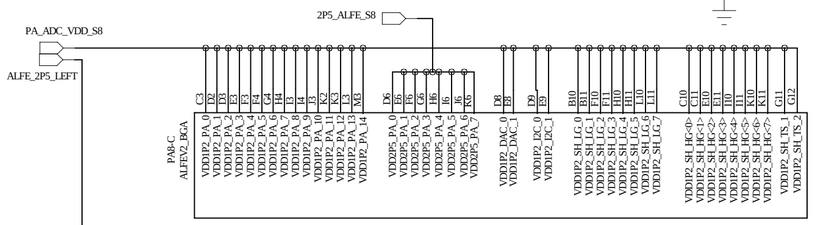

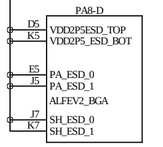

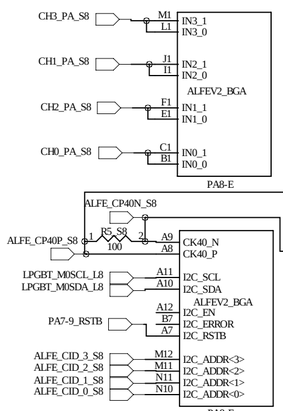

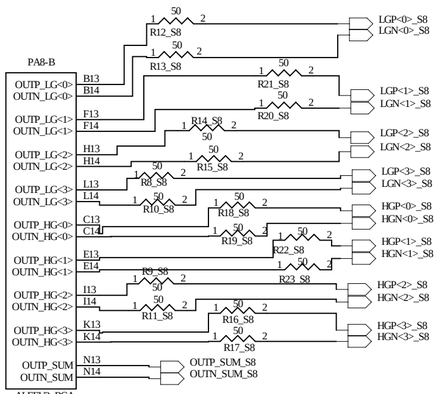

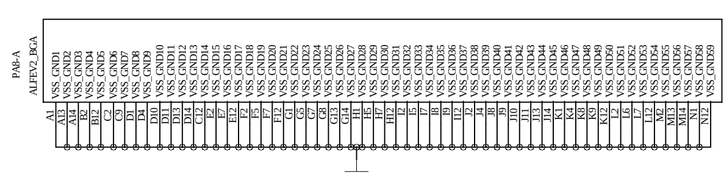

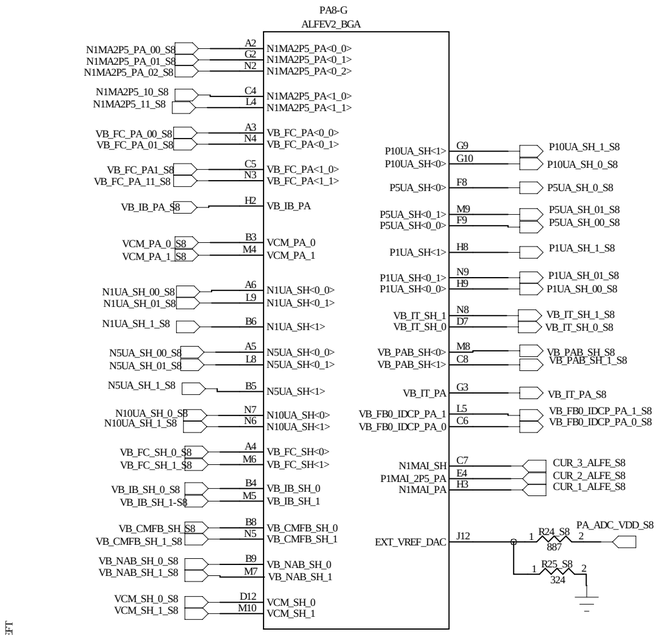

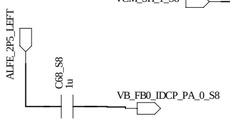

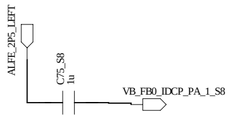

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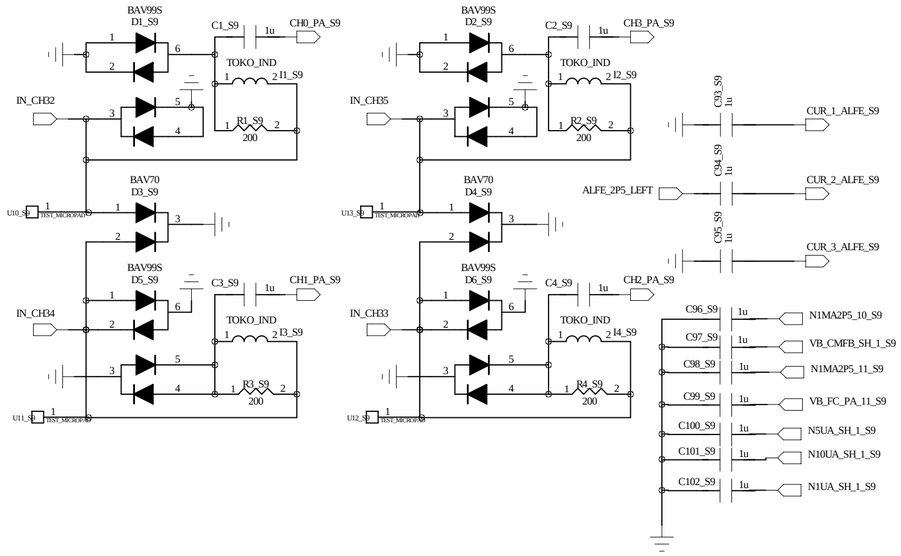

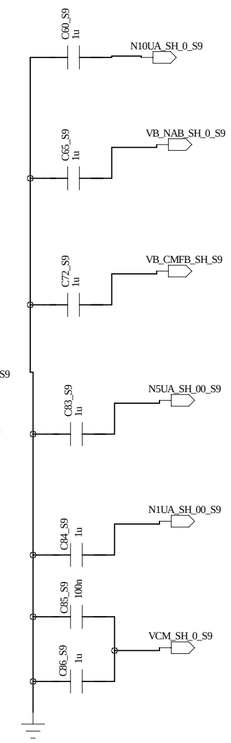

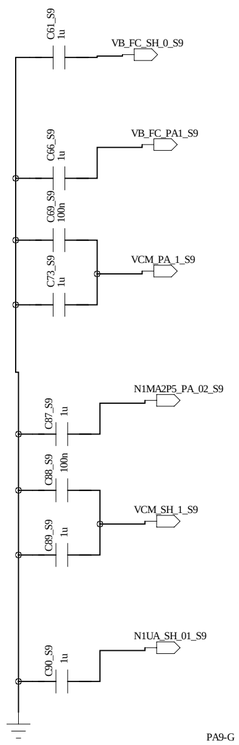

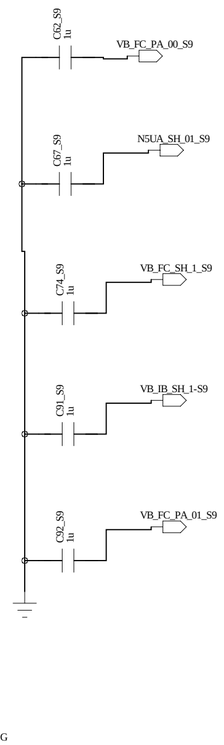

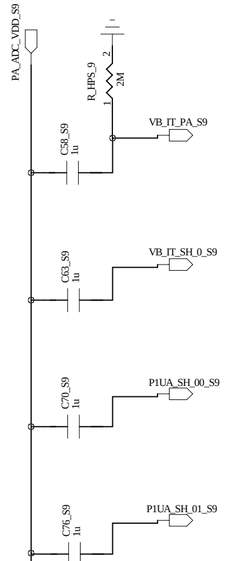

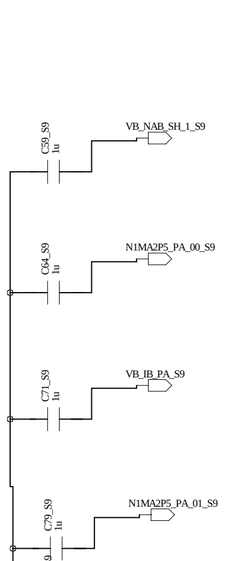

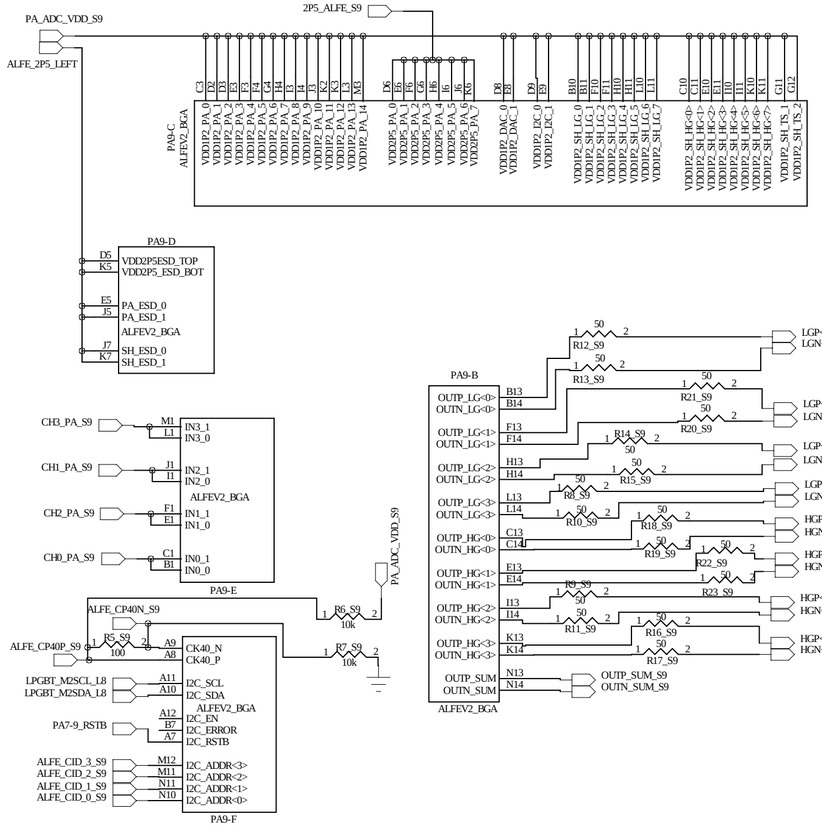

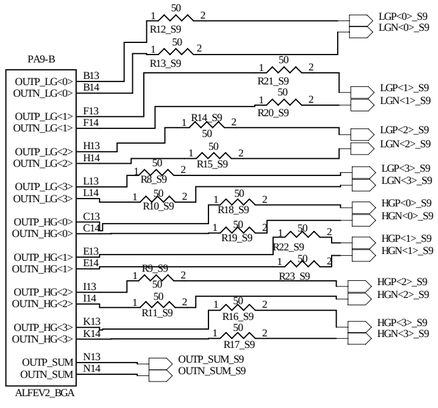

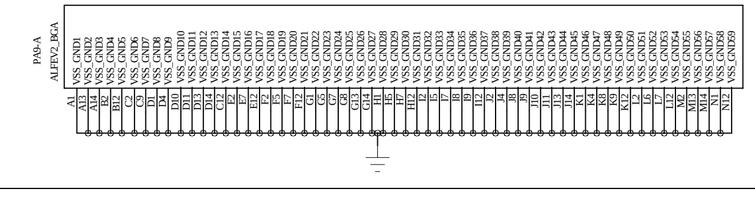

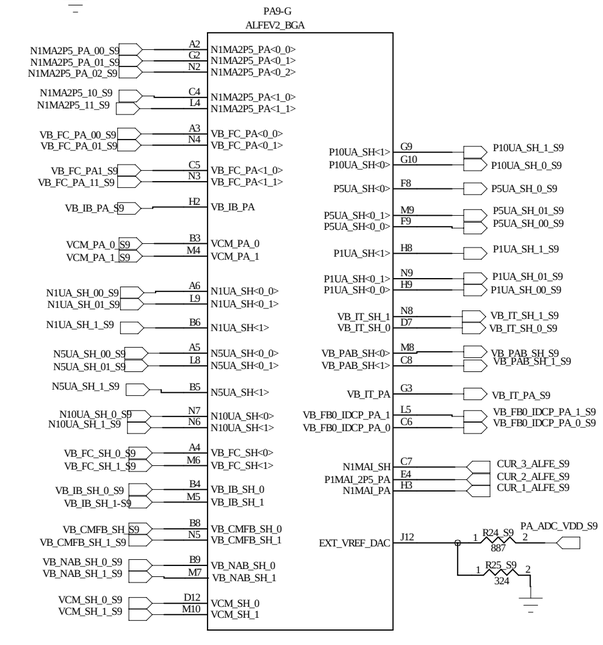

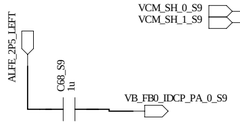

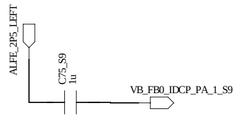

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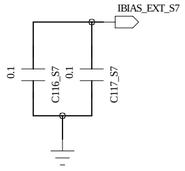

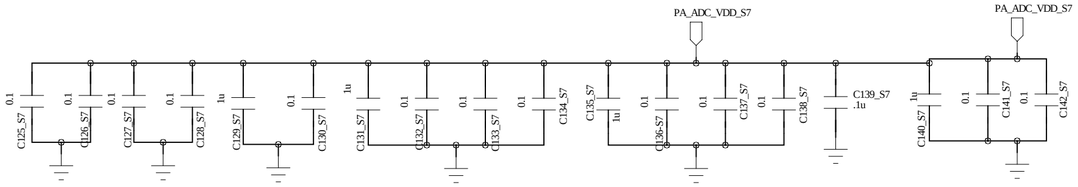

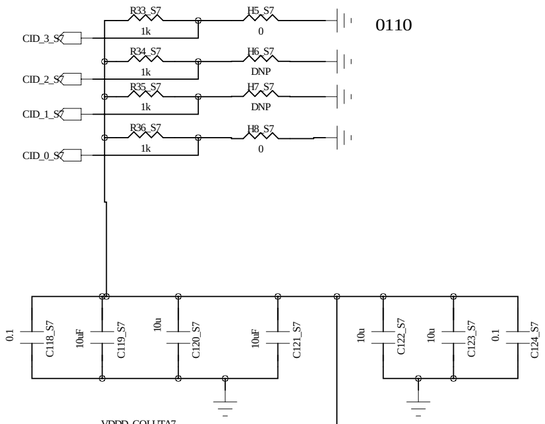

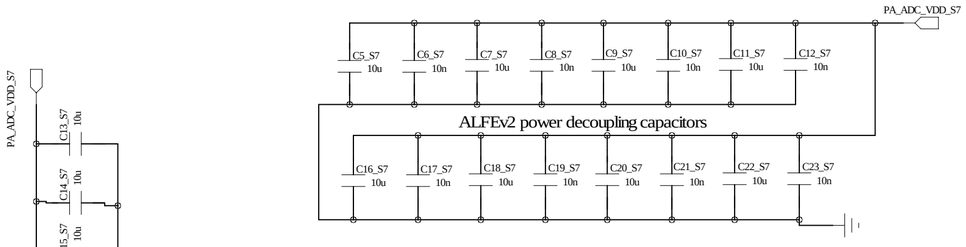

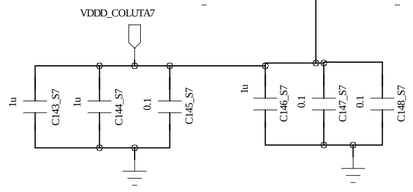

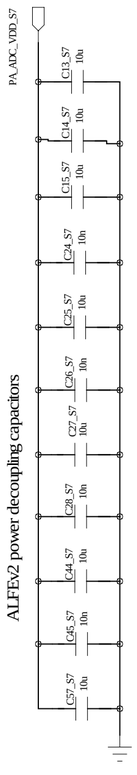

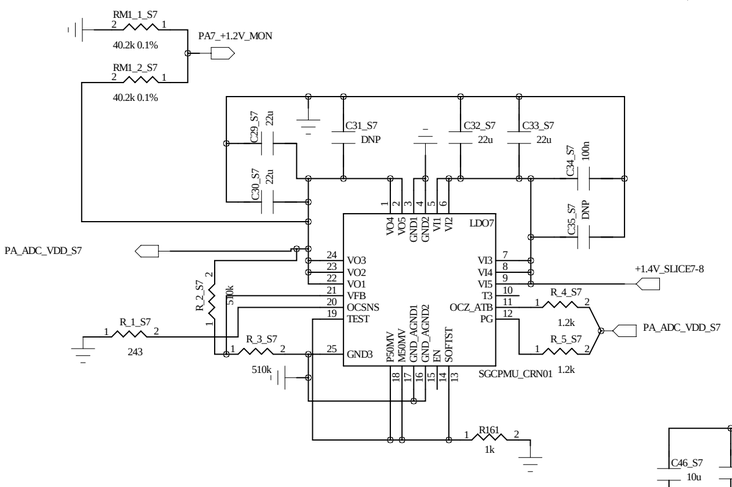

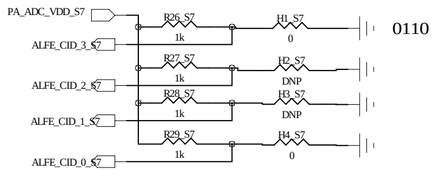

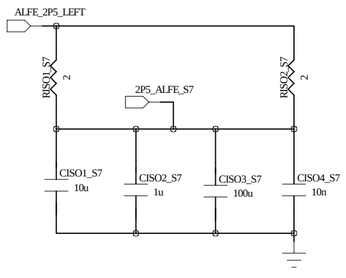

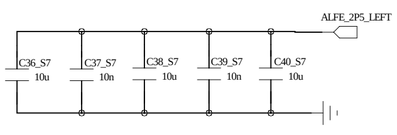

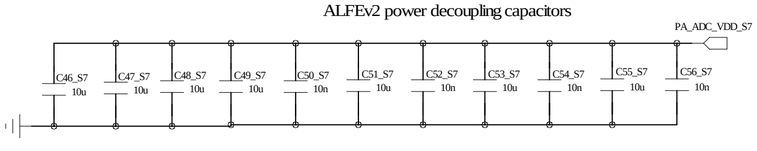

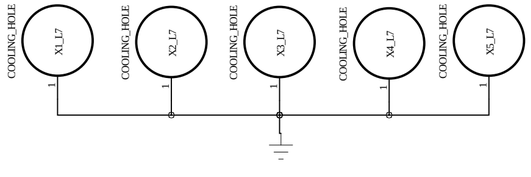

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COMPANY: Nevis Laboratories of Columbia University

TITLE: FEB2 prototype v2.0

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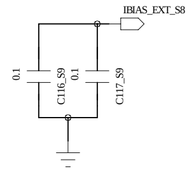

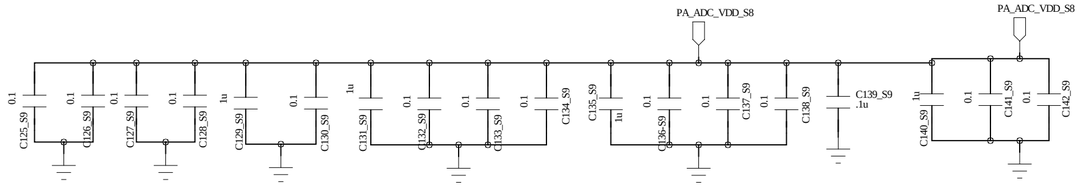

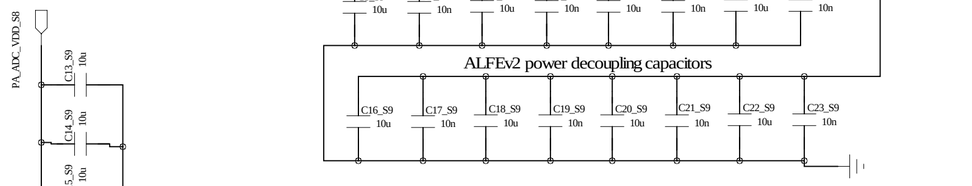

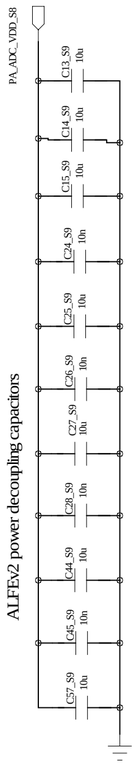

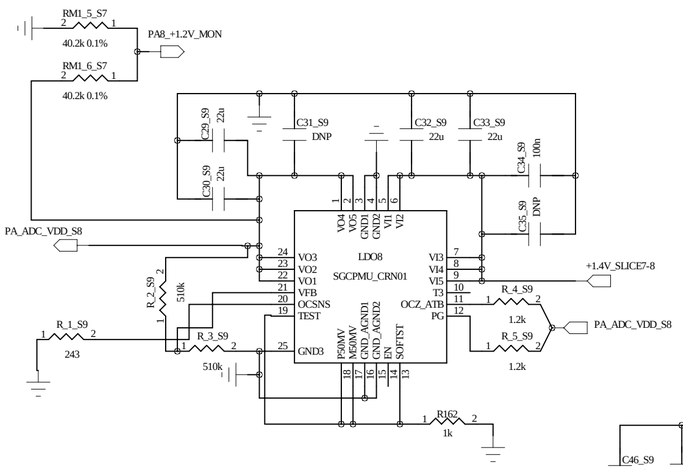

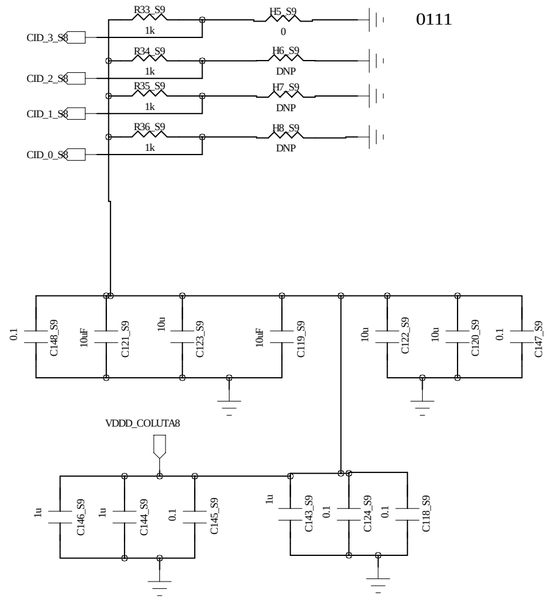

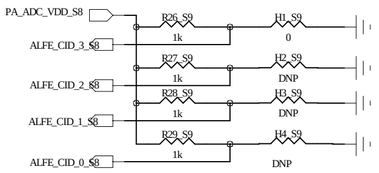

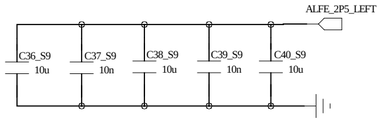

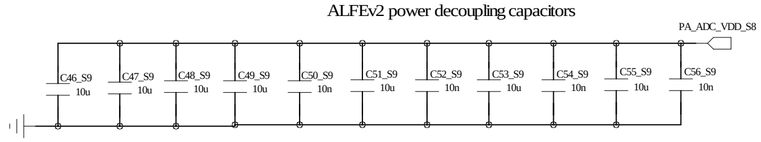

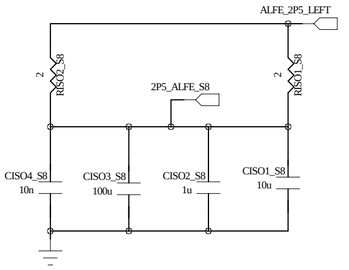

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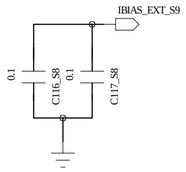

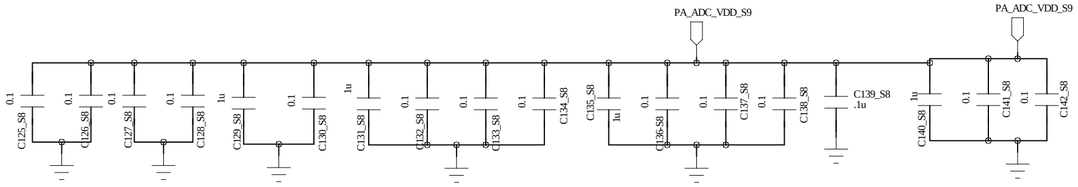

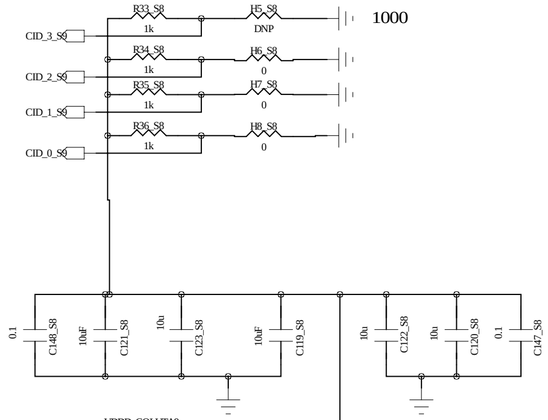

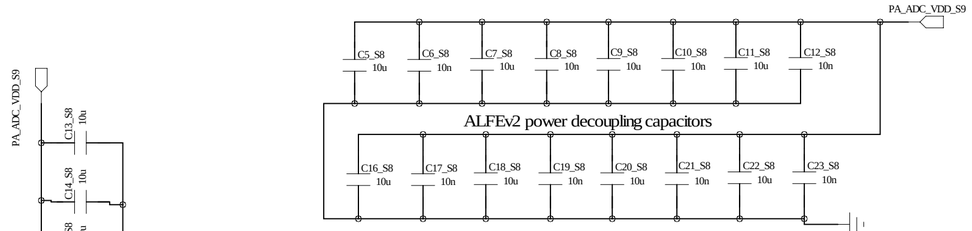

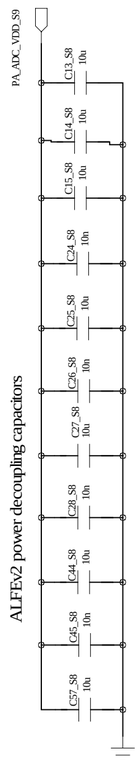

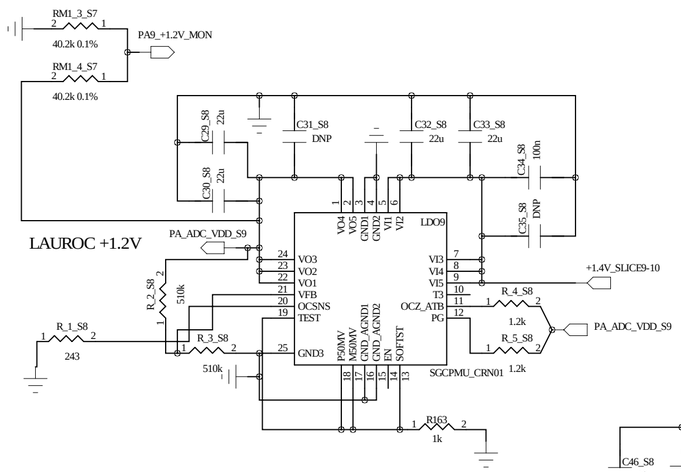

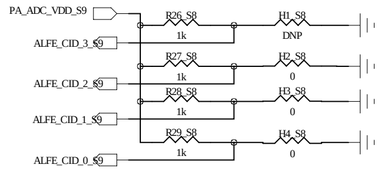

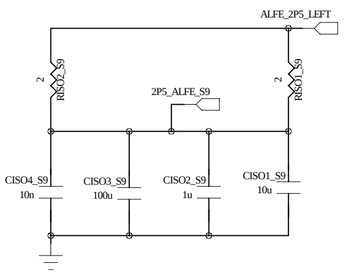

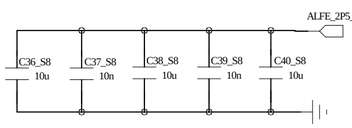

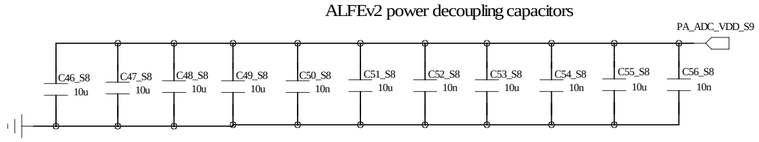

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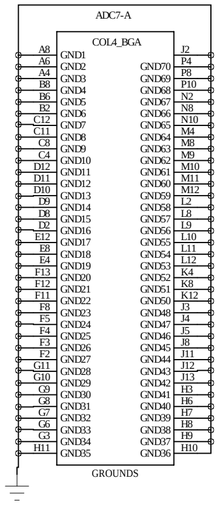

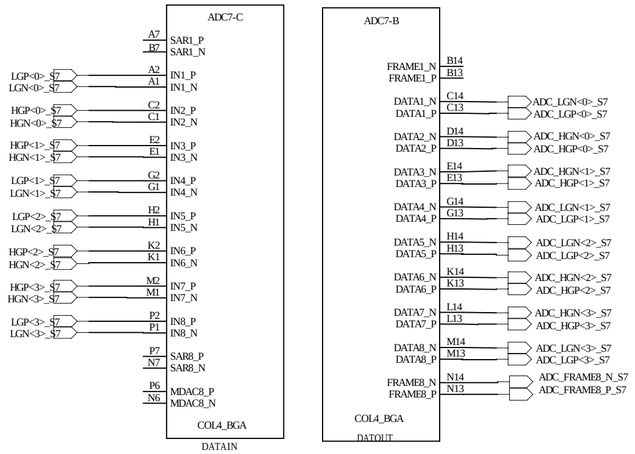

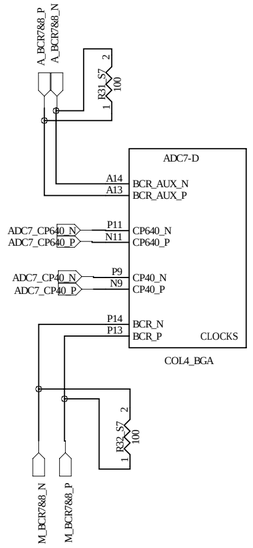

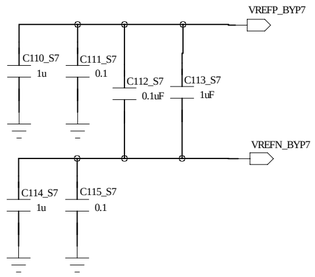

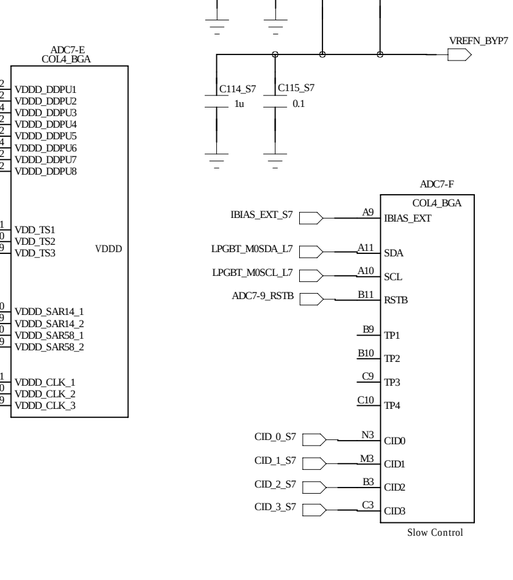

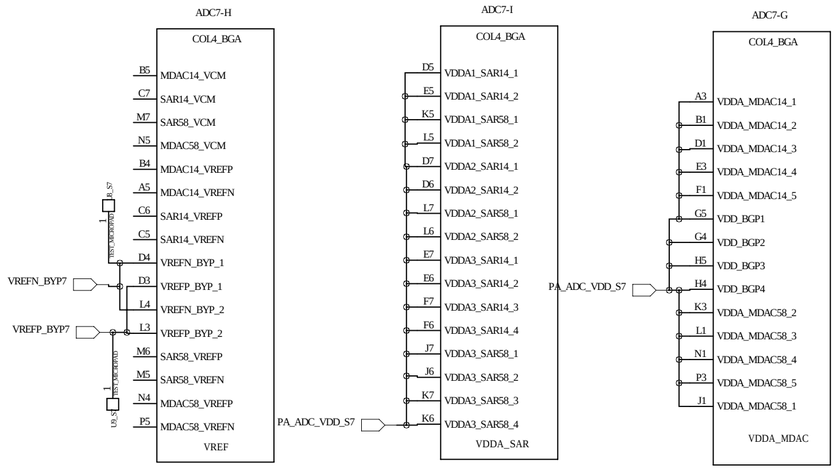

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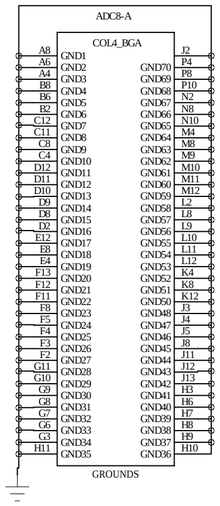

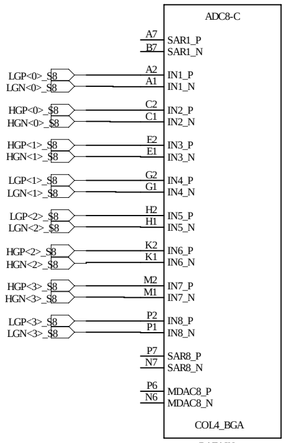

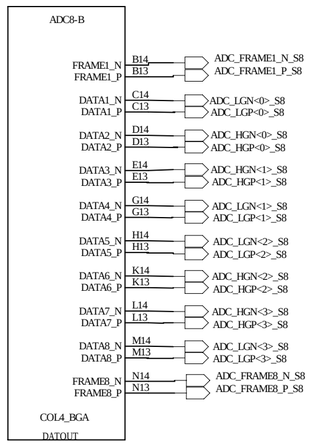

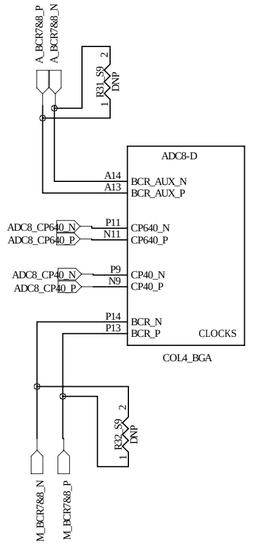

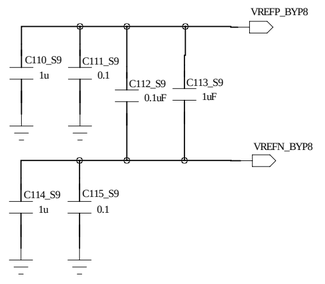

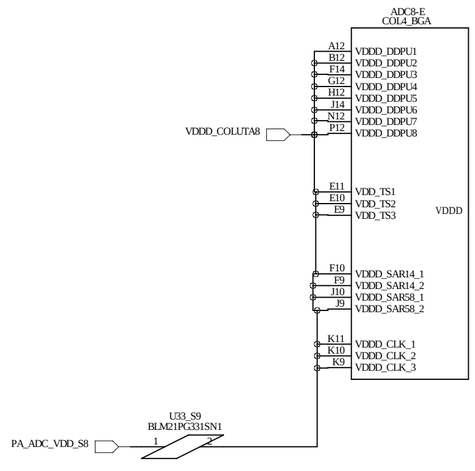

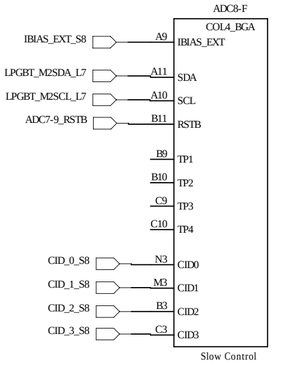

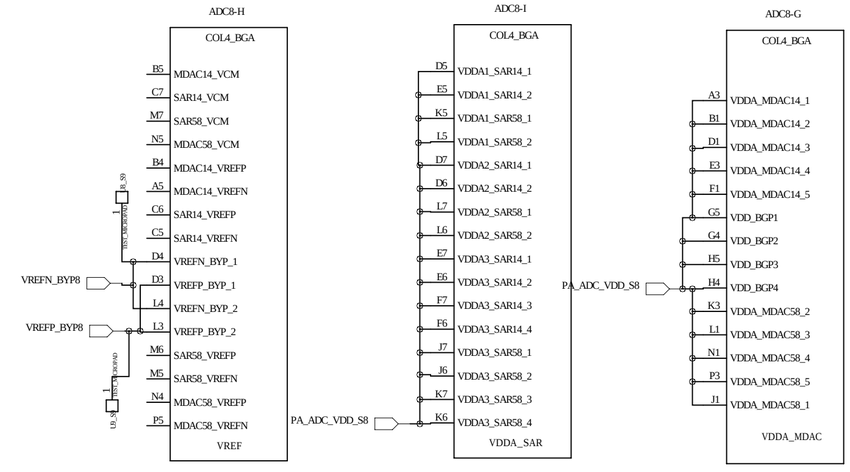

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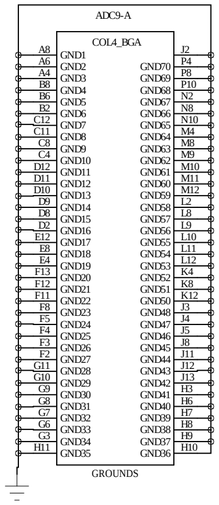

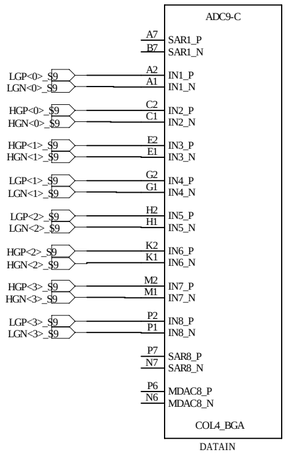

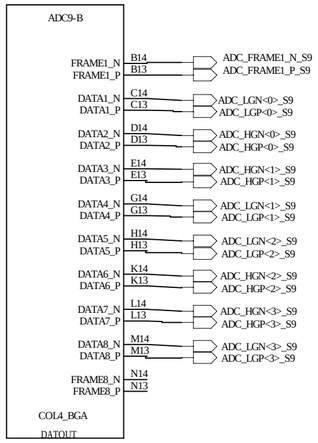

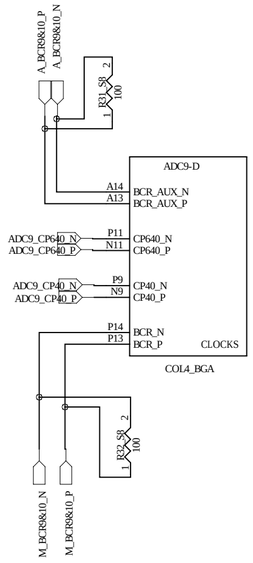

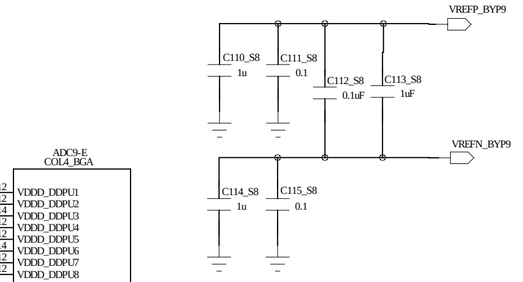

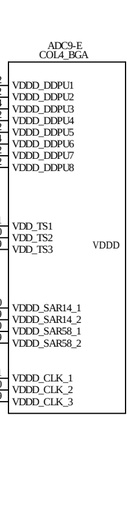

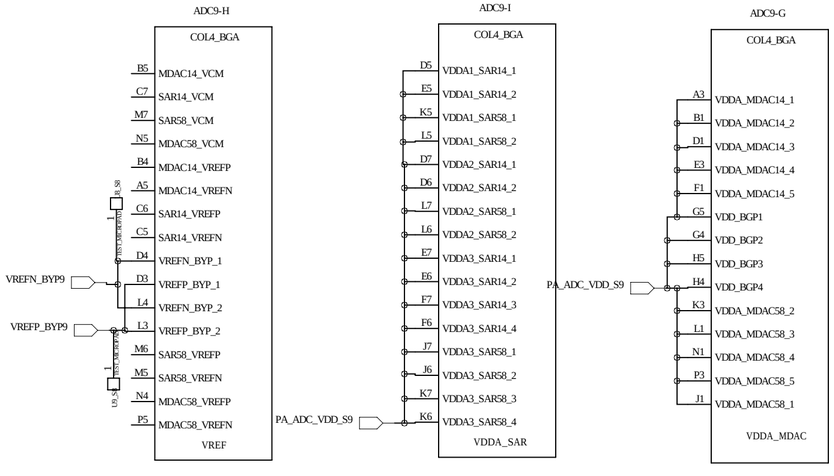

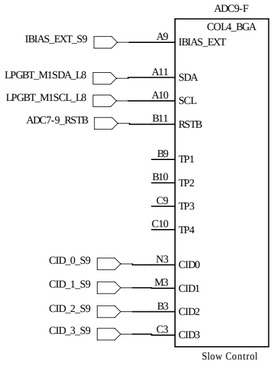

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QUALITY CONTROL: jb	DATED: <QC Date>	CODE: jb2023	SIZE: C
RELEASED: jb	DATED: <Release Date>	DRAWING NO: 35	REV: v2.0
		SCALE: <Scale>	SHEET: 40 OF 154

REVISION RECORD			
LTR	ECO NO:	APPROVED:	DATE:

RS1_L7
LPGBT5_ADR0
LPGBT5_ADR1
LPGBT5_ADR2
LPGBT5_ADR3
CAY16-221J4LF

RS2_L7
LPGBT5_MOD0
LPGBT5_MOD1
LPGBT5_MOD2
LPGBT5_MOD3
CAY16-221J4LF

Simplex TX 10GHz FEC5 mode 1001

RS3_L7
LPGBT5_BOOTCNF1
LPGBT5_LOCKMODE
LPGBT5_STATEOVRD
LPGBT5_PORDIS
CAY16-221J4LF

Lock to external 40MHz

LPGBT5_VDD
RC1_L7 3k
RC2_L7 DNP
RC3_L7 3k
RC4_L7 DNP
RC5_L7 3k
RC6_L7 DNP
RC7_L7 DNP
RC8_L7 3k
RC9_L7 DNP
RC10_L7 DNP
RC11_L7 DNP
RC12_L7 DNP
RC13_L7 3k
LPGBT5_BOOTCNF0

0101

LPGBT5-A
LPGBT_V1
ADC_LGN<0>_S7
ADC_LGP<0>_S7
ADC_HGN<0>_S7
ADC_HGP<0>_S7
ADC_HGN<1>_S7
ADC_HGP<1>_S7
ADC_LGN<1>_S7
ADC_LGP<1>_S7
ADC_LGN<2>_S7
ADC_LGP<2>_S7
ADC_HGN<2>_S7
ADC_HGP<2>_S7
ADC_HGN<3>_S7
ADC_HGP<3>_S7
ADC_LGN<3>_S7
ADC_LGP<3>_S7
ADC_FRAME8_N_S7
ADC_FRAME8_P_S7
ADC_FRAME1_N_S8
ADC_FRAME1_P_S8
ADC_LGN<0>_S8
ADC_LGP<0>_S8
ADC_HGN<0>_S8
ADC_HGP<0>_S8
ADC_HGN<1>_S8
ADC_HGP<1>_S8
ADC_LGN<1>_S8
ADC_LGP<1>_S8
EDIN00N … EDIN63P
EDOUT00N … EDOUT33P

LPGBT5-B
LPGBT_V1
ECLK0N … ECLK27P
ADC7_CP640_N
ADC7_CP640_P
ADC8_CP640_N
ADC8_CP640_P

LPGBT5-C
LPGBT_V1
PA7_+1.2V_MON
PA8_+1.2V_MON
ADC0 … ADC7
VDAC
M2SDA
M2SCL
M1SDA
M1SCL
M0SDA
M0SCL
LPGBT_M2SDA_L7
LPGBT_M2SCL_L7
LPGBT_M1SDA_L7
LPGBT_M1SCL_L7
LPGBT_M0SDA_L7
LPGBT_M0SCL_L7
PA7-9_RSTB
GPIO0 … GPIO15
RSTOUTB
ECLK28P
ECLK28N
EDOUTECN_L12
EDOUTECP_L12
EDINECN
EDINECP
EDOUTECP
EDOUTECN
EDOUTECP_L1-11
EDOUTECN_L1-11

LPGBT5-F
LPGBT_V1
PSCLK0N … PSCLK3P
ALFE_CP40N_S7
ALFE_CP40P_S7
ADC7_CP40_N
ADC7_CP40_P

LPGBT5-H
LPGBT_V1
TSTOUT0 … TSTOUT5P
TSTCLKINN
TSTCLKINP

LPGBT5-G
LPGBT_V1
M2_S
M1_S
TEST_MICROPAD
HSINN
HSINP
HSOUTP
HSOUTN
LPGBT5_HSOUTP
LPGBT5_HSOUTN

LPGBT5_VDD
LPGBT5-D
LPGBT_V1
VDD1V2_1 … VDD1V2_19
VDDRX1V2_1 … VDDRX1V2_4
VDDTX1V2_1 … VDDTX1V2_4
GNDRX_1 … GNDRX_6
GNDTX_1 … GNDTX_6
GND_1 … GND_19
GNDA_1
GNDA_2
VDDA1V2_1
VDDA1V2_2
VDDF2V5_1
VDDF2V5_2
VDDF2P5_LPGBT5
VREF_1
VREF_2

LPGBT5_VDD
C29_M7 22u
C31_M7 DNP
C33_M7 22u
C34_M7 100n
C35_M7 DNP
VO4 VO5 GND1 GND2 VI1 VI2
LDO_LPGBT5
SGCPMU_CRN01
VO3 VO2 VO1 VFB OCSNS TEST GND3
VI3 VI4 VI5 T3 OCZ_ATB PG
P50MV M50MV GND_AGND1 GND_AGND2 EN SOFTST
+1.4V_SLICE7-8
R_1_M7 243
R_2_M7 20k
R_3_M7 510k
R189 1k
R_4_M7 1.2k
R_5_M7 1.2k
LPGBT5_VDD
C1_L7 10u
C2_L7 10u
C3_L7 4.7u
C4_L7 4.7u
C5_L7 4.7u
C6_L7 2.2u
C7_L7 2.2u
C8_L7 2.2u
C9_L7 2.2u
C10_L7 2.2u
C11_L7 … C22_L7 100n
C23_L7 … C34_L7 2.2n
C30_L7 470p
C32_L7 220p
C33_L7 220p

LPGBT5-E
LPGBT_V1
LPGBT1-11_RSTB
LPGBT5_ADR0 … LPGBT5_ADR3
LPGBT5_MOD0 … LPGBT5_MOD3
MCLK5N
MCLK5P
LPGBT5_BOOTCNF1
LPGBT5_LOCKMODE
LPGBT5_STATEOVRD
LPGBT5_PORDIS
LPGBT5_BOOTCNF0
RSTB
READY
LPGBT5_RDY
ADR0 … ADR3
SLSDA
SLSCL
MODE0 … MODE3
REFCLKN
REFCLKP
BOOTCNF1
LOCKMODE
STATEOVRD
PORDIS
BOOTCNF0
LPGBTI2_M0SDA
LPGBTI2_M0SCL
U7
LTST-C190GKT
100
R_75
VTRX+_2P5
NMOS_L7
1k
R_119

LPGBT5_VDD
R4_L7 2k
R5_L7 2k
LPGBT_M2SDA_L7
LPGBT_M2SCL_L7
R6_L7 2k
R7_L7 2k
LPGBT_M1SDA_L7
LPGBT_M1SCL_L7
R8_L7 2k
R9_L7 2k
LPGBT_M0SDA_L7
LPGBT_M0SCL_L7

DRAWN: Jb	DATED: <Drawn Date>	COMPANY: Nevis Laboratories of Columbia University	
CHECKED: jb	DATED: <Checked Date>	TITLE: FEB2 prototype v2.0	
QUALITY CONTROL: jb	DATED: <QC Date>	CODE: jb2023	SIZE: C
RELEASED: jb	DATED: <Release Date>	DRAWING NO: 35	REV: v2.0
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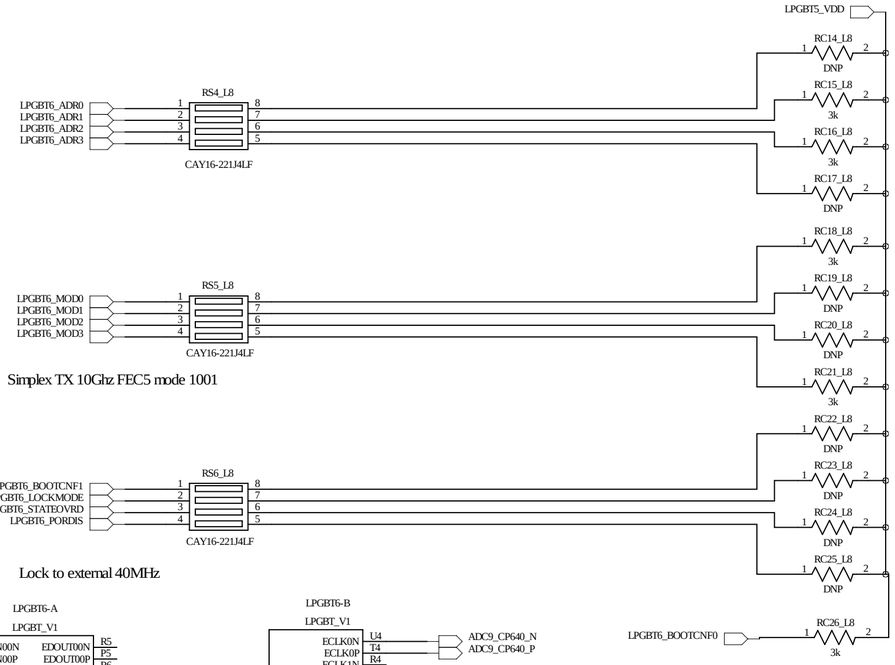
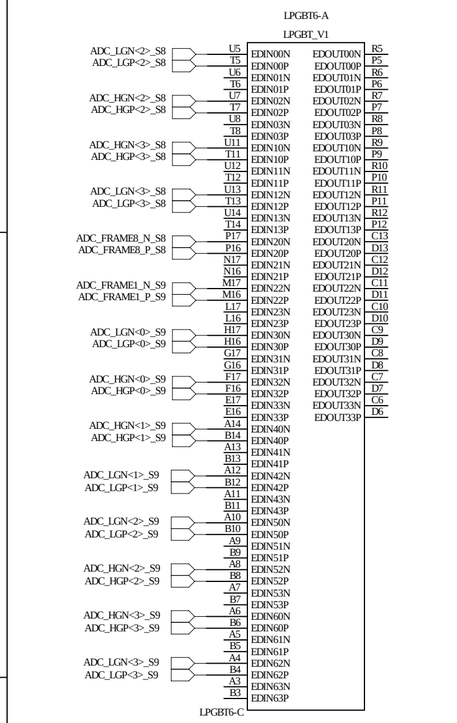
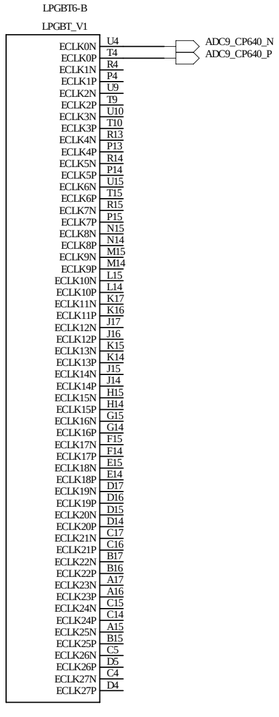
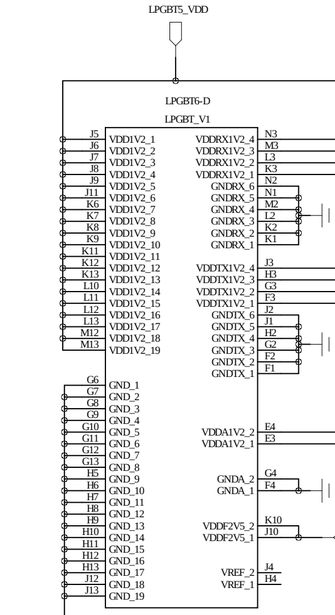
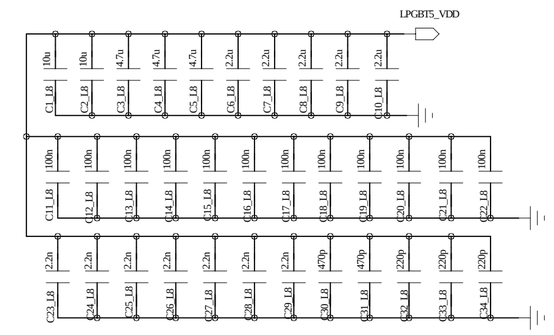
REVISION RECORD			
LTR	ECO NO:	APPROVED:	DATE:

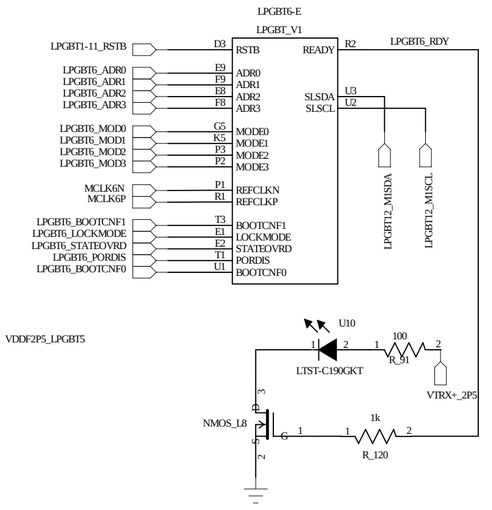


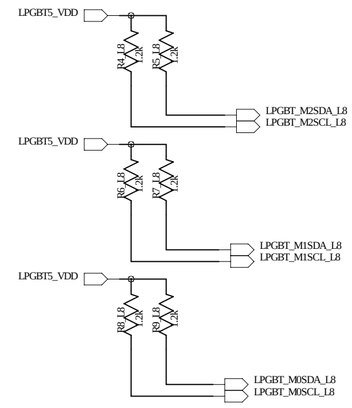


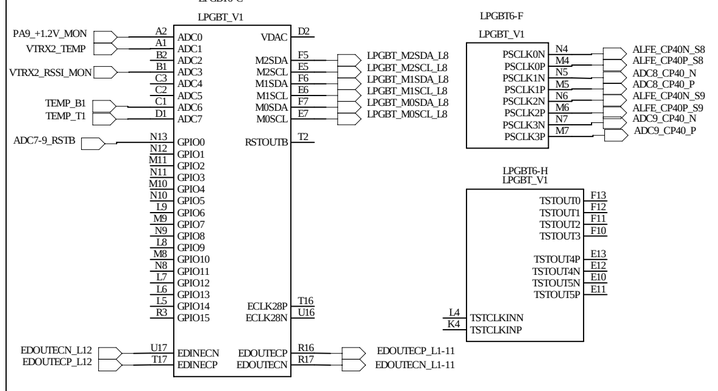


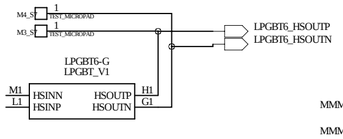


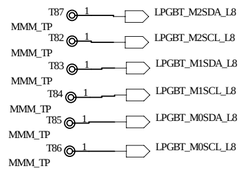












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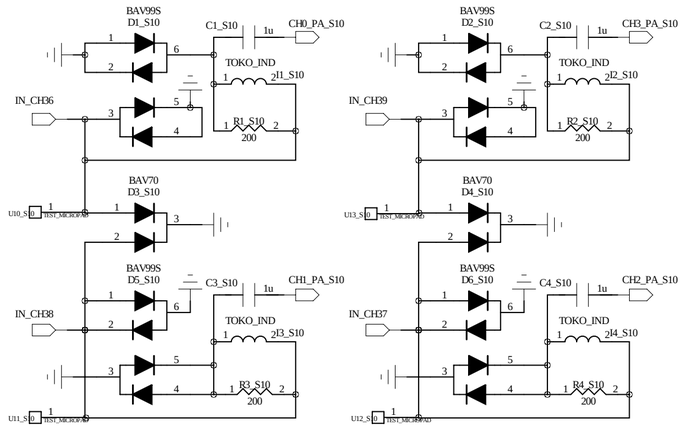

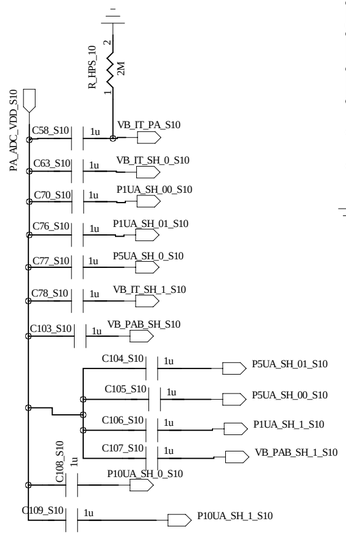

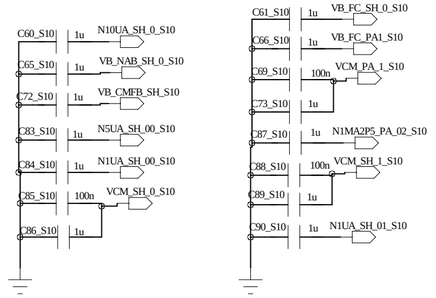

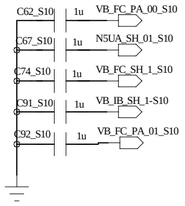

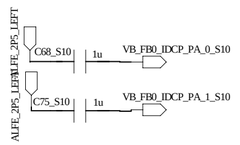

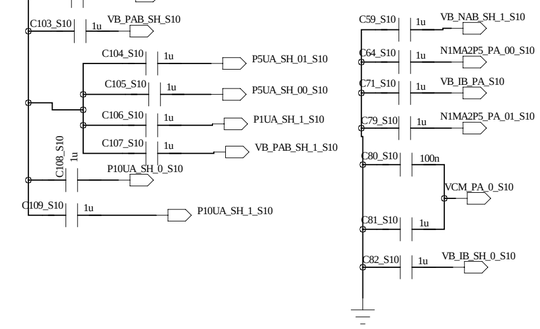

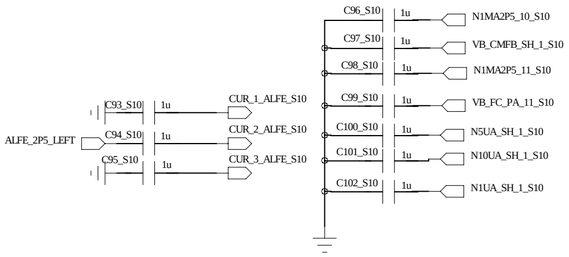

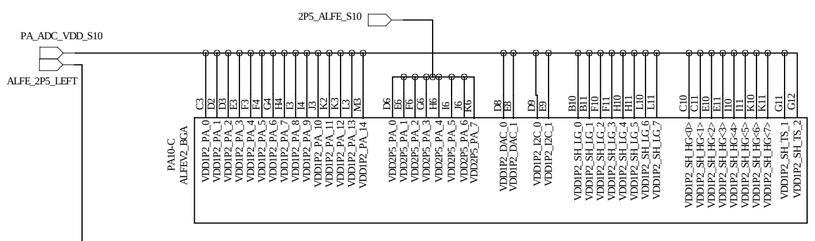

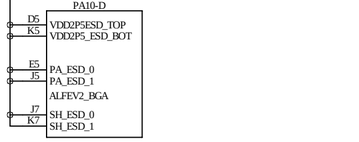

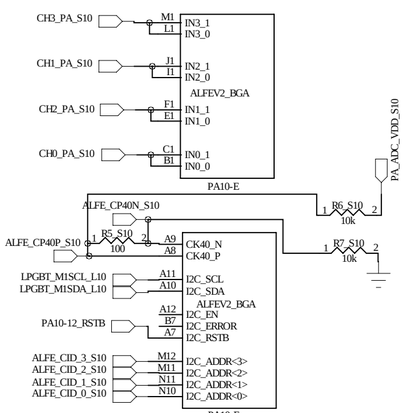

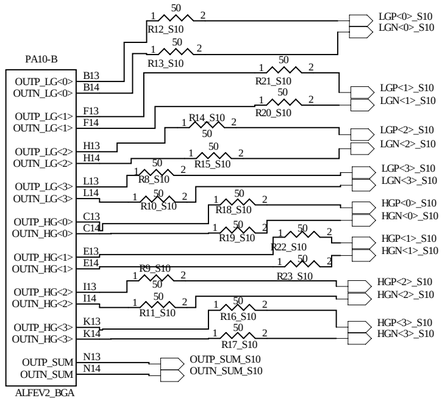

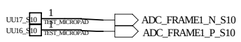

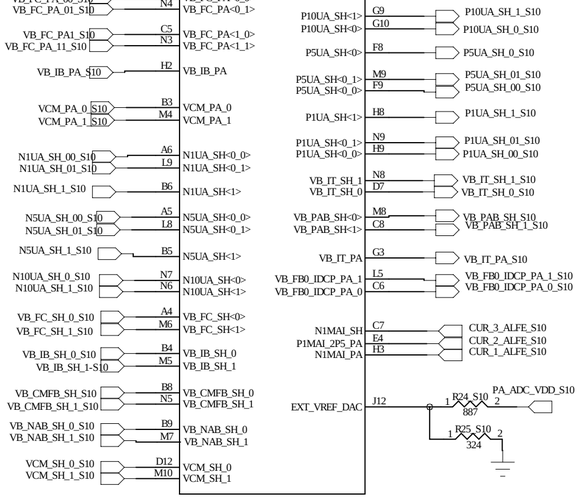

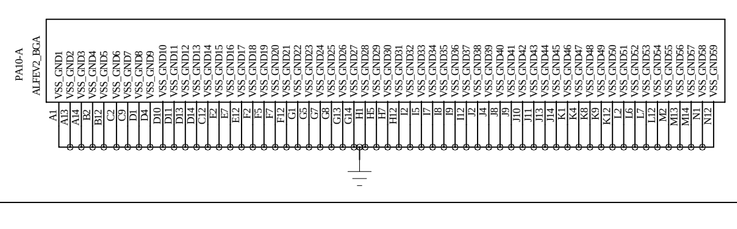

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RELEASED: jb	DATED: <Release Date>	DRAWING NO: 35	REV: v2.0
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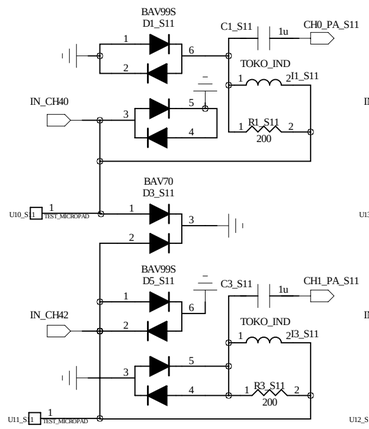

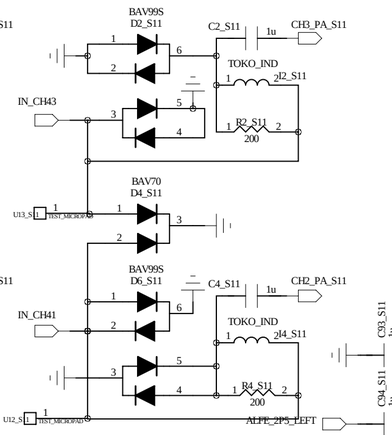

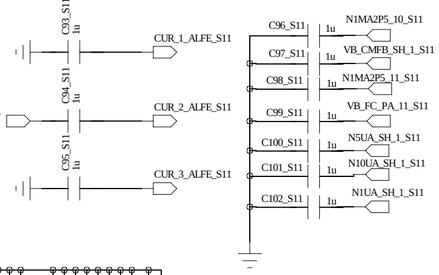

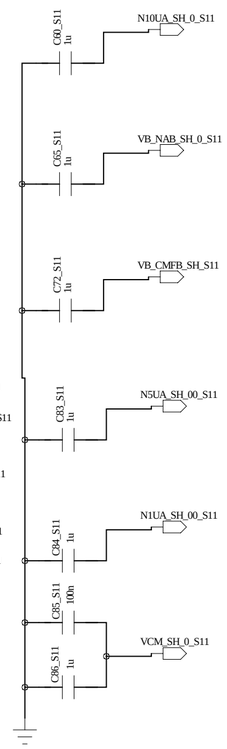

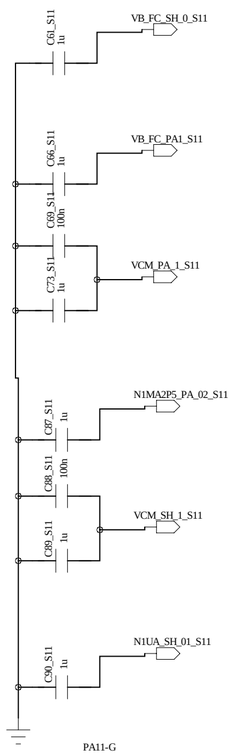

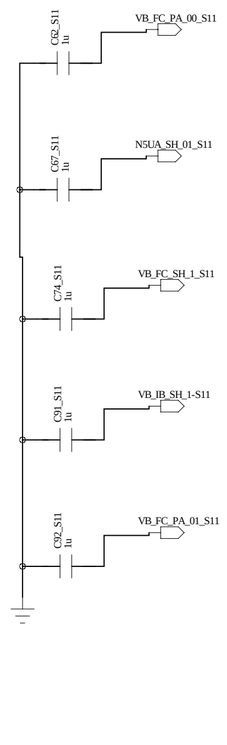

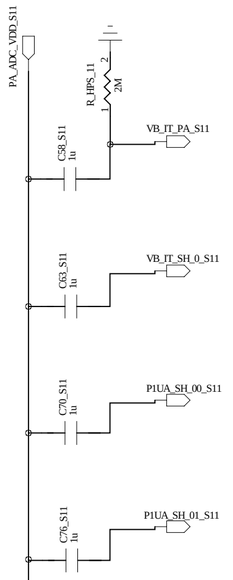

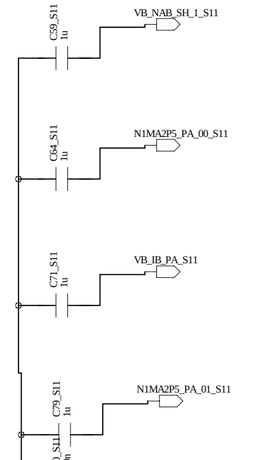

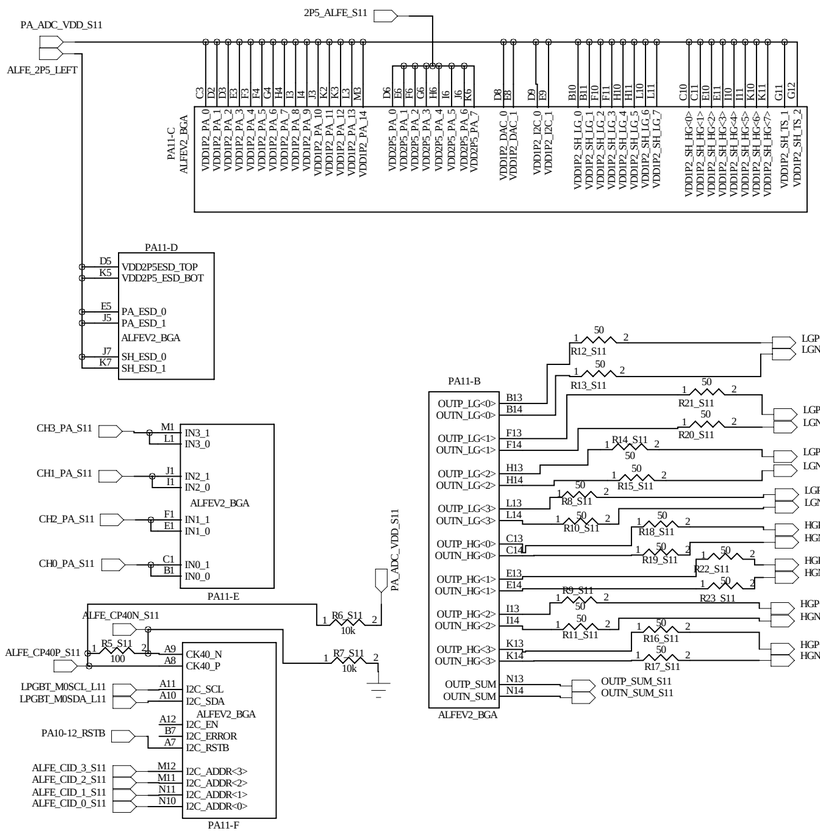

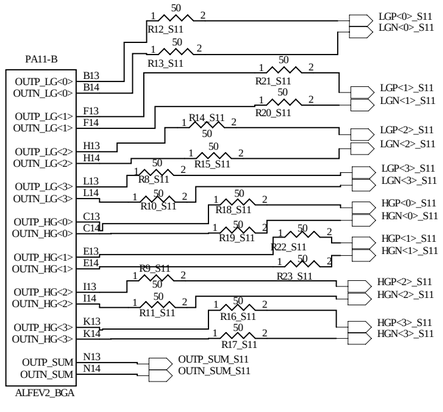

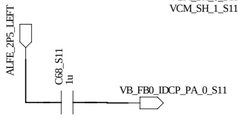

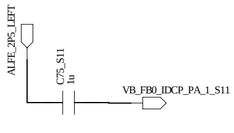

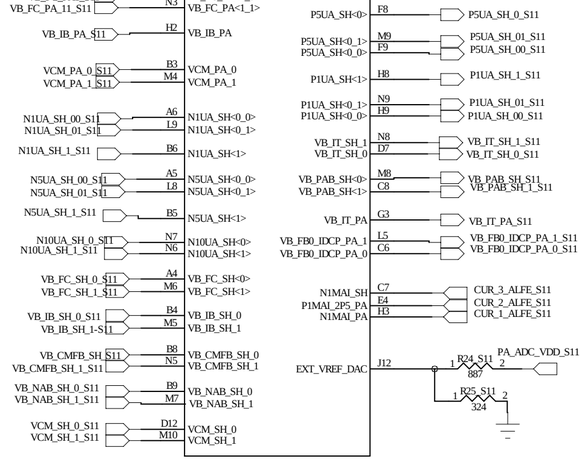

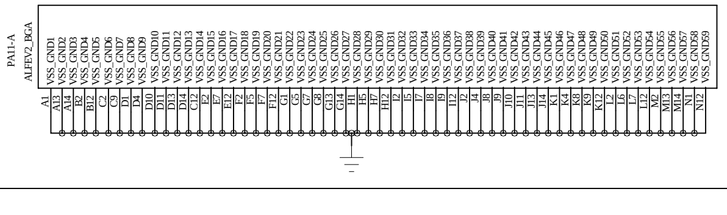

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COMPANY: Nevis Laboratories of Columbia University

TITLE: FEB2 prototype v2.0

CODE:	SIZE:	DRAWING NO:	REV:
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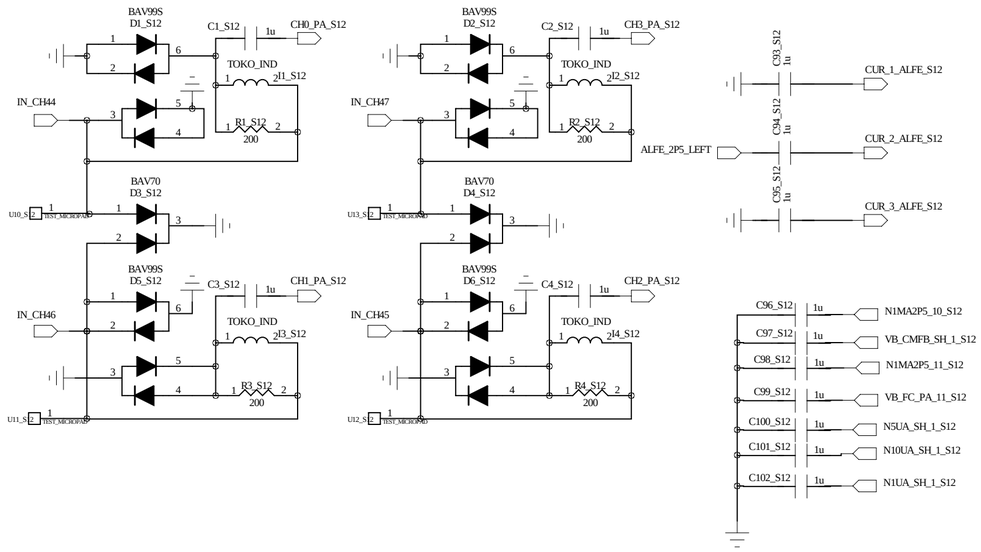

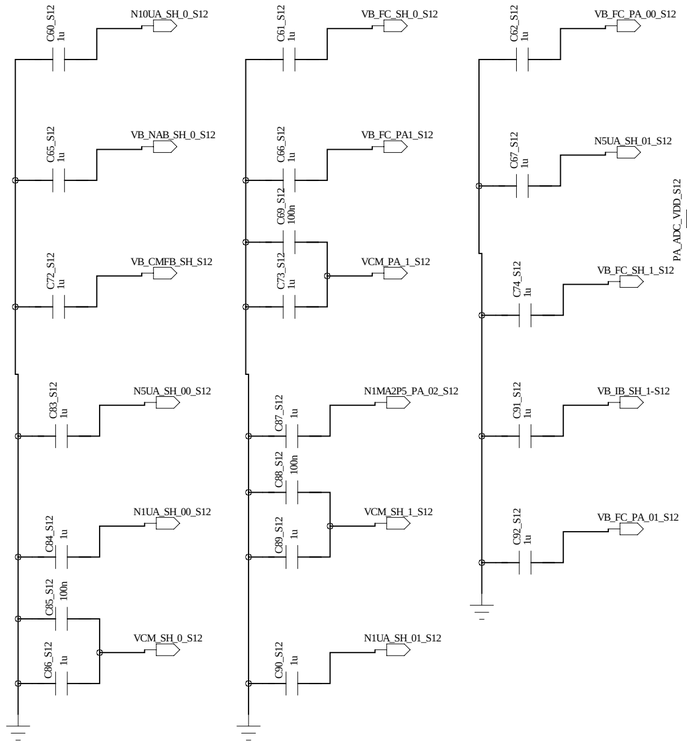

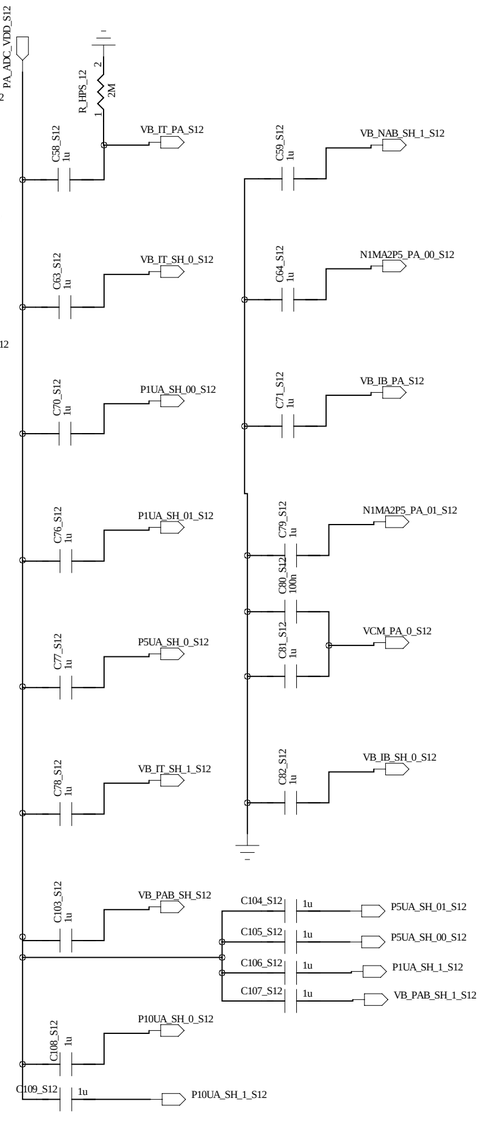

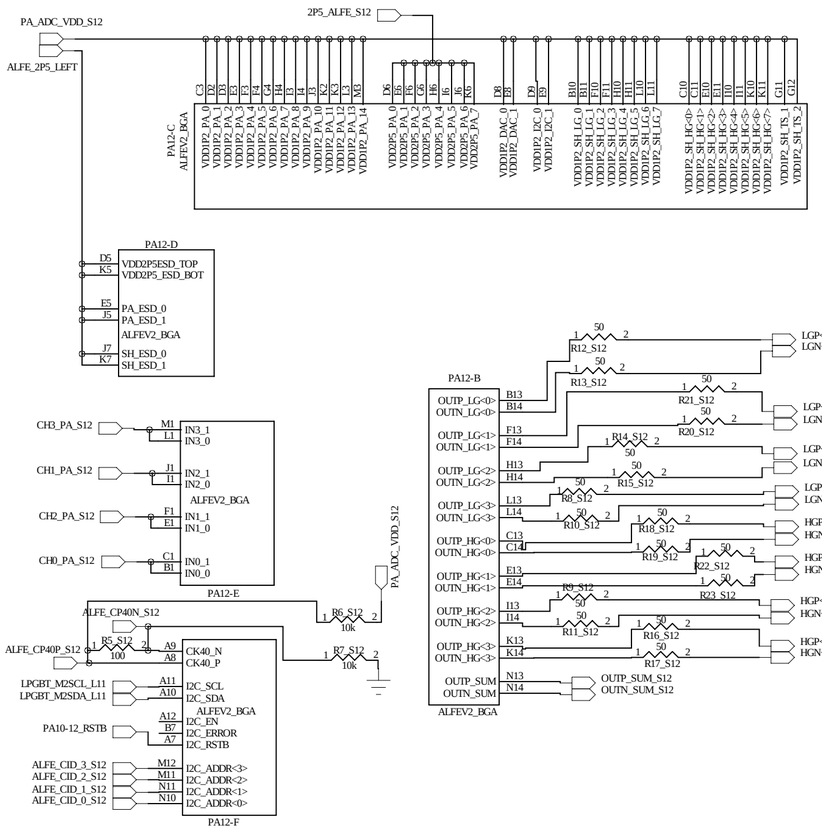

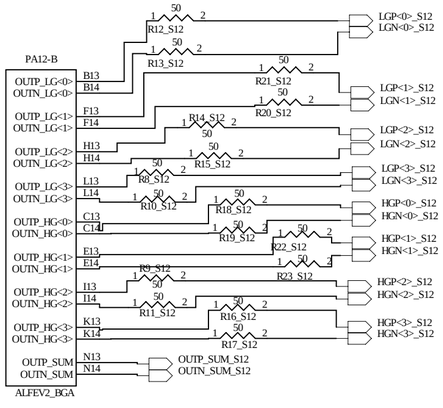

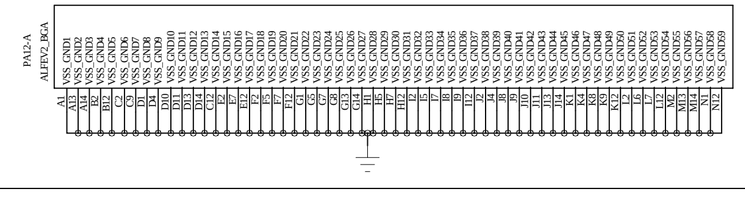

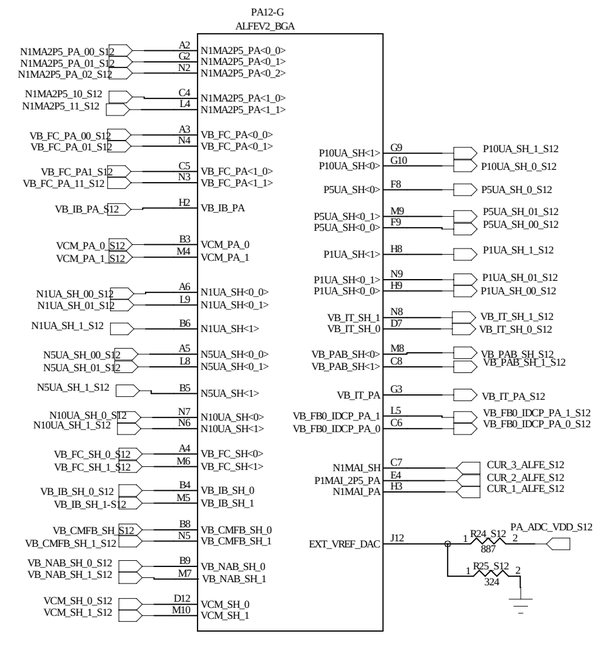

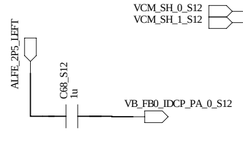

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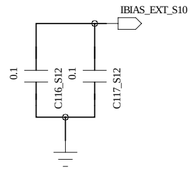

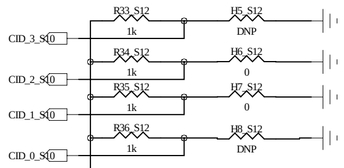

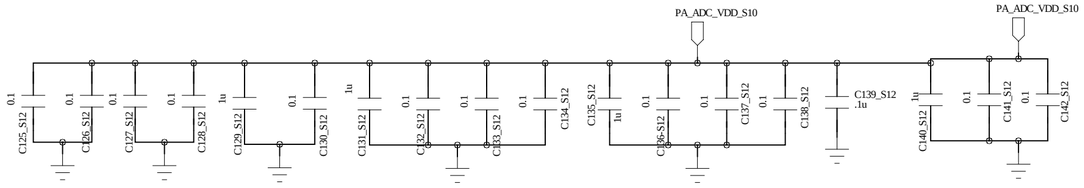

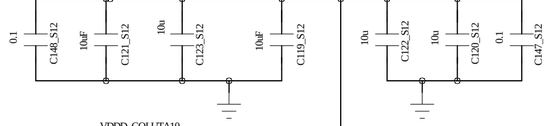

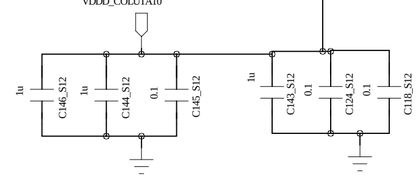

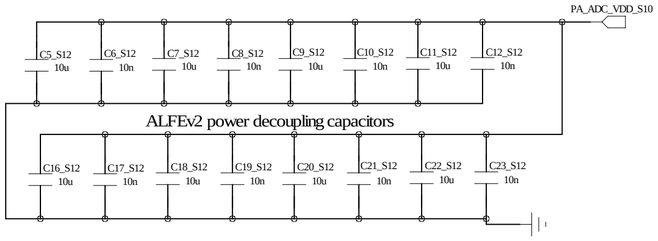

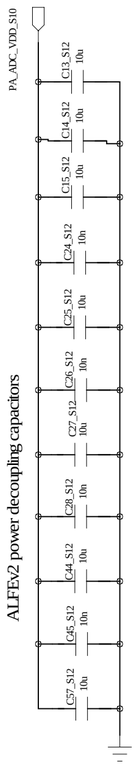

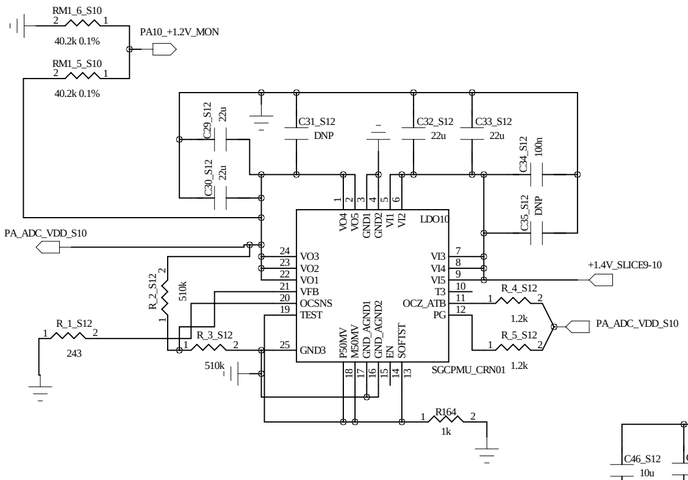

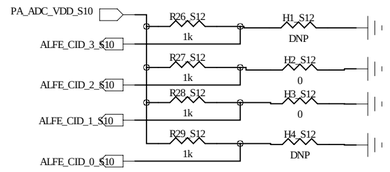

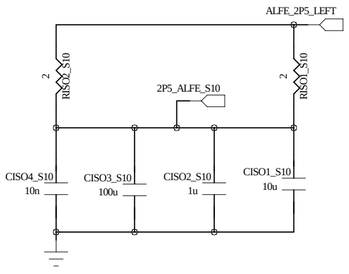

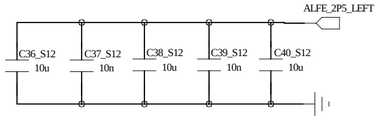

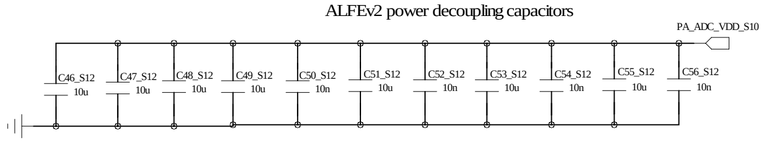

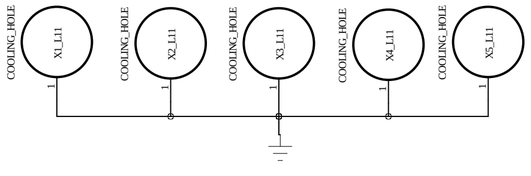

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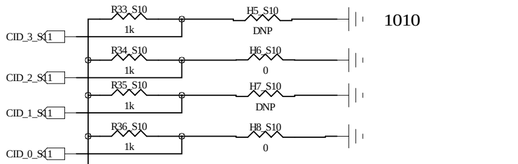

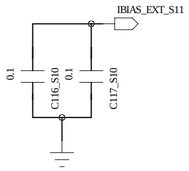

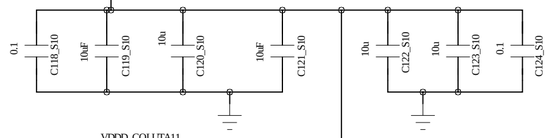

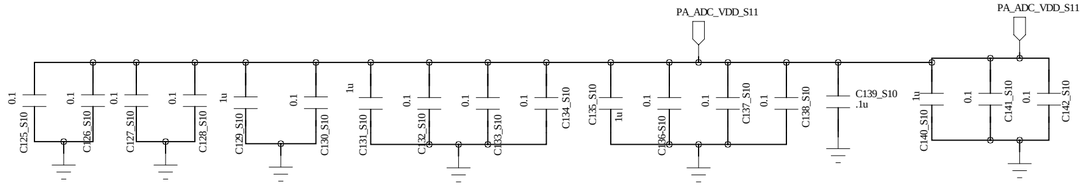

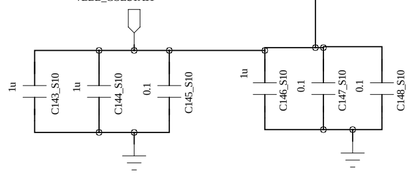

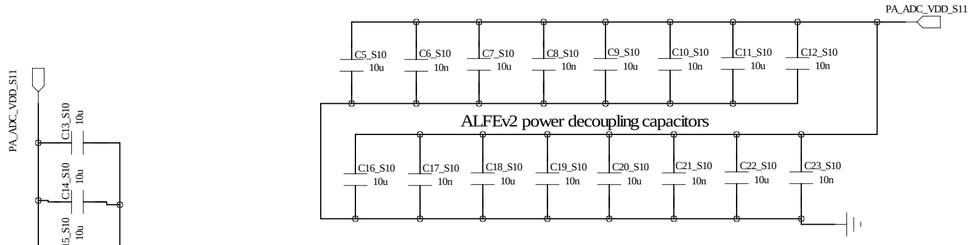

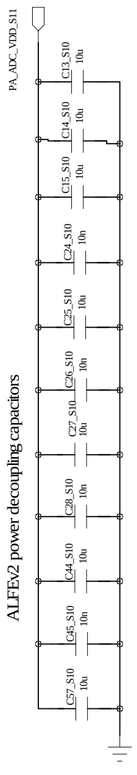

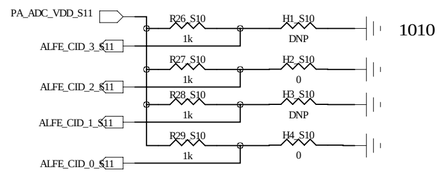

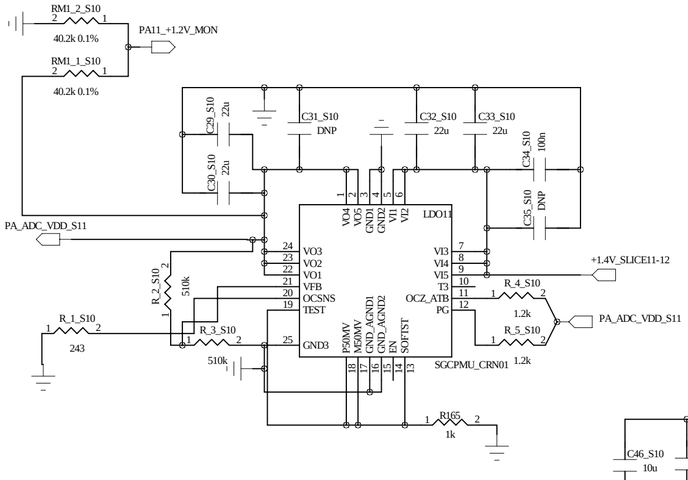

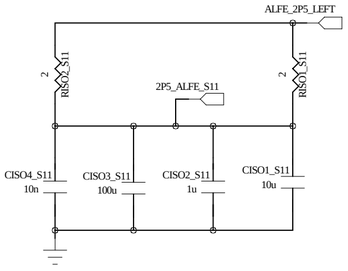

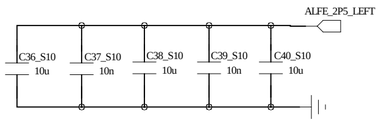

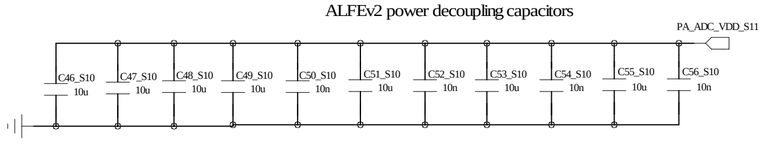

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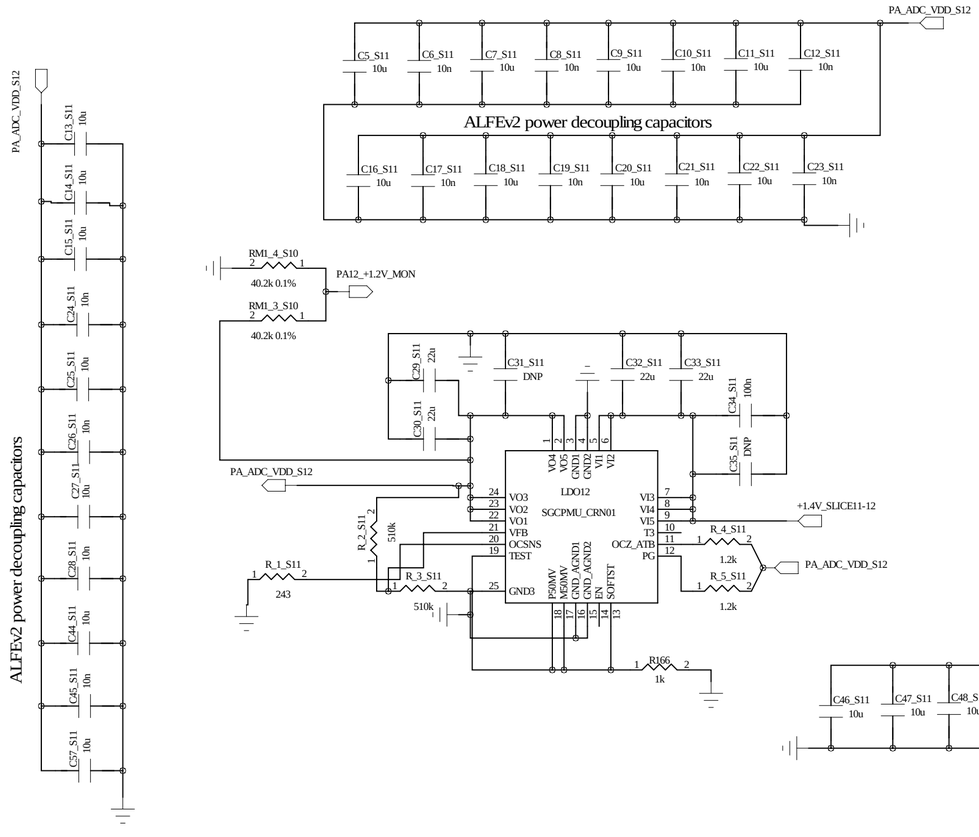

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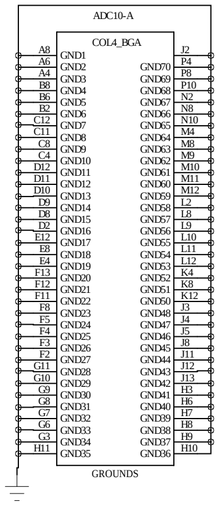

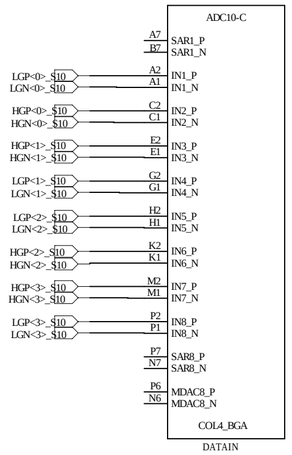

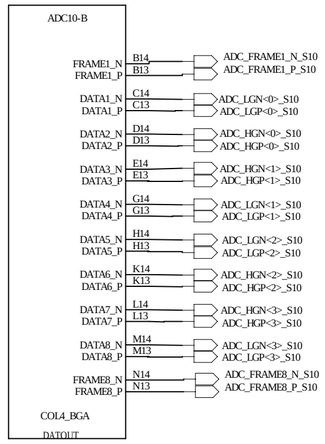

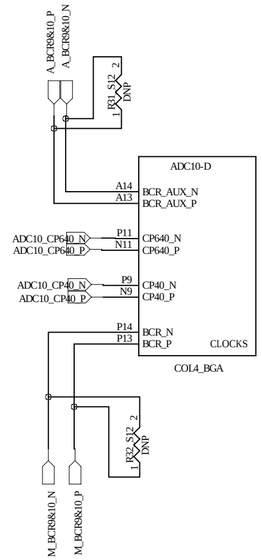

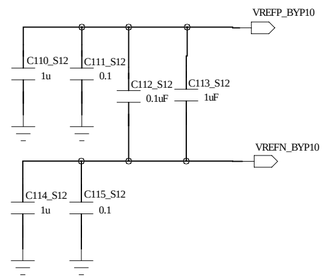

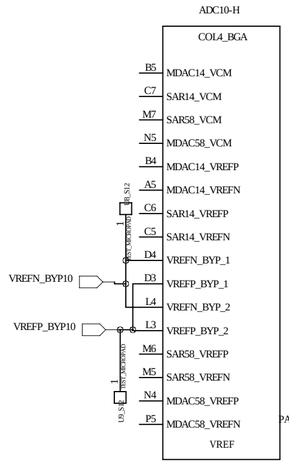

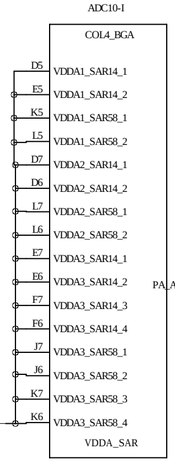

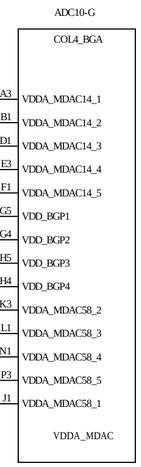

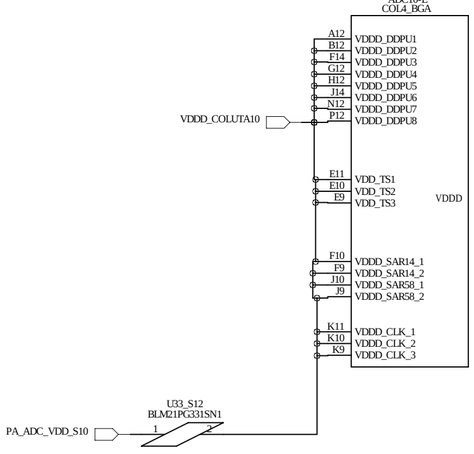

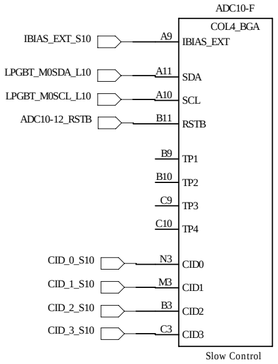

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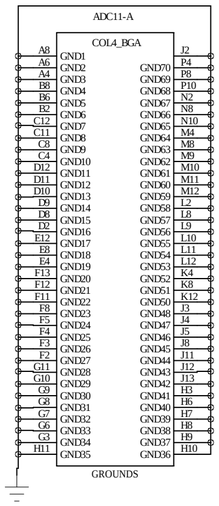

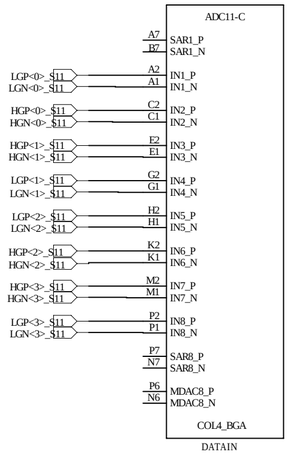

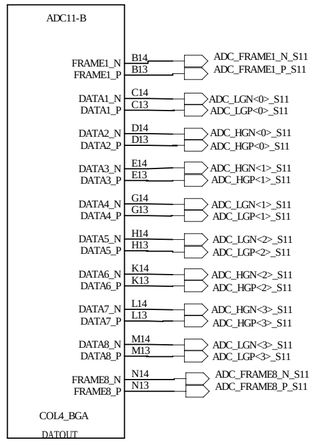

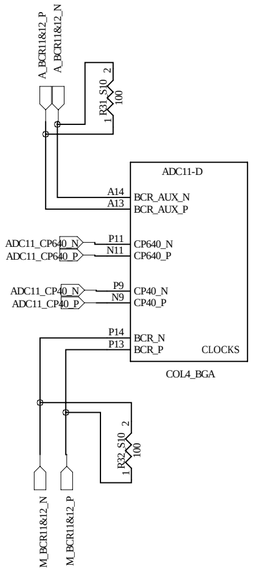

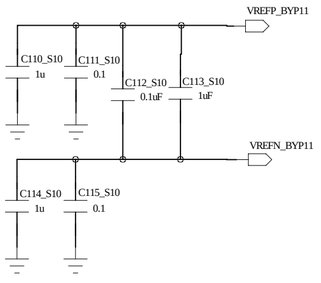

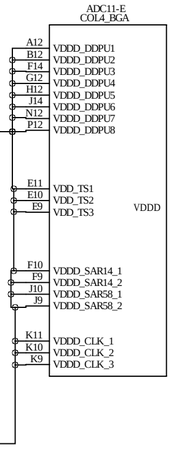

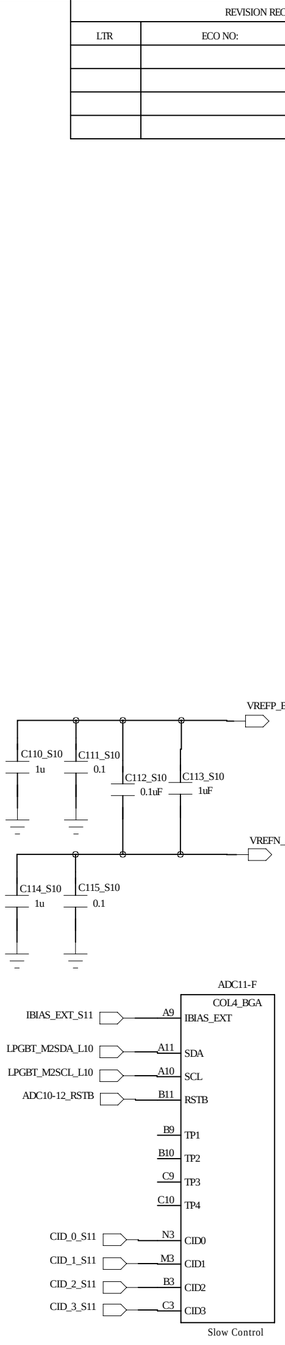

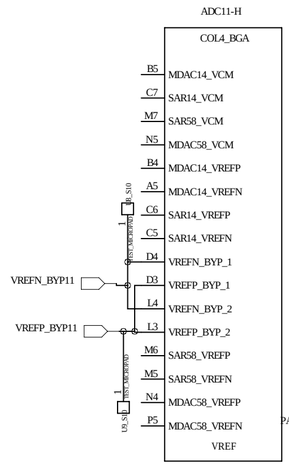

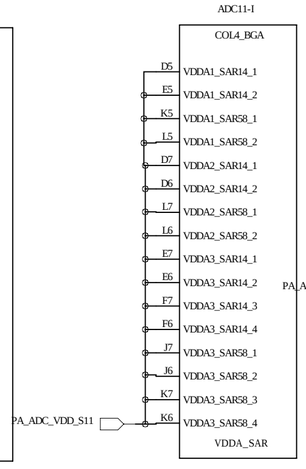

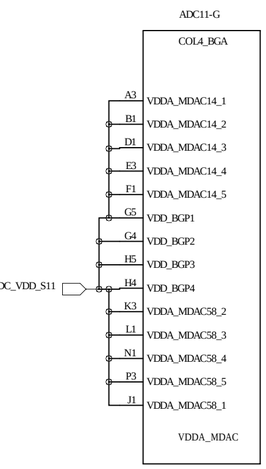

DRAWN: Jb	DATED: <Drawn Date>	COMPANY: Nevis Laboratories of Columbia University	
CHECKED: jb	DATED: <Checked Date>	TITLE: FEB2 prototype v2.0	
QUALITY CONTROL: jb	DATED: <QC Date>	CODE: jb2023	SIZE: C
RELEASED: jb	DATED: <Release Date>	DRAWING NO: 35	REV: v2.0
		SCALE: <Scale>	SHEET: 50 OF 154

REVISION RECORD			
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1011

R33_S11 1k — H5_S11 DNP — CID_3_S12
R34_S11 1k — H6_S11 0 — CID_2_S12
R35_S11 1k — H7_S11 DNP — CID_1_S12
R36_S11 1k — H8_S11 DNP — CID_0_S12

C148_S11 0.1, C121_S11 10uF, C123_S11 10u, C119_S11 10uF, C122_S11 10u, C120_S11 10u, C147_S11 0.1

VDDD_COLUTA12

C146_S11 1u, C144_S11 1u, C145_S11 0.1, C143_S11 1u, C124_S11 0.1, C118_S11 0.1

IBIAS_EXT_S12

C116_S11 0.1, C117_S11 0.1

PA_ADC_VDD_S12

C125_S11 0.1, C126_S11 0.1, C127_S11 0.1, C128_S11 0.1, C129_S11 1u, C130_S11 0.1, C131_S11 1u, C132_S11 0.1, C133_S11 0.1, C134_S11 0.1, C135_S11 1u, C136_S11 0.1, C137_S11 0.1, C138_S11 0.1, C139_S11 1u, C140_S11 1u, C141_S11 0.1, C142_S11 0.1

ADC12-A — COL4_BGA — GROUNDS

ADC12-C — COL4_BGA — DATAIN

ADC12-B — COL4_BGA — DATOUT

FRAME1_N B14, FRAME1_P B13 → ADC_FRAME1_N_S12, ADC_FRAME1_P_S12
DATA1_N C14, DATA1_P C13 → ADC_LGN<0>_S12, ADC_LGP<0>_S12
DATA2_N D14, DATA2_P D13 → ADC_HGN<0>_S12, ADC_HGP<0>_S12
DATA3_N E14, DATA3_P E13 → ADC_HGN<1>_S12, ADC_HGP<1>_S12
DATA4_N G14, DATA4_P G13 → ADC_LGN<1>_S12, ADC_LGP<1>_S12
DATA5_N H14, DATA5_P H13 → ADC_LGN<2>_S12, ADC_LGP<2>_S12
DATA6_N K14, DATA6_P K13 → ADC_HGN<2>_S12, ADC_HGP<2>_S12
DATA7_N L14, DATA7_P L13 → ADC_HGN<3>_S12, ADC_HGP<3>_S12
DATA8_N M14, DATA8_P M13 → ADC_LGN<3>_S12, ADC_LGP<3>_S12
FRAME8_N N14, FRAME8_P N13

A_BCR11&12_P, A_BCR11&12_N — BR1_S11 DNP

ADC12-D — COL4_BGA — CLOCKS

A14 BCR_AUX_N, A13 BCR_AUX_P
ADC12_CP640_N P11 → CP640_N N11, ADC12_CP640_P → CP640_P
ADC12_CP40_N P9 → CP40_N N9, ADC12_CP40_P → CP40_P
P14 BCR_N, P13 BCR_P

BR2_S11 DNP

M_BCR11&12_N, M_BCR11&12_P

ADC12-E — COL4_BGA — VDDD

VDDD_COLUTA12 → VDDD_DDPU1, VDDD_DDPU2, VDDD_DDPU3, VDDD_DDPU4, VDDD_DDPU5, VDDD_DDPU6, VDDD_DDPU7, VDDD_DDPU8
VDD_TS1, VDD_TS2, VDD_TS3
VDDD_SAR14_1, VDDD_SAR14_2, VDDD_SAR58_1, VDDD_SAR58_2
VDDD_CLK_1, VDDD_CLK_2, VDDD_CLK_3

U33_S11 BLM21PG331SN1 — PA_ADC_VDD_S12

VREFP_BYP12 — C110_S11 1u, C111_S11 0.1, C112_S11 0.1uF, C113_S11 1uF
VREFN_BYP12 — C114_S11 1u, C115_S11 0.1

ADC12-F — COL4_BGA — Slow Control

IBIAS_EXT_S12 → IBIAS_EXT
LPGBT_M1SDA_L11 → SDA
LPGBT_M1SCL_L11 → SCL
ADC10-12_RSTB → RSTB
TP1, TP2, TP3, TP4
CID_0_S12 → CID0, CID_1_S12 → CID1, CID_2_S12 → CID2, CID_3_S12 → CID3

ADC12-H — COL4_BGA — VREF

MDAC14_VCM, SAR14_VCM, SAR58_VCM, MDAC58_VCM, MDAC14_VREFP, MDAC14_VREFN, SAR14_VREFP, SAR14_VREFN, VREFN_BYP_1, VREFP_BYP_1, VREFN_BYP_2, VREFP_BYP_2, SAR58_VREFP, SAR58_VREFN, MDAC58_VREFP, MDAC58_VREFN
VREFN_BYP12, VREFP_BYP12
R6_S11 1k, R7_S11 1k

ADC12-I — COL4_BGA — VDDA_SAR

VDDA1_SAR14_1, VDDA1_SAR14_2, VDDA1_SAR58_1, VDDA1_SAR58_2, VDDA2_SAR14_1, VDDA2_SAR14_2, VDDA2_SAR58_1, VDDA2_SAR58_2, VDDA3_SAR14_1, VDDA3_SAR14_2, VDDA3_SAR14_3, VDDA3_SAR14_4, VDDA3_SAR58_1, VDDA3_SAR58_2, VDDA3_SAR58_3, VDDA3_SAR58_4
PA_ADC_VDD_S12

ADC12-G — COL4_BGA — VDDA_MDAC

VDDA_MDAC14_1, VDDA_MDAC14_2, VDDA_MDAC14_3, VDDA_MDAC14_4, VDDA_MDAC14_5, VDD_BGP1, VDD_BGP2, VDD_BGP3, VDD_BGP4, VDDA_MDAC58_2, VDDA_MDAC58_3, VDDA_MDAC58_4, VDDA_MDAC58_5, VDDA_MDAC58_1
PA_ADC_VDD_S12

DRAWN: Jb	DATED: <Drawn Date>		
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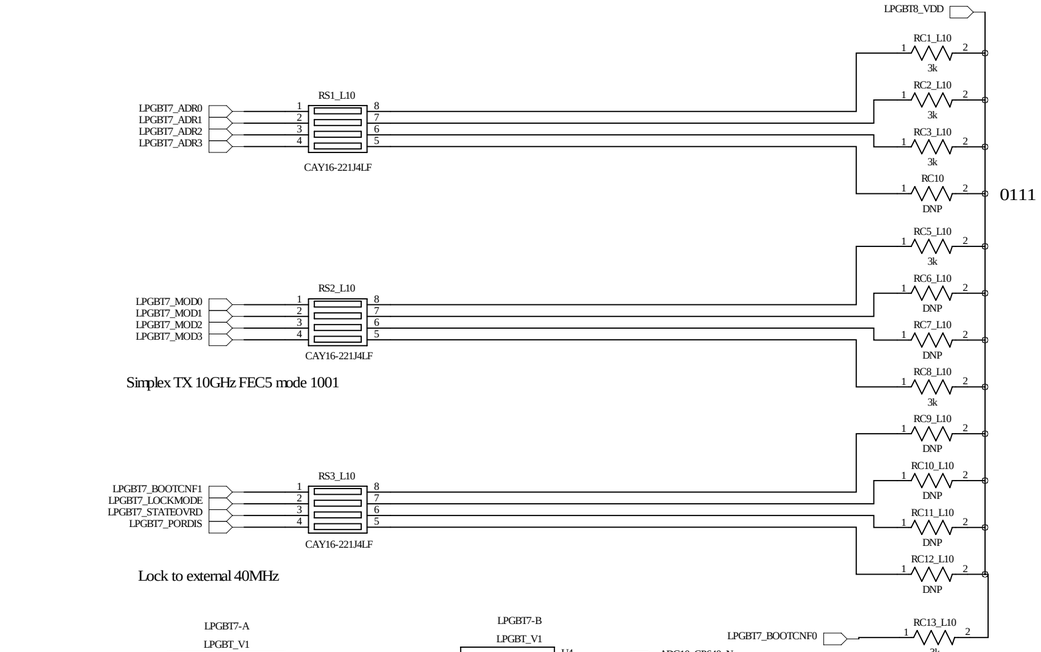
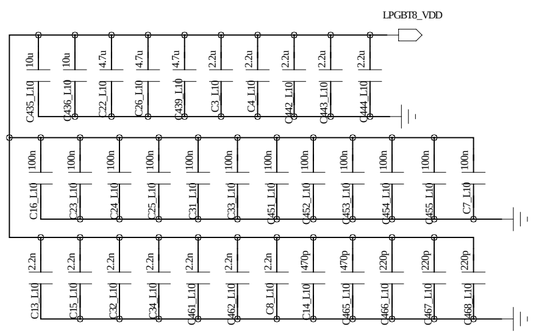
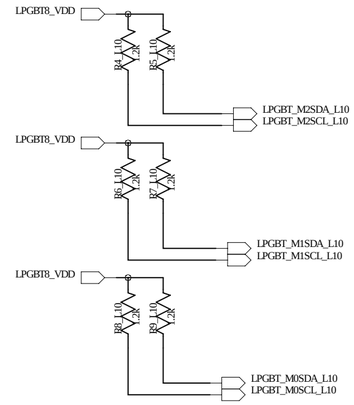
RELEASED: jb	DATED: <Release Date>		

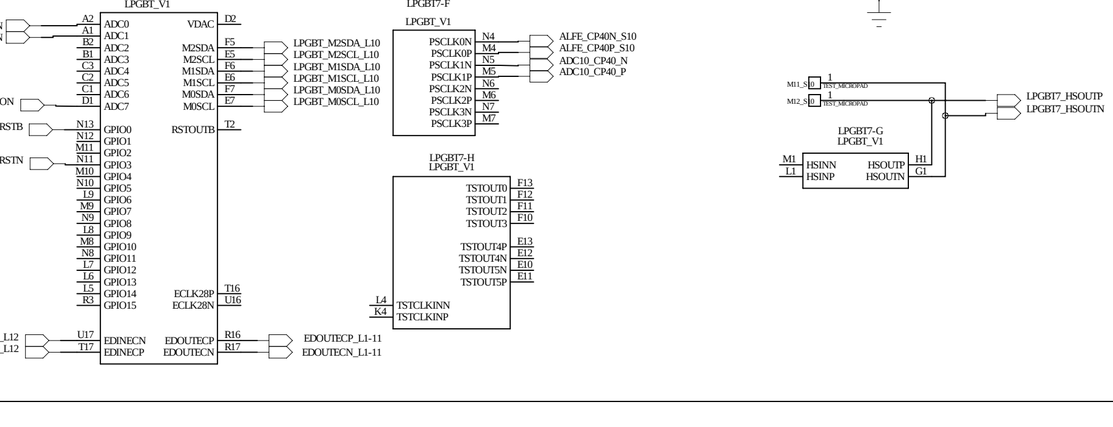
COMPANY: Nevis Laboratories of Columbia University			
TITLE: FEB2 prototype v2.0			
CODE: jb2023	SIZE: C	DRAWING NO: 35	REV: v2.0
SCALE: <Scale>	SHEET: 51 OF 154		

REVISION RECORD			
LTR	ECO NO:	APPROVED:	DATE:









DRAWN: Jb	DATED: <Drawn Date>	COMPANY: Nevis Laboratories of Columbia University	
CHECKED: jb	DATED: <Checked Date>	TITLE: FEB2 prototype v2.0	
QUALITY CONTROL: jb	DATED: <QC Date>	CODE: jb2023	SIZE: C
RELEASED: jb	DATED: <Release Date>	DRAWING NO: 35	REV: v2.0
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REVISION RECORD			
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RS4_L11
LPGBT8_ADR0
LPGBT8_ADR1
LPGBT8_ADR2
LPGBT8_ADR3
CAY16-221J4LF

RS5_L11
LPGBT8_MOD0
LPGBT8_MOD1
LPGBT8_MOD2
LPGBT8_MOD3
CAY16-221J4LF

Simplex TX 10GHz FEC5 mode 1001

RS6_L11
LPGBT8_BOOTCNF1
LPGBT8_LOCKMODE
LPGBT8_STATEOVRD
LPGBT8_PORDIS
CAY16-221J4LF

Lock to external 40MHz

LPGBT8_VDD
RC14_L11 DNP
RC15_L11 DNP
RC16_L11 DNP
RC17_L11 3kI
RC18_L11 3k
RC19_L11 DNP
RC20_L11 DNP
RC21_L11 3k
RC22_L11 DNP
RC23_L11 DNP
RC24_L11 DNP
RC25_L11 DNP
RC26_L11 3k
LPGBT8_BOOTCNF0

1000

LPGBT8-A
LPGBT_V1
ADC_LGN<2>_S11
ADC_LGP<2>_S11
ADC_HGN<2>_S11
ADC_HGP<2>_S11
ADC_HGN<3>_S11
ADC_HGP<3>_S11
ADC_LGN<3>_S11
ADC_LGP<3>_S11
ADC_FRAME8_N_S11
ADC_FRAME8_P_S11
ADC_FRAME1_N_S12
ADC_FRAME1_P_S12
ADC_LGN<0>_S12
ADC_LGP<0>_S12
ADC_HGN<0>_S12
ADC_HGP<0>_S12
ADC_HGN<1>_S12
ADC_HGP<1>_S12
ADC_LGN<1>_S12
ADC_LGP<1>_S12
ADC_LGN<2>_S12
ADC_LGP<2>_S12
ADC_HGN<2>_S12
ADC_HGP<2>_S12
ADC_HGN<3>_S12
ADC_HGP<3>_S12
ADC_LGN<3>_S12
ADC_LGP<3>_S12
LPGBT8-C

LPGBT8-B
LPGBT_V1
ADC12_CP640_N
ADC12_CP640_P

LPGBT8_VDD
LPGBT8-D
LPGBT_V1

LPGBT8-E
LPGBT_V1
LPGBT1-11_RSTB
LPGBT8_ADR0
LPGBT8_ADR1
LPGBT8_ADR2
LPGBT8_ADR3
LPGBT8_MOD0
LPGBT8_MOD1
LPGBT8_MOD2
LPGBT8_MOD3
MCLK8N
MCLK8P
LPGBT8_BOOTCNF1
LPGBT8_LOCKMODE
LPGBT8_STATEOVRD
LPGBT8_PORDIS
LPGBT8_BOOTCNF0
LPGBT12_M1SDA
LPGBT12_M1SCL

LDO_LPGBT8
SGCPMU_CRN01
+1.4V_SLICE9-10
LPGBT8_VDD
R_1_M12 243
R_2_M12 10k
R_3_M12 510k
R_4_M12 1.2k
R_5_M12 1.2k
R190 1k
C29_M12 22u
C31_M12 DNP
C33_M12 22u
C34_M12 100n
C35_M12 DNP

C1_L11 2.2n
C2_L11 2.2n
C37_L11 10n
C63_L11 4.7n
C5_L11 100n
C6_L11 2.2n
C51_L11 2.2n
C66_L11 2.2n
C9_L11 2.2n
C10_L11 470p
C11_L11 2.2n
C12_L11 100n
C35_L11 100n
C41_L11 100n
C50_L11 100n
C56_L11 100n
C17_L11 4.7n
C18_L11 100n
C19_L11 100n
C20_L11 100n
C21_L11 4.7n
C57_L11 100n
C42_L11 10n
C49_L11 2.2n
C38_L11 2.2n
C39_L11 2.2n
C27_L11 100n
C28_L11 2.2n
C29_L11 100n
C30_L11 2.2n
C65_L11 470p
C40_L11 220p
C55_L11 220p
C58_L11 220p

LPGBT8-F
LPGBT_V1
ALFE_CP40N_S11
ALFE_CP40P_S11
ADC11_CP40_N
ADC11_CP40_P
ALFE_CP40N_S12
ALFE_CP40P_S12
ADC12_CP40_N
ADC12_CP40_P
LPGBT8-G
LPGBT_V1
M1_S
L1_S
TEST_MICROHAD
LPGBT8_HSOUTP
LPGBT8_HSOUTN

LPGBT8-H
LPGBT_V1
TSTCLKINN
TSTCLKINP

LPGBT8_VDD
R6_L11 2.2k
R5_L11 1.2k
R1_L11 2.2k
R2_L11 1.2k
R3_L11 2.2k
R4_L11 1.2k
LPGBT_M2SDA_L11
LPGBT_M2SCL_L11
LPGBT_M1SDA_L11
LPGBT_M1SCL_L11
LPGBT_M0SDA_L11
LPGBT_M0SCL_L11

U23
LTST-C190GKT
100
R_93
VTRX+_2P5
NMOS_L10
1k
R_122

PA12_+1.2V_MON
ADC10-12_RSTB
LPGBT_V1
LPGBT_M2SDA_L11
LPGBT_M2SCL_L11
LPGBT_M1SDA_L11
LPGBT_M1SCL_L11
LPGBT_M0SDA_L11
LPGBT_M0SCL_L11
EDOUTECN_L12
EDOUTECP_L12
EDOUTECP_L1-11
EDOUTECN_L1-11

MMM_TP
LPGBT_M2SDA_L11
LPGBT_M2SCL_L11
LPGBT_M1SDA_L11
LPGBT_M1SCL_L11
LPGBT_M0SDA_L11
LPGBT_M0SCL_L11

DRAWN: Jb	DATED: <Drawn Date>	COMPANY: Nevis Laboratories of Columbia University	
CHECKED: jb	DATED: <Checked Date>	TITLE: FEB2 prototype v2.0	
QUALITY CONTROL: jb	DATED: <QC Date>	CODE: jb2023	SIZE: C
RELEASED: jb	DATED: <Release Date>	DRAWING NO: 35	REV: v2.0
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REVISION RECORD			
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BAV99S D1_S13 — C1_S13 1u — CH0_PA_S13 — TOKO_IND 2I1_S13 — R1_S13 200 — IN_CH48 — TEST_MICROPAD TP3_S13
BAV99S D2_S13 — C2_S13 1u — CH3_PA_S13 — TOKO_IND 2I2_S13 — R2_S13 200 — IN_CH51 — TEST_MICROPAD TP4_S13
C93_S13 1u — CUR_1_ALFE_S13
C94_S13 1u — CUR_2_ALFE_S13 — ALFE_2P5_LEFT
C95_S13 1u — CUR_3_ALFE_S13
BAV70 D3_S13
BAV70 D4_S13
BAV99S D5_S13 — C3_S13 1u — CH1_PA_S13 — TOKO_IND 2I3_S13 — R3_S13 200 — IN_CH50 — TEST_MICROPAD TP1_S13
BAV99S D6_S13 — C4_S13 1u — CH2_PA_S13 — TOKO_IND 2I4_S13 — R4_S13 200 — IN_CH49 — TEST_MICROPAD TP2_S13
C96_S13 1u — N1MA2P5_10_S13
C97_S13 1u — VB_CMFB_SH_1_S13
C98_S13 1u — N1MA2P5_11_S13
C99_S13 1u — VB_FC_PA_11_S13
C100_S13 1u — N5UA_SH_1_S13
C101_S13 1u — N10UA_SH_1_S13
C102_S13 1u — N1UA_SH_1_S13

C60_S13 1u — N10UA_SH_0_S13
C65_S13 1u — VB_NAB_SH_0_S13
C72_S13 1u — VB_CMFB_SH_S13
C88_S13 1u — N5UA_SH_00_S13
C84_S13 1u — N1UA_SH_00_S13
C85_S13 100n
C86_S13 1u — VCM_SH_0_S13

C61_S13 1u — VB_FC_SH_0_S13
C66_S13 1u — VB_FC_PA1_S13
C69_S13 100n
C73_S13 1u — VCM_PA_1_S13
C87_S13 1u — N1MA2P5_PA_02_S13
C68_S13 100n
C89_S13 1u — VCM_SH_1_S13
C90_S13 1u — N1UA_SH_01_S13

C62_S13 1u — VB_FC_PA_00_S13
C67_S13 1u — N5UA_SH_01_S13
C74_S13 1u — VB_FC_SH_1_S13
C91_S13 1u — VB_IB_SH_1-S13
C92_S13 1u — VB_FC_PA_01_S13

PA_ADC_VDD_S13 — R_HPS_13 2M
C58_S13 1u — VB_IT_PA_S13
C63_S13 1u — VB_IT_SH_0_S13
C70_S13 1u — P1UA_SH_00_S13
C76_S13 1u — P1UA_SH_01_S13
C77_S13 1u — P5UA_SH_0_S13
C78_S13 1u — VB_IT_SH_1_S13
C103_S13 1u — VB_PAB_SH_S13
C108_S13 1u — P10UA_SH_0_S13
C109_S13 1u — P10UA_SH_1_S13

C59_S13 1u — VB_NAB_SH_1_S13
C64_S13 1u — N1MA2P5_PA_00_S13
C71_S13 1u — VB_IB_PA_S13
C79_S13 1u — N1MA2P5_PA_01_S13
C80_S13 100n
C81_S13 1u — VCM_PA_0_S13
C82_S13 1u — VB_IB_SH_0_S13
C104_S13 1u — P5UA_SH_01_S13
C105_S13 1u — P5UA_SH_00_S13
C106_S13 1u — P1UA_SH_1_S13
C107_S13 1u — VB_PAB_SH_1_S13

PA_ADC_VDD_S13
ALFE_2P5_LEFT
2P5_ALFE_S13

PA13-C ALFEV2_BGA: VDD1P2_PA_0 C3 … VDD1P2_PA_14 M3; VDD2P5_PA_0 D6 … VDD2P5_PA_7 K6; VDD1P2_DAC_0 D8 … VDD1P2_DAC_1 D9; VDD1P2_SH_LG_0 B10 … VDD1P2_SH_LG_7 L11; VDD1P2_SH_HG<0> C10 … VDD1P2_SH_HG<7> G11; VDD1P2_SH_TS_1 G12; VDD1P2_SH_TS_2

PA13-D: D5 VDD2P5ESD_TOP; K5 VDD2P5_ESD_BOT; E5 PA_ESD_0; J5 PA_ESD_1; ALFEV2_BGA; J7 SH_ESD_0; K7 SH_ESD_1

CH3_PA_S13 — M1 IN3_1, L1 IN3_0
CH1_PA_S13 — J1 IN2_1, I1 IN2_0
CH2_PA_S13 — F1 IN1_1, E1 IN1_0
CH0_PA_S13 — C1 IN0_1, B1 IN0_0
ALFEV2_BGA — PA13-E

ALFE_CP40N_S13 — R6_S13 10k — PA_ADC_VDD_S13
ALFE_CP40P_S13 — R5_S13 100 — A9 CK40_N, A8 CK40_P
R7_S13 10k
LPGBT_M1SCL_L13 — A11 I2C_SCL
LPGBT_M1SDA_L13 — A10 I2C_SDA
ALFEV2_BGA
A12 I2C_EN
PA13-15_RSTB — B7 I2C_ERROR, A7 I2C_RSTB
ALFE_CID_3_S13 — M12 I2C_ADDR<3>
ALFE_CID_2_S13 — M11 I2C_ADDR<2>
ALFE_CID_1_S13 — N11 I2C_ADDR<1>
ALFE_CID_0_S13 — N10 I2C_ADDR<0>
PA13-F

PA13-B: OUTP_LG<0> B13, OUTN_LG<0> B14 — R12_S13 50 — LGP<0>_S13, LGN<0>_S13
OUTP_LG<1> F13, OUTN_LG<1> F14 — R13_S13 50 — R21-S13 50 — LGP<1>_S13, LGN<1>_S13
OUTP_LG<2> H13, OUTN_LG<2> H14 — R14_S13 50 — R20_S13 50 — LGP<2>_S13, LGN<2>_S13
OUTP_LG<3> L13, OUTN_LG<3> L14 — R15_S13 50 — R8_S13 50 — LGP<3>_S13, LGN<3>_S13
OUTP_HG<0> C13, OUTN_HG<0> C14 — R10_S13 50 — R18_S13 50 — HGP<0>_S13, HGN<0>_S13
OUTP_HG<1> E13, OUTN_HG<1> E14 — R19_S13 50 — R22_S13 50 — HGP<1>_S13, HGN<1>_S13
OUTP_HG<2> I13, OUTN_HG<2> I14 — R9_S13 50 — R23_S13 50 — HGP<2>_S13, HGN<2>_S13
OUTP_HG<3> K13, OUTN_HG<3> K14 — R11_S13 50 — R16_S13 50 — R17_S13 50 — HGP<3>_S13, HGN<3>_S13
OUTP_SUM N13 — OUTP_SUM_S13
OUTN_SUM N14 — OUTN_SUM_S13
ALFEV2_BGA

PA13-G ALFEV2_BGA

N1MA2P5_PA_00_S13, N1MA2P5_PA_01_S13	A2, G2, N2	N1MA2P5_PA<0_0>, N1MA2P5_PA<0_1>, N1MA2P5_PA<0_2>
N1MA2P5_PA_02_S13		
N1MA2P5_10_S13, N1MA2P5_11_S13	C4, L4	N1MA2P5_PA<1_0>, N1MA2P5_PA<1_1>
VB_FC_PA_00_S13, VB_FC_PA_01_S13	A3, N4	VB_FC_PA<0_0>, VB_FC_PA<0_1>
VB_FC_PA1_S13, VB_FC_PA_11_S13	C5, N3	VB_FC_PA<1_0>, VB_FC_PA<1_1>
VB_IB_PA_S13	H2	VB_IB_PA
VCM_PA_0_S13, VCM_PA_1_S13	B3, M4	VCM_PA_0, VCM_PA_1
N1UA_SH_00_S13, N1UA_SH_01_S13	A6, L9	N1UA_SH<0_0>, N1UA_SH<0_1>
N1UA_SH_1_S13	B6	N1UA_SH<1>
N5UA_SH_00_S13, N5UA_SH_01_S13	A5, L8	N5UA_SH<0_0>, N5UA_SH<0_1>
N5UA_SH_1_S13	B5	N5UA_SH<1>
N10UA_SH_0_S13, N10UA_SH_1_S13	N7, N6	N10UA_SH<0>, N10UA_SH<1>
VB_FC_SH_0_S13, VB_FC_SH_1_S13	A4, M6	VB_FC_SH<0>, VB_FC_SH<1>
VB_IB_SH_0_S13, VB_IB_SH_1-S13	B4, M5	VB_IB_SH_0, VB_IB_SH_1
VB_CMFB_SH_S13, VB_CMFB_SH_1_S13	B8, N5	VB_CMFB_SH_0, VB_CMFB_SH_1
VB_NAB_SH_0_S13, VB_NAB_SH_1_S13	B9, M7	VB_NAB_SH_0, VB_NAB_SH_1
VCM_SH_0_S13, VCM_SH_1_S13	D12, M10	VCM_SH_0, VCM_SH_1

P10UA_SH<1>	G9	P10UA_SH_1_S13
P10UA_SH<0>	G10	P10UA_SH_0_S13
P5UA_SH<0>	F8	P5UA_SH_0_S13
P5UA_SH<0_1>	M9	P5UA_SH_01_S13
P5UA_SH<0_0>	F9	P5UA_SH_00_S13
P1UA_SH<1>	H8	P1UA_SH_1_S13
P1UA_SH<0_1>	N9	P1UA_SH_01_S13
P1UA_SH<0_0>	H9	P1UA_SH_00_S13
VB_IT_SH_1	N8	VB_IT_SH_1_S13
VB_IT_SH_0	D7	VB_IT_SH_0_S13
VB_PAB_SH<0>	M8	VB_PAB_SH_S13
VB_PAB_SH<1>	C8	VB_PAB_SH_1_S13
VB_IT_PA	G3	VB_IT_PA_S13
VB_FB0_IDCP_PA_1	L5	VB_FB0_IDCP_PA_1_S13
VB_FB0_IDCP_PA_0	C6	VB_FB0_IDCP_PA_0_S13
N1MAI_SH	C7	CUR_3_ALFE_S13
P1MAI_2P5_PA	E4	CUR_2_ALFE_S13
N1MAI_PA	H3	CUR_1_ALFE_S13
EXT_VREF_DAC	J12	R24_S13 887 — PA_ADC_VDD_S13; R25_S13 324

ALFE_2P5_LEFT — C68_S13 1u — VB_FB0_IDCP_PA_0_S13
ALFE_2P5_LEFT — C75_S13 1u — VB_FB0_IDCP_PA_1_S13

PA13-A ALFEV2_BGA: VSS_GND1 A1 … VSS_GND59 N12

DRAWN: Jb	DATED: <Drawn Date>	COMPANY: Nevis Laboratories of Columbia University	
CHECKED: jb	DATED: <Checked Date>	TITLE: FEB2 prototype v2.0	
QUALITY CONTROL: jb	DATED: <QC Date>	CODE: jb2023	SIZE: C
RELEASED: jb	DATED: <Release Date>	DRAWING NO: 35	REV: v2.0
		SCALE: <Scale>	SHEET: 54 OF 154

REVISION RECORD			
LTR	ECO NO:	APPROVED:	DATE:

BAV99S D1_S14 — C1_S14 1u — CH0_PA_S14 — TOKO_IND 1 2 I1_S14 — R1_S14 200 — IN_CH52 — U10_S HST_MICROPAD
BAV99S D2_S14 — C2_S14 1u — CH3_PA_S14 — TOKO_IND 1 2 I2_S14 — R2_S14 200 — IN_CH55 — U13_S HST_MICROPAD
BAV70 D3_S14
BAV70 D4_S14
BAV99S D5_S14 — C3_S14 1u — CH1_PA_S14 — TOKO_IND 1 2 I3_S14 — R3_S14 200 — IN_CH54 — U11_S HST_MICROPAD
BAV99S D6_S14 — C4_S14 1u — CH2_PA_S14 — TOKO_IND 1 2 I4_S14 — R4_S14 200 — IN_CH53 — U12_S HST_MICROPAD

C93_S14 1u — CUR_1_ALFE_S14
C94_S14 1u — CUR_2_ALFE_S14 — ALFE_2P5_LEFT
C95_S14 1u — CUR_3_ALFE_S14

C96_S14 1u — N1MA2P5_10_S14
C97_S14 1u — VB_CMFB_SH_1_S14
C98_S14 1u — N1MA2P5_11_S14
C99_S14 1u — VB_FC_PA_11_S14
C100_S14 1u — N5UA_SH_1_S14
C101_S14 1u — N10UA_SH_1_S14
C102_S14 1u — N1UA_SH_1_S14

C60_S14 1u — N10UA_SH_0_S14
C63_S14 1u — VB_NAB_SH_0_S14
C72_S14 1u — VB_CMFB_SH_S14
C83_S14 1u — N5UA_SH_00_S14
C84_S14 1u — N1UA_SH_00_S14
C85_S14 100n
C86_S14 1u — VCM_SH_0_S14

C61_S14 1u — VB_FC_SH_0_S14
C66_S14 1u — VB_FC_PA1_S14
C69_S14 100n
C73_S14 1u — VCM_PA_1_S14
C87_S14 1u — N1MA2P5_PA_02_S14
C88_S14 100n
C89_S14 1u — VCM_SH_1_S14
C90_S14 1u — N1UA_SH_01_S14

C62_S14 1u — VB_FC_PA_00_S14
C67_S14 1u — N5UA_SH_01_S14
C74_S14 1u — VB_FC_SH_1_S14
C91_S14 1u — VB_IB_SH_1-S14
C92_S14 1u — VB_FC_PA_01_S14

PA_ADC_VDD_S14 — R_HPS_14 2M — C58_S14 1u — VB_IT_PA_S14
C63_S14 1u — VB_IT_SH_0_S14
C70_S14 1u — P1UA_SH_00_S14
C76_S14 1u — P1UA_SH_01_S14
C77_S14 1u — P5UA_SH_0_S14
C78_S14 1u — VB_IT_SH_1_S14
C103_S14 1u — VB_PAB_SH_S14
C108_S14 1u — P10UA_SH_0_S14
C109_S14 1u — P10UA_SH_1_S14

C59_S14 1u — VB_NAB_SH_1_S14
C64_S14 1u — N1MA2P5_PA_00_S14
C71_S14 1u — VB_IB_PA_S14
C79_S14 1u — N1MA2P5_PA_01_S14
C80_S14 100n
C81_S14 1u — VCM_PA_0_S14
C82_S14 1u — VB_IB_SH_0_S14
C104_S14 1u — P5UA_SH_01_S14
C105_S14 1u — P5UA_SH_00_S14
C106_S14 1u — P1UA_SH_1_S14
C107_S14 1u — VB_PAB_SH_1_S14

PA_ADC_VDD_S14
ALFE_2P5_LEFT
2P5_ALFE_S14

PA14-C ALFEV2_BGA

VDD1P2_PA_0	C3	VDD2P5_PA_0	D6	VDD2P5_DAC_0	D8	VDD1P2_DAC_0	D9	VDD1P2_SH_LLG_0	B10	VDD1P2_SH_HG<0>	C10
VDD1P2_PA_1	D2	VDD2P5_PA_1	E6	VDD2P5_DAC_1	E8	VDD1P2_DAC_1	E9	VDD1P2_SH_LLG_1	B11	VDD1P2_SH_HG<1>	C11
VDD1P2_PA_2	E3	VDD2P5_PA_2	F6					VDD1P2_SH_LLG_2	F10	VDD1P2_SH_HG<2>	E10
VDD1P2_PA_3	F3	VDD2P5_PA_3	G6					VDD1P2_SH_LLG_3	F11	VDD1P2_SH_HG<3>	E11
VDD1P2_PA_4	F4	VDD2P5_PA_4	H6					VDD1P2_SH_LLG_4	H10	VDD1P2_SH_HG<4>	H10
VDD1P2_PA_5	G4	VDD2P5_PA_5	J6					VDD1P2_SH_LLG_5	H11	VDD1P2_SH_HG<5>	H11
VDD1P2_PA_6	H4	VDD2P5_PA_6	K6					VDD1P2_SH_LLG_6	L10	VDD1P2_SH_HG<6>	K10
VDD1P2_PA_7	J4	VDD2P5_PA_7	K5					VDD1P2_SH_LLG_7	L11	VDD1P2_SH_HG<7>	K11
VDD1P2_PA_8	J3										
VDD1P2_PA_9	K3										
VDD1P2_PA_10	J5										
VDD1P2_PA_11	K2										
VDD1P2_PA_12	L3										
VDD1P2_PA_13	M3										
VDD1P2_PA_14											

VDD1P2_SH_HG<0>	C10	VDD1P2_SH_HG<8>	G11	VDD2P5_SH_HG<0>	D11	VDD2P5_SH_HG<8>	G10	VDD2P5_SH_LLG_0	B9	VDD2P5_SH_LLG_8	A10	VDD2P5_SH_TS_1	G11
VDD1P2_SH_HG<1>	C11	VDD1P2_SH_HG<9>	G12	VDD2P5_SH_HG<1>	E11	VDD2P5_SH_HG<9>	G9	VDD2P5_SH_LLG_1	B8	VDD2P5_SH_LLG_9	A9	VDD2P5_SH_TS_2	G12
VDD1P2_SH_HG<2>	E10	VDD1P2_SH_HG<10>	K11	VDD2P5_SH_HG<2>	E12	VDD2P5_SH_HG<10>	K9	VDD2P5_SH_LLG_2	F9	VDD2P5_SH_LLG_10	A8		
VDD1P2_SH_HG<3>	E11	VDD1P2_SH_HG<11>	K12	VDD2P5_SH_HG<3>	F11	VDD2P5_SH_HG<11>	K8	VDD2P5_SH_LLG_3	F8	VDD2P5_SH_LLG_11	A7		
VDD1P2_SH_HG<4>	H10	VDD1P2_SH_HG<12>	L12	VDD2P5_SH_HG<4>	H11	VDD2P5_SH_HG<12>	L9	VDD2P5_SH_LLG_4	H9	VDD2P5_SH_LLG_12	A6		
VDD1P2_SH_HG<5>	H11	VDD1P2_SH_HG<13>	M2	VDD2P5_SH_HG<5>	H12	VDD2P5_SH_HG<13>	M1	VDD2P5_SH_LLG_5	H8	VDD2P5_SH_LLG_13	A5		
VDD1P2_SH_HG<6>	K10	VDD1P2_SH_HG<14>	M3	VDD2P5_SH_HG<6>	K11	VDD2P5_SH_HG<14>	M4	VDD2P5_SH_LLG_6	J8	VDD2P5_SH_LLG_14	A4		
VDD1P2_SH_HG<7>	K11	VDD1P2_SH_HG<15>	N1	VDD2P5_SH_HG<7>	K12	VDD2P5_SH_HG<15>	N2	VDD2P5_SH_LLG_7	J9	VDD2P5_SH_LLG_15	A3		

PA14-D
D5 VDD2P5ESD_TOP
K5 VDD2P5_ESD_BOT
E5 PA_ESD_0
J5 PA_ESD_1
ALFEV2_BGA
J7 SH_ESD_0
K7 SH_ESD_1

PA14-B

OUTP_LG<0>	B13	R12_S14 50	LGP<0>_S14
OUTN_LG<0>	B14	R13_S14 50	LGN<0>_S14
OUTP_LG<1>	F13	R21_S14 50	LGP<1>_S14
OUTN_LG<1>	F14	R20_S14 50	LGN<1>_S14
OUTP_LG<2>	H13	R14_S14 50	LGP<2>_S14
OUTN_LG<2>	H14	R15_S14 50	LGN<2>_S14
OUTP_LG<3>	L13	R8_S14 50	LGP<3>_S14
OUTN_LG<3>	L14	R10_S14 50	LGN<3>_S14
OUTP_HG<0>	C13	R18_S14 50	HGP<0>_S14
OUTN_HG<0>	C14	R19_S14 50	HGN<0>_S14
OUTP_HG<1>	E13	R22_S14 50	HGP<1>_S14
OUTN_HG<1>	E14	R23_S14 50	HGN<1>_S14
OUTP_HG<2>	I13	R9_S14 50	HGP<2>_S14
OUTN_HG<2>	I14	R11_S14 50	HGN<2>_S14
OUTP_HG<3>	K13	R16_S14 50	HGP<3>_S14
OUTN_HG<3>	K14	R17_S14 50	HGN<3>_S14
OUTP_SUM	N13		OUTP_SUM_S14
OUTN_SUM	N14		OUTN_SUM_S14

ALFEV2_BGA

CH3_PA_S14 — M1 L1 — IN3_1 IN3_0
CH1_PA_S14 — J1 I1 — IN2_1 IN2_0
CH2_PA_S14 — F1 E1 — IN1_1 IN1_0
CH0_PA_S14 — C1 B1 — IN0_1 IN0_0
ALFEV2_BGA
PA14-E

PA_ADC_VDD_S14
ALFE_CP40N_S14 — R6_S14 10k
ALFE_CP40P_S14 — R5_S14 100 — A9 CK40_N, A8 CK40_P — R7_S14 10k

LPGBT_M0SCL_L14 — A11 I2C_SCL
LPGBT_M0SDA_L14 — A10 I2C_SDA
ALFEV2_BGA
PA13-15_RSTB — A12 I2C_EN, B7 I2C_ERROR, A7 I2C_RSTB
ALFE_CID_3_S14 — M12 I2C_ADDR<3>
ALFE_CID_2_S14 — M11 I2C_ADDR<2>
ALFE_CID_1_S14 — N11 I2C_ADDR<1>
ALFE_CID_0_S14 — N10 I2C_ADDR<0>
PA14-F

PA14-G ALFEV2_BGA

N1MA2P5_PA_00_S14	A2	N1MA2P5_PA<0_0>	P10UA_SH<1>	G9	P10UA_SH_1_S14
N1MA2P5_PA_01_S14	G2	N1MA2P5_PA<0_1>	P10UA_SH<0>	G10	P10UA_SH_0_S14
N1MA2P5_PA_02_S14	N2	N1MA2P5_PA<0_2>	P5UA_SH<0>	F8	P5UA_SH_0_S14
N1MA2P5_10_S14	C4	N1MA2P5_PA<1_0>	P5UA_SH<0_1>	M9	P5UA_SH_01_S14
N1MA2P5_11_S14	L4	N1MA2P5_PA<1_1>	P5UA_SH<0_0>	F9	P5UA_SH_00_S14
VB_FC_PA_00_S14	A3	VB_FC_PA<0_0>	P1UA_SH<1>	H8	P1UA_SH_1_S14
VB_FC_PA_01_S14	N4	VB_FC_PA<0_1>	P1UA_SH<0_1>	N9	P1UA_SH_01_S14
VB_FC_PA1_S14	C5	VB_FC_PA<1_0>	P1UA_SH<0_0>	H9	P1UA_SH_00_S14
VB_FC_PA_11_S14	N3	VB_FC_PA<1_1>	VB_IT_SH_1	N8	VB_IT_SH_1_S14
VB_IB_PA_S14	H2	VB_IB_PA	VB_IT_SH_0	D7	VB_IT_SH_0_S14
VCM_PA_0_S14	B3	VCM_PA_0	VB_PAB_SH<0>	M8	VB_PAB_SH_S14
VCM_PA_1_S14	M4	VCM_PA_1	VB_PAB_SH<1>	C8	VB_PAB_SH_1_S14
N1UA_SH_00_S14	A6	N1UA_SH<0_0>	VB_IT_PA	G3	VB_IT_PA_S14
N1UA_SH_01_S14	L9	N1UA_SH<0_1>	VB_FB0_IDCP_PA_1	L5	VB_FB0_IDCP_PA_1_S14
N1UA_SH_1_S14	B6	N1UA_SH<1>	VB_FB0_IDCP_PA_0	C6	VB_FB0_IDCP_PA_0_S14
N5UA_SH_00_S14	A5	N5UA_SH<0_0>	N1MAI_SH	C7	CUR_3_ALFE_S14
N5UA_SH_01_S14	L8	N5UA_SH<0_1>	P1MAI_2P5_PA	E4	CUR_2_ALFE_S14
N5UA_SH_1_S14	B5	N5UA_SH<1>	N1MAI_PA	H3	CUR_1_ALFE_S14
N10UA_SH_0_S14	N7	N10UA_SH<0>	EXT_VREF_DAC	J12	R24_S14 887 — PA_ADC_VDD_S14
N10UA_SH_1_S14	N6	N10UA_SH<1>			R25_S14 324
VB_FC_SH_0_S14	A4	VB_FC_SH<0>			
VB_FC_SH_1_S14	M6	VB_FC_SH<1>			
VB_IB_SH_0_S14	B4	VB_IB_SH_0			
VB_IB_SH_1-S14	M5	VB_IB_SH_1			
VB_CMFB_SH_S14	B8	VB_CMFB_SH_0			
VB_CMFB_SH_1_S14	N5	VB_CMFB_SH_1			
VB_NAB_SH_0_S14	B9	VB_NAB_SH_0			
VB_NAB_SH_1_S14	M7	VB_NAB_SH_1			
VCM_SH_0_S14	D12	VCM_SH_0			
VCM_SH_1_S14	M10	VCM_SH_1			

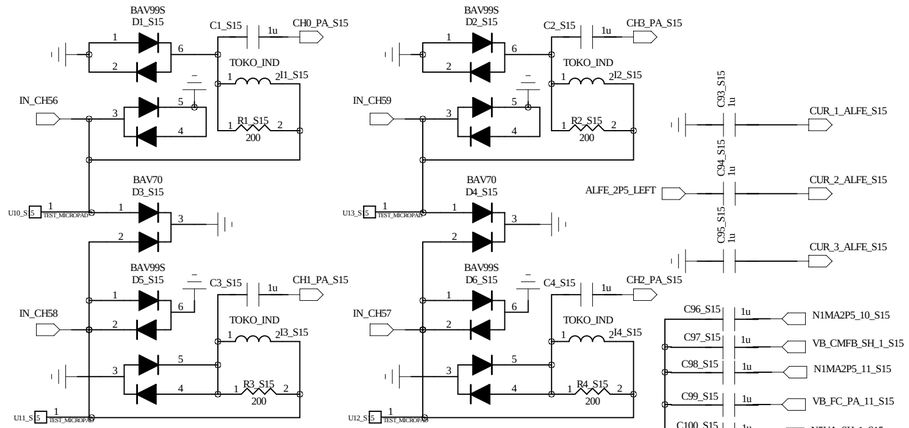
ALFE_2P5_LEFT — C68_S14 1u — VB_FB0_IDCP_PA_0_S14
ALFE_2P5_LEFT — C75_S14 1u — VB_FB0_IDCP_PA_1_S14

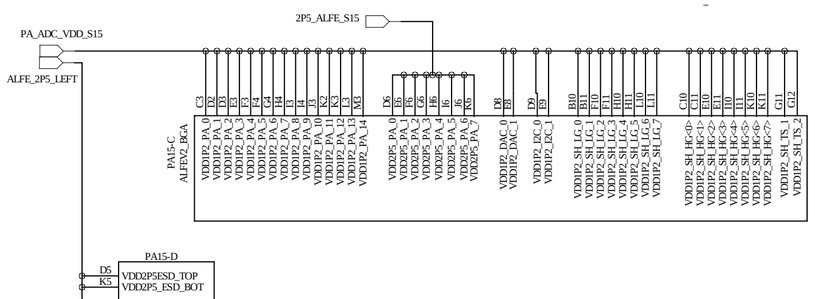
PA14-A ALFEV2_BGA

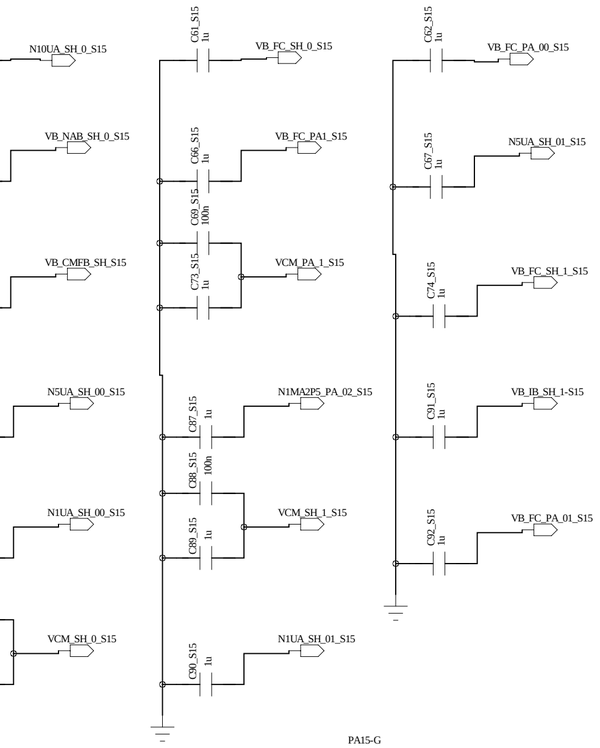
VSS_GND1	A1	VSS_GND11	D14	VSS_GND21	F1	VSS_GND31	H12	VSS_GND41	J10	VSS_GND51	L7	VSS_GND61	N13
VSS_GND2	A13	VSS_GND12	C12	VSS_GND22	G5	VSS_GND32	H7	VSS_GND42	J11	VSS_GND52	L8	VSS_GND62	N14
VSS_GND3	A14	VSS_GND13	E2	VSS_GND23	G8	VSS_GND33	H5	VSS_GND43	J13	VSS_GND53	L12		
VSS_GND4	B2	VSS_GND14	E7	VSS_GND24	G14	VSS_GND34	J2	VSS_GND44	J14	VSS_GND54	M2		
VSS_GND5	B12	VSS_GND15	F2	VSS_GND25	H1	VSS_GND35	J7	VSS_GND45	K1	VSS_GND55	M13		
VSS_GND6	C3	VSS_GND16	F5	VSS_GND26	H6	VSS_GND36	J8	VSS_GND46	K4	VSS_GND56	N1		
VSS_GND7	D1	VSS_GND17	F7	VSS_GND27	H8	VSS_GND37	J9	VSS_GND47	K9	VSS_GND57	N4		
VSS_GND8	D4	VSS_GND18	F12	VSS_GND28	H9	VSS_GND38	J12	VSS_GND48	K12	VSS_GND58	N12		
VSS_GND9	D10	VSS_GND19	F14	VSS_GND29	H14	VSS_GND39	K2	VSS_GND49	L2	VSS_GND59			
VSS_GND10	D11	VSS_GND20	G1	VSS_GND30	H2	VSS_GND40	K7	VSS_GND50	L6	VSS_GND60			

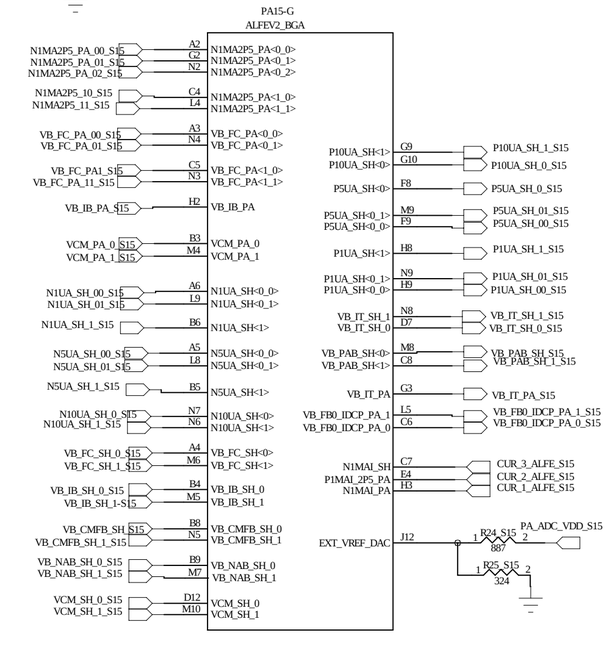
COMPANY:	Nevis Laboratories of Columbia University		
TITLE:	FEB2 prototype v2.0		
DRAWN: Jb	DATED: <Drawn Date>	CODE: jb2023	SIZE: C
CHECKED: jb	DATED: <Checked Date>	DRAWING NO: 35	REV: v2.0
QUALITY CONTROL: jb	DATED: <QC Date>	SCALE: <Scale>	SHEET: 55 of 154
RELEASED: jb	DATED: <Release Date>		

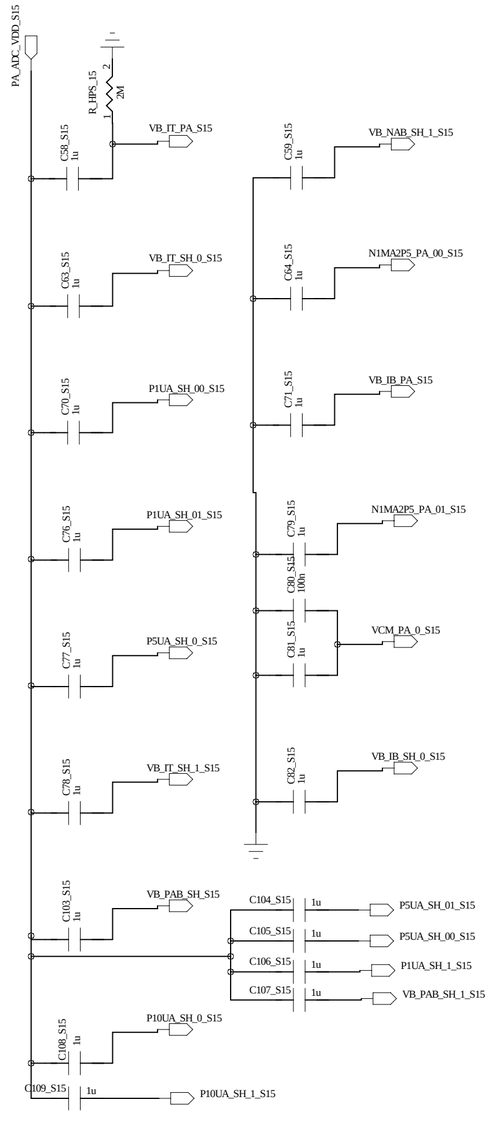
REVISION RECORD			
LTR	ECO NO:	APPROVED:	DATE:

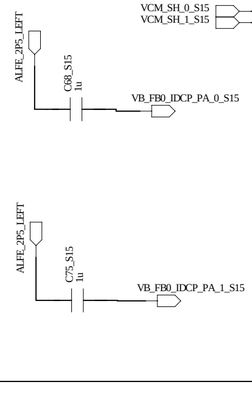


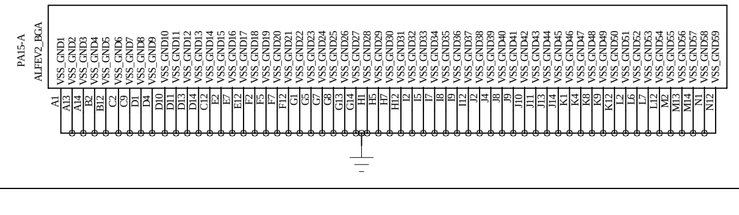












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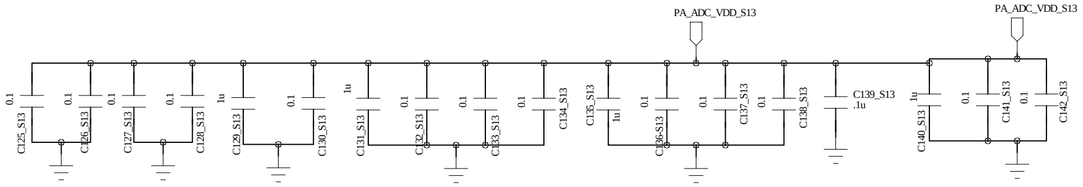

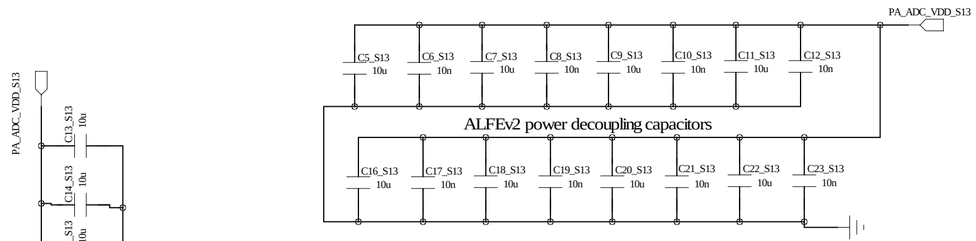

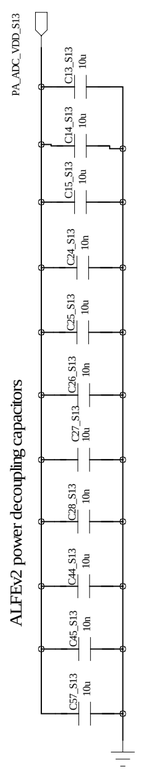

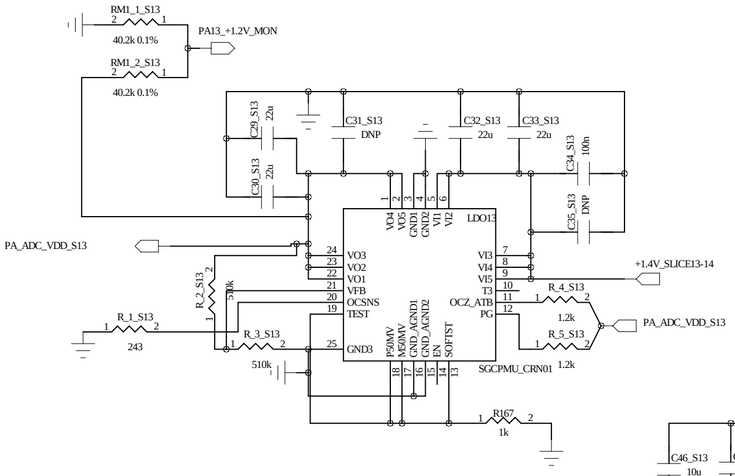

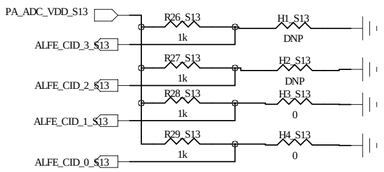

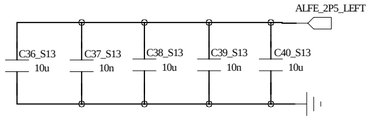

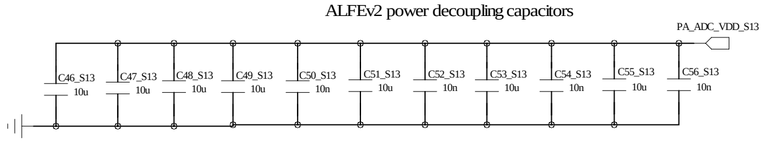

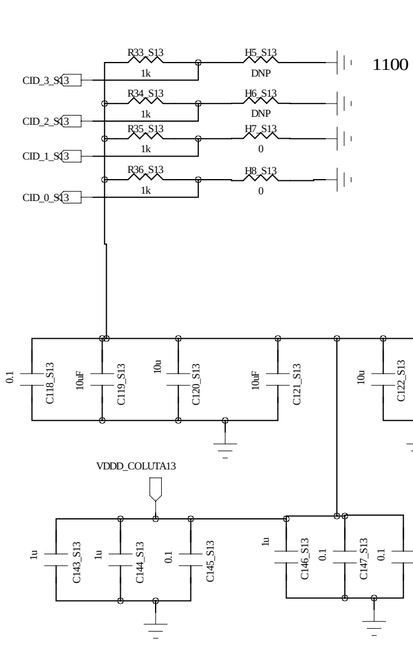

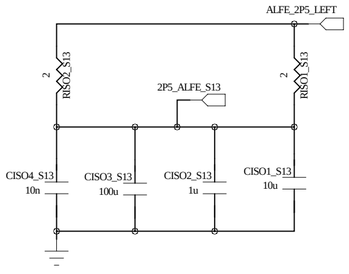

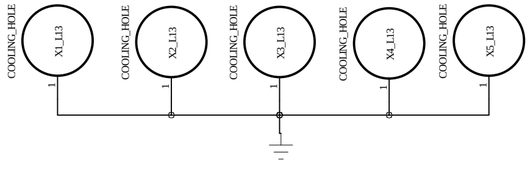

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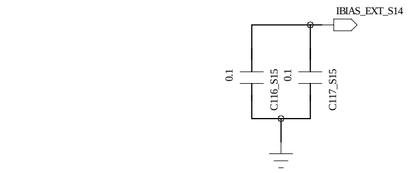

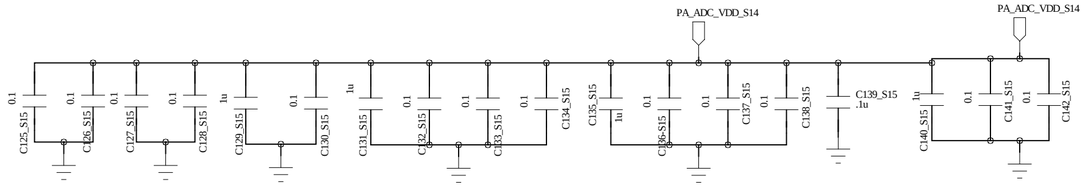

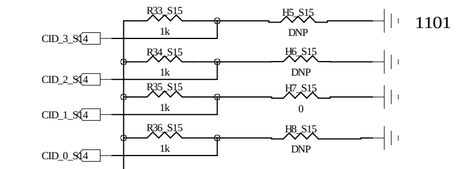

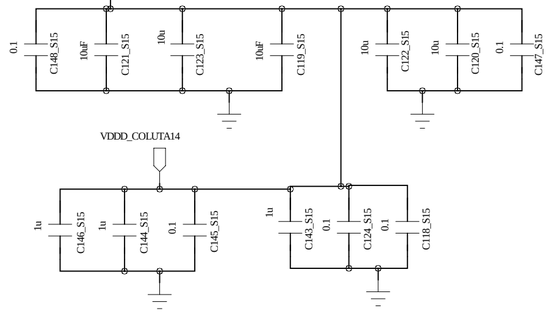

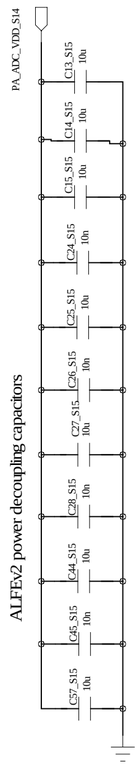

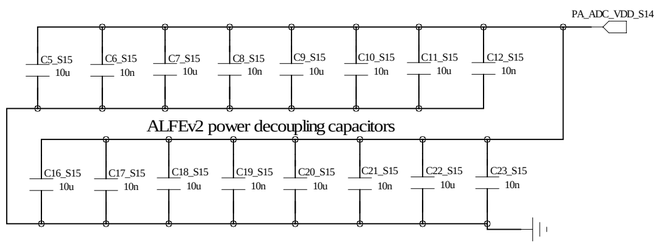

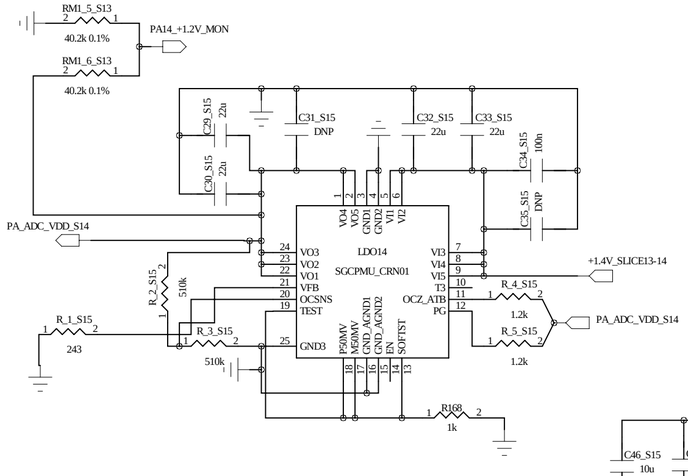

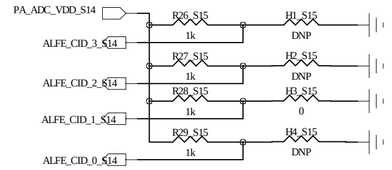

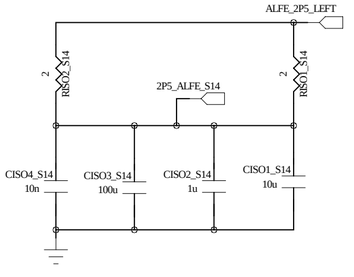

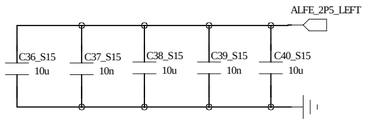

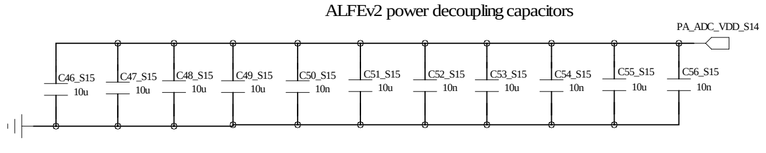

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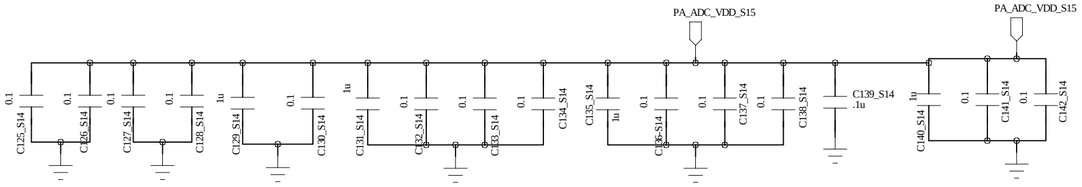

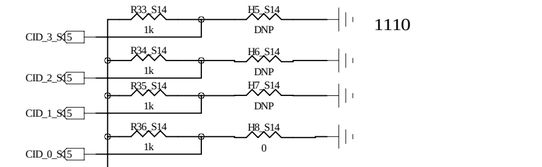

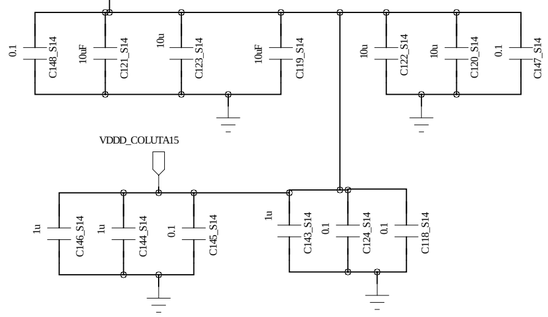

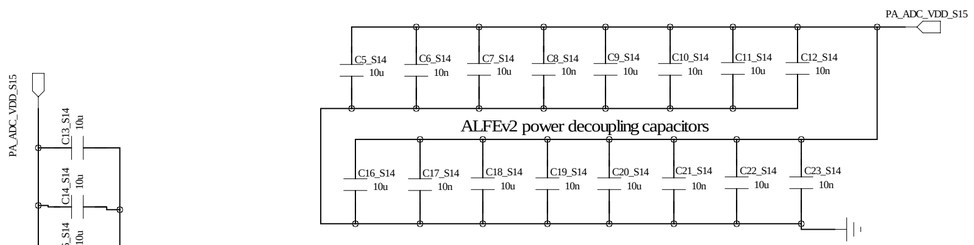

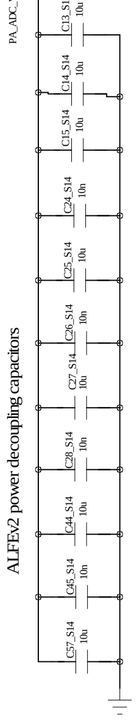

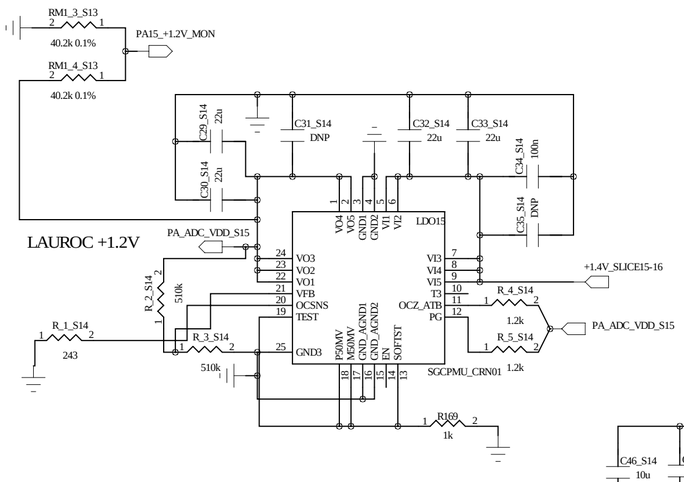

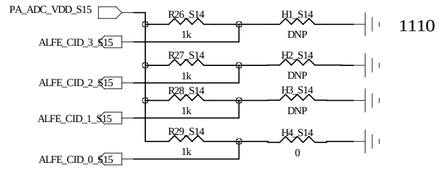

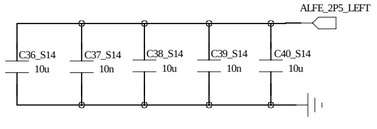

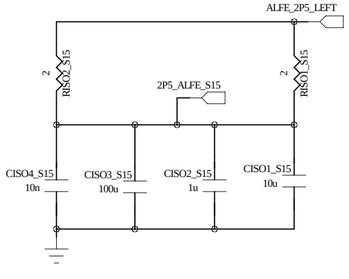

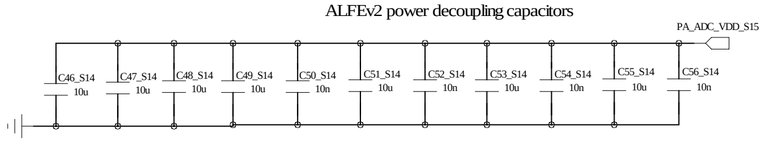

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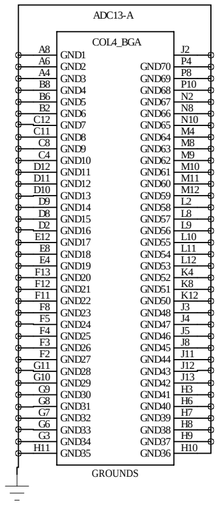

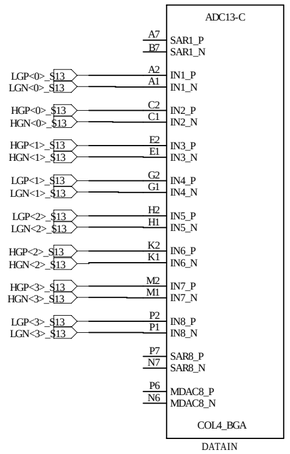

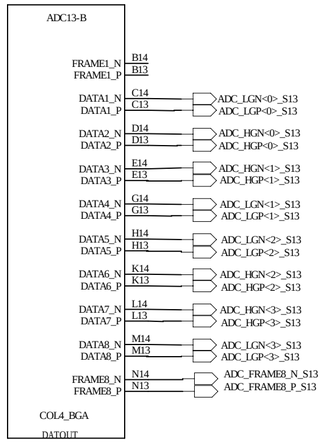

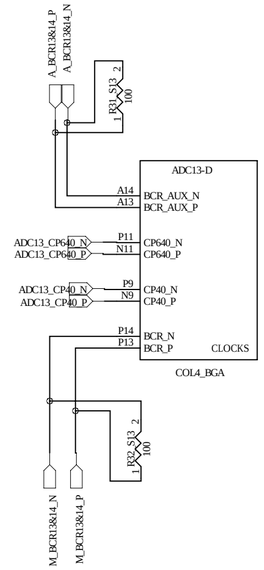

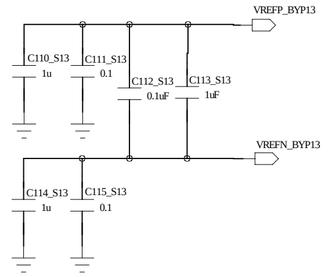

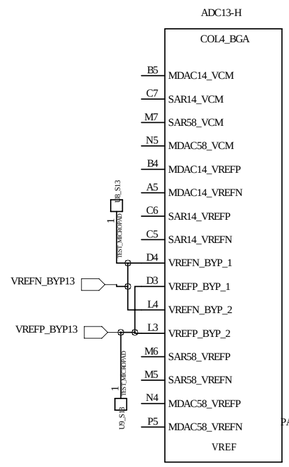

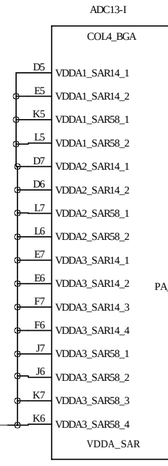

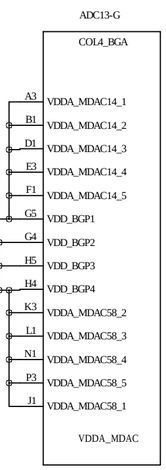

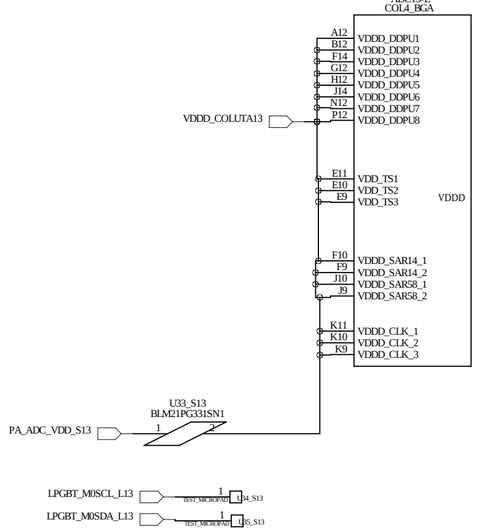

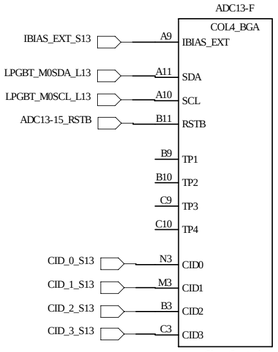

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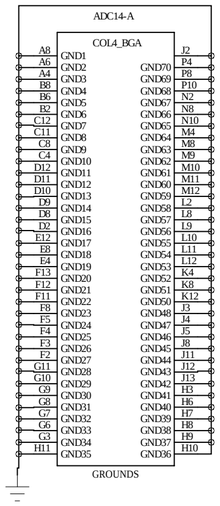

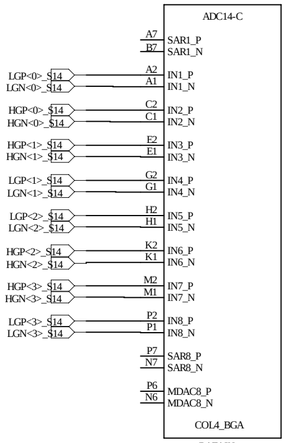

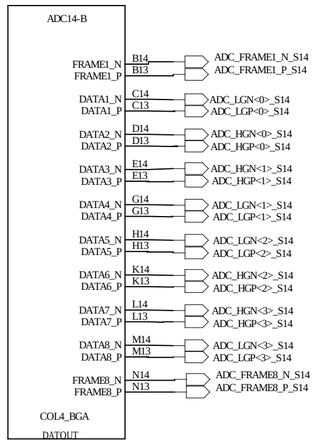

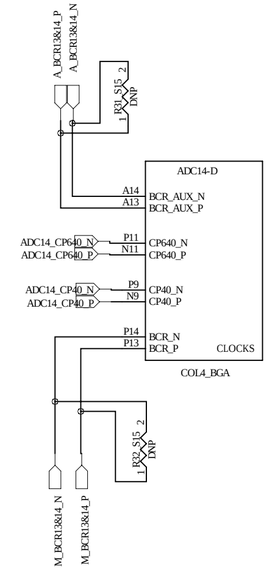

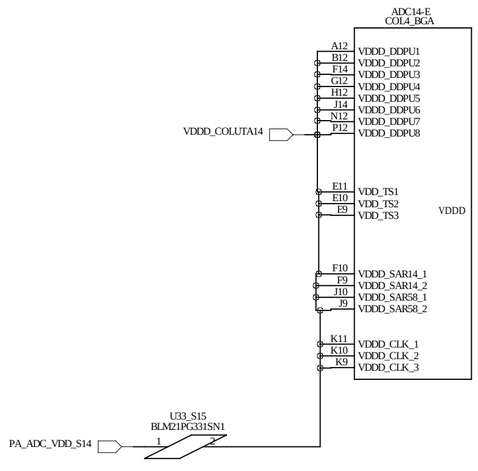

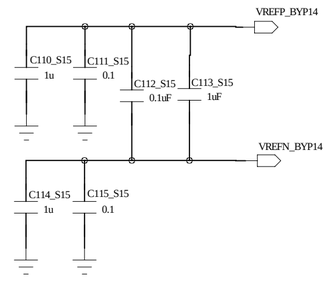

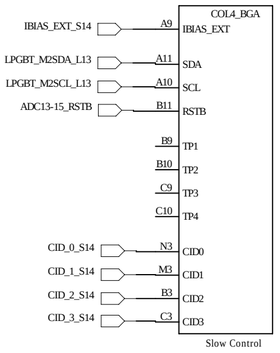

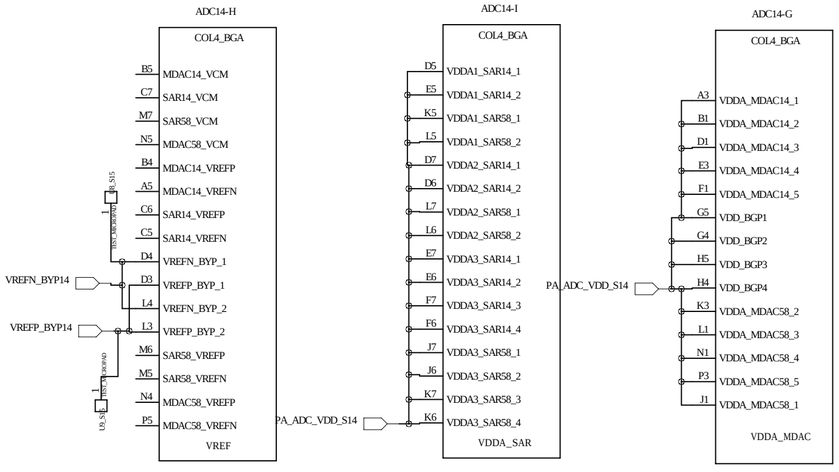

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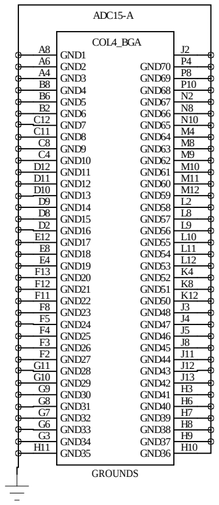

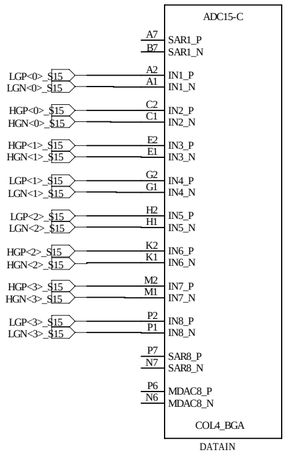

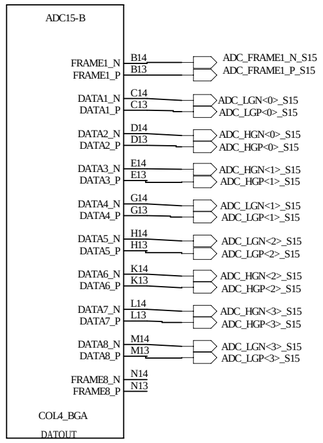

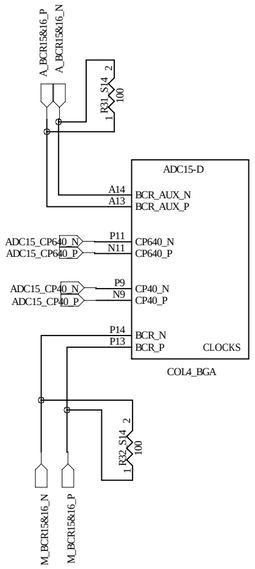

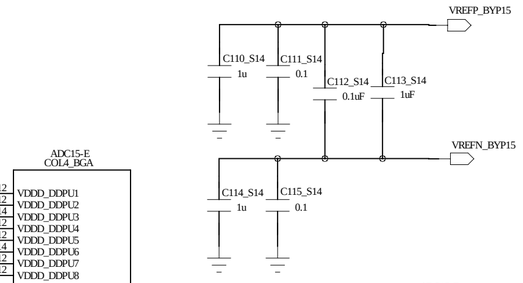

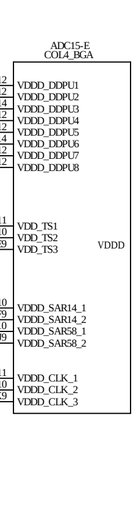

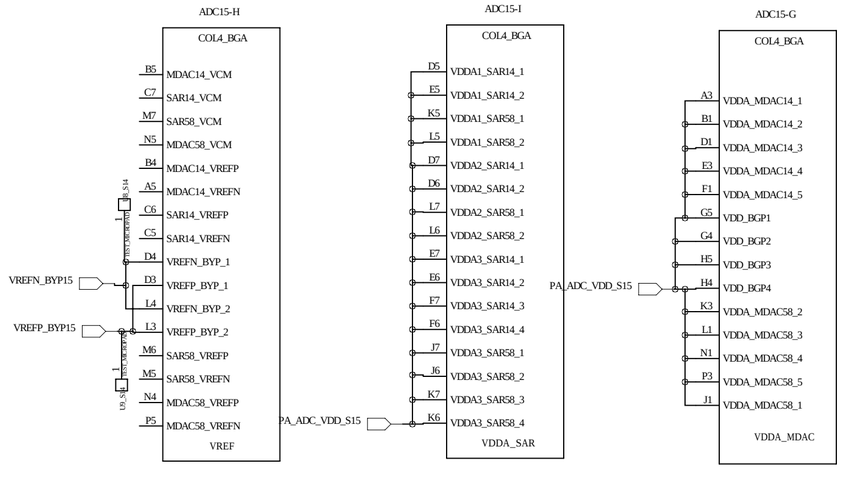

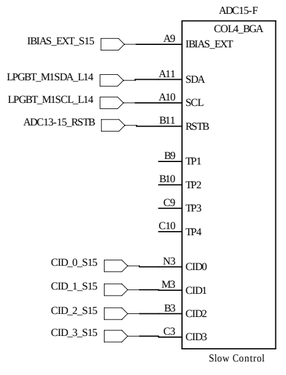

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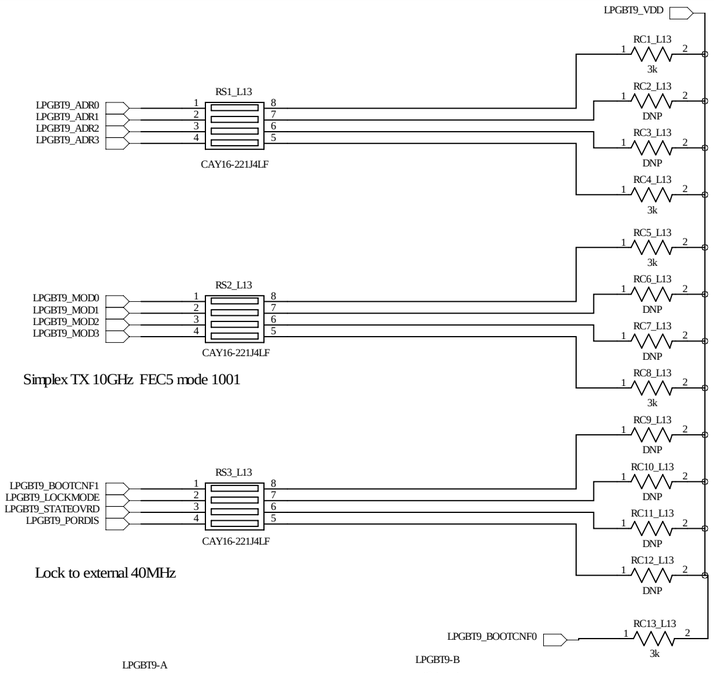
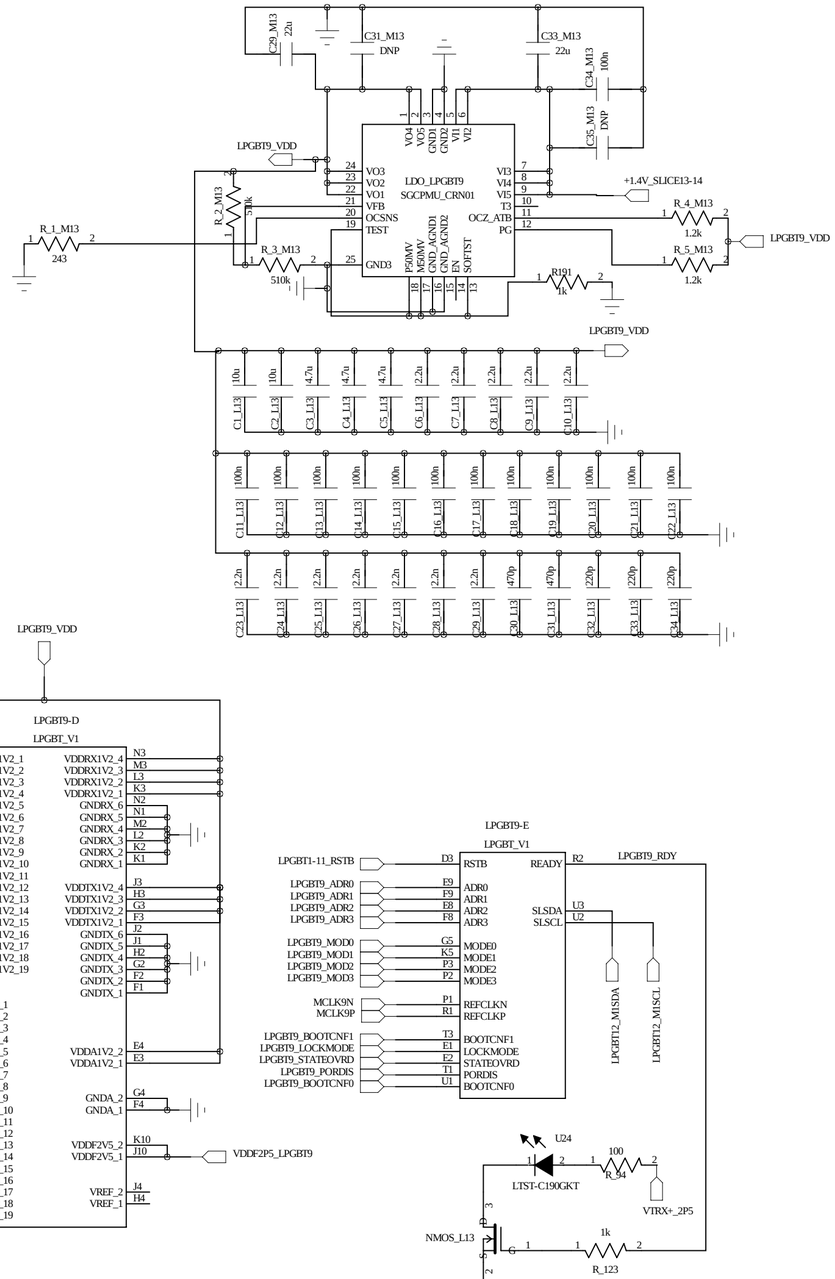
QUALITY CONTROL: jb	DATED: <QC Date>	CODE: jb2023	SIZE: C
RELEASED: jb	DATED: <Release Date>	DRAWING NO: 35	REV: v2.0
		SCALE: <Scale>	SHEET: 0f62 154

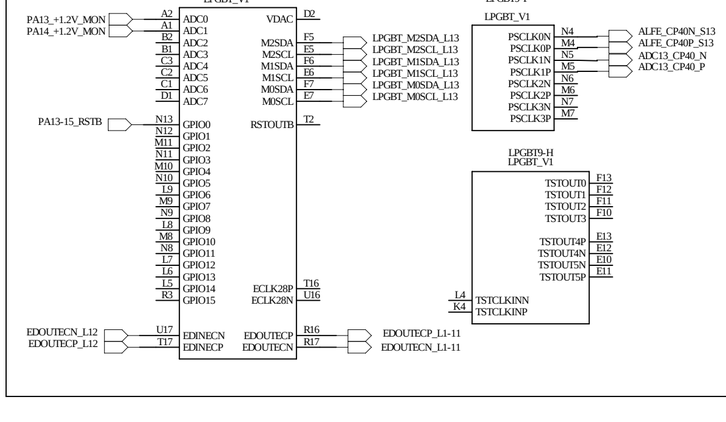
REVISION RECORD			
LTR	ECO NO:	APPROVED:	DATE:

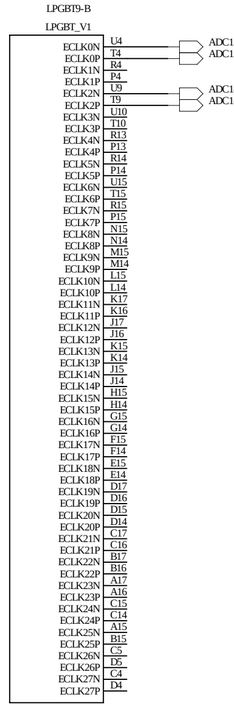
Simplex TX 10GHz FEC5 mode 1001

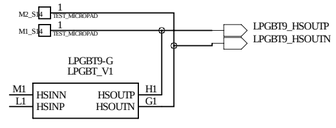
Lock to external 40MHz











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RELEASED: jb	DATED: <Release Date>	DRAWING NO: 35	REV: v2.0
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REVISION RECORD			
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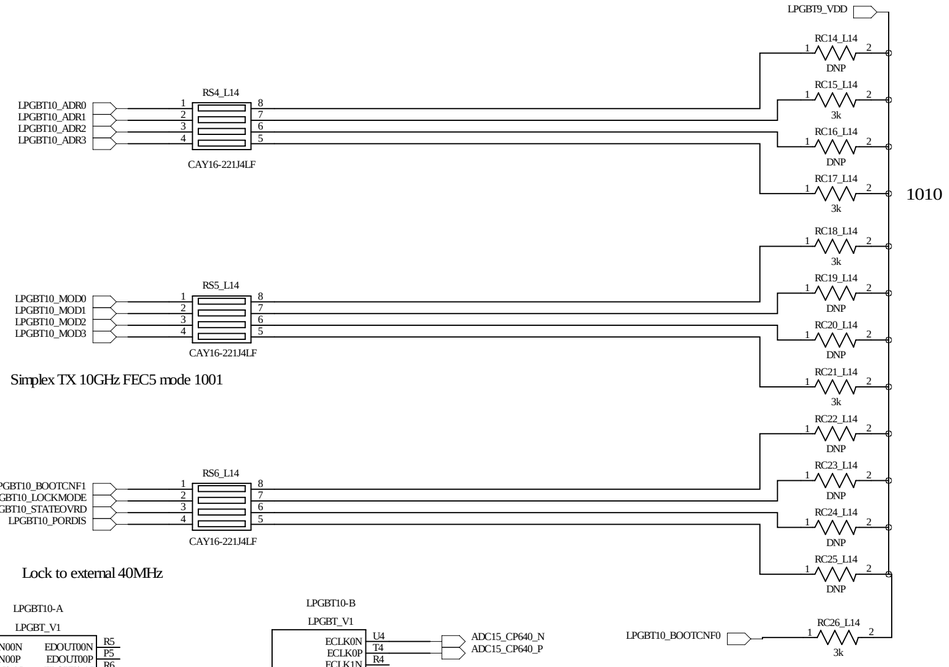

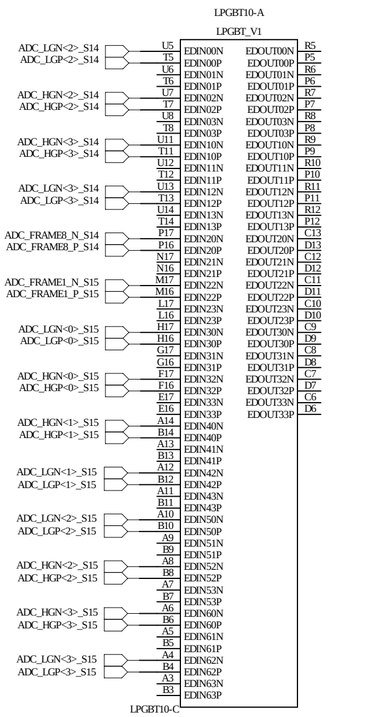

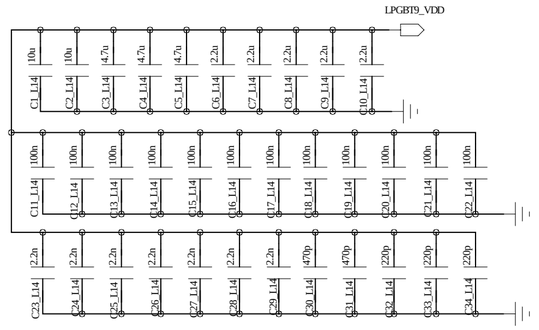

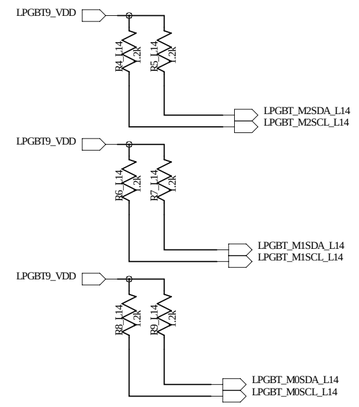

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RELEASED: jb	DATED: <Release Date>	DRAWING NO: 35	REV: v2.0
		SCALE: <Scale>	SHEET: 64 OF 154

REVISION RECORD			
LTR	ECO NO:	APPROVED:	DATE:

LPGBT11_1P2

R147_S16 1.2k
R146_S16 2k

LPGBT_M2SDA_L16
LPGBT_M2SCL_L16

LPGBT11_1P2

R149_S16 1.2k
R148_S16 2k

LPGBT_M1SDA_L16
LPGBT_M1SCL_L16

LPGBT11_1P2

R151_S16 1.2k
R150_S16 2k

LPGBT_M0SDA_L16
LPGBT_M0SCL_L16

LPGBT11-A
LPGBT_V1

ADC_LGN<0>_S16	U5	EDIN00N	EDOUT00N R5
ADC_LGP<0>_S16	T5	EDIN00P	EDOUT00P P5
	U6	EDIN01N	EDOUT01N R6
	T6	EDIN01P	EDOUT01P R7
ADC_HGN<0>_S16	U7	EDIN02N	EDOUT02N P7
ADC_HGP<0>_S16	T7	EDIN02P	EDOUT02P R8
	U8	EDIN03N	EDOUT03N P8
	T8	EDIN03P	EDOUT03P R9
ADC_HGN<1>_S16	U11	EDIN10N	EDOUT10N P9
ADC_HGP<1>_S16	T11	EDIN10P	EDOUT10P R10
	U12	EDIN11N	EDOUT11N P10
	T12	EDIN11P	EDOUT11P R11
ADC_LGN<1>_S16	U13	EDIN12N	EDOUT12N P11
ADC_LGP<1>_S16	T13	EDIN12P	EDOUT12P R12
	U14	EDIN13N	EDOUT13N P12
	T14	EDIN13P	EDOUT13P C13
ADC_LGN<2>_S16	P17	EDIN20N	EDOUT20N D13
ADC_LGP<2>_S16	P16	EDIN20P	EDOUT20P C12
	N17	EDIN21N	EDOUT21N D12
	N16	EDIN21P	EDOUT21P C11
ADC_HGN<2>_S16	M17	EDIN22N	EDOUT22N D11
ADC_HGP<2>_S16	M16	EDIN22P	EDOUT22P C10
	L17	EDIN23N	EDOUT23N D10
	L16	EDIN23P	EDOUT23P C9
ADC_HGN<3>_S16	H17	EDIN30N	EDOUT30N D9
ADC_HGP<3>_S16	H16	EDIN30P	EDOUT30P C8
	G17	EDIN31N	EDOUT31N D8
	G16	EDIN31P	EDOUT31P C7
ADC_LGN<3>_S16	F17	EDIN32N	EDOUT32N D7
ADC_LGP<3>_S16	F16	EDIN32P	EDOUT32P C6
	E17	EDIN33N	EDOUT33N D6
	E16	EDIN33P	EDOUT33P
ADC_FRAME8_N_S16	A14	EDIN40N	
ADC_FRAME8_P_S16	B14	EDIN40P	
	A13	EDIN41N	
	B13	EDIN41P	
	A12	EDIN42N	
	B12	EDIN42P	
	A11	EDIN43N	
	B11	EDIN43P	
	A10	EDIN50N	
	B10	EDIN50P	
	A9	EDIN51N	
	B9	EDIN51P	
	A8	EDIN52N	
	B8	EDIN52P	
	A7	EDIN53N	
	B7	EDIN53P	
	A6	EDIN60N	
	B6	EDIN60P	
	A5	EDIN61N	
	B5	EDIN61P	
	A4	EDIN62N	
	B4	EDIN62P	
	A3	EDIN63N	
	B3	EDIN63P	

LPGBT11-B
LPGBT_V1

ECLK0N	U4	ADC16_CP640_N
ECLK0P	T4	ADC16_CP640_P
ECLK1N	R4	
ECLK1P	P4	
ECLK2N	U9	
ECLK2P	T9	
ECLK3N	U10	
ECLK3P	T10	
ECLK4N	R13	
ECLK4P	P13	
ECLK5N	R14	
ECLK5P	P14	
ECLK6N	U15	
ECLK6P	T15	
ECLK7N	R15	
ECLK7P	P15	
ECLK8N	N15	
ECLK8P	N14	
ECLK9N	M15	
ECLK9P	M14	
ECLK10N	L15	
ECLK10P	L14	
ECLK11N	K17	
ECLK11P	K16	
ECLK12N	J17	
ECLK12P	J16	
ECLK13N	K15	
ECLK13P	K14	
ECLK14N	J15	
ECLK14P	J14	
ECLK15N	H15	
ECLK15P	H14	
ECLK16N	G15	
ECLK16P	G14	
ECLK17N	F15	
ECLK17P	F14	
ECLK18N	E15	
ECLK18P	E14	
ECLK19N	D17	
ECLK19P	D16	
ECLK20N	D15	
ECLK20P	D14	
ECLK21N	C17	
ECLK21P	C16	
ECLK22N	B17	
ECLK22P	B16	
ECLK23N	A17	
ECLK23P	A16	
ECLK24N	C15	
ECLK24P	C14	
ECLK25N	A15	
ECLK25P	B15	
ECLK26N	C5	
ECLK26P	D5	
ECLK27N	C4	
ECLK27P	D4	

LPGBT11_1P2

R_100_S16 3k
R_101_S16 3k
R_102_S16 DNP
R_103_S16 3k

RS1_L16
LPGBT11_ADR0
LPGBT11_ADR1
LPGBT11_ADR2
LPGBT11_ADR3
CAY16-221J4LF

1011

R_104_S16 3k
R_105_S16 DNP
R_106_S16 DNP
R_107_S16 3k

RS2_L16
LPGBT11_MOD0
LPGBT11_MOD1
LPGBT11_MOD2
LPGBT11_MOD3
CAY16-221J4LF

Simplex TX 10GHz FEC5 mode 1001

R_108_S16 DNP
R_109_S16 DNP
R_110_S16 DNP
R_111_S16 DNP

RS3_L16
LPGBT11_BOOTCNF1
LPGBT11_LOCKMODE
LPGBT11_STATEOVRD
LPGBT11_PORDIS
CAY16-221J4LF

Lock to external 40MHz

R_200_S16 3k
LPGBT11_BOOTCNF0

LPGBT11_1P2

LPGBT11-D
LPGBT_V1

J5	VDD1V2_1	VDDRX1V2_4	N3
J6	VDD1V2_2	VDDRX1V2_3	M3
J7	VDD1V2_3	VDDRX1V2_2	L3
J8	VDD1V2_4	VDDRX1V2_1	K3
J9	VDD1V2_5	GNDRX_6	N2
J11	VDD1V2_6	GNDRX_5	N1
K6	VDD1V2_7	GNDRX_4	M2
K7	VDD1V2_8	GNDRX_3	L2
K8	VDD1V2_9	GNDRX_2	K2
K9	VDD1V2_10	GNDRX_1	K1
K11	VDD1V2_11		
K12	VDD1V2_12	VDDTX1V2_4	J3
K13	VDD1V2_13	VDDTX1V2_3	H3
L10	VDD1V2_14	VDDTX1V2_2	G3
L11	VDD1V2_15	VDDTX1V2_1	F3
L12	VDD1V2_16	GNDTX_6	J2
L13	VDD1V2_17	GNDTX_5	J1
M12	VDD1V2_18	GNDTX_4	H2
M13	VDD1V2_19	GNDTX_3	G2
		GNDTX_2	F2
		GNDTX_1	F1
G6	GND_1		
G7	GND_2	VDDA1V2_2	E4
G8	GND_3	VDDA1V2_1	E3
G9	GND_4		
G10	GND_5	GNDA_2	G4
G11	GND_6	GNDA_1	F4
G12	GND_7		
G13	GND_8	VDDF2V5_2	K10
H5	GND_9	VDDF2V5_1	J10
H6	GND_10		
H7	GND_11	VREF_2	J4
H8	GND_12	VREF_1	H4
H9	GND_13		
H10	GND_14		
H11	GND_15		
H12	GND_16		
H13	GND_17		
J12	GND_18		
J13	GND_19		

VDDF2P5_LPGBT11

LPGBT11-E
LPGBT_V1

LPGBT1-11_RSTB	D3	RSTB	READY R2 LPGBT11_RDY
LPGBT11_ADR0	E9	ADR0	
LPGBT11_ADR1	F9	ADR1	
LPGBT11_ADR2	E8	ADR2	SLSDA U3
LPGBT11_ADR3	F8	ADR3	SLSCL U2
LPGBT11_MOD0	G5	MODE0	
LPGBT11_MOD1	K5	MODE1	
LPGBT11_MOD2	P3	MODE2	
LPGBT11_MOD3	P2	MODE3	
MCLK11N	P1	REFCLKN	
MCLK11P	R1	REFCLKP	
LPGBT11_BOOTCNF1	T3	BOOTCNF1	
LPGBT11_LOCKMODE	E1	LOCKMODE	
LPGBT11_STATEOVRD	E2	STATEOVRD	
LPGBT11_PORDIS	T1	PORDIS	
LPGBT11_BOOTCNF0	U1	BOOTCNF0	

LPGBT12_MISCL
LPGBT12_MISDA

U26
LTST-C190GKT
100
R_97
VTRX+_2P5

U37_S16
1k
R_125

LAUROC +1.2V

C29_M16 22u
C31_M16 DNP
C33_M16 22u
C34_M16 100n
C35_M16 DNP

U2_M16
VO4 VO5 GND1 GND2 VI1 VI2
VO3 VO2 VO1 VFB OCSNS TEST GND3
VI3 VI4 VI5 T3 OCZ_ATB PG
P50MV M50MV GND_AGND1 GND_AGND2 EN SOFTST

LPGBT11_1P2
R_2_M16 510k
R_3_M16 510k
R_1_M16 243
R_4_M16 1.2k
R_5_M16 1.2k
SGCPMU_CRN01
+1.4V_SLICE15-16
LPGBT11_1P2
R192 1k
LPGBT11_1P2

C435_S16 10n
C436_S16 10n
C437_S16 4.7n
C438_S16 4.7n
C439_S16 4.7n
C440_S16 2.2n
C441_S16 2.2n
C442_S16 2.2n
C443_S16 2.2n
C444_S16 2.2n

C445_S16 100n
C446_S16 100n
C447_S16 100n
C448_S16 100n
C449_S16 100n
C450_S16 100n
C451_S16 100n
C452_S16 100n
C453_S16 100n
C454_S16 100n
C455_S16 100n
C456_S16 100n

C457_S16 2.2n
C458_S16 2.2n
C459_S16 2.2n
C460_S16 2.2n
C461_S16 2.2n
C462_S16 2.2n
C463_S16 2.2n
C464_S16 470p
C465_S16 470p
C466_S16 220p
C467_S16 220p
C468_S16 220p

LPGBT11-C
LPGBT_V1

PA16_+1.2V_MON	A2	ADC0	VDAC D2
TEMP_B5	A1	ADC1	
	B2	ADC2	M2SDA E5 LPGBT_M2SDA_L16
	B1	ADC3	M2SCL E6 LPGBT_M2SCL_L16
VTRX4_1P2_MON	C3	ADC4	M1SDA F6 LPGBT_M1SDA_L16
TEMP_B6	C2	ADC5	M1SCL F7 LPGBT_M1SCL_L16
VTRX3_1P2_MON	C1	ADC6	M0SDA E6 LPGBT_M0SDA_L16
	D1	ADC7	M0SCL E7 LPGBT_M0SCL_L16
PA16_RSTB	N13	GPIO0	RSTOUTB T2
ADC16_RSTB	N12	GPIO1	
	M11	GPIO2	
VTRX+3_RSTN	N11	GPIO3	
	M10	GPIO4	
	N10	GPIO5	
	L9	GPIO6	
	M9	GPIO7	
	N9	GPIO8	
	L8	GPIO9	
	M8	GPIO10	
	N8	GPIO11	
	L7	GPIO12	
	L6	GPIO13	
	L5	GPIO14	ECLK28P T16
	R3	GPIO15	ECLK28N U16
EDOUTECN_L12	U17	EDINECN	EDOUTECP R16 EDOUTECP_L1-11
EDOUTECP_L12	T17	EDINECP	EDOUTECN R17 EDOUTECN_L1-11

LPGBT11-F
LPGBT_V1

PSCLK0N	N4	ALFE_CP40N_S16
PSCLK0P	M4	ALFE_CP40P_S16
PSCLK1N	N5	ADC16_CP40_N
PSCLK1P	M5	ADC16_CP40_P
PSCLK2N	N6	
PSCLK2P	M6	
PSCLK3N	N7	
PSCLK3P	M7	

LPGBT11-H
LPGBT_V1

	TSTOUT0	F13
	TSTOUT1	F12
	TSTOUT2	F11
	TSTOUT3	F10
	TSTOUT4P	E13
	TSTOUT4N	E12
	TSTOUT5N	E10
	TSTOUT5P	E11
L4	TSTCLKINN	
K4	TSTCLKINP	

M11_S16 1 TEST_MICROPAD
M12_S16 1 TEST_MICROPAD

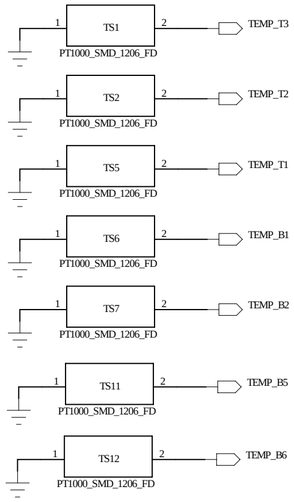
LPGBT11-G
LPGBT_V1

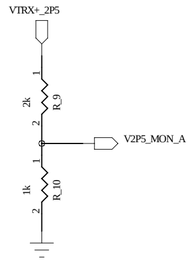
M1	HSINN	HSOUTP	H1 LPGBT11_HSOUTP
L1	HSINP	HSOUTN	G1 LPGBT11_HSOUTN

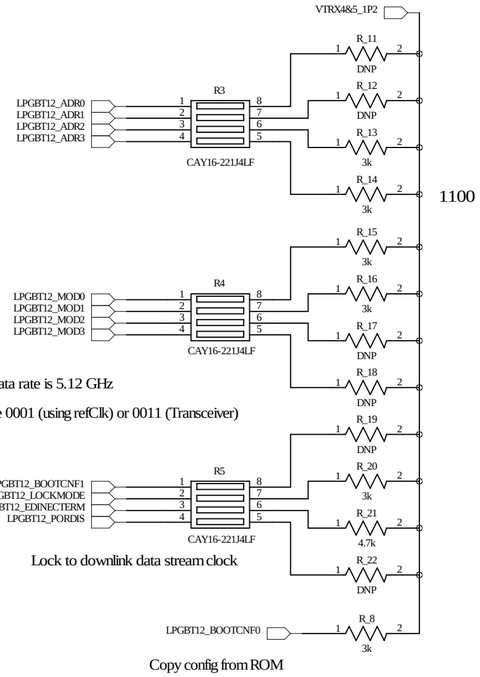
T63 1 MMM_TP LPGBT_M2SDA_L16
T58 1 MMM_TP LPGBT_M2SCL_L16
T59 1 MMM_TP LPGBT_M1SDA_L16
T60 1 MMM_TP LPGBT_M1SCL_L16
T61 1 MMM_TP LPGBT_M0SDA_L16
T62 1 MMM_TP LPGBT_M0SCL_L16

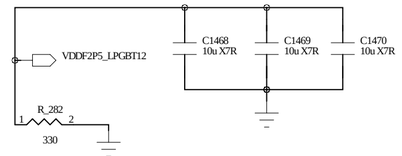
DRAWN: Jb	DATED: <Drawn Date>	COMPANY: Nevis Laboratories of Columbia University	
CHECKED: jb	DATED: <Checked Date>	TITLE: FEB2 prototype v2.0	
QUALITY CONTROL: jb	DATED: <QC Date>	CODE: jb2023	SIZE: C
RELEASED: jb	DATED: <Release Date>	DRAWING NO: 35	REV: v2.0
		SCALE: <Scale>	SHEET: 65 OF 154

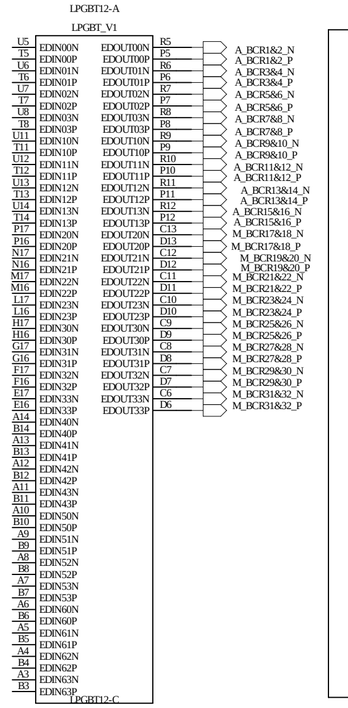
REVISION RECORD			
LTR	ECO NO:	APPROVED:	DATE:

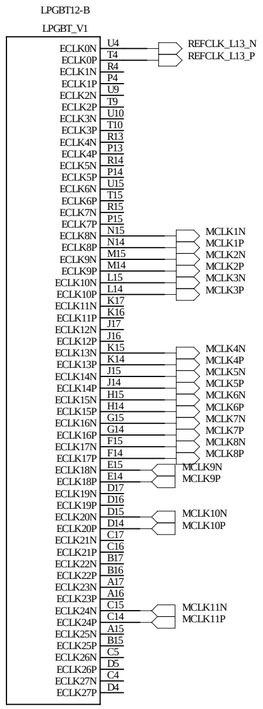


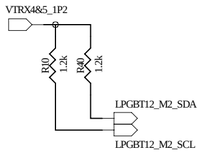


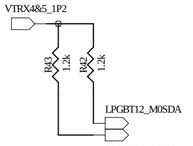


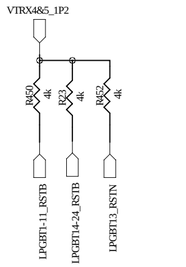


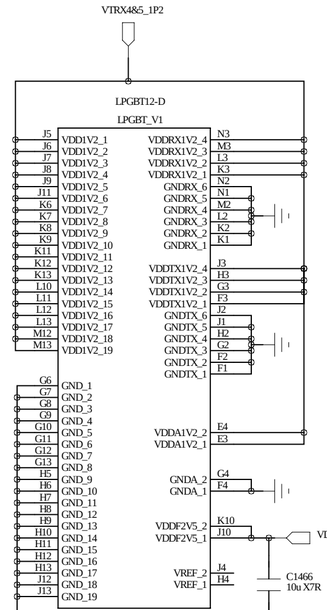


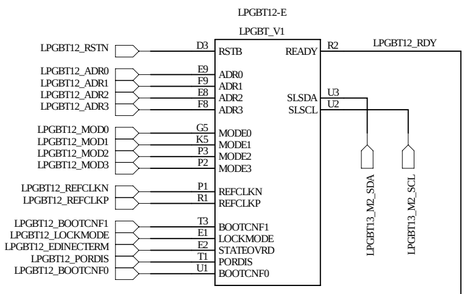


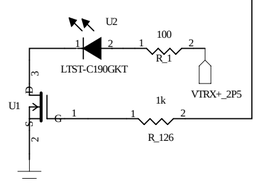


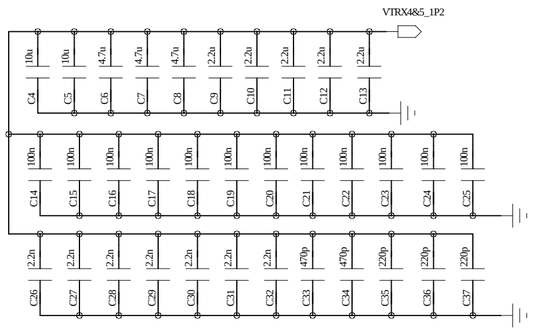


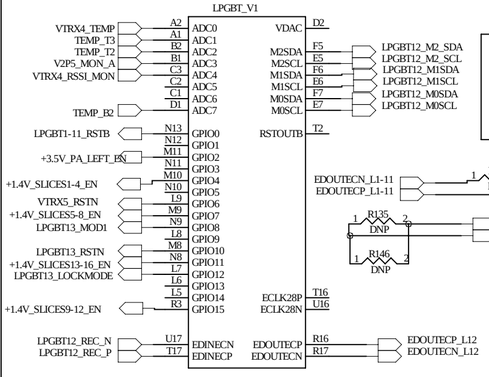


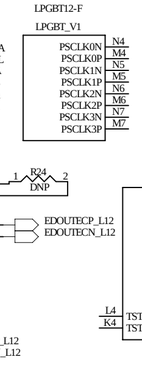


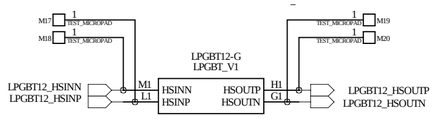


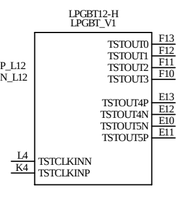


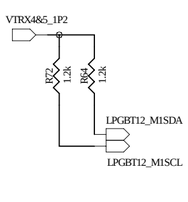


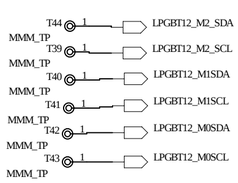












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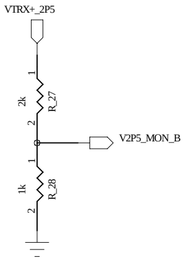
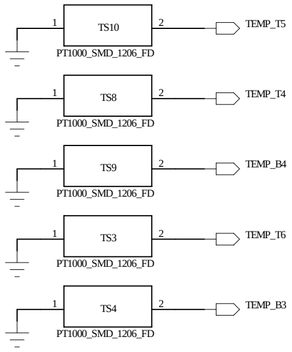
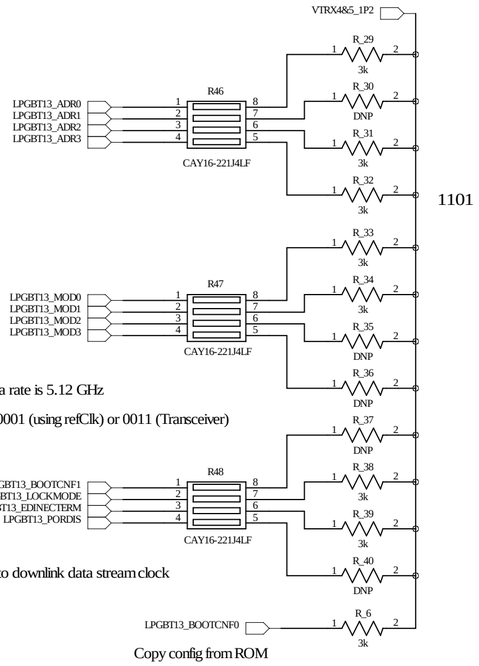




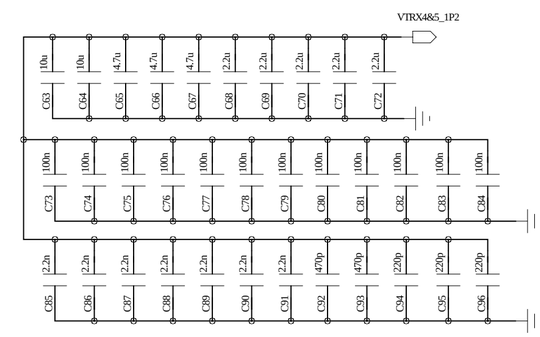


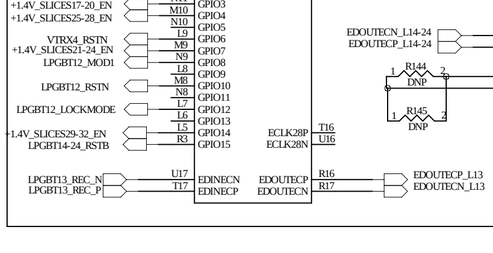
TX data rate is 5.12 GHz

Mode 0001 (using refClk) or 0011 (Transceiver)

Lock to downlink data stream clock

Copy config from ROM





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TITLE:	FEB2 prototype v2.0		
CODE: jb2023	SIZE: C	DRAWING NO: 35	REV: v2.0
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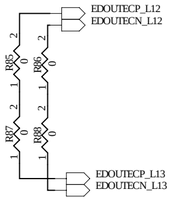

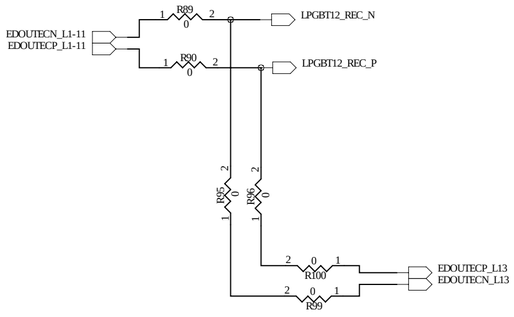

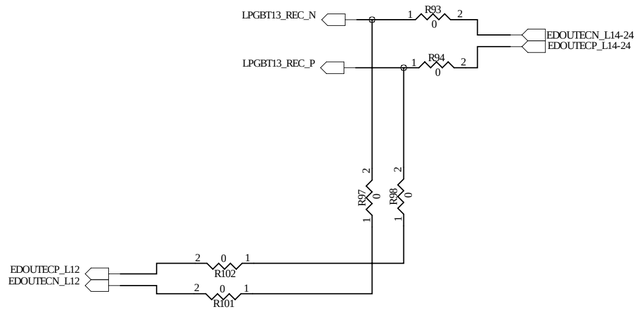

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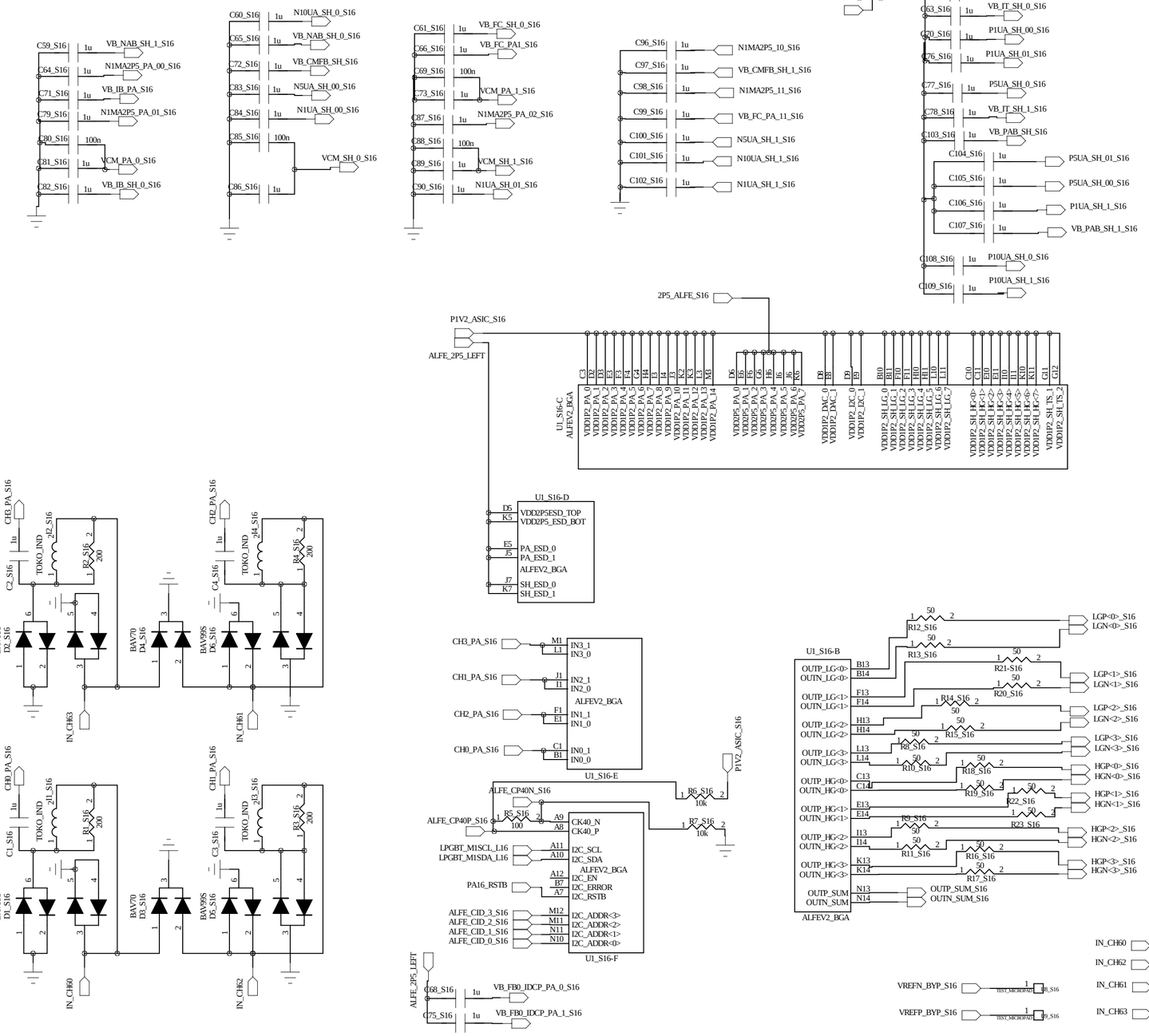

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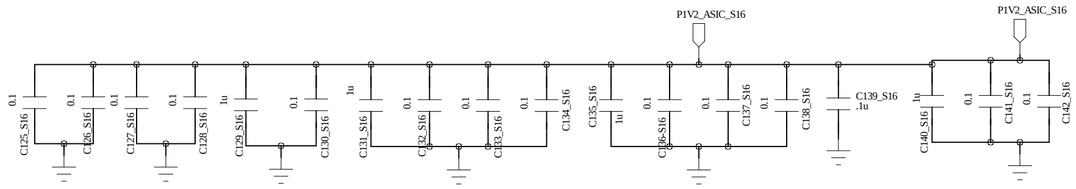
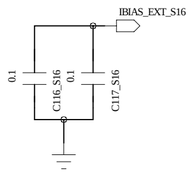
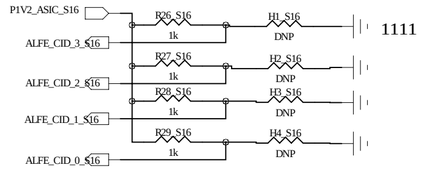
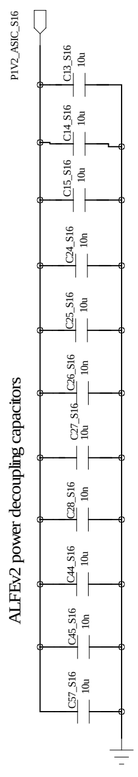
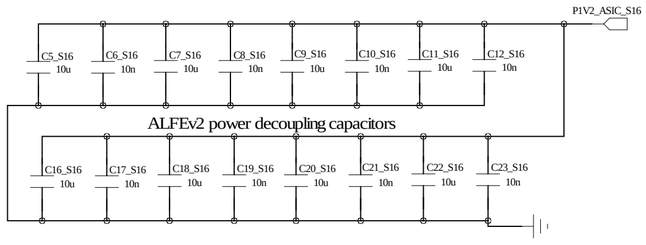
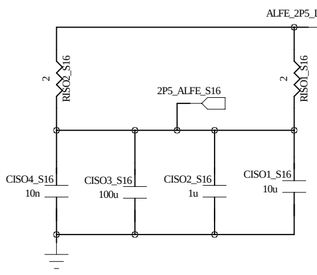


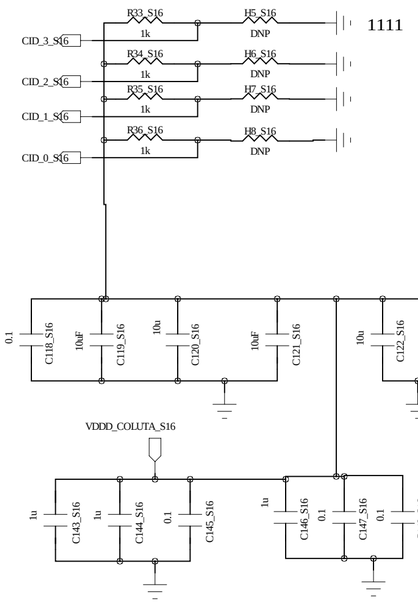


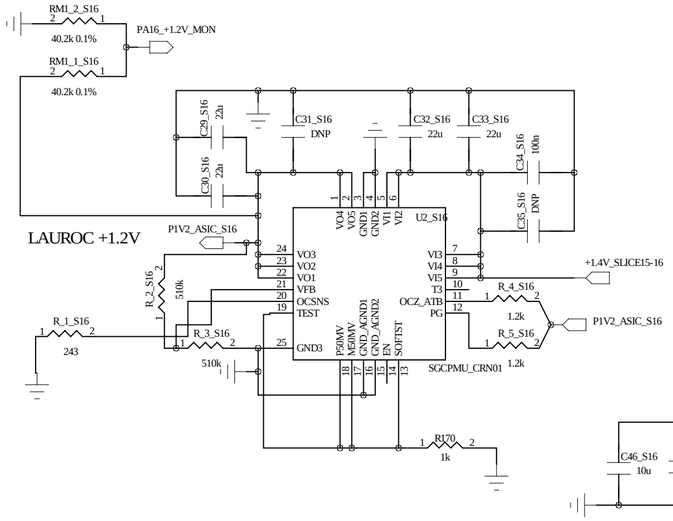


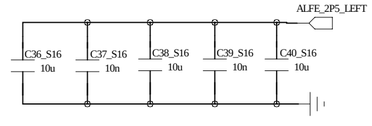




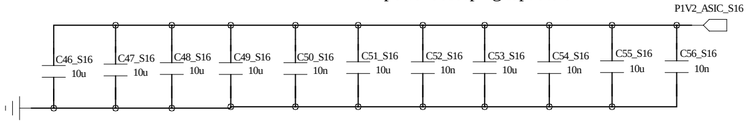








ALFEv2 power decoupling capacitors



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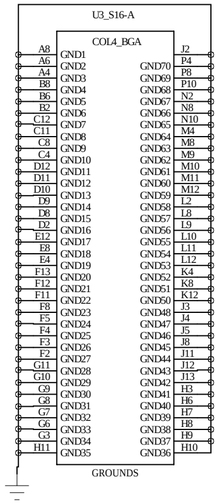

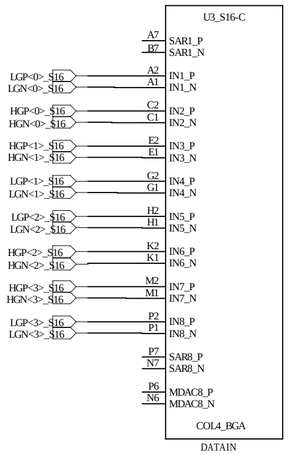

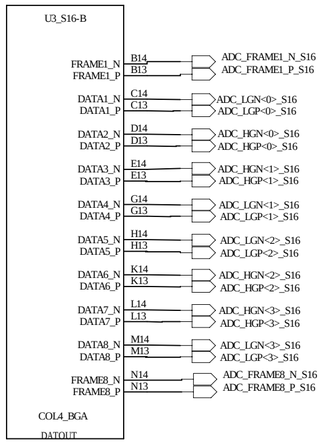

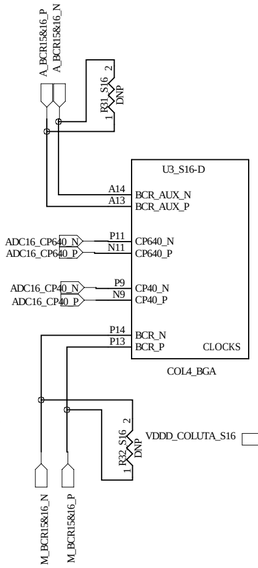

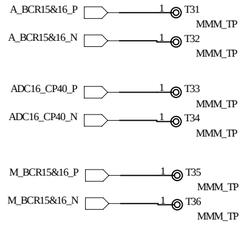

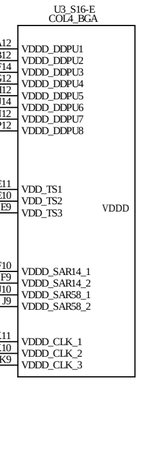

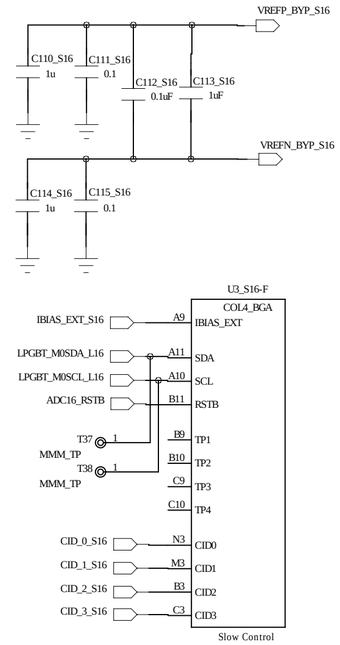

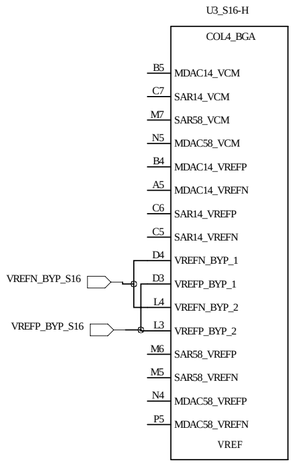

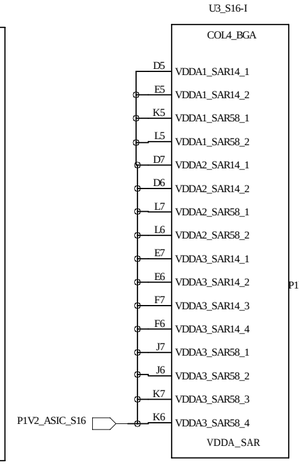

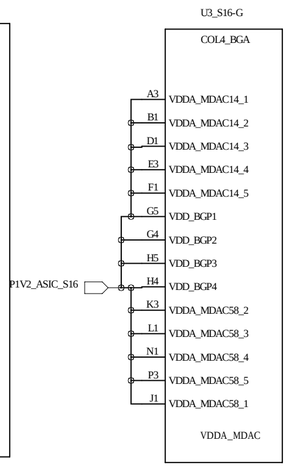

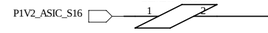

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REVISION RECORD			
LTR	ECO NO:	APPROVED:	DATE:

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BAV99S D2_S17 · C2_S17 1u · CH3_PA_S17 · TOKO_IND L2_S17 · IN_CH67 · R2_S17 200 · ALFE_2P5_RIGHT · TEST_MICROPAD TP4_S17
BAV70 D3_S17 · BAV70 D4_S17
BAV99S D5_S17 · C3_S17 1u · CH1_PA_S17 · TOKO_IND L3_S17 · IN_CH66 · R3_S17 200 · TEST_MICROPAD TP1_S17
BAV99S D6_S17 · C4_S17 1u · CH2_PA_S17 · TOKO_IND L4_S17 · IN_CH65 · R4_S17 200 · TEST_MICROPAD TP2_S17

C93_S17 1u · CUR_1_ALFE_S17
C94_S17 1u · CUR_2_ALFE_S17
C95_S17 1u · CUR_3_ALFE_S17

C96_S17 1u · N1MA2P5_10_S17
C97_S17 1u · VB_CMFB_SH_1_S17
C98_S17 1u · N1MA2P5_11_S17
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C100_S17 1u · N5UA_SH_1_S17
C101_S17 1u · N10UA_SH_1_S17
C102_S17 1u · N1UA_SH_1_S17

C60_S17 1u · N10UA_SH_0_S17
C65_S17 1u · VB_NAB_SH_0_S17
C72_S17 1u · VB_CMFB_SH_S17
C88_S17 1u · N5UA_SH_00_S17
C84_S17 1u · N1UA_SH_00_S17
C85_S17 100n
C86_S17 1u · VCM_SH_0_S17

C61_S17 1u · VB_FC_SH_0_S17
C66_S17 1u · VB_FC_PA1_S17
C69_S12 100n
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C87_S17 1u · N1MA2P5_PA_02_S17
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R_HPS_17 2M
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C109_S17 1u · P10UA_SH_1_S17

C59_S17 1u · VB_NAB_SH_1_S17
C64_S17 1u · N1MA2P5_PA_00_S17
C71_S17 1u · VB_IB_PA_S17
C79_S17 1u · N1MA2P5_PA_01_S17
C80_S17 100n
C81_S17 1u · VCM_PA_0_S17
C82_S17 1u · VB_IB_SH_0_S17
C104_S17 1u · P5UA_SH_01_S17
C105_S17 1u · P5UA_SH_00_S17
C106_S17 1u · P1UA_SH_1_S17
C107_S17 1u · VB_PAB_SH_1_S17

2P5_ALFE_S17 · P1V2_VDD_S17 · ALFE_2P5_RIGHT

PA17-C ALFEV2_BGA: VDD1P2_PA_0 C3 · VDD1P2_PA_1 D2 · VDD1P2_PA_2 E3 · VDD1P2_PA_3 F3 · VDD1P2_PA_4 F4 · VDD1P2_PA_5 G4 · VDD1P2_PA_6 H4 · VDD1P2_PA_7 I3 · VDD1P2_PA_8 I4 · VDD1P2_PA_9 J3 · VDD1P2_PA_10 K2 · VDD1P2_PA_11 K3 · VDD1P2_PA_12 L3 · VDD1P2_PA_13 M3 · VDD1P2_PA_14 M2
VDD2P5_PA_0 D6 · VDD2P5_PA_1 E6 · VDD2P5_PA_2 F6 · VDD2P5_PA_3 G6 · VDD2P5_PA_4 H6 · VDD2P5_PA_5 I6 · VDD2P5_PA_6 J6 · VDD2P5_PA_7 K6
VDD1P2_DAC_0 D8 · VDD1P2_DAC_1 E8
VDD1P2_I2C_0 D9 · VDD1P2_I2C_1 E9
VDD1P2_SH_LG_0 B10 · VDD1P2_SH_LG_1 B11 · VDD1P2_SH_LG_2 F10 · VDD1P2_SH_LG_3 F11 · VDD1P2_SH_LG_4 H10 · VDD1P2_SH_LG_5 H11 · VDD1P2_SH_LG_6 L10 · VDD1P2_SH_LG_7 L11
VDD1P2_SH_HG_0 C10 · VDD1P2_SH_HG_1 C11 · VDD1P2_SH_HG_2 E10 · VDD1P2_SH_HG_3 E11 · VDD1P2_SH_HG_4 I10 · VDD1P2_SH_HG_5 I11 · VDD1P2_SH_HG_6 K10 · VDD1P2_SH_HG_7 K11
VDD1P2_SH_TS_1 G11 · VDD1P2_SH_TS_2 G12

PA17-G ALFEV2_BGA
N1MA2P5_PA_00_S17 · N1MA2P5_PA_01_S17 · N1MA2P5_PA_02_S17 → A2 G2 N2 → N1MA2P5_PA<0_0> N1MA2P5_PA<0_1> N1MA2P5_PA<0_2>
N1MA2P5_10_S17 · N1MA2P5_11_S17 → C4 L4 → N1MA2P5_PA<1_0> N1MA2P5_PA<1_1>
VB_FC_PA_00_S17 · VB_FC_PA_01_S17 → A3 N4 → VB_FC_PA<0_0> VB_FC_PA<0_1>
VB_FC_PA1_S17 · VB_FC_PA_11_S17 → C5 N3 → VB_FC_PA<1_0> VB_FC_PA<1_1>
VB_IB_PA_S17 → H2 → VB_IB_PA
VCM_PA_0_S17 · VCM_PA_1_S17 → B3 M4 → VCM_PA_0 VCM_PA_1
N1UA_SH_00_S17 · N1UA_SH_01_S17 → A6 L9 → N1UA_SH<0_0> N1UA_SH<0_1>
N1UA_SH_1_S17 → B6 → N1UA_SH<1>
N5UA_SH_00_S17 · N5UA_SH_01_S17 → A5 L8 → N5UA_SH<0_0> N5UA_SH<0_1>
N5UA_SH_1_S17 → B5 → N5UA_SH<1>
N10UA_SH_0_S17 · N10UA_SH_1_S17 → N7 N6 → N10UA_SH<0> N10UA_SH<1>
VB_FC_SH_0_S17 · VB_FC_SH_1_S17 → A4 M6 → VB_FC_SH<0> VB_FC_SH<1>
VB_IB_SH_0_S17 · VB_IB_SH_1-S17 → B4 M5 → VB_IB_SH_0 VB_IB_SH_1
VB_CMFB_SH_S17 · VB_CMFB_SH_1_S17 → B8 N5 → VB_CMFB_SH_0 VB_CMFB_SH_1
VB_NAB_SH_0_S17 · VB_NAB_SH_1_S17 → B9 M7 → VB_NAB_SH_0 VB_NAB_SH_1
VCM_SH_0_S17 · VCM_SH_1_S17 → D12 M10 → VCM_SH_0 VCM_SH_1
P10UA_SH<1> G9 → P10UA_SH_1_S17 · P10UA_SH<0> G10 → P10UA_SH_0_S17
P5UA_SH<0> F8 → P5UA_SH_0_S17
P5UA_SH<0_1> M9 → P5UA_SH_01_S17 · P5UA_SH<0_0> F9 → P5UA_SH_00_S17
P1UA_SH<1> H8 → P1UA_SH_1_S17
P1UA_SH<0_1> N9 → P1UA_SH_01_S17 · P1UA_SH<0_0> H9 → P1UA_SH_00_S17
VB_IT_SH_1 N8 → VB_IT_SH_1_S17 · VB_IT_SH_0 D7 → VB_IT_SH_0_S17
VB_PAB_SH<0> M8 → VB_PAB_SH_S17 · VB_PAB_SH<1> C8 → VB_PAB_SH_1_S17
VB_IT_PA G3 → VB_IT_PA_S17
VB_FB0_IDCP_PA_1 L5 → VB_FB0_IDCP_PA_1_S17 · VB_FB0_IDCP_PA_0 C6 → VB_FB0_IDCP_PA_0_S17
N1MAI_SH C7 → CUR_3_ALFE_S17 · P1MAI_2P5_PA E4 → CUR_2_ALFE_S17 · N1MAI_PA H3 → CUR_1_ALFE_S17
EXT_VREF_DAC J12 → R24_S17 887 → P1V2_VDD_S17 · R25_S17 324

PA17-D: D5 VDD2P5ESD_TOP · K5 VDD2P5_ESD_BOT · E5 PA_ESD_0 · J5 PA_ESD_1 · ALFEV2_BGA · J7 SH_ESD_0 · K7 SH_ESD_1

PA17-B ALFEV2_BGA: OUTP_LG<0> B13 · OUTN_LG<0> B14 → R12_S17 50 → LGP<0>_S17 · LGN<0>_S17
OUTP_LG<1> F13 · OUTN_LG<1> F14 → R13_S17 50 → R21-S17 50 → LGP<1>_S17 · LGN<1>_S17
OUTP_LG<2> H13 · OUTN_LG<2> H14 → R14_S17 50 → R20_S17 50 → LGP<2>_S17 · LGN<2>_S17
OUTP_LG<3> L13 · OUTN_LG<3> L14 → R15_S17 50 → R8_S17 50 → LGP<3>_S17 · LGN<3>_S17
OUTP_HG<0> C13 · OUTN_HG<0> C14 → R10_S17 50 → R18_S17 50 → HGP<0>_S17 · HGN<0>_S17
OUTP_HG<1> E13 · OUTN_HG<1> E14 → R19_S17 50 → R22_S17 50 → HGP<1>_S17 · HGN<1>_S17
OUTP_HG<2> I13 · OUTN_HG<2> I14 → R9_S17 50 → R23_S17 50 → HGP<2>_S17 · HGN<2>_S17
OUTP_HG<3> K13 · OUTN_HG<3> K14 → R11_S17 50 → R16_S17 50 → R17_S17 50 → HGP<3>_S17 · HGN<3>_S17
OUTP_SUM N13 → OUTP_SUM_S17 · OUTN_SUM N14 → OUTN_SUM_S17

CH3_PA_S17 → M1 L1 IN3_1 IN3_0
CH1_PA_S17 → J1 I1 IN2_1 IN2_0
CH2_PA_S17 → F1 E1 IN1_1 IN1_0
CH0_PA_S17 → C1 B1 IN0_1 IN0_0
ALFEV2_BGA
P1V2_VDD_S17 · R6_S17 10k
ALFE_CP40N_S17 · R5_S17 100 · ALFE_CP40P_S17 → A9 A8 CK40_N CK40_P
R7_S17 10k
LPGBT_M1SCL_L17 → A11 I2C_SCL · LPGBT_M1SDA_L17 → A10 I2C_SDA
ALFEV2_BGA
PA17-19_RSTB → A12 I2C_EN · B7 I2C_ERROR · A7 I2C_RSTB
ALFE_CID_3_S17 → M12 I2C_ADDR<3> · ALFE_CID_2_S17 → M11 I2C_ADDR<2> · ALFE_CID_1_S17 → N11 I2C_ADDR<1> · ALFE_CID_0_S17 → N10 I2C_ADDR<0>
PA17-E · PA17-F

ALFE_CP40P_S17 → T11 MMM_TP · ALFE_CP40N_S17 → T12 MMM_TP
LPGBT_M1SCL_L17 → T19 MMM_TP · LPGBT_M1SDA_L17 → T20 MMM_TP

PA17-A ALFEV2_BGA: VSS_GND1 A1 · VSS_GND2 A13 · VSS_GND3 A14 · VSS_GND4 B2 · VSS_GND5 B12 · VSS_GND6 C2 · VSS_GND7 C3 · VSS_GND8 D1 · VSS_GND9 D4 · VSS_GND10 D10 · VSS_GND11 D11 · VSS_GND12 D14 · VSS_GND13 C12 · VSS_GND14 F2 · VSS_GND15 E7 · VSS_GND16 F7 · VSS_GND17 F5 · VSS_GND18 F12 · VSS_GND19 G1 · VSS_GND20 G5 · VSS_GND21 G7 · VSS_GND22 G8 · VSS_GND23 G13 · VSS_GND24 G14 · VSS_GND25 H1 · VSS_GND26 H5 · VSS_GND27 H7 · VSS_GND28 H12 · VSS_GND29 J2 · VSS_GND30 J7 · VSS_GND31 J8 · VSS_GND32 J12 · VSS_GND33 K1 · VSS_GND34 K4 · VSS_GND35 K5 · VSS_GND36 K8 · VSS_GND37 K12 · VSS_GND38 L2 · VSS_GND39 L5 · VSS_GND40 L7 · VSS_GND41 L8 · VSS_GND42 J10 · VSS_GND43 J11 · VSS_GND44 J14 · VSS_GND45 K3 · VSS_GND46 K7 · VSS_GND47 K9 · VSS_GND48 K13 · VSS_GND49 L12 · VSS_GND50 L6 · VSS_GND51 L7 · VSS_GND52 L9 · VSS_GND53 L12 · VSS_GND54 M6 · VSS_GND55 M13 · VSS_GND56 N4 · VSS_GND57 N7 · VSS_GND58 N11 · VSS_GND59 N12

ALFE_2P5_RIGHT · C68_S17 1u · VB_FB0_IDCP_PA_0_S17
ALFE_2P5_RIGHT · C75_S17 1u · VB_FB0_IDCP_PA_1_S17

DRAWN: Jb	DATED: <Drawn Date>	COMPANY: Nevis Laboratories of Columbia University	
CHECKED: jb	DATED: <Checked Date>	TITLE: FEB2 prototype v2.0	
QUALITY CONTROL: jb	DATED: <QC Date>	CODE: jb2023 · SIZE: C · DRAWING NO: 35 · REV: v2.0	
RELEASED: jb	DATED: <Release Date>	SCALE: <Scale> · SHEET: OF 72 154	

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BAV99S D1_S18 — C1_S18 1u — CH0_PA_S18 — TOKO_IND 2I1_S18 — R1_S18 200 — IN_CH68 — U10_S18 TEST_MICROPAD

BAV99S D2_S18 — C2_S18 1u — CH3_PA_S18 — TOKO_IND 2I2_S18 — R2_S18 200 — IN_CH71 — U13_S18 TEST_MICROPAD

BAV70 D3_S18 — BAV99S D5_S18 — C3_S18 1u — CH1_PA_S18 — TOKO_IND 2I3_S18 — R3_S18 200 — IN_CH70 — U11_S18 TEST_MICROPAD

BAV70 D4_S18 — BAV99S D6_S18 — C4_S18 1u — CH2_PA_S18 — TOKO_IND 2I4_S18 — R4_S18 200 — IN_CH69 — U12_S18 TEST_MICROPAD

C93_S18 1u — CUR_1_ALFE_S18

C94_S18 1u — CUR_2_ALFE_S18 — ALFE_2P5_RIGHT

C95_S18 1u — CUR_3_ALFE_S18

C96_S18 1u — N1MA2P5_10_S18

C97_S18 1u — VB_CMFB_SH_1_S18

C98_S18 1u — N1MA2P5_11_S18

C99_S18 1u — VB_FC_PA_11_S18

C100_S18 1u — N5UA_SH_1_S18

C101_S18 1u — N10UA_SH_1_S18

C102_S18 1u — N1UA_SH_1_S18

C60_S18 1u — N10UA_SH_0_S18

C63_S18 1u — VB_NAB_SH_0_S18

C72_S18 1u — VB_CMFB_SH_S18

C83_S18 1u — N5UA_SH_00_S18

C84_S18 1u — N1UA_SH_00_S18

C85_S18 100n

C86_S18 1u — VCM_SH_0_S18

C61_S18 1u — VB_FC_SH_0_S18

C66_S18 1u — VB_FC_PA1_S18

C69_S18 100n

C73_S18 1u — VCM_PA_1_S18

C87_S18 1u — N1MA2P5_PA_02_S18

C88_S18 100n

C89_S18 1u — VCM_SH_1_S18

C90_S18 1u — N1UA_SH_01_S18

C62_S18 1u — VB_FC_PA_00_S18

C67_S18 1u — N5UA_SH_01_S18

C74_S18 1u — VB_FC_SH_1_S18

C91_S18 1u — VB_IB_SH_1-S18

C92_S18 1u — VB_FC_PA_01_S18

P1V2_VDD_S18 — R_HF5_18 2M — C58_S18 1u — VB_IT_PA_S18

C59_S18 1u — VB_NAB_SH_1_S18

C63_S18 1u — VB_IT_SH_0_S18

C64_S18 1u — N1MA2P5_PA_00_S18

C70_S18 1u — P1UA_SH_00_S18

C71_S18 1u — VB_IB_PA_S18

C76_S18 1u — P1UA_SH_01_S18

C79_S18 1u — N1MA2P5_PA_01_S18

C77_S18 1u — P5UA_SH_0_S18

C80_S18 100n

C81_S18 1u — VCM_PA_0_S18

C78_S18 1u — VB_IT_SH_1_S18

C82_S18 1u — VB_IB_SH_0_S18

C103_S18 1u — VB_PAB_SH_S18

C104_S18 1u — P5UA_SH_01_S18

C105_S18 1u — P5UA_SH_00_S18

C106_S18 1u — P1UA_SH_1_S18

C107_S18 1u — VB_PAB_SH_1_S18

C108_S18 1u — P10UA_SH_0_S18

C109_S18 1u — P10UA_SH_1_S18

2P5_ALFE_S18 — P1V2_VDD_S18 — ALFE_2P5_RIGHT

PA18-C ALFEV2_BGA

| | | |

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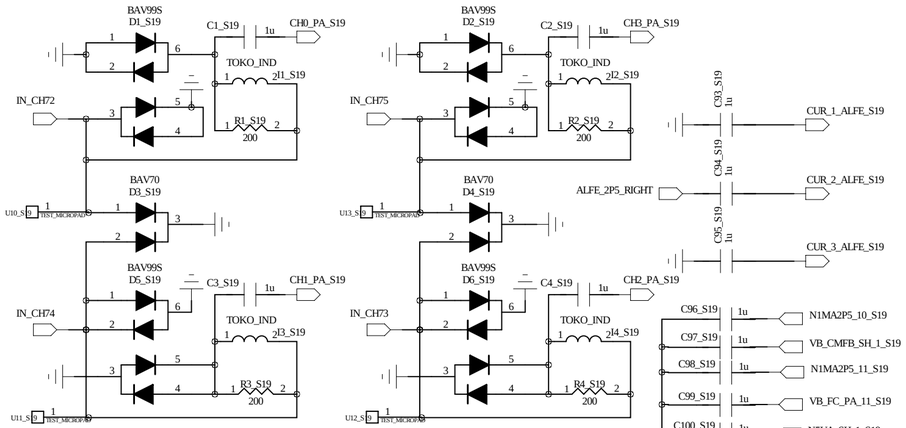

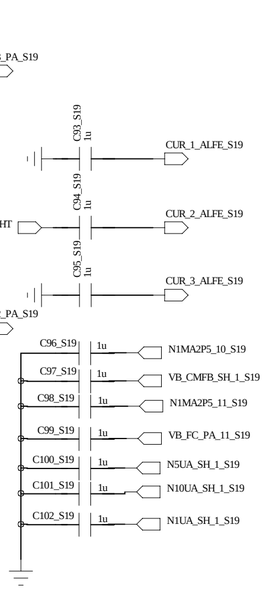

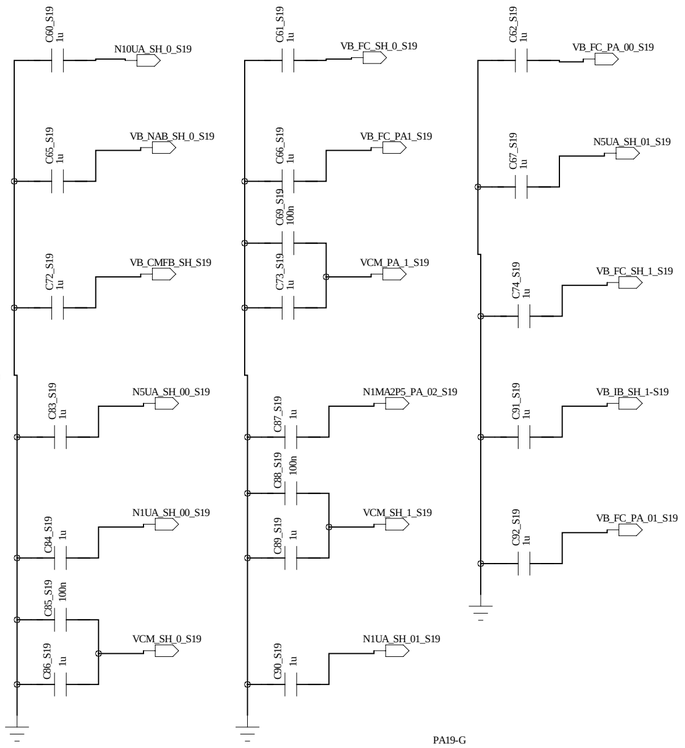

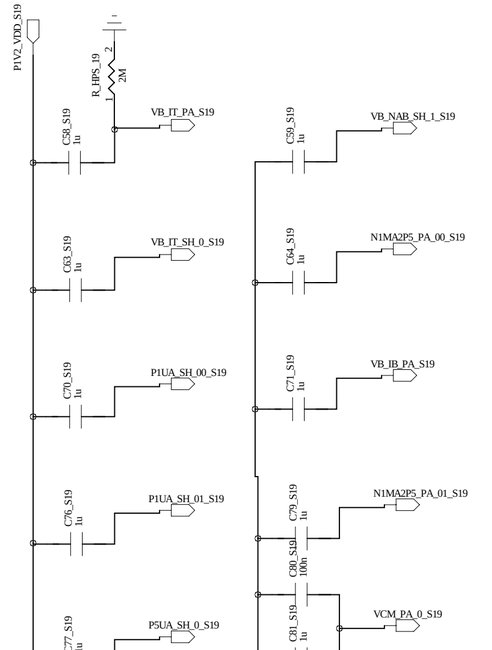

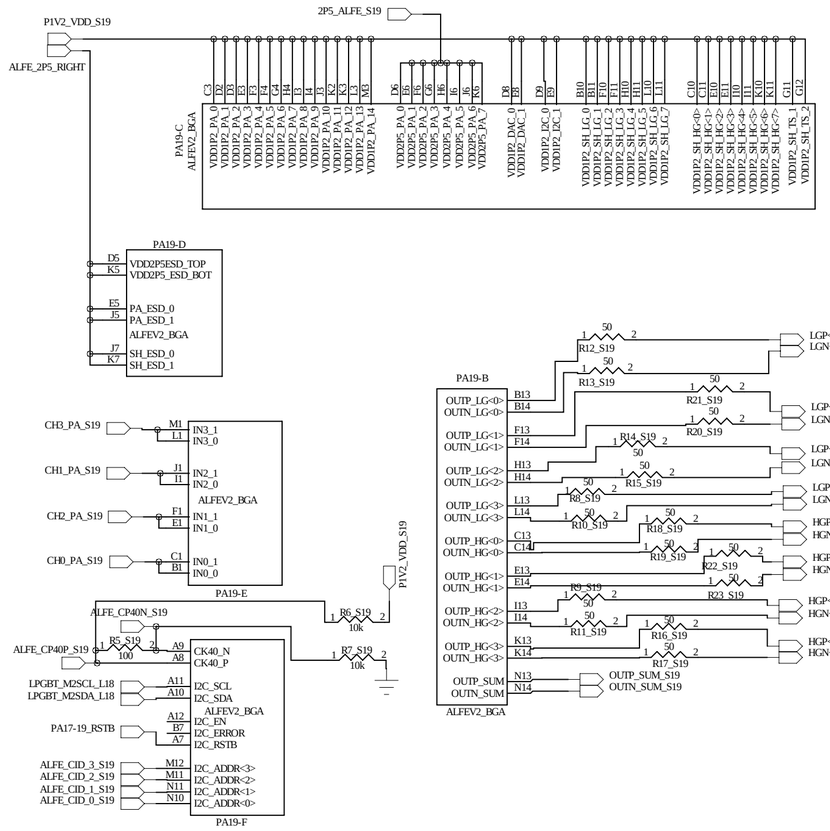

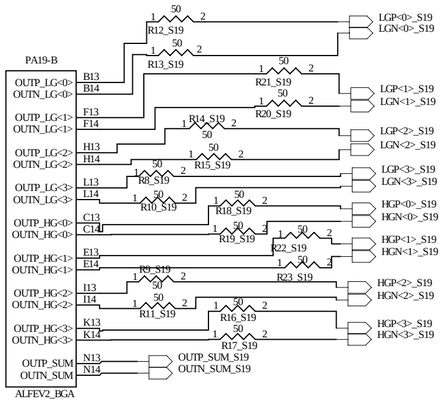

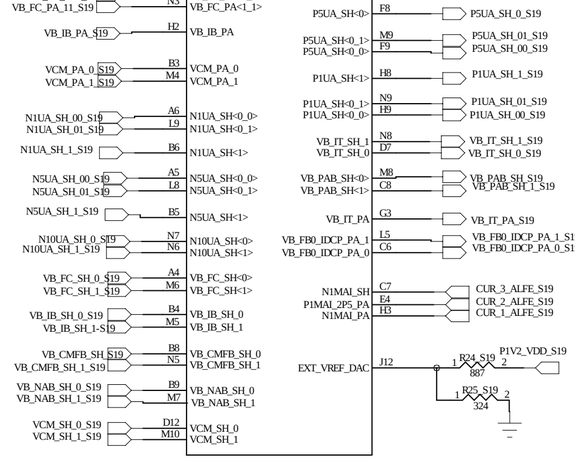

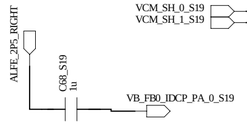

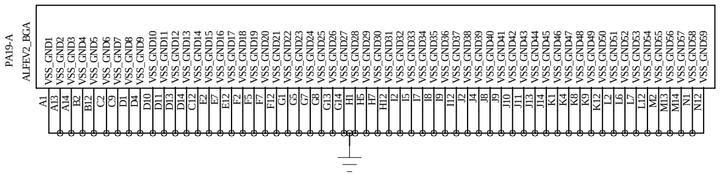

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CHECKED: jb	DATED: <Checked Date>	TITLE: FEB2 prototype v2.0	
QUALITY CONTROL: jb	DATED: <QC Date>	CODE: jb2023	SIZE: C
RELEASED: jb	DATED: <Release Date>	DRAWING NO: 35	REV: v2.0
		SCALE: <Scale>	SHEET: OF 74 154

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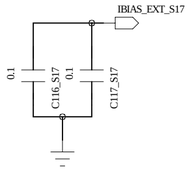

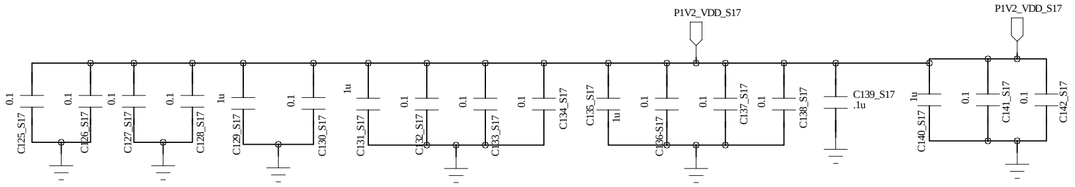

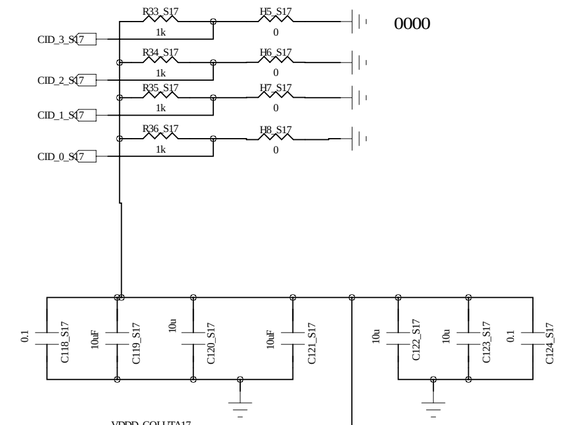

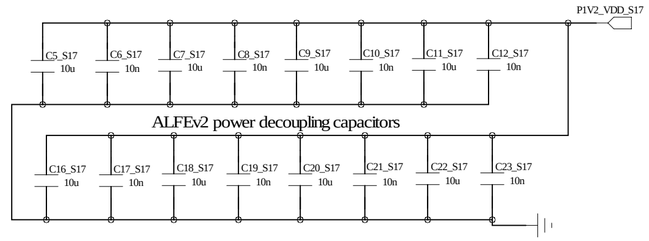

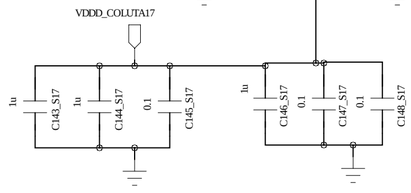

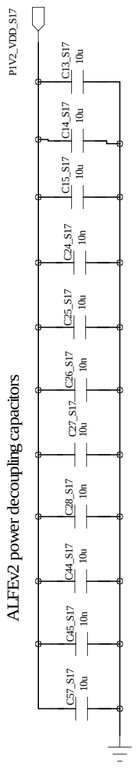

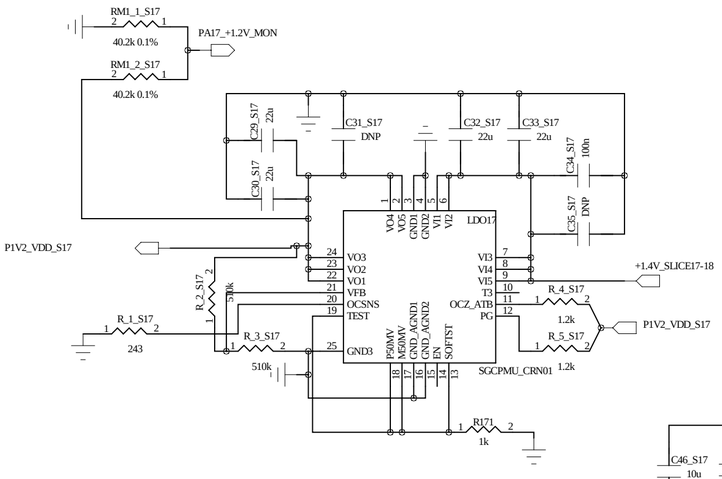

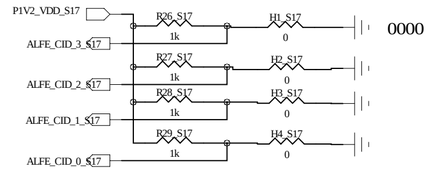

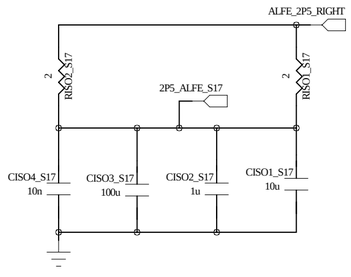

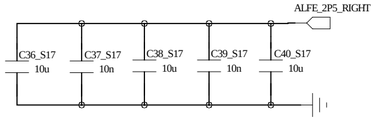

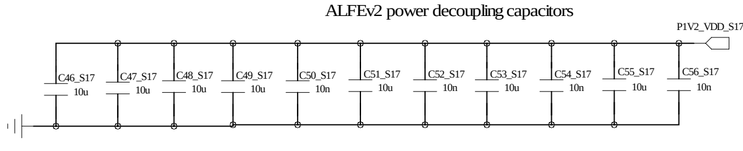

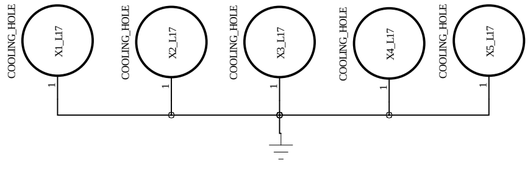

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CHECKED: jb	DATED: <Checked Date>	TITLE: FEB2 prototype v2.0	
QUALITY CONTROL: jb	DATED: <QC Date>	CODE: jb2023	SIZE: C
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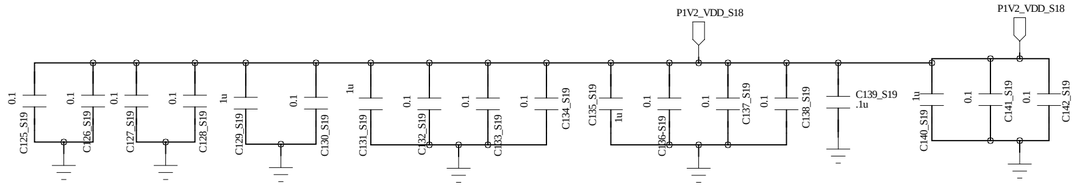

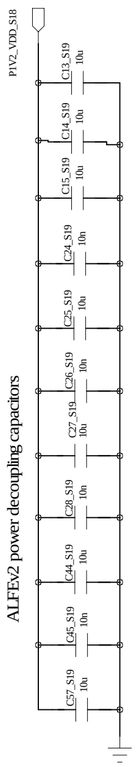

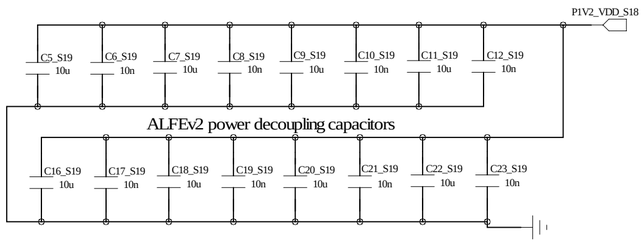

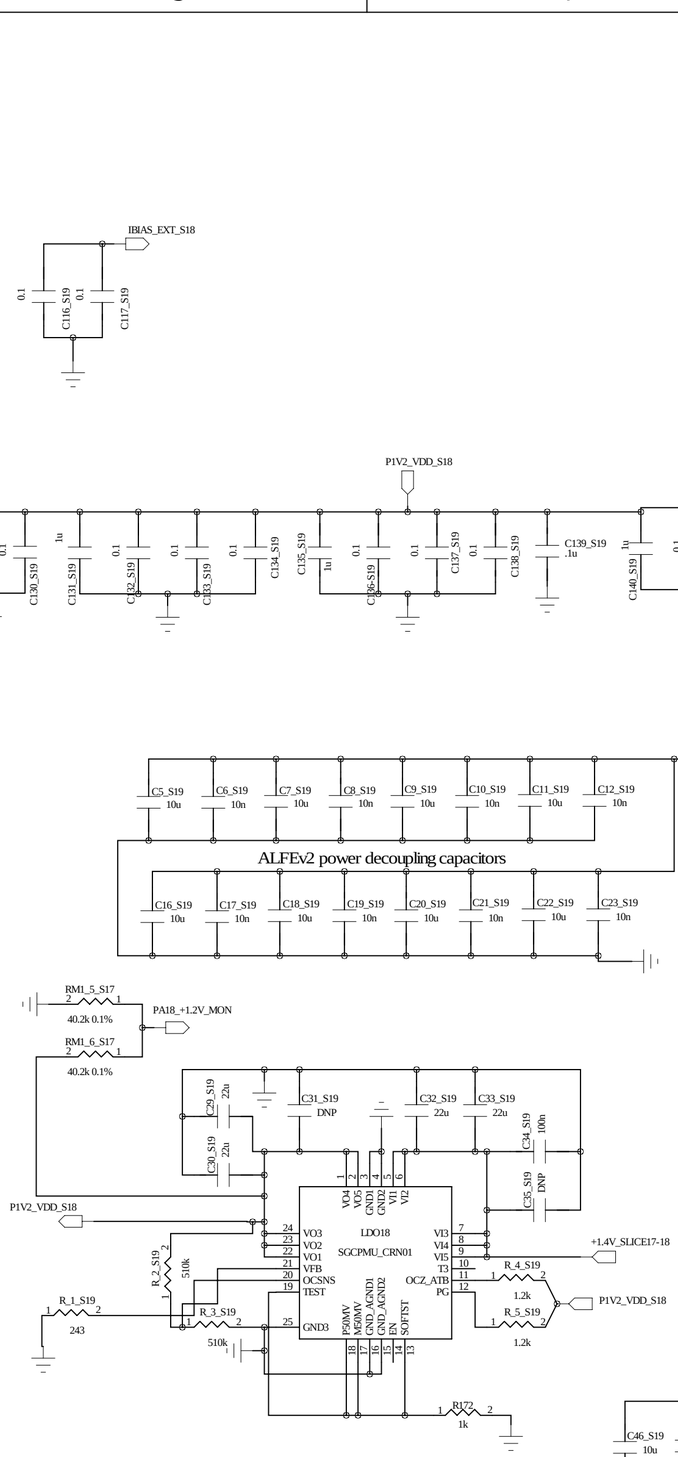

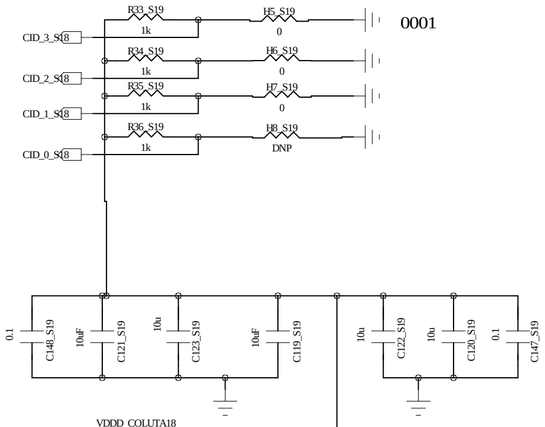

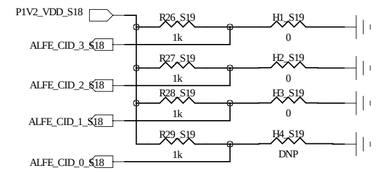

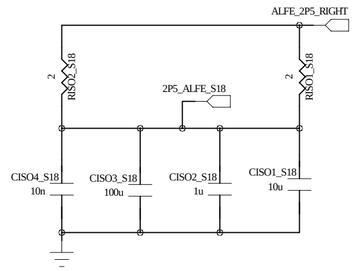

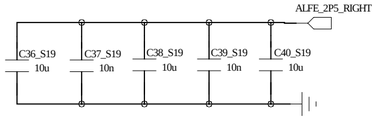

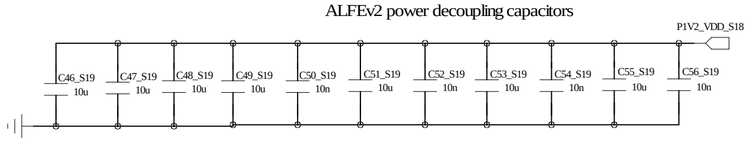

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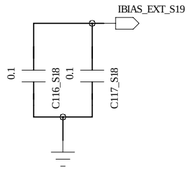

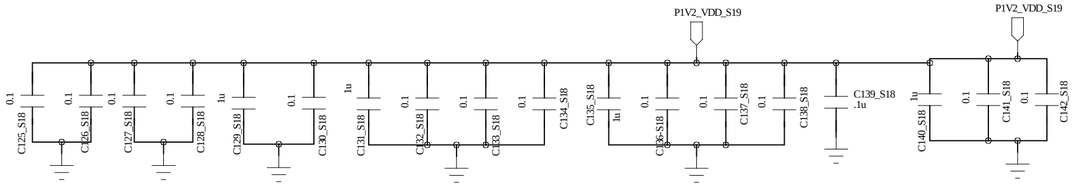

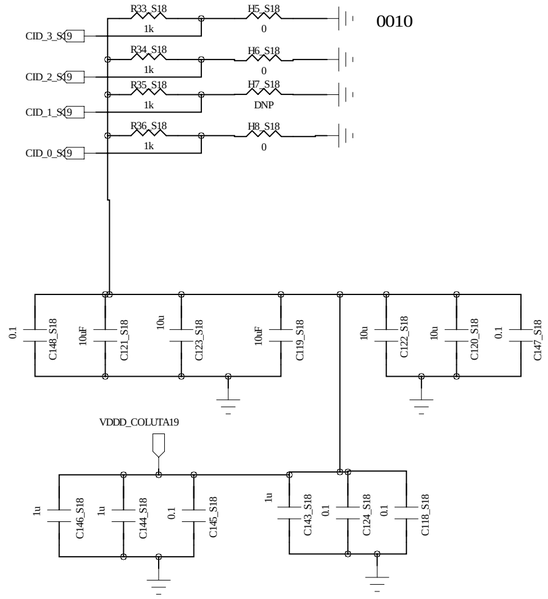

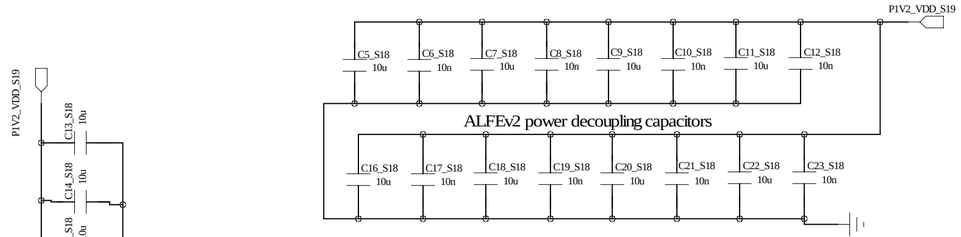

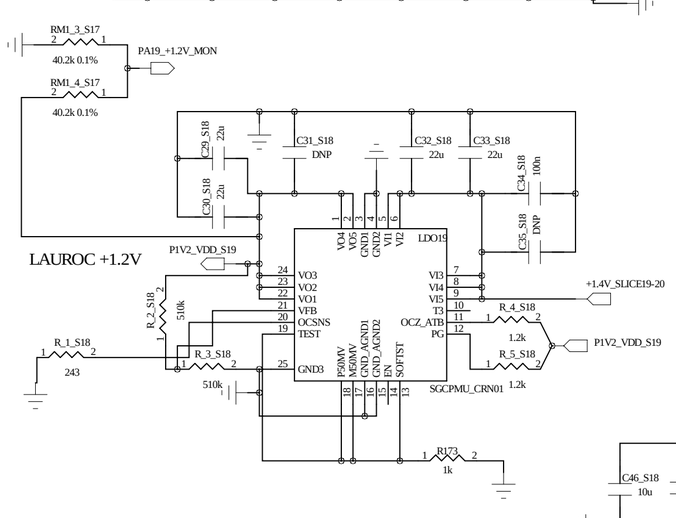

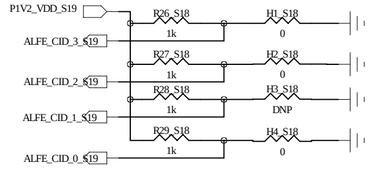

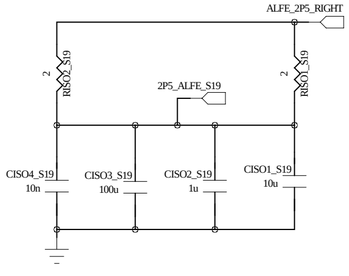

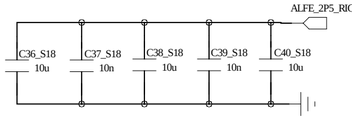

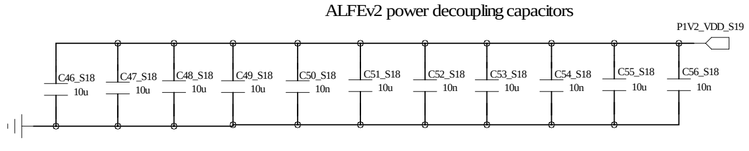

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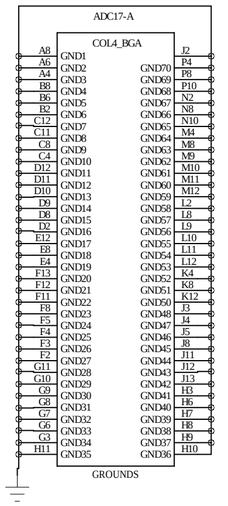

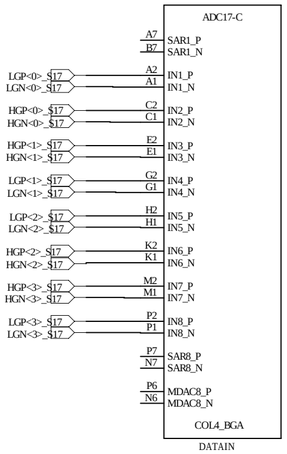

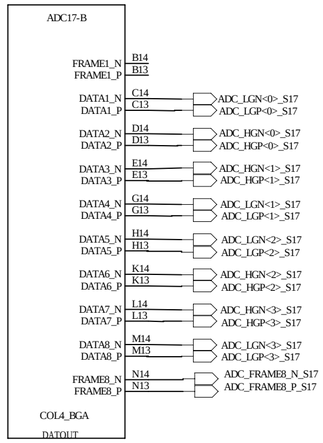

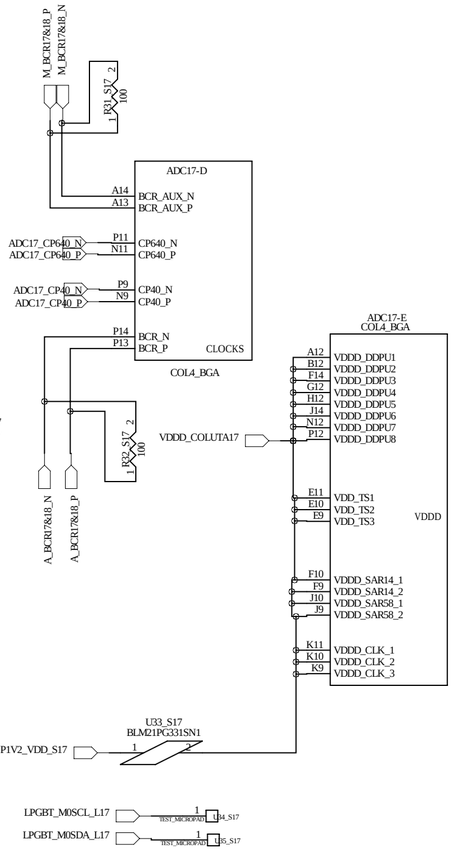

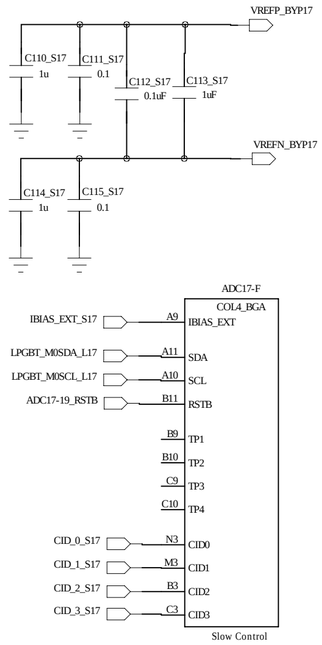

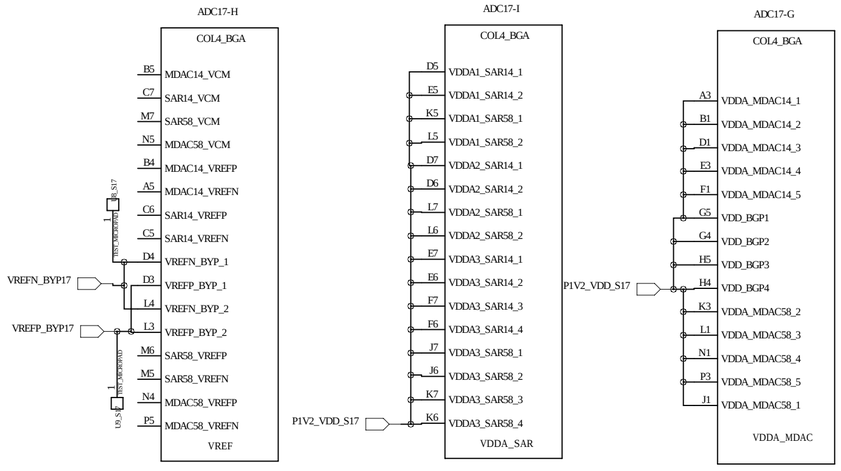

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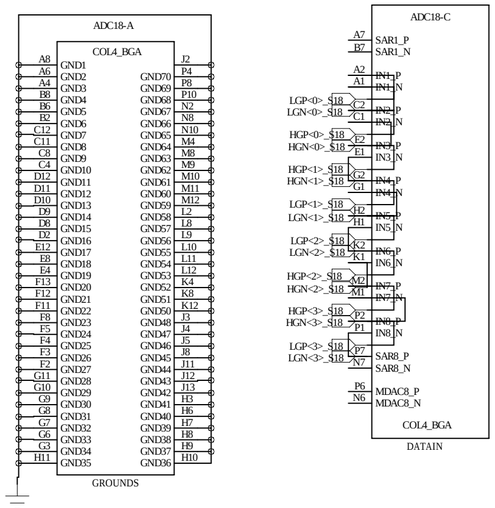

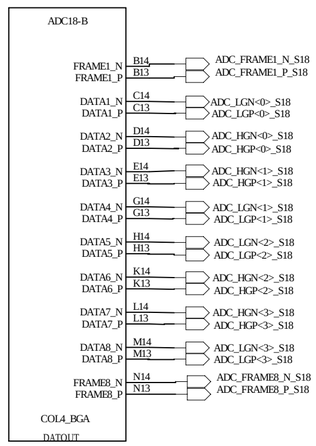

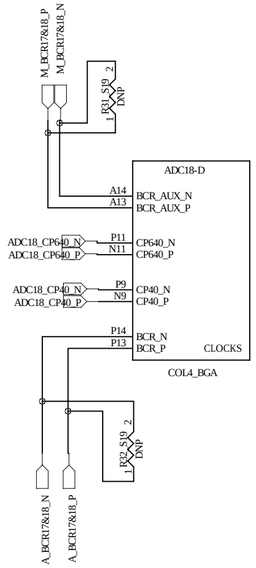

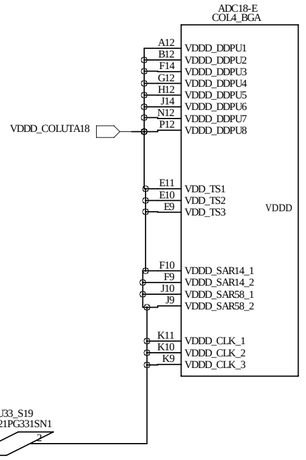

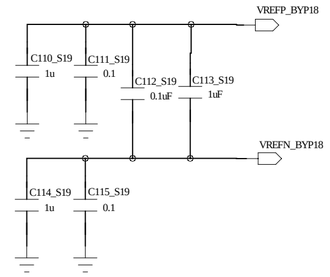

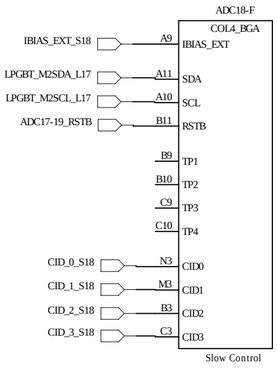

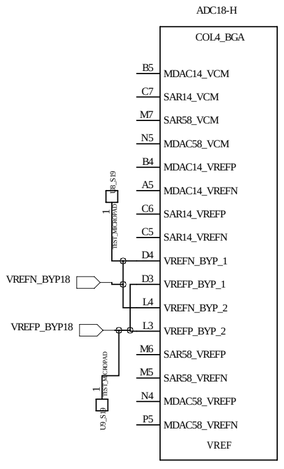

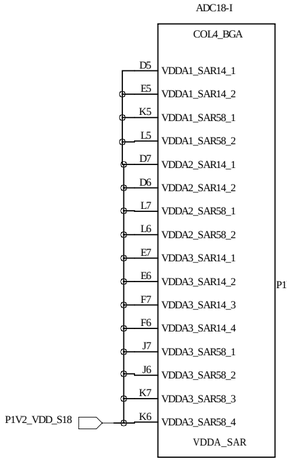

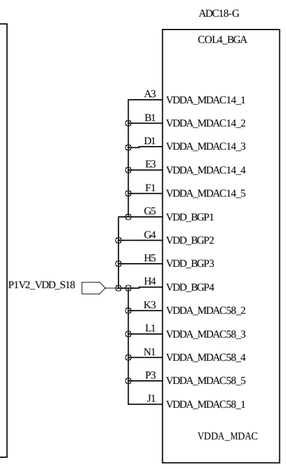

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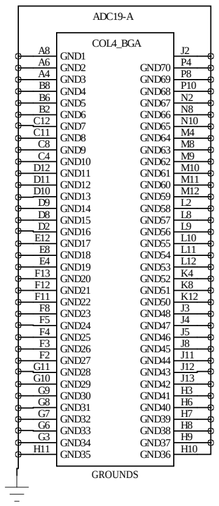

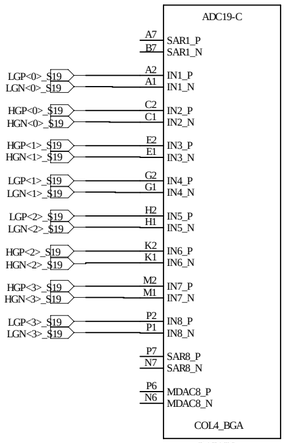

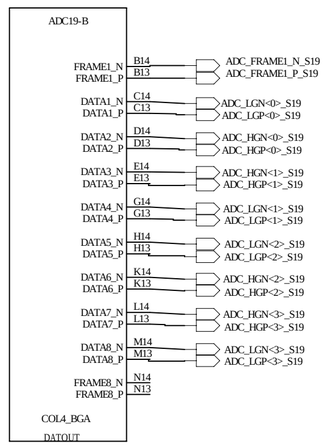

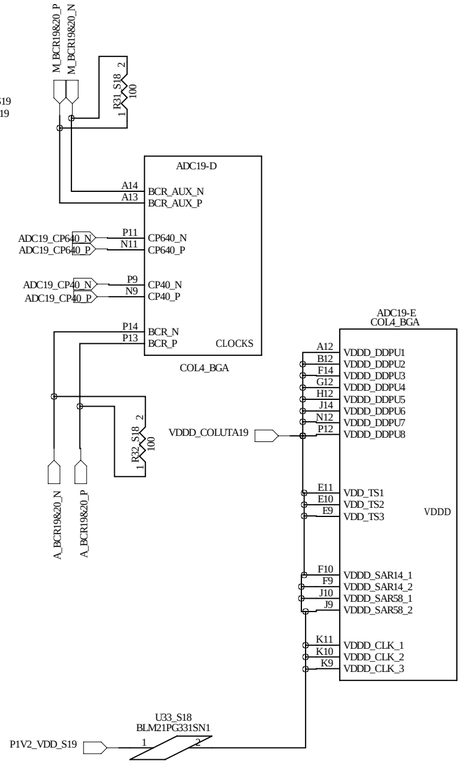

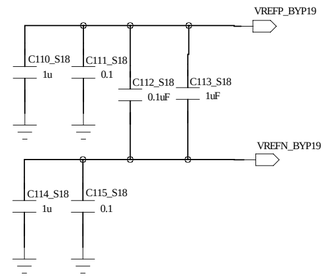

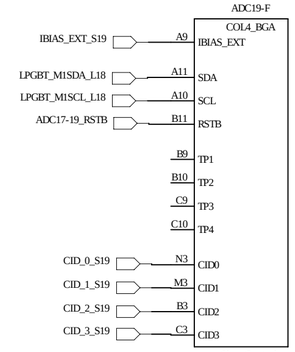

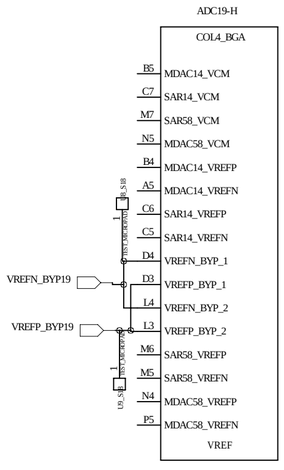

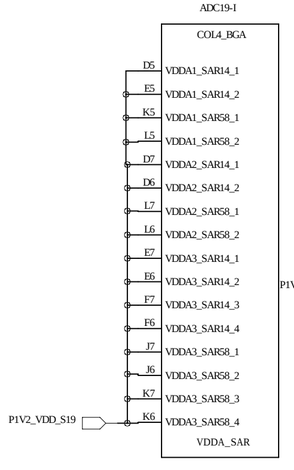

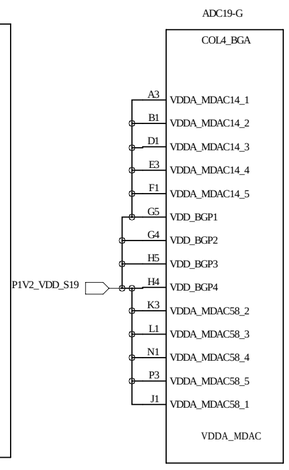

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RC2_L17 DNP
RC3_L17 DNP
RC4_L17 DNP
RS1_L17
LPGBT14_ADR0
LPGBT14_ADR1
LPGBT14_ADR2
LPGBT14_ADR3
CAY16-221J4LF
0001
RC5_L17 3k
RC6_L17 DNP
RC7_L17 DNP
RC8_L17 3k
RS2_L17
LPGBT14_MOD0
LPGBT14_MOD1
LPGBT14_MOD2
LPGBT14_MOD3
CAY16-221J4LF
Simplex TX 10GHz FEC5 mode 1001
RC9_L17 DNP
RC10_L17 DNP
RC11_L17 DNP
RC12_L17 DNP
RS3_L17
LPGBT14_BOOTCNF1
LPGBT14_LOCKMODE
LPGBT14_STATEOVRD
LPGBT14_PORDIS
CAY16-221J4LF
Lock to external 40MHz
LPGBT14_BOOTCNF0
RC13_L17 3k
LPGBT14-A
LPGBT_V1
ADC_LGN<0>_S17
ADC_LGP<0>_S17
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LPGBT14-B
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ADC17_CP640_N
ADC17_CP640_P
ADC18_CP640_N
ADC18_CP640_P
LPGBT14-F
LPGBT_V1
PSCLK0N PSCLK0P PSCLK1N PSCLK1P PSCLK2N PSCLK2P PSCLK3N PSCLK3P
ALFE_CP40N_S17
ALFE_CP40P_S17
ADC17_CP40_N
ADC17_CP40_P
LPGBT14-G
LPGBT_V1
HSINN HSINP HSOUTP HSOUTN
LPGBT14_HSOUTP
LPGBT14_HSOUTN
LPGBT14-H
LPGBT_V1
TSTOUT0 TSTOUT1 TSTOUT2 TSTOUT3 TSTOUT4P TSTOUT4N TSTOUT5N TSTOUT5P
TSTCLKINN TSTCLKINP
LPGBT14-D
LPGBT_V1
VDD1V2_1 VDD1V2_2 VDD1V2_3 VDD1V2_4 VDD1V2_5 VDD1V2_6 VDD1V2_7 VDD1V2_8 VDD1V2_9 VDD1V2_10 VDD1V2_11 VDD1V2_12 VDD1V2_13 VDD1V2_14 VDD1V2_15 VDD1V2_16 VDD1V2_17 VDD1V2_18 VDD1V2_19
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VDDA1V2_2 VDDA1V2_1
GNDA_2 GNDA_1
VDDF2V5_2 VDDF2V5_1
VDDF2P5_LPGBT14
VREF_2 VREF_1
C29_M17 22u
C31_M17 DNP
C33_M17 22u
C34_M17 100n
C35_M17 DNP
VO4 VO5 GND1 GND2 VI1 VI2
LDO_LPGBT14
SGCPMU_CRN01
VO3 VO2 VO1 VFB OCSNS TEST GND3
VI3 VI4 VI5 T3 OCZ_ATB PG
P50MV M50MV GND_AGND1 GND_AGND2 EN SOFTST
+1.4V_SLICE17-18
R_2_M17 20k
R_1_M17 243
R_3_M17 510k
R_4_M17 1.2k
R_5_M17 1.2k
R201 1k
C1_L17 10u
C2_L17 10u
C3_L17 4.7u
C4_L17 4.7u
C5_L17 4.7u
C6_L17 2.2u
C7_L17 2.2u
C8_L17 2.2u
C9_L17 2.2u
C10_L17 2.2u
C11_L17 100n
C12_L17 100n
C13_L17 100n
C14_L17 100n
C15_L17 100n
C16_L17 100n
C17_L17 100n
C18_L17 100n
C19_L17 100n
C20_L17 100n
C21_L17 100n
C22_L17 100n
C23_L17 2.2n
C24_L17 2.2n
C25_L17 2.2n
C26_L17 2.2n
C27_L17 2.2n
C28_L17 2.2n
C29_L17 2.2n
C30_L17 470p
C31_L17 470p
C32_L17 220p
C33_L17 220p
C34_L17 220p
LPGBT14-E
LPGBT_V1
LPGBT14-24_RSTB
LPGBT14_ADR0
LPGBT14_ADR1
LPGBT14_ADR2
LPGBT14_ADR3
LPGBT14_MOD0
LPGBT14_MOD1
LPGBT14_MOD2
LPGBT14_MOD3
MCLK14N
MCLK14P
LPGBT14_BOOTCNF1
LPGBT14_LOCKMODE
LPGBT14_STATEOVRD
LPGBT14_PORDIS
LPGBT14_BOOTCNF0
RSTB READY
ADR0 ADR1 ADR2 ADR3
SLSDA SLSCL
MODE0 MODE1 MODE2 MODE3
REFCLKN REFCLKP
BOOTCNF1 LOCKMODE STATEOVRD PORDIS BOOTCNF0
LPGBT14_RDY
LPGBT13_M1SDA
LPGBT13_M1SCL
U27
LTST-C190GKT
100 R_98
VTRX+_2P5
U1_S17
1k R_128
LPGBT14_VDD
R4_L17 2.2k
R5_L17 2.2k
LPGBT_M2SDA_L17
LPGBT_M2SCL_L17
R6_L17 2.2k
R7_L17 2.2k
LPGBT_M1SDA_L17
LPGBT_M1SCL_L17
R8_L17 2.2k
R9_L17 2.2k
LPGBT_M0SDA_L17
LPGBT_M0SCL_L17
T57 MMM_TP LPGBT_M2SDA_L17
T52 MMM_TP LPGBT_M2SCL_L17
T53 MMM_TP LPGBT_M1SDA_L17
T54 MMM_TP LPGBT_M1SCL_L17
T55 MMM_TP LPGBT_M0SDA_L17
T56 MMM_TP LPGBT_M0SCL_L17
PA17_+1.2V_MON
PA18_+1.2V_MON
VTRX5_1P2_MON
PA17-19_RSTB
VTRX+6_RSTN
EDOUTECN_L13
EDOUTECP_L13
LPGBT_V1
ADC0 ADC1 ADC2 ADC3 ADC4 ADC5 ADC6 ADC7
VDAC
M2SDA M2SCL M1SDA M1SCL M0SDA M0SCL
RSTOUTB
GPIO0 GPIO1 GPIO2 GPIO3 GPIO4 GPIO5 GPIO6 GPIO7 GPIO8 GPIO9 GPIO10 GPIO11 GPIO12 GPIO13 GPIO14 GPIO15
ECLK28P ECLK28N
EDINECN EDINECP
EDOUTECP EDOUTECN
LPGBT14_M2SDA_L17
LPGBT14_M2SCL_L17
LPGBT14_M1SDA_L17
LPGBT14_M1SCL_L17
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EDOUTECP_L14-24
EDOUTECN_L14-24

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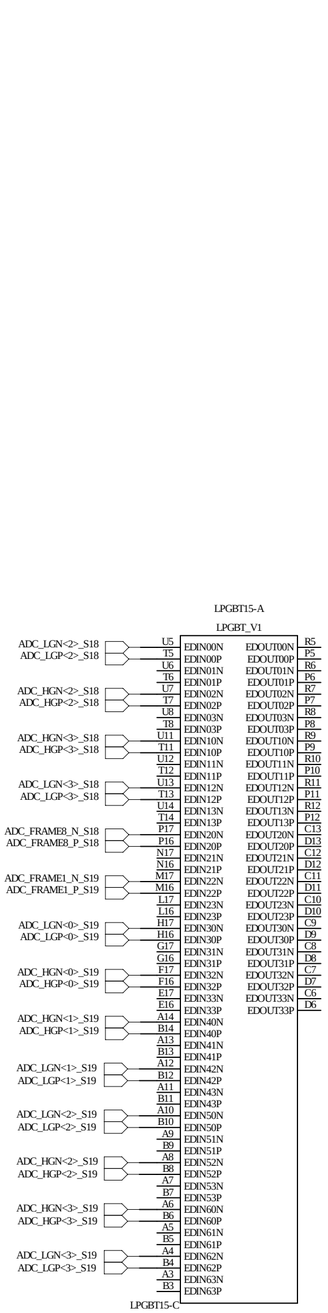

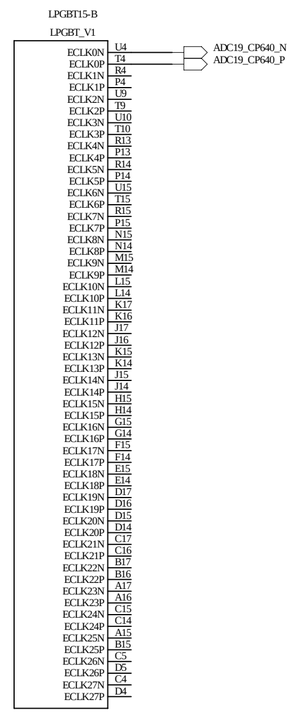

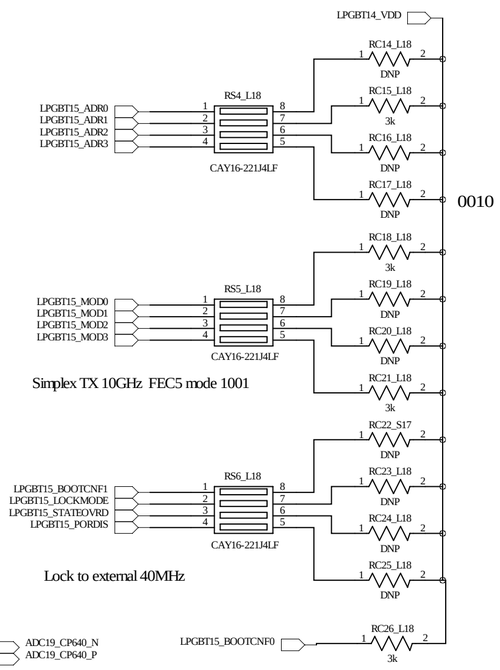

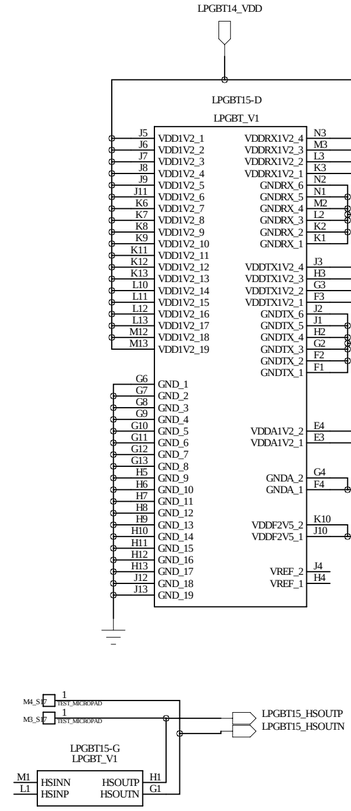

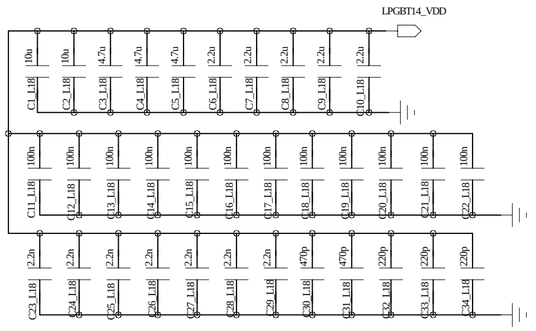

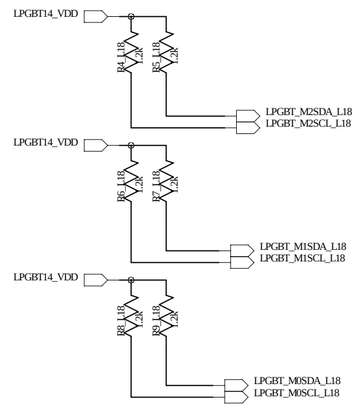

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COMPANY: Nevis Laboratories of Columbia University

TITLE: FEB2 prototype v2.0

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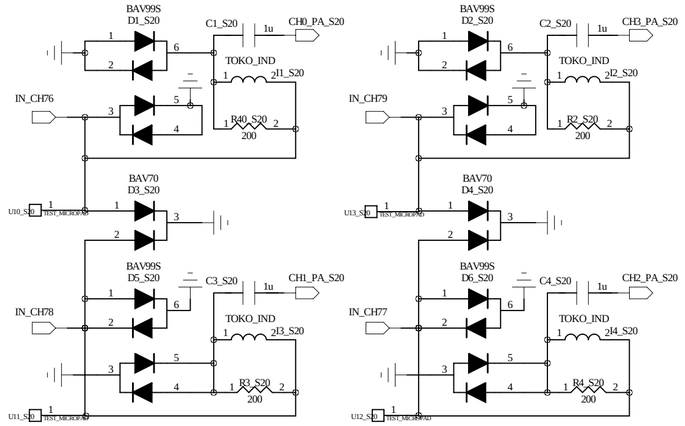

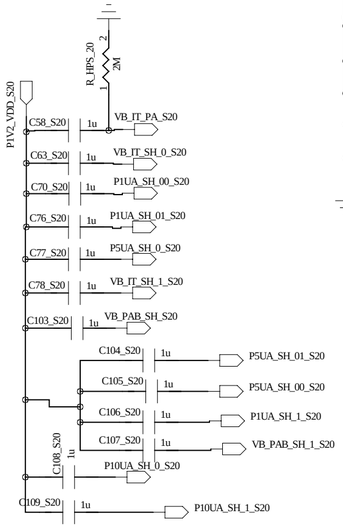

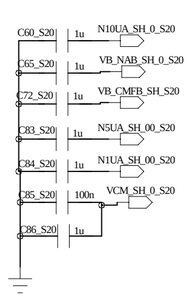

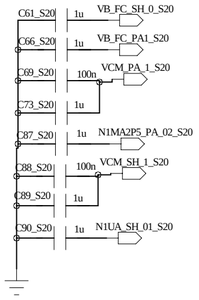

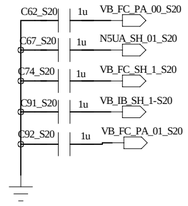

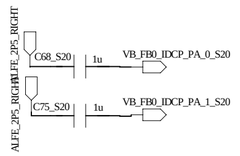

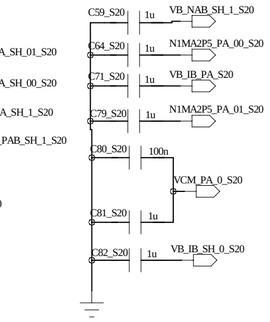

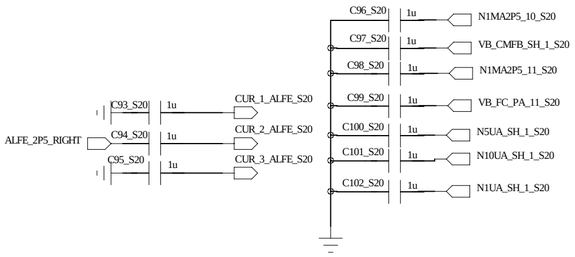

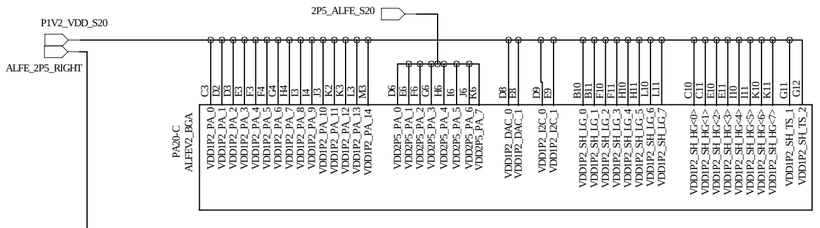

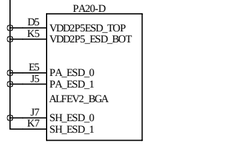

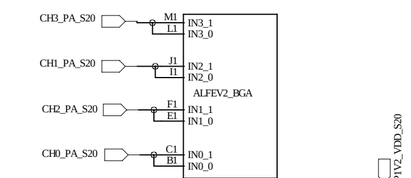

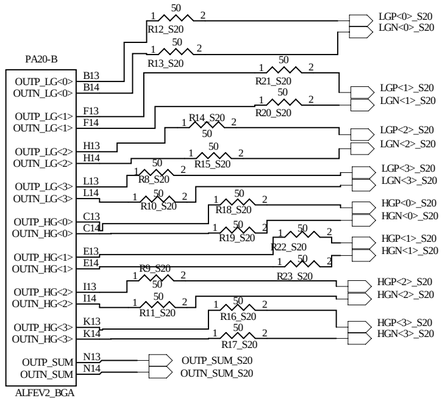

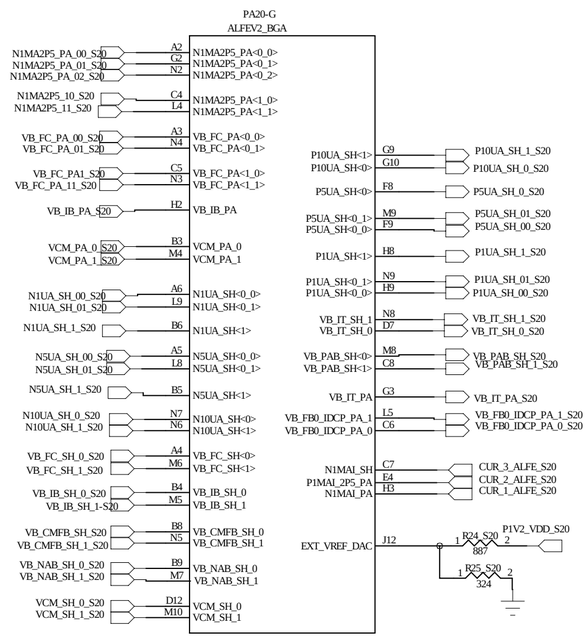

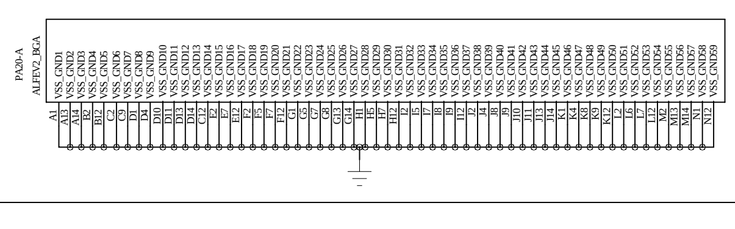

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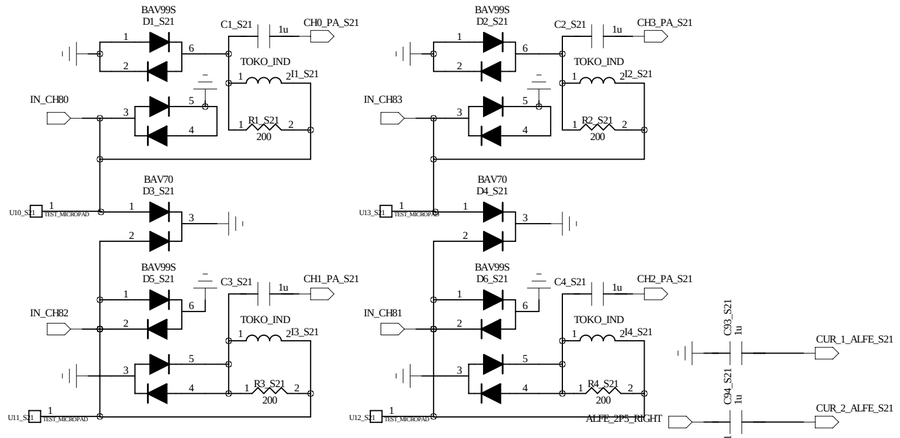

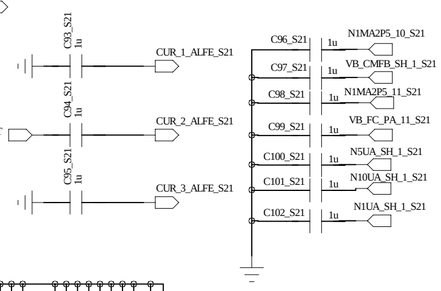

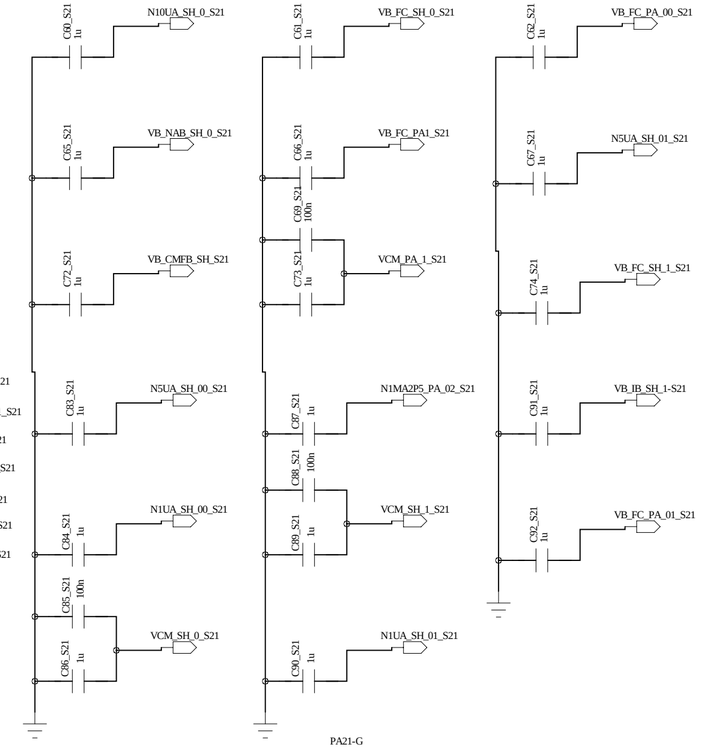

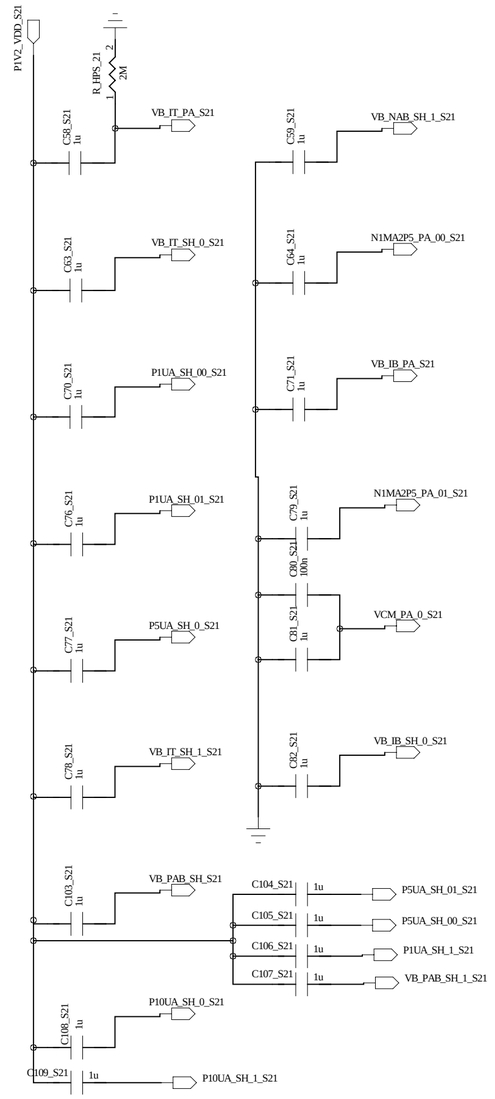

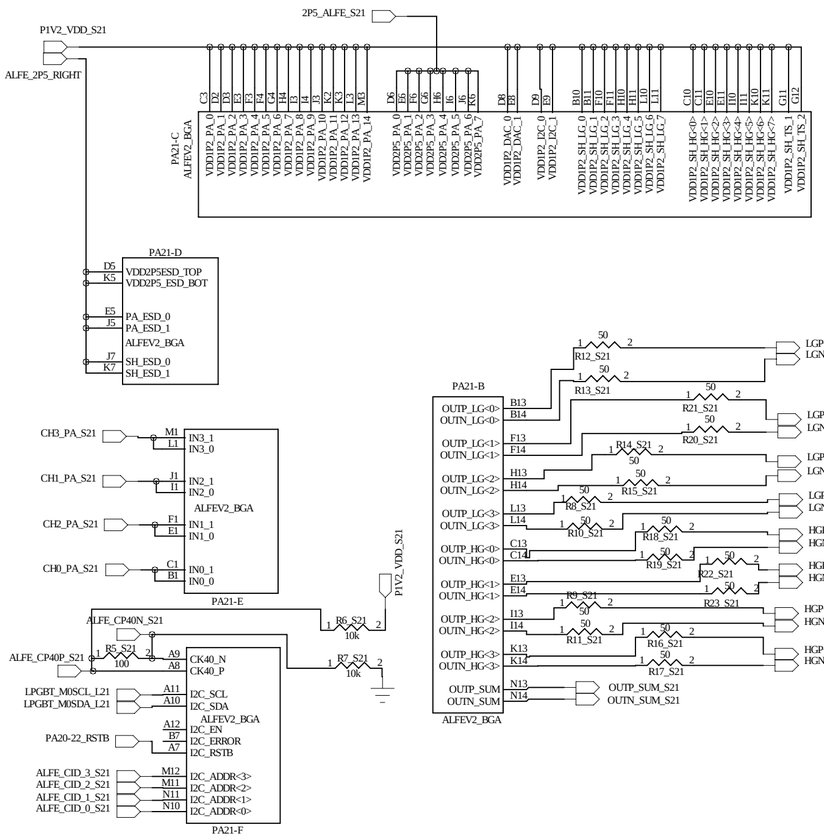

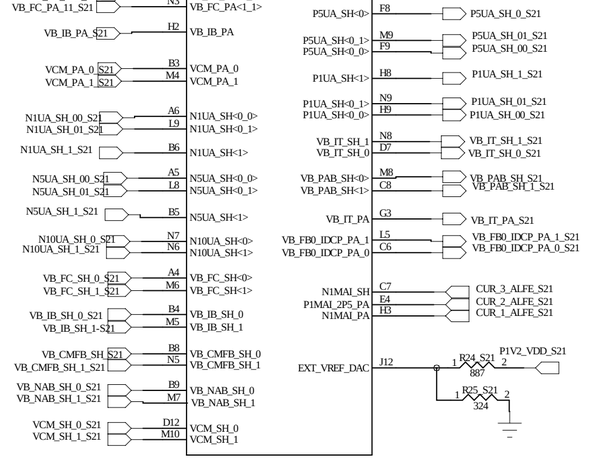

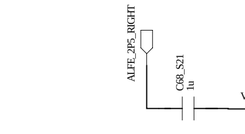

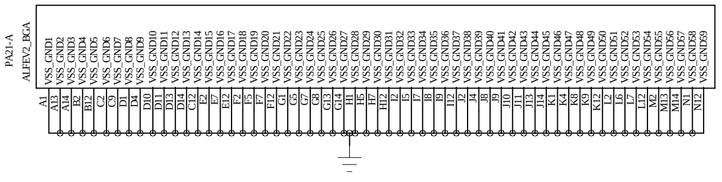

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COMPANY: Nevis Laboratories of Columbia University

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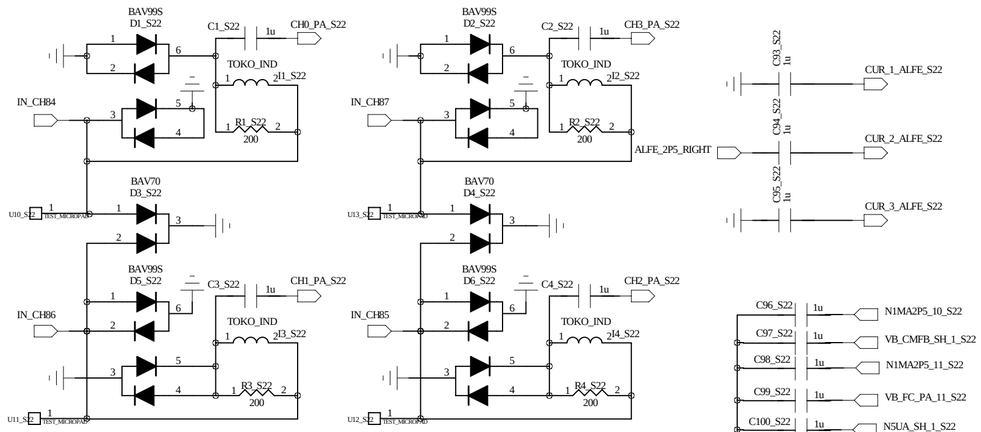

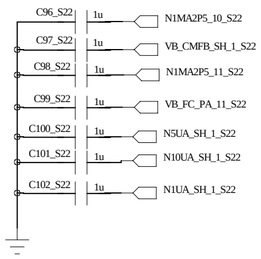

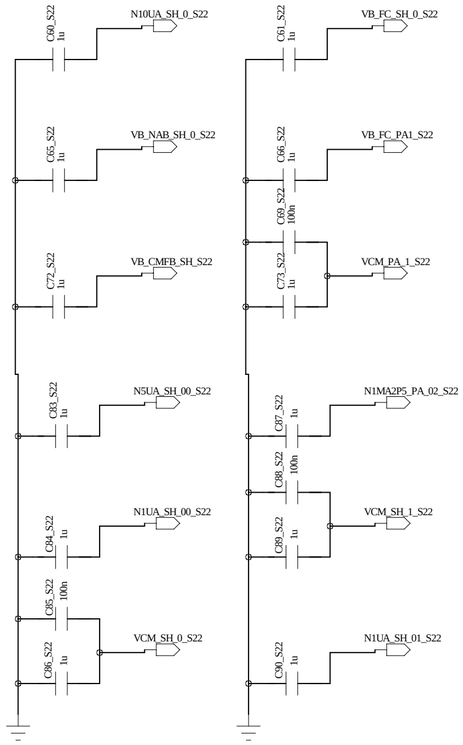

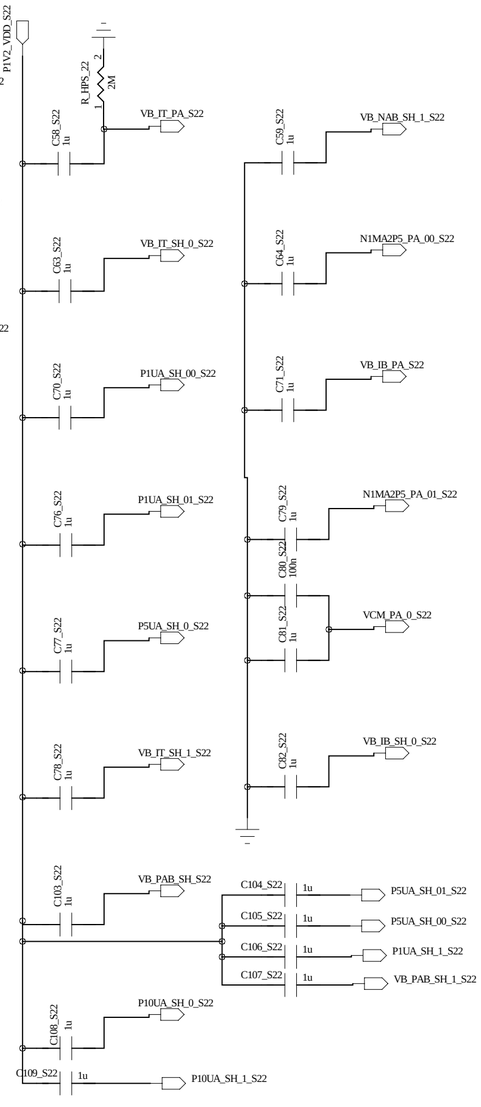

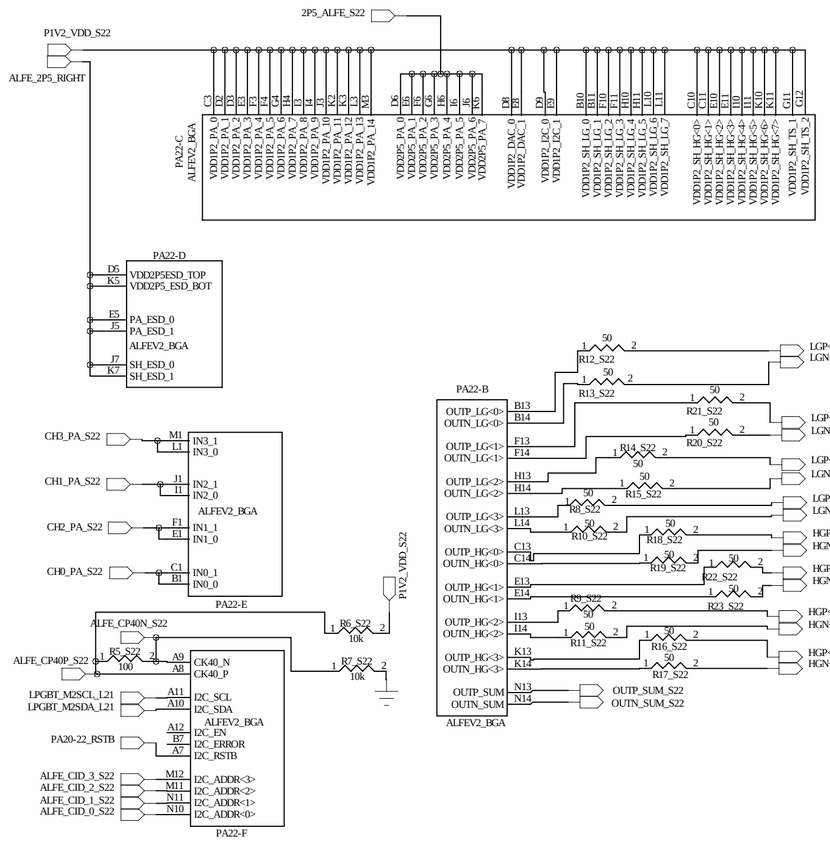

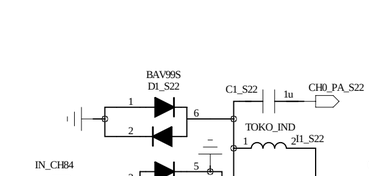

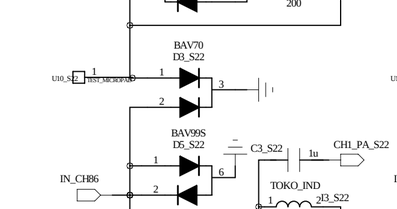

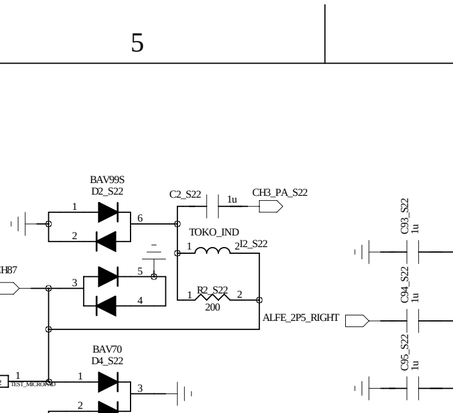

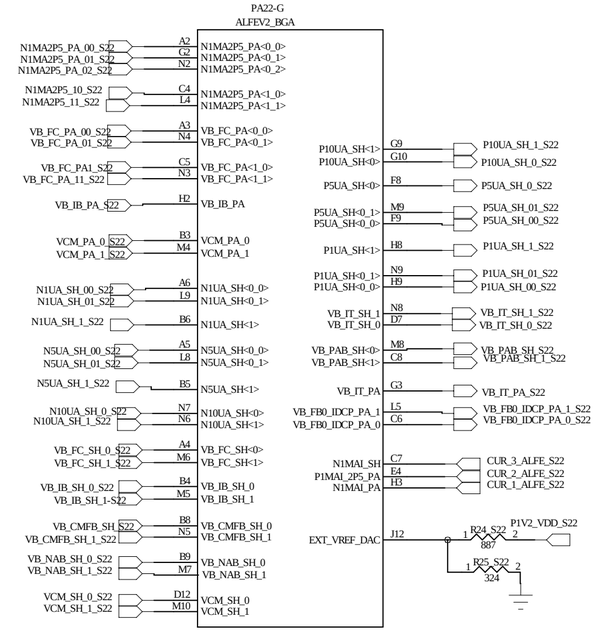

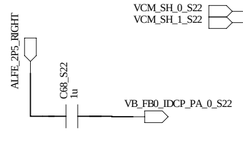

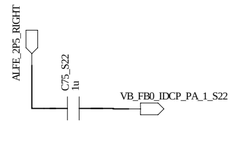

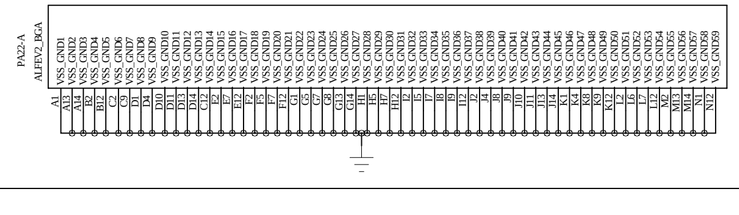

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COMPANY: Nevis Laboratories of Columbia University

TITLE: FEB2 prototype v2.0

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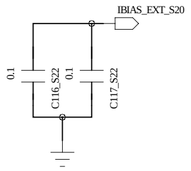

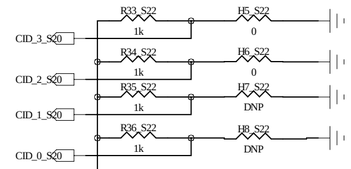

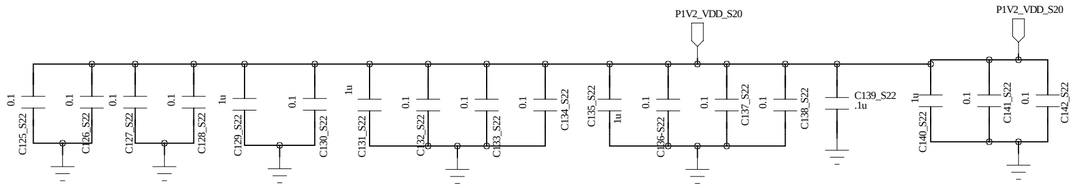

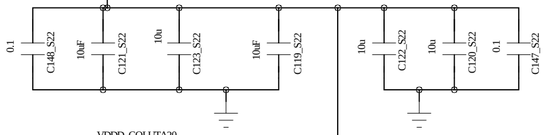

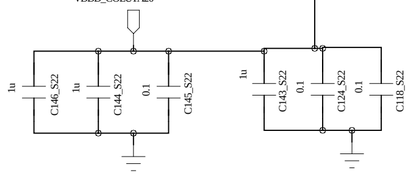

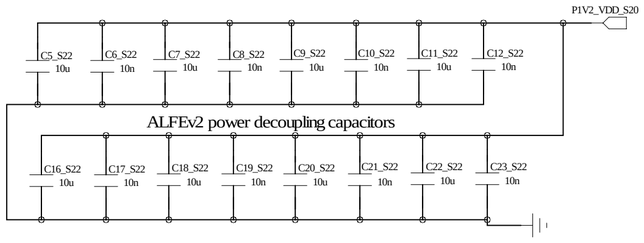

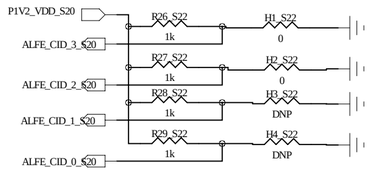

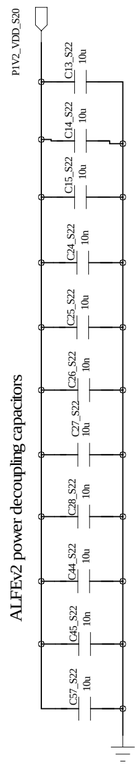

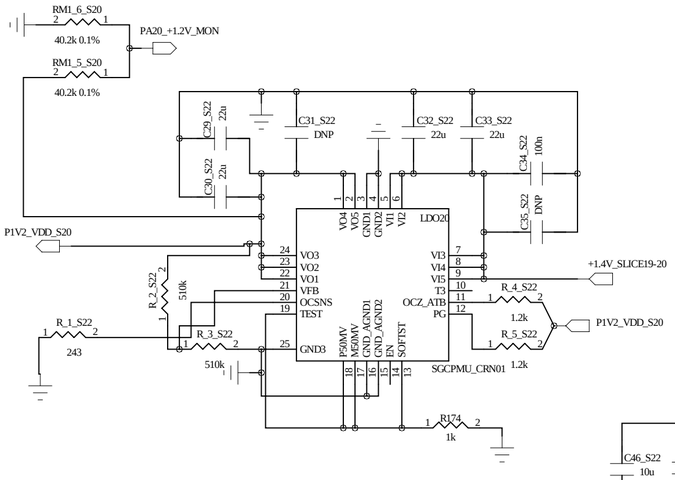

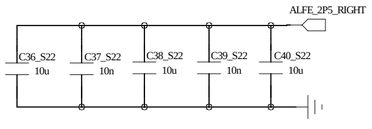

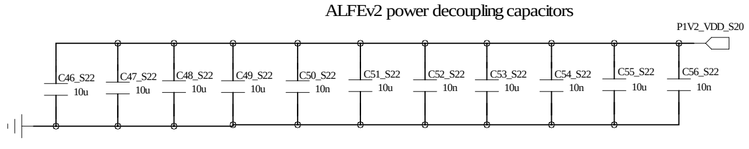

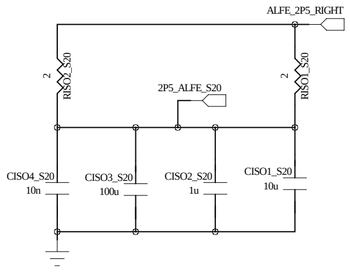

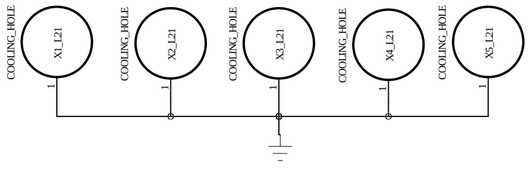

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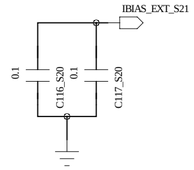

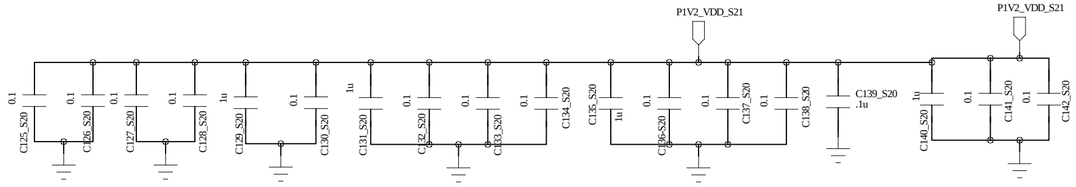

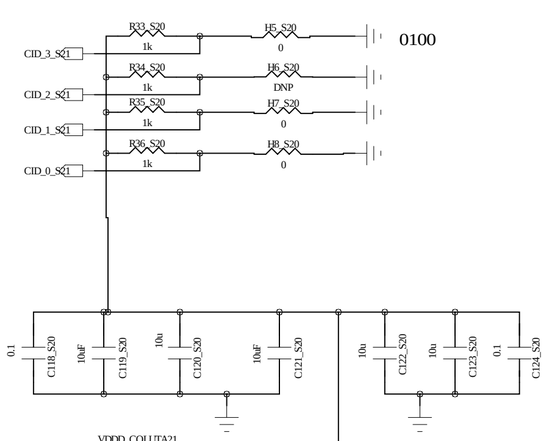

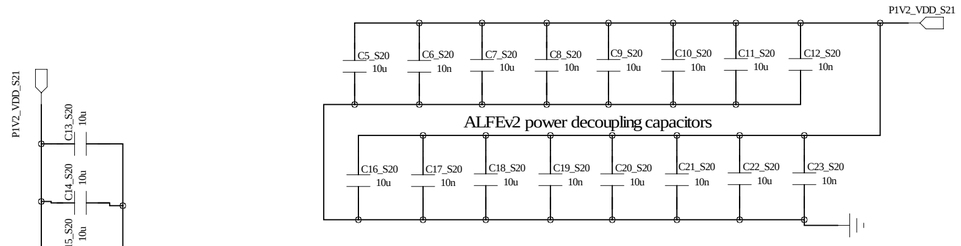

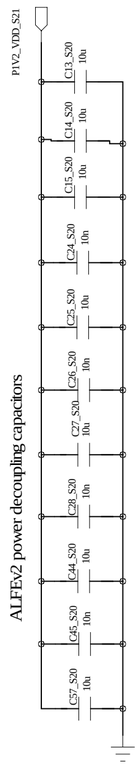

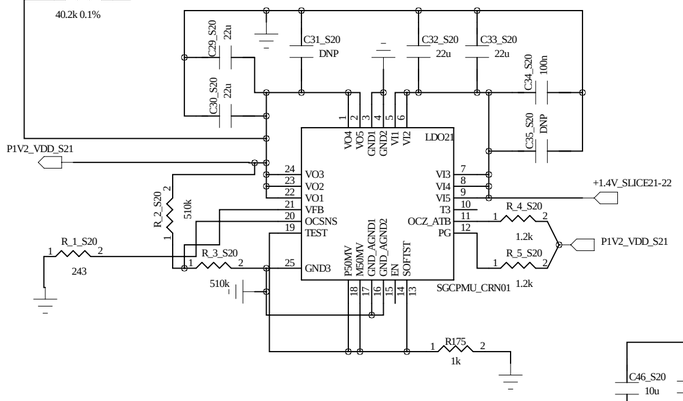

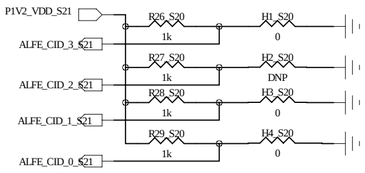

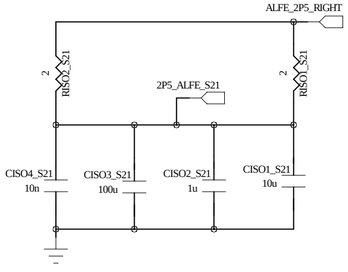

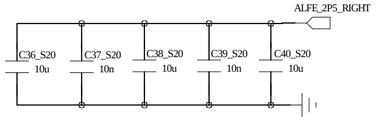

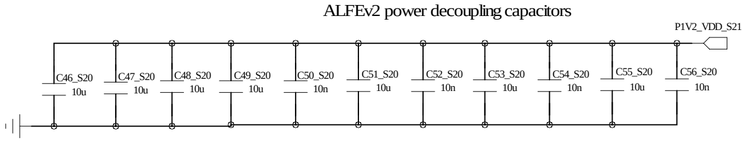

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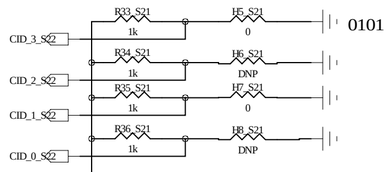

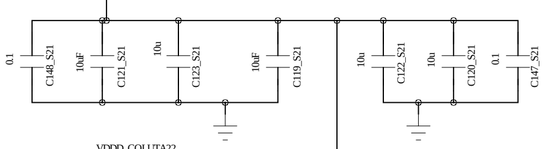

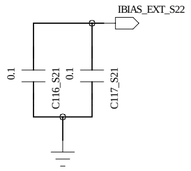

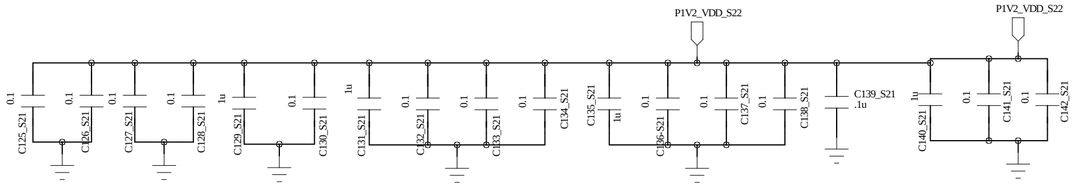

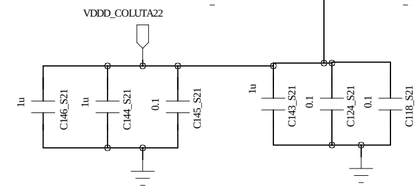

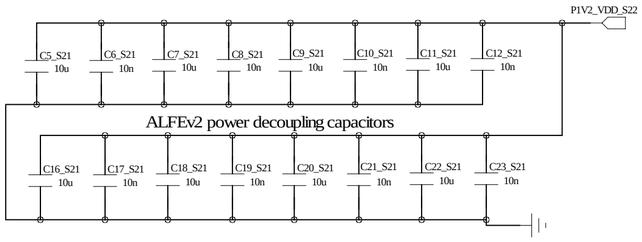

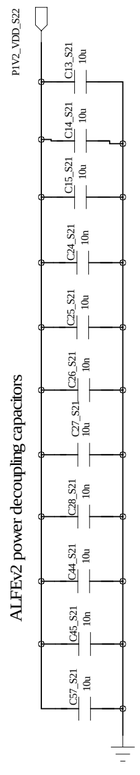

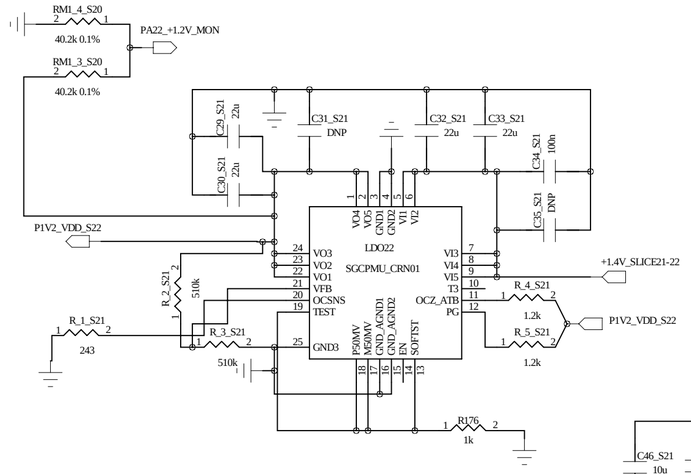

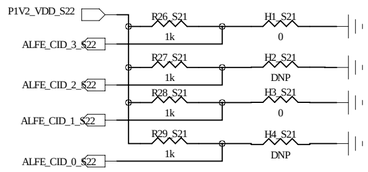

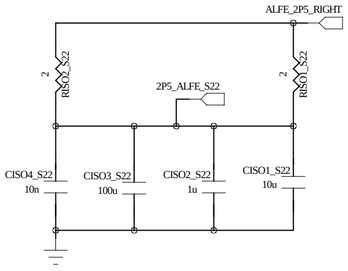

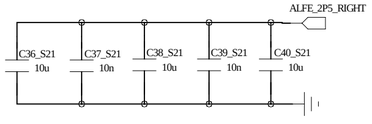

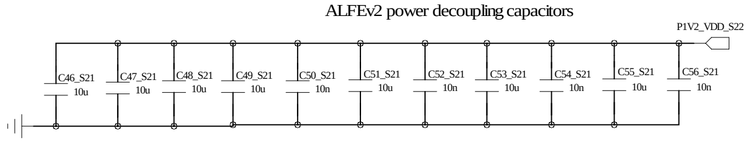

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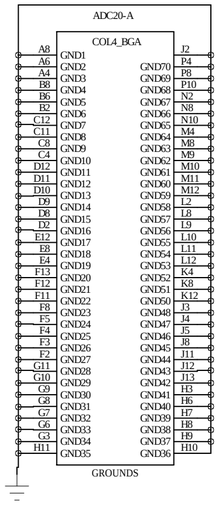

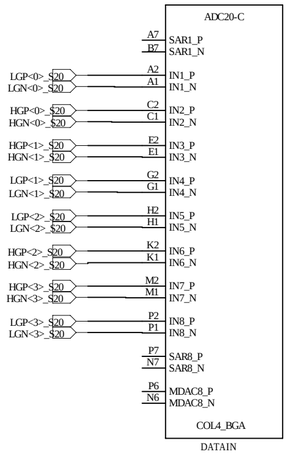

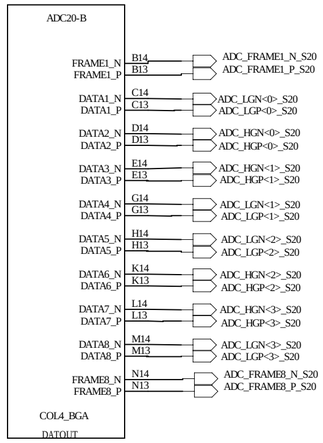

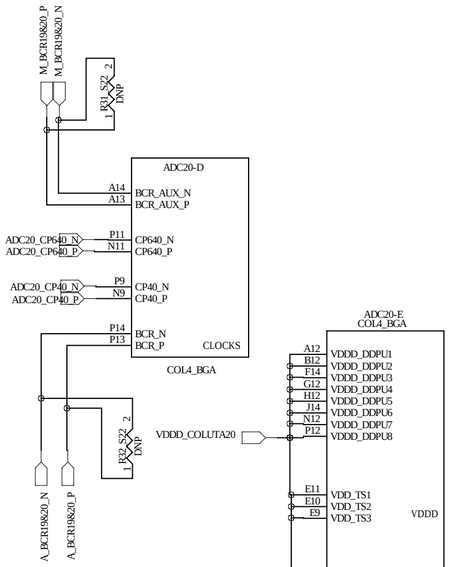

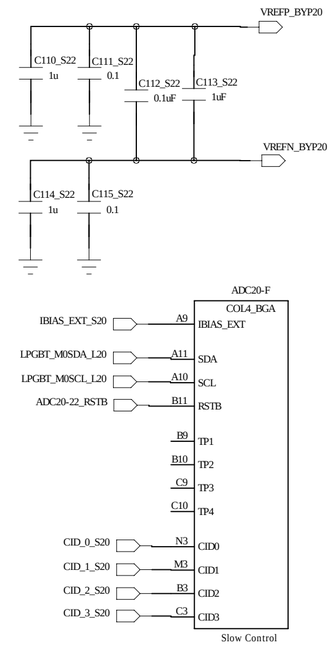

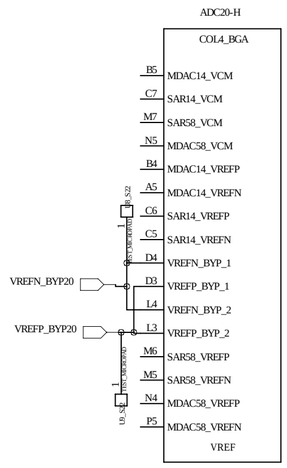

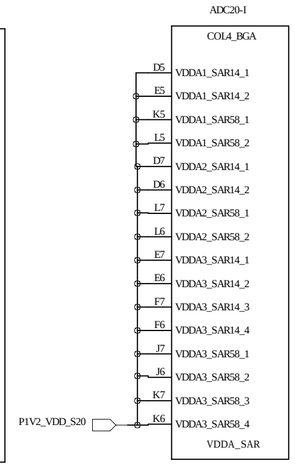

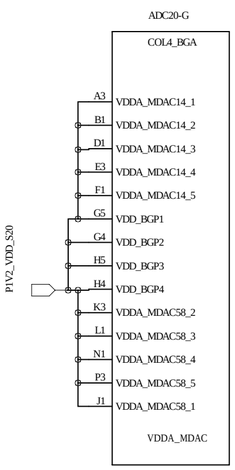

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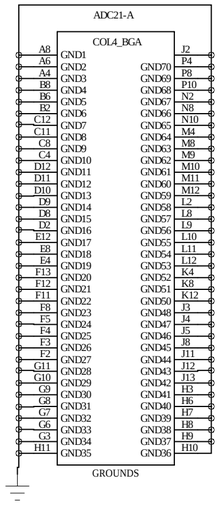

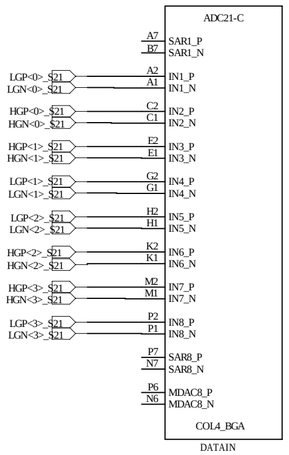

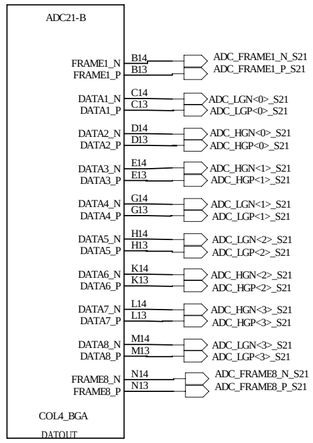

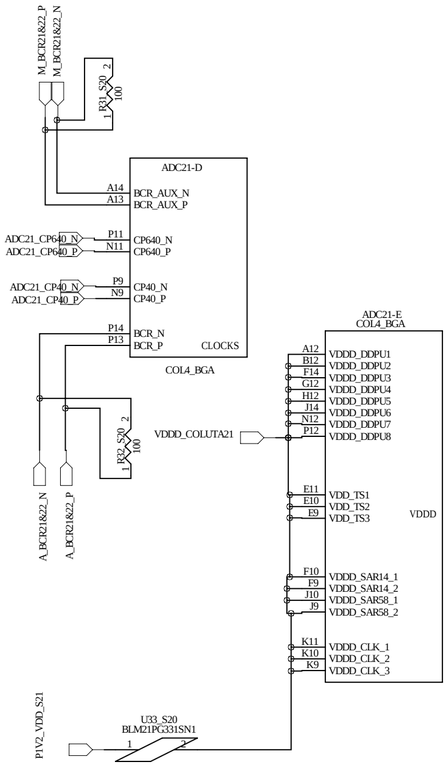

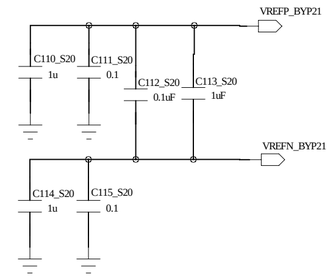

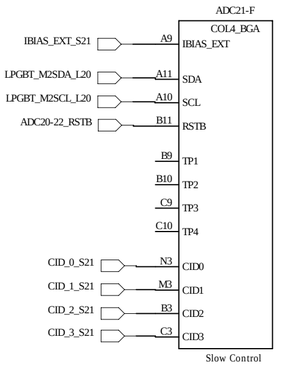

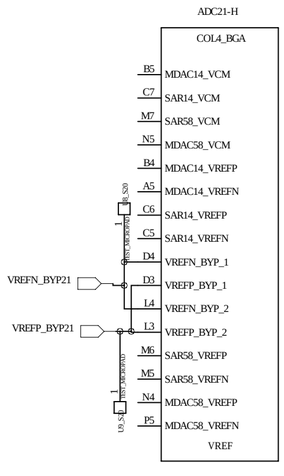

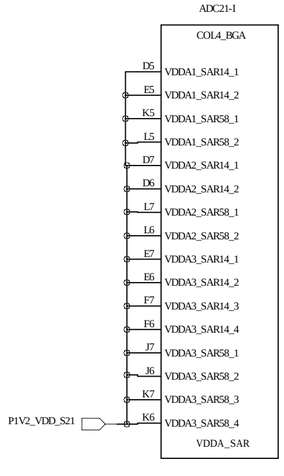

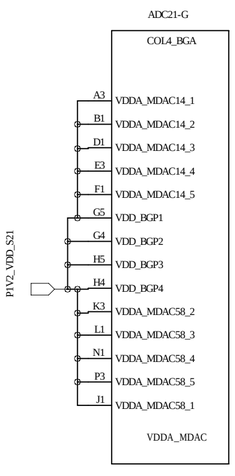

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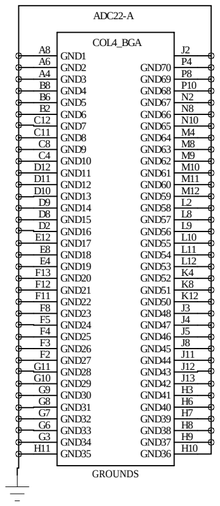

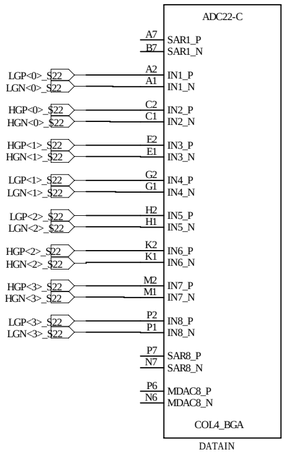

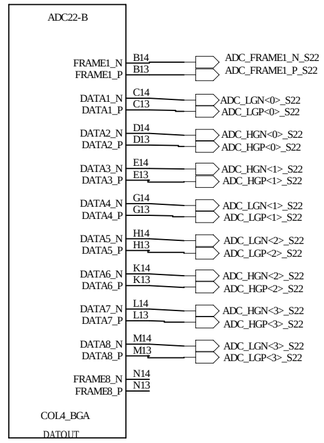

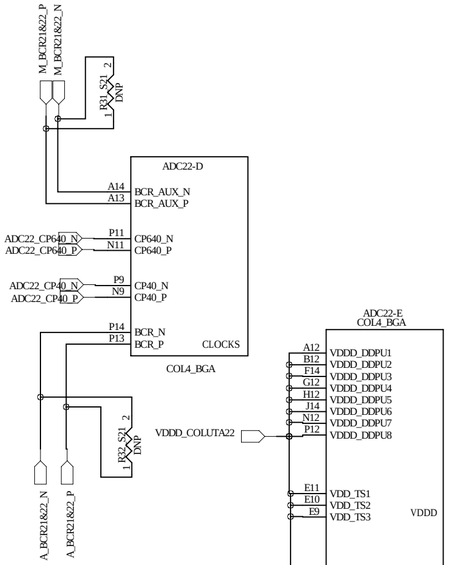

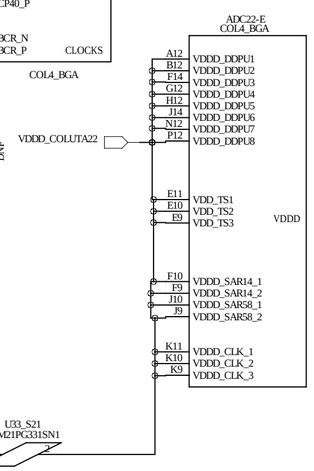

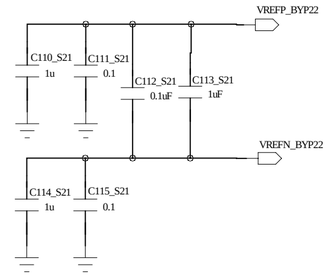

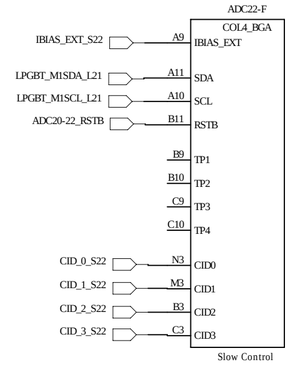

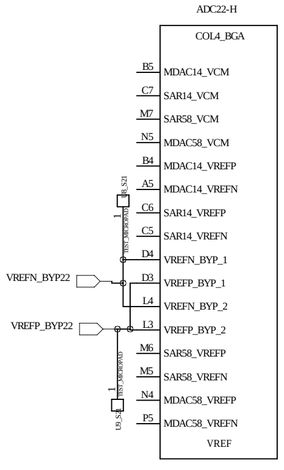

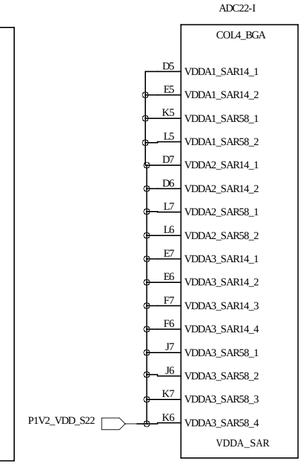

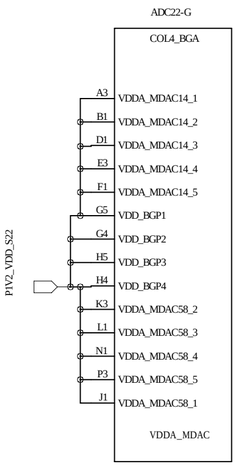

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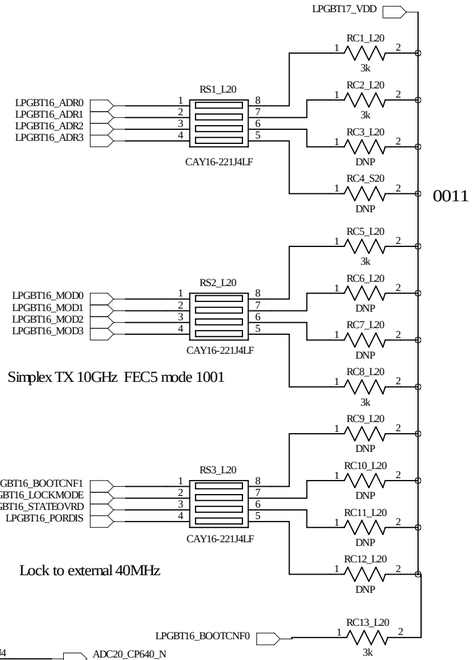

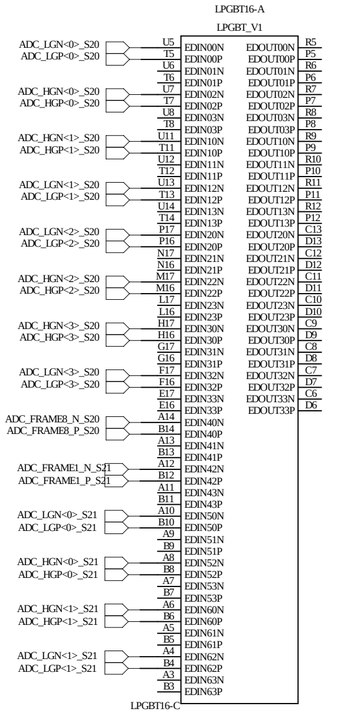

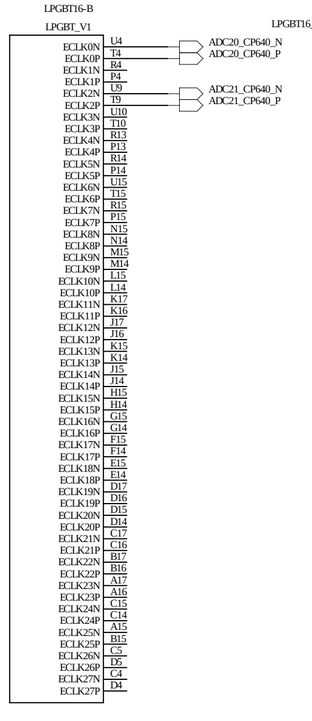

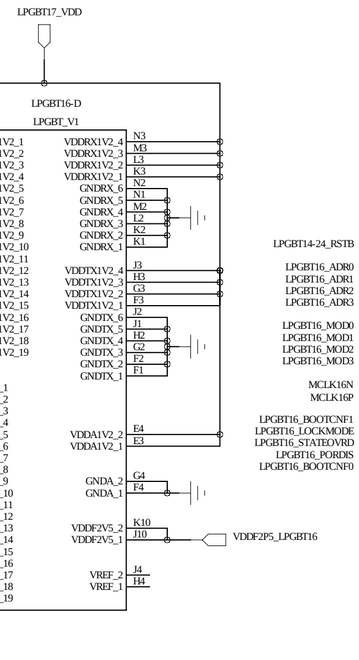

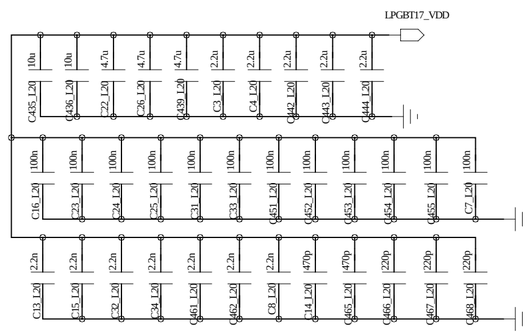

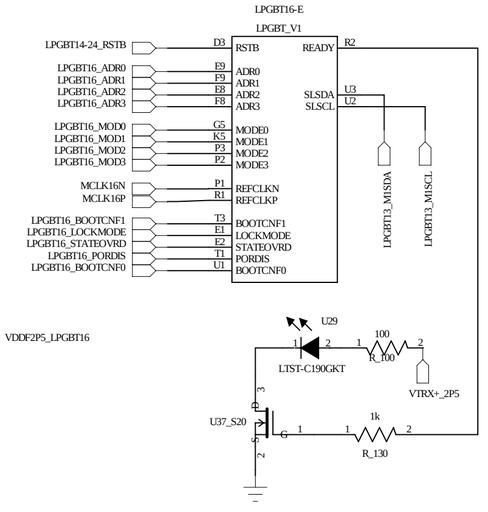

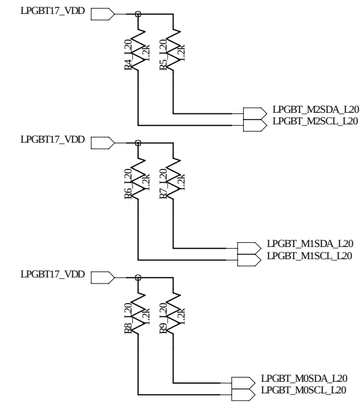

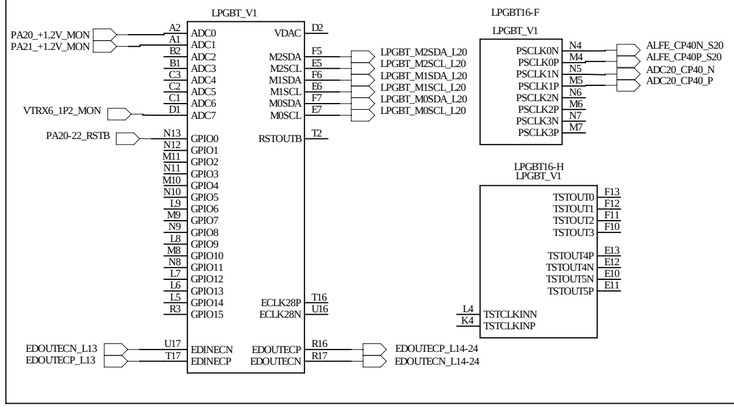

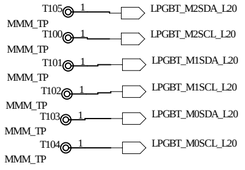

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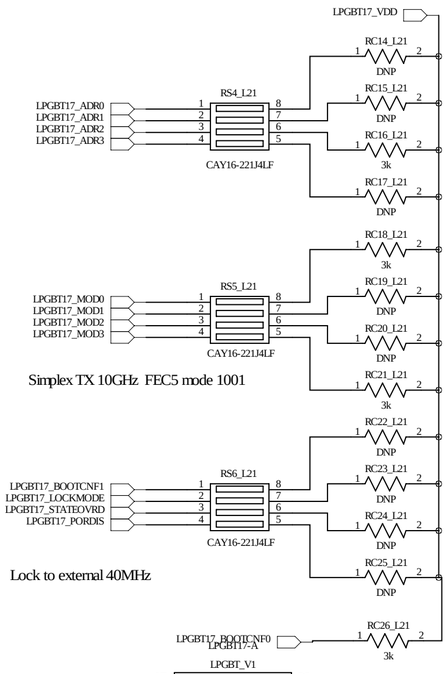

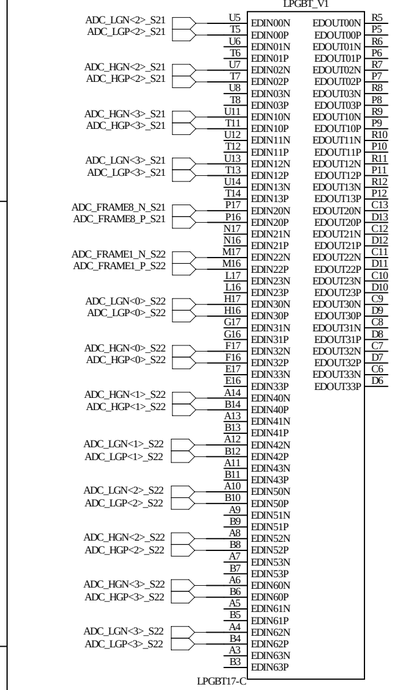

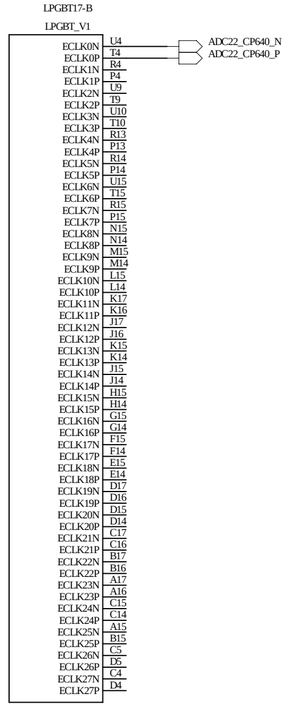

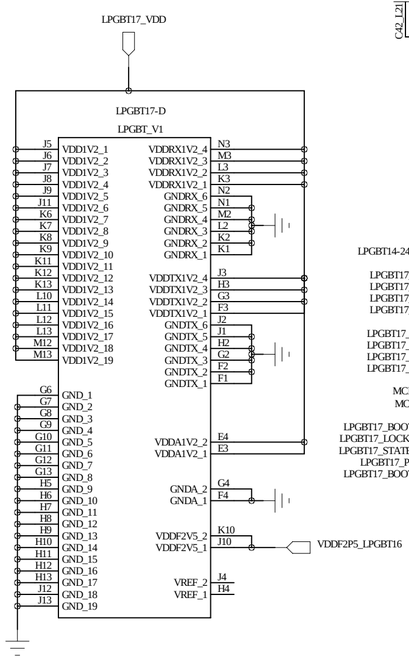

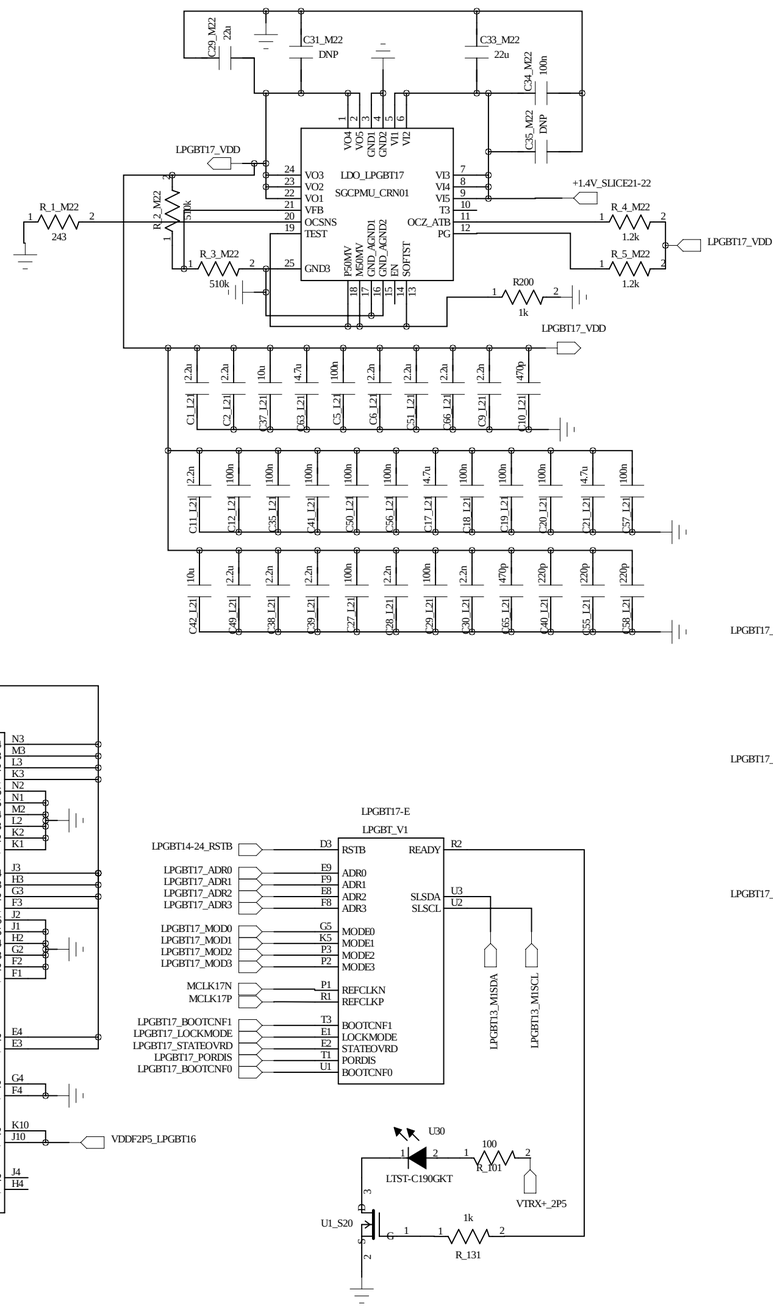

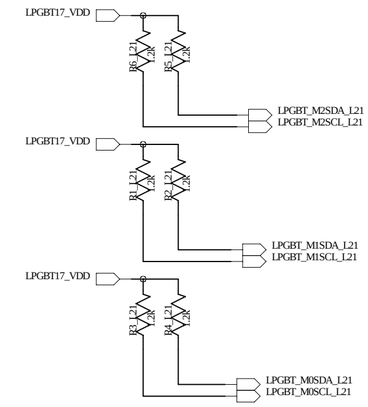

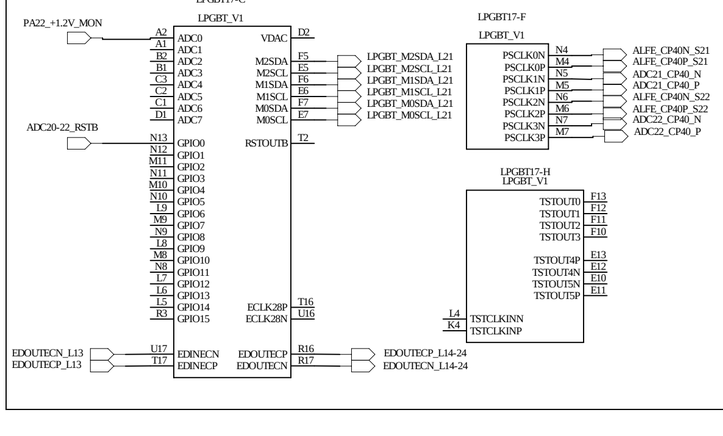

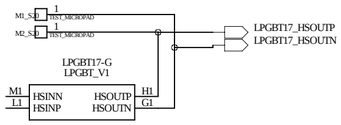

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BAV99S D1_S23 · C1_S23 1u · CH0_PA_S23 · TOKO_IND L1_S23 · IN_CH88 · R1_S23 200 · TEST_MICROPAD T3_S23
BAV99S D2_S23 · C2_S23 1u · CH3_PA_S23 · TOKO_IND L2_S23 · IN_CH91 · R2_S23 200 · ALFE_2P5_RIGHT · TEST_MICROPAD T3_S23
BAV70 D3_S23
BAV70 D4_S23
BAV99S D5_S23 · C3_S23 1u · CH1_PA_S23 · TOKO_IND L3_S23 · IN_CH90 · R3_S23 200 · TEST_MICROPAD T3_S23
BAV99S D6_S23 · C4_S23 1u · CH2_PA_S23 · TOKO_IND L4_S23 · IN_CH89 · R4_S23 200 · TEST_MICROPAD U12_S23

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C94_S23 1u · CUR_2_ALFE_S23
C95_S23 1u · CUR_3_ALFE_S23

C96_S23 1u · N1MA2P5_10_S23
C97_S23 1u · VB_CMFB_SH_1_S23
C98_S23 1u · N1MA2P5_11_S23
C99_S23 1u · VB_FC_PA_11_S23
C100_S23 1u · N5UA_SH_1_S23
C101_S23 1u · N10UA_SH_1_S23
C102_S23 1u · N1UA_SH_1_S23

C60_S23 1u · N10UA_SH_0_S23
C65_S23 1u · VB_NAB_SH_0_S23
C72_S23 1u · VB_CMFB_SH_S23
C88_S23 1u · N5UA_SH_00_S23
C84_S23 1u · N1UA_SH_00_S23
C85_S23 100n
C86_S23 1u · VCM_SH_0_S23

C61_S23 1u · VB_FC_SH_0_S23
C66_S23 1u · VB_FC_PA1_S23
C69_S23 100n
C73_S23 1u · VCM_PA_1_S23
C87_S23 1u · N1MA2P5_PA_02_S23
C68_S23 100n
C89_S23 1u · VCM_SH_1_S23
C90_S23 1u · N1UA_SH_01_S23

C62_S23 1u · VB_FC_PA_00_S23
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C91_S23 1u · VB_IB_SH_1-S23
C92_S23 1u · VB_FC_PA_01_S23

P1V2_VDD_S23
R_HPS_23 2M
C58_S23 1u · VB_IT_PA_S23
C63_S23 1u · VB_IT_SH_0_S23
C70_S23 1u · P1UA_SH_00_S23
C76_S23 1u · P1UA_SH_01_S23
C77_S23 1u · P5UA_SH_0_S23
C78_S23 1u · VB_IT_SH_1_S23
C103_S23 1u · VB_PAB_SH_S23
C108_S23 1u · P10UA_SH_0_S23
C109_S23 1u · P10UA_SH_1_S23

C59_S23 1u · VB_NAB_SH_1_S23
C64_S23 1u · N1MA2P5_PA_00_S23
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C79_S23 1u · N1MA2P5_PA_01_S23
C80_S23 100n
C81_S23 1u · VCM_PA_0_S23
C82_S23 1u · VB_IB_SH_0_S23
C104_S23 1u · P5UA_SH_01_S23
C105_S23 1u · P5UA_SH_00_S23
C106_S23 1u · P1UA_SH_1_S23
C107_S23 1u · VB_PAB_SH_1_S23

2P5_ALFE_S23 · P1V2_VDD_S23 · ALFE_2P5_RIGHT

PA23-C ALFEV2_BGA
VDD1P2_PA_0 C3 · VDD1P2_PA_1 D2 · VDD1P2_PA_2 E3 · VDD1P2_PA_3 F3 · VDD1P2_PA_4 F4 · VDD1P2_PA_5 G4 · VDD1P2_PA_6 H4 · VDD1P2_PA_7 I3 · VDD1P2_PA_8 J4 · VDD1P2_PA_9 J3 · VDD1P2_PA_10 K2 · VDD1P2_PA_11 K3 · VDD1P2_PA_12 L3 · VDD1P2_PA_13 M3 · VDD1P2_PA_14
VDD2P5_PA_0 D6 · VDD2P5_PA_1 E6 · VDD2P5_PA_2 F6 · VDD2P5_PA_3 G6 · VDD2P5_PA_4 H6 · VDD2P5_PA_5 J6 · VDD2P5_PA_6 K6 · VDD2P5_PA_7
VDD1P2_DAC_0 D8 · VDD1P2_DAC_1 E8
VDD1P2_DC_0 D9 · VDD1P2_DC_1 E9
VDD1P2_SH_LG_0 B10 · VDD1P2_SH_LG_1 B11 · VDD1P2_SH_LG_2 F10 · VDD1P2_SH_LG_3 F11 · VDD1P2_SH_LG_4 H10 · VDD1P2_SH_LG_5 H11 · VDD1P2_SH_LG_6 L10 · VDD1P2_SH_LG_7 L11
VDD1P2_SH_HG_0 C10 · VDD1P2_SH_HG_1 C11 · VDD1P2_SH_HG_2 E10 · VDD1P2_SH_HG_3 E11 · VDD1P2_SH_HG_4 I10 · VDD1P2_SH_HG_5 I11 · VDD1P2_SH_HG_6 K10 · VDD1P2_SH_HG_7 K11
VDD1P2_SH_TS_1 G11 · VDD1P2_SH_TS_2 G12

PA23-D
D5 VDD2P5ESD_TOP · K5 VDD2P5_ESD_BOT
E5 PA_ESD_0 · J5 PA_ESD_1 · ALFEV2_BGA · J7 SH_ESD_0 · K7 SH_ESD_1

PA23-B ALFEV2_BGA
OUTP_LG<0> B13 · OUTN_LG<0> B14 · R12_S23 50 · R13_S23 50 · LGP<0>_S23 · LGN<0>_S23
OUTP_LG<1> F13 · OUTN_LG<1> F14 · R21-S23 50 · R20_S23 50 · LGP<1>_S23 · LGN<1>_S23
OUTP_LG<2> H13 · OUTN_LG<2> H14 · R14_S23 50 · R15_S23 50 · LGP<2>_S23 · LGN<2>_S23
OUTP_LG<3> L13 · OUTN_LG<3> L14 · R8_S23 50 · R10_S23 50 · LGP<3>_S23 · LGN<3>_S23
OUTP_HG<0> C13 · OUTN_HG<0> C14 · R18_S23 50 · R19_S23 50 · HGP<0>_S23 · HGN<0>_S23
OUTP_HG<1> E13 · OUTN_HG<1> E14 · R22_S23 50 · R23_S23 50 · HGP<1>_S23 · HGN<1>_S23
OUTP_HG<2> I13 · OUTN_HG<2> I14 · R9_S23 50 · R11_S23 50 · HGP<2>_S23 · HGN<2>_S23
OUTP_HG<3> K13 · OUTN_HG<3> K14 · R16_S23 50 · R17_S23 50 · HGP<3>_S23 · HGN<3>_S23
OUTP_SUM N13 · OUTN_SUM N14 · OUTP_SUM_S23 · OUTN_SUM_S23

PA23-E ALFEV2_BGA
CH3_PA_S23 · M1 IN3_1 · L1 IN3_0
CH1_PA_S23 · J1 IN2_1 · I1 IN2_0
CH2_PA_S23 · F1 IN1_1 · E1 IN1_0
CH0_PA_S23 · C1 IN0_1 · B1 IN0_0
P1V2_VDD_S23 · R6_S23 10k

PA23-F ALFEV2_BGA
ALFE_CP40N_S23 · R5_S23 100 · ALFE_CP40P_S23 · A9 CK40_N · A8 CK40_P
R7_S23 10k
LPGBT_M1SCL_I23 · A11 I2C_SCL
LPGBT_M1SDA_I23 · A10 I2C_SDA
A12 I2C_EN
PA23-25_RSTB · B7 I2C_ERROR · A7 I2C_RSTB
ALFE_CID_3_S23 · M12 I2C_ADDR<3>
ALFE_CID_2_S23 · M11 I2C_ADDR<2>
ALFE_CID_1_S23 · N11 I2C_ADDR<1>
ALFE_CID_0_S23 · N10 I2C_ADDR<0>

PA23-A ALFEV2_BGA
VSS_GND1 A1 · VSS_GND2 A13 · VSS_GND3 A14 · VSS_GND4 B2 · VSS_GND5 B12 · VSS_GND6 C9 · VSS_GND7 D1 · VSS_GND8 D4 · VSS_GND9 D10 · VSS_GND10 D11 · VSS_GND11 D13 · VSS_GND12 D14 · VSS_GND13 E2 · VSS_GND14 E7 · VSS_GND15 E12 · VSS_GND16 F2 · VSS_GND17 F5 · VSS_GND18 F7 · VSS_GND19 F12 · VSS_GND20 G5 · VSS_GND21 G7 · VSS_GND22 G8 · VSS_GND23 G9 · VSS_GND24 G13 · VSS_GND25 G14 · VSS_GND26 H1 · VSS_GND27 H5 · VSS_GND28 H7 · VSS_GND29 H12 · VSS_GND30 H8 · VSS_GND31 J2 · VSS_GND32 J7 · VSS_GND33 J8 · VSS_GND34 J9 · VSS_GND35 J12 · VSS_GND36 J14 · VSS_GND37 K1 · VSS_GND38 K4 · VSS_GND39 K8 · VSS_GND40 K9 · VSS_GND41 J10 · VSS_GND42 J13 · VSS_GND43 K12 · VSS_GND44 L2 · VSS_GND45 L5 · VSS_GND46 L7 · VSS_GND47 L8 · VSS_GND48 L9 · VSS_GND49 L12 · VSS_GND50 M2 · VSS_GND51 M5 · VSS_GND52 M7 · VSS_GND53 M8 · VSS_GND54 M9 · VSS_GND55 M14 · VSS_GND56 N1 · VSS_GND57 N7 · VSS_GND58 N8 · VSS_GND59 N12

PA23-G ALFEV2_BGA
N1MA2P5_PA_00_S23 · A2 · G2 · N1MA2P5_PA_01_S23 · N2 · N1MA2P5_PA_02_S23
N1MA2P5_PA<0_0> · N1MA2P5_PA<0_1> · N1MA2P5_PA<0_2>
N1MA2P5_10_S23 · C4 · N1MA2P5_11_S23 · L4
N1MA2P5_PA<1_0> · N1MA2P5_PA<1_1>
VB_FC_PA_00_S23 · A3 · VB_FC_PA_01_S23 · N4 · VB_FC_PA<0_0> · VB_FC_PA<0_1>
VB_FC_PA1_S23 · C5 · VB_FC_11_S23 · N3 · VB_FC_PA<1_0> · VB_FC_PA<1_1>
VB_IB_PA_S23 · H2 · VB_IB_PA
VCM_PA_0_S23 · B3 · VCM_PA_1_S23 · M4 · VCM_PA_0 · VCM_PA_1
N1UA_SH_00_S23 · A6 · N1UA_SH_01_S23 · L9 · N1UA_SH<0_0> · N1UA_SH<0_1>
N1UA_SH_1_S23 · B6 · N1UA_SH<1>
N5UA_SH_00_S23 · A5 · N5UA_SH_01_S23 · L8 · N5UA_SH<0_0> · N5UA_SH<0_1>
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VB_FC_SH_0_S23 · A4 · VB_FC_SH_1_S23 · M6 · VB_FC_SH<0> · VB_FC_SH<1>
VB_IB_SH_0_S23 · B4 · VB_IB_SH_1-S23 · M5 · VB_IB_SH_0 · VB_IB_SH_1
VB_CMFB_SH_S23 · B8 · VB_CMFB_SH_1_S23 · N5 · VB_CMFB_SH_0 · VB_CMFB_SH_1
VB_NAB_SH_0_S23 · B9 · VB_NAB_SH_1_S23 · M7 · VB_NAB_SH_0 · VB_NAB_SH_1
VCM_SH_0_S23 · D12 · VCM_SH_1_S23 · M10 · VCM_SH_0 · VCM_SH_1

P10UA_SH<1> · G9 · P10UA_SH<0> · G10 · P10UA_SH_1_S23 · P10UA_SH_0_S23
P5UA_SH<0> · F8 · P5UA_SH_0_S23
P5UA_SH<0_1> · M9 · P5UA_SH<0_0> · F9 · P5UA_SH_01_S23 · P5UA_SH_00_S23
P1UA_SH<1> · H8 · P1UA_SH_1_S23
P1UA_SH<0_1> · N9 · P1UA_SH<0_0> · H9 · P1UA_SH_01_S23 · P1UA_SH_00_S23
VB_IT_SH_1 · N8 · VB_IT_SH_0 · D7 · VB_IT_SH_1_S23 · VB_IT_SH_0_S23
VB_PAB_SH<0> · M8 · VB_PAB_SH<1> · C8 · VB_PAB_SH_S23 · VB_PAB_SH_1_S23
VB_IT_PA · G3 · VB_IT_PA_S23
VB_FB0_IDCP_PA_1 · L5 · VB_FB0_IDCP_PA_0 · C6 · VB_FB0_IDCP_PA_1_S23 · VB_FB0_IDCP_PA_0_S23
N1MAI_SH · C7 · P1MAI_2P5_PA · E4 · N1MAI_PA · H3 · CUR_3_ALFE_S23 · CUR_2_ALFE_S23 · CUR_1_ALFE_S23
EXT_VREF_DAC · J12 · R24_S23 887 · P1V2_VDD_S23 · R25_S23 324

ALFE_2P5_RIGHT · C68_S23 1u · VB_FB0_IDCP_PA_0_S23
ALFE_2P5_RIGHT · C75_S23 1u · VB_FB0_IDCP_PA_1_S23

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BAV99S D1_S24 — C1_S24 1u — CH0_PA_S24 — TOKO_IND 1 2 I1_S24 — R1_S24 200 — IN_CH02 — U10_S24 1 HST_MICROPAD

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BAV70 D3_S24 — BAV70 D4_S24

BAV99S D5_S24 — C3_S24 1u — CH1_PA_S24 — TOKO_IND 1 2 I3_S24 — R3_S24 200 — IN_CH04 — U11_S24 1 HST_MICROPAD

BAV99S D6_S24 — C4_S24 1u — CH2_PA_S24 — TOKO_IND 1 2 I4_S24 — R4_S24 200 — IN_CH03 — U12_S24 1 HST_MICROPAD

C93_S24 1u — CUR_1_ALFE_S24

C94_S24 1u — CUR_2_ALFE_S24 — ALFE_2P5_RIGHT

C95_S24 1u — CUR_3_ALFE_S24

C96_S24 1u — N1MA2P5_10_S24

C97_S24 1u — VB_CMFB_SH_1_S24

C98_S24 1u — N1MA2P5_11_S24

C99_S24 1u — VB_FC_PA_11_S24

C100_S24 1u — N5UA_SH_1_S24

C101_S24 1u — N10UA_SH_1_S24

C102_S24 1u — N1UA_SH_1_S24

C60_S24 1u — N10UA_SH_0_S24

C63_S24 1u — VB_NAB_SH_0_S24

C72_S24 1u — VB_CMFB_SH_S24

C83_S24 1u — N5UA_SH_00_S24

C84_S24 1u — N1UA_SH_00_S24

C85_S24 100n

C86_S24 1u — VCM_SH_0_S24

C61_S24 1u — VB_FC_SH_0_S24

C66_S24 1u — VB_FC_PA1_S24

C69_S24 100n

C73_S24 1u — VCM_PA_1_S24

C87_S24 1u — N1MA2P5_PA_02_S24

C88_S24 100n

C89_S24 1u — VCM_SH_1_S24

C90_S24 1u — N1UA_SH_01_S24

C62_S24 1u — VB_FC_PA_00_S24

C67_S24 1u — N5UA_SH_01_S24

C74_S24 1u — VB_FC_SH_1_S24

C91_S24 1u — VB_IB_SH_1-S24

C92_S24 1u — VB_FC_PA_01_S24

P1V2_VDD_S24 — R_HF5_24 2M — C58_S24 1u — VB_IT_PA_S24

C63_S24 1u — VB_IT_SH_0_S24

C70_S24 1u — P1UA_SH_00_S24

C76_S24 1u — P1UA_SH_01_S24

C77_S24 1u — P5UA_SH_0_S24

C78_S24 1u — VB_IT_SH_1_S24

C103_S24 1u — VB_PAB_SH_S24

C108_S24 1u — P10UA_SH_0_S24

C109_S24 1u — P10UA_SH_1_S24

C59_S24 1u — VB_NAB_SH_1_S24

C64_S24 1u — N1MA2P5_PA_00_S24

C71_S24 1u — VB_IB_PA_S24

C79_S24 1u — N1MA2P5_PA_01_S24

C80_S24 100n

C81_S24 1u — VCM_PA_0_S24

C82_S24 1u — VB_IB_SH_0_S24

C104_S24 1u — P5UA_SH_01_S24

C105_S24 1u — P5UA_SH_00_S24

C106_S24 1u — P1UA_SH_1_S24

C107_S24 1u — VB_PAB_SH_1_S24

2P5_ALFE_S24 — P1V2_VDD_S24 — ALFE_2P5_RIGHT

PA24-C ALFEV2_BGA

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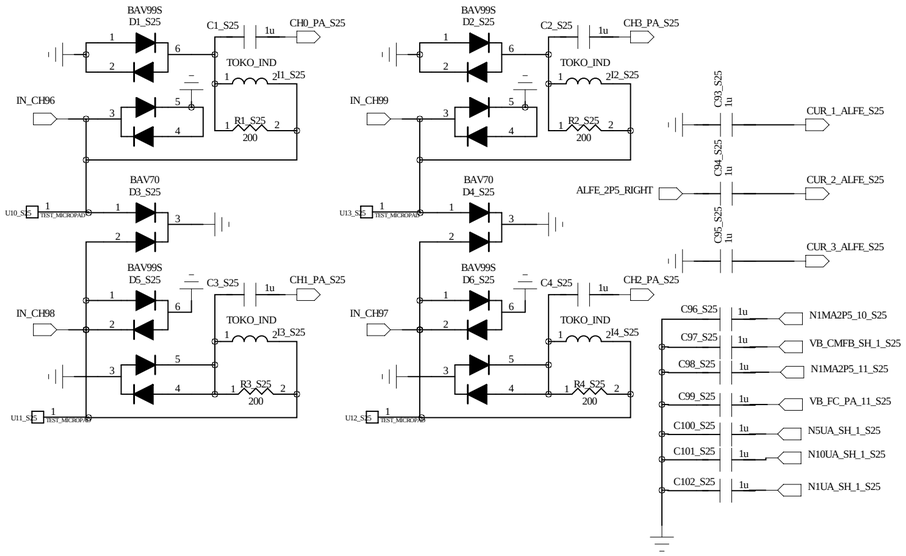

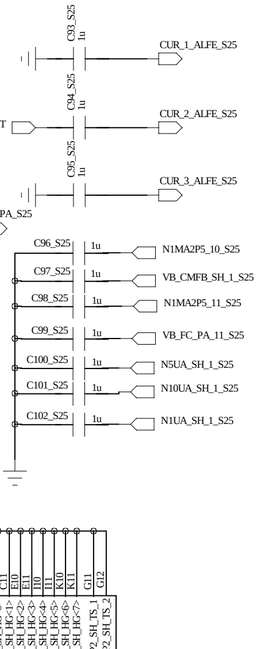

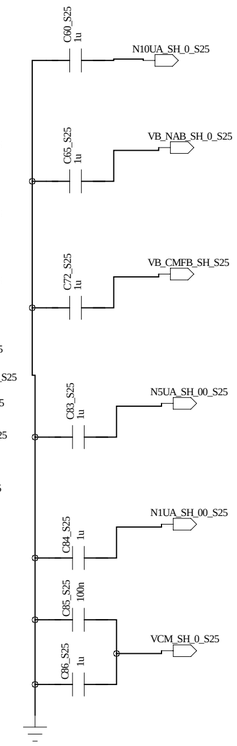

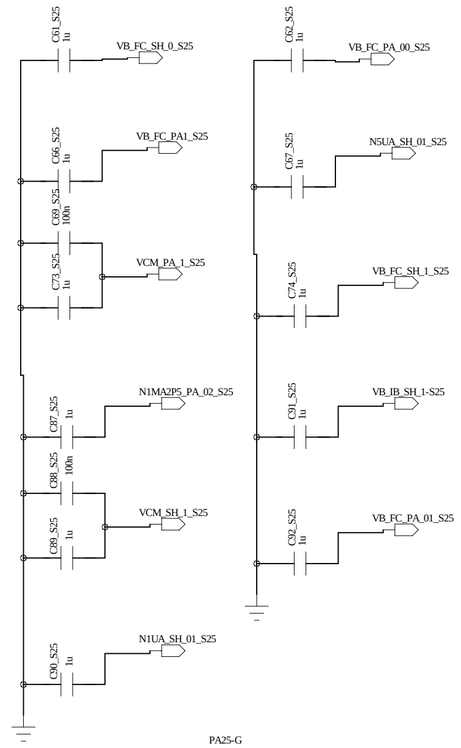

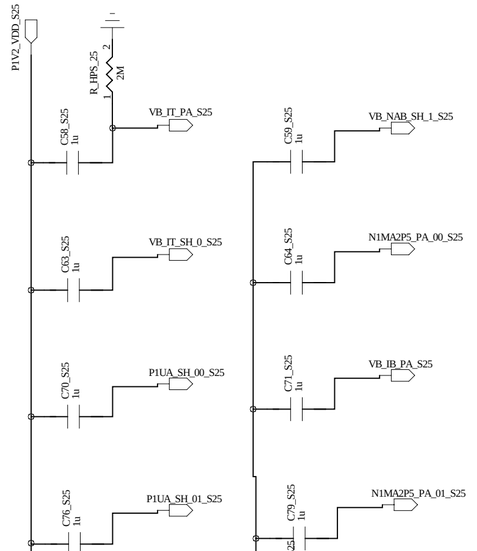

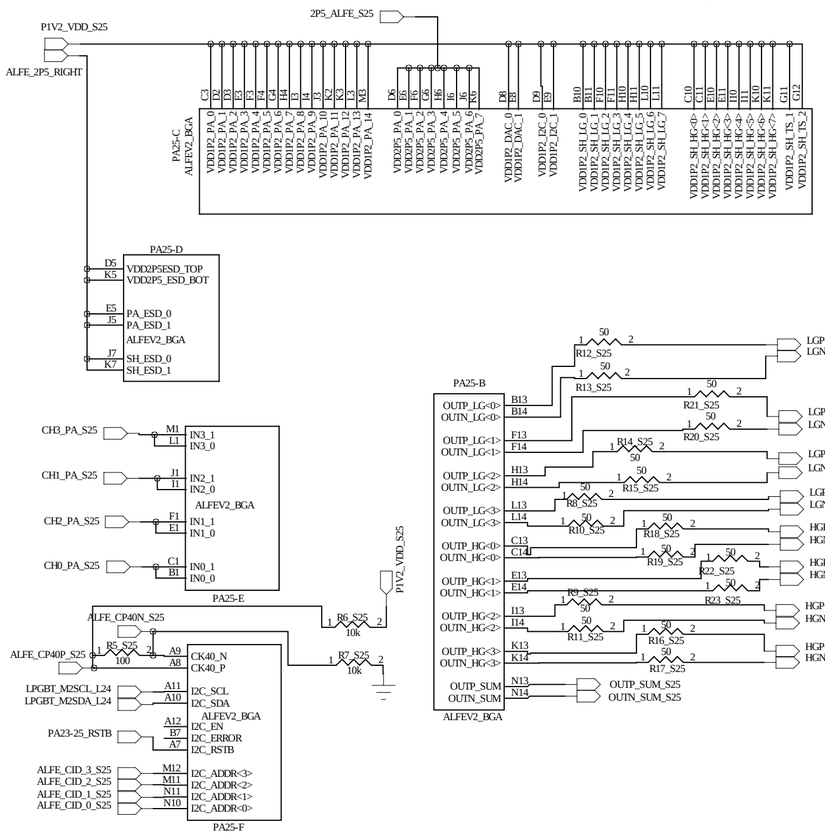

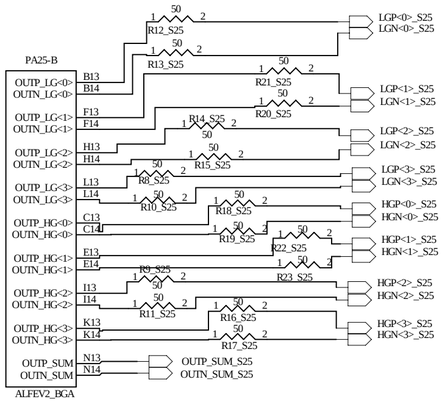

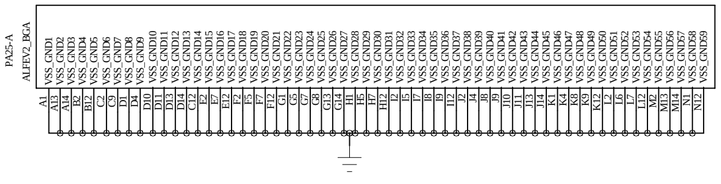

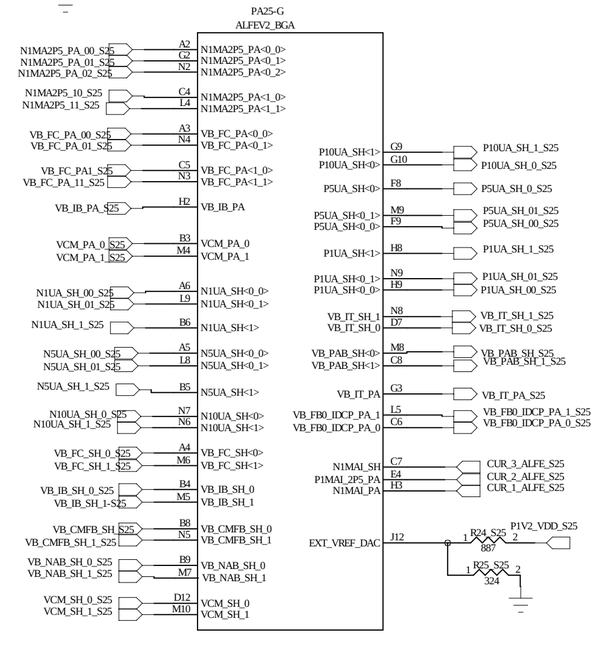

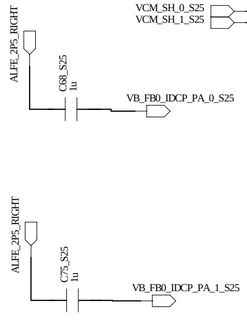

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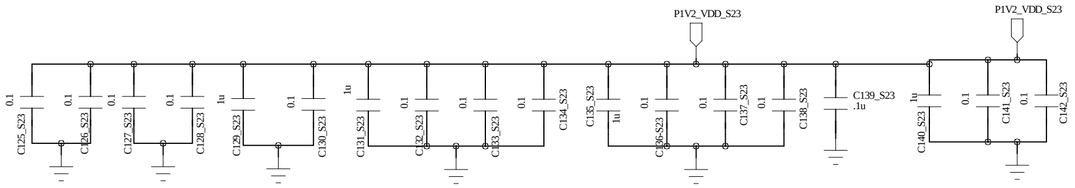

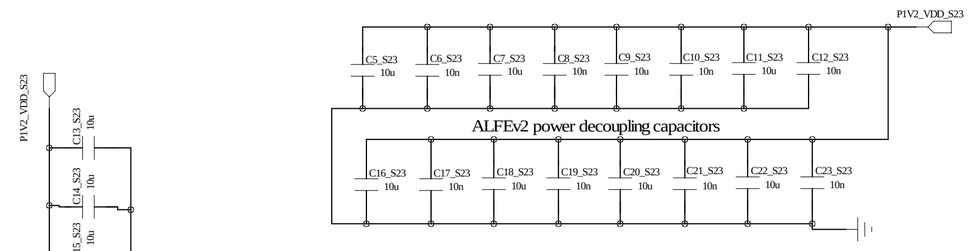

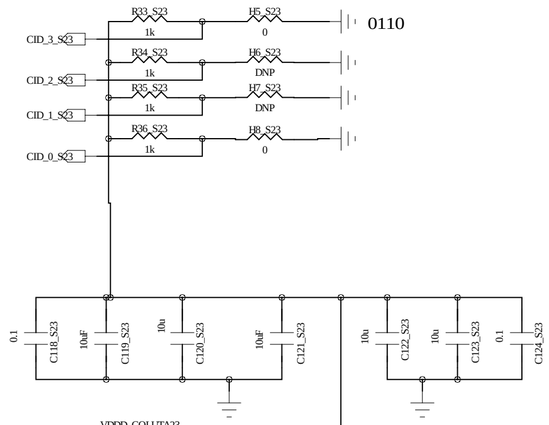

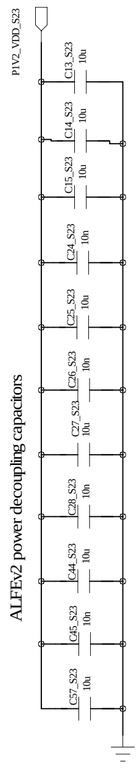

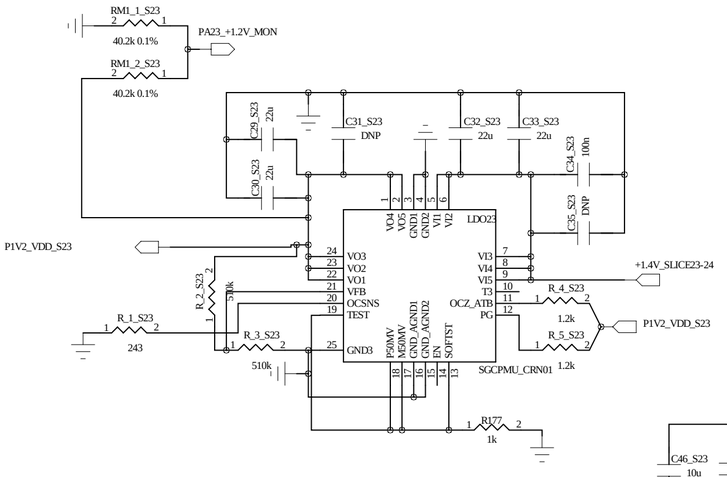

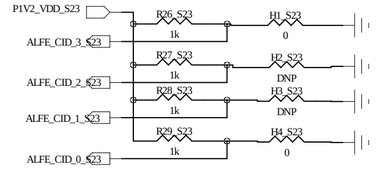

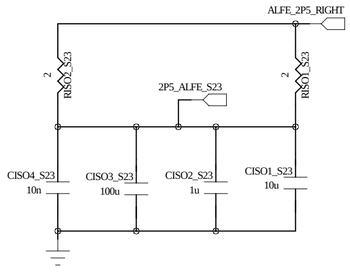

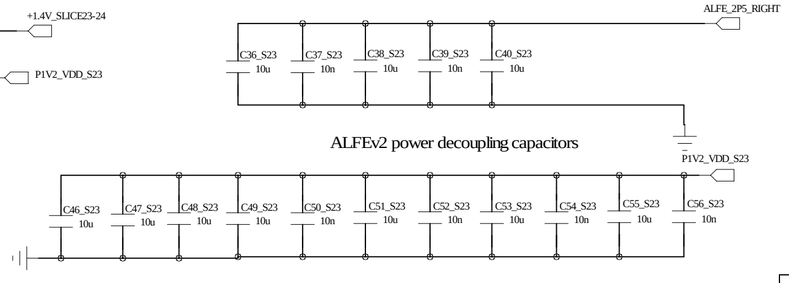

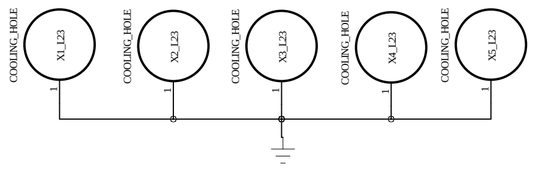

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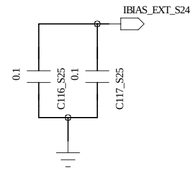

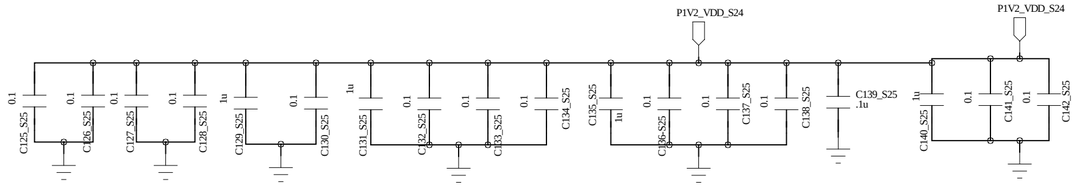

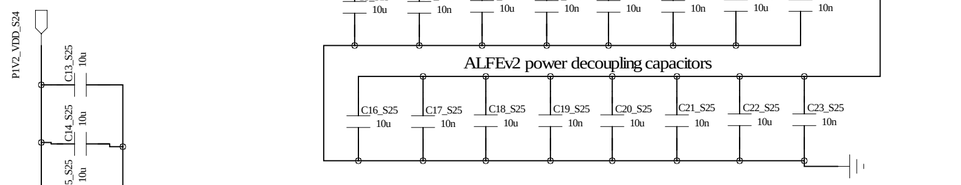

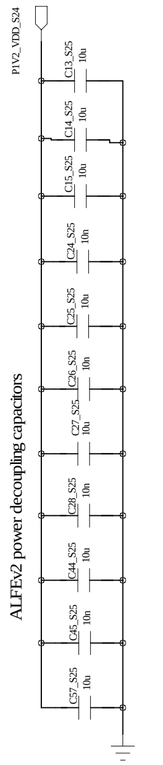

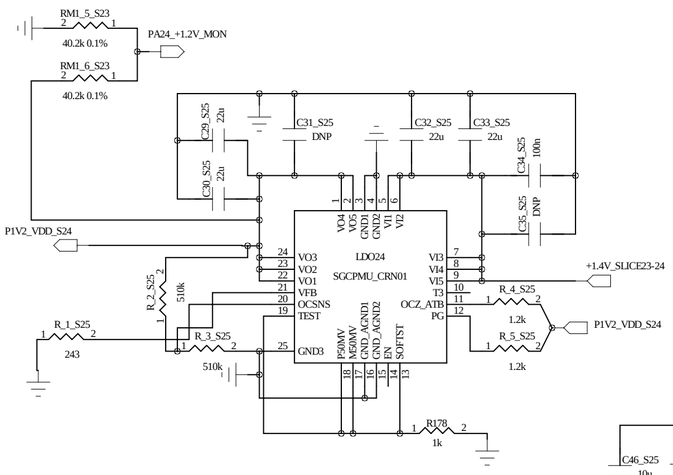

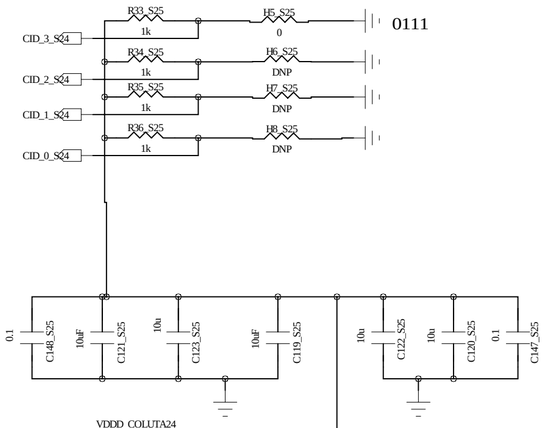

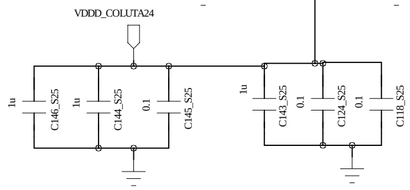

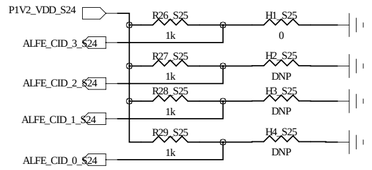

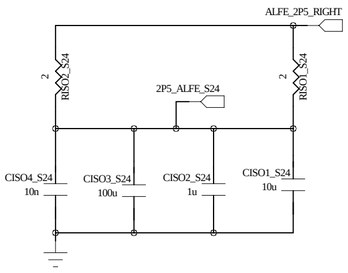

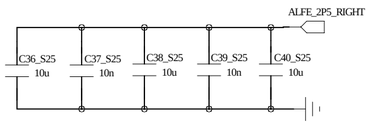

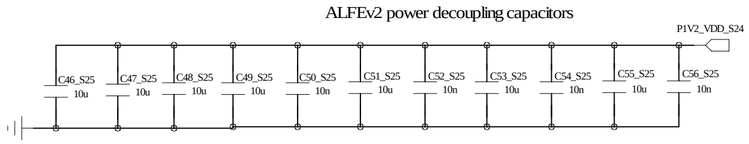

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COMPANY: Nevis Laboratories of Columbia University

TITLE: FEB2 prototype v2.0

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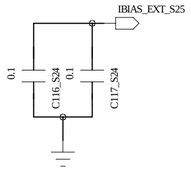

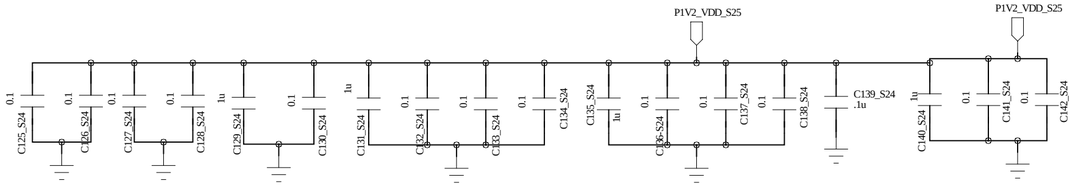

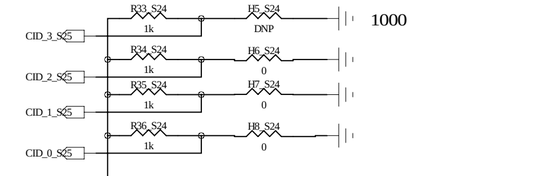

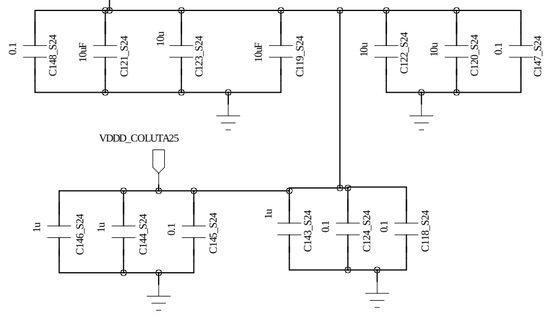

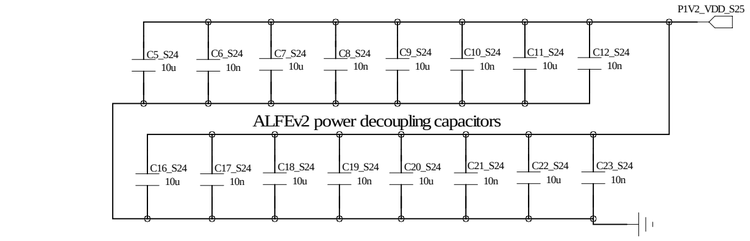

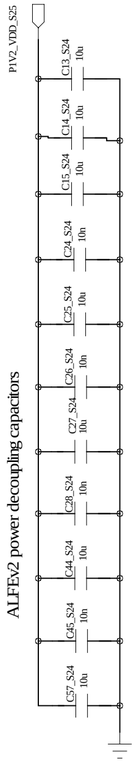

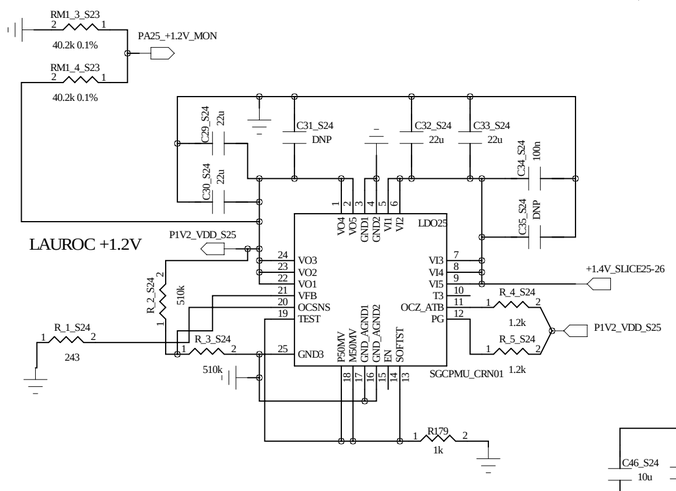

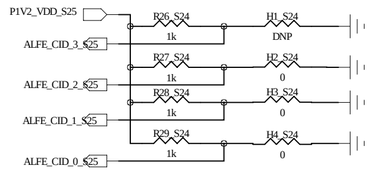

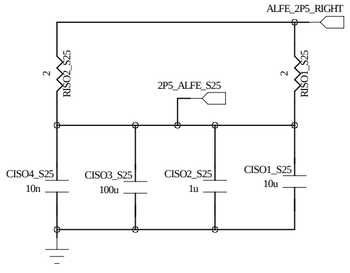

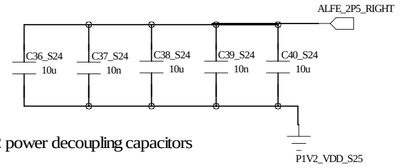

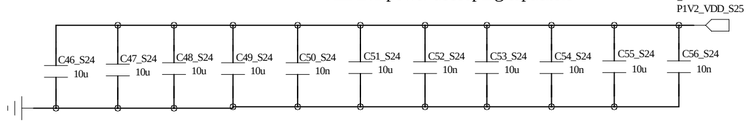

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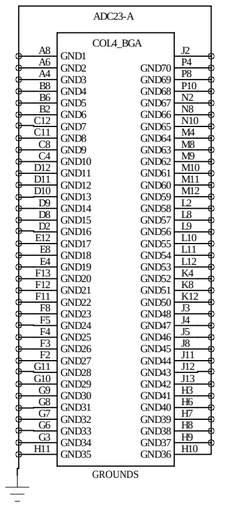

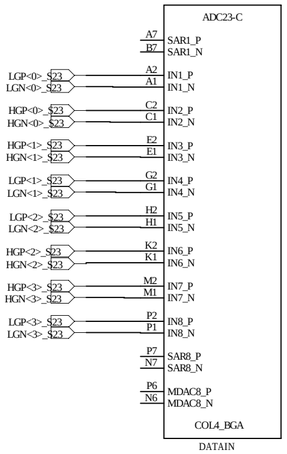

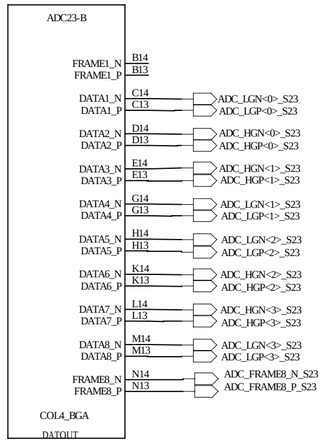

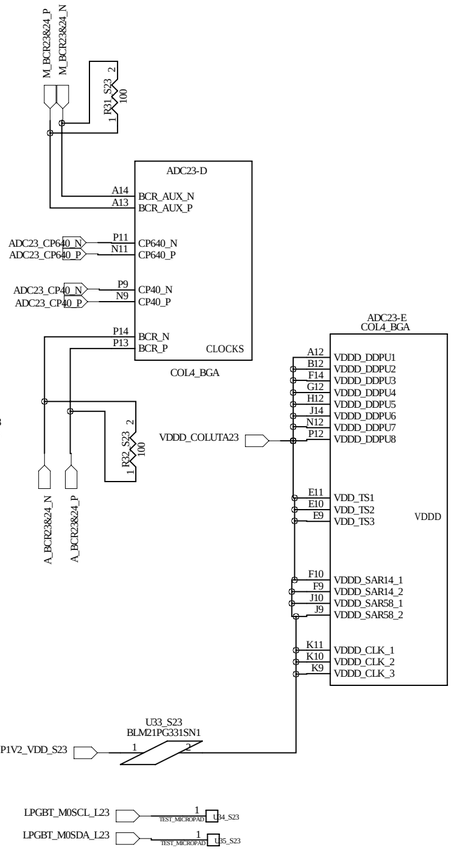

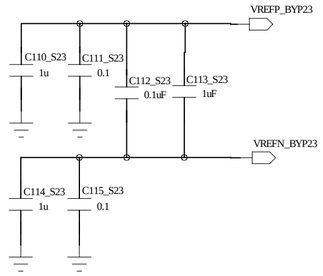

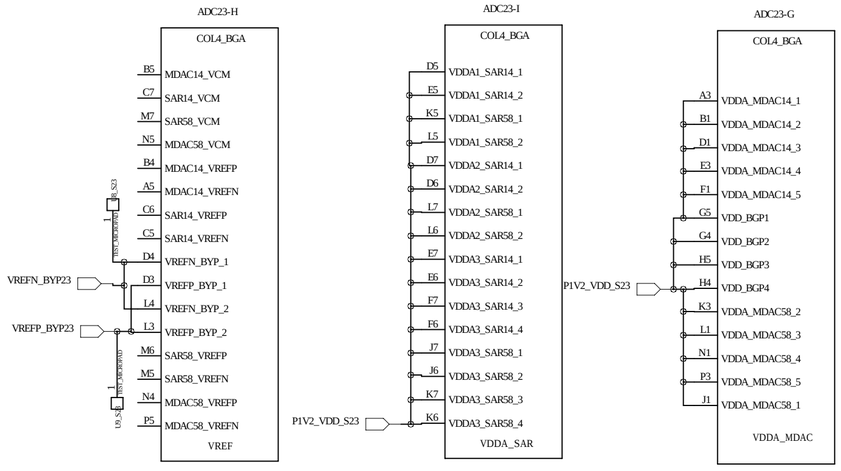

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RELEASED: jb	DATED: <Release Date>	DRAWING NO: 35	REV: v2.0
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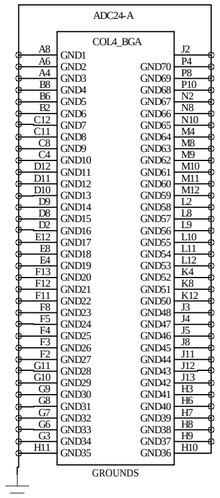

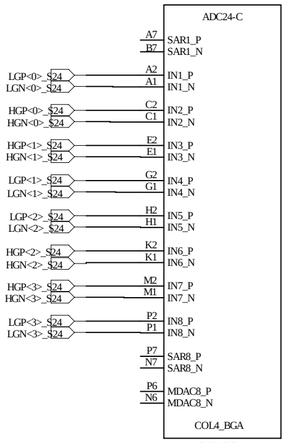

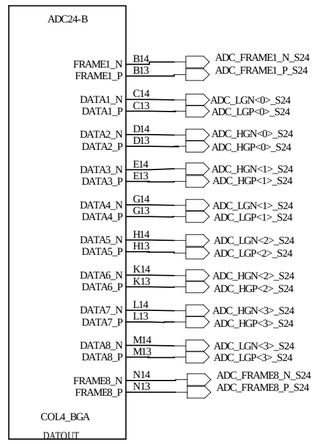

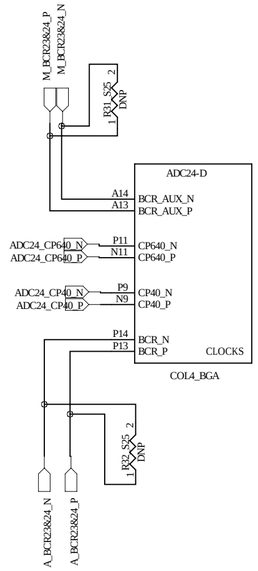

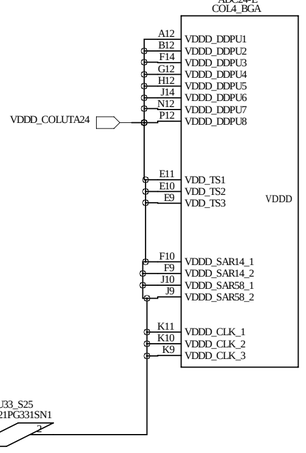

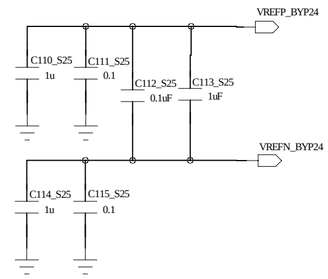

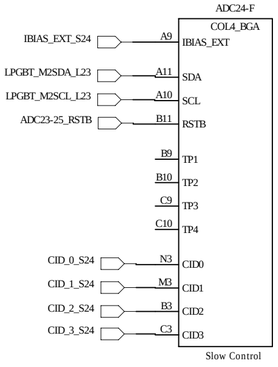

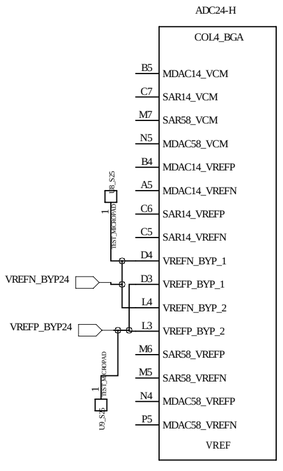

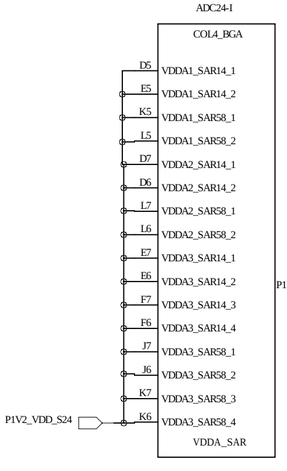

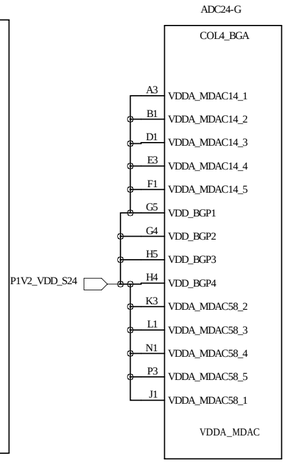

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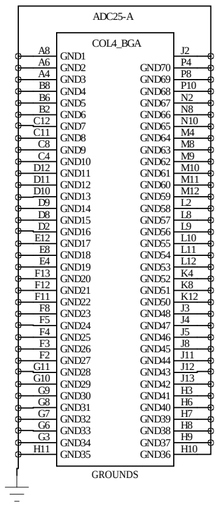

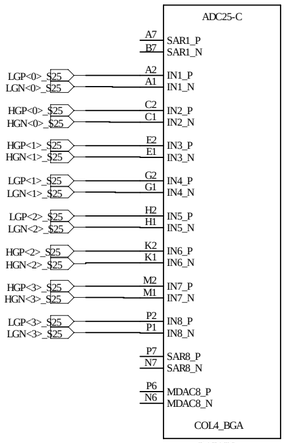

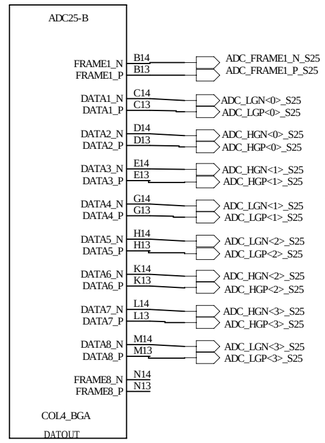

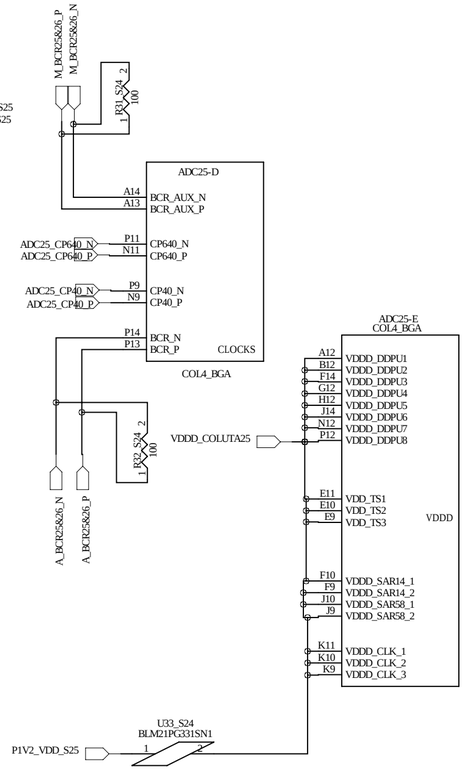

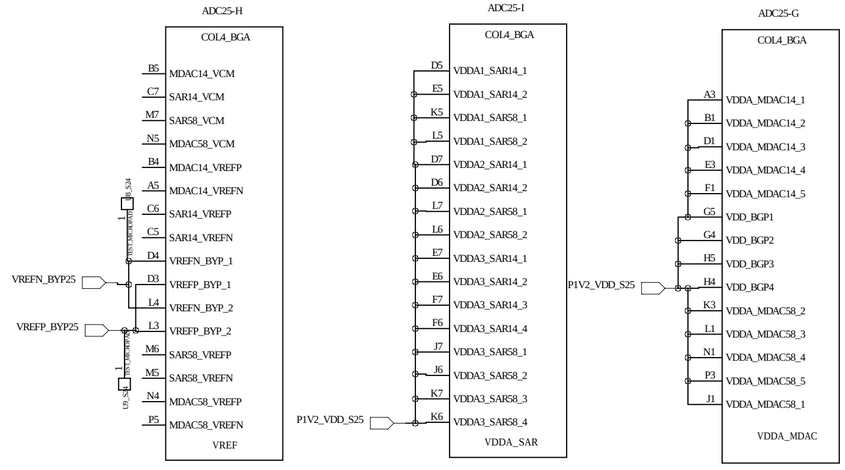

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Simplex TX 10GHz FEC5 mode 1001

Lock to external 40MHz

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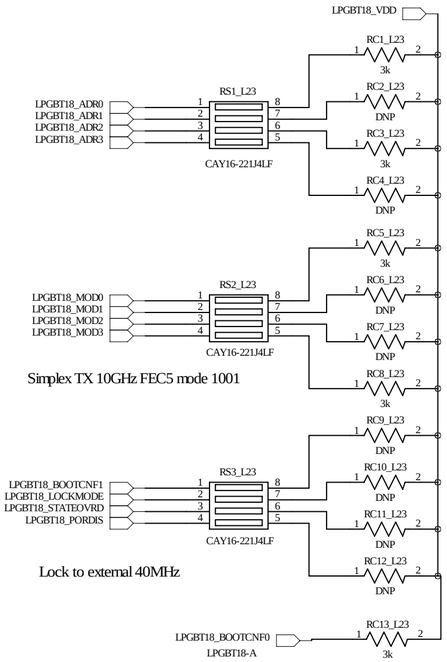

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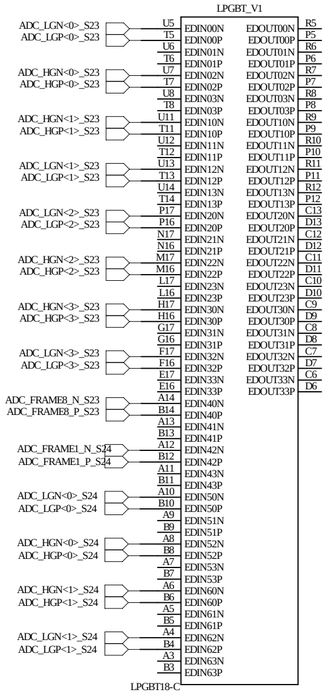

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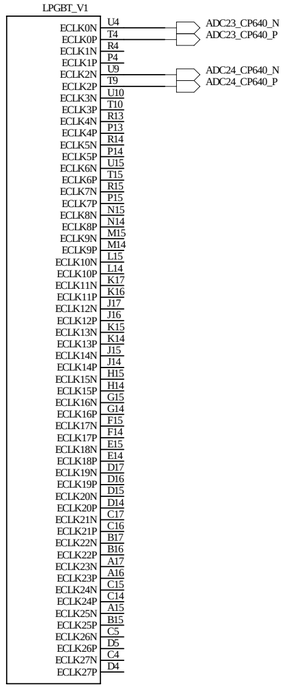

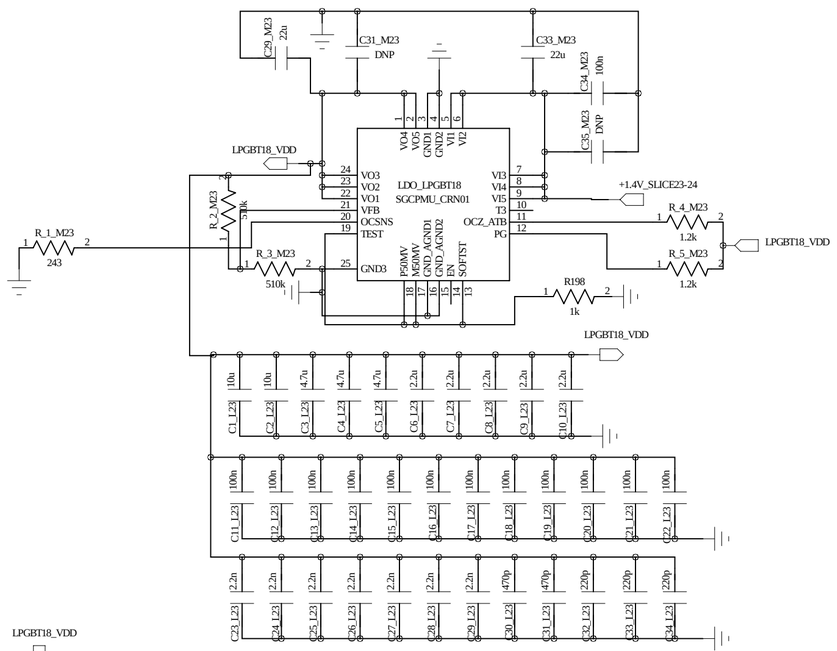

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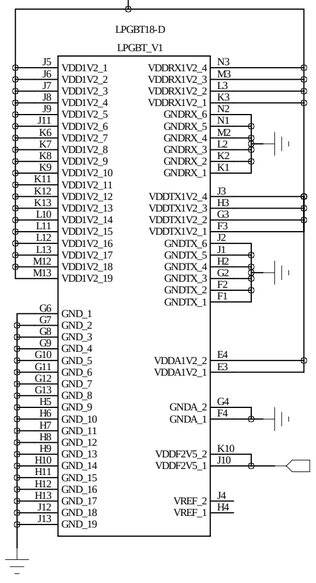

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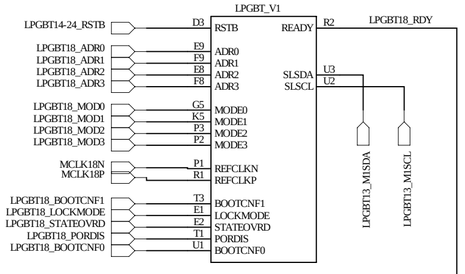

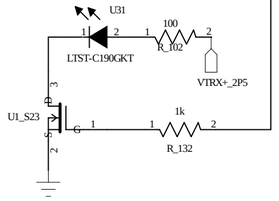

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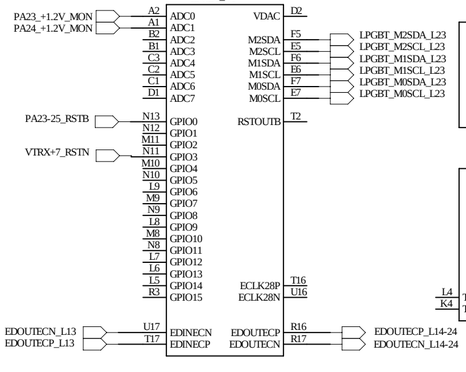

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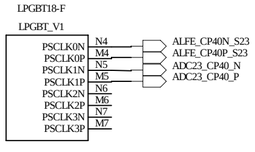

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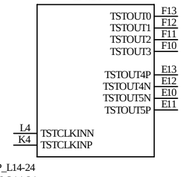

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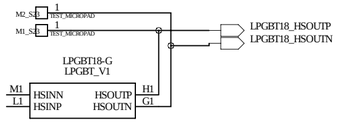

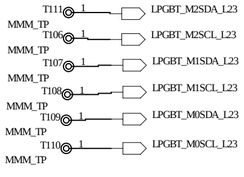

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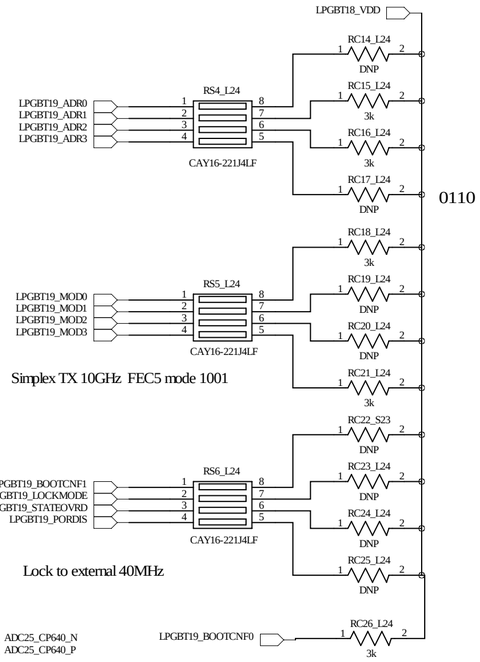

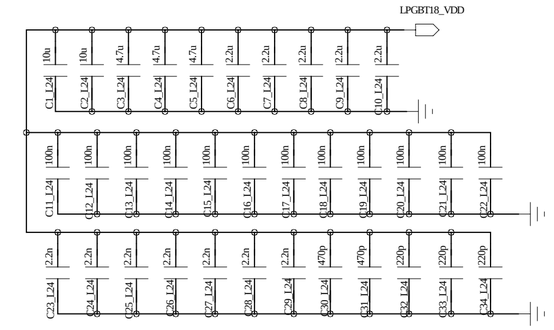

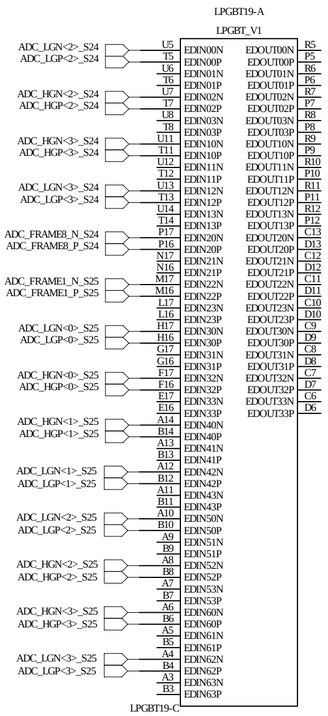

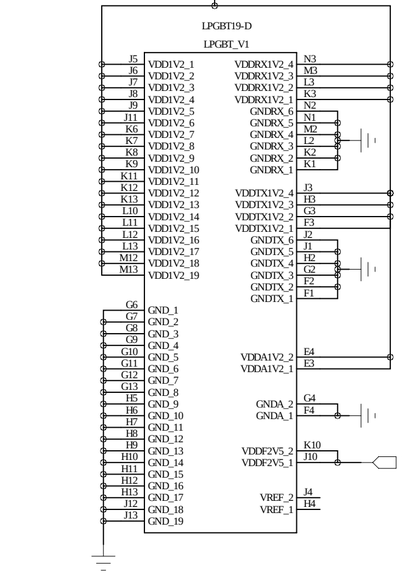

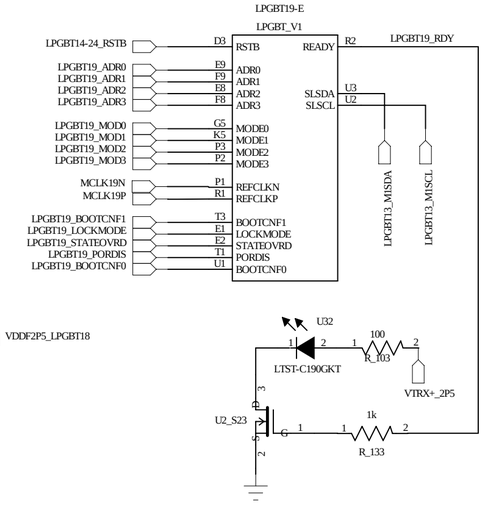

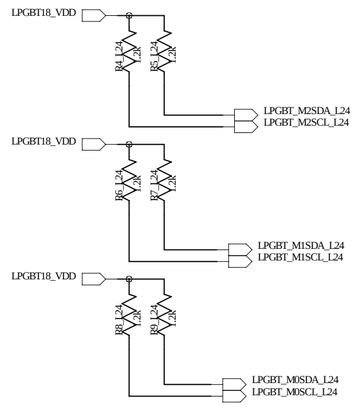

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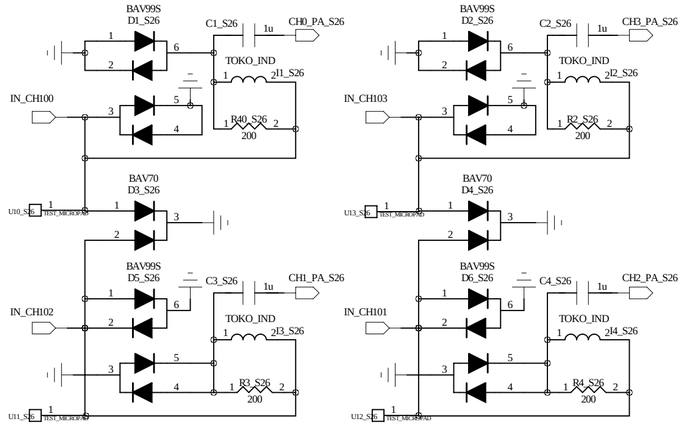

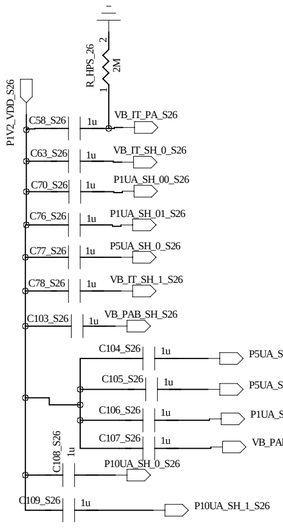

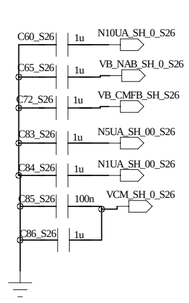

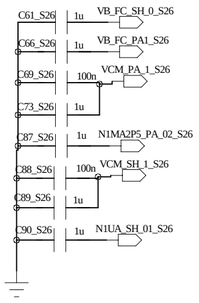

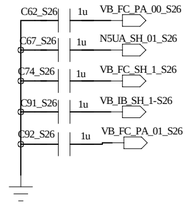

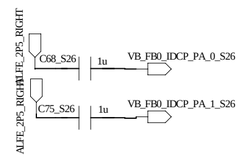

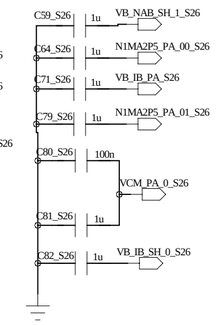

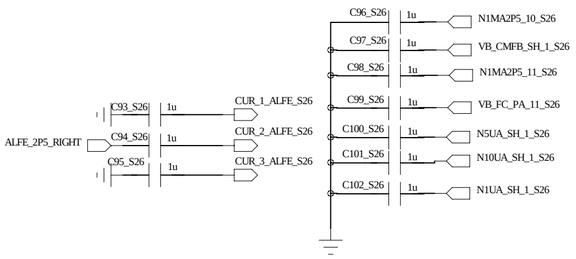

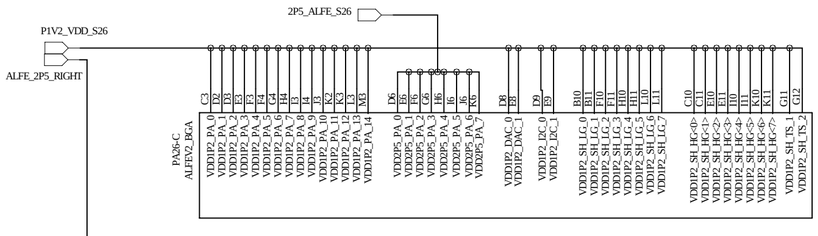

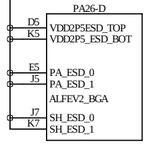

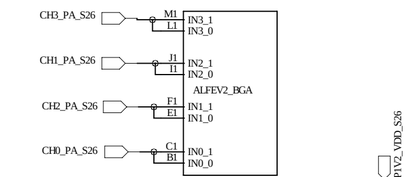

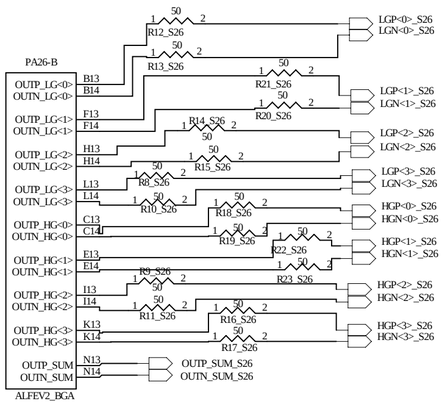

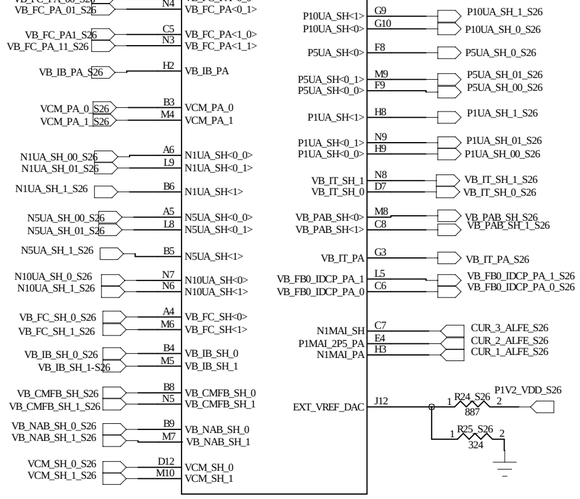

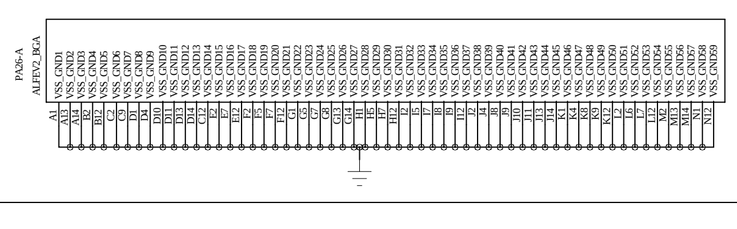

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ALFE_2P5_RIGHT

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C78_S27 1u · VB_IT_SH_1_S27
C103_S27 1u · VB_PAB_SH_S27
C108_S27 1u · P10UA_SH_0_S27
C109_S27 1u · P10UA_SH_1_S27

C59_S27 1u · VB_NAB_SH_1_S27
C64_S27 1u · N1MA2P5_PA_00_S27
C71_S27 1u · VB_IB_PA_S27
C79_S27 1u · N1MA2P5_PA_01_S27
C80_S27 100n
C81_S27 1u · VCM_PA_0_S27
C82_S27 1u · VB_IB_SH_0_S27
C104_S27 1u · P5UA_SH_01_S27
C105_S27 1u · P5UA_SH_00_S27
C106_S27 1u · P1UA_SH_1_S27
C107_S27 1u · VB_PAB_SH_1_S27

2P5_ALFE_S27 · P1V2_VDD_S27 · ALFE_2P5_RIGHT

PA27-C ALFEV2_BGA
VDDI1P2_PA_0 C3 · VDDI1P2_PA_1 D2 · VDDI1P2_PA_2 D3 · VDDI1P2_PA_3 E3 · VDDI1P2_PA_4 F3 · VDDI1P2_PA_5 F4 · VDDI1P2_PA_6 G4 · VDDI1P2_PA_7 I3 · VDDI1P2_PA_8 I4 · VDDI1P2_PA_9 J3 · VDDI1P2_PA_10 K2 · VDDI1P2_PA_11 K3 · VDDI1P2_PA_12 L3 · VDDI1P2_PA_13 M3 · VDDI1P2_PA_14
VDDP2P5_PA_0 D6 · VDDP2P5_PA_1 E6 · VDDP2P5_PA_2 F6 · VDDP2P5_PA_3 G6 · VDDP2P5_PA_4 H6 · VDDP2P5_PA_5 J6 · VDDP2P5_PA_6 K6 · VDDP2P5_PA_7
VDDI1P2_DAC_0 D8 · VDDI1P2_DAC_1 E8
VDDI1P2_I2C_0 D9 · VDDI1P2_I2C_1 E9
VDDI1P2_SH_LG_0 B10 · VDDI1P2_SH_LG_1 B11 · VDDI1P2_SH_LG_2 F10 · VDDI1P2_SH_LG_3 F11 · VDDI1P2_SH_LG_4 H10 · VDDI1P2_SH_LG_5 H11 · VDDI1P2_SH_LG_6 L10 · VDDI1P2_SH_LG_7 L11
VDDI1P2_SH_HG<0> C10 · VDDI1P2_SH_HG<1> C11 · VDDI1P2_SH_HG<2> E10 · VDDI1P2_SH_HG<3> E11 · VDDI1P2_SH_HG<4> I10 · VDDI1P2_SH_HG<5> I11 · VDDI1P2_SH_HG<6> K10 · VDDI1P2_SH_HG<7> K11
VDDI1P2_SH_TS_1 G11 · VDDI1P2_SH_TS_2 G12

PA27-D
D5 VDD2P5ESD_TOP · K5 VDD2P5_ESD_BOT
E5 PA_ESD_0 · J5 PA_ESD_1
ALFEV2_BGA
J7 SH_ESD_0 · K7 SH_ESD_1

PA27-B
OUTP_LG<0> B13 · OUTN_LG<0> B14 · R12_S27 50 · R13_S27 50 · LGP<0>_S27 · LGN<0>_S27
OUTP_LG<1> F13 · OUTN_LG<1> F14 · R21_S27 50 · R20_S27 50 · LGP<1>_S27 · LGN<1>_S27
OUTP_LG<2> H13 · OUTN_LG<2> H14 · R14_S27 50 · R15_S27 50 · LGP<2>_S27 · LGN<2>_S27
OUTP_LG<3> L13 · OUTN_LG<3> L14 · R8_S27 50 · R10_S27 50 · LGP<3>_S27 · LGN<3>_S27
OUTP_HG<0> C13 · OUTN_HG<0> C14 · R18_S27 50 · R19_S27 50 · HGP<0>_S27 · HGN<0>_S27
OUTP_HG<1> E13 · OUTN_HG<1> E14 · R22_S27 50 · R23_S27 50 · HGP<1>_S27 · HGN<1>_S27
OUTP_HG<2> I13 · OUTN_HG<2> I14 · R9_S27 50 · R11_S27 50 · HGP<2>_S27 · HGN<2>_S27
OUTP_HG<3> K13 · OUTN_HG<3> K14 · R16_S27 50 · R17_S27 50 · HGP<3>_S27 · HGN<3>_S27
OUTP_SUM N13 · OUTN_SUM N14 · OUTP_SUM_S27 · OUTN_SUM_S27
ALFEV2_BGA

PA27-E
CH3_PA_S27 · M1 IN3_1 · L1 IN3_0
CH1_PA_S27 · J1 IN2_1 · I1 IN2_0
CH2_PA_S27 · F1 IN1_1 · E1 IN1_0
CH0_PA_S27 · C1 IN0_1 · B1 IN0_0
ALFEV2_BGA

ALFE_CP40N_S27 · R6_S27 10k · P1V2_VDD_S27
ALFE_CP40P_S27 · R5_S27 100 · R7_S27 10k
PA27-F
A9 CK40_N · A8 CK40_P
LPGBT_M0SCL_1.27 A11 I2C_SCL · LPGBT_M0SDA_1.27 A10 I2C_SDA
ALFEV2_BGA
PA26-28_RSTB A12 I2C_EN · B7 I2C_ERROR · A7 I2C_RSTB
ALFE_CID_3_S27 M12 I2C_ADDR<3> · ALFE_CID_2_S27 M11 I2C_ADDR<2> · ALFE_CID_1_S27 N11 I2C_ADDR<1> · ALFE_CID_0_S27 N10 I2C_ADDR<0>

UU15_S27 TEST_MICROPAD · ADC_FRAME8_N_S27
UU14_S27 TEST_MICROPAD · ADC_FRAME8_P_S27

PA27-G ALFEV2_BGA
N1MA2P5_PA_00_S27 A2 N1MA2P5_PA<0_0> · N1MA2P5_PA_01_S27 G2 N1MA2P5_PA<0_1> · N1MA2P5_PA_02_S27 N2 N1MA2P5_PA<0_2>
N1MA2P5_10_S27 C4 N1MA2P5_PA<1_0> · N1MA2P5_11_S27 L4 N1MA2P5_PA<1_1>
VB_FC_PA_00_S27 A3 VB_FC_PA<0_0> · VB_FC_PA_01_S27 N4 VB_FC_PA<0_1>
VB_FC_PA1_S27 C5 VB_FC_PA<1_0> · VB_FC_PA_11_S27 N3 VB_FC_PA<1_1>
VB_IB_PA_S27 H2 VB_IB_PA
VCM_PA_0_S27 B3 VCM_PA_0 · VCM_PA_1_S27 M4 VCM_PA_1
N1UA_SH_00_S27 A6 N1UA_SH<0_0> · N1UA_SH_01_S27 L9 N1UA_SH<0_1>
N1UA_SH_1_S27 B6 N1UA_SH<1>
N5UA_SH_00_S27 A5 N5UA_SH<0_0> · N5UA_SH_01_S27 L8 N5UA_SH<0_1>
N5UA_SH_1_S27 B5 N5UA_SH<1>
N10UA_SH_0_S27 N7 N10UA_SH<0> · N10UA_SH_1_S27 N6 N10UA_SH<1>
VB_FC_SH_0_S27 A4 VB_FC_SH<0> · VB_FC_SH_1_S27 M6 VB_FC_SH<1>
VB_IB_SH_0_S27 B4 VB_IB_SH_0 · VB_IB_SH_1-S27 M5 VB_IB_SH_1
VB_CMFB_SH_S27 B8 VB_CMFB_SH_0 · VB_CMFB_SH_1_S27 N5 VB_CMFB_SH_1
VB_NAB_SH_0_S27 B9 VB_NAB_SH_0 · VB_NAB_SH_1_S27 M7 VB_NAB_SH_1
VCM_SH_0_S27 D12 VCM_SH_0 · VCM_SH_1_S27 M10 VCM_SH_1

P10UA_SH<1> G9 P10UA_SH_1_S27 · P10UA_SH<0> G10 P10UA_SH_0_S27
P5UA_SH<0> F8 P5UA_SH_0_S27
P5UA_SH<0_1> M9 P5UA_SH_01_S27 · P5UA_SH<0_0> F9 P5UA_SH_00_S27
P1UA_SH<1> H8 P1UA_SH_1_S27
P1UA_SH<0_1> N9 P1UA_SH_01_S27 · P1UA_SH<0_0> H9 P1UA_SH_00_S27
VB_IT_SH_1 N8 VB_IT_SH_1_S27 · VB_IT_SH_0 D7 VB_IT_SH_0_S27
VB_PAB_SH<0> M8 VB_PAB_SH_S27 · VB_PAB_SH<1> C8 VB_PAB_SH_1_S27
VB_IT_PA G3 VB_IT_PA_S27
VB_FB0_IDCP_PA_1 L5 VB_FB0_IDCP_PA_1_S27 · VB_FB0_IDCP_PA_0 C6 VB_FB0_IDCP_PA_0_S27
N1MAI_SH C7 CUR_3_ALFE_S27 · P1MAI_2P5_PA E4 CUR_2_ALFE_S27 · N1MAI_PA H3 CUR_1_ALFE_S27
EXT_VREF_DAC J12 · R24_S27 887 · P1V2_VDD_S27 · R25_S27 324

ALFE_2P5_RIGHT · C68_S27 1u · VB_FB0_IDCP_PA_0_S27
ALFE_2P5_RIGHT · C75_S27 1u · VB_FB0_IDCP_PA_1_S27

PA27-A ALFEV2_BGA
VSS_GND1 A1 · VSS_GND2 A13 · VSS_GND3 A14 · VSS_GND4 B2 · VSS_GND5 B12 · VSS_GND6 C5 · VSS_GND7 D1 · VSS_GND8 D4 · VSS_GND9 D10 · VSS_GND10 D11 · VSS_GND11 D13 · VSS_GND12 D14 · VSS_GND13 E2 · VSS_GND14 E7 · VSS_GND15 F2 · VSS_GND16 F7 · VSS_GND17 F12 · VSS_GND18 F13 · VSS_GND19 G1 · VSS_GND20 G5 · VSS_GND21 G7 · VSS_GND22 G8 · VSS_GND23 G10 · VSS_GND24 G13 · VSS_GND25 G14 · VSS_GND26 H1 · VSS_GND27 H5 · VSS_GND28 H7 · VSS_GND29 H12 · VSS_GND30 J2 · VSS_GND31 J5 · VSS_GND32 J7 · VSS_GND33 J8 · VSS_GND34 J9 · VSS_GND35 J12 · VSS_GND36 K1 · VSS_GND37 K4 · VSS_GND38 K8 · VSS_GND39 K9 · VSS_GND40 K12 · VSS_GND41 L2 · VSS_GND42 L7 · VSS_GND43 L12 · VSS_GND44 M2 · VSS_GND45 M13 · VSS_GND46 N1 · VSS_GND47 N4 · VSS_GND48 N8 · VSS_GND49 N13 · VSS_GND50 P1 · VSS_GND51 P2 · VSS_GND52 P13 · VSS_GND53 P14 · VSS_GND54 VSS_GND55 · VSS_GND56 VSS_GND57 · VSS_GND58 VSS_GND59

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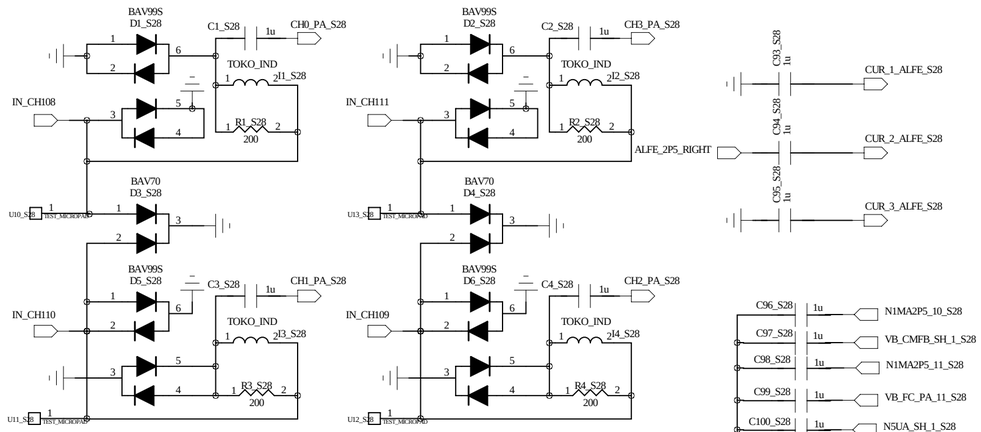

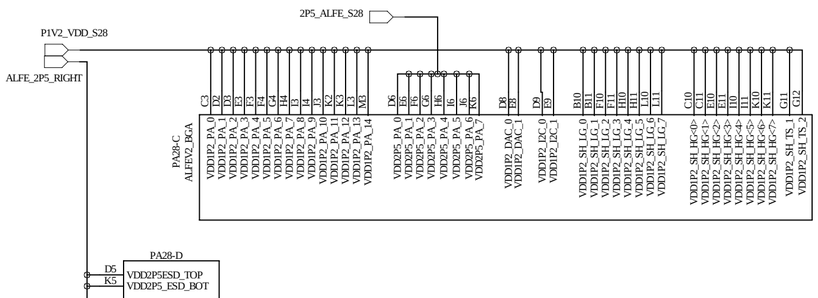

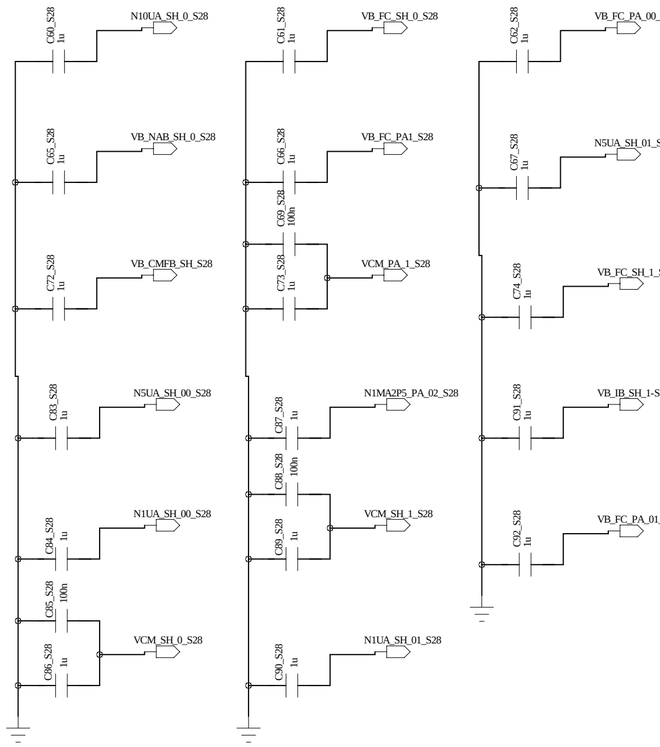

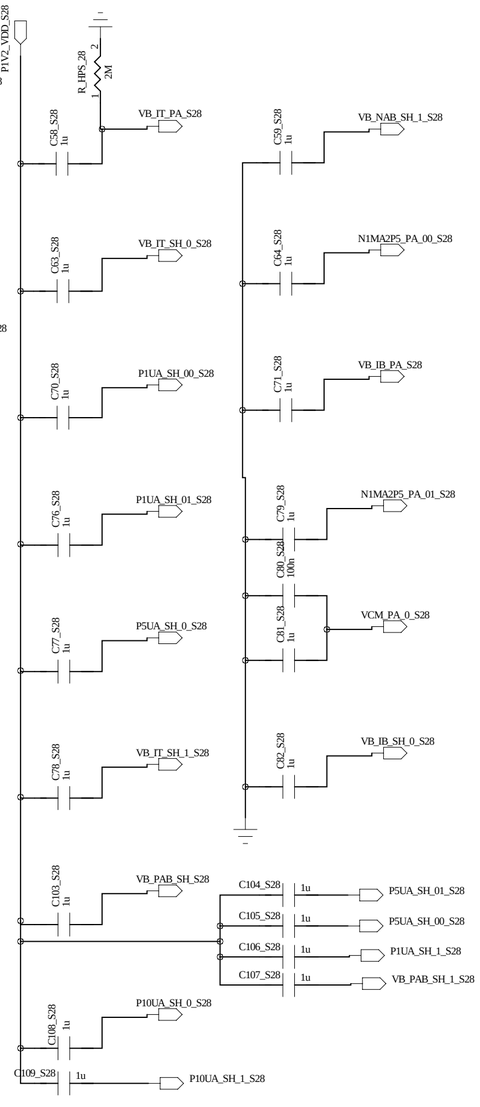

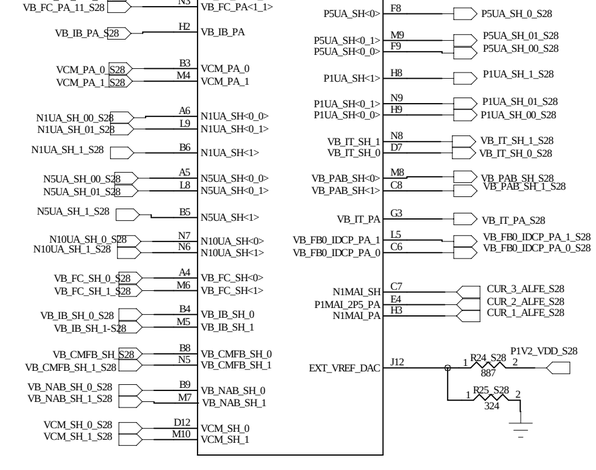

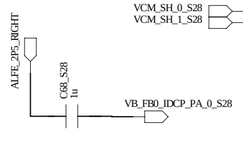

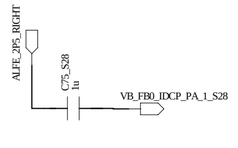

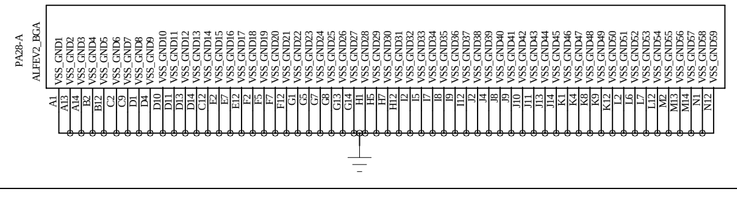

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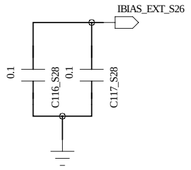

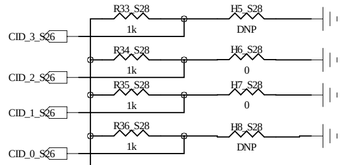

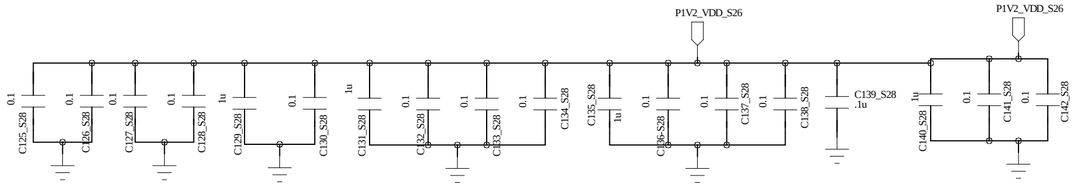

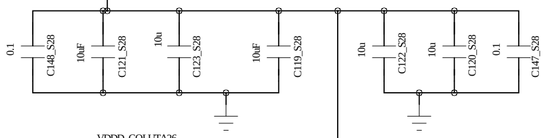

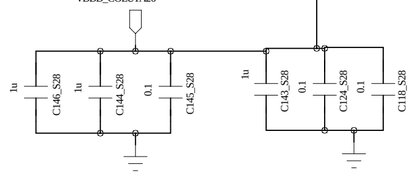

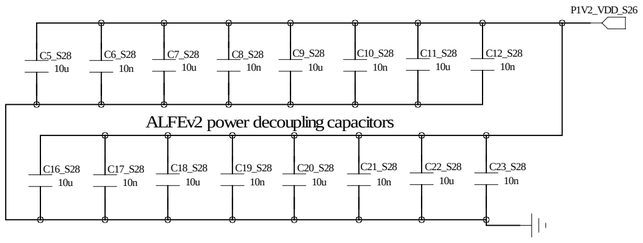

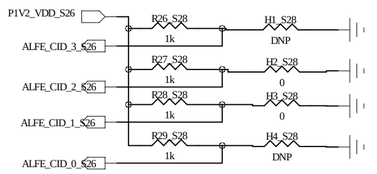

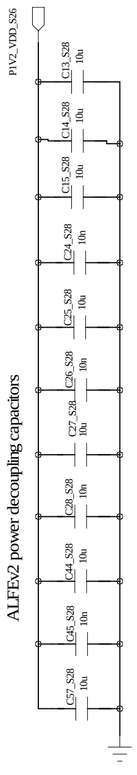

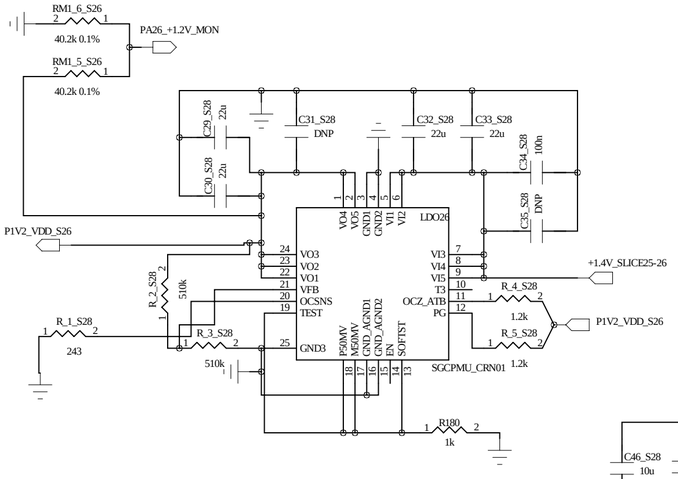

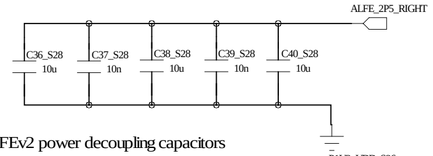

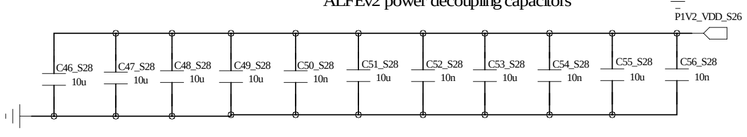

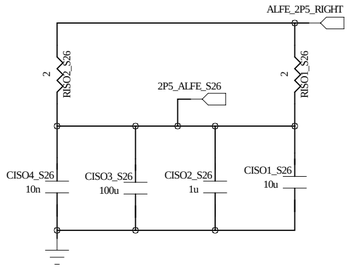

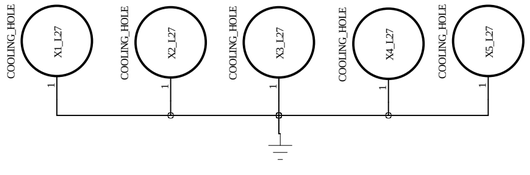

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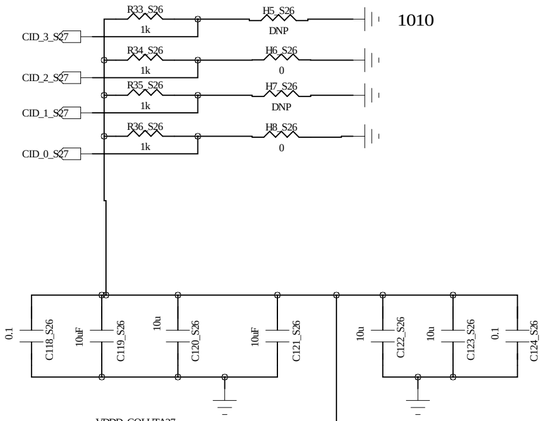

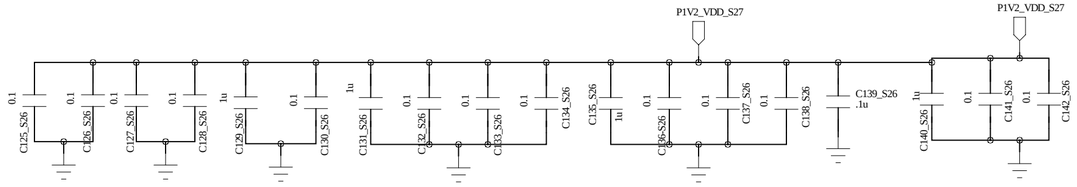

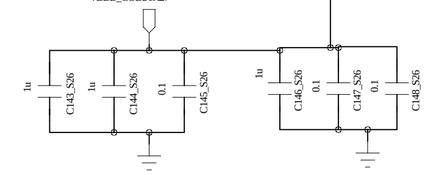

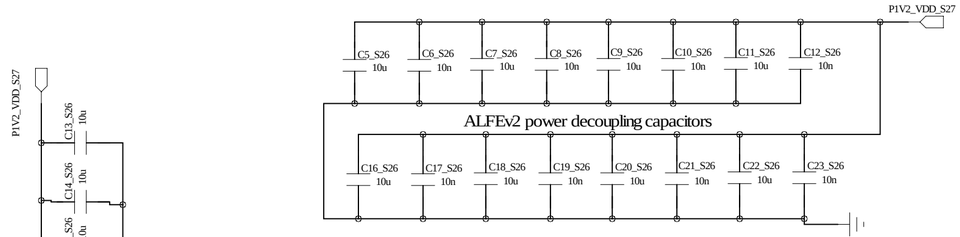

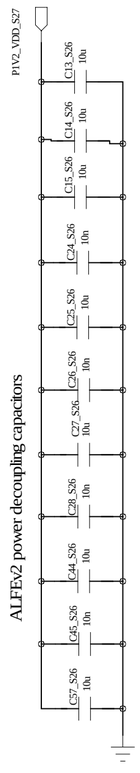

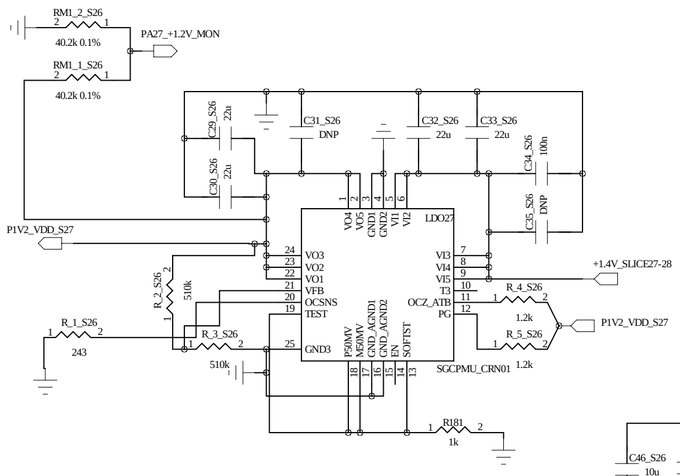

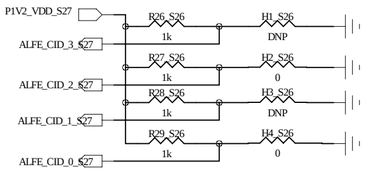

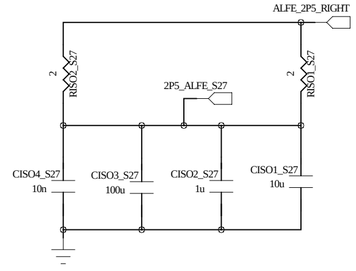

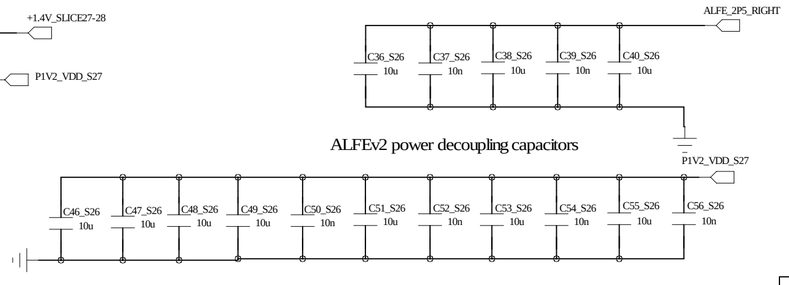

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COMPANY: Nevis Laboratories of Columbia University

TITLE: FEB2 prototype v2.0

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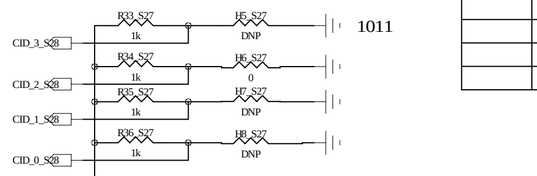

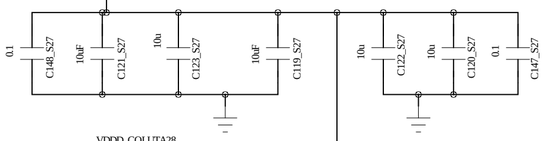

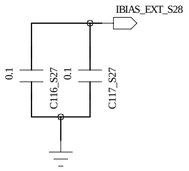

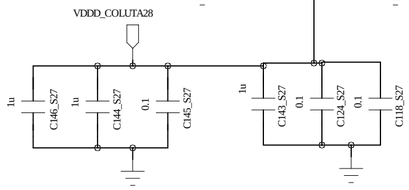

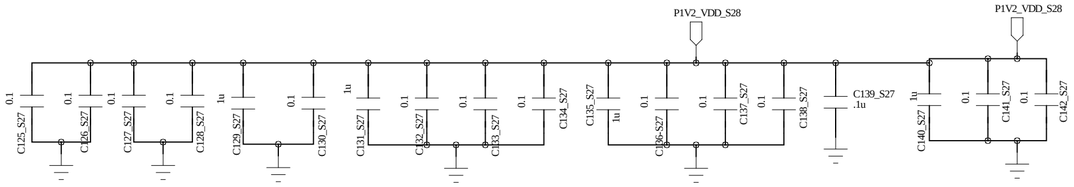

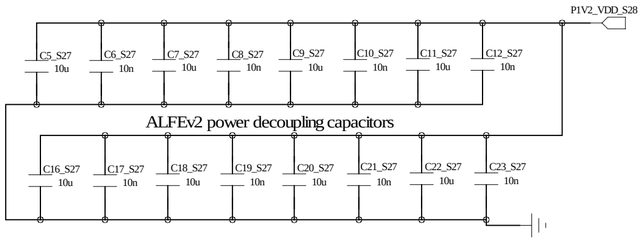

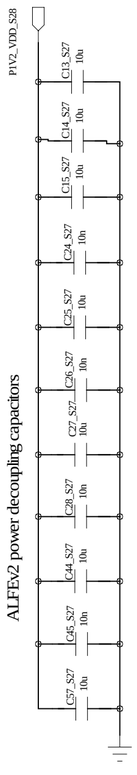

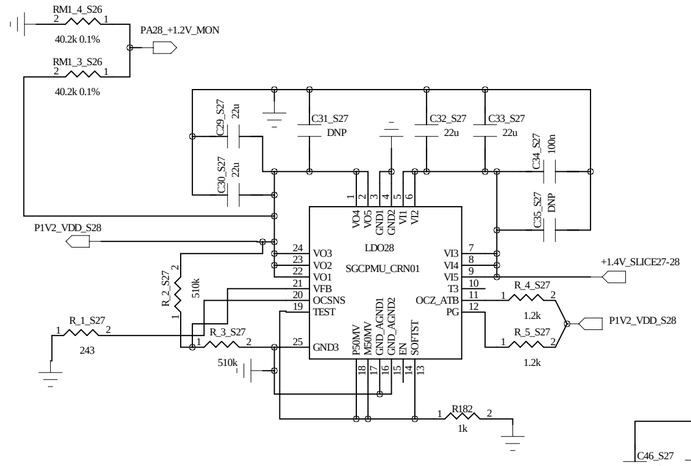

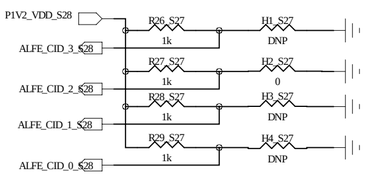

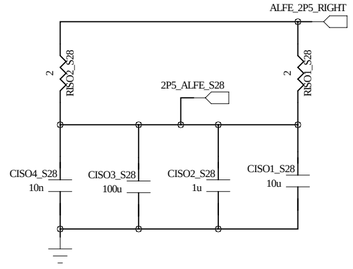

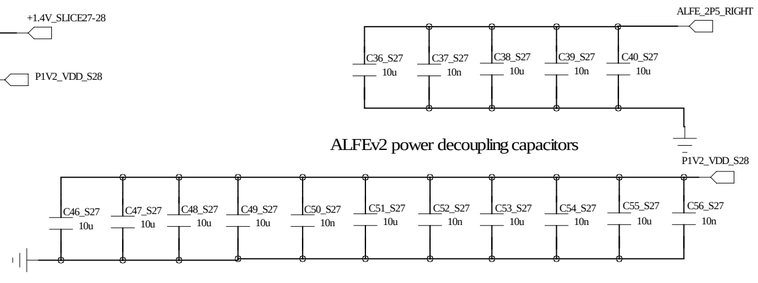

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TITLE: FEB2 prototype v2.0			
CODE: jb2023	SIZE: C	DRAWING NO: 35	REV: v2.0
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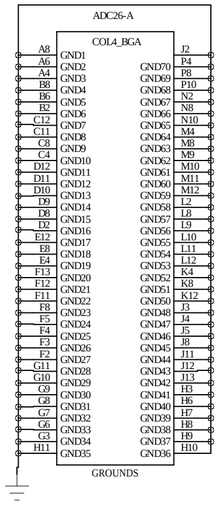

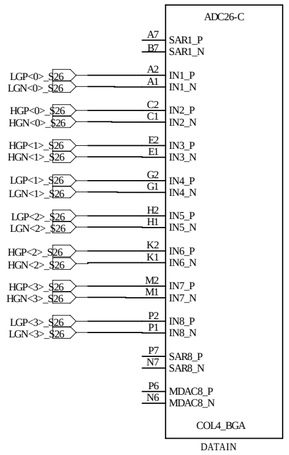

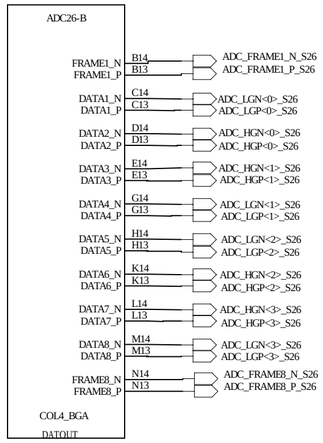

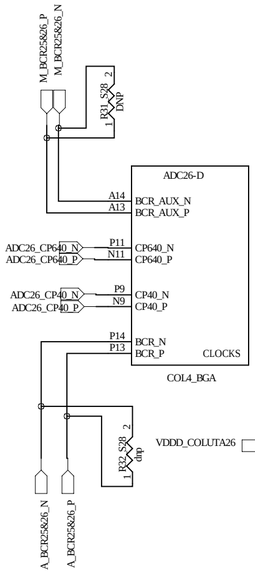

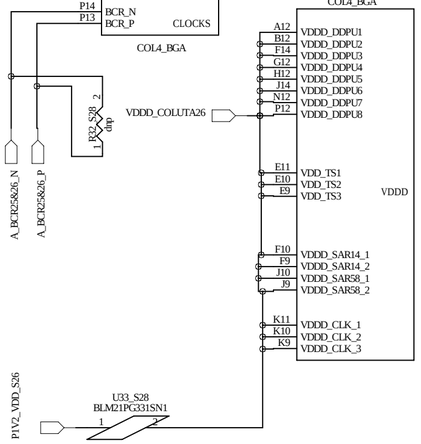

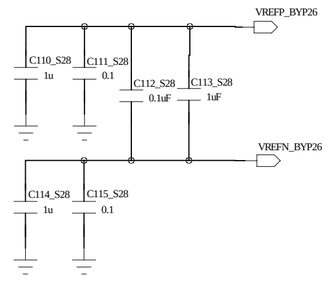

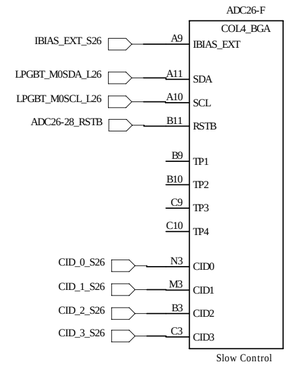

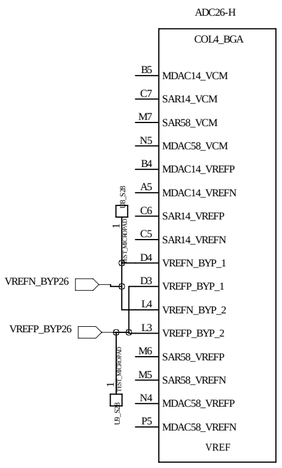

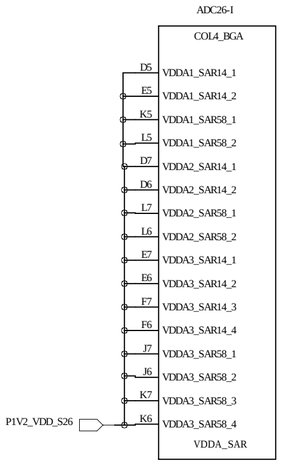

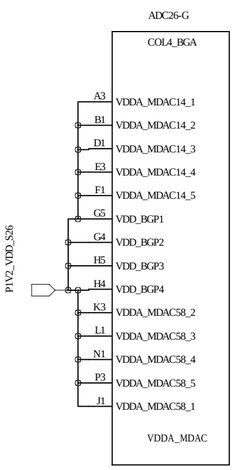

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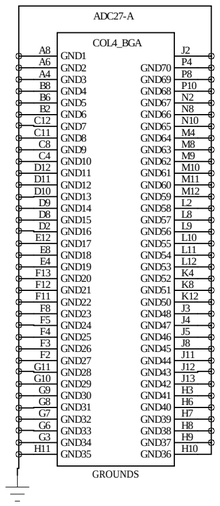

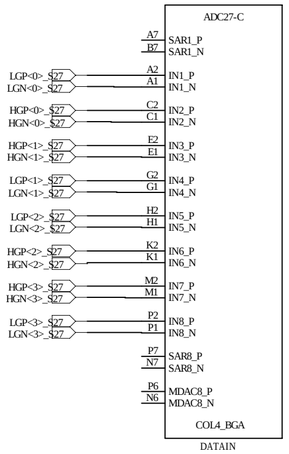

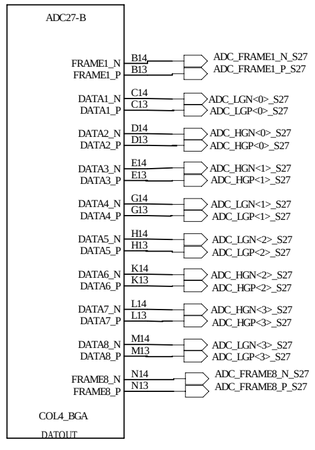

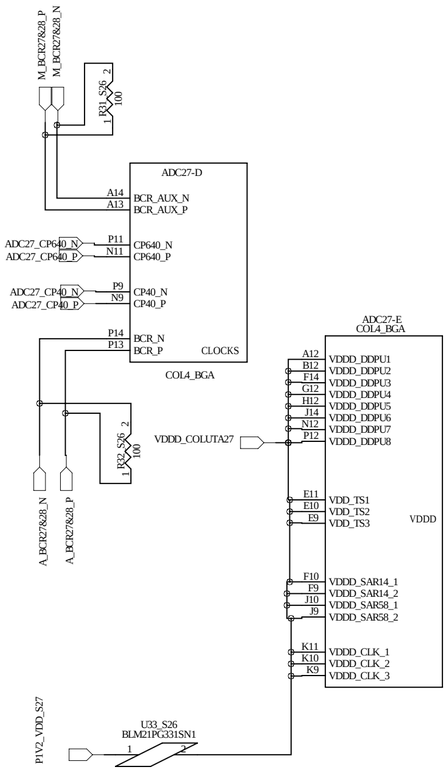

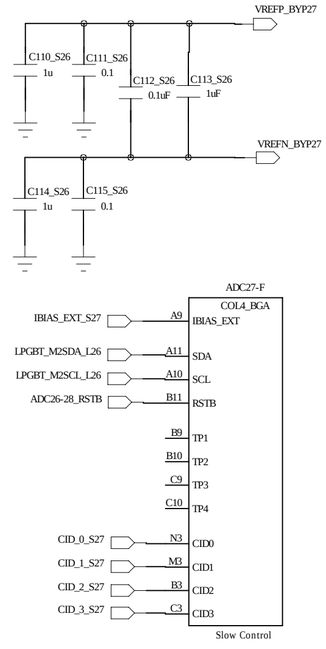

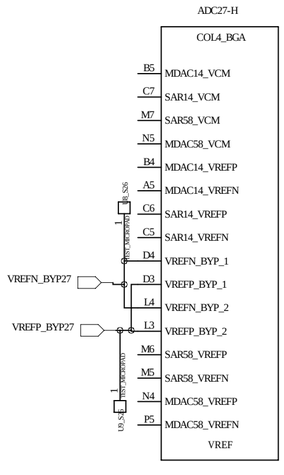

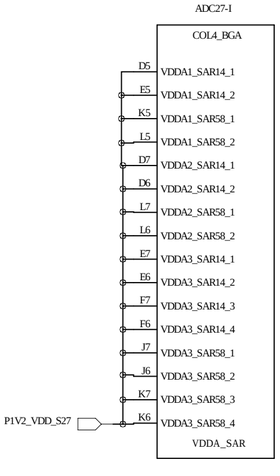

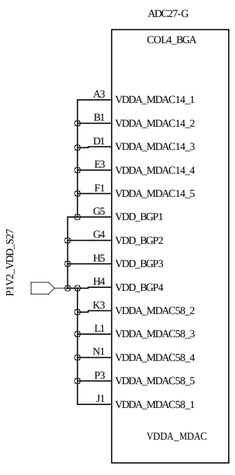

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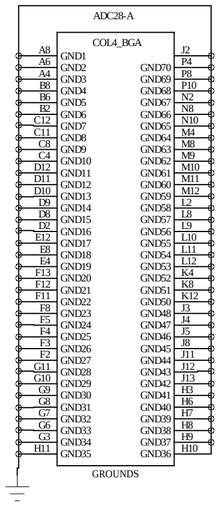

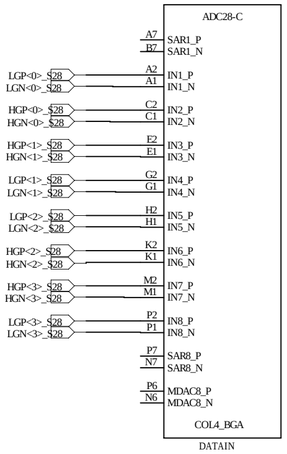

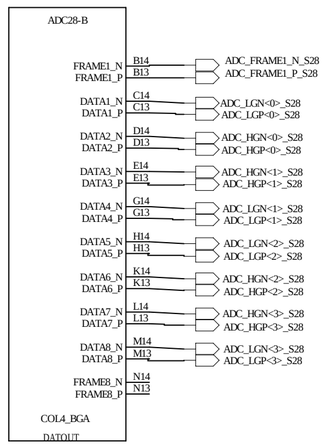

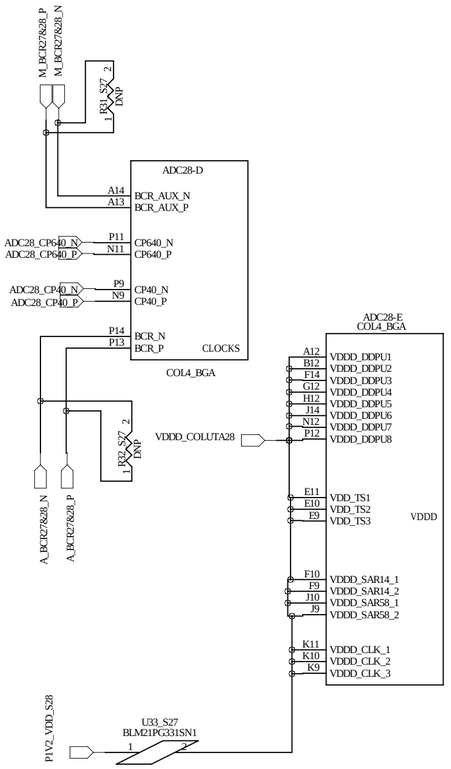

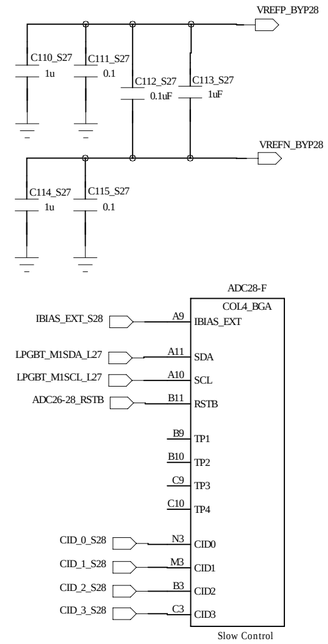

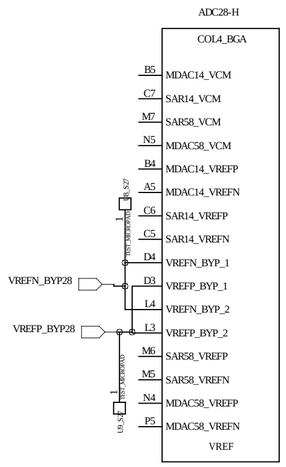

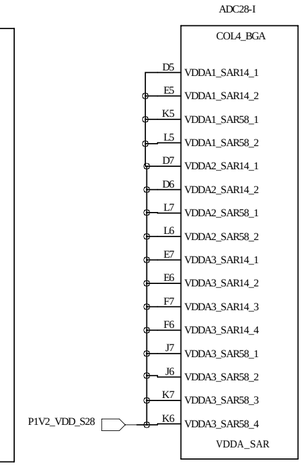

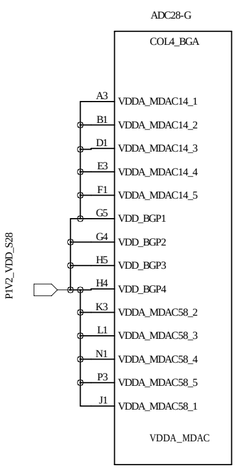

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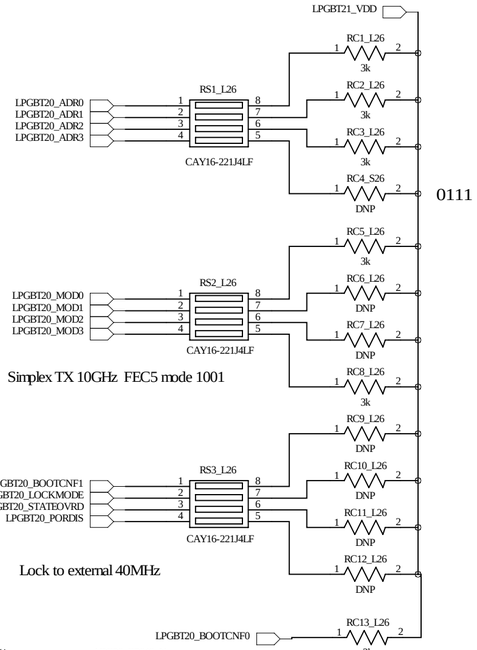

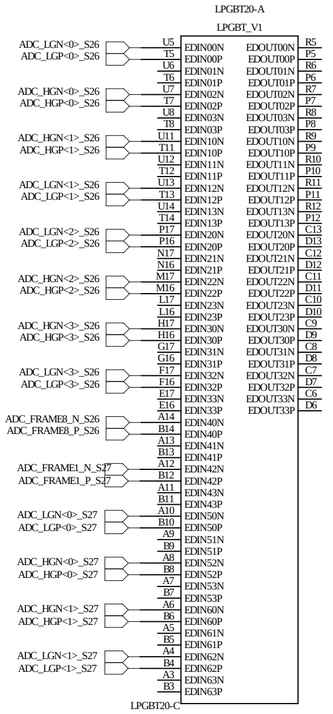

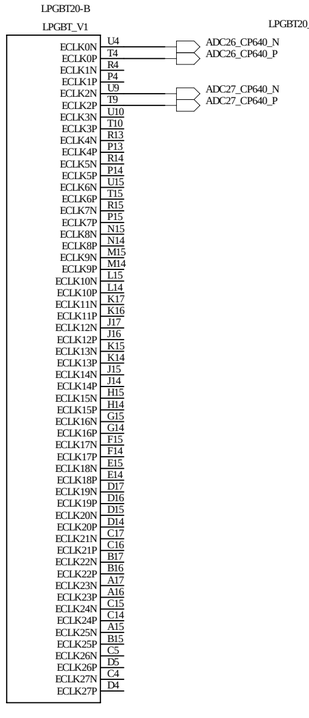

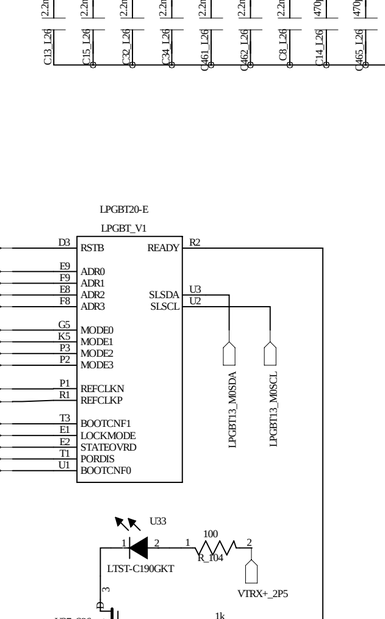

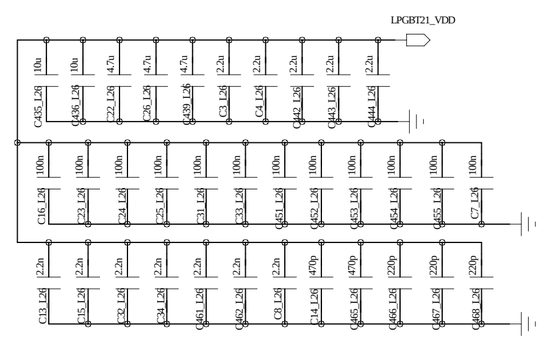

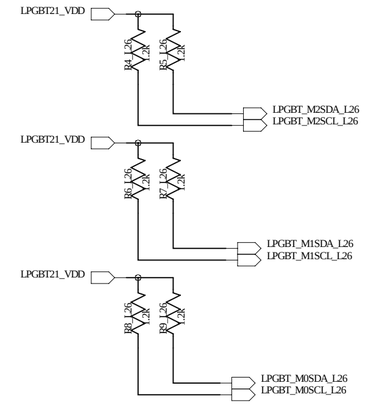

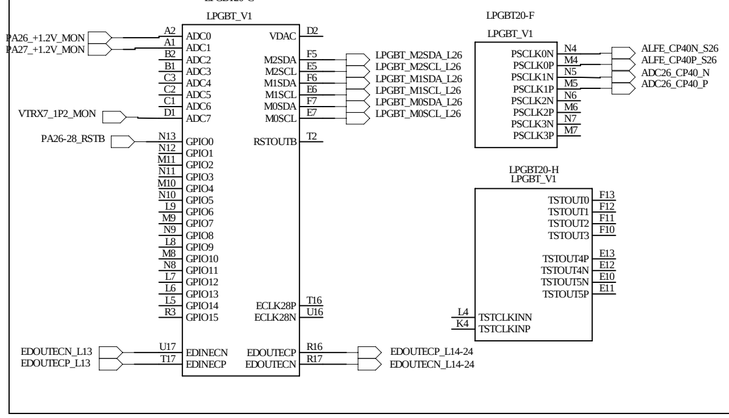

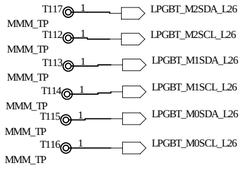

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RELEASED: jb	DATED: <Release Date>	SCALE: <Scale>	SHEET: OF 114 154

REVISION RECORD			
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LPGBT21_VDD

RS4_L27
LPGBT21_ADR0
LPGBT21_ADR1
LPGBT21_ADR2
LPGBT21_ADR3
CAY16-221J4LF

RC14_L27 DNP
RC15_L27 DNP
RC16_L27 DNP
RC17_L27 3k

1000

RS5_L27
LPGBT21_MOD0
LPGBT21_MOD1
LPGBT21_MOD2
LPGBT21_MOD3
CAY16-221J4LF

RC18_L27 3k
RC19_L27 DNP
RC20_L27 DNP
RC21_L27 3k

Simplex TX 10GHz FEC5 mode 1001

RS6_L27
LPGBT21_BOOTCNF1
LPGBT21_LOCKMODE
LPGBT21_STATEOVRD
LPGBT21_PORDIS
CAY16-221J4LF

RC22_L27 DNP
RC23_L27 DNP
RC24_L27 DNP
RC25_L27 DNP

Lock to external 40MHz

LPGBT21_BOOTCNF0
RC26_L27 3k

LPGBT21-A

LPGBT21-B
LPGBT_V1
ECLK0N U4 → ADC28_CP640_N
ECLK0P T4 → ADC28_CP640_P
ECLK1N R4
ECLK1P P4
ECLK2N U9
ECLK2P T9
ECLK3N U10
ECLK3P T10
ECLK4N R13
ECLK4P P13
ECLK5N R14
ECLK5P P14
ECLK6N U15
ECLK6P T15
ECLK7N R15
ECLK7P P15
ECLK8N N15
ECLK8P N14
ECLK9N M15
ECLK9P M14
ECLK10N L15
ECLK10P L14
ECLK11N K17
ECLK11P K16
ECLK12N J17
ECLK12P J16
ECLK13N K15
ECLK13P K14
ECLK14N J15
ECLK14P J14
ECLK15N H15
ECLK15P H14
ECLK16N G15
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ECLK17N F15
ECLK17P F14
ECLK18N E15
ECLK18P E14
ECLK19N D17
ECLK19P D16
ECLK20N D15
ECLK20P D14
ECLK21N C17
ECLK21P C16
ECLK22N B17
ECLK22P B16
ECLK23N A17
ECLK23P A16
ECLK24N C15
ECLK24P C14
ECLK25N A15
ECLK25P B15
ECLK26N C5
ECLK26P D5
ECLK27N C4
ECLK27P D4

LPGBT21-C
LPGBT_V1
ADC_LGN<2>_S27 U5 EDIN00N
ADC_LGP<2>_S27 T5 EDIN00P
U6 EDIN01N
T6 EDIN01P
ADC_HGN<2>_S27 U7 EDIN02N
ADC_HGP<2>_S27 T7 EDIN02P
U8 EDIN03N
T8 EDIN03P
ADC_HGN<3>_S27 U11 EDIN10N
ADC_HGP<3>_S27 T11 EDIN10P
U12 EDIN11N
T12 EDIN11P
ADC_LGN<3>_S27 U13 EDIN12N
ADC_LGP<3>_S27 T13 EDIN12P
U14 EDIN13N
T14 EDIN13P
ADC_FRAME8_N_S27 P17 EDIN20N
ADC_FRAME8_P_S27 P16 EDIN20P
N17 EDIN21N
N16 EDIN21P
ADC_FRAME1_N_S28 M17 EDIN22N
ADC_FRAME1_P_S28 M16 EDIN22P
L17 EDIN23N
L16 EDIN23P
ADC_LGN<0>_S28 H17 EDIN30N
ADC_LGP<0>_S28 H16 EDIN30P
G17 EDIN31N
G16 EDIN31P
ADC_HGN<0>_S28 F17 EDIN32N
ADC_HGP<0>_S28 F16 EDIN32P
E17 EDIN33N
E16 EDIN33P
ADC_HGN<1>_S28 A14 EDIN40N
ADC_HGP<1>_S28 B14 EDIN40P
A13 EDIN41N
B13 EDIN41P
ADC_LGN<1>_S28 A12 EDIN42N
ADC_LGP<1>_S28 B12 EDIN42P
A11 EDIN43N
B11 EDIN43P
ADC_LGN<2>_S28 A10 EDIN50N
ADC_LGP<2>_S28 B10 EDIN50P
A9 EDIN51N
B9 EDIN51P
ADC_HGN<2>_S28 A8 EDIN52N
ADC_HGP<2>_S28 B8 EDIN52P
A7 EDIN53N
B7 EDIN53P
ADC_HGN<3>_S28 A6 EDIN60N
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A5 EDIN61N
B5 EDIN61P
ADC_LGN<3>_S28 A4 EDIN62N
ADC_LGP<3>_S28 B4 EDIN62P
A3 EDIN63N
B3 EDIN63P

EDIN00N EDOUT00N R5
EDIN00P EDOUT00P P5
EDIN01N EDOUT01N R6
EDIN01P EDOUT01P R7
EDIN02N EDOUT02N P7
EDIN02P EDOUT02P U10
EDIN03N EDOUT03N R8
EDIN03P EDOUT03P P8
EDIN10N EDOUT10N R9
EDIN10P EDOUT10P P9
EDIN11N EDOUT11N R10
EDIN11P EDOUT11P P10
EDIN12N EDOUT12N R11
EDIN12P EDOUT12P P11
EDIN13N EDOUT13N R12
EDIN13P EDOUT13P P12
EDIN20N EDOUT20N D13
EDIN20P EDOUT20P C13
EDIN21N EDOUT21N C12
EDIN21P EDOUT21P D12
EDIN22N EDOUT22N C11
EDIN22P EDOUT22P D11
EDIN23N EDOUT23N C10
EDIN23P EDOUT23P D10
EDIN30N EDOUT30N C9
EDIN30P EDOUT30P D9
EDIN31N EDOUT31N C8
EDIN31P EDOUT31P D8
EDIN32N EDOUT32N C7
EDIN32P EDOUT32P D7
EDIN33N EDOUT33N C6
EDIN33P EDOUT33P D6

LPGBT21-D
LPGBT_V1
VDD1V2_1 J5
VDD1V2_2 J6
VDD1V2_3 J7
VDD1V2_4 J8
VDD1V2_5 J9
VDD1V2_6 J11
VDD1V2_7 K6
VDD1V2_8 K7
VDD1V2_9 K8
VDD1V2_10 K9
VDD1V2_11 K11
VDD1V2_12 K12
VDD1V2_13 K13
VDD1V2_14 L10
VDD1V2_15 L11
VDD1V2_16 L12
VDD1V2_17 L13
VDD1V2_18 M12
VDD1V2_19 M13

VDDRX1V2_4 N3
VDDRX1V2_3 M3
VDDRX1V2_2 L3
VDDRX1V2_1 K3
GNDRX_6 N2
GNDRX_5 N1
GNDRX_4 M2
GNDRX_3 L2
GNDRX_2 K2
GNDRX_1 K1

VDDTX1V2_4 J3
VDDTX1V2_3 H3
VDDTX1V2_2 G3
VDDTX1V2_1 F3

GNDTX_6 J2
GNDTX_5 J1
GNDTX_4 H2
GNDTX_3 G2
GNDTX_2 F2
GNDTX_1 F1

VDDA1V2_2 E4
VDDA1V2_1 E3

GNDA_2 G4
GNDA_1 F4

VDDF2V5_2 K10
VDDF2V5_1 J10 → VDDF2P5_LPGBT20

VREF_2 J4
VREF_1 H4

GND_1 G6
GND_2 G7
GND_3 G8
GND_4 G9
GND_5 G10
GND_6 G11
GND_7 G12
GND_8 G13
GND_9 H5
GND_10 H6
GND_11 H7
GND_12 H8
GND_13 H9
GND_14 H10
GND_15 H11
GND_16 H12
GND_17 H13
GND_18 J12
GND_19 J13

LPGBT21-E
LPGBT_V1
LPGBT14-24_RSTB D3
LPGBT21_ADR0 E9
LPGBT21_ADR1 F9
LPGBT21_ADR2 E8
LPGBT21_ADR3 F8
LPGBT21_MOD0 G5
LPGBT21_MOD1 K5
LPGBT21_MOD2 P3
LPGBT21_MOD3 P2
MCLK21N P1
MCLK21P R1
LPGBT21_BOOTCNF1 T3
LPGBT21_LOCKMODE E1
LPGBT21_STATEOVRD E2
LPGBT21_PORDIS T1
LPGBT21_BOOTCNF0 U1

RSTB
ADR0
ADR1
ADR2
ADR3
MODE0
MODE1
MODE2
MODE3
REFCLKN
REFCLKP
BOOTCNF1
LOCKMODE
STATEOVRD
PORDIS
BOOTCNF0
READY R2
SLSDA U3
SLSCL U2

LPGBT13_M0SDA
LPGBT13_M0SCL

U34
LTST-C190GKT
100 R_105
VTRX+_2P5
U1_S26
1k R_135

C29_M28 22u
C31_M28 DNP
C33_M28 22u
C34_M28 100n
C35_M28 DNP

LDO_LPGBT21
SGCPMU_CRN01
VO3 VO2 VO1 VFB OCSNS TEST GND3
VI3 VI4 VI5 T3 OCZ_ATB PG
P50MV M50MV GND_AGND1 GND_AGND2 EN SOFTST

+1.4V_SLICE25-26
R_1_M28 243
R_2_M28 20k
R_3_M28 510k
R_4_M28 1.2k
R_5_M28 1.2k
R197 1k

C1_L27 2.2n
C2_L27 2.2n
C37_L27 10n
C63_L27 4.7n
C5_L27 100n
C6_L27 2.2n
C51_L27 2.2n
C66_L27 2.2n
C9_L27 2.2n
C10_L27 470p

C11_L27 2.2n
C12_L27 100n
C35_L27 100n
C41_L27 100n
C50_L27 100n
C56_L27 100n
C17_L27 4.7u
C18_L27 100n
C19_L27 100n
C20_L27 100n
C21_L27 4.7u
C57_L27 100n

C42_L27 10n
C49_L27 2.2u
C38_L27 2.2n
C39_L27 2.2n
C27_L27 100n
C28_L27 2.2n
C29_L27 100n
C30_L27 2.2n
C65_L27 470p
C40_L27 220p
C55_L27 220p
C58_L27 220p

LPGBT21_VDD
R6_L27 2.2k
R5_L27 1.2k
LPGBT_M2SDA_L27
LPGBT_M2SCL_L27
R1_L27 2.2k
R2_L27 1.2k
LPGBT_M1SDA_L27
LPGBT_M1SCL_L27
R3_L27 2.2k
R4_L27 1.2k
LPGBT_M0SDA_L27
LPGBT_M0SCL_L27

LPGBT21-F
LPGBT_V1
PSCLK0N N4 → ALFE_CP40N_S27
PSCLK0P M4 → ALFE_CP40P_S27
PSCLK1N N5 → ADC27_CP40_N
PSCLK1P M5 → ADC27_CP40_P
PSCLK2N N6 → ALFE_CP40N_S28
PSCLK2P M6 → ALFE_CP40P_S28
PSCLK3N N7 → ADC28_CP40_N
PSCLK3P M7 → ADC28_CP40_P

LPGBT21-G
LPGBT_V1
M1_SCL 1 TEST_MICROHAD
M2_SCL 1 TEST_MICROHAD
M1 L1 HSINN HSINP
HSOUTP HSOUTN H1 G1
LPGBT21_HSOUTP
LPGBT21_HSOUTN

LPGBT21-H
LPGBT_V1
TSTOUT0 F13
TSTOUT1 F12
TSTOUT2 F11
TSTOUT3 F10
TSTOUT4P E13
TSTOUT4N E12
TSTOUT5N E10
TSTOUT5P E11
L4 TSTCLKINN
K4 TSTCLKINP

LPGBT21-C
LPGBT_V1
PA28_+1.2V_MON
ADC26-28_RSTB
ADC0 A2 VDAC D2
ADC1 A1
ADC2 B2 M2SDA F5 → LPGBT_M2SDA_L27
ADC3 B1 M2SCL E5 → LPGBT_M2SCL_L27
ADC4 C3 M1SDA F6 → LPGBT_M1SDA_L27
ADC5 C2 M1SCL E6 → LPGBT_M1SCL_L27
ADC6 C1 M0SDA F7 → LPGBT_M0SDA_L27
ADC7 D1 M0SCL E7 → LPGBT_M0SCL_L27
GPIO0 N13 RSTOUTB T2
GPIO1 N12
GPIO2 M11
GPIO3 N11
GPIO4 M10
GPIO5 N10
GPIO6 L9
GPIO7 M9
GPIO8 N9
GPIO9 L8
GPIO10 M8
GPIO11 N8
GPIO12 L7
GPIO13 L6
GPIO14 L5 ECLK28P T16
GPIO15 R3 ECLK28N U16
EDOUTECN_L13 U17 EDINECN EDOUTECP R16 → EDOUTECP_L14-24
EDOUTECP_L13 T17 EDINECP EDOUTECN R17 → EDOUTECN_L14-24

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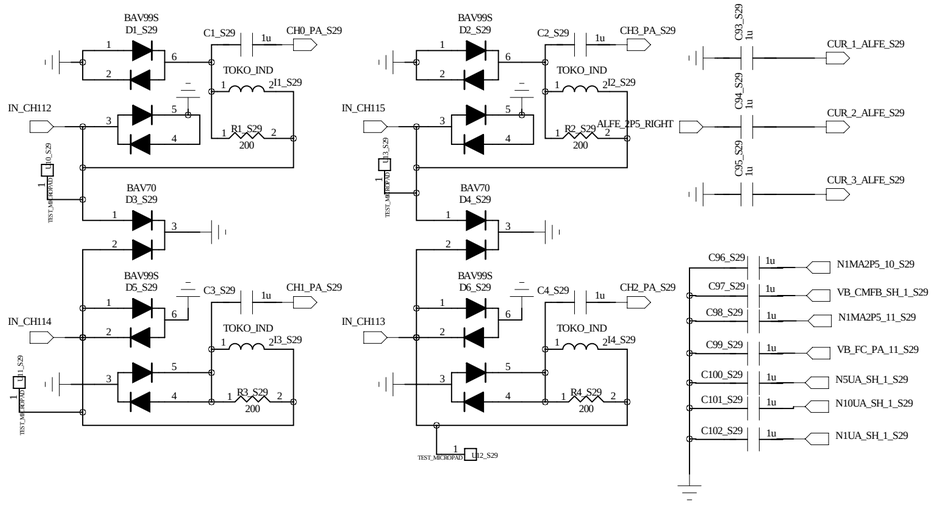

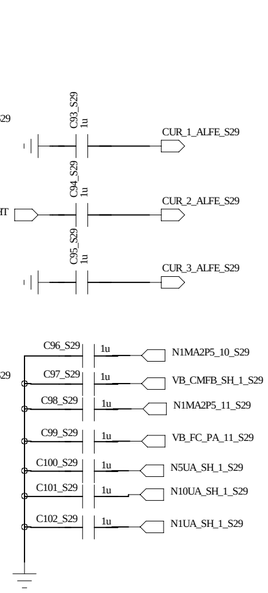

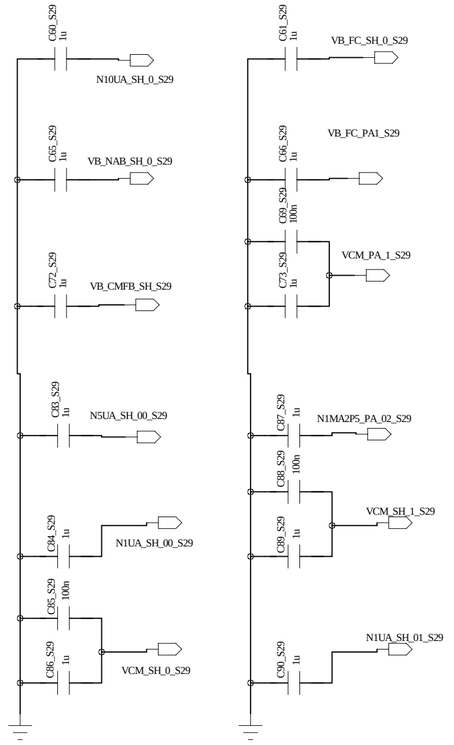

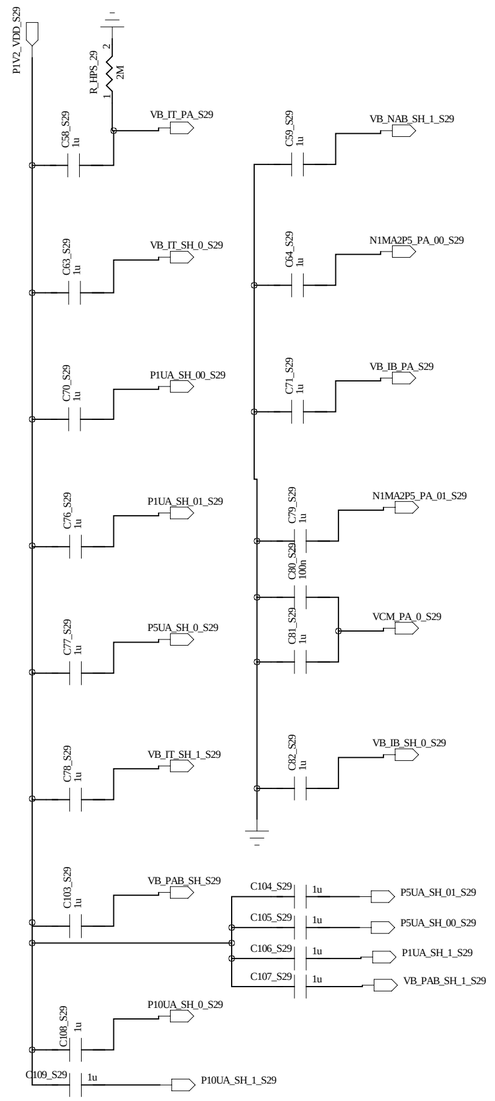

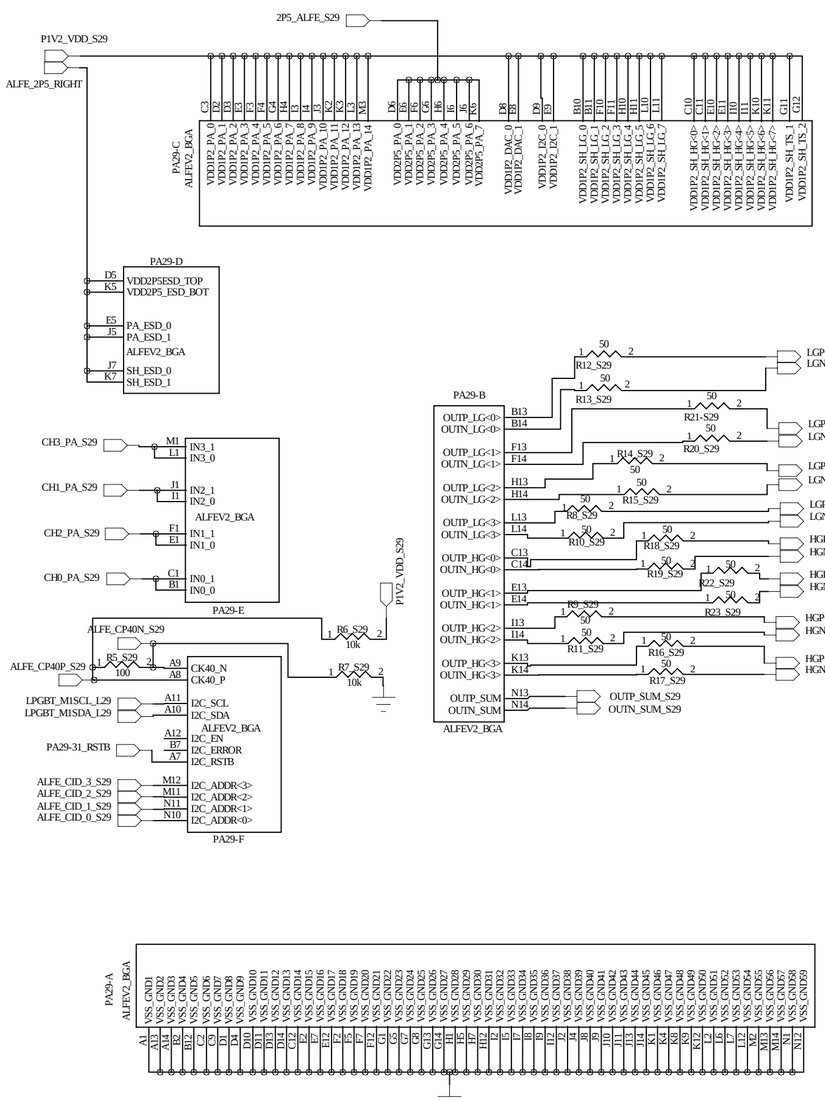

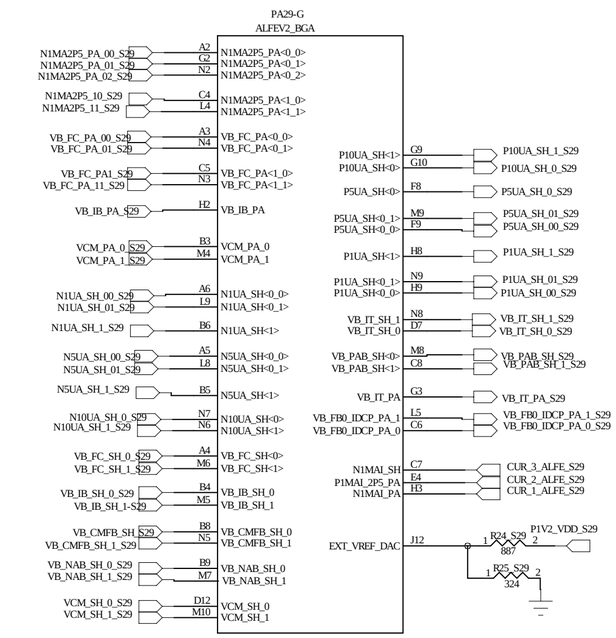

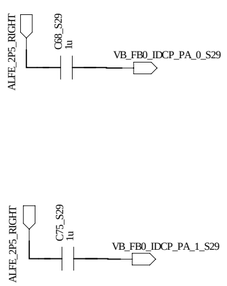

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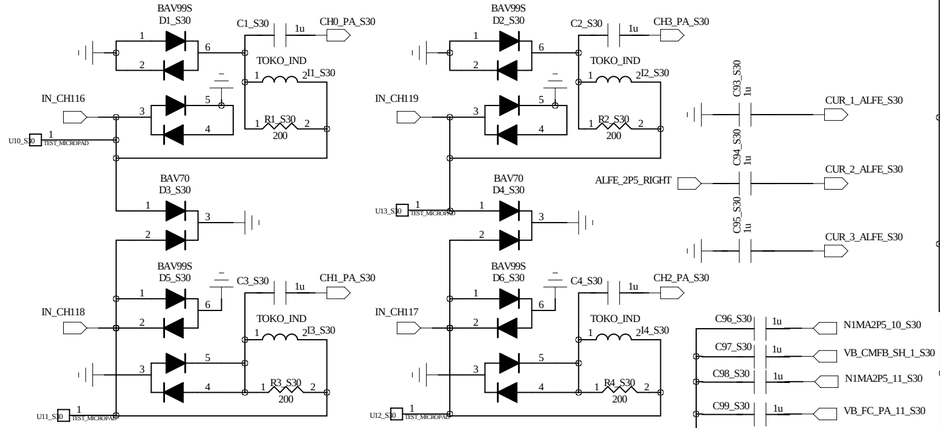

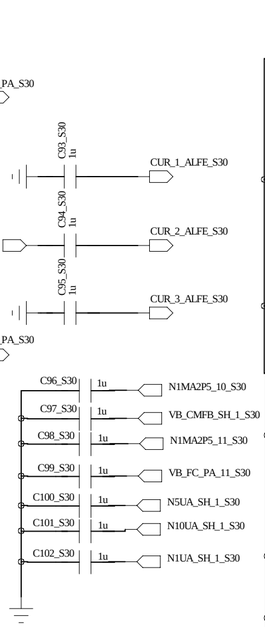

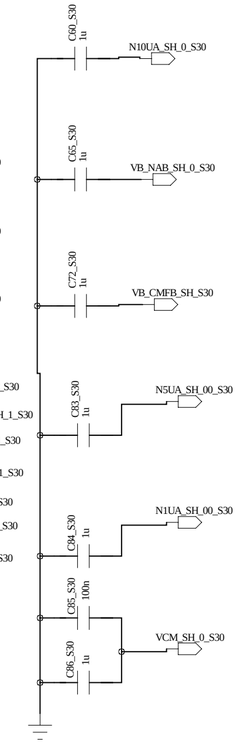

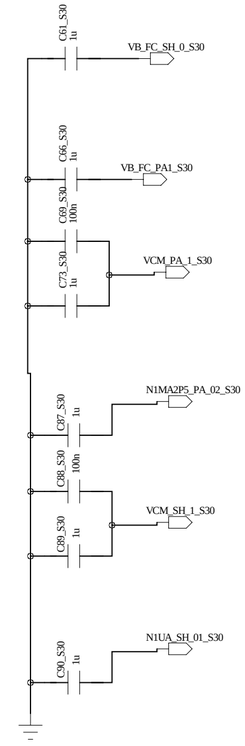

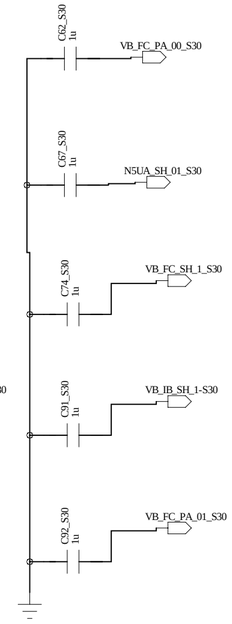

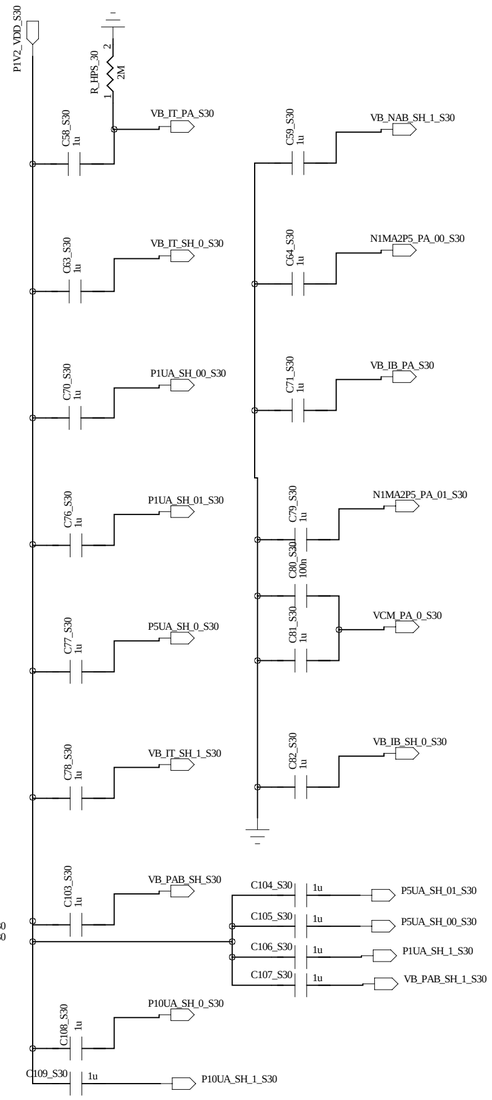

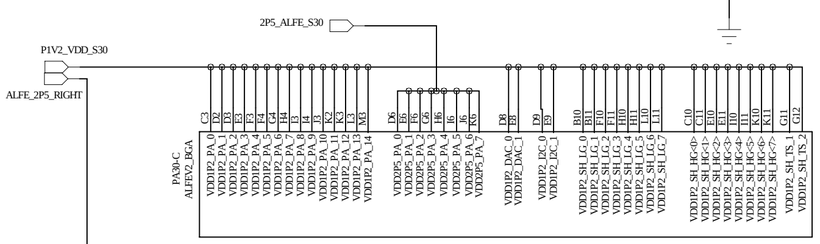

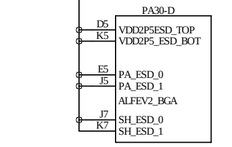

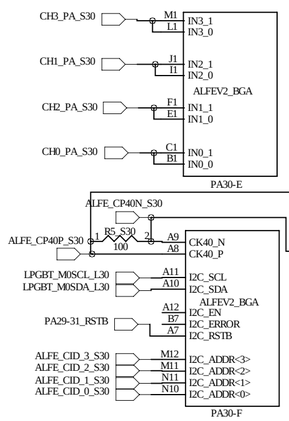

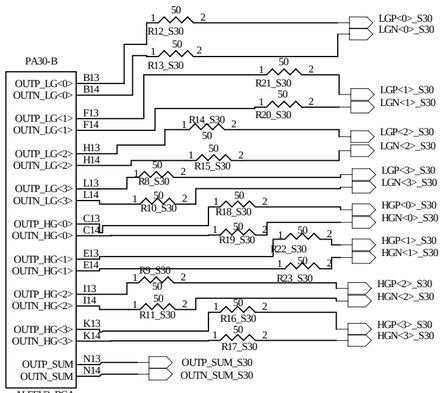

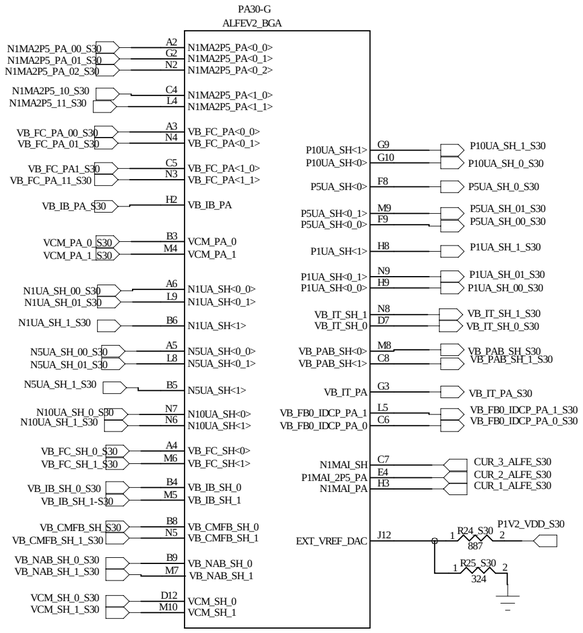

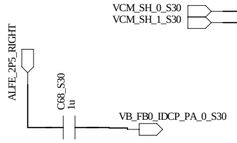

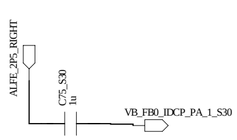

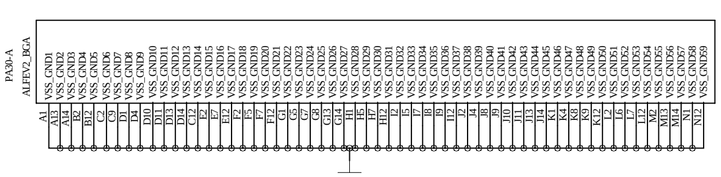

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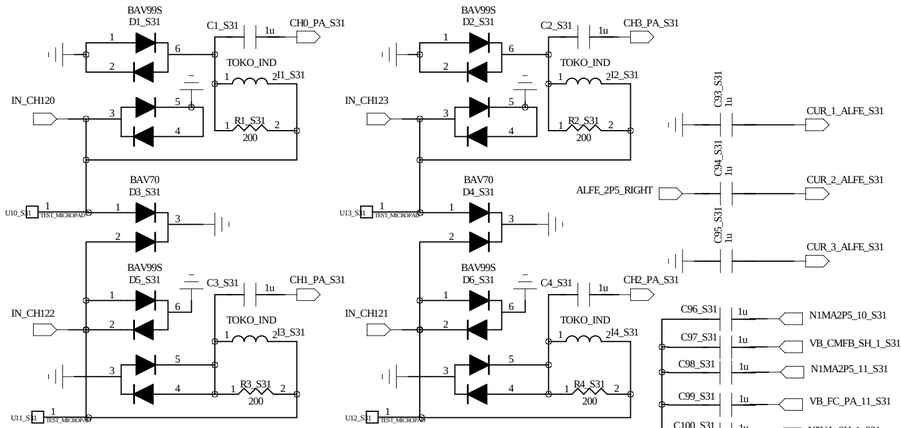

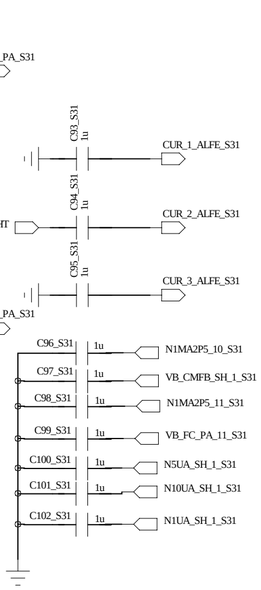

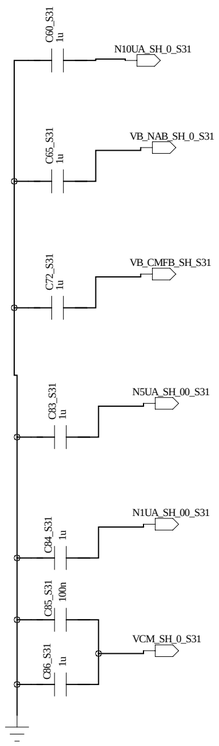

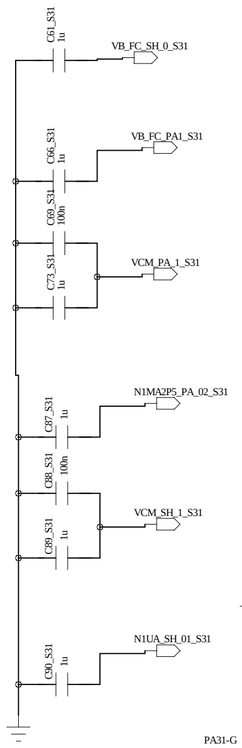

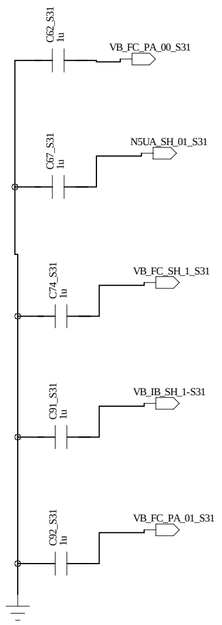

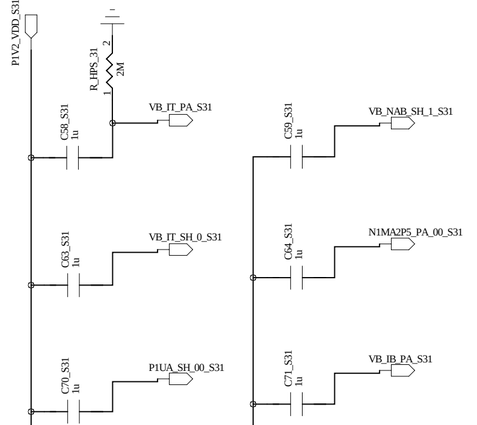

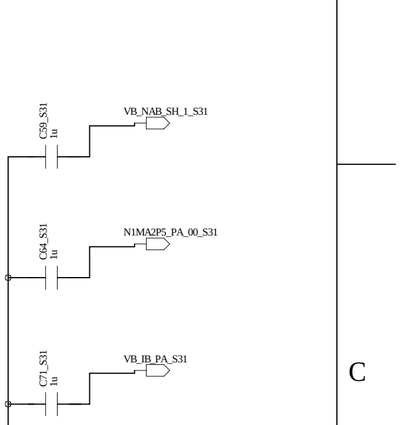

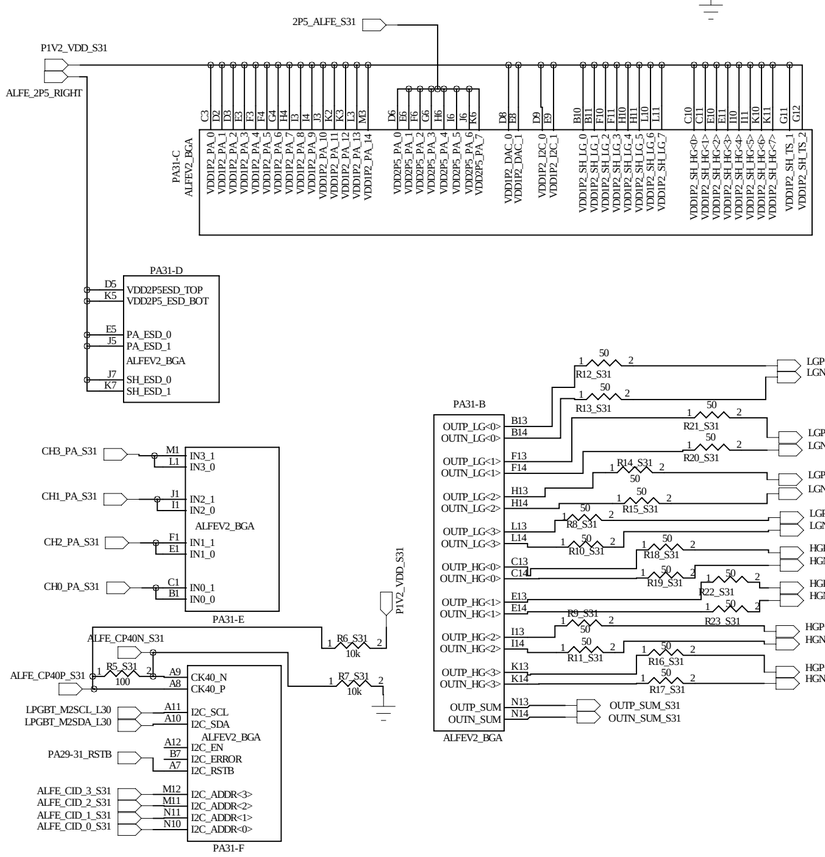

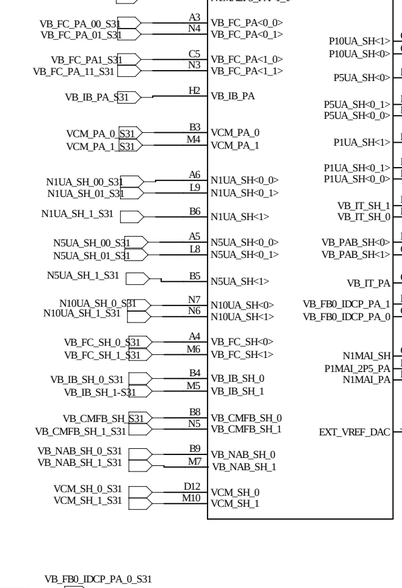

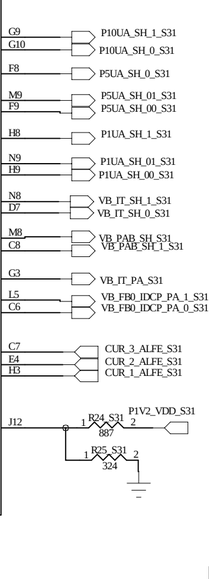

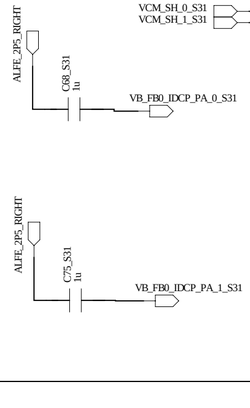

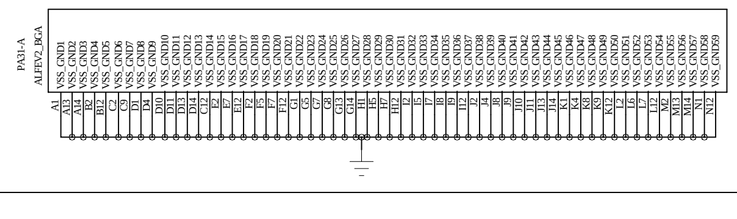

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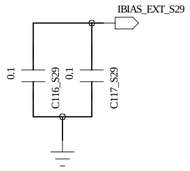

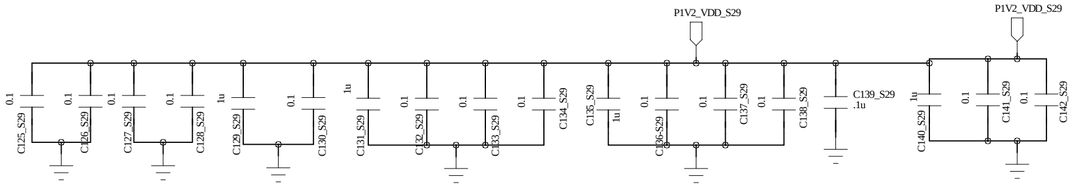

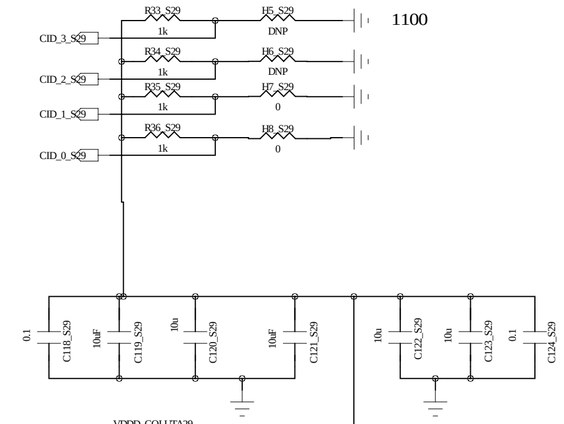

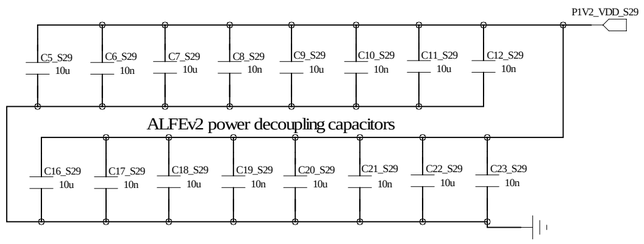

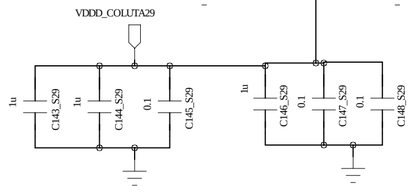

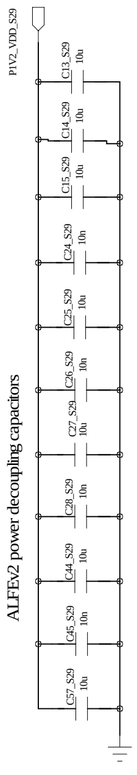

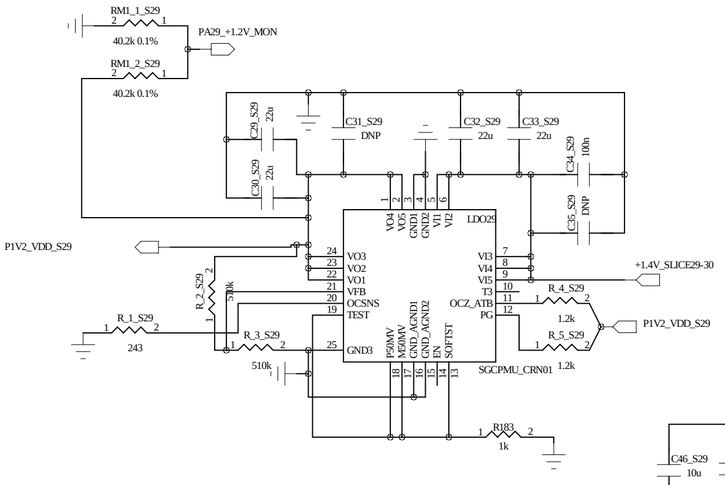

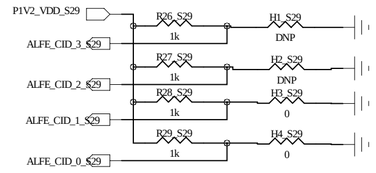

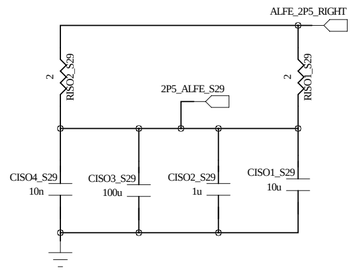

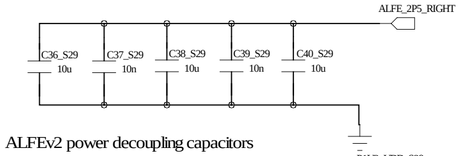

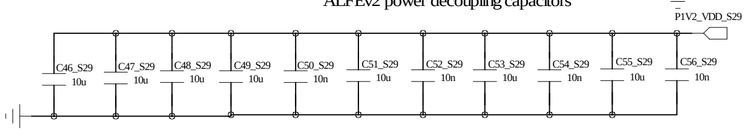

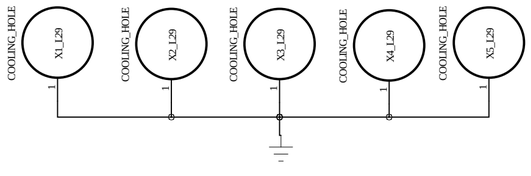

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TITLE: FEB2 prototype v2.0

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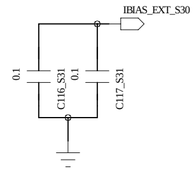

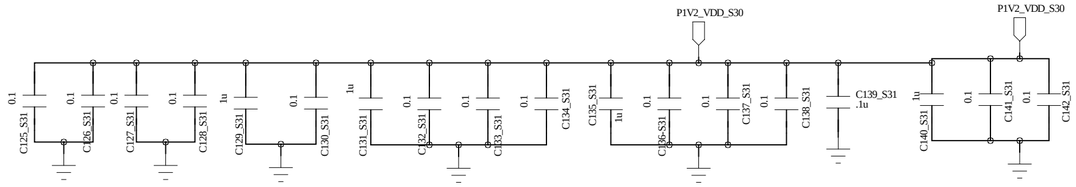

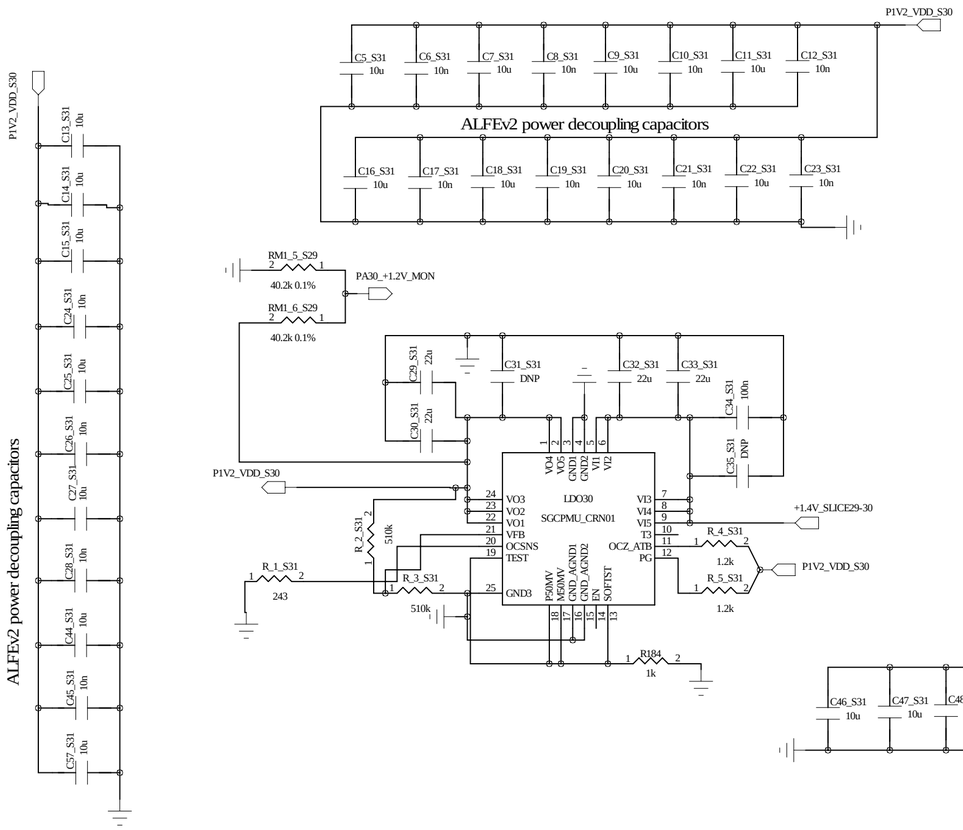

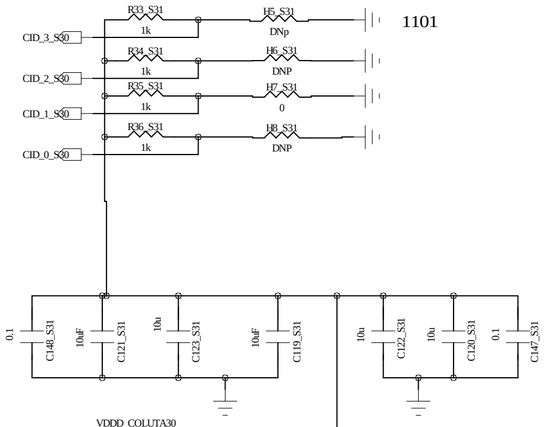

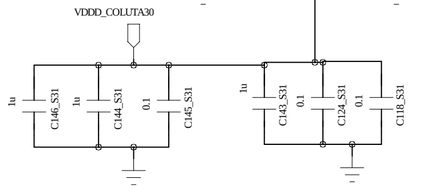

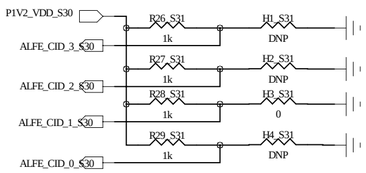

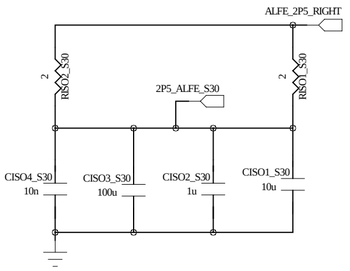

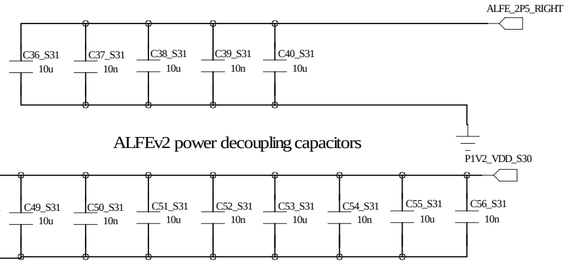

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COMPANY: Nevis Laboratories of Columbia University

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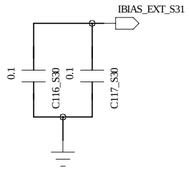

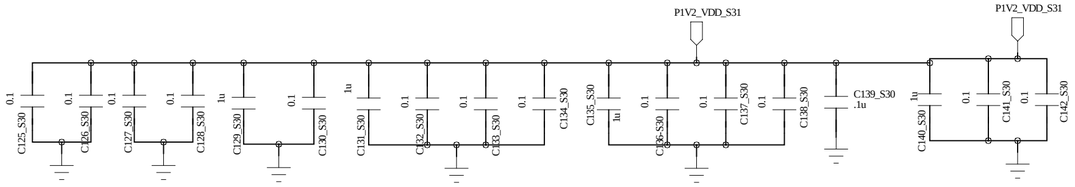

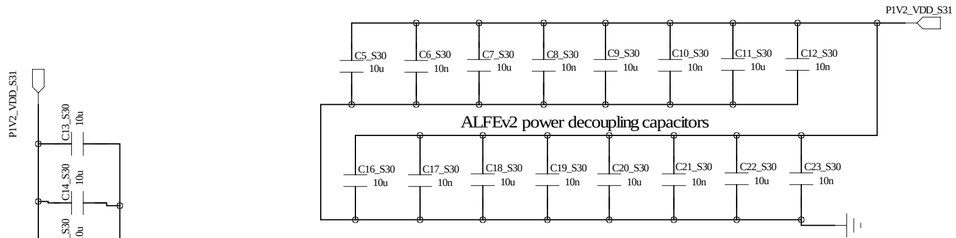

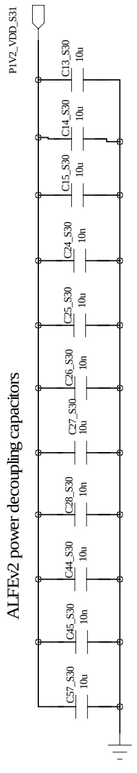

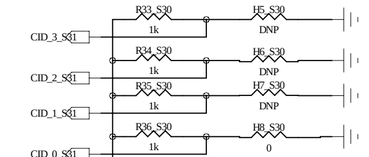

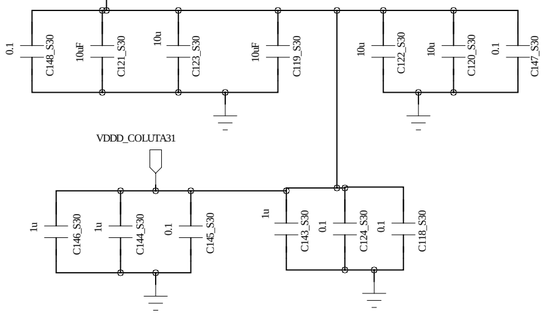

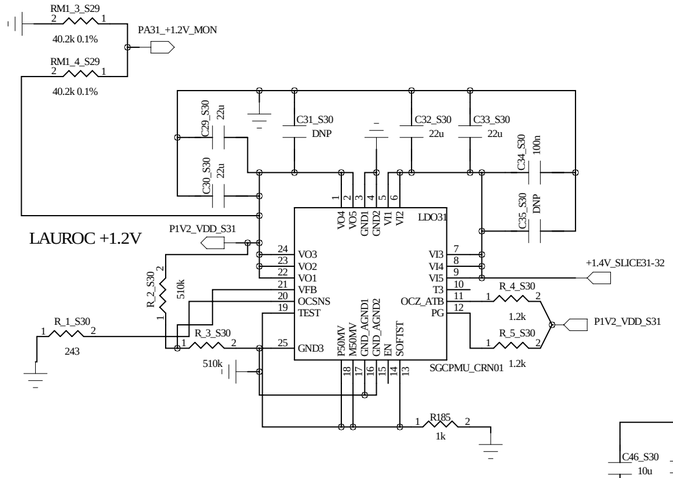

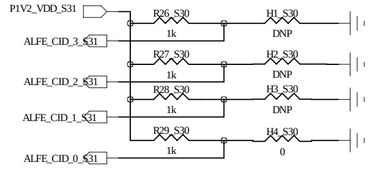

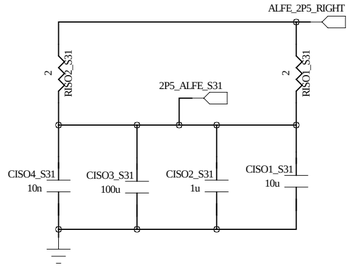

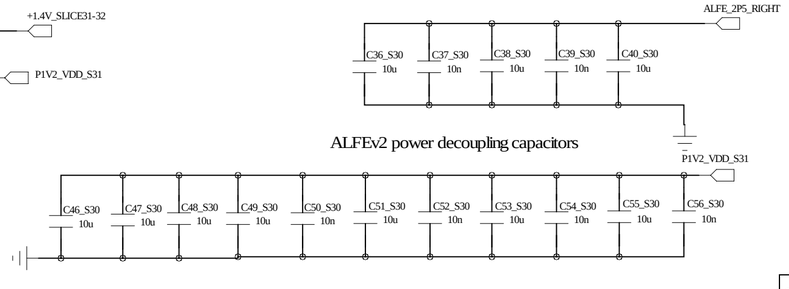

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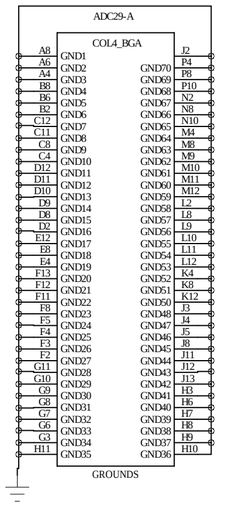

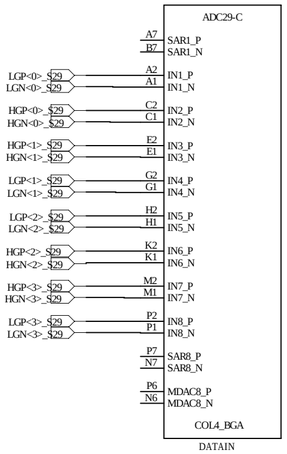

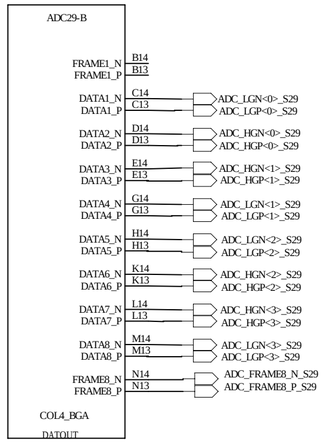

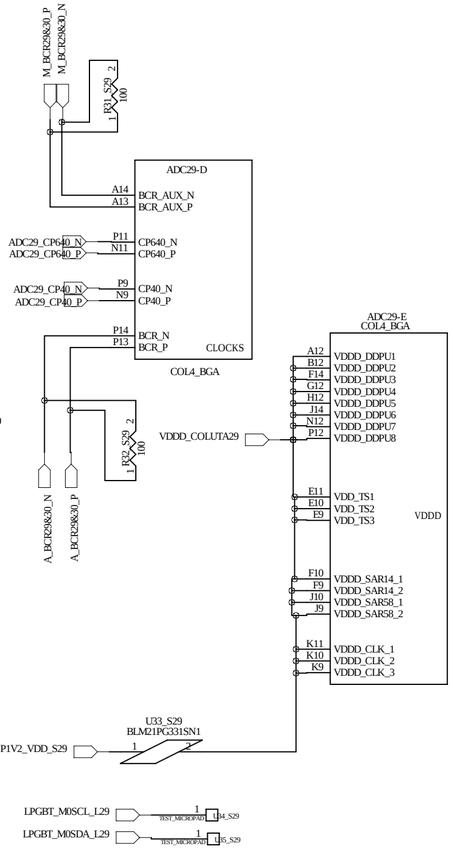

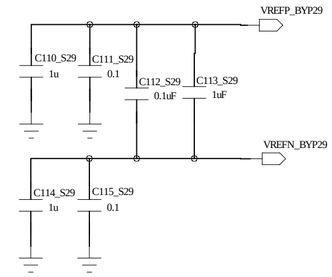

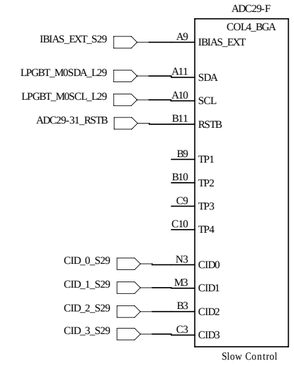

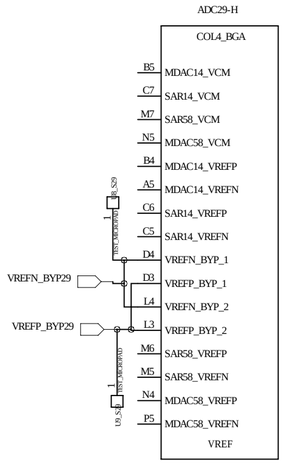

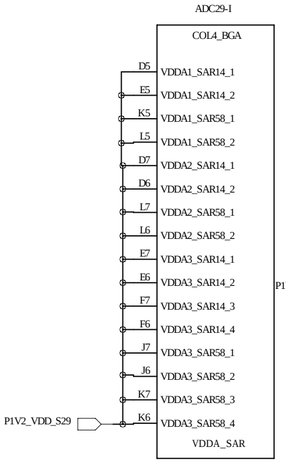

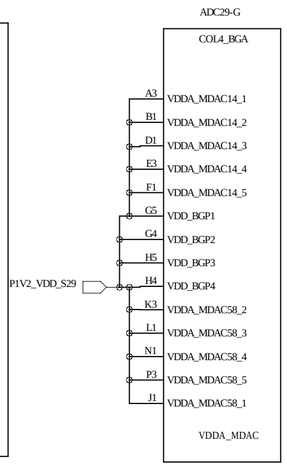

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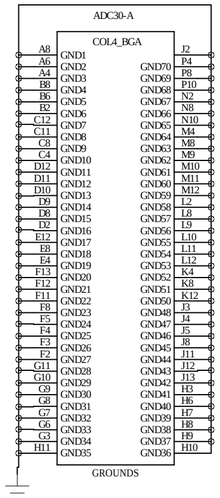

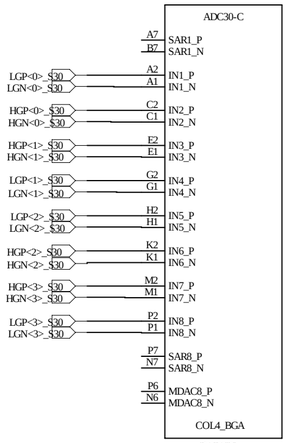

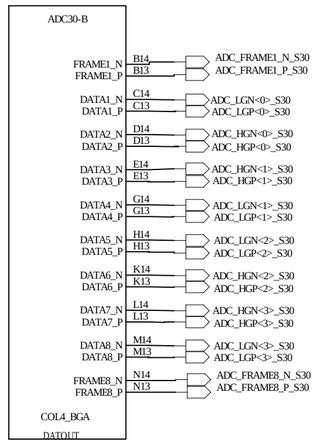

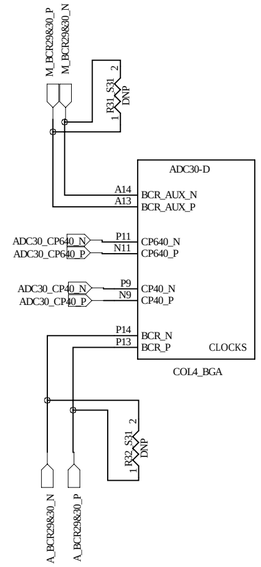

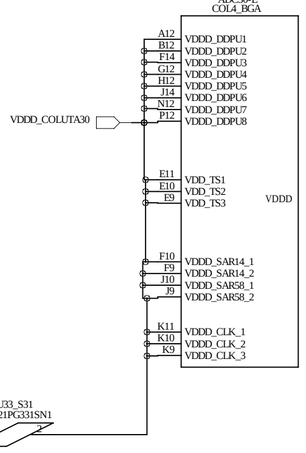

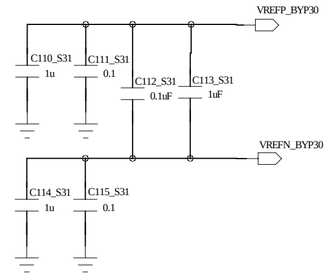

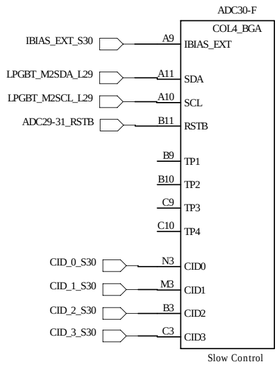

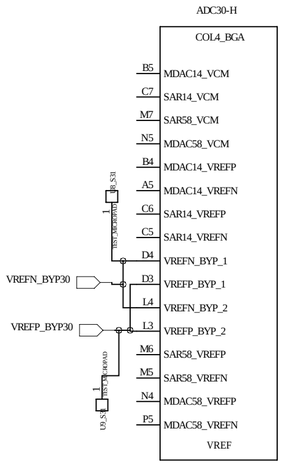

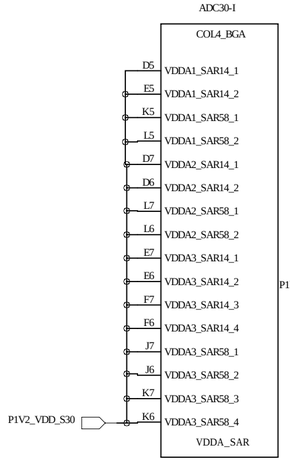

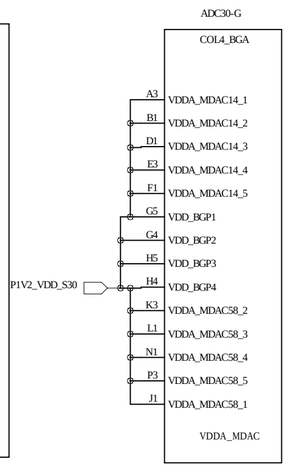

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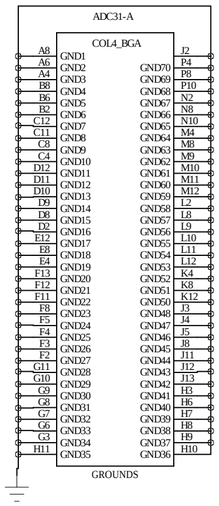

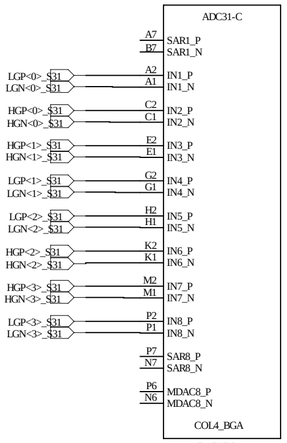

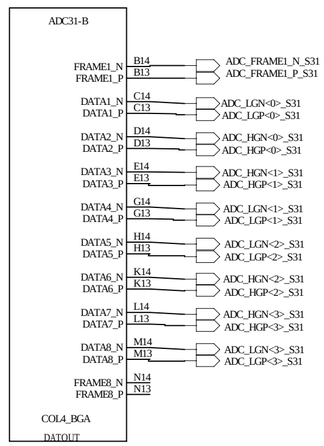

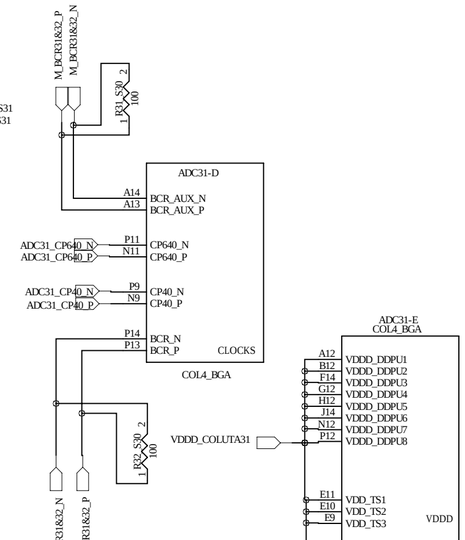

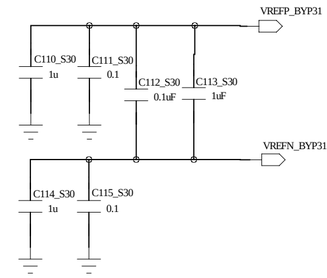

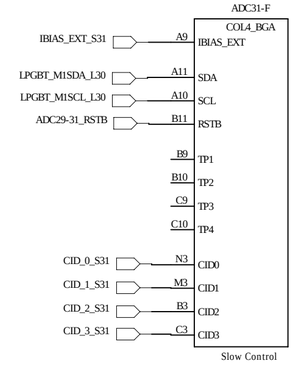

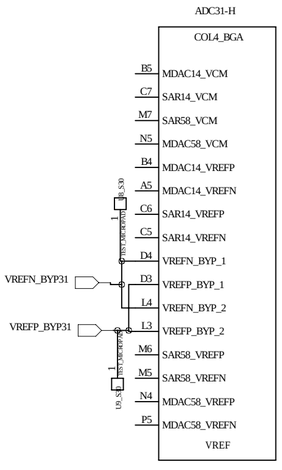

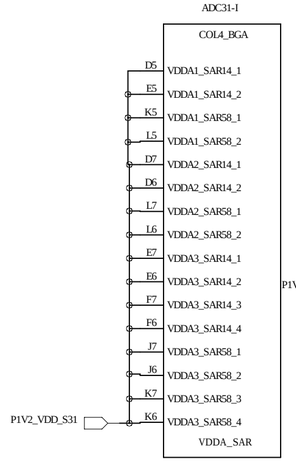

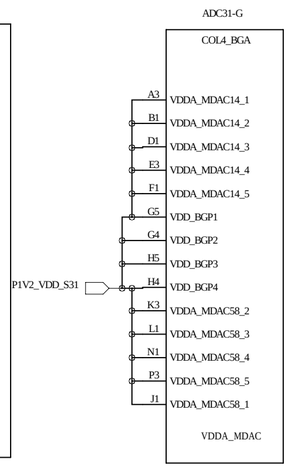

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		SCALE: <Scale>	SHEET: OF 124 154

REVISION RECORD			
LTR	ECO NO:	APPROVED:	DATE:

LPGBT22_VDD

RC1_L29 3k

RC2_L29 DNP

RC3_L29 DNP

RC4_L29 3k

1001

RS1_L29 CAY16-221J4LF

LPGBT22_ADR0
LPGBT22_ADR1
LPGBT22_ADR2
LPGBT22_ADR3

RC5_L29 3k

RC6_L29 DNP

RC7_L29 DNP

RC8_L29 3k

RS2_L29 CAY16-221J4LF

LPGBT22_MOD0
LPGBT22_MOD1
LPGBT22_MOD2
LPGBT22_MOD3

Simplex TX 10Ghz FEC5 mode 1001

RC9_L29 DNP

RC10_L29 DNP

RC11_L29 DNP

RC12_L29 DNP

RS3_L29 CAY16-221J4LF

LPGBT22_BOOTCNF1
LPGBT22_LOCKMODE
LPGBT22_STATEOVRD
LPGBT22_PORDIS

Lock to external 40MHz

RC13_L29 3k

LPGBT22_BOOTCNF0

LPGBT22-A

LPGBT_V1

ADC_LGN<0>_S29	U5	EDIN00N	EDOUT00N R5
ADC_LGP<0>_S29	T5	EDIN00P	EDOUT00P P5
	U6	EDIN01N	EDOUT01N R6
	T6	EDIN01P	EDOUT01P P6
ADC_HGN<0>_S29	U7	EDIN02N	EDOUT02N R7
ADC_HGP<0>_S29	T7	EDIN02P	EDOUT02P P7
	U8	EDIN03N	EDOUT03N P8
	T8	EDIN03P	EDOUT03P R9
ADC_HGN<1>_S29	U11	EDIN10N	EDOUT10N P9
ADC_HGP<1>_S29	T11	EDIN10P	EDOUT10P R10
	U12	EDIN11N	EDOUT11N P10
	T12	EDIN11P	EDOUT11P R11
ADC_LGN<1>_S29	U13	EDIN12N	EDOUT12N P11
ADC_LGP<1>_S29	T13	EDIN12P	EDOUT12P R12
	U14	EDIN13N	EDOUT13N P12
	T14	EDIN13P	EDOUT13P C13
ADC_LGN<2>_S29	P17	EDIN20N	EDOUT20N D13
ADC_LGP<2>_S29	P16	EDIN20P	EDOUT20P C12
	N17	EDIN21N	EDOUT21N D12
	N16	EDIN21P	EDOUT21P C11
ADC_HGN<2>_S29	M17	EDIN22N	EDOUT22N D11
ADC_HGP<2>_S29	M16	EDIN22P	EDOUT22P C10
	L17	EDIN23N	EDOUT23N D10
	L16	EDIN23P	EDOUT23P C9
ADC_HGN<3>_S29	H17	EDIN30N	EDOUT30N D9
ADC_HGP<3>_S29	H16	EDIN30P	EDOUT30P C8
	G17	EDIN31N	EDOUT31N D8
	G16	EDIN31P	EDOUT31P C7
ADC_LGN<3>_S29	F17	EDIN32N	EDOUT32N D7
ADC_LGP<3>_S29	F16	EDIN32P	EDOUT32P C6
	E17	EDIN33N	EDOUT33N D6
	E16	EDIN33P	EDOUT33P
ADC_FRAME8_N_S29	A14	EDIN40N	
ADC_FRAME8_P_S29	B14	EDIN40P	
	A13	EDIN41N	
	B13	EDIN41P	
ADC_FRAME1_N_S30	A12	EDIN42N	
ADC_FRAME1_P_S30	B12	EDIN42P	
	A11	EDIN43N	
	B11	EDIN43P	
ADC_LGN<0>_S30	A10	EDIN50N	
ADC_LGP<0>_S30	B10	EDIN50P	
	A9	EDIN51N	
	B9	EDIN51P	
ADC_HGN<0>_S30	A8	EDIN52N	
ADC_HGP<0>_S30	B8	EDIN52P	
	A7	EDIN53N	
	B7	EDIN53P	
ADC_HGN<1>_S30	A6	EDIN60N	
ADC_HGP<1>_S30	B6	EDIN60P	
	A5	EDIN61N	
	B5	EDIN61P	
ADC_LGN<1>_S30	A4	EDIN62N	
ADC_LGP<1>_S30	B4	EDIN62P	
	A3	EDIN63N	
	B3	EDIN63P	

LPGBT22-C

LPGBT22-B

LPGBT_V1

ECLK0N	U4		ADC29_CP640_N
ECLK0P	T4		ADC29_CP640_P
ECLK1N	R4		
ECLK1P	P4		
ECLK2N	U9		ADC30_CP640_N
ECLK2P	T9		ADC30_CP640_P
ECLK3N	U10		
ECLK3P	T10		
ECLK4N	R13		
ECLK4P	P13		
ECLK5N	R14		
ECLK5P	P14		
ECLK6N	U15		
ECLK6P	T15		
ECLK7N	R15		
ECLK7P	P15		
ECLK8N	N15		
ECLK8P	N14		
ECLK9N	M15		
ECLK9P	M14		
ECLK10N	L15		
ECLK10P	L14		
ECLK11N	K17		
ECLK11P	K16		
ECLK12N	J17		
ECLK12P	J16		
ECLK13N	K15		
ECLK13P	K14		
ECLK14N	J15		
ECLK14P	J14		
ECLK15N	H15		
ECLK15P	H14		
ECLK16N	G15		
ECLK16P	G14		
ECLK17N	F15		
ECLK17P	F14		
ECLK18N	E15		
ECLK18P	E14		
ECLK19N	D17		
ECLK19P	D16		
ECLK20N	D15		
ECLK20P	D14		
ECLK21N	C17		
ECLK21P	C16		
ECLK22N	B17		
ECLK22P	B16		
ECLK23N	A17		
ECLK23P	A16		
ECLK24N	C15		
ECLK24P	C14		
ECLK25N	A15		
ECLK25P	B15		
ECLK26N	C5		
ECLK26P	D5		
ECLK27N	C4		
ECLK27P	D4		

LPGBT22-F

LPGBT_V1

PSCLK0N	N4	ALFE_CP40N_S29
PSCLK0P	M4	ALFE_CP40P_S29
PSCLK1N	N5	ADC29_CP40_N
PSCLK1P	M5	ADC29_CP40_P
PSCLK2N	M6	
PSCLK2P	N6	
PSCLK3N	N7	
PSCLK3P	M7	

LPGBT22-H

LPGBT_V1

TSTOUT0	F13	
TSTOUT1	F12	
TSTOUT2	F11	
TSTOUT3	F10	
TSTOUT4P	E13	
TSTOUT4N	E12	
TSTOUT5N	E10	
TSTOUT5P	E11	
TSTCLKINN	L4	
TSTCLKINP	K4	

LPGBT_V1

PA29_+1.2V_MON	A2	ADC0	VDAC D2
PA30_+1.2V_MON	A1	ADC1	
	B2	ADC2	M2SDA F5 LPGBT_M2SDA_L29
	B1	ADC3	M2SCL E5 LPGBT_M2SCL_L29
	C3	ADC4	M1SDA F6 LPGBT_M1SDA_L29
	C2	ADC5	M1SCL E6 LPGBT_M1SCL_L29
	C1	ADC6	M0SDA F7 LPGBT_M0SDA_L29
	D1	ADC7	M0SCL E7 LPGBT_M0SCL_L29
PA29-31_RSTB	N13	GPIO0	RSTOUTB T2
	N12	GPIO1	
	M11	GPIO2	
VTRX+8_RSTN	N11	GPIO3	
	M10	GPIO4	
	N10	GPIO5	
	L9	GPIO6	
	M9	GPIO7	
	N9	GPIO8	
	L8	GPIO9	
	M8	GPIO10	
	N8	GPIO11	
	L7	GPIO12	
	L6	GPIO13	
	L5	GPIO14	ECLK28P T16
	R3	GPIO15	ECLK28N U16
EDOUTECN_L13	U17	EDINECN	EDOUTECP R16 EDOUTECP_L14-24
EDOUTECP_L13	T17	EDINECP	EDOUTECN R17 EDOUTECN_L14-24

LPGBT22-C

C29_M29 22u

C31_M29 DNP

C33_M29 22u

C34_M29 100n

C35_M29 DNP

LPGBT22_VDD

LDO_LPGBT22
SGCPMU_CRN01

+1.4V_SLICE29-30

R_1_M29 243

R_2_M29 20k

R_3_M29 510k

R_4_M29 1.2k

R_5_M29 1.2k

LPGBT22_VDD

R196 1k

LPGBT22_VDD

C1_L29 10u
C2_L29 10u
C3_L29 4.7u
C4_L29 4.7u
C5_L29 4.7u
C6_L29 2.2u
C7_L29 2.2u
C8_L29 2.2u
C9_L29 2.2u
C10_L29 2.2u

C11_L29 100n
C12_L29 100n
C13_L29 100n
C14_L29 100n
C15_L29 100n
C16_L29 100n
C17_L29 100n
C18_L29 100n
C19_L29 100n
C20_L29 100n
C21_L29 100n
C22_L29 100n

C23_L29 2.2n
C24_L29 2.2n
C25_L29 2.2n
C26_L29 2.2n
C27_L29 2.2n
C28_L29 2.2n
C29_L29 2.2n
C30_L29 470p
C31_L29 470p
C32_L29 220p
C33_L29 220p
C34_L29 220p

LPGBT22-D

LPGBT_V1

VDD1V2_1	J5	VDDRX1V2_4	N3
VDD1V2_2	J6	VDDRX1V2_3	M3
VDD1V2_3	J7	VDDRX1V2_2	L3
VDD1V2_4	J8	VDDRX1V2_1	K3
VDD1V2_5	J9	GNDRX_6	N2
VDD1V2_6	J11	GNDRX_5	N1
VDD1V2_7	K6	GNDRX_4	M2
VDD1V2_8	K7	GNDRX_3	L2
VDD1V2_9	K8	GNDRX_2	K2
VDD1V2_10	K9	GNDRX_1	K1
VDD1V2_11	K11		
VDD1V2_12	K12	VDDTX1V2_4	J3
VDD1V2_13	K13	VDDTX1V2_3	H3
VDD1V2_14	L10	VDDTX1V2_2	G3
VDD1V2_15	L11	VDDTX1V2_1	F3
VDD1V2_16	L12	GNDTX_6	J2
VDD1V2_17	L13	GNDTX_5	J1
VDD1V2_18	M12	GNDTX_4	H2
VDD1V2_19	M13	GNDTX_3	G2
		GNDTX_2	F2
		GNDTX_1	F1
GND_1	G6		
GND_2	G7		
GND_3	G8		
GND_4	G9		
GND_5	G10	VDDA1V2_2	E4
GND_6	G11	VDDA1V2_1	E3
GND_7	G12		
GND_8	G13		
GND_9	H5	GNDA_2	G4
GND_10	H6	GNDA_1	F4
GND_11	H7		
GND_12	H8		
GND_13	H9	VDDF2V5_2	K10
GND_14	H10	VDDF2V5_1	J10 VDDF2P5_LPGBT22
GND_15	H11		
GND_16	H12	VREF_2	J4
GND_17	H13	VREF_1	H4
GND_18	J12		
GND_19	J13		

LPGBT22-E

LPGBT_V1

LPGBT14-24_RSTB	D3	RSTB	READY R2 LPGBT22_RDY
LPGBT22_ADR0	E9	ADR0	
LPGBT22_ADR1	F9	ADR1	
LPGBT22_ADR2	E8	ADR2	SLSDA U3
LPGBT22_ADR3	F8	ADR3	SLSCL U2
LPGBT22_MOD0	G5	MODE0	
LPGBT22_MOD1	K5	MODE1	
LPGBT22_MOD2	P3	MODE2	
LPGBT22_MOD3	P2	MODE3	
MCLK22N	P1	REFCLKN	
MCLK22P	R1	REFCLKP	
LPGBT22_BOOTCNF1	T3	BOOTCNF1	
LPGBT22_LOCKMODE	E1	LOCKMODE	
LPGBT22_STATEOVRD	E2	STATEOVRD	
LPGBT22_PORDIS	T1	PORDIS	
LPGBT22_BOOTCNF0	U1	BOOTCNF0	

LPGBT13_M0SDA

LPGBT13_M0SCL

U35 LTST-C190GKT

100 R_106

VTRX+_2P5

U1_S29

1k R_136

LPGBT22_VDD

R4_L29 2.2k
R5_L29 2.2k

LPGBT_M2SDA_L29
LPGBT_M2SCL_L29

LPGBT22_VDD

R6_L29 2.2k
R7_L29 2.2k

LPGBT_M1SDA_L29
LPGBT_M1SCL_L29

LPGBT22_VDD

R8_L29 2.2k
R9_L29 2.2k

LPGBT_M0SDA_L29
LPGBT_M0SCL_L29

LPGBT22_VDD

LPGBT22-G

LPGBT_V1

M2_S29 TEST_MICROPAD
M1_S29 TEST_MICROPAD

HSINN	M1	HSOUTP	H1 LPGBT22_HSOUTP
HSINP	L1	HSOUTN	G1 LPGBT22_HSOUTN

T123	MMM_TP	LPGBT_M2SDA_L29
T118	MMM_TP	LPGBT_M2SCL_L29
T119	MMM_TP	LPGBT_M1SDA_L29
T120	MMM_TP	LPGBT_M1SCL_L29
T121	MMM_TP	LPGBT_M0SDA_L29
T122	MMM_TP	LPGBT_M0SCL_L29

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CHECKED:	jb	DATED:	<Checked Date>
QUALITY CONTROL:	jb	DATED:	<QC Date>
RELEASED:	jb	DATED:	<Release Date>

COMPANY: Nevis Laboratories of Columbia University

TITLE: FEB2 prototype v2.0

CODE:	SIZE:	DRAWING NO:	REV:
jb2023	C	35	v2.0

SCALE: <Scale> SHEET: 125 OF 154

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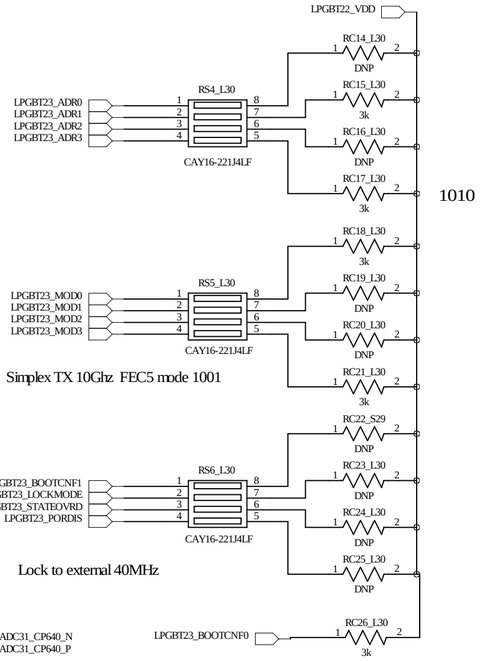
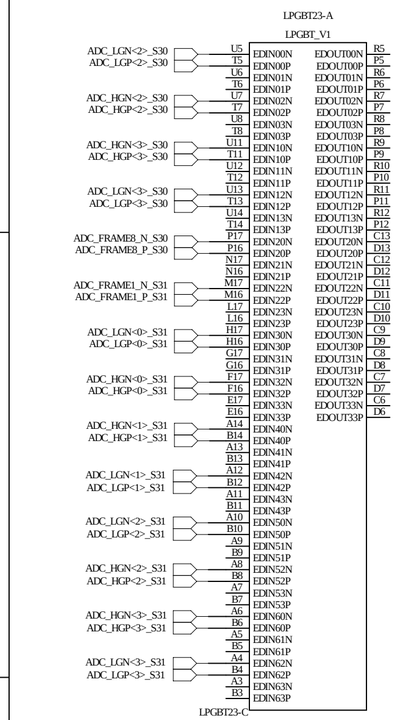
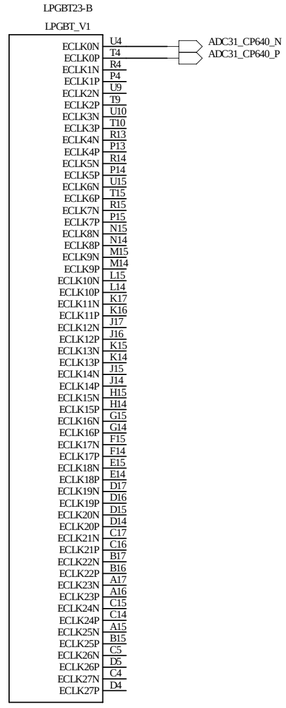
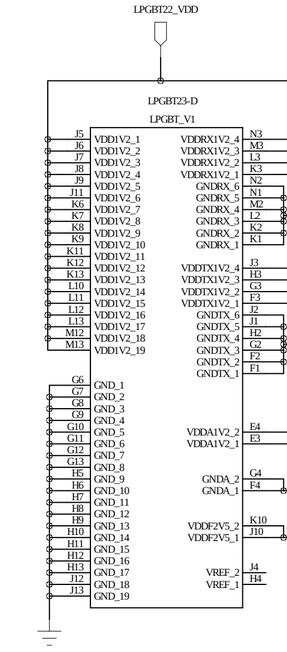
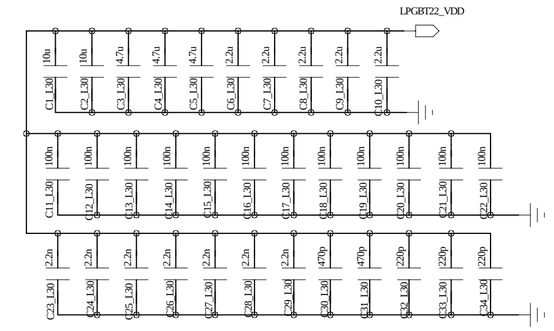
LTR	ECO NO:	APPROVED:	DATE:

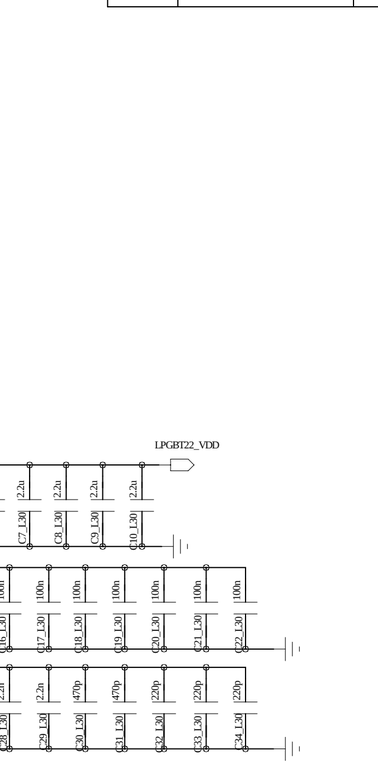


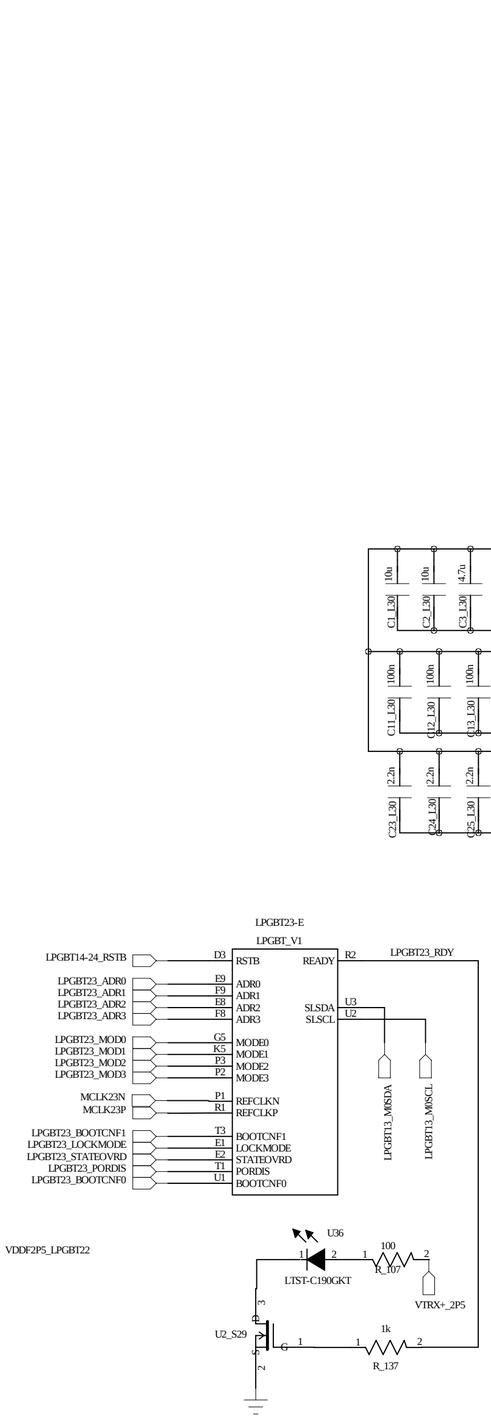


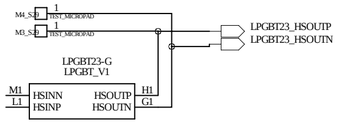


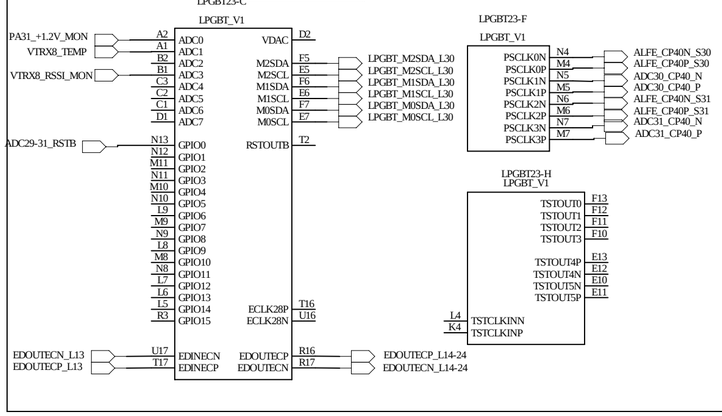












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RELEASED: jb	DATED: <Release Date>
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SCALE: <Scale>	SHEET: 126 OF 154

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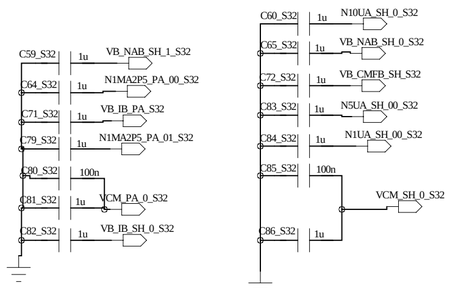

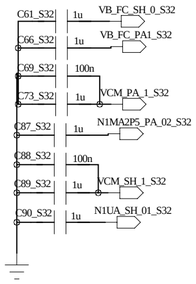

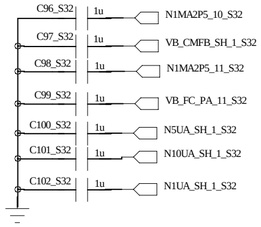

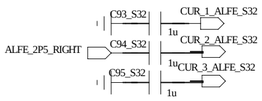

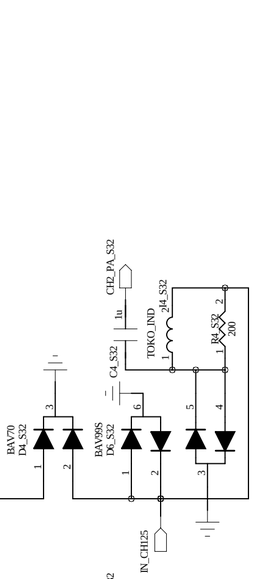

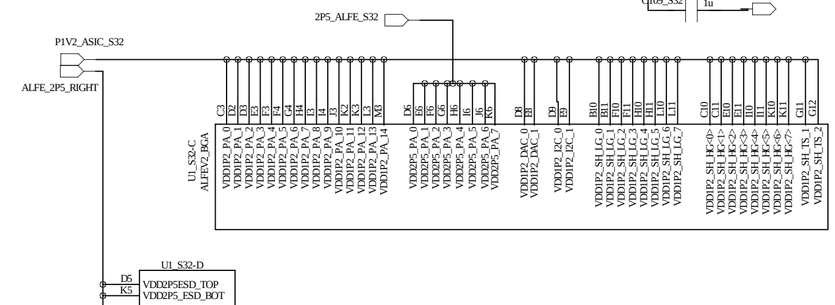

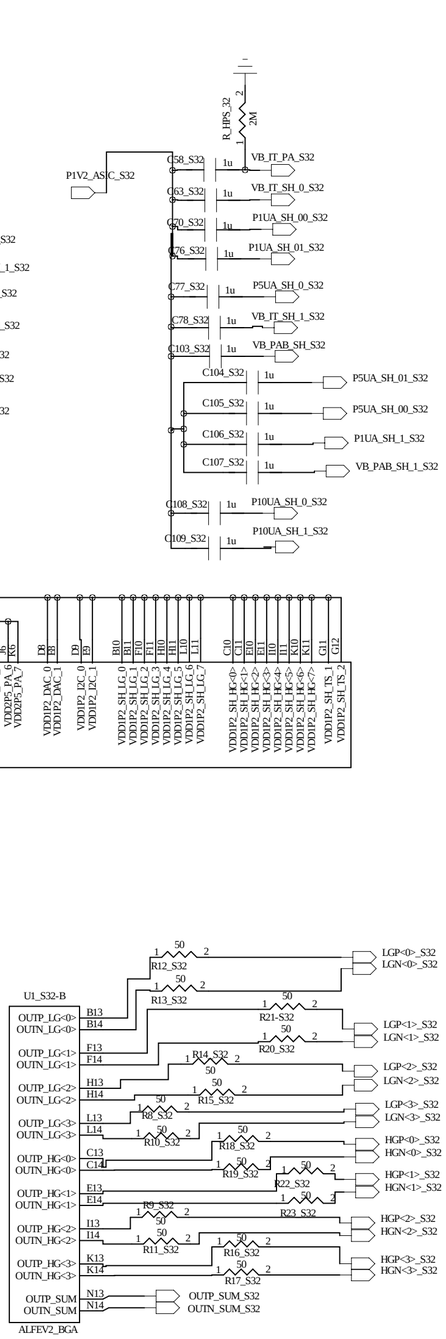

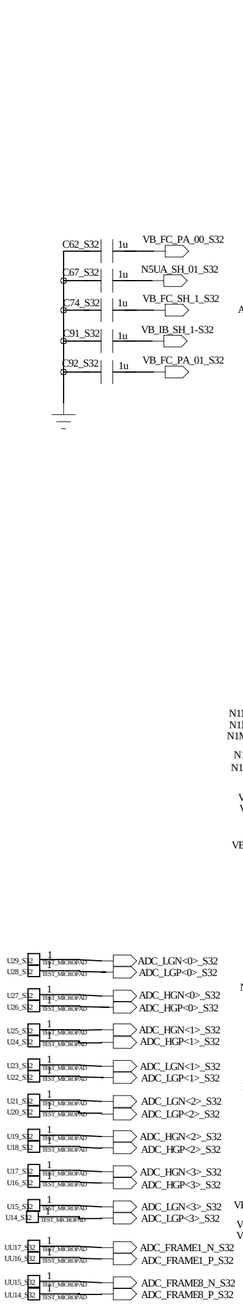

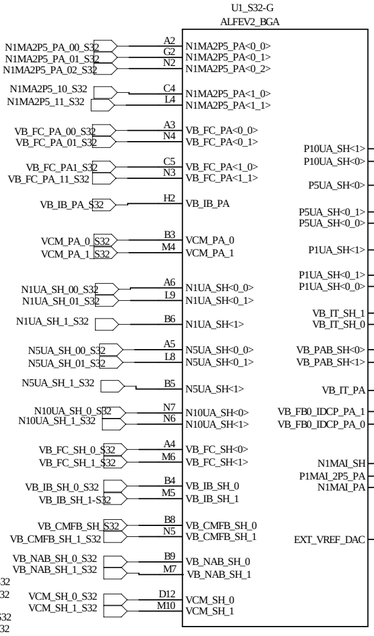

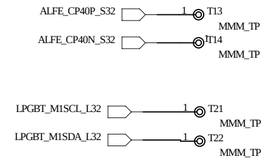

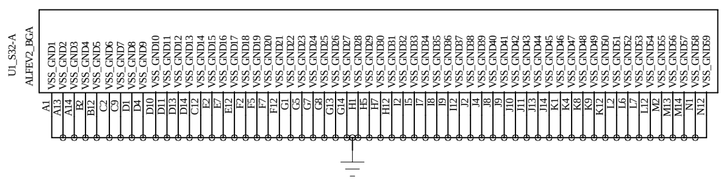

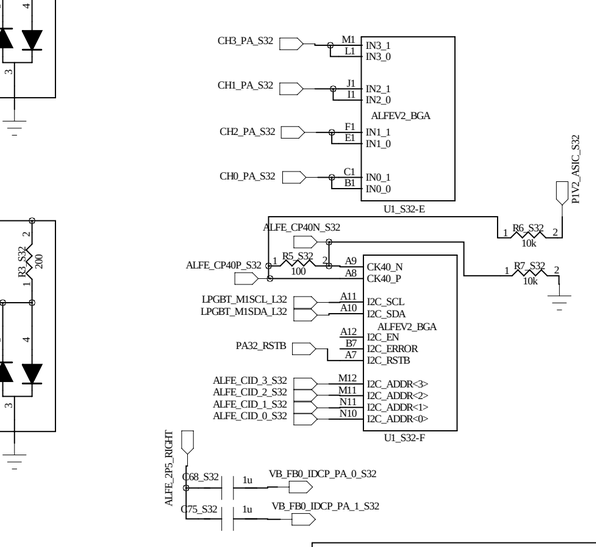

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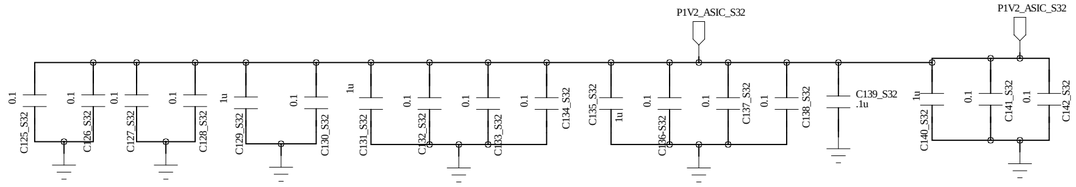

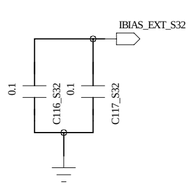

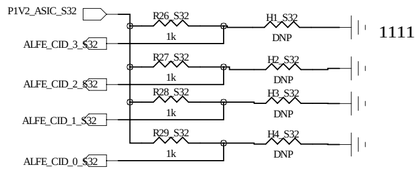

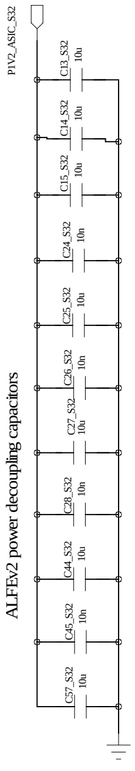

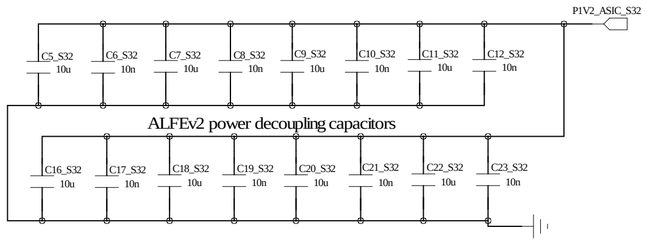

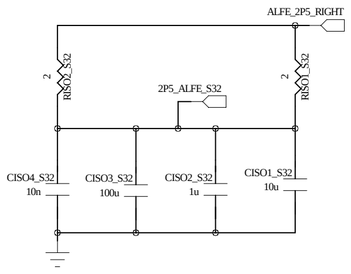

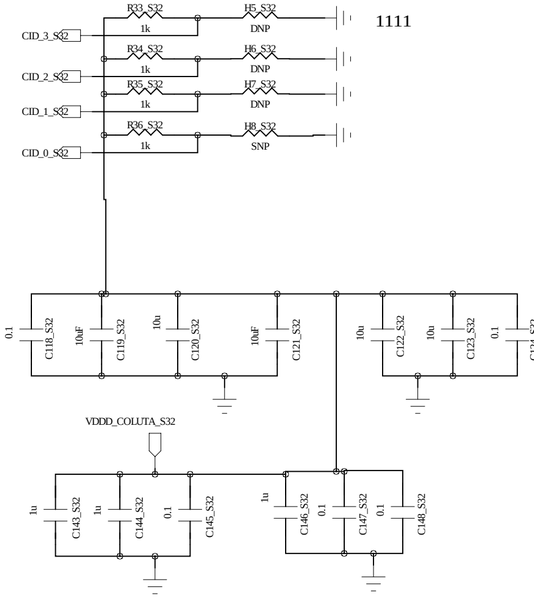

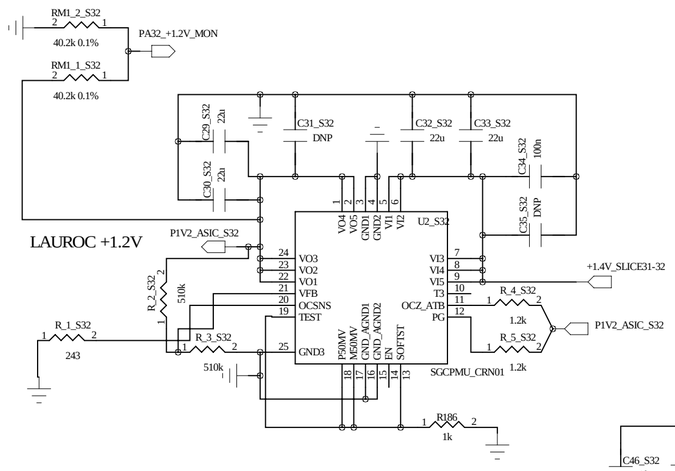

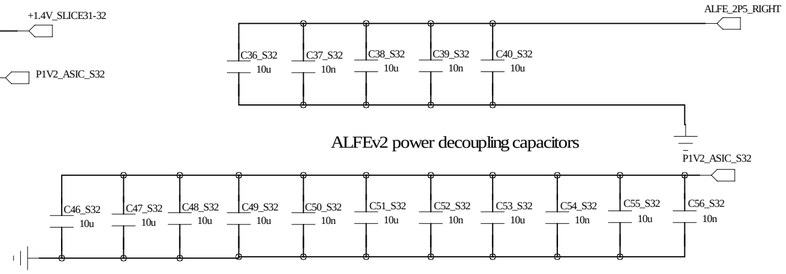

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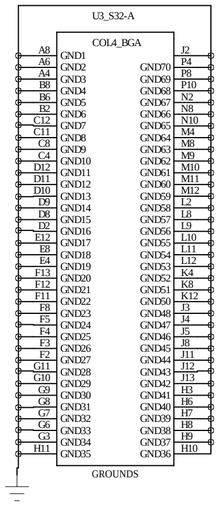

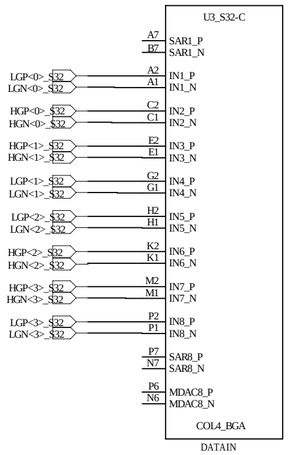

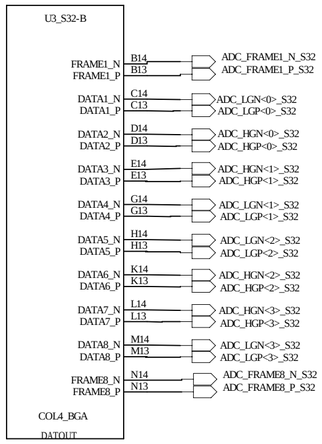

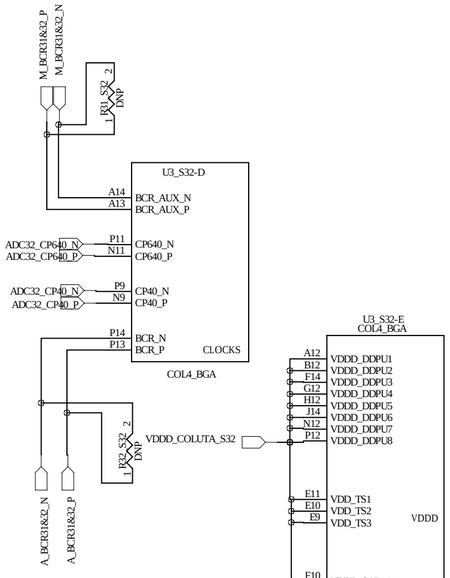

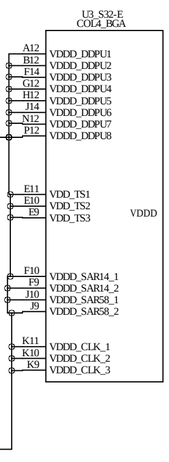

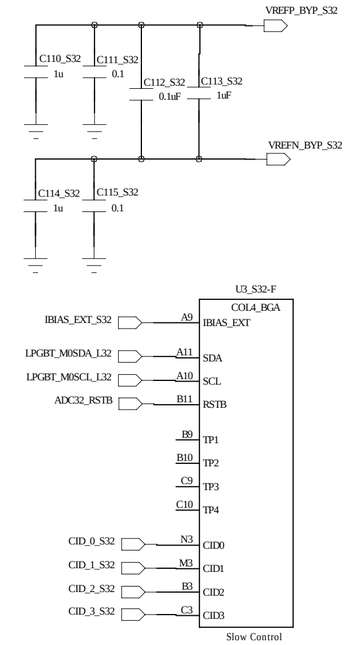

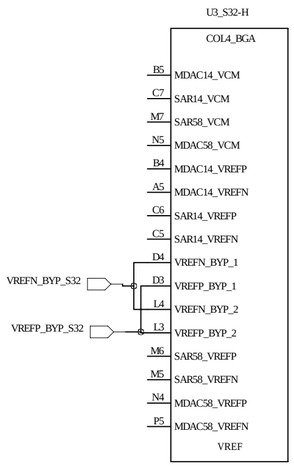

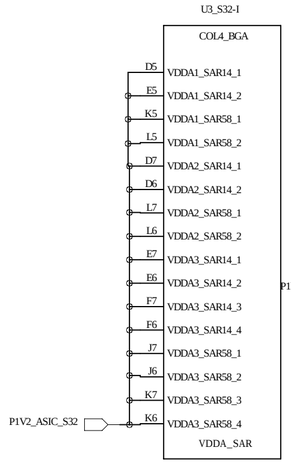

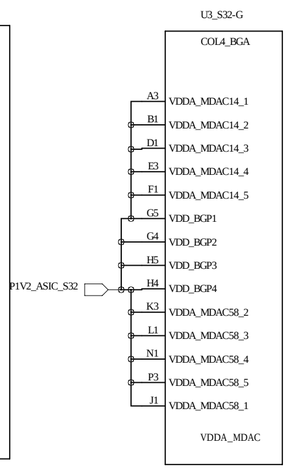

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Simplex TX 10GHz FEC5 mode 1001

Lock to external 40MHz

1011

LAUROC +1.2V

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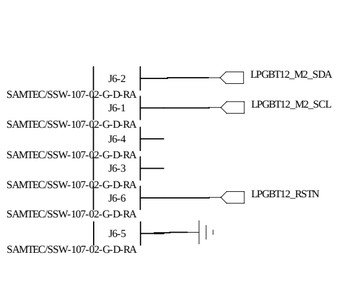

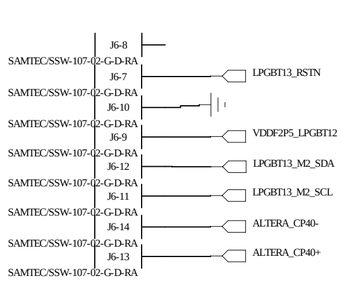

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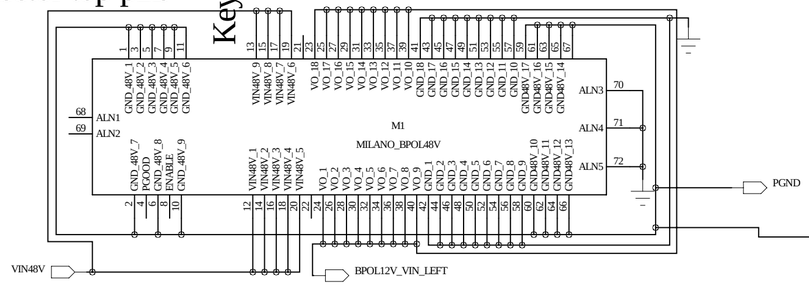
Connector top pins



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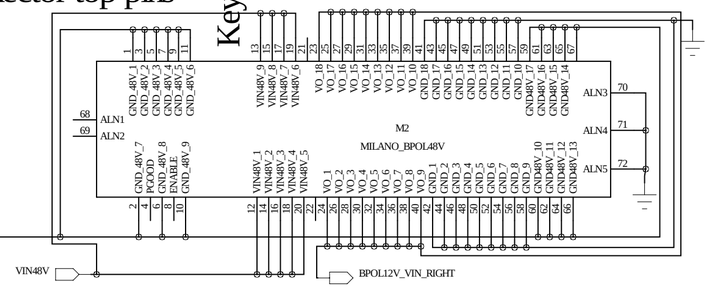
Connector top pins



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Vout=Vref (R8+R10)/R10

Vout=0.63V(499k+392k)/392k=1.43V

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Drawn by	P. Antoszczuk 01/09/2021
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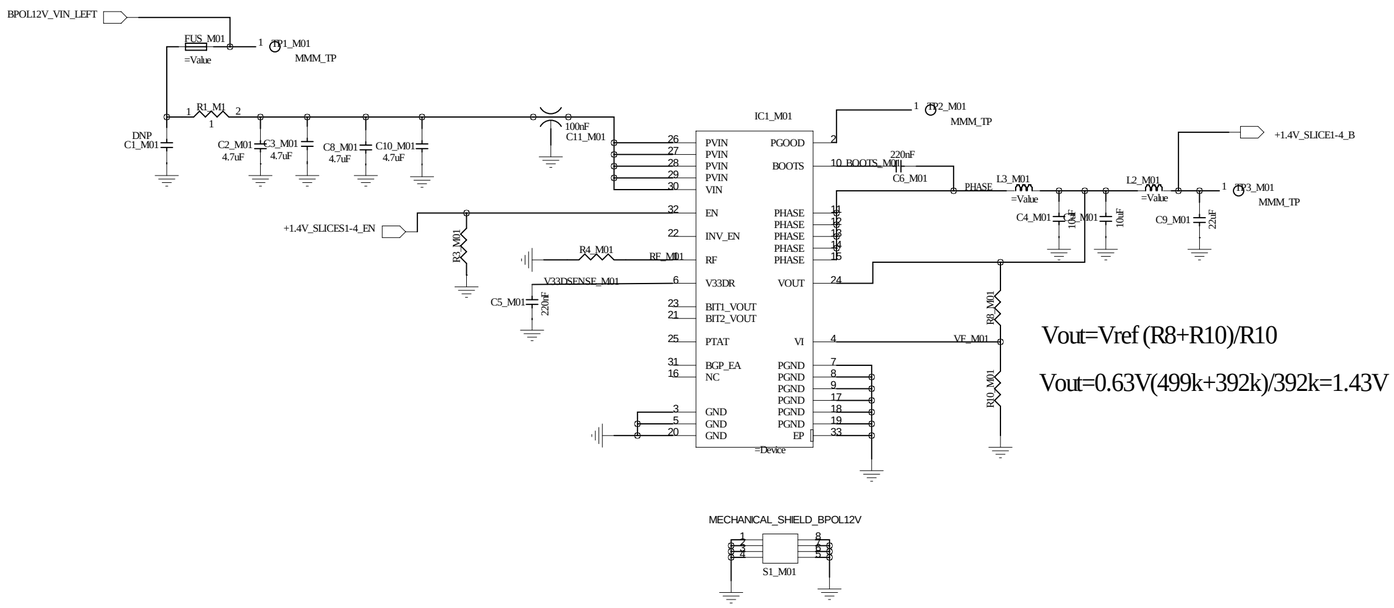

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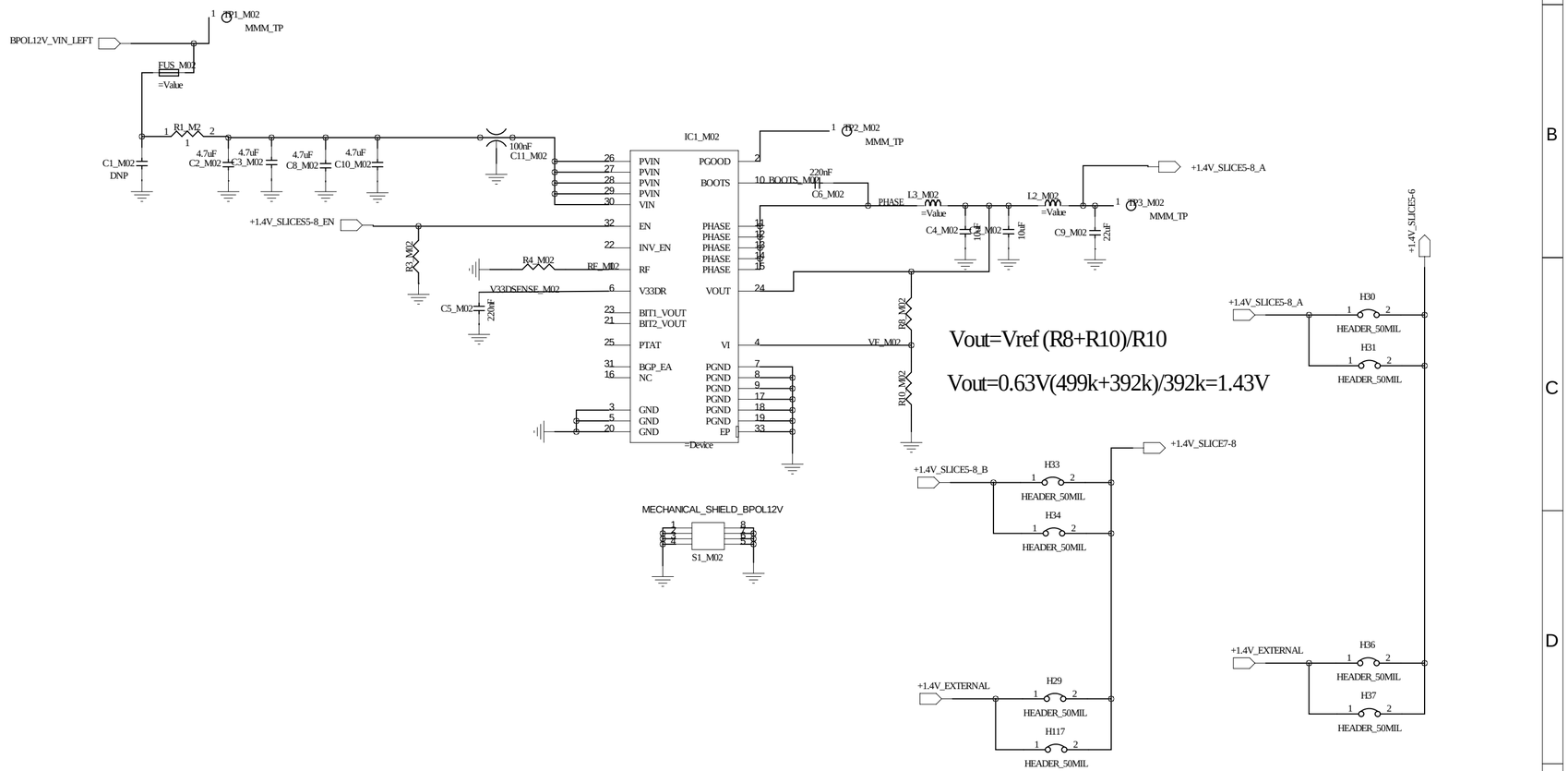

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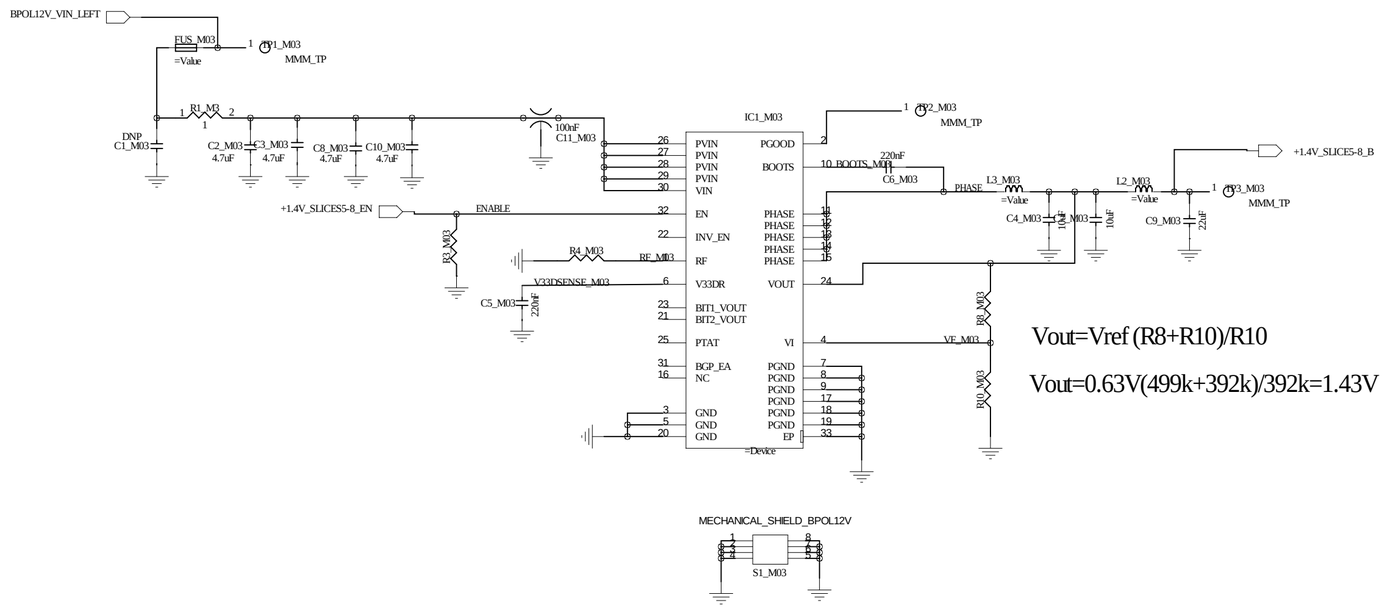

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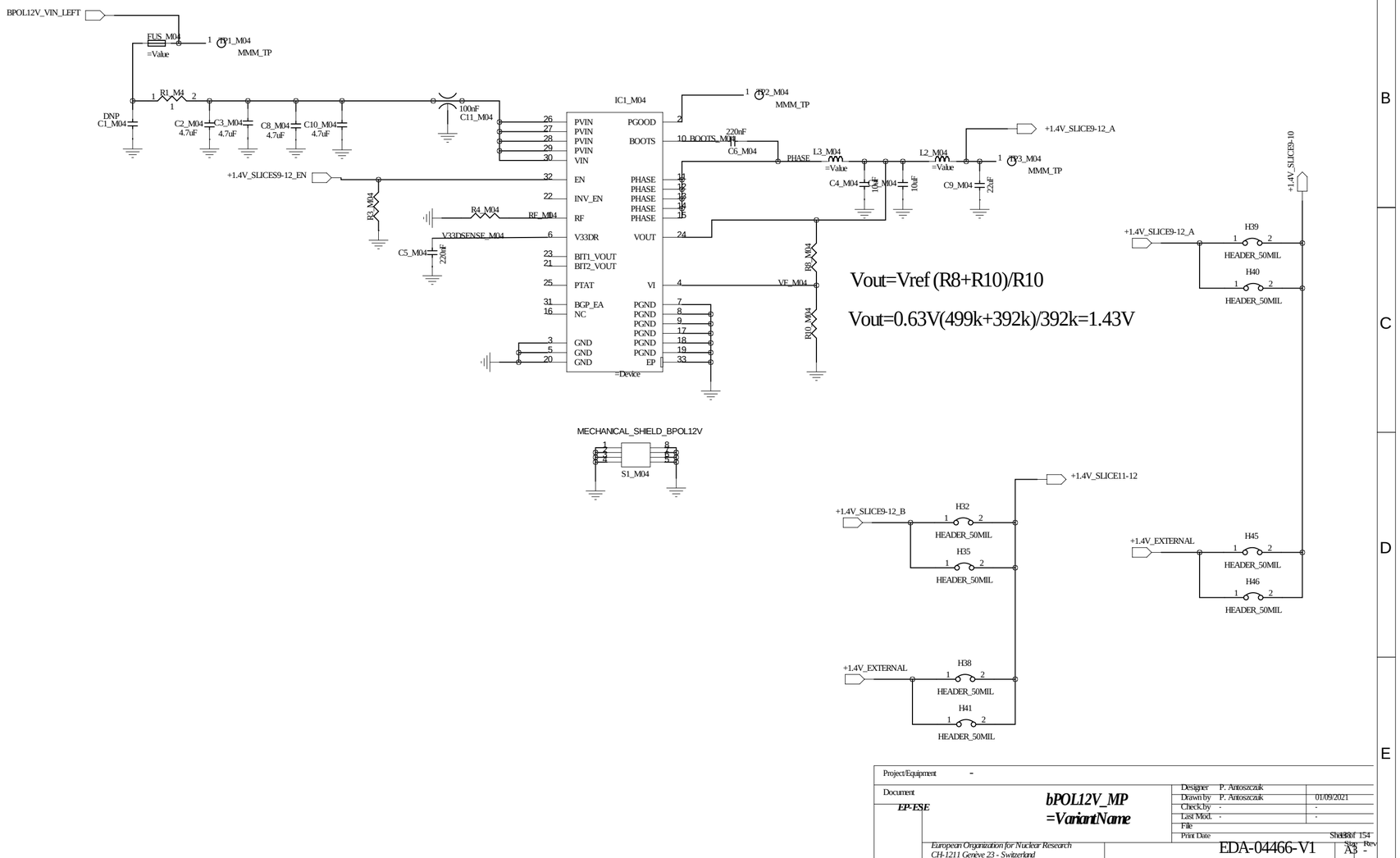

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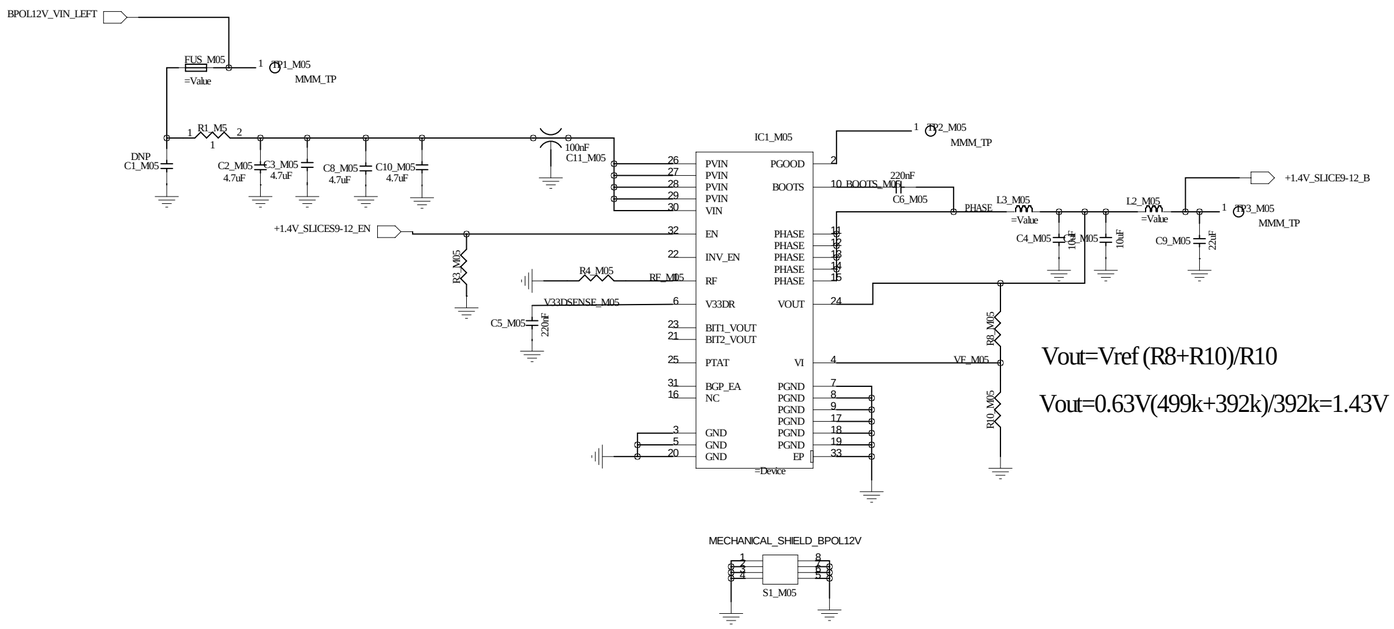

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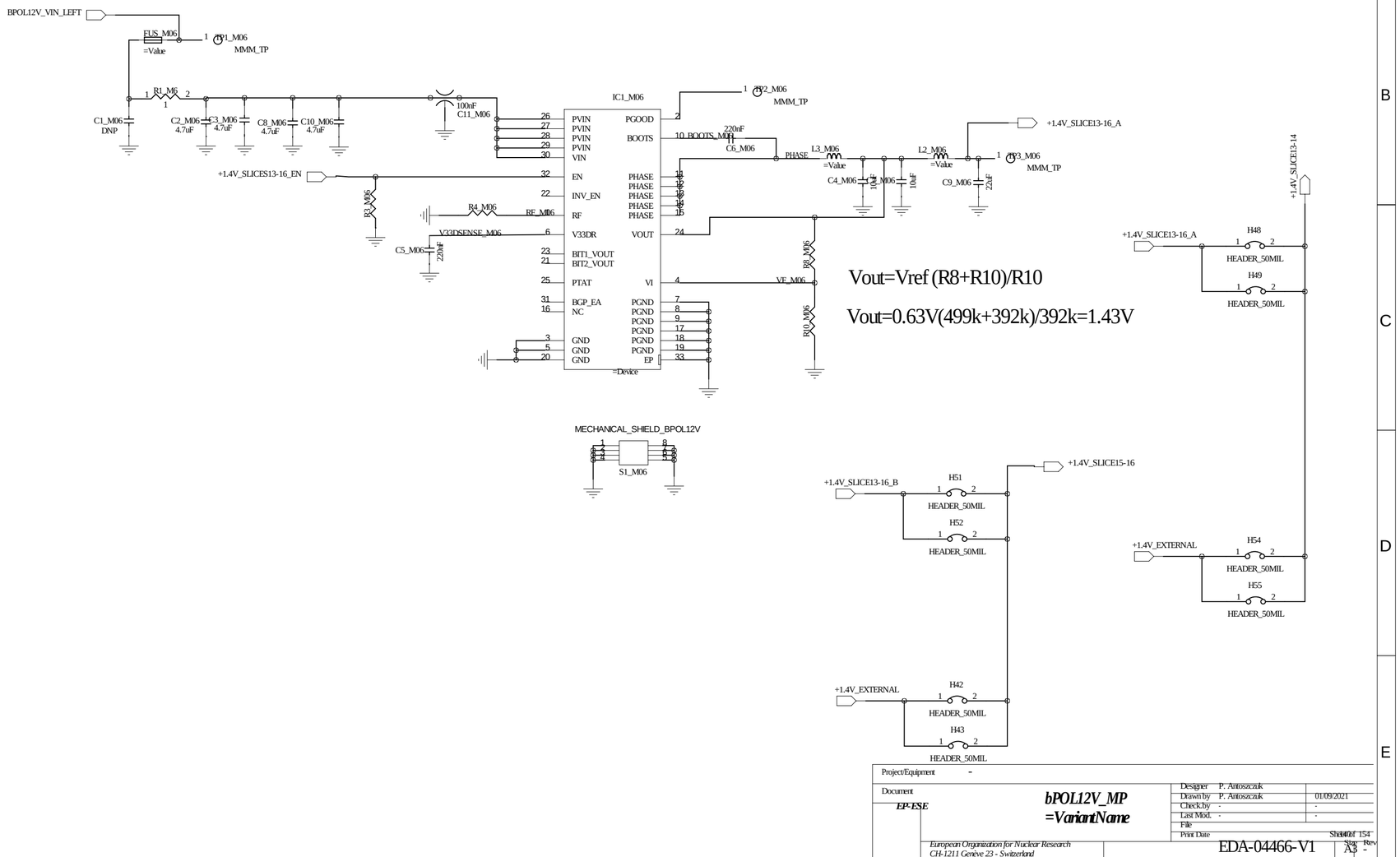

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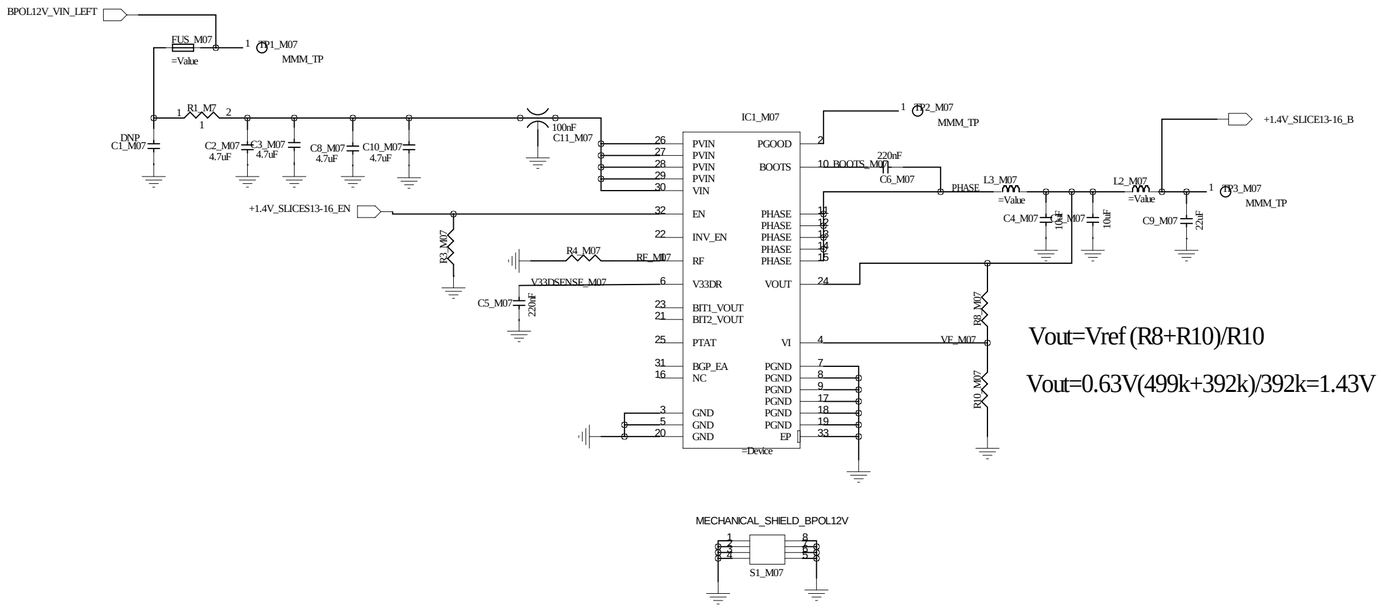

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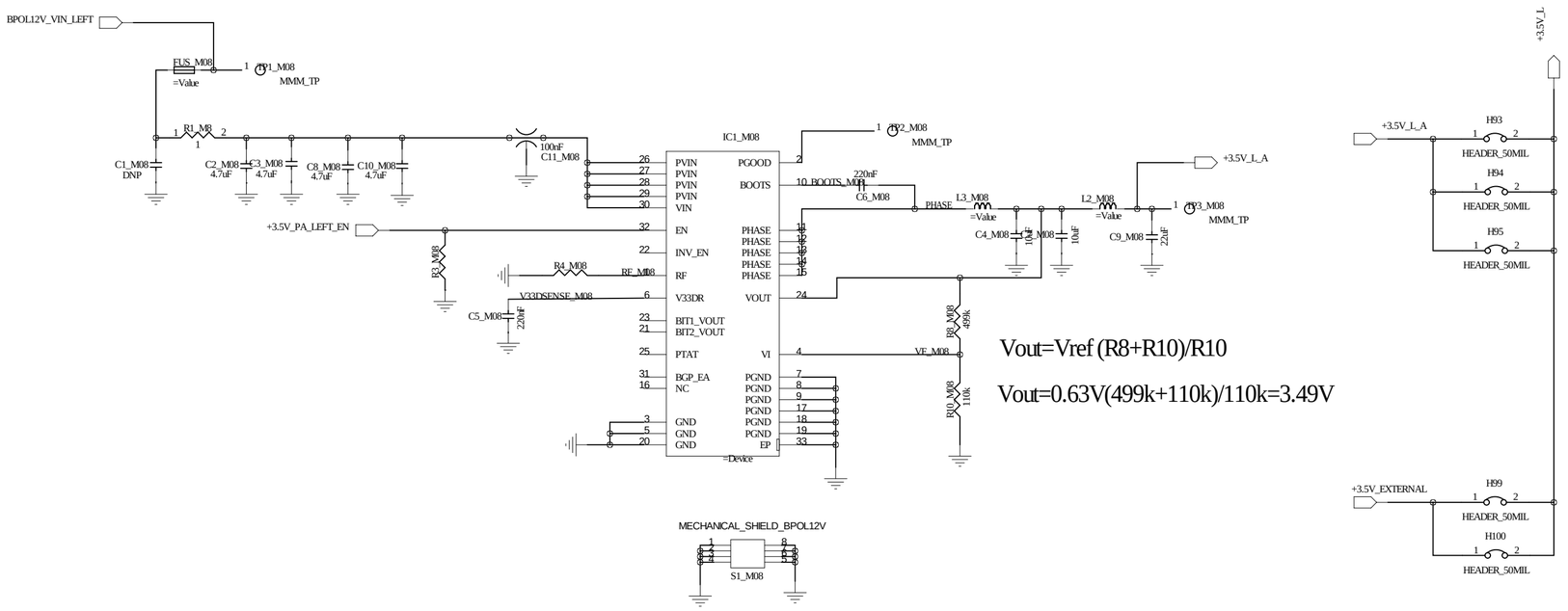

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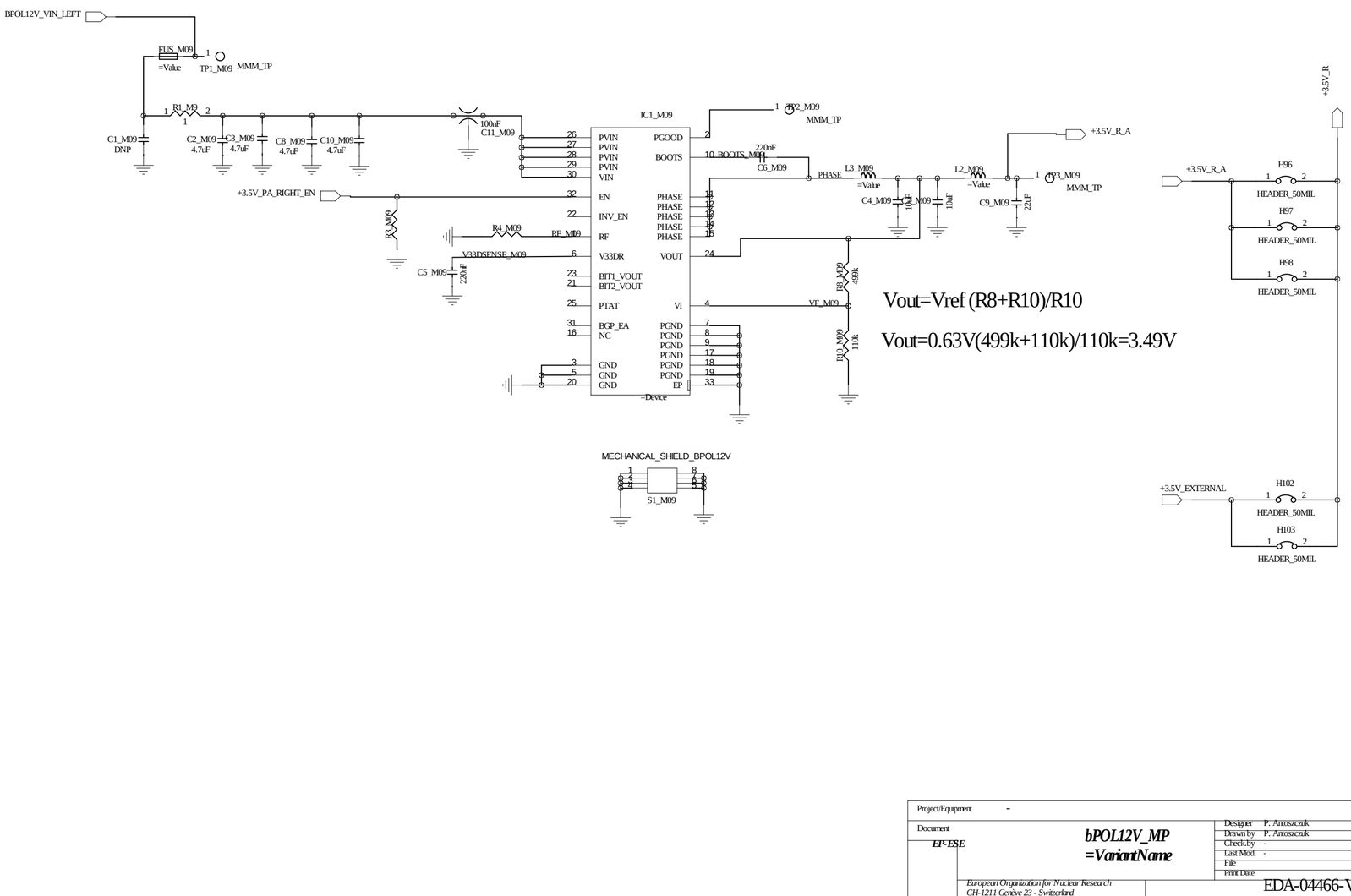

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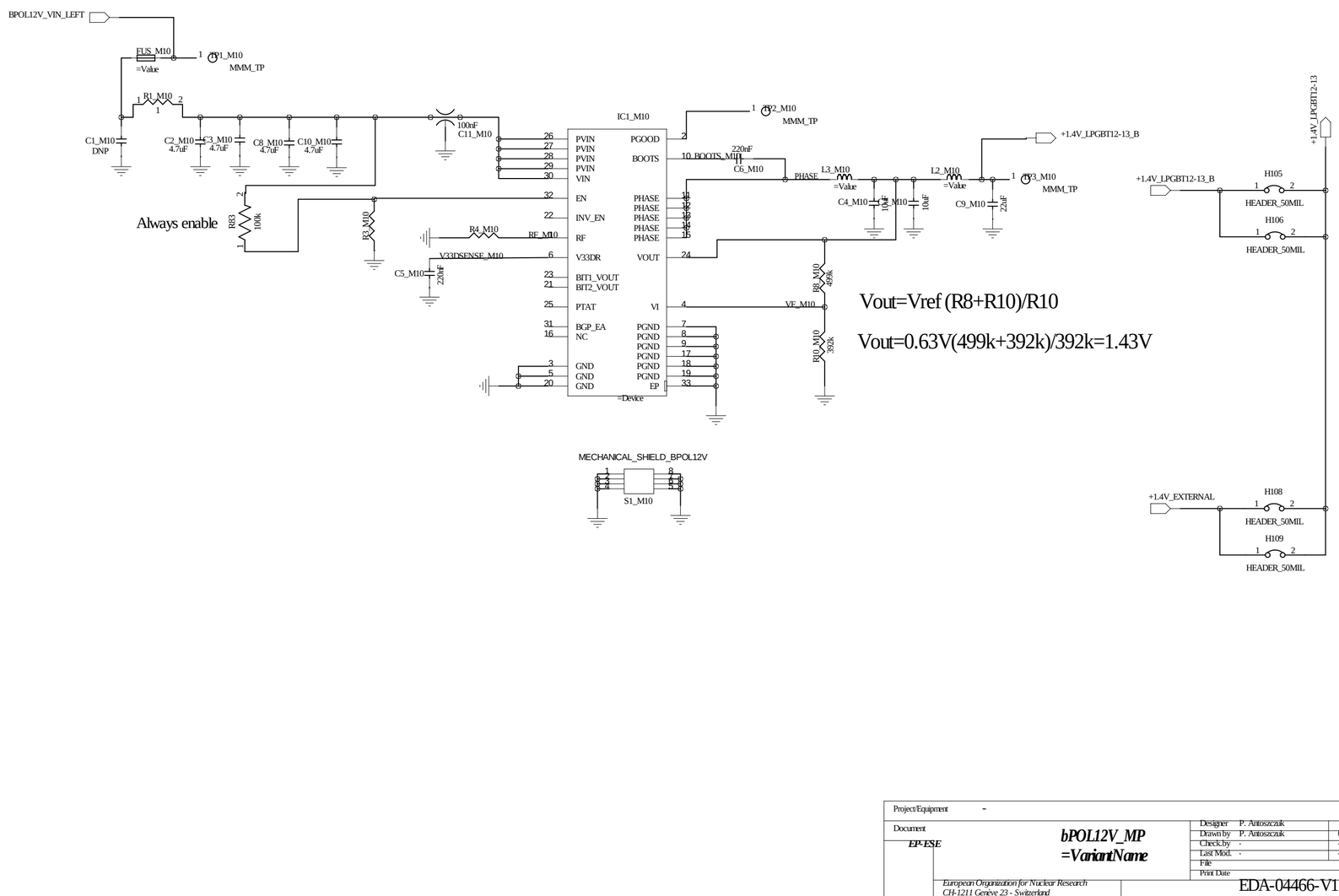

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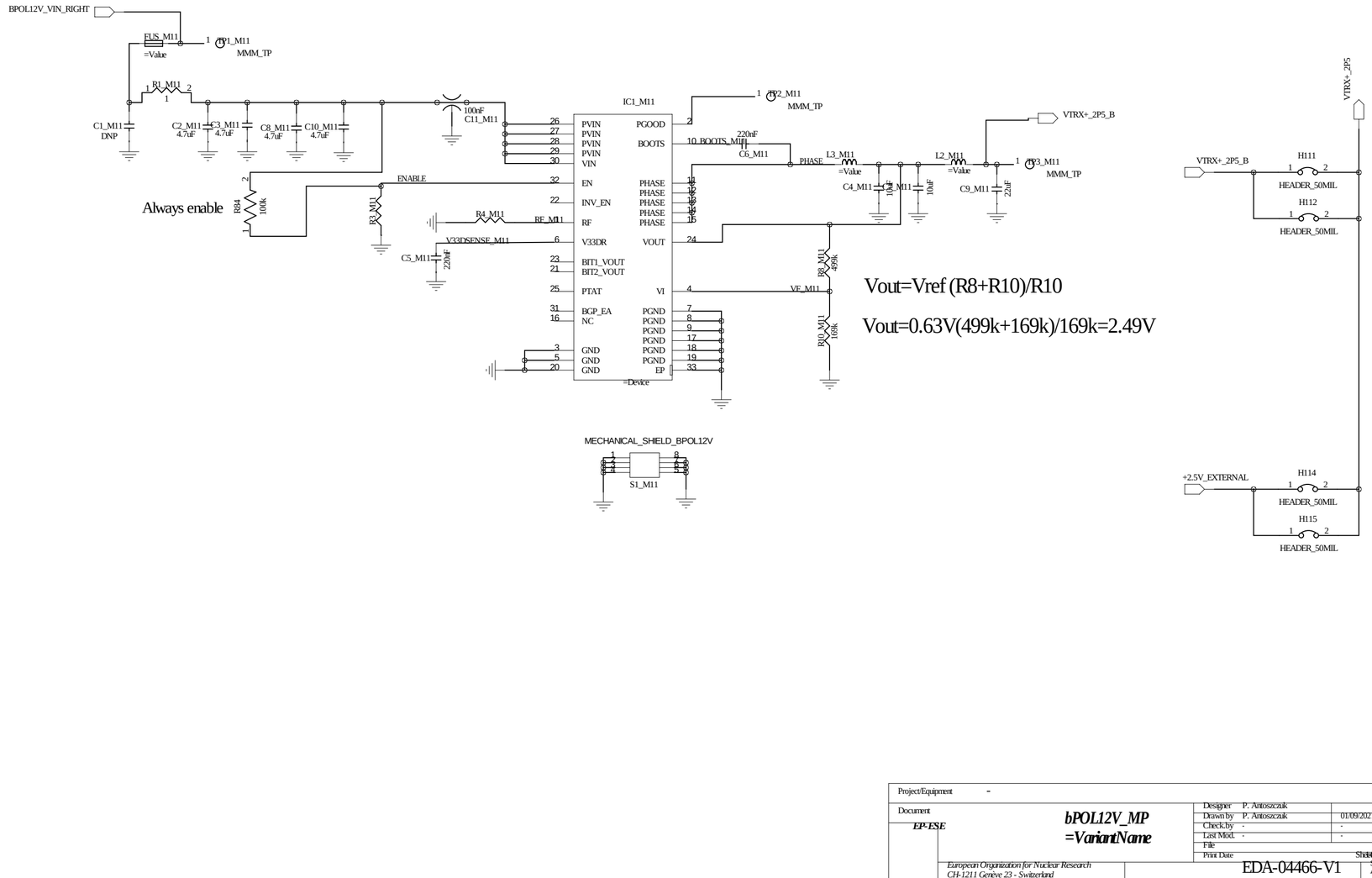

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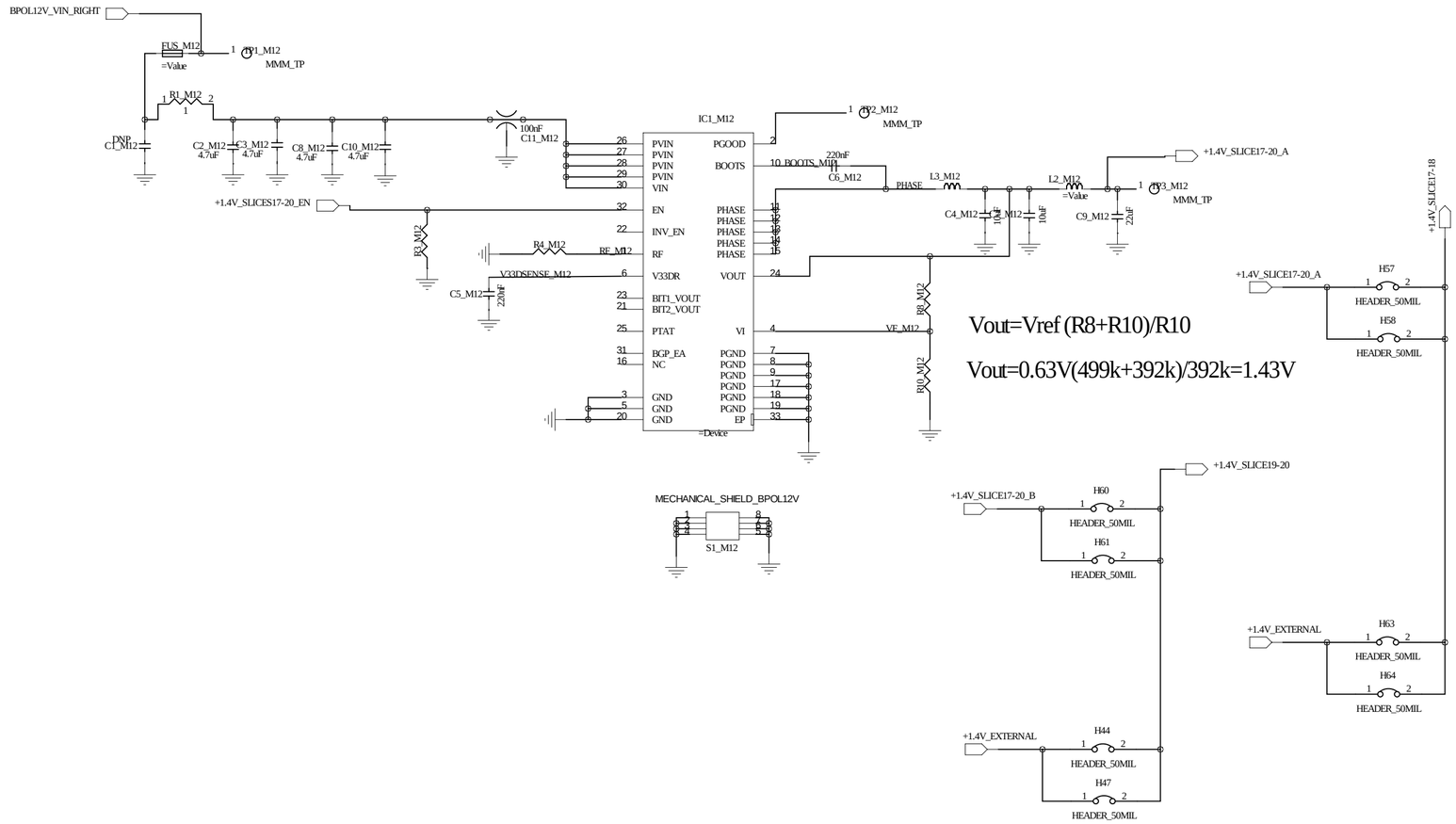

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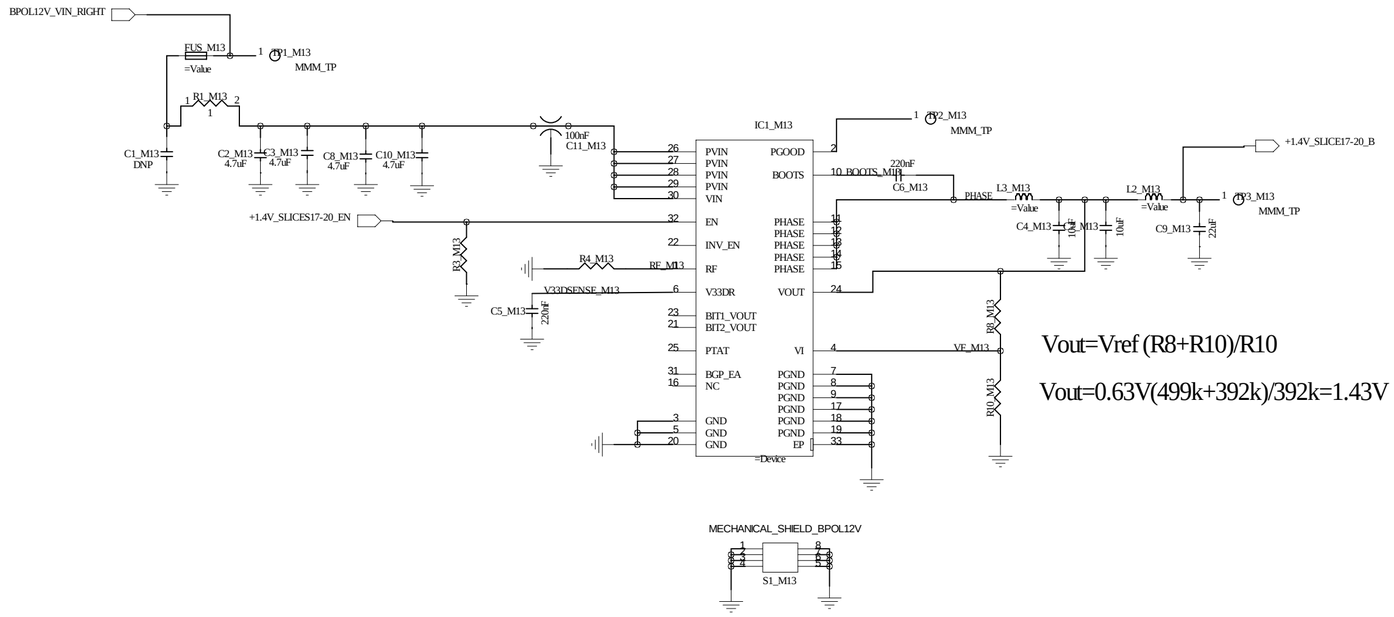

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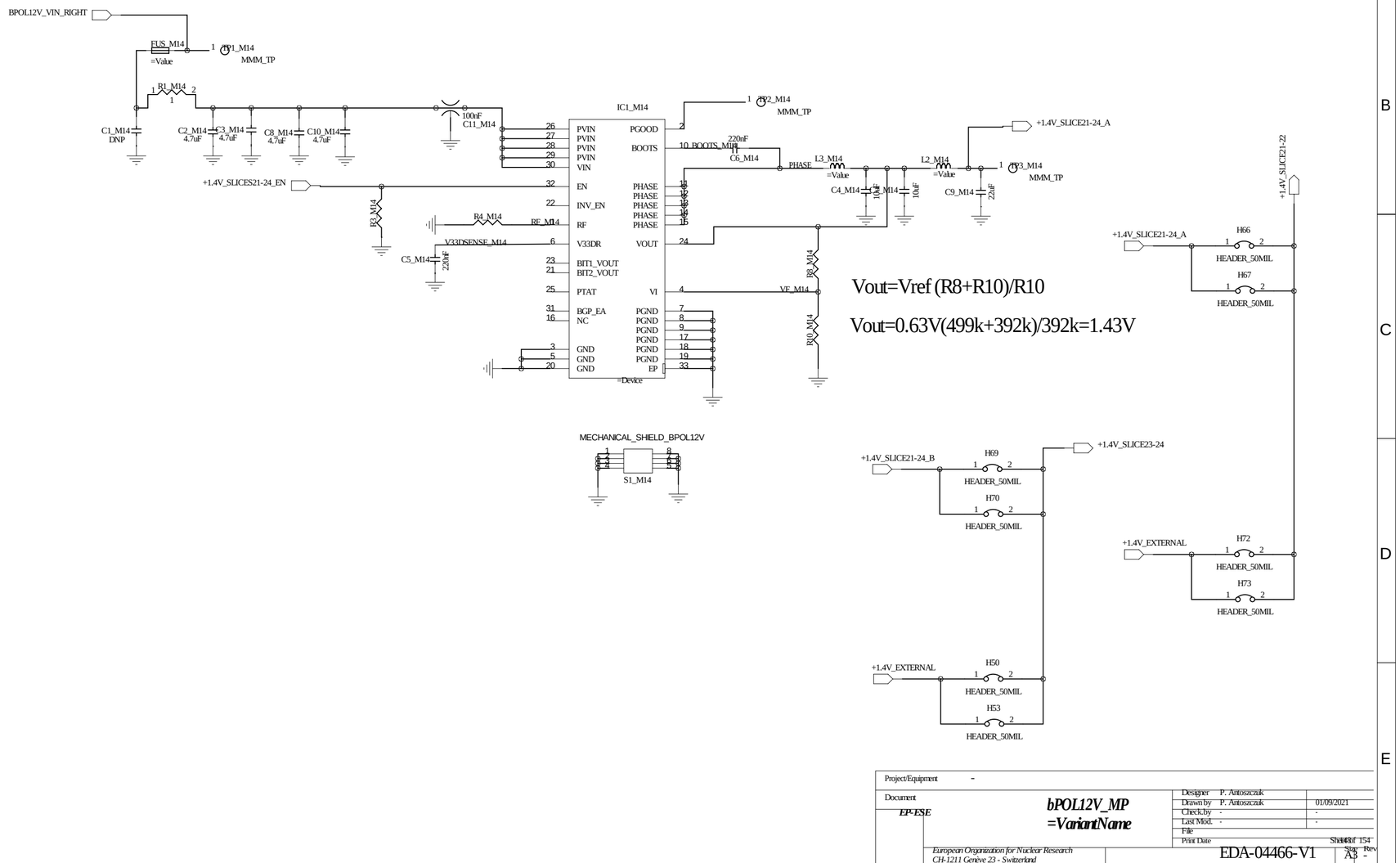

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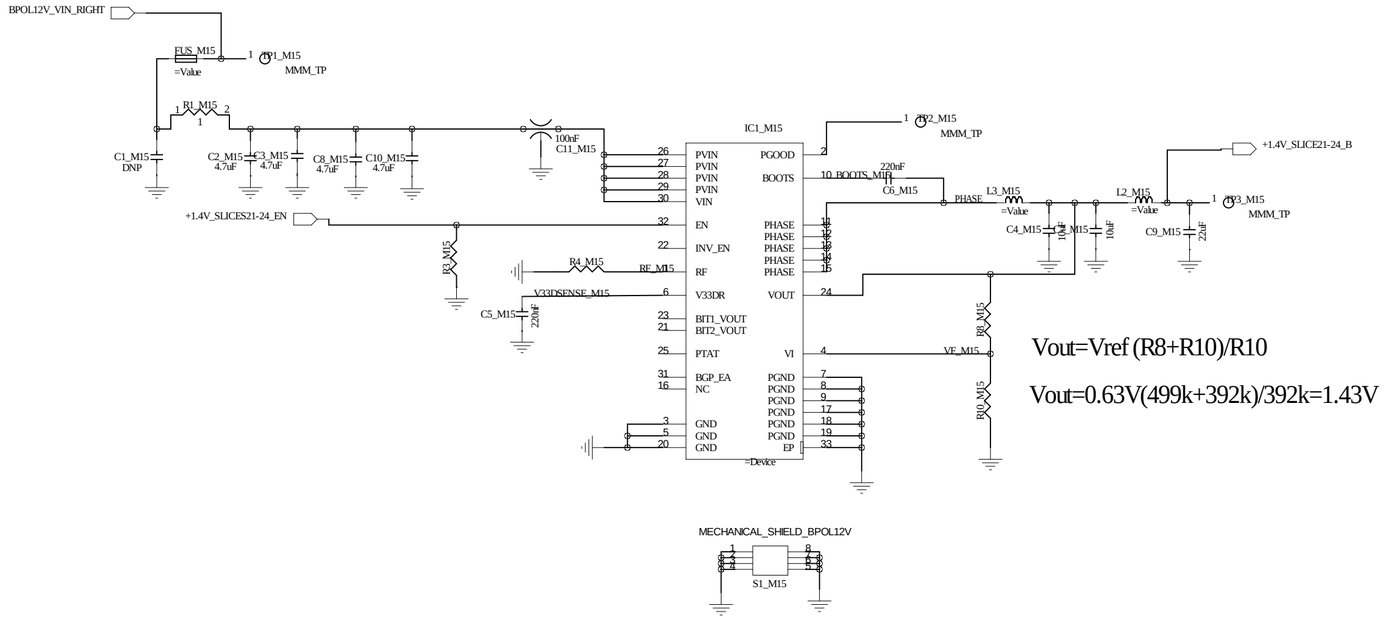

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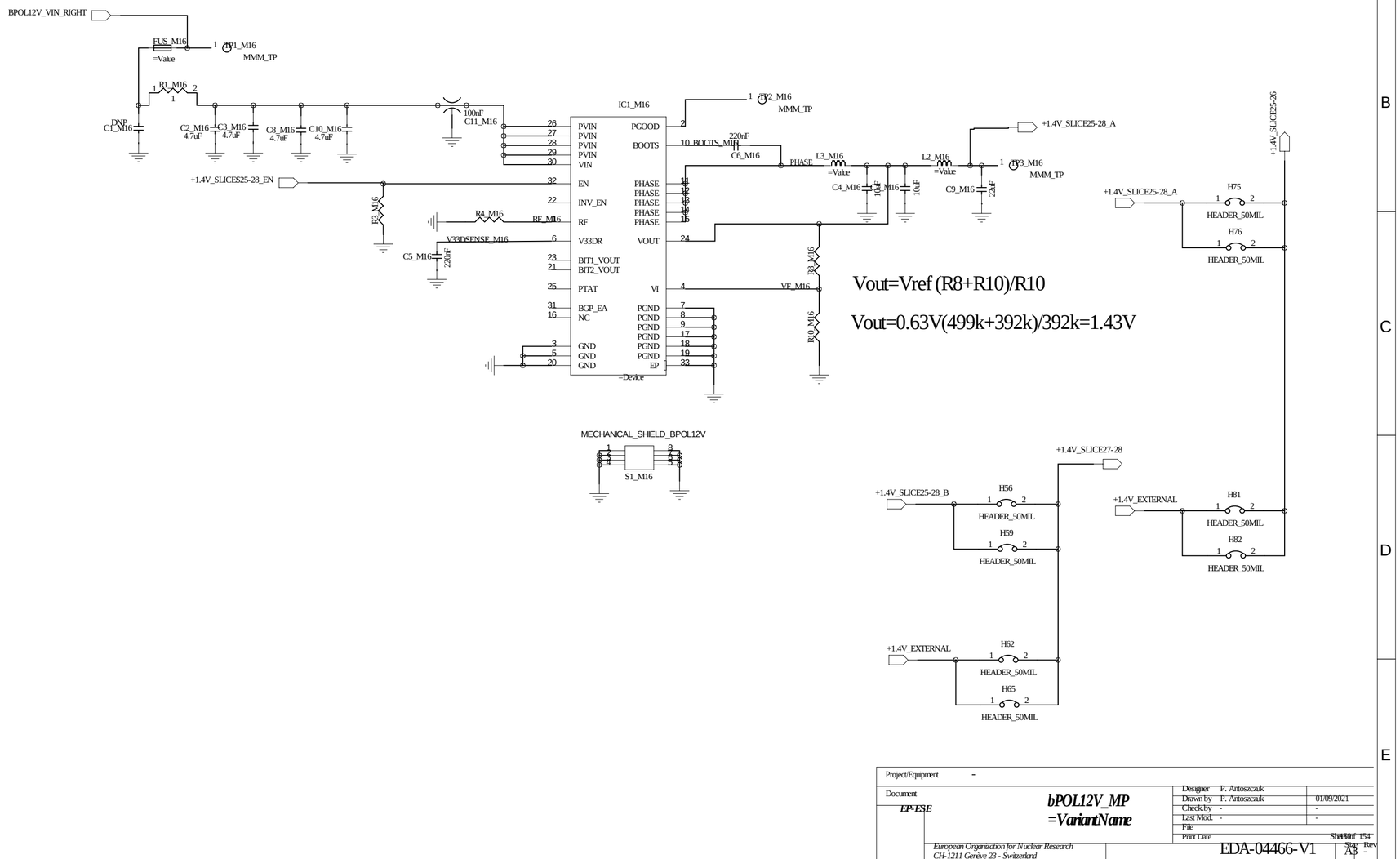

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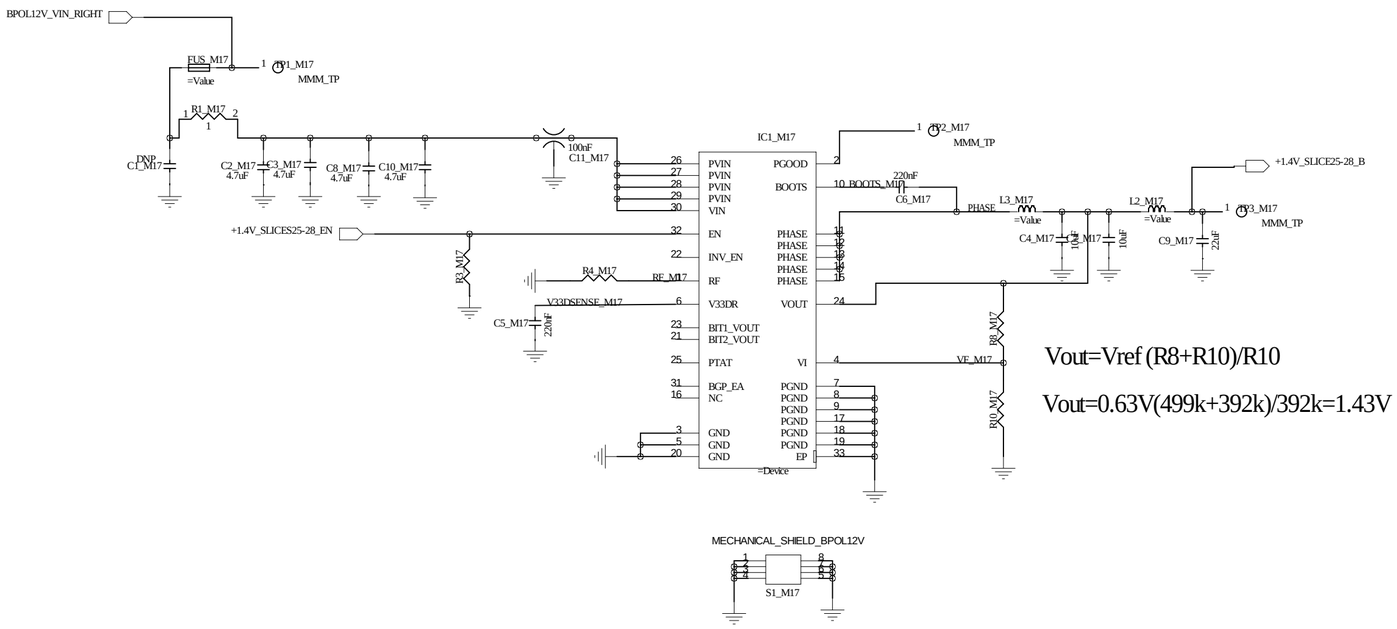

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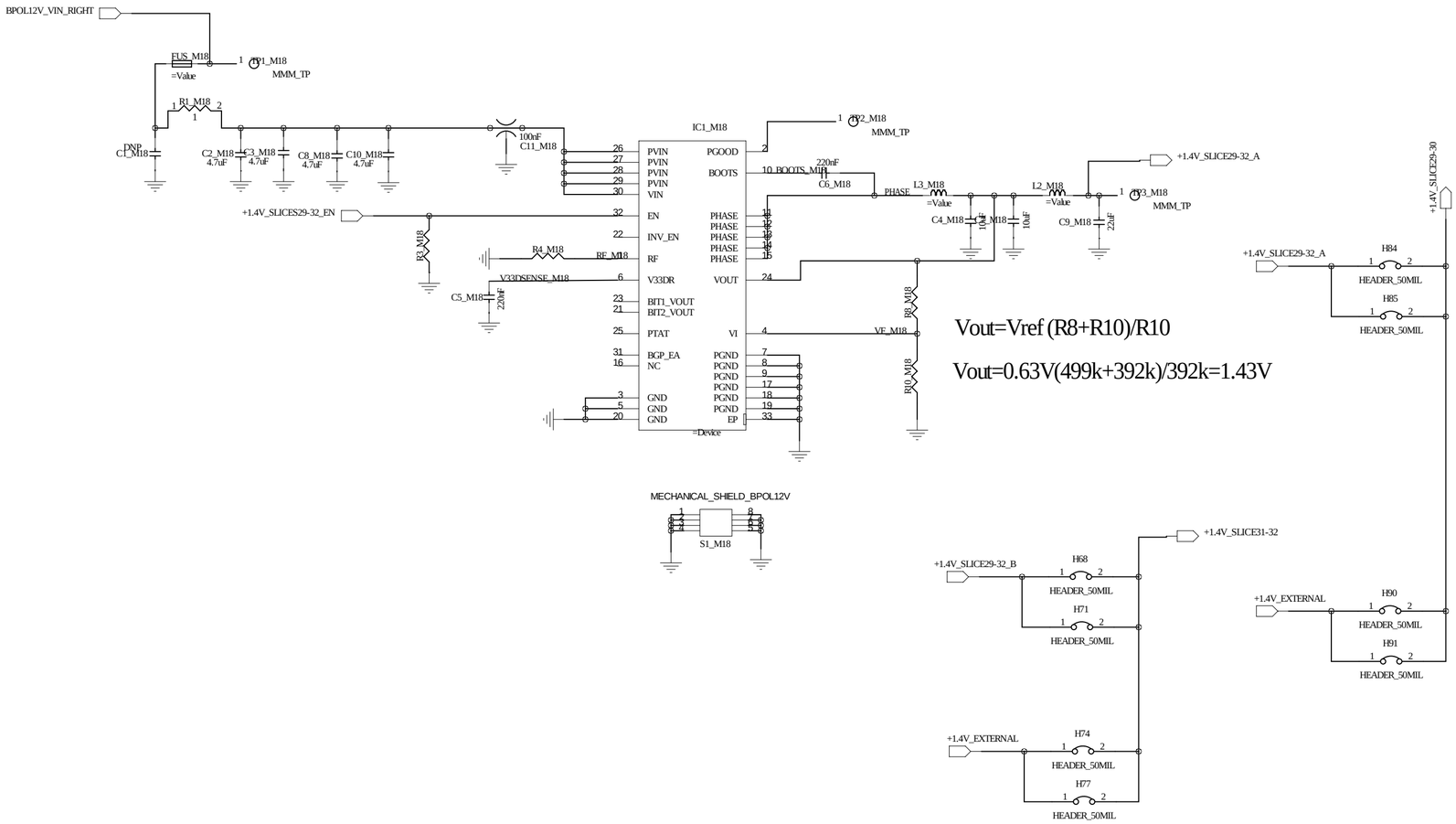

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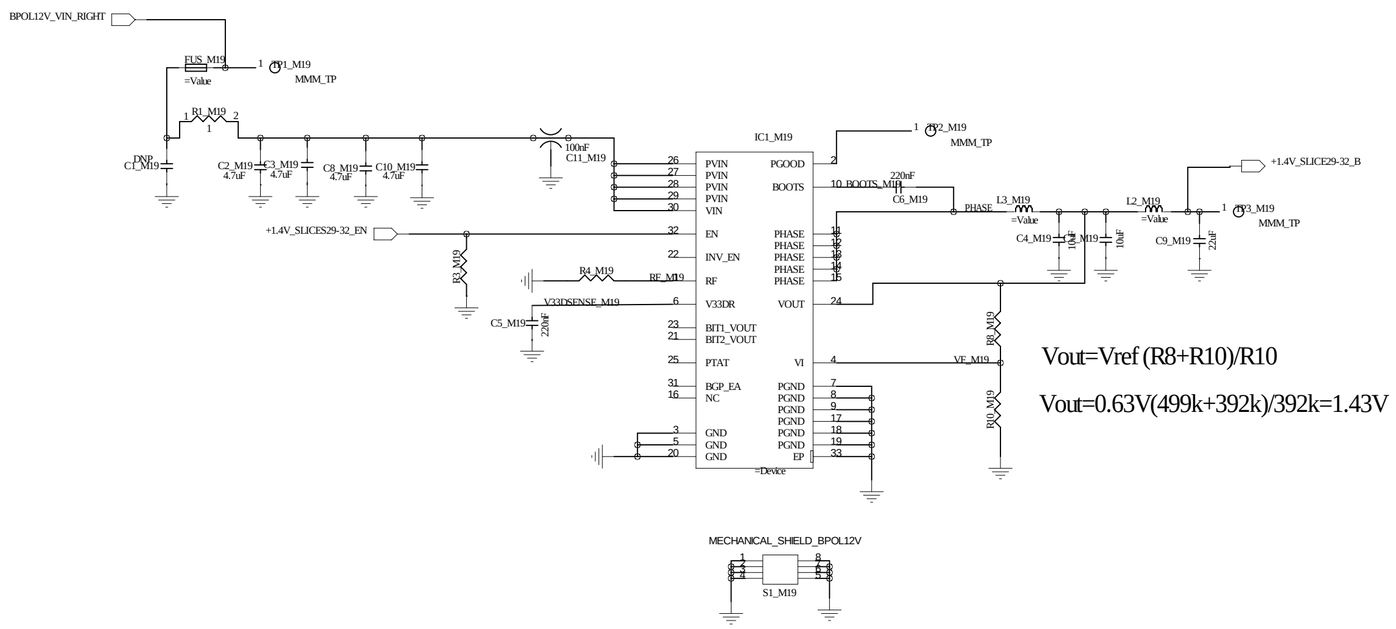

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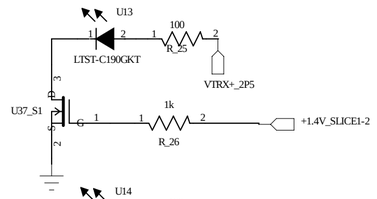

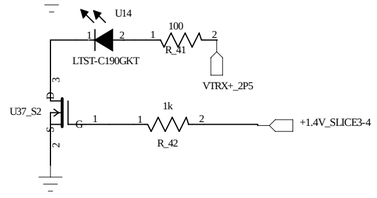

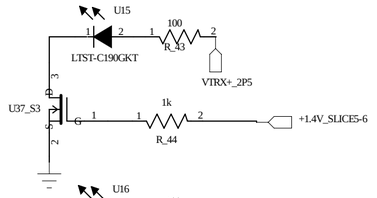

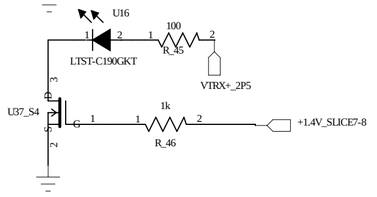

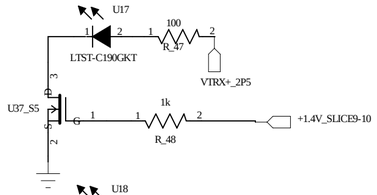

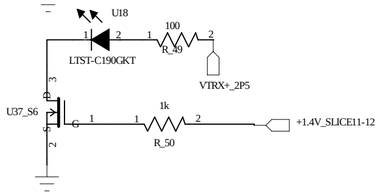

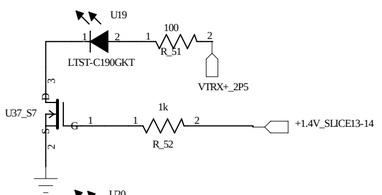

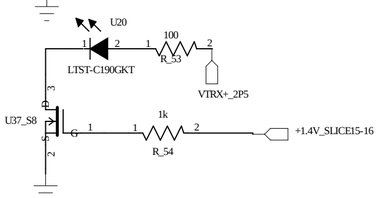

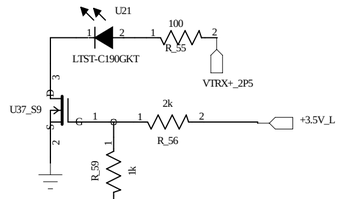

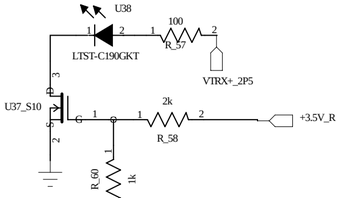

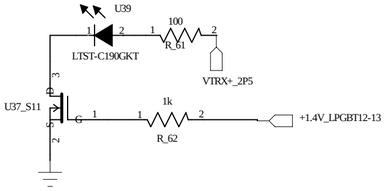

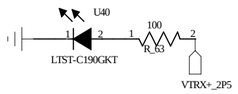

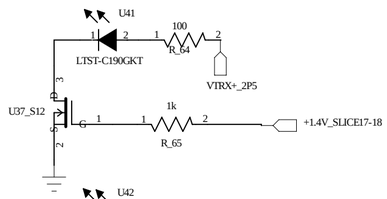

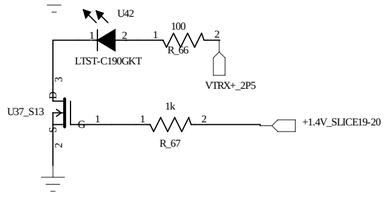

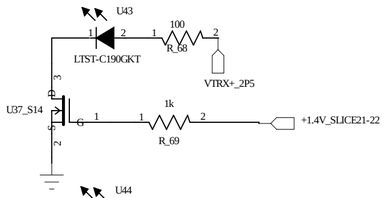

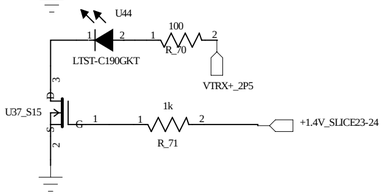

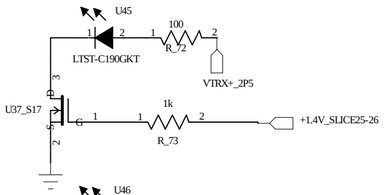

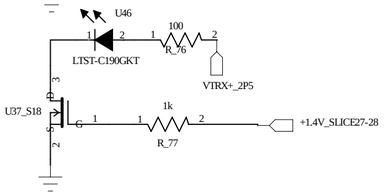

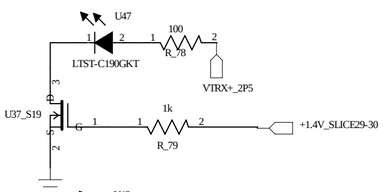

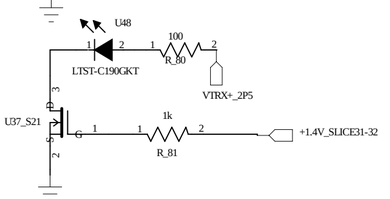

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